



Air Track Inc

Energy Efficient - Intelligent HVAC/R Solutions

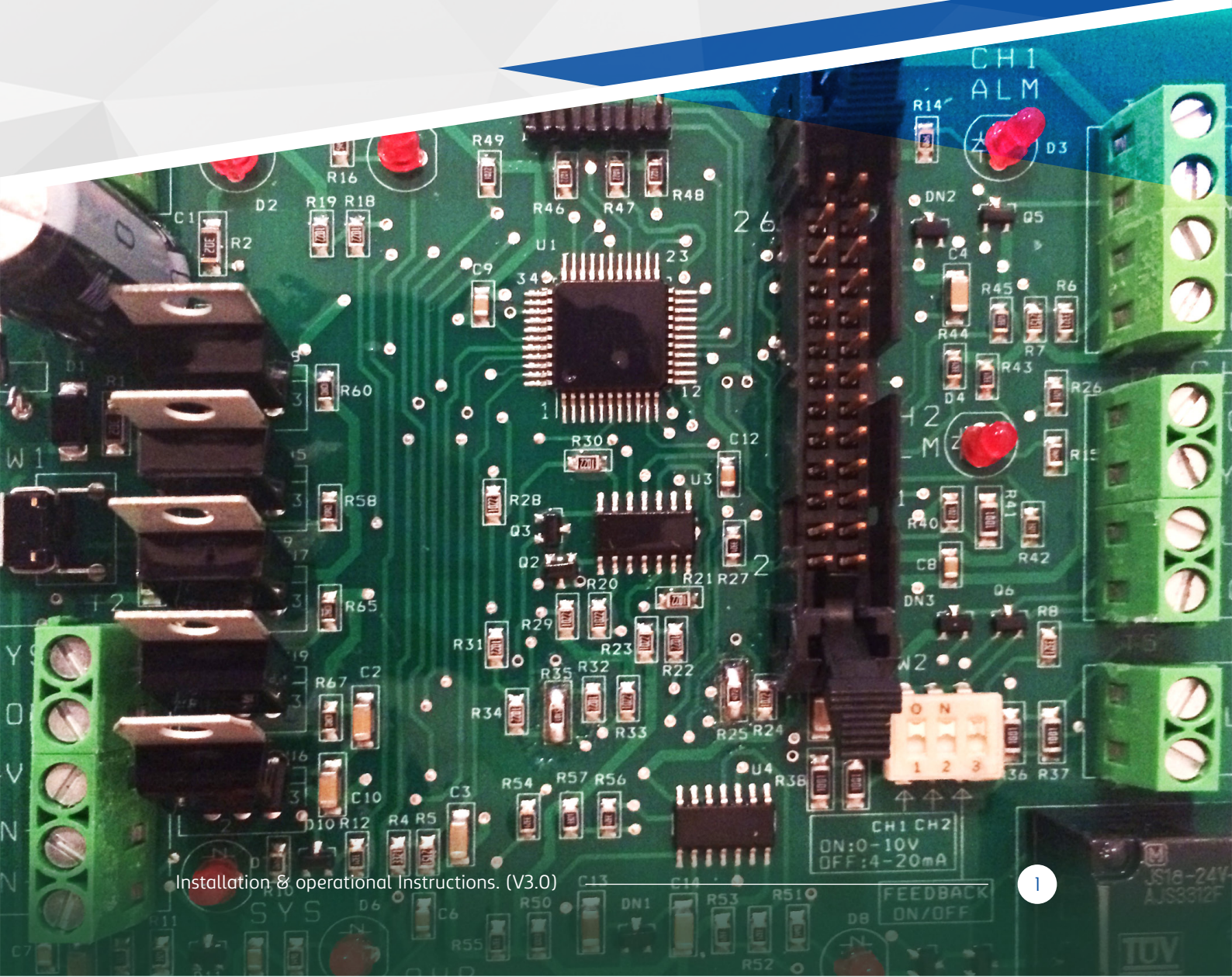
LINKAGE - LESS [VD-2300]

INSTALLATION & OPERATIONAL INSTRUCTIONS. (V3.0)

① INTRODUCTION / SCOPE

The main function of this system is Fuel Air Ratio Control. This system converts linear control input (2-10VDC) voltage provided by external temperature System into two independent programmable outputs as air and fuel.

External Burner safety system controls and maintains safety of the unit. This VD-2300 system controls two actuators these two actuators are controlling two different air and gas from two different sources, which are mixed together with an appropriate ratio in common combustion chamber to maintain proper combustion.



2 SPECIFICATIONS

POWER SUPPLY

24 VAC (18-32 VAC). (15 WATTS)

ANALOG INPUTS

- 1.) Control Signal: 2-10VDC.
- 2.) Feedback signal from actuator #1 (U): 2-10V DC.
- 3.) Feedback signal from actuator #2 (U): 2-10V DC.

ANALOG OUTPUTS

- 1.) Actuator #1 CH1: (Y)
4-20mA or 2-10V DC.
(Jumper selectable)
- 2.) Actuator #2 CH2: (Y)
4-20mA or 2-10V DC.
(Jumper selectable)

DISCRETE I/O

- 1.) SYSTEMS ON/OFF
External dry contacts
- 2.) OVERRIDES ON/OFF
External dry contacts

WARNING

THIS DISCRETE I/O TERMINALS MUST BE SUPPLIED WITH "DRY" CONTACT ONLY FROM A SWITCH OR RELAY. NO EXTERNAL POWER SHOULD BE APPLIED TO THESE TERMINALS.

- 3.) System Alarm relay:
1 Amp, N/C Relay

(C Relay contact: max 3 Amp)

OPERATING TEMPERATURE

-10 to 120 degree F (-23 to 50 degree C).

OPERATING - HUMIDITY

5 to 90%. (None Condensing)

DIMENSIONS

4.0" wide, 4.5" long VD-2300 Board is assembled on "Snaptrck" compatible

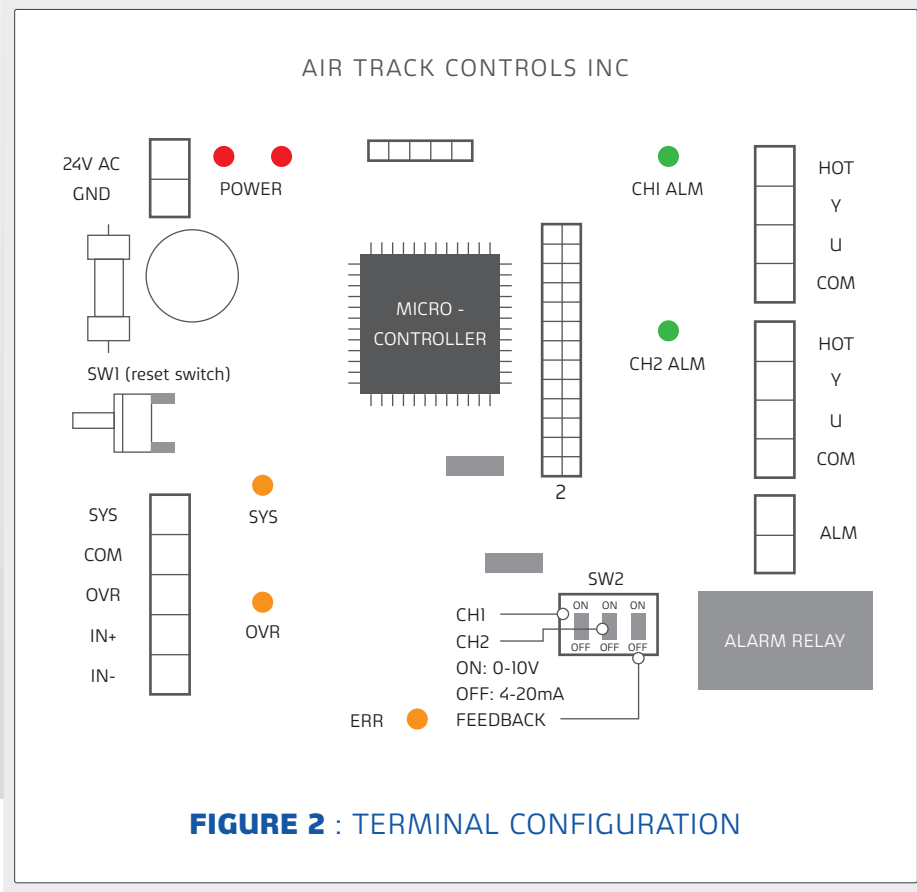


FIGURE 2 : TERMINAL CONFIGURATION

3 INSTALLATION

● POWER SUPPLY

A) 24VAC

Power supply Hot
24 VAC (18-32VAC).

B) GND

Power supply Common

● CONTROL INPUTS

C) SYS

System OFF/ON signal

D) COM

Common for both SYSTEM and OVERRIDE.

E) OVE

OVERRIDE OFF/ON signal

F) +IN

Control signal 2-10V DC

G) -COM

Control signal ground 0.00V
(Same as power supply common)

● **CH#1 (ACTUATOR # 1)**

H) HOT

Power to Actuator. 24 VAC.

I) Y

Actuator control signal:
4-20mA / 2-10V DC

J) U

Feedback signal from actuator #1
2-10V DC

K) COM

Actuator Common 0 V

I) Y

Actuator 2 control signal:
4-20mA / 2-10V DC

M) U

Feedback signal from actuator #2
2-10V DC

K) COM

Actuator Common 0 V

● **INTERLOCK RELAY**

D) ALM

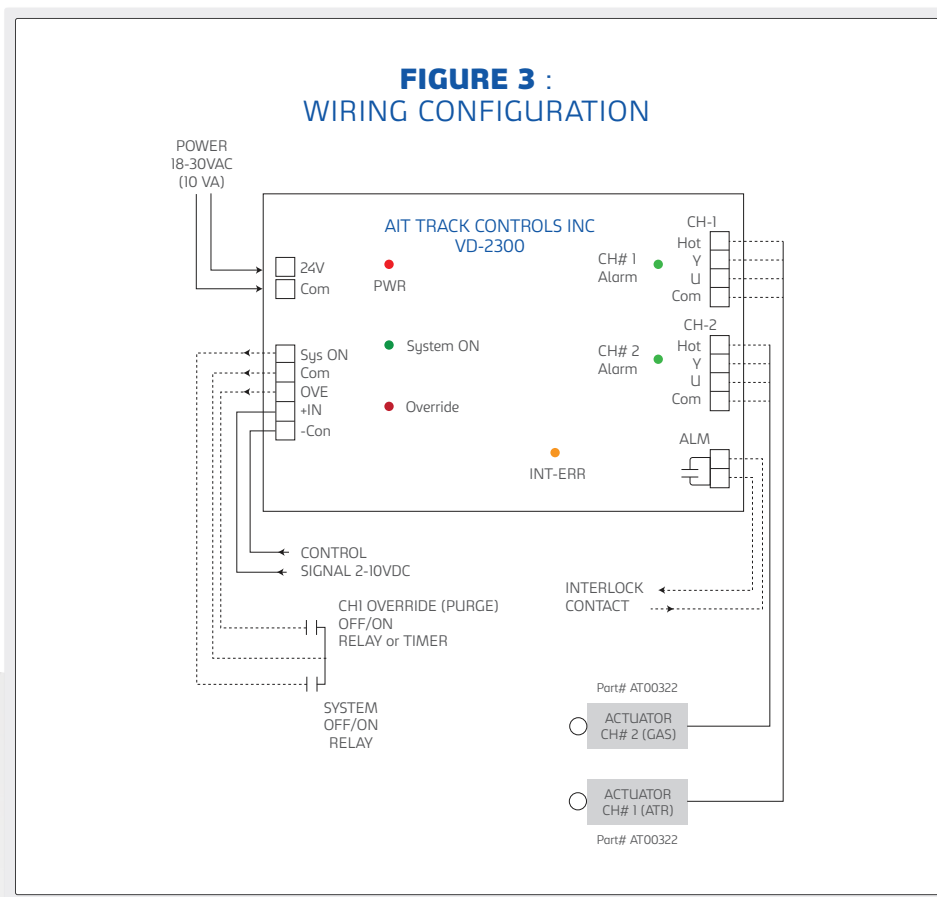
INTERLOCK Relay Contact, N/C contact.
1 Amps (max)

● **CH#2 (ACTUATOR # 2)**

K) HOT

Power to Actuator. 24 VAC

FIGURE 3 :
WIRING CONFIGURATION



4 HARDWARE DESCRIPTION AND SYSTEM OPERATION

Each actuator could have its own control voltage-angle transfer function, predefined by 9 (2,3,4,...,10) set points plus “Override set point” (for CH1 only), entered and saved manually by means of separate Keypad/LCD Board plugged into the VD-2300 Board. Values between defined set points will be calculated as linear-piecewise segments.

External temperature via “System control signal” sets control point for both actuators. VD-2300 Board responds with two synchronized (2-10V or 4-20mA) output signals, CH1 (air) and CH2 (gas), to turn each actuator/valve to preprogrammed 0-90 degrees angle, (best on actual combustion.) According to pre programmed defined/saved voltage-angle transfer function. System is always monitoring feedback signals from CH1- U and CH2-U, from both actuators.

● **SYSTEM ON/OFF**

Actuator Controller Board (VD-2300) constantly monitors two signals; SYSTEM and OVERRIDE programmed as NO (normally open) relay contacts from the External source. When a transition from ON to OFF state is detected on the SYSTEM contact or upon power-up the SYSTEM contact is detected as open, the CH1(air) and CH2(gas) outputs are driven to 0V. The SYSTEM contact is ignored during the actuators’ travel to return to their zero angle positions. When both actuator feedback signals reach zero volts the SYSTEM contact are again monitored and the outputs are kept at 0V as long as the SYSTEM contact is open.

● **OVERRIDE (PURGE)**

When OVERRIDE contact is detected as ON while SYSTEM is OFF, Actuator Controller Board sets predefined “Override set point” to Air actuator #1 only (CH1). CH2 signal is set to zero. The OVR LED is turned ON; this function can be use for purging by external timer or relay to activate this OVE contact. When OVERRIDE contact is detected as ON while SYSTEM is ON, the Actuator Controller Board ignores OVERRIDE and sets “Override failed” alarm by blinking the OVR LED.

● **ACTUATOR MONITOR**

VD-2300 Boards constantly monitors two feedback signals, CH1-U and CH2-U, from both actuators. If either actuator feedback signal does not settle the feedback is assumed to have failed and Actuator Controller Board will send 0V control signals to both actuators and set “Actuator feedback failed” alarm by energizing corresponding LED for the failed feedback channel, CH1 or CH2...And energize the alarm relay from normally close to normally open position.

In case that Actuator Controller Board detects internal error both control outputs, CH1 and CH2, will be automatically disconnected from the actuator board, driving the actuators to the 0V and energize the alarm relay.

● **ALARM RESET**

VD-2300 will have a manual reset button. When this button is pressed the System will be interrupted and the microcontroller will reinitiate.

● **NOTE**

Cable length for the Actuator controller board to Actuator connections should not exceed 10ft. For No feedback actuators with 4-20mA connections this length may be increased up to 30ft.

● **STATUS L.E.D**

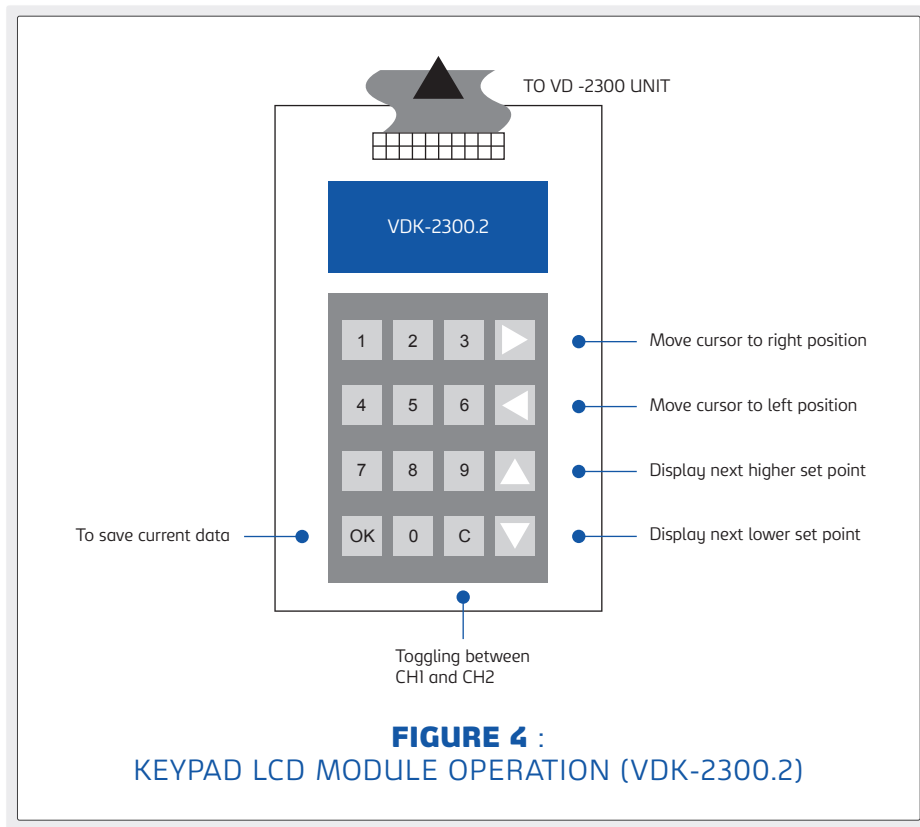
Actuator Controller Boards will show its status and operation via 6 LED indicators as follows:

● **TABLE - 1**

LED'S	ON	OFF	FLASHES	COMMENTS
POWER (D2)	POWER ON TO VD-2300	CHICK VOLTAGE IN THE TERMINAL 24VAC, GND IN THE VD2300		
SYS (D7) (SYSTEM)	VD-2300 FUNCTION IS ENABLE BY EXTERNAL RELAY	D-2300 FUNCTION IS DESABLE BY EXTERNAL RELAY		
OVR (D6) (OVERRIDE)	OVERRIDE FUNTEN IS ENABLE BY EXTERNAL RELAY	OVERRIDE FUNCTION IS DESABLE BY EXTERNAL RELAY	EXTERNAL RELAY SYSTEM AND OVRRIE "ON" (SYSTEM IS ON)	
CHI-ALM (D3) (CH-1 ALARM)	CH-1 ACTUATOR IS BEHAVING ABNORMAL (CHECK THE ACTUATOR)	CH-1 ACTUATEOR IS NORMAL		THIS FUNCTION IS ONLY FOR ACTUATER FEEDBACK ON MODE
CHI-ALM (D4) (CH-1 ALARM)	CH-2 ACTUATOR IS BEHAVING ABNORMAL (CHECK THE ACTUATOR)	CH-2 ACTUATEOR IS NORMAL		THIS FUNCTION IS ONLY FOR ACTUATER FEEDBACK ON MODE
ERR (D8) (INTERNAL ERROR)	VD-2300 IS IN INTERNALERROR	VD-2300 IS IN NORMAL FUNCTION		INTERNAL ERROR CAN BE RESET BY RESETBUTTON. IF DIN"T RESET, REPLACE THE VD-2300 BOARD

5 SET UP AND INTERFACING

Keypad/LCD Board is intended to operate as daughter card under control of Actuator Controller Board.



Keypad/LCD Board can be hot plugged/removed to/from Actuator Controller Board. Actuator Controller Board can detect when Keypad/LCD Board is plugged in and then activate LCD display with following text:

AIR TRACK
CONTROLS INC.

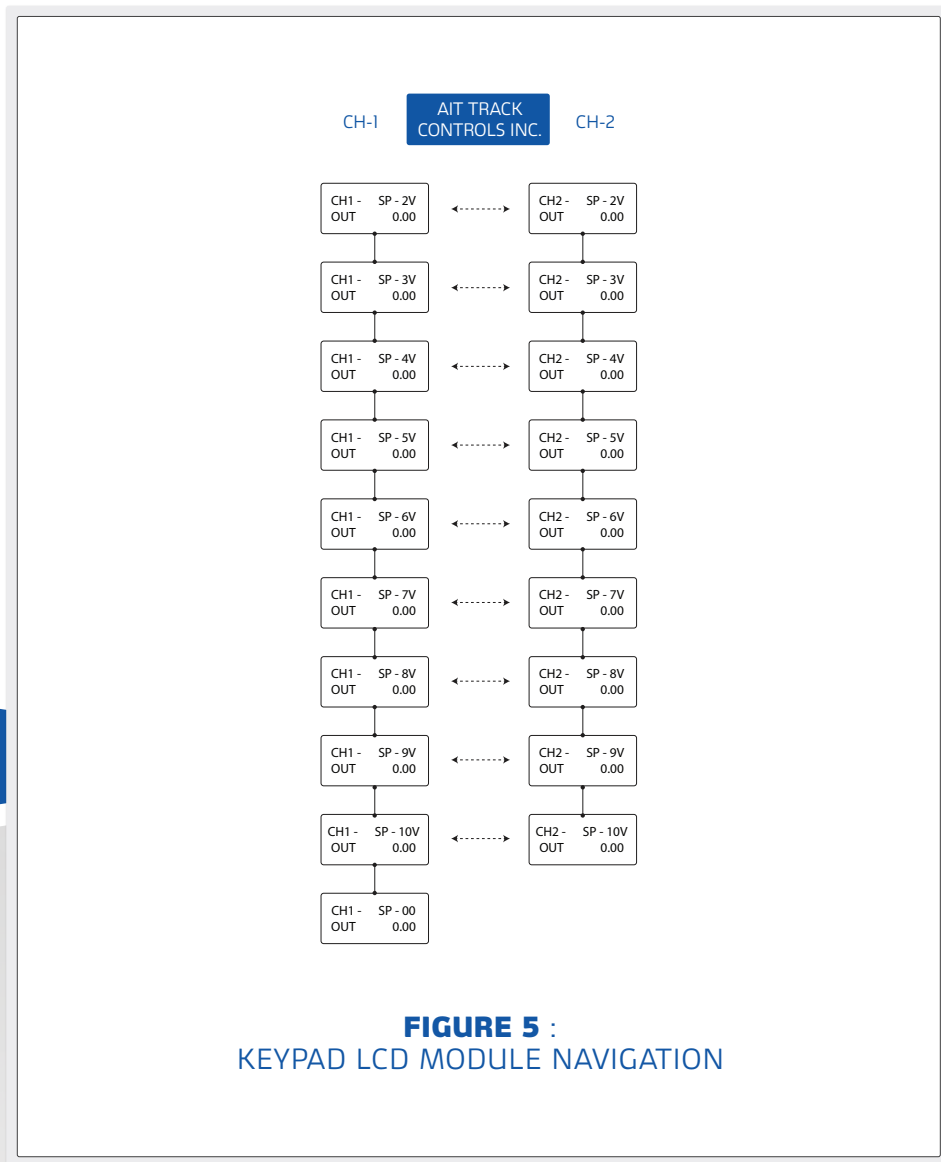
Upon pressing any key, display is changed to monitor/modify control transfer function for actuator #1 (CH1). The following line will be displayed:

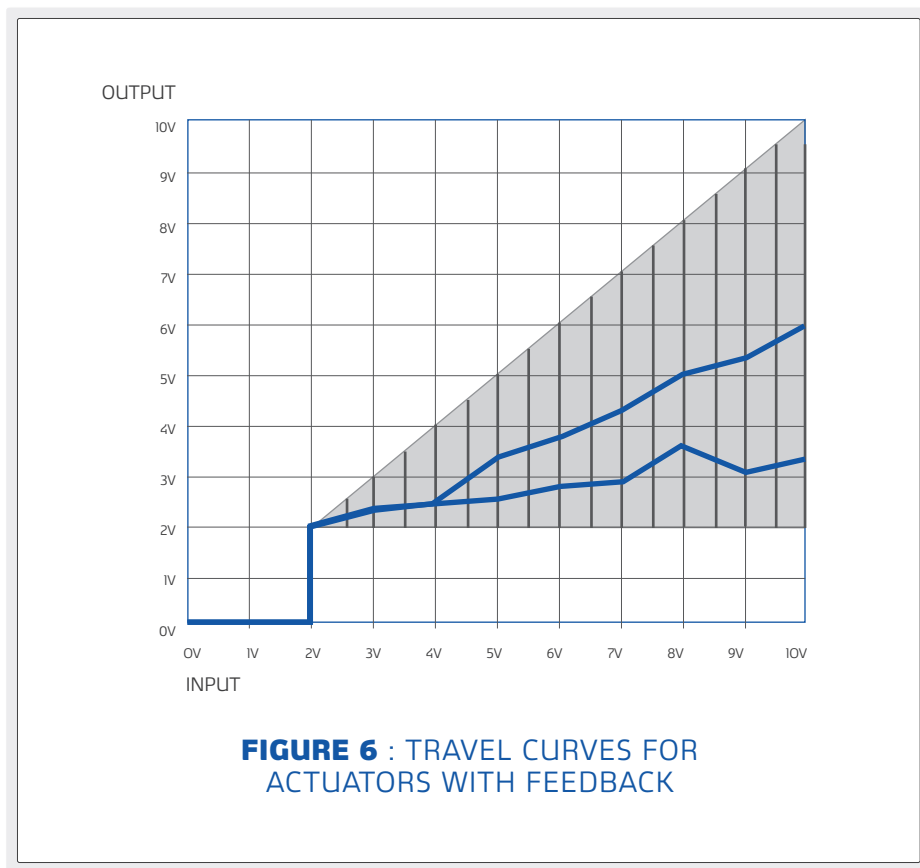
CH1 - SP - 2V
OUT XYZ

Cursor points to first entry location (x). Data entry is restricted to the values corresponding to the shaded area as shown in Fig. 4. Only one significant digit is allowed after decimal point. Pressing “OK” button saves the new or old value of current set point and next set point will be displayed on the first line. The entered value is effective immediately. By successively pressing “OK” key, current displayed set point value is always saved and set point display changed to next set point, e.g. 3V, 4V, ..., 10V, and OVR (for channel 1 only) with corresponding set values (xy.z) on second line.

If at any point the channel number is toggled the set point for the same point will be displayed for the next channel.

Same data entry procedure applies to CH2 as well. OVR set point does not exist for CH.





With FEEDBACK “ON”(SW-2) operation only, values in the shaded zone can be programmed

WARNING

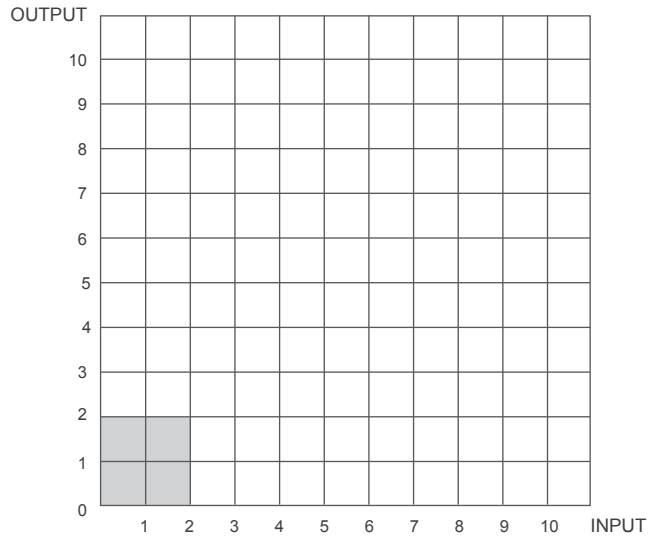
THE WIRING TECHNICIAN MUST BE TRAINED AND EXPERIENCED WITH ELECTRONIC CIRCUITS. DISCONNECT POWER SUPPLY BEFORE ATTEMPTING ANY WIRING CONNECTIONS OR CHANGES. MAKE ALL CONNECTION IN ACCORDANCE WITH WIRING DIAGRAMS AND FOLLOW ALL APPLICABLE LOCAL AND NATIONAL CODES. PROVIDE DISCONNECT AND OVERLOAD PROTECTION AS REQUIRED. USE COPPER WIRE, TWISTED PAIR ONLY.

THE ACTUATOR CONTROL BOARD (VD-2300) IS NOT A SAFETY DEVICE; USER SHOULD PROVIDE APPROPRIATE SAFETY DEVICES FOR THE INDIVIDUAL APPLICATION.

6 SET POINT RECORD SHEET

TRAVEL CURVES

JOB PROFILE	
DATE:	
UNIT SERIAL #	
MODEL #	
GAS INPUT	
BURNER MODEL	
GAS ORIFICE	
BUTTERFLY VALVE	
MANIFOLD PRESSURE	



INPUT	CH-1	CH-2	O 2	EX AIR	CO 2	CO
VOLTS			%	%	%	PPM
2						
3						
4						
5						
6						
7						
8						
9						
10						

COMMENTS:

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