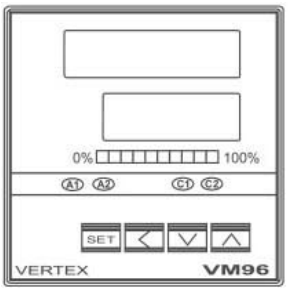
INSTRUCTION MANUAL FOR VM96 VALVE CONTROL SETINNG AND WIRING

■ FRONT PANEL DESCRIPTION：



(1)PV －Process Value
(2)SV －Setting Value
(3)AT －Auto tuning LED
(4)MA －Manual mode LED
(5)A1 －Alarm 1 LED
(6)A2 －Alarm 2 LED
(7)C1 －Control 1 LED
(8)C2 －Control 2 LED
(9)0~100% -- Output percentage.

(1) 

－SET KEY. Press once to access the next programmable parameter.

(2)  －UP KEY. Press to increase the set point or parameter value.

(3)  －DOWN KEY. Press to decrease the set point or parameter value.

(4)  －SHIFT KEY.

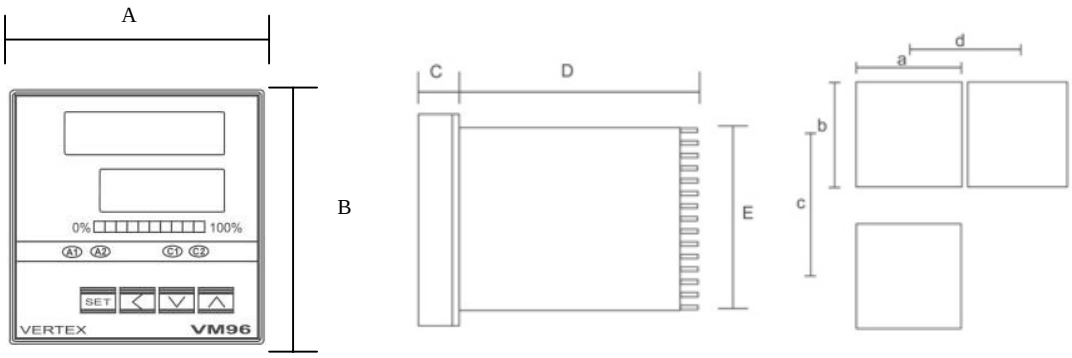
(5) 

－Press the SET and UP keys once to return the normal operation.

(6) 

－LEVEL KEY. Press the SET and SHIFT keys simultaneously for 5 seconds to select programming level, then press SET key to enter this level.

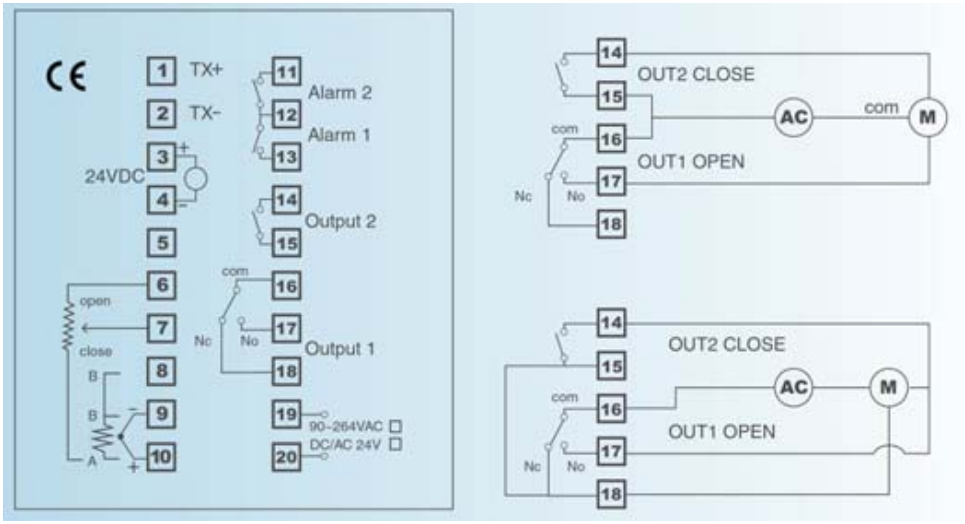
■PANEL CUTOUT：



Model	A	B	C	D	E	a	b	c	d
VM96	96	96	10	80	91	92+0.5	92+0.5	120	96

(Unit:mm)

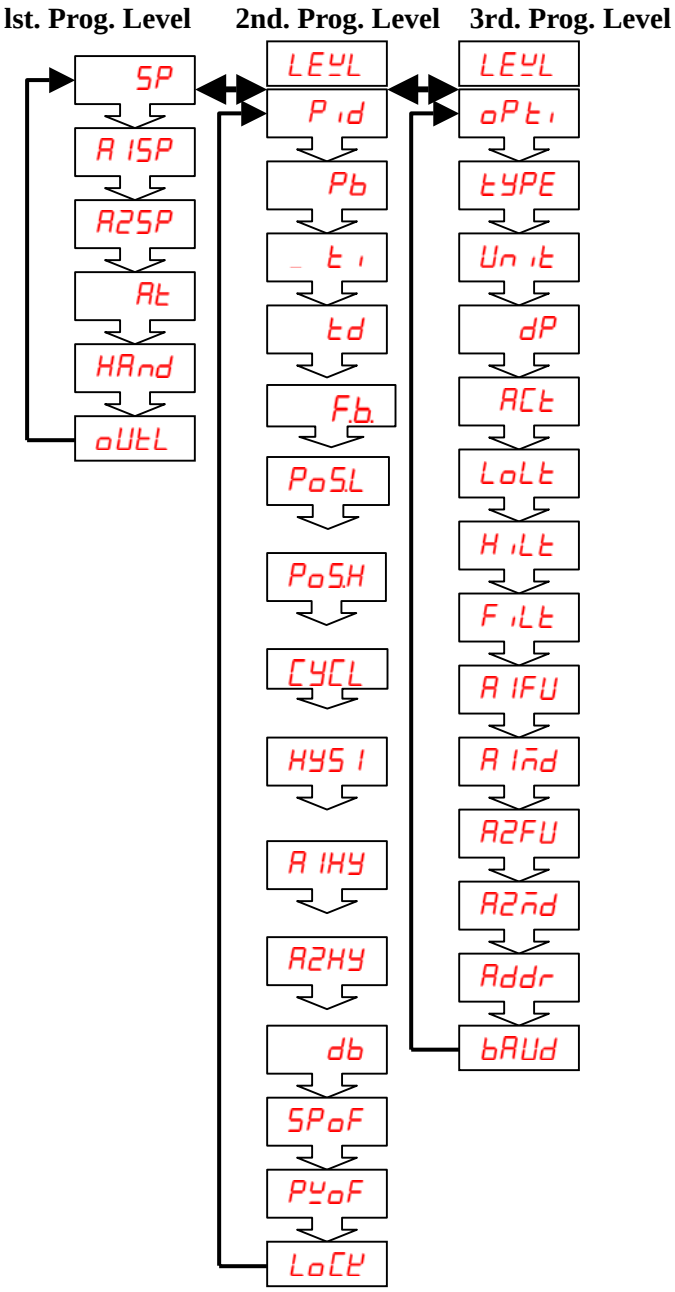
■WIRING DIAGRAM：



Wiring Precautions:

1.Before wiring, verify the controller label for correct model number and option.
2. For thermocouple input, use the appropriate compensation wire. And note the polarity of input signal.
3.To avoid noise induction, keep input signal wire away from instrument power line, load lines and power lines of other electric equipment.

■ PROGRAMMING LEVEL PARAMETERS



■PARAMETER DESCRIPTION：

LEVL	LEVEL selection. Press  keys for at least 5 seconds to access the PID level.

LEVEL	DESCRIPTION
PId	PID Level
oPt1	Option Level

USER LEVEL

CODE	DESCRIPTION	RANGE	Default
SP	Set point value of control	LoLt — HiLt	100
A1SP	Alarm 1 set point value	-1999 — 9999	10
A2SP	Alarm 2 set point value	-1999 — 9999	10
At	Autotune no：Auto-tuning is disable YES.1：Standard type auto-tuning. PV is compared wit SV during auto tuning. YES.2：Low PV type auto-tuning. PV is compared with SV-10%FS during Auto-tuning.	no YES.1 YES.2	no
HAnd	Manual control no：Disable the manual mode YES：Enable the manual mode.	no YES	no
oUtL	Output percentage. Adjustable when “Hand” is set to “Yes”	-100.0 — 100.0	0.0

PID LEVEL

CODE	DESCRIPTION	RANGE	Default
Pb	Proportional band variable. Set to 0.0 for ON/OFF control mode.	0.0-300.0%	5.0
t1	Integral time (Reset). This value is automatically calculated by activating the Autotune function. If desired, the user can later adjust this parameter to better suit the application. When PB=0.0, this parameter will be not available. When set to zero, Pb & td ≠ 0 for PD control.	0-3600sec	240
td	Derivative (Rate). This value is automatically calculated by activating the Auto tune function. If desired, the user can later adjust this parameter to better suit the application. When PB=0.0, this parameter will be not available. When set to zero, Pb & td ≠ 0 for PI control.	0-900sec	60
F.b.	Select if there is a feed back potentiometer of valve	yes, no	
PoSL	THE LOW LIMIT OF VALVE POSISTION	0.0~50.0%	
PoSH	THE HIGH LIMIT OF VALVE POSITION	50.0~100.0%	
CYCL	The running time of valve from fully close to fully open	0~250sec	
HYS1	Hysteresis for ON/OFF control on output 1.	0-2000(0.0-200.0)	1
A1HY	Hysteresis of alarm 1.	0-2000	0
A2HY	Hysteresis of alarm 2.	0-2000	0

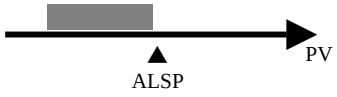
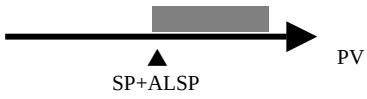
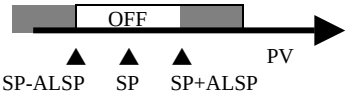
<table>
<tr><td>db</td><td>Dead band value. This defines the area in which output 1 and output 2 are both active (negative value) or the area in which output 1 and output 2 are both inactive (positive value).</td><td>-1000-1000
(-100.0-100.0)</td><td>0</td></tr>
<tr><td>SPoF</td><td>Set point offset. This value will be added to SV to perform control. It mainly used to eliminate offset error during P control.</td><td>-1000-1000
(-100.0-100.0)</td><td>0</td></tr>
<tr><td>PVoF</td><td>Process value offset. Permits the user to offset the PV indication from the actual PV.</td><td>-1000-2000
(-100.0-200.0)</td><td>0</td></tr>
<tr><td>LoCK</td><td>Parameter lock. This security feature locks out selected levels or single parameters prohibiting tampering and inadvertent programming changes.
<table>
<tr><td>1000</td><td>All parameters are locked out.</td></tr>
<tr><td>1001</td><td>Only SP is adjustable</td></tr>
<tr><td>1010</td><td>Only USER level is adjustable</td></tr>
<tr><td>1011</td><td>USER and PID levels are adjustable.</td></tr>
<tr><td>1100</td><td>USER,PID,OPTI levels are adjustable.</td></tr>
<tr><td>1101~1111</td><td>All parameters in all levels are opened.</td></tr>
</table></td><td></td><td>1100</td></tr>
</table>

OPTION LEVEL

<table>
<tr><th>CODE</th><th>DESCRIPTION</th><th>RANGE</th><th>Default</th></tr>
<tr><td>tYPE</td><td>Input type selection.
<table>
<tr><th>TYPE</th><th>RANGE(℃)</th><th>RANGE(℉)</th></tr>
<tr><td>J</td><td>-50 ～ 1000</td><td>-58 ～ 1832</td></tr>
<tr><td>K</td><td>-50 ～ 1370</td><td>-58 ～ 2498</td></tr>
<tr><td>T</td><td>-270 ～ 400</td><td>-454 ～ 752</td></tr>
<tr><td>E</td><td>-50 ～ 750</td><td>-58 ～ 1382</td></tr>
<tr><td>B</td><td>0 ～ 1800</td><td>32 ～ 3272</td></tr>
<tr><td>R</td><td>0 ～ 1750</td><td>32 ～ 3182</td></tr>
<tr><td>S</td><td>0 ～ 1750</td><td>32 ～ 3182</td></tr>
<tr><td>N</td><td>-50 ～ 1300</td><td>-58 ～ 2372</td></tr>
<tr><td>C</td><td>-50 ～ 1800</td><td>-58 ～ 3272</td></tr>
<tr><td>D-PT</td><td>-200 ～ 850</td><td>-328 ～ 1652</td></tr>
<tr><td>J-PT</td><td>-200 ～ 650</td><td>-328 ～ 1202</td></tr>
<tr><td>LINE</td><td colspan="2">-1999 ～ 9999</td></tr>
</table></td><td>Refer to figure.</td><td>K</td></tr>
<tr><td>Unit</td><td>Unit of process value
oC ：Degrees C.
oF ：Degrees F.
EnG : Engineer unit for linear input.</td><td>oC
oF
EnG</td><td>℃</td></tr>
<tr><td>dP</td><td>Decimal point selection.
0000：No decimal point.
000.0：0.1 resolution
00.00：0.01 resolution, used for linear input only.
0.000：0.001 resolution, used for linear input only.
After change decimal point, please reconfirm the parameter.</td><td>0000
000.0
00.00
0.000</td><td>0000</td></tr>
<tr><td>ACt</td><td>Output 1 control action.
rEV: Reverse action for heating.
dir: Direct action for cooling.</td><td>rEV
dir</td><td></td></tr>
</table>

LoLt	Low limit of span or range. Set the low limit lower than the lowest expected SV and PV display.	Full range	0
HiLt	High limit of span or range. Set the high limit higher than highest expected SV and PV display.	Full range	500
FiLt	Software filter.	0.0 –9 9.9	10.0
A1FU	Alarm 1 function. Refer to alarm function section for detail.	None, Hi, Lo, dif.H, dif.L, bd.Hi , bd.Lo	d.FH
A1md	Alarm 1 mode. Refer to alarm mode section for detail.	none, Stdy, Lath, St.La	nonE
A2FU	Alarm 2 function. Refer to alarm function section for detail	none, Hi, Lo, dif.H, dif.L, bd.Hi, bd.Lo	d.FL
A2md	Alarm 2 mode. Refer to alarm mode section for detail.	none, Stdy, Lath, St.La	nonE
Addr	Address of controller when communication with master device.	0 - 255	0
bAUd	Communication baud rate. 2.4k=2400bps, 4.8k=4800 bps, 9.6k=9600 bps, 19.2k=19200 bps	2.4k, 4.8k 9.6k, 19.2k	9.6k

ALARM FUNCTION

A1FU/A2FU	ALARM TYPE	ALARM OUTPUT OPERATION
nonE	Alarm function OFF	Output OFF
Hi	Process high alarm	
Lo	Process low alarm	
d.FH	Deviation high alarm	
d.FL	Deviation low alarm	
bdHi	Band high alarm	
bdLo	Band low alarm	

ALARM MODE

A1MD/A2MD	DESCRIPTION
nonE	Normal alarm mode
Stdy	Standby mode When selected, in any alarm function, prevents an alarm on power on. The alarm is enabled only when the process value reach alarm set point. Also known as “Startup inhibit” and is useful for avoiding alarm trips during startup.
LAtH	Latch mode. When selected, the alarm output and indicator latch as the alarm occurs. The alarm output and indicator will

	be energized even if the alarm condition has been cleared unless the power is shut off.
StLA	Standby and latch mode

■AUTOMATIC AND MANUAL OUTPUT CONTROL

Automatic control is the normal mode of controller operation. In automatic control mode the controller automatically adjust the control output percentage by PID algorithm so that the PV=SV. The PID parameter Pb, Ti and Td can be also calculated by Auto Tune procedure.

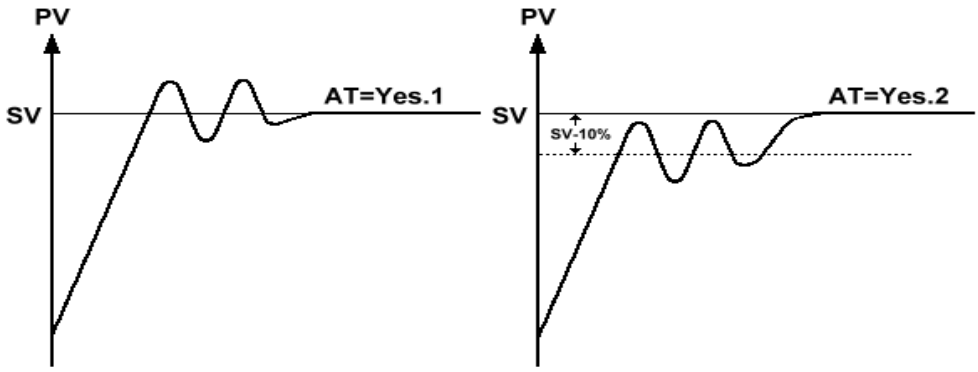
Manual control allows the user to manually drive the output percentage from 0.0 to 100.0%. To access the manual mode, set the "HAnd"parameter to " YES", the rightmost decimal (MA) on SV display will flash. Then the "oUtL " parameter will display alternately "oUtL " and process value. The output percentage then can be adjusted by pressing UP or DOWN key.

To abort the manual control just simply set the "HAnd" to " no".

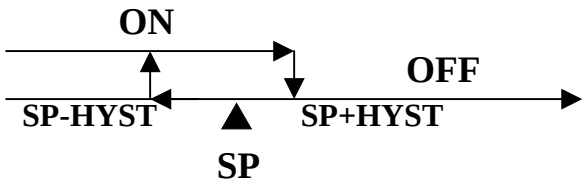
■AUTO TUNE

In order to automatically set the PID parameter in PID level ("Pb" proportional band, "ti: integral time or reset and "td" derivative time or rate), first adjust the controller's set point to a value, which closely approximates your application. Set the " At " parameter to "YES. 1" for standard type auto tune or "YES.2" for low PV type auto tune. The right-most decimal point (AT) on the PV display begins flashing. The auto tune procedure will take two cycle oscillations. After that, the controller performs PID control with the "learned" PID value to verify the results. Finally the PID values will be entered into the nonvolatile memory and then start the Fuzzy enhanced PID control. The auto tune process can last from several minutes up to two hours, depending on the system's parameter. A time out error will occur if the auto tune process can not be completed within two hours, in this case, try to set the PID parameters manually.

To abort an auto tune process, simply set the " At " parameter to " no".



The controller can also be set to ON/OFF, PI, PD and P control mode. Set Pb = 0 for ON/OFF control mode. Set ti = 0 for PD control mode. Set td = 0 fro PI control mode and ti, td = 0 fro P control mode. The Hysteresis (dead band) 0f ON/OFF control can be set as follow:



■ERROR MESSAGE AND TROUBLESHOOTING

Symptom	Probable	Solution
uuuu	-Input signal below the low limit -Incorrect input sensor selection	-Set a higher value to high limit. -Check connect input sensor selection.
nnnn	-Input signal below the low limit -Incorrect input sensor selection	-Set al lower value to low limit. -Check correct input sensor selection
oPEn	-Sensor break error -Sensor not connected	-Replace sensor -Check the sensor is connected correctly
AtEr	-A/D converter damage	-Unit must be repaired or replaced. -Check for outside source of damage such as transient voltage spikes.
Keypad no function	-Keypads are locked -Keypads defective	-Set"LoCK"to a proper value -Replace keypads
Process value unstable	-Improper setting of Pb, Ti, Td and CT	-Start AT process to set Pb, Ti, Td automatically -Set Pb, Ti, Td manually
No heat or output	-No heater power or fuse open -Output device defective or incorrect output used	-Check output wiring and fuse -Replace output device
All LED's and display not light	-No power to controller -SMPS failure	-Check power lines connection -Replace SMPS
Process Value changed abnormally	-Electromagnetic Interference (EMI) or Radio Frequency Interference (RFI)	-Suppress arcing contacts in system to eliminate high voltage spike sources. Separate sensor and controller wiring from "dirty" power lines. Ground heaters
Entered data lost	-Fail to enter data to EEPROM	-Replace EEPROM