SD660+ Digital Indicator

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Vertex SD 660+ Digital Display Indicator is a low cost, yet reliable, Digital Panel Indicator. It boasts a 0.8 inch LED Display that is easy to read from a reasonable distance. They come standard with one relay output and one alarm and can have as optional extra up to 3 alarms. These are ideal for temperature or speed displays on extrusion machines etc when used with a 0~10 Vdc input signal. The unit can be used as an indicator or as a simple on/off or proportional controller is you wish. RS485 comms are also available so that these indicators can be networked or act as a remote display for a temperature controller. You can choose to have either 90~264 V mains or 18 ~ 32 Vdc. The instrument also includes a low power 24Vdc supply to power transmitters like thermocouple transmitters and the like.

FRONT PANEL DESCRIPTION

There are 4 LED's and 3 Buttons so on the left is

M — Control output status indicator
A1 — Alarm 1 output status indicator
A2 — Alarm 2 output status indicator
A3 — Alarm 3 output status indicator

Note: At the outset to change the setpoint simply press either the up or down button and the display will change to the "set value" and you can then use the up and down buttons to change it.

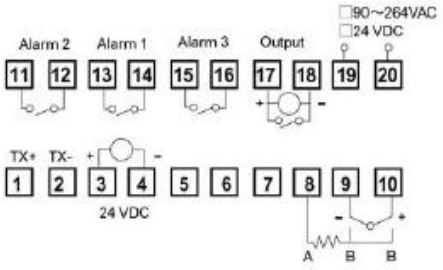
The key between the M and A1 LED's is the SEL key.
Press this once to scroll through the various parameters.

The key between the A1 and A2 LED's is the UP key.
Press this to increase the set point or parameter value.

The key between the A2 and A3 LED's is the DOWN key.
Press to decrease the set point or parameter value.

Press the SEL + ☑ (SEL and DOWN) keys once to return to normal process value display after changing parameters.

WIRING DIAGRAM：



1 **Mains Power**

1. Mains power is connected to T19 and T20
2. You can use any mains voltage between 90 and 264 Volts AC (50 or 60 Hz)
3. You can also order the indicator for use with a low voltage between 18 ~ 32 dc for the mains power voltage.
4. The When using DC mains the input is not polarity sensitive

2 **Inputs**

1. Will mostly be either thermocouple or RTD (PT100) for temperature measurements and 0~10 Vdc or 4~20 mA for speed or other applications.
2. Please check on the box and case label to see what the input is on your indicator.

3 **Thermocouples have two wires**

1. Thermocouples should be connected to T9 and T10
2. If the temperature reads but responds in the reverse when testing, like when heating the display goes down instead of up just swap these two wires around. This will not harm the controller in any way if it is not correct.

4 **PT100 (RTD) in most cases have three wires**

1. For PT100 use terminals T8 +T 9 + T10. The one color goes on terminal T8 and the two wires with the same color go on terminals T9 + T10
2. If you are using a PT100 (RTD) with only two wires, one wire will go on T8 and the other wire T9 and then you must bridge with a short piece of wire between T9 and T10.

5 **Control outputs**

1. The control output gets connected to T17 and T18. Incorrectly wiring this may blow the output and you will be charged for repairing it.

6 To Change the Input type on a VD series controller. (V4)

1. Press and hold the “set” key for 5 seconds.
2. The display will change and read “Pb”
3. Press and hold the “set” key for another 5 seconds.
4. The display will change and read “Type”
5. Use the “up” or “down” keys to select the input type you require.
6. Now press the “set” key once and the display will read “Type”
7. Now press the “set” key a few times until you reach the parameter “HiLt”.
8. Now use the up and down keys to set the input range high limit.
9. Typically these should be either 100, 200, 400, 600 etc etc to suit your application.
10. Now press the “set” key once again to move away from that parameter.
11. Now press the “set” and “down” keys together to revert to the normal position.
12. It is always a good idea after doing this to turn the power off and back on again and watch during the self test that the correct input has been selected.

13. After turning the power on the display will flash and show the following
    a. First the input type will be displayed.
    b. Next the measurement units as in ºC or ºF
    c. Next the range High limit will be displayed.
    d. Lastly it will display the Range Low Limit. (This should always 0ºC)

7 **Retransmission**

e. The retransmission of the PV signal gets connected to T1 and T2 if you have chosen this option when purchasing. You can either have a retransmission signal or RS485 connection but not both.

8 24 Vdc Aux Power Supply

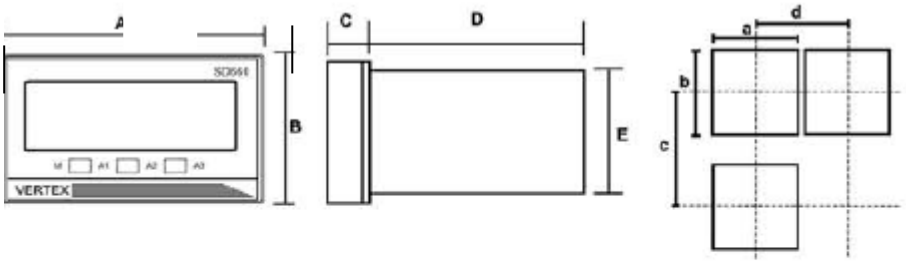
a. This is the power supply to be found on T3 + T4. It is intended to drive signal transmitter 4 wire devices so is only a very low powered source. We do not recommend using it on anything needing more than 50 mA.

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.

PANEL CUTOUT：

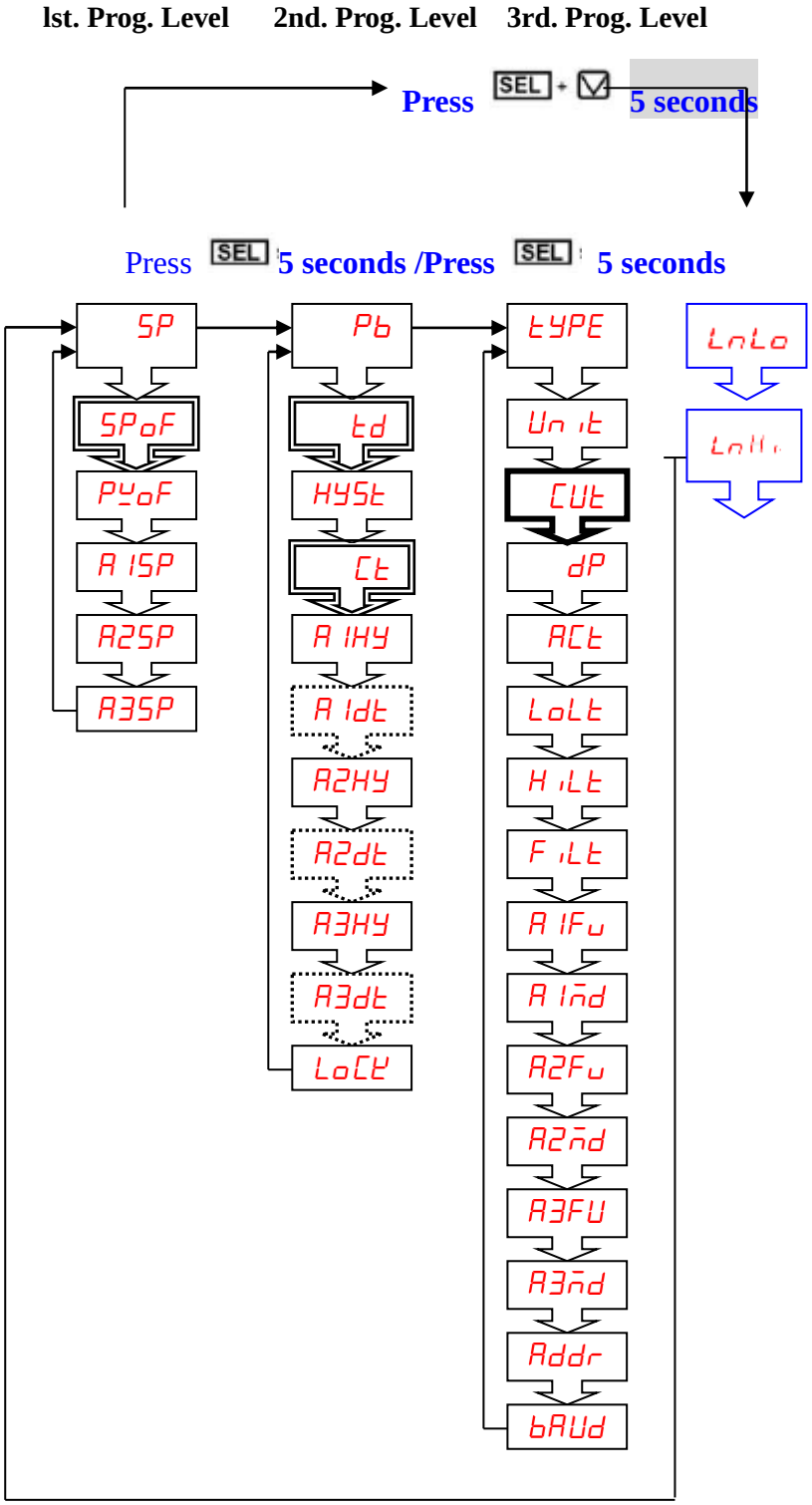


Model	A	B	C	D	E	a	b	c	d
SD660	96	48	9	80	45	92+0.5	45+0.5	48	120

(Unit:mm)

1.  parameters will be available only when Pb≠0.0. and HYSt will be skipped.
2.  parameters will be available only when A1Fu,A2Fu,A2Fu= t.on or t.Off. and A1HY ,A2HY,A3HY will be skipped
3.  parameters will be available only when tYPE= LinE. And Unit will be skipped.

PROGRAMMING LEVEL PARAMETERS



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FIRST PROGRAMMING LEVEL PARAMETERS(USER LEVEL)

CODE	DESCRIPTION	RANGE	DEFAULT
SP	Set point value of control	LoLt — HiLt	500
SPoF	Set point offset.：Offset (manual reset) value for P control only.	-1000-1000 (-100.0-100.0)	0
PVoF	Process value offset.：use to offset the PV indication from the actual PV	-1000-2000 (-100.0-200.0)	0
A1SP	Alarm 1 setting value	-1999—9999	10
A2SP	Alarm 2 setting value	-1999—9999	10
A3SP	Alarm 3 setting value	-1999—9999	10

SECOND PROGRAMMING LEVEL PARAMETERS(PID LEVEL)

CODE	DESCRIPTION	RANGE	DEFAULT
Pb	Proportional band variable. Set to 0.0 for ON/OFF control mode.	0.0-300.0%	0.0
td	Derivative (Rate). When Pb =0.0, this parameter will not appear.	0-900sec	0
HYSt	Hysteresis for ON/OFF control action on output. When Pb ≠ 0.0 this parameter will not appear.	0-2000 (0.0-200.0)	1
Ct	Proportional cycle time of control output. When Pb = 0.0 this parameter will not appear. Set to 15 or 20 for relay output Set to 1 or 2 for SSR output Set to 0 for current output.	0-100sec	15
A1HY	Hysteresis of alarm 1 action. When A1Fu= t.on or t.Off, A1HY is not displayed.	0-2000	0
A1dt	Delay time of alarm 1 action when A1Fu = t.on or t.Off	99 MM. 59 SS. 99 HH. 59MM.	
A2HY	Hysteresis of alarm 2 action. When A2Fu= t.on or t.Off, A2HY is not displayed.	0-2000	0
A2dt	Delay time of alarm 2 action when A2Fu=t.on or t.Off	99 MM. 59 SS. 99HH. 59 MM.	
A3HY	Hysteresis of alarm 3 action. When A3FU= t.on or t.Off, A3HY is not displayed.	0-2000	0
A3dt	Delay time of alarm 3 action when A3FU=t.on or t.Off	99 MM. 59 SS. 99HH. 59 MM.	
LoCK	Parameter lock. This security feature locks out selected levels or single parameters prohibiting tampering and inadvertent programming changes. 0000 All parameters are locked. 0001 Only SP is adjustable. 0010 USE (level) and A1(parameter) are adjustable. 0011 USER、PID(level) and A1、A2(parameter) are		0100

		adjustable.		
	0100	USER、PID、OPTI(level) and A1、A2(parameter) are adjustable.		
	1000	Additional A3(parameter). All parameter you can find out, but can't adjustable.		
	1001	Additional A3(parameter)，only SP is adjustable.		
	1010	Additional A3(parameter). USER(level) and A1(parameter) are adjustable.		
	1011	USER、PID (level) and A1、A2、A3 (parameter) are adjustable.		
	1100	All parameters in all level are opened.		

THIRD PROGRAMMING LEVEL PARAMETERS(OPTION LEVEL)

CODE	DESCRIPTION	RANGE	DEFAULT
tYPE	Input type selection. TYPE / RANGE(℃) / RANGE(℉) J: -50 ～ 1000 / -58 ～ 1832 K: -50 ～ 1370 / -58 ～ 2498 T: -270 ～ 400 / -454 ～ 752 E: -50 ～ 750 / -58 ～ 1382 B: 0 ～ 1800 / 32 ～ 3272 R: 0 ～ 1750 / 32 ～ 3182 S: 0 ～ 1750 / 32 ～ 3182 N: -50 ～ 1300 / -58 ～ 2372 C: -50 ～ 1800 / -58 ～ 3272 D-PT: -200 ～ 850 / -328 ～ 1652 J-PT: -200 ～ 650 / -328 ～ 1202 LINE: -1999 ～ 9999 RSP: -32768 ～32767	Refer to figure.	K
Unit	Unit of process value. This parameter is not displayed when tYPE=LinE or RSP	°C：Degrees C. °F：Degrees F.	℃
CUt	When using an analog input, use this to limit the display when it goes out of range, like below 4 mA or above 20 mA so that it only reads between min and max range values and not below or above. Options available are None= this function is not used. Lo = The process value will be limited to LoLt when input signal is lower than the scale range. Hi = The process value will be limited to HiLt when input signal is higher than the scale range. Lo.Hi = The process value will be limit within the range of LoLt to HiLt when input signal is out of scale.	nonE，Lo Hi，Hi.Lo	nonE
dP	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.	0000 000.0 00.00 0.000	0000

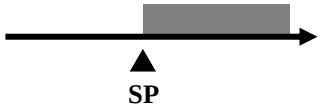
	After change decimal point, make sure all other setting of parameters are correct.		
ACt	**Control Output action.**	rEV **:Reverse action for heating.** dir **:Direct action for cooling.**	rEV
LoLt	**Low limit of span or range. Set the low limit lower than the lowest expected SV and PV display.**	**Full range**	**0**
HiLt	**High limit of span or range. Set the high limit higher than highest expected SV and PV display.**	**Full range**	**1000**
FiLt	**Input signal filter.**	**0.0-99.9**	**10.0**
A1FU	**Alarm 1 function. Refer to alarm function section for detail.**	**Refer to alarm function section for detail.**	Ad iH
A1md	**Alarm 1 mode. Refer to alarm mode section for detail.**	**Refer to alarm function section for detail.**	nonE
A2FU	**Alarm 2 function. Refer to alarm function section for detail**	**Refer to alarm function section for detail.**	diFL
A2md	**Alarm 2 mode. Refer to alarm mode section for detail.**	**Refer to alarm function section for detail.**	nonE
A3FU	**Alarm 3 function. Refer to alarm function section for detail**	**Refer to alarm function section for detail.**	diFL
A3md	**Alarm 3 mode. Refer to alarm mode section for detail.**	**Refer to alarm function section for detail.**	nonE
Addr	**Address of controller when communication with master device.**	**1-255**	**1**
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**

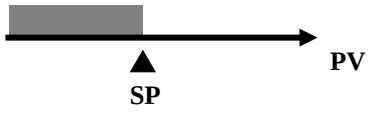
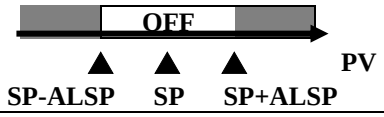
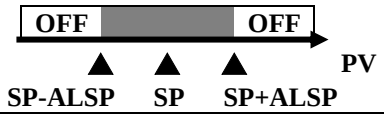
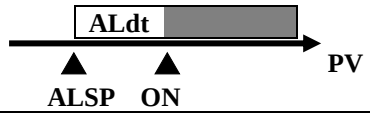
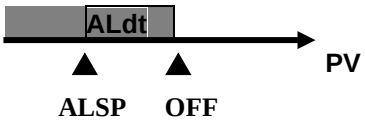
Changing the display unit scale

1. This section explains how to change the unit display units that correspond to the linear input which as an example may be 4~20 mA or 0~10 Vdc. It does not change the input signal calibration.
2. Press the SET and DOWN keys simultaneously for 5 seconds to access “LnLo” parameter.
3. Adjust “LnLo” setting to correspond to the low scale value and after adjustment press SET key once to access “LnHi” parameter.
4. Adjust “LnHi” setting to correspond to the high scale value and after adjustment press SET key once for normal operation.
5. Note: When changing the engineering display units please ensure that the high limit to be found in the PID level is set to that as well or the display will flash once the high limit in the PID level is exceeded.

Code	Description	Range	Default
LnLo	**Low Scale of Linear Input**	**-1999~9999(-199.9~999.9)**	**0.0**
LnHi	**High Scale of Linear Input**	**-1999~9999(-199.9~999.9)**	**100.0**

ALARM FUNCTION

A1FU/A2FU/A3FU	ALARM TYPE	ALARM OUTPUT OPERATION
AoFF	**Alarm function OFF**	**Output OFF**
AH i	**PV high alarm with A contact**	

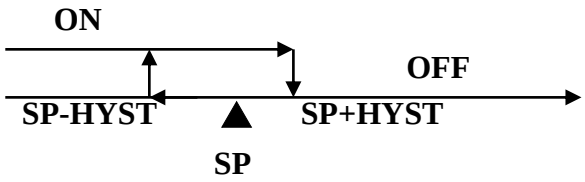
A.Lo	**PV low alarm with A contact**	
A.d .H	**Deviation high alarm with A contact**	
A.d .L	**Deviation low alarm with A contact**	
A.bd.H	**Band high alarm with A contact**	
A.bd.L	**Band low alarm with A contact**	
A.t.on	**PV high alarm with delay time with A contact**	
A.t.oF	**PV low alarm with delay time with A contact**	
b.oFF	**Alarm function OFF**	
b.H .	**PV high alarm with B contact**	
b.Lo	**PV low alarm with B contact**	
b.d .H	**Deviation high alarm with B contact**	
b.d .L	**Deviation low alarm with B contact**	
b.bd.H	**Band high alarm with Bcontact**	
b.bd.L	**Band low alarm with B contact**	
b.t.on	**PV high alarm with delay time with B contact**	
b.t.oF	**PV low alarm with delay time with B contact**	

ALARM FUNCTION

ALMD	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**
HH.nn	**99Hours 59 Minutes (Latch mode : When selected, the alarm timer will not be reset even if the alarm condition has been cleared unless the power is shut off.)**
nn.SS	**99Minutes 59Seconds (Latch mode : When selected, the alarm timer will not be reset even if the alarm condition has been cleared unless the power is shut off.)**
nH.n	**99Hours 59 Minutes (Normal mode: When selected, the alarm timer will be reset even if the alarm condition has been cleared)**
nn.S	**99Minutes 59Seconds (Normal mode: When selected, the alarm timer will be reset even if the alarm condition has been cleared)**

The controller can also be set to ON/OFF, P and PD control mode. Set Pb = 0 for ON/OFF control mode. The Hysteresis (dead band) 0f ON/OFF control can be set as follow: 1.ON/OFF



■ERROR MESSAGE AND TROUBLESHOOTING

Symptom	Probable	Solution
oPEn	-Sensor break error -Sensor not connected	-Replace sensor -Check the sensor is connected correctly
Keypad no function	-Keypads are locked -Keypads defective	-Set"LoCK"to a proper value -Replace keypads
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

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