Clavex Plus

Advanced Autoclave Controller with Recording + 4 Channel Mapping + Pressure Indication with PC Software & Printer Module



PC Software

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Controller with Graphic Display



Checked By

49.83

Printer Module



Equipment Name : Clavex_	Plus_11SN/3450989	SB		0.000		
Print Date Time : 24-Feb-17 17:42:14 OPERATOR NAME : Not Logged in			Reported By : admin			
				BATCH	H NAME : 201702	24170034
REMARK :						
STERILIZATION TEMPERA	ATURE : 121 °C					
STERILIZATION HOLD TIN						
STER. STOP TEMPERATU	JRE : 120.5 °C					
STER. RESET TEMPERAT	URE : 120 °C					
OVERSHOOT TEMPERAT	URE : 131 °C					
HOLD PRESSURE : 15 psi						
CONTROL BAND : 0.2 °C						
PRINT INTERVAL TIME : 1	5 Seconds					
DATE TIME	Control °C	Map1 °C	Map2 °C	Map3 °C	Map4 °C	Pressure (psi)
24-02-2017 17:00:34			Start_Command			
24-02-2017 17:00:35	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:00:35			Air_	Valve_Close		
24-02-2017 17:00:35			Sterilization_Start			
24-02-2017 17:00:48	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:01:03	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:01:18	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:01:33	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:01:48	126.2	126.2	OPEN	-1.6	OPEN	55.2
			Air_	Valve_Open		
			Sterilization End			
			ACTOAL	TO VALUE . 49.00		ALUE : 49.83
			Stop Com	mand - Normal Sto		

Approved By

Registered By



Cycle-End Timer Starts

Cycle State : Waiting for Start

The Steam Valve is Close and the Air Outlet is Open. Issue 'Start' command to initiate a new autoclave cycle. If the Water level is low or Door is open, the start command is ignored. The F0 value is reset to zero & data recording starts.

Cycle State : Pre-Heating

The Steam Valve is Opened. The Air Outlet Valve is kept open. As soon as the temperature reaches the Air Outlet SP (say, 100.0°C), the Air Outlet Valve is closed & F0 calculation starts.

Cycle State : Heating

In this state, the Steam Valve is kept open until the temperature reaches the Sterilization Temperature SP (say, 121.1°C). As soon as the temperature reaches the Sterilization Temperature SP, the Sterilization state starts.

Cycle State : Sterilization

The temperature is maintained at *Sterilization SP* by opening & closing the Steam Valve.

If the temperature falls below the *Sterilization Stop Temperature SP* (say, 120.0°C), the timer enters the hold state i.e. it stops counting down until the temperature rises again.

If the temperature falls below the *Sterilization Reset Temperature SP* (say, 119.0°C), the timer value is reset to the initial set value. That is, full sterilization time is executed again.

After the Sterilization Time is over, the Steam Valve is closed. The F0 value computation stops and the Cycle-End state starts.

Cycle State : Cycle End

There are 3 possible settings for the cycle end state.

Immediate End

The autoclave cycle ends immediately after the Sterilization time is over. The Air Outlet Valve is opened.

Timer Based End

Once the sterilization time is over, the user set *Cycle-End Timer* is run. When the timer reaches 0, the Air Outlet Valve is opened & the cycle ends.

Temp Based End

Once the sterilization time is over, the controller waits till the temperature falls below *Cycle-End Temperature SP*. The Air Outlet is opened & the cycle ends.

POWER FAILURE DURING CYCLE OPERATION

If the power fails while an Autoclave Cycle is in progress, the cycle state after power resumption depends upon the temperature value. Refer table below for the cycle re-start state against the temperature value at the time of power resumption.

TEMPERATURE VALUE UPON POWER RESUMPTION	CYCLE RE-START STATE		
The temperature is above Sterilization Stop Temperature SP	The controller starts executing the balance Sterilization Time.		
The temperature is above Sterilization Reset Temperature SP & below Sterilization Stop Temperature SP	The controller waits till the temperature rises above <i>Sterilization</i> <i>Stop Temperature SP</i> & then starts executing the balance Sterilization Time.		
The temperature is above Air Outlet SP & below Sterilization Reset Temperature SP	The controller waits till the temperature reaches <i>Sterilization</i> <i>Temperature SP</i> & then starts executing the full Sterilization Time all over again.		
The temperature is below Air Outlet SP	The cycle is aborted.		

Features

- 160 X 80 Monochrome Graphic Display for Comprehensive Process Information
- 4 Universal Temperature Inputs for Control & Mapping
- User Programmable Temperature Measurement Strategy (MAP-1 or Average of MAP-1 to MAP-4 or Min/Max of All Mappings)
- 1 Universal Input (mA / V) for Pressure Indication with Programmable Units (PSI, KG/CM², BAR & EU)
- Digital Inputs for Door Open & Low Water Level Detection
- Digital Outputs (SSR Drive) for Heating, Air Exhaust Valve
 and Alarm
- Programmable Sterilization Timer with Setpoints for Timer
 Pause & Reset
- Programmable Setpoint for Air Exhaust Valve Closing

- Automatic Cycle Abortion at High Temperature Safety Limit & Low Water Level
- Front / Remote Sterilization Cycle Start Command
- F0 Value Calculation & Indication
- Programmable Cycle-End Strategy :
 - > Immediate upon End of Sterilization Time
 - > After Preset Temperature Drop from End of Sterilization
 - > After Preset Time Elapse from End of Sterilization
- In-built Huge Memory for Autoclave Cycle Data Recording with Settable Interval
- 21 CFR Compliance PC Software for Report Generation with User Programmable Company Name/Logo & Footer
- Optional Printer Interface Module for Direct Printout of Report on 80/132 Column Dot-Matrix Printer

Specifications

Display						
Graphic LCD	160 X 80 STN Monochrome					
Keys	Keys					
Туре	6 Tactile Switches					
Functions	SCROLL PAGE START / STOP & ALARM ACK UP DOWN ENTER					
Analog Inputs						
4 Temperature Inputs (Control & Mapping)	User Programmable (Common for all 4 Inputs) RTD Pt100, 3 wire DC Linear : 0-20 mA, 4-20 mA, 0-5 V, 0-10 V, 1-5 V					
Strategy for Computing Temperature for Control	 User Programmable MAP-1 Temperature as Final Temperature Average of MAP-1 to MAP-4 Default MAP-1. If MAP-1 Sensor fails then Average of other MAPs Min / Max of MAP-1 to MAP-4 for different Cycle States 					
Pressure Input	User Programmable : 0-20 mA, 4-20 mA, 0-5 V, 0-10 V, 1-5 V					
Accuracy	RTD Pt100 : ± 0.25% of reading ± 0.1°C DC Volts/Current : ± 0.25% of reading ± 1 LSD					
Display Resolution	For Temperature : 0.1°C For Pressure User Programmable : 1 / 0.1 / 0.01 / 0.001					
Zero Offset	User Adjustable over Full Range (Independent for Each Input)					
ADC	16 Bit (±32,768 Counts), Sigma-Delta (ΣΔ)					
Sampling Time	250mS (4 Samples per Second)					
Common Mode Rejection	> 100dB at 50/60 Hz					
Signal Conditioning	L-C Analog Filter on Each Input					

Door Status Monitoring				
Input	Digital Input (Potential-free Contacts) from Door Switch			
Action (Door Open)	Abort Running Cycle / Ignore Start Command & Alarm			
Water Level Monitoring				
Input	Digital Input (Potential-free Contacts) from Float Switch			
Action (Water Level Low)	Abort Running Cycle / Ignore Start Command & Alarm			
Alarm System				
Process Alarm	High Temperature Safety Limit			
Door Alarm	Alarm on Door Open			
Water Level Alarm	Alarm on Water Level Low in Steam Generator			
Audio Alert	In-Built Buzzer (Beeper)			
Output	SSR Output (12 VDC @ 30 mA, Short - Circuit Protected)			
Alarm Acknowledge	Front Panel Alarm Acknowledge (Mute) Key			
Temperature Control Loo	pp			
Туре	ON-OFF			
Control Parameters	Control Band (Hysteresis)			
Output	SSR Drive (12 VDC @ 30 mA, Short - Circuit Protected)			
Air Exhaust Control				
Туре	On-Off			
Control Strategy (Programmable)	 Remains open till temperature reaches Air Outlet SP Closes after reaching Air Outlet SP until Cycle - End 			
Output	SSR Drive (12 VDC @ 30 mA, Short - Circuit Protected)			
Data Recording				
Storage Device	In-built Micro SD Card (2 GB)			
Recording Interval	User Programmable			
Recording Data (Date/Time Stamped)	 Process Values Mapping Temperatures & Pressure Events Start Command Air Valve Close Sterilization Start Air Valve Open Sterilization End Sterilization Reset Stop Command Change in Date/Time Settings Change in Recording Interval Change in Parameter Values Autoclave Door Open Fail Safe Low / High Alarm Einal F0 Value 			

Power Supply					
Туре	Switch Mode (SMPS) 18 ~ 32 VDC, nominal 24 VDC @ 1A Min. Note : In case of looping multiple instruments on one power source, make sure that the source is capable of supplying minimum 1A current per instrument. 5VA Max				
Line Voltage					
Consumption					
Physical					
Mounting	Plug-in with Panel Mounting Clamps				
Overall Dimensions	80 (H) X 160 (W) 144 (D)				
Panel Cutout	78 (H) X 154 (W), mm				
Terminals	3.5 mm Pitch, Pluggable Terminal Blocks				
Environmental					
Operating Ambient	0~55°C & 5~90%RH Non-condensing				
Storage Temperature	-10 to +70 °C				
Atmospheres	Not Suitable for use in Corrosive or Explosive Atmospheres. The Panel in which the Instrument is Mounted must be free of Electrically Conductive Pollution.				

Back Panel Terminations



PC Interface with 21 CFR Compliant Software

Supported Operating Systems (OS)	 Windows Vista 32 bit / 64 bit Windows 8 	 Windows 7 32 bit / 64 bit Pentium Dual Core
Minimum PC Configuration Requirements	 2.8 GHz Clock Speed 40 GB Hard Disk 	• 2 GB RAM

Printer Interface (Optional Add-on Device)

	Controller Interface Port	RS485 Serial
-	Printer Interface Port	Centronix (Parallel Interface)
	Printer Support	80/132 Column Dot-Matrix (EPSON LX-300-II or Equivalent)
	Print Data	Well-Formated, Date-Time Stamped Process value & Event Records (PC Tool for user Programmable Header & Footer)
	Supply Voltage	10~30 VDC (24 VDC Nominal)



Sample Report



Process Precision Instruments

Address: 101, Diamond Industrial Estate, Navghar, Vasai Road (E) Dist. Palghar, Palghar, Maharasht 401210 Phone: 0250 609 0063

Data Log Report

Equipment Name : Clavex_Plus_11SN/3450989SB Print Date Time : 24-Feb-17 17:42:14 OPERATOR NAME : Not Logged in REMARK : STERILIZATION TEMPERATURE : 121 °C STERILIZATION HOLD TIME : 15 Min STER. STOP TEMPERATURE : 120.5 °C STER. RESET TEMPERATURE : 120 °C OVERSHOOT TEMPERATURE : 131 °C HOLD PRESSURE : 15 psi CONTROL BAND : 0.2 °C PRINT INTERVAL TIME : 15 Seconds

Reported By : admin BATCH NAME : 20170224170034

DATE TIME	Control °C	Map1 °C	Map2 °C	Map3 °C	Map4 °C	Pressure [psi]
24-02-2017 17:00:34			Sta	rt_Command		
24-02-2017 17:00:35	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:00:35			Air_	Valve_Close		
24-02-2017 17:00:35			Ster	ilization_Start		
24-02-2017 17:00:48	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:01:03	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:01:18	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:01:33	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:01:48	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:02:03	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:02:18	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:02:33	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:02:48	126.2	126.2	OPEN	-1.6	OPEN	55.2
24-02-2017 17:03:03	126.2	126.2	OPEN	-1.6	OPEN	55.3
24-02-2017 17:03:18	126.2	126.2	OPEN	-1.6	OPEN	55.3
24-02-2017 17:14:18	126.2	126.2	OPEN	-1.6	OPEN	56.7
24-02-2017 17:14:33	126.2	126.2	OPEN	-1.6	OPEN	56.8
24-02-2017 17:14:48	126.2	126.2	OPEN	-1.6	OPEN	56.8
24-02-2017 17:15:03	126.2	126.2	OPEN	-1.6	OPEN	56.9
24-02-2017 17:15:18	126.2	126.2	OPEN	-1.6	OPEN	57
24-02-2017 17:15:33	126.2	126.2	OPEN	-1.6	OPEN	57
24-02-2017 17:15:38	126.2	126.2	OPEN	-1.6	OPEN	56.9
24-02-2017 17:15:38			Air_	Valve_Open		
24-02-2017 17:15:38			Ster	rilization_End		
24-02-2017 17:15:38			ACTUAL	F0 VALUE : 49.83	3	
24-02-2017 17:15:38 Stop_Command - Normal Sto			pp			
Registered By	App	roved By		Checked By		
						Page No 2

Process Precision Instruments (An ISO 9001 : 2008 Company)



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