

For detailed instructions see Controller Product Manual 51-52-25-139.

**Step 1. Record Instrument Model & Serial**

Note: Check inside label on chassis (remove from case)

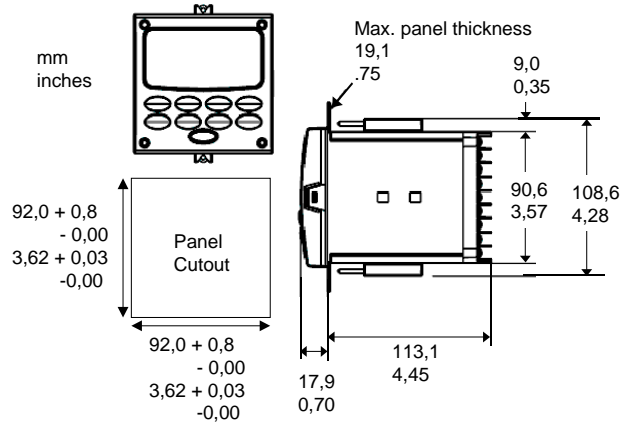
Model number: \_\_\_\_\_

Serial number: \_\_\_\_\_

**ETC32:** Superior Process Controller with Current Output and 2 alarms, or current output 1 and relay output 2 with one alarm; auxiliary output and 1 digital input or no aux-out and 2 digital inputs; 10baseT Ethernet/ModbusRTU communications; set-point programming; math functions; IR configuration port; second universal input.

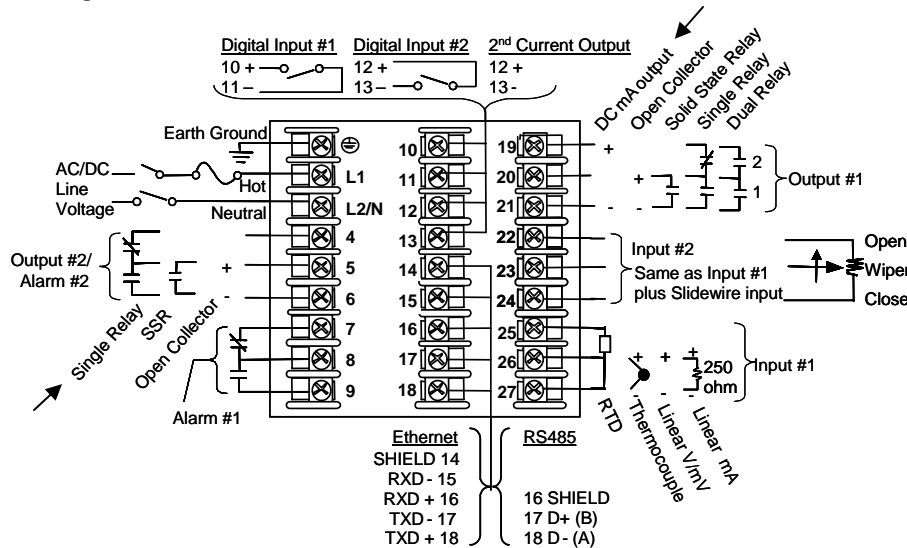
**Step 2. Dimensions and mounting**

Note: For NEMA 4 water protection, install the 4 screws and washers into the indentations at the corners of the front bezel.

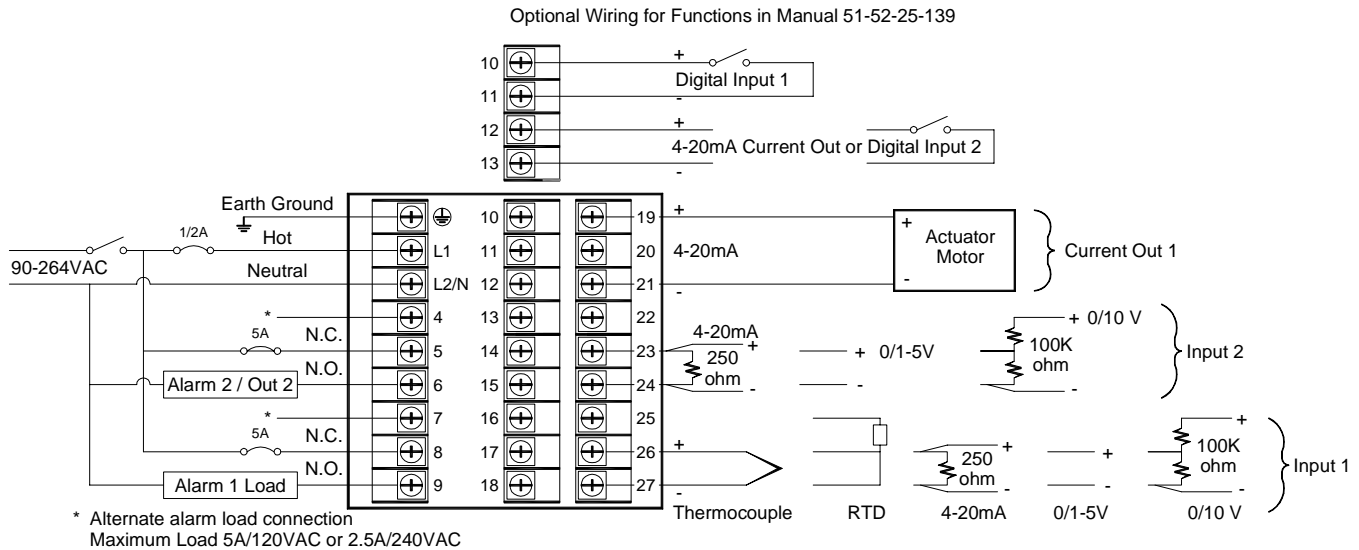


**Step 3. Wiring**

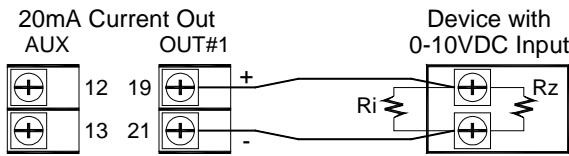
**Fig. 3-1: General Connection Diagram**



**Fig. 3-2: ETC32 for 4-20mA current driven actuators**



**Fig. 3-3: ETC32 for 0-10VDC output.**



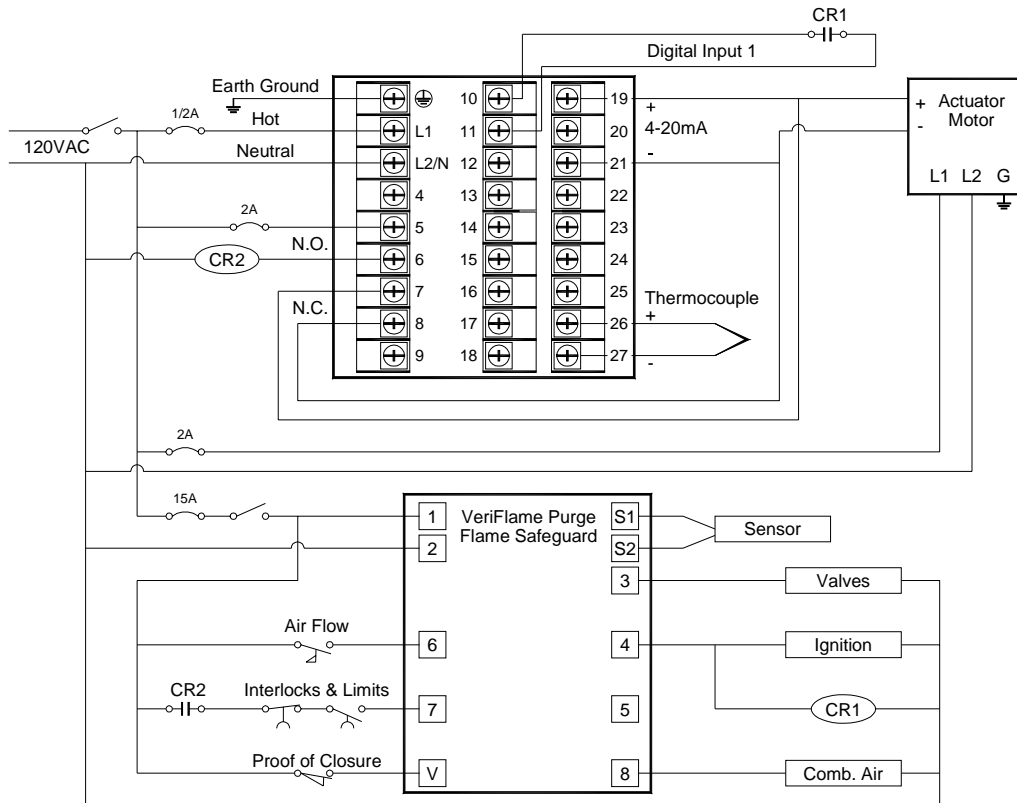
Ri is a resistor to be added to the input terminals of the device.  
Rz is the input impedance of the device. It must be greater than 500 ohms.

- Set OUTALG – CORANGE to 0-20mA to get 0V at 0%
- Measure or look up the input impedance of the driven device
- Calculate Ri resistor value from the formula:  $R_i = (500 \times R_z) / (R_z - 500)$
- Choose a 1% resistor equal to or the next greater standard value for the calculated resistance and power rating of at least 1/4W.

**Fig. 3-4: ETC32 example of wiring to VeriFlame and a 4-20mA actuator**

This circuit provides:

- a burner start position that is increased above the minimum firing rate,
- an alarm 1 setpoint to force the actuator to the minimum firing rate, and
- an alarm 2 setpoint to shut off the burner.



- In this example Alarm 1 is set for high deviation, A1S1TYPE = DE, A1S1HL = HIGH. When the temperature exceeds the setpoint by the value entered for A1S1VAL, then the contact closes across the current output causing the actuator to move to the low fire position. It will be held at low fire until the difference between the temperature and setpoint drops below the A1S1VAL setting.
- In this example Alarm 2 is also set for high deviation, A2S1TY = DE, A2S1HL = HIGH, except the value entered for A2S1VAL is set greater than for alarm 1. If the application temperature keeps rising with the actuator at low fire, then the alarm 2 contact will open. This causes the CR2 contact to remove power from the interlock input of the flame safeguard and shut down the burner. When the difference between the temperature and setpoint falls within the A2S1VAL setting, then power is restored to the flame safeguard interlock input and the burner is lit.
- Digital input 1 is used to force the output to a specific value for a burner starting position. It is useful for burners that require a higher firing rate to light reliably but can be turned down lower after lit. In the OPTION group, DIGINP1 is set to manual failsafe MANFS. The value for the starting position is entered in the CONTROL group under FAILSAFE as a percentage of output.

**Fig 3-5 Alarm Relay Contact States**



Alarm Relay Wiring	Variable NOT in Alarm State		Variable in Alarm State	
	Relay Contact	Indicators	Relay Contact	Indicators
N.O. - 5-6 or 8-9	Closed	Off	Open	On
N.C. - 4-5 or 7-8	Open		Closed	

**Step 4. Configuring the Controller**






Refer to the procedure in Table 4-2 and enter the value or selection for each prompt on Table 4-1 so you will have a record of your controller settings. Some prompts may not appear due to the settings of other prompts.

**Table 4-1: Configuration Record Sheet**

Group Prompt	Function Prompt	Value or Selection	Factory Setting	Group Prompt	Function Prompt	Value or Selection	Factory Setting	
<b>TUNING</b>	PROP BD or GAIN	_____	1.000 (GAIN)	<b>INPUT2</b>	IN2 TYPE	_____	0-10mV	
	GAINVALn	Read Only	---		XMITTER2	_____	LINEAR	
	RATE MIN	_____	0.00		IN2 HIGH	_____	1000	
	RSET MIN or RSET RPM	_____	1.00 (MIN)		IN2 LOW	_____	0	
	MAN RSET	_____	0.0		RATIO2	_____	1.00	
	PROPB2 or GAIN 2	_____	1.000 (GAIN)		BIAS IN2	_____	0	
	RATE2MIN	_____	0.00		FILTR2	_____	0	
	RSET2MIN or RSET2RPM	_____	1.00 (MIN)		BURNOUT2	_____	NONE	
	CYC SEC or CYC SX3	_____	20		EMMISIV2	_____	0.00	
	CYC2 SEC or CYC2 SX3	_____	10		<b>CONTROL</b>	PV SOURC	_____	INPUT 1
	SECURITY	_____	0			PID SETS	_____	1 ONLY
	LOCKOUT	_____	CALIB			SW VALUE	_____	0.00
	AUTO MAN	_____	ENABLE			LSP'S	_____	1 ONLY
	RUN HOLD	_____	ENABLE			RSP SRC	_____	NONE
SP SEL	_____	ENABLE	AUTOBIAS	_____		DISABLE		
<b>SPRAMP</b>	SP RAMP	_____	DISABLE	SP TRACK		_____	NONE	
	TIME MIN	_____	3	PWR MODE		_____	MANUAL	
	FINAL SP	_____	1000	PWR OUT		_____	LAST	
	SP RATE	_____	DIS	SP HILIM		_____	1000	
	EU/HR UP	_____	0	SP LoLIM		_____	0	
	EU/HR DN	_____	0	ACTION		_____	REVERSE	
	HOTSTART	_____	DISABLE	OUT RATE		_____	DISABLE	
	SP PROG	_____	DISABLE	PCT/M UP		_____	0	
<b>ACCU TUNE</b>	FUZZY	_____	DISABLE	PCT/M DN	_____	0		
	ACCUTUNE	_____	DISABLE	OUTHILIM	_____	100		
	DUPLEX	_____	MANUAL	OUTLoLIM	_____	0.0		
	AT ERR	Read Only	---	I Hi LIM	_____	100.0		
<b>ALGO RTHM</b>	CONT ALG	_____	PID A	I Lo LIM	_____	0.0		
	TIMER	_____	DISABLE	DROPOFF	_____	0		
	PERIOD	_____	0.01	DEADBAND	_____	1.0		
	START	_____	KEY	OUT HYST	_____	0.5		
	LOW DISP	_____	TI REM	FAILMODE	_____	NOLATCH		
	INP ALG1	_____	NONE	FAILSAFE	_____	0.0		
	MATH K	_____	1.0	MAN OUT	_____	0.0		
	CALC HI	_____	--	AUTO OUT	_____	0.0		
	CALC LO	_____	--	PBorGN	_____	GAIN		
	ALG1 INA	_____	INPUT 1	MINRPM	_____	MIN		
	ALG1 INB	_____	INPUT 2	<b>OPTIONS</b>	AUX OUT	_____	DISABLE	
	ALG1 INC	_____	NONE		CO RANGE	_____	4-20mA	
	ALG1BIAS	_____	0.000		LOW VAL	_____	0.0	
	PCT CO	_____	0.200		HIGH VAL	_____	100.0	
<b>OUT ALG</b>	OUTALG	_____	CUR*		DIG INP1	_____	NONE	
	RLYSTATE	_____	1OF 2ON		DIG1COMB	_____	DISABLE	
	RLY TYPE	_____	MECHAN	DIG INP2	_____	NONE		
	MOTOR TI	_____	30	DIG2COMB	_____	DISABLE		
	CUR OUT	_____	DISABLE	<b>COM</b>	Com ADDR	_____	3	
	CO RANGE	_____	4-20mA		Com STATE	_____	DISABLE	
LOW VAL	_____	0.0	IR ENABLE		_____	ENABLE		
HIGH VAL	_____	100.0	BAUD		_____	19200		
<b>INPUT1</b>	IN1 TYPE	_____	0-10mV		TX DELAY	_____	1	
	XMITTER1	_____	LINEAR		WS FLOAT	_____	FP B	
	IN1 HIGH	_____	1000	SHEDENAB	_____	DISABLE		
	IN1 LOW	_____	0	SHEDTIME	_____	30.0		
	RATIO 1	_____	1.00	SHEDMOD	_____	LAST		
	BIAS IN1	_____	0	SHEDSP	_____	TO LSP		
	FILTER 1	_____	0	UNITS	_____	ENG		
	BURNOUT	_____	NONE	CSP RATO	_____	1.0		
	EMMISIV1	_____	0.00	CSP BIAS	_____	0		
					LOOPBACK	_____	DISABLE	





Group Prompt	Function Prompt	Value or Selection	Factory Setting	Group Prompt	Function Prompt	Value or Selection	Factory Setting	
<b>ALARMS</b>	A1S1TYPE	_____	NONE	<b>DISPLY</b>	DECIMAL	_____	NONE	
	A1S1 VAL	_____	90		TEMPUNIT	_____	NONE	
	A1S1 H L	_____	HIGH		FREQ	_____	60 HZ	
	A1S1 EV	_____	--		RATIO 2	_____	DISABLE	
	A1S2TYPE	_____	NONE	LANGUAGE	_____	ENGLISH		
	A1S2 VAL	_____	10	<b>Ethernet</b> Accessible via the PIE tool	MAC Addr	_____	--	
	A1S2 H L	_____	LOW		IP Addr	_____	10.0.0.2	
	A1S2 EV	_____	--		Subnet Mask	_____	225.225.225.0	
	A2S1TYPE	_____	NONE		Default Gate	_____	0.0.0.0	
	A2S1VAL	_____	95		To Email	_____	--	
	A2S1 H L	_____	HIGH		SMPT Addr	_____	0.0.0.0	
	A2S1 EV	_____	--		Alarm	_____	NONE	
	A2S2TYPE	_____	NONE		Email Subj	_____	--	
	A2S2 VAL	_____	5					
	A2S2 H L	_____	LOW					
	A2S2 EV	_____	--					
	AL HYST	_____	0.1					
ALMOUT1	_____	NoLATCH						
BLOCK	_____	DISABLE						
DIAGNOST	_____	DISABLE						

**Table 4-2. General Configuration Procedure**



Step	Operation	Press	Result
1	Enter Set Up Mode		<i>Upper Display</i> = <b>SET</b> <i>Lower Display</i> = <b>TUNING</b> (This is the first Set Up Group title)
2	Select any Set Up Group		Sequentially displays each Set Up Group Prompt, as listed below in the <b>Configuration Record Sheet</b> . You can also use the ▲ or ▼ keys to scan the Set Up groups in both directions. Stop at the group title that describes the group of parameters you want to configure. Then proceed to the next step.
3	Select a Function Parameter		<i>Upper Display</i> = the current value or selection for the first function prompt of the selected Set Up group. <i>Lower Display</i> = the first Function prompt within that Set Up group. Sequentially displays the other function prompts of the Set Up group you have selected. Stop at the function prompt that you want to change and then proceed to the next step.
4	Change the Value or Selection	▲ or ▼	Increments or decrements the value or selection that appears for the selected function prompt. If you change the value or selection of a parameter while in Set Up mode then decide not to enter it, press the [Man/Auto] key once to recall the original value or selection. The recall does not work for a Field Calibration procedure.
5	Enter the Value or Selection		Enters value or selection made into memory after another key is pressed.
6	Exit Configuration		Exits configuration mode and returns controller to the same state it was in immediately preceding entry into the Set Up mode. It stores any changes you have made. If you do not press any keys for 30 seconds, the controller times out and reverts to the mode and display used prior to entry into Set Up mode.

## Step 6. Operation

**Table 6-1: Start Up Procedure**


Step	Operation	Press	Result
1	Select Manual Mode		Until "M" indicator is ON. The controller is in manual mode.
2	Adjust the Output	▲ or ▼	To adjust the output value and test proper operation of the final control element. <i>Upper Display = Pv Value</i> <i>Lower Display = OT and the output value in %</i>
3	Enter the Local Setpoint		<i>Upper Display = Pv Value</i> <i>Lower Display = SP and the Local Setpoint Value</i>
		▲ or ▼	To adjust the local setpoint to the value at which you want the process variable maintained. The local setpoint cannot be changed if the Setpoint Ramp function is running.
4	Select Automatic Mode		Until "A" indicator is ON. The controller is in Automatic mode. The controller will automatically adjust the output to maintain the process variable at setpoint.
5	Tune the Controller		Make sure the controller has been configured properly and all the values and selections have been recorded on the Configuration Record Sheet. Refer to Tuning Set Up group to ensure that the selections for PB or GAIN, RATE T, and I MIN, or I RPM have been entered. Use Accutune to tune the controller; see product manual for detailed procedure or refer to Tuning Set Up group to manually adjust PB or GAIN, RATE T, and I MIN or I RPM.

**Table 6-2: Procedure for Changing the Local Setpoints**

Step	Operation	Press	Result
1	Select the Setpoint		Until you see: <i>Upper Display = PV</i> <i>Lower Display = SP or 2SP or 3SP (Value)</i>
2	Change the Value	▲ or ▼	To change the Local Setpoint to the value at which you want the process maintained. The display "blinks" if you attempt to enter setpoint values beyond the high and low limits.
3	Return to PV Display		To store immediately or will store after 30 seconds.

**Table 6-3: Procedure for Switching Between Setpoints**

You can switch Local and Remote setpoints or between two Local setpoints when configured. NOTE: The REMOTE SETPOINT value cannot be changed at the keyboard.

Step	Operation	Press	Result
1	Select the Setpoint		To switch between the Three Local Setpoints and/or the Remote Setpoint. NOTE: "KEY ERROR" will appear in the lower display, if: <ul style="list-style-type: none"> <li>the remote setpoint or additional local setpoints are not configured as a setpoint source</li> <li>you attempt to change the setpoint while a setpoint ramp is enabled, or</li> <li>if you attempt to change the setpoint with the setpoint select function key disabled.</li> </ul>

**Table 6-4: Viewing the Operating Parameters**

Press the LOWER DISPLAY key to scroll through the operating parameters listed. The lower display will show only those parameters and their values that apply for a specific model.

**Lower Display Key Parameter Prompts**

Lower Display	Description
<b>OUT XX.X</b>	OUTPUT—Output value is shown in percent with one decimal point for all output types except Three Position Step Control (TPSC). For TPSC, when no slidewire is connected, this display is an estimated motor position and is shown with no decimal point. For Position Proportional Control, if the slidewire fails, then the instrument automatically switches over to TPSC and the OUT display changes with it.
<b>SP XXXX</b>	LOCAL SETPOINT #1—Also current setpoint when using SP Ramp.
<b>2SP XXXX</b>	LOCAL SETPOINT #2
<b>3SP XXXX</b>	LOCAL SETPOINT #3
<b>RSP XXXX</b>	REMOTE SETPOINT
<b>1IN XXXX</b>	INPUT 1—Used only with combinational input algorithms.
<b>2IN XXXX</b>	INPUT 2
<b>POS XX</b>	SLIDEWIRE POSITION—Used only with TPSC applications that use a slidewire input.
<b>CSP XXXX</b>	COMPUTER SETPOINT—When SP is in override.
<b>DEV XXXX</b>	DEVIATION—Maximum negative display is -999.9.
<b>PIDSET X</b>	TUNING PARAMETER —where X is either 1 or 2.
<b>ET HR.MN</b>	ELAPSED TIME—Time that has elapsed on the Timer in Hours.Minutes.
<b>OTR HR.MN</b>	TIME REMAINING—Time remaining on the Timer in Hours.Minutes. The “O” is a rotating clock face.
<b>RAMPXXXM</b>	SETPOINT RAMP TIME—Time remaining in the Setpoint Ramp in minutes.
<b>SPN XXXX</b>	SETPOINT NOW—Current Setpoint when SP Rate is enabled. The SP XXXX display shows the “target” or final setpoint value.
<b>XXRAHR.MN</b>	RAMP SEGMENT NUMBER AND TIME REMAINING—Set Point Programming display. XX is the current segment number and HR.MN is the time remaining for this segment in Hours.Minutes.
<b>XXSKHR.MN</b>	SOAK SEGMENT NUMBER AND TIME REMAINING— Set Point Programming display. XX is the current segment number and HR.MN is the time remaining for this segment in Hours.Minutes.
<b>RECYC XX</b>	NUMBER OF SP PROGRAM RECYCLES REMAINING
<b>To BEGIN</b>	RESET SP PROGRAM TO START OF FIRST SEGMENT
<b>RERUN</b>	RESET SP PROGRAM TO START OF CURRENT SEGMENT
<b>AUX XXXX</b>	AUXILIARY OUTPUT—Displayed only when output algorithm is not Current Duplex.
<b>BIA XXXX</b>	BIAS—Displays the manual reset value for algorithm PD+MR.
<b>TUNE OFF</b>	LIMIT CYCLE TUNING NOT RUNNING—Appears when Accutune is enabled but not operating.
<b>DO FAST</b>	Limit Cycle Tuning with the objective of producing quarter-damped tuning parameters. This tuning may result in PV overshoot of the SP setting.
<b>DO SLOW</b>	Limit Cycle Tuning with the objective of producing damped or Dahlin tuning parameters, depending upon the detected process deadtime. The tuning parameters calculated by this selection are aimed at reducing PV overshoot of the SP setting.



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