

# TOP CUT

TC-100XP Sampler

## CARON MEASUREMENT & CONTROLS

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# 1 INFORMATION

## 1.1 SAFETY PRECAUTIONS

- Always keep the controller cover tightly closed while powered up. Throughout this manual the term “buttons” will be used to describe both the faceplate buttons as well as the magnetic switches. Always keep the enclosure cover on tightly unless the area is known to be non-hazardous. The magnetic switches allow configuration while safely keeping the cover closed.
- Make sure both on/off switches are in the off position when sampler is not in use.
- Do not exceed 1400psi on the sample point
- Vent independently to outside of building
- For sour applications, purge the sampler properly before opening door.

## 1.2 CONTROLLER ELECTRICAL SPECIFICATIONS

Voltage	9 – 30VDC (12 or 24v based on solenoid model)
Maximum Continuous Current	2A
Typical Power Consumption	< 3w
Enclosure Rating	Type 4x
Temperature Code	T5
Ambient Temperature	-20 to 40 °C
Classification	Class I Division 1 Groups C, D
Power Supply	Class 2

## 2 TOP CUT OPERATION

The timer of the TC-100XP uses Caron Measurement & Controls Eliminator Controller and is supplied with 12 or 24v based on the equipped solenoids. The timer is configurable using the buttons on the faceplate or magnetic switches. Throughout this manual the term “buttons” will be used to describe both the faceplate buttons as well as the magnetic switches. Always keep the enclosure cover on tightly unless the area is known to be non-hazardous. The magnetic switches allow configuration while safely keeping the cover closed.

A signal sent from the level controller or other signal device turns on the electronic timer via the pressure switch. The timer then begins counting the predetermined seconds. When the specified time has elapsed, it then signals the pulse valve to open. The pulse valve receives the supply from the lower on/off switch (Micro Valve). When the pulse valve opens it sends a signal to the high-pressure sample valve, thereby giving a sample in the jug. The high-pressure sample valve handles inlet pressure up to 1440 psi. The red hand wheel will adjust sample size for as small or large a quantity required. The valve is factory set to take a 3-5 ml sample at an inlet pressure of 500 psi. This can be adjusted to best accommodate your Top Cut Sampler’s application. See section 4 on optimizing a 24-hour sample using the high-pressure sample valve and timer settings together.

### 3 INSTALLATION

Your new sampler should be installed as close as possible to the sample point. A sample quill must be used at the sample point and will have optimum results if installed in a horizontal position with a 45° angle into flow. The sample quill must be located at a point in the line where the flow stream is well mixed. A level controller or other signal device is tubed into the ¼” bulkhead on the side of sampler box labeled “Signal”. This signal should be a clean, oil-free supply of 20-30 psi. An additional 20-30 psi supply will also need to be tubed into the ¼” bulkhead on the side of the box labeled “Supply”. Process product is tubed into the ¼” bulkhead labeled “Sample” (1440 psi maximum).

The “Vent Independently” 3/8” bulkhead must be tubed to the outside of the building. The “Purge Point” is to be used in sour applications.

#### 3.1 WIRING

Power to the timer is wired through the supplied conduit brought to the outside of the cabinet. A conduit seal must be used on this connection before any fitting and withing 18” of the timer. Follow all local electrical codes.

As of Main Board version 3.0.10

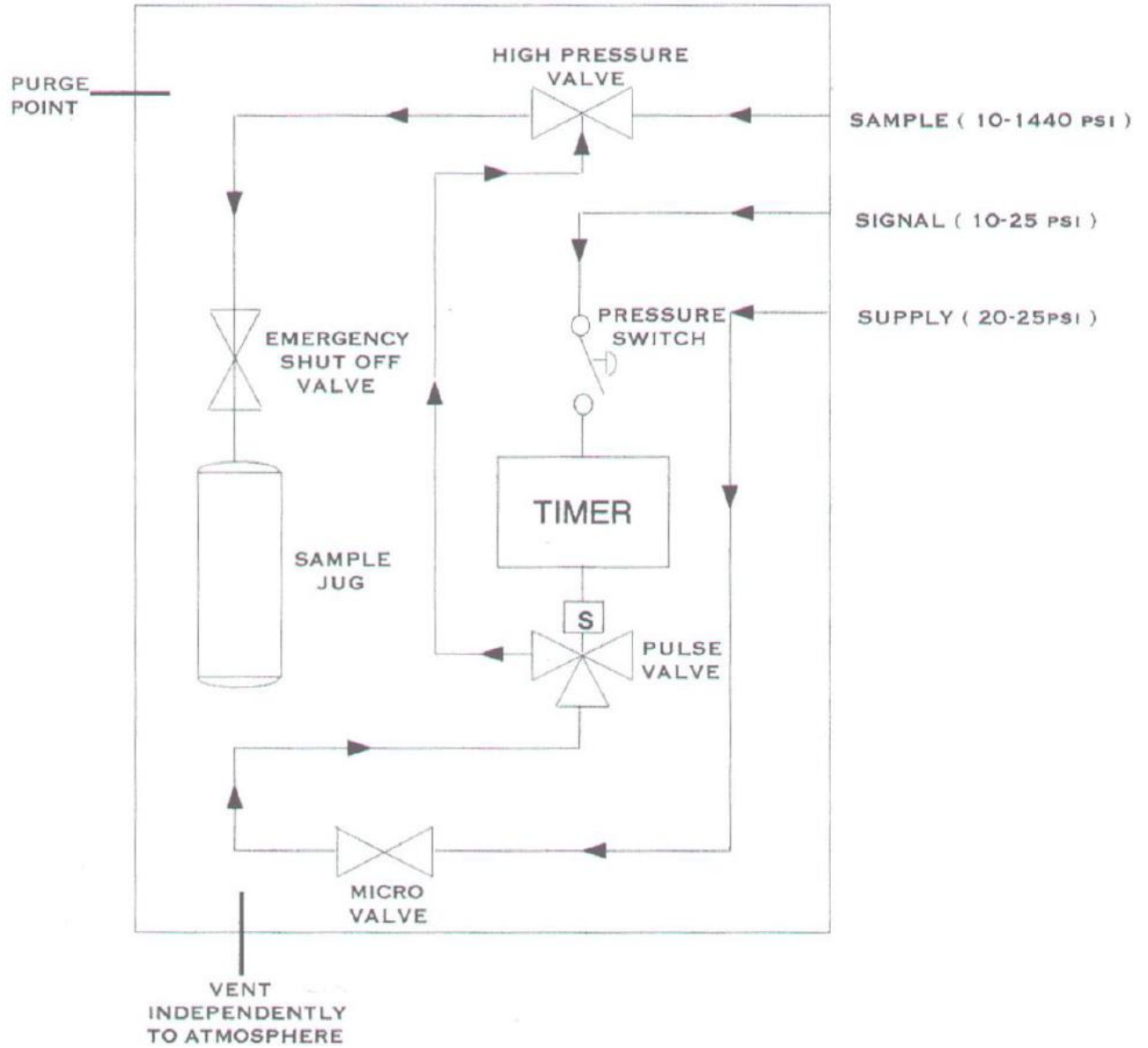
J1 Header (Bottom, Left to Right)

Q1	OPEN COLLECTOR OUTPUT Q1 (1A SINK) – SOLENOID VALVE SINK
Q2	OPEN COLLECTOR OUTPUT Q2 (1A SINK)
DO1	PUSH-PULL DC OUTPUT (100MA @ INPUT VOLTAGE)
DO2	PUSH-PULL DC OUTPUT (100MA @ INPUT VOLTAGE)
-	DC NEGATIVE
-	DC NEGATIVE
+	DC POSITIVE – SOLENOID VALVE SOURCE
+	DC POSITIVE (9-30VDC SUPPLY)

J5 HEADER (TOP, LEFT TO RIGHT)

V+	PERIPHERAL SUPPLY POSITIVE (@ INPUT VOLTAGE) – FLOW SIGNAL SOURCE
DI1	DIGITAL INPUT 1 (5-30VDC) – FLOW SIGNAL INPUT
DI2	DIGITAL INPUT 2 (5-30VDC) -
AI3	ANALOG INPUT 3 (1-5V OR 4-20MA)
AI4	ANALOG INPUT 4 (1-5V OR 4-20MA)
AO3	ANALOG OUTPUT 3 (4-20MA VERSION OF ANALOG OUTPUT 2)
A1	PORT 1 RS485 A
B1	PORT 1 RS485 B

### 3.2 SCHEMATIC DIAGRAM



## 4 START UP PROCEDURES

1. Install sample jug into basket.
2. Turn the two on/off switches to the on position.
3. Pressure up sample line.
4. Ensure a 20 psi supply to sampler is available.
5. Set the sample size to 3mL. See section 5.1 for setting sample size.
6. Set the sample time preset using the up and down magnetic buttons on the timer. There is a default of 7 presets, with "0" holding the solenoid open continuously. The time setting is the accumulated flowing time that controls when the solenoid will open. Example: If the preset is set at #2 (40 sec.), then the electronics is waiting for a signal to sampler. When the signal time has accumulated 40 seconds, the electronics will pulse the solenoid allowing the high-pressure sample valve to open.

### 4.1 SETTING SAMPLE SIZE

There are two ways to adjust this sample size: 1- adjust the size of each sample taken (preset to 3-5ml) OR, 2- adjust the total amount of sample taken. The sampler is preset to take a total sample size of 1000 ml.

In order for the timer to take samples without input signal, set the sampler to "test" mode by scrolling to the right using the "next" magnet button to the "Status" screen and use the up button to enter "Test" mode. This will energize the solenoid every 3 seconds regardless of input signal.

1. To adjust the size of each sample taken, the red hand wheel on the high-pressure sample valve is used. Turn the red knob clockwise to decrease sample size or counter-clockwise to increase until the desired quantity is reached. Take 5 samples in the syringe and use the average of these 5 volumes to get an accurate sample size reading. The syringe is necessary to ensure accurate readings will be obtained.
2. In order to increase or decrease the **total amount** of sample taken in jug, the *spring adjusting nuts* must be used. Unlock the nuts by securing the bottom one while loosening the upper (turn counter-clockwise). Two 7/16" wrenches are required for these adjustments. To **increase** the total sample, the spring needs to be **tightened**. This is done by simply turning the nuts clockwise. To **decrease** the total sample, the spring needs to be **loosened** (counter-clockwise).

To test the above adjustment, place an empty sample jug into the basket and pour similar sample liquid into it until the basket drops and sampler is off. Do this 3 times to ensure a proper setting was achieved. When the desired amount is reached, lock the spring adjusting nuts in position by again securing the bottom nut and tightening the upper nut (turn clockwise).

Navigate back to the "Status" screen and use the down button the return to "Run" mode

## 5 TIMER OPERATION

Configuration of the controller can be done via the display by using the buttons on the face or the Magnetic switches located around the enclosure. The magnetic switches allow configuration without removing the housing cover. The position of each switch is marked on the faceplate. This manual will use the term buttons throughout which describes both the faceplate buttons as well as the magnetic switches. **CAUTION: DO NOT** remove the housing cover unless the area is known to be non-hazardous.

To navigate through the screens use the Left (Back) and Right (Next) buttons. To change settings us the “UP” and “Down” buttons. Follow the prompts shown on screen for other navigational and configuration functions.

The below sections will describe the layout and function of the screens. When navigating screens, if no buttons are pressed for 30s, the screen will revert to the home screen.

### 5.1 MAIN SCREENS

#### 5.1.1 HOME SCREEN

This screen will display the current status of the sampler as well as the current preset or time setting. The screen will be turn from Green to Purple when an flow signal input is applied.

Use the “Up” and “Down” buttons to change the preset or time setting. See the “Sampler Mode” section for more information.

#### 5.1.2 SAMPLES

This is a counter of samples taken. It can be reset by pressing the “Up” button. This can be useful for verify the correct settings for the process, or verifying the correct amount of sample is being taken. For example, if the sample size is 3mL, the sample jug should have 600mL when the counter reaches 200. Or in 24hours, the sampler should have taken close to 333 samples to obtain 1000mL based on the same 3mL sample size.

#### 5.1.3 STATUS

This screen can be used to change the operating status of the sampler. Use the up and down buttons to adjust. The following are options in the following order (Press down to go lower):

- TEST: For initial setup. A sample will be taken every 3 seconds regardless of flow signal input.
- RUN: Normal running in the configured mode. Monitor for flow signal input.
- OFF: Sampler not in use.

#### 5.1.4 MENU ACCESS

Press “Up” on this screen to access the menu for configuration.

## 5.2 MENU SCREENS

**IMPORTANT:** If settings are modified, you **must** navigate to the “Save and Exit” screen to save the changes to memory. If you let the screen time out and return to the home screen, the settings will be applied, but will not persist upon power cycle.

Changes made take effect immediately but will not be saved to non-volatile memory until saved using the “Save and Exit” screen.

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### 5.2.1 PULSE TIME

The length of time that the solenoid is pulsed to open the sample valve. This is preset at factory to 680ms. It can be adjusted to account for different viscosities of product or when desired sample size cannot be obtained with the high pressure sample valve adjustment.

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### 5.2.2 SAMPLER MODE

Change the operating mode of the sampler. Options are:

- **TIME:** Sampler operates using a timed interval. Adjustments are made directly to the time setting in seconds.
- **PRESET:** Sampler operates using a timed interval. Times are setup in preset times and adjusted by selecting a preset. There are 7 configured by default and can be adjusted up to 20. Presets times can be customized using the “Modify Presets” screen.

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### 5.2.3 NUM OF PRESETS

Adjust the number of available presets. Maximum number is 20.

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### 5.2.4 MODIFY PRESETS

Edit the times of individual presets. Press up to edit the presets. Scroll left (Back) and Right (Next) to scroll through the available presets and use Up and Down to adjust the times.

**IMPORTANT:** If settings are modified, you **must** navigate to the “Save and Exit” screen to save the changes to memory. If you let the screen time out and return to the home screen, the settings will be applied, but will not persist upon power cycle.

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### 5.2.5 FACTORY RESET

Reset all configured settings to their defaults. Press Up 5 times to reset.

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### 5.2.6 SAVE AND EXIT

Save any changes to settings and exit the menu.

### If there is no sample in the Jug:

make sure both on/off switches are in the on position

- make sure that both the signal and supply pressure are at least 20 psi; if the pressure is lower the sampler may not work
- make sure the sample line does not have some kind of blockage; if there is a possibility of this, turn the red hand wheel on the high-pressure valve counter-clockwise to increase sample size and remove blockage or clean tubing line to sample
- In order for the high-pressure sample valve to give a sample, the solenoid valve must send a signal for it to open. The solenoid valve is located at the bottom of the timer enclosure (see schematic drawing). You should be able to hear the solenoid valve click when it is sending this signal. If you cannot hear the valve click, next check the electronics
- To test the electronics you can check for a voltage pulse on the Q1 + and - terminals on the bottom of the timer board inside the enclosure.
  - Note: In test or standard mode the pulse may be shorter than some multimeters can pickup. Close a valve on the sample line and change to preset 0 which holds the solenoid open. You should be able to read 24 or 12v depending on the model.
- Follow the setting sample size procedure in section 5.1

**For additional support call 780-524-5954**