Orenco® SYSTEMS *Instructions*

TCOM™ Timer Setting Guide

Instructions For Setting Recirculating Pump Timers In Orenco® Telemetry Control Panels

Overview

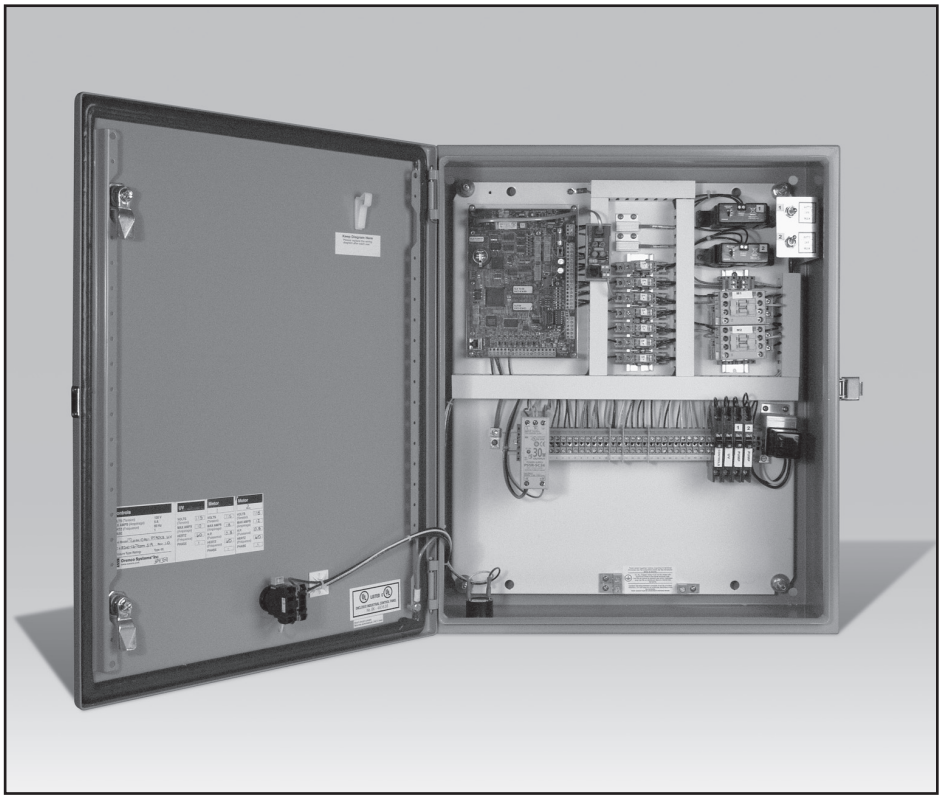
Orenco's TeleComm (TCOM) Control panels for AdvanTex ® AX100 Treatment Systems are integrated panels that include digital control, data logging, and remote access. With TCOM Control Panels, you can remotely adjust operational parameters and monitor the system's function in real time. The unit has been programmed at the factory for the control functions specified in the design. Some operational parameters, such as recirculation timers, may require adjusting for your specific application.

This document discusses the methods for setting recirculation timing. It supplements the general login and menu structure information found in Custom TCOM™ Control Panels and HyperTerminal Access (EIN-CP-TCOM-3). For additional information specific to your panel, consult your panel-specific TCOM Settings Guide. Read and understand all three of these documents before setting your recirculation timer.

TCOM Control Panels have three modes for recirculation timing:

Estimated Flow Mode is the default mode set by the factory. It's used at startup and when there is not enough flow trend data to implement Trend mode. It enables you to adjust and set the timer using projected flow data without manual calculations. Estimated Flow Mode changes are made on the Rec. Tank Auto Timer Settings page.

Trend Mode is the preferred timer setting mode for established systems. Trend Mode enables the panel to run the recirculation timers automatically using historical flow trend data. This mode can only be used after enough historical flow trend data has been collected to enable the system to set the recirculation timers automatically. We recommend that a minimum of two weeks trend data be recorded before this mode is used. Trend Mode changes are also made on the Rec. Tank Auto Timer Settings page.



Manual Mode is the mode used to address special circumstances, or to tightly constrain recirculation timer settings. It enables you to manually calculate and input recirculation on and off times based on formulas provided in this document. Manual Mode changes are made on the *Rec. Tank Manual Timer Settings* page.

General Setting Instructions

This section covers general information about changing recirculation timer settings.

The screens to the left show typical examples of the TCOM **Rec. Tank Auto Timer Settings** page, **Rec. Tank Manual Timer Settings** page, and **Recirc Tank Status** page.

NOTE: *Screen font styles, sizes, line numbers, and items appearing on page screens may differ, depending on system configuration and user settings.*

To change TCOM recirculation timer settings, first select the correct System Status Display page. Changes to Estimated Flow Mode and Trend Mode are made on the **Rec. Tank Auto Timer Settings** page. However, recirculation timer "on" settings for all three modes can only be adjusted from the **Rec. Tank Manual Timer Settings** page. If the Manual Time Set "Value" datapoint on the **Rec. Tank Manual Timer Settings** page is set to "on," then Manual mode settings will override all recirculation timer setting inputs based on trend or estimated flow! Other changes to Manual mode can be made on the **Rec. Tank Manual Timer Settings** page, as well.

You can view and confirm changes made to a recirculation timer mode on the **Recirc Tank Status** page.

When you are on the page you want, use your keyboard's directional arrows to move your cursor and select a specific parameter. To change the state of the parameter, key the alpha character for the change you want to make from the legend shown at the bottom of the System Status Display pages. Then key "enter" or "return." To change a numeric value, select the value you want to change, key in "C," then input the new numeric value, and key "enter" or "return."

Page Key

- **PT#** provides each line item with an indentification number. This information is specific to your TCOM panel.
- **Description** displays the name and function of the line item.
- **Value** can describe the line item's state, or its numeric value.
- **Sts** identifies the line item value as either automatic ("A") or constrained ("C").
- **CurTm**, **PrevTm**, and **Why**? are explained in *Custom TCOM™ Control Panels and HyperTerminal Access* (EIN-CP-TCOM-3) .
- **Choices** explains which key to press to make a particular status or numeric value change to a timer setting.

HMI-Equipped Panels

Some control panels are equipped with an optional, built-in graphic Human Machine Interface (HMI) touchscreen. The HMI provides a direct method for viewing and manually setting parameters at the panel, which is not covered in this document. Inputting values for HMI-equipped panels using the standard text interface is the same as for non-HMI-equipped panels, with one important, additional step:

You must return all changed "Value" datapoints to "A" after entering all of your new settings, or those values not returned to "A" will not be changeable from the HMI touchscreen.

```
L0 Ok Std              SYSTEM STATUS DISPLAY      TUE 7/29/08  17:41
<==================================================================
Quote #061208B1  Custom #123456        Rec. Tank Auto Timer Settings
 Pt#  Description          Value       Sts CurTm      PrevTm    Why?
  49 Use Trend Data?        off O/F    A  0:02:59   0:00:00   OFF
  50
  51 Ret RecircRatio         3.0 X:1   C  0:02:59   0:00:00   3.0
  52 RT Max Off Time        10.0 Min   C  0:02:59   0:00:00   10.0
  53 RT Min Off Time         0.5 Min   C  0:02:59   0:00:00   0.5
  54
  55 No. of Days-Avg        28.0 1-28  A  0:02:59   0:00:00   28.0
  56 Avg Daily Flow       6000.0 GPD      0:02:59   0:00:00   Rule
  57 @Peak Flow          12000.0 GPD      0:02:59   0:00:00   P390
  58 RT TrendOffTime        2.55 Min      0:02:59   0:00:00   Rule
  59 RT Trend OVROff        0.53 Min      0:02:59   0:00:00   Rule
  60
  61 EstAvgDailyFlow      6000.0 GPD   A  0:02:59   0:00:00   6000.0
  62 EstPeakDayFlow      12000.0 GPD   A  0:02:59   0:00:00   12000.0
  63 RT EstFlowOffTm        2.55 Min      0:02:59   0:00:00   Rule
  64 RTEstFlowOvrOff        0.53 Min      0:02:59   0:00:00   Rule

Choices: A(auto) O(on) F(off) C(const) P(point) T(timer) N(num) M(menu)
```

Typical Rec. Tank Auto Timer Settings page

```
L0 Ok Std              SYSTEM STATUS DISPLAY      TUE 7/29/08  17:42
<==================================================================>
Quote #061208B1  Custom #123456        Rec. Tank Manual Timer Settings
 Pt#  Description          Value       Sts CurTm      PrevTm    Why?
  65 Manual Time Set        on O/F     A  0:03:32   0:00:00   OFF
  66
  67 RT Man Off Time        2.55 Min   A  0:03:32   0:00:00   2.55
  68 RT Man Ovr Off         0.53 Min   A  0:03:32   0:00:00   0.53
  69
  70 RT On Time              1.5 Min   A  0:03:32   0:00:00   1.5
  71 RT OVR On Time          1.5 Min   A  0:03:32   0:00:00   1.5
  72
  73

Choices: A(auto) O(on) F(off) C(const) P(point) T(timer) N(num) M(menu)
```

Typical Rec. Tank Manual Timer Settings page

```
L0 Ok Std              SYSTEM STATUS DISPLAY      TUE 7/29/08  17:40
<==================================================================>
Quote #061208B1  Custom #123456        Recirc Tank Status
 Pt#  Description          Value       Sts CurTm      PrevTm    Why?
  17 RT Alarm Status           OK          0:00:33   0:01:02   "OK
  18 RT Pump Mode        OffCycl           0:00:33   0:01:02   Rule
  19 RT Lead Pump            Two        A  0:01:21   0:00:14   Rule
  20
  21 RT Timer Mode        Normal           0:00:33   0:01:02   Rule
  22 RT Timer Type       EstFlow           0:01:35   0:00:00   "EstFlow
  23 RTOffTimeStatus      Normal           0:01:35   0:00:00   "Normal
  24 RTActiveOffTime        2.55           0:01:35   0:00:00   Rule
  25 RTActiveOnTime          1.5           0:01:35   0:00:00   Rule
  26
  27 RT Pump1 Status          Off          0:01:35   0:00:00   Rule
  28 RT Pump2 Status          Off          0:01:35   0:00:00   Rule
  29
  30
  31
  32

Choices: A(auto) O(on) F(off) C(const) P(point) T(timer) N(num) M(menu)
```

Typical Recirc Tank Status page

HMI touchscreen

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```
LO Ok Std              SYSTEM STATUS DISPLAY      TUE

<==================================================

Quote #061208B1  Custom #123456        Rec. Tank Manu

 Pt#  Description            Value       Sts CurTm
  65 Manual Time Set          off O/F    A  0:03:32
  66
  67 RT Man Off Time         2.55 Min    A  0:03:32
  68 RT Man Ovr Off          0.53 Min    A  0:03:32
  69
  70 RT On Time               1.5 Min    A  0:03:32
  71 RT OVR On Time           1.5 Min    A  0:03:32
  72
```

Make sure the Manual Time Set "Value" datapoint is "off" before entering trend or estimated flow data

```
LO Ok Std              SYSTEM STATUS DISPLAY

<==================================================

Quote #061208B1  Custom #123456        Rec. Tank

 Pt#  Description            Value       Sts CurTm
❶ 49 Use Trend Data?           off O/F    A  0:02:
  50
❷ 51 Ret RecircRatio           3.0 X:1    C  0:02:
❸ 52 RT Max Off Time          10.0 Min    C  0:02:
❹ 53 RT Min Off Time           0.5 Min    C  0:02:
  54
  55 No. of Days-Avg          28.0 1-28   A  0:02:
  56 Avg Daily Flow         6000.0 GPD       0:02:
  57 @Peak Flow            12000.0 GPD       0:02:
  58 RT TrendOffTime          2.55 Min       0:02:
  59 RT Trend OVROff          0.53 Min       0:02:
  60
❺ 61 EstAvgDailyFlow        6000.0 GPD    A  0:02:
❻ 62 EstPeakDayFlow        12000.0 GPD    A  0:02:
  63 RT EstFlowOffTm          2.55 Min       0:02:
  64 RTEstFlowOvrOff          0.53 Min       0:02:

Choices: A(auto) O(on) F(off) C(const) P(point)
```

Changing default values in Estimated Flow Mode

```
LO Ok Std              SYSTEM STATUS DISPLAY

<==================================================

Quote #061208B1  Custom #123456        Rec. Tank

 Pt#  Description            Value       Sts CurTm
❶ 49 Use Trend Data?           on O/F    A  0:02:
  50
❷ 51 Ret RecircRatio           3.0 X:1    C  0:02:
❸ 52 RT Max Off Time          10.0 Min    C  0:02:
❹ 53 RT Min Off Time           0.5 Min    C  0:02:
  54
❺ 55 No. of Days-Avg          28.0 1-28   A  0:02:
  56 Avg Daily Flow         6000.0 GPD       0:02:
  57 @Peak Flow            12000.0 GPD       0:02:
  58 RT TrendOffTime          2.55 Min       0:02:
  59 RT Trend OVROff          0.53 Min       0:02:
  60
  61 EstAvgDailyFlow        6000.0 GPD    A  0:02:
  62 EstPeakDayFlow        12000.0 GPD    A  0:02:
  63 RT EstFlowOffTm          2.55 Min       0:02:
  64 RTEstFlowOvrOff          0.53 Min       0:02:

Choices: A(auto) O(on) F(off) C(const) P(point)
```

Changing default values in Trend Mode

Detailed Setting Instructions

This section covers detailed instructions for changing recirculation timer settings in each mode.

Before entering trend or estimated flows, be sure the **Manual Time Set** "Value" datapoint on the **Rec. Tank Manual Timer Settings** page is set to "off."

Although the default return recirculation value is set at 3 from the factory, actual return recirculation ratios can range from 2-5.

If the number of recirculating pumps operating in the system varies seasonally or due to system expansion, the **PumpsPerDose** "Value" datapoint (not covered in this document) must be set correctly for all three modes of timer settings. Call Orenco for more information.

1: Changing Settings in Estimated Flow Mode

Go to the **Rec. Tank Auto Timer Settings** page to make changes.

1. Change the "Value" datapoint for **UseTrend Data?** to "off" by keying "A"or "F" and then keying "enter."
2. If a return recirculation ratio other than the default value of 3 is desired, change the **Ret RecircRatio** "Sts" datapoint to "C," key "enter," input the new numerical value, and key "enter" again.
3. To set the maximum off-time during extended periods of low flows, change the **RT Max Off Time** "Sts" datapoint to "C," key "enter," input the new numerical value, and key "enter" again.
4. To set the minimum off-time during extended periods of high flows, change the **RT Min Off Time** "Sts" datapoint to "C," key "enter," input the new numerical value, and key "enter" again.
5. To change the **EstAvgDailyFlow** "Sts" datapoint to "C," key "enter," input the projected daily flow number, and key "enter" again.
6. To change the **EstPeakDayFlow** "Sts" datapoint to "C," key "enter," input the estimated peak flow number, and key "enter" again.

2: Changing Settings in Trend Mode

Go to the **Rec. Tank Auto Timer Settings** page to make changes.

1. Change the "Value" datapoint for **Use Trend Data?** to "on" by keying "O" and then keying "enter."
2. If a return recirculation ratio other than the default value of 3 is desired, change the **Ret Recirc Ratio** "Sts" datapoint to "C," key "enter," then input the new numerical value and key "enter" again.
3. To set the maximum off-time during extended periods of low flows, change the **RT Max Off Time** "Sts" datapoint to "C," key "enter," input the new numerical value, and key "enter" again.
4. To set the minimum off-time during extended periods of high flows,change the **RT Min Off Time** "Sts" datapoint to "C," key "enter," input the new numerical value, and key "enter" again.
5. If a data range for flow trending other than the default value of 28.0 days is desired, change the **No. of Days-Avg** "Value" data point to "C," key "enter," input the new numerical value, and key "enter" again.

3: Changing Settings in Manual Mode

Go to the **Rec. Tank Manual Timer Settings** page. Use the equations below as a basis for calculating recirculation tank manual off time and recirculation tank manual override off time. Times given are in minutes.

NOTE: *Off time cannot be less than 30 seconds for normal and override timer settings.*

Normal timer settings:
On time = 1.5 minutes (Default)
Off time is described in the equation below:

$$T_r = \left[\frac{(T_d)(1440)(Q_d)(P_d)}{(R_b+1)(Q_a)}\right] - T_d$$

Override timer settings:
On time = 1.5 minutes (Default)
Off time is described in the equation below.

$$T_r = \left[\frac{(T_d)(1440)(Q_d)(P_d)}{(R_b+1)(Q_p)}\right] - T_d$$

For both equations:

T_r = *Off time, in minutes (rest)*

T_d = *On time, in minutes (1.5-minute dose, default)*

1440 = *Available minutes per 24-hr day*

Q_d = *Actual pump dose rate in gallons or liters per minute*

P_d = *Number of pumps per dose*

R_b = *Return recirculation ratio (recirc-blend ratio)*

Q_a = *Average daily flow in gallons or liters per day*

Q_p = *Peak daily flow in gallons or liters per day (estimated at 2× the average daily flow total, unless specified otherwise)*

1. Change the **Manual Time Set** "Value" datapoint to "on" by keying "O" and then keying "enter."
2. Change the **RT Man Off Time** "Sts" datapoint to "C," key "enter," input the new numerical value, and key "enter" again.
3. Change the **RT Man OVR Off** "Sts" datapoint to "C," key "enter," input the new numerical value, and key "enter" again.
4. If a recirculation timer "On" setting other than the default is desired, change the **RT On Time** "Sts" datapoint to "C," key "enter," input the calculated values, and key "enter" again.
5. If a recirculation timer "OVR On" setting other than the default is desired, change the **RT OVR On Time** "Sts" datapoint to "C," key "enter," input the calculated values, and key "enter" again.

NOTE: *For additional assistance with recirculation timer settings, contact Orenco's Engineered Systems Department at (541) 459-4449 or (800) 348-9843.*

```
LO Ok Std              SYSTEM STATUS DISPLAY

<=============================================

Quote #06120881  Custom #123456        Rec. Tank

 Pt#  Description           Value       Sts CurTm
❶ 65 Manual Time Set           on O/F    A  0:03:
  66
❷ 67 RT Man Off Time         2.55 Min    C  0:03:
❸ 68 RT Man Ovr Off          0.53 Min    C  0:03:
  69
❹ 70 RT On Time               1.5 Min    C  0:03:
❺ 71 RT OVR On Time           1.5 Min    C  0:03:
  72
  73
  74
  75
  76
  77
  78
  79
  80

Choices: A(auto) O(on) F(off) C(const) P(point)
```

Changing values in Manual mode

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