Feed Smart™ Feed Timer for Aquaculture Monitors Models 5200A and 5400
Manages Feed Delivery

- Standard in YSI 5200A and 5400 continuous monitors
- Setup from monitor menu or from AquaManager™ desktop software
- Can be used with most powered feeders
- Up to 100 feedings per day
- Can decrease feed amounts by user defined % based on DO, Temperature and pH values
- Increases feed amount on a daily basis using the user defined FCR (Feed Conversion Ratio)
- Feed amounts are determined by “rate based” calculations and a simple one-step calibration process
- Multiple modes of operation for versatility; Continuous or Timed Mode and can be used with or without FCR and Parameter Control functions
- Units of measure; ounce (oz), pound (lbs), kilogram (kg), gram (g)
Feed Timer

Enabled
Yes / No

Setup

Select Relay

Feed Days
M T W T F S S
Y Y Y Y N N

Start Date: 11/12/00
Press Enter to Accept

End Date: 12/12/00
Press Enter to Accept

Mode: Timed
Press Enter to Accept

Start Time: 8:00 AM
Press Enter to Accept

Stop Time: 9:00 PM
Press Enter to Accept

Daily Wt 0125.0 oz
Press Enter to Accept

Daily Feedings 05
Press Enter to Accept

Feeder

FCR

Enabled Yes/No

Biomass 000000 oz
Press Enter to Accept

Feed 03.0% of biomass
Press Enter to Accept

Daily Wt 00125.0 oz
Press Enter to Accept

FCR 1.5 to 1.0
Press Enter to Accept

Parameter

Enabled Yes/No

High DO 7.00 mg/L
Press Enter to Accept

High Temp 25.0°C
Press Enter to Accept

High pH 7.00
Press Enter to Accept

Temps units (C or F) are selected when units are selected in temp menu.

Low DO 6.00 mg/L
Press Enter to Accept

Low Temp 02.0°C
Press Enter to Accept

Low pH 1.00 pH
Press Enter to Accept

Low pH 1.00 pH
Press Enter to Accept

Calibrate / Test

Test On Time 100 sec
Press Enter to Accept

Weight 0125.0 oz
Enter measured weight

2.0% / 0.1mg/L Δ
Enter % decrease. Press Enter to Accept.

3.0% / 0.1°C Δ
Enter % decrease. Press Enter to Accept.

2.5% / 0.1 pH Δ
Enter % decrease. Press Enter to Accept.

User selectable

Feed Smart Software Flow
Feed Timer Setup

AquaManager Setup Screen  (AquaManager is not required)
Continuous Mode

- Select what days you would like to feed, i.e. Monday, Tuesday, Thursday
- Select a start and end date
- Enter a daily feed amount
- Enter the number of feedings/day
Timed Mode

- Select what days you would like to feed, i.e. Monday, Tuesday, Thursday
- Select a start and end date
- Select the time you would like to feed, i.e. Start 8:00AM and End 6:00PM
- Enter a daily feed amount
- Enter the number of feedings/day
Example of calculations:

<table>
<thead>
<tr>
<th>Timed Mode</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Time - Calibration</td>
<td>60</td>
<td>Seconds</td>
</tr>
<tr>
<td>Feed Weight Per Test</td>
<td>10</td>
<td>Pounds</td>
</tr>
<tr>
<td>Rate (calculated)</td>
<td>0.166666667</td>
<td>lbs/sec</td>
</tr>
<tr>
<td>Start Time</td>
<td>8:00</td>
<td>AM</td>
</tr>
<tr>
<td>Stop Time</td>
<td>6:00</td>
<td>PM</td>
</tr>
<tr>
<td>Total Available Time</td>
<td>600</td>
<td>Min/day</td>
</tr>
<tr>
<td>Daily Weight</td>
<td>100</td>
<td>lbs</td>
</tr>
<tr>
<td>Daily Feedings</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Weight per Feeding</td>
<td>2</td>
<td>lbs</td>
</tr>
<tr>
<td>On time per feeding</td>
<td>12</td>
<td>sec</td>
</tr>
<tr>
<td>Time between feedings</td>
<td>12</td>
<td>min</td>
</tr>
</tbody>
</table>
FCR Feeding

- Can be used in either Continuous or Timed Modes
- Select what days you would like to feed, i.e. Monday, Tuesday, Thursday
- Select a Start and End date
- Select the time you would like to feed, i.e. Start 8:00AM and End 6:00PM (Timed Mode)
- Enter the number of feedings per day
- Enter starting biomass – will be recalculated daily and can be adjusted as needed, based on FCR
- Enter % of biomass to be feed – used to calculate daily feed amount
- Enter anticipated FCR – used to calculate biomass
### FCR and Biomass Calculation

**Example of calculations:**

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
<th>Day 6</th>
<th>Day 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed % Biomass</td>
<td>9.90%</td>
<td>9.90%</td>
<td>9.90%</td>
<td>9.90%</td>
<td>9.90%</td>
<td>9.90%</td>
<td>9.90%</td>
</tr>
<tr>
<td>Biomass</td>
<td>2000</td>
<td>2132</td>
<td>2272.712</td>
<td>2422.711</td>
<td>2582.61</td>
<td>2753.062</td>
<td>2934.764</td>
</tr>
<tr>
<td>Daily Feed Amount</td>
<td>198</td>
<td>211.068</td>
<td>224.9985</td>
<td>239.8484</td>
<td>255.6784</td>
<td>272.5532</td>
<td>290.5417</td>
</tr>
<tr>
<td>Cumulative Feed Amount</td>
<td>198</td>
<td>409.068</td>
<td>634.0665</td>
<td>873.9149</td>
<td>1129.593</td>
<td>1402.146</td>
<td>1692.688</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCR Factor to 1.0</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCR made into a decimal</td>
<td>0.666667</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in Biomass</td>
<td>132</td>
<td>140.712</td>
<td>149.999</td>
<td>159.8989</td>
<td>170.4523</td>
<td>181.7021</td>
<td>193.6944</td>
</tr>
<tr>
<td>Cumulative Biomass Increase</td>
<td>132</td>
<td>272.712</td>
<td>422.711</td>
<td>582.6099</td>
<td>753.0622</td>
<td>934.7643</td>
<td>1128.459</td>
</tr>
<tr>
<td>Calculated New Biomass</td>
<td>2132</td>
<td>2272.712</td>
<td>2422.711</td>
<td>2582.61</td>
<td>2753.062</td>
<td>2934.764</td>
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<th>Day 6</th>
<th>Day 7</th>
</tr>
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<tbody>
<tr>
<td>Feed % Biomass</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
</tr>
<tr>
<td>Biomass</td>
<td>2000</td>
<td>2050</td>
<td>2101.25</td>
<td>2153.781</td>
<td>2207.626</td>
<td>2262.816</td>
<td>2319.387</td>
</tr>
<tr>
<td>Daily Feed Amount</td>
<td>100</td>
<td>102.5</td>
<td>105.0625</td>
<td>107.6891</td>
<td>110.3813</td>
<td>113.1408</td>
<td>115.9693</td>
</tr>
<tr>
<td>Cumulative Feed Amount</td>
<td>100</td>
<td>202.5</td>
<td>307.5625</td>
<td>415.2516</td>
<td>525.6329</td>
<td>638.7737</td>
<td>754.743</td>
</tr>
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<td>0.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in Biomass</td>
<td>50</td>
<td>51.25</td>
<td>52.53125</td>
<td>53.84453</td>
<td>55.19064</td>
<td>56.57041</td>
<td>57.98467</td>
</tr>
<tr>
<td>Cumulative Biomass Increase</td>
<td>50</td>
<td>101.25</td>
<td>153.7813</td>
<td>207.6258</td>
<td>262.8164</td>
<td>319.3868</td>
<td>377.3715</td>
</tr>
<tr>
<td>Calculated New Biomass</td>
<td>2050</td>
<td>2101.25</td>
<td>2153.781</td>
<td>2207.626</td>
<td>2262.816</td>
<td>2319.387</td>
<td>2377.372</td>
</tr>
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</table>
• Can be used in any feeding mode
• Reduces the amount of feed based on user defined criteria
  ➢ Define High and Low values – between these values feeding is 100%
  ➢ Enter % decrease in feed weight based on change in parameter condition, i.e. 2.0% / .1mg/L
  ➢ Can be set to turn off feeding if conditions warrant
• Controls can be set for dissolved oxygen, temperature and pH and values are additive
• All values are user selectable
• Event logging can record every time the feeder turns on and off

• Data is also in tabular form
Advantages

- Low start up capital cost – included with 5200A and 5400 monitors
- Very flexible, easy to setup and use
- Saves money on labor vs other feeding methods
- Increases yields and reduces feed waste
- Parameter control protects livestock if water quality deteriorates