LAKOS MULTI-TOWER SWITCHING KIT (MTSK)
QUICK START GUIDE

INTRODUCTION

The LAKOS Multi-Tower Switching Kit (MTSK) is a standalone unit that can be used to switch filtration cycles between 2-4 individual cooling towers and requires a separate 120VAC/1 power source. All valve switching is controlled directly by the Zelio Smart Relay. There are no options provided as standard for remote control of the valve switching by an external controller. The Zelio Smart Relay comes with a factory preset program that should be modified for the individual application. The instructions below provide information on how the settings can be adjusted accordingly.

The MTSK has two operating modes that can be selected thru a switch on the controller marked “TIMED” or “CONTINUOUS”. In the “CONTINUOUS” mode the unit will continuously cycle thru the cooling towers based on the cycle times for each tower. Once it has cycled thru all the towers it will return to the first tower and start the cycle over again. This is a 24/7 cycling of the valves, even though the LAKOS Tower Clean Filtration Package may not be operating at all times.

In the “TIMED” mode the operator can “fine tune” the valve switching operation with adjustable values such as “Weeks”, “Days”, and “Cycle Time START/STOP” options. This mode can be used to cycle the switching valves during a normal operating day (8-5) and then idle the valves until the next day of normal operation, and even set the valves to an idle position over a weekend when the rest of the equipment is idle as well.

INITIAL TIME SETTING FOR LOCATION

The LAKOS MTSK (Multi-Tower Switching Kit) comes preset from the factory with the time settings based on Pacific Standard Time (PST) and all 4 tower settings are active with a 2 hour (120 minute) run cycle. These settings should be modified to meet your location time (EST, CST, MST, etc…) and the correct number of towers that are being operated (2, 3, or 4). Please follow instructions below for these two setting changes:

CLOCK TIMER SETTINGS

1. Turn power switch to ON (POWER ON light should illuminate).
2. Press the green “Menu/OK” button to take you to the Edit Screen. Using the down/up arrow keys scroll down the Menu to “CHANGE D/H” and press the green button again.
3. Using the down/up and right/left arrow keys set the Date, Month, Year, and Time based on your location. Time is based on a full 24 hour clock (14:00 = 2:00 PM) Once the setting are correct hit the “Menu/OK” green button again to take you back to the Edit Screen.
TOWER DURATION SETTING

4. Use the down/up arrow keys to scroll to “PARAMETERS” (flashing), press the green button once again

5. “R00B040” is the Daily Timer screen to set the time the controller turns on and off daily. There are various features that can be adjusted in this screen including “Weeks” (W), “Days” (D), and “Cycle Start Time” (0:00 ON). These setting can be used to adjust the switching valve operation based on a weekly, daily, and specific start time. An example would be if the application only operates M-F from 8-5 and is idle on the weekends. So the operator could go to this screen and change “D” from 0 1 2 3 4 5 6 (7 day operation) to show 0 1 2 3 4 - - which would run the switching valve M-F (01234) and sit idle on Saturday-Sunday (56). The “-” Symbol is used to turn off the program. The operator would also set the “Cycle Start Time” from 0:00 to 8:00 and the valves would start cycling at 8 AM. The “Weeks”, “Days”, and “Cycle Start Time” are only used when the center switch is set to “TIMED” operation.

6. Press the up arrow once to go to the “R00B048” time setting to start setting the tower run cycle times.

7. Line “R00B048” is the Tower #1 run duration time in minutes. The MAXIMUM run cycle time on each tower is 540 minutes (9 hours). To leave this value alone, go to step 5. To change this timer, press the right arrow button once to highlight “C=000xx”. Use the up or down arrow button to change the value. Press the green button to show “CONFIRM CHANGES”. With “YES” flashing, press the green button again to confirm. This returns you to the “R00B048” screen. Press the right arrow to highlight the “R00B048” line.

8. Press the up arrow once to go to the “R00B049” (Tower #2) timer setting. Repeat the steps outlined in step 4 to change Tower #2 run duration.

9. Repeat steps 4 and 5 as applicable for line “R00B050” (Tower #3) and line “R00B051” (Tower #4) settings.

10. Depending on the number of towers you have for your application you will need to “Turn Off” the towers that don’t exist. For example if you have 3 towers total you should adjust the settings for “R00B048”, “R00B049”, and “R00B050”. For the last tower “R00B051” that doesn’t exist you will need follow step 7 above and set the time for “0” to always bypass this tower. This would be the same if you had 2 towers, you would adjust the run duration time to “0” for “R00B050” and “R00B051”.

11. When complete, press the green button to return to the run screen. The system is now running again with the updated timer settings. The display will show the tower that is now in service and the amount

NORMAL OPERATIONS

Turn center switch below to “TIMED” for daily timer operations, or to “CONT” for continuous operation. If you are running the unit in the “TIMED” mode you will need to make sure the clock settings have been set per the instructions above.

The four grey buttons on the controller below allow the user to bypass individual towers/cells. The display screen identifies the associated towers/cells 1, 2, 3, or 4 directly above each button. The “Tower OOS” display line indicates which towers are out of service. Press and release the appropriate button to bypass the selected tower/cell. Press and release this button again to allow the system to resume cleaning the tower/cell.
WIRING CONNECTIONS

Please see attached wiring schematic for the LAKOS MTSK controller and connection points for actuators/valves. All wiring to and from the controller and actuators should be sized and selected accordingly by an electrical engineer or a qualified electrical contractor.

The actuators provided with the kit are the Bonomi VB Series and are designed to be operated with 120VAC/1 that is provided from the MTSK controller. The power for the MTSK controller should be wired its own 120VAC/1 source and should NEVER be tied to the LAKOS Filtration Package controller. The filtration package controller is not designed to handle the additional amp loading generated by the MTSK controller.
1. DASHED LINES INDICATE FIELD WIRING.
2. 72VA MAX FOR EACH ACTUATOR.
1. Tower 1 Inlet Valve - RED to open O12. BLUE to close C12. WHITE to neutral.
2. Tower 1 Outlet Valve - The second set of wires goes below in O12 and C12.
Do not remove JP1 unless you are hooking up to a remote switch

Complete 4 tower system
WIRING CONNECTIONS (CON’T)

[ 1 – CLOSE ] [ 2 – NEUTRAL ] [ 3 – OPEN ]

Fig.4 Board for the high voltage supply and particular of terminal block “F”

HIGH VOLTAGE MODELS (100-240 VAC)
Bonomi North America series EN500N and EN500S, cast iron wafer style, epoxy coated, resilient seat butterfly valves in sizes 1-1/2″-12″, with EPDM seat are NSF/ANSI 61/372 certified. This series shall offer a dual stem design and ISO 5211/DIN 3337 direct mounting for high cycle automation capabilities.

In addition, the EN500N-EN500S series features a phenolic-backed cartridge seat design which offers a 250 CWP maximum pressure rating, dead-end service to 100 PSI, and conforms to ANSI B16.1 and ANSI B16.5. The EN500 Series includes an electric actuator with a high-strength, weather-proof technopolymer housing with a heater and thermostat included. The NEMA 4, 4X housing is resistant to dusty areas, and in areas where water may be sprayed.

### ACTUATOR FEATURES
- NEMA 4, 4X IP67 Housing
- Dual voltage motors
- ISO 5211 dual patterns
- 75% Duty Cycle
- High-Strength, Impact Resistant IP67 Technopolymer Housing
- Temperature Range -4°F to 131°F
- PG11 Electrical Connection/Optional 1/2” Conduit

### VALVE FEATURES
- ISO 5211 Direct Mount/Square Stem
- Epoxy coated Ductile Iron Wafer body
- EPDM resilient seat (-30°F TO 250°F)
- 530N/530S - VITON seats (10°F TO 300°F)
- 540S - BUNA seats (10°F TO 250°F)
- API609 face to face flange
- Floating dual shaft disc design
- MSS SP 67 compliant
- No pins in disc prevent potential leak points
- NSF/ANSI 61, 372 approved

### BILL OF MATERIALS

<table>
<thead>
<tr>
<th>N PCS</th>
<th>PART NAME</th>
<th>MODEL</th>
<th>MATERIAL</th>
<th>N PCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BODY</td>
<td>CAST IRON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>SEAT</td>
<td>N500N/N500S</td>
<td>EPDM (-30°F TO 250°F)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>LOWER SHAFT</td>
<td>SS416</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>DISC 500N</td>
<td>CAST IRON / NYLON 11 COATED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>UPPER SHAFT</td>
<td>SS416</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>LOCATING PIN</td>
<td>CARBON STEEL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>BUSHING</td>
<td>P.T.F.E.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>O-RING</td>
<td>EPDM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>LEVER</td>
<td>EPOXY-COATED CARBON STEEL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BONOMI NORTH AMERICA

RUBINETTERIE BRESCIANE

VALPRES
# DIMENSIONS

<table>
<thead>
<tr>
<th>Size</th>
<th>1-1/2” *</th>
<th>2”</th>
<th>2-1/2”</th>
<th>3”</th>
<th>4”</th>
<th>5”</th>
<th>6”</th>
<th>8”</th>
<th>10”</th>
<th>12” **</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.30</td>
<td>1.69</td>
<td>1.81</td>
<td>1.81</td>
<td>2.05</td>
<td>2.20</td>
<td>2.20</td>
<td>2.36</td>
<td>2.58</td>
<td>3.03</td>
</tr>
<tr>
<td>C</td>
<td>11.43</td>
<td>11.61</td>
<td>11.96</td>
<td>12.2</td>
<td>12.95</td>
<td>13.46</td>
<td>14.61</td>
<td>16.03</td>
<td>20.69</td>
<td>22.46</td>
</tr>
<tr>
<td>D</td>
<td>7.28</td>
<td>7.28</td>
<td>7.28</td>
<td>7.28</td>
<td>7.28</td>
<td>7.28</td>
<td>8.31</td>
<td>8.31</td>
<td>8.74</td>
<td>8.74</td>
</tr>
<tr>
<td>E</td>
<td>8.43</td>
<td>8.43</td>
<td>8.43</td>
<td>8.43</td>
<td>8.43</td>
<td>9.33</td>
<td>9.33</td>
<td>9.72</td>
<td>9.72</td>
<td></td>
</tr>
<tr>
<td>Seat Torque</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 psi</td>
<td>111</td>
<td>126</td>
<td>134</td>
<td>205</td>
<td>339</td>
<td>523</td>
<td>677</td>
<td>1205</td>
<td>1890</td>
<td>2808</td>
</tr>
<tr>
<td>200 psi</td>
<td>133</td>
<td>146</td>
<td>167</td>
<td>223</td>
<td>386</td>
<td>602</td>
<td>996</td>
<td>1864</td>
<td>3140</td>
<td>4767</td>
</tr>
<tr>
<td>Cv (GPM @1psi)</td>
<td>35</td>
<td>45</td>
<td>65</td>
<td>70</td>
<td>140</td>
<td>235</td>
<td>360</td>
<td>715</td>
<td>1225</td>
<td>1900</td>
</tr>
<tr>
<td>50% OP</td>
<td>108</td>
<td>135</td>
<td>220</td>
<td>300</td>
<td>605</td>
<td>1010</td>
<td>1620</td>
<td>3205</td>
<td>5305</td>
<td>8250</td>
</tr>
<tr>
<td>100% OP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Act.</td>
<td>VB030</td>
<td>VB030</td>
<td>VB030</td>
<td>VB030</td>
<td>VB060</td>
<td>VB110</td>
<td>VB190</td>
<td>VB270</td>
<td>VB350</td>
<td>VB350</td>
</tr>
</tbody>
</table>

* 1-1/2” available in Stainless Steel Disc only ** Liquid Service = 100 psi Maximum

Note: EPDM Seats Std. Other Seating Material Available