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REFERENCE GUIDE

IM288 R1



Duplex tuning guide for Aquavar® Intelligent Pump Controller in high rise buildings:

This guide is intended to help users in duplex applications ensure proper and smooth system operation. Every installation has unique system behavior that depends on many factors specific to the site. Issues, like hunting, over pressure when staging, slow response or pumps cycling between operation and sleep, use the following guide to adjust parameters for proper behavior in your system.

IMPORTANT NOTES BEFORE TUNING

- 1) Pumps should be sized to satisfy the maximum water demand and maximum pressure on your system; best practice for duplex is to have the same size for each pump; not mandatory.
- 2) Adequate NPSHr (Minimum Suction Pressure Required) for full flow will be required for proper system function; best practice is installing a gauge in the suction size or a low water switch sensor for protection and wired to the Drives. (See NPSHr on the pump curve)
- 3) Proper check valves are required on each pump's discharge side and before sensor or transducers; both transducers should be installed as close as possible each other
- 4) The equipment needs isolation valves on both suction and discharge of pump
- 5) Best practices suggest having a pressure tank sized 15-20% of the system total max flow; install as close as possible to the transducers. Set the inner pressure tank 20 psi below your pressure set point.

BEFORE CHANGING THESE PARAMETERS, 1) RESET THE IPC TO FACTORY SETTINGS (THREE FINGER RESET); 2) PROPERLY PROGRAM THE IPC THROUGH THE GENIE FOR DUPLEX OPERATION AGAIN (NOTE: JUMPER BETWEEN 12-18 SHOULD BE UNPLUGGED); 3) BEGIN FINE TUNING BY CHANGING THE FOLLOWING PARAMETERS:

- 1) When Working on duplex or lead-lag operations, (especially multistage pumps for booster applications), change parameter **4-12 Sleep Frequency/Low Limit between 40 Hz to 50 Hz (factory default is 30 Hz)**. Determine the optimum Sleep Frequency/Low Limit in a system by running one pump in Hand On mode to see at what Hz the pump can overcome the static head in the building. Start at 30 Hz and continue to bump the speed until the static pressure peak.
 - a. If "Duty Stand by" is DISABLED, the Lag pump stop frequency should be **5 Hz above the Sleep Frequency/Low Limit (4-12)**.

2) If the lag pump is cycling between sleep and run while the lead pump remains on, (3 or 4 times per minute), change parameter **22-24 Sleep Delay between 7 seconds to 30 seconds (factory default is 3 seconds)**. It is preferable to keep the lag pump more time working on minimum frequency in order to response quickly and have less startups from 0 Hz to 40 Hz (The low limit frequency previously set). See behavior/results.

3) To prevent the lag pump from starting to quickly when lead pump hits the 59 Hz and see a smoother ramp-up (avoid overshooting set point), increase parameter **3-41 Ramp1 Ramp Up Time between 10 to 20 seconds (factory default is Slow:20 seconds, Medium 10 seconds, Fast 5 seconds)**. See behavior/results.

4) Adjust the ramp down slower, on parameter **3-42 Ramp1 Ramp Down Time between 8 to 20 seconds (factory default are: Slow 10 seconds, Medium 5 seconds, Fast 3 seconds)**. See behavior/results

5) Change parameter **1-71 Start Delay on IPC1 to 10 seconds** and on **IPC2 to 5 seconds**; (default 0 seconds or 5 seconds) this prevents both drives to start at the same time after a power shut down.

6) Change parameter **22-40 Minimum Run Time**: adjust **between 30 seconds to 60 seconds**

7) Change parameter **22-41 Minimum Sleep Time**: **adjust to 3 seconds**; for some systems the default time at 10 seconds is too long for standby, the pressure can drop very fast in that time. Observe system behavior and set the best time.

8) If system pressure is dropping down to quickly with both drives off, change the parameter **22-44 Restart Difference1 to 5%** (default is at 10%)

If the previous parameters are not helping smooth the system, re-check the hydraulic application and pump sizing. As a last option, use parameter **20-93 PID Proportional Gain**: adjust **between 3 to 8**, one increment at the time and observe the system (factory default is 5) **CAUTION: Increasing this value too high can make the system unstable and produce severe oscillations**. Also parameter **20-94 PID Integration Time**: increase this number by second and see results (factory default is 3.3) **CAUTION: Decreasing this value too low can make the system unstable and produce severe oscillations. See behavior/results.**



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