

Aquavar IPC Multipump Configurations and Setups



WHITE PAPER / AMCSWHITE R1

The Intelligent pump controller supports many types of multipump operation. The best type of operation depends on the specific system and equipment used. Reference the guide below to help understand which control type may be right for your application.

System Type	Drive Control Type	Pump Operation Type
Multipump	Fixed Master	Synchronous
Multipump	Fixed Master	Multicontrol
Multipump	Multi Master	Synchronous
Multipump	Multi Master	Multicontrol
Multipump	Fixed Master	Fixed Speed Follower

DEFINITIONS:

Multipump: Two or more drives in a system controlling individual pumps.

Fixed Master: One drive (master) is controlling the speed of all pumps in the system by a speed signal to the additional drives. The operation conditions are set by the Master for all drives in the system. The master drive, as designated, does not change from the pre-defined drive. A single sensor, wired into the master is used to control the entire system so additional sensors are not needed in the slave drives. This is a potential weak link for system reliability in the case of sensor/drive failure.

Multimaster: Two or more drives operating individual pumps and motors with one drive as the master or also the lead, and the other drive as the follower slave. During operation, the Master drive sets the required speed for each drive in the system. Master control of the system can switch between any of the drives in the system providing redundancy in the case of drive or equipment failure. Sensors are required in each drive for it to operate as a master.

Synchronous: When multiple pumps are running in a system each pump will run at the same speed. The drives will synchronize together. This ensures equal flow through each pump.

Multi-control: In multi-control mode of operation, the last staged pump runs on variable speed to achieve the set-point and all other staged pumps runs at maximum speed. In some systems, multicontrol allows more precise set point control. Caution is required in the following applications:

- Hydraulic conditions that may prevent flow through the slower speed pump. Verify the slower speed pump can generate enough pressure at speed to break into the line.
- During rapid decreases in flow, the system may experience momentary high pressure before the fixed speed pumps fully ramp down.

THE FOLLOWING ARE DESCRIPTIONS OF THE AVAILABLE CONTROL TYPES IN THE AQUAVAR IPC:

Multi Master Multi Control: The master controller controls the staging and destaging as well as the speed of all connected lag-pumps. The last staged pump runs on variable speed to achieve the set point. In Multi-master operation all controllers can work as the master controller. Upon failure of any working master, the next pump in sequence will take up as master keeping the system running.

Multi Master Synchronous: The master controller controls the staging and destaging as well as the speed of all connected lag-pumps. All staged pumps run at the same speed to achieve the set-point. In the event that drive one (1) fails, drive two (2) will take over and will be now the master drive.

Fixed Master Multi Control: This control mode will have one fixed master drive and up to 3 lag-pumps to run at variable speed. In this operation mode, the master controller varies speed of the last staged pump to achieve the set-point and all other staged pumps runs at maximum speed.

Fixed Master Synchronous: This control mode will have one fixed master drive and up to 3 lag-pumps to run at variable speed. In this operation mode, all the staged pumps run on the same speed to achieve the set-point. The Fixed Master Synchronous Multipump-controlled mode supports up to four pumps parallel operation with one master and up to three lag pumps to run at variable speed.

Fixed Speed Follower: The fixed speed follower multipump-controlled mode supports up to four pumps in parallel operation. In the fixed speed follower mode, the master pump controller can run its pump at a variable speed and alternate up to three fixed-speed pumps through the separated run relays. The master controller

speed is varied to maintain a set point. It supports up to two standby pumps. Selection between motors is made automatically by the master controller.

An example with this configuration would be an irrigation system that requires periods of high flow at full speed. The controller varies speed of the main supply and uses the fixed speed for high flow irrigation.

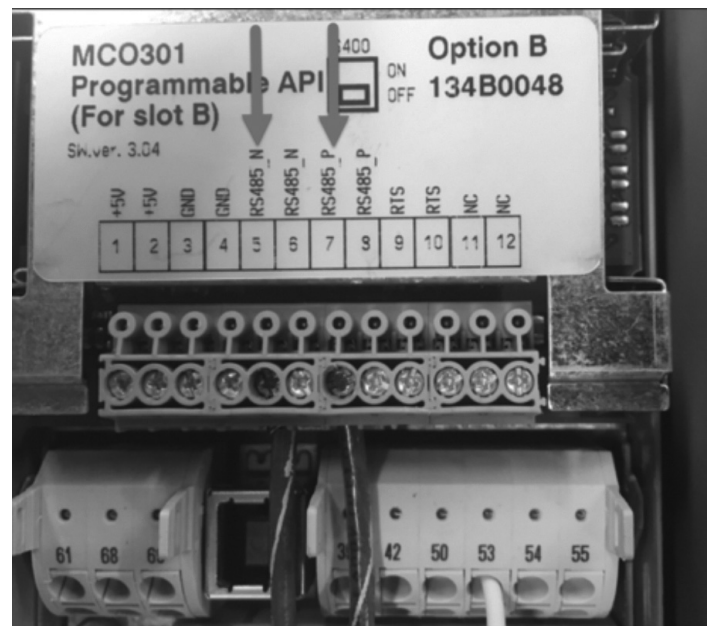
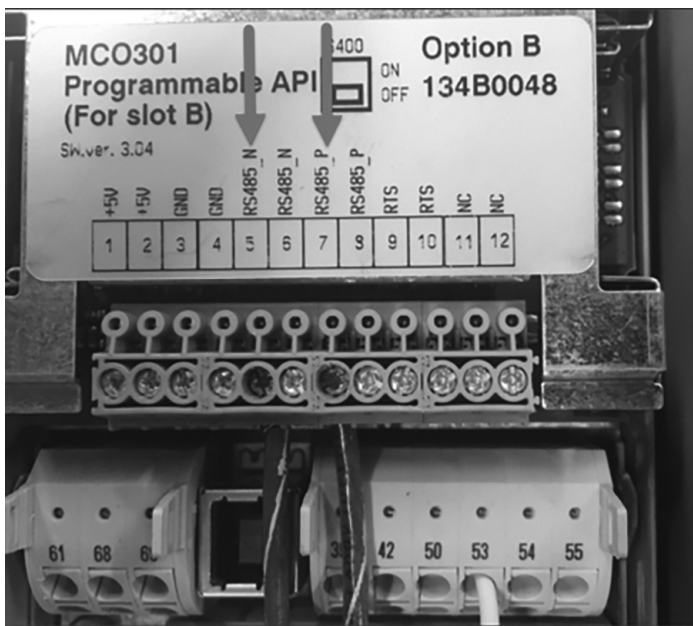
Synchronous control benefits:

- Handles large variation in flow
- Quick response for pump staging
- Eliminate hydraulic concerns regarding equal flow and load through pumps

Multicontrol benefits:

- To fine tune control of set point for small demand changes
- Run fewer pumps

MULTIPUMP WIRING:



Make sure that the following are adhered to:

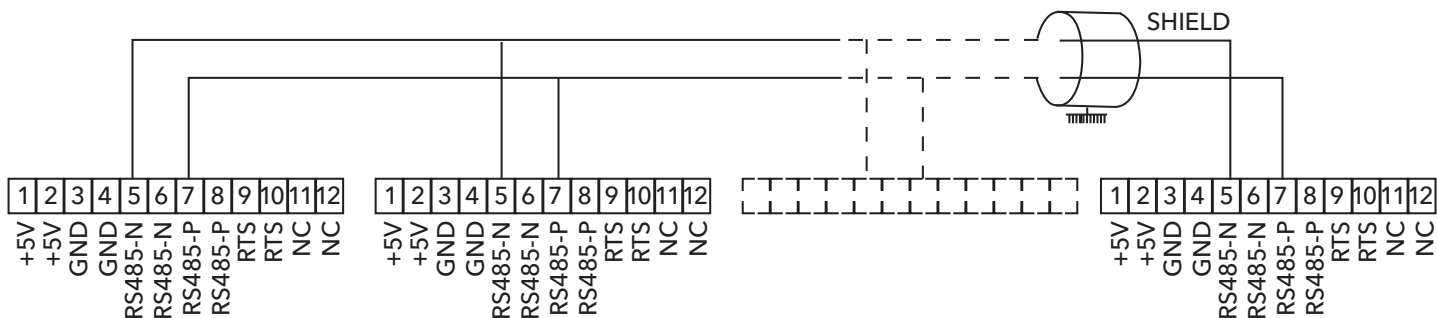
- Run input power and control wiring in separate metallic conduits or raceways for high frequency isolation. Failure to isolate power, motor, and control wiring could result in less than optimum drive and associated equipment performance.
- Use control wiring rated for 600 V for 480 V and 600 V drives and 300 V for 200–240 V drives
- Isolate control wiring from high power components in the drive.

MULTIMASTER WIRING:

Terminal #5 to Terminal #5

Terminal #7 to Terminal #7

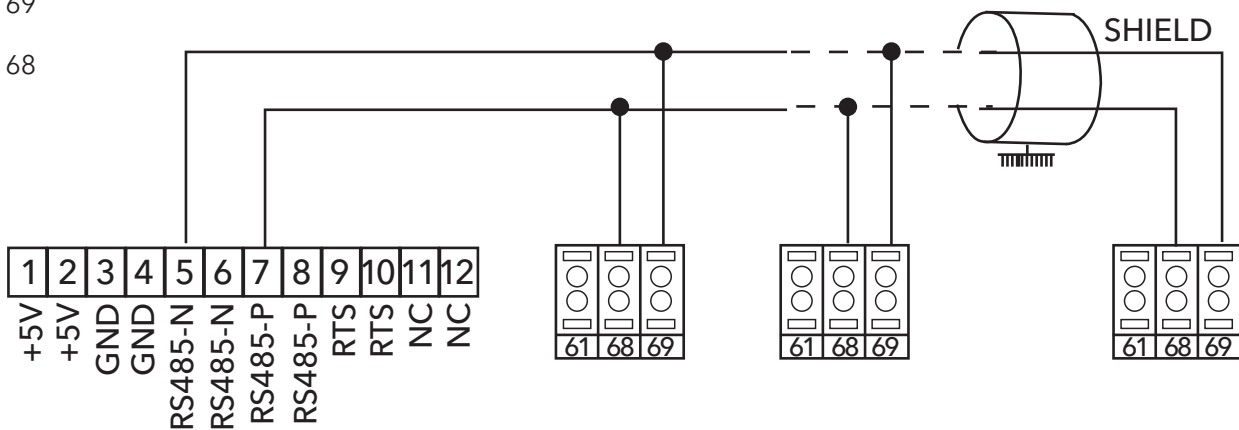
If using more than two controllers, follow the same wiring instructions for the additional drives.



FIXED MASTER WIRING:

Terminal #5 to # 69

Terminal #7 to # 68

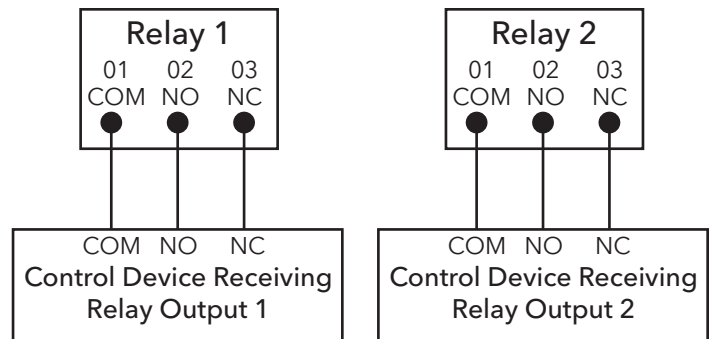


FIXED SPEED WIRING:

No wiring connection is required for the MCO301 Programmable API option B card. Relay outputs will be used to open and close a motor starter on the fixed speed pumps (up to two).

RELAY WIRING:

Each controller has two programmable form C relay outputs. The relay terminals are located in various locations on the controller depending on the frame size.



For an additional fixed speed pump, it will require the General Purpose option card MCB101 (part # 9K654). Please refer to the IOM for fixed speed Follower wiring instructions.

Please Note:

The configurations above are for standard equipment. Please refer to the IOM for further wiring instructions.

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- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

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