

Milacron Mosaic QTS Control Retrofit for Industrial Blow Molding Machines

Advantages of upgrading a control system to the new Mosaic control from Milacron

- The Rexroth Proportional and Servo control system utilized on older controls was good for process control at the time of their development, however this hydraulic control and ramping system has always been difficult for customers to diagnose and adjust. The Mosaic control system replaces all of the Rexroth hydraulic driver boards, and ramp boards. The updated PC handles all control for proportional hydraulic systems. Any ramp adjustment that maybe required is done though the control (after the initial setup, ramp adjustments are not normally required). For electrical diagnosis of problems related to proportional valves on the machine, all the maintenance technician needs to look at is a simple +0 - 10vdc signal. Controlling proportional valve movement with the updated control requires much less wiring. This makes the chance of a problem caused by a loose wire or noise introduced to the system much less likely.
- Installing our Mosaic control system and removing the Rexroth valve driver system will also require the replacement of existing servo, and proportional valves with modern smart proportional valves supplied with onboard electronics to handle the spool position feedback. Valves replaced include Tooling, Pushout, Clamp, and Extruder (if driven hydraulically)
- With other control systems it can be difficult to run multiple heads, and the process from head to head must be very similar. The Mosaic control makes it simple to run both heads completely independent of each other or run one head or the other as needed, the control can handle up to four heads completely independent of each other. All heads in a multiple head application can be synched together regardless of shot size or profiling. Any of the heads can be used as a master to trigger clamp functions by simply changing the master head on the setup menu.
- On older machines with Dual controls for independent head control, these will be replaced by one Mosaic control. This eliminates the need for the two controls to communicate to one another and eliminating any process instability due to the two controls.
- The Mosaic control synchronizes refill rates proportionally, so there is no need for blocking valves or chokes on the heads. The refill synchronization works in conjunction with Pack Pressure. Using Pack Pressure you select the pressure to maintain on the heads during refill. The master head is held to this pressure and the slave head is varied around this pressure to maintain synchronization. If Pack Pressure is not used, the control will apply the minimum amount of pressure needed to the leading head in order to let the trailing head catch up. If you are using Pack Pressure or Standard refill synchronization the control holds the heads together in a tight window, even with a difference in shot size. Head refill synchronization is controlled proportionally by metering the oil out of the pushout cylinder, not by blocking the oil flow from the cylinder.
- With the Mosaic control multiple heads will have independent profiling and pushout speeds if you need to manually control the pushout rates individually or the control will sync the speeds to match the head of your choice. Automatic pushout synchronization keeps both heads in sync and completing pushout at the same time so you don't have a parison hanging, stretching and waiting for the other head to finish pushout no matter what the shot lengths are. This allows you to run with completely different shot weights and profiles and still maintains the same exact pushout times on each head. The only limitation to running different parts is clamp movement. All proportional functions are run in a closed loop operation for better process control and ease of operation.

- The Mosaic control runs all functions for heads independently. Options like needles, eject, pinch, etc. are all operated with double solenoid valves for increased control and safety. **Prior to installation of the Mosaic Control you must specify what options are on the machine or need to be added to the machine.**
- The Mosaic control has up to 300 points of parison profile and pushout speeds per head. The pushout speeds and profile points are selectable in blocks of 50. (50, 100, 150, etc.) Parison and pushout speed profiles can be copied from one head to the other in any order needed. When changes are made to either the profile or pushout speed and you want to return to the starting point changes can be undone back to the last saved profile. Once the adjustments are where you want them all you need to do is save the changes.
- The parison profile and pushout speed displays are oriented with the actual parison so it is easier to match the profile to the actual parison. The tooling actual position and pushout speed plot right on the profile menu, so you can see the response as you make changes.
- With the Mosaic control temperature control is much more accurate due to years of developing the algorithms that control this process. There are dual alarm bands for both high and low temp alarms with independent settings for all heat zones.
- Head cooling plates can become blocked over time leading to premature head cylinder failure. The Mosaic control would monitor the temperature of the plates and alert the operator of an over temperature condition, thus extending the life of the head cylinders. If your machine does not have cooling plates this feature can be turned off.
- The Rexroth servo driver that controls the clamp speed is eliminated with the retrofit of a Mosaic control, speed and position is controlled directly from the Mosaic control and is more accurate.
- The new control would add the pre-close function to the clamp (not included on some controls).
- The Rexroth servo driver that controls the extruder speed would be eliminated (if hydraulic extruder) with the Mosaic control, and speed control will be more accurate.
- Retrofitting the Mosaic control would also involve replacing all position feedback devices with digital devices. Digital feedback eliminates problems with electrical noise generated on the analog feedback devices, and thus increasing machine accuracy.
- The Mosaic control uses touch screen technology, with on screen keyboard for data entry and is more user friendly. Menu numbers have been eliminated for a direct menu selection system with no more than two key presses to access any menu in the system.
- A Change Log is also included with the Mosaic control. With the Change Log you can see what changes were made to the machine. This is useful if your process goes wrong and you don't remember what changes you made, or you desire to see what changes your operators are making. The change log also time stamps each change with the time, date and operator ID number so you know what was changed who did and when. This helps track part quality issues.

- This control has extensive on board diagnostic features that aid in machine trouble shooting. Alarm log page, Faults page, Error Log page, Help Messages page, Input / Output monitoring page, Analog Input / Output page, Timer Monitoring page
- Many different things can be downloaded from the control to a memory stick such as mold files, screen shots, mold setup data, reports etc. Reports can also be downloaded over Ethernet to any computer attached to the plants network.
- The operator can select core function names. If you are using a core for a knife then you can name it KNIFE. This name is displayed on the core menu and will print out on the setup printout.
- Configurable Cores have a wide array of functions that are completely configurable with selectable trigger points, positions, timers, limit switches etc.
- All functions such as needles, pinch, blow air, etc. can be operated off position or timers. Operating the process on timers makes the process more repeatable and removes the extrusion rate variable. The needles will always stay in the same amount of time; the blow air will always blow the same amount of time, etc.
- The Mosaic control lights on Mop panel manual function lights when these functions are on during automatic cycle, giving the operator another tool to use when troubleshooting a process.
- The Mosaic control has a menu where you may watch the progress of all timers during cycle on the cycle analyzer menu also the control has extensive SPC capability to track process variability and consistency.
- Proportional smart valve response plotting to monitor valve performance in relation ship to the controls command.
- Heat control uses an Auto Tune feature that eliminates the tedious process of manually tuning the PID settings. There is also auto heat startup and auto heat banking to streamline the startup process so the heats will be up to temp and ready to run when you are.
- The Mosaic control stores up to 30 mold files and "Note Pad" files for each mold file. The "Note Pad" allows an operator to write descriptions or notes about a particular mold file setup, these notes can be read without loading the mold files. All mold files can be saved to any device that can be plugged into a "USB" port (flash drive, external hard drive, external CD-ROM, etc.), so the number of savable mold files is infinite
- The Mosaic control runs at a 15msec to 2msec scan rate depending on the function priority, while most controls run at a much slower rate, some at a 30msec+ scan rate. This technology gives the control and the process more repeatability. Milacron is currently building new machines with this control, retrofitting a machine with a Mosaic control will bring the machine technology to the current state of the art. Retrofitting the control will not guarantee the condition of hydraulic pumps, hydraulic motors, hydraulic valves (except those replaced), electric motors, mechanical components or any other components not rebuilt or replaced on the machine at the time of the retrofit.
- All electrical and hydraulic safeties will be brought up to date to meet the latest ANSI standard.

Some of the more advanced available options with the Mosaic Control

- Configurable I/O

- In Clamp area Scanner for Presence Sensing

- Electric Servo Powered Front Gate

- Dynamic Parison Length Control

- Dynamic Extruder Speed Control

- Servo Drive Part Take Out

These are some of the highlights of the Mosaic control system, for additional information please contact Uniloy Milacron Industrial Blow Molding.