Base Color Issues & Fixes

Occasionally, issues can pop up with the base color system on the Autocaster RC, Economizer, and Ultra. The following table has descriptions of issues and corrective actions for those problems.

Base Color System Issue	Problem	Corrective Action
Air Bubbles In Base Color Flow	Air can be found in the base color flow at the initial system startup, whenever the system has been drained and refilled as a result of a maintenance operation, or for a short time after the machine has been off for a while such as overnight.	Put the base color into recirculation mode. This will pump base color from the reservoir, through the pump, to the base color injector, and back to the reservoir. This pumping action will help to eliminate the entrapped air. For an RC that doesn't have recirc hold the base color button in to run the pump manually long enough to prime the line.
	Leak in fittings or tubing on suction side of the pump.	Air can be sucked into the tubing or fittings on the suction side of the pump. Check the fittings and tubing running from the base color reservoir to the pump and replace as required. The discharge side of the pump is under pressure so no air could be introduced into the system from the components on the discharge side of the pump. Make sure there is no obstruction near the source causing the pump to struggle and cause a vacuum that actually pulls air in through even the smallest openings.
Leaking Base Color Tank	Gruber Systems uses a 7.5 gallon high-density polyethylene tank with a bulkhead fitting to store the base color material. The leaks can occur where the bulkhead fitting is sealed to the tank.	Gruber Systems sells replacement bulk head fittings. The tank is also available, but typically not needed. Inspect and replace as required.

Base Color Motor Rotation Fail	The base color system uses an inductive sensor to detect a target mounted on the motor shaft. When the sensor sees the target, it sends a signal to the PLC that 1 revolution has occurred. An alarm occurs when the PLC turns on the motor and no revolutions have occurred in a specified period of time.	Put the base color system into recirculation mode. Check the sensor to confirm that it is properly positioned to see the target on the motor shaft. The sensor has a LED light on it that should blink when the sensor sees the target. The sensor should be positioned about the thickness of 3 business cards away from the target to ensure that the target does not hit the sensor. If the target is aligned with the sensor and the light does not light up, check the wiring from the sensor to the PLC for damage. Replace the sensor as required. If the sensor seems to be functioning correctly, check the base color inverter for issues.
Inverter Error	The Inverter Fail alarm is triggered when a motor pulls to many AMPs and the inverter shuts the motor off. If this is combined with Base Color Rotation Fail, it is probably the base color inverter that caused the alarm.	Base color motor overload issues are typically a result of issues with the gearbox or the motor itself. Remove the motor from the gearbox. You should be able to turn the collar on the gearbox where the motor shaft is inserted by hand with pliers or a pipe wrench and turn the gearbox. If it is hard to turn or will not turn, remove the intermediate shaft that connects the gearbox to the pump and check the gearbox again. The gearbox should turn freely. Replace the gearbox as required. If the gearbox is fine, test run the base color motor by running a base color calibration. If the motor continues to overload, check the wiring making sure all 3 lines have power, otherwise replace the motor.
Leaking Base Color Pump	Base color pump leaks can occur around the 2 O-rings that seal the pump to the aluminum adapter and around the shaft seal as the pump wears with use.	Remove the base color pump from the aluminum adapter block. Inspect and replace O-rings in the adapter block as required. Make sure and clean the adapter block thoroughly. The adapter block has a weep hole located at the bottom or side that is designed to allow any leaking base color material to drain out. If the weep hole is clogged, leaking base color material can be pushed back toward the gearbox shaft seals. Eventually, base color could be forced into the gearbox. Next, do a visual inspection of the base color pump. If the shaft seal is leaking, replace the seal on the rotor shaft and check for other signs of wear on the pump rotor, idler pin, idler gear, and on the cover. The FAQ located at https://grubersystems.com/support/faq/autocaster-faqs/autocaster-base-color-pump-wear shows how to determine if the pump parts are worn and need to be replaced. Rebuild pump as required.

		Replace the base color pump and make sure the intermediate shaft is properly coupled to the pump shaft. Recalibrate the base color materials before use.
Base Color Gearbox Not Turning	The gearbox used in the base color system can fail due to normal wear and due to pigment pushing past the shaft seals and into the gearbox. When necessary, they must be replaced.	The normal maintenance on a base color gearbox would involve checking and filling the gear oil in the gearbox and visually inspecting the gearbox for signs of any issues. When there are problems, the gearbox must be replaced since the repair parts are very expensive. Baldor gearboxes have been used by Gruber for over 25 years but are no longer available. Gruber Systems has sourced new gearboxes as a replacement. These new gearboxes may require a new aluminum adapter. See the Gruber Tech Tip located at https://grubersystems.com/support/gruber-tech-tips/tech-tips-baldor-gearboxes for additional information on the replacement gearboxes.
Base Color Pump Not Turning	The base color intermediate shaft extends through the gearbox and engages the end of the pump shaft. Improper positioning and wear/damage to the intermediate shaft can cause intermittent base color flow issues.	The end of the base color pump rotor shaft is machined with 2 flat spots on it. The intermediate shaft has a notch machined into the end that slides over the end of the base color rotor shaft. On the single color base color systems, the shaft can become loose and move away from the end of the rotor shaft. This can cause the pump to stop turning or can damage the end of the rotor or intermediate shaft. The intermediate shaft is held in position by set screws on the gearbox shaft collar. Make sure the intermediate shaft is fully engaged and tighten the set screws. A 2 color base color system can be built by attaching 2 base color pump / base color pump adapter assemblies on either side of the gearbox. An additional gearbox can be attached to the first gear box to add another 1 or 2 base color systems. This allows one motor to turn up to 4 base color assemblies. The intermediate shaft that is used for when 2 base color systems are mounted on one gearbox has a slot cut in both ends of the shaft and will engage the base color pump rotor on each end. In this case, the intermediate shaft is trapped and cannot move. Both types of intermediate shafts have a hole drilled through the shaft that has a pin placed in it. This pin extends out from the shaft on one side and when used slides into the keyway slot on the gearbox and allows the gearbox to turn the intermediate shaft / base color pump. If the pin

		becomes worn or damaged, it could cause issue with pump rotation. Replace parts as required. Re-calibrate after working on the base color system.
Base Color Injector Not Opening	The base color solenoid valve receives a signal from the PLC to open or close the air flow to the base color injector. The air flow opens and closes the base color injector. Any problem with the solenoid valve will cause issues with the operation of the base color injector. Possible sticking of injector.	Compressed air is used to open/close the base color injector. The compressed air is controlled through the use of solenoid valves connected to the PLC control system. Issues with the compressed air supply, the solenoid valve itself or the PLC output will impact the operation of the injector. Check the following: - Ensure the compressed air supply is 80-90 PSI with minimal fluctuations. - Test the solenoid by depressing the manual activation button on the body of the solenoid valve. - Check the wiring from the solenoid to the PLC for damage. - Check to ensure that the PLC output is activated when the base color injector is supposed to open and that the voltage measures 24V. Replace the solenoid, wiring, or PLC as required. Disassemble the injector and clean it well. Lubricate the cylinder and piston. Check for bent or damages parts.
Base Color Injector Not Operating Properly	The base color injector has evolved over time. The current tip seal base color injector is composed of a pneumatic cylinder, injector body, O-rings, Teflon ring, and gaskets.	Damage to the O-rings positioned on the piston shaft can cause the base color injector to leak. Damage to the O-ring that goes around the piston can cause air to leak from one side of the piston to the other and affect how far the injector opens. Damage to the Teflon ring can result in base color leaking at the tip. Damage to the pneumatic cylinder gaskets can cause the pneumatic cylinder to leak and affect the operation of the injector. Inspect and replace parts as required.
Clogged Or Leaking Base Color Check Valves	The Autocaster RC used check valves to release pigment into the resin stream. These check valves can get clogged or weak and result in pigment flow issues.	On the Autocaster RC, base color check valves are connected to a manifold built out of a series of pipe tees and nipples. The resin comes in one end and picks up the base color pigment as it moves through the manifold to the other end and into the mixing auger. Remove the base color check valve and clean. A FAQ located at https://grubersystems.com/support/faq/autocaster-faqs/repair-autocaster-check-valve explains how to disassemble, replace O-rings and clean the check valves. Replace check valve if required.

Base Color Flow Issues	Base color flow issues can be caused by clogs in the fluid lines, fittings and the base color injector.	- Check the base color circulation path for blockages - Check all fittings especially elbows where pigment can become packed - Disassemble the lower porting of the base color injector. Clean and Inspect. Replace O-rings as required. - Make sure the injector opens and closes all the way. - Check flow of pigment through the injector to make sure that no pigment leaks when the injector is closed and no pigment leaks to the return line when it is open. - Make sure the line from the pump is connected to the lower port and the return to tank is connected to the upper port.
The 'V' notch location determines what direction the motor needs to turn. The 'S' determines the best inlet port and will affect flow and seal life.	The base color pump efficiency can be impacted by how it is mounted.	The cartridge type gear pump used to pump base color is designed to pump efficiently when material is drawn in from the suction side, away from the "V" notch on the cover, and out the pressure side. The base color pump can be mounted either horizontally or vertically. This mounting position, "V" notch position, and the motor rotation direction can have an impact on the efficiency of the pump operation. The FAQ located at https://grubersystems.com/support/faq/autocaster-faqs/assemble-autocaster-pump explains how to verify the pump is mounted correctly.
Base Color System Reliability	There are certain things that you can do to increase the base color system reliability.	- Use base color pigments with a 3000 Centipoise or less. - Agitate pigment in the base color tank prior to use. Pneumatic pigment agitators are available from Gruber Systems. - Keep pigment tanks free from foreign debris and solid pigment clumps. - Regularly check pigment inlet fitting into injector (keep clean). - Calibrate on a regular basis. - If the base color pump is running at above 75%, check for obstructions, check for pump wear, and check the pump calibration speed (High speed can cause pump cavitation. - Calibrate at normal speeds – 50% or less.