AccuChop™ Closed Loop Fluid Delivery

Description

AccuChop is a process control package used in fiberglass lay-up applications which provides features for resin and glass delivery rate control and display, as well as various detection alarms. AccuChop is designed for both gelcoat (resin and catalyst) and chopped fiberglass (resin, catalyst and glass) applications. Both resin flow and glass feed can operate under open loop or closed loop control. The functionality provided also handles error recovery events and does not require PLC logic to spray parts.

Features and Benefits

Closed loop fluid control of resin and chopped glass provides:

- Improved product quality.
- More consistent material builds.
- Reduced operating expense.
- Reduced resin usage due to tighter flow rate control.
- Reduced waste disposal costs.
- Reduced end product rework due to higher first time quality.
- Monitoring and fault recovery for broken glass supply.
- Material usage monitoring.
- Monitoring for catalyst flow.
- Independent triggering for resin and glass chopper motor.
- Automatic flow correction for changing viscosity due to temperature shifts.
- Alarms which provide opportunity to quickly correct for out-of-specification conditions due to plugged or damaged delivery lines.
- Alarms for flow out-of-tolerance.

- Automatic and continual calibration through a fast response adaptive control scheme.
- Automatically determines equipment characteristics during calibration.
- Evaluate true part costs and yield.

Sample Teach Pendant Screens

USAGE MONITOR AccuChop				JOINT 10%
Active color: 2				
	Combined	Resin	Chop	
Target:	80.1	52.1	18.0	(lbs)
Current:	49.5	31.9	17.6	(lbs)
Previous:	79.7	51.3	28.4	(lbs)
Flow var:		1.7	2.2	(%)
Catalyst flow: OK		Glass detect: OK		
Between jobs timer (.2 min): 12 sec				
[TYPE]	FLOW	WPD_TARG		HELP >

Monitoring of process parameters

- System monitoring
- Provides quick feedback on amount of material being applied to the part.

- Systems status of glass feed and catalyst flow.
- Defines accurate target weight.

STATUS Paint	JOINT 10%
TIMING STATUS	1/1
Gun on line: 1	
Prev gun on time: 54.0 sec	
Prev job run time: 84.0 sec	
Prev job: JOB755	
PAINT STATUS	
Status: Waiting for job in queue	
Curr Job:	
Curr Proc:	
Next Job:	
[TYPE]	HELP >

Production Status Information

- Display of cycle times.
- Display of production information

FANUC Robotics (vertical text in right margin)

Operations

Resin/Gelcoat Control

The AccuChop resin control loop provides a pneumatic signal from the I/P (current to pneumatic pressure) transducer to the pump air motor. The resin flow is measured by a mass flow meter and a signal is sent to the robot controller. Flow rate calculations are made and corrective closed loop control signals are sent to the I/P transducer, which in turn makes corrections to the air pressure provided to the resin pump. Proprietary closed loop control features "remember" the command values required, enabling the software to achieve set point flow in the shortest possible time.
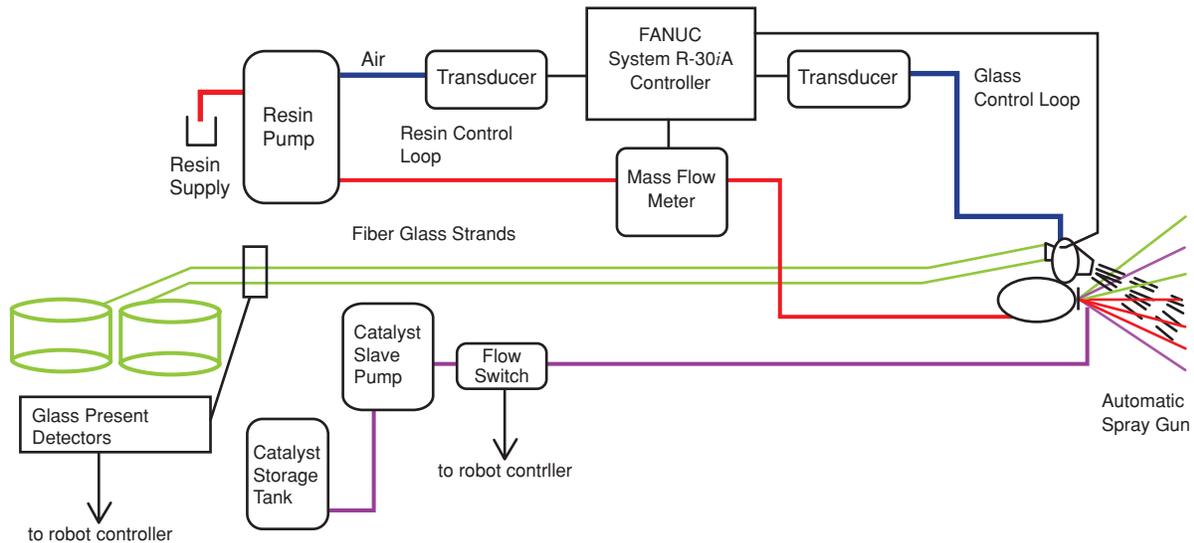
Glass

The AccuChop glass control loop provides a pneumatic signal from the I/P (current to pressure) transducer to the air chopper motor. Glass usage is measured by reading the RPM of the chopper motor with a sensor retro fit kit. This signal is sent to the robot controller. Glass usage calculations are made and corrective closed loop control signals are sent to the I/P transducer, which in turn makes corrections to the air pressure provided to the chopper motor. Proprietary closed loop control features "remember" the command values required, enabling the software to achieve set point flow in the shortest possible time.

Glass Breakage Detection

Glass is routed through sensors detecting glass motion. The system is monitored to ensure glass motion is detected while the glass trigger is activated. If glass breakage is sensed, an alarm occurs halting the robot. The user can re-feed the glass strands, and continue with the application.

Requirements

- Supported by the robot controller
- High speed counter modules (for flow meter to digital signal conversion)
- FANUC 32-bit input module
- Transducer/Regulators
- Feedback Device (positive displacement flow meter or mass flow meter)
- AccuChop Softpart integrated into PaintTool™ Application