



Bruxzir Factory AutoFinisher

Troubleshooting Guide

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Overview – AutoFinisher

The AutoFinisher process is handled in detail in other documents. This document is concerned primarily with the errors encountered during operations and what to do about them.

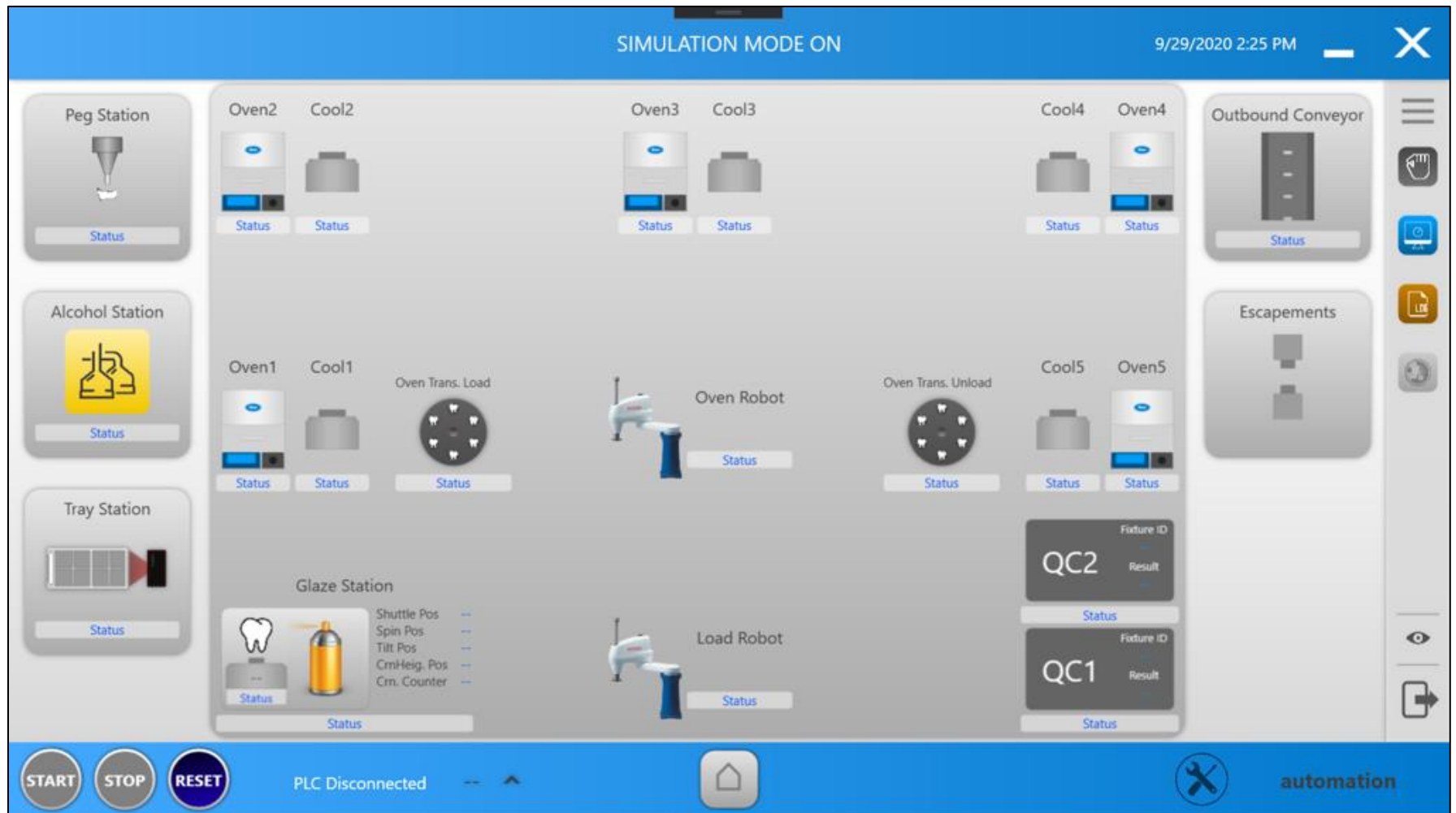


Figure 1: AutoFinisher Layout with all the stations.



The Gun Nozzles

There are two spray nozzles for the glazer, often simply referred to as gun #1 and gun #2.

Gun #1 fires first at the occlusal. Gun #2 fires second, and covers the body of the crown. It should be noted that Gun #1 fires an alcohol/powder mixture, while Gun #2 uses only the powder.

In order, the glazing process should be:

Spray Gun #1 – sprays the occlusal for 2 revolutions of the crown.

Spray Gun #2 – sprays the body of the crown, time of the spray depends on the size of the crown.

Spray Gun #1 – sprays again.

Primary Errors – Glaze Station

The majority of the errors that occur happen in the Glaze Station, and those errors can be far reaching with the rest of the AutoFinishing process.

Symptom: The finished crown looks Brown and matte (i.e. no shine).

When the crown is finished, it may look matte and dark (see image below) there can be several causes for this.



Images 1 & 2: An unglazed crown (left) and a completed, glazed crown (right).

Cause 1:

The spray guns are not calibrated properly.

Per procedure, the technicians will calibrate the spray guns at the beginning of the operation. To do this, they insert the Calibration Target (see image below.)



Image 2: The Calibration Target

Check to see if the spray is on target or not (see images below).

If the target looks like the image on the left, then this is not the error. However, when the calibration is off, the guns must be re-adjusted. This can be accomplished it two ways.

WAITING ON NEW DOORS CLOSED METHOD**Manual Calibration:**

Hit the estop button to stop the system.

Remove any crowns currently in the glazer.

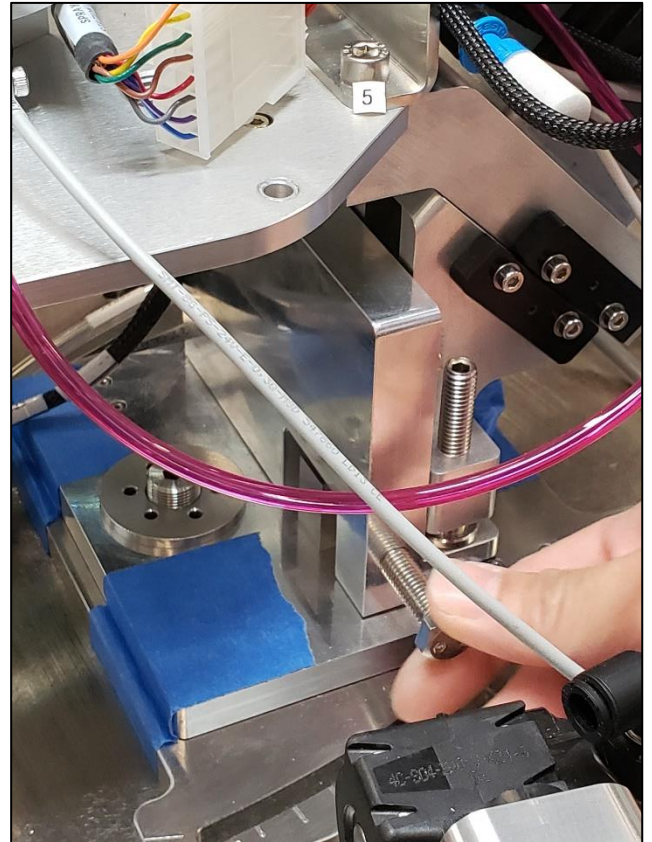
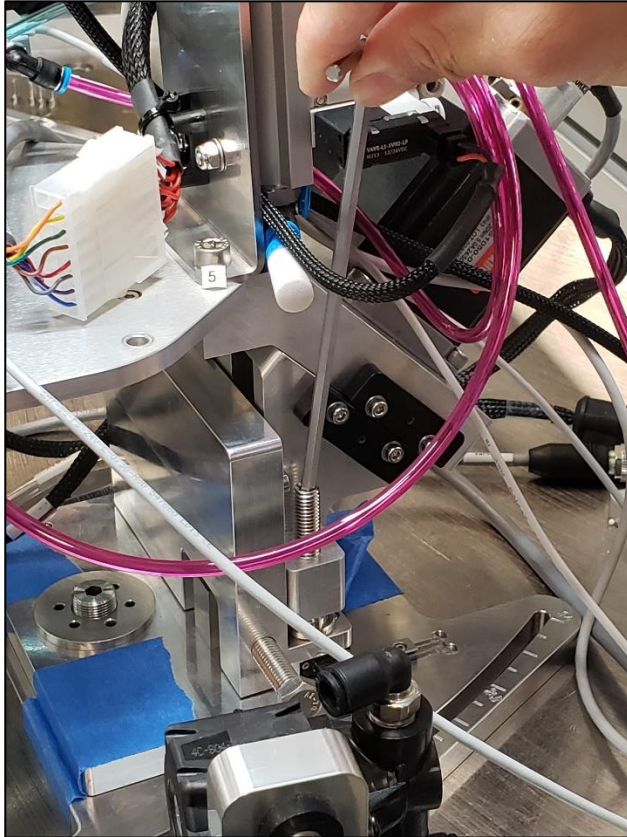
Replace the crown with the target, making sure any powder is wiped off of it.

Test Fire the spray guns.

Check to see if the powder is on target (the center white dot) or is off target.

Remove the calibration allen wrench from the tool rack.

Insert the wrench to adjust the horizontal and vertical elevations. For horizontal adjustments, turn the screw.



Images 3 & 4: Calibrating the glazer gun nozzles.

The other correction is to physically move the guns themselves. Operators will note that each gun lies on its own tray. Grasping the handholds on the edges of these trays operators can manually shift their positions.

Glazer Gun Mixture

To understand any problems that may come up with the nozzles on the Glazing station, some fundamental facts need to be understood.

Mixture

The actual mixture of the spray is set at three parts alcohol, and 0.9 part powder. This has been optimized to get the most effect out of the nozzles. It is just enough alcohol to assure the powder sticks to the model, and the right amount of powder to assure an even coat.

Symptom: The powder 'falls off' and the finished crown is brown and porous.

Cause: The nozzle in the gun is clogged, and does not disperse the alcohol solution that allows for the powder the stick to the crown.

Solution: Activate the purge function. This should clean the nozzle and allow the normal mixture of alcohol and powder.

To purge, select the main menu.

Tap

If this fails The cause is likely an O ring issue or particulate matter clogging the nozzle. In cases like this, a technician needs to be contacted.

Symptom: The Glaze Station Stops

Cause: Liquid levels aren't optimum. If the levels are too low, the system will stop.

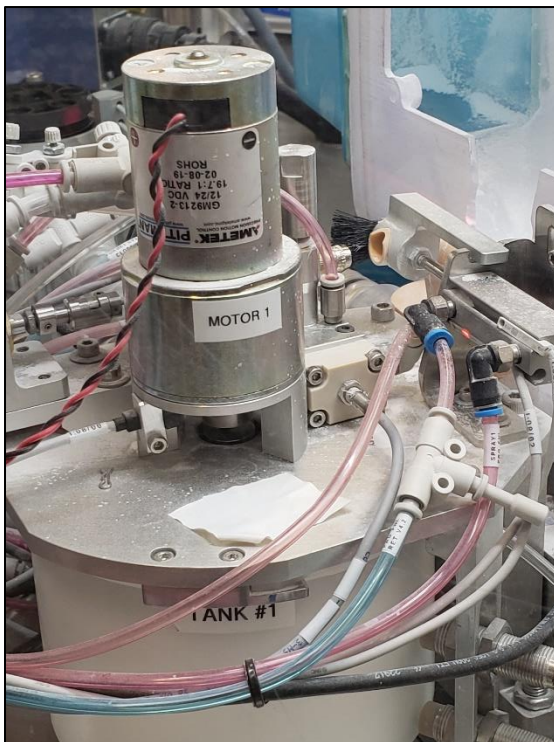
Solution: Replace the mixture.

To do this, obtain the solution, which is kept on the rollers to keep it mixed (i.e. the Mixer).



Solution on the Mixer

Open the flap on the mixture tank at the Glaze Station.



Place the designated funnel into the tank opening.



Pour the specified level of powder into the tank.

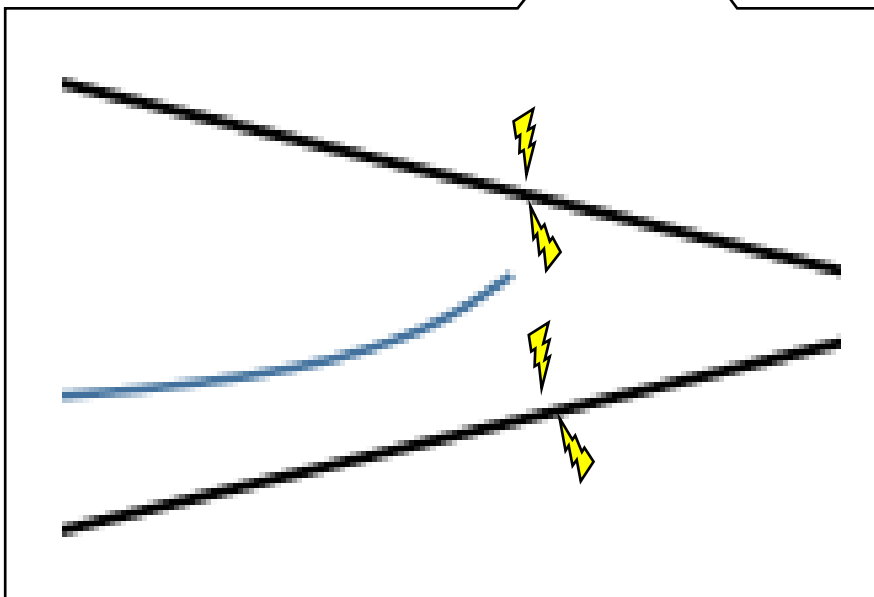
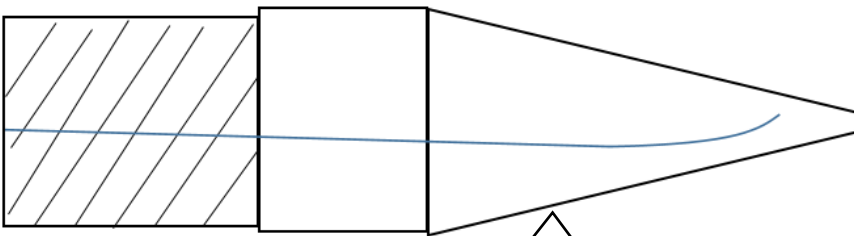
The Nozzles

There are a number of issues that can go wrong with the nozzles, as they are moving parts and generally tend to wear out. In order to address these issues, the devices need to be understood.

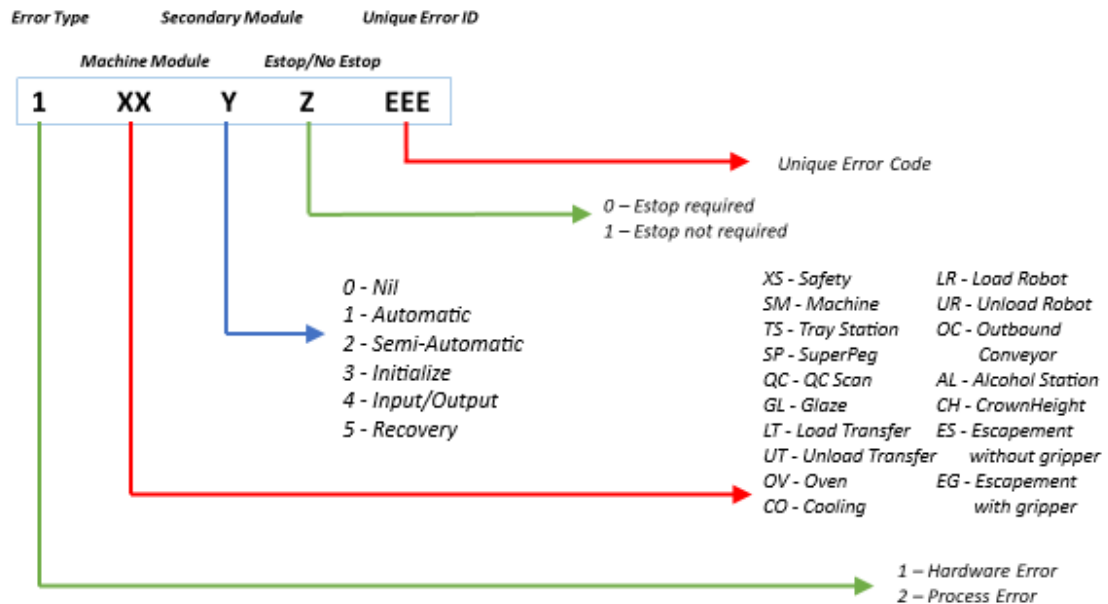
The main mixture line is set on a piston action that contacts with the cone near the end of the nozzle. Repeated contact with the ends of the nozzle cone causes some wear on the cone, and in time will lead to a misalignment, as show in the schematic below:



Image 1: The spray nozzle.



1.0 Structure of the Error Code



2.0 Type of Errors

- **Hardware Error** – A fault that occurred due to the inappropriate functioning or absolute failure of a physical device on the machine or loss of communication, power or air. This always requires the machine to be Estopped and reset.
- **Process Error** – A fault that occurred due to the inappropriate handling of the machine, inaccurate sequence of operation. In most cases this requires, taking the necessary actions as specified in the error table and then clearing the error to bring the machine back to error-free state.

3.0 Machine Module Components

The Autofinisher machine has been divided into 17 modules based on its location and function. Each of these modules work together to successfully complete a job cycle. They do not have the capability to function independently. A complete list of devices under each module is mentioned below and labelled on pictures.

4.0 Error Description

Error Code	Description	Possible Causes	Solution
1XS00 001	Safety failed to recover in time. Try again or please reset PLC.	Problem with PLC wiring or the safety configuration was changed.	Try again by clearing error. If error persists, Estop the machine, reset PLC, press reset button and try again. Call support if error persists.
1XM00 002	Severe Error! Needs machine reset from Estop.	Machine was Estopped.	Release all the depressed Estops. Press yellow reset button. Then click stop – reset - start buttons on GUI in the same order.
1XM00 003	Error! EtherCAT slave missing.	An EtherCAT device must have got disconnected.	Check the EtherCAT network. Make sure there is no discontinuity. All the cables should be connected then restart the machine.
1XM00 004	Ethercat/Power: Communication Down.	An EtherCAT device must have got disconnected.	Check the EtherCAT network. Make sure there is no discontinuity. All the cables should be connected then restart the machine.
1XM00 005	Error! Problem with EtherCAT network. Please check cables and configuration.	An EtherCAT device must have got disconnected or a new device was added without scanning it into the PLC.	Check the EtherCAT network. Make sure there is no discontinuity. All the cables should be connected then restart the machine.. If a new device was added, call support/engineer.
1XM00 006	Error! Machine Air!	Main Air Line not connected or the valve is out of order.	Connect main air line and then restart the machine. If problem still persists, call support.
1XM00 007	Error! Door: X is Open!	Door is Open!	Close door and restart system.
1XM00 008	Machine needs 5 Pallets to start! Add Pallets and run the machine again.	There are less than 5 pallets inside the machine.	However many pallets are short, insert them and then restart the system.
1OC40 009	Motor Alarm is ON. Restart machine.	Conveyor Motor is jammed.	Check if there is any obstruction, clear it and restart the system.
2OC21 010	Could not read barcode.	Label was not placed correctly on the box,	Take the box out, clear the error, make sure the label

2OC11 012		label size not correct or the box was not sent into the conveyor in the correct orientation.	size is correct, correct the label orientation, box orientation and send it again through the conveyor.
2OC21 011 2OC11 013	Bad Barcode, no \$R.	Fixture read something other than the barcode.	Make sure the barcode reader didn't read something else other than the box label. Take the box out from the blow out region and clear the error. Put the box back on conveyor. It should scan normally.
2OC11 014	Timeout! Part could not escape. Check Blow Nozzle air connection.	The air to the blow nozzle may have got disconnected.	Connect the air- line to the nozzle and clear the error.
1AL10 015 1AL20 021	Alcohol Tank & Cartridges are empty.	There is no alcohol in the tank and one or both the cartridges are empty. We can't glaze in this situation.	Fill the alcohol tank and restart the machine. The cartridges will automatically refilling. Do not try to fill them manually.
2AL11 016 2AL21 022	Warning! Alcohol Tank is empty. Fill it.	No Alcohol in the tank or the level sensor is out of place.	Fill the tank with alcohol, close the lid and then clear the error. If error still persists, sensor may have to be replaced.
2AL11 017 2AL21 023	Warning! Alcohol Tank missing or empty.	The tank drawer is open or there is no Alcohol in the tank.	Close the drawer and clear the error. If error still persists, make sure there is enough alcohol in the tank and clear error.
2AL41 018 2AL41 019	Cartridge 1 Low Level Sensor out of order. Cartridge 2 Low Level Sensor out of order.	Sensor is out of order or not placed at the correct sensing position or the cartridge is not secured properly in its correct position.	Make sure the cartridge is secured appropriately. Check if the sensor still works, if so adjust it to see the low level of alcohol and then clear the error. If sensor is out of order, call support to replace it.
2AL41 020	Warning! Tank Air Pressure too Low.	Air hose to alcohol tank could have been pinched or disconnected.	Check the hoses and then clear error.
1CO40 024	Work position not reached / Base position not reached.	Cooling Station pinched air hose, air hose disconnection,	Check the hoses and restart the system. If there is obstruction by robot due to an earlier crash, robot should

		valve out of order or obstruction by robot.	recover on its own and move out of the way of the cooling station. To recover the robot, estop and then stop – reset – start the system from GUI.
1CO40 025	Fan is not ON.	Cooling Fan sensor has moved and does not sense the fan moving anymore or the fan is out of order, or the fan cable got disconnected or the fan sensor is out of order.	If the fan is ON, then reposition the sensor to make sure it senses the fan moving, if it still doesn't work, the sensor may have to be replaced. If the fan is not ON, make sure the fan is getting power by checking the power cable. If fan is still not ON, fan may need to be replaced. Restart the machine after taking care of the issue.
1CO30 027	Tray Presence not working or Fixture Presence false triggered.		
1CO10 028	Tray or Crown Missing!		
1OV10 029	Oven is not ON.	Oven is not ON.	Estop, open door, switch on Oven, close the doors and then restart the system.
1OV10 030	Pallet missing or Pallet Presence Sensor not working.		
1OV10 031 1OV20 036	Table not down.	Oven table sensor is not correctly positioned to see the table or the oven table is not completely down. The table has some horizontal play because of which the sensor may not have picked up.	Make sure the table down sensor is able to sense the table for its whole range of horizontal play. If the sensor has gone bad due to heat exposure, change the sensor.
1OV10 032 1OV20 037	Oven failed to start program.	The oven is not set to run the correct program.	Call support to set the correct program on that oven.
1OV10 033 1OV20 038	Oven failed to complete program.	Oven table came down after finishing baking but the table down sensor did not see it for some reason	If the table is down upon baking, but the table down sensor is not ON, estop, readjust the sensor to see the table and then restart the

		and it has been more than 30minutes since bake had started.	system. Do not remove the baked pallet.
2OV10 034	Waking up or Table down sensor not working correctly!		
1OV20 035	Pallet not present.		
1CH30 039	Glaze Height Adjust Motor Initialize Error:		
1CH40 040	Axis actual position error.		
1CH40 041	Glaze Height Motor Error:		
1CH60 042	nCommPos out of range. Start machine to try again.		
2CH11 043	Invalid DSM ID. Clear Error to try again.		
1CH20 044	Invalid DSM ID.		
2QC11 045 1QC20 059	DSM software not running or not Ready.		
1QC10 046	Barcode scanner connection timeout.	Barcode reader power or Ethernet cable disconnected.	Reconnect the cables and clear error.
2QC11 047 2QC21 055	Could not read barcode.		
1QC10 048	Could not read barcode after 3 Attempts.		
1QC10 049 1QC20 056	Barcode Out of Range.	Barcode on the fixture is out of the fixture ID range set as 400 to 200.	If it is a valid fixture with a barcode range out of the set range, call engineer/support to modify fixture ID range setting through the config page.
2QC11 050 2QC21 057	Connection/Data Transmission Error.	Barcode reader power or Ethernet cable disconnected while reading the part.	Reconnect the cables and clear error.
2QC11 051 2QC21 060	Timeout - QC Scan did not start.	Cloud issue, Cloud server down/crash	Relaunch the DSM software and clear the error.
2QC11 052			
2QC11 053 2QC21 062	Timeout: DSM Scan could not complete or result not valid.	Cloud issue, Cloud server down/crash	Relaunch the DSM software and clear the error.
1QC11 054	DSM Scanner failed to reset!		
2QC21 058			
2QC21 061			
2QC21 063			

1GL40 064	Glaze Mix Level too low! Please Refill and restart machine.		
1GL40 065	Tilt axis actual position error.		
1GL40 066	Spin axis actual position error.		
1GL40 067	Shuttle axis actual position error.		
1GL40 068	Mixer Motor 1 not running	Motor power got disconnected or motor is out of order.	Check the power cable disconnecter of the motor.
1GL40 069	Mixer Motor 2 not running.	Motor power got disconnected or motor is out of order.	Check the power cable disconnecter of the motor.
1GL40 070	Glaze Shuttle Motor Error:		
1GL40 071	Glaze Tilt Motor Error:		
1GL40 072	Glaze Spin Motor Error:		
1GL40 073	Shuttle in Crash Zone!		
1GL40 074	Funnel1Cylinder:		
1GL40 075	Funnel2Cylinder:		
1GL40 076	GlazeShieldCylinder:		
1GL40 077	VacuumDivertingCylinder:		
1GL40 078	PurgeValve1:		
1GL40 079	PurgeValve2:		
1GL40 080	fbSpool1:		
1GL40 081	fbSpool2:		
1GL10 082 1GL20 108	Glaze Mix Tank 1 is empty! Please Refill and restart machine.		
2GL10 083 2GL20 109	Glaze Mix Tank 1 is Low on Spray Solution.		
1GL10 084 1GL20 110	Mixer 1 Low Level sensor out of order.		
1GL10 085 1GL20 111	Glaze Mix Tank 2 is empty! Please Refill and restart machine.		
2GL10 086 2GL20 112	Glaze Mix Tank 2 is Low on Spray Solution.		
1GL10 087 1GL20 113	Mixer 2 Low Level sensor out of order.		
1GL10 088	Unknown/Partially glazed crown in glaze station. Remove and try again.		
1GL10 089	Barcode scanner connection timeout.		

2GL10 090 2GL20 114	Could not read barcode.		
1GL10 091 1GL20 115	Could not read barcode after 3 Attempts.		
1GL10 092	Fixture scanned at Glaze station does not match data requested to cloud.		
1GL10 093 1GL20 116	Barcode Out of Range.		
1GL10 094	Waiting for Crown data timeout.		
1GL10 095 1GL20 117	Both spool Valves Stuck		
1GL10 096 1GL20 118	Spool Valve 1 Stuck.		
1GL10 097 1GL20 119	Spool Valve 2 Stuck.		
1GL10 098 1GL20 120	Spool valve (1) stuck timed out.		
1GL10 099 1GL20 121	Spool valve (2) stuck timed out.		
1GL10 100 1GL20 122	Spool valve (both) stuck timed out.		
2GL10 101	Glaze Purge timeout error as Alcohol Station is not Ready.		
1GL10 102	Alcohol Station not ready after 3 Attempts.		
1GL30 103	Glaze Shuttle Motor Homing/Initialization Error:		
1GL30 104	Glaze Tilt Motor Set Pos Error:		
1GL30 105	Glaze Spin Motor Set Pos Error:		
1GL30 106			
1GL30 107	Initialize Time out.		
1GL20 123	Spool2 did not reach Work Position.		
1GL20 124	Spool2 did not reach Base Position.		

2GL21 125	Glaze Purge timeout error as Alcohol Station is not Ready.		
1GL20 126	Alcohol Station not ready after 3 Attempts.		
1OR30 127	Both robots in overlap zone. Jog one robot out of overlap zone.		
1OR30 128	Initialize Timeout.		
1OR30 129	Denso Robot state error.		
1OR50 130	Robot recovery failed. Do not know destination.		
1OR50 131	Robot recovery failed. Timed out.		
2OR51 132	Tray present at Load Transfer station.	N/A	
2OR51 133	Oven 1 not ready.		
2OR51 134	Oven 2 not ready.		
2OR51 135	Oven 3 not ready.		
2OR51 136	Oven 4 not ready.		
2OR51 137	Oven 5 not ready.		
1OR50 138	Cooling 1 not ready.		
1OR50 139	Cooling 2 not ready.		
1OR50 140	Cooling 3 not ready.		
1OR50 141	Cooling 4 not ready.		
1OR50 142	Cooling 5 not ready.		
1OR50 143	Tray present at Unload Transfer station.		
1OR50 144	Robot recovery failed. Location cannot be a destination.		
1LR30 145	Both robots in overlap zone. Jog one robot out of overlap zone.		
1LR30 146	Initialize Timeout.		
1LR30 147	Denso Robot state error.		
2LR10 148	Fixture not placed correctly in Oven Unload Transfer station. Call Support!		
2LR10 149	Fixture not placed correctly in Oven Load Transfer station. Call Support!		
2LR10 150	Part not placed correctly in glaze station. Call Support!		
2LR10 151	Fixture not placed correctly in Oven Load Transfer Station. Call Support!		

1LR60 152	Crown Missing during drop off.		
1LR50 153	Robot recovery failed. Do not know destination		
1LR50 154	Robot recovery failed. Timed out.		
1LR50 155	Robot recovery failed. Safe location cannot be a destination.		
2LR51 156	Load robot needs peg for recovery, Please load Empty Peg.	N/A	N/A
2LR51 157	DSM1 Not Ready.	Robot was going to DSM1 with a part when an unexpected machine abort happened. Robot is trying to recover on machine restart but someone placed a random fixture at the DSM1 manually before restarting the machine because of which DSM1 is not in ready state after machine initialize.	Make sure the part at DSM1 is not a valid case and was placed manually by someone for DSM manual testing and then remove the part and restart the machine.
2LR51 158	DSM2 Not Ready.	Robot was going to DSM2 with a part when an unexpected machine abort happened. Robot is trying to recover on machine restart but someone placed a random fixture at the DSM1 manually before restarting the machine because of which DSM1 is not in ready state after machine initialize.	Make sure the part at DSM2 is not a valid case and was placed manually by someone for DSM manual testing and then remove the part and restart the machine.
2LR51 159	Glaze Not Ready.		
2LR51 160 2LR51 161 2LR51 162 2LR51 163	Cannot go to Load Position X - 1/2/3//5/6.	The Load transfer station position the robot was trying to go on recovery is not	Clear the error and see if the robot is able to go to the position. If it can't, machine will timeout in few seconds.

2LR51 163 2LR51 164 2LR51 165		available anymore. It could be because someone placed a part manually at that position after the machine got aborted or the position sensor is getting triggered falsely.	Follow the steps for that error and restart the machine. If there is a non-production fixture at the referred position, take it out and then estop and stop - reset - start from GUI. If robot is still not able to go to the desired position, estop and take the part out manually from robot's gripper and restart the system. Send the case back into the conveyor after cleaning up the glaze.
2LR51 166 2LR51 167 2LR51 168 2LR51 169 2LR51 170 2LR51 171	Cannot go to Unload Position X – 1/2/3/4/5/6.	The Unload transfer station position the robot was trying to go on recovery is not available anymore. It could be because someone placed a part manually at that position after the machine got aborted or the position sensor is getting triggered falsely.	Clear the error and see if the robot is able to go to the position. If it can't, machine will timeout in few seconds. Follow the steps for that error and restart the machine. If there is a non-production fixture at the referred position, take it out and then estop and stop - reset - start from GUI. If robot is still not able to go to the desired position, estop and take the part out manually from robot's gripper and restart the system. Unload the part manually by placing it on the inbound escapement and scanning it using the unload GUI.
2LR51 172	Reject station Not available/Ready.	N/A	N/A
1SP30 173	Motor Initialize Error:		
1SP30 174 1SP40 182	Dispense Valve: Base/Work position not reached.		
1SP40 175	Motor Error:		
2SP11 176 2SP21 179	Cartridge Cap Not Locked!	Cartridge cap not locked/ cap sensor cable disconnected/	Make sure the cap is locked/cap sensor cable is not disconnected/mount the

		cap sensor not in correct position/ cap sensor not working.	sensor in correct position/replace the sensor if it is out of order. Clear error.
2SP11 177 2SP21 180	Cannot refill, Cartridge Cap Not Locked!	Cartridge cap not locked/ cap sensor cable disconnected/ cap sensor not in correct position/ cap sensor not working.	Make sure the cap is locked/cap sensor cable is not disconnected/mount the sensor in correct position/replace the sensor if it is out of order. Clear error.
1SP10 178 1SP20 181	Super Peg Dispenser could not refill.	Refill timed out – If the dispenser was refilled in reality, the syringe Full sensor must be out of order or its cable got disconnected or it is no longer mounted in the correct position or if there was no refill, then motor did not move because it is jammed or its cable got disconnected or an encoder issue.	