



8 - APL - Troubleshooting

Haas Automatic Parts Loader - Service Manual

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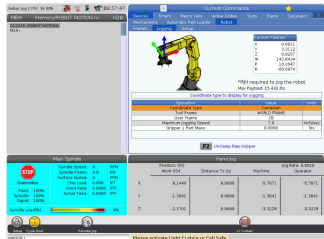
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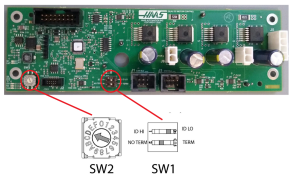
8.1 APL - TROUBLESHOOTING

Symptom Table

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Gripper alignment for pickup/dropoff is not repeatable. Error increases as gripper moves down the table that can cause the gripper to crash into parts.	Flat style rail guides allow the table to drift and change the pickup/dropoff locations.	Upgrade the table to the new linear guide rails. The Part Number is 93-3163. Follow the Installation Guide to upgrade your table.
Machine generates Alarm 9920 POSITION ERROR TOO LARGE or 9921 VELOCITY ERROR TOO LARGE during zero return or handle jog.	The machine configuration files may be incorrect.	Contact the service department for more information.
	The rollers are misaligned.	Loosen and realign the rollers on the specified axis.
There is a loud noise when the AV Axis is jogged or is in motion.	A faulty AV- axis motor can generate noise.	Remove the AV axis motor from the module and run the motor by itself and see if the noise repeats. If the noise repeats the problem is with the motor.
	The module is not aligned.	Loosen the screws from the module and jog the AV axis to its full travel a few times. This will help self aligning the module to the base, tighten the screws when done.
The APL skips the unload sequence of a finished part.	There is a workholding state commanded in the part program.	Remove the workholding command from the part program. Workholding states are commanded in the APL template.
There is a delay when the grippers are commanded to rotate or clamp/unclamp.	There is a small delay when the digital SMC solenoid is commanded.	Order service kits 93-3450 & 93-3452 and follow the Low Load Solenoid Valve Kit - Installation procedure.
The Light Curtain when broken does not trigger the machine to stop APL motion.	There is no input from the light curtain to the machine.	See the Light Curtain Troubleshooting Guide for more information.
When trying to run the machine a yellow warning message appears saying "Please activate Light Curtain or Cell Safe". 	The correct safety parameter kit has not been applied to the machine.	Order the corresponding Front Automation Safety or Side Automation Safety kits (93-1000997 or 93-1000996) and re-upload the configuration files from HBC .


8.2 COMPACT APL - TROUBLESHOOTING

Introduction



Controller Area Network (CAN) is a robust vehicle bus standard designed to allow microcontrollers and devices to communicate with each other. This method is used to create satellite nodes grouped by function that can be expanded on without changing the core electronics.

- Each board has a node ID selection switch [SW2] that must be set correctly.
- Devices are connected in Daisy Chain.
- Each board has a termination switch [SW1] that much be set correctly.

 **Note:** The last device on the chain needs to be terminated.

Node ID Selection

DEVICE	NODE ID	FACTORY SETTING
IO Board	3	N/A
CAN Autodoor	13 (D on selector)	9013.001
CAN Electric Vise	11 (B on selector)	9011.001
CAN Lube Panel	5	9005.001
CAN Spindle Head	7	9007.001
Legacy CAN Autodoor	9	9009.001
Compact APL	15 (F on the selector)	9015.001
Active Ballscrew Compensation	20 (4 on the selector)	9020.001

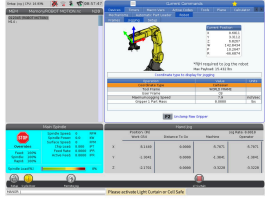
Symptom Table

ALARM / CAN CODE	POSSIBLE CAUSE	CORRECTIVE ACTION
<p>Alarm 9105: IO BOARD COMMAND EXECUTION FAILURE</p> <p>The machine outputs the following alarms with this alarm:</p> <ul style="list-style-type: none">• 2001.003: EMERGENCY STOP SWITCH ERROR• 2002: OPERATOR'S PENDANT EMERGENCY STOP SWITCH ERROR• 120: LOW AIR PRESSURE OR FLOW	<p>Outdated main I/O firmware.</p>	<p>Updated the main I/O firmware to the latest version.</p> <p>Refer to the Firmware Update procedure.</p>
<p>Alarm 17.9920/18.9920: POSITION ERROR TOO LARGE</p>	<p>Electrical connections to the C-APL AV or AU servo amplifiers may be swapped.</p>	<p>Reference the C-APL electrical schematic below.</p>

Alarm 9899: IOPCB CAN FAULT and/ or 9105: IO BOARD COMMAND EXECUTION FAILURE	The CAN node I/O Configuration is incorrect.	Update the I/O configuration via the I/O Config tab.
	The incorrect CAN node is enabled.	Verify that Factory Settings 9000.001 -> 9031.001 are set correctly. Only active nodes should be enabled.
	The CAN PCB does not have power.	Verify that the Low Volt Power supply is supplying power to the CAN PCB.
	The CAN node Communication cable is disconnected.	Power down machine for at least a minute. Verify all CAN communication cables are connected correctly.
	The CAN Module ID Selector is incorrect.	Power down machine for at least a minute. Set ID selector correctly. Power up machine.
	The CAN Modules have incorrect termination.	Power down machine for at least a minute. Verify that only last node in the chain is terminated. Power up machine.
	The CAN Node needs to be reset.	Disable CAN Node via 9000.001 -> 9031.001. If the machine recovers (I/O page isn't "X") after disabling a particular node, try to enable the node again.
Alarm 9798: IOPCB CAN FCT CRC MISMATCH	<p>A test of the internal CRC for the Factory Config Table (FCT) located on one of the CAN devices does not match the CRC for the machines FCT. This can happen due to power failure at a critical time or after replacement of a CAN board attached to the I/O board</p>	<ol style="list-style-type: none"> 1. Press [POWER OFF]. 2. Put the USB memory device into the control. Note: The USB memory device must contain your Haas Control Key and the correct configuration files. 3. Press [POWER ON]. 4. Press [DIAGNOSTIC]. 5. Go to I/O Config in the Diagnostics tab. 6. Press [F3] to Update Config Table. 7. Press [RESET] to continue. If the alarm does not clear, cycle the machine power. <p>The Main CRC and the Factory CRC are now the same.</p>
Alarm 9704: CAN NODE INVALID COMMAND FOR MOTOR 1 CAN code [0x41]	Motor was commanded on in both directions simultaneously.	If using Macro programming, verify G-Code is not turning on both outputs.

Alarm 9706: CAN NODE COMMANDED CURRENT OUT OF RANGE CAN code [0x43]	Outdated CAN Board firmware.	Update the CAN Board latest CAN firmware.
Alarm 9707: CAN NODE INVALID MAX VOLTAGE CAN code [0x44]		
Alarm 9708: CAN NODE MOTOR 1 SHORT DETECTED CAN code [0x81]	Cable Failure	Replace the motor cable.
	Board Failure	Replace the Autodoor/Evise board.
	Motor Failure	Replace the motor.
Alarm 9700: CAN BUS OFF ERROR	Poor connection	Verify CAN Bus Connetors are fully seated and termination resistor set correctly.
	Short circuit on CAN Bus	Use multimeter to diagnose short circuit: 1. Power down machine 2. Disconnect all nodes 3. Reconnect nodes one at a time while measuring resistance between CAN lines and 12V and Ground on the connectors 4. Replace the node that results in a short circuit Note: It should be 60 ohm between CAN-H and CAN-L
Alarm 9701: CAN NODE LOST COMMUNICATION WITH IO CAN code [0x01]	Old IO firmware.	Load I/O firmware 4.09 or greater.
	Poor connection	Verify CAN Bus Connectors are fully seated and termination resistor set correctly.
Alarm 9702: IO LOST COMMUNICATION WITH CAN NODE CAN code [0x30]	I/O mapping missing node	Verify in I/O Config tab that the node is mapped. Get the latest configuration from portal.
	Incorrect node enabled	Verify that Factory settings 9000.001 - 9031.001 are only set to true for the nodes that are installed in the machine.
	Node ID set incorrectly on node	Select correct node ID on ID selection switch. Reboot the machine.
	Node lost power	Use a multimeter to verify that the node has power. Replace the power supply if necessary.
	Poor connection	Verify that the CAN Bus Connectors are fully seated and that the termination resistor set correctly.
Alarm 9703: INTERNAL FAULT	Node Fatal alarm. Firmware has a non-recoverable alarm.	Cycle node enable (90nn.001) or update config table in I/O page. The machine may need to be rebooted.

When trying to run the machine a yellow warning message appears saying "Please activate Light Curtain or Cell Safe".

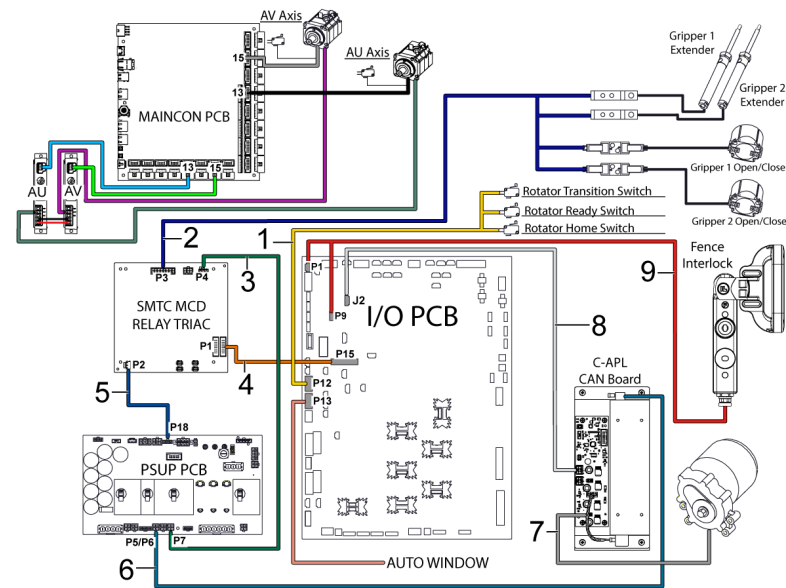


The correct safety parameter kit has not been applied to the machine.

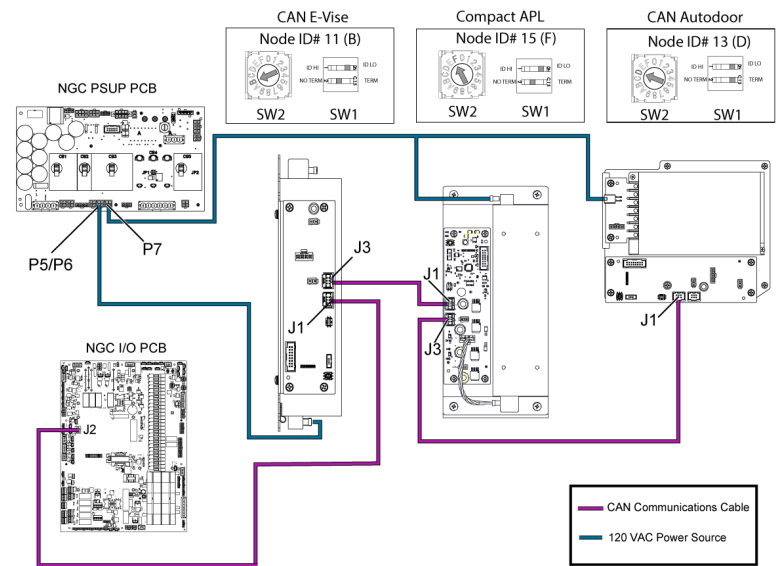
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Electrical Diagrams

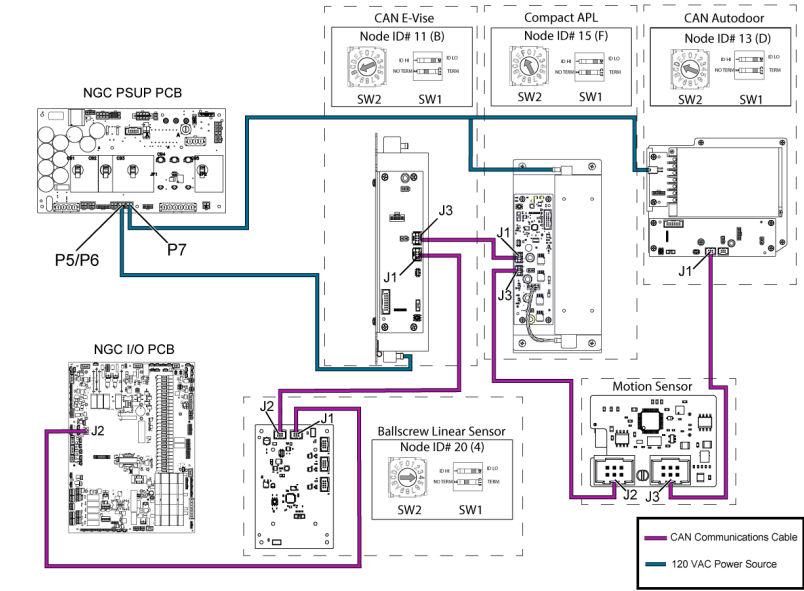
Compact APL Electrical Schematic



CAN Bus sequence when a machine has a CAN E-Vise, Compact APL, and CAN Autodoor.



CAN Bus sequence when a machine has Active Ballscrew Compensation, CAN E-Vise, Compact APL, Motion Sensor, and CAN Autodoor.



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