

DIAGNOSTICS / TROUBLESHOOTING



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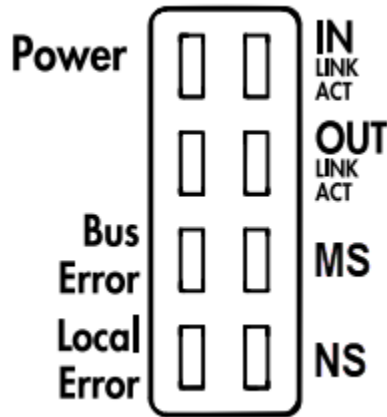
LED STATUS

Diagnostics of the NITRA PAL Electro-Pneumatic System are reported via the LEDs and a hexadecimal error code. Each Signal Module and Valve in the system will indicate its state through its local LEDs and report any error code to the controller. If more than one error is present, the errors will be reported in order of priority. Byte 0 of the Input Data will show the present error code.



NODE ERRORS

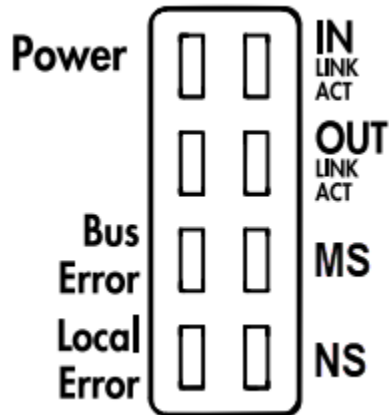
Diagnostics of the EtherNet/IP node are reported through the IN, OUT, MS, and NS LEDs.



Node Errors			
LED	Status		Description
IN/OUT link / act	OFF		No connection to the EtherNet/IP Scanner.
	ON (green)		The module is connected to the network but there is no data exchange.
	ON (flashing)		The module is communicating correctly with the network.
MS	OFF		No power or communications initializing.
	ON (green)		The module is operating correctly.
	ON (flashing)		The module is connected but not configured correctly on the network..
	ON (flashing)		Auto test when powering on the module.
	ON (flashing)		Error: Configuration error, IP Address assignment error, duplicate IP.
	ON (red)		Module operating fault.
NS	OFF		Incorrect communication initialization or module configuration on the network.
	ON (green)		Good EtherNet/IP connection.
	ON (flashing)		Scanner is not connected to the module.
	ON (flashing)		Auto test when powering on the module.
	ON (flashing)		Connection to the scanner previously existed but is now down. The scanner should reconnect to establish communications.




























SYSTEM DIAGNOSTICS

Diagnostics of the NITRA PAL Electro-Pneumatic System as a whole are reported through the Power, Bus Error, and Local Error LEDs. Byte 0 of the Input Data will show the present error code.





















Node Errors									
LED Light State						Hex Value (Byte 0: Diagnostic Data)	Description	Notes	Solution
Power	Bus Error		Local Error						
ON (green)		OFF		ON (red)		0xFF	System limits exceeded, communication buffer overflow.	Number of I/O to check simultaneously is too high or the scan rate (RPI) is too fast.	Reduce the I/O count or increase the RPI time.
ON (green)		OFF		ON (red)		0xD4 - 0xD7	Fault with a temperature analog input module.	Could be sensors not connected or parameters configured incorrectly.	Check the connections and the parameters.
ON (green)		OFF		ON (red)		0xD0 - 0xD3	Analog Input module not calibrated.	---	Replace the module exhibiting this error.
ON (green)		OFF		ON (red)		0xCC - 0xCF	Analog Output module fault or total module current exceeded.	Individual Output fault/ module current exceeded/ Digital to Analog converter error.	Power down and remove the cause of the error.
ON (green)		OFF		ON (red)		0xC8 - 0xCB	Analog Input module fault or total module current exceeded.	Under range, or over range for single input. Over range for module.	Power down and remove the cause of the error.
ON (green)		OFF		ON (red)		0xB0 - 0xC5	Digital output failure or total module current exceeded.	Short circuit of an individual output/module over current.	Power down and remove the cause of the error.
ON (green)		OFF		OFF		0xA0 - 0xAF	Overcurrent of a digital input.	Triggered by 1 input.	Power down and remove the cause of the error.

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Node Errors									
LED Light State			Hex Value (Byte 0: Diagnostic Data)	Description	Notes	Solution			
Power	Bus Error						Local Error		
ON (green)		OFF		ON (red)		0x20 - 0x9F *Solenoid valve 1 - 128 fault. *see calculation at the end of the table	Solenoid short circuit or not connected.	Power down and remove the cause of the error.	
ON (flash)		OFF		OFF		0x17	No auxiliary power.	---	Connect auxiliary power.
ON (green)		ON (flash)		OFF		0x16	Address or configuration of a solenoid valve or signal module error.	Solenoid valve or signal module faulty.	Power down and remove the cause of the error.
ON (flash)		OFF		ON (red)		0x15	Power supply out of range (under/over voltage).	---	Correct power input to specified range.
ON (green)		ON (flash)		OFF		0x14	Configuration of a solenoid valve or signal module error.	Current configuration doesn't match the ones stored in the device.	Repeat the hardware configuration procedure using pushbutton A in the controller access panel (see user manual section 1). If error persists, replace the faulty device.
ON (green)		ON (red)		OFF		0x10	Internal base communication fault.	Expansion base is configured but not communicating.	Check the connection cable. Ensure correct end plates are being used. If communications are corrected, the alarm resets automatically after 3 seconds.
ON (green)		OFF		ON (flash)		0x09	Error in the PAL controller parameters.	Check that correct values are being configured.	---
ON (flash)		OFF		ON (flash)		0x08	Number of solenoid valves connected exceeds 128	---	Ensure that connected solenoid valves do not exceed 128.
ON (green)		OFF		ON (flash)		0x07	Mapping error. Number of valve bases exceeds max allowed.	Current configuration doesn't match the ones stored in the device.	Reduce number of valve bases. Ensure end plates are correct.

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Node Errors									
LED Light State						Hex Value (Byte 0: Diagnostic Data)	Description	Notes	Solution
Power	Bus Error		Local Error						
ON (green)		OFF		ON (flash)		0x06	Addressing error: type of module not allowed or no valve base/signal module connected.	---	Remove incompatible module or connect valve base/signal module.
ON (flash)		OFF		ON (flash)		0x05	Number of digital input modules connected to the system exceeds 128.	---	Reduce number of digital input modules.
ON (green)		OFF		ON (flash)		0x04	Number of digital output modules connected to the system exceeds 128.	---	Reduce number of digital output modules.
ON (green)		OFF		ON (flash)		0x03	Number of analog input modules connected to the system exceeds 16.	---	Reduce number of analog input modules.
ON (green)		OFF		ON (flash)		0x02	Number of analog output modules connected to the system exceeds 16.	---	Reduce number of analog output modules.
ON (green)		OFF		OFF		0	System is working properly.	---	---

Calculating the specific faulty solenoid valve:
 Dummy and bypass valves must be considered in the calculation. 0 corresponds to the first solenoid valve in the island.
 Error code in HEX: 0x20 = n; where n is the faulty solenoid valve
 Example: Error code 0x3F
 $0x3F - 0x20 = 0x1F$
 $0x1F = 31$
 Solenoid valve 32 has a problem.





MODULE LED DIAGNOSTICS

Signal Modules and Valves indicate their state through individual LEDs and report any errors to the PAL Controller with a hexadecimal error code. Byte 0 of the Input Data will show the present error code.





SOLENOID VALVE LED

Solenoid Valve LED Status			
LED Status		Description	Solution
OFF		The solenoid valve is not enabled.	No fault signal.
ON (green)		The solenoid valve is enabled and working.	No fault signal.
ON (flashing) X 2		Indication for each solenoid valve. Solenoid missing, output triggered for dummy valve or missing solenoid on double valve.	Fault signal active. The output resets automatically when error is removed. The power must be cycled to reset Fault signal.
ON (flashing)		Solenoid valve short circuit.	Fault signal active. The output is disabled. Both the fault signal and output can only be reset by power cycle.
ON (flashing) all LEDs		Voltage is out of range: Less than 10.8V or greater than 31.2V. CAUTION: Voltage greater than 32V can damage the system.	Fault signal active. Error will self-reset when voltage is in proper range. Error will take 5 seconds to reset after voltage is within range.






DIGITAL INPUT MODULE LEDs

Digital Input Module LED Status			
LED Status (X1-X8)		Description	Solution
OFF		Input not active.	---
ON (green)		Input active.	---
ON (red)		Short circuit or overcurrent on input.	Remove the cause of the error.
ON (flashing) all LEDs		Current on module too high.	Remove the cause of the error.










DIGITAL OUTPUT MODULE LEDs

Digital Output Module LED Status			
LED Status (X1-X8)		Description	Solution
OFF		Output not active.	---
ON (green)		Output active.	---
ON (red)		Short circuit or overcurrent on output.	Remove the cause of the error.
ON (flashing) all LEDs		Current on module too high.	Remove the cause of the error.











ANALOG INPUT MODULE LEDs

Analog Input Module LED Status			
LED Status (X1-X4)		Description	Solution
OFF		Input not active.	---
ON (green)		Input active and no problems.	---
ON (flashing)		Analog input signal outside of range.	Correct range or replace sensor.
ON (red)		Analog input signal too low or too high.	Correct range or replace sensor.
ON (flashing) all LEDs		Overload or short circuit of module.	Remove the cause of the error.

ANALOG OUTPUT MODULE LEDs

Analog Output Module LED Status			
LED Status (X1-X4)		Description	Solution
OFF		Output not active.	---
ON (green)		Output active and no problems.	---
ON (flashing) all LEDs On .2s Off 1s		Power supply outside of permitted range.	Correct power supply range.
ON (flashing) all LEDs On .2s Off .2s		Power supply overload or short circuited.	Correct power supply range.
ON (red)		All LEDs active simultaneously: Internal fault.	Replace the module.
ON (flashing) all LEDs On .6s Off .6s		Output overload or short circuit.	Remove the cause of the error.
ON (flashing) all LEDs On .2s Off .2s		Module over temperature.	Reduce temperature of module.
ON (flashing) all LEDs On .6s Off 1s		Open circuit (4-20ma or 1-5V channels).	Ensure sensor is installed properly or channel is disabled.
ON (flashing) all LEDs On .6s Off .6s		Value sent to output outside of permissible range.	Correct value sent to module. Module must be power cycled to reset.

TEMPERATURE INPUT MODULE LEDs

Temperature Input Module LED Status			
LED Status (X1-X4)		Description	Solution
OFF		Input not active.	---
ON (green)		Input active and no problems.	---
ON (flashing) all LEDs On .2s Off 1s	 	Power supply outside of permitted range.	Correct power supply range.
ON (flashing) all LEDs On .2s Off .2s		Input value below configured minimum value or higher than configured maximum value.	Temperature must be within specified range or re-configure minimum and maximum values.
ON (red)		Sensor short circuit.	Remove the cause of the error.
ON (flashing) all LEDs On .5s Off .5s	 	Internal error.	Remove the cause of the error. If error persists, replace module.
ON (flashing) all LEDs On .2s Off .2s		Open circuit on channel.	Connect sensor, replace sensor or disable channel.
ON (flashing) all LEDs On .6s Off .6s		Sensor out of range.	Connect sensor, replace sensor or disable channel.