WIRING INSTRUCTIONS FOR NATIONAL INSTRUMENTS USB-6210 / 6211

The USB 6210 / 6211 devices are used to monitor the position of a C-Scan system when the machine has a motion controller that is not commanded by InspectionWare.   This mode of data acquisition is called externally controlled scanning or "along for the ride" scanning.

The USB 6210 / 6211 device acquires the quadrature encoder A / B signals and uses this position information to map the C-Scan image.

The device also acquires analog signals from flaw detectors, such as Amplitude from one or more A-Scan gates. The Scan Axis encoder, and the analog data to be captured must be wired into the same USB-6211 module. This ensures that the data for the C-Scan image is correctly mapped according to the motion of the component under inspection, and with respect to the position of the probe(s).

The Index Axis is monitored by a second USB-6210 module, which does not collect analog data.

SCANNING AXIS: USB MODULE 1

From Scanner or Motion Controller			
Signal Description	**Term**	**USB-6211 Function**	**Comment**
Scan Axis Encoder A+	1	PFI 0 / PO 0	Encoder signals must be single-ended.
Scan Axis Encoder B+	2	PFI 1 / PO 1	If the encoder counts Fwd / Back opposite from the true direction of the machine: reverse the A+ and B+ connections on PFI 0 / PFI 1 inputs.
Scan Axis Encoder Ground	5	D GND	
Scan Axis Encoder Power	10	+5 V	USB-6211 power supply is limited to 50mA at +5 V DC. Use an external power supply for encoders that need more current.
Scan Axis Encoder Ground	11	D GND	
From Flaw Detector			
Signal Description	**Term**	**USB-6211 Function**	**Comment**
Analog Output Ch 1 (+)	15	AI 0 / AI 0(+)	
Analog Output Ch 1 (-)	16	AI 8 / AI 0 (-)	
Analog Output Ch 2 (+)	17	AI 1 / AI 1(+)	Differential (+/-) signaling shown. Up to 8 channels can be monitored
Analog Output Ch 2 (-)	18	AI 9 / AI 1 (-)	
Analog Output Ch 3 (+)	19	AI 2 / AI 2(+)	For Single-Ended signaling, up to 16 channels may be monitored, sharing the Analog Ground.
Analog Output Ch 3 (-)	20	AI 10 / AI 2 (-)	Maximum signal range is +/- 10 V
Analog Signal Ground	28	AI GND	

INDEX AXIS: USB MODULE 2

The Index Axis module is used only for acquiring the position of the index axis.

From Scanner or Motion Controller			
Signal Description	**Term**	**USB-6210 Function**	**Comment**
Index Axis Encoder A+	1	PFI 0 / PO 0	Encoder signals must be single-ended.
Index Axis Encoder B+	2	PFI 1 / PO 1	If the encoder counts Fwd / Back opposite from the true direction of the machine: reverse the A+ and B+ connections on PFI 0 / PFI 1 inputs.
Index Axis Encoder Ground	5	D GND	
Index Axis Encoder Power	10	+5 V	USB-6210 power supply is limited to 50mA at +5 V DC. Use an external power supply for encoders that need more current.
Index Axis Encoder Ground	11	D GND	

NOTES:

The Index Axis encoder module is not used for data acquisition, even though the USB-6210 hardware has this capability.   Data is acquired only by the Scan Axis encoder module, because the incoming analog data must be mapped to the Scan Axis encoder position at high speed. The Index Axis mapping occurs only once per scan line, or once per revolution, for rotary scanning.

The USB-6210 and USB-6211 are nearly identical devices, except that the USB-6211 has analog output capability.
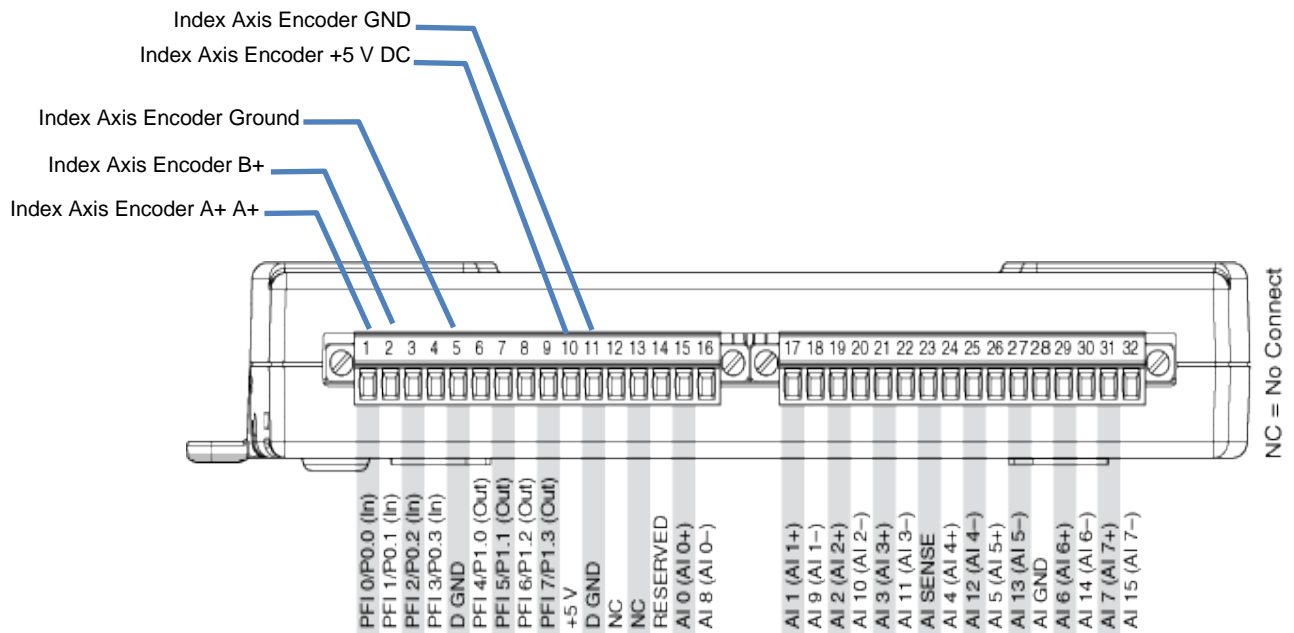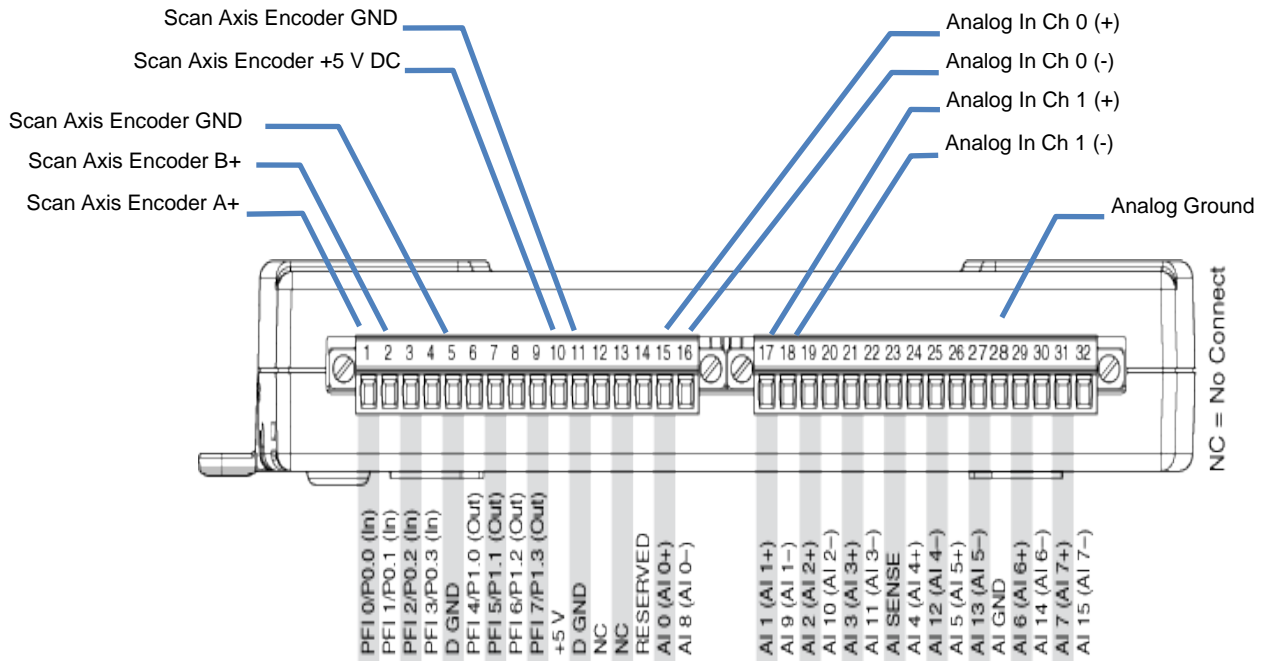
Release	Date	Release Notes
1.0	2021-09-14	Initial Release.
1.1	2021-09-28	Added +5 V DC encoder power terminals. Corrected typos in channel numbers