JNIOR Input Signal Requirements

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The JNIOR Model 410 provides eight standard digital inputs and eight standard relay outputs. The inputs allow for the monitoring of logic signals up to a frequency of almost 2000 cycles/second. The outputs are single contact normally open type relays designed for low current and non-inductive loads. This document outlines the specifics associated with input wiring.

Digital Input Requirements

The digital inputs are rated to operate with signals ranging from 0 to 30 volts. The eight inputs are independent and optically isolated. They do not require a common ground. These are not high-impedance inputs and do represent a signal load. Care must be taken to insure that the monitoring connection does not adversely affect the signals being monitored.

Low (0) Input Condition

Input signal voltages from 0 to 1 volt are considered to be OFF. As a result they do not light the corresponding LED and are read by the JNIOR as a logic level 0. These are reported by the standard applets as OFF depending on the inversion settings. For input voltages under 0.7V one may assume that the JNIOR draws no current from the signal source. An open circuit at a digital input is also a reliable low (0) input condition.

High (1) Input Condition

Input signal voltages from 2 to 30 volts are considered to be ON. The corresponding LED illuminates and the input is read by the JNIOR as a logic level 1. These are reported by the standard applet as ON depending on the inversion setting.

In order to determine the current required by the input and thus the load one can assume that the input impedance of the JNIOR is approximately 1130 Ohms. For a 5V logic level a current around 3.5 mA is required; For a 12V logic level the JNIOR draws about 10 mA; And, for a 30V input the JNIOR will draw over 25 mA. Refer to Figure 1, Digital Input VI Characteristic curve, for the generalized case. The signal source must be able to supply the required current without affecting operation.

Recommended Logic Levels

Although the range of operating logic levels is quite broad if you have a choice we would recommend using 12V logic levels. The JNIOR may be powered by a wide range of DC or AC voltages and works quite well when powered by a 12VDC (0.5A minimum) power transformer. This may provide a convenient source of logic voltage for input circuits when for example relays are used.

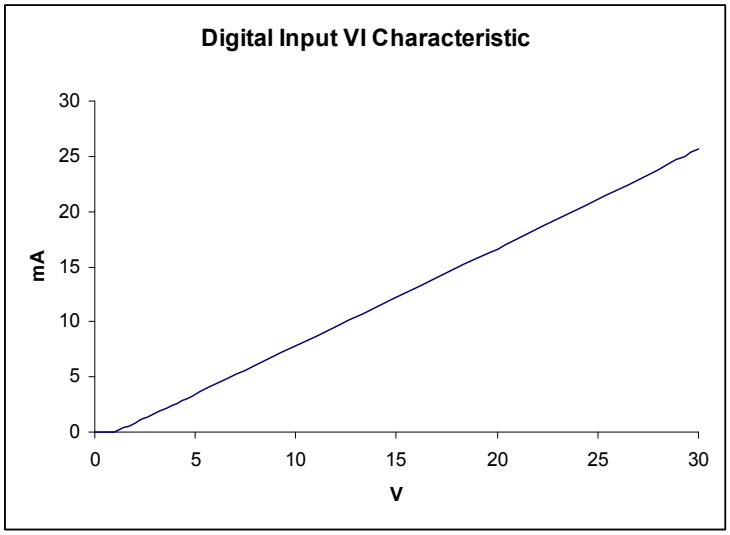
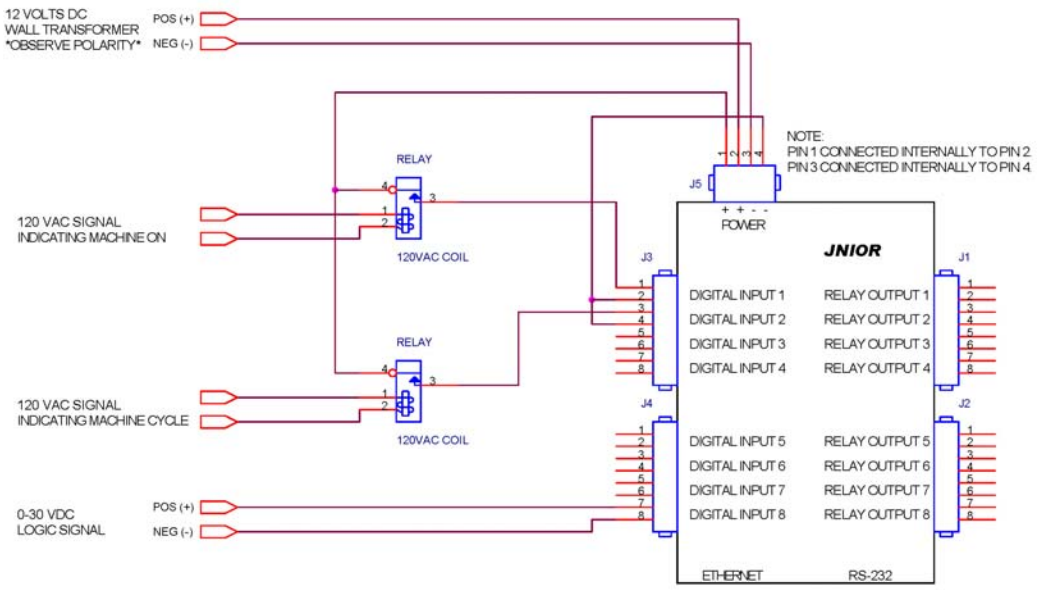


Figure 1

Typical Input Signal Conditioning

When monitoring conditions such as “machine power-on” or “motor running” the appropriate electrical signals can usually be obtained from the associated A/C circuitry. The voltages here are typically 110/220 VAC and cannot be connected directly to the JNIOR digital inputs. The solution is to use relays or suitable coil voltage to control the logic signal as shown here.



In this case the 120 VAC circuits drive 120VAC relays which control the application of the power supply voltage to the digital inputs. The bridged positions on the power connector provide convenient taps for wires. Similarly 24 VAC or 220 VAC relays would be used if appropriate. Simple switches may be used in place of the relays if human input or other mechanical actuation where available.

Also shown is the direct connection of a compatible 0-30 volt logic signal. No common ground is necessary as the inputs are completely isolated from each other.

Signal De-Bouncing

Relays and switches have mechanical contacts which physically make or break the circuit. Rarely will the contacts come together solidly or separate decisively without bouncing (briefly making and breaking the circuit). This can raise havoc with digital latching and counting circuits that might be monitoring through the relay/switch contact. It can result in latching at the wrong time (when the relay opens for instance) or in extra counts. Both are undesirable and the effect would get worse with the age of the components.

By default the JNIOR digital inputs are *debounced*. The default debouncing delay is 200 milliseconds. An input must remain quiet (not change) for 200ms before any transition on that input will be processed (latched, counted or logged). This is sufficient to eliminate almost all of the issues arising from contact bounce. If high frequency signals or pulses of very short duration must be monitored a Registry setting in the JNIOR allows for adjustments to the debounce filter. Refer to the Registry Key Assignments document for more information.

Wires and Connectors

The JNIOR is supplied with screw-type removable terminal blocks accepting wire sizes from 22 to 12 AWG (Weidmuller 1527010000 or equivalent). There are four identical 8 position connectors covering the inputs and outputs. These are not keyed. Care should be taken to insure that connectors are not inserted into the wrong positions.