

# PROTEUS XES-00H Users Manual



COPYRIGHT © 2003 ARCUS,  
ALL RIGHTS RESERVED

First edition, December 2003

ARCUS TECHNOLOGY copyrights this document. You may not reproduce or translate into any language in any form and means any part of this publication without the written permission from ARCUS.

ARCUS makes no representations or warranties regarding the content of this document. We reserve the right to revise this document any time without notice and obligation.

**Revision History:**

**1.0 – First revision**

**1.01 – Minor Updates**

**1.02 – Updated for XES only**

**1.03 – Updated for XES-00H**

## Table of Contents

1. Introduction	4
2. Dimensions – Proteus XES	5
3. Connector Descriptions	7
Integrated Junction Top Pinouts	7
34 pin IO Connector Pinouts	9
5. Electrical Specifications	10
Proteus XES Power Requirement	10
Proteus XES USB Communication Interface	10
Proteus XES Ethernet Communication Interface	10
Status LED	10
Pulse/Dir/Enable/Clear Outputs	11
+Lim, -Lim, Home, Alarm, In Pos Motion Inputs	13
Encoder Inputs	14
+5V Supply	15
Configurable DIO	16
Analog Inputs	17
RS-232	17

# 1. Introduction

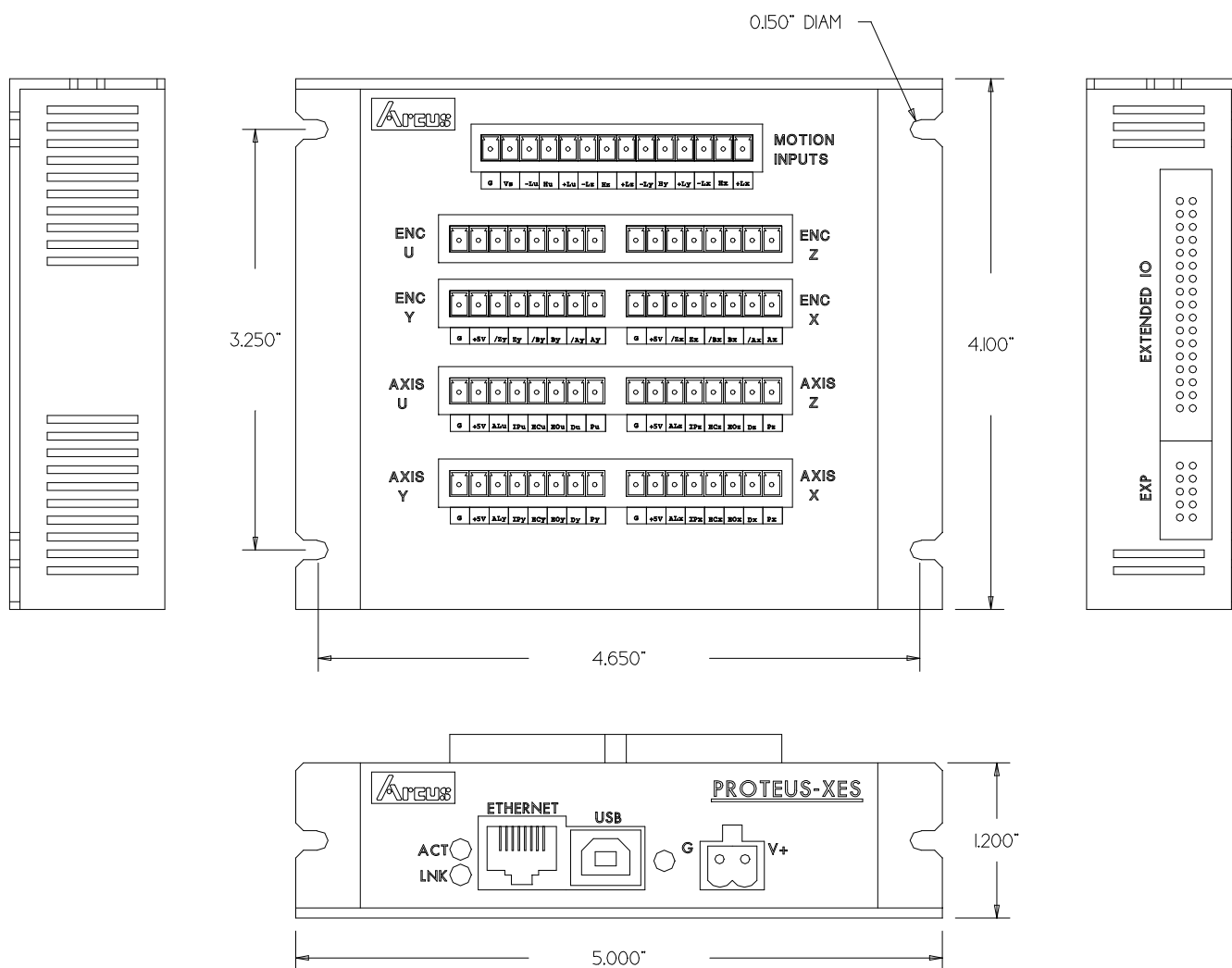
Proteus XES-00H is an advanced standalone 4-axis stepper controller with USB/RS-232/Ethernet communication interface. Proteus XES-00H comes with integrated junction board for easy wiring.

## **Proteus XES Capabilities**

- 4 axis stepper pulse/direction control
- Linear and circular interpolation
- S-curve acceleration profiling
- Maximum output Frequency of 6.55M PPS
- Limits, Home, Alarm, In Pos inputs per axis
- Enable and Clear outputs per axis
- Quadrature encoder A and B channels, and Index Z channel per axis
- 24 configurable TTL digital IO
- 4 multi-tasking motion program with maximum of 6K bytes per program
- Text based BASIC like programming language
  - o IF and WHILE condition
  - o 64 sub routines
  - o 256 general purpose variables (24 bit)
  - o 48 setup variables (32 bits)
  - o 128 Boolean flag variables
  - o Math operations: addition, subtraction, multiplication, division
  - o Bit manipulations: OR, AND, SHIFT

Proteus XES-00H comes with a Windows program called Proteus IPE, which provides easy and graphical way to program, setup, and debug the Proteus XES controller. See Proteus IPE manual for details.

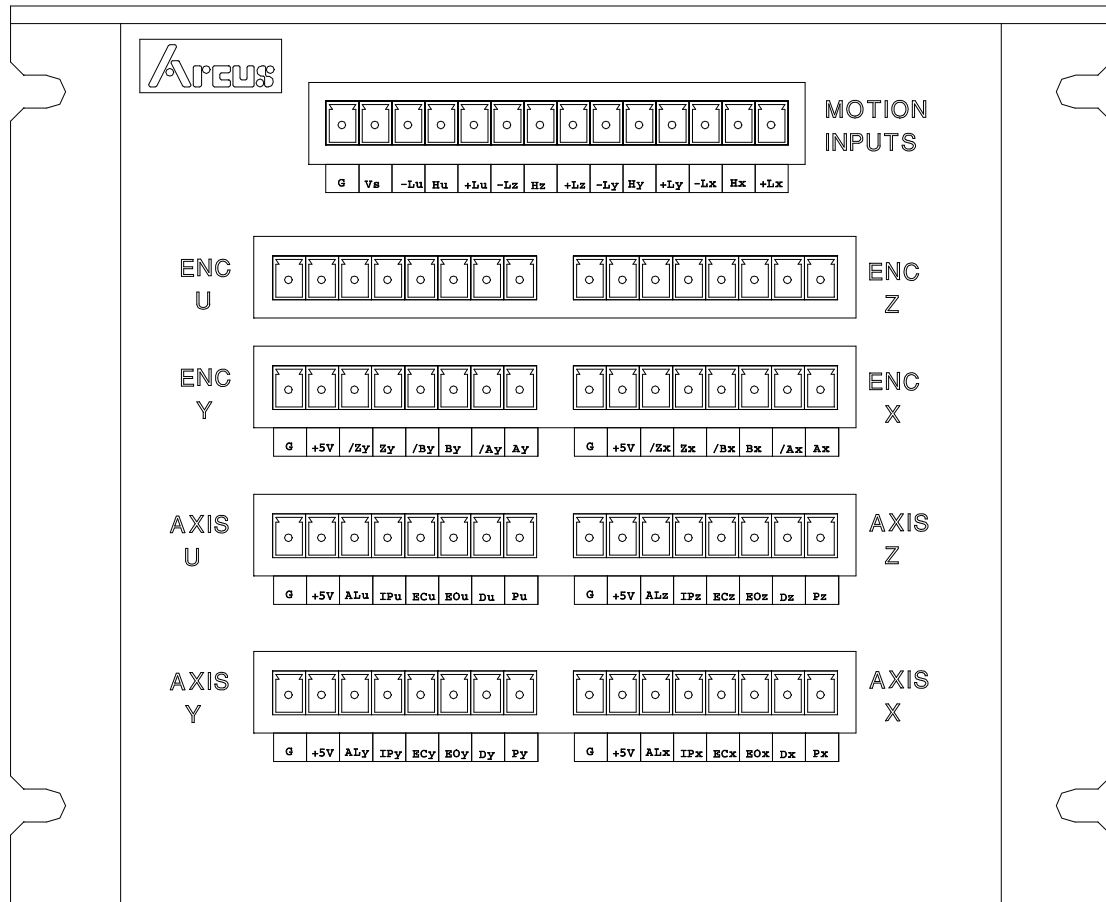
## 2. Dimensions – Proteus XES





## 3. Connector Descriptions

### Integrated Junction Top Pinouts



### AXIS X, AXISY, AXIS Z, AXISU

Signals	Description	Signal Type
Px, Py, Pz, Pu	Pulse (also known as step or clock) output signals	Open Collector Output
Dx, Dy, Dz, Du	Direction output signal	Open Collector Output
EOx, EOy, EOz, EOU	Enable Output signals	Open Collector Output
ECx, ECy, ECz, ECU	Error Clear outputs (used typically for digital servo)	Open Collector Output
IPx, IPy, IPz, IPu	In Position Inputs (used typically for digital servo)	*Opto-isolated Input
ALy, ALy, ALz, ALu,	Alarm Inputs (used typically for digital servo)	*Opto-isolated Input
+5V	5 volt supply output	Supply output
G	Ground	Ground

\* - For opto-isolated inputs, Vs on top 14-pin connector need to be supplied with voltage 12-24V.

\*\* - Total combined available current for 5V supply output is 500mA.

### ENC X, ENC Y, ENC Z, ENCU

Signals	Description	Signal Type
Ax, Ay, Az, Au	Plus Quadrature A Channel Differential Encoder inputs	Differential input
/Ax, /Ay, /Az, /Au	Minus Quadrature A Channel Differential Encoder inputs	Differential input
Bx, By, Bz, Bu	Plus Quadrature Channel B Differential Encoder inputs	Differential input
/Bx, /By, /Bz, /Bu	Minus Quadrature Channel B Differential Encoder inputs	Differential input
Zx, Zy, Zz, Zu	Plus Index Channel Differential Encoder inputs	Differential input
/Zx, /Zy, /Zz, /Zu	Minus Index Channel Differential Encoder inputs	Differential input
+5V	**5 volt supply output.	Supply output
G	Ground	Ground

**\*\* - Total combined available 5V output supply current is 500mA.**

### MOTION INPUTS

Signals	Description	Signal Type
+Lx, +Ly, +Lz, +Lu	Plus Limit inputs	Opto-isolated input
Hx, Hy, Hz, Hu	Home (also known as origin) inputs	Opto-isolated input
-Lx, -Ly, -Lz, -Lu	Minus Limit inputs	Opto-isolated input
Vs	Opto-isolator supply input. Supply input range is 12-24V and must be supplied for the opto-isolated inputs to work.	Supply input
G	Ground	Ground



### **34 pin IO Connector Pinouts**

Description	Pin	Pin	Description
Configurable DIO1	1	2	Configurable DIO7
Configurable DO2	3	4	Configurable DIO8
Configurable DO3 (SYNCOU TX)	5	6	Configurable DIO9 (SYNCOU TY)
Configurable DO4	7	8	Configurable DIO10
Configurable DO5	9	10	Configurable DIO11
Configurable DO6	11	12	Configurable DIO12
Configurable DO13	13	14	Configurable DIO19
Configurable DO14	15	16	Configurable DIO20
Configurable DO15 (SYNCOU TZ)	17	18	Configurable DIO21 (SYNCOU TU)
Configurable DO16	19	20	Configurable DIO22
Configurable DO17	21	22	Configurable DIO23
Configurable DO18	23	24	Configurable DIO24
Latch Input 1	25	26	Latch Input 2
Latch Input 3	27	28	Latch Input 4
Optional Analog Input 1	29	30	Optional Analog Input 2
RS-232 TXD	31	32	RS-232 RXD
+5V Supply	33	34	GND

Note that the configurable DIO is TTL level 0-5V and the current restriction is 8mA per channel. Care should be taken to use within the range to avoid any damage to the controller.

## 5. Electrical Specifications

### **Proteus XES Power Requirement**

Supply Power Voltage Requirement:	+9 to +30 VDC
Supply Power Current Requirement:	1.2A @ 9VDC 1.0A @ 12VDC 0.5A @ 24VDC
Built-in Protection:	1.0 A Resettable Fuse Reverse Voltage Protection

### **Proteus XES USB Communication Interface**

Proteus XES controller comes with USB communication interface.

USB Compliance:	version 1.1
USB Speed:	Low Speed
Device Type:	HID
Recommended Max USB Cable Length:	12 ft

### **Proteus XES Ethernet Communication Interface**

Proteus XES controller comes with Ethernet communication interface using TCP/IP protocol.

Proteus XES controller also comes with optional Web enabled communication interface.

Communication Speed:	10Mbps
IP Address:	Configurable
Port Number for TCP/IP:	101
Port Number for Web Server:	80

### **Status LED**

Proteus XES controller comes with a Status LED located between the power connector and USB connector.

On power-up, Status LED

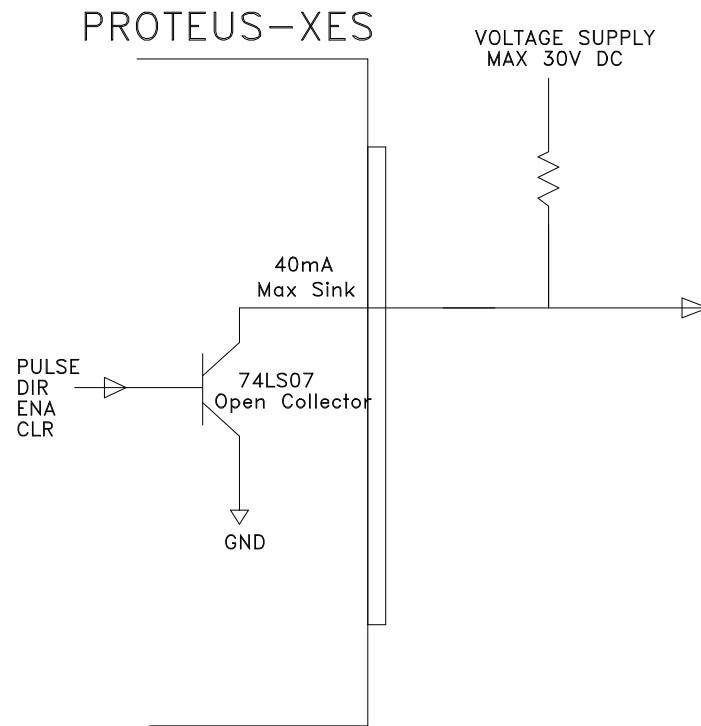
- 1) Turns on for less than a second
- 2) Turns off while loading the programs and variables from the EEPROM.
- 3) Turn on after successful startup

After power-up, Status LED

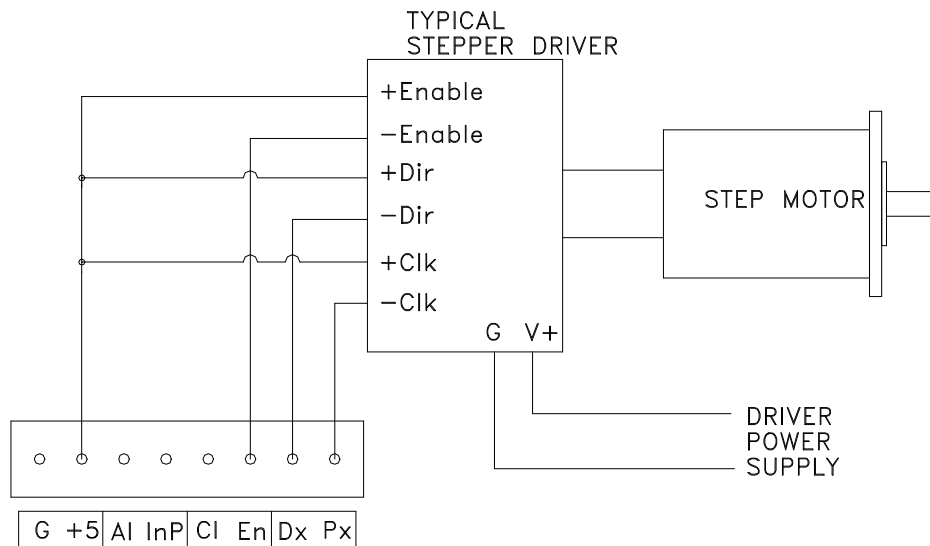
- 1) Remains on if there is no error
- 2) Blinks if there is any program error.

## **Pulse/Dir/Enable/Clear Outputs**

Type:	Open Collector (74LS07)
Max Voltage:	30V max
Sink Current:	40 mA



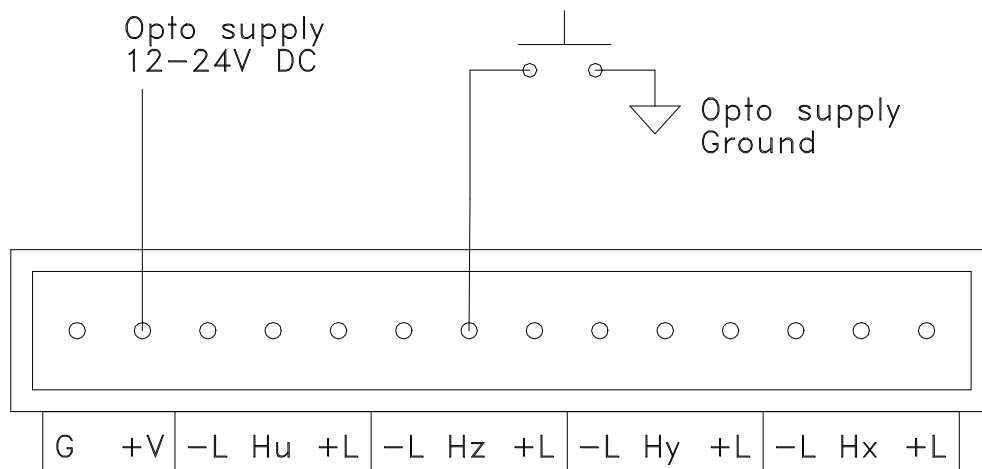
## Typical Pulse and Direction Interface to Stepper Driver



Pulse and direction outputs are open-collector outputs. Connect the pulse (or sometimes called Clock) and direction signals step driver as shown above.

**+Lim, -Lim, Home, Alarm, In Pos Motion Inputs**

Type: Opto-isolated Inputs (74LS14)

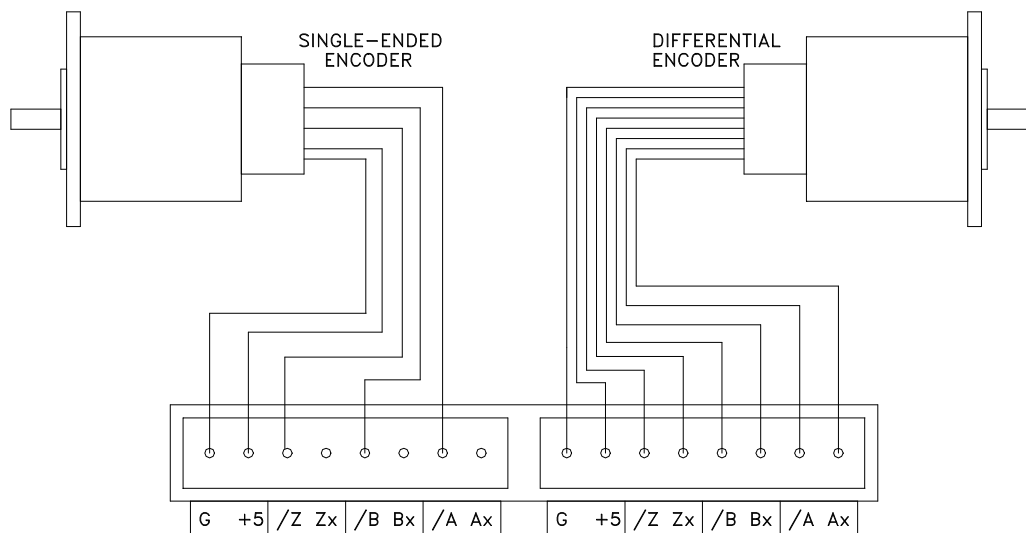


Connection example as shown applies to Limits, Home, Alarm and InPos inputs.

## **Encoder Inputs**

Proteus XES-00H has inputs for encoder inputs for differential and single ended quadrature encoders.

+5V is available to supply power to the encoder. Make sure that total +5V current usage does not go over the limit of 500mA.



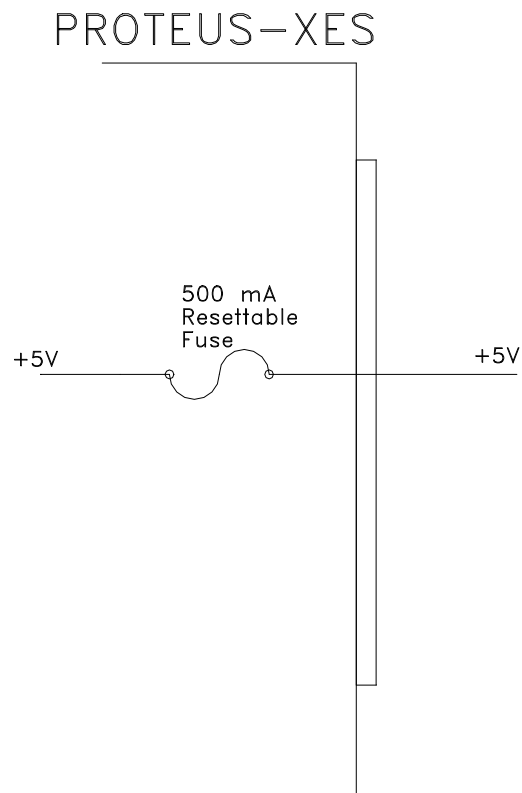
For single-ended encoder, connect to /A, /B, and /Z.

## **+5V Supply**

Proteus XES controller provides +5V supply that can be used to power opto-isolators, encoders, switches, etc.

Maximum available current from +5V on the top junction board is 500mA.

Maximum available current from +5V on the 34 pin Extended DIO connector is 500mA.



## **Configurable DIO**

Proteus XE controller comes with 24 TTL level configurable digital IO's.

### **Voltage/Current Specification as input**

	<b>Min</b>	<b>Max</b>
Low Level Input Current:	-200 uA	10 uA
High Level Input Current:	-10 uA	10 uA
Low Level Input Voltage:		0.8 V
High Level Input Voltage:	2.0 V	

### **Voltage/Current Specifications as outputs**

	<b>Min</b>	<b>Max</b>
Low Level Output Voltage:		0.05 V @ 1uA 0.4 V @ 8 mA
High Level Output Voltage:	4.95 V @ -1 uA 2.4 V @ -8 mA	
Low Level Output Current:		8mA @ 0.4V
High Level Output Current:	-8 mA @ 2.4V	

### **Internal Resistors**

	<b>Min</b>	<b>Max</b>
Pull-up resistor	25k Ohm	500k Ohm
Current limiting resistor		100 Ohm

***NOTE: 24 Configurable DIO are TTL Level with currently limit of 8mA. Using outside of this range will damage the controller.***



## **Analog Inputs**

Proteus XES controller comes with optional 2 channel analog inputs.

Analog Input Resolution:	12 bits
Analog Input Range:	0 to 5VDC

## **RS-232**

Proteus XES controller comes with RS-232 channel with following fixed configuration:

Baud Rate:	9600 (Fixed)
Data:	8
Parity:	None
Stop:	1

### **Example RS-232 wiring diagram for connecting with PC serial port**

