ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Control Technology 2203* at our website: *Click HERE*

Control Technology Corporation

Installation Guide

2200XM Automation Controller

LISTED AC61 UL

115-230 VAC
50° C

This document is current as of the following revision levels:	
Resident Firmware	R12
Hardware	B

This guide is intended to assist in the proper installation and use of the model 2200XM Automation Controller. This controller provides a flexible plug-in architecture supporting a variety of function boards.

The model 2200XM may be programmed using CTC's personal computer-based programming software. All programming and diagnostic functions with this model are accomplished via an RS-232 interface, which is also available for use as a computer communications port.

This guide provides installation and connection information for the model 2200XM, as well as wiring information for its RS-232 communications port, and information on system capacities and specifications.

25 South Street, Hopkinton, MA 01748

© 1993 Control Technology Corporation

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Installation and Connection Information

Controller Installation

The model 2200XM Automation Controller is provided with mounting ears, allowing it to be easily mounted to a flat surface (for example, a NEMA-rated electrical enclosure) with four mounting bolts. There are, however, several guidelines which should be followed to promote a successful design.

Mounting Considerations

When selecting a mounting location for the controller, care should be taken to provide protection against various environmental factors:

1. The controller should not be exposed to flying metal chips (be careful during installation and subsequent machine construction work!), conductive dusts, liquids or condensing humidity. In environments where these hazards may be present, the controller should be housed in a NEMA 4 or NEMA 12 rated enclosure, as appropriate.

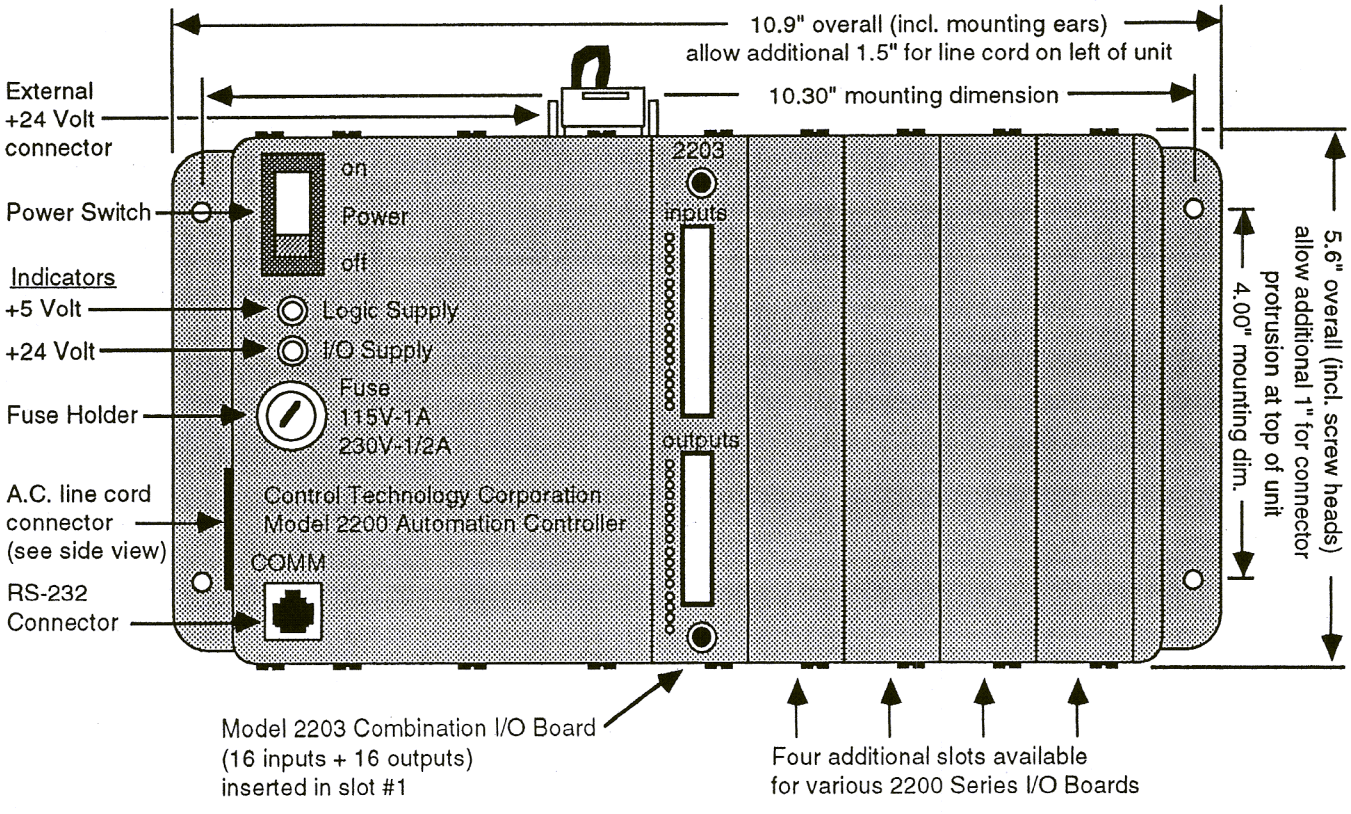
2. The controller is not intended for mounting in an environment requiring explosion-proof practices.

3. The controller should be mounted to a vertical surface, with its longest dimension horizontal, and adequate space should be provided for convective ventilation through the controller. Additional heat-producing devices mounted within the controller enclosure should not be allowed to raise the ambient temperature above the controller's rating.

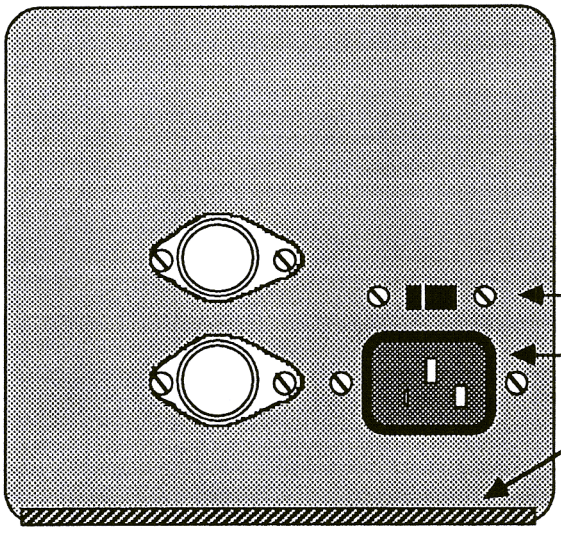
4. If possible, the controller should be mounted physically distant from devices producing Electro-Magnetic Interference (EMI) or Radio Frequency Interference (RFI). This includes motor starters, relays, large power transformers, ultrasonic welding apparatus, etc.

Model 2200XM Mounting Dimensions

(note: depth of unit is 5.4", measured from mounting surface, but allow approximately 1 - 2" additional for connector protrusion)



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Side view of Model 2200XM, illustrating Voltage Selector Switch

Connecting A.C. Power

The model 2200XM contains an integral power supply which provides two mutually-isolated voltages (+5 VDC and +24VDC) for the operation of the controller. Also included are two LED indicators for these voltages, and a power ON-OFF switch.

The controller's power supply requires A.C. power, either 120 VAC or 240 VAC nominal, for proper operation. The supply voltage required is determined by a line voltage selector switch on the side of the unit (see diagram). A fuse of the appropriate rating must also be installed in the fuse holder on the front of the controller:

Voltage	Range	Fuse
120 VAC	90-132	1 Amp
240 VAC	190-264	1/2 Amp

Power is applied to the controller via the standard "IEC"-type power connector on the side of the controller. A U.S.-standard 3-prong power cord is provided with the controller for this purpose.

When using a step-down or isolation transformer to supply power to the controller, be aware of the following potential issues, all of which are drawn from experience:

1. Step-down transformers are typically used to derive 120 VAC from much higher-voltage lines being used to power heavy equipment. Often, when motors are first energized in such equipment, the stall currents which result can cause the voltage being supplied to drop by as much as 50%. Because step-down transformers are ratiometric devices, the voltage being supplied to the controller will drop proportionately, causing a potential system malfunction.

2. The relatively light load imposed by the controller on the transformer secondary may result in excessive voltage being present, representing a potential hazard to the system.

3. Neither type of transformer represents ideal protection against electrical noise; inter-winding capacitances can result in noise transference among windings, and differential noise may still be electromagnetically coupled to the secondary.

4. Adequate grounding of the controller is still critical to its proper performance (see below).

The above issues often point to the use of an independent power feed (120 VAC) for the controller and associated componentry. The resulting additional stability and design integrity are often well worth the slight additional cost.

The Importance of Proper Grounding

The controller is outfitted with an integral line filter to protect against electrical noise carried on the A.C. power line. This line filter, along with the shielding provided by the controller enclosure itself, depend on the presence of a good ground connection for effectiveness. This is normally accomplished by connecting the controller's power cord into a well-grounded outlet.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

As with any electronic equipment, the controller's ground should follow a direct, low-impedance path to the plant's power source. If possible, this path should not be shared by any mach-inery which injects a large amount of electrical noise into the ground.

In instances where step-down or isolation transformers are being used to power the controller, the ground connection should still be made directly to the controller.

For further considerations regarding noise protection generally, refer to the application note entitled "Reducing 'Noise' Susceptibility", which may be obtained at no charge from your distrib-utor or directly from CTC.

The Controller's Power System

As noted above, the controller's power system provides two operating voltages, electrically isolated from one another:

+5 Volts D.C. - This is used to power the controller's internal circuitry, including the CPU and the logic-level circuitry on the various function boards.

+24 Volts D.C. - This is available, with a current capacity of up to 1.0 Amp, to power external control devices, such as solenoid valves, relays, sensors, etc. This power supply is also utilized on certain of the function boards to power circuitry on the "out-bound" side of any on-board isolation.

The +5 Volt supply is typically not made available at any of the I/O board connectors. **It is not recommended that any external connection be made to either the +5 Volt power supply or its common, as an incr-eased susceptibility to electrical noise may result.**

Using External Power Supplies

Many of the I/O boards available for this series of controllers allow the use of an external power supply for powering actuators and other devices, in place of using the controllers +24 Volt supply. The individual Installation Guides for these boards will provide additional details in this regard.

It is possible, however, to connect an external +24 Volt power supply (with a capacity not in excess of 10 Amps) to the controller's backplane, taking the place of the controller's internal +24 Volt supply. A nylon 3-pin connector is provid-ed at the top of the controller for this purpose. This connector, as supplied by CTC, is fitted with a mating plug wired with a jumper. The jumper carries +24 Volts from the internal power supply to the I/O power bus extending across the controller's backplane.

If the jumper plug is removed, the connector may be used to attach an external power supply to the I/O power bus (and to the I/O common, which is present on the third contact of the connector). A plug with pigtail wires is available from CTC for this purpose (Model 2885). ***WARNING - Do not connect an external supply with a voltage rating other than +24 Volts to this connector, as potential incompatibilities may exist with various function boards in the controller. Consult CTC for further information.***

Inserting I/O Boards into the model 2200XM

The model 2200XM accepts a variety of plug-in I/O boards, each of which provides one or more connectors on its faceplate for connecting to external devices. These boards may be installed into any of the five I/O Board Slots of the controller; input numbers, output numbers, motor numbers, etc., are assigned dynamically by the CPU each time power is applied to the controller. These numbers are assigned from left to right across the controller (from slot #1 to slot #5).

To install a board into the controller:

1. Insure that all A.C. and D.C. power to the controller has been shut off (including any exter-nal power supplies).

2. Slide the board into an unused I/O Board Slot. The board must be oriented such that its labelling reads properly (right-side up). Press the board firmly into the controller. When the board is properly seated, the board's faceplate will be flush with the adjacent sheet metal.

3. Retain the faceplate top and bottom using the two machine screws provided.

The board may then be wired according to the instructions in its Installation Guide.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The RS-232 port on the model 2200XM provides a means for both programming and data communications via a personal computer. CTC's personal-computer-based programming software allows programs to be quickly written, stored on disk, and ultimately downloaded into a model 2200XM Automation Controller. This software package also provides a comprehensive diagnostic capability, allowing you to monitor or modify the controller's internal registers, flags, I/O, etc., in real time while your program is executing.

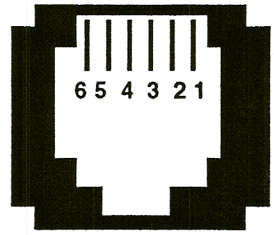
The model 2200XM is also equipped with a built-in protocol allowing direct computer communications with the controller's RS-232 port. This protocol, described fully in CTC's "A Guide to CTC Serial Data Communications", allows an external computer to directly interact with many of the controller's resources (i.e.; counters, registers, I/O, flags, etc.), without modifying the controller's program.

This communications capability facilitates the use of model 2200XM Controllers in an "intelligent factory" environment, deriving parametric or production information from a central data store, and supplying status and quality control data for centralized reporting.

RS-232 Connections

Connection to the controller's RS-232 port is made via a modular jack on the front of the controller (labelled "COMM"). This jack carries the "receive" signal, two grounds and the "transmit" signal for the communications channel. The "Pin Connection" diagram on this page illustrates the wiring of the jack; note that the center four conductors of a six-conductor jack are used.

A series of standard CTC cables are available for making connection to this jack, as shown in the diagram below. As an alternative, many commonly-available telephone cables may be substituted – do NOT, however, connect the controller to a telephone line.



1 - +5 Volts DC
2 - TxD (outbound)
3 - Common
4 - Common
5 - RxD (inbound)
6 - Ground

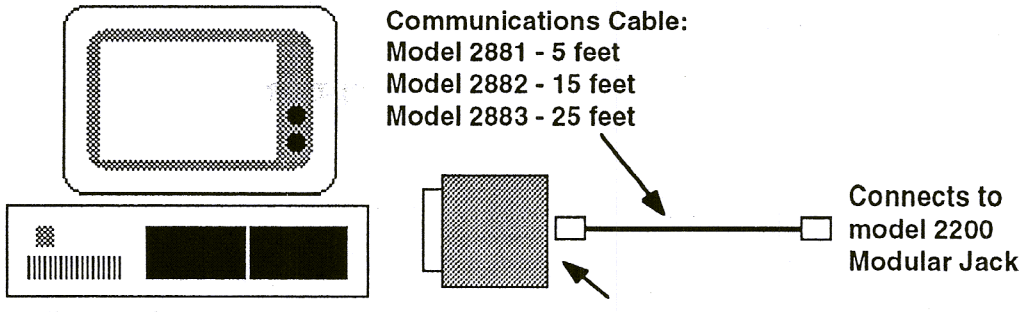
Modular Jack Pin Connections
6-Position, populated with 4 contacts
End View

Connecting to a "D" Connector

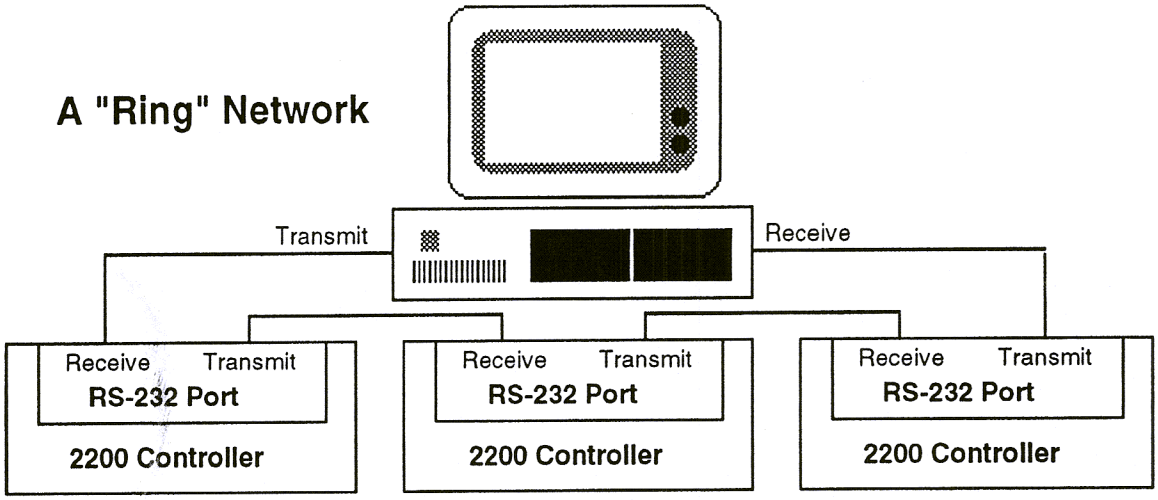
RS-232 ports on computers are frequently brought out through 25-pin or 9-pin "D" type connectors. There is a standard for wiring such connectors, followed by IBM and many other PC manufacturers.

CTC has adapters, the model 2880A or -B, which will connect directly to a male 25-pin (-A version) or 9-pin (-B version) "D" connector, and which provides a modular jack wired for compatibility with the model 2200XM COMM port. To be fully compatible when using this adapter, the computer's communications port should be wired as a "DTE" device (i.e.; pin 2 = TxD, pin 3 = RxD, pin 7 = Ground).

Wiring Aids for Connection of Personal Computer to RS-232 "COMM" Connector on model 2200



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Establishing a Ring Network

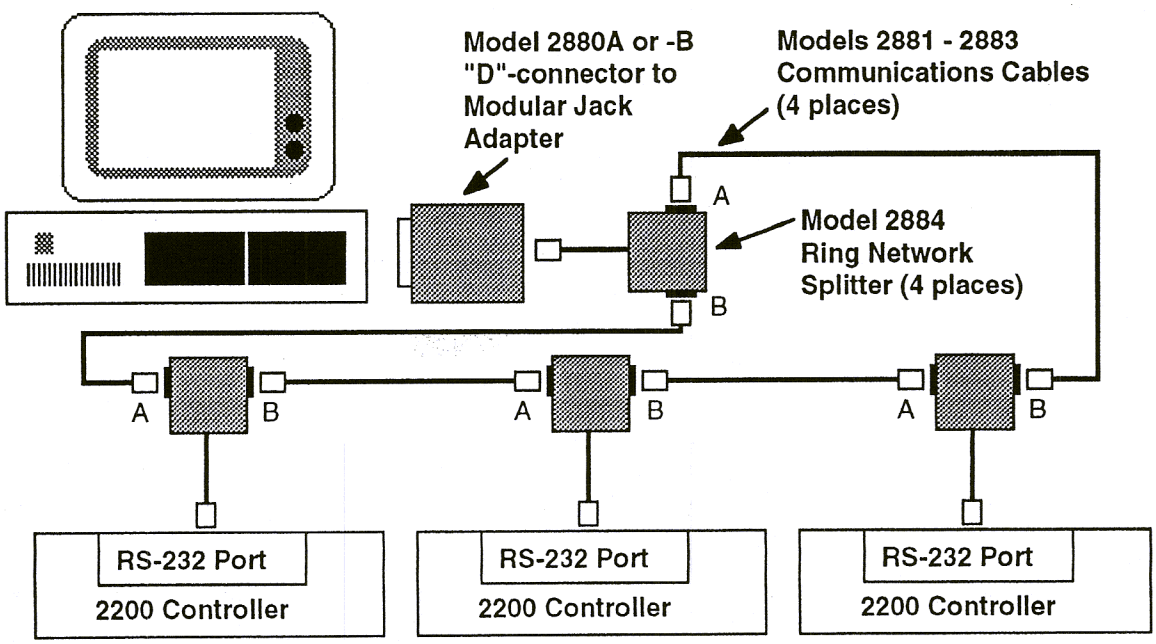
The CTC communications protocols support the implementation of a "ring" network of interconnected Controllers. In this form of network, the information travels in a circle, retransmitted from Controller to Controller until the message reaches the target system. The response or acknowledge-ment from that system is then transmitted around the remainder of the ring until it reaches the host system.

The wiring of a ring network requires that the "transmit" line from the computer be connected to the receive input of the first Controller in the ring, the transmit line of that Controller be connected to the receive input of the second Control-ler, and so on. The last Controller in the ring then has its transmit line returned to the receive input of the computer.

CTC has available a wiring aid for easily establishing a ring network, the model 2884 Ring Network Splitter. This "T" adapter provides a short cable with a modular plug for connection to the Controller or computer, and two modular jacks to tap into the network. The receive signal to the Controller is routed to one of the jacks and the transmit signal is routed to the other. By connecting cables as shown in the diagram below, a complete ring is established, resulting in a functional network.

For further information about establishing a ring network, consult the booklet "A Guide to CTC Serial Data Communications".

Wiring Aids for Implementing a Ring Network



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) Buy-Used | www.artisantg.com

Specifications

Temperature Ratings

Parameter	Min	Max	Units
Ambient Temperature:			
operating	0	50	° C
storage	-20	80	° C

A.C. Power Supply Requirements

Parameter	Min	Typ	Max	Unit
A.C. Voltage Range				
120 Volt mode	90.0	120.0	132.0	Volts A.C.
240 Volt mode	190.0	240.0	264.0	Volts A.C.
Current Requirements				
120 Volt mode		0.1	0.5	Amp A.C.
240 Volt mode		0.05	0.25	Amp A.C.

Internal Power Supply Capacities

Parameter	Typ	Max	Unit
+5 Volt Logic Supply			
Current Capability		3.0	Amps D.C.
CPU Requirement	0.350	0.400	Amp D.C.
+24 Volt I/O Supply			
Current Capability (continuous)		1.0	Amp D.C.

Controller Resource Summary

Multi-Tasking (tasks)	14
Volatile Registers (32-bit)	118
Non-Volatile Registers (32-bit)	500
Data Table Elements (16-bit, Non-Volatile)	1724
Input-linkable Counters	8
Flags	32

Controller Capacities (not mutually inclusive)

Board Slot Capacity	5
Inputs	128
Outputs	120
Analog Inputs	64
Thumbwheels (4-digit, half for 8-digit)	16
Numeric Displays (4-digit, half for 8-digit)	16
Stepping Motor Axes	5
RS-232 Channels	1

For performance specifications for the controllers, and specifications relating to individual I/O boards, refer to the respective data sheets and Installation Guides.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP