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## Quantum Automation Platform

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| | | |
|---|---|---|
| **Native operating system** | 984 ladder logic (IEC languages require the 16 bit Concept loadable) | |
| |  |  |
| **On-board communication ports** | 1 Modbus<br>1 Modbus Plus | |
| **On-board math coprocessor** | No | |
| **On-board processor clock speed** | Intel 186<br>20 MHz | |
| **984 LL performance (logic solve time)** | 0.3…1.4 ms/ K ladder logic instructions | |
| **IEC 1131-3 program memory (max)** | 109 Kbytes | 368 Kbytes |
| **Maximum number of option interfaces supported** | 2 | |
| **Total memory**<br>**RAM**<br>**Flash**<br>**984 LL user logic**<br>**Available registers**<br>**Extended memory** | 256 K bytes<br>256 K bytes<br>8 K bytes<br>10 K<br>None | 512 K bytes<br>256 K bytes<br>16 K bytes<br>10 K<br>None |
| **Model** | 140 CPU 113 02 | 140 CPU 113 03 |
| **Page** | 1/13 | |

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Integrated 984 ladder logic and 32 bit Concept IEC





2 Modbus
1 Modbus Plus

Yes

| | |
|---|---|
| Intel 486 DX<br>80 MHz | Intel 586 DX<br>133 MHz |
| 0.1 ... 0.5 ms/K ladder logic instructions | 0.09 ... 0.45 ms/K ladder logic instructions |
| 896 Kbytes | 2.5 Mbytes |
| 6 | |
| 2 M bytes<br>1 M bytes<br>64 Kbytes<br>57 K<br>96 Kbytes | 4 M bytes<br>1 M bytes<br>64 K bytes<br>57 K<br>96 Kbytes |
| 140 CPU 434 12A | 140 CPU 534 14A |



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# Introduction

The Modicon Telemecanique Quantum Automation Series Platform provides the right solution for your control needs with a full range of high performance, compatible control products. Its architecture is modular and scaleable, so it can be configured to meet the highest performance requirements for mid-size to large control systems.

Quantum systems combine a very small form factor with industrially rugged designs that ensure cost-effective and reliable installation in even the most difficult plant environments. The systems are simple to install and configure, and they cover a wide range of applications.

## Performance

With a module depth of only 104 mm (4 inches), including the field wiring, the Quantum Automation Platform represents a major improvement in panel size requirements. It fits in a standard 156 mm (6 inch) electrical cabinet, saving you up to 50% over the cost of traditional control panels. It can be mounted easily on a backplane in an industry-standard panel or rack-mounted in a 500 mm (19 inch) installation.

Within this small form factor, Quantum maintains Schneider's very high standards of product performance and integrity. The Quantum Platform features:

- Increased system output based on very high scan rates with up to 486- and 586-based processors
- Tightly integrated automation technologies including motion, ASCII, communication and process control
- Redundant power supply and I/O cabling options and true Hot Standby capabilities to provide the highest system availability for critical applications
- Configurable output fail states for more predictable performance in critical applications
- High levels of isolation for noise immunity in electrically severe environments
- High-accuracy analog I/O for tighter process monitoring and control
- High-speed on/off circuits and interrupt processing for higher system performance
- Hot swapping (the ability to remove and insert I/O modules under power without disturbing other operating elements) for easier maintenance and increased system availability

## A wide range of solutions

Quantum automation solutions can range from a single standalone control system of up to 448 I/O points to a multi-drop, redundantly serviced network with up to 64 000 I/O points. Connectivity to plant-level and fieldbus networks can be achieved with communication options that support over eight industry-standard networks, from Ethernet to ASCII.



With advanced Intel-based CPUs, Quantum logic solve times and I/O throughput rates are fast enough to handle the high-speed demands of machine control and material handling. CPU memory sizes range from 256 K bytes to 4 M bytes. Some CPUs are equipped with floating-point coprocessor chips that solve process algorithms and math calculations at optimal speeds for process integrity and quality.

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## Introduction (continued)

### Programming software

Two popular Schneider Automation programming software packages can be used with Quantum – Concept and Modsoft.

Concept is a Microsoft Windows-based software that complies with all five programming languages specified in the IEC 1131-3 international standard. Concept provides a feature-rich environment where you can rapidly develop structured, re-usable code. Overall design, startup and maintenance costs are significantly reduced. Concept also supports 984 Ladder Logic programming. You can easily import programs previously developed in a Modsoft environment.

Modsoft is a field-proven DOS-based programming software for the 984 Ladder Logic language. Modsoft provides an easy step forward for users who want to step up to the improved performance of Quantum while retaining familiarity with the Ladder Logic environment.

| IEC Languages | Software | Features |
|---|---|---|
| Function Block Diagram | Concept | Math, bistables, comparators, counters/timers, logic, edge detection, communications, diagnostics |
| Sequential Function Chart | Concept | State language approach using steps and transitions |
| Instruction List | Concept | Boolean instruction set |
| Structured Text | Concept | High-level text language with Pascal-level instructions |
| Ladder Diagram | Concept | Discrete contacts, coils and function blocks |
| **Non-IEC Language** | **Software** | **Features** |
| 984 Ladder Logic | Modsoft or Concept | 984 ladder logic instruction set including contacts, coils, function blocks, process control, Equation Editor, and communications |

### A simple integration path

Ongoing support for our large installed customer base is a commitment we take seriously. The TSX Quantum Automation Series provides a straightforward and cost-effective integration path for existing 984 and Sy/Max users. The Quantum's enhanced 984 instruction set allows any Modsoft or translated Sy/Mate application to be executed. In fact, a 584 or 984 program written for existing Modicon controllers will run in a Quantum CPU without any translation required. Quantum is also backward-compatible with older I/O series that use the Modicon S908 remote I/O network.

Our commitment to simple integration paths can reduce life cycle costs by protecting your investments in software, hardware and training. Integration of field-proven Ethernet, Modbus and Modbus Plus communication networks is available for both Quantum and Sy/Max controllers.

### Flexible system architectures

No single control architecture can meet all the demands of today's automation market. Some systems are centralized with local I/O providing the solution. Other systems use a centralized controller with a few drops of remotely mounted I/O. Still others use many smaller distributed I/O drops along with peer-to-peer communications and integration of fieldbus data. Using a single I/O family, Quantum can be configured for all of these architectures. It is suitable for process control, material handling or distributed control.
Quantum is unique in its ability to meet all your automation needs, whatever they may be.

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## Mecanical characteristics

| | | |
|---|---|---|
| Weight/module | **kg** | 1.0 max. |
| | **lb** | 2 max |
| Dimensions (H x D x W) | **mm** | 250 x 103.85 x 40.34 |
| | **inch** | 9.84 x 4.09 x 1.59 |
| Wire size | **mm** | 0.5...2.0 one wire, 0.5...1.3 two wires |
| | **AWG** | 14 one wire, 16 two wires, 20 max |
| Material (chassis and cover) | | Flame-retardant polycarbonate |
| Space in the backplane | **slots** | 1/ module typical, 2 /module for the MMS modules |

## Electrical characteristics

| | | |
|---|---|---|
| Electrostatic discharge (IEC 801-2) | | |
| air | **kV** | 8 |
| contact | **kV** | 4 |
| RFI immunity (IEC 801-3) | **MHz** | 80...1000, 10 V/m |
| Ground surge (IEC 801-5) | **kV** | 2, shield-to-ground |

## Environmental characteristics

| | | |
|---|---|---|
| Temperature | | |
| operating | **°C** | 0...+60 |
| storage | **°C** | -40...+85 |
| Relative humidity | **%** | 0...95 non-condensing @ 60 °C |
| Altitude | **m** | up to 2000, full operation |
| Shock | **G** | +/-15 peak for 11 ms, half sine wave |
| Flammability | **V-O** | 94, connector and module |
| Free fall | **m** | 1 |
| | **ft** | 3 |
| Agency approvals | | UL 508 |
| | | CSA 22.2-142 |
| | | Factory Mutual, Class I, Div 2 |
| | | CE |

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# Optional conformal coating



If your control system needs to operate in a corrosive environment, Quantum modules can be ordered with a conformal coating applied to the cover and bezel. Conformal coating will extend its life and enhance its environmental performance capabilities.

**Mixed flowing gas** (power on)

| Standard | Pollutant | Parts/billion | Quantum's performance |
|---|---|---|---|
| EIA 364-65 level III | $Cl_2$ | 20 (+/-5) | Meets the standard |
| | $NO_2$ | 200 (+/-50) | Exceeds standard (1250 parts/billion) |
| | $H_2S$ | 100 (+/-20) | Meets standard |
| ISA-S71.04 GX severe | $Cl_2$ | 10 | Exceeds standard (20 parts/billion) |
| | $NO_2$ | 1250 | Meets standard |
| | $H_2S$ | 50 | Exceeds standard (100 parts/billion) |
| | $SO_2$ | 300 | Meets standard |

**Humidity**(operating)

| Standard | Concentration (%) | Quantum's performance |
|---|---|---|
| IEC-68-2-3 | 93 @ 60 ° C | Meets standard |

**Salt mist** (non-operating)

| Standard | Concentration (%) | Quantum's performance |
|---|---|---|
| IEC 68-2-11 | 5 (+/-1) | Exceeds standard (5.7%) |

**Fungus resistance**

| Standard | | Quantum's performance |
|---|---|---|
| MIL-I-46058C | | Designed to meet standard |

**Temperature cycling** (operating)

| Standard | Cycles | Quantum's performance |
|---|---|---|
| IEC 68-2-14 | 100 @ 0 ... 60 ° C | Meets standard |

**Dust** (non-operating)

| Standard | Pollutant | Weight (%) | Quantum's performance |
|---|---|---|---|
| EIA 364-TP91 (pending) | silica | 36 | Meets standard |
| | calcite | 29 | Meets standard |
| | iron oxide | 12 | Meets standard |
| | alumina | 8 | Meets standard |
| | gypsom | 5 | Meets standard |
| | paper fiber | 3 | Meets standard |
| | cotton fiber | 3 | Meets standard |
| | polyester fiber | 2 | Meets standard |
| | carbon black | 1 | Meets standard |
| | human hair | 0.5 | Meets standard |
| | cigarette ash | 0.5 | Meets standard |

## Availability

All Quantum backplanes, power supplies, I/O modules, special-purpose modules and CPUs are available as conformally coated modules. Almost all the Quantum communication adapters are available as conformally coated modules–the only exceptions is the Echelon 140 NOL 911 10 LonWorks option modules.

## How to order conformally coated modules

To order a Quantum module or backplane with conformal coating applied, simply append a C to the standard model number. For example, if you want to order a 140 CPS 114 00 Power Supply with conformal coating, the new model number

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# Backplanes

## Presentation, description



## Presentation

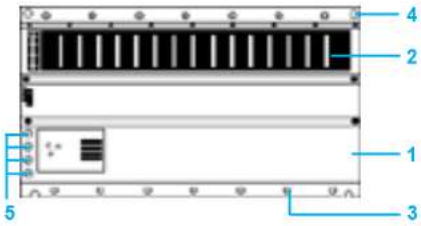
The Modicon TSX Quantum modules mount easily into backplanes in industry-standard electrical cabinets or on19-inch racks. Optional mounting brackets are available for rack-mounting. A backplane provides the control signals and distributes the power necessary operate the installed modules.

## Description

Six different backplane models are available (with 2, 3, 4, 6, 10, or 16 slots. Backplane slots are universal) in other words, any module may fit into any slot. Almost all Quantum modules are designed to fit into single slots on a Quantum backplane; the only exception is the MMS SERCOS motion module, which requires two contiguous slots.

There are no slot dependencies in a Quantum system, although we do recommend that power supply modules use the outermost slot position for optimum heat dissipation. The only limits on the backplane are available module power and addressing space. Any backplane may be used in any of the three system architectures supported by Quantum (standalone with local I/O, remote I/O or distributed I/O). Your service inventory can be reduced because there are no special backplanes for different I/O architectures.

In a Quantum system, all module addressing and configuration are handled by panel software. There are no DIP switches or other hardware settings required.




1 Metal frame.

2 Backplane connector.

3 Tapped holes for affixing modules.

4 Mounting holes.

5 Grounding terminals.

### Backplane Expander Module

The 140 XBE 100 00 Quantum Backplane Expander module allows I/O in an adjacent, "secondary" backplane to communicate with the CPU or RIO drop adapter in the "primary" backplane over a custom communications cable. A Backplane Expander module must be installed in each backplane. The expander cable provides all the signals required to accomplish data communication between the two backplanes. Only a single Backplane Expander module can be added to each backplane.

The Backplane Expander module features the following flexible characteristics:

- The same 140 XBE 100 00 Backplane Expander modules are used for the primary and secondary backplanes.
- The system can use any type of Quantum power supply. Each backplane can have a different type of power supply.
- Loss of power in the secondary backplane will not shut down the entire drop. Only modules located in the secondary backplane will lose power.
- Backplane Expander modules can be located in any slot in the backplane, and do not have to be placed in corresponding slots in the primary and secondary backplanes.
- The Backplane Expander module will not be recognized by the programming panel software. It appears as an unfilled slot in the I/O map.

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## References

| Description | Number of slots | Reference | Weight kg (lb) |
|---|---|---|---|
| Racks for:<br>Local I/O modules<br>Remote I/O modules<br>Distributed I/O modules | 2 | **140 XBP 002 00** | 0.230 (0.5) |
| | 3 | **140 XBP 003 00** | 0.340 (0.75) |
| | 4 | **140 XBP 004 00** | 0.450 (1.0) |
| | 6 | **140 XBP 006 00** | 0.640 (1.4) |
| | 10 | **140 XBP 010 00** | 1.000 (2.2) |
| | 16 | **140 XBP 016 00** | 1.600 (3.5) |

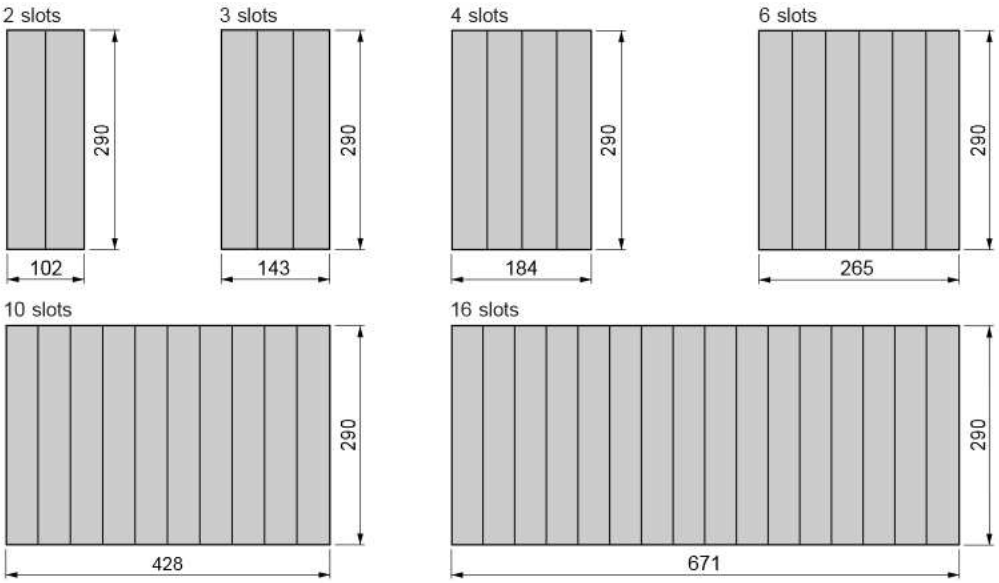
**Backplane accessories**

| Description | Dimensions | Reference | Weight kg (lb) |
|---|---|---|---|
| Backplane expander | – | **140 XBE 100 00** | – |
| Backplane expander cables | 1 m | **140 XCA 717 03** | – |
| | 2 m | **140 XCA 717 06** | – |
| | 3 m | **140 XCA 717 09** | – |
| 19 in front rail mounting bracket for 140 XBP 010 00 | 125 mm (4.92 in) depth | **140 XCP 401 00** | – |
| 19 in rear rail mounting bracket for 140 XBP 010 00 | 20 mm (0.79 in) depth | **140 XCP 402 00** | – |

## Dimensions

**140 XBP 0●0 00**

Front view




Depth with modules: 104 mm

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# Presentation

The Quantum CPUs are single-slot programmable controllers with built-in executive memory, application memory and communication ports. With all memory components on-board, you do not need extra chips or cartridges for configuration.

### Flash-based executive memory

Quantum CPUs use flash memory technology to support the CPU's executive memory and instruction set. Flash is a state-of-the-art, nonvolatile memory technology that enables field upgrades by downloading files over the Modbus or Modbus Plus port as new features and maintenance updates become available.

### Memory backup and protection

The CPUs store the application program in battery-backed RAM. The battery is located on the front of the module and can be serviced while the CPU is running. To protect the application program from inadvertent changes during operation, the CPUs feature a memory-protect slide switch. An LED goes on when this switch is activated.

### Math coprocessor hardware support

For math-intensive applications, Quantum offers math coprocessor hardware on select CPU models. The coprocessor significantly improves execution times for the 984 Process Control Function Library (PCFL) and Equation Editor as well as math operations in the IEC languages. Improved floating point execution times mean more accurate performance for process algorithms and math calculations.

### Write protection

Controller write protection minimizes the possibility of a programmer inadvertently writing from a source controller to a memory area in a destination controller that has been reserved for internal operations. The programming software sets up an enabled area in the CPU for coil access and data references from across the network. Whatever data is not enabled is prevented from writing references, both locally and over the network. This data fence option provides excellent security against data transfer errors, creating a simple and effective communications firewall.

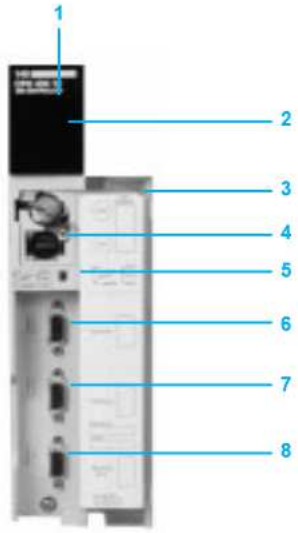
### Communication ports

All CPUs support Modbus and Modbus Plus networking strategies. Simple rotary switches on the back of the modules are used to set the network address of the Modbus Plus port(s). Each device on a Modbus Plus network must have a unique address in the range 1…64. Modbus port settings include baud, parity, number of data bits, number of stop bits, protocol and drop address. By default, these settings are 9600 baud, even parity, 8 data bits, 1 stop bit, RTU mode and address 1. A slide switch on the front of the CPU can reset the Modbus port parameters to an alternative power-up mode that supports modem communications–2400 baud, even parity, 7 data bits, 1 stop bit, ASCII mode and address 1.

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1

## Description

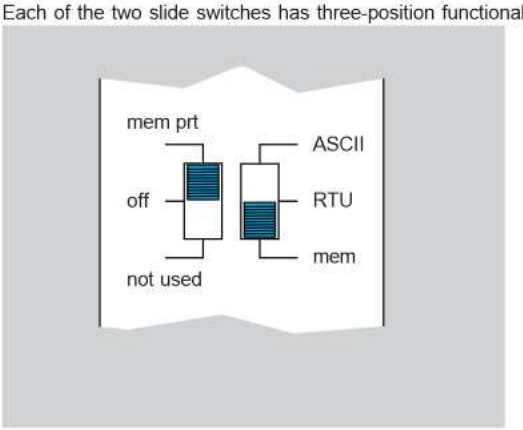



1 Model number and color code
2 LED array
3 Removable, hinged door and customer identification label
4 Battery
5 Micro switches
6 Modbus port A
7 Modbus Plus port B
8 Modbus Plus port

Note:
The 140 CPU 113 0x CPUs have one Modbus and one Modbus Plus communication ports.

### Slide switches

Each of the two slide switches has three-position functionality:




The left slide switch activates the memory write-protect. In the upper position, write protection is enabled; in the middle position, write protection is disabled.

The right slide switch determines the startup communication parameters for the Modbus port. The middle position, RTU, is the factory-set default. The upper position, ASCII, is for modem communications. If you need to set special startup parameters for the Modbus port–for example, if your Modbus address is not 1–you can set application-specific parameters in memory and set the slide switch in the bottom position.

### Language choices

#### Advanced IEC 61131-3 Languages

Quantum's 5 IEC 61131-3 languages are:
- Sequential Function Chart: provides overall structure and coordination for batch oriented process of machine control applications.
- Function Block Diagram: particularly well suited for process control applications.
- Ladder Diagram: excellent for discrete control and interlocking logic.
- Structured Text: higher level language which is a terrific solution for complex algorithms and data manipulation.
- Instruction List: low level language for optimized code performance.

#### 984 Ladder Logic

A high performance, low level language whose application source code resides in the controller.
A full set of over 80 instructions are included with every Quantum CPU. The 984 instruction set ensures compatibility and easy integration paths for installed Modicon applications, including:
- Immediate I/O and interrupt servicing to enhance system performance.
- Equation editor for easier match capabilities.

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## Characteristics

| Model | | | 140 CPU 113 02 | 140 CPU 113 03 | 140 CPU 434 12A | 140 CPU 534 14A |
|---|---|---|---|---|---|---|
| **Processor** | | | 80186 | 80186 | 80486 | 80586 |
| **Math coprocessor** | | | No | No | Yes | Yes |
| **Clock speed** | | **MHz** | 20 | 20 | 66 | 133 |
| **User logic** | max. IEC program | **words** | 109 K | 368 K | 896 K | 2.5 M |
| | 984 ladder logic | **words** | 8 K | 16 K | 64 K | 64 K |
| **Reference capacity** | discretes | **bits** | 8192 in/8192 out | 8192 in/8192 out | 64 K any mix | 64 K any mix |
| | registers | **words** | 9999 max | 9999 max | 57 K max | 57 K max |
| | extended memory | **words** | – | – | 96 K | 96 K |
| **Logic solve time** (984 LL instructions) | | **ms/k** | 0.3...1.4 | 0.3...1.4 | 0.1...0.5 | 0.9...0.45 |
| **Watchdog timer** | | **ms** | 250 (software-adjustable) | | | |
| **TOD clock accuracy** | | **s/day** | +/-8@ 0...60 °C | | | 45°C |
| **Local I/O** | Maximum I/O words | | 64 I/64 O | | | |
| **Remote I/O (RIO)** | I/O words/drop | | 64 I/64 O | | | |
| | number of drops | | 31 | | | |
| | number of networks | | 3 | | | |
| **Distributed I/O (DIO)** | I/O words/drop | | 30 I/32 O | | | |
| | I/O words/network | | 500 I/500 O | | | |
| | drops/networks | | 63 | | | |
| | number of networks | | 1 | | | |
| **Battery** | type | | lithium | | | |
| | service life | **mAh** | 1200 | | | |
| | lifetime | **yrs** | 10 | | | |
| | load current, typical | **µA** | 5 | 7 | 7 | 14 |
| | load current, max | **µA** | 110 | 210 | 210 | 420 |
| **Communication ports** | Modbus (RS 232) | | 1 | 1 | 2 | 2 |
| | Modbus Plus | | 1 | 1 | 1 | 1 |
| **Maximum number of NOM, NOE, CRP, MMS modules supported** | | | 2 | 2 | 6 | 6 |
| **Key switch** | | | No | No | Yes | Yes |
| **Required bus current** | | **mA** | 780 | 790 | 1800 | 1800 |

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## References

| Memory | Co-processor | Reference | Weight kg (lb) |
|---|---|---|---|
| 256 K bytes | No | **140 CPU 113 02** | 0.300 (0.66) |
| 512 K bytes | No | **140 CPU 113 03** | 0.300 (0.66) |
| 2 M bytes | integrated | **140 CPU 434 12A** | 0.850 (1.87) |
| 4 M bytes | integrated | **140 CPU 534 14A** | 0.850 (1.87) |

**Accessories**

| Description | Length m (ft) | Reference | Weight kg (lb) |
|---|---|---|---|
| Programming cable for Modbus interface | 3.7 (12) | **990 NAA 263 20** | 0.300 (0.66) |
| | 15 (50) | **990 NAA 263 50** | 1,820 (4.0) |
| Battery for CPU | – | **990 XCP 980 00** | – |
| Quantum automation series hardware reference guide | – | **840 USE 100 0X** | – |

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# Quantum Automation Platform

## Power supply modules

## Selection guide

1

| Type | Standalone | | | Summable |
|---|---|---|---|---|
| |  |  |  |  |
| **Input voltage** | c 100…276 V | a 20…30 V | a 100…150 V | c 93…138 V or<br>c 170…276 V |
| **Frequency** | 47…63 Hz | – | | 47…63 Hz |
| **Input current** | 0.4 A @ c 115 V<br>02 A @ c 230 V | 1.6 A | 0.4 A | 1.1 A @ c 115 V<br>0.6 A @ c 230 V |
| **Output current** | 3.0 A max.<br>0.3 A min. | | | 8.0 A @ 60° C |
| **External fusing** | 1.5 A slow-blow | 2.5 A medium time lag | 0.75 A slow-blow | 2.0 A slow-blow |
| **Maximum power interruption** | 8 ms | 20 ms | 1 ms | 8 ms |
| **Alarm relay contact** | No | | | |
| **Model** | 140 CPS 111 00 | 140 CPS 211 00 | 140 CPS 511 00 | 140 CPS 114 10 |
| **Page** | 919 | | | |

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| Summable | | Redundant | | | |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| a 20…30 V | a 48…60 V | c 93…138 V or<br>c 170…276 V | a 20…30 V | a 48…60 V | a 100…150 V |
| – | | 47…63 Hz | – | | |
| 3.8 A max. | | 1.1 A @ c 115 V<br>0.6 A @ c 230 V | 3.8 A max. | | 0.5 A @ a 125 V |
| 8.0 A | | 8.0 A @ 60° C | 8.0 A | | |
| 5.0 A slow-blow | 2.0 A medium time lag | 2.0 A slow-blow | 5.0 A slow-blow | 2.0 A medium time lag | 2.0 A slow-blow |
| 1 ms | 13 ms | 8 ms | 1 ms | 13 ms | 1 ms |
| Yes | | No | Yes | | No |
| 140 CPS 214 00 | 140 CPS 414 00 | 140 CPS 124 00 | 140 CPS 224 00 | 140 CPS 424 00 | 140 CPS 524 00 |

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# Power supply modules

## Presentation, characteristics



## Presentation

Quantum power supply modules serve two purposes–they provide power to the system backplane and protect the system from noise and nominal voltage swings. All power supplies feature over-current and over-voltage protection. They operate in most electrically noisy environments without the need for external isolation transformers. In the event of an unforseen loss of power, the power supplies ensure that the system has adequate time for a safe and orderly shutdown.

A power supply converts the incoming power source to a regulated +5 V d.c. to support the CPU, the local I/O and any communication option modules mounted in the backplane. Power between the field sensors/actuators and the Quantum I/O points is not provided by these power supply modules.

If your Quantum system is being used in a standalone (local I/O) or remote I/O control architecture, three types of power supplies are available:

- Low-power standalone power supplies.
- High-power summable power supplies.
- High-power redundant power supplies.

If your Quantum system is being used in a distributed I/O architecture, special low-power standalone power supplies, which are dedicated to distributed architectures and are integrated into distributed I/O adapter modules, are available. Distributed power supplies are described in the DIO architecture section of this catalog.

## Characteristics of the power supply types

### Standalone power supplies

A standalone power supply delivers 3 A of power to a Quantum backplane.When your control system has low-power requirements, a standalone power supply is an economical choice. Standalone supplies are available for115/230 V a.c., 24 V d.c.and 125 V d.c. source voltages.

### Summable power supplies

A summable power supply delivers 8 A of power to a Quantum backplane. Summable supplies can operate in either a standalone or summable mode. Whenever two summable supplies are combined in the same backplane, they automatically operate in summable mode–delivering 16 A of power to the backplane. In summable mode, the two supplies must be the same model and they should be placed in the left and right edge slots of the backplane for maximum life. If one of the two supplies fails, power is lost to the backplane.

If only one summable power supply is placed in a backplane, it functions in standalone mode–delivering 8 A to the backplane.

Summable power supplies are available for 115/230 V a.c., 24 V d.c. and 48/60 V d.c. source voltages.

### Redundant power supplies

A redundant power supply delivers 8 A of power to a Quantum backplane. For high-availability applications, two redundant power supplies in a backplane deliver 8 A of redundant power. In the event that one supply fails, the healthy one maintains the necessary power so that backplane processing and active communications are not affected. Each redundant supply has a status bit that can be monitored by the CPU's application program or by a supervisory system so that you can respond quickly in the event of a power supply failure.

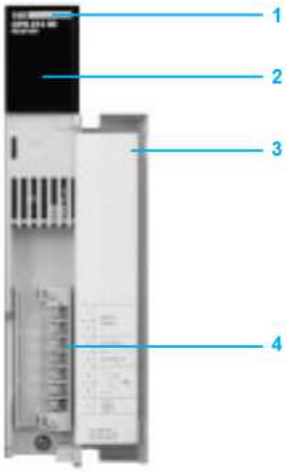
If additional power is required in a redundant power supply configuration, a third redundant supply module can be added to the backplane - increasing the total redundant power capacity to 16 A. Should one of the three supplies fail, the two healthy modules will revert to the standard redundant mode–delivering 16 A of redundant power to the backplane.

A single redundant power supply module may be used as a standalone supply if you need to reduce your stockroom requirements.

Redundant power supplies are available for 115/230 V a.c., 24 V d.c., 48/60 V d.c. and 125 V d.c. source voltages.

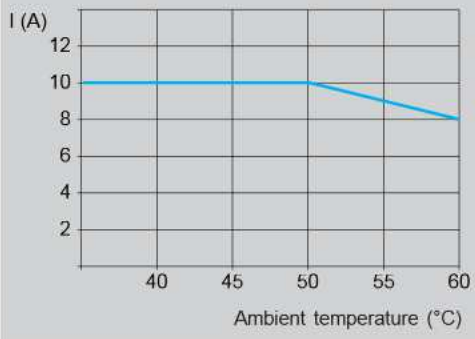
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## Description



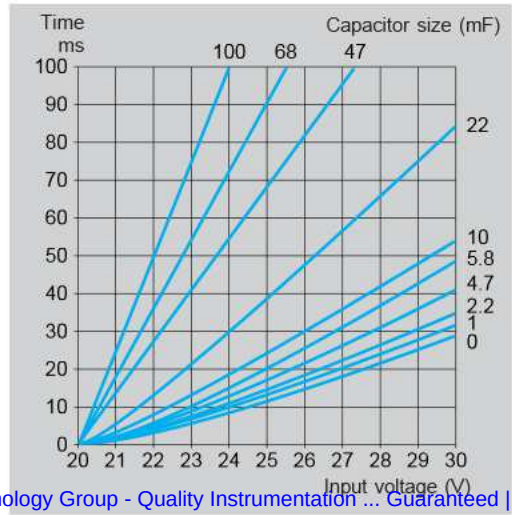

1 Model number and color code
2 LED array
3 Removable, hinged door and customer identification label
4 Terminal block

### Temperature range




The bus current has a guaranteed minimum value valid for the entire temperature range (up to 60 °C). This chart, for a 140 CPS 114 10 standalone V a.c. supply, shows that a power supply module can provide significantly more power at lower temperatures.

### Maximum power interruption




The buffer processing times for the CPS 214 00, CPS 224 00, CPS 414 00, and the CPS 424 00 power supplies can be increased by adding V d.c. electrolytic capacitors at terminals 5 and 6. Respective capacitor ratings are shown in this diagram.

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## Characteristics for V a.c. and V d.c. source voltages

| Model | | | 140 CPS 111 00 (1) | 140 CPS 114 10 (2) | 140 CPS 124 00 (3) |
|---|---|---|---|---|---|
| **Input Requirements** | | | | | |
| | Input voltage | c V | 100…276 | 93…138 or 170…276 | 93…138 or 170…276 |
| | Input frequency | Hz | 47…63 | 47…63 | 47…63 |
| | Input current | | | | |
| | @ c 230 V | A | 0.2 | 0.6 | 0.6 |
| | @ c 115 V | A | 0.4 | 1.1 | 1.1 |
| | Inrush current | | | | |
| | @ c 230 V | A | 20 | 19 | 19 |
| | @ c 115 V | A | 10 | 38 | 38 |
| | Rating | VA | 50 | 130 | 130 |
| | External fusing | A | 1.5 slow-blow | 2.0 slow-blow | 2.0 slow-blow |
| | Input power | | 1/2 cycle @ full load and minimum line voltage/frequency, and | | |
| | Interruption | | less than 1 s between interrupts | | |
| | Harmonic distortion | % | Less than 10 of fundamental rms value | | |
| **Output-to-bus** | Voltage | a V | 5.1 | 5.1 | 5.1 |
| | Current | A | 3 max, 0.3 min | 8 @ 60 °C | 8 @ 60 °C |
| | Protection | | Over-current, over-range | | |
| **General** | Internal power dissipation | W | 2.0 + (3 x $I_{OUT}$) where $I_{OUT}$ is in A | 6.0 + (1.5 x $I_{OUT}$) where $I_{OUT}$ is in A | 6.0 + (1.5 x $I_{OUT}$) where $I_{OUT}$ is in A |

| Module Type | | | 140 CPS 211 00 (1) | 140 CPS 214 00 (2) | 140 CPS 224 00 (3) |
|---|---|---|---|---|---|
| **requirements** | Input voltage | a V | 20…30 | 20…30 | 20…30 |
| | Input current | A | 1.6 | 3.8 max | 3.8 max |
| | Inrush current | A | 30 | 25 @ a 24 V, 14 @ a 20 V | 25 @ a 24 V, 14 @ a 20 V |
| | Input ripple | a V | – | 94…189 Hz | 94…189 Hz |
| | Input power | ms | 1.0 @ a 20 V | 1.0 @ a 20 V | 1.0 @ a 20 V |
| | Interruption | | 20.0 @ a 25 V | 100 ms maxi with external condensateur | |
| | External fusing (recommended) | A | 2.5 slow-blow | 5.0 slow-blow | |
| **Output-to-bus** | Voltage | a V | 5.1 | 5.1 | |
| | Current | A | 3 max, 0.3 min | 8.0 | |
| | Protection | | Over-current, over-range | | |
| **General** | Surge withstand | a V | – | | 2.3 x max rated input voltage for 1.3 ms |
| | Internal power dissipation | W | 2 + (3 x $I_{OUT}$), where $I_{OUT}$ is A | 6 + (1.8 x $I_{OUT}$), where $I_{OUT}$ is A | |
| | Alarm relay | | N | Y | |

| Module Type | | | 140 CPS 414 00 (2) | 140 CPS 424 00 (3) | 140 CPS 511 00 (1) | 140 CPS 524 00 (3) |
|---|---|---|---|---|---|---|
| **Input requirements** | Input voltage | a V | 48…60 | 48…60 | 100…150 | 100…150 |
| | Input current | A | 3.8 max | 3.8 max | 0.4 | 0.5 @ a 125 V |
| | Inrush current | A | 14 @ a 40 V | 14 @ a 40 V | 10 | 28 @ a 125 V |
| | Input power interruption | ms | 13.0 @ a 48 V | 13.0 @ a 48 V | 1.0 max | 1.0 max |
| | External fusing (recommended) | A | 2.0, medium time lag | 2.0, medium time lag | 3/4 slow-blow | 2 slow-blow |
| **Output-to-bus** | Voltage | a V | 5.1 V | 5.1 V | 5.1 V | 5.1 V |
| | Current | A | 8.0 | 8.0 | 3 max, 0.3 min | 8.0 |
| | Protection | | Over-current, over-range | | | |
| **General** | Internal power dissipation | W | 15.6 @ 8 A | 17.2 @ 8 A | 2 + (3 x $I_{OUT}$) where $I_{OUT}$ is A | 6 + (1.5 x $I_{OUT}$) where $I_{OUT}$ is A |
| | Alarm relay | | Y | Y | N | N |

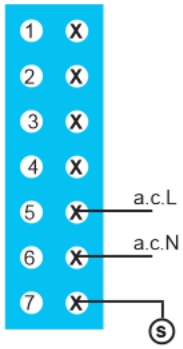
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## References

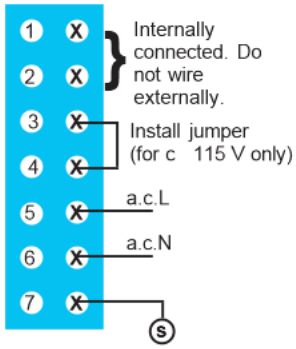
| Power supplies<br>Input Voltage/Power | Type | Reference | Weight<br>kg (lb) |
|---|---|---|---|
| c 120/230 V, 3 A | Standalone | **140 CPS 111 00** | 0.650 (1.43) |
| c 120/230 V, 8 A | Summable | **140 CPS 114 10** | 0.650 (1.43) |
| c 120/230 V, 8 A | Redundant | **140 CPS 124 00** | 0.650 (1.43) |
| a 24 V, 3 A | Standalone | **140 CPS 211 00** | 0.650 (1.43) |
| a 24 V, 8 A | Summable | **140 CPS 214 00** | 0.650 (1.43) |
| a 24 V, 8 A | Redundant | **140 CPS 224 00** | 0.650 (1.43) |
| a 48 ... 60 V, 8 A | Summable | **140 CPS 414 00** | 0.650 (1.43) |
| a 48 ... 60 V, 8 A | Redundant | **140 CPS 424 00** | 0.650 (1.43) |
| a 125 V, 3 A | Standalone | **140 CPS 511 00** | 0.650 (1.43) |
| a 125 V, 8 A | Redundant | **140 CPS 524 00** | 0.650 (1.43) |
| **Accessories** | | | |
| Power connector | IP20 rated | **140 XTS 001 00** | 0.150 (0.33) |

## External wiring

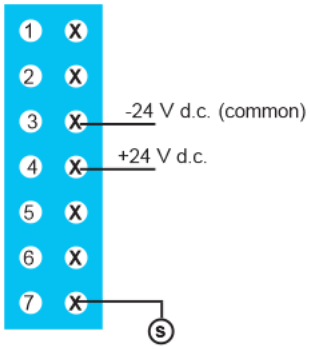
**140 CPS 111 00**



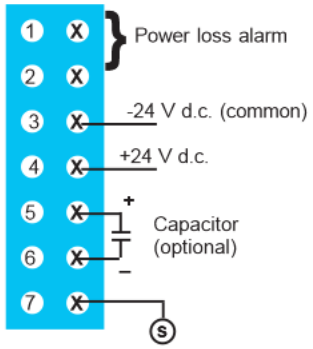

**140 CPS 114 10**
**140 CPS 114/124 00**



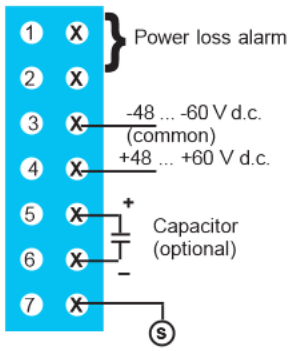

**140 CPS 211 00**



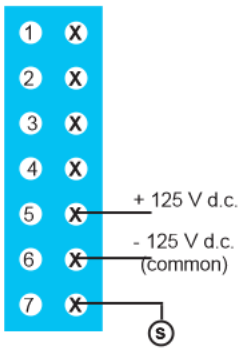

**140 CPS 214/224 00**



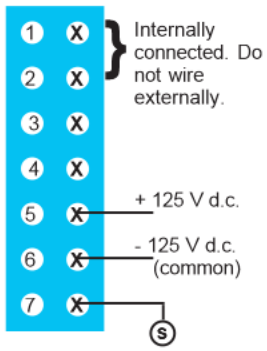

**140 CPS 414/424 00**




**140 CPS 511 00**




**140 CPS 524 00**




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