



OWNER'S MANUAL

CQ SERIES
SEQUENCED POWER CONTROL

*CQ-1515™, CQ-1520™,
CQ-1™, CQ-5™, CQ-2200™,
CQ-3000™ and CQ-PD1-4™*

includes

CQ-1515-RX™ and CQ-1520-RX™

JULY 2021



File: 3176209DEN-001
Standard: UL508

DISCLAIMER

Juice Goose shall under no circumstances be held responsible for any losses, damage, or injury resulting directly or indirectly from the use of a CQ Series device in a manner contrary to accepted safe operating methods or any instructions contained in this document. The user should determine prior to use whether this product is adequate, suitable and safe for the application intended. Since individual applications can be subject to extreme variation Juice Goose makes no representation or guarantee as to the suitability of a CQ product for any generally described application.

CQ-SERIES SEQUENCED POWER CONTROL SYSTEM

The Juice Goose CQ Series products are power distribution devices that will control AC power application to multiple pieces of equipment. The primary intent of the design of this equipment is to power rack mounted audio or video equipment with electric power current requirements of less than 15 amps, 20 amps or 30 amps depending on the CQ model being considered.

All CQ Series products can be remote activated. Several CQ devices can be connected to form a power sequencing system that includes multiple circuits in multiple locations.

SAFETY PRECAUTIONS

CQ Series products are designed to operate at 120 volts, 60 hertz. Operation with any voltage or frequency other than that can damage the equipment and create an unsafe situation.

CAUTION #1: All CQ devices must be grounded. If a power extension cord is required, use a properly insulated and grounded cord. Failure to ground the device could expose the user to dangerous electric shock.

CAUTION #2: All CQ devices should be installed only by qualified electrical technicians using appropriate mounting hardware and correct installation techniques. When installing make sure main power is off before attaching the CQ device. There are no user serviceable parts inside any of the CQ products.

CAUTION #3: Do not expose the CQ product to moisture or salty air. Doing so could cause significant damage and create an unsafe condition.

PRÉCAUTIONS DE SÉCURITÉ

Série CQ produits sont conçus pour fonctionner à 120 volts, 60 hertz. Fonctionnement avec une tension ou une fréquence autre que celle qui peut endommager l'équipement et de créer une situation dangereuse.

ATTENTION #1 : CQ tous les périphériques doivent être mis à la terre. Si une extension de cordon est nécessaire, utiliser un correctement isolés et cordon mis à la terre. Échec à la masse le périphérique pourrait exposer l'utilisateur à choc électrique.

ATTENTION #2 : Tous les périphériques CQ ne devrait être installé que par des électriciens qualifiés avec matériel de montage approprié et correct techniques d'installation. Lors de l'installation assurez-vous que l'alimentation principale est hors tension avant de procéder à l'accrochage de la CQ périphérique. Il n'y a aucune pièce réparable par l'utilisateur à l'intérieur des CQ produits.

ATTENTION #3 : Ne pas exposer le CQ produit de l'humidité ou air salé. Cela pourrait causer des dommages importants et créer une situation dangereuse.

DETAIL SPECIFICATIONS

DIMENSIONS (H x W x D inches)

CQ 1515 & CQ 1520.....	1.72 x 19.00 x 7.00
CQ 1(Including 3 Gang Utility Box).....	4.50 x 6.50 x 3.75
CQ 5.....	4.50 x 6.50 x 2.00
CQ 2200.....	5.50 x 6.40 x 3.75
CQ 3000.....	9.00 x 6.00 x 4.00
CQ PD1-4.....	32.00 x 3.50 x 2.00

WEIGHT (lbs)

CQ 1515 & CQ 1520.....	10.0
CQ 1.....	1.0
CQ 5.....	3.0
CQ 2200.....	4.0
CQ 3000.....	6.0
CQ PD1-4.....	15.0

CIRCUIT BREAKER

CQ 1515.....	Back Panel, 15A Thermal
CQ 1520.....	Back Panel, 20A Thermal
CQ 1.....	None
CQ 5.....	Back Panel, 15A Thermal
CQ 2200.....	Side Panel, 20A Thermal
CQ 3000.....	Side Panel, 30A Thermal
CQ PD1-4.....	None

POWER INPUT

CQ1515.....	Power Cord, 7 Foot, 14/3 SJTW with NEMA 5/15P
CQ1520.....	Power Cord, 7 Foot, 12/3 SJTW with NEMA 5/20P
CQ 1.....	Hardwire, Insulated Three Wire Connection (H, N, G)
CQ 5.....	Power Cord, 6 Foot, 14/3 SJTW with NEMA 5/15P
CQ 2200.....	Hardwire with Crimp Tight Fast-on Terminals
CQ 3000.....	Hardwire to Screw Terminal
CQ PD1-4.....	Hardwire with External 4' Wire Harness

VOLTAGE INPUT.....120 VAC at 60 Hz

POWER OUTPUTS

CQ 1515.....	Six NEMA 5/15R Sequenced and One NEMA 5/15R Unswitched
CQ 1520.....	Six NEMA 5/20R Sequenced and One NEMA 5/15R Unswitched
CQ 1.....	Two, NEMA 5/15R
CQ 5.....	Two, NEMA 5/15R
CQ 2200.....	Four NEMA 5/20R, Sequenced
CQ 3000.....	One NEMA L5/30R
CQ PD1-4.....	Eight NEMA 5/20R, Sequenced

NUMBER OF SEQUENCE EVENTS

CQ 1515 & CQ 1520.....	Three (Timing adjustable)
CQ 1.....	One
CQ 5.....	One
CQ 2200.....	Two (Two second delay)
CQ 3000.....	One
CQ PD1-4.....	Four (Two second delay)

POWER PROTECTION

CQ 1515 & CQ 1520.....Triple MOV Matrix & Multi-stage Filter (48dB at 30 MHz)
See "RX Series Surge Protection" section for additional information about -RX models.

COMMUNICATIONS LINE.....RJ-45 (See Owners Manual for Assembly)

MOUNTING AND PLUG IN

CQ 1515 & CQ 1520 — Mount the CQ-1515 or CQ-1520 to a 19" wide rack with metal mounting rails. Use appropriate rack mounting hardware. Plug the power cord into a grounded outlet. **Do not defeat the grounding feature of the power cord.**

CQ 5 - This product can be mounted to a flat, stable surface using four holes on the two mounting side flanges. Be sure to place the CQ-5 near an AC receptacle and to leave room for connection of the CQ control cable(s). Plug the cord into a grounded outlet. **Do not defeat the grounding feature of the power cord.**

HARD WIRED INSTALLATION

These products were designed to be installed only by qualified electrical technicians. Failure to follow correct installation techniques and instructions could result in equipment damage and/or personal injury. **CAUTION:** Be certain power has been turned off at the breaker panel or disconnected before installation. (**ATTENTION:** certains power a été désactivé sur le panneau de disjoncteur ou déconnecté avant l'installation.)

CQ 1 - This product should be installed in a three gang utility box mounted inside a wall. The installation process may vary depending on whether the installation is in new or retrofit construction. Fit the utility box into the space where the CQ 1 will be installed. Pull the main power cable and the RJ45 signal cable(s) into position inside the utility box. Connect the power feed to the corresponding colored wires on the CQ 1 using wire nuts or another acceptable method. Plug the input signal cable into the Input port on the CQ1 and the output cable into the Output port. Install the CQ 1 enclosure and cover plate onto the utility box with the screws provided with the unit.

CQ 2200 & CQ 3000 are intended to be hardwired to a main utility power supply with power cable routed through conduit. A "squeeze" type conduit connector is assembled onto the CQ back box specifically for this purpose. A power line strain relief is also included in the box with the CQ device in case alternate power connection is necessary.

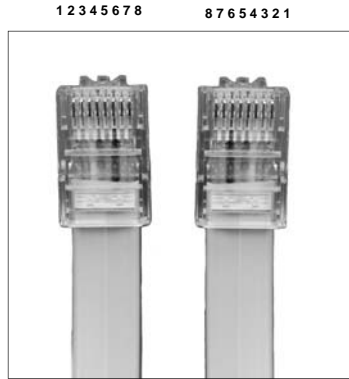
These two CQ Series models have front panel and a back box construction that are held together with seven screws. To begin installation, remove the screws that hold these two pieces together. The back box has four holes in the back surface. These holes are large enough to accommodate mounting screws or bolts (not included) to hold the CQ device securely to a stable, flat mounting surface, such as a wall. At least two screws or bolts should be used to mount the back box.

After the back box is secured, feed the cable that is connected to the desired power source through the hole in the side of the back box. **CQ2200:** Securely crimp a connector (provided) to the end of each wire lead (hot, neutral and ground). Press the connectors onto the appropriate locations on the circuit board as labeled. **CQ3000:** Connect each wire lead to the appropriate position on the terminal block and tighten securely. Attach the front panel (containing the circuit board) to the back box using all seven screws. Gently pull excess power cable out of the box by tugging slightly on the cable from the outside of the box. Insert conduit into squeeze connector and tighten the connector to hold the conduit in place.

CQ-PD1-4 - The CQ-PD1-4 has two slotted side brackets that can be relocated along the length of the chassis. Use only appropriate hardware (not included) and use four mounting holes to secure the device. The wire harness should be connected directly to a circuit breaker panel or to an appropriate junction box.

SIGNAL CABLE ASSEMBLY

The interconnecting CQ Series devices requires eight wire, RJ-45 cable. While this is the same component used to assemble CAT5 and CAT6 cables, orientation of the connectors on the CQ Series cable is slightly different than for the CAT data networking cable. **Standard CAT5 or CAT6 cables will not work with CQ Series devices.**



After crimping a RJ45 connector on one end of the eight wire cable, attach a connector on the other end with reversed orientation from the first so Pin 1 is on the opposite side of the cable from the first connector. Check the cable with a continuity tester prior to installation.

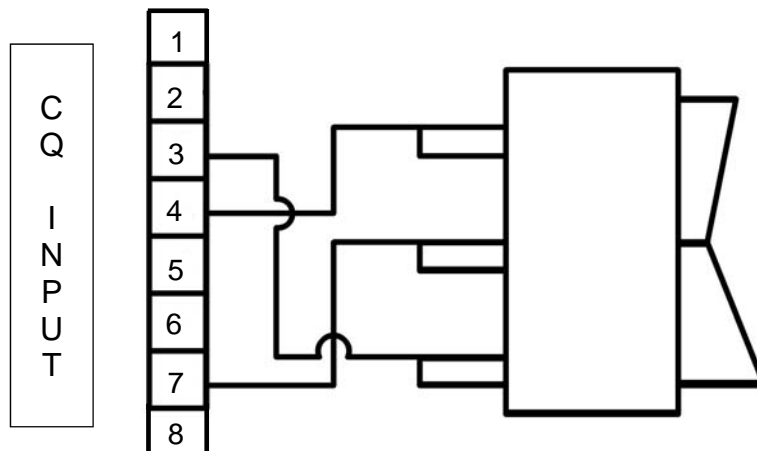
There is no known distance limit for the connection of CQ units by means of this cable system.

REMOTE SWITCH CONNECTION

Single Pole Double Throw Latching Switch or Relay

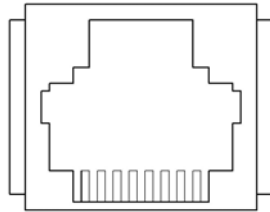
Although a Juice Goose CQ Series product can be remote controlled with a Juice Goose RC-5 accessory or another CQ device, it can also be remote activated with a simple contact closure using a switch or relay. The following instructions are provided to assist with this configuration.

In the illustration below, connecting a single pole, double throw (SPDT) switch to the signal input line of a CQ Series device will control the sequence up and down activity. Closing Pin 3 to Pin 7 will begin a sequence UP. Closing Pin 4 to Pin 7 will begin a sequence DOWN. Closing both 3 and 4 to 7 will PAUSE the sequence process. When one of these contacts is made the sequence control switch on the chassis will be inoperative. The Manual Override switch will still function.



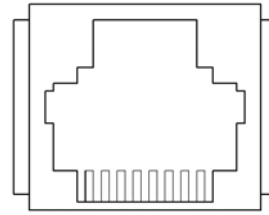
CQ Series Signal Cable Connectors

Signal
Input



8 7 6 5 4 3 2 1

Signal
Output



1 2 3 4 5 6 7 8

PIN ASSIGNMENTS

The chart above shows assigned locations for each of the eight pins on the RJ45 connectors on the CQ Series Signal Input and Output. Note: although there are eight pins, only the middle six are being used.

This information may be used to connect a latching contact, as per the diagram on the previous page. It also illustrates the reversed orientation of the connectors on each end of a CQ signal cable.

Pin assignments are correct when viewed from the outside of the chassis.

OPERATION

These versatile CQ devices can be controlled by way of either another CQ device, a remote latching contact closure, a Juice Goose RC5 accessory unit or the switch on the CQ device itself (except the CQ 1 or CQ5).

CQ DEVICES - Any CQ device can operate in concert with others. Each can be a master (except the CQ 1 or CQ 5) or slave unit. Any number of CQ devices can be connected in a daisy chain fashion to operate as a power sequencing system.

REMOTE CONTACT CLOSURE - As one option, to control the sequencing function, the Signal Input for the first CQ device can be connected to a latching contact closure (see previous section "Remote Switch Connection"). Juice Goose recommends use of a double throw device in order to maintain one of two contact closures at all times. AV control devices such as those produced by Crestron may have relay cards that can serve this function.

RC-5 REMOTE ACCESSORY - Juice Goose offers, as an accessory, the RC-5 Remote Control/Monitor. These devices provide sequence control as well as indicators to show the status of the power sequencing operation. The RC-5 connects directly to the Signal Input of the first CQ device.

SEQUENCE SWITCH (Not including the CQ 1 or CQ5) - Without a contact closure on the Signal Input, the switch on the CQ device will control its operation. Switches on the CQ 2200, CQ 3000 and CQ PD1-4 have three positions: Sequence up, Sequence Down and Manual On. If the product in question is not a slave in the CQ network, the Sequence Up and Down positions will activate the sequence process for that CQ unit and cause it to activate any units connected to its Signal Output. In the event of a failure of a particular CQ unit, the Manual On switch position allows activation of the CQ device. (Note: the Manual On option does not provide sequencing). The CQ 1515 and CQ1520 have a two position sequence switch and a second, recessed Manual On switch on the front panel of the chassis.

MONITORING

Some CQ Series devices have a number of LEDs on the chassis to allow real time monitoring of the device's operation. One LED indicates the processor is running the CQ control program. That LED blinks on all models except the CQ 1 on which that LED is on but static. Should there be a question about the product's performance, the processor LED indicates the status of the electronic circuitry that controls the CQ unit. There are no indicator LEDs on the CQ 5. Some CQ models also have a number of LEDs that corresponds to the number of sequence events (Pods). Each Pod LED lights to indicate that a sequence stage has been completed and the corresponding POD has power.

Juice Goose offers RC-5 remote control and monitor accessories that provide indications of sequence operation and completion. For more information about the RC-5, contact your Juice Goose dealer, refer to the Juice Goose product catalog or visit www.juicegoose.com.

RX SERIES SURGE PROTECTION

CQ 1515-RX and **CQ 1520-RX** feature high level power line protection. This RX power protection technology is particularly valuable because it works against common mode (ground line) as well as normal mode (line to neutral) events. While it protects against dramatic surge events of up to 6,000 volts at 3,000 amps on hot and neutral, it also limits ground line surges to one-half (0.50) volt to prevent operating faults of digital processing equipment. Power protection circuitry in the **CQ Series-RX** includes a differential transformer, series inductor, high levels of filtering capacitance and control circuitry providing protection from dangerous surges, high frequency interference, building wiring faults and over voltage.

AC Power Filtration @ 30 MHz.....	80dB Common Mode, 60dB Normal Mode
Transient Energy Absorption.....	1,020 Joules
Max AC Surge Let Through.....	10 Volts Normal Mode, 1/2 Volt Common Mode (Ground)
External Fault Protection.....	Open Ground, Hot-Neutral Reversal, High Voltage

ADJUSTING SEQUENCE DELAY TIMING

There are three sequence events on the CQ1515 and CQ1520. (See also CQ1515-RX and CQ1520-RX). The standard factory delay is 2 seconds between each sequence event. That timing can be adjusted. Note: Only the CQ15xx models have field adjustable timing. Contact Juice Goose if a sequence delay adjustment is required on any other CQ Series model.

Optional settings are 10 seconds, 20 seconds and 30 seconds. Changing the timing will only affect the product to which the adjustment is made and will not change the timing of any other CQ Series products connected by control lines.

Adjusting the delay time requires removing the top of the CQ15xx chassis and accessing a small “dip switch” located on the main circuit board.

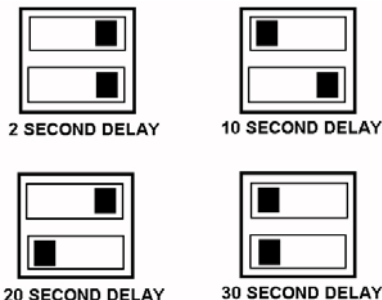
WARNING: Always ensure the unit is powered down and unplugged before attempting this procedure.

Step 1. Remove the chassis top

The chassis top is held in place by six screws (three at the top of each side). Remove all six and remove the top. Leave the bottom screws in place.



Step 2. Locate the dip switch on the main board and move to desired position



Step 3. Replace the chassis top and test

Return the top to the main chassis and fasten securely with the six top assembly screws. Plug the unit in and test the delay. If the delay is not as expected, repeat steps 1 through 3 and ensure the dip switches are fully pushed into the correct positions.

IN CASE OF MALFUNCTION

The Juice Goose CQ Series of products are ruggedly constructed and contain quality components. There are no user serviceable parts inside a CQ device. Unauthorized service will void all existing warranties and may result in equipment damage and personal injury.

Should improper performance be observed consult the following guidelines for diagnosis.

SYMPTOMS AND SOLUTIONS.

(NOTE: References to LEDs and circuit breakers do not apply to the CQ-1 and CQ-PD1-4)

1. Unit will not turn on.
 - a. Check to see that main utility power is available.
 - b. Check that the circuit breaker on the CQ unit is not tripped.
 - c. Check the Processor LED on the chassis. If it is not lit the CQ device is probably not receiving power. If it is lit but not flashing the CQ processor is not running. Remove power from the CQ device by unplugging it or turning off the circuit breaker that feeds the unit. Then restore power to reset the CQ processor.
 - d. If the device is being remotely activated:
 - i. Check the signal line leading to the CQ signal input. Disconnect the signal input cable and try to activate the CQ product with the switch on the chassis. If this works either the cable is bad or the control device intended to remote control the CQ in question is failing to create the correct contact closure. If possible, exchange the cable in question with a known good cable. If this does not solve the problem examine the remote activation device and its connections to the cable.
 - ii. Refer to the manual's *Signal Cable Assembly and Remote Switch Connection* sections.
 - iii. If the CQ device is being operated by another CQ unit check that controlling unit. Is the controlling unit operating properly? Is its Processor LED flashing?
2. Unit will not turn off.
 - a. It is likely that when a unit fails to turn off the cause is similar to that which would cause a unit to fail to turn on.
 - b. Follow steps outline in 1 c. and d., above.
 - c. Once a system of interconnected CQ devices is turned on, a specific CQ device will not turn off if the device following it in the turn-on sequence is still on. Check the CQ device following the CQ device in question. Has it turned off properly? If not, check all the following units to the end of the CQ system. Follow the steps in 1., above regarding the last unit that is misperforming.
3. Unit turns itself off unexpectedly.
 - a. The unit may have encountered excessive current draw that caused the circuit breaker to trip. Examine the breaker. If it has tripped, the button section of the breaker will be extended and can be reset by pushing it in after the unit has been off for a brief period.
 - b. Review the current requirement of the equipment plugged into the CQ device and compare it to the amperage rating of the CQ device in question. See the Detail Specification section of this manual.

If the problem can not be remedied or if the encountered problem is not listed here and particularly if any evidence of severe or hazardous performance is observed, immediately disconnect power to the CQ device and contact your local Juice Goose dealer or Juice Goose directly.

SERVICE

Should your unit require service, contact Juice Goose to receive a service authorization number. This number will allow us to track your returned unit. Please note that no returns will be accepted without such a number.

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OTHER JUICE GOOSE PRODUCTS

RACK MOUNTED POWER DISTRIBUTION - **JG Series** and **RP Series** horizontal power distribution with several optional features.

AC LINE SURGE PROTECTION - The Juice Goose **RX Series** technology provides very high levels of protection against damaging power surges and high frequency interference on hot, neutral and ground. RX Series protection is available as an optional feature in the CQ, IP Series models.

WEB BASED CONTROL POWER - When Ethernet or RS232 power control is required, Juice Goose offers the **iP Series** of remote control power distribution products. These devices feature an on board web server as well as TCP or UDP communications links.

CUSTOM MULTIPLE CIRCUIT POWER DISTRIBUTION - When the components in a single rack demand multiples of twenty or thirty amp circuits Juice Goose provides a custom assembled power distribution product. The **PD Series** is configured by Juice Goose to the specified requirements of each individual installation. A wide variety of features is available.

UPS (Battery Back Up) - Juice Goose sells high quality, value priced battery back up products to provide clean AC power and battery support in the event of a black out. Sizes range from 350 VA to 3,000 VA, in either line interactive (voltage regulating) or on-line designs.



Since 1983