

# COR-20 STANDALONE MODE USER GUIDE



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## INTRODUCTION

Congratulations on your purchase of the Neptune Systems APEX COR-20 pump!



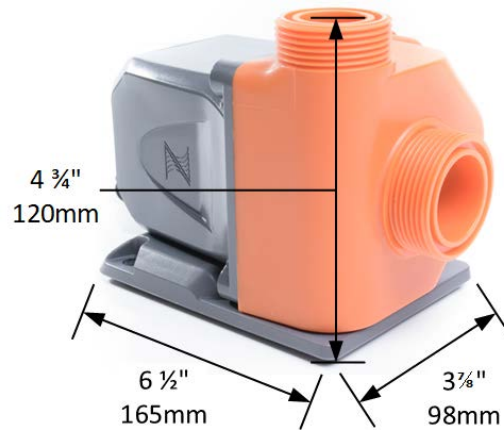
This Guide is for use by persons who will be using their COR pump without a Neptune Systems APEX controller system. If you will be using the COR-20 with a Neptune Systems APEX system, refer to the COR User Guide for APEX Systems found on the Documentation page on the [Neptune Systems web site](https://www.neptunesystems.com).

The COR-20 pump is a flow-optimized, energy-efficient variable-speed DC pump which is ideal for use as a return pump, closed loop pump, or reactor manifold pump in saltwater and freshwater aquariums. The COR-series pumps were designed from the ground up to be tightly integrated with the Neptune Systems APEX family of aquarium controllers for ease of use and advanced control, however the COR-20 was also designed so that it can be operated WITHOUT connecting it to an APEX.

## COR-20 FEATURES AND SPECIFICATIONS

- ❖ COR-20: 2000GPH @ 0', 90w maximum current
- ❖ Multicolor status LED to indicate the operating state of the pump system and of any conditions requiring user attention
- ❖ Speed indicator 8-LED bar to visually show the speed for the pump
- ❖ Convenient push buttons to turn off the pump, turn on the pump, and to activate a 5-minute feed mode which may be used during feeding times or during aquarium maintenance periods
- ❖ COR pumps may be used submerged/in-sump or for externally-plumbed installations

- ❖ 2-port AquaBus hub for APEX system interconnection (*not used during standalone operation*)
- ❖ Dedicated 100-watt 24VDC power supply
- ❖ Watertight connectors in the cables between the COR driver and COR pump
- ❖ COR pump cable length: 9 feet (275cm)
- ❖ Pump dimensions: 120mm x 98mm x 165mm



## WHAT'S IN THE BOX



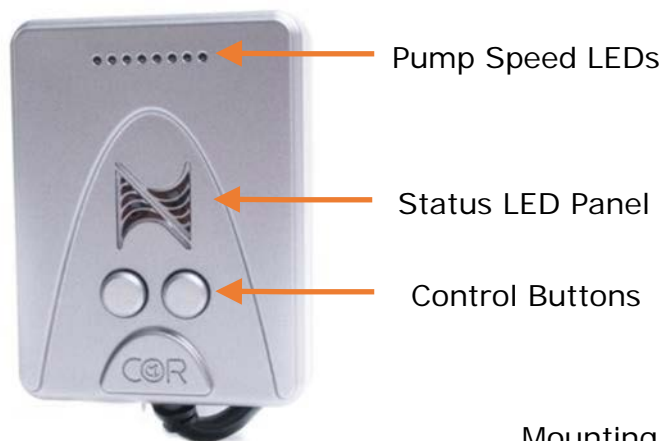
**COR-20 Package Contents**

The COR-20 package comes with:

- ❖ COR-20 driver / control unit
- ❖ COR pump
- ❖ 6' (2m) AquaBus cable for connection to an APEX system
- ❖ 100w 24VDC power supply & power cord
- ❖ 1-1/4" threaded x 1-1/4" slip union for use on the COR pump output
- ❖ 1-1/4" threaded x 3/4" slip fitting for optional hard-piped use on the pump output
- ❖ 1-1/2" threaded x 1" slip fitting for optional hard-piped external plumbing
- ❖ O-rings for each fitting (not depicted)
- ❖ 5mm hex wrench

*Note: the included power supply may be slightly different than the one depicted*

## GET TO KNOW YOUR COR DRIVER



**COR Driver - Front**



**COR Driver - Back**



**COR-20 Driver Connections**

AquaBus Ports (used only when connected to an APEX)

DC Power Jack

Pump Cable



**WARNING:** DO NOT CONNECT THE COR-20 DRIVER TO A COMPUTER OR OTHER USB DEVICE.

AquaBus ports look like USB, but are not USB. NEVER plug standard USB devices into any AquaBus connector or connect an APEX controller or AquaBus module to computer equipment's USB ports. Damage to the AquaBus module and/or the USB device may result.

## GET TO KNOW YOUR COR PUMP





## PHYSICAL INSTALLATION – COR-20 DRIVER

The COR-20 driver should be securely mounted in a location free from moisture. The COR driver uses an innovative mounting system which provides safe secure mounting yet allows easy removal of the COR from the mounting plate. It is recommended that the COR driver be mounted on a vertical surface such as a wall, an upright mounting board, or the side or back of your aquarium stand. Use the included screws to mount the COR driver mounting plate, then slip the COR driver over the mounting plate and press downward to firmly seat the COR driver on the mounting plate. If mounting on drywall, use drywall anchors (screws and anchors not included). A printable mounting template is available [HERE](#). The mounting template contains additional mounting guidelines.

- ❖ Be sure to utilize drip loops on all cables plugged into the COR driver.
- ❖ Leave at least 1" of clearance at the top of the COR driver to allow for easy dismounting of the driver.
- ❖ Leave at least 2.5" of clearance below the COR driver to allow sufficient room for cabling



**WARNING:** Water damage will void your COR driver warranty! Mount the COR driver in a location safe from any form of moisture exposure – drips, splashes, etc.

## PHYSICAL INSTALLATION – COR PUMP

The COR pump may be installed for use either submerged (in sump) or externally-plumbed. An extensive discussion of aquarium plumbing design, PVC plumbing cementing, etc. is beyond the scope of this user guide; however, some tips and suggestions are provided here. If you need assistance with plumbing design or assembly, enlist the help of a local aquarist or an aquarium design, installation, and maintenance professional.

### Submerged/In Sump Installation

***It is highly recommended that your return plumbing has 1-1/4" piping and fittings to obtain the most flow from your COR pump. Smaller diameter piping will reduce the overall flow of water.***

- ❖ If your tank return piping is 1-1/4", use the included 1-1/4" union.
- ❖ If your tank return piping is 1" diameter, use the included 1-1/4" union and a 1-1/4" to 1" slip x slip PVC reducer fitting (not included).
- ❖ Do not use the small orange O-ring on the pump if using the 1-1/4" union.



1-1/4" Union Mounted on COR output

- ❖ If your tank return piping is 3/4" or smaller, use the smaller 1-1/4" x 3/4" slip adapter and the smaller orange O-ring.



3/4" Slip Adapter Mounted on COR output

- ❖ It is recommended that you install the outer collar part of the 1-1/2" x 1" slip adapter on the intake threads, as this will provide protection for those threads. Do not use the inner 1" slip part of the adapter, just use the outer collar.



Slip Adapter Collar Mounted on COR Intake

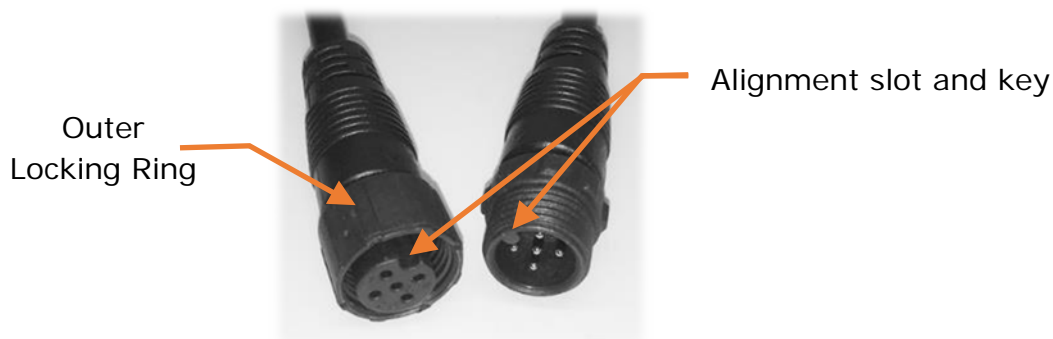
## Externally-Plumbed Installation

If you will install your COR external to the sump, use both supplied slip adapter fittings, or optionally, use the 1-1/2" x 1" slip fitting on the pump intake and the 1-1/4" union on the pump output. Note that the reduced diameter of these fittings will restrict the flow through the pump. Optionally, use a 1-1/2" BSPP coupler or union (not supplied) to connect to larger intake piping. The included orange O-rings must be installed when using the slip adapter fittings.



## COR PUMP AND COR DRIVER CONNECTION

To connect the COR pump and driver, simply connect the pump's cable to the short pigtail cable of the COR driver. The connectors are keyed; align the connectors carefully; do not force the connectors together.



Use the outer locking ring of the driver-side connector to tighten the connection and form a water-resistant seal. The mated and properly tightened connectors are not intended to be submerged in water.



The COR driver and COR pump cables should be connected prior to connecting power to the COR driver. If you need to disconnect the COR pump from the COR driver, power should be disconnected first, before you disconnect the pump cable.

Plug the included detachable power supply power cord into the power supply and plug the other end into a wall outlet or power strip.

## COR-20 DRIVER STATUS LED PANEL AND LED BAR

The Neptune Systems logo on the face of the COR-20 driver is a multicolor LED panel which indicates the status of the COR.

The top bar of 8 small LEDs provides additional information. In most cases, it indicates the approximate speed of the pump.

There are several possible states of the LED panel.



Logo Color	Status Meaning and 8-LED Bar Indication
<b>Orange</b>	<ul style="list-style-type: none"> <li>The COR driver is operating normally</li> <li>The number of LEDs lit on the 8-LED bar indicates the current pump speed. There are 16 speed levels when in standalone mode.</li> </ul>
<b>Blue</b>	<ul style="list-style-type: none"> <li>The COR is in Feed Mode</li> <li>The number of LEDs lit on the 8-LED bar indicates the current pump speed</li> </ul>
<b>Red</b>	<ul style="list-style-type: none"> <li>An error condition exists. When the status LED is red, one of the LEDs of 8-LED bar will flash to indicate the specific issue detected. <ul style="list-style-type: none"> <li>The COR driver has detected an overcurrent condition (LED #1, #4, or #5 may be flashing) This may indicate that the pump's intake is blocked or a foreign object is preventing the impeller from rotating</li> <li>The input power voltage is too high (LED #2 will be flashing)</li> <li>The input power voltage is low (LED #3 will be flashing)</li> <li>The COR pump is running while dry or out of water (LED #6 will be flashing)</li> <li>The internal temperature of the pump is high (LED #7 will be flashing)</li> </ul> </li> </ul>
<b>Not Lit</b>	<ul style="list-style-type: none"> <li>One of these conditions exist: <ul style="list-style-type: none"> <li>The COR-20 driver has no 24VDC input power</li> <li>The COR-20 driver has suffered a failure</li> </ul> </li> </ul>

#### ADDITIONAL NOTE:

- The LED panel may continue to be red for up to one minute after an error condition has cleared or has been resolved.

## COR DRIVER BUTTONS

During normal COR operation, the left and right buttons are used to control the speed and flow rate of the COR pump.

- ❖ The left button will decrease the pump speed
- ❖ The right button will increase pump speed

Each button press changes the pump speed by approximately 6%. The buttons are also used to control the pump – OFF, ON, and entering FEED MODE.

- ❖ To turn the COR pump OFF, press and hold the left button for 3 seconds.
- ❖ To return the COR output to ON, tap the right button.

- ❖ To activate FEED MODE, press and hold the right button for 3 seconds; the status LED will turn green to indicate that FEED MODE is active. FEED MODE lasts 5 minutes. The status LED panel will return to normal orange illumination when the FEED MODE timer expires.
- ❖ To cancel FEED MODE before the 5-minute timer expires, press and hold the right button again for 3 seconds.

## SETTING IQ-LEVEL

Setting IQ-Level is entirely optional but is highly recommended. IQ-Level allows you to preset the pump's normal speed (the speed it runs upon power up) and to preset the Feed Mode speed.

In the next few paragraphs, we will discuss IQ-Level as it should be done for a common aquarium setup in which the COR is used as a return pump. Other COR uses, such as closed loop applications, will require different criteria be used for IQ-Level.

The COR pump's normal operating and power-on speed should be preset so that the pump moves the ideal amount of water for the tank's overflow drain(s), without exceeding the capacity of the overflow or pumping insufficient volume of water to maintain a constant full siphon drain. This is important to do, as properly setting the normal operating speed of the pump ensures that the output of the pump will not exceed the capacity of the overflow and drain system, and that the pump runs at the proper speed after a power outage.

The COR's Feed Mode speed should be set with IQ-Level so that when the pump's Feed Mode is activated, it is running at a low speed. The ideal Feed Mode speed is that speed which just holds the return piping water column full and in a quiescent state, and does not actually cause water to be pumped or allow water to back-drain through the return piping back into the sump.

To perform IQ-Level Adjustment for normal operation:

1. Use the left and right buttons to set the COR speed so that the water in the display tank is stable, and that the water volume being pumped matches the ideal water flow rate for your overflow or drain system. Each press of the button equates to roughly a 6% change in pump speed.
2. As you get closer to the desired flow level, observe the water flow in the aquarium for 30 seconds or more in between each change.

3. Press and hold both COR buttons at the same time for about 3 seconds until the status LED flashes blue. This will save the current pump speed setting into the COR driver. The COR will now automatically run at that speed after a power loss or being turned off.

To perform IQ-Level Adjustment for Feed Mode operation:

1. Activate Feed Mode by pressing and holding the right COR button until it turns green (about 3 seconds).
2. Use the left and right buttons on the COR driver to set the COR so that the water in the return line plumbing is at a point of equilibrium – when the water is neither draining back into the sump through the COR nor is water being pumped into the tank. Each press of the button equates to roughly a 6% change in pump speed.
3. As you get closer to the desired flow level, observe the water flow in the aquarium for 30 seconds or more in between each change.
4. Press and hold both COR buttons at the same time for about 3 seconds until the status LED flashes blue. This will save the current Feed Mode speed setting into the COR driver. The COR will now automatically run at that speed whenever Feed Mode is activated.

## COR PUMP MAINTENANCE

Like all pumps, the COR pump should be serviced periodically as part of routine maintenance or may need to be disassembled if, for example, a foreign object becomes lodged in the pump.

To disassemble the pump:

1. Disconnect the power cable from the COR-20 driver
2. Disconnect the pump cable from the COR driver
3. Disconnect plumbing
4. Remove the pump, and drain excess water out
5. Slide the baseplate toward the rear of the pump and remove it
6. Use the supplied 5mm hex wrench to remove the 4 screws
7. Carefully slide the volute away from the pump body
8. Grasp the impeller firmly and slide it out of the pump body.



### WARNINGS

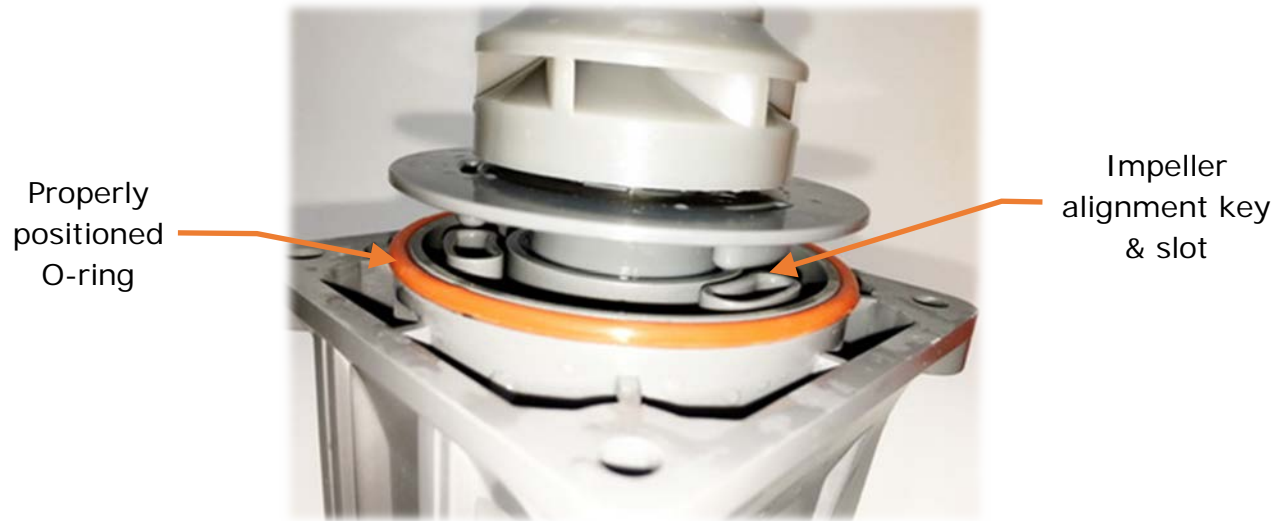
- ❖ The impeller may roll and fall off a flat work surface; use caution to ensure the impeller assembly does not become damaged as a result.
- ❖ Do not attempt to further disassemble the impeller.



Clean the impeller assembly, the pump cavity, the volute, and the exterior of the pump case with a toothbrush or other suitable brush. If necessary, the pump components may be soaked in a vinegar and water solution to remove calcium or hardwater mineral deposits. Gently clean and dry the O-ring with a cloth, then apply a light coating of silicone grease.

To reassemble the COR pump:

1. Carefully position the O-ring on the circular ridge on the pump body *(see image below)*
2. Position the pump body so the impeller cavity is up.
3. Slip the impeller assembly down into the pump body until it is fully seated, ensuring that the 3 keys in the impeller plate are aligned with the corresponding slots in the pump body *(see image below)*
4. While continuing to hold the pump pointing up, position and seat the volute over the face of the pump body
5. Holding the volute firmly against the pump body, then set the pump down on its base
6. Reinstall the 4 screws. Tighten the screws just enough to hold the volute snugly in place against the pump body; *do not overtighten.*





## NEPTUNE SYSTEMS LIMITED WARRANTY

Neptune Systems warrants this product to be free from defects in material and workmanship for a period of 1 year from the date of purchase. If repair or adjustment is necessary and has not been the result of abuse, Neptune Systems warrants this product to be free from defects in material and workmanship for a period of 1 year from the date of purchase. If repair or adjustment is necessary and has not been the result of abuse, misuse, or accidental damage, within the 1-year period, please return the product with proof of purchase, and correction of the defect will be made without charge.

For your protection, items being returned must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Neptune Systems will not be responsible for damage resulting from careless or insufficient packaging. Before returning please obtain a return authorization (RMA) number from Neptune Systems. Returned merchandise will not be accepted without a RMA number. To obtain assistance with your Neptune Systems product, contact Neptune Systems technical support by phone or via the [Technical Support Contact Web Page](https://www.neptunesystems.com) at <https://www.neptunesystems.com>.

Except for the warranty set forth above, Neptune Systems is not responsible for any damages including, but not limited to, consequential damage occurring out of or relating to the delivery, use or performance of Neptune Systems' products. Buyer's remedies for breach of warranty shall be limited to repair, or replacement and full or partial adjustment to purchase price.

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The symbols to the right mean that according to local laws and regulations your product should be disposed of separately from household waste. When this product reaches its end of life, take it to a collection point designated by local authorities. Some collection points accept products for free. The separate collection and recycling of your product at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

