CRYSTAL QUEST®
Water Filters

NV Series

Stainless Steel Multistage Centrifugal Pump

Installation & Operating Manual



Congratulations on Your Choice in Purchasing this Webtrol Pump!

Its Quality is unsurpassed in material and workmanship and has been factory tested.
If properly installed, it will give many years of trouble free service.

NV-Series
1/21 Edition

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Introduction

This manual was prepared to assist the installer and/or operator in understanding the proper method of installing, operating and maintaining the NV Vertical Series pump. We recommend that you thoroughly understand the proper installation and start-up procedures, prior to starting the pump. If these procedures are followed, you will have years of trouble-free service.

WARNING: Rules For Safe Installation And Operation

1. Read these rules and instructions carefully. Failure to follow them could cause serious bodily injury and/or property damage.

2. Check your local codes before installing.

3. For maximum safety, this product should be connected to a grounded circuit equipped with a ground fault interrupter device.

4. Before installing this product, have the electrical circuit checked by an electrician to make sure it is properly grounded.

5. Before installing or servicing your pump, BE CERTAIN pump power source is disconnected.

6. Make sure the line voltage and frequency of the electrical current supply agrees with the motor wiring. If motor is dual voltage type, BE SURE it is wired correctly for your power supply.

7. Complete pump and piping system MUST be protected against below freezing temperature. Failure to do so could cause severe damage and voids the Warranty.

8. Do not operate the pump in flammable and / or explosive atmosphere.

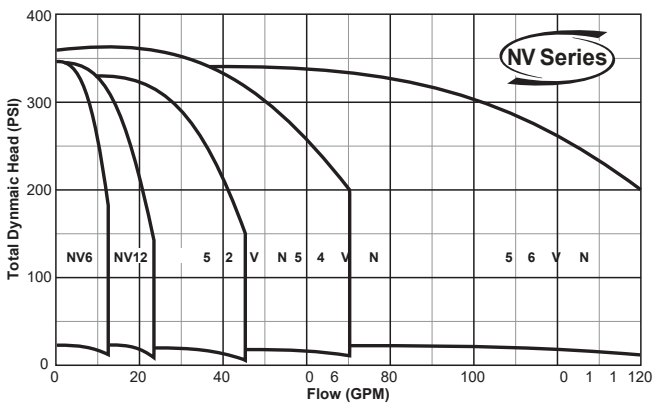
Caution: The NV Series pumps with motor installed tend to be top heavy, care should be taken in handling and transporting to prevent damage or injury caused by the pump falling over.

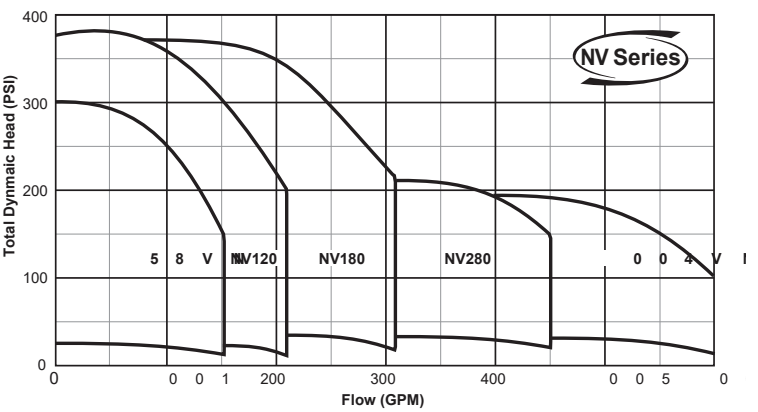
Specifications

Caution: Be careful not to exceed the given specifications in the use of your products.

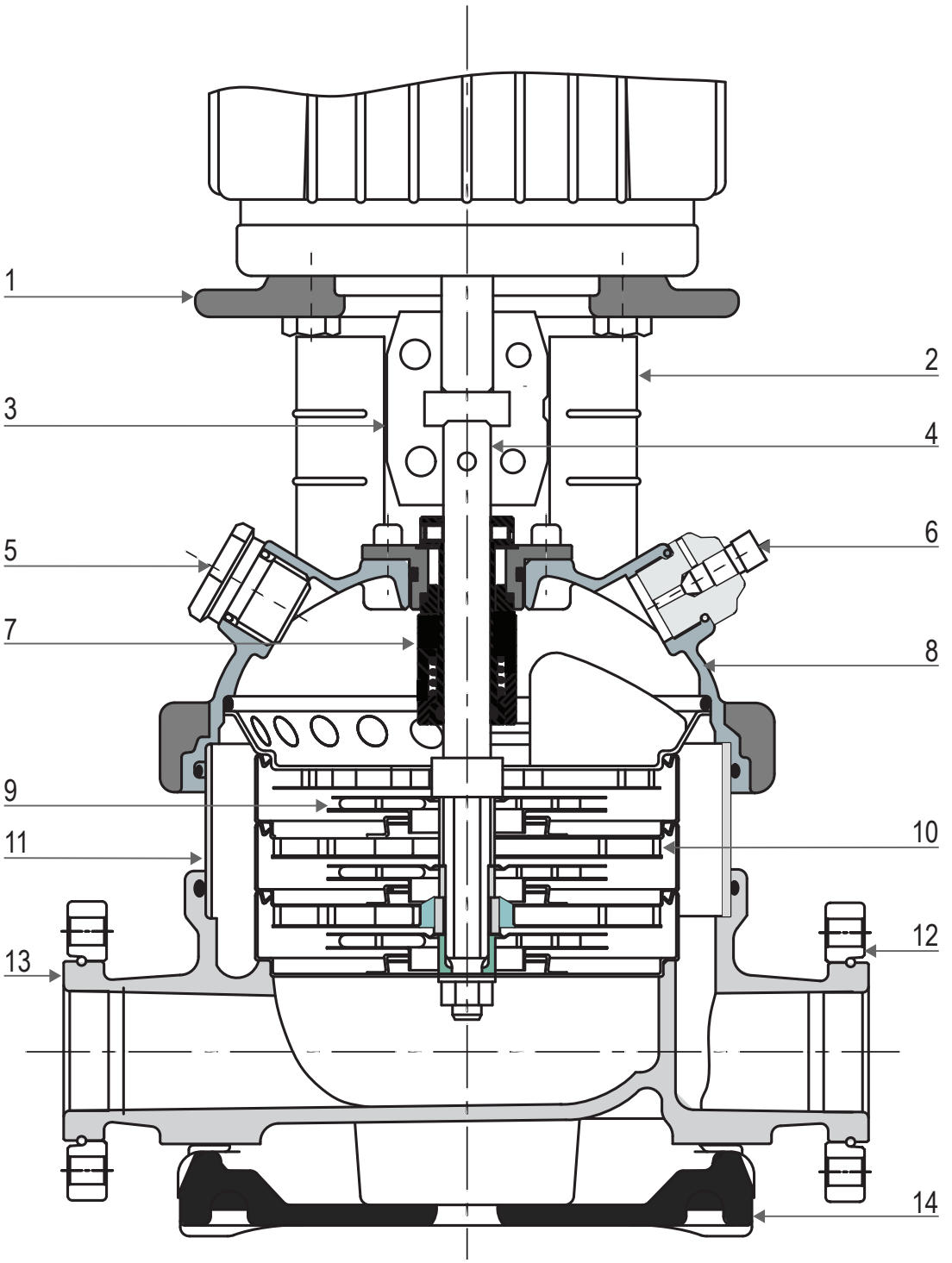
Liquid Handled:	Type of Liquid	Clean Water
	Temperature	5° to 248°F (-15° to 120°C)
	Working pressure	See Chart Below
Construction:	Impeller	Closed Centrifugal
	Seal	Cartridge Type Shaft Seal
	Suction/Discharge	ANSI 300 Lb. 1 1/4" thru 4" - 4 or 8 bolt flange
Materials:	See Sectional View Parts Breakdown on Page 5	
Motor:	NEMA C / TC Frame Speed: 60 Hz, 3450 RPM (2 Poles)	

Series	Stages	Max. Working Pressure	Series	Stages	Max. Working Pressure
NV6	2 - 27	362 PSI	NV120	1 - 5	232 PSI
NV12	2 - 25	362 PSI		6 - 10	465 PSI
NV25	2 - 24	362 PSI	NV180	1 - 4	232 PSI
NV45	1 - 10	232 PSI		5 - 7	465 PSI
	12 - 17	362 PSI	NV280	1 - 3	232 PSI
NV65	1 - 8	232 PSI		4 - 5	465 PSI
	9 - 12	362 PSI	NV400	1 - 3	232 PSI
NV85	1 - 7	232 PSI		4	465 PSI
	8 - 10	362 PSI			





Sectional View



Sectional View

Sectional View Parts Breakdown		
Part No.	**Part Name**	**Material**
1	Motor Bracket	Cast Iron
2	Coupling Guard	304 SS
3	Motor Coupling	Sintered Fe-Cu-C
4	Shaft	431 SS
5	Fill Plug	304 SS
6	Vent Plug	304 SS
7	Mechanical Seal	Silicon Carbide / Silicon Carbide / EPDM
8	Pump Head	304 SS
9	Impeller	304 SS
10	Diffuser	304 SS
11	Casing	304 SS
12	Flange	Cast Iron
13	Pump Discharge	304 SS
14	Base	Cast Iron



MODEL NO.: N V 2 5 B 9 F E 3 T

Series/Nominal Rated Flow (GPM)

Construction
B = 304SS S = 316SS

Number of Stages

Connection
F = Flanged V = Victaulic

Elastomers
E = EPDM V = Viton

Phase / Hz (PH)
1= 1PH / 60Hz 3 = 3PH / 60Hz

Motor Enclosure
D = ODP T = TEFC

Pump Checks

Examine the components carefully to ensure that no damage has occurred to the pump or motor during shipment. Report damage immediately to the shipping carrier or to your dealer. The Vertical Series pump should remain in the shipping carton until it is ready to be installed. Do not drop or mishandle the pump prior to installation.

Always check the pump label against the requirement to make sure you are installing the proper pump specified for the job.

Make sure the pump suction, marked by an arrow on pump base, is connected to the liquid source and the pump discharge, similarly marked, is connected to the discharge line.



Caution: On three phase motor installations, always check for proper motor rotation prior to starting by jogging the motor. Rotation must turn **counter-clockwise** when viewed from back of the motor.

Make sure the motor is correctly wired, refer to instructions on motor name plate.

Make sure that the pump base is firmly secured to a solid flat surface and that the suction and discharge lines are aligned and properly supported to prevent pipe strain on the pump.

Ensure that the suction and discharge gaskets are properly installed to prevent leaks and that they do not restrict the flow to or from the pump.

Standard ANSI mating flanges should be used to connect the pump to the piping. Suction and discharge piping should be no smaller than the respective pump port sizes.

Remove the protective stickers in the suction/discharge flange prior to installation.

Isolation valves should be installed on both the suction and discharge side of the pump in the event service to the pump is required.

Provide adequate space and ventilation around the pump for service and motor cooling.

Warning: Use standard plumbing practices to ensure unnecessary line losses, cavitation and prevent air lock.

Installation

Never operate the pump without water. A lack of water may cause severe damage to the internal components.

Completely prime the pump by removing the fill plug and opening the 9mm needle valve, in the vent plug, opposite the fill plug. Using a funnel, fill the pump body with water until a steady stream of water comes out of the small hole in the vent plug. Retighten the 9mm needle valve to complete process.

Alternatively for installations with positive suction heads, close the discharge valve and open the 9mm needle valve in the vent plug. Open the suction valve until liquid flows out the hole in the vent plug and then retighten the 9mm needle valve in the vent plug securely and open discharge valve.

Caution: Extreme caution should be used if priming the pump in this manner in a hot water application.

Replace the coupling guards if previously removed.

Warning: Operating the pump without the coupling guards in place can cause physical injury.

It is recommended that a bleed valve be installed in the discharge line, or in a line from the vent port to the reservoir. This will allow the pressure in the pump to be relieved for service.

Installing a bleed valve is especially necessary in hot water application to prevent injury.

Pipe, valves and fittings must have a pressure rating equal to or greater than the maximum system pressure.

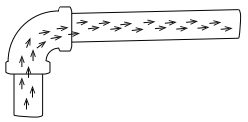
A bypass or pressure relief valve should be installed in the discharge line if there is any possibility the pump may operate against a closed valve in the discharge line.

Minimum flow is required for proper cooling and lubrication of the pump. Operating below the following minimum pumping rates could cause damage and premature failure could occur.

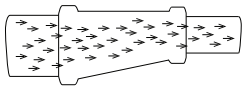
Minimum Pumping Rate			
Series	**Flow Rate**	**Series**	**Flow Rate**
NV6	2 GPM	NV85	20 GPM
NV12	4 GPM	NV120	30 GPM
NV25	7.5 GPM	NV180	30 GPM
NV45	10 GPM	NV280	50 GPM
NV65	10 GPM	NV400	100 GPM

To avoid damage to the pump, make sure on the suction side of the pump that there are no airlocks in the system. The suction pipe should be level or slightly rising.

Correct Installation

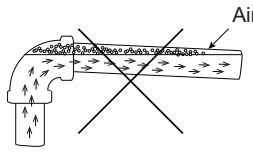


Suction Pipe Sloping Up

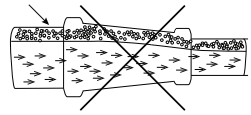


Suction Pipe Belled Down

Incorrect Installation



Suction Pipe Sloping Down



Suction Pipe Belled Down

Operation

Make sure that the system is properly installed and primed as instructed in the installation section.

Check that the suction valve is fully open and the discharge valve is in the open position.

Caution: Prolonged operation of the NV Series pump with either valve in the closed position will cause severe damage to the pump.

Check to make sure all electric connections are correct.

Apply power to the motor.

Check motor rotation. Shaft rotation must be counter-clockwise when viewed from back of motor. On 3 phase motors, if the rotation is not correct reverse any two leads to the starter. The rotation will now be correct.

Check that the noise, vibration, pressure, voltage and amps are at normal levels.

Warning: NV Series pumps are designed for continuos and normal on/off operation.

Rapid cycling can cause high heat and loading that can cause damage to the pump or motor.

Motor and Mechanical Seal Removal

Warning: When lifting the pump, use appropriate crane (or hoist), check position and tightness of lift system so that weight of the pump is not unbalanced.
Failure to observe this precaution can result in serious accidents.

Warning: For any removal or installation procedures, always disconnect the power first.
Failure to observe this precaution can result in serious accidents.

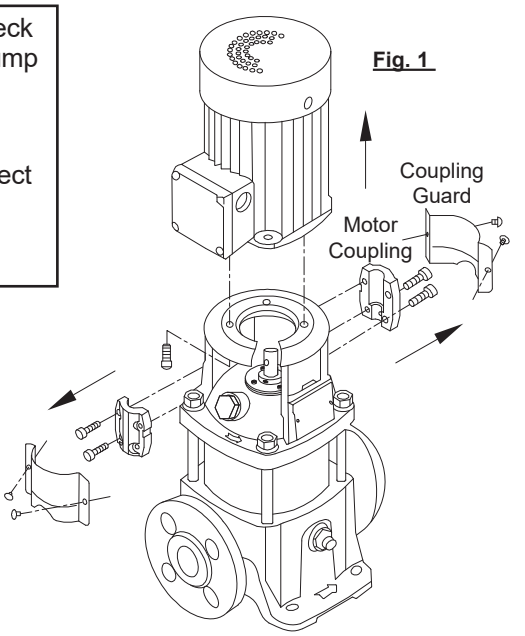


Fig. 1

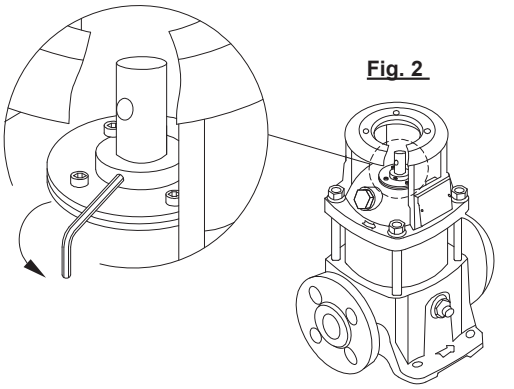
1. Using a phillips screw driver, remove the 2 screws holding the coupling guard. This will need to be done on both sides of the pump.

2. Remove the 2 bolts that attach the two piece motor coupling. This will be done on both sides for the motor coupling. Once completed remove the pin.

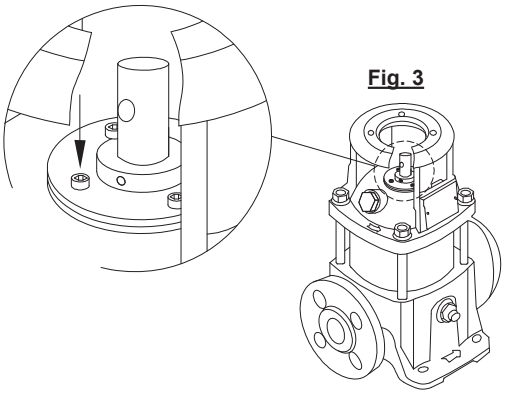
3. Remove the 4 bolts and washers that hold the motor to the motor bracket.

4. With the motor free, remove and note the orientation of the wiring box. (Fig. 1)

STOP HERE AND GO TO STEPS 6 - 10 UNDER MOTOR AND MECHANICAL SEAL INSTALLATION, IF JUST REPLACING MOTOR.


Fig. 2

5. Using an allen wrench, loosen the 3 set screws that hold the collar to the pump shaft. ONLY LOOSEN THEM 1/4 TURN. (Fig. 2)


Fig. 3

6.Using an allen wrench, remove all 4 of the retaining bolts that hold the mechanical seal in place. (Fig. 3)

7. Using the notches on the mechanical seal plate and a flat-head screwdriver, lift the mechanical seal straight up off of the pump shaft (Fig. 4 & Fig. 5)

Fig. 4

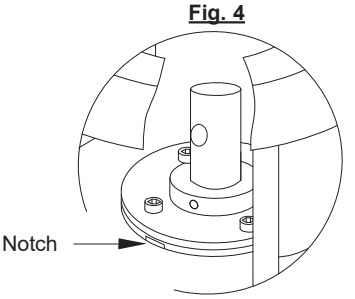
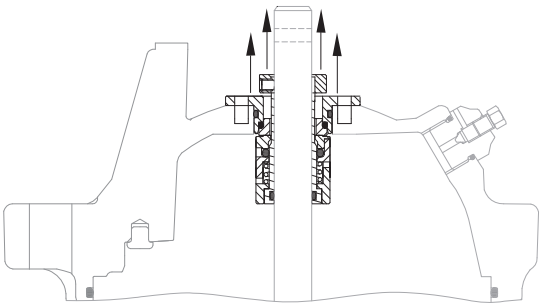


Fig. 5



Motor and Mechanical Seal Installation

1. Prior to installing the mechanical seal, use clean water, wet the inside rubber pieces of the mechanical seal.

2. After rubber is wetted, slide the mechanical seal down the pump shaft. (Fig. 6)

Fig. 6

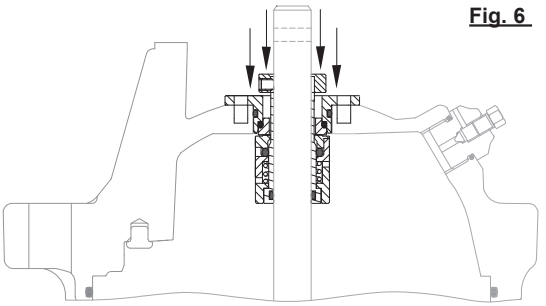
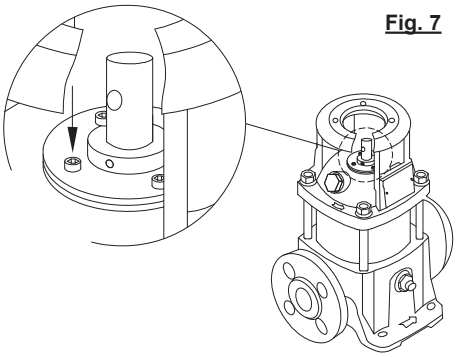
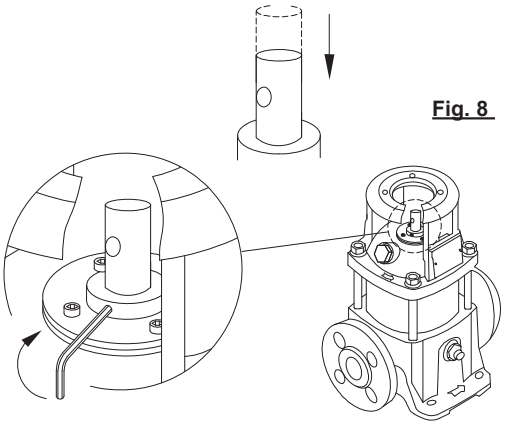


Fig. 7



3. Once the new Mechanical seal is seated, install the four retaining bolts. (Fig 7)

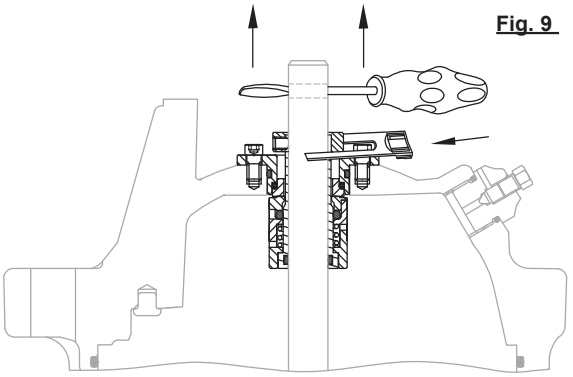
Fig. 8



4. Make sure the pump shaft is pushed down completely and tighten the set screws in the collar. (Fig. 8)

5. After all the set screws in the collar have been tightened, use a screwdriver to lift the pump shaft up. Once it is up, slide the stack height setting tool under the collar and let the shaft drop. (Fig. 9)

Fig. 9



Motor and Mechanical Seal Installation

Warning: When lifting the pump, use appropriate crane (or hoist), check position and tightness of lift system so that weight of the pump is not unbalanced.
Failure to observe this precaution can result in serious accidents.

Warning: For any removal or installation procedures, always disconnect the power first.
Failure to observe this precaution can result in serious accidents.

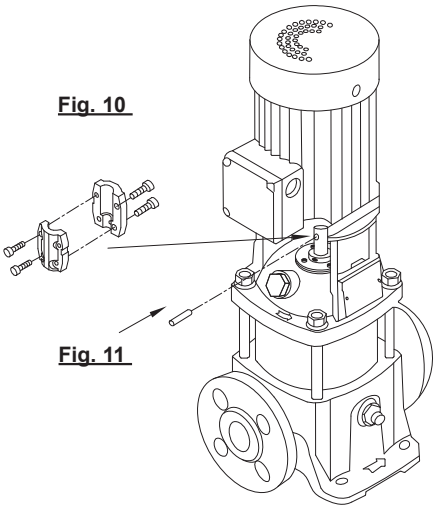


Fig. 10

Fig. 11

6. Place the motor back on to the motor bracket, making sure to orientate the wiring box in the same position prior to removal, then attach the 4 bolts and washers that hold the motor to the motor bracket. (Fig 10)

7. Place the pin back into the shaft. (Fig. 10)

8. Attach the two piece motor coupling and place back on the pump shaft and motor shaft, making sure the pin slides into the holes in both pieces of the coupling. Tighten down the four coupling bolts evenly so that the gaps are equal on both sides. (Fig. 10 & Fig. 11)

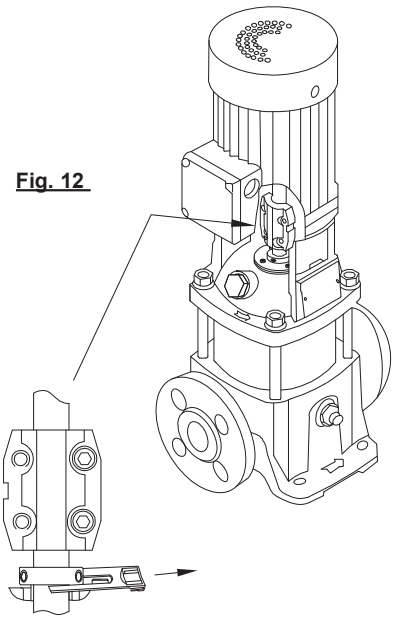


Fig. 12

9. Remove the stack height setting tool. (Fig. 12)

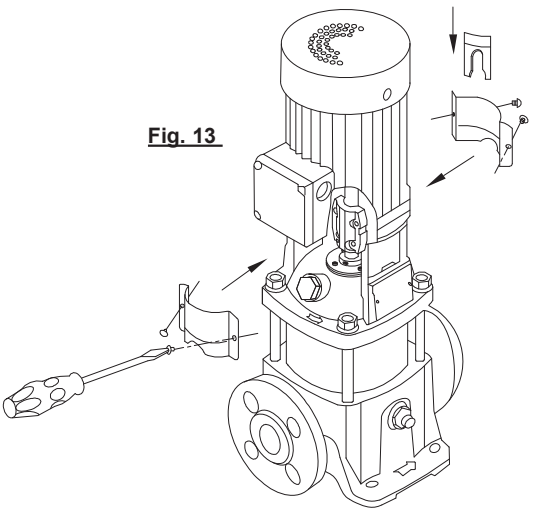


Fig. 13

10. Hang the stack height setting tool on the guard for future use and then attach the coupling guards on both sides of the pump. (Fig. 13)

Notes

Thank You for Purchasing an NV Series Vertical Booster Pump

We at Crystal Quest are constantly working on new products to make your job easier, while making your systems more efficient, reliable and affordable.

Your opinion means a lot to us, so please let us know what you think about our NV Series Vertical Booster Pump.

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