

Variator Stroke Rate Control Operating Manual



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TABLE OF CONTENTS

1.	INTRODUCTION 3	}
1.1	Scope	3
1.2	Description	3
1.3	Specification5	5
1.4	Features	5
1.5	Options5	5
2.	INSTALLATION	5
2.1	Inspection	5
2.2	Storage	5
2.3	Unpacking6	5
2.4	Safety6	5
2.5	Mounting6	5
2.6	Drive Requirements	7
3.	OPERATION 7	7
3.1	Initial Startup	1
3.2	Normal Operation	3
4.	MAINTENANCE	3
4.1	Preventative maintenance	3
4.2	Decommissioning	3
5.	TROUBLESHOOTING	3
5.1	Speed varies or will not turn	3
5.2	Excessive noise)
5.3	Miscellaneous)



Congratulations! You have chosen the finest, most versatile Variator; designed to exacting specifications for long life, reliable performance, and low maintenance. To ensure proper operation and to maximize the Variator durability, please read and follow this guide. Failure to correctly install and maintain the Variator is a primary cause for future service problems and may void certain warranty provisions.

NOTE: This Guide applies to all variator equipped electrically driven CheckPoint Chemical Injection Pumps.

1. INTRODUCTION

1.1 Scope

This IOM covers the Variator Stroke Rate Adjuster installation and operation. Safe system design and mechanical drive systems for pump head are covered in other manuals.

1.2 Description

The Variator is a Hydraulic speed control positioned between an electric motor and a gear reducer. The device consists of a hydraulic pump integrally coupled to a hydraulic motor. By adjusting the control knob a full range of speed can be achieved.







1.3 Specification

Maximum Input Speed	1800 RPM
Minimum Input Speed	900 RPM
Minimum Output Speed	0 RPM
Maximum Output Speed	Up to input speed
Maximum Ambient Temperature	131°F (55°C)
Hydraulic Oil Capacity	23.66 Fl Oz, (700 ml)
Hydroulic Eluid	Mobil DTE 10 Excel 22 recommended,
	or equivalent ISO VG 22 Hydraulic Oil

1.4 Features

- Speed Control
- Torque Limitation
- Fully Reversable

1.5 Options

The Variator has limited features and options. There are indicating control knobs and remote control options.

1.5.1 Control knobs – A mechanical knob is used to adjust the output speed of the variator. Two types are available.

1.5.1.1 Plain Knob – Simple knob with no indications

1.5.1.2 Indicating KnobKnob has a gravity positioned indicator which counts rotations, providing a numeric reading.

1.5.2 Input and Output sizing

Different motor input and output sizes are available in the Variator. The Variator can accommodate Nema 56C, 145TC and IEC 80 motors.

1.5.3 Torque Limiting

An adjustable torque limiting device is included on the variator housing. Adjusting the screws clockwise will increase the maximum torque, and rotating the screws counterclockwise will lower the maximum torque.

Tighten locknuts after torque adjustments are carried out.

This feature is not designed to replace a downstream pressure relief valve, but may be set as an additional safety.

NOTE: All variators are factory set at maximum torque. CheckPoint does not recommend adjustment.



2. INSTALLATION

2.1 Inspection

2.1.1 Before installation, please inspect the variator carefully. If the variator appears to have sustained damage in transit, call your CheckPoint Authorized Distributor or CheckPoint Customer Service directly at +1 (504) 340-0770 to report and confirm damage. If it is determined that damage occurred in transit, a carrier claim will be required.

2.2 Storage

The variator has been thoroughly tested at the CheckPoint factory prior to shipment. This testing required all fluids and lubricants to be filled. Prior to shipping, these lubricants were drained. Residual lubrication that did not drain will protect the internal components from corrosion. Although our pumps can be placed in service without environmental protection, we suggest they are stored indoors until being commissioned.

If the variator will be stored for periods longer than two or three months, lubricate the exposed shaft and machined parts to protect from oxidation.

Variators should always be stored filled with hydraulic oil; check oil levels after installation to ensure the variator is properly filled.

2.3 Unpacking

The variator can be shipped as a single component or as part of a completed pump. When shipped as a component, the variator is secured with expanding foam to protect it during shipment. Ensure unpackaged variators are securely placed in a safe area.

2.4 Safety

When shipped as a completed pump, the unit is not safe until the mounting base is secured to its final location. Vertical units have a high center of gravity and can be easily tipped over, causing damage to the pump and injury to others. Ensure the pump is securely fastened to a firm base at all times.

2.5 Mounting

- CheckPoint requires vertical mounting for the variator. Improper mounting will result in oil leakage from the variator vent.
- If the motor is equipped with a cooling fan, be sure not to install the motor where the air flow may be impeded.
- Two pole motors are not recommended for use with variator equipped injection pumps

NOTE: Coupling between electric motor and variator must be free and smooth.The fastening bolts should not be tightened until both the variator and motor flanges are in contact. When mounting is complete, check to ensure that the coupling is free and smooth by manually rotating the motor shaft (or fan).



2.6 Drive Requirements

- The variator has a maximum input speed of 1800 rpm. Exceeding this limit will generate excess heat and void your warranty.
- Ensure a minimum motor speed of 900 rpm is maintained during operation. Lower input speeds will cause damage to the internally lubricated components.

3. OPERATION

3.1 Initial Startup

When installing a new variator, or if the variator has been stored for a long duration prior to commissioning, allow the variator to run without being under no load at a low speed for fifteen to twenty minutes.

If the variator is already installed within a pump system and needs to run for the prescribed fifteen to twenty minutes without being under a no load, the bleed valve on the pump head may be opened as to allow the pump to stroke under no load. Capture the resulting fluid and return it to the chemical tank after the run time has expired.

Once proper oil levels and run times have been established, the variator is ready to operate under load conditions.

See Section 1.3 for recommended oil and quantity

CAUTION: Use of oils other than those which are recommended may allow oils to become overheated and can lead to premature oil breakdown and pump flow failures.

3.1.1 Filling the Hydraulic System

- Remove the shipping plug
- Slowly add 700 ml of hydraulic oil to the reservoir. As the oil enters the system, air will percolate up through the reservoir. Continue until reaches the top of the reservoir. The final oil level should be at the fill port level.
- Install supplied reservoir vent cap





3.1.2 Bleeding of Hydraulic system

• Start the pump via the Start/Stop switch or VFD.

NOTE: Prior to initial pump operation, ensure that the suction check valve is connected to an adequate chemical supply, and that all valves connecting the chemical are open.

• With the motor on, turn the control knob both directions several times to allow trapped air to be removed from the system.

3.2 Normal Operation

3.2.1 Set Delivery Volume / Vary Pump Stroke Rate

Turning the rate adjustment dial of the variator counterclockwise will increase the pump stroke rate.

The variator has been preset to limit rotation to a single direction. This ensures the pump will stroke at its minimum rate with the variator dial in the (full clockwise position).

The variator control knob can be adjusted while the unit is off without damage to the unit.

4. MAINTENANCE

The CheckPoint Variator is designed to provide trouble-free operation for many years with little adjustment, lubrication, or other routine maintenance. However, like any other device, proper maintenance can extend the life of the product. This can include periodic changing of the lubricats.

4.1 Preventative maintenance

4.1.1 Lubrication

4.1.1.1 Periodic Inspection

For proper operation, oil must be visible in the sight glass of the variator. Remove the top breather vent and inspect the fluid level <u>monthly</u>. Add oil as required to maintain proper levels.

4.1.1.2 Oil Change

The hydraulic fluid used in the variator is a working fluid and can absorb moisture during normal operation. CheckPoint suggests that this fluid be drained and replaced after the first 200 hours of run time and then <u>every 2,000 hours</u>.

4.2 Decommissioning

Draining the variator's hydraulic fluid is the only action required prior to disassembly and packaging for transport.

5. TROUBLESHOOTING

5.1 Speed varies or will not turn

If the speed variator is not operating properly, decrease the RPM by rotating the speed control dial counterclockwise, then check the oil level to ensure that the variator is properly filled (but not over filled).



If, after hydraulic oil levels are corrected, the speed variator still does not operate properly, it may be necessary to bleed air from the hydraulic chamber. Unscrew the relief valve plug to allow air to escape. Always check fluid levels after bleeding.

For all pump or motor related problems, refer to the individual IOM or contact us directly at HELP@cppumps.com.

5.2 Excessive noise

High noise levels (levels above 78 dBA) observed after installation is a sign of improper installation or alignment.

Improper alignment or installation will allow for excess vibration and acoustic resonance. Adjust the position of the variator and ensure that all fasteners are properly tightened.

- Check hydraulic level
- Cycle control knob to extremes
 - Check for mechanical failures Damaged keys Loose fasteners Contaminated fluids

5.3 Miscellaneous

If you are experiencing an operating problem not listed above, or if none of the above troubleshooting actions solve your operating problem, please contact your Authorized CheckPoint Distributor, or contact CheckPoint directly at +1 (504) 340-0770 or HELP@cppumps.com. We will work to assist you in determining the appropriate next steps. Once CheckPoint has had the opportunity to assist you with troubleshooting your problem, please keep in mind the following information regarding repairs:

5.3.1 *CheckPoint offers exchange programs to keep you in service* We will ship you a rebuilt pump, which you will be able to install prior to sending us your existing pump. Upon receipt of your pump, we will tear it down, rebuild it, and report to you our findings. We offer a fixed-price exchange plan, an actual-cost plan, and a consigned exchange plan. Please contact CheckPoint to learn more about our unique exchange services.

5.3.2 *Nothing beats factory-direct repairs* Although the Series HDA pump has been designed to be easy to operate and repair, the best way to ensure continued reliable service is to have your pump repaired by the CheckPoint factory. OEM repair services ensure CheckPoint quality and reliability.

5.3.3 *Remember that after you repair your CheckPoint pump, it should perform like new* If your pump is anything less than exceptional, call us to determine what can be done to restore the pump to "like-new" performance.

5.3.4 *Training sessions are available* CheckPoint strives to maintain excellence in all that we do, and we are happy to share. If you would like to train your employees regarding anything involving CheckPoint Pumps & Systems, please contact us to discuss training options.