



# Operation and Maintenance Manual

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## Series 365 Vic-Plug™ Large Diameter Plug Valve 14, 16 & 18" Sizes



### **! WARNING**



Failure to follow instructions and warnings can result in serious injury.

- Always read and understand all installation instructions before attempting assembly of Victaulic piping products.
- Always wear safety glasses and foot protection.
- Failure to do so could result in serious personal injury, property damage, joint leakage or joint separation.

If you need additional copies of the manual or have any questions about the safe operation of this product, contact Victaulic Company of America, P.O. Box 31, Easton, PA 18044-0031, 610-559-3300.

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## Important Information

Definitions for identifying the various hazard levels shown on warning labels or to indicate proper safety procedures in this instruction manual are provided below.



This safety alert symbol indicates important safety messages on warning labels in this instruction manual. When you see this symbol be alert to the possibility of personal injury and carefully read and fully understand the message that follows.

### **DANGER**

The use of the word "DANGER" always signifies an immediate hazard with a likelihood of severe personal injury or death if instructions, including recommended precautions, are not followed.

### **CAUTION**

The use of the word "CAUTION" signifies possible hazards or unsafe practices which could result in minor injury, product or property damage if instructions, including precautions, are not followed.

### **WARNING**

The use of the word "WARNING" signifies the presence of hazards or unsafe practices which could result in severe personal injury if instructions, including recommended precautions, are not followed.

### **NOTICE**

The use of the word "NOTICE" signifies special instructions which are important but not related to hazards.

## ! WARNING

Piping systems must always be depressurized and drained before attempting disassembly and removal of any Victaulic piping products.

Failure to do so could result in serious personal injury, property damage, joint leakage or joint separation.

### GASKET SELECTION MUST ALWAYS BE SPECIFIED ON YOUR ORDER

GRADE	TEMP. RANGE	COMPOUND	COLOR CODE	*GENERAL SERVICE RECOMMENDATIONS
E	-30°F to +230°F (-34°C to +110°C)	EPDM	Green Mark	Recommended for hot water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. UL classified in accordance with ANSI/NSF 61 for cold +86°F (+30°C) and hot +180°F (+82°C) potable water service. <i>Not recommended for petroleum services. Not recommended for steam services.</i>
T	-20°F to +180°F (-29°C to +82°C)	Nitrile	Orange Mark	Recommended for petroleum products, air with oil vapors, vegetable and mineral oils within the specified temperature range. UL classified in accordance with ANSI/NSF 61 for cold +86°F (+30°C) and hot +180°F (+82°C) potable water service. <i>Not recommended for hot water services over +150°F (+66°C) steam, or for hot dry air over +140°F (+60°C).</i>
M	-20°F to +200°F (-29°C to +93°C)	Halogenated Butyl	Brown Stripe	Recommended for water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. Readily conforms to ductile pipe surfaces. UL classified in accordance with ANSI/NSF 61 for cold +86°F (30°C) potable water service. <i>Not recommended for petroleum services.</i>
S	-20°F to +180°F (-29°C to +82°C)	Nitrile	Red Stripe	Specially compounded to conform to ductile pipe surfaces. Recommended for petroleum products, air with oil vapors, vegetable and mineral oils within the specified temperature range. <i>Not recommended for hot water services over +150°F (+66°C) or for hot dry air over +140°F (+60°C).</i>

**ALWAYS CHECK GASKET SUPPLIED TO BE CERTAIN IT IS SUITED FOR THE SERVICE INTENDED. REFER TO VICTAULIC GASKET SELECTION GUIDE (05.01).**

**ALWAYS LUBRICATE GASKET FOR PROPER COUPLING ASSEMBLY.**

\*Services listed are General Service Recommendations only. It should be noted that there are services for which these gaskets are not recommended. Reference should always be made to the latest Victaulic Gasket Selection Guide (05.01) for specific gasket service recommendations and for a listing of services which are not recommended.



## PREFACE

The Victaulic Series 365 Vic-Plug™ valve is a grooved end eccentric plug valve which is ideal for “dead-end” shutoff or flow balancing functions in municipal water and wastewater services, plus a wide range of other piping systems where solids may present a problem. The ductile iron body conforms to AWWA C-509 standard end-to-end dimensions and the grooved ends conform to ANSI/ AWWA C-606 rigid groove specifications.

The Vic-Plug valve is designed for long service life and does not require field maintenance. It is equipped with a packing gland and multiple chevron packing rings which are easily adjusted while the valve is in service. Self-lubricated stainless steel bearings maintain alignment and resist corrosion to prevent shaft binding (no lubrication is required). Gear operators and actuators are factory lubricated, and under normal operation will not require servicing.

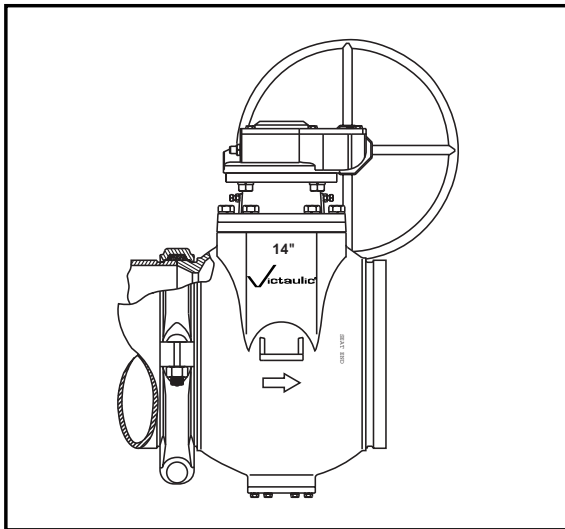
This Operation and Maintenance Manual is written to provide information in order to maintain optimum valve performance. **NOTE:** Under normal operating conditions, the Series 365 Vic-Plug valve does not require field maintenance. However, should adjustments be required, the information contained herein is designed to provide assistance.

## INSTALLATION

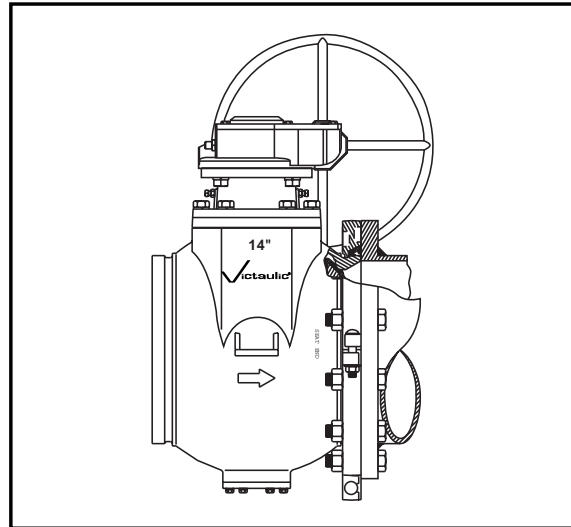
The Victaulic Series 365 Vic-Plug valve is easily installed with Style 31 couplings and/or Style 341 Vic-Flange adapters. For installation instructions, request I-31 for the Style 31 and I-341 for Style 341. The Series 365 Vic-Plug valves in sizes 14, 16 & 18" (350, 400 & 450 mm) are equipped with integral side support lugs which can be used to prevent rotation during installation in the pipeline.

The Series 365 Vic-Plug valve is available with either uni-directional or full bi-directional service capabilities. The valve must be installed with the seat in the proper orientation in order to provide the performance desired. Uni-directional valves should be installed with the seat downstream of the flow to provide 150 PSI (1034 kPa) shutoff pressure. A nominal back pressure of 50 PSI (345 kPa) is available with uni-directional valves in sizes 14 - 18" (350 - 450 mm). Bi-directional valves should be installed to prevent solids from being trapped inside the valve during shutoff.

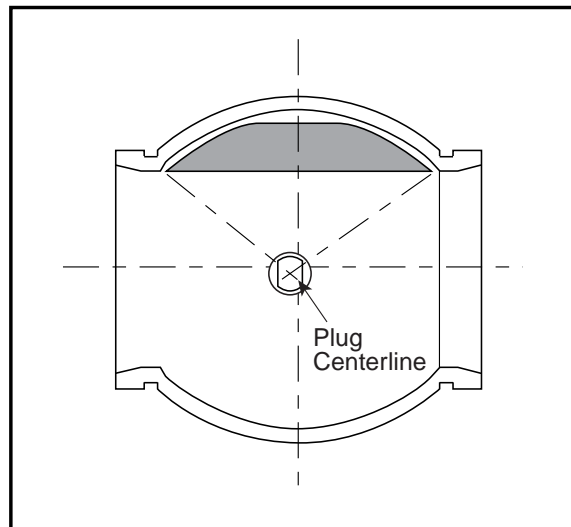
**NOTE:** When installed horizontally, the plug should be on the upside of the flow path. This will provide optimum valve longevity.



**Vic-Plug valve installed with Style 31 coupling**



**Vic-Plug valve installed with Style 341 Vic-Flange adapter**



**Vic-Plug valve installed horizontally with valve plug on upside of flow path**

## MAINTENANCE

### PACKING GLAND ADJUSTMENT PROCEDURE

For item numbers refer to drawing diagram on page 15.

Packing gland adjustments can be performed without removing gear operator or actuator. Under normal conditions, packing adjustments are not required. If adjustments become necessary, the following procedures should be performed:



1. Loosen two lock nuts (Item 22) located on the sides of the bonnet.



2. Evenly tighten the two adjusting screws (Item 21) also located on the sides of the bonnet until leakage has stopped. If leakage persists, replacement of the stem packing (Item 7) and/or internal o-ring (Item 10) may be required. Refer to Stem Packing Replacement Instructions below or Plug Replacement Instructions on page 8 for these procedures.



3. Tighten lock nuts (Item 22) when adjustment is complete.

## STEM PACKING REPLACEMENT PROCEDURE

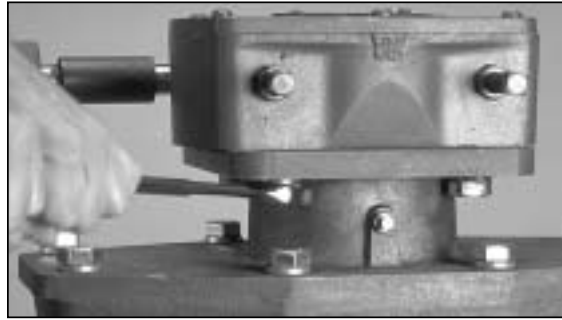
For item numbers refer to drawing diagrams on pages 15 and 17.

### **! WARNING**

Piping systems must always be depressurized and drained before attempting disassembly and removal of any Victaulic piping products.

Failure to do so could result in serious personal injury, property damage, joint leakage or joint separation.

Victaulic recommends that the system be depressurized before removing and replacing stem packing, if possible. If not, precautions should be taken to prevent contact with media.



1. Remove the gear operator mounting bolts (Item 34).



2. Remove the gear operator (Item 30).

### **! WARNING**

- Use hoist when removing gear operator.
- Gear operator weighs in excess of 75 lbs. (34.0 kg). Failure to do so could result in serious personal injury and/or property damage



3. Remove the eight flat head screws (Item 23) from the bonnet top plate (Item 4).



4. Remove the bonnet top plate (Item 4).

## **⚠ DANGER**

**DO NOT** remove the bonnet bolts (Item 19). The valve must be depressurized before removing these bolts. The bonnet will blow off if these bolts are removed while the valve is pressurized. This may result in serious personal injury and/or property damage.



5. Remove two lock nuts (Item 22) and the two adjusting screws (Item 21) located on the sides of the bonnet.



6. Using needle nose pliers, remove the packing gland (Item 6).



7. Using needle nose pliers or a small screwdriver, remove the stem packing (Item 7). The stem packing consists of an upper and lower

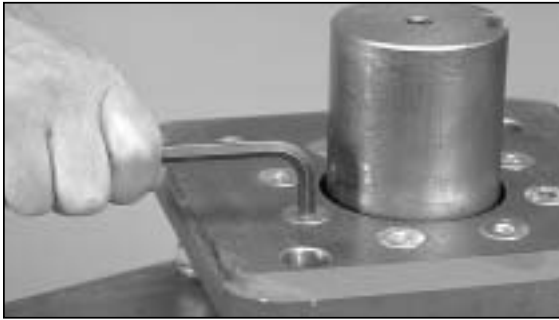
**NOTE:** Packing should not be reused once removed. Reuse of packing may result in leakage at stem.



8. Lightly lubricate new packing (Item 7) with silicone grease. Insert new packing and replace packing gland (Item 6). The top of the packing gland should be initially located below the top of the bonnet to the dimensions as follows: 14" (350 mm) valve:  $\frac{1}{8}$ " (3.18 mm); 16" (400 mm) valve:  $\frac{1}{4}$ " (6.35 mm); 18" (450 mm) valve:  $\frac{7}{16}$ " (11.11 mm). Verify this dimension with a scale.



9. Install the two adjusting screws (Item 21) and two lock nuts (Item 22).



10. Replace the bonnet top plate (Item 4) and install the eight flat head screws (Item 23) using a removable threadlock compound. Torque to 70 ft. lbs. (94.9 N•m) for 14 & 16" (350 & 400 mm) valves and 130 ft. lbs. (176.3 N•m) for the 18" (450 mm) valve.



11. Replace gear operator (Item 30) and gear operator mounting bolts (Item 34).

## PLUG REPLACEMENT PROCEDURE

### PLUG REMOVAL

For item numbers refer to drawing diagrams on page 15 & 17.

## **!** WARNING

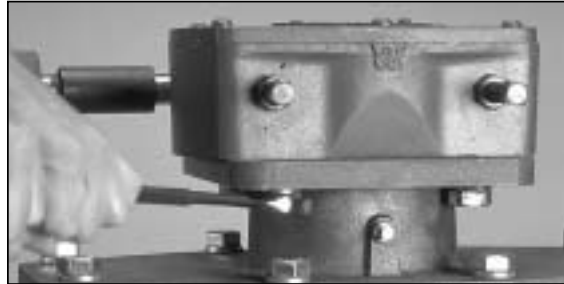
Piping systems must always be depressurized and drained before attempting disassembly and removal of any Victaulic piping products.

Failure to do so could result in serious personal injury, property damage, joint leakage or joint separation.

## **!** WARNING

During maintenance, one person cannot safely handle the valve because it weighs more than 400 lbs. (181.4 kg). A hoist must be used to lift the valve and some of its components into position.

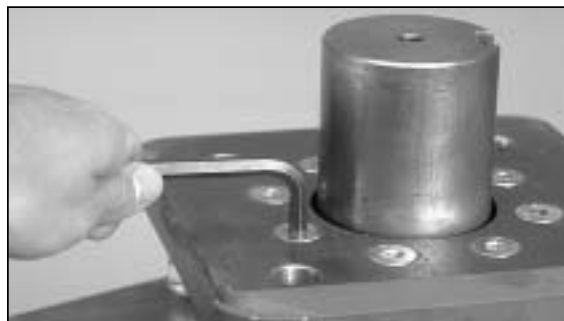
Failure to follow this instruction may result in serious injury.



1. Plug replacement must be made with the valve in the open position. Remove the gear operator mounting bolts (Item 34).



2. Remove the gear operator (Item 30).



3. Remove the eight flat screws (Item 23) from the bonnet top plate (Item 4).



4. Remove the bonnet top plate (Item 4).





5. Remove the two lock nuts (Item 22) and the two adjusting screws (Item 21) located on the sides of the bonnet.



6. Using needle nose pliers, remove the packing gland (Item 6).



7. Using needle nose pliers or a small screwdriver, remove the stem packing (Item 7). The stem packing consists of an upper and lower retaining ring and two Chevron seals. Note: Packing should not be reused once removed. Re-use of packing may result in leakage at the stem.



8. Remove bonnet bolts (Item 19) and remove bonnet (Item 3).



9. If necessary, pry off bonnet (Item 3) with screwdriver or chisel.



10. Remove plug and shaft. To ease removal, rotate as shown to remove from body. Inspect nickel seat on valve body for evidence of corrosion. If sealing surface is pitted replace valve.

## **WARNING**

- A pitted sealing surface may cause premature deterioration of the plug coating.
- If sealing surface is pitted replace valve.

Failure to do so could result in serious personal injury, property damage, joint leakage or joint separation.



11. Remove plug from shaft by removing socket head cap screws (Item 18) and lockwashers (Item 17). Do not remove or adjust hex nuts (Item 16) or set screws (Item 15).



12. Remove steel journal bearing (Item 9) from lower seat.



13. Using a putty knife, remove bonnet gasket (Item 8).



14. To complete cleaning of bonnet area, use a mild solvent and a Scotch-Brite pad. Bonnet gasket area must be smooth and clean for proper reassembly.

## PLUG INSTALLATION

For item numbers refer to drawing diagrams on page 15 & 17.

### **! WARNING**

During maintenance, one person cannot safely handle the valve because it weighs more than 400 lbs. (181.4 kg). A hoist must be used to lift the valve and some of its components into position.

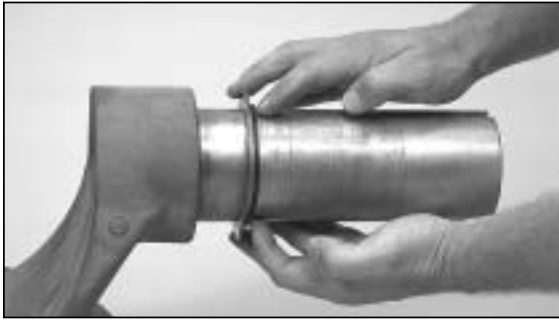
Failure to follow this instruction may result in serious injury.



1. Assemble plug to shaft and install socket head cap screws (Item 18) and lockwashers (Item 17). Torque to 60 ft. lbs. (81.4 N•m) for 14" (350 mm) valve and 100 ft. lbs. (135.6 N•m) for 16" & 18" (400 & 450 mm) valves.



2. Install journal bearings (Item 9) into lower seat. Apply silicone grease to the journal area.



6. Install journal bearings (Item 9) into bonnet (Item 3). Apply silicone grease to the journal area

3. Lubricate then install thrust washer (Item 12) and o-ring (Item 10) onto the bottom and top of the shaft (Item 2).



7. Note orientation of dowel pins (Item 14). Proper orientation of the bonnet with the dowel pins is necessary to permit bonnet reassembly.



4. Place assembled plug and shaft into body. Rotate to ensure that the plug properly seats. Proper plug and shaft engagement is most easily accomplished with the plug and shaft in the open position.

8. Install bonnet on top of body, making sure that the bonnet is correctly oriented and engaged on the dowel pins.



5. Place gasket (Item 8) on the top of the valve body (Item 1).

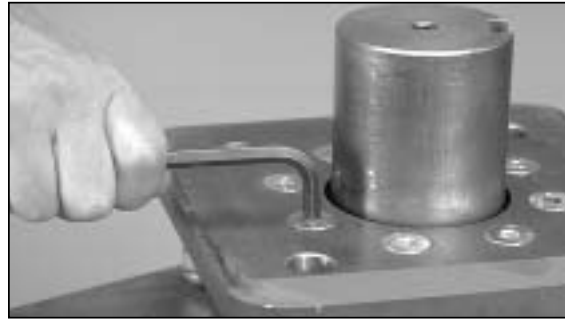
9. Install bonnet bolts (Item 19). Torque to 160 ft. lbs. (217.0 N•m) for 14 & 16" (350 & 400 mm) valves and 250 ft. lbs. (339.0 N•m) for 18" (450 mm) valve. Tighten in alternating criss-cross pattern.



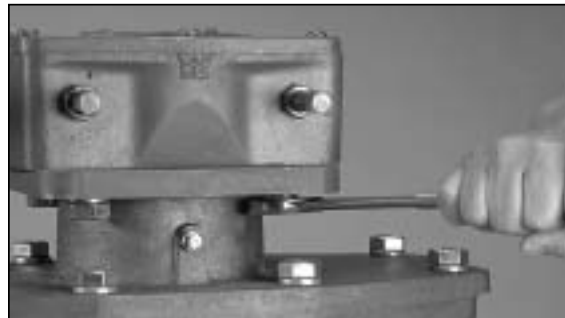
10. Lightly lubricate the new packing (Item 7) with silicone grease. Insert new packing and replace packing gland (Item 6). The top of the packing gland should be initially located below the top of the bonnet to the dimensions as follows: 14" (350 mm) valve:  $\frac{1}{8}$ " (3.18 mm); 16" (400 mm) valve:  $\frac{1}{4}$ " (6.35 mm); 18" (450 mm) valve:  $\frac{7}{16}$ " (11.11 mm). Verify this dimension with a scale.



11. Install the two adjusting screws (Item 21) and two lock nuts (Item 22).



12. Replace the bonnet top plate (Item 4) and install the eight flat head screws (Item 23) using a removable threadlock compound. Torque to 70 ft. lbs. (94.9 N•m) for 14 & 16" (350 & 400 mm) valves and 130 ft. lbs. (176.3 N•m) for the 18" (450 mm) valve.



13. Replace gear operator (Item 30) and gear operator mounting bolts (Item 34).

## SETTING THE GEAR OPERATOR TRAVEL LIMIT STOPS

### ADJUSTING THE CLOSED TRAVEL LIMIT STOP



1. Loosen the hex lock nut located on the side of the gear operator.



2. Loosen the set screw approximately three (3) turns.



3. Turn the handwheel in the clockwise direction to place the plug in the closed (“shut”) position.



4. Tighten the set screw until it contacts the internal quadrant gear.



5. Tighten the lock nut and check for proper valve operation.

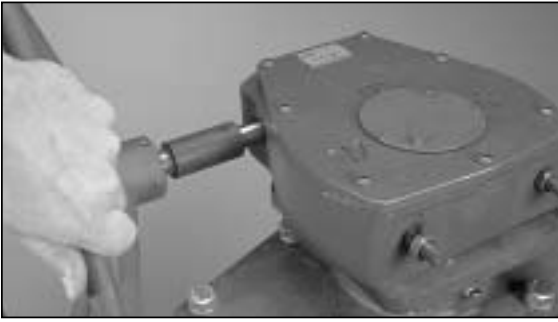
### ADJUSTING THE OPEN TRAVEL LIMIT STOP



1. Loosen the hex lock nut located on the side of the gear operator.



2. Loosen the set screw approximately three (3) turns.



3. Turn the handwheel counterclockwise to place the valve in the "open" position. This occurs when the torque to operate the handwheel increases sharply as the plug seats, creating sealing.

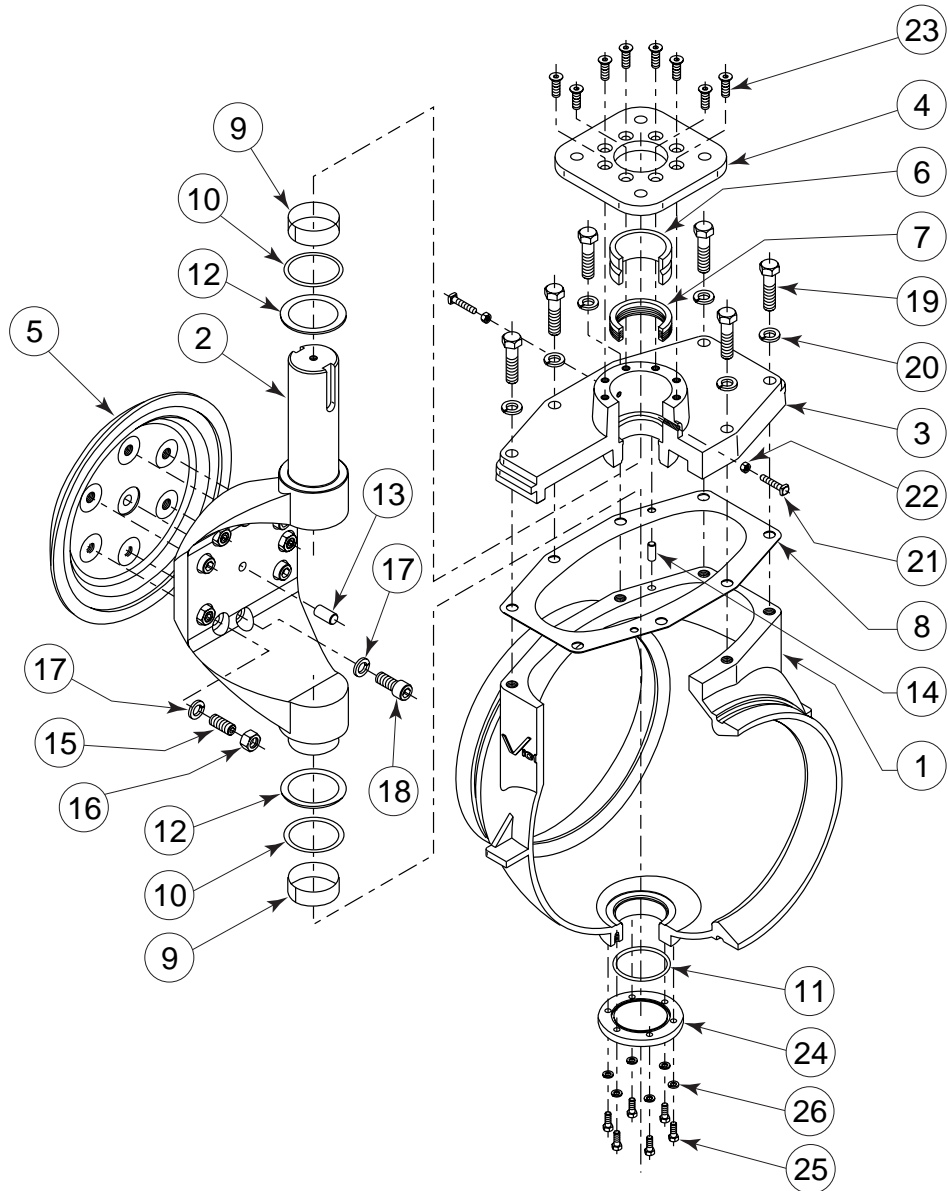


4. Tighten the set screw until it contacts the internal quadrant gear.



5. Tighten the lock nut and check for proper valve operation.

14 - 18" SERIES 365 VIC-PLUG  
ASSEMBLY PARTS



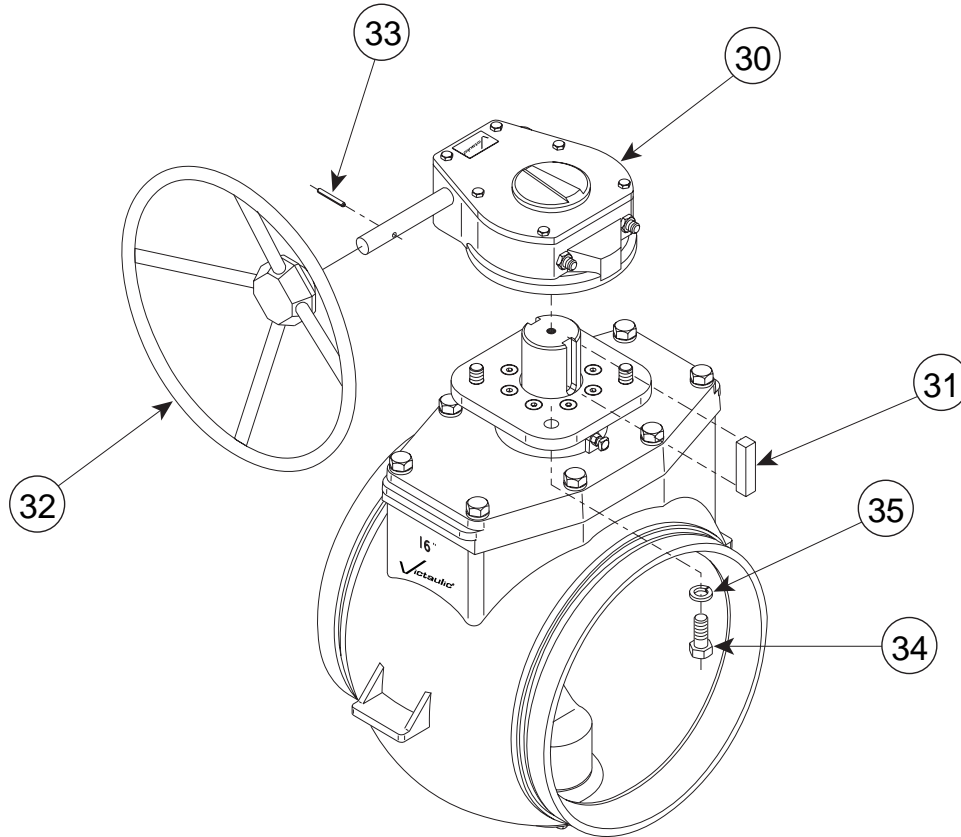
See table on page 16.

# 14 - 18" SERIES 365 VIC-PLUG ASSEMBLY PARTS LIST

Item No.	Qty.	Description	Valve Size		
			14"/350 mm	16"/400 mm	18"/450 mm
1	1	Valve Body	Ductile iron to ASTM A-536		
2	1	Shaft	Ductile iron to ASTM A-536		
3	1	Bonnet	Ductile iron to ASTM A-536		
4	1	Bonnet Top Plate	Steel		
5	1	Coated Plug	As specified on purchase order		
6	1	Packing Gland	Steel		
7	1 set	Stem Packing	Same as plug coating		
8	1	Gasket	Graphalloy		
9	2	Bearing	Teflon impregnated fiberglass with stainless steel backing		
10	2	O-ring	Same as plug coating		
11	1	O-ring	Same as plug coating		
12	2	Thrust Washer	Nylon		
13	1	Dowel Pin	Stainless Steel		
14	2	Dowel Pin	Steel		
15	3	Set Screw	Stainless Steel		
16	3	Hex Nut	Stainless Steel		
17	9	Lockwasher	Stainless Steel		
18	6	Socket Head Cap Screw	Stainless Steel		
19	8	Hex Head Cap Screw	Steel		
20	8	Lockwasher	Steel		
21	2	Packing Gland Adjusting Screw, Sq. Hd. Cone Pt.	Steel		
22	2	Hex Nut	Steel		
23	8	Flat Head Socket Cap Screw	Steel		
24	1	Cap	Steel		
25	6	Hex Head Cap Screw	Steel		
26	6	Lockwasher	Steel		



14 - 18" SERIES 365 VIC-PLUG  
 GEAR OPERATOR ASSEMBLY PARTS LIST



Item Number	Quantity	Description
30	1	Gear Operator
31	1	Square Key
32	1	Handwheel
33	1	Roll Pin
34	4	Hex Head Cap Screw
35	4	Lockwasher

