

GLOBE AND ANGLE DESIGN 1" THRU 8" V500 Series CTV (Cage Trim Valve)

Storage

When a valve is to be stored for an extended period, remove the line connection covers and spray a light coating of machine oil on the internals. Replace the covers to prevent foreign matter from entering the valve body. Exposed parts should also be sprayed with a protective film of oil.

A packing list, containing a complete description of the valve and accessories (such as a valve positioner etc.), accompanies each valve when shipped. This list should be checked soon after the shipment has been received.

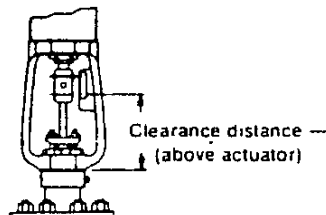
When hoisting the valve, make sure that ropes or cables are of sufficient strength and are positioned so that any tubing or accessories will not be damaged.

Installation

The valve performs best when placed in a straight run of the main line away from pipe bends or sections of abnormal velocity. The valve may be installed in any position provided the correct direction of flow is maintained.

Clearance should be provided above the actuator to permit its removal for servicing, or for inspection of the pull-stem-top-open plug.

Clearance determination for servicing valve in line



By-Pass: The conventional three valve by-pass should be installed if it is necessary to continue operation during periods of control valve servicing.

Connections: Pipe threads should be clean and sharp. Use pipe compound on the male threads only.

When making flanged connections, tighten the bolts evenly to avoid placing a strain on the body or cracking a flange.

Instruments: An air supply pressure regulator with filter should be installed in the air line ahead of any valve-mounted instruments. Mounted positioners are piped and adjusted at the factory.

Excessive delay in response occurs when air control instruments are placed more than 100 feet from the valve.

Packing Adjustment:

Standard teflon impregnated asbestos — Tighten packing flange nuts (24) evenly for optimum seal pressure on valve stem and packing box walls. Slightly more than hand tightening is adequate to stop any stem leakage. Over-tightening will restrict stem movement.

See page 7 for other packing materials.

Special bonnets: The special valve bonnets shown on page 5 are designed to protect the stem packing from extremes of line temperature. Radiation fin bonnets dissipate heat and must not be wrapped with any form of insulating material.

Final check: After the valve has been installed, make a final check of the following: (1) Valve travel — vary air supply to the actuator to ascertain that actual travel corresponds with the nameplate indication. (2) Air lines to the actuator — check for leaks. (3) Control instruments/valve action — check to be sure that the combined actions (direct or reverse) of controller, positioner (if any), and valve will provide the desired direction of valve movement, and will ensure the required valve position in the event of air failure.

Under actual operating conditions, pressure drop across the valve may differ from the calculated figure. Diaphragm actuators on single seated valves may require readjustment of the spring in order to provide full valve travel and shutoff. See Actuator Instructions Supplement for this procedure.

Maintenance

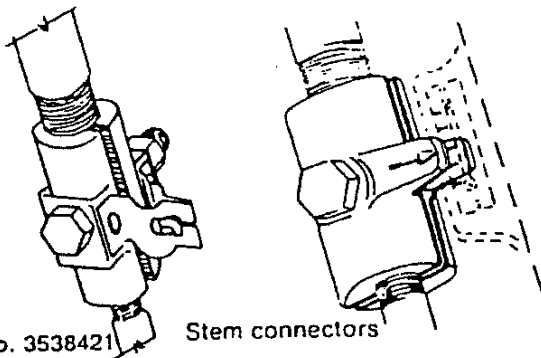
I. General

- A. Maintenance such as diaphragms, packing, or trim replacement can be done without removing the valve from the line.

II. Removal of actuator from body assembly

Note: The valve plug must be off the seat ring while the stem connector is being separated — apply air to the actuator if necessary.

- A. Remove any existing checknut or other attachment from the end of the stem connector cap screw — actuator yoke will pass over the packing flange.
- B. Separating the stem connector
1. Type I — split coupling, joined with travel indicator pointer.
 - a. Unscrew the connector bolt and nut.
 - b. Carefully spread the coupling halves and remove from the actuator stem and valve stem.
 - c. The threads of the split coupling are always properly oriented because they are held in position by the indicator pointer.
 2. Type II — with integral travel indicator fingers
 - a. Unscrew the connector screw and remove the halves of the connector.
 - b. Remove the rubber dust boot from the end of the actuator packing box.



Type I — split coupling
joined by travel
indicator pointer

Type II — with integral
indicator fingers

C. Dismounting the actuator

The actuator is removed from the body as a unit, without disturbing the packing box bolting. Clamp nut and actuator yoke will pass over the packing flange.

1. Disconnect the air supply and/or any electrical connections to the actuator.
2. Unscrew the hammer lug clamp nut (25) from the bonnet threads and lift the nut over the plug stem.

3. Lift or hoist the actuator unit off the valve, taking care to avoid damaging the plug stem, instruments, or tubing.

III. Disassembly of valve body

A. Removing packing

1. Unscrew the packing flange nuts (24), and remove packing flange (15) and packing follower (14).
2. Using a narrow hook or bent wire, remove packing rings.
3. Remove lantern ring (13).
4. Clean packing box thoroughly before replacing. (Packing details on page 7)

B. Complete disassembly

1. Remove the bonnet/body stud nuts (10) and lift the bonnet (2) while holding the plug stem (8) (to prevent the plug from dropping out) carefully off the valve body.

CAUTION: Spline plugs (in the 1" valve only) are seat guided, so that a straight upward pull is required until the plug clears the seat.

2. Withdraw the plug and stem (6 & 8) out of the bonnet.
3. Remove bonnet gasket (4), bonnet back-up gasket (4G), and cage gasket (4J). Lift out valve cage (32) (In the 1" valve only, lift out seat ring (5)). Remove seat gasket (4B).

IV. Assembly of valve body

A. Assembly of plug and stem

Note: Trim is usually renewed as a unit — plug, stem, and cage (and in the 1" size valve, the seat ring).

CAUTION: Each spline plug and seat is a matched set, precision ground to a selective fit. Never install a new seat or plug only. Extreme care should be taken with splines to avoid chipping or breakage.

1. A new plug and stem are pinned together at the factory. If only one of these parts is to be renewed or if either part has been re-machined:
 - a. Screw plug tightly onto stem.
 - b. Drill through plug shank and stem.
 - c. Insert pin. The new pin should be the same diameter as the original pin (19).
2. Completing body assembly.
 1. Clean inside of body thoroughly — particularly the gasket surfaces.
 2. Replace parts in the following order:
 - a. Seat gasket (4B).
 - b. Seat ring (5) (For 1" valve only), and cage (32).
 - c. Cage gasket (4J), bonnet back-up gasket (4G), and bonnet gasket (4).

Note: Before proceeding with step 3, if the plug is seal balanced, install seal ring or rings (20 in the grooves provided on plug. If the seal ring furnished

requires a metal expander ring behind it, extreme care should be exercised so as not to score the plug when installing the rings. Expander ring and seal ring joints should be staggered when installed.

3. Lower the plug carefully through the cage until it rests on the seat.
4. Lower the bonnet over the stem to its position over the gasket. Screw on bonnet/body stud nuts (10) and tighten evenly.
5. Pack the stuffing box (see page 7).

V. Mounting the actuator

Assemble and adjust the actuator as instructed in the appropriate Actuator Instructions.

- A. Lower the actuator over the plug stem and packing flange to seat squarely on the bonnet shoulder.
- B. Rotate the actuator to a convenient position, then screw the hammer lug clamp nut (25) onto the valve bonnet threads and tighten it securely.
- C. Connecting actuator stem to valve plug stem.

The valve plug must be on its seat while the actuator stem is being connected: On pull-stem-to-open valves, the actuator stem must be at its lowest position of travel.

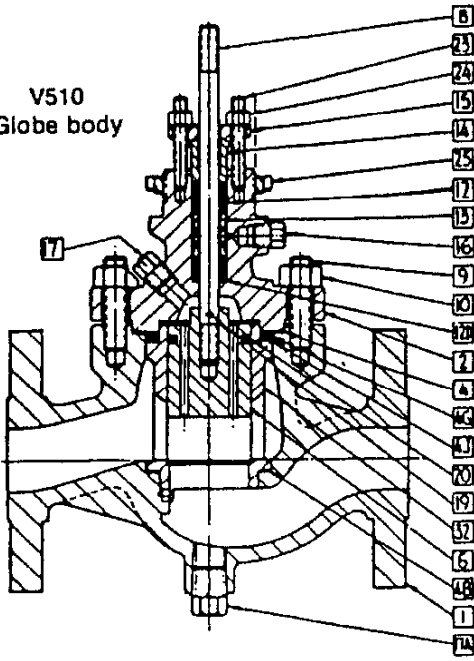
1. Type I stem connector — with separate brass ring travel indicator.
 - a. Place the brass travel indicator (tongue downward) on the actuator stem. Tape the indicator to the actuator stem temporarily while the stem connector is being applied.
 - b. Press the half of the stem connector which is threaded for the connector cap screw against the actuator stem and valve plug stem so that:
 - (1) The ends of the stems are equidistant from the tapped connector screw hole, and
 - (2) The tapped connector screw hole is on the same side of the actuator as the positioner or other accessories which may require attachment to the connector screw.

Note: It may be necessary to move the valve plug off its seat a slight distance in order to mesh the valve

plug stem threads with the lower connector threads.

- c. Apply the other half of the connector, carefully engaging threads, then insert the connector cap screw and tighten it by hand.
 - d. Slide the travel indicator ring over the connector, and back off the connector cap screw enough to permit the slotted tongue of the indicator to slide behind the cap screw head. Position the indicator approximately opposite the "Shut" marking on the travel indicator scale, then retighten the connector cap screw by hand.
2. Type II stem connector — with integral travel indicator fingers.
 - a. Push the dust boot upward on the actuator stem while applying the connector.
 - b. Follow steps (b) and (c) above, for the Type I connector, but note that the indicator fingers of the Type II connector must straddle the indicator scale boss.
- D. Establishing valve travel and plug seating tension
 1. Pull-stem-to-open valves
 - a. Maintain the actuator stem at its lowest position of travel.
 - b. In case the plug was moved off the seat during the stem connection procedure: Prevent the stem connector from rotating, then unscrew the valve plug stem from the connector until the plug is firmly seated.
 - c. Move the plug off the seat, then unscrew the valve plug stem an additional one-half turn out of the connector to ensure positive seating.
 - d. Tighten the connector cap screw securely.
 - e. Seat the valve plug firmly by means of the actuator.
 - f. Adjust the travel indicator scale so that the "Shut" mark is opposite the travel indicator ring (Type I connector), or finger arrows (Type II connector).
 - g. Disconnect the air line used for assembly procedure, then apply the check nut or attachments (if any) to the connector capscrew.

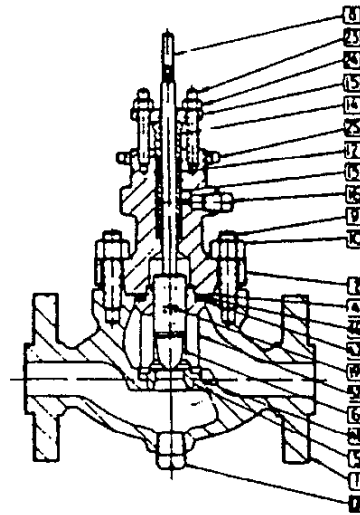
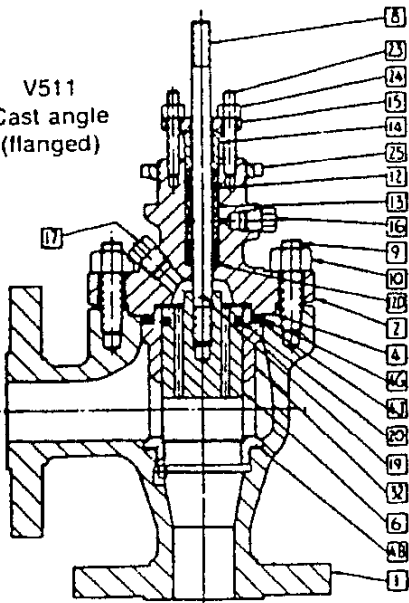
V510
Globe body



Parts List

- 1 Valve body
- 2 Bonnet
- 4 Bonnet gasket
- 4B Seat gasket
- 4G Bonnet back-up gasket
- 4J Cage gasket
- 5 Seat ring
- 6 Valve plug
- 8 Plug stem
- 9 Body stud
- 10 Body stud nut
- 12 Packing ring
- 12D Packing washer
- 13 Lantern ring
- 14 Packing follower
- 15 Packing flange
- 16 Bonnet lubricating plug
- 17 Bonnet flushing conn. plug
- 17A Body drain plug
- 19 Plug stem pin
- 20 Valve plug seal ring
- 23 Packing stud
- 24 Packing nut
- 25 Clamp nut
- 32 Cage

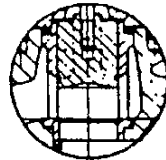
V511
Cast angle
(flanged)



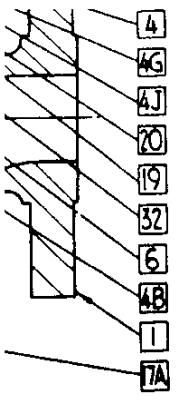
Globe design
(unbalanced)
1/2" to 1"
Cage Guided Plug

Note:
Angle Design
1/2" — 1" internals
are identical.

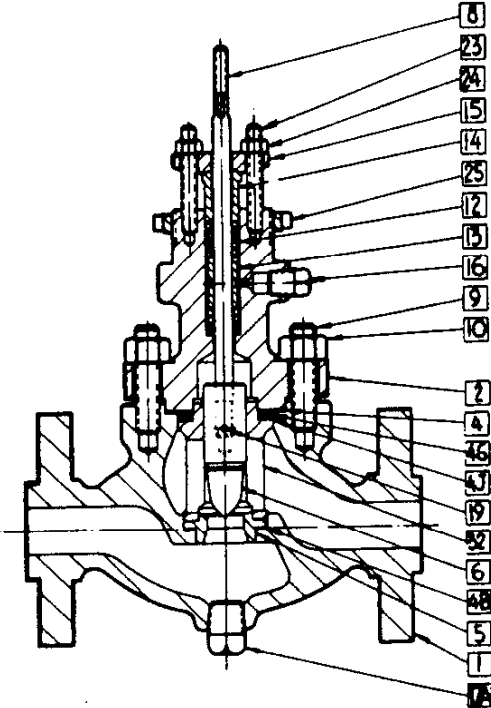
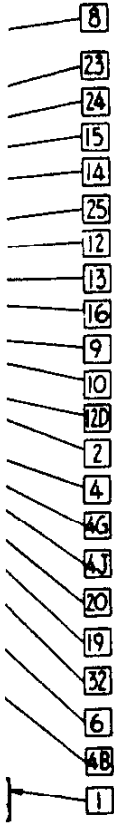
V500
502



Unbalanced trim
1 1/2" — 8"



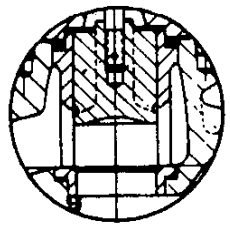
- 14 Packing follower
- 15 Packing flange
- 16 Bonnet lubricating plug
- 17 Bonnet flushing conn. plug
- 17A Body drain plug
- 19 Plug stem pin
- 20 Valve plug seal ring
- 23 Pakcing stud
- 24 Packing nut
- 25 Clamp nut
- 32 Cage



Globe design
(unbalanced)
1/2" to 1"
Cage Guided Plug

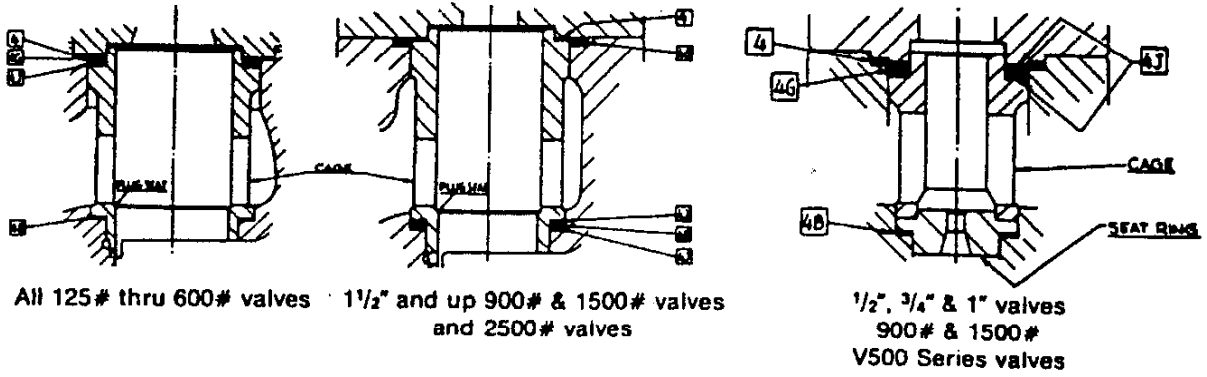
Note:
Angle Design
1/2" — 1" internals
are identical.

V500
502



Unbalanced trim
1 1/2" — 8"

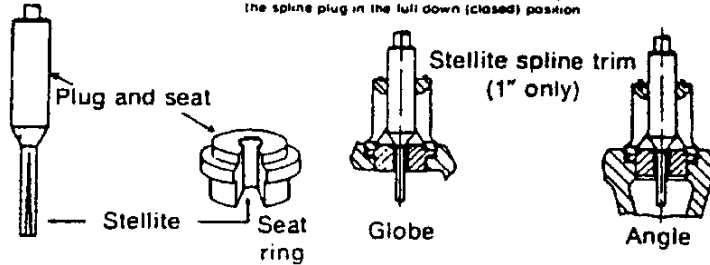
Typical gasketing for V500 series cage trim valves



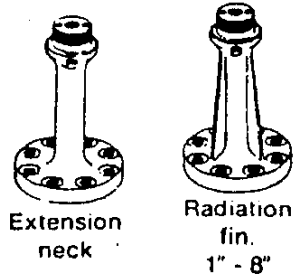
Spline trim

Spline Trim

Spline trim illustrated at left shows the "V" (spline) groove in the valve plug. As the plug is drawn out of the seat ring, more of the "V" is exposed to pass an increasingly greater flow. Section views below illustrate the seat ring as installed in the valve bridge and with the spline plug in the full down (closed) position.



Bonnets



NELES-JAMESBURY

640 LINCOLN ST., WORCESTER, MA. 01615-004, USA

LINEAR CONTROL VALVES

APPLICATIONS MANUAL

DATE:

REV.

BY: *BYG*

DATE 2/92

APR'D. *GPZ*

DATE 2/92

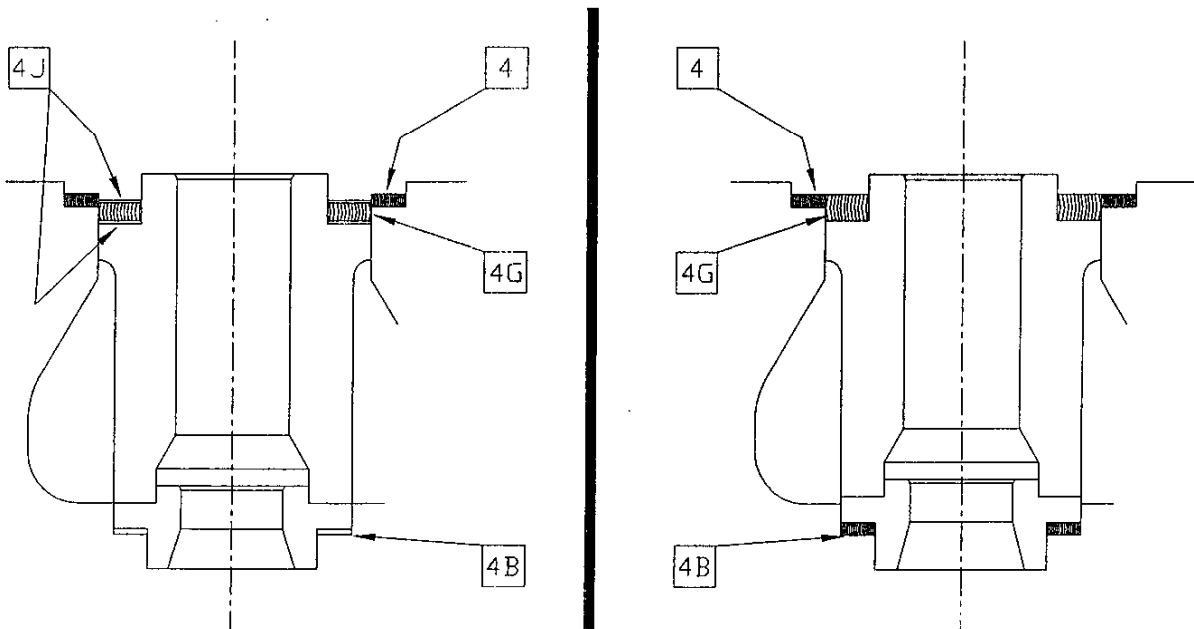
SHEET

1

OF

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1/2"-1" CLASS 900/1500-V510 SERIES GASKET ARRANGEMENT CHANGE FROM \longrightarrow TO



ITEM	PART NAME	PART NO.
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4	BONNET GASKET	6176390
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4G	BONNET BACK-UP GASKET	6176341
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4J	CAGE GASKET	6145387
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4B	SEAT GASKET	6145957
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ITEM	PART NAME	PART NO.
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4	BONNET GASKET	6176390
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4G	BONNET BACK-UP GASKET	6407827
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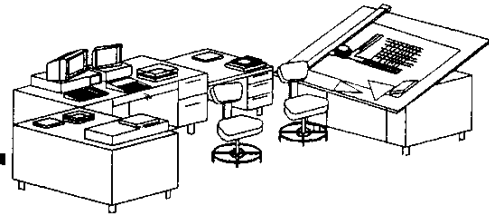
4B	SEAT GASKET	6394753
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HAMMEL DAHL, INC.

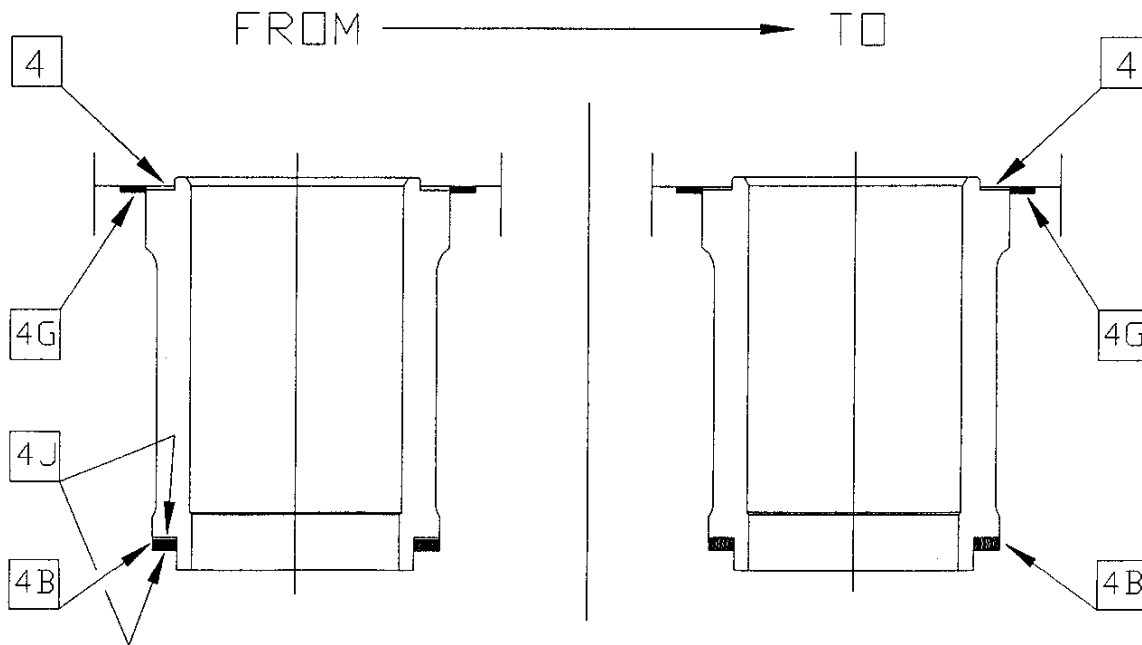
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ENGINEERING



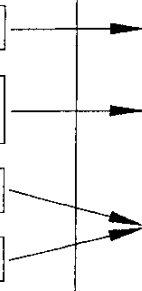
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1.50" - CLASS 900 / 1500 - V510 SERIES
GASKET ARRANGEMENT CHANGE



ITEM	PART NAME	PART NO.
4	BONNET GASKET	6145445
4G	BONNET BACK-UP GASKET	6176408
4B	SEAT GASKET	6176507
4J	CAGE GASKET	6145452

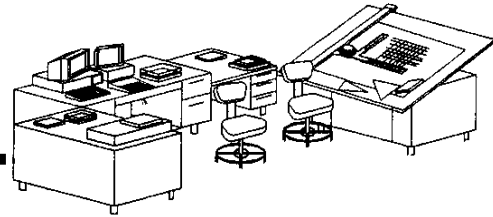
ITEM	PART NAME	PART NO.
4	BONNET GASKET	6145445
4G	BONNET BACK-UP GASKET	6176408
4B	SEAT GASKET	6406095



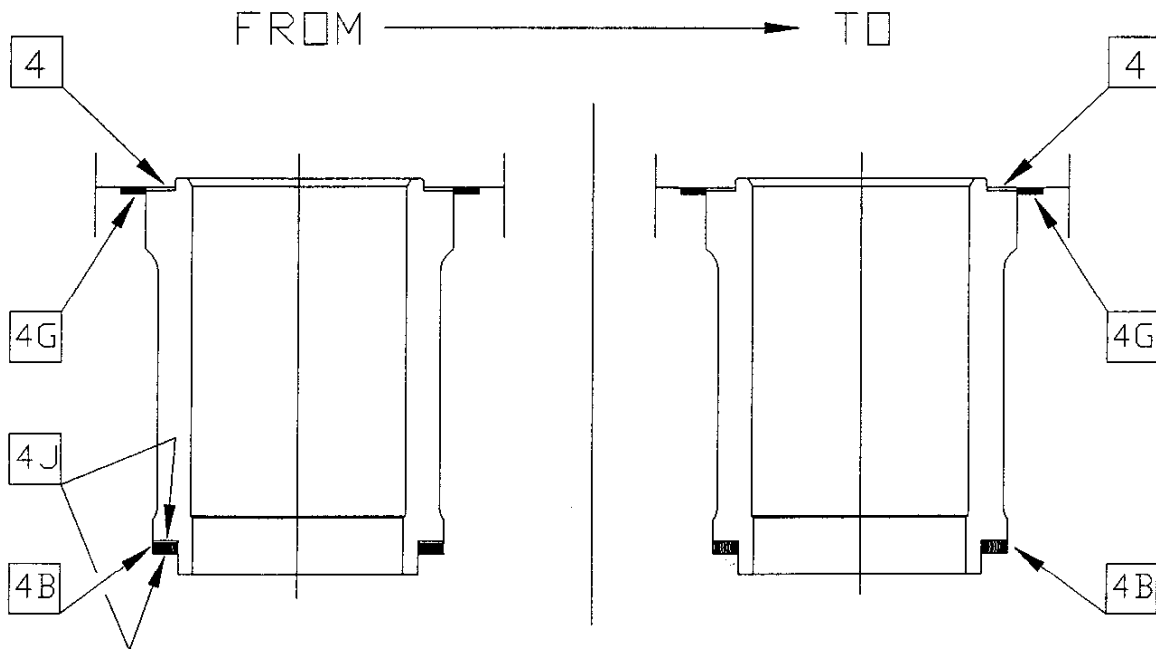
HAMMEL DAHL, INC.

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ENGINEERING



2.00" - CLASS 900 / 1500 - V510 SERIES
GASKET ARRANGEMENT CHANGE



ITEM	PART NAME	PART NO.
4	BONNET GASKET	6188734
4G	BONNET BACK-UP GASKET	6176416
4B	SEAT GASKET	6176515
4J	CAGE GASKET	6188692

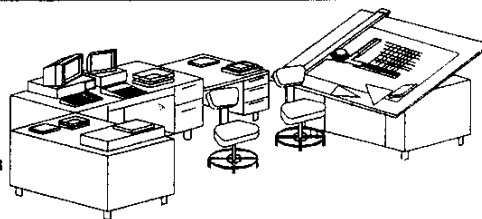
ITEM	PART NAME	PART NO.
4	BONNET GASKET	6188734
4G	BONNET BACK-UP GASKET	6176416
4B	SEAT GASKET	6406096

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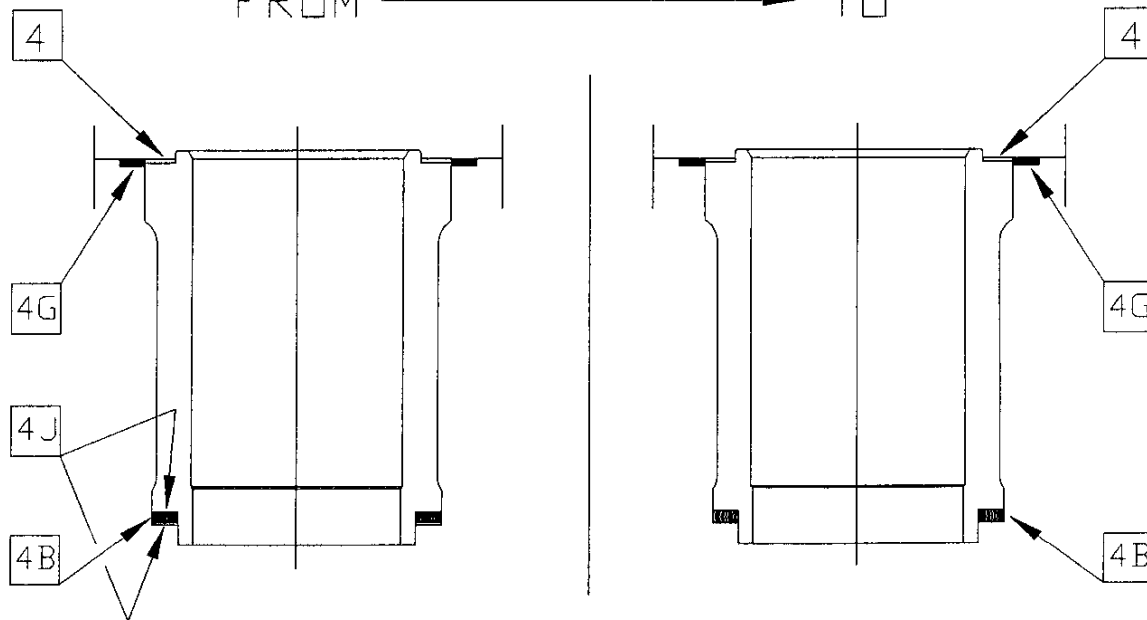
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3.00" - CLASS 900 / 1500 - V510 SERIES
GASKET ARRANGEMENT CHANGE

FROM → TO



ITEM	PART NAME	PART NO.
4	BONNET GASKET	6188718
4G	BONNET BACK-UP GASKET	6176424
4B	SEAT GASKET	6176523
4J	CAGE GASKET	6188726

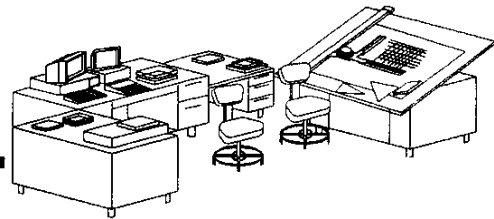
ITEM	PART NAME	PART NO.
4	BONNET GASKET	6188718
4G	BONNET BACK-UP GASKET	6176424
4B	SEAT GASKET	6406097

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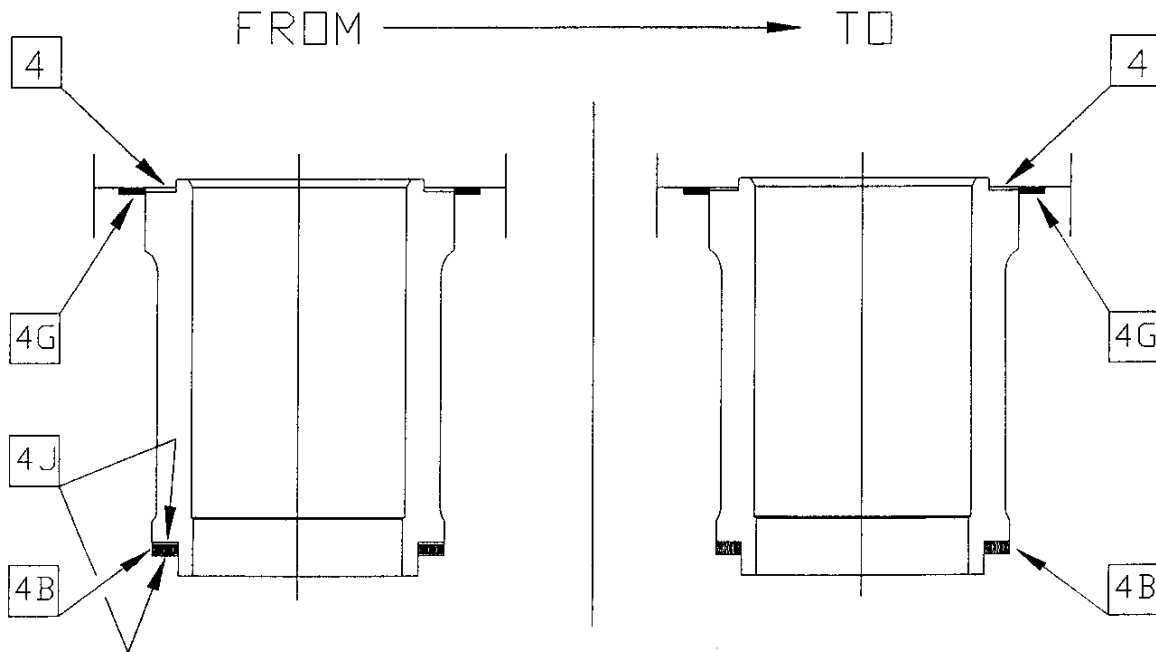
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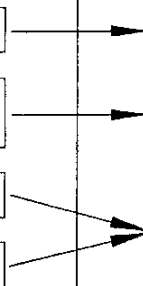
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4.00" - CLASS 900 / 1500 - V510 SERIES
GASKET ARRANGEMENT CHANGE



ITEM	PART NAME	PART NO.
4	BONNET GASKET	6188742
4G	BONNET BACK-UP GASKET	6176432
4B	SEAT GASKET	6176531
4J	CAGE GASKET	6188700

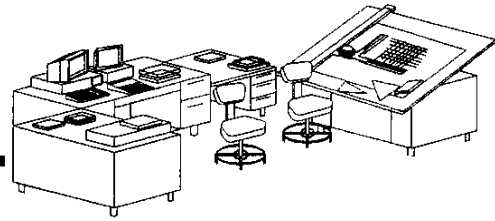
ITEM	PART NAME	PART NO.
4	BONNET GASKET	6188742
4G	BONNET BACK-UP GASKET	6176432
4B	SEAT GASKET	6406098



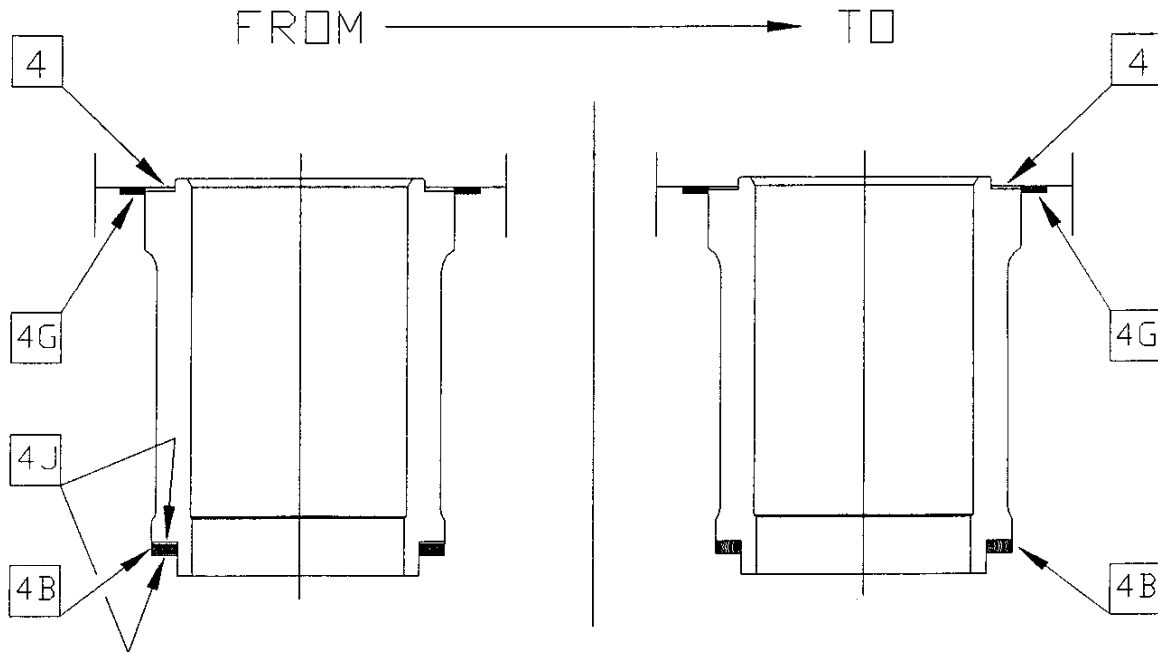
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6.00" - CLASS 900 / 1500 - V510 SERIES
GASKET ARRANGEMENT CHANGE



ITEM	PART NAME	PART NO.
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4	BONNET GASKET	6188759
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4G	BONNET BACK-UP GASKET	6176440
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4B	SEAT GASKET	6176549
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4J	CAGE GASKET	6145460
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ITEM	PART NAME	PART NO.
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4	BONNET GASKET	6188759
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4G	BONNET BACK-UP GASKET	6176440
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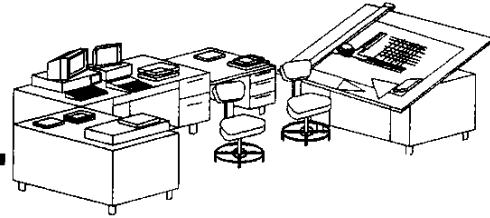
4B	SEAT GASKET	6406099
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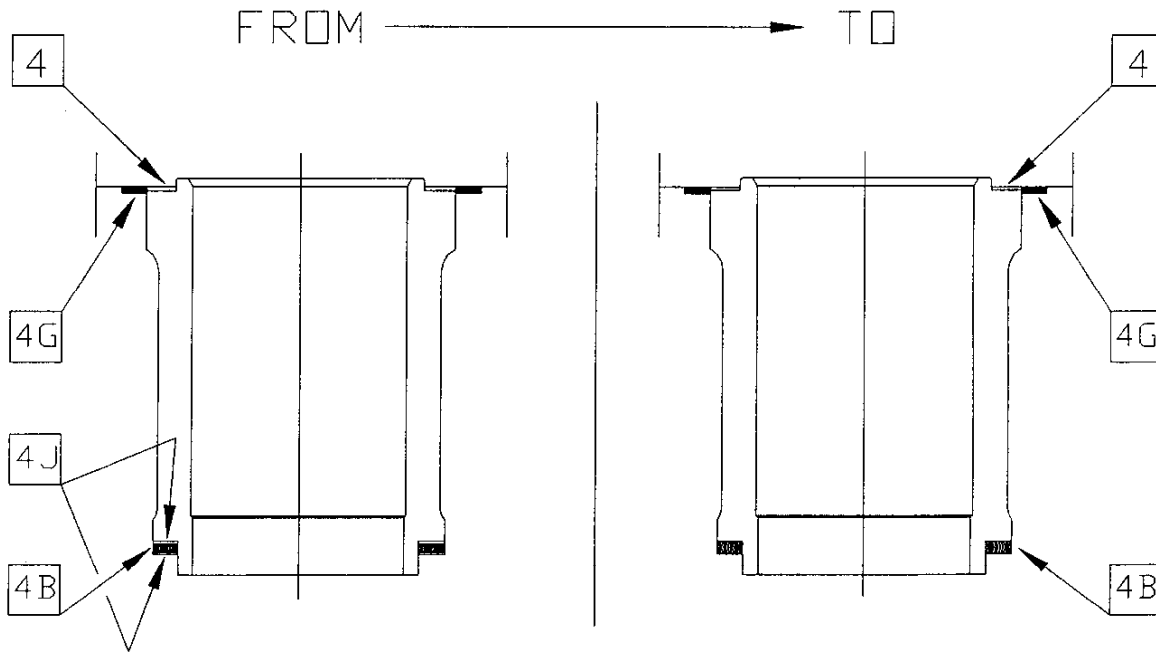
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8.00" - CLASS 900 / 1500 - V510 SERIES
GASKET ARRANGEMENT CHANGE



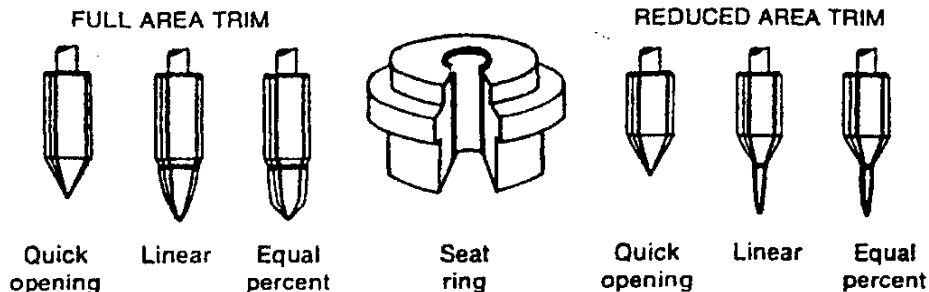
ITEM	PART NAME	PART NO.
4	BONNET GASKET	6145569
4G	BONNET BACK-UP GASKET	6090229
4B	SEAT GASKET	6090237
4J	CAGE GASKET	6145577

ITEM	PART NAME	PART NO.
4	BONNET GASKET	6145569
4G	BONNET BACK-UP GASKET	6090229
4B	SEAT GASKET	6406100

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Contoured Trim Identification

Spline Trim illustrated on page 5. Never lap Spline Trim



Contoured Trim Lapping Instructions

(1" Valve Only)

I. General

- A. Assembly of the valve for lapping (as outlined below) establishes the exact areas of plug and seat surface which will make contact when the valve is closed. The lapping operation then ensures minimum leakage by creating an extremely smooth, uniform contact between these seating surface areas.

CAUTION: Never lap a spline plug and seat ring.

- B. Lapping can correct shallow scratches or slight roughness only. Excessive lapping produces a groove in the plug, therefore plugs or seats having relatively deep scratches must be remachined.

CAUTION: Never lap a spline plug and seat ring.

II. Machining of trim

- A. Plugs or seats having a hard facing such as Stellite can be remachined before being lapped, but care should be taken to leave sufficient hard facing material intact.

III. Lapping

A. General

1. Grinding compound should be grade "A" or finer.
2. Apply grinding compound to the seating surface of the seat ring only. Compound on the characterized portion of the plug could increase the clearance between plug and seat, thus changing the flow characteristic and rangeability of the valve.
3. A film of light machine oil on the valve plug stem will facilitate stem movement during the lapping procedure.
4. Thoroughly clean the seat ring and the plug before and after lapping.

B. Fabricating the lapping tool

1. A "T" handle for the valve plug stem can be made by welding a nut (with threading to match the plug stem threads) to the center of a rod.

C. Assembling the valve for lapping

1. Assemble seat ring, cage, and gaskets into body as described in Maintenance, Section IV, paragraph A.
2. Carefully insert the valve plug and stem assembly (6 & 8) into the bonnet (2) from the bottom. Avoid damaging the stem threads or the walls of the guide bushing (18).
3. Position the bonnet and the plug assembly on the body and install and tighten two or three body stud nuts (10) to secure the bonnet during lapping.
4. Install temporary packing so that the valve plug stem will be aligned during the lapping operation. Any rope packing may be used for this purpose.
5. Screw a lock nut onto the valve plug stem, then screw the lapping tool onto the stem and lock it in position.

D. Lapping procedure

1. Lap with short, oscillating strokes. The weight of the plug, stem, and lapping tool provides ample pressure for lapping — do not bear down.
2. Raise the plug occasionally, lower it to another position and resume the oscillating strokes. This ensures an even lap over the entire seating surfaces of plug and seat.
3. Approximately 5 to 10 minutes lapping time, with grade A compound, is usually required to obtain a satisfactory fit between a new plug and seat.
4. Clean the plug and seat, then, holding the plug on the seat by hand, apply compressed air to the inlet side of the valve to check the tightness of the lapped parts. Repeat the lapping procedure if necessary.
5. Disassemble the valve and clean all parts thoroughly. Remove all traces of grinding compound. Remove the temporary packing and clean the packing box.

Packing Instructions

Before proceeding with the appropriate packing operation below, clean the valve packing box thoroughly and assemble the valve body as per Maintenance Section IV. Teflon or Mica packings normally do not require periodic lubrication.

CAUTION: All packings without spring loading —

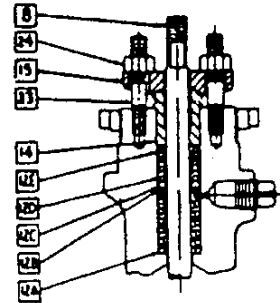
Finger tightening of the packing flange nuts (24) should provide ample sealing pressure to the packing rings. When the valve is placed in service this adjustment should be checked, and the nuts tightened just enough to prevent any leakage. Excessive tightening will bind the valve stem and prevent sensitive response.

Spring-loaded Teflon V-rings

1. Lubricate the five teflon rings lightly with silicone lubricant for ease in assembly (one male adapter, one female adapter, and three chevron rings).
2. Slide the compression spring (12A) over the valve plug stem to the bottom of the packing box.
3. Drop the packing washer (12B) over the stem to rest on the packing spring.
4. Place the teflon male adapter (12C) flat side down, against the packing washer (12B), then fit the three chevron rings (12D) into the packing box, with grooved sides down. Seat the female adapter (12E), flat side up, on the topmost chevron ring.

Note: Avoid damage to the teflon rings when slipping them over the stem threads, and be sure each ring is pushed firmly into the packing box.

5. Slide the packing follower (14) over the stem to rest on the female adapter.
6. Place the packing flange (15), flat side up, over the stem and flange studs (8 & 23) to rest on the



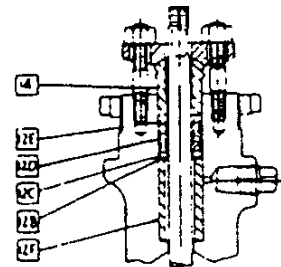
- packing follower.
7. Screw the packing flange nuts (24) onto the studs and tighten them evenly until the packing follower shoulder contacts the top of the bonnet. No further packing adjustment is required because packing spring compression maintains the proper sealing pressure on the chevron rings.

Teflon V-rings

1. Lubricate the five teflon rings lightly with silicone lubricant for ease in assembly (one male adapter, one female adapter, and three chevron rings).
2. Slide the packing spacer (12F) over the valve plug stem to the bottom of the packing box.
3. Drop the packing washer (12B) over the stem to rest on the spacer.
4. Place the teflon male adapter (12C) flat side down, against the packing washer (12B), then fit the three chevron rings (12D) into the packing box, with grooved sides down. Seat the female adapter (12E), flat side up, on the topmost chevron ring.

Note: Avoid damage to the teflon rings when slipping them over the stem threads, and be sure each ring is pushed firmly into the packing box.

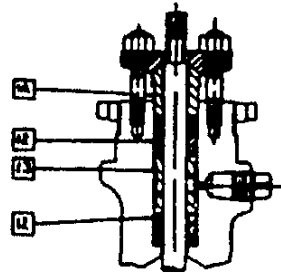
5. Slide the packing follower (14) over the stem to rest on the female adapter.



6. Place the packing flange (15), flat side up, over the stem and flange studs (8 & 23) to rest on the packing follower.
7. Screw the packing flange nuts (24) onto the studs and tighten them evenly to avoid cocking the flange (15). Finger tightening is sufficient.

Teflon or Mica Impregnated Asbestos

1. For the purpose of assembly only, lubricate the seven packing rings (12) lightly with silicone lubricant.
2. Slide three packing rings over the valve plug stem to the bottom of the packing box.
3. Place the lantern ring (13) on top of the packing. Check to be sure that the channel in the lantern ring is opposite the lubricator hole in the valve bonnet.
4. Insert the remaining four packing rings above lantern ring (13).
5. Slide the packing follower (14) over the stem and guide it into the packing box at least $\frac{1}{8}$ ".
6. Place the packing flange (15), flat side up, over the stem and flange studs (8 & 23) to rest on the



7. Screw the packing flange nuts (24) onto the studs and tighten them evenly to avoid cocking the flange (15). Finger tightening is sufficient.

Neles-Jamesbury, Inc.

640 Lincoln Street
Box 15004

Worcester, Massachusetts 01615-0004, U.S.A.

NELES-JAMESBURY

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Phone: (508) 852-0200

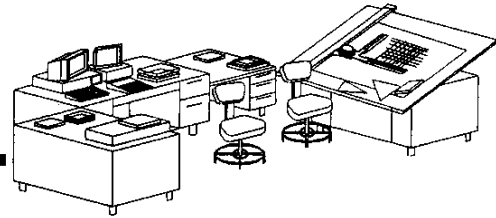
Telex: 92-0448

Fax: (508) 852-8172

HAMMEL DAHL, INC.

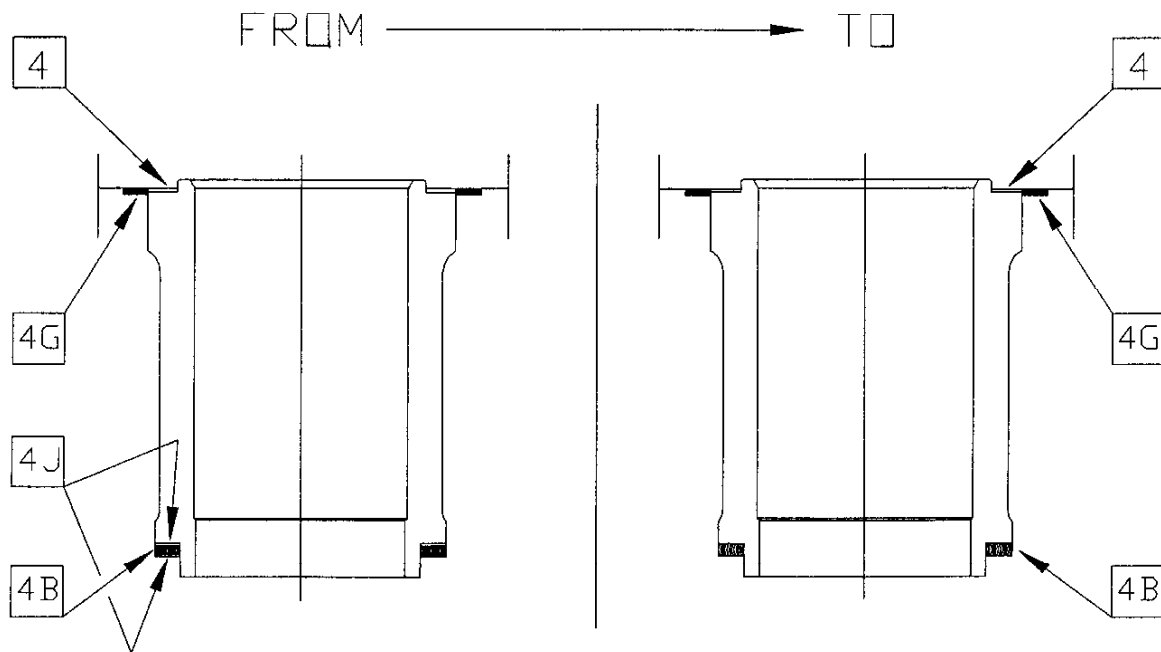
A NELES—JAMESBURY COMPANY

NOTES: From the Desk of
ENGINEERING



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1.00" - CLASS 2500 - V520 SERIES GASKET ARRANGEMENT CHANGE



ITEM	PART NAME	PART NO.
4	BONNET GASKET	6145486
4G	BONNET BACK-UP GASKET	6176457
4B	SEAT GASKET	6176556
4J	CAGE GASKET	6145494

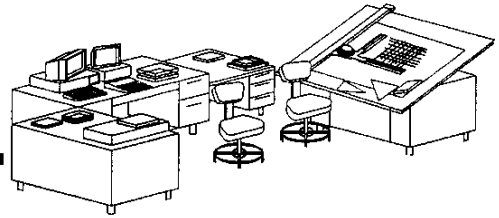
ITEM	PART NAME	PART NO.
4	BONNET GASKET	6145486
4G	BONNET BACK-UP GASKET	6176457
4B	SEAT GASKET	6406121



HAMMEL DAHL, INC.

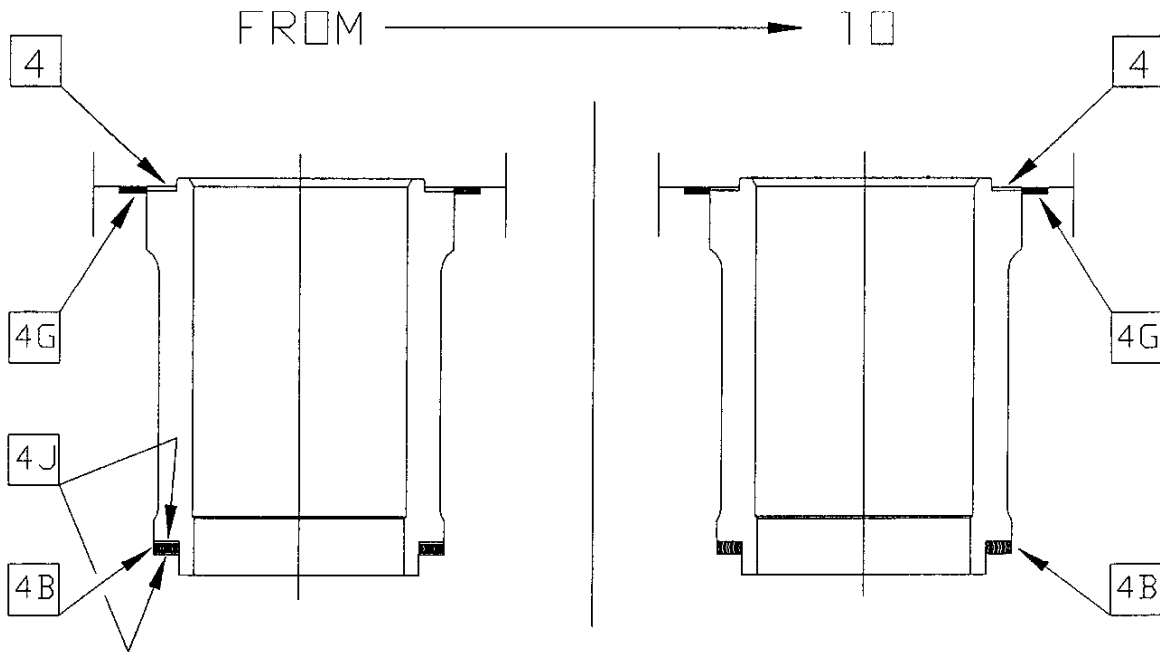
A NELES—JAMESBURY COMPANY

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1.50" - CLASS 2500 - V520 SERIES
GASKET ARRANGEMENT CHANGE



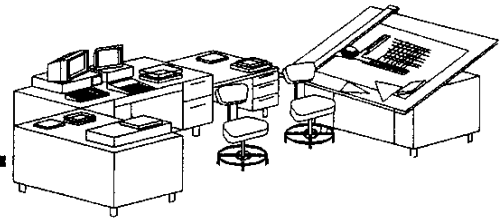
ITEM	PART NAME	PART NO.
4	BONNET GASKET	6145510
4G	BONNET BACK-UP GASKET	6176465
4B	SEAT GASKET	6176564
4J	CAGE GASKET	6145528

ITEM	PART NAME	PART NO.
4	BONNET GASKET	6145510
4G	BONNET BACK-UP GASKET	6176465
4B	SEAT GASKET	6406122

HAMMEL DAHL, INC.

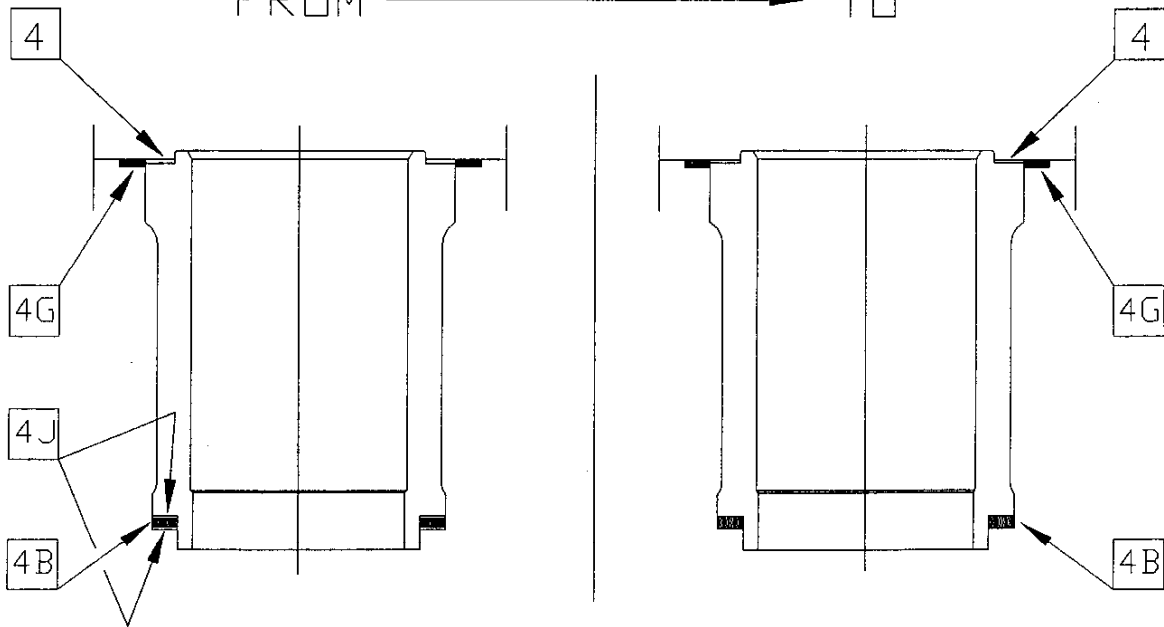
A NELES—JAMESBURY COMPANY

NOTES: From the Desk of
ENGINEERING



2.00" - CLASS 2500 - V520 SERIES
GASKET ARRANGEMENT CHANGE

FROM → TO



ITEM	PART NAME	PART NO.
4	BONNET GASKET	6145478
4G	BONNET BACK-UP GASKET	6190128
4B	SEAT GASKET	6176580
4J	CAGE GASKET	6145650

ITEM	PART NAME	PART NO.
4	BONNET GASKET	6145478
4G	BONNET BACK-UP GASKET	6190128
4B	SEAT GASKET	6406123

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