

EN

Gravity-discharge Commode
Operation manual



Dometic®
4410N Commode

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Test procedure after installation or service

1. Initial check should be performed once commode is installed, with water and electrical services turned off, and ship’s wiring connector at **J1** on the Control Module disconnected:

a. Check that commode is installed securely.

b. Check that cable connecting Control Module (at **J2**) is connected to the commode.

c. Check that the control box (with Flush Switch) is fastened securely, and is not located below any past or present leaky pipe connections.
2. Turn on external water supply to commode:

a. Check for water leaks at all connections from ship’s piping to water valve, and water valve to commode bowl inlet. If a visual check is not possible, check fittings with dry hands or tissue paper.

b. Confirm no water is entering bowl through rim at this time.

c. Attach ship’s wiring connector to Control Module **J1** . Turn on external 115VAC electrical supply to commode.
-
-
- Caution!**
115VAC is now present inside the Control Module.
- 2

- d. Verify power is supplied.
Open Control Module and confirm green LED light is lit above right side (DC output) terminals (shown at right).
Close Control Module when verified.



3. Check basic commode and flush switch operation:

- a. Push “Add Water” side of rocker switch (**1** at top) for about 5 seconds, and confirm water enters bowl. Release switch and water should enter for only a few seconds after flush switch is released.
- b. Push “Flush” side of switch (**2** at bottom) for 2 seconds. The following stages of the flush cycle should occur automatically:
 - i. water valve actuates (opens),
 - ii. water enters bowl,
 - iii. white flush ball opens quickly,
 - iv. white flush ball slowly closes,
 - v. water valve actuates (closes),
 - vi. water will enter the bowl for a few more seconds, then stop.
- c. Repeat steps 3a and 3b five times.

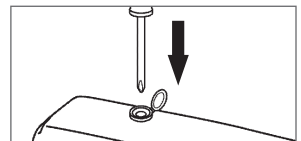


4. Check for proper flush ball seal operation:

- a. With some water in the bowl, disconnect power to commode by pulling **J1** connector at bottom left of Control Module.
- b. With a colored marker, mark the edge of the water line in the bowl.
- c. 4 hours later, the waterline should not have moved noticeably lower.

5. Check for manual opening of the flush ball (requires **J1** to be disconnected):

- a. Open the small round white plastic cap located on the upper back of the commode. Push a #2 Philips screwdriver or similar diameter blunt tool down onto the black shaft to open the flush ball.
 - i. Without power, flush ball should remain open.
- b. Re-install connector at **J1** (lower left-side of Control Module)
 - i. Flush ball should now close.



Test procedure before normal operation

1. Water line integrity:

- Check for water leaks at all connections from ship's piping to water valve, and water valve to commode bowl inlet. If a visual check is not possible, check all fittings with dry hands or a tissue paper.
- Confirm no water is entering bowl through rim without Add Water or Flush functions being activated through switch.

2. Check basic operation:

- Push "Add Water" side of rocker switch (**1** at top) for about 5 seconds, and confirm water enters bowl. Release switch and water should enter for only a few seconds after flush switch is released.
- Push "Flush" side of switch (**2** at bottom) for 2 seconds. The following stages of the flush cycle should occur automatically:
 - water valve actuates (opens),
 - water enters bowl,
 - white flush ball opens quickly,
 - white flush ball slowly closes,
 - water valve actuates (closes),
 - water will enter the bowl for a few more seconds, then stop.
- Repeat steps 3a and 3b five times.



3. Check for proper flush ball seal operation:

- With some water in the bowl, disconnect power to commode by pulling **J1** connector (see photo, p.2) at bottom left of Control Module.
- With a colored marker, mark the edge of the water line in the bowl.
- 4 hours later, the waterline should not have moved noticeably lower.

Maintenance

The only regular maintenance required is to ensure the flush ball seal is sealing properly. The normal function of this seal both 1) allows the bowl to retain water, and 2) keeps odors from the drain pipe from coming up past the seal.

Over time, the buildup of deposits on the flush ball rubber seal can cause water to slowly leak past the seal and drain the bowl between uses of the commode. In most cases the seal can be cleaned – or if necessary, replaced – to address this. Please refer to **Troubleshooting** section for more information.

Troubleshooting

Problem	Possible Cause	Service Instruction
1. Toilet does not operate (neither Add Water or Flush functions work).	a. Electrical power not supplied to toilet. b. Blown fuse in Control Module. c. Electrical failure in Control Module.	a. Remove ship's wiring connector from J1 and verify 115VAC is present at terminals A and B on same connector. b. Open Control Module and check the two fuses inside the fuse holders. If fuses are OK, re-assemble fuse holders and reinstall connector to J1. c. Check "Power On" LED on AC/DC converter. If not lit, check electrical connections, or replace power supply.
2. Bowl does not hold water; water drains out of bowl past seal between flushes, possibly emitting odors back up from piping.	a. Debris or mineral buildup on underside of flush ball seal, or on flush ball, preventing proper seal operation.	a. Clean flush ball seal and the flush ball. .

Seal Cleaning Recommendations

- Use a soft bristle brush and mild cleansers to gently clean both 1) the underside of the blue-gray flush ball seal where it contacts the white flush ball, and 2) the surface of the white flush ball.
- Avoid scratching the flush ball surface, or using abrasive cleansers directly on the flush ball or flush ball seal.



Caution
To avoid damaging the toilet system's seals and valves, do not clean toilet with abrasive cleaners, caustic chemicals, or lubricants and cleaners that contain alcohols or petroleum distillates.

If abrasive cleansers are necessary to clean the inside surface of the bowl, ensure they are completely rinsed out before using the commode to prevent seal damage. Harsh cleansers will not damage the commode, but may accelerate the wear of the flush ball seal coating, necessitating sooner replacement.

If cleaning the flush ball seal does not solve the issue, replace the seal (see next section - **Service**)

Problem	Possible Cause	Service Instruction
3. Flush ball closes, but then opens again automatically and continuously or intermittently cycles (open and close).	a. Faulty flush switch. b. Flush mechanism cam switch out of alignment.	a. While commode is still cycling, open Control Module and pull 3 wires from back of flush switch. If problem stops, replace flush switch. b. Adjust cam switch (see Service section, below).

Service

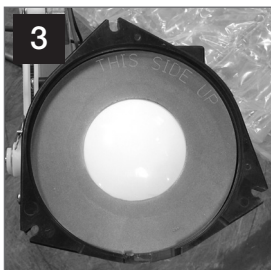
Familiarization with components is recommended before servicing the 4410N commode, using exploded view on page 11.

1. Replacement of Flush Ball Seal or Plug-in Base Assembly

- a. Shut off ship’s water supply at valve near commode.
- b. Push Add Water button for 5 seconds to relieve water pressure.
- c. Push Flush button to drain water from bowl.
- d. Remove connector at J1 on Control Module to disconnect power to commode.
- e. Disconnect commode’s braided water supply line from ship’s water supply.
- f. Remove mounting nuts and washers on lower left and right sides of commode base.
- g. Disconnect commode’s electric cable from ship’s wiring.
- h. Lift commode from platform, cover drain pipe opening in deck, turn commode upside down to gain access to underside components.
- i. Remove base assembly from bowl:
 - 1. Cut tie-wraps to the loop of black wire to water valve to create slack.
 - 2. Loosen nuts on L-Bolts (shown at right) with 7/16-in. deepwell socket, removing them and their washers.
 - 3. Lift base assembly from bowl.
- j. Remove and discard rubber seals (items #9 in exploded view, p. 11).
- k. Clean flush ball with damp cloth and verify there are no deep scratches.



- l. Hook the 3 L-bolts (item #8 in exploded view, p. 11, supplied with seal kit) unthreaded ends into retaining holes in bowl. Use foam retainer included with bolts to retain them upward to facilitate re-installation of base assembly.
- m. On base assembly, place new thin gray seal over ball, positioning “This Side Up” words to face upward (**3** below).
- n. Place thick black rubber seal over thin gray seal. This seal can be placed either side up (**4** below).



- o. While holding 2 seals in place with fingers, flip base assembly and place it back onto ceramic bowl. L-bolts should pass through slots in base assembly.
- p. Install washers and hex nuts onto L-bolts, and tighten L-bolt nuts to no greater than 25 in.-lbs. Tightening beyond this level will not improve sealing and can crack the ceramic, requiring complete replacement of commode.

**Note**

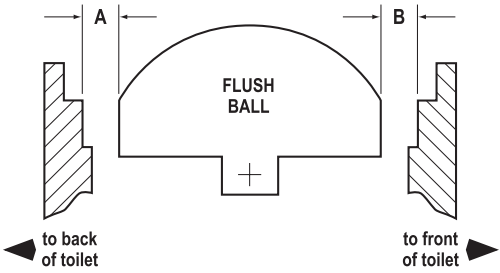
For best re-installation of toilet base to floor flange, spread thin layer of silicone grease inside floor flange.

- q. Remove drain pipe cover (if used in step 8) from floor flange opening. Turn commode right side up and with base centered over floor flange, lower the commode vertically into the floor flange; this will ensure the base's O-ring (item #10) is not pinched.
- r. Re-install the mounting washers then nuts on lower left and right sides of commode base. Finger tighten nuts, then turn with wrench or socket only one half turn further. Install shims if necessary below back of commode to prevent front from lifting up when nuts are tightened.
- s. Connect commode power cable back into ship's wiring cable.
- t. Re-install connector at J1 on Control Module to re-power commode.
- u. Re-connect braided water supply line from commode to ship's water.
- v. Turn water supply back on and test toilet according to Installation Test Procedure (p. 2).

2. Adjustment of Flush Mechanism Cam Switch

Familiarization with components is recommended before servicing the 4410N commode, using exploded view on page 11.

The flush ball should be properly positioned so that the “A” and “B” distances are equal (see illustration at right). If the flush ball becomes misaligned (resulting in water leaking from bowl or other flushing problems), follow instructions below to resolve problem.



REMOVING COMMODE FROM FLOOR

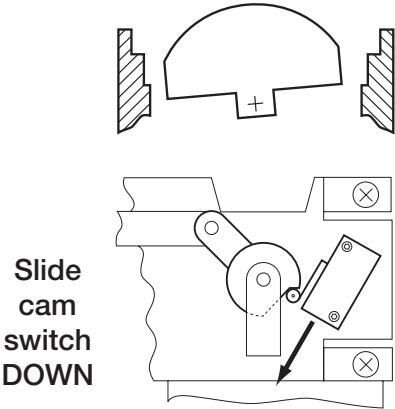
1. Follow **Service** instructions on page 6, **steps a, b, c, e, f, h**, to remove commode from floor and turn it upside down.
2. **MAKE SURE POWER WIRES REMAIN SECURE TO COMMODOE.**

TO CORRECT PROBLEM 3b:

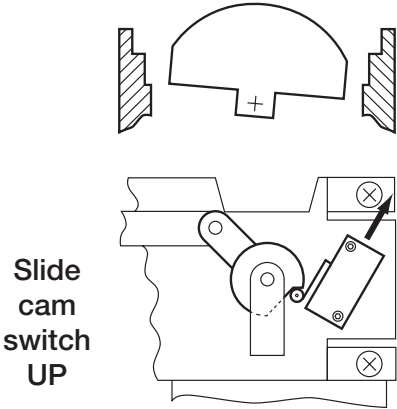
3. Loosen cam switch mounting screws with 3/32-inch hex tool

- and 1/4-inch box-end wrench. Slide cam switch up or down (see illustrations below) depending on flush ball position.
5. Tighten cam switch mounting screws, apply electrical power and check adjustment. Repeat as necessary.
 6. After cam switch and flush ball are properly positioned, reinstall commode.

Over-travel condition

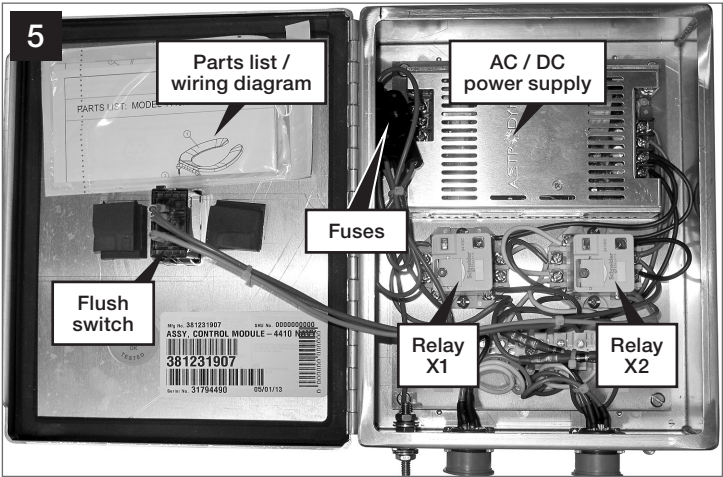


Under-travel condition



Theory of 4410N commode operation

Refer to System Wiring Diagram located inside Control Module, and the below photo **5** for reference in this section.



115VAC is brought in through 2A fuses on both the hot and neutral legs, and is converted to 24VDC through the Power Supply. +24VDC is always available at the Add Water / Flush switch (through its red wire) and also at one side of the cam switch in the commode base assembly. DC ground is always available at the coils of Control Module (CM) relays X1 and X2, and at the flush valve motor.

Water Valve Actuation

The water valve is a fast-acting (~1.6 sec) 24V electric ball valve that closes with normal polarity and opens with reversed polarity. It has built-in limit stop switches. CM relay X2 sends normal polarity to the water valve (+24V through CM blue wire and DC ground through CM white wire) when commode is powered but not being actuated in any way.

When “Add Water” is actuated via the switch, +24V is sent to relay X2’s coil and it is energized, routing DC ground through the CM’s blue wire and +24VDC through the CM’s white wire (reversed from normal). These wires energize the water valve as long as the “Add Water” switch is pressed. Releasing the “Add Water” switch de-energizes relay X2, shutting the water valve.

The “Flush” function of the switch also actuates the above sequence through diodes D1 and D2.

Flush Valve Actuation

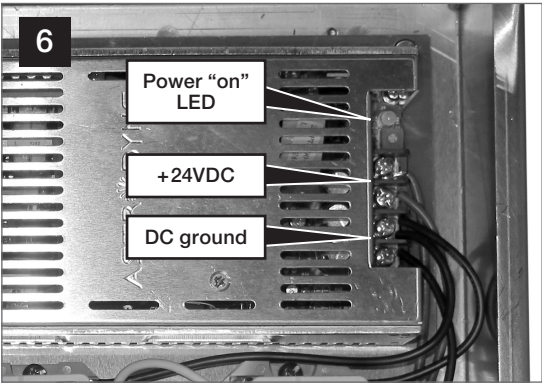
The flush ball valve mechanism is spring-loaded to be fast opening and slow closing, and it uses a small 24V gearmotor through a cam to open and close the flush ball valve. The gearmotor can be actuated either of two ways: 1) when the cam switch is electrically closed (by the flush ball valve being in any position but fully closed), or 2) when the CM's Flush switch is pressed, +24V is applied to the CM's brown wire which routes directly to the gearmotor.

External GATX signal

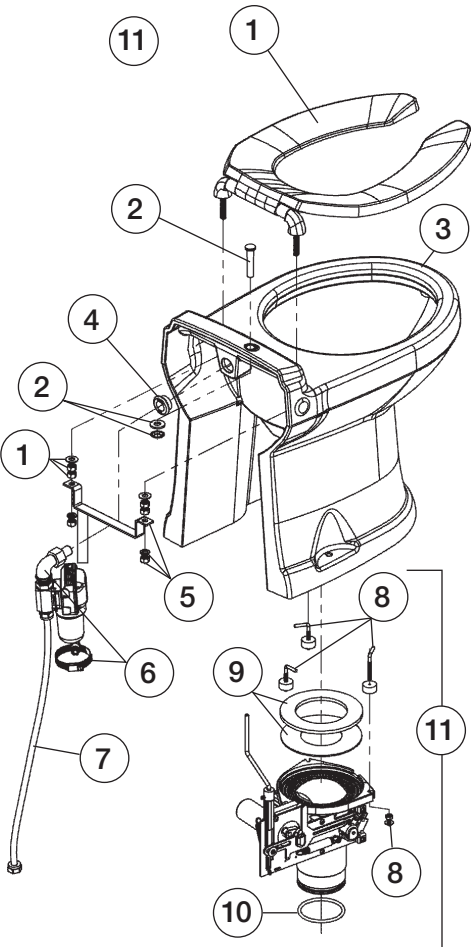
Ship's waste drainage relies on an MT (Macerator-Transfer) pump to move waste through the nearly-horizontal pipe. The MT pump is intended to be actuated whenever flushing occurs. Actuating the CM's Flush switch sends +24V to CM's relay X1 coil, energizing X1. This electrically connects together the CM's yellow and grey wires. This completes a loop which energizes a 115VAC relay in the GATX controller (located elsewhere on the ship) which in turn energizes the MT pump. Therefore, the MT pump can be activated as long as the "Flush" button is pressed.

Operation of Dometic 4410N Commode in case of loss of ship's supply of 115 VAC 60Hz

The commode's electrical components operate on 24VDC, which is produced from an AC-DC converter in the Control Module. In the event of loss of 115VAC 60Hz, any temporary 24VDC 5 amp source can be connected to the 2 positive outputs and 2 ground connections of the AC-DC converter to allow complete operation of the commode. See below figure **6** :



4410N Commode exploded view and parts list



item	Part Number / Description
1	385311953 / seat, black
2	385311733 / manual override guide
3	385311730 / toilet bowl kit, white
4	385311164 / 1/2 in. sealing grommet
5	385311955 / mounting bracket and hardware for water valve
6	385311954 / water valve with mounting clamp
7	385311956 / water supply hose
8	385311011 / base-to-bowl installation hardware
9	385311009 / flush ball seal replacement kit – includes item 8
10	385311294 / base O-ring replacement kit
11	385311957 / 4410N plug-in base kit – includes items 8, 9, 10
NS	385311958 / power supply replacement kit – includes installation hardware
NS	385311959 / replacement relay 24V coil (control module) – kit includes 2 relays
NS	385311961 – 4410N flush switch (control module)
NS	385311960 / 4410N control module (complete) – includes all NOT SHOWN (NS) items

Refer to complete parts list (packed separately) for additional information.

Manufacturer's One-Year Limited Warranty

Dometic Corporation warrants, to the original purchaser only, that this toilet is free from defects in material and workmanship for a period of one (1) year from the date of installation.

Dometic reserves the right to replace or repair any part of this product that proves, upon inspection by Dometic, to be defective in material or workmanship. All labor and transportation costs or charges incidental to warranty service are to be borne by the purchaser-user.

EXCLUSIONS

IN NO EVENT SHALL DOMETIC BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, FOR DAMAGES RESULTING FROM IMPROPER INSTALLATION, OR FOR DAMAGES CAUSED BY NEGLIGENCE, ABUSE, ALTERATION, OR USE OF UNAUTHORIZED COMPONENTS. ALL IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, ARE LIMITED TO A PERIOD OF ONE (1) YEAR FROM DATE OF INSTALLATION.

IMPLIED WARRANTIES

No person is authorized to change, add to, or create any warranty or obligation other than that set forth herein.

Implied warranties, including those of merchantability and fitness for a particular purpose, are limited to one (1) year from the date of installation.

To obtain warranty service, contact Dometic Corp., Sanitation Div. at 1-800-321-9886.

Customer service

Questions about technical details, operation, replacement parts, or servicing may be directed to:

Dometic Corporation
Sanitation Division
13128 State Route 226
Big Prairie, OH 44611

Phone: 330-439-5550
Toll free: 1-800-321-9886

Customer Service hours:
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