CKD

SM-9902-A

INSTRUCTION MANUAL

Automatic drain

DT3000

DT3010

DT4000

DT4010

- Please read this instruction manual carefully before using this product, particularly the section describing safety.
- Retain this instruction manual with the product for further consultation whenever necessary.

Ver. 3

CKD Corporation

Safety precautions

When designing and manufacturing a device using CKD products, the manufacturer is obligated to manufacture a safe product by confirming safety of the system comprising the following items:

■Device mechanism

■Pneumatic or water control circuit

■Electric control that controls the above

It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

⚠WARNING

1. This product is designed and manufactured as a general industrial machine part
   It must be handled by someone having sufficient knowledge and experience.

2. Use this product within its specifications.
   Consult with CKD for details when using the product beyond the unique specification range, outdoors, or in the following conditions or environment: Additionally, the product must not be modified or machined.
   ① Use for special applications requiring safety including nuclear energy, railroad, aviation, ship, vehicle, medical equipment, equipment or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.
   ② Use for applications where life or assets could be adversely affected, and special safety measures are required.

3. Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.
   ISO4414, JIS B 8370 (pneumatic system rules)
   JFPS2008(principles for pneumatic cylinder selection and use)
   Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, body standards and regulations, etc.

4. Do not handle, pipe, or remove devices before confirming safety.
   ① Inspect and service the machine and devices after confirming safety of the entire system related to this product.
   ② Note that there may be hot or charged sections even after operation is stopped.
   ③ When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Discharge any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.
   ④When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

5. Observe warnings and cautions on the pages below to prevent accidents.

■The safety cautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

⚠ DANGER	: When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.
⚠ WARNING	: When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.
⚠ CAUTION	: When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation. In any case, important information that must be observed is explained.

Precautions with regard to guarantee

● Guarantee period
The guarantee period of our product shall be one (1) year after it is delivered to the place specified by the customer.

● Guarantee coverage
If any failure for which CKD CORPORATION is recognized to be responsible occurs within the above warranty period, a substitute or necessary replacement parts shall be provided free of charge, or the product shall be repaired free of charge at the plant of CKD CORPORATION.

However, the guarantee excludes following cases:
① Defects resulting from operation under conditions beyond those stated in the catalogue or specifications.
② Failure resulting from malfunction of the equipment and/or machine manufactured by other companies.
③ Failure resulting from wrong use of the product.
④ Failure resulting from modification or repairing that CKD CORPORATION is not involved in.
Failure resulting from causes that could not be foreseen by the technology available at the time of delivery.
⑥ Failure resulting from disaster that CKD is not responsible of.

Guarantee stated here covers only the delivered products. Any other damage resulting from failure of the delivered products is not covered by this guarantee.

● Confirmation of product compatibility
Our customer shall be responsible of confirming compatibility of our product used in our customer's system, machinery or device.

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Automatic drain
DT Series

1. Unpacking

⚠ WARNING	To prevent foreign matter from entering the product, unpack the product just before piping starts.

(1) Make sure that the model number indicated on the product matches with what you have ordered.

(2) Check the exterior of the product for damage.

2. Installation

2.1 Installation Environment

⚠ CAUTION	a) Plastic bowl These parts are made of polycarbonate, and cannot be used in environments containing synthetic oil, organic solvents, chemicals, coolant, screw locking agent, leak detection solutions, or hot water, etc., or where these substances may come in contact with them.Refer to page 5 for details on bowl chemical resistance.

⚠ WARNING	a) Avoid installing this product where it is subject to ultraviolet rays. b) Prevent installation where the product is exposed to a direct sunlight. c) Avoid installation at places where there is excessive vibration or impact. e) For compressor circuit of water lubrication method Take measures to prevent chlorine-based substances from entering the compressed air.

(1)Avoid using this product under the following conditions.

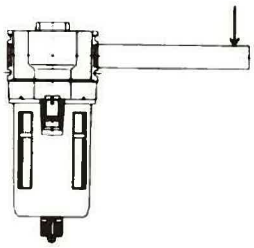
- Avoid using the product outside the range of 5 to 60℃.
- The air may be frozen.
- The water drop or coolant is splashed onto the product.
- The humidity is high and the temperature changes largely, causing dew condensation.
- Sea breeze or seawater is splashed onto the product.
- Avoid using the product in an atmosphere containing corrosive gas.
- Avoid using the product in a dusty atmosphere.
- Avoid using the product in an atmosphere where spluttering may occur.
- Direct rays of the sun and wind and rain, water appear
- Do not expose the product to radiant heat if the product is installed near a heat source.
- Avoid using the product in an atmosphere where ozone is produced.

⚠ WARNING	The chemical resistance of plastic parts is shown below. ・Avoid using products in an atmosphere where chemicals are contained in compressed air, the atmosphere, or where they could adhere to parts. ・Use in the above state could lead to bowl damage and accidents. ・Avoid using these types of chemicals or in an atmosphere containing these chemicals. ・A metal bowl is available if these chemicals must be used.

Types of chemicals	Classi-fication	Major chemical products	General example	Poly-carbo-nate	Nylon bowl	Nylon body
Inorganic product	Acid	Hydrochloric acid, sulfuric acid, hydrofluoric acid, phosphoric acid, chromic acid, etc.	Pickling fluid for metal,acidic degreasing fluid, film treatment fluid	×	×	×
	Alkali	Alkali materials such as caustic soda, caustic potash, slaked lime, aqueous ammonia, sodium carbo-nate.	Water-soluble machining oil, leakage detecting agent	×	○	○
	Inorganic salt	Sodium sulfide, potassium nitrate, potassium dichromate, sodium sulfate, etc	Plating	×	○	○
Organic chemical	Aromatic hydro-carbon	Benzene, toluene, xylene, ethylbenzene, styrene, etc	Included in paint thinner.	×	×	×
	Chlori-nated aliphatichyd ro-carbon	Methyl chloride, ethylene chloride, methylene chloride, acetylene chloride, chloroform, trichlene, berklene, carbon tetrachloride	Organic solvent cleaning fluid for metal	×	○	○
	Chlori-nated hydro-carbon	Chloro-benzene, dichloro-benzene, Hexachloro-ethane(B-H-C), etc.	Agricultural chemical	×	○	○
	Petro-leum compo-sition	Solvent naphtha, gasoline, kerosene	Degreasing for metal	×	○	○
	Alcohol	Methyl alcohol, ethyl alcohol, cyclohexanol, benzyl alcohol	Used in anti-freeze leakage detecting agent	×	×	×
	Phenol	Carbolic acid, cresol, naphthol, etc	Material for disinfection liquid	×	×	×
	Ether	Methyl ether, methyl ethyl ether, ethyl ether	Additive for brake fluid	×	○	○
	Ketone	Acetone, methyl ethyl ketone, cyclohexanone, acetophenone, etc		×	×	×
	Carbo-xylic acid	Formic acid, acetic acid, butyl acid, acrylic acid, oxalic acid, phthalic acid, etc	Aluminum treatment, paint-based material, leakage detecting agent	×	×	×
	Ester	Dimethyl phthalate(DMP),diethyl phthalate (DEP) dibutyl phthalate (DBP), dioctyl phthalate(DOP)	Additive for lubrication oil, synthetic hydraulic oil, rust preventive oil	×	○	○
	Hydroxy acid	Glycol acid, lactic acid, malic acid, citric acid, tartaric acid	Additive for food	×	×	×
	Nitro com-pound	Nitro methane, nitro ethane, nitro ethylene, nitro benzene		×	○	○
	Amine	Methyl-amine, dimethyl-amine, ethyl-amine, aniline, acetanilide, etc.	Additives for brake fluid, anti-static agent, dye for plastics	×	×	×
	Nitrile	Acetonitrile, acrylonitrile, benznitrile, acetisonitrile, etc	Raw material for nitrile rubber	×	○	○

○: Available, X: Not available (Plastic will break.)

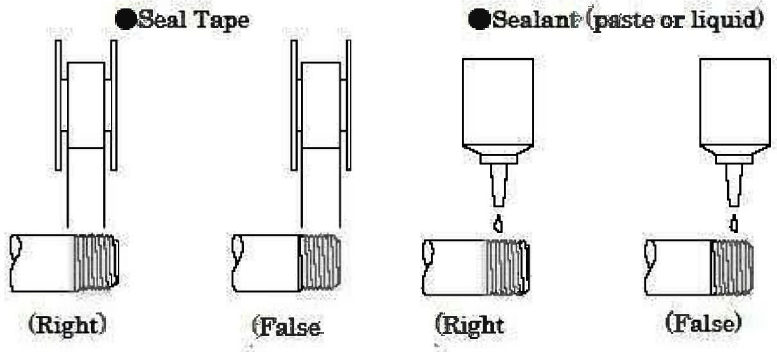
2. 2 Piping

⚠ WARNING	Piping and load torque Make sure that piping load or torque is not applied on the body or piping.  Max. torque : 50N·m

⚠ CAUTION	a) Flush the air piping to be used sufficiently before connecting the regulator. If dust or sealant enters the product during piping work, this may cause the product to malfunction or operate incorrectly. b) Install the Residual pressure release valve so as the arrow mark on the name plate of the valve matches the air flow direction. c) If dust or sealant enters the product during piping work, this may cause the product to decline in performance. d) When connecting the piping, tighten with proper tightening torque. e) Carefully connect the piping so that no bending moment caused by the piping load is applied to the product main body and piping.

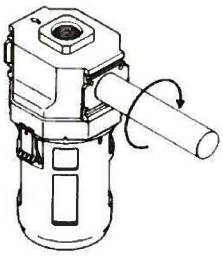
(1) Flush air into the pipe to blow out foreign substances and chips before piping.

(2) Do not apply sealant or sealing tape for two pitches of thread from the tip of the pipe to avoid residual substances from falling into the piping system.



(3) Piping screw-in torque

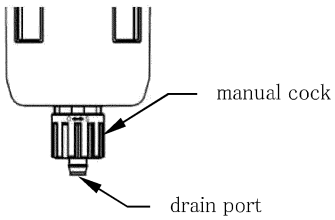
Do not apply excessive torque to the body and piping when connecting pipes.



Max. torque : 30N·m

(4) Drain discharge piping for plastic bowl type

- The nylon tube can be directly attached.
- A recommendation tube is "F-1508"
- Keep the piping length within 5m, and avoid upward slope.
- Make shure that the drain cock is closed before inserting the tube.
- Inserting the tube is only once. If remove and reinserting that the tube coming off.
- Fix the tube that the tube is not swing.

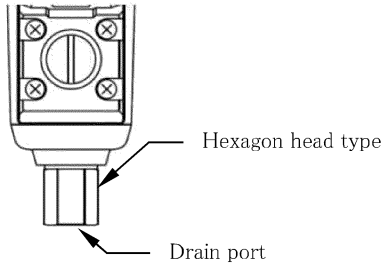


(5) Tightening torque of drain cock

Max. tightening torque of drain cock of a plastic bowl is 0.5N·m

(6) Drain discharge piping for metal bowl type

- Fix the cock's hexagonal face before screwing the joint, etc., into the drain port's female threads.
- Use a bore size ø5.7 to ø6.0 tube for the drain discharge piping, and keep the length within 5m.
- Avoid upward sloping piping.

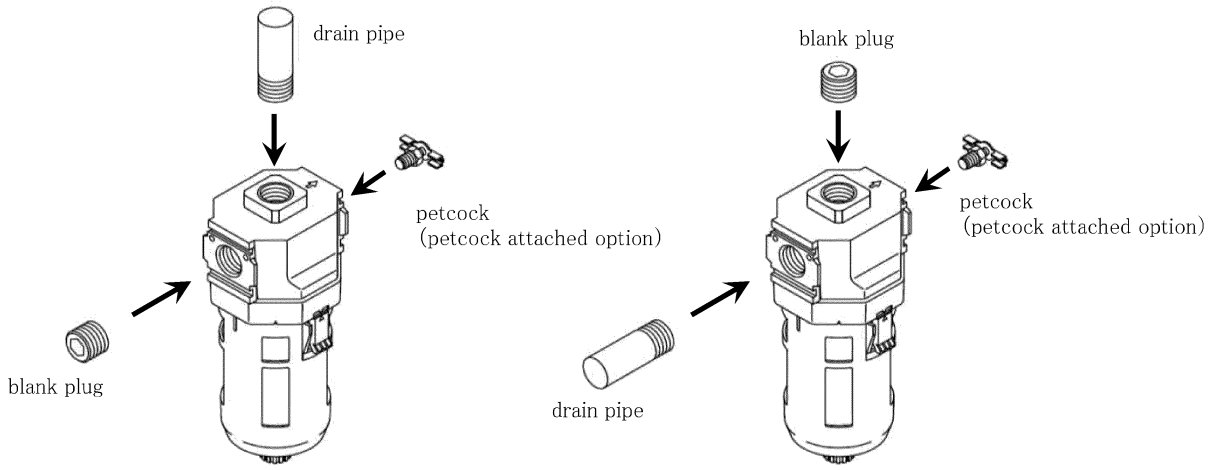


(7) Piping selection

Either a top or side connection can be selected based on the applications.

Attach the enclosed blank plug to the port not being used.

When the option is Metal bowl option (M,M2) and petcock attached option (C), instaii the petcock.



3. Proper operation

3. 1 Caution for use

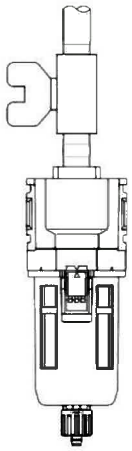
⚠ WARNING	a) Operate the product within the specified pressure. b) This product is for industrial use. Must not be used in components or circuits for medical equipment or components that involve human lives.

(1) Use the automatic drain under the working conditions below.
Failure to observe this could result in operation faults.
DT3000、DT4000 (exhaust without pressurized)
・Use a compressor with a capacity of 0.75 kW {90R/min.[ANR]} or more.
・Set the working pressure to 0.1 MPa or more. (Air is purged with initial drainage until pressure reaches 0.1 MPa.)
DT3010、DT4010(no exhaust without pressurized)
・A compressor with a capacity of 0.75 kw or less is used.
・Set the working pressure to 0.15 MPa or more.

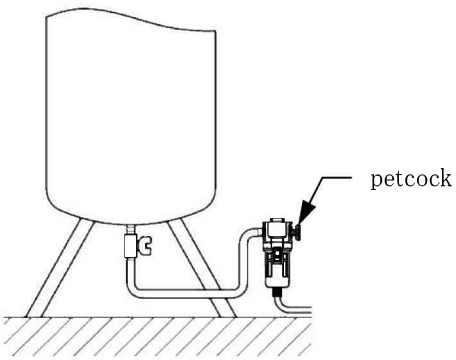
3. 2 Installation

(1) Install the automatic drain case downward vertical.

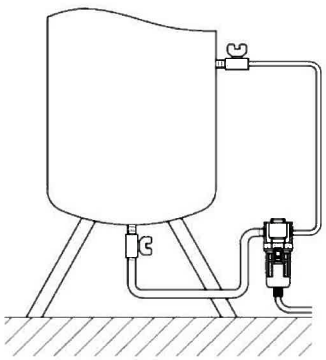
(2) Stop valve is recommended to ensure easy maintenance at connecting port side.



(3) Following installation is possible when installation space is limited.



Open the pet cock slightly, and bleed the air.



Remove the pet cock as shown below, and provide equalizer piping in the tank.

3. 3 Operation

(1) Before supplying air

Following points to be checked before athe utomatic drainair is supplied after installation is made.

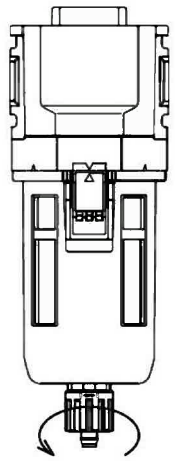
- ·Check if drain piping is done firmly.
- ·Check if drain-cock is closed. (for plastic bowl)
- ·Check if petcock is closed. (for petcock)
- ·Check if latch works.

(2) Others

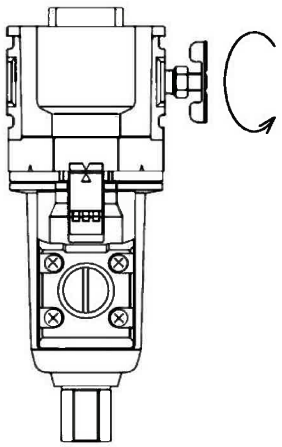
Drain is discharged manually when drain cock at the bottom of bowl is roated counterclockwise.(for plastic bowl type)

Release residual pressure from the manual cock at the bottom.

When using the metal bowl, release pressure from the petcock on the side.



plastic bowl type



metal bowl type

4. Maintenance

4. 1 Inspection

⚠ WARNING	a)Regularly, once or more in six months, check the plastic bowl for cracks, damage,and other deterioration. Cracks, damage or other deterioration could result in breakage, so if found, replace with a new bowl or with a metal bowl b)Check the plastic bowl periodically for contamination. ·If parts are heavily contaminated or if transparency has dropped, replace with a new bow. ·Use a diluted neutral household detergent to wash parts, and then rinse well with clean water. Use of other agents could result in breakage.

⚠ CAUTION	a) Do not disassemble or modify the product.

(1) Daily inspection

・Before operating the product, confirm proper operation.

・Check the drains drainage. Check the plastic bowl periodically for contamination.

(2) Periodic inspection

・To operate the product in its optimal operating state, carry out the periodic inspection normally once every six months.

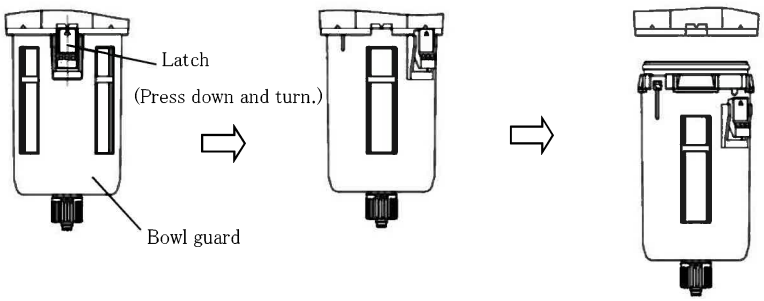
・Check the plastic bowl for cracks, damage,and other deterioration.

4. 2 Disassembly

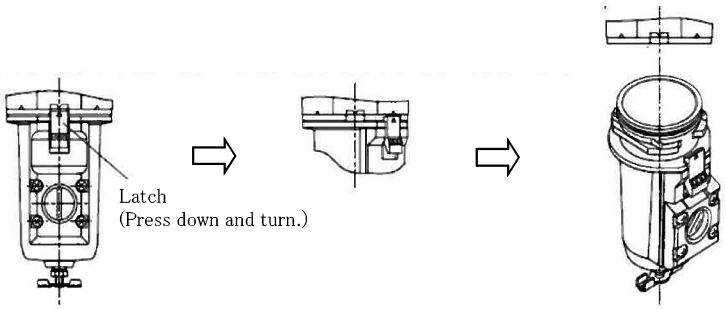
⚠ WARNING	a) Before servicing the product, turn power OFF, stop the compressed air supply, and check that there is no residual pressure. b) Before removing the bowl, cut off the pressurized air and depressurize the bowl. Make sure that the bowl is compieteiy depressurized.

⚠ CAUTION	Read instructions and precautions enclosed with the product before starting use or maintenance.

(1) Removing resin bowl



(2)Removing metal bowl



5. Troubleshooting

Trouble symptom	Major Causes	Remedies
Sludge does not come out when open the drain cock.	Drain port has been clogged with foreign particles.	Remove the bowl, upon shutting air off, and replace it with new one or wash and rinse the cock.
Auto drain does not drain automatically. Air leaks from drain port.	Mechanical trouble of Auto drain or clogged with foreign particle.	
Air leaks at the hook up of a bowl.	The O-ring is damaged or has foreign matter on its surface.	Remove the bowl, upon shutting air off, and replace the O-ring with new one or wash and rinse the packing.
	Bowl is defective.	Remove the bowl, upon shutting air off, and replace it with new one.

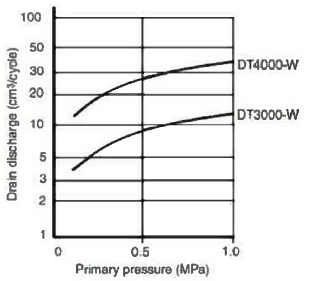
6. Product specifications and designation

6. 1 Product specifications

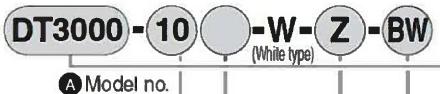
Descriptions		DT3000-W	DT4000-W	DT3010-W	DT4010-W
Type		Normally open (Note 1)		Normally closed	
Working fluid		Drain in compressed air (water or oil)			
Withstanding pressure	MPa	1.5			
Working king press ure range	MPa	0.1～1.0		0.15～1.0	
Ambient temperature range	℃	5～60			
Port size	Rc、NPT、G	3/8、1/2			

Note 1. Use a normally closed type if the compressor is under 0.75kW (discharge flow rate 0.09m^3/min.).

Automatic drain performance diagram



6. 2 Product designation

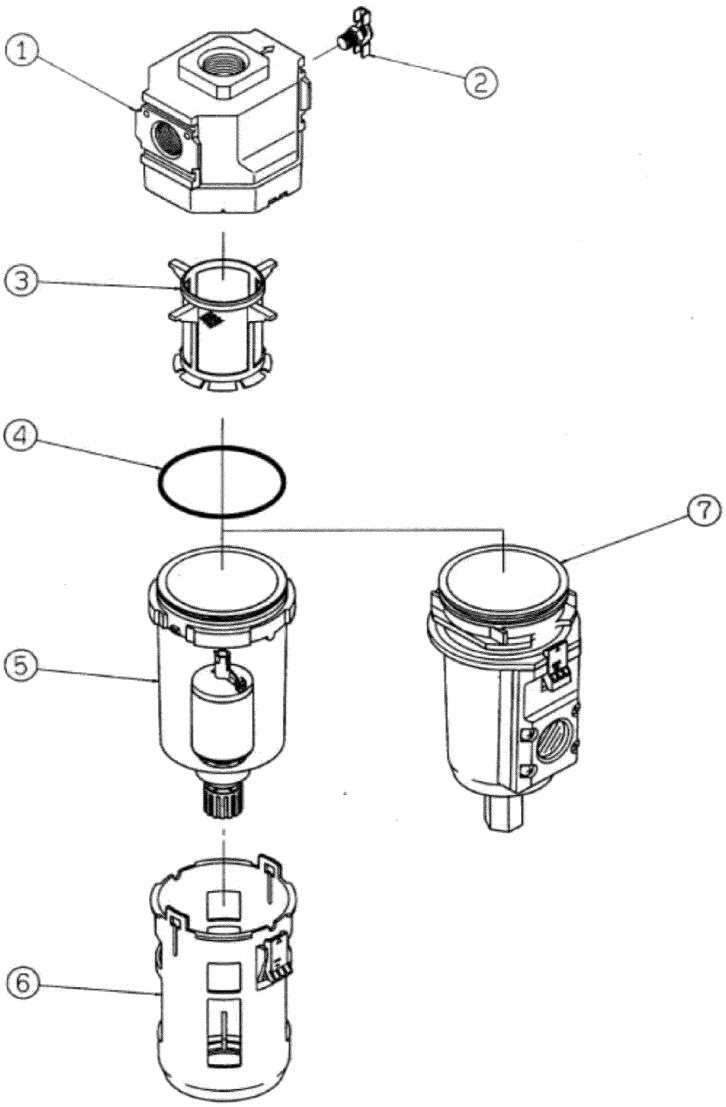


⚠ Note on model no. selection

Note 1: The petcock is included.
Note 2: C type bracket model no. DT3000-W : B320
DT4000-W : B420
Note 3: One masking plug matching the bore size is enclosed.

Symbol		Descriptions
Ⓐ Model no.		
DT3000		Normally open automatic drain
DT3010		Normally closed automatic drain
DT4000		Normally open automatic drain
DT4010		Normally closed automatic drain
Ⓑ Port size		
10		3/8
15		1/2
Ⓒ Port thread type		
Blank		Rc thread
N		NPT thread
G		G thread
Ⓓ Option		
Bowl material	Blank	Polycarbonate bowl
	Z	Nylon bowl
	M Note 1	Metal bowl (with gauge) drain port Rc1/8
	M2 Note 1	Metal bowl (with gauge) drain port Rc1/4
Petcock attached	Blank	Pipe plug assembly
	C Note 1	Petcock attached (without pipe plug)
Ⓔ Attachment		
Blank		Not attached
BW		C type bracket

6. 3 Internal structure and parts list



No	品名	Parts No				remark
		DT3000	DT3010	DT4000	DT4010	
②	Petcock	DT3000-PETCOCK				
③	Screen	DT3000-SCREEN		DT4000-SCREEN		
④	O ring	F3000-ORING		F4000-ORING		5pieces/set
⑤	Bowl assembly	DT3000-W-BOWL	DT3010-W-BOWL	DT4000-W-BOWL	DT4010-W-BOWL	including O ring ④
		DT3000-W-BOWL-Z	DT3010-W-BOWL-Z	DT4000-W-BOWL-Z	DT4010-W-BOWL-Z	
⑥	Bowl guard	DT3000-W-BOWL-GUARD		DT4000-W-BOWL-GUARD		
		DT3000-W-BOWL-GUARD-Z		DT4000-W-BOWL-GUARD-Z		
⑦	Metal bowl assembly	DT3000-W-BOWL-M	DT3010-W-BOWL-M	DT4000-W-BOWL-M	DT4010-W-BOWL-M	including O ring ④
		DT3000-W-BOWL-M2	DT3010-W-BOWL-M2	DT4000-W-BOWL-M2	DT4010-W-BOWL-M2	