

What is an accumulator?

The accumulator is a pressure vessel (container) storing the pressurised hydraulic fluid (oil, water, etc).

Function of Accumulator

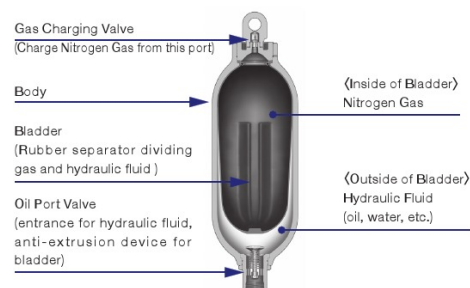
Utilizing the compressibility of gas and the incompressible character of hydraulic fluid, the accumulator stores and discharges the fluid following the demand for fluid by the hydraulic system.

The accumulator is used for the various purposes in various kinds of industrial machines/facilities.

The usage is mainly classified into the following four categories.

1. Energy Storage	Speed Up/ Size Down of Pump / Electric Power Saving
2. Pressure Keeping	Leakage Compensation / Temperature Compensation / Counter Balance
3. Pulsation Absorption	Attenuation of the pressure pulsations created by the hydraulic pump.
4. Shock Dampening	Elimination of shock wave generated by closing of shutoff valve on hydraulic circuit or from conduct by the actuator.

Construction of Accumulator



Mechanism of Accumulator Operation

① Before Operation

This is the state just the nitrogen gas has been precharged.

When the hydraulic pressure is lower than the precharged nitrogen gas pressure, the bladder expands fully in the accumulator body.

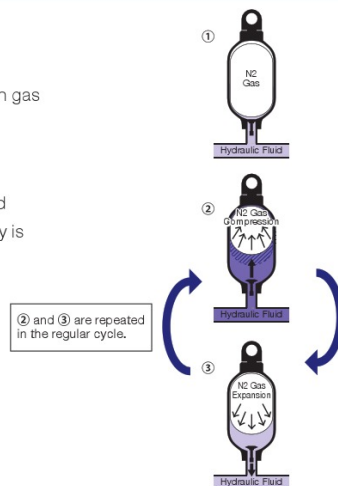
② Energy Storing Up

When the hydraulic pressure becomes higher than the precharged nitrogen gas pressure, the nitrogen gas is compressed and energy is stored.

(The slashed area of right figure shows usable stored oil volume.)

③ Stored Energy Release

When the hydraulic pressure drops, the nitrogen gas expands and releases the stored energy.

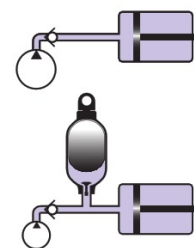


Accumulator Usages

Saving Energy/Electricity (Energy Storage)

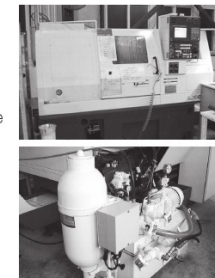
By installing accumulator, the oil pump capacity can be downsized and the idling-stop operation of the electrical motor becomes available. So the downsizing of oil pump and electrical motor can decrease the peak electrical power.

Furthermore, by the idling-stop operation of the electrical motor and the hydraulic pump, the electricity consumption can be reduced drastically. You can contribute to the reduction of CO2 amount of emission. Also, the temperature rise of the system fluid is suppressed, so the prevention of the system fluid deterioration can be attained. It helps to improve the working environment by reducing the noise.



- Miniaturization of Pump
- Idling-Stop Operation
- Suppression of Temperature Rise of System Fluid

**Saving Energy
Saving Electricity**

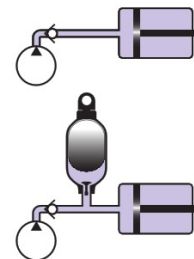


NC Lathe with oil hydraulic unit assembling accumulator for suppressing hydraulic pump electricity consumption.

- Main Usages —
- Oil Hydraulic Press
 - Numerical Control Lathe
 - Machining Center
 - Other Overall Machine Tools

Speedup (Increasing of Speed)

By installing accumulator, the shortage of the pump output oil volume can be supplemented, and will help to speedup the actuator.

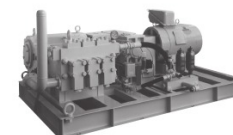
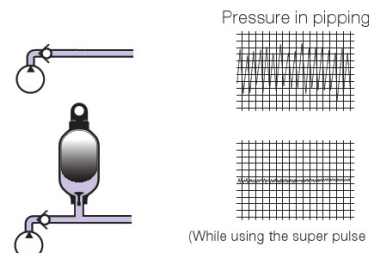


Speedup of motion cylinder for flight simulator.

- Main Usages —
- Flight Simulator
 - Oil Hydraulic Press
 - Injection Moulding Machine
 - Diecast Machine
 - Overall Machine Tools

Pulsation Dampening

The pressure pulsations created by various types of the hydraulic pumps become a cause of the vibrations and noises and machine damages. By adopting accumulator, the pulsations can be attenuated.



Pulsation Dampening for Plunger Pump

- Main Usages —
- Overall Machine Tools
 - Descaling Unit
 - High Pressure Cleaning Machine

Shock Dampening

Rapid opening and closing of valves will create the shock waves in the hydraulic system and the noise occurs and they will damage the machine and/or the components of hydraulic system. By installing accumulator, it eliminates the shock in the hydraulic system.

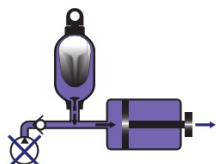


Shock dampening for fuel supply pipings to the aircraft.

- Main Usages —
- Various Pipelines
 - Water Service Pipe

For Emergency Operation

In case the power source is cut off and the supply of operation fluid from the pump is stopped, the accumulator will provide the operation fluid until the machine stops in safety.

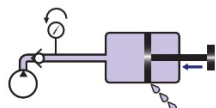


Controlling the angle of wing of the wind power generation and the brake circuit in emergency operation.

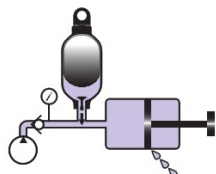
- Main Usages —
- Grinding Machine
 - Emergency Shutdown Valve
 - Refuel System
 - Clamping
 - Double Column Machining Centers
 - Polishing Machine

Leakage Compensation

Accumulator can compensate for the pressure drop that will be caused by the oil leakage on the equipments these require to keep constant pressure condition for long time (Pressure maintaining circuit, etc.) and as the result, the pressure drop in such circuit can be minimized.



Pressure Drop

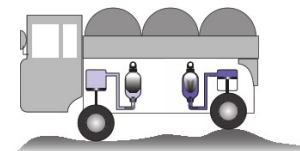


Pressure Preservation

- Main Usages —
- Oil Hydraulic Machine
 - Clamping Equipment

Shock Absorber

The accumulator plays the role as the gas spring and absorbs the shocks from the bumpy roads. Also, it is used to raise and lower the vehicle body. It contributes for reducing passengers' fatigue compared with the metallic spring and the accumulators assist to make the heavy load bearing hydraulic system compact.



Used for the suspension of special vehicle.

- Main Usages —
- Suspension for Special Vehicle
 - Coal Mill
 - Cement Mill
 - Cone Crusher

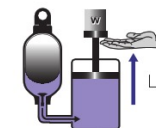
Counter Balance

The gas pressure of the accumulator supports the heavy weight which are supported by the cylinder.

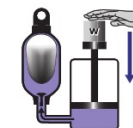


Balanced by the Pressure

When you need to move the heavy weight, you can easily move it by light power.



Light Power

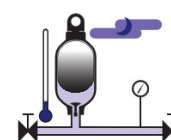


Light Power

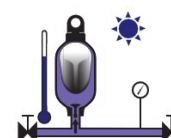
- Main Usages —
- Tool Rest of Large Machine Tools
 - Large Crane Facilities

Temperature Compensation

On the case of closed hydraulic circuit, the oil volume changes according the oil temperature change. The change creates hydraulic pressure up and down change, and becomes the cause of the damages of the hydraulic equipments. y installing accumulator, the pressure in circuit can be stabilized to an almost constant level.



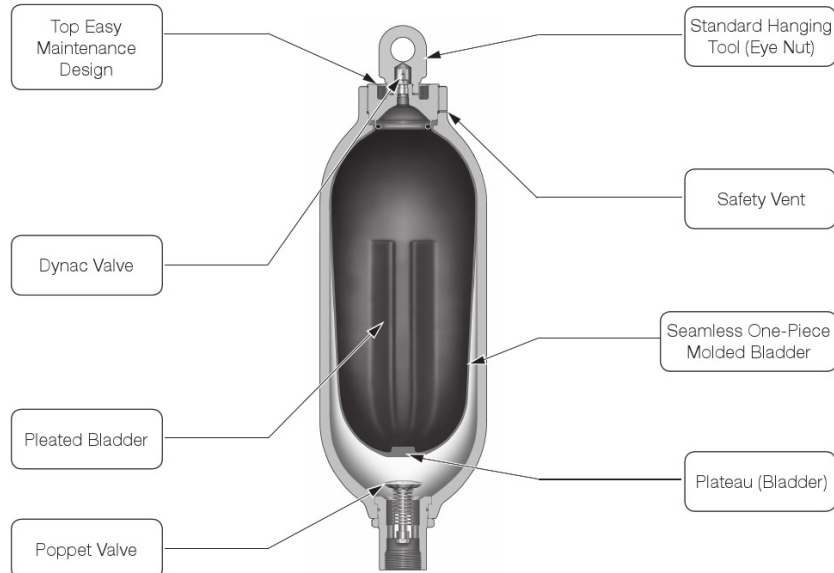
The volume decreased is supplemented.



The volume increased is absorbed.

- Main Usages —
- Plant Facilities
 - Pipeline
 - Boiler

Superior Design and Construction Features of NACOL Accumulator



Top Easy Maintenance Design Accumulator

Bladder replacement of NACOL Top Easy Maintenance Design Accumulators can be done very easily and in a short time as they have large openings at the top and the components parts are just a few. You can perform easily because number of parts is small.

No need to remove the accumulator from the piping for replacement of bladder.
So you are free from hard work and save working hours.
NACOL accumulator is an environmentally friendly product because it does not disperse the hydraulic fluid during the maintenance jobs.

It is possible for you to inspect the inside of accumulator easily.
Therefore, it prevents bladder damage from inadequate installation at the time of bladder replacement.



Bladder Replacement Job

Dynac Valve

The Dynac Valve is a gas charging valve which has also "Fuse" function.

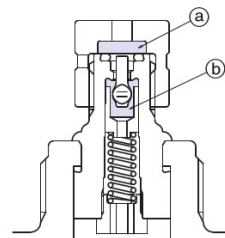
The function of Fuse

The NACOL Dynac Valve contains two parts (Right Figure (a), (b)) whose fuse parts melt at the temperature $160 \pm 20^\circ\text{C}$ and vent the charged gas in the event of fire or extreme heat.
This prevents the accumulator from becoming a potential bomb on such occasions.

The function of Dynac Valve

By installing Gas Charging 3-way Valve, nitrogen gas can be charged, sealed or released.

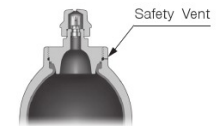
Compared with core type gas valve, Dynac Valve is superior in air tightness, durability and high-low temperature resistance.



Safety Vent

The Safety Vent is a safety device which warns by the relieving sound.

The Safety Vent is a safety device which release the gas charge and warns the existence of the remaining gas in the accumulator by relieving sound before the accumulator is disassembled.

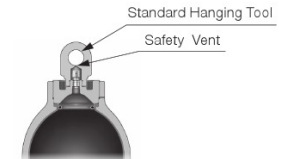


Standard Hanging Tool (Eye Nut)

Standard Hanging Tool makes accumulator install safer.

The tool is equipped with the product which weight is more than 20kg. This hanging tool has a vent for releasing gas discharged from the accumulator to the atmosphere.

After used as a hanging tool, it can be used as a valve cover for the protection of the Dynac Valve.
So, there is no need to keep the hanging tool in another place separately.



Bladder

NACOL Bladders are seamless one-piece molded bladders.

The bladders which are assembled to NACOL Bladder Type Accumulators are seamless one-piece molded bladders except those designated models (part of R/U/H Series).

Seamless one-piece molded bladders do not have seamed parts which result in the stress concentration, so they can remain stable to be used for a long time.

In general, the seamed parts of special rubber material is inferior to the seamed parts of nitrile rubber in adhesion and durability. But NACOL bladders are seamless one-piece molded bladders, so you do not have to worry about the seamed parts.

NACOL pleated bladders prevent bladder damage due to the bladder's turning up (U-turn phenomenon).

NACOL bladder forms a triangular "stelliform" pillar vertically owing to the pleated structure, and the pillar suppresses the bottom area of bladder to rise up by buoyancy. (U-turn phenomenon)

The plateau at the bottom of the bladder prevent the bladder damage.

Plateau reinforcement in the bladder prevents it from being damaged by sharp bending in the bottom portion of the bladder.

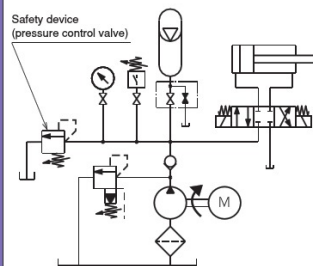


● Volume calculation example

In advance, using the amount of hydraulic fluid that is charged in the accumulator, calculate the accumulator volume required for activating the cylinder.

Specification conditions

Di: Cylinder bore = $\phi 300$ mm (cross-sectional area (A) = 706.5 cm^2)
 S: Cylinder stroke = 380 mm
 V: Cylinder speed = 0.75 m/sec
 F_c : Required cylinder power = 1,000 kN
 ΔP : Pressure loss in piping etc. = 0.84 MPa
 P_s : Maximum working pressure = 20 MPa
 P_2 : Minimum working pressure = $F_c / A \times 10 + \Delta P = 15 \text{ MPa}$
 (Pay attention to the pressure loss ΔP between the accumulator and actuator)
 Q : Oil discharge volume from pump = 90 L/min
 Working temperature = 10 to 90°C
 Service fluid = Petroleum hydraulic oil
 *In calculation, convert all assigned pressure to the absolute pressure (MPa · abs).



- 1) Find the required oil volume to be discharged from accumulator V_w (required cylinder oil amount).

$$V = \frac{\pi \cdot D_i^2}{4} \cdot S \cdot 10^{-6}$$

$$= \frac{\pi \cdot 300^2}{4} \times 380 \times 10^{-6}$$

$$\approx 26.9 \text{ L}$$

- 2) **Considering the change in temperature during operation**, find the gas charging pressure (P_1) in the following steps.

- i) For Max. P_1 at the maximum working temperature (90°C), set the gas charging pressure ratio to 85%. (The gas charging pressure ratio can be up to 90% in consideration of the temperature change.)

$$\text{Max. } P_1 = 0.85 \cdot P_2$$

$$= 0.85 \times 15.1013 \text{ MPa} \cdot \text{abs}$$

$$= 12.84 \text{ MPa} \cdot \text{abs}$$

- ii) Find Min. P_1 at the minimum working temperature (10°C) by the "Formula for gas charging pressure actual change due to temperature change".

$$\text{Min. } P_1 = 9.38 \text{ MPa} \cdot \text{abs}$$

- 3) Find the gas charging pressure ratio (e) at the minimum working temperature.

$$e = \frac{P_1}{P_2} = \frac{9.38}{(15 + 0.1013)}$$

$$\approx 0.62$$

- 4) Find the polytropic exponent (m, n).

$$\text{Average working pressure (Pa)} = \frac{P_2 + P_1}{2} = \frac{20.1013 + 15.1013}{2}$$

$$\approx 17.6 \text{ MPa} \cdot \text{abs}$$

- Find the oil charge time from V_w (the amount charged in the accumulator) and the pump flow rate.

$$\text{Oil Charge Time (Tm)} = \frac{V_w}{Q} = \frac{26.9}{90/60}$$

$$\approx 17.9 \text{ sec}$$

- The cylinder operation time becomes the accumulator oil discharge time.

$$\text{Oil Discharge Time (Tn)} = \frac{S}{V} 10^{-3} = \frac{380}{0.75} \times 10^{-3}$$

$$\approx 0.5 \text{ sec}$$

- From the nitrogen gas polytropic exponent list on page 20

$$m=1.90 \quad n=1.96$$

- 5) Find the oil discharge coefficient (F).

$$F = \frac{a^{\frac{1}{m}} - 1}{a^{\frac{1}{n}}} = \frac{\left(\frac{20.1013}{15.1013}\right)^{\frac{1}{1.90}} - 1}{\left(\frac{20.1013}{15.1013}\right)^{\frac{1}{1.96}}} \approx 0.135$$

- 6) Find the accumulator gas volume (V_1).

$$V_1 = \frac{V_w}{e \cdot F} = \frac{26.9}{0.62 \times 0.135} \approx 339 \text{ L}$$

1-3-2 Pulsation Dampening Calculation

$$V_1 = \frac{q \cdot F_1 \cdot \left(\frac{P_x}{P_1}\right)^{\frac{1}{n}}}{1 - \left(\frac{P_x}{P_m}\right)^{\frac{1}{n}}}$$

V_1 : Accumulator gas volume (L)

q : Oil discharge volume per pump revolution (L/rev)

F_1 : Pump oil discharge coefficient (from the list)

P_x : Regular circuit pressure (MPa)

P_m : Maximum allowable pulsation pressure (MPa)

- * For gas charging pressure P_1 , at the maximum working temperature, a value of 60% of P_x is recommended. (Adjust the gas charging pressure ratio up to 80% of P_x in consideration of the temperature change.)

- * The maximum allowable pulsation pressure P_m is the maximum pressure that can be tolerated when an accumulator is used, rather than the pressure currently generated.

- * For polytropic exponent n , use a value that is found at the intersection of less than 15 seconds and P_x in the polytropic exponent list.
 If you use the polytropic exponent formula, use the value of 8 seconds.

- * Please refer to the volume calculation sheet on page 226.

Pump Oil Discharge Coefficient (F_1) List

Pump Type	Pump Oil Discharge Coefficient F_1
Simplex	Single Action
	Double Action
Duplex	Single Action
	Double Action
Triplex	Single Action
	Double Action

- * For a pump larger than triplex, vane pump, or gear pump, use 0.06 for F_1 .

1-3-3 Shock Absorbing Calculation

$$V_1 = \frac{W \cdot v^2 \cdot (n-1) \cdot \left(\frac{P_x}{P_1}\right)^{\frac{1}{n}}}{203.94 \cdot g \cdot P_x \cdot \eta \cdot \left[\left(\frac{P_m}{P_x}\right)^{\frac{n-1}{n}} - 1\right]}$$

$$W = \frac{\pi \cdot d^2}{4} \cdot L \cdot \gamma \cdot 10^{-6}$$

V_1 : Accumulator gas volume(L)

W : Weight of fluid in the line(kg)

v : Flow velocity(m/sec)

g : Acceleration of gravity 9.8(m/sec²)

d : Pipe bore(mm)

L : Total pipe length(m)

γ : Weight volume ratio of the fluid(kg/m³)

P_x : Regular circuit pressure(MPa)

P_m : Maximum allowable shock pressure(MPa)

- * For gas charging pressure P_1 , at the maximum working temperature, a value of 60% of P_x is recommended. (Adjust the gas charging pressure ratio up to 80% of P_x in consideration of the temperature change.)

- * The maximum allowable shock pressure P_m is the maximum pressure that can be tolerated when an accumulator is used, rather than the pressure currently generated.

- * For polytropic exponent n , use a value that is found at the intersection of less than 15 seconds and P_x in the polytropic exponent list.

- If you use the polytropic exponent formula, use the value of 8 seconds.

- * Please refer to the volume calculation sheet on page 227.

2. Selection of Maximum Allowable Working Pressure and Gas Volume

Based on the maximum allowable working pressure that will actually be used and gas volume calculation results, select an available series, maximum allowable working pressure, and gas volume from the NACOL Product List on page 28.

Points for selection

- Select an accumulator with maximum allowable working pressure exceeding the designed circuit pressure.
- Maximum allowable working pressure used for pulsation dampening or shock absorbing should be higher than the maximum pressure generated without an accumulator.
- If the gas volume calculation result exceeds the volume of a single accumulator, use multiple accumulators.
- For pulsation dampening and shock absorbing, select the maximum allowable working pressure and gas volume from the pulsation and shock-specific series first.
- If corresponding maximum allowable working pressure and gas volume are not found, select from the standard series.
- For dust-proof oil tanks, select from the Dynaclean series.

3. Confirmation of Allowable Charge/Discharge Flow Rate

For the selected accumulators, confirm whether the allowable charge/discharge flow rate satisfies the flow rate in actual use.

Points for selection

- Compare the flow rate with the allowable charge/discharge flow rate shown in the NACOL Product List on page 28.
- If the allowable charge/discharge flow rate of the standard series is not enough, select an accumulator from High Flow or Super High Flow series.
- Use multiple accumulators if the actual charge/discharge flow rate exceeds the allowable charge/discharge flow rate shown in the catalog.
- If multiple accumulators are used, aggregate the accumulator volume and satisfy the calculation result.

4. Selection of Bladder Material

Select a bladder material according to working temperature and fluid that you want to use.

Points for selection

- Select a bladder material according to ② Bladder Material Table in the Item Number Description for Finished Accumulator Products on page 37.
- Confirm that the selected bladder material can be used for production on the page for the selected series.
- If your desired fluid or temperature is not listed in the Bladder Material Table, please contact us.

5. Confirmation of Applicable Inspection/Standards

Select the inspection and standards corresponding to the destination or country where the accumulator will be installed.

Points for selection

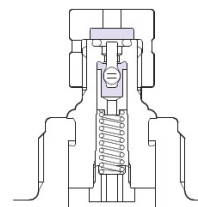
- Select the inspection and standards to be applied from ① Inspection and Standards Table in the Item Number Description for Finished Accumulator Products on page 36.
- For use at sea, ship's class standards will be applied.
- On the page for the selected series, confirm that the series, pressure, and volume comply with the inspection and standards.
- For inspection and standards not listed in the table, please contact us.

6. Selection of Gas Charging Side Specifications

Select the specifications of the gas charging port of the accumulator.

Gas charging side specifications	No.	Item
Standard	1	Dynac valve
SG valve	2(a)	SG valve + fuse plug
	2(b)	SG valve + spring loaded type safety valve

1. Dynac Valve



NACOL standard.

The Dynac valve is a gas charge valve with a fuse plug function.

The gas charging tools kit is required for charging, inspection, and pressure adjustment of nitrogen gas.

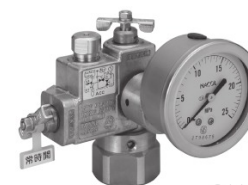
Sizes of connection screws include G1/4, G3/8, 1/2-20UNF, and 8V1, depending on the series and pressure. Please refer to the page for each series.

In addition, we provide an accumulator with an M16 x 2-screw-type gas charging valve, which complies with JIS B 8398 "Hydraulic fluid power -- Gas-loaded accumulators -- Dimensions of gas ports". Please contact our sales department for more information.

2. SG Valve



You can install a pressure gauge to charge gas or measure the gas charging pressure easily without gas charging tools. As a safety device, select a spring loaded type safety valve or fuse plug.



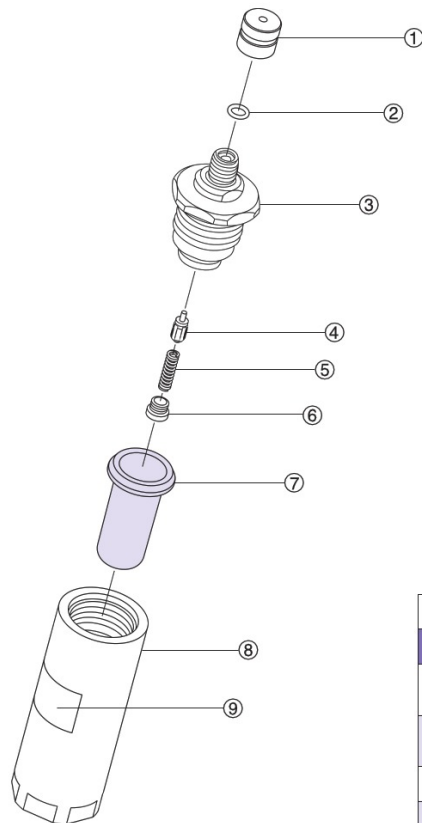
2 (a) With the fuse plug



2 (b) With the spring loaded type safety valve

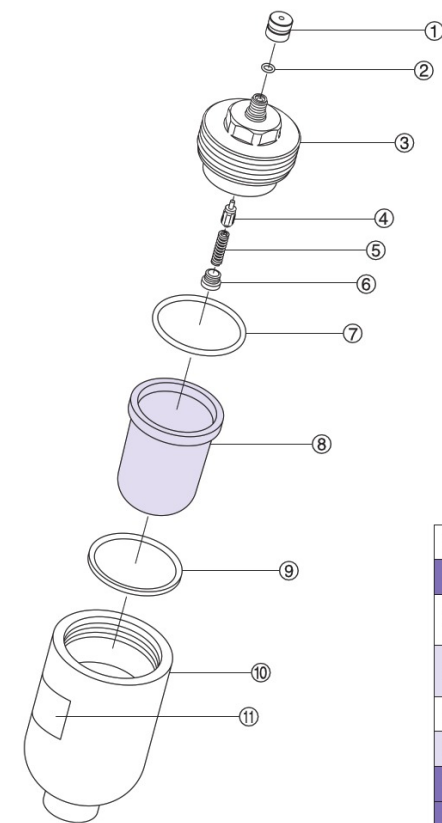
Points for selection

- Select the Dynac valve or SG valve from ⑥ Gas Charging Side Specifications in the Item Number Description for Finished Accumulator Products on page 39.
- Unless otherwise specified, select the fuse plug as the safety device of the SG valve.
- When external temperature reaches $160 \pm 20^\circ\text{C}$, the fuse plug parts melt, releasing the gases in the accumulator into the atmosphere.
- When pressure exceeds the pre-set value, the spring loaded type safety valve will release the gases in the accumulator into the atmosphere. Specify the set value of pressure according to the maximum allowable working pressure of the accumulator to be used.
- The pressure gauge used for the SG valve contains glycerin. Specify the pressure range according to the pressure to be used.
- For details on the SG valve and pressure gauge, please refer to "SG Valve" on page 196.
- For details on the safety valve, please refer to "Spring Loaded Type Safety Valve" on page 198.
- For details on the Dynac valve, please refer to "Dynac Valve" on page 212.

Typical Exploded View

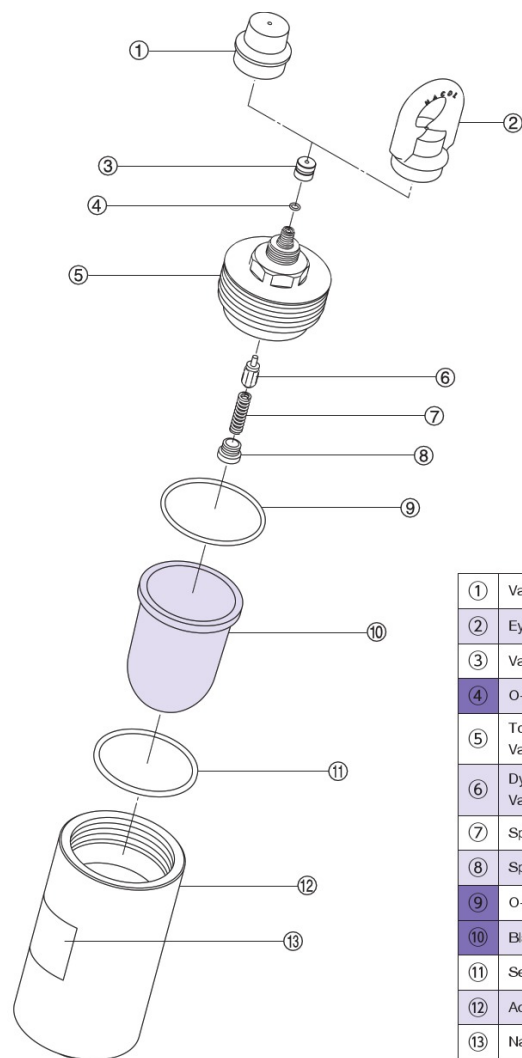
①	Valve Cap
②	O-ring
③	Top Cap With Dynac Valve
④	Dynac Valve Packing With Valve Stem
⑤	Spring
⑥	Spring Nut
⑦	O-ring
⑧	Accumulator Body
⑨	Nameplate

※1 The typical exploded view for this series.
 ※2 If you purchase ⑦ bladder as the spare parts, ② O-ring will be attached with the bladder.

Typical Exploded View

①	Valve Cap
②	O-ring
③	Top Cap With Dynac Valve
④	Dynac Valve Packing With Valve Stem
⑤	Spring
⑥	Spring Nut
⑦	O-ring
⑧	Bladder
⑨	Seat Ring
⑩	Accumulator Body
⑪	Nameplate

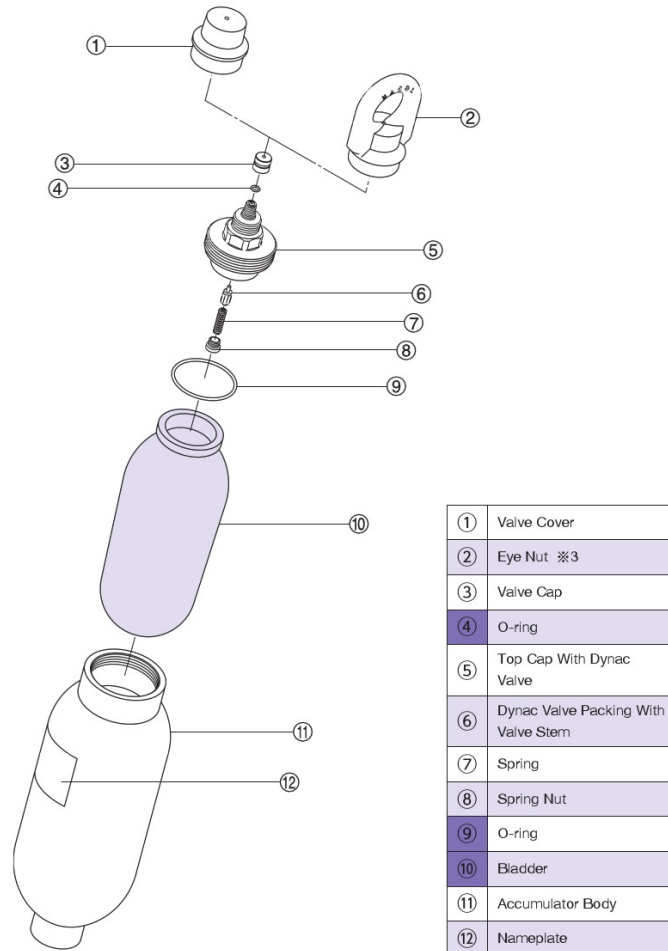
※1 The typical exploded view for this series.
 ※2 If you purchase ⑧ bladder as the spare parts, ② O-rings will be attached with the bladder.

Typical Exploded View

①	Valve Cover
②	Eye Nut
③	Valve Cap
④	O-ring
⑤	Top Cap With Dynac Valve
⑥	Dynac Valve Packing With Valve Stem
⑦	Spring
⑧	Spring Nut
⑨	O-ring
⑩	Bladder
⑪	Seat Ring
⑫	Accumulator Body
⑬	Nameplate

※1 The typical exploded view for this series.
 ※2 If you purchase ⑩ bladder as the spare parts, ④⑨ O-rings will be attached with the bladder.

Typical Exploded View

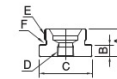


※1 The typical exploded view for this series.
 ※2 If you purchase ⑩ bladder as the spare parts, ④⑨ O-rings will be attached with the bladder.
 ※3 Only for 2.5L and 4L accumulator which maximum allowable working pressure is 35MPa or more.

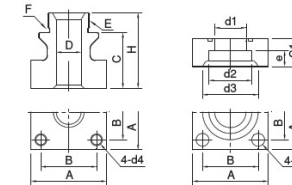
Piping Connection

Dimensional Drawing

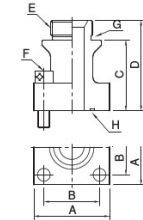
● Bushing



● Flange (with Counter Flange)



● Valve Flange



※1 The above shows the shape of representative model. Confirm the actual shape with the drawing or the actual product.

※2 When there is no indication of maximum allowable working pressure of your accumulator in the column of "Applicable ACC. MAWP" of the following dimensional table, please contact us.

Dimensional Table

● Bushing

Applicable ACC. MAWP	Item Number	Connection Port Size	A	B	C	D	E	F	
								O-Ring	B.U. Ring
21MPa 23MPa	6FAM42F02N23M	Rc1/4	28	12	φ53 (Width across flat 50)	Rc1/4	M42x2	AS568 920	—
	6FAM42F03N23M	Rc3/8				Rc3/8			
	6FAM42F04N23M	Rc1/2				Rc1/2			
	6FAM42F06N23M	Rc3/4				Rc3/4			
35MPa	6FAM42F02N35M	Rc1/4	57	22	φ70 (Width across flat 65)	Rc1/4	M42x2	AS568 920	Special B.U. Ring
	6FAM42F03N35M	Rc3/8				Rc3/8			
	6FAM42F04N35M	Rc1/2				Rc1/2			
	6FAM42F06N35M	Rc3/4				Rc3/4			

● Flange (with Counter Flange)

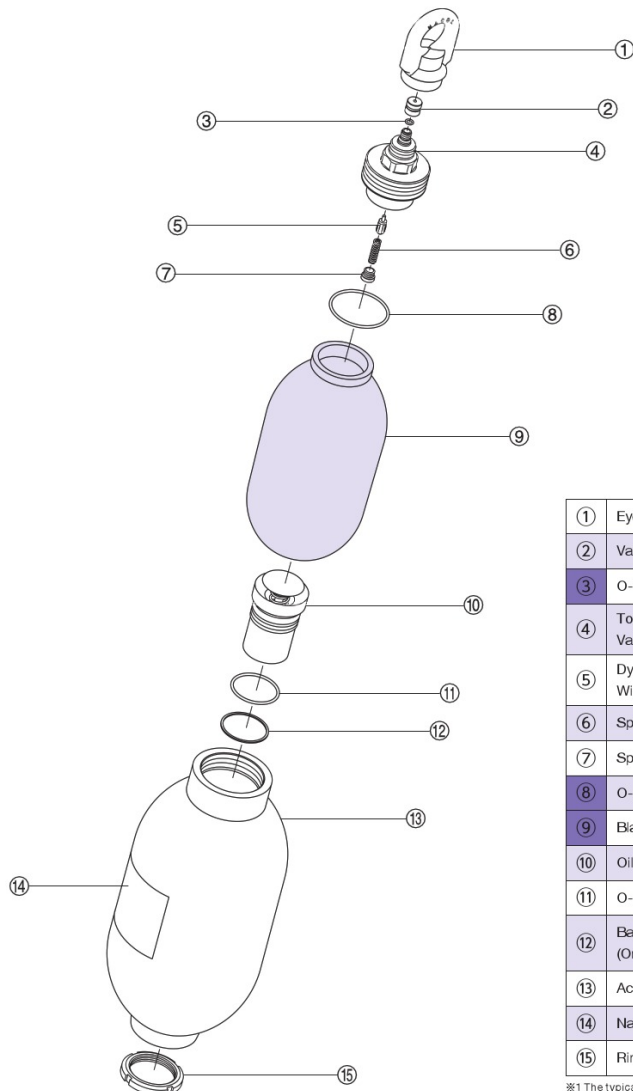
Applicable ACC. MAWP	Item Number	CPS	A	B	C	H	e	φD	C1	φ d1	φ d2	φ d3	φ d4	φ d5	E	F		G
																O-Ring	B.U. Ring	
21MPa	6FAM4215AN21M	15A	54	36	22	42	11	16	22	16	22.2	32	M10	11	M42x2	AS568 920	—	G25
	6FAM4215LX003	15A					12			20	27.7	38						G40
	6FAM4220LX005	20A					14	25	28	25	34.5	45	M12	13				G60
	6FAM4225LX001	25A	76	56	56	76	16			31.5	43.2	56						G80
	6FAM4232LN21M	32A					18			37.5	49.1	63	M16	18				G100
	6FAM4240AX008	40A					20	48	36	47.5	61.1	75						G125
35MPa	6FAM4250AN21M	50A	100	73		36				12.3	22.2	37.5	M12	14	M42x2	AS568 920	—	G150
	6FAM4215AX009	15A					71	12	16	16.2	27.7	43.5						G175
	6FAM4220AN35M	20A	68	48														G200
	6FAM4225AX006	25A	92	65	45	80	14	25	36	21	34.5	53	M16	18				G225

● Valve Flange

Applicable ACC. MAWP	Item Number	CPS	A	B	C	D	E	F	G		H
									O-Ring	B.U. Ring	
21MPa	6FAM4232DN21M	32A	76	56	71	91	M42x2	M12x45	AS568 920	—	G40
	6FAM4250DN21M	50A	100	73	36	84		M16x55			G60
35MPa	6FAM4225DX020	25A	95	65	35	136		M16x60	AS568 920	—	G30
	6FAM4232DN35M	32A	100	70	70	105					G35

CPS: Connection Port Size MAWP: Maximum Allowable Working Pressure

Typical Exploded View



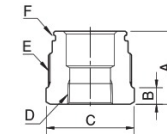
①	Eye Nut
②	Valve Cap
③	O-ring
④	Top Cap With Dynac Valve
⑤	Dynac Valve Packing With Valve Stem
⑥	Spring
⑦	Spring Nut
⑧	O-ring
⑨	Bladder
⑩	Oil Port Valve Assembly
⑪	O-ring
⑫	Back Up Ring (Only for 35MPa or more)
⑬	Accumulator Body
⑭	Nameplate
⑮	Ring Nut

※1 The typical exploded view for this series.
 ※2 If you purchase ⑨ bladder as the spare parts, ③⑧ O-rings will be attached with the bladder.

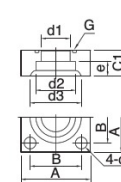
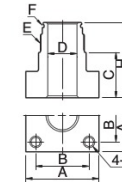
Piping Connection

Dimensional Drawing

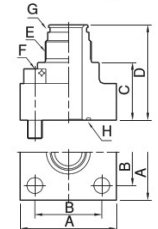
● Bushing



● Flange (with Counter Flange)



● Valve Flange



※1 The above shows the shape of representative model. Confirm the actual shape with the drawing or the actual product.

※2 When there is no indication of maximum allowable working pressure of your accumulator in the column of "Applicable ACC. MAWP" of the following dimensional table, please contact us.

Dimensional Table

● Bushing

Applicable ACC. MAWP	Item Number	Connection Port Size	A	B	C	D	E	F	
								O-Ring	B.U. Ring
17.5MPa 21MPa 23MPa	6FCM42F02N23M	Rc1/4	42	12.7	φ44 (Width across flat 41)	Rc1/4	M42x2	JIS B2401 P32	—
	6FCM42F03N23M	Rc3/8				Rc3/8			
	6FCM42F04N23M	Rc1/2				Rc1/2			
	6FCM42F06N23M	Rc3/4	60	30	φ50 (Width across flat 46)	Rc3/4			
	6FCM42F08N23M	Rc1				Rc1			
35MPa	6FCM42F10N23M	Rc1-1/4	70	40	φ65 (Width across flat 60)	Rc1-1/4			
	6FCM42F02N35M	Rc1/4	58	17	φ50 (Width across flat 46)	Rc1/4	M42x2	AS568 218	AS568 218
	6FCM42F03N35M	Rc3/8				Rc3/8			
	6FCM42F04N35M	Rc1/2				Rc1/2			
	6FCM42F06N35M	Rc3/4	76	35	φ60 (Width across flat 55)	Rc3/4			
	6FCM42F08N35M	Rc1				Rc1			
	6FCM42F10N35M	Rc1-1/4	81	40	φ65 (Width across flat 60)	Rc1-1/4			

● Flange (with Counter Flange)

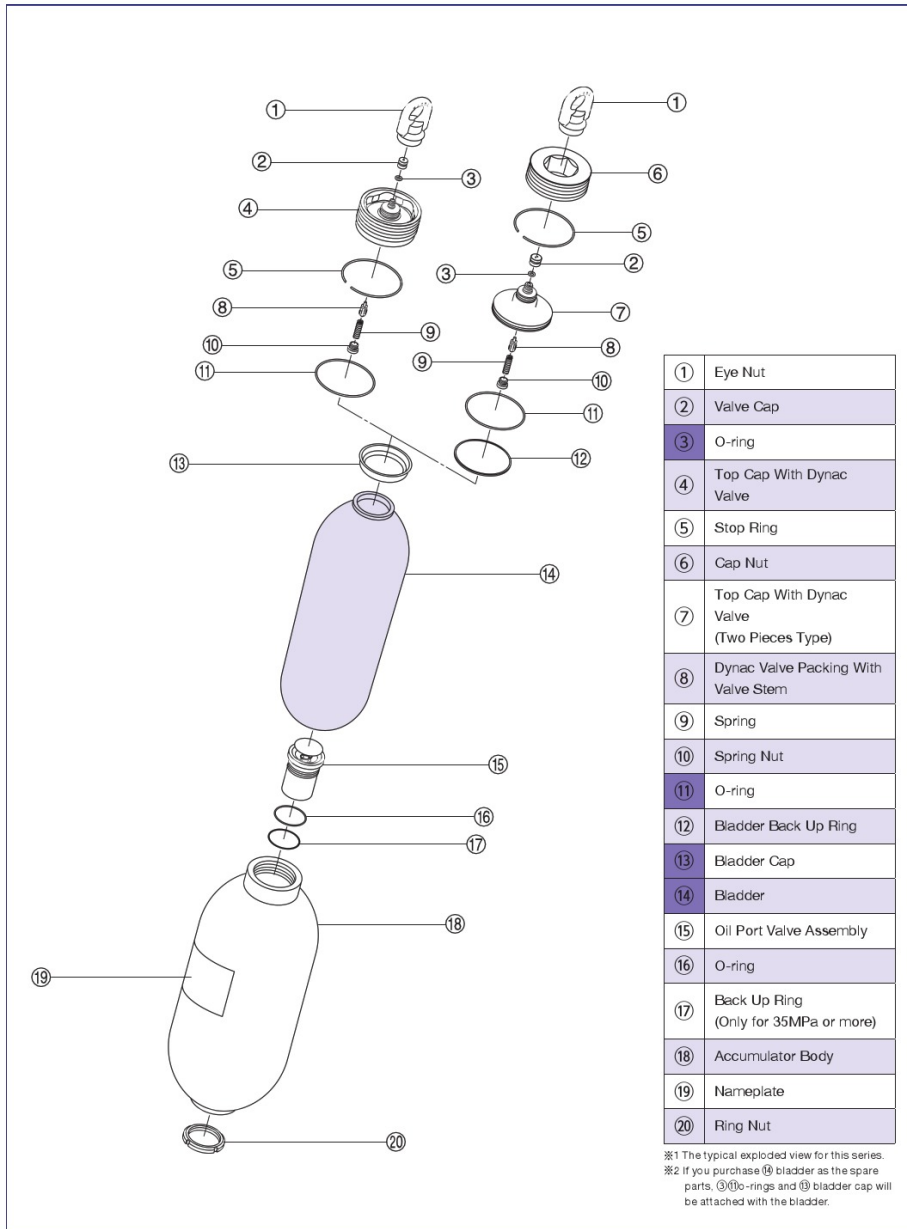
Applicable ACC. MAWP	Item Number	CPS	A	B	C	H	e	φD	C1	φ d1	φ d2	φ d3	φ d4	φ d5	E	F		G		
																O-Ring	B.U. Ring			
17.5MPa 21MPa	6FCM4215AX007	15A	76	56	28	58	11	25	28	16	22.2	32	M12	13	M42x2	JIS B2401 P32	—	G40		
	6FCM4220AX006	20A					12			20	27.7	38								
	6FCM4225AX005	25A					14			25	34.5	45								
	6FCM4232AN21M	32A					16			31.5	43.2	56								
	6FCM4240AX013	40A	18	37.5	49.1	63	M16	18	AS568 218	AS568 218	G60									
6FCM4250AN21M	50A	20	47.5	61.1	75															
6FCM4215AX015	15A	68	48	36	77	12						16	28	12.3		22.2	37.5	M12	14	G30
6FCM4220AN35M	20A																			
35MPa	6FCM4225AX009	25A	92	65	45	86	14	25			36	21	34.5	53		M16	18			
	6FCM4232AN35M	32A					18		36	30		43.2	63							
	6FCM4250AN35M	50A	132	92	50	91	25	35	50	35	61.1	84	M20	22	G50					

● Valve Flange

Applicable ACC. MAWP	Item Number	CPS	A	B	C	D	E	F	G		H
									O-Ring	B.U. Ring	
17.5MPa 21MPa	6FCM4232DN21M	32A	76	56	51	81	M42x2	M12x45	JIS B2401 P32	—	G40
	6FCM4240DN21M	40A	92	65	36	86		M16x55			G50
	6FCM4250DN21M	50A	100	73	36	66		M16x60			G60
35MPa	6FCM4225DN35M	25A	95	65	54	95	M42x2	M16x60	AS568 218	AS568 218	G30
	6FCM4225DX027	25A	φ106	52	110	151		M16x55			G35
	6FCM4232DN35M	32A	100	70	54	95		M16x60			

CPS: Connection Port Size MAWP: Maximum Allowable Working Pressure

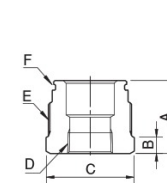
Typical Exploded View



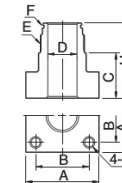
Piping Connection

Dimensional Drawing

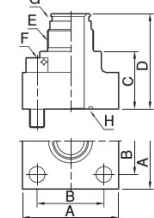
● Bushing



● Flange (with Counter Flange)



● Valve Flange



※1 The above shows the shape of representative model. Confirm the actual shape with the drawing or the actual product.

※2 When there is no indication of maximum allowable working pressure of your accumulator in the column of "Applicable ACC. MAWP" of the following dimensional table, please contact us.

Dimensional Table

● Bushing

Applicable ACC. MAWP	Item Number	Connection Port Size	A	B	C	D	E	F	
								O-Ring	B.U. Ring
17.5MPa 21MPa 23MPa	6FCM60F02N23M	Rc1/4	53	12	φ64 (Width across flat 60)	Rc1/4	M80x2	JIS B2401 G50	—
	6FCM60F03N23M	Rc3/8				Rc3/8			
	6FCM60F04N23M	Rc1/2				Rc1/2			
	6FCM60F06N23M	Rc3/4				Rc3/4			
	6FCM60F08N23M	Rc1				Rc1			
	6FCM60F10N23M	Rc1-1/4				Rc1-1/4			
35MPa	6FCM60F12N23M	Rc1-1/2	73	20	φ65 (Width across flat 60)	Rc1-1/2	M80x2	AS568 225	AS568 225
	6FCM60F02N35M	Rc1/4				Rc1/4			
	6FCM60F03N35M	Rc3/8				Rc3/8			
	6FCM60F04N35M	Rc1/2				Rc1/2			
	6FCM60F06N35M	Rc3/4				Rc3/4			
	6FCM60F08N35M	Rc1				Rc1			
	6FCM60F10N35M	Rc1-1/4	85	32		Rc1-1/4			

● Flange (with Counter Flange)

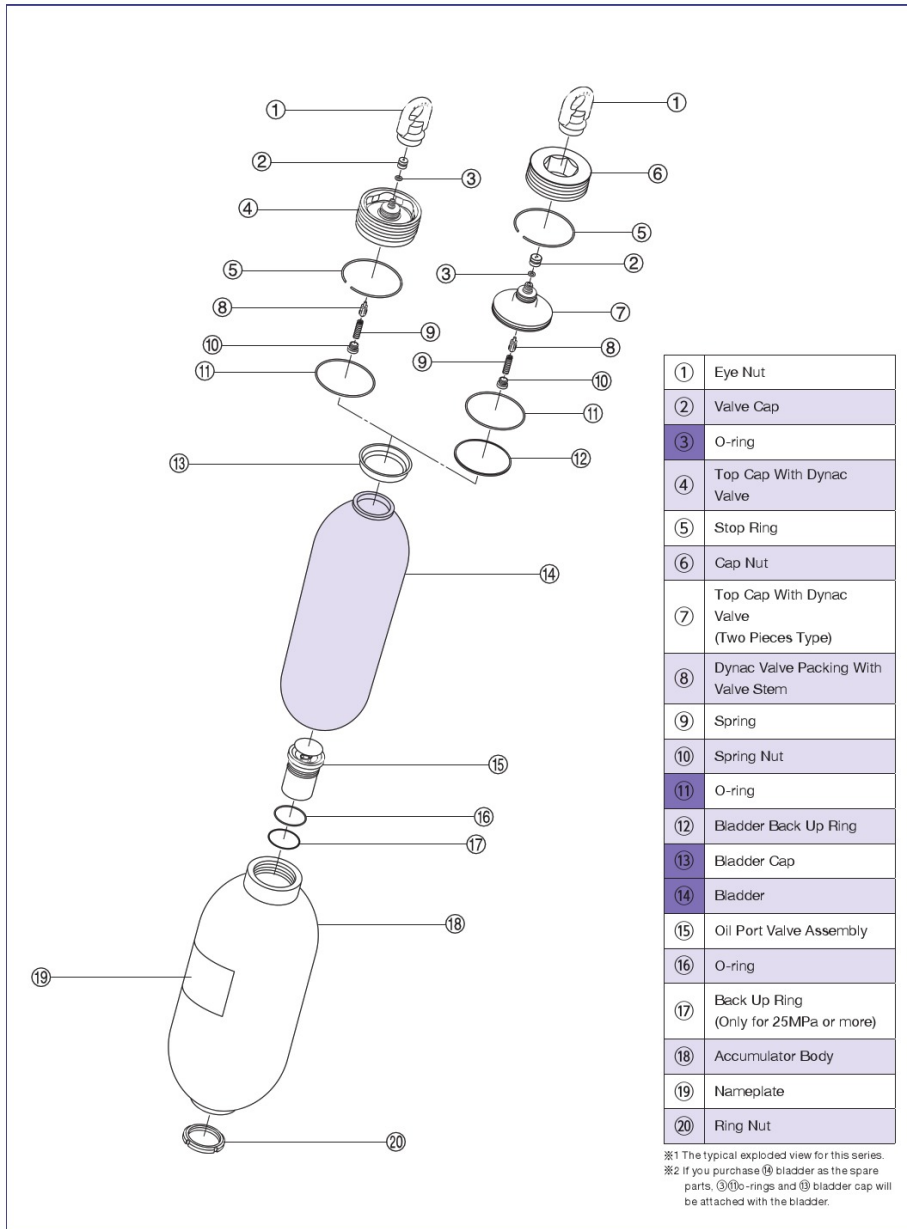
Applicable ACC. MAWP	Item Number	CPS	A	B	C	H	e	φD	C1	φ d1	φ d2	φ d3	φ d4	φ d5	E	F		G
																O-Ring	B.U. Ring	
17.5MPa 21MPa	6FCM6015AX009	15A	76	56	28	69	11	30	28	16	22.2	32	M12	13	M80x2	JIS B2401 G50	—	G40
	6FCM6020AX006	20A								20	27.7	38						G60
	6FCM6025AX007	25A								25	34.5	45						G80
	6FCM6032AN21M	32A								31.5	43.2	56						G100
	6FCM6040LX010	40A								37.5	49.1	63						G125
	6FCM6050LN21M	50A								47.5	61.1	75						G150
35MPa	6FCM6055AN21M	65A	128	92	45	86	22	60	45	60	77.1	95	M20	22	M80x2	AS568 225	AS568 225	G175
	6FCM6015AX014	15A								12.3	22.2	37.5						G30
	6FCM6020AN35M	20A								16.2	27.7	43.5						G40
	6FCM6025AX012	25A								21	34.5	53						G50
	6FCM6032AN35M	32A								30	43.2	63						G60
	6FCM6040AN35M	40A								35	49.1	70						G75
	6FCM6050AN35M	50A	128	90	50	103	25	50	43	61.1	84	100	M18	20				G90

● Valve Flange

Applicable ACC. MAWP	Item Number	CPS	A	B	C	D	E	F	G		H
									O-Ring	B.U. Ring	
17.5MPa 21MPa	6FCM6032DN21M	32A	76	56	83	124	M80x2	M12x45	JIS B2401 G50	—	G40
	6FCM6040DX001	40A	92	65	119	160		M16x55			G50
	6FCM6050KN21M	50A	100	73	103			M16x55			G60
35MPa	6FCM6025DX055	25A	φ106	52	115	168	M80x2	M16x55	AS568 225	AS568 225	G35
	6FCM6032DN35M	32A	100	70	91	144		M16x60			G50
	6FCM6040DN35M	40A	105	75	47	100		M16x65			G50
	6FCM6050DN35M	50A	132	92	60	113		M20x80			G50

CPS: Connection Port Size MAWP: Maximum Allowable Working Pressure

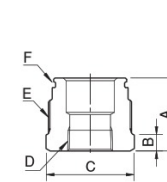
Typical Exploded View



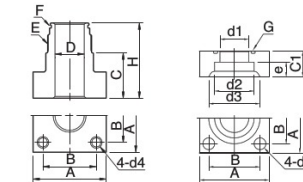
Piping Connection

Dimensional Drawing

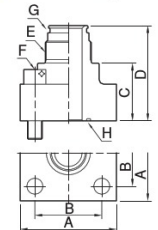
● Bushing



● Flange (with Counter Flange)



● Valve Flange



※1 The above shows the shape of representative model. Confirm the actual shape with the drawing or the actual product.

※2 When there is no indication of maximum allowable working pressure of your accumulator in the column of "Applicable ACC. MAWP" of the following dimensional table, please contact us.

Dimensional Table

● Bushing

Applicable ACC. MAWP	Item Number	Connection Port Size	A	B	C	D	E	F	
								O-Ring	B.U. Ring
15MPa 21MPa 25MPa	6FCM75F03N25M	Rc3/8	66	20	φ80 (Width across flat 75)	Rc3/8	M75x2	JIS B2401 G65	—
	6FCM75F04N25M	Rc1/2				Rc1/2			
	6FCM75F06N25M	Rc3/4				Rc3/4			
	6FCM75F08N25M	Rc1				Rc1			
	6FCM75F10N25M	Rc1-1/4				Rc1-1/4			
	6FCM75F12N25M	Rc1-1/2				Rc1-1/2			
28MPa 33MPa	6FCM75F03N35M	Rc3/8	68	20	φ80 (Width across flat 75)	Rc3/8	M75x2	JIS B2401 G65	JIS B2407 G65
	6FCM75F04N35M	Rc1/2				Rc1/2			
	6FCM75F06N35M	Rc3/4				Rc3/4			
	6FCM75F08N35M	Rc1				Rc1			
	6FCM75F10N35M	Rc1-1/4				Rc1-1/4			

● Flange (with Counter Flange)

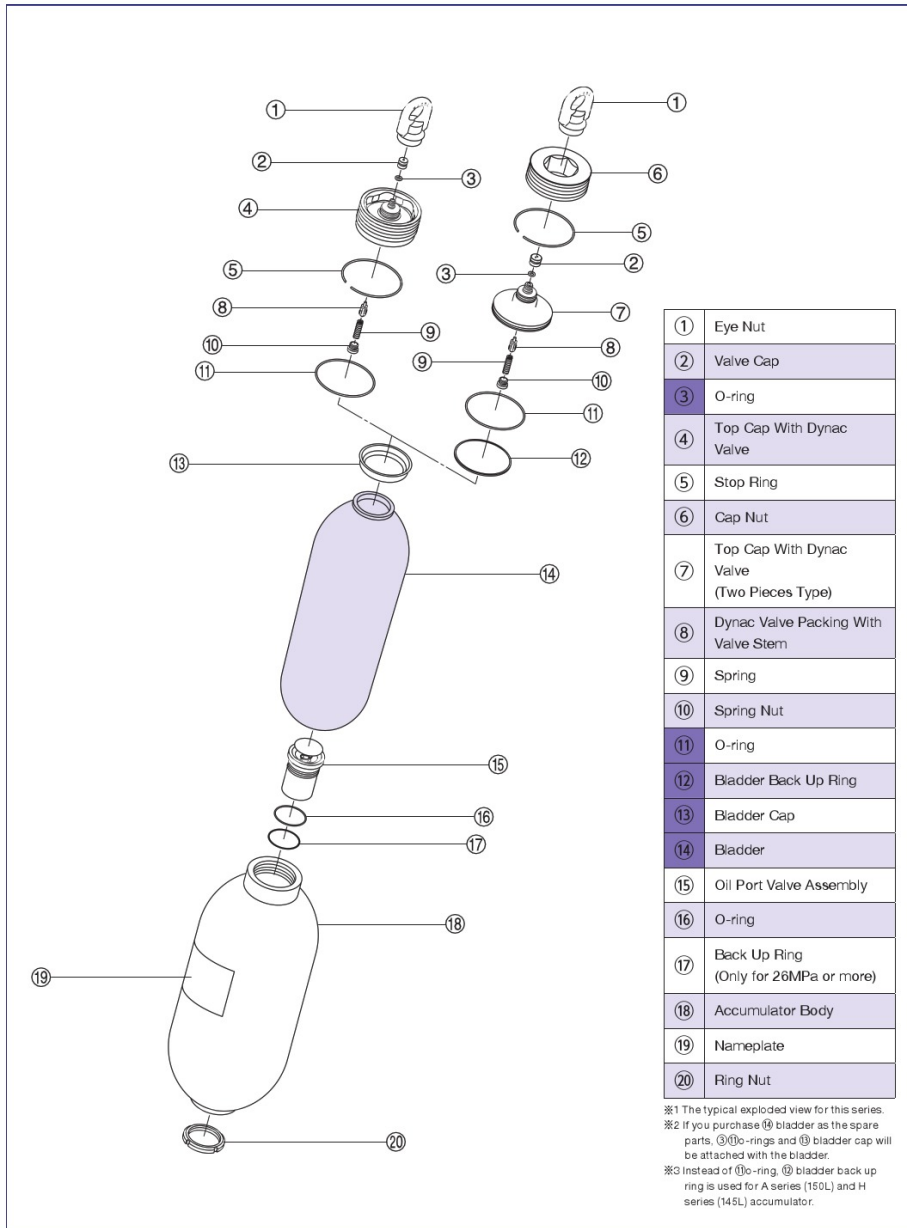
Applicable ACC. MAWP	Item Number	CPS	A	B	C	H	e	φD	C1	φ d1	φ d2	φ d3	φ d4	φ d5	E	F		G
																O-Ring	B.U. Ring	
15MPa 21MPa	6FCM7515AX007	15A	100	73	38	84	11	47.5	36	16	22.2	32	M16	18	M75x2	JIS B2401 G65	—	G80
	6FCM7520AX006	20A								20	27.7	38						G80
	6FCM7525AX005	25A								25	34.5	45						G80
	6FCM7532AX004	32A								31.5	43.2	56						G80
	6FCM7540AX003	40A								37.5	49.1	63						G80
	6FCM7550AN21M	50A								47.5	61.1	75						G80
25MPa 28MPa 33MPa	6FCM7565AN21M	65A	128	92	45	91	22	50	45	60	77.1	95	M20	22	M75x2	JIS B2401 G65	JIS B2407 G65	G75
	6FCM7532AN35M	32A	92	65	45	93	18	30	36	30	43.2	63	M16	18				G340
	6FCM7550AN35M	50A	132	92	50	97	25	35	50	35	61.1	84	M20	22				G50

● Valve Flange

Applicable ACC. MAWP	Item Number	CPS	A	B	C	D	E	F	G		H
									O-Ring	B.U. Ring	
15MPa 21MPa	6FCM7532DN21M	32A	78	56	92	138	M75x2	M12x45	JIS B2401 G65	—	G40
	6FCM7540DX013	40A	92	65	122	168		M16x60			G50
	6FCM7550DN21M	50A	100	73	91	137		M16x55			G60
	6FCM7565DN21M	65A	128	92	64	110		M20x80			G75
25MPa 28MPa 33MPa	6FCM7525DX030	25A	φ106	52	125	173	M75x2	M16x55	JIS B2401 G65	JIS B2407 G65	G35
	6FCM7550DN35M	50A	132	92	67	115		M20x80			G50

CPS: Connection Port Size MAWP: Maximum Allowable Working Pressure

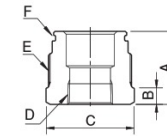
Typical Exploded View



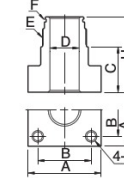
Piping Connection

Dimensional Drawing

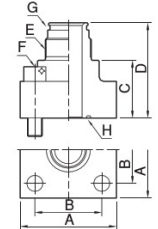
● Bushing



● Flange (with Counter Flange)



● Valve Flange



※1 The above shows the shape of representative model. Confirm the actual shape with the drawing or the actual product.

※2 When there is no indication of maximum allowable working pressure of your accumulator in the column of "Applicable ACC. MAWP" of the following dimensional table, please contact us.

Dimensional Table

● Bushing

Applicable ACC. MAWP	Item Number	Connection Port Size	A	B	C	D	E	F	
								O-Ring	B.U. Ring
15MPa 21MPa 23MPa	6FCM90F08N25M	Rc3/4	71	20	φ100 (Width across flat 90)	Rc3/4	M90x2	JIS B2401 G80	—
	6FCM90F08N25M	Rc1				Rc1			
	6FCM90F10N25M	Rc1-1/4				Rc1-1/4			
	6FCM90F12N25M	Rc1-1/2				Rc1-1/2			
	6FCM90F16N25M	Rc2				Rc2			

● Flange (with Counter Flange)

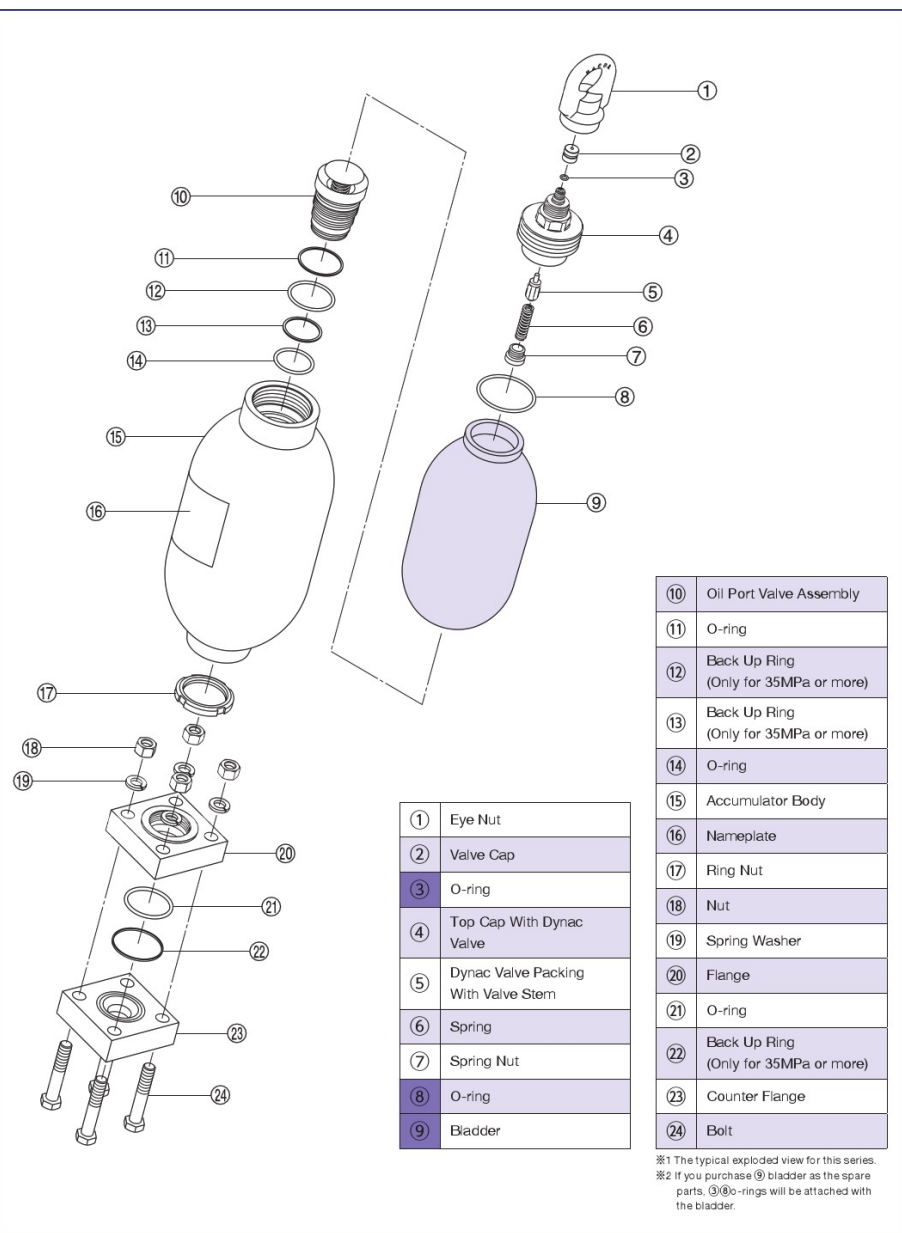
Applicable ACC. MAWP	Item Number	CPS	A	B	C	H	e	φD	C1	φ d1	φ d2	φ d3	φ d4	φ d5	E	F		G
																O-Ring	B.U. Ring	
15MPa 21MPa	6FCM9025AX003	25A	100	73	38	89	14	47.5	36	25	34.5	45	M16	18	M90x2	JIS B2401 G80	—	G80
	6FCM9032AX002	32A																
	6FCM9040AX001	40A																
	6FCM9050AN21M	50A																

● Valve Flange

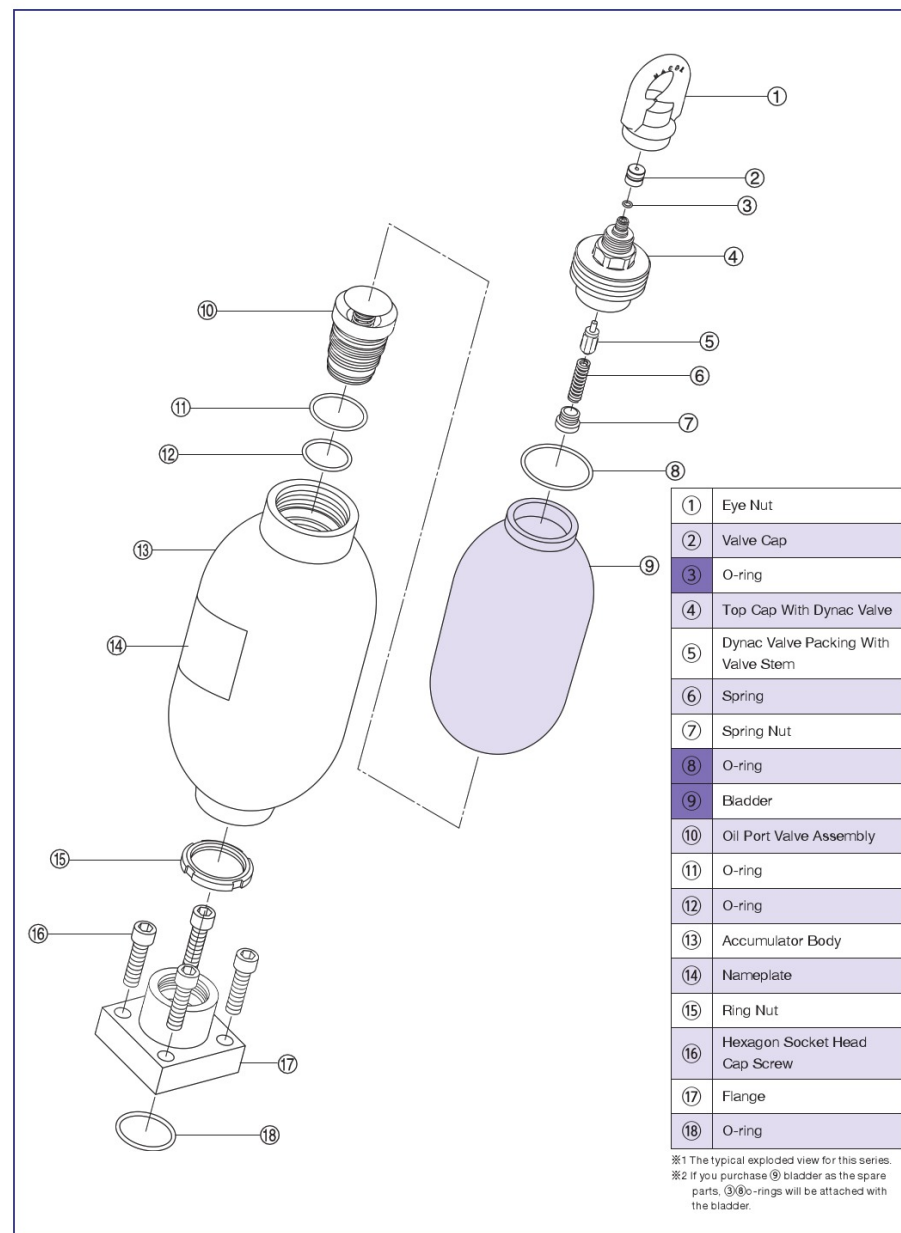
Applicable ACC. MAWP	Item Number	CPS	A	B	C	D	E	F	G		H
									O-Ring	B.U. Ring	
15MPa 21MPa	6FCM9032DN21M	32A	76	56	103	154	M90x2	M12x45	JIS B2401 G80	—	G40
	6FCM9050DN21M	50A									
26MPa 35MPa	6FCM7525DX030	25A	φ106	52	125	173	M75x2	M16x55	JIS B2401 G65	JIS B2407 G65	G35
	6FCM7525DX031								AS568 229	AS568 229	

CPS: Connection Port Size MAWP: Maximum Allowable Working Pressure

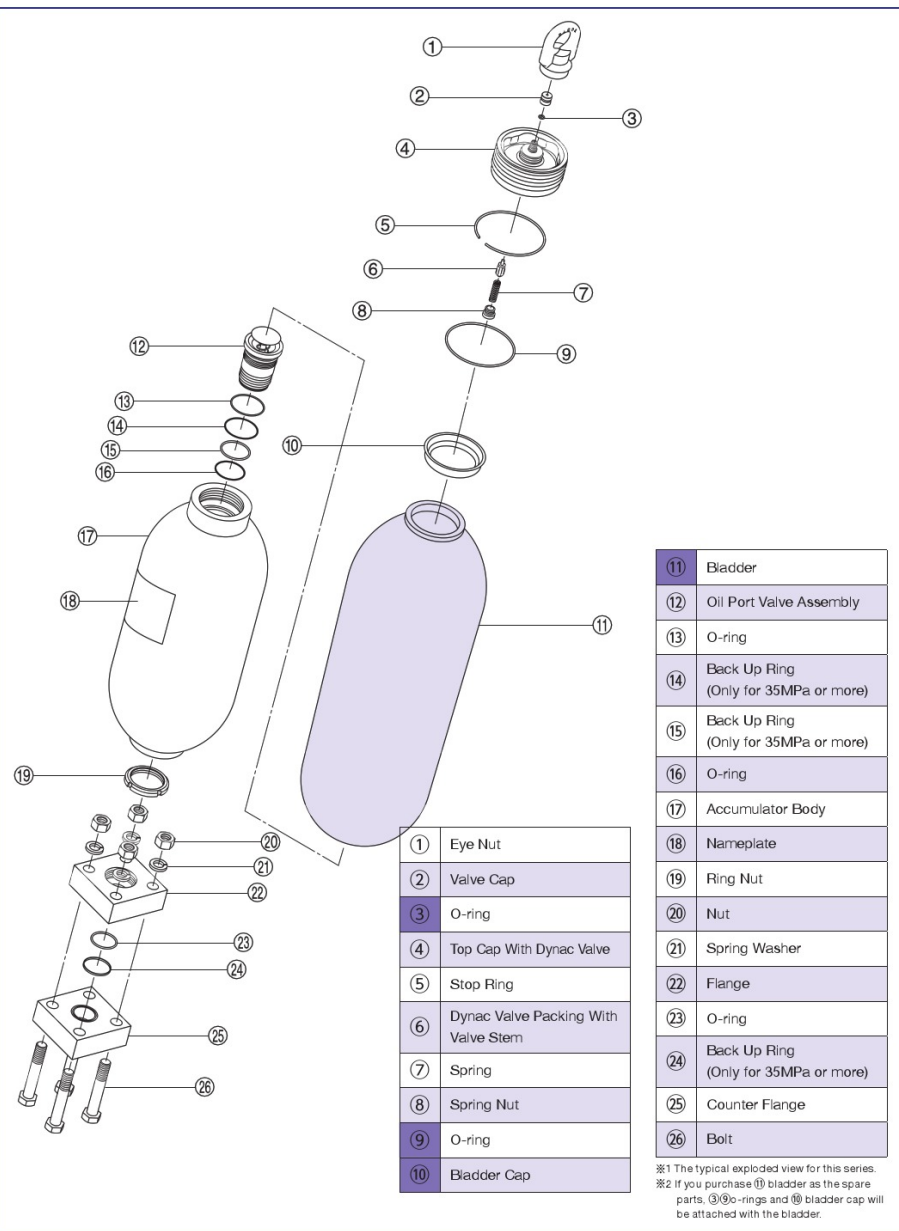
Typical Exploded View



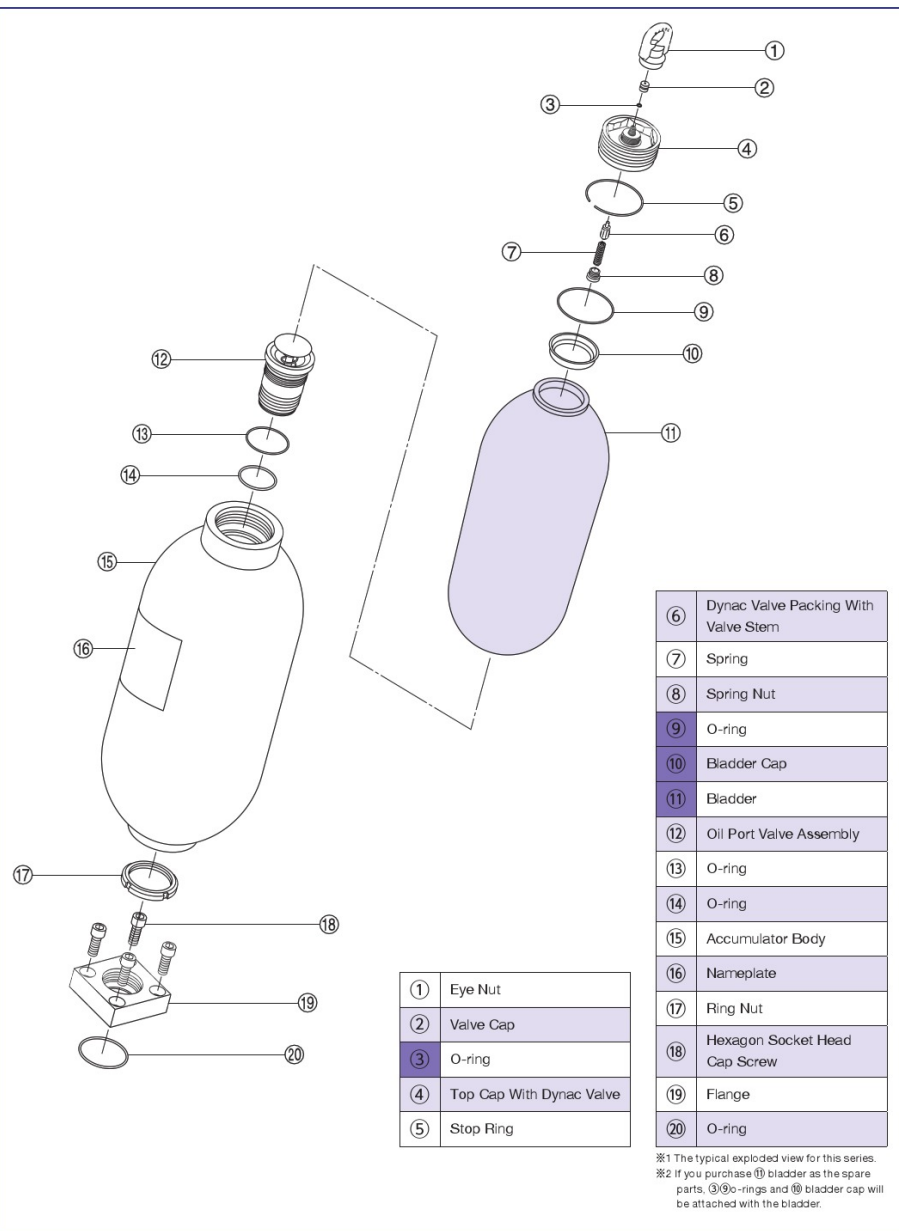
Typical Exploded View



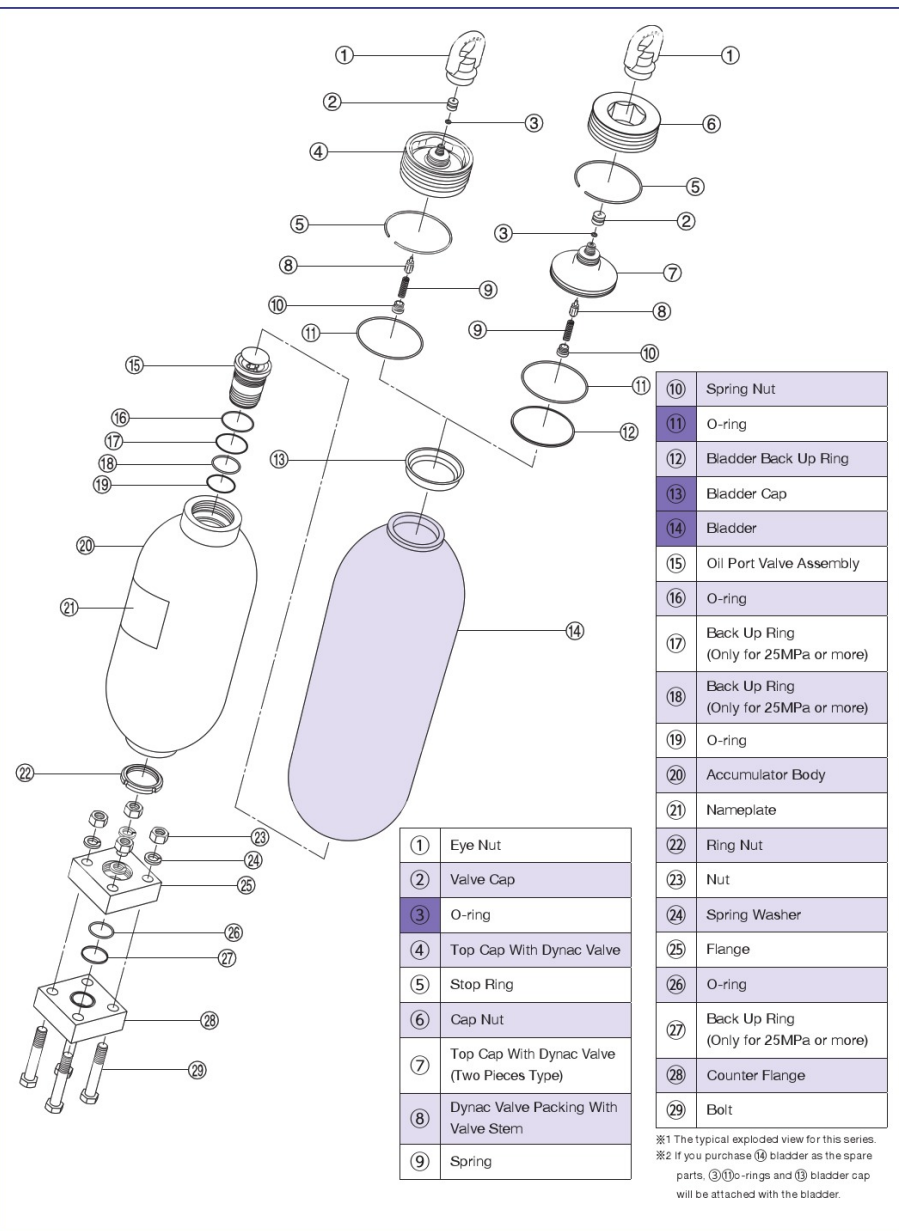
Typical Exploded View



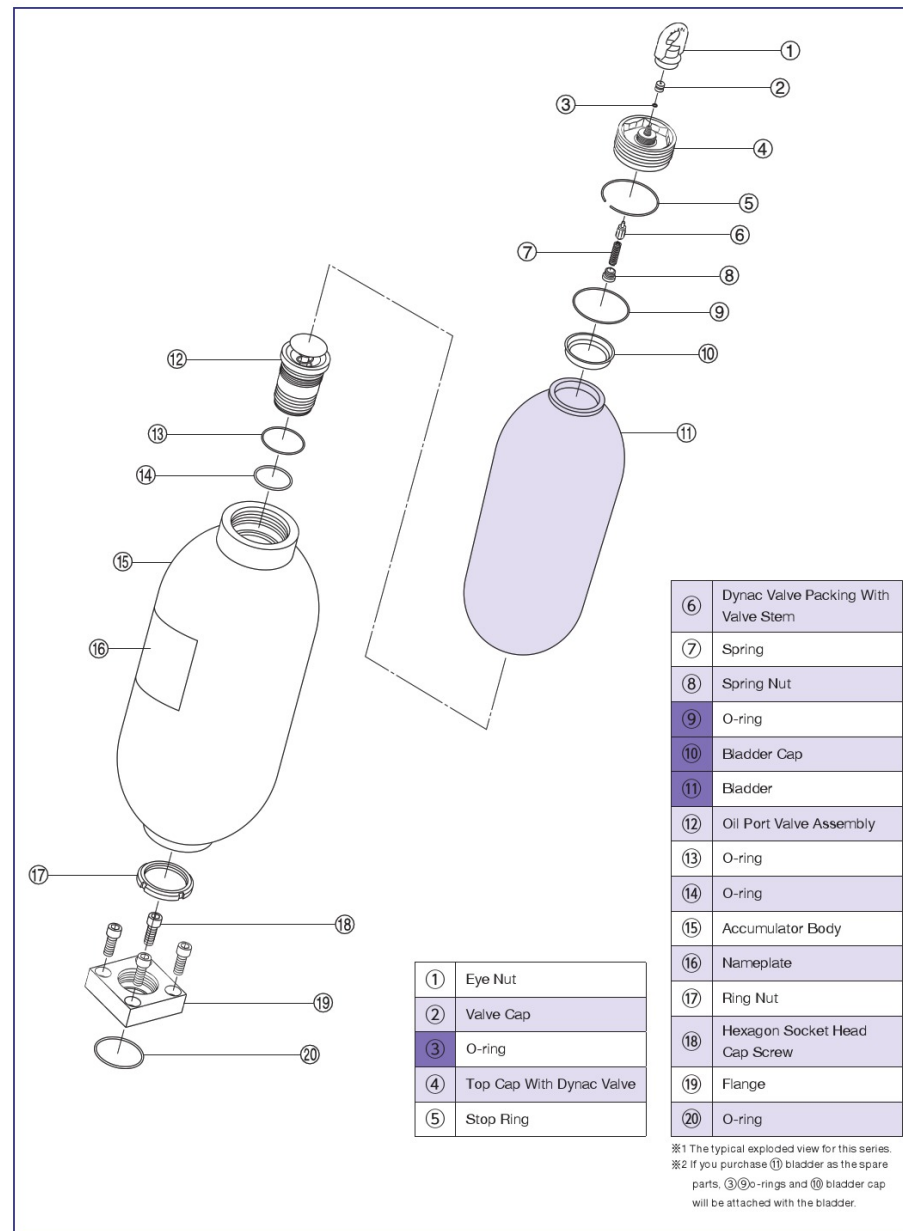
Typical Exploded View



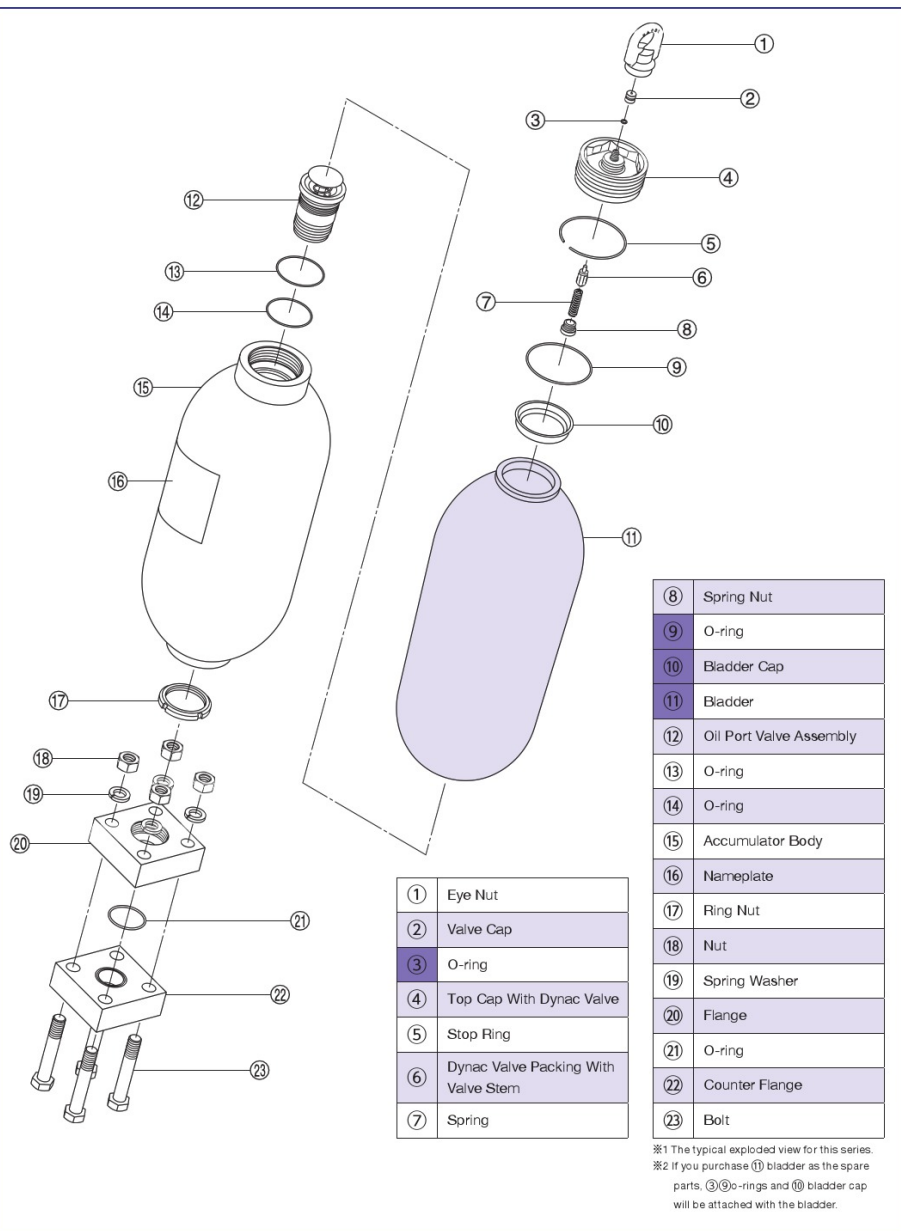
Typical Exploded View



Typical Exploded View



Typical Exploded View

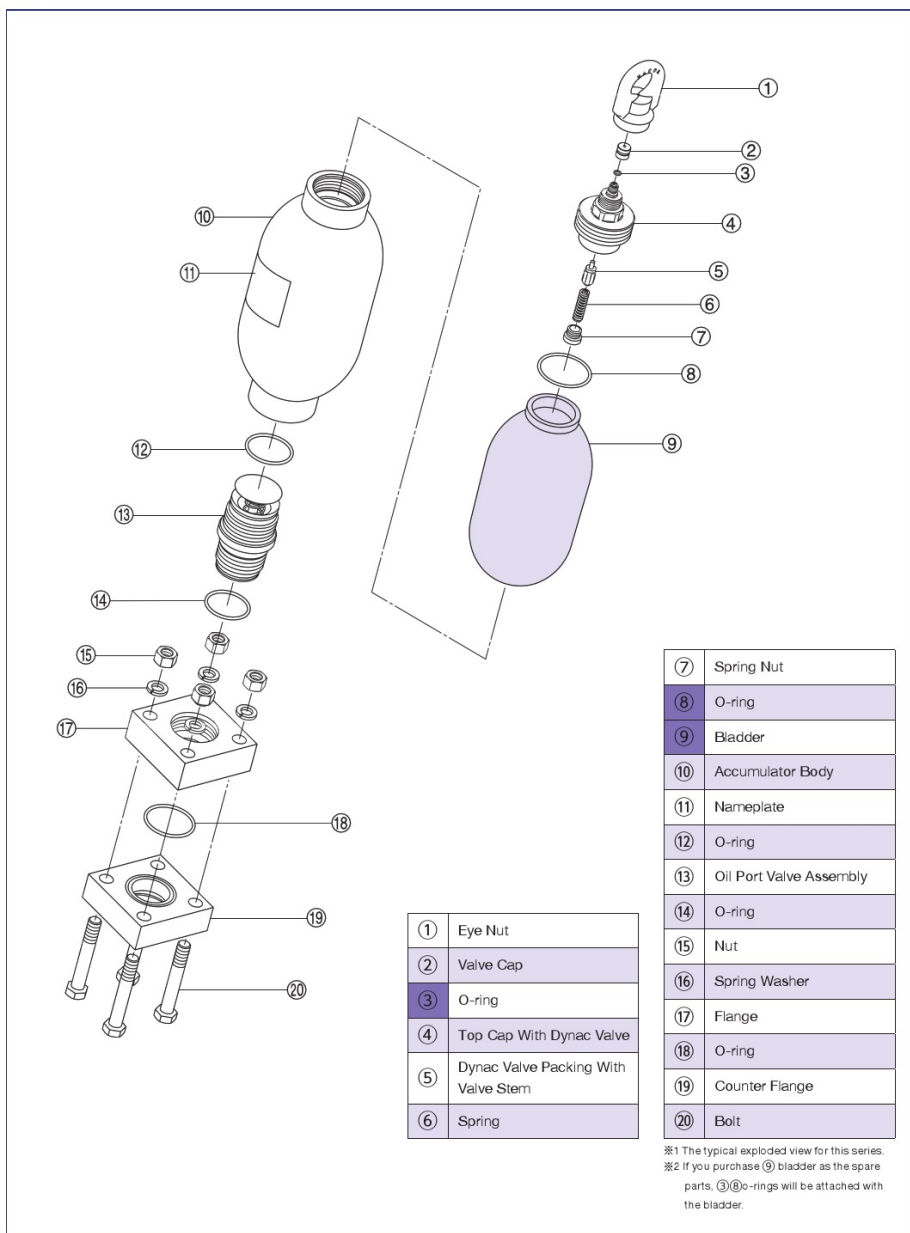


Accessories/Tools

Maximum Allowable Working Pressure MPa				15	21
Item Number of Accumulator				①②-N15MP-160-⑥E⑧	①②-N21MP-160-⑥E⑧
Optional Parts	Gas Charging Tools Kit ※ 1		P204	6GG	
	For Installation	NACOL Clamp	P200	6KH406	
		NORMA Clamp	P201	6081C406	
		Base Mounting Plate (Exclusively for NACOL Clamp)	P193	—	
		Base Mounting Plate (Exclusively for NORMA Clamp)	P193	—	
Bladder Replacement	Parts	Bladder	P210	6.5 ② N 160 A	
		Bladder Back Up Ring		—	
	Tools	Cap Wrench	P208	6TWH100	
Dynac Valve Replacement (DV Spec.)	Parts	Dynac Valve Packing with Valve Stem	P212	645026400A	
		Spring	P212	645045500	
		Spring Nut	P212	645048200	
	Tools	Spring Nut Key	P212	6TWH04	
For Oil Port Valve Assembly	Tools	Ring Nut Wrench	P209	6TWD140	
Separately Available Parts	Eye Nut (Hanging Tool)			6HTM42	
	Valve Cover			645049705	
	Exclusively for Q/R Spec.	SG Valve	P196	6H -AV35MP-F03-M42A	
		Pressure Gauge Containing Glycerol	P197	6018DUF0206 G	
		Spring Loaded Type Safety Valve	P198	6H-SV -03-F03	
		Fuse Plug	P197	6H-FP35MP-03-F03	

※1 Nitrogen gas charging, inspection, or pressure adjustment requires a gas charging tools kit.
 (Only a hose and an adaptor are required for R or Q specification accumulator with SG valve.)

Typical Exploded View

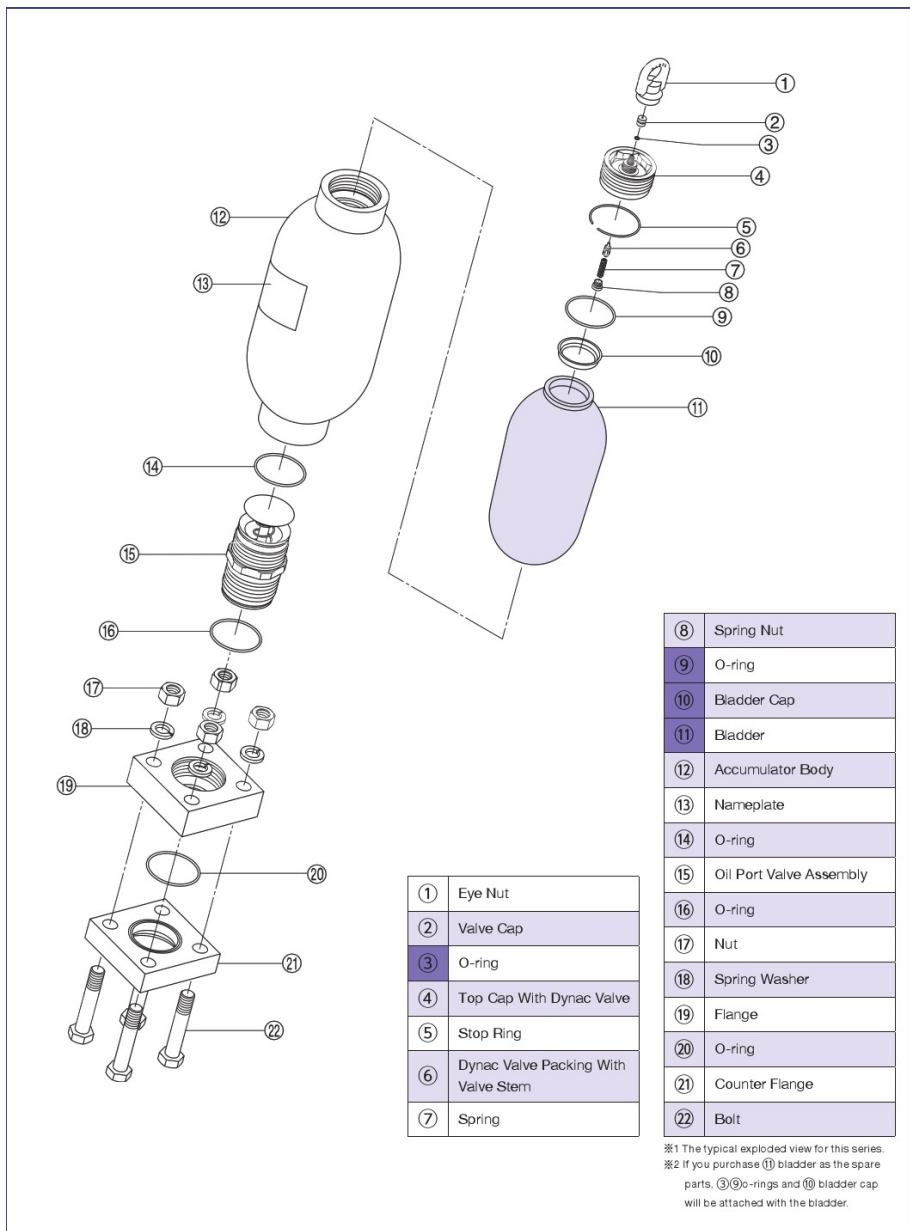


Accessories/Tools

Maximum Allowable Working Pressure MPa					21	
Item Number of Accumulator					①②-A21MP-LL5-⑥Y⑧	
					①②-A21MP-6.3-⑥Y⑧	
					①②-A21MP-L10-⑥Y⑧	
					①②-A21MP-L16-⑥Y⑧	
Optional Parts	Gas Charging Tools Kit ※ 1			☞ P204	6GG ☐ ☐ ☐ ☐ ☐ ☐	
	For Installation	NACOL Clamp		☞ P200	6K190N	
		NORMA Clamp		☞ P201	6081C191	
		Base Mounting Plate (Exclusively for NACOL Clamp)		☞ P199	—	
		Base Mounting Plate (Exclusively for NORMA Clamp)		☞ P199	—	
Bladder Replacement	Parts	Bladder		☞ P210	6.5②A⑤⑤⑤A	
		Bladder Back Up Ring			—	
	Tools	Cap Wrench		☞ P208	— (Please use a commercially available wrench.)	
Dynac Valve Replacement (DV Spec.)	Parts	Dynac Valve Packing with Valve Stem		☞ P212	645026400A	
		Spring		☞ P212	645045500	
		Spring Nut		☞ P212	645048200	
	Tools	Spring Nut Key		☞ P212	6TWH04	
For Oil Port Valve Assembly		Tools	Ring Nut Wrench		☞ P209	— (Please use a commercially available wrench.)
Separately Available Parts	Eye Nut (Hanging Tool)				6HTM32	
	Valve Cover				645049608	
	Exclusively for Q/R Spec.	SG Valve		☞ P196	6H ☐ -AV35MP-F03-M32A	
		Pressure Gauge Containing Glycerol		☞ P197	6018DUF0206 ☐ ☐ ☐ ☐ G	
		Spring Loaded Type Safety Valve		☞ P198	6H-SV ☐ ☐ ☐ ☐ -03-F03	
		Fuse Plug		☞ P197	6H-FP35MP-03-F03	

※1 Nitrogen gas charging, inspection, or pressure adjustment requires a gas charging tools kit.
 (Only a hose and an adaptor are required for R or Q specification accumulator with SG valve.)

Typical Exploded View

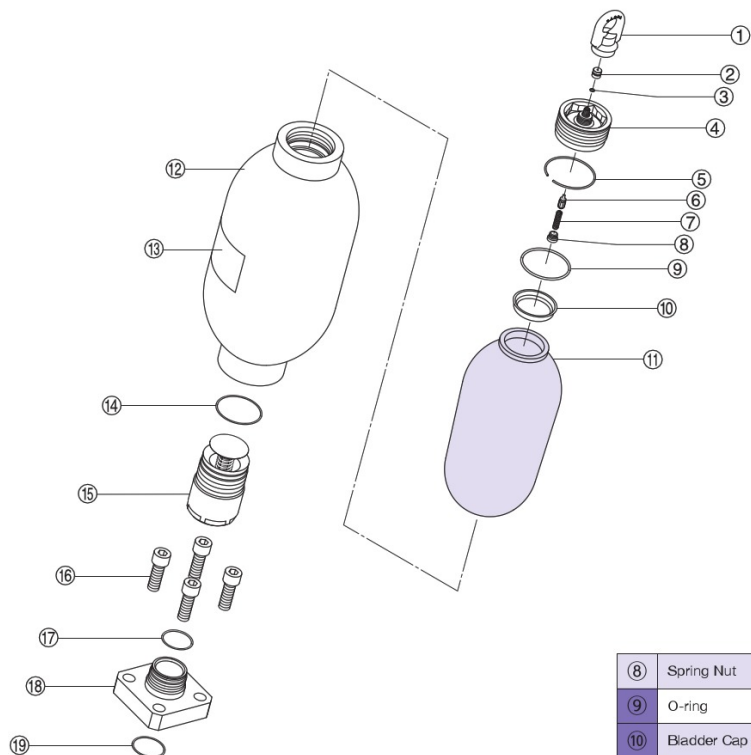


Accessories/Tools

Maximum Allowable Working Pressure MPa				21	
Item Number of Accumulator				①②-N21MP-L20-⑥Y⑧	
				①②-N21MP-L30-⑥Y⑧	
				①②-N21MP-L40-⑥Y⑧	
				①②-N21MP-L50-⑥Y⑧	
				①②-N21MP-L60-⑥Y⑧	
Optional Parts	Gas Charging Tools Kit ※ 1			ⒺP204	6GG ☐ ☐ ☐ ☐ ☐ ☐
	For Installation	NACOL Clamp		ⒺP200	6KH267
		NORMA Clamp		ⒺP201	6081C267
		Base Mounting Plate (Exclusively for NACOL Clamp)		ⒺP199	—
		Base Mounting Plate (Exclusively for NORMA Clamp)		ⒺP199	—
Bladder Replacement	Parts	Bladder		ⒺP210	6.5 ②N ⑤⑤⑤A
		Bladder Back Up Ring			—
	Tools	Cap Wrench		ⒺP208	6TWH81
Dynac Valve Replacement (DV Spec.)	Parts	Dynac Valve Packing with Valve Stem		ⒺP212	645026400A
		Spring		ⒺP212	645045500
		Spring Nut		ⒺP212	645048200
	Tools	Spring Nut Key		ⒺP212	6TWH04
For Oil Port Valve Assembly		Tools	Ring Nut Wrench		ⒺP209 — (Please use a commercially available wrench.)
Separately Available Parts	Eye Nut (Hanging Tool)				6HTM32
	Valve Cover				645049608
	Exclusively for Q/R Spec.	SG Valve		ⒺP196	6H ☐ -AV35MP-F03-M32A
		Pressure Gauge Containing Glycerol		ⒺP197	6018DUF0206 ☐ ☐ ☐ ☐ G
		Spring Loaded Type Safety Valve		ⒺP198	6H-SV ☐ ☐ ☐ ☐ -03-F03
		Fuse Plug		ⒺP197	6H-FP35MP-03-F03

※1 Nitrogen gas charging, inspection, or pressure adjustment requires a gas charging tools kit.
 (Only a hose and an adaptor are required for R or Q specification accumulator with SG valve.)

Typical Exploded View



①	Eye Nut
②	Valve Cap
③	O-ring
④	Top Cap With Dynac Valve
⑤	Stop Ring
⑥	Dynac Valve Packing With Valve Stem
⑦	Spring

⑧	Spring Nut
⑨	O-ring
⑩	Bladder Cap
⑪	Bladder
⑫	Accumulator Body
⑬	Nameplate
⑭	O-ring
⑮	Oil Port Valve Assembly
⑯	Hexagon Socket Head Cap Bolt
⑰	O-ring
⑱	O-ring

※1 The typical exploded view for this series.
 ※2 If you purchase ⑪ bladder as the spare parts, ③ O-rings and ⑩ bladder cap will be attached with the bladder.

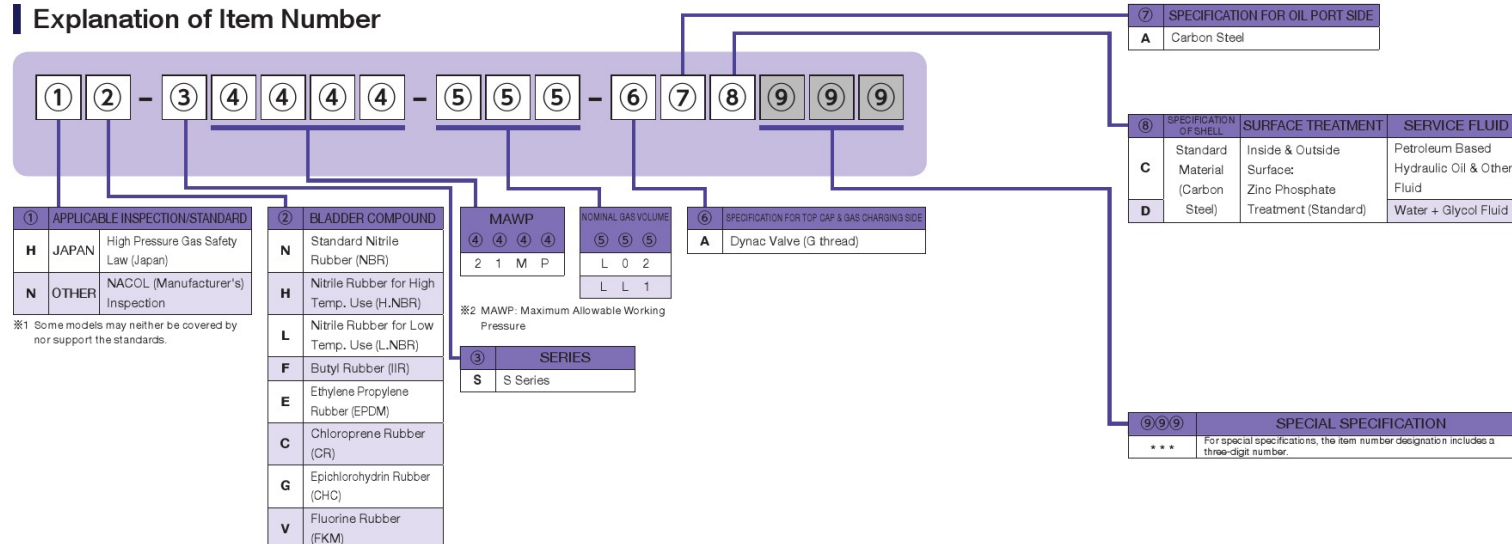
Accessories/Tools

Maximum Allowable Working Pressure MPa				21
Item Number of Accumulator				①②-N21MP-L80-⑥Y⑧
				①②-N21MP-120-⑥Y⑧
Optional Parts	Gas Charging Tools Kit ※ 1		P204	6GG
	For Installation	NACOL Clamp	P200	6KH355
		NORMA Clamp	P201	6081C350
		Base Mounting Plate (Exclusively for NACOL Clamp)	P199	—
		Base Mounting Plate (Exclusively for NORMA Clamp)	P199	—
Bladder Replacement	Parts	Bladder	P210	6 5 ②N ⑤⑤⑤A
		Bladder Back Up Ring		—
	Tools	Cap Wrench	P208	6TWH100
Dynac Valve Replacement (DV Spec.)	Parts	Dynac Valve Packing with Valve Stem	P212	645026400A
		Spring	P212	645045500
		Spring Nut	P212	645048200
	Tools	Spring Nut Key	P212	6TWH04
For Oil Port Valve Assembly	Tools	Ring Nut Wrench	P209	— (Please use a commercially available wrench.)
Separately Available Parts	Eye Nut (Hanging Tool)			6HTM42
	Valve Cover			645043705
	Exclusively for Q/R Spec.	SG Valve	P196	6H -AV35MP-F03-M42A
		Pressure Gauge Containing Glycerol	P197	6018DUF0206 G
		Spring Loaded Type Safety Valve	P198	6H-SV -03-F03
		Fuse Plug	P197	6H-FP35MP-03-F03

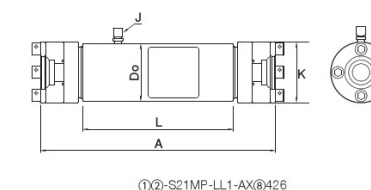
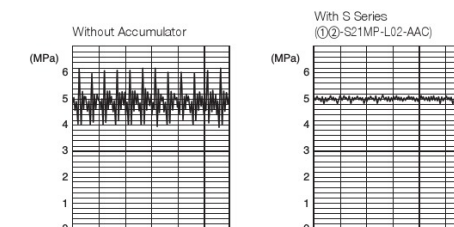
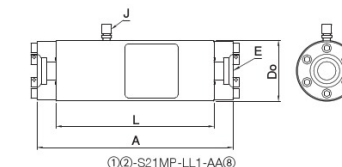
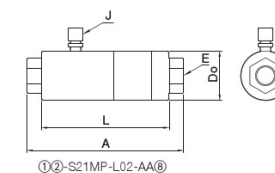
※1 Nitrogen gas charging, inspection, or pressure adjustment requires a gas charging tools kit.
 (Only a hose and an adaptor are required for R or Q specification accumulator with SG valve.)

Accumulator

Explanation of Item Number



Dimensional Drawing



Dimensional Table

Maximum Allowable Working Pressure MPa	Item Number	Nominal Gas Volume L	Mass kg	Max. Transit Oil Flow Volume L/min	A mm	L mm			φD _o mm	E	J
21	①②-S21MP-L02-AA⑧	0.1	3.3	90	206	168			65	Rc3/4	G1/4
	①②-S21MP-L02-AA⑧	0.6	19	400	370	298			114.3	40A	

※3 Dimensions without tolerance indication are for reference. Please confirm the dimensions with the actual product.

S series allowing for correct flange orientation

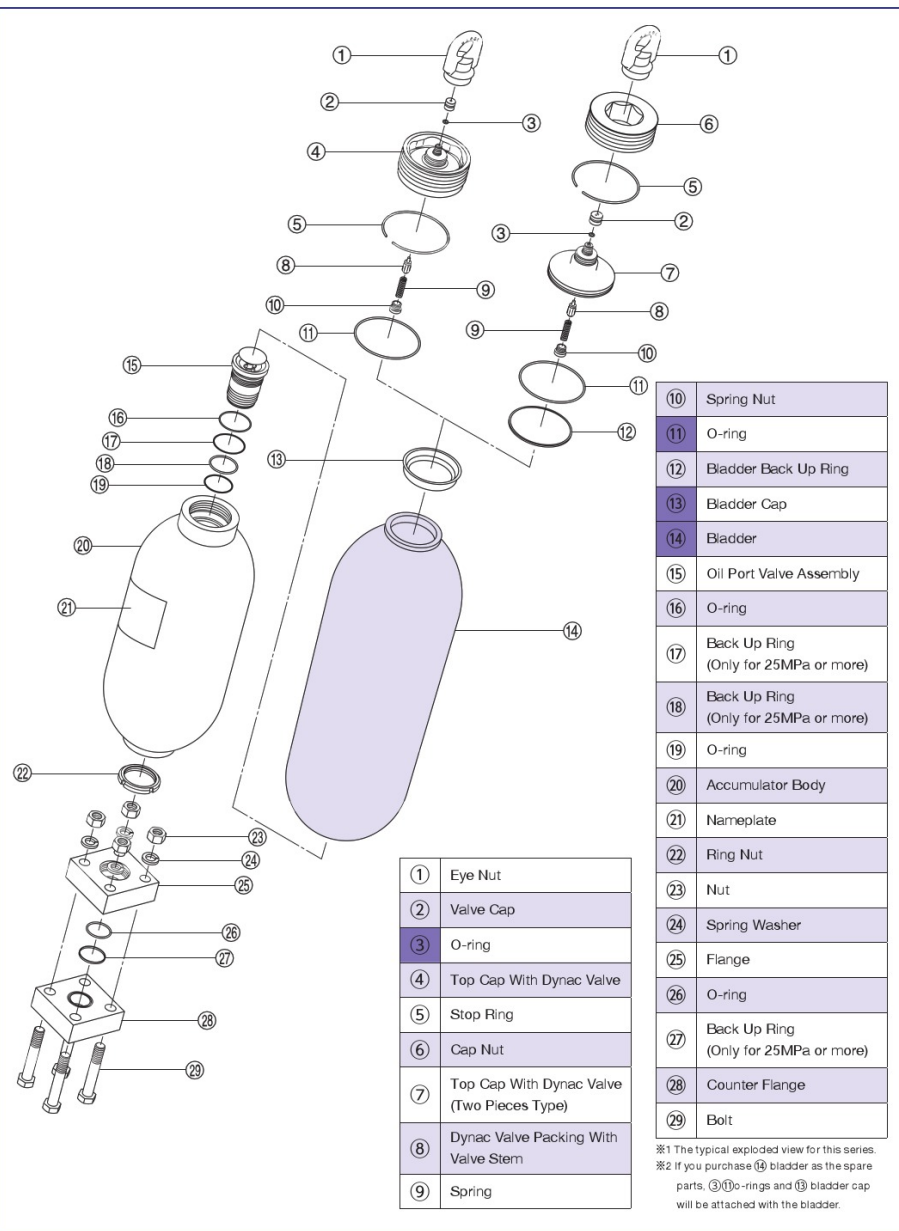
When removing ①②-S21MP-LL1-AA⑧ listed above from piping for bladder replacement, accumulator bolt hole positions must be marked in advance to ensure the correct orientation relative to the pipe flange upon reassembly.

①②-S21MP-LL1-AX⑧426 listed below allows for the correct orientation relative to the pipe flange without troublesome work.

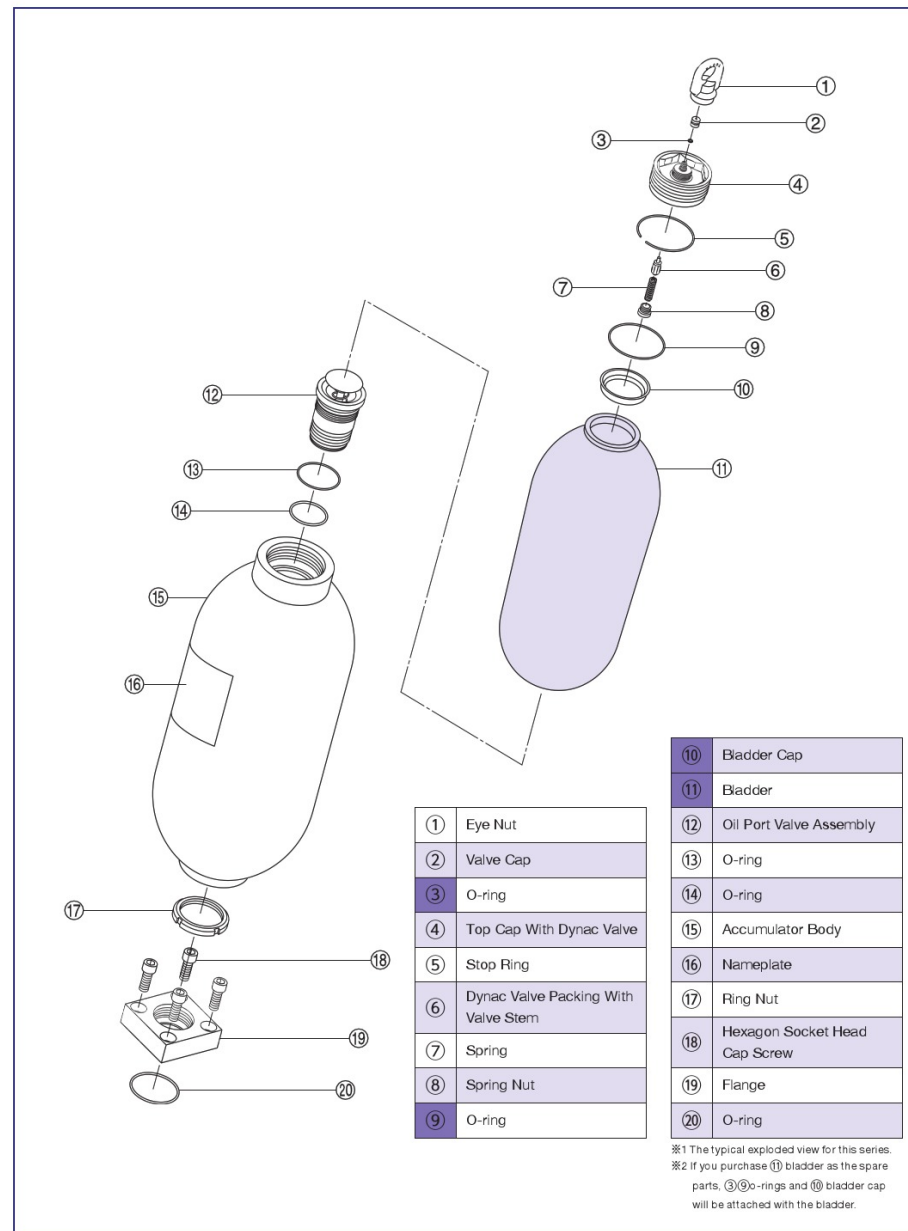
Maximum Allowable Working Pressure MPa	Item Number	Nominal Gas Volume L	Mass kg	Max. Transit Oil Flow Volume L/min	A mm	L mm			φD _o mm	φK mm	E	J
21	①②-S21MP-L02-AA⑧	0.6	28	400	466	306			114.3	120	40A	G1/4

※4 Dimensions without tolerance indication are for reference. Please confirm the dimensions with the actual product.

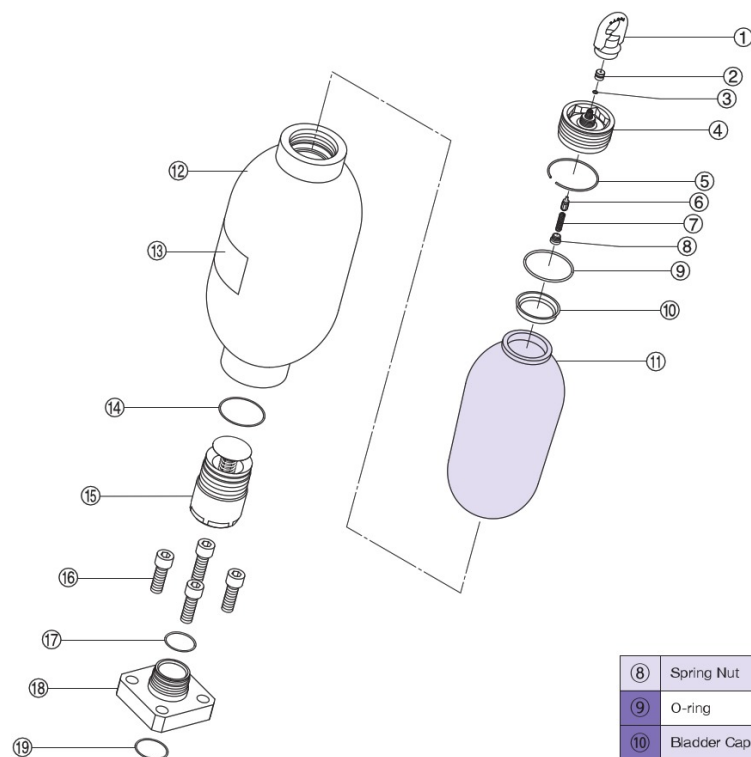
Typical Exploded View



Typical Exploded View



Typical Exploded View



①	Eye Nut
②	Valve Cap
③	O-ring
④	Top Cap With Dynac Valve
⑤	Stop Ring
⑥	Dynac Valve Packing With Valve Stem
⑦	Spring

⑧	Spring Nut
⑨	O-ring
⑩	Bladder Cap
⑪	Bladder
⑫	Accumulator Body
⑬	Nameplate
⑭	O-ring
⑮	Oil Port Valve Assembly
⑯	Hexagon Socket Head Cap Bolt
⑰	O-ring
⑱	Flange
⑲	O-ring

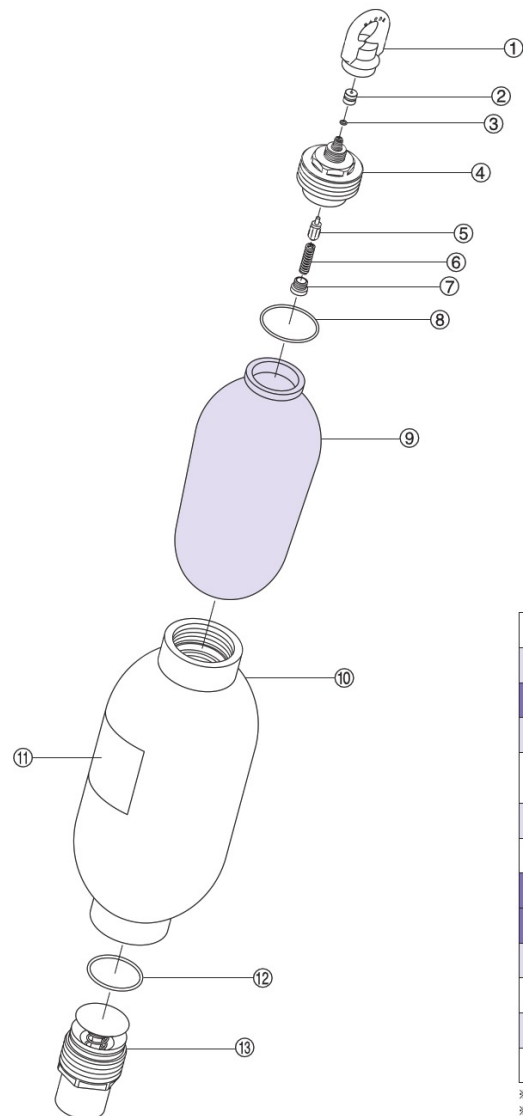
※1 The typical exploded view for this series.
 ※2 If you purchase ⑪ bladder as the spare parts, ③ O-rings and ⑩ bladder cap will be attached with the bladder.

Accessories/Tools

Maximum Allowable Working Pressure MPa				21
				①②-Y21MP-L60-⑥Y⑧
Optional Parts	Gas Charging Tools Kit ※ 1		P204	6GG ☐ ☐ ☐ ☐ ☐ ☐
	For Installation	NACOL Clamp	P200	6KH355
		NORMA Clamp	P201	6081C350
		Base Mounting Plate (Exclusively for NACOL Clamp)	P199	—
		Base Mounting Plate (Exclusively for NORMA Clamp)	P199	—
Bladder Replacement	Parts	Bladder	P210	6 5 ② Y ⑤ ⑤ ⑤ A
		Bladder Back Up Ring		—
Dynac Valve Replacement (DV Spec.)	Parts	Dynac Valve Packing with Valve Stem	P212	645026400A
		Spring	P212	645045500
		Spring Nut	P212	645048200
	Tools	Spring Nut Key	P212	6TWH04
For Oil Port Valve Assembly	Tools	Ring Nut Wrench	P209	— (Please use a commercially available wrench.)
Separately Available Parts	Eye Nut (Hanging Tool)			6HTM42
	Valve Cover			645049705
	Exclusively for Q/R Spec.	SG Valve	P196	6H ☐ -AV35MP-F03-M42A
		Pressure Gauge Containing Glycerol	P197	6018DUF0206 ☐ ☐ ☐ G
		Spring Loaded Type Safety Valve	P198	6H-SV ☐ ☐ ☐ -03-F03
		Fuse Plug	P197	6H-FP35MP-03-F03

※1 Nitrogen gas charging, inspection, or pressure adjustment requires a gas charging tools kit.
 (Only a hose and an adaptor are required for R or Q specification accumulator with SG valve.)

Typical Exploded View



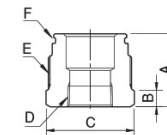
①	Eye Nut
②	Valve Cap
③	O-ring
④	Top Cap With Dynac Valve
⑤	Dynac Valve Packing With Valve Stem
⑥	Spring
⑦	Spring Nut
⑧	O-ring
⑨	Bladder
⑩	Accumulator Body
⑪	Nameplate
⑫	O-ring
⑬	Oil Port Valve Assembly

※1 The typical exploded view for this series.
 ※2 If you purchase ⑨ bladder as the spare parts, ③⑧ O-rings will be attached with the bladder.

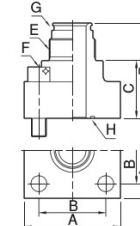
Piping Connection

Dimensional Drawing

● Bushing



● Valve Flange



※1 The above shows the shape of representative model. Confirm the actual shape with the drawing or the actual product.

※2 When there is no indication of maximum allowable working pressure of your accumulator in the column of "Applicable ACC. MAWP" of the following dimensional table, please contact us.

Dimensional Table

● Bushing

Applicable ACC. MAWP	Item Number	Connection Port Size	A	B	C	D	E	F	
								O-Ring	B.U. Ring
25MPa	6FCM60F02X014	Rc1/4	63	20	Φ75 (Width across flat 70)	Rc1/4	M80x2	AS568 225	—
	6FCM60F03X014	Rc3/8				Rc3/8			
	6FCM60F04X014	Rc1/2				Rc1/2			
	6FCM60F06X014	Rc3/4				Rc3/4			
	6FCM60F08X014	Rc1				Rc1			

(mm)

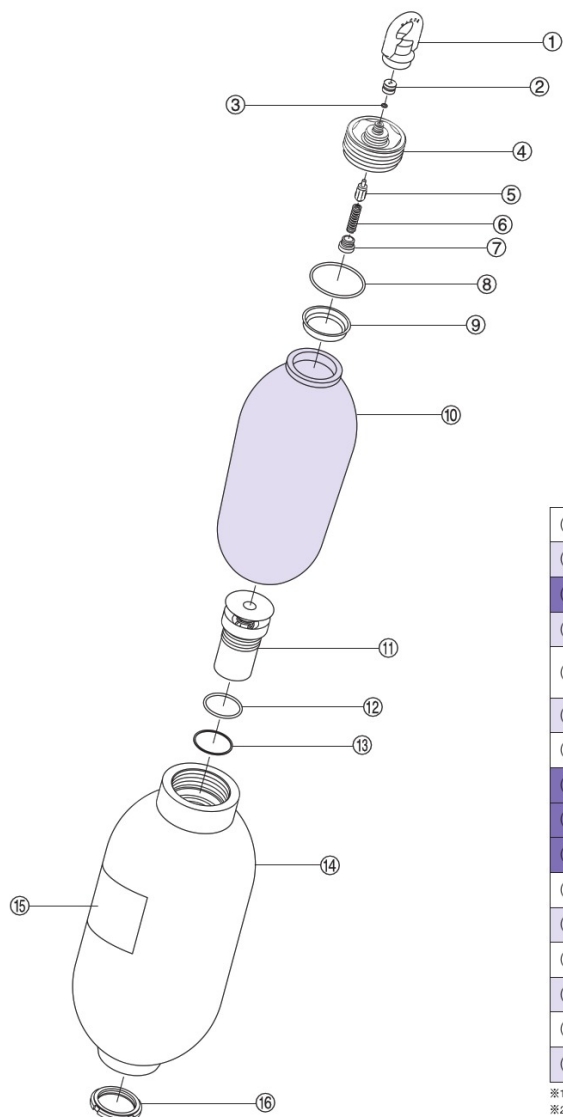
● Valve Flange

Applicable ACC. MAWP	Item Number	CPS	A	B	C	D	E	F	G		H
									O-Ring	B.U. Ring	
25MPa	6FCM6050DX034	50A	100	73	36	79	M60x2	M16x55	AS568 225	—	G55

(mm)

CPS: Connection Port Size MAWP: Maximum Allowable Working Pressure

Typical Exploded View



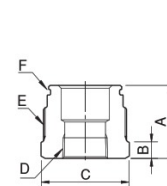
①	Eye Nut
②	Valve Cap
③	O-ring
④	Top Cap With Dynac Valve
⑤	Dynac Valve Packing With Valve Stem
⑥	Spring
⑦	Spring Nut
⑧	O-ring
⑨	Bladder Cap
⑩	Bladder
⑪	Oil Port Valve Assembly
⑫	O-ring
⑬	Back Up Ring
⑭	Accumulator Body
⑮	Nameplate
⑯	Ring Nut

※1 The typical exploded view for this series.
 ※2 If you purchase ⑩ bladder as the spare parts, ③, ⑧ O-rings and ⑨ bladder cap will be attached with the bladder.

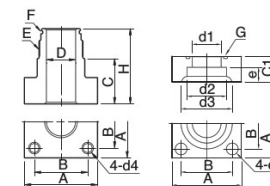
Piping Connection

Dimensional Drawing

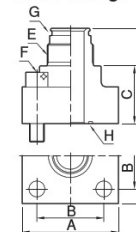
● Bushing



● Flange (with Counter Flange)



● Valve Flange



※1 The above shows the shape of representative model. Confirm the actual shape with the drawing or the actual product.

※2 When there is no indication of maximum allowable working pressure of your accumulator in the column of "Applicable ACC. MAWP" of the following dimensional table, please contact us.

Dimensional Table

● Bushing

Applicable ACC. MAWP	Item Number	Connection Port Size	A	B	C	D	E	F	
								O-Ring	B.U. Ring
25MPa	6FCM50F02N25M	Rc1/4	53	12	φ60 (Width across flat 54)	Rc1/4	M50x2	JIS B2401 G40	JIS B2407 G40
	6FCM50F03N25M	Rc3/8				Rc3/8			
	6FCM50F04N25M	Rc1/2				Rc1/2			
	6FCM50F06N25M	Rc3/4				Rc3/4			
	6FCM50F08N25M	Rc1				Rc1			
	6FCM50F10N25M	Rc1-1/4	77	36	φ65 (Width across flat 60)	Rc1-1/4			

● Flange (with Counter Flange)

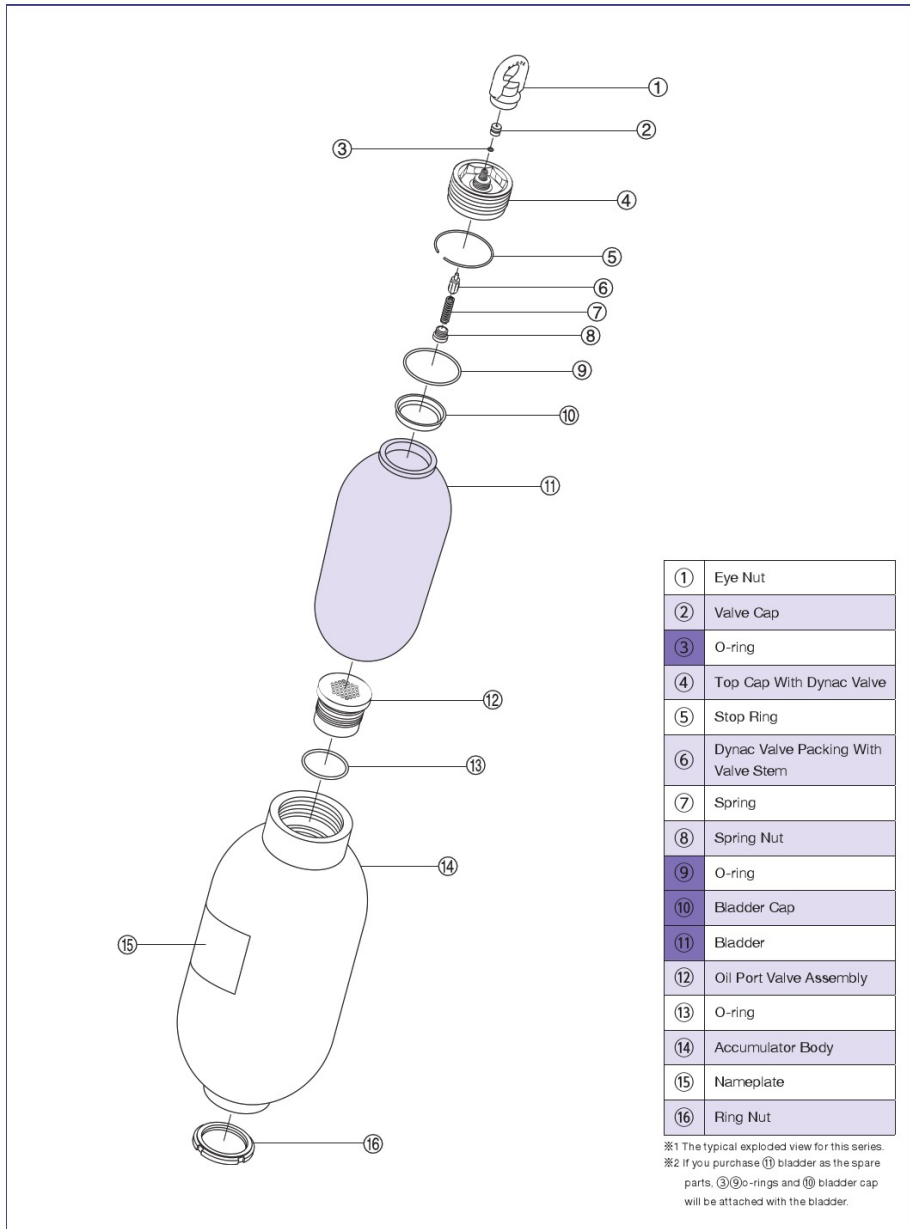
Applicable ACC. MAWP	Item Number	CPS	A	B	C	H	e	φD	C1	φ d1	φ d2	φ d3	φ d4	φ d5	E	F		G
																O-Ring	B.U. Ring	
25MPa	6FCM5050AN25M	50A	130	90	50	φ1	20	30	50	43.1	61.1	79	M20	22	M50x2	JIS B2401 G40	JIS B2407 G40	G55

● Valve Flange

Applicable ACC. MAWP	Item Number	CPS	A	B	C	D	E	F	G		H
									O-Ring	B.U. Ring	
25MPa	6FCM5025DX007	25A	φ106	52	110	151	M50x2	M16x55	JIS B2401 G40	JIS B2407 G40	G35
	6FCM5032DX002	32A	106	77	36	77		M16x60			G40
	6FCM5040DX001	40A	105	73	53	94					

CPS: Connection Port Size MAWP: Maximum Allowable Working Pressure

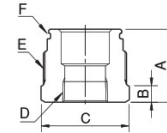
Typical Exploded View



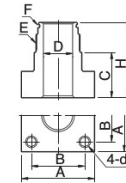
Piping Connection

Dimensional Drawing

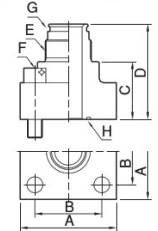
● Bushing



● Flange (with Counter Flange)



● Valve Flange



※1 The above shows the shape of representative model. Confirm the actual shape with the drawing or the actual product.

※2 When there is no indication of maximum allowable working pressure of your accumulator in the column of "Applicable ACC. MAWP" of the following dimensional table, please contact us.

Dimensional Table

● Bushing

Applicable ACC. MAWP	Applicable ACC.	Item Number	Connection Port Size	A	B	C	D	E	F O-Ring
2MPa	N Series 20~60L	6FCM60F02N23M	Rc1/4	53	12	φ64 (Width across flat 60)	Rc1/4	M60x2	JIS B2401 G50
		6FCM60F03N23M	Rc3/8				Rc3/8		
		6FCM60F04N23M	Rc1/2				Rc1/2		
		6FCM60F06N23M	Rc3/4				Rc3/4		
		6FCM60F08N23M	Rc1				Rc1		
		6FCM60F10N23M	Rc1-1/4				Rc1-1/4		
2MPa	Y Series 60L N Series 80~120L	6FCM60F12N23M	Rc1-1/2	77	36	φ85 (Width across flat 80)	Rc1-1/2	M75x2	JIS B2401 G85
		6FCM75F03N25M	Rc3/8				Rc3/8		
		6FCM75F04N25M	Rc1/2				Rc1/2		
		6FCM75F06N25M	Rc3/4				Rc3/4		
		6FCM75F08N25M	Rc1				Rc1		
		6FCM75F10N25M	Rc1-1/4				Rc1-1/4		
		6FCM75F12N25M	Rc1-1/2				Rc1-1/2		

● Flange (with Counter Flange)

Applicable ACC. MAWP	Applicable ACC.	Item Number	CPS	A	B	C	H	e	φD	C1	φ d1	φ d2	φ d3	φ d4	φ d5	E	F O-Ring	G
2MPa	N Series 20~60L	6FCM6015AX009	15A	76	56	26	69	11	30	28	16	22.2	32	M12	13	M60x2	JIS B2401 G50	G40
		6FCM6020AX008	20A					12			20	27.7	38					G50
		6FCM6025AX007	25A					14			25	34.5	45					G60
		6FCM6032AN21M	32A	100	73	62	103	16	47.5	36	31.5	43.2	56	M16	18	M75x2	JIS B2401 G65	G75
		6FCM6040LX010	40A					18			37.5	49.1	63					G80
		6FCM6050LN21M	50A					20			47.5	61.1	75					G85
	Y Series 60L N Series 80~120L	6FCM6065AN21M	65A	128	92	45	86	22	60	45	60	77.1	95	M20	22	M75x2	JIS B2401 G65	G75
		6FCM7515AX007	15A					11			16	22.2	32					G40
		6FCM7520AX008	20A					12			20	27.7	38					G50
		6FCM7525AX005	25A	100	73	38	84	14	47.5	36	25	34.5	45	M16	18	M75x2	JIS B2401 G65	G60
		6FCM7532AX004	32A					16			31.5	43.2	56					G75
		6FCM7540AX003	40A					18			37.5	49.1	63					G80
		6FCM7550AN21M	50A	128	92	45	91	20	50	45	47.5	61.1	75	M20	22	M75x2	JIS B2401 G65	G85
		6FCM7565AN21M	65A					22			60	77.1	95					G90

● Valve Flange

Applicable ACC. MAWP	Applicable ACC.	Item Number	CPS	A	B	C	D	E	F	G O-Ring	H
2MPa	N Series 20~60L	6FCM6032DN21M	32A	76	56	83	124	M60x2	M12x45	JIS B2401 G50	G40
		6FCM6040DX001	40A	92	65	119	160		M16x55		G50
		6FCM6050DN21M	50A	100	73	82	103		M12x45		G60
		6FCM7532DN21M	32A	76	56	92	138		M16x60		G40
	Y Series 60L N Series 80~120L	6FCM7540DX013	40A	92	65	122	168	M75x2	M12x45	JIS B2401 G65	G50
		6FCM7550DN21M	50A	100	73	91	137		M16x55		G60
		6FCM7565DN21M	65A	128	92	84	110		M20x90		G75

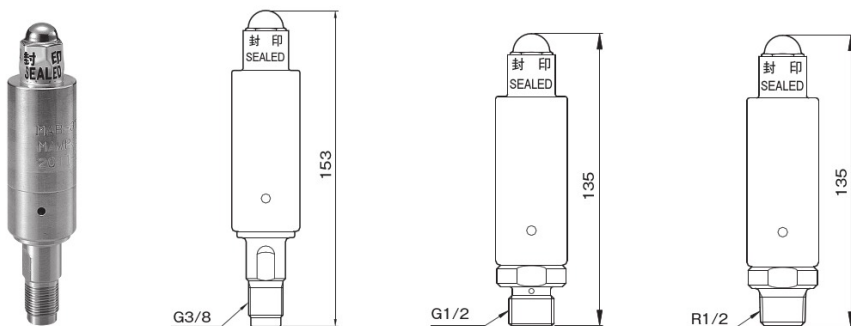
CPS: Connection Port Size MAWP: Maximum Allowable Working Pressure

Spring Loaded Type Safety Valve

This valve vents gas from an accumulator to the atmosphere when a predetermined gas pressure has been reached or exceeded.

It is certified according to the "High Pressure Gas Safety Law, Japan".

With three connection diameters supported, the valve is also available for accumulators other than NACOL products.



Explanation of Item Number

Item Number: 6 H - S V ④ ④ ④ ④ - 0 3 - ⑥ ⑥ ⑥

① Inspection/Standard ② Spring Loaded Type Safety Valve ③ Blowout Port Diameter

②	Inspection/Standard
H	High Pressure Gas Safety Law, Japan (Authorized Product by Ministry of Economy, Trade and Industry of Japan)

④	Blowout Pressure ※
7 M P A	7 MPa
1 0 M P	10 MPa
1 5 M P	15 MPa
1 7 . 5	17.5 MPa
2 1 M P	21 MPa
2 3 M P	23 MPa
2 5 M P	25 MPa
2 8 M P	28 MPa
3 5 M P	35 MPa

⑥	Connection Diameter
F 0 3	G3/8
F 0 4	G1/2
R 0 4	R1/2

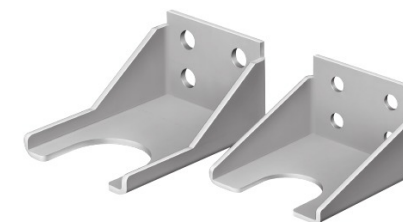
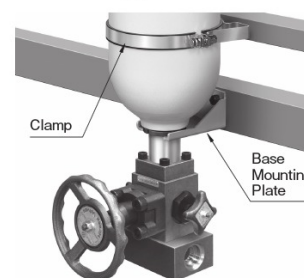
※ The Spring Loaded Type Safety Valve starts venting at 97 to 100% of a predetermined pressure.

Please exercise caution when performing operation at close to the predetermined pressure.

Base Mounting Plate

The base mounting plate is used to fix an accumulator. It can be mounted in upward or downward orientation as specified.

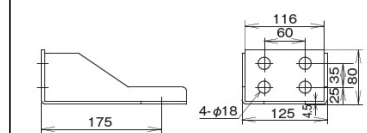
The base mounting plate can be used in combination with dedicated clamps to secure an accumulator.



Bolt Fix Type

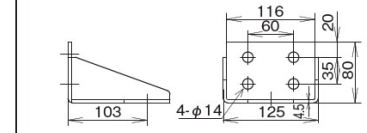
Base mounting plates available
for use in conjunction
with NACOL's clamps

6BMP190N

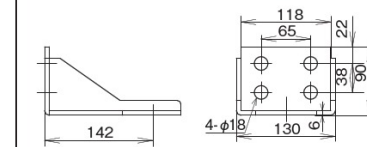


Base mounting plates available
for use in conjunction with NORMA
Germany GmbH's clamps

6BMP191



6BMP267



Applicable Accumulators

Series	Gas Volume: L	Item Number	
A/H	5~16	6BMP190N	6BMP191
N/H	20~60	Coming Soon	6BMP267
R/H	20~63	Coming Soon	6BMP267

※1: Not available for use with super high flow type accumulators.

※2: Not available for use with high flow type accumulators depending on the model. For more information, please contact us※

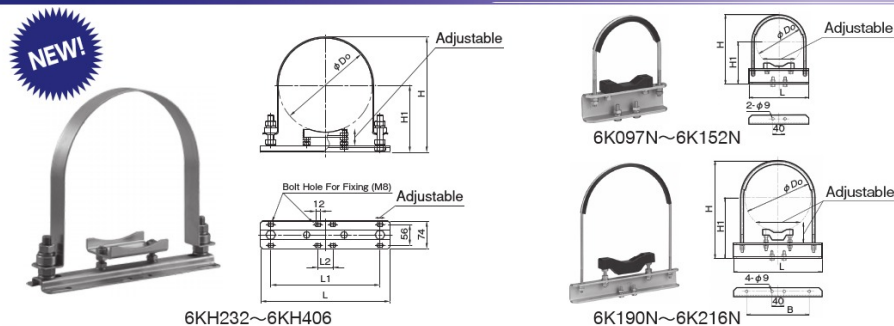
※3: When ordering a base mounting plate, pay attention to compatibility with the clamp (see pages 200 to 201).

• NACOL's clamps cannot be used in conjunction with 6BMP191/6BMP267.

• NORMA Germany GmbH's clamps cannot be used in conjunction with 6BMP190N.

※4: The base mounting plates listed above cannot be used with H series and Y series 60 L accumulators (accumulator shell diameter: 355.6 mm).

NACOL's Clamp



6KH232~6KH406

6K097N~6K152N

6K190N~6K216N

- Features**
- ① An adjustment function designed to prevent application of excessive force to the accumulator facilitates safe installation.
 - ② The clamp can be easily bolted to an accumulator stand, etc.
 - ③ The clamp can be used in combination with a base mounting plate to secure an accumulator.(Only some models).

Item Number	Applicable Accumulators			Acc. Body Diameter φ Do mm	L mm	H mm	H1 mm	Base Mounting Plate
	Series	Max Allowable Working Pressure: MPa	Nominal Gas Volume: L					
6K097N	J	10	0.5	89.1	140	160	104	
		25	0.5					
6K114N	J	21, 23	1	114.3		186	118	
		5, 10 (Made of Carbon Steel)	1~3					
6K120N	J	21	0.6	120		192	121	
		10 (Made of Stainless Steel), 17.5	1~3					
6K127N	E	0.95	4	127		200	125	-
		25	1~3					
6K133N	J	35, 45	1	133		206	128	
		25	1.6~7.2					
6K139N	J	10	4 & 5	139.8		213	132	
		21	2.5 & 4					
6K146N	J	7, 17.5	4 & 5	146		220	136	
		25	4 & 5					
6K152N	J	35, 45	2.5 & 4	152.4		227	139	
		22	5~20					

Item Number	Applicable Accumulators			Acc. Body Diameter φ Do mm	B mm	L mm	H mm	H1 mm	Base Mounting Plate
	Series	Max Allowable Working Pressure: MPa	Nominal Gas Volume: L						
6K190N	A/H	11, 17.5, 21, 23	5~16	190.7	155	263	292	186	6BMP190N
6K216N	A/H	21 (Made of Stainless Steel), 35, 45	5~16	216.3	180	290	320	201	-
		25	5~40						

Item Number	Applicable Accumulators			Acc. Body Diameter φ Do mm	L mm	L1 mm	L2 mm	H mm	H1±3 mm	Base Mounting Plate		
	Series	Max Allowable Working Pressure: MPa	Nominal Gas Volume: L									
6KH232	U	25	10~50	232	346	292		291	172	—		
6KH244	R/H	8, 13	20~63	244.5								
6KH267	N/H	2, 17.5, 21, 23	20~60	267.4								
	P	17.5	10~60									
6KH298	R	28	20~63	298.5	486	400	40	327	190	Coming Soon		
	N	21 (Made of Stainless Steel), 35, 43.4 (43.1)	20~60					359	206			
6KH355	Y/H	2, 7, 15, 21, 25, 28, 33	60 & Y60	355.6								
	N/H		80 & 120					418	236			
6KH406	P	17.5	52~100	406.4				450		470	262	—
	A	26	150									
	N/H	7, 15, 21, 23	160									
	H	35	145									

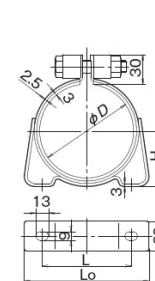
※1 Mounting dimensions differ between the above clamps and NORMA Germany GmbH's clamps.

※2 Mounting dimensions differ between the above 6KH232, 6KH244, 6KH267, 6KH298, 6KH355, 6KH406 and old design 6K232N, 6K244N, 6K267N, 6K298N, 6K355N, 6K406N.

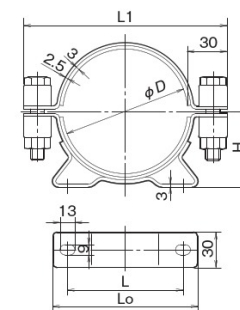
※3 When ordering a base mounting plate (see page 199), pay attention to compatibility with the clamp.

- NACOL's clamps cannot be used in conjunction with 6BMP191/6BMP267.
- NORMA Germany GmbH's clamps cannot be used in conjunction with 6BMP190N.

NORMA Germany GmbH's Clamp



6081C089~C095



6081C114~C406

Item Number	Applicable Accumulators			φ D mm	H +1 mm	L±2 mm	Lo +2 mm	L1 mm	ACC Mounting Interval (Reference) mm	Base Mounting Plate
	Series	Maximum Allowable Working Pressure: MPa	Nominal Gas Volume: L							
6081C089	J	10	0.5	89	53	82	112	—	175	
6081C095	J	25	0.5	95	56	90	126	—	185	
6081C114	N/H	21, 23	1	114	66	100	138	174	200	
		5, 10 (Made of Carbon Steel)	1~3							
6081C120	J	21	0.6	120	69			180	210	
6081C128	E	0.95	4	128	73	136	172	188	215	-
		25	1~3							
6081C133	J	35, 45	1	133	75	148	184	212	240	
		25	1.6~7.2							
6081C139	J	10	4 & 5	139	75			193	220	
6081C140	N/H	21	2.5 & 4	140	79			200	230	
6081C146	J	7, 17.5	4 & 5	146	82			206	235	
6081C152	J	25	4 & 5	152	85			212	240	
6081C152	N/H	35, 45	2.5 & 4	152	85			212	240	
6081C152	P	22	5~20	152	85			212	240	
6081C191	A/H	11, 17.5, 21, 23	5~16	191	104			251	280	
6081C215	A/H	21 (Made of Stainless Steel), 35, 45	5~16	215	116	216	254	275	300	6BMP191
		25	5~40							
6081C232	U	25	10~50	232	124			292	320	-
6081C246	R/H	8, 13	20~63	246	132			306	330	
6081C267	N/H	2, 17.5, 21, 23	20~60	267	142	248	300	327	350	6BMP267
		17.5	10~60							
6081C298	R	28	20~63	298	158			358	400	
6081C350	N/H	21 (Made of Stainless Steel), 35, 43.4 (43.1)	20~60	350	184	345	410	410	450	
		2, 7, 15, 21, 25, 28, 33	80 & 120							
6081C406	P	21	52~100	406	212	384	460	466	500	-
		26	150							
6081C406	N/H	7, 15, 21, 23	160	406	212	384	460	466	500	
		35	145							

※1 Dimensions without tolerance indication are for reference. Please confirm the latest dimensions with the actual product or its drawing.

※2 Mounting dimensions differ between the above clamps and NACOL's clamps.

※3 When ordering a base mounting plate (see page 199), pay attention to compatibility with the clamp.

- NORMA Germany GmbH's clamps cannot be used in conjunction with 6BMP190N.
- NACOL's clamps cannot be used in conjunction with 6BMP191/6BMP267.

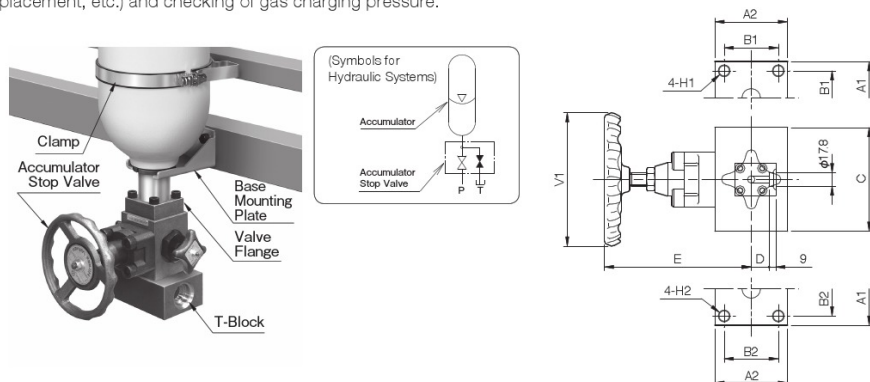


Caution

- When mounting the clamp, avoid applying excessive force to hydraulic circuit connections (oil port valve assembly, fittings, and pipes).
- Make sure that the clamp does not support the overall weight of an accumulator. The clamp may be unable to support the accumulator due to the installation condition or vibration.
- Secure each accumulator with multiple clamps. If the vibration of the accumulator is inconsistent with that of the piping or stand, the pipes and connections may be damaged.
- Do not operate accumulators with clamps, bolts, pipe fittings, or ring nuts loosened. Continued use under such conditions may cause damage to the connections, including the oil port valve assembly, resulting in fluid leakage.

Accumulator Stop Valves/T-Block(for 21MPa)

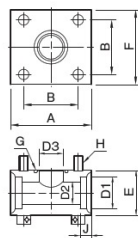
This valve is an accumulator stop valve integrating a main valve and a drain valve. It can relieve the accumulator hydraulic pressure by closing the main valve and opening the drain valve, facilitating maintenance (bladder replacement, etc.) and checking of gas charging pressure.



Accumulator Stop Valve Size Chart

Heads Item Number	A1	A2	B1	B2	C	D	E	H1	H2	V1	Oil Control Function
6080HFACC321023	76	76	56	56	110	24	203	M12	M12	190	NO
6080HFACC3210NS	98	98	73	73	140		208	M16	M16	140	YES
6080HFACC3210NN							255				
6080HFACC5010NS	138	155		103	103	150	78		258	M22	M22
6080HFACC5010NN			341					YES			
6080HFACC5010NSL			258					NO			
6080HFACC5010NNLL			341	YES							

The accumulator stop valve is connected to an accumulator with a valve flange.
For valve flange dimensions, please refer to the page about pipe connectors for each series.



T-Block Size Chart

(mm)											
Item Number	A	B	D1	D2	D3	E	F	G	H	J	Applicable Stop Valves
6WT032020020N21M	108	56	27.7	20		46	76	JIS B2401 G40	M12	12	6080HFACC321023
6WT032032032N21M			43.2	30		60	16				
6WT050020020N21M	140	73	27.7	20	32	46	100	JIS B2401 G40	M16	12	6080HFACC3210NS 6080HFACC3210NN
6WT050032032N21M			43.2	30		60				16	
6WT050050050N21M											
6WT080050050N21M	175	103	61.1	43	48	80	140	JIS B2401 G65	M22	20	6080HFACC5010NS 6080HFACC5010NN 6080HFACC5010NSL 6080HFACC5010NNL

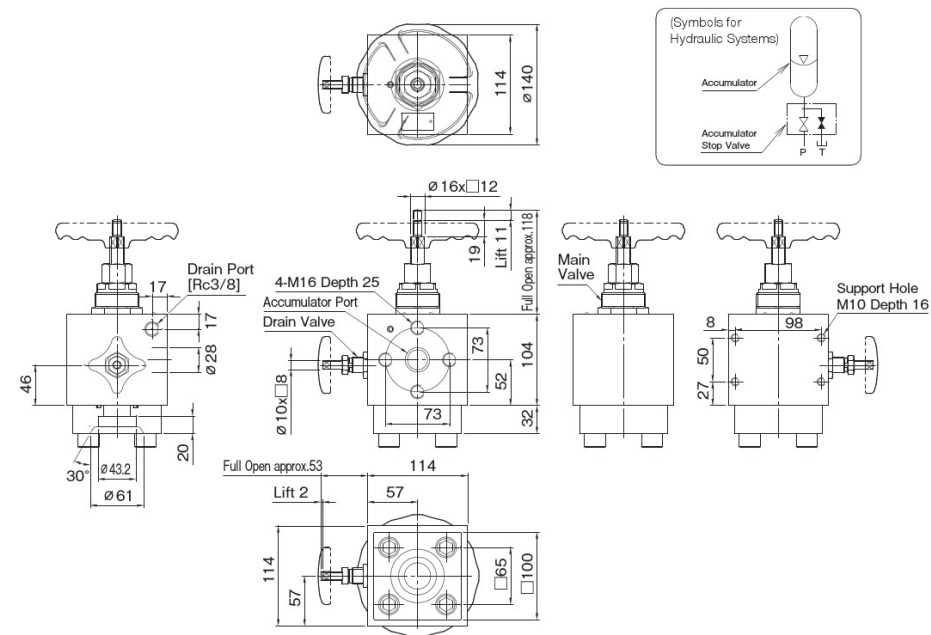
Accumulator Stop Valve (for 35MPa)

Compact Design, Low-Cost High Pressure Stop Valve

Item	Item Number
Stop Valve Without Handle	6080HFL35ACC321011
Stop Valve With Handle	6080HFL35ACC321011H

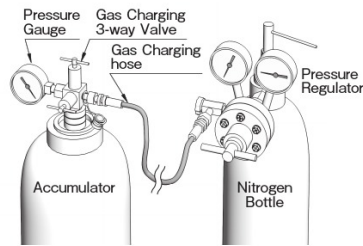
※1 Stop Valve without Handle is a standard model. When you purchase the Stop Valve without Handle, please use commercially available tools for opening and closing of valves.

※2 Since the outer diameter of the main valve handle is larger than the dimension of valve body, please pay attention to the installation space.



Gas Charging Tools

NACOL Accumulator gas charging or checking of gas charging pressure requires a special gas charging tools kit. (Only a hose and an adaptor are required for R or Q specification accumulator with SG valve.)



Caution

- After nitrogen gas charging, inspection, and pressure adjustment, be sure to remove the gas charging 3-way valve from the accumulator.
- For measuring the pressure at all times, please use the SG valve.

Gas Charging Tools Kit

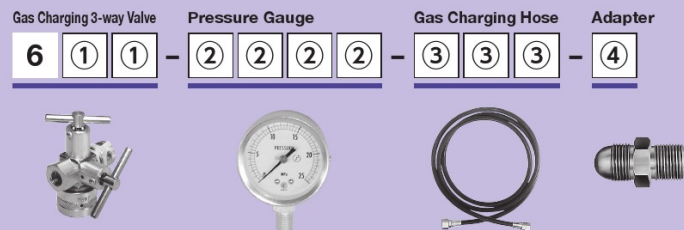
A gas charging 3-way valve, a pressure gauge, a gas charging hose, and an adapter are contained in a dedicated tool box.

Note that the pressure gauge 6018AUF031060MP and gas charging hose longer than 5 m (6075H20.510, 6075H20.515, etc.) are packaged separately in cardboard cartons.

The dedicated tool box can accommodate several cap wrenches, pressure gauges (except for 6018AUF031060MP), and adapters.

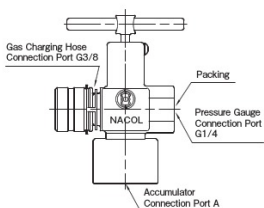
The item number for the standard kit is shown on page 206.

Explanation of Item Number



① Gas Charging 3-way Valve

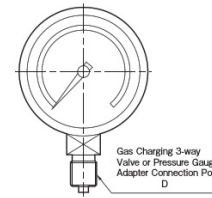
The valve has a filter function to remove dust in a nitrogen gas cylinder.



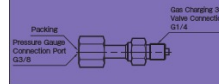
Item Number of Tools Kit			Specification		Item Number of Single Article
⑥	①	①	Accumulator Connection Port A	Maximum Allowable Working Pressure	
6	G	G	G1/4	35 MPa	6M3G02
6	G	H	G3/8	50 MPa	6H3G03
6	G	T	8V1	0.95 MPa	6L38V1
6	G	U	1/2-20UNF	25 MPa	6M3U04J
6	G	W	W22-14	35 MPa	6M3W22

No Gas Charging 3-way valve is required when the SG Valve is available.

② Pressure Gauge



※ Pressure Gauge Adapter
40 MPa and 60 MPa pressure gauges come with a pressure gauge adapter.



Item Number of Kit				Specification				Item Number of Single Item
②	②	②	②	Maximum Scale of Pressure Gauge	Recommended Gauge Range	Connection Port D	Pressure Gauge Adapter※	
0	-	4	M	0.4 MPa	0.12~0.26 MPa	G1/4	-	6018ATF02060.4M
1	M	P	A	1 MPa	0.30~0.65 MPa	G1/4	-	6018ATF02061MPA
1	-	6	M	1.6 MPa	0.48~1.04 MPa	G1/4	-	6018ATF02061.6M
2	-	5	M	2.5 MPa	0.75~1.63 MPa	G1/4	-	6018ATF02062.5M
4	M	P	A	4 MPa	1.20~2.60 MPa	G1/4	-	6018ATF02064MPA
6	M	P	A	6 MPa	1.80~3.90 MPa	G1/4	-	6018ATF02066MPA
1	0	M	P	10 MPa	3.00~6.50 MPa	G1/4	-	6018ATF020610MP
1	6	M	P	16 MPa	4.80~10.40 MPa	G1/4	-	6018ATF020616MP
2	5	M	P	25 MPa	7.50~16.20 MPa	G1/4	-	6018ATF020625MP
4	0	M	P	40 MPa	12.0~26.0 MPa	G3/8	Attached	6018ATF031040MP
6	0	M	P	60 MPa	18.0~39.0 MPa	G3/8	Attached	6018AUF031060MP

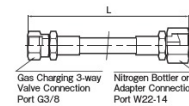
No pressure gauge is required when the SG Valve is available.

The maximum gauge scale value should be 1.5 to 3 times the maximum pressure value to be measured.

The pressure gauge "6018AUF031060MP" (maximum scale value: 60 MPa) cannot be accommodated in the dedicated tool box.

When delivering a gas charging tools kit including this pressure gauge, the gauge is packaged separately in a cardboard carton.

③ Gas Charging Hose



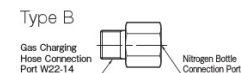
Item Number of Kit			Specification		Item Number of Single Item
③	③	③	Hose Length L	Maximum Allowable Working Pressure	
H	0	2	2 m	20.5 MPa	6075H20.502
H	0	3	3 m	20.5 MPa	6075H20.503
H	0	4	4 m	20.5 MPa	6075H20.504
H	0	5	5 m	20.5 MPa	6075H20.505
H	1	0	10 m	20.5 MPa	6075H20.510
H	1	5	15 m	20.5 MPa	6075H20.515
B	0	2	2 m	29.5 MPa	6075H29.502
B	0	4	4 m	29.5 MPa	6075H29.504

If the gas charging hose is short, please use a hose extension adapter (see page 206).

The dedicated tool box can accommodate a hose of up to 5 m.

When delivering a gas charging tools kit including a hose longer than 5 m, the hose is packaged separately in a cardboard carton.

④ Adapter



Item Number of Kit		Specification			Item Number of Single Item
④	Country	Type	Nitrogen Bottle Connection Port E	Maximum Allowable Working Pressure	
A	Japan	A	W23-14	20 MPa	6AD023022C
G	United Kingdom	A	G5/8	20 MPa	6ADG05022
U	United States	A	0.960-14NGO-RH	20 MPa	6AD096022C
D	Germany	B	W24.32-14	20 MPa	6AD243022C
C	China	B	G5/8	25 MPa	6ADF05022C
K	Republic of Korea	B	W22-14	20 MPa	6ADW22022

The adapter which last digit of item number is C can also be used for the pressure regulator (See page 207).

Gas Charging Tools Kit Standard Kit

For the standard kit, a gas charging 3-way valve (6M3G02), a pressure gauge (6018ATF020625MP), a gas charging hose (6075H20.502), and an adapter (6AD023022C) are contained in a dedicated tool box.

Item Number of Standard Kit

① Gas Charging 3-way Valve

6 G G - 2 5 M P - H 0 2 - A



Gas Charging 3-way Valve
6 ① ①
6 G G
Accumulator Connection Port
G1/4
Maximum Allowable Working Pressure
35 MPa

② Pressure Gauge

6 G G - 2 5 M P - H 0 2 - A



Pressure Gauge
② ② ② ②
2 5 M P
Maximum Scale of Pressure Gauge
25 MPa

③ Gas Charging Hose

6 G G - 2 5 M P - H 0 2 - A



Gas Charging Hose
③ ③ ③
H 0 2
Hose Length
2 m
Maximum Allowable Working Pressure
20.5 MPa

④ Adapter

6 G G - 2 5 M P - H 0 2 - A



Adapter
④
A
Country
Japan
Nitrogen Bottle Connection Port
W23-14
Maximum Allowable Working Pressure
20 MPa

Hose Extension Adapter

This adapter is used to extend the gas charging hose. It is useful when the gas charging hose is shorter than the required length.

Item Number	Maximum Allowable Working Pressure	Connection Port
6ADG03022	29.5 MPa	W22-14 G3/8



Pressure Regulator

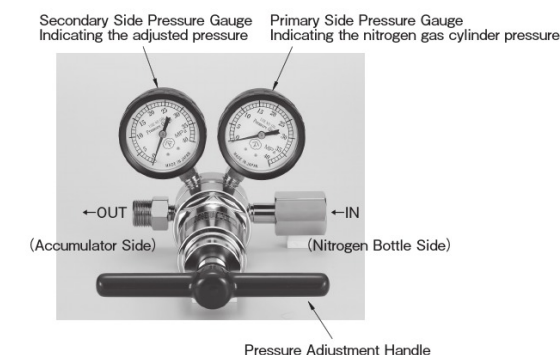
When charging an accumulator with nitrogen gas, using a pressure regulator is recommended.

A nitrogen gas cylinder pressure higher than the maximum allowable working pressure of the accumulator or gas charging tools may cause damage to the equipment.

Item Number	Primary Side Pressure	Secondary Side Pressure	Inlet Connection (IN)	Outlet Connection (OUT)	Maximum Allowable Working Pressure
6084YR5062R11182323	0~40 MPa	0~40 MPa	W22-14 Cap Nut	W22-14 External Thread	20 MPa

This pressure regulator is not complying with any overseas regulations.

Before purchasing, please confirm the laws and regulations of your country / region.

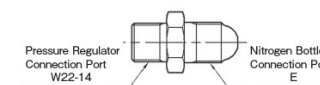


Adapter for Pressure Regulator

This adapter is used to connect the pressure regulator and a nitrogen gas cylinder.

Item Number	Specification		
	Country	Nitrogen Bottle Connection Port E	Maximum Allowable Working Pressure
6AD023022C	Japan	W23-14	35 MPa

※ The adapter can also be used with a gas charging hose (see page 205).

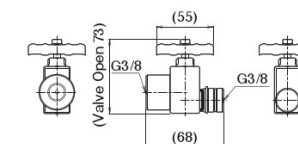
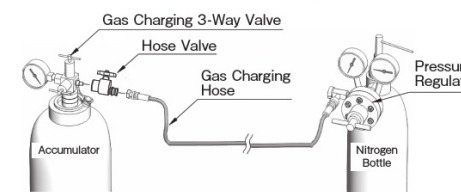


Hose Valve

This valve is used to connect the gas charging 3-way valve and the gas charging hose.

It is useful when the accumulator to be charged with nitrogen gas is far away from the nitrogen gas cylinder.

Item Number	Inlet Connection	Outlet Connection	Maximum Allowable Working Pressure
6XN-HV35MP-F03-F03	G3/8	G3/8	35 MPa



Wrench

Disassembling/assembling NACOL's accumulators requires using special wrenches.
Three types of special wrenches are available for different purposes.

Cap Wrench

This wrench is used to disassemble/assemble the top cap.

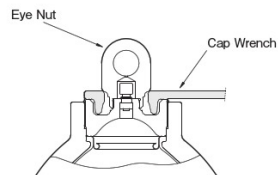
For information about how to use it, please refer to the instruction manual. Use the hoisting attachment supplied with the product to prevent the top cap from coming off.

Picture	Item Number	Series	ACC Gas Volume: L	Top Cap Type
	6TWH81	N	20~60	One Piece Type
		R	20~63	
		H	20~60 (Except for the 35 MPa type)	
	6TWH100	N	80, 120	
		N	160	
		Y	60	
		H	Y60, 80, 120 (Except for the 33 MPa type)	
		H	160 (Except for the 35 MPa type)	
	6TWH63	N	20~60	Two Pieces Type
		N	80, 120	
		N	160	
		Y	60	

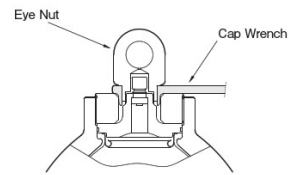
※1 For models not listed above, use a commercially available wrench.

※2 For stainless steel accumulators, use a commercially available wrench.

Cap Wrench & Hoisting Attachment in Place



Top Cap One Piece Type



Top Cap Two Pieces Type

Ring Nut Wrench

This wrench is used to disassemble/assemble the oil port valve assembly. For information about how to use it, please refer to the instruction manual.

Picture	Item Number	Accumulator Shell Material	Series	Accumulator Nominal Gas Volume: L	Accumulator Shell Diameter: mm
	6TWD075	Carbon Steel	A	5~16	190.7, 216.3
		Stainless Steel	A	5~16	190.7
		Carbon Steel	H	5~16	190.7, 216.3
		Stainless Steel	H	5~16	190.7
	6TWD085	Carbon Steel	R	20~63	267.4
		Stainless Steel	R	20~63	244.5
		Stainless Steel	H	20~63	244.5
	6TWD105	Carbon Steel	N	20~60	267.4, 298.5
		Stainless Steel	N	80, 120	355.6
		Stainless Steel	Y	60	355.6
		Stainless Steel	N	20~60	298.5
		Carbon Steel	H	20~60	267.4, 298.5
		Carbon Steel	H (Only for the 33 MPa type)	Y60, 80, 120	355.6
		Stainless Steel	H	Y60, 80, 120	355.6
	6TWD120	Carbon Steel	N	80, 120	355.6
		Carbon Steel	H (Only for the 35 MPa type)	160	406.4
		Carbon Steel	Y	60	355.6
		Stainless Steel	N	160	406.4
		Carbon Steel	H (Except for the 33 MPa type)	Y60, 80, 120	355.6
		Stainless Steel	H	160	406.4
	6TWD140	Carbon Steel	N	160	406.4
		Carbon Steel	A	160	406.4
		Carbon Steel	H (Except for the 35 MPa type)	160	406.4

※1 For models not listed above, use a commercially available wrench.

※2 For super high flow type accumulators, use a commercially available wrench.

Spring Nut Key

For information about Spring Nut Key, please refer to the Dynac Valve (See page 212).

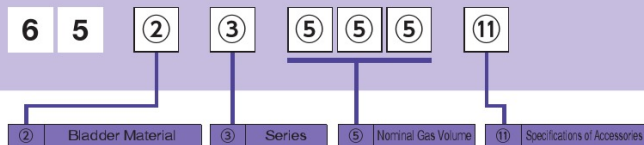
Bladder

Since bladders are consumables, periodically replacing them is recommended. Periodic bladder replacement ensures operation without emergency system shutdown.

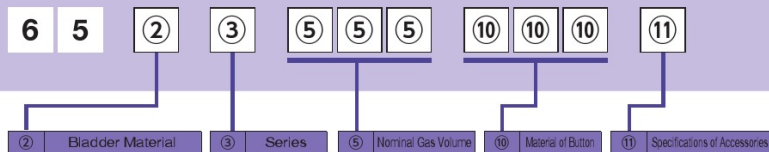
When ordering accumulator bladders listed in the catalogue, please refer to the page about accessories/tools for each series along with the following information.

When ordering special items (accumulator item number containing "X") or accumulator bladders not listed in the catalogue, please refer to page 220 and inform us of the serial number of the accumulator in use.

Item Number of Bladders without a Button



Item Number of Bladders with a Button



② Bladder Material

Select the item number code corresponding to the material suitable for "service fluid" and "service temperature" for the accumulator in use.

※1 J series standard nitrile bladders with a button are designated by "B".

Symbol	Bladder Material	Service Fluid	Allowable Service Temperature [°C]	O-ring Material
N	Standard Nitrile Rubber	Turbine Oil	-10~+70	NBR
B	Standard Nitrile Rubber with Button ※1	Fatty Acid Ester Fluid		
H	Nitrile Rubber for High Temperature Use	Water Glycol Fluid	-10~+110	FKM
L	Nitrile Rubber for Low Temperature Use	W/O Emulsion Fluid		
F	Butyl Rubber	O/W Emulsion Fluid	-35~+70	L.NBR
E	Ethylene Propylene Rubber	Biodegradable Fluid		
C	Chloroprene Rubber	Tap Water	-10~+70	FKM
G	Epichlorohydrin Rubber	Sea Water		
V	Fluorine Rubber	Phosphate Ester Fluid	-20~+80	CR
		Phosphate Ester Based Fluid		EPDM
		Basic, Water		FKM

③ Series

Select the item number code corresponding to the series name of the accumulator in use.

※2 Please designate "N" for A series accumulators with a nominal gas volume of 150 L.

Symbol	Series	Symbol	Series	Symbol	Series	Symbol	Series
A	A Series ※2	J	J Series	R	R Series	U	U Series
G	G Series	N	N Series	S	S Series	Y	Y Series
H	H Series						

⑤ Nominal Gas Volume

Select the item number code corresponding to the nominal gas volume of the accumulator in use.

Symbol	Nominal Gas volume
0 0 3	0.03 L
L 0 1	0.1 L
L 0 3	0.3 L
L 0 5	0.5 L
L L 1	1 L
L L 2	2 L
2 . 5	2.5 L
L L 3	3 L
L L 4	4 L
L L 5	5 L
6 . 3	6.3 L

Symbol	Nominal Gas volume
L 1 0	10 L
L 1 6	16 L
L 2 0	20 L
R 2 0	20 L
L 2 5	25 L
L 3 0	30 L
L 3 2	32 L
R 3 2	32 L
L 4 0	40 L
R 4 0	40 L
L 5 0	50 L

Symbol	Nominal Gas volume
R 5 0	50 L
L 6 0	60 L
Y 6 0	60 L ※3
L 6 3	63 L
R 6 3	63 L
L 8 0	80 L
1 2 0	120 L
1 6 0	145-160 L

Gas volume of S series are as follows.

Symbol	Nominal Gas volume
L 0 2	0.1 L
L L 1	0.6 L

※3 Only for H series accumulators with an accumulator shell diameter of 355.6 mm.

⑩ Button Material

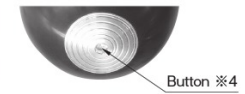
Select the item number code corresponding to the button material suitable for the volume, maximum allowable working pressure, and material of the accumulator in use.

※4 The button is made of a metal plate (material listed below) and located at the bladder bottom.

※5 Water glycol fluids and some phosphate ester based fluids cannot be used for accumulators having bladders with an aluminum button. For more information, please contact us or the fluid manufacturer.

※6 For the A, G, H, N, R, S, U, and Y series, the bladder does not have a button; no button material designation (⑩) is required for this bladder.

Symbol	0.03~0.5L	For 17.5 MPa 1~5L	For 25 MPa 1~5L
A17	Standard (Material: Aluminum)		—
35C	—		Standard (Material: Carbon Steel)
U16		Stainless Steel	



⑪ Accessories Supplied with Bladders

Select the item number code corresponding to the gas charging side specifications of the accumulator in use.

※7 Bladders come with an O-ring, etc., required for replacement. Accessories vary depending on the accumulator.

For accumulators with a separate type top cap, please check the bladder back up ring in use before ordering a new bladder.

Please reuse the bladder back up ring if no abnormality is found.

If any damage or deformation has been found, order a new bladder and bladder back up ring for replacement.

※8 Bladders for stainless steel accumulators do not come with a bladder cap.

For stainless steel accumulators, please check the bladder cap in use before ordering a new bladder.

Please reuse the bladder cap if no abnormality is found.

If any damage, deformation, or rust has been found, order a new bladder and bladder cap for replacement.

※9 For the shapes of the SG valve and the SG coreless valve, please see the photos below. The SG coreless valve has been discontinued.

Symbol	Application	Accessories
A	Accumulator with Dynac Valve	O-ring for Top Cap and O-ring for Gas Charging Valve (Bladder Cap)
C	Accumulator with SG valve	O-ring for Top Cap and O-ring for Gas Charging Valve, (Bladder Cap), Core, Core Rotator, (Valve Cap)
S	Accumulator with Core Type Gas Charging Valve	O-ring for Top Cap and O-ring for Gas Charging Valve (Bladder Cap), Seal Washer (W30, W5S1)
No Symbol	Only Bladder	None



SG Valve



SG Coreless Valve (Old Model)

Dynac Valve

Dynac Valve is a gas valve that also serves as a "fuse plug".

Function of Fuse Plug

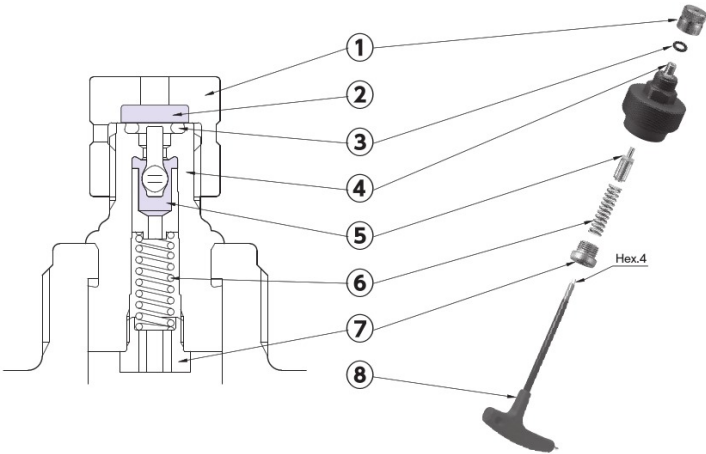
In the event of extremely high temperatures, such as a fire, the packing (② and ⑤ in the figure below) melts to release the gas in the accumulator to the atmosphere when a predetermined temperature (160±20 °C) has been reached or exceeded.

By using the valve in combination with a pressure control valve to prevent pressure build-up on the fluid side, the Dynac Valve can serve as a safety device pursuant to the High Pressure Gas Safety Law, Japan, and Article 6, Paragraph 1, No. 19 of the General High Pressure Gas Safety Regulations.

Function of Gas Valve

Dynac Valve provided works in three ways: charging, retaining, and venting accumulator nitrogen gas.

Compared to traditional gas valves, the Dynac Valve offers excellent air tightness, durability, and resistance to high/ low temperatures.



Number	Item	Item Number	Thread Size
① ②	Valve Cap with Fuse Packing ※1	645024106A (Brass)	G1/4
		645051802A (Stainless Steel)	G1/4
		645045301A (Brass)	G3/8
		645024204A (Brass)	1/2-20UNF
		645052000A (Stainless Steel)	1/2-20UNF
③	O-ring (AS568009)	—	—
④	Dynac Valve Body (Assembled with Top Cap)	—	G1/4
		—	G3/8
		—	1/2-20UNF
⑤	Packing with Valve Stem ※1	645026400A	—
⑥	Spring	645045500	—
⑦	Spring Nut	645048200	—

※1 Packing deteriorates over years, periodically replacing them is recommended

⑧	Spring Nut Key ※2	6TWH04
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※2 Spring Nut Key (6TWH04) is required when replacing ⑤, ⑥ and ⑦.

Spring Nut Key (6TWH04) cannot be used for the accumulator manufactured before January, 1992.

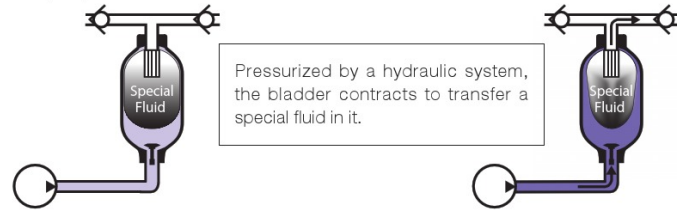
The spring nut before January, 1992 is 10mm (hexagon outer nut size).

Transfer Barrier 5 ~ 160L

Transfer Barrier 5~160L Carbon Steel

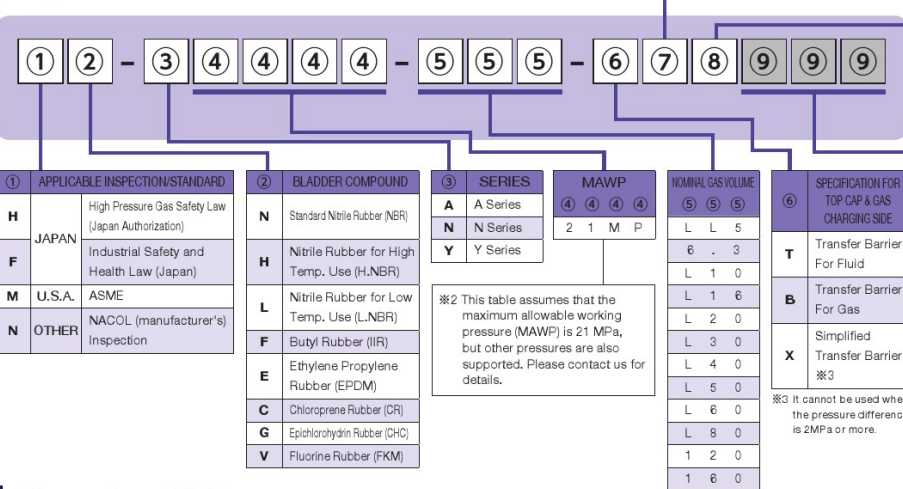
Function

Transfer barrier type accumulators allow a hydraulic system using general hydraulic fluid to transfer a special fluid without a special fluid pump.



※1 For information about how to use transfer barrier type accumulators, please contact us.

Explanation of Item Number



⑦	SPECIFICATION FOR OIL PORT SIDE
A	Carbon Steel
D	Stainless Steel

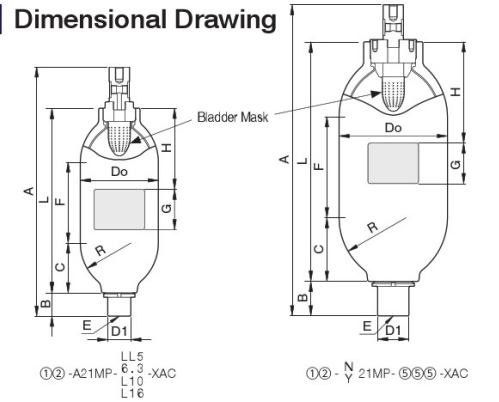
※4 When selecting D, please contact us.

⑧	SPECIFICATION FOR SURFACE TREATMENT	SERVICE FLUID
C	Inside & Outside Surfaces: Zinc Phosphate Treatment (Standard)	Petroleum Based Hydraulic Oil & Other Fluid
D	Inside & Outside Surfaces: Standard Paint Coating	Water + Glycol Fluid
A	Inside & Outside Surfaces: Standard Paint Coating	Petroleum Based Hydraulic Oil & Other Fluid
B	Inside Surface: Standard Paint Coating	Petroleum Based Hydraulic Oil & Other Fluid
N	Outside Surface: Zinc Phosphate Treatment	※5
W	Inside Surface: Zinc Phosphate Treatment	Petroleum Based Hydraulic Oil & Other Fluid
H	Standard Paint Coating	Water + Glycol Fluid
	Inside & Outside Surfaces: Standard Plating	Petroleum Based Hydraulic Oil & Other Fluid

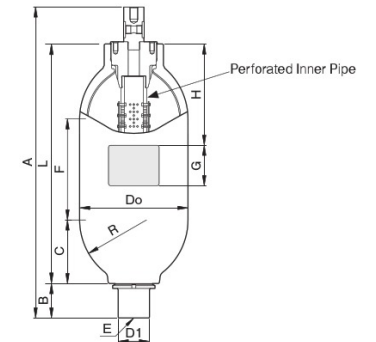
※5 Inner surface coating is unsuitable when using fire resistant fluids that may cause the paint to peel off, such as phosphate ester based fluids and water glycol fluids.

⑨⑨⑨	SPECIFICATION FOR OIL PORT SIDE
***	For special specifications, the item number designation includes a three-digit number.

Dimensional Drawing



Simplified Transfer Barrier



Fluid/Gas Transfer Barrier

Dimensional Table

Maximum Allowable Working Pressure MPa	Item Number							Nominal Gas Volume L	Mass kg	A mm	L mm	B mm	C mm			F mm	H mm	G mm	φDo±1% mm	φD1 mm	R mm	E	Allowable Oil Flow Rate (When Vertically Installed 15~20°C)	Bladder	Ring Nut Wrench	Accessories NACOL's Clamp	Accessories Base Mounting Plate exclusively for NACOL's Clamp	Accessories NORMA's Clamp	Accessories Base Mounting Plate exclusively for NORMA's Clamp	
21	①② - A 2 1 M P - L L 5 - ⑥⑦⑧	5	28	630 ^{+12 0}	390	58	123									134	160	100	190.7	57	125	M42 X 2	300 L/min	65 ② ALL5	6TWD075	6K190N	6BMP190N	6081C191	6BMP191	
	①② - A 2 1 M P - 6 . 3 - ⑥⑦⑧	6.3	31	695 ^{+12 0}	463								207	200	65 ② A6.3															
	①② - A 2 1 M P - L 1 0 - ⑥⑦⑧	10	40	870 ^{+12 0}	638								382	200	65 ② AL10															
	①② - A 2 1 M P - L 1 6 - ⑥⑦⑧	16	59	1,182 ^{+12 0}	950								694	250	65 ② AL16															
	①② - N 2 1 M P - L 2 0 - ⑥⑦⑧	20	95	845 ^{+12 0}	668	85	157											100	267.4	77	165	M60 X 2	600 L/min	65 ② NL20	6TWD105	6KH267	Coming Soon	6081C267	6BMP267	
	①② - N 2 1 M P - L 3 0 - ⑥⑦⑧	30	122	1,090 ^{+12 0}	913									571	400	65 ② NL30														
	①② - N 2 1 M P - L 4 0 - ⑥⑦⑧	40	150	1,305 ^{+12 0}	1,128									786	400	65 ② NL40														
	①② - N 2 1 M P - L 5 0 - ⑥⑦⑧	50	190	1,627 ^{+12 0}	1,450									1,108	700	65 ② NL50														
	①② - N 2 1 M P - L 6 0 - ⑥⑦⑧	60	200	1,765 ^{+12 0}	1,588	99	210												100	355.6	92.5	230	M75 X 2	900 L/min	65 ② NL60	6TWD120	6KH355	—	6081C350	—
	①② - Y 2 1 M P - L 6 0 - ⑥⑦⑧	60	230	1,279 ^{+12 0}	1,088									638	400	65 ② YL60														
	①② - N 2 1 M P - L 8 0 - ⑥⑦⑧	80	280	1,534 ^{+12 0}	1,343									893	400	65 ② NL80														
	①② - N 2 1 M P - 1 2 0 - ⑥⑦⑧	120	370	1,986 ^{+12 0}	1,795									1,345	1,000	65 ② N120														
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							
	①② - N 2 1 M P - 1 6 0 - ⑥⑦⑧	160	500	2,081 ^{+12 0}	1,870	119	246																							

※6 Dimensions without tolerance indication are for reference. Please confirm the dimensions with the actual product.

※7 This table assumes that the maximum allowable working pressure (MAWP) is 21 MPa, but other pressures are also supported. Please contact us for details.

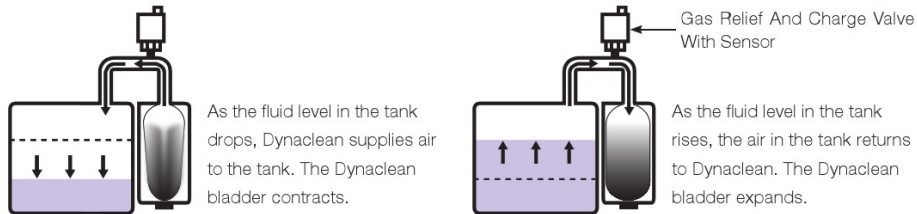
※8 Please refer to the page about pipe connectors for each series.

L Series (Dynaclean) 20 ~ 120L

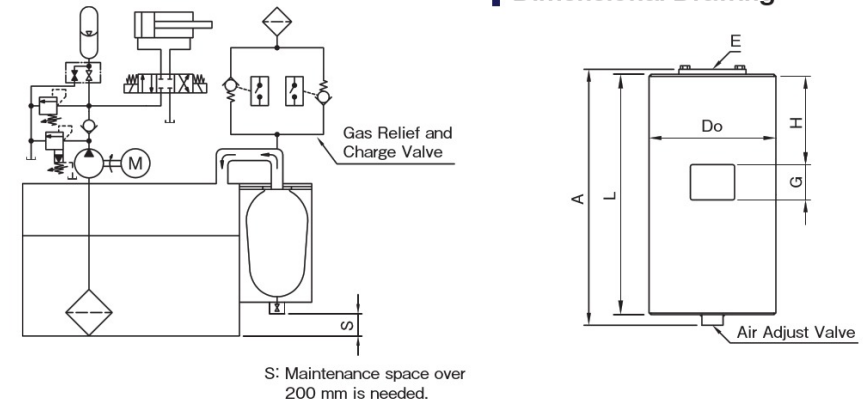
L Series 20~120L Carbon Steel

Function

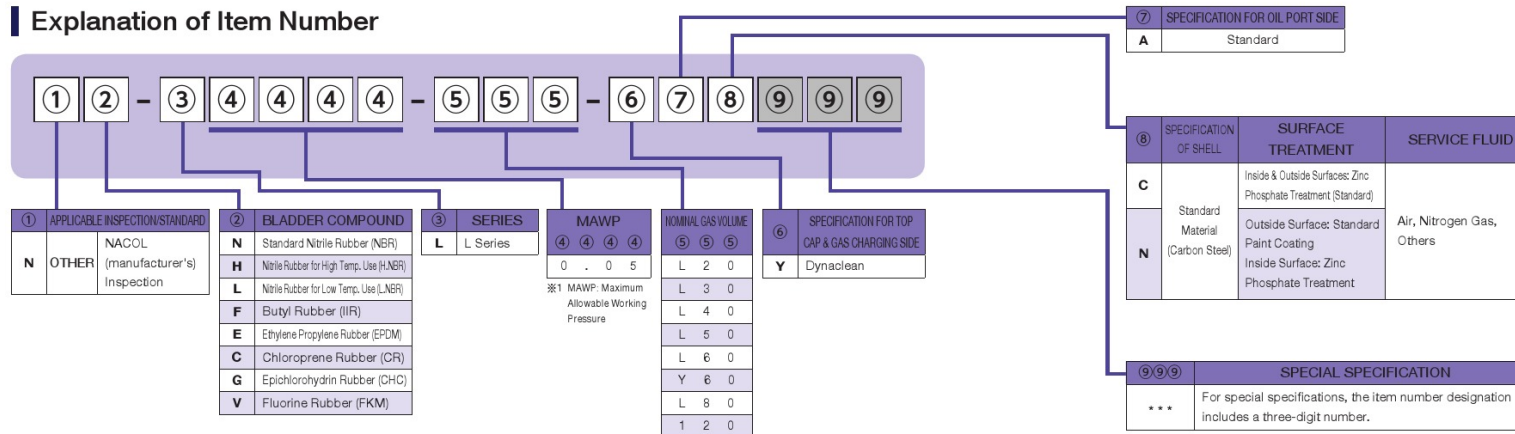
Dynaclean can be used with a sealed oil tank to minimize entry of dust/moisture, fluid contamination, oxidative degradation, and moisture evaporation (for water based fluids). As the tank oil level increases/decreases with actuator operation, the volume of air space in the tank changes accordingly; Dynaclean has a bladder that expands or contracts to accommodate the change. Dynaclean also accommodates changes in the volume of oil/air space caused by temperature changes. In addition, Dynaclean can be provided with a sensor-equipped gas relief and charge valve to detect the difference between internal and external air pressures for gas relief/charge monitoring.



Dimensional Drawing



Explanation of Item Number



Dimensional Table

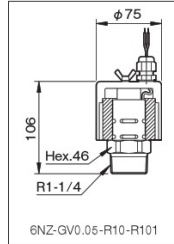
Item Number	Nominal Gas Volume L	Max. Transit Volume L	Mass kg	A+17 mm	L mm	H mm	G mm			E	φDo±1% mm	Accessories NACOL's Clamp	Accessories Base Mounting Plate exclusively for NACOL's Clamp	Accessories NORMA's Clamp	Accessories Base Mounting Plate exclusively for NORMA's Clamp
N ② - L 0 . 0 5 - L 2 0 - Y A ⑧	20	11	36	590	546	250	100			G2	267.4	6KH267	Coming Soon	6081C267	6BMP267
N ② - L 0 . 0 5 - L 3 0 - Y A ⑧	30	16.5	47	825	781										
N ② - L 0 . 0 5 - L 4 0 - Y A ⑧	40	22	56	1,029	985										
N ② - L 0 . 0 5 - L 5 0 - Y A ⑧	50	27.5	69	1,332	1,288										
N ② - L 0 . 0 5 - L 6 0 - Y A ⑧	60	33	74	1,472	1,428										
N ② - L 0 . 0 5 - Y 6 0 - Y A ⑧	60	33	60	949	905										
N ② - L 0 . 0 5 - L 8 0 - Y A ⑧	80	40.7	74	1,204	1,160	250	100			G2	355.6	6KH355	—	6081C350	—
N ② - L 0 . 0 5 - 1 2 0 - Y A ⑧	120	66	97	1,633	1,589										

※2 Dimensions without tolerance indication are for reference. Please confirm the dimensions with the actual product.

"Reciprocating Nitrogen Gas Compressor" for Nitrogen Gas Booster**Gas Relief and Charge Valve**

A gas relief and charge valve mounted on Dynaclean protects the tank, piping, and Dynaclean from damage due to abnormal air pressure in the sealed tank (when the tank air pressure exceeds the set pressure of the gas relief and charge valve, the valve is activated for air relief or charging).

The gas relief and charge valve may be available with or without a sensor.



Item Number	without sensor	6NZ-GV0.05-R10-R10
	with sensor	6NZ-GV0.05-R10-R101
Maximum Allowable Working Pressure (MPa)		0.05
Gas Charge Set Pressure (MPa)		-0.02
Gas Relief Set Pressure (MPa)		0.02

Specification of Gas Relief and Charge Valve Sensor

Load Voltage	AC DC 24V	AC DC 100V
Max. Load Current	50mA	20mA
Length of Lead Wire	0.5m	

Gas Volume Calculation

Calculate the gas volume of Dynaclean V₁ (L) as follows.

1) Operating Condition

Oil Tank Volume (L)	V _T	—
Total Oil Volume in Oil Tank (L)	V	—
Max. Fluid Level Change (L)	V ₀	Difference between the highest and lowest fluid levels
Air Volume in Oil Tank (L)	V _A	V _A = V _T - V
Specific Gravity of Fluid	γ	—
Max. Operating Temperature (°C)	T _H	—
Min. Operating Temperature (°C)	T _L	—

2) Coefficient of thermal expansion

Refer to the table on the right to determine the coefficient of thermal expansion α corresponding to the specific gravity of the fluid γ.

3) Calculate the thermal expansion of oil O_H (L).

$$O_H = V \cdot \alpha (T_H - T_L)$$

4) Calculate the thermal expansion of air A_H (L).

$$A_H = V_A \left(\frac{T_H + 273}{T_L + 273} - 1 \right)$$

5) Calculate the maximum transit oil flow amount of Dynaclean V_W (L).

$$V_W = V_0 + O_H + A_H$$

6) Calculate the gas volume of Dynaclean V₁ (L).

$$V_1 = \frac{V_W}{0.55}$$

Relation between Specific Gravity and Coefficient of Thermal Expansion

Specific Gravity	Coefficient of Thermal Expansion: α
0.867 ~ 0.874	0.00077
0.875 ~ 0.882	0.00076
0.883 ~ 0.891	0.00075
0.892 ~ 0.902	0.00074
0.903 ~ 0.912	0.00073
0.913 ~ 0.923	0.00072
0.924 ~ 0.937	0.00071
0.938 ~ 0.951	0.00070
0.952 ~ 0.964	0.00069
0.965 ~ 0.975	0.00068
0.976 ~ 0.986	0.00067
0.987 ~ 1.000	0.00066
1.001 ~ 1.075	0.00063

Determination of the nominal gas volume

Select a Dynaclean with a nominal gas volume exceeding the calculated gas volume of Dynaclean V₁ (L).

A volume calculation sheet is available on page 228.

Function

The "reciprocating nitrogen gas compressor" can be incorporated in a hydraulic unit and connected to a nitrogen gas cylinder on the gas side to generate high pressure gas.

Seal material: Teflon

Max. Allowable Working Pressure: 25 MPa

Hydrostatic Test Pressure: 37.5 MPa

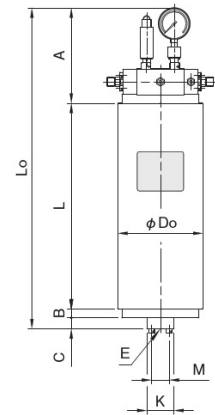
Gas Name: Nitrogen Gas

Spring Loaded Type Safety Valve: 25 MPa

Pressure Gauge: 50 MPa

A "piston type accumulator" used in the nitrogen gas booster is treated as a "reciprocating nitrogen gas compressor" in accordance with the High Pressure Gas Safety Law, Japan.

In line with the High Pressure Gas Safety Law, Japan, a "reciprocating nitrogen gas compressor" for the nitrogen gas booster is offered after passing a high pressure gas production facility inspection.

Dimensional Drawing**Dimensional Table**

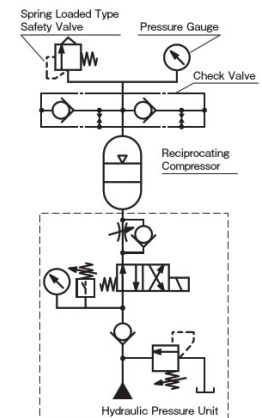
Item Number	Nominal Gas Volume L	Mass kg	L mm	Lo ⁺⁸ ₋₀ mm	A mm	B mm	C mm	φDo±1% mm	□K mm	□M mm	E
X N - P 2 5 M P - L L 5 - X X ⑧ 0 3 4	5	109	518	810	242	28	22	216.3 (6K216N)	68	45	10A
X N - P 2 5 M P - L 1 0 - X X ⑧ 0 3 4	10	126	714	1,006				(6081C215)		(M10 X 35)	

※ Dimensions without tolerance indication are for reference. Please confirm the latest dimensions with the actual product or its drawing.

※ For accumulator shell specifications ⑧, please select the item number code from "⑧ Accumulator Shell Specification" for piston type accumulators (see page 192).

※ For piston type accumulators, the fluid may enter the gas side depending on the operating conditions. Failure to remove the fluid from the gas side may result in inability to obtain a sufficient flow out speed.

The customer is recommended to make a hydraulic unit for the nitrogen gas booster with reference to the circuit diagram shown on the right.



Manufacturer's Serial Number and Nameplate

When making inquiries about NACOL products or ordering replacement parts, please provide the serial number marked on the accumulator shell and the item number indicated on the name plate.



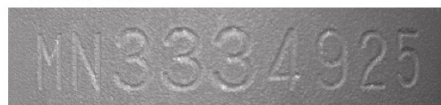
Manufacturer's Serial Number

All of NACOL's accumulators are marked with Manufacturer's Serial Numbers. A Manufacturer's Serial Number consists of two alphabetical letters followed by seven numerical digits.

※ For accumulators manufactured before September 1982, the number of numerical digits differs.

※ Marking position for accumulators manufactured before 1999.

Marking Sample



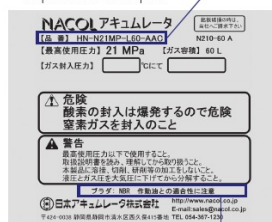
Nameplate

An accumulator nameplate contains product information.

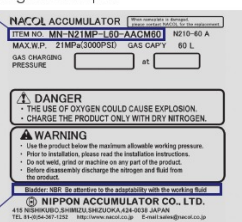
The information may differ depending on the period of production.

Item Number ※3

Japanese Sample



English Sample



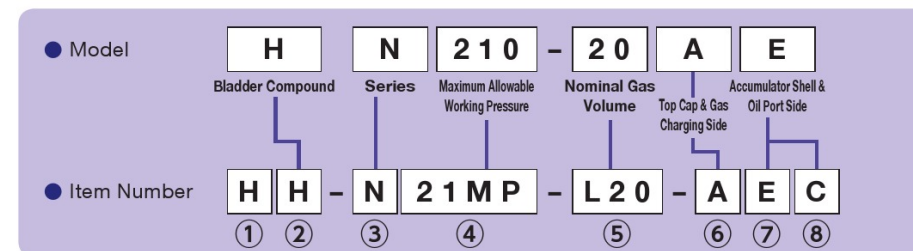
Bladder Compound

The material of the original bladder incorporated in the accumulator upon shipment is indicated.

※3 Refer to explanation of an item number P36.

Explanation of "Model↔Item Number"

Model and Item Number designations are described below.



For the details of item number, please refer to "Explanation of Item Number" on page 36.

- ① Applicable inspection/standards cannot be identified by model.
- ② The bladder material code in the item number is the same as the model designation; if there is no code in the model designation, the material is NBR.
- ③ The series name code in the item number is the same as the model designation.
- ④ The maximum allowable working pressure designation includes a pressure unit. The previous designation system uses kg/cm² pressure designation includes a pressure unit. The previous designation system uses kg/cm² as the pressure unit.
- ⑤ The gas volume designation is a three-digit code (unit: L).
- ⑥ This code should match "Top Cap/Gas Charging Side Specification" in the model designation.

Model: Top Cap/Gas Charging Side Specification

Gas Charging Side Specification	Top Cap Specification		Plating	Stainless Steel
	Top Cap for Less than 10L 2 Pieces Type Top Cap for More than 20L	Top Cap for More than 20L		
Dynac Valve	D	A	H	P
SG Coreless Valve + Spring Loaded Type Safety Valve + Pressure Gauge	S	E		
SG Coreless Valve + Plug + Pressure Gauge	S1			
SG Coreless Valve only	S2			
SG Coreless Valve + Fuse Plug + Pressure Gauge	S4	F		
SG Coreless Valve + Plug + Pressure Gauge Adaptor	S5			
SG Valve + Spring Loaded Type Safety Valve + Pressure Gauge		Q		
SG Valve + Fuse Plug + Pressure Gauge		R		
Transfer Barrier		T		
Core Type Gas Valve		C		
Dynac Valve, 8V1 Type		W (without symbol)		
Other		X		

⑦⑧ This code should match "Accumulator Shell/Oil Port Side Specification" in the model designation. For an item number, oil port side and accumulator shell specifications are designated separately.

Model: Accumulator Shell/Oil Port Side Specification

Accumulator Shell Specification		Standard	Plating	Stainless Steel
Oil Port Side Specification				
Standard Internal Thread	Standard Material	A (without symbol)		
	(※1)	B		
	Plating	C	H	
	Stainless Steel	D	I	L
High Flow	Standard Material	E		
	Plating	F	J	
	Stainless Steel	G	K	M
Meta High Flow (※2)	Standard Material	W		
	Stainless Steel	O	P	
Super High Flow	Standard Material	Y		
	Plating			
Pulse Damper	Standard Material	U		
	Plating			
Super Pulse Damper	Standard Material	V		
	Plating			
Other			X	

※1 Poppet/Poppet Fitting; Stainless Steel ※2 Meta high flow type accumulators have been discontinued. ※3 Fire Resistant Fluid: N

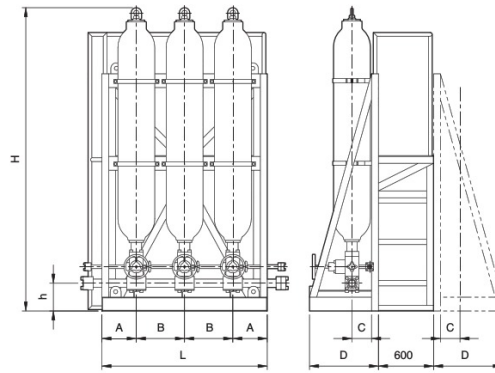
Accumulator Stand

The accumulator stand facilitates installation/maintenance work.

The dimensions of an accumulator stand used with T-blocks and accumulator stop valves are shown on the right.

(They are auxiliary dimensions by using 21MPa accumulators.)

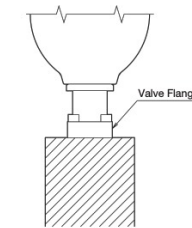
The dimensions take into consideration the transportation height and installation workability. When fabricating the stand, please refer to the stand dimensions and pipe sizing table shown below.



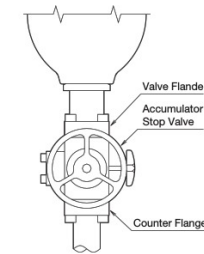
Nominal Gas Volume of ACC (L)	A(mm)	B(mm)	L(mm)					C(mm)	D(mm)	Remarks
			1 piece	2 pcs (W4 pcs)	3 pcs (W6 pcs)	4 pcs (W8 pcs)	5 pcs (W10 pcs)			
20~60	250	350	500	850	1,200	1,550	1,900	142	500	Use Clamp 6081C267
120	300	450	600	1,050	1,500	1,950	2,400	184	525	Use Clamp 6081C350
160	300	500	600	1,100	1,600	2,100	2,600	212	560	Use Clamp 6081C406

Main Pipe Size	Accumulator Stop Valve		h(mm)	H(mm)						
	HF-ACC-32×10N*	HF-ACC-50×10N*		ACC:20L	ACC:30L	ACC:40L	ACC:50L	ACC:60L	ACC:120L	ACC:160L
1(25A)	○	—	142	1,219	1,464	1,679	2,001	2,139	2,334	2,447
1½(32A)	○	—	142	1,226	1,471	1,686	2,008	2,146	2,341	2,454
1½(40A)	○	—	161	1,245	1,490	1,705	2,027	2,165	2,360	2,473
2(50A)	○	○	161	1,255	1,500	1,715	2,037	2,175	2,370	2,483
2½(65A)	—	○	176	1,290	1,535	1,750	2,072	2,210	2,405	2,518
3(80A)	—	○	176	1,299	1,544	1,759	2,081	2,219	2,414	2,527

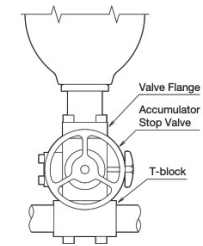
Variation of Fittings for Accumulator Pipings



Manifold Connection



Connection using Acc. Stop Valve and Counter Flange



Connection using Acc. Stop Valve and T-block

List of Fittings for Pipings (for 21MPa)

Applicable Acc. (lit)	Valve Flange	Acc. Stop Valve	Counter Flange	T-block
1~4	6FAM42 32D N21M	6080 HFACC 321023	SSA32	6WT 032 0** 0** N21M
5~16	6FCM42 32D N21M	6080 HFACC 321023	SSA32	6WT 032 0** 0** N21M
20~60	6FCM60 32D N21M	6080 HFACC 321023	SSA32	6WT 032 0** 0** N21M
		6080 HFACC 3210NS	SSA50	6WT 050 0** 0** N21M
		6080 HFACC 3210NN		
		6080 HFACC 5010NS	SSA80	6WT 080 050 050 N21M
		6080 HFACC 5010NN		
	6FCM60 80D X027	6080 HFACC 5010NSL	SSA80	6WT 080 050 050 N21M
		6080 HFACC 5010NNL		
Y60 80~120	6FCM75 32D N21M	6080 HFACC 321023	SSA32	6WT 032 0** 0** N21M
		6080 HFACC 3210NS	SSA50	6WT 050 0** 0** N21M
		6080 HFACC 3210NN		
		6080 HFACC 5010NS	SSA80	6WT 080 050 050 N21M
		6080 HFACC 5010NN		
	6FCM75 80D N21M	6080 HFACC 5010NSL	SSA80	6WT 080 050 050 N21M
		6080 HFACC 5010NNL		
160	6FCM90 32D N21M	6080 HFACC 321023	SSA32	6WT 032 0** 0** N21M
		6080 HFACC 3210NS	SSA50	6WT 050 0** 0** N21M
		6080 HFACC 3210NN		
		6080 HFACC 5010NS	SSA80	6WT 080 050 050 N21M
		6080 HFACC 5010NN		
	6FCM90 50D N21M	6080 HFACC 5010NSL	SSA80	6WT 080 050 050 N21M
		6080 HFACC 5010NNL		

List of Fittings for Piping (for 35MPa)

Applicable Acc. (lit)	Valve Flange	Acc. Stop Valve	Counter Flange	T-Block
5~16	6FCM42 25D X027	6080 HFL35ACC 321011 6080 HFL35ACC 321011H	Acc. Stop Valve includes the Counter Flange. Please refer P203 and confirm a piping connecting position.	—
20~60	6FCM60 25D X055			
R20~63	6FCM50 25D X007			
Y60, 80~120	6FCM75 25D X030			
160	6FCM75 25D X031			