

Note for Operation Rubber flexible hose

Please thoroughly read the following "Handling precautions" to fully benefit from the product features and use them safely.

■ Handling precautions

- 1 **Please use the product under the pressure not more than the catalog value.**
Using the product under the pressure higher than the catalog value is dangerous because it results in damaging the hose or the removal of joint metal fittings.
- 2 **Please use the product within the temperature described in the catalog.**
Using the product under the temperature outside of the catalog value is dangerous because it results in damaging the hose or removal of joint metal fittings.
- 3 **Please use the product for proper fluids described in the catalog.**
Use for inappropriate fluid is dangerous because it deteriorates the inner layer (rubber) and the reinforcement layer (steel wire and fiber) that results in damaging the hose or removal of joint metal fittings.
- 4 **Please use this product at the smallest bend radius that is described in the catalog or larger.**
Using this product at less than the smallest bend radius is dangerous because it results in damaging the hose.
- 5 **Please select a compatible joint metal by thoroughly checking the joint parts (threads and shapes) on the other side.**
Attaching incompatible joint metal fittings is dangerous because it results in leaks and removal of joint metal fittings.
- 6 **Please do not apply negative or external pressure.**
The hose is designed to withstand the internal pressure, and there is a risk of removing or damaging the inner layer when negative pressure or external pressure is applied. The service life of the hose is significantly reduced in such cases.
- 7 **Do not run electricity.**
Running electricity is dangerous because it may rupture the hose or cause electric shocks.
- 8 **Do not apply excessive vibration.**
Applying excessive vibration is dangerous because it causes fatigue-based cracks on joint metal fittings that results in leaks and ruptures. (The guideline for vibration acceleration is 8 G or less.)
- 9 **Please provide some allowance in the hose length to avoid applying tension on the hose.**
Providing no allowance is dangerous since the length changes when pressure is applied, and tensile force is generated and ruptures the hose or results in the removal of joint metal fittings.

■ Storage precautions

- 1 **Please apply rust inhibitor when the product is kept in storage for one month or longer.**
Please apply rust proof oil on metal parts, such as joint metal fittings or wrap them by rust proof paper. Corrosion of joint metal fittings causes contamination of fluid or leaks.
- 2 **Please keep the hose in the suitable environment.**
Keep the hose in storage in dry areas without direct sunlight and the temperature of about -10°C to +40°C. Direct sunlight and high temperature accelerate the deterioration of rubber and cause cracks. Humidity significantly accelerates the corrosion of metals. Low temperature hardens rubber and may cause damages.
- 3 **Please do not cause deformation or damage on the hose or joint metal fittings during storage.**
Please keep a hose in storage by keeping it straight. When storing a hose by winding it, make sure that the bend radius would not become less than the designated smallest bend radius. Also, do not place a heavy object on a hose. Deformation or damage of the hose or joint metal results in unexpected rupture or damage.
- 4 **Please keep inside the hose clean.**
Please seal joint metal fittings by placing caps to prevent foreign objects, such as dirt and dust from entering inside the hose. Foreign objects, such as dust and dirt may contaminate fluid and result in troubles in hydraulic systems and hydraulic circuits.
- 5 **Please do not keep a hose in storage for more than a year.**
It is impossible to perfectly prevent the deterioration of hoses even if they are properly packed and stored and the performance of hoses is expected to decrease. Therefore, please implement proper management so that hoses would not be kept in storage for more than a year.

■ Precautions on installation

- 1 **Please thoroughly remove foreign objects, such as dirt attached on screws of joint metal fittings.**
Please thoroughly check screws on metal connectors before connecting and thoroughly remove foreign objects, such as dirt adhered on them by using air-blow or cleaning oil (light oil). Adhered dirt may cause fluid leaks.
- 2 **Please make sure that sealing agent would not enter into the hose.**
To gain better sealing performance, please take precautions to prevent sealing agent from entering or remaining in the hose when sealing agent is used on screws of joint metal fittings. Such conditions cause clogging of pipes or decrease the flow rate.
- 3 **Please do not fold a hose.**
Please take precautions to prevent excessive bend in the hose especially near joint metal fittings. Excessive bend and fold are dangerous because the hose may rupture at the bend. Please do not use a hose that is once folded because the deformation remains in the hose.
- 4 **Please do not pull a hose.**
Pulling a hose is dangerous because the stress accumulates on the attached section of joint metal fittings and results in rupture or damage.
- 5 **Please do not twist a hose.**
Twisting a hose is dangerous because it deforms the internal structure of the hose and results in damages and rupture.
- 6 **Please do not interfere with a hose. Please protect a hose from external damages.**
When there is a possibility that a hose touches other objects (such as mechanical facilities), such condition is dangerous because it may result in rupture of the hose or damages to joint metal fittings caused by external damages.
- 7 **Please strictly comply with the tightening torque specified in the catalog.**
Inappropriate tightening is dangerous because it fails to provide sufficient sealing and results in fluid leaks and damages to joints. (Please see p. 32.)

■ Maintenance and inspection

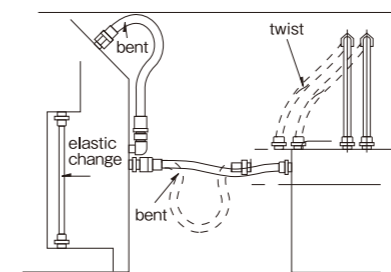
Please inspect hoses based on the chart below either regularly or before starting to work. Proper inspection and handling enable the prevention of unexpected rupture of hoses and damages to joint metal fittings. Please refer to the chart below for the implementation of inspection.

Category		Main causes	Handling
Oil leak at screw joint		Scratches on the sheet surface or dirt or foreign objects that get caught	Clean the sheet surface.
		Loosened screws or deterioration of O-rings	Re-tighten the screw or replace the O-ring.
		Partial contact of the sheet surface	Re-tighten or replace depending on the degree of the problem.
Oil leak from a flange joint		Loosened pressing bolt	Re-tighten the bolt.
		Deterioration of O-rings/packings	Replace the O-ring/packing.
Oil leak from an assembly between a hose and joint		Deterioration of the hose materials caused by heat, oil, or long-term uses	Replace
		Unreasonable pipe layout	Reevaluate the method of pipe layout to make sure there is no violent bend at a joint assembly.
Deformation	Collapse (dent), kink	External impact	•Remove causes. •Protect the outer layer of the hose. •Replace depending on the degree of the problem.
	Swelling	Oil transferred from a joint to which oil is transferred from outside	
External damage (abrasion or cut)		Interfere with other parts. Impact from outside.	
Crack on the outer layer (cracks in various sizes on the outer layer)		Effects of ozone, sunlight, or paint	•Protect the outer layer of the hose. •Replace depending on the degree of the problem.
Abnormal movement of hose during operation (Extension, contraction, twisting, bend, or kink)		Inappropriate hose length	Replace
		Inappropriate method of pipe layout	Check pipe layout, apply attachment if necessary.
Hardening or softening		Deterioration caused by high or low temperature or oil	Replace when necessary.
Abnormal noise, odor, abnormally high temperature, etc.		Often caused related circuits	Inspect all circuits.
Rust on joints		Sand, dust, adhesion of water drop, industrial water, salty wind	Properly apply rust inhibiting paint while avoiding the outer layer.

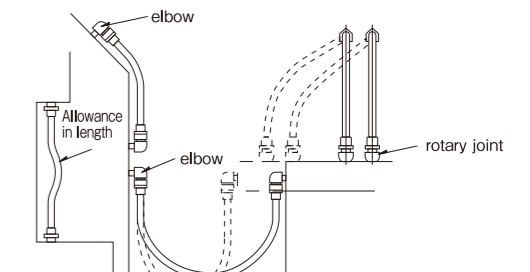
It is preferable to change a hose after using it for more than two years even when there is no abnormality in the above categories. (See descriptions of JIS B 8360, JIS B 8362, or JIS B 8364.)

■ Handling of hose

Bad example of layout



Good example of layout



■ Torque for tightening

Hose size		8A (φ6.3)	10A (φ9.5)	15A (φ12.7)	20A (φ15.9)	20A (φ19.0)	25A (φ25.4)	32A (φ31.8)	40A (φ38.1)	50A (φ50.8)
Thread size	Pipe thread (PF)	1/4	3/8	1/2	3/4	3/4	1	1 1/4	1 1/2	2
	Metric thread (MXP)	14×1.5	18×1.5	22×1.5	27×2	27×2	33×2	42×2	50×2	50×2
	Unified thread (UNF)	7/16-20	9/16-18	3/4-16	—	1 1/16-12	1 5/16-12	—	—	—
Max. tightening torque N·m		25	34	64	132	132	196	225	225	316
Suitable pressure MPa		34.5					27.5	20.5	17.0	10.5

Note: Torque value for Pipe thread is based on JIS B8363.

■ Warranty

The warranty for this product expires in one year after the product is supplied.

Please take precautions, for the following cases are not covered by the warranty.

1. Accidents and damages caused by wrong installation, wrong uses, repair, or modification
2. Accidents and damages caused by natural disasters, such as fire and earthquake
3. Accidents and damages caused by defects in transportation and storage after purchase