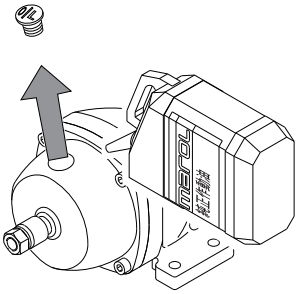
# 4 Oil Filling and Air Purging

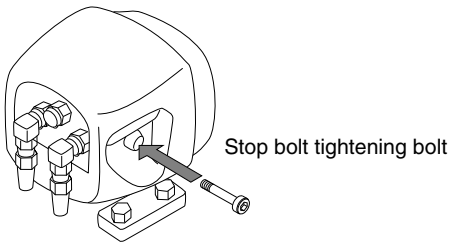
## Preparation of air purging

1. Firstly, once remove metal fitting connecting Receiving Cylinder and tiller and make Receiving Cylinder move at full stroke.
2. Remove filling cap on Helm Pump and fill it with hydraulic oil.


**At this juncture, make sure that no dust enter Helm Pump.**

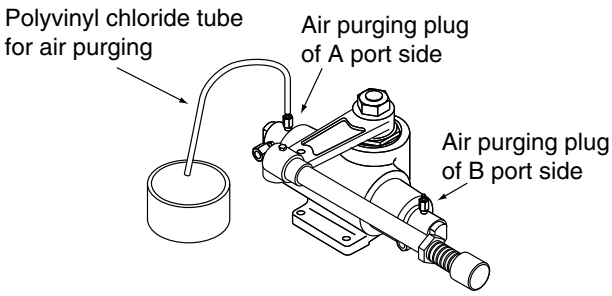


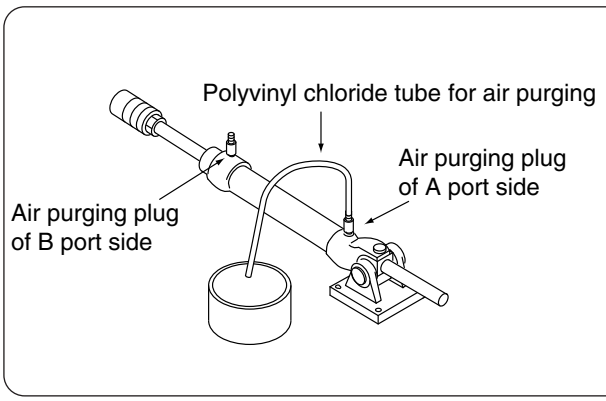
3. Fit attached tube exclusive for oil filling. Fit tube to Helm Pump side firmly so as not to suck air. Insert the other end of tube into can of hydraulic oil so as not to float up from oil level.
4. Screw in stop valve tightening bolt (M6 x 25 bolt with hexagonal hole) about 6 rotations until stop it and lastly tighten it lightly by wrench up to 10 degree.




## Air purging works of A port side

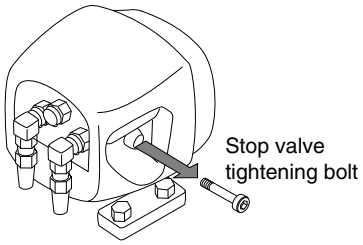
1. Insert attached polyvinyl chloride tube for air purging to the tip of air purging plug of A port side of Receiving Cylinder. When can of receiving hydraulic oil is provided, release air purging plug of A port side.
   (Don't release plug of B port side yet.)
2. Turn wheel clockwise continuously at the speed of 1 rotation per sec. When turning 3~4 rotations, oil level will go down but hydraulic oil will be filled automatically through oil filling tube.
3. As soon as clear hydraulic oil comes out constantly without bubble from air purging plug of A port side, close air purging plug of A port side.



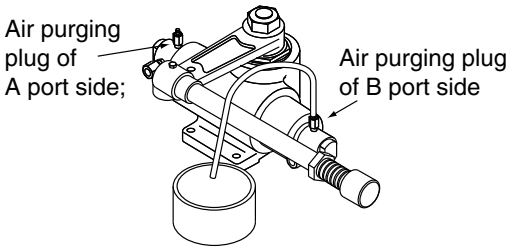
## Air purging works of B port side

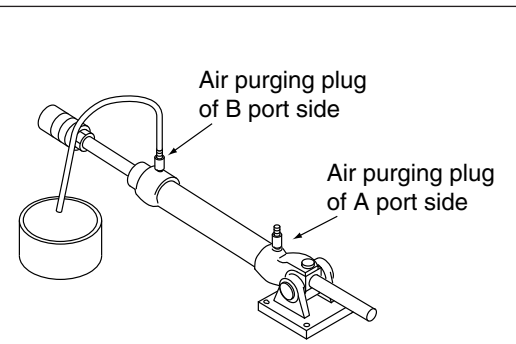
1. Release fully remove stop valve tightening bolt (M6 x 25 bolt with hexagonal hole) of Helm Pump side and remove it.




2. Remove polyvinyl chloride tube for air purging from A pot side, change it to fit to B port side and release air purging plug of B port side.
3. After confirmation of correct connection of oil filling tube between Helm Pump and can of hydraulic oil, turn wheel anti-clockwise slowly but continuously.
4. As soon as clear hydraulic oil comes out constantly without bubble from air purging plug of B port side, close air purging plug of B port side.
5. When wheel works smoothly by operating from side to side after completion of air purging works, remove oil filling tube and close filling cap tightly. Further works will finish by reconnecting Receiving Cylinder and tiller as it was.

   Last of all, check oil leakage from every unit and pipe fitting section.




Reference

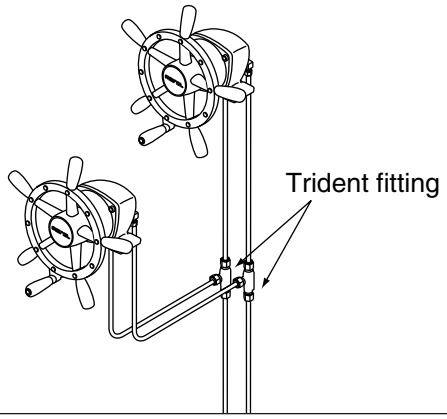
**In case of reverse connection, namely connection between A port of Helm Pump and B port of Receiving Cylinder, or B port of Helm Pump and A port of Receiving Cylinder for convenience of installation space of Receiving Cylinder, conduct air purging works by replacement of A port with B port of Receiving Cylinder.**

# 5 In case of steering at 2 places

- Hydraulic Steering System can be operated at 2 places by additional installation of Helm Pump. Even in this case, working load of wheel operation does not change.

## Piping for steering at 2 places

1. After decision of installing location of Helm Pumps, cut copper tubes by pipe cutter considering piping arrangement.
2. Connect A to A, B to B of both Helm Pumps correctly using trident fitting as per right side drawing.
3. After piping works, conduct flushing and fixing of copper tubes same as steering at 1 place.




## Air purging of steering at 2 places

1. Fill Helm Pump of low side (or near side to Receiving Cylinder) with hydraulic oil and close filling cap tightly.
2. Purge air from Helm Pump of high side (or far side from Receiving Cylinder). Air purging procedure is same as Clause 11~12.
3. At next step, purge air from Helm Pump of low side (or near side to Receiving Cylinder).
4. For further perfect air purging, remove oil filling cap of Helm Pump of high side (or far side from Receiving Cylinder) and repeat turning of wheel from side to side at full stroke several times. Air will return to tank gradually.