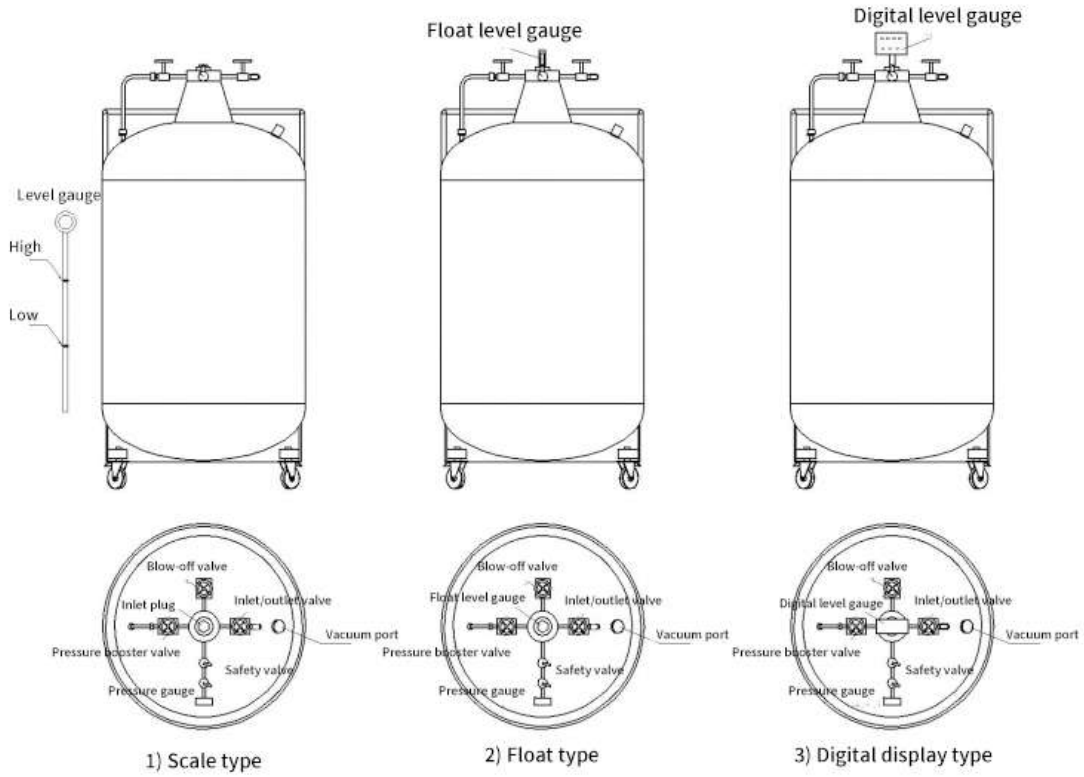
LN_2 Supply Tanks

User Manual

Please read this manual carefully before using the product and keep it for future reference.



Product Overview

The LN_2 Supply Tanks are manufactured from high-quality stainless steel. The container is equipped with a pressure-building system that enables continuous liquid discharge through self-generated pressure. The system consists of a control panel and the tank vessel. The control system primarily includes: Fill/Drain Valve, Pressure Build-Up Valve, Vent Valve, Dual Safety Valves, Level Gauge, and Pressure Gauge.

Typical Applications:

Replenishing and transferring liquid nitrogen, liquid oxygen, or liquid argon between storage containers.

Commonly used to supply cryogenic liquids to laboratory instruments, electronic equipment, and other devices.

Key Features:

Equipped with dual safety relief valves, providing redundant protection for safer operation.

Capable of continuous pressure building and liquid discharge for efficient, uninterrupted liquid supply.

Mounted on high-capacity swivel casters for easy and quick mobility.

Specialized ultra-low temperature shut-off valves are easy to operate, durable, and aesthetically designed.

Model	YDZ-15	YDZ-30	YDZ-50	YDZ-100	YDZ-150	YDZ-200	YDZ-230	YDZ-300	YDZ-500
Geometric volume（L）	16.5	33	55	110	165	220	250	330	550
Effective volume（L）	15	30	50	100	150	200	230	300	500
Outer diameter of the tank（mm）	377	404	455	556	656	656	656	806	958
Height（mm）	830	850	960	1100	1260	1300	1400	1410	1500
Empty weight（kg）	24	42	50	68	110	125	140	205	265
Static daily evaporation rate（%）	7	3	2	1.2	1.1	1	1	0.8	0.8
Standard working pressure(M Pa)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Infusion volume（L/min）	≥2	≥5	≥5	≥5	≥10	≥10	≥10	≥15	≥15

Note: The table above lists specifications for vertical ("V") models. Horizontal ("W") models are also available. Besides the standard specifications listed, custom cryogenic products can be manufactured according to customer requirements.

II. Operation Instructions

1. Filling the Container (Liquid Ingress)

Liquid is filled through the Fill/Drain Valve. Before filling, always OPEN the Vent Valve. Connect the transfer hose to the Fill/Drain Valve, open the Fill/Drain Valve, and begin filling. Once filling is complete, close the Fill/Drain Valve.

***** CRITICAL SAFETY NOTE: You MUST open the Vent Valve BEFORE filling, and the filling rate must NOT be excessive! *****

The safety valves on this self-pressurized container are set at 0.09 MPa. Supply tanks (e.g., bulk storage dewars) often operate at significantly higher pressures. If you open the Fill/Drain Valve without first opening the Vent Valve, the container connects directly to the high-pressure supply, causing the safety valves to operate under overpressure. Repeated operation in this manner will shorten the safety valve service life. In severe cases, the safety valve may fail to reseat, rendering the container inoperable.Furthermore, if the filling rate is too fast, vaporized gas inside the container cannot escape quickly enough, also causing the safety valves to activate due to overpressure.Therefore, ALWAYS OPEN THE VENT VALVE BEFORE FILLING, and maintain a moderate filling speed.

2. Liquid Level Indication

1)Dipstick: To measure the liquid level, unscrew the top fill port plug. Insert the dipstick through the port until it contacts the bottom of the container. After 2-3 minutes, remove the stick. The frost line on the stick, relative to its 刻度 (graduations), provides an approximate indication of the liquid level height.

2)Float Gauge: A direct-reading level gauge based on the principle of force balance. The liquid level is indicated by the position of a yellow ring inside a transparent viewer. (Refer to its

dedicated manual for details).

3)Digital Mass % Gauge: Utilizes advanced high-speed digital signal measurement technology to quickly and continuously detect the mass percentage of liquid inside the container.

3. Static Storage

When using the container for static storage of liquid, ensure the Fill/Drain Valve, Pressure Build-Up Valve, and Vent Valve are all CLOSED.

4. Transportation

When transporting the container with liquid inside, all valves should be in the same closed state as for storage.Ensure the container remains UPRIGHT. Avoid tipping.NEVER lay the container on its side or roll it horizontally.Secure the container firmly to the vehicle using straps. Do NOT use chains, as they can damage the container surface and potentially compromise the vacuum insulation.

5. Discharging Liquid (Liquid Withdrawal)

To withdraw liquid from the container, follow this sequence:

1. Close the Vent Valve.
2. Open the Pressure Build-Up Valve.
3. Observe the Pressure Gauge.
4. When the pressure rises to 0.05 MPa (~0.5 bar / ~7 psi) or reaches your desired operating pressure, open the Fill/Drain Valve. Continuous liquid discharge will begin.

III. Initial Setup Note

As received from our factory, all valves (except the safety valves) are in the CLOSED position. The container is shipped with a protective nitrogen charge to prevent atmospheric moisture from entering, which could cause ice blockages in the pressure-building coil or transfer lines during initial filling.

IV. Important Precautions

1.Due to the significant thermal mass of the container, the initial cooldown period during the first fill is lengthy. To avoid ice blockages, first pre-cool the container by filling with a small amount of liquid (approx. 20% of total capacity), then slowly complete the fill.

2.To minimize liquid loss during subsequent refills, it is best to refill the container while it still contains some residual liquid. Alternatively, refill within 48 hours after the liquid is depleted.

3.For safety and reliability, this container is designed ONLY for liquid nitrogen (LN2), liquid oxygen (LOX), and liquid argon (LAr).

4.Frost or condensation forming on the outer surface during liquid discharge or pressure building is a normal phenomenon.

5.When transporting liquid on roads rated Class 3 or below, do not exceed a vehicle speed of 30 km/h (~19 mph).

6.Do not damage the protective cap on the vacuum port, the seals, or the safety valve tamper indicators/lead seals.

7.If the container will not be used for an extended period, drain all liquid, purge and dry the interior with dry gas, close all valves, and store it sealed.

8.Before initial filling with cryogenic liquid, the inner vessel, all valves, and piping MUST be thoroughly purged and dried using dry air or nitrogen. Failure to do so will cause moisture to freeze and block the pipes, affecting pressure building and liquid transfer.

9.Handle this precision instrument with care. Operate all valves with moderate force—avoid

excessive force or speed. When connecting a metal transfer hose to the Fill/Drain Valve fitting, do not overtighten. Support the valve body with one hand while tightening the connection to prevent bending or breaking the connection.

V. Troubleshooting

symptoms	Possible Cause	Corrective Action
No pressure reading on gauge	1. Faulty pressure gauge. 2. Safety valve did not reseat or is damaged. 3. Leak in valve or piping.	1. Replace pressure gauge. 2. Manually reset safety valve spring or replace valve. 3. Perform leak check and repair.
Exterior "sweating" or heavy frosting; significantly shortened holding time	1. Pressure Build-Up Valve left open. 2. Loss of vacuum insulation.	1. Close Pressure Build-Up Valve. 2. Return to factory for repair.
Float gauge indicator stuck at one position	Float rod is caught on the guide.	Reinstall the float assembly.
Exterior frosting during liquid discharge or pressure building	Normal phenomenon.	No action required.
Frost or ice formation at container bottom after closing Pressure Build-Up Valve	1. Very low ambient temperature. 2. Pressure Build-Up Valve failing to close/seal.	1. No action required. 2. Replace valve seal or the entire valve.

VI. Ice Blockage

Ice blockage typically occurs in the pressure-building coil but can also happen in the drain line. It is caused by moisture from the air entering the container and not being fully purged out (hence the importance of a moderate fill speed) before condensing and freezing in the cold lines.

Resolution Procedure:

1.Connect a dry nitrogen gas cylinder to the container.

2.Pressurize the container to between 0.05 MPa and 0.09 MPa.

3.Drain any remaining liquid from the container via the Fill/Drain Valve.

4.Use warm, dry nitrogen gas or warm, dry air to blow through the blocked line, melting and purging the ice.

5.Close all valves after the line is clear and dry.