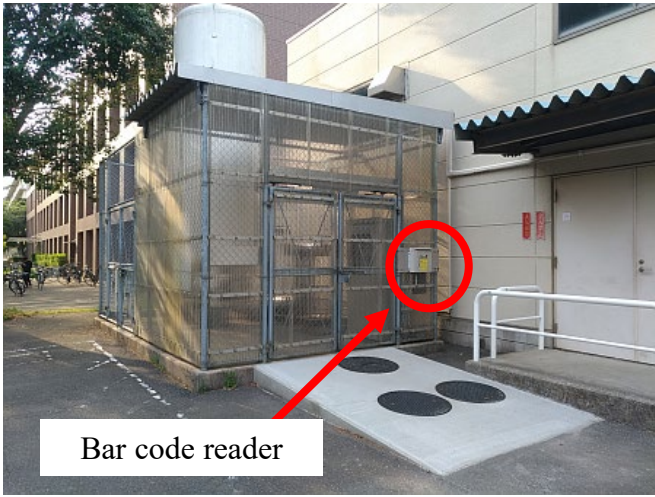


# Manual for filling liquid nitrogen

2022.05

Chiba University  
Department of Science

# 1.Unlock the door with a bar code .



Place a user's bar code below a bar code reader.



When the bar code is read, the door is temporarily unlocked. If the door is left open, a buzzer will sound and the door must be closed. When the door closes, it will automatically lock.

\* Press the top button to temporarily open the door.

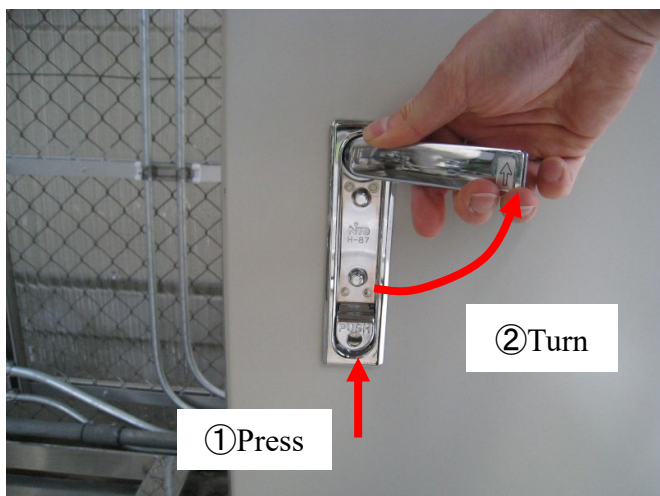


## 2. Place your dewar in the correct position on the scales.

For dewar with wheels, ensure the wheels are locked.



## 3. Press and turn latch to access the bar code reader and refill controls.



Remove the bar code reader and scan the bar code which corresponds with the dewar followed by your user's bar code.

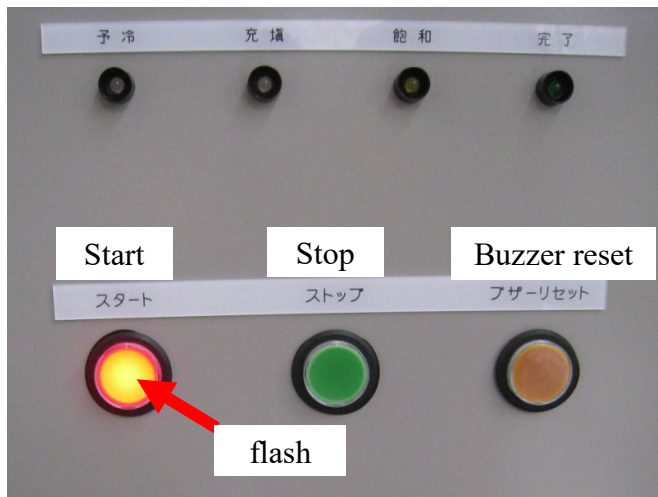
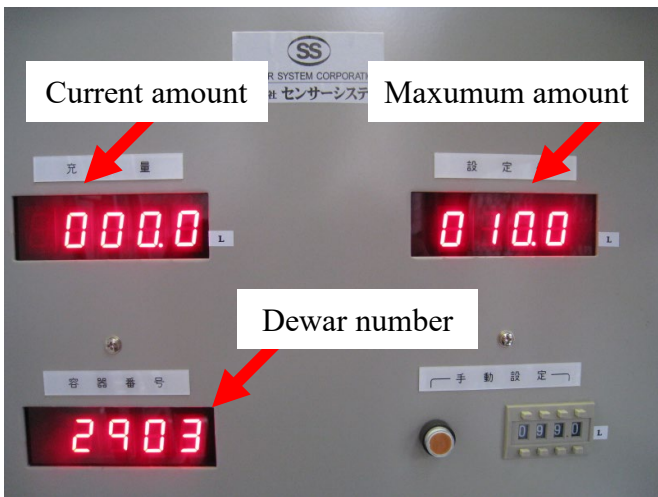
\* Never look directly into the laser on the bar code reader.

\* You will hear a tone and the green light will be turned on if you have successfully scanned the bar code.

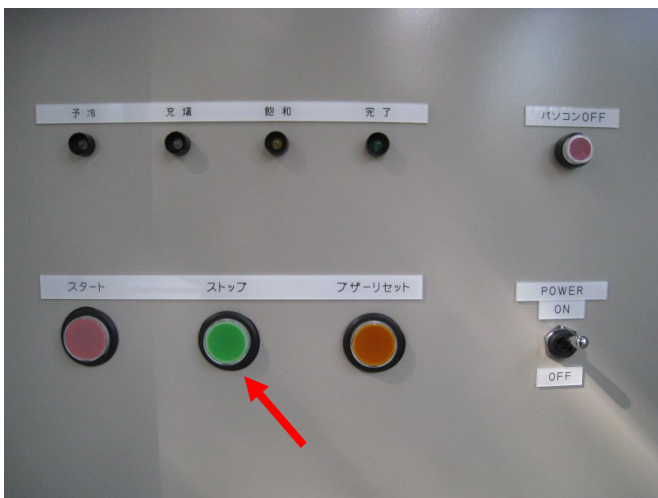




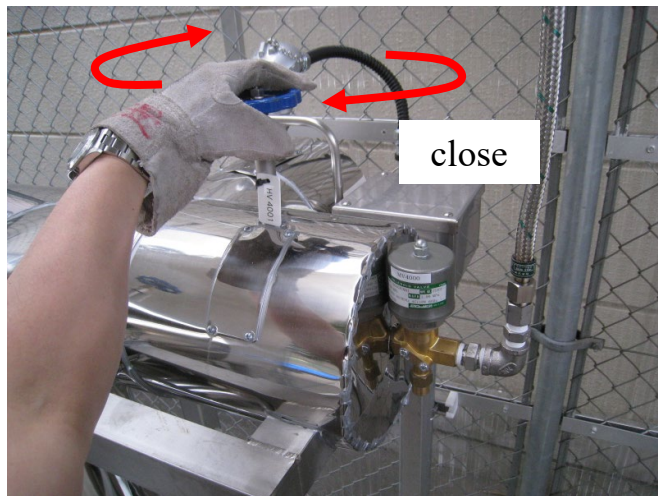
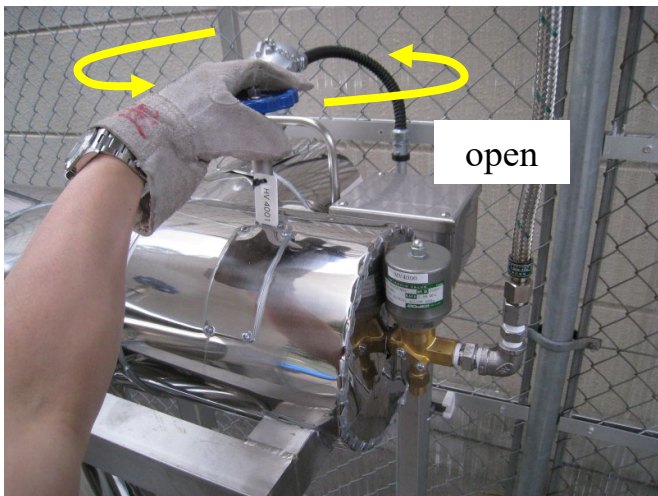
The control panell will display the dewar number and the maximum refill amount etc.  
 If user's code and dewar code do not correspond, you will not be able to proceed this point.  
 If you have the correct numbers, the refill button will begin to flash.



If you wish to reset this process, please press the stop button. **Activate the button once without holding.**  
 Also if there is a delay, the process will automatically be cancelled and reset.  
 In this case, the display will show all zeros. Rescan the bar codes



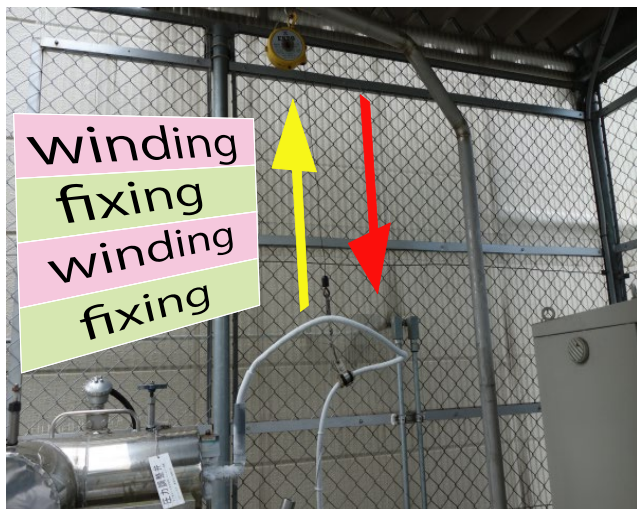
4. Before proceeding further, shut valve completely.



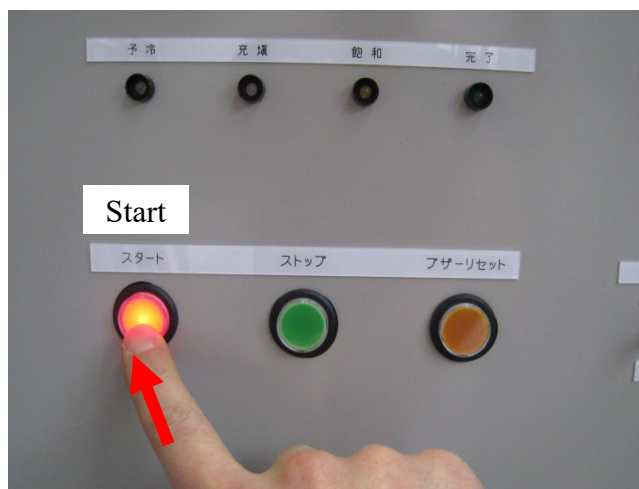


## 5. Set the supply hose.

The hanging cable reel can be fixed in this position when it makes a "crunching" sound when pulled. When the cable is pulled further and does not make a "crunching" sound, it is wound upward and returns to its original position. The "fixing zone" with the "crunching" sound and the "winding zone" without the sound alternate. Each container has a different height, so it is fixed at a suitable position.

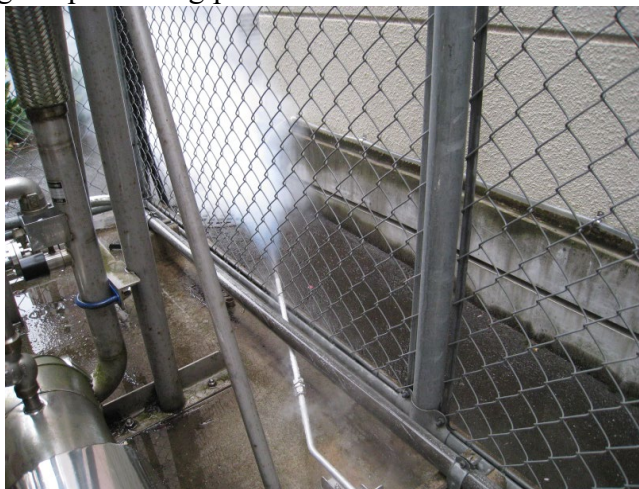
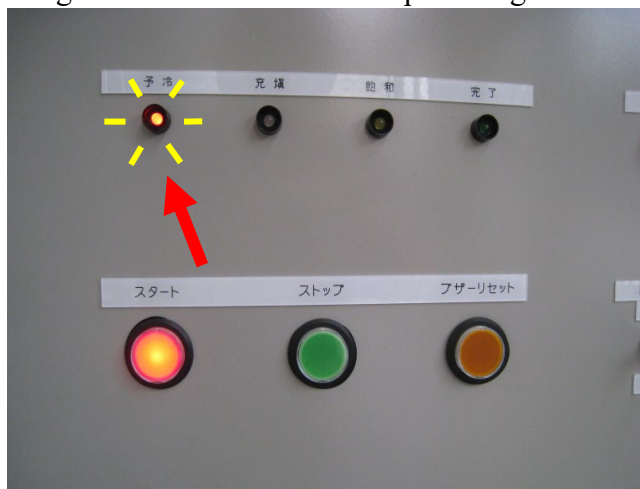


## 6. Grip the hose firmly and press the start button.

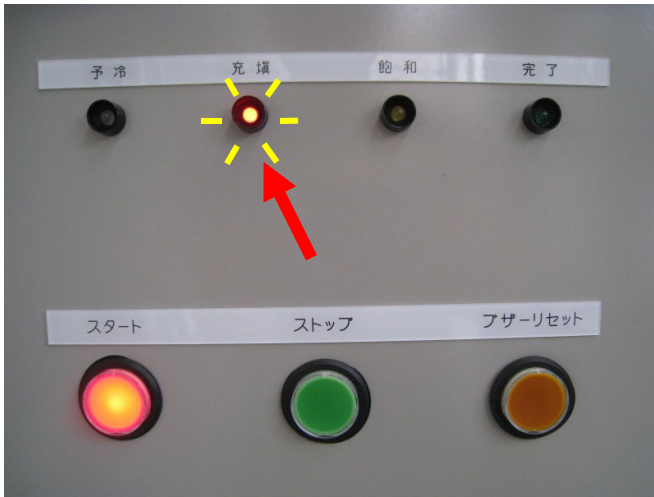


Depending on the temperature, the machine may need to complete a precooling process. Please wait until this process is taking place.

Hot gas from the hose will escape through a vent during the precooling process

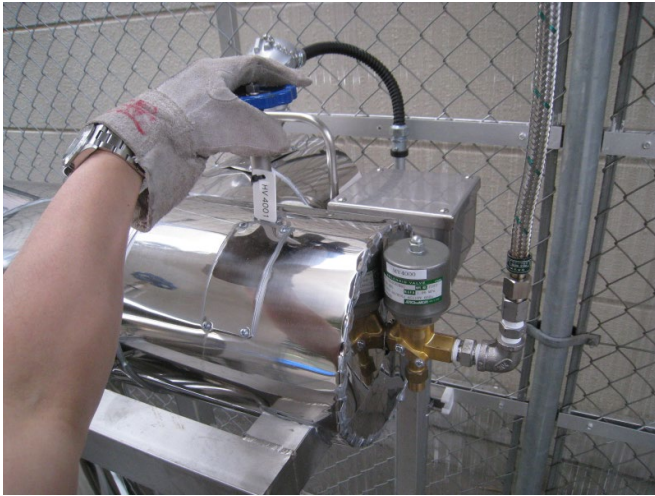


Once precooling process is complete, the refill lump will be turned on.

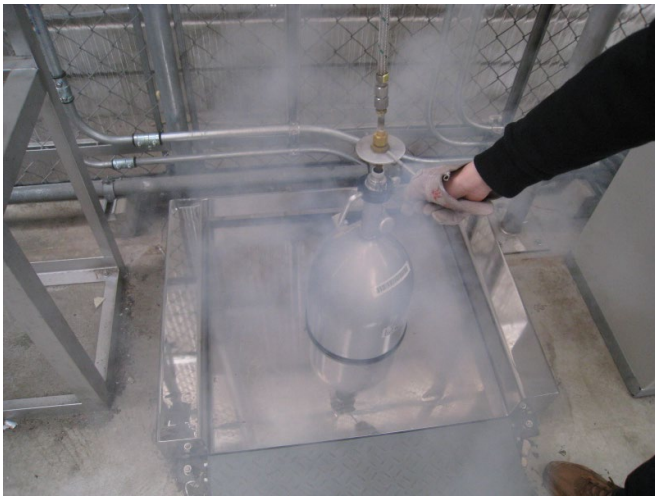


## 7. Open the valve slowly.

If the opening is too small, only gas will come out without cooling. Please open to some extent.



At first, the evaporated nitrogen gas is vigorous as it comes out. As it cools and converts to liquid nitrogen, the pressure settles down.





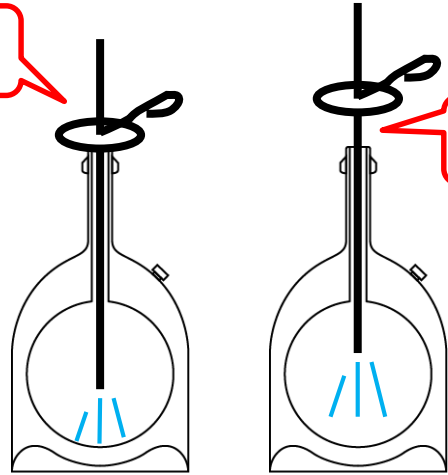
## <Safety Stop Function>

This device detects the amount of weight change during filling. If the change in weight is zero for a certain period of time, the unit automatically comes to a safety stop. If the manual valve opening is too small, liquid nitrogen may not accumulate and the safety stop may occur. Please open the manual valve a little more. Also, when a large capacity container is started from a warmed state, it tends to not accumulate easily and the amount of change becomes zero because of its large heat capacity. If the safety stop occurs, please try again.

## <Making a gap>

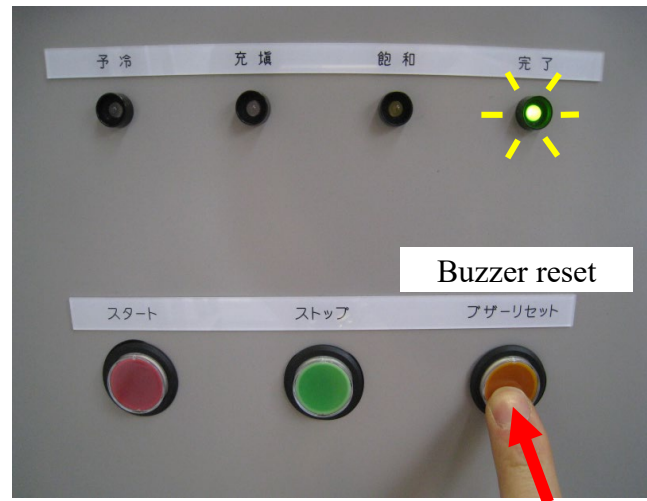
Some people hold the mouth of a liquid nitrogen container by the shade of the supply hose. This is dangerous because the mouth of the container is blocked and the evaporated nitrogen gas loses its escape route, causing the internal pressure to increase. Make a gap at the mouth of the container to allow the nitrogen gas to escape.

Do not block the mouth of the container.



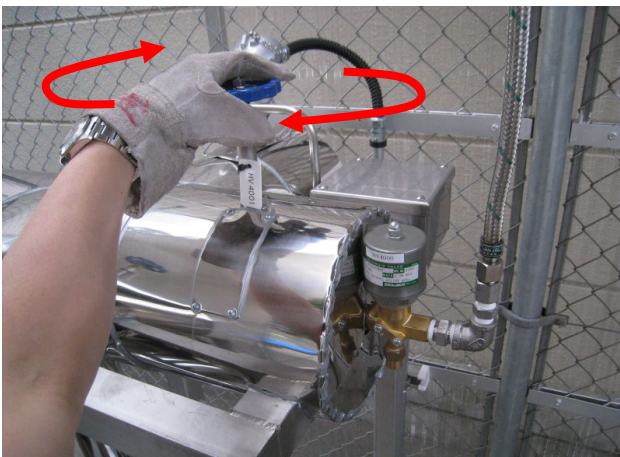
Make a gap

When the filling volume reaches the set value, the machine stops automatically. The completion lamp will light and a buzzer will sound, please release it by pressing the buzzer reset button.



Buzzer reset

## 8. Don't forget to close the valve.

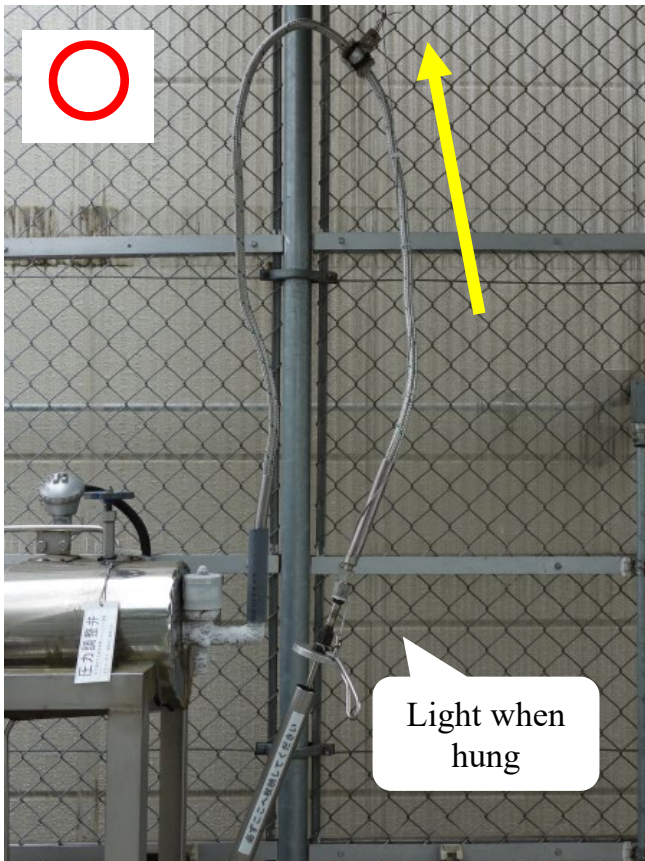


## 9. Return the hose to its original position.

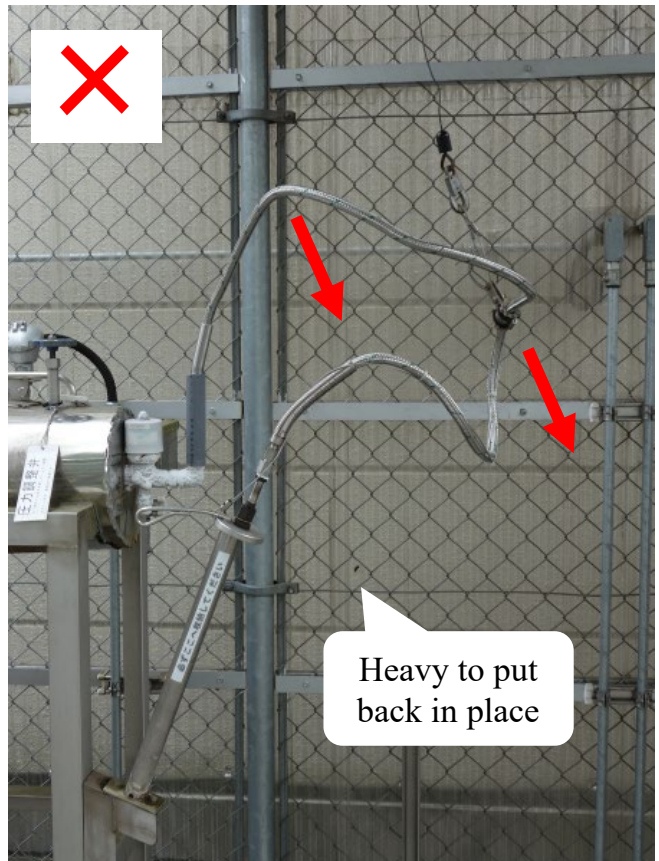
When the cable reel is pulled, it alternates between "fixed" and "rewind." If the cable is pulled down slightly, it will be rewound upward and return to its original position. Some people pull more than necessary, or pull with force, but please do not do this as it may cause malfunction. A slight pull is sufficient.



If you try to return the supply hose to its original position without winding it upward, you will have to lift the weight of the supply hose yourself, which is heavy. This will also put a load on the supply hose. If the supply hose is wound up, it is hung high, so it is light and easy to return it to its original position. And there is no load on the supply hose.



Wound up state



Unwound state

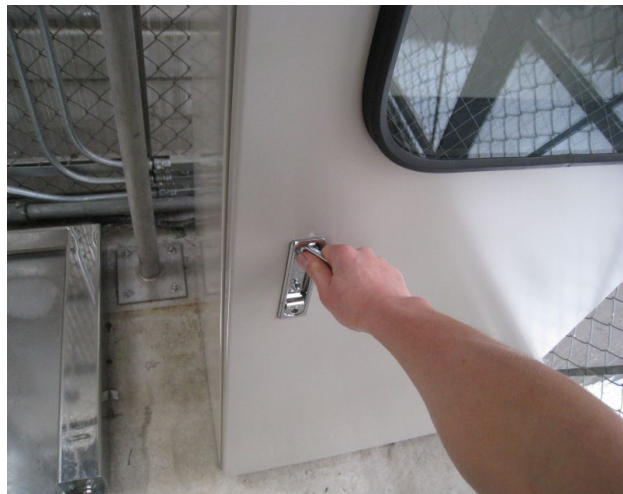


Be sure to return the supply hose to its original position. Leaving the supply hose hanging is dangerous if it is blown by a strong wind.



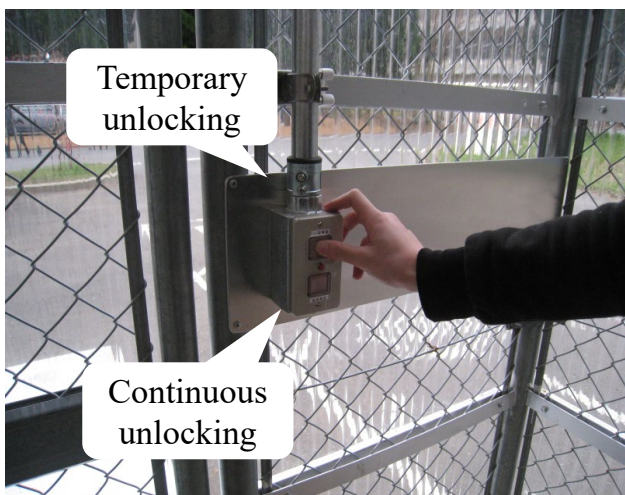
### 10. Close the door securely.

Be careful not to pinch the cord.

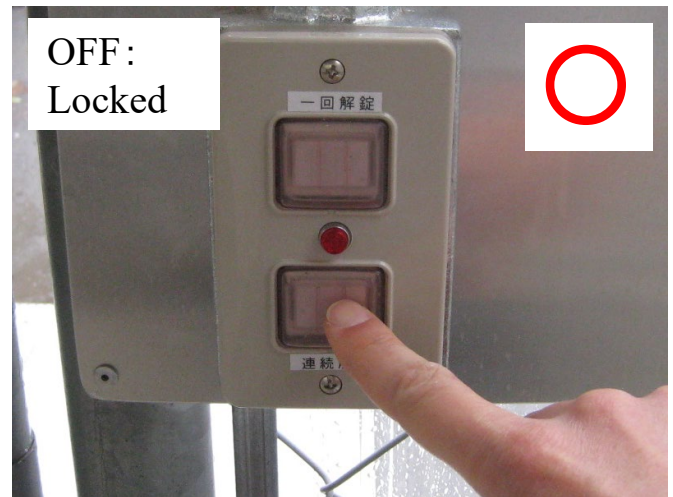
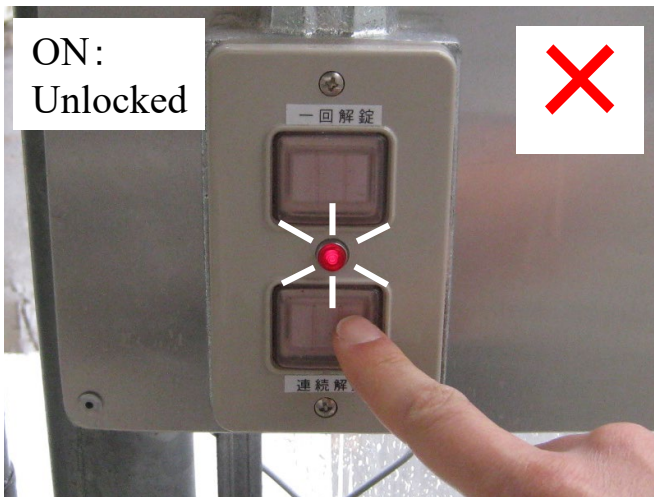


### 11. When leaving, press the unlock button to open the fence door.

Pressing the top button temporarily unlocks the door.



If the door is not locked, there is a possibility that you have pressed the button by mistake. If the bottom button is pressed wrongly (the red light will be on), correct to the normal situation by pressing the button again (the red light will be off).



## 12. Confirm the door is locked.

The door will automatically lock after a few seconds pressing the top button.





# Appendix

## <Bar code reading>

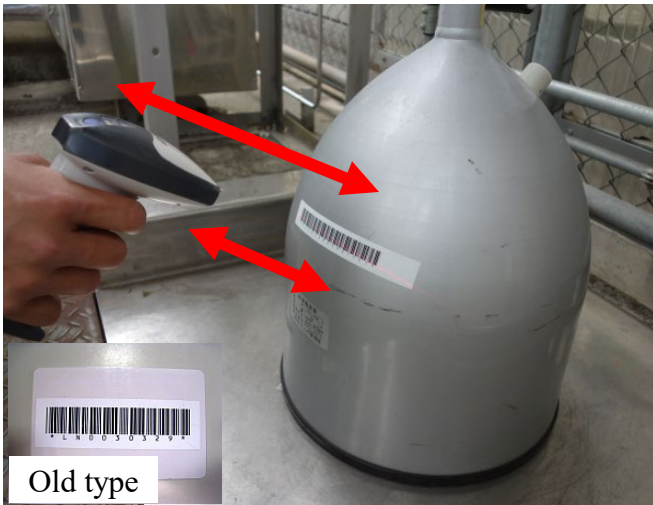
[In the case of an old type bar code]

If it is difficult to read, try changing the angle or distance between the bar code and the reader. The bar code tends to be readable the moment it is changed, rather than when it is held still. Keep the distance so that the red laser beam hits the entire area of the bar code. If you are too close, the bar code cannot be read.

[In the case of a new type of bar code]

The bar code is narrow, so you can get closer to it. Sensitivity is also good.

\*Please contact us when you wish to exchange the bar code for a new one.

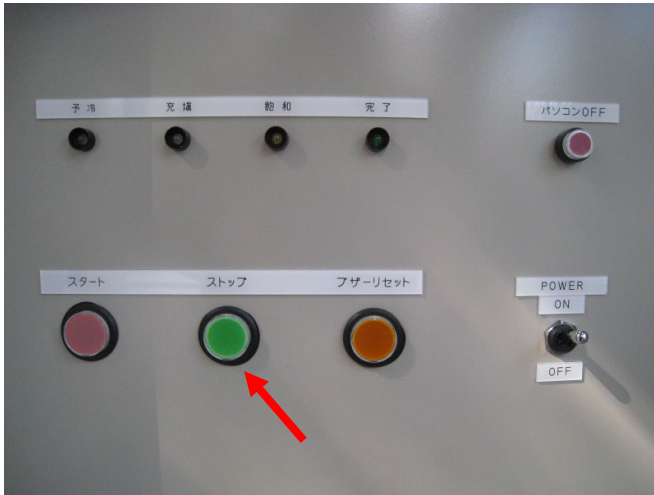


Sunlight reduces the barcode reader's reading sensitivity. You can increase the reading sensitivity by holding up a notebook or your hand to create a shadow, or by turning the container to face the darker side.

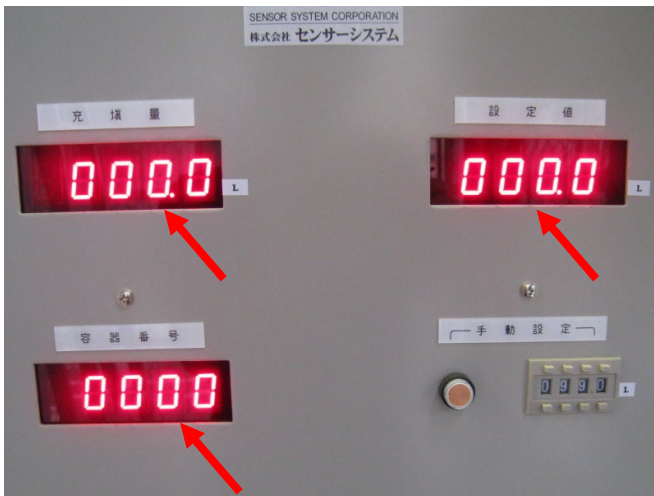


## <Reset function>

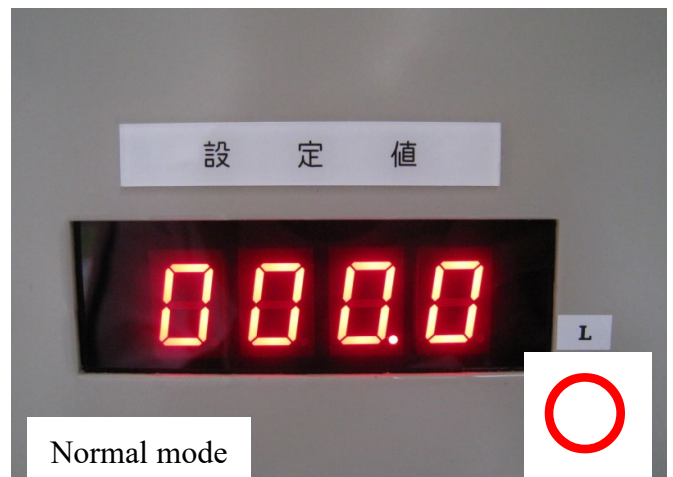
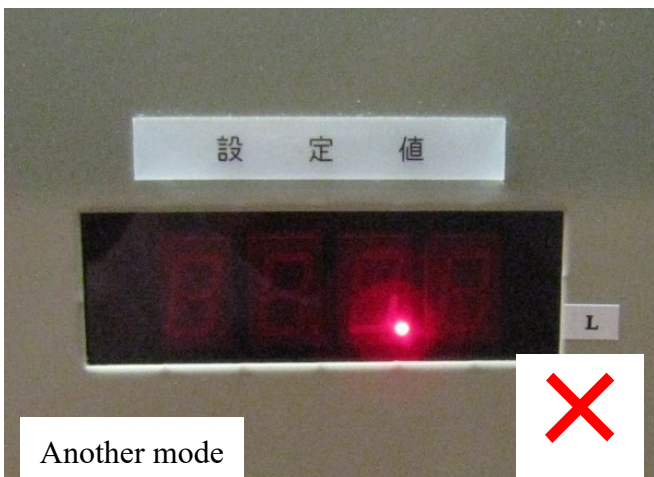
If the bar code reading fails or the start button does not light up, press the stop button. The stop button has a reset function. (Do not press and hold.)



Please confirm that the display has returned to the initialized state of "0000" before reading the bar code again.



Never "press and hold" the stop button. It will change to another mode. If the display is in another mode as shown in the picture below, press and hold the stop button again to return to the normal mode.





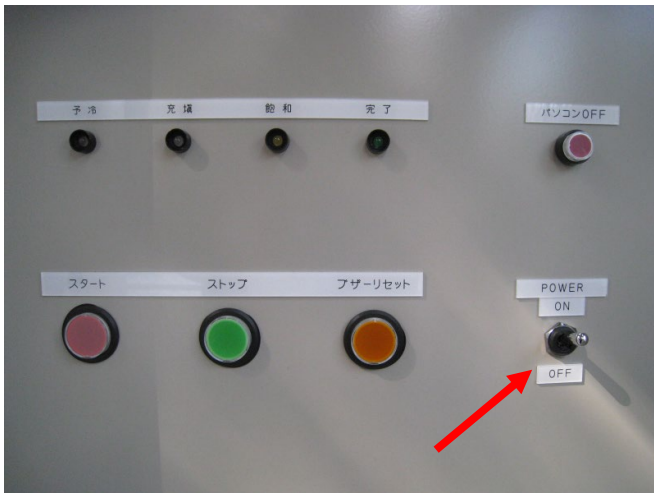
## <Reset function 2>

If you still fail to reset the system, remove the dewars from the scales, then switch the power off.



Switch the power back on and then the system will be reset.

If this fails, call the engineer.



## <Manual stop>

If you do not require to fill the dewar to it's maximum value, press the stop button once the value equals the desired value.

For example, if the dewar is a 100L dewar and you require it half full, press the stop button once the filling value equals around 50L.



Also, if the overflow occurs during filling and the filling amount does not reach the set value, press the stop button to manually stop the filling.

If this happens every time, the setpoint is probably wrong. Please contact us so that we can change the setpoint.



## <Common problems>

### 1. the machine stops automatically even though it is not full.

#### 1-1. Insufficient flow rate

[Solution] The flow rate is probably low, so try opening the manual valve more.

The safety stop function of the device may have been activated. During filling, the device is watching the weight change. If this weight does not change during a certain period of time (first 120 seconds, then every 40 seconds), the solenoid valve is closed and filling is stopped for safety reasons. If the flow rate of liquid nitrogen is low, it evaporates in the container and does not accumulate. Therefore, it is thought that the amount of change is insufficient and the safety stop function is activated. Since a container with a large capacity has a large thermal capacity, if you try to fill the container from room temperature, it may not accumulate even with the manual valve fully open, and the safety stop function will stop. In this case, please try again.

#### 1-2. False detection

[Solution] Make sure that the operator does not have his/her foot on the scale.

The operator's weight will be mistaken for the completion of filling and the machine will stop. Please be careful not to step on the scale.

Also, please inform us of any data that has been marked as filling complete by the operator's weight, as it will be subject to billing. We will delete the data.

### 2. solenoid valve does not close

#### 2-1. Mechanical non-conformity

[Solution] Close the manual valve to cut off the flow.

When the flow of liquid nitrogen stops, the solenoid valve tends to close. Open the manual valve again and check if the solenoid valve has closed. If there is no flow when you open the manual valve, the problem is solved (a small amount of gas can flow). If it still does not close, there may be a foreign object trapped in the valve body. If it is ice, it will disappear when warmed up, so close the manual valve and let it warm up. Contact the staff.

#### 2-2. Electrical failure

[Solution] Try turning off the device.

Solenoid valves are designed to close when there is no electrical supply.

If it still does not close, there is a possibility that a foreign object is trapped in the valve body. Please contact our staff.