



# TECHNICAL INSTRUCTION

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## OPERATING MANUAL FOR

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## DISCHARGING CONTAINER LAR/LOX/LIN




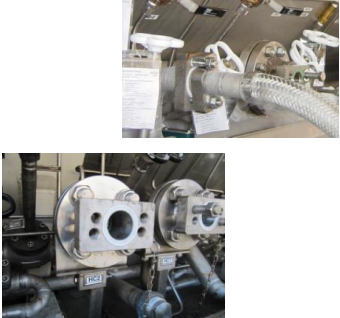
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Aprobateur : FL

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### Phase 1 : Check and first manipulations before the discharge

<p>1- Security rules:</p> <ul style="list-style-type: none"><li>• Wear all required safety equipments for discharging.</li><li>• Never open totally the valves.</li><li>• Be aware of all gas related hazards.</li><li>• In case of LOX, be sure that no grease is used and that the container is not located over asphalt</li></ul>	
<p>2- Open the side doors of the container and check its general state.</p>	
<p>3- Be sure that all the valves of both container and tank are fully closed.</p>	
<p>4- Connect <b>DN50</b> Hose between the <b>HC2</b> connection of the container and the liquid Valve of the tank</p>	



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5- Purge the connected hose. Open the purge valve **V18** of the container then, open slightly the Gas valve of the tank.

→ Let it open for 30 seconds then close.



6- Plug electrical cable on the BALS (REF 2402) plug of the container.



7- Turn on the electrical panel using the red switch "ON" The light should turn on.

→ If the "POWER" light do not turn on, go to the Annex 1

**Attention:** Do not use the pump if a sealing is on the red switch.



8- Open **V2** and **V4** valve of the container (yellow globe valves) using the dedicated key.



← V2

V4 →





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### Phase 2 : Cool-down of the container

9- Start to cool down the pump by :

a) opening V7 and V17.if the pressure is minder that half of the maximal service pressure

Or

b) opening V7, V35 and liquid valve of receiving tank

if the pressure is close to the maximal service pressure

Be sure that container pressure is above receiving tank pressure (if not, rise it using **V5**)

➔ The pump will be cold enough and ready when the « **ready** » sign is lighted up (about 30 min).

➔ If the sign do not light up after 40 min, go to annex 1



← V7



V17 →



← Panel

10- If the pressure of the tank is bellow the required pressure (cf pump label) open V5 until you reach the minimum pressure then close it.





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### Phase 3 : Discharge of the container

- 11- Start the pump ("**START**" button).  
→ If the pump does not start; go to annex 1.



- 12- If you used method a), progressively close **V17**, open progressively the liquid phase valve of the tank and open progressively **V35** holding the differential pressure between the entry (**PI1**) and the exit (**PI2**) between

- 8.5 bar for **LIN**
- 6 bar pour **LOX**
- 5 bar for **LAR**

**Attention:** If you experience a heavy leakage, stop the transfer, tight the flanges and/or change the joints then start again.

If a hazard appears, use the "STOP" button or the emergency stop button, close V2, V4 pulling on the emergency cable

Open **V8** to raise the post pump pressure. If the pressure rises too much, close it.

V17 should stay close during all transfer independently of the V35 position.



← V17



V35 →



PI1 and PI2



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13- Stay close of the container during all the transfer period, if the container is equipped and when the buzz is on, press the “**AWAKE MAN**” button to keep the pump in function.

→ If the pressure rises to much, open **V6** to drop it down

→ If the pressure drops, open **V5** to rise it



14- When the speed pump changes, or when the level reach « 0 », push the « **STOP** » button on the control panel.



15- Shut down the electrical box alimentation (red switch)







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#### Phase 4 : End of discharging process

16- When you have shut down the electrical panel, close **V35** of the container and the liquid phase valve on the receiving tank. Open the purge valve of the container (**V18**)



← V35



V18→

17- Close **V7** and open **V17** to purge the pump.



18- Close **V2** and **V4** of the container (use the dedicated key or the security cable).



← V2

V4 →





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19- Unplug the electrical cable.



20- Disconnect the hoses and the **HC2** and **HC7** flences.

**Attention:** Cold burns hazards due to remaining liquid in the hoses.




21- Close **V17** and **V18**.



22- Check that all the valves are closed and shut the containers doors.




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## ANNEX 1

SYMPTOM	POSSIBLE CAUSES	SOLUTIONS
The white light HL1 "POWER" does not turn on	No electrical supply	Check the plug-in and the power supply
	Absence of a phase	
	The transformer T is blown	Follow the manual unloading procedure (annex 2)
	The FA10 breaker is off	Turn on the FA10 breaker
	The lamp is broken	Test the alimentation on terminals 3 & 4 of the transformer
The light HL2 "READY" does not turn on	The magneto-thermal relay KS1 is faulty (KA3 under tension)	Push the "RESET" button of KS1
	The motor is over-heating (KA2 out of tension and red light HL4 turned on)	Let the motor cooling down
		Limit the output flow of the pump
	The temperature inside the electrical box is bellow 5 °C	Check EH1
	The FU2 fuse is blown	Change the fuse (50 mA)
	The temperature sensor BT1 of the pump is blown	Switch SA1
	The UT1 unit is faulty	
	The KT4 relay (on-function temporization 10s.) is faulty	
	The KT3 relay (stop temporization 3s.) is faulty	
	The SP1 switch (pump output) is faulty	
The KT1 relay (stop temporization if the discharge pressure of the pump is under the limit 4s.) is faulty		
The KT2 relay(on function temporization 30s.) is faulty		



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SYMPTOM	POSSIBLE CAUSES	SOLUTIONS
	The pump temperature is above -115 °C	If the temperature displayed on UT1 keep changing, wait, if not, switch SA1
	The SB3 button "EMERGENCY STOP" is on	Switch off SB3
The temperature in the electrical box is under 5 °C	The FA2 breaker is off	Turn on the FA2 breaker
	The ST1 sensor is faulty	Switch SA1
	Le radiator is blown	
The pump does not turn on	KA1 is faulty	Follow the manual unloading procedure (annex 2)
	KS1 is faulty	
	KM1 or KM2 are faulty	

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### ANNEX 2 – Unloading manual procedure:

- Follow the procedure from **step 1 to 5**.
- Go directly to **step 8**, then follow the following steps :
  - Open **V5** to rise the pressure in the container;
  - When the pressure on **PI1** is :
    - 22 bar for a 24 bar container,
    - 16 bar for a 18 bar container,
 open **V7** then **V35** to start the transfer ;
  - Keep **V5** open during all the transfer progress ;
  - If **PI1** rises above :
    - 22 bar for a 24 bar container,
    - 16 bar for a 18 bar container,
 close **V5** to drop the pressure (open **V6** if the pressure keeps rising until you reach the desired pressure) ;
  - Keep the pressure inside the container 4 bar above the one of the receiving tank by turning on or off **V35** ;
  - Keep close to the container all the transfer progress ;
- At the end of the transfer, go to **stage 16** of the procedure and follow the closing instructions of the unloading procedure.



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P&ID of a Air Flow's container

