# Training Manual_ TCD-188




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a. Connect the TCD-188 to an approved solar array and connect a 24V switch power supply to the DC input port of the device.

b. Use reliable grounding that is tied to the earth; not connected to any grid, heating pipe, gas pipe, etc.

c. Turn off the circuit breaker at the back of the TCD-188 before unplugging or plugging in the connectors to the solar array.

d. For safety reasons, conduct any repair work by unplugging the unit before starting the work.

e. Do not use wet cloth to wipe any electrical parts.

f. Do not place or operate the TCD-188 near any inflammable, explosive, corrosive materials, any volatile gases, liquids, and any inflammable gases.

g. Do not touch any electrical components (such as plugs, switches, etc.) with wet hands in order to avoid electric shock.

h. Do not damage or break the power wires and connectors, in order to prevent fire and electric shock. Replace any damaged wires or connectors immediately by qualified maintenance personnel.

i. Do not place any water containers or heavy objects on the top of the TCD-188 to avoid any damage to the top, any injury due to falling objects, or any electric leakage or electric shock due to splashing water on any electric components.

j. Do not climb onto or lean on the TCD-188, which may cause injury due to tilting or falling of unit.

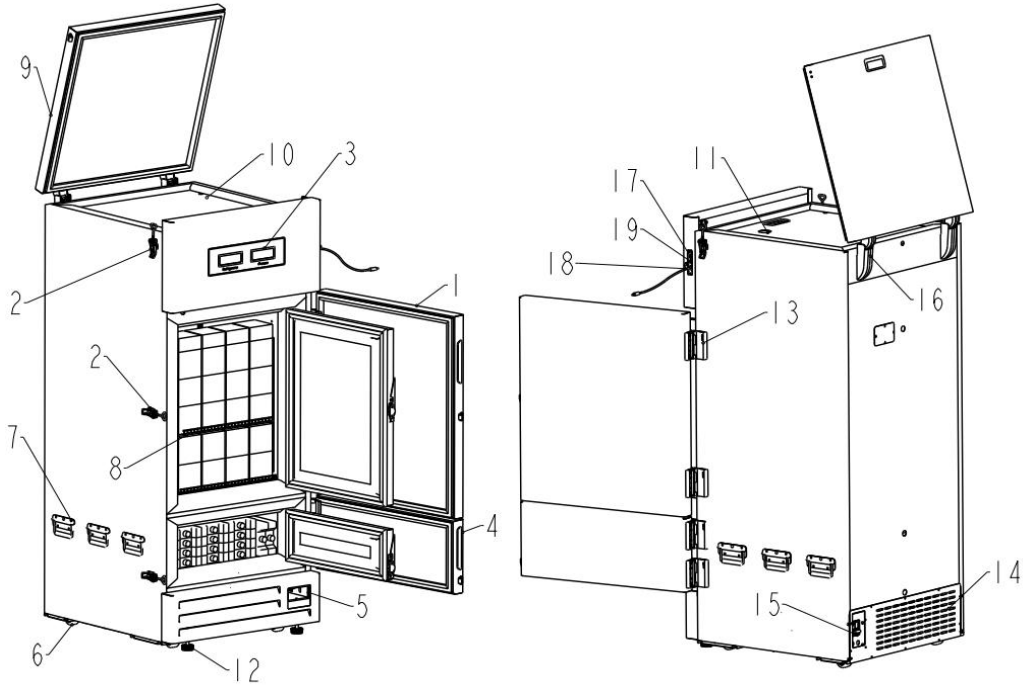
k. Do not touch the compressor when the TCD-188 is plugged in to avoid being burned or injured.

l. Do not allow children to play in inside of the TCD-188, which may cause damage or injury.

m. Remove the door when the TCD-188 is no longer in use so children cannot be trapped inside.

# 2. TCD-188 Specification

| Model | | TCD-188 |
|---|---|---|
| Ambient Operating Temperature and Humidity Range | | 10°C – 43°C;<br>Relative Humidity ≤ 85% |
| Vaccine Chamber Temperature Range | | 2 ℃ - 8 ℃ |
| Freezer Chamber Temperature Range | | ≤-5℃ |
| Holdover Time @ +43 °C | | 124-hrs |
| Autonomy Time @ +43 °C | | 124-hrs |
| Water-pack freezing capacity @ +43 °C | | 2.2kg/24h |
| water-pack storage compartment capacity @ +43 °C | | 11kg |
| Vaccine Gross Capacity | | 150L |
| Vaccine Storage Capacity | | 120L |
| Freezer Gross Capacity | | 38L |
| Solar Array Voltage Range | | 18~40V DC |
| DC Iuput | | 24V DC |
| SMPS AC Input（optional） | | 100~240V 50/60HZ |
| Power | | 300W |
| Charging Interface | | 5V/0.5A |
| Refrigerant | Vaccination Compartment | R290/50g |
| | Freezer Compartment | R290/55g |
| | Dehumidification compressor | R600a/25g |
| External Dimensions | | 660W * 710 D * 1575 H mm |
| Net Weight | | 130kg |




| | | |
|---|---|---|
| 1: Refrigerator external door | 2: Lock | 3: Solar thermometer |
| 4: Freezing external door | 5: Thermostat | 6: Wheel |
| 7: Operating handle | 8: Shelf*2 | 9: Top cover |
| 10: Top inner cover | 11: Water filling hole | 12: Stopping foot |
| 13: Outer door hinge | 14: Compressor compartment（contains compressor, fan） | 15: Circuit breaker |
| 16: Top cover hinge | 17: Type-c interface | 18: DC Barrel-type interface |
| 19:DC interface Sealing seat | | |

# 3. Installation TCD-188

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**1 .Preparation**

a. Read the instruction manual carefully.

b. Remove all packaging materials, including foam base and tape.

• Discard plastic wrappers and bags safely, to avoid suffocation of children.

c. Inventory accessories and installation tools to make sure there are no missing parts. Each TCD-188 should include the following parts shipped inside the vaccine chamber:

• 2 shelves.

• 2 plastic vaccine trays (additional trays can be ordered).

• 1 funnel for filling the water tank to commission the TCD-188.

• User manual and maintenance manual.

• 2 locks and keys.

If any parts are missing, please contact the manufacturer or service provider.

**2. Installation of Photovoltaic (Solar) Array**

• Install solar array at the site, the solar array can be provided by Aucma or other approved solar array. If the solar array of Aucma is used, you can install the solar array according to the TCD-188 Solar Power Kit Installation Manual.

• During solar array installation, route wiring to the location where the TCD-188 is to be located

**3. Installing switch power supply**

•Insert the output plug of the switch power supply into the DC input port of the device, The model of the output plug is LD-20, The plug is waterproof and has anti reverse connection function. After inserting the plug, tighten the bolt of the plug then insert the power plug of the SMPS into the mains power supply.

**4. Date logger**

When the appliance is powered on, the integrated data logger will automatically start without the need for additional installation.

# 3. Installation TCD-188

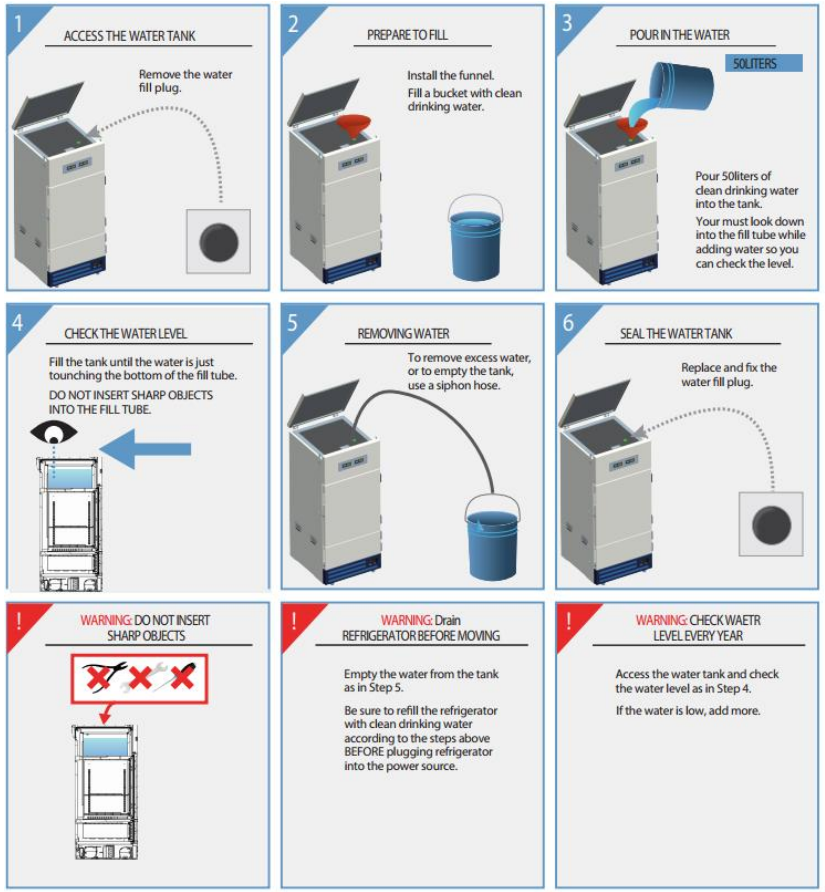
## 5. Positioning the TCD-188

a. Place the TCD-188 on a flat and solid ground and ensure the unit is level.
b. Position the TCD-188 at the location where the solar array wiring is routed.
c. Position the TCD-188 away from direct sunlight and any source of heat (e.g. gas stove, fireplace, etc.).
d. TCD-188 must not be placed in or around flammable or corrosive gases that could cause an explosion or electric shock.
e. In order to prevent rust or electrical leakage, the TCD-188 should not be placed in a high humidity environment or in a location where it could be splashed with water or rained upon.
f. Position the TCD-188 in a well ventilated area and make sure there is a minimum of 10 cm of empty space around the sides and back of the unit.
g. Allow a minimum of 70 cm clearance above the TCD-188 for accessing the water tank lid.

## 6. Filling Instructions

⚠ *TCD-188 must be properly filled with clean drinking water before operation and use. During the filling process, use care and common sense and follow all local safety precautions.*

Fill water according to the operating instructions on the top surface of the inner door



## 7. Startup and Cool down

⚠ Ensure that the water tank has been filled to the correct level before plugging in the TCD-188.

**Step 1:** Power-on the TCD-188 by connecting the MC4 solar power connectors from the solar array( 18V~40V DC) and turning on the switch/circuit breaker at the back of the refrigerator, or insert the power plug into the mains power(100V~240V AC).
When solar energy and main power are supplied simultaneously, when the light intensity is sufficient, the machine prioritizes using solar energy, when the light is insufficient, the machine switches to using mains power.
When using solar power for power supply only, when the light is not enough, the machine will cut off the dehumidification compressor, if the light is still not enough, the machine will cut off the freezer compressor until the light intensity is enough to turn on all of the compresses. When using mains power only, the compressor operates based on the temperature.
**Step 2:** Once powered on, the battery and logger will turn on automatically， and freezing chamber. and the temperature display will show the temperature of the vaccine chamber
**Step 3:** When powered on, the compressor will start after a delay of 3 minutes.
**Step 4:** If solar power and main power is not available, close the circuit breaker and follow up the next day in person or by phone to verify the installation.
**Step 5:** Do not use the vaccine compartment until the display indicates that the vaccine chamber temperature is below 8° C, which might take more than eight sunny days to achieve. If solar power is sufficient， the freezer compartment is available, don't put too much water packs at one time.

⚠ In the case of intermittent solar availability and high ambient temperature environment, the TCD-188's vaccine compartment may require more than 14 days after initial installation to reach full holdover capability.

• Check the temperature display daily and make sure the vaccine chamber temperature is between 2-8 ° C before using, and the freezing chamber temperature is lower than 0 ° C after solar power on 3h.
• Do not overfill the vaccine chamber. Leave gaps between vials and boxes to enable cold air circulation within the chamber. Use trays to organize vaccines and keep boxes from touching the walls or sitting directly on the floor of the vaccine chamber.
• Don't put too much water packs to freezer compartment at one time.
• Keep TCD-188 cover tightly closed and latched when not in use to maintain the storage temperature inside.
• The thermostat has a password. It is not necessary to adjust the thermostat under normal conditions
• Designate a person to inspect and record the daily operation to ensure the safe use of the TCD-188.
• Basket are not essential for Grade A freeze protection but only supplied as an
accessory for ease of use.
• Only approved vaccines or medical supplies should be stored in the vaccine compartment. Do not store any foods, beverages, or flammable, explosive, volatile items (such as alcohol or gasoline) or other dangerous items in TCD-188.
• The dehumidification compressor and refrigeration compressor can be independently turned off. When the light intensity is insufficient, it is recommended to turn off the dehumidification compressor and refrigeration compressor
•The dehumidification compressor will work when the temperature of the refrigeration room is within the range of 2-8 ℃. When the dehumidifier evaporator defrosts, the humidity in the refrigeration room will be higher, The defrosting time is generally controlled between 8-12 hours

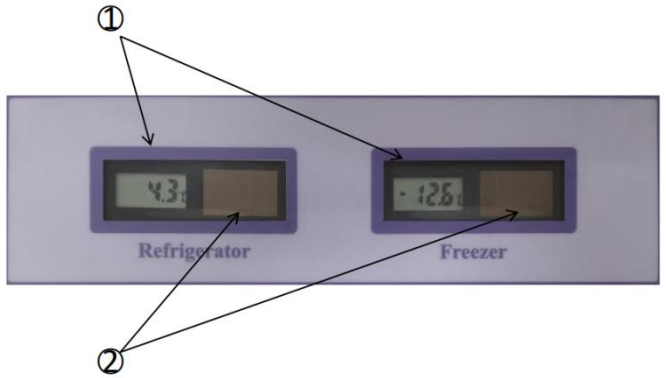
**1. Vaccine Chamber and Freezer Chamber**

All parts of the vaccine chamber are controlled between 2-8 ° C and are suitable for vaccine storage.
Loose vials should be stored in the provided trays on shelves inside the vaccine chamber. Secondary packaging may be placed directly on shelves or in trays. Do not place secondary packaging directly on the bottom of the vaccine chamber to avoid contact with any excess condensation. Also avoid leaving secondary packaging in direct contact with the chamber walls.
The dehumidification compressor is temperature controlled, and dehumidification will only work when the temperature drops to within the range of 2-8 ℃.
The temperature of the freezing chamber is controlled below -5 ℃,and it’s daily water-pack freezing capacity is 2.0kg/day.

# 4. Use of the TCD-188

## 2. Temperature Display

The thermometer on the cover shows the actual temperature of the TCD-188. The temperature sensor and thermostat are factory calibrated and set. The user does not need to adjust any temperature settings. It was power by integrated solar panel.




Current temperature and status

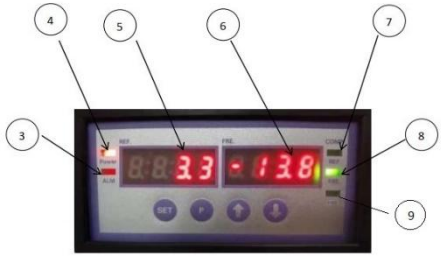
| | |
|---|---|
| 1.Current chamber temperature | The left side shows the temperature of the vaccine chamber.<br>The right side shows the temperature of the freezer chamber. |
| 2.Integrated solar panel | Power the thermometer |

## 3. Thermostat

The thermostat on the compressor room side control the temperature and it can also shows and record the temperature and alarm history over the past 30 days.
The thermostat has a password protection function, and there is no need to adjust parameters under normal circumstances. If necessary, please contact your local dealer.

### 3.1 Temperature display and Status LED

Note: Within 6 minutes, if there is no button operation, the controller will automatically turn off the display, and the colons on the left and right digital tubes will flash. Press any key to activate the display.




| | |
|---|---|
| 3. ALM indicator | The alarm indicator blinking red during alarms |
| 4. Power indicator | When the light is sufficient, the indicator light is on.<br>The indicator blinks when powered by the back battery. |
| 5.Vaccine chamber temperature | Under normal conditions, the vaccine chamber temperature is displayed.<br>Please press “SET”+“⬆”one second, and display cold storage chamber temperature. |
| 6.Freezer temperature | Under normal conditions, the Freezer temperature is displayed.<br>Please press” SET”+“⬇”one second, and Display ambient temperature. |
| 7.Vaccine chamber compressor working indicator | When the vaccine chamber compressor is working, the indicator light flashes green. |
| 8.Freezer compressor working indicator | When the freezer compressor is working, the indicator light flashes green. |
| 9. Dehumidifier compressor working indicator | When the dehumidifier compressor is working, the indicator light flashes green. |

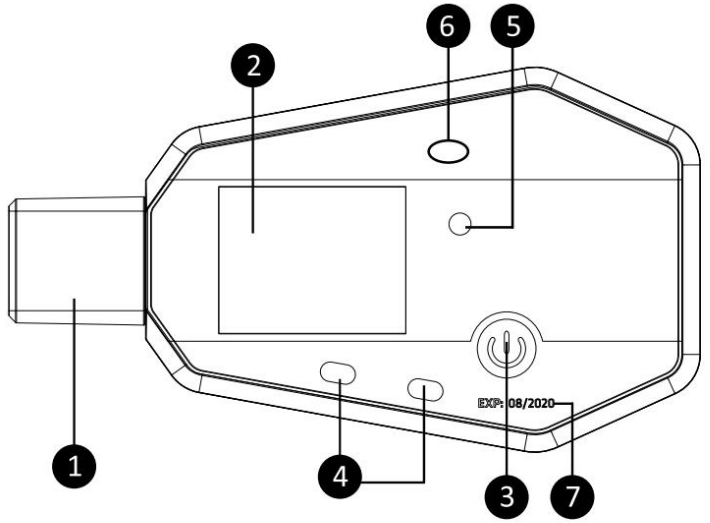
## 4. Alarms

| Display symbols | Symbol description |
|---|---|
| E1 | Ice layer sensor failure |
| E2 | Refrigerator storage sensor failure |
| E3 | Freezing sensor failure |
| E4 | Ambient temperature sensor failure |
| AH1 | High temperature alarm for ice |
| AL1 | Low temperature alarm for ice |
| AH2 | High temperature alarm in vaccine chamber |
| AL2 | Low temperature alarm in vaccine chamber |
| AH3 | Freezer high temperature alarm |
| AL3 | Freezer low temperature alarm |
| bAt | Battery under voltage alarm |

After an alarm condition is triggered the Active Alarm screen will show, the red LED will blink and the audible buzzer will sound. Pressing any button will silence the audible alarm, but the red LED will continue flashing until the alarm condition has ended.

## 5. 30 DTR (Daily Temperature Record)

The appliance is equipped with an independent 30 day temperature recorder.




| | |
|---|---|
| 1. USB Protective Cover | 5. Light Sensor |
| 2. LCD Screen | 6. Humidity Sensor |
| 3. Button (1) | 7. Shelf Life |
| 4. LED Indicator | |

**30 DTR (Daily Temperature Record)**

*(1)Button Function Instructions:*

| Operation | Function | Status Indication* |
|---|---|---|
| Press & Hold 5 Seconds | Start/Stop Recording | Start Recording: Rec. Stop Recording: Stop |
| Single Click | Light Up LCD Backlight; Page Up/Down | See "Indication Instructions" |
| Double Click | Mark Events | Mark Success: Mark Mark Failure: Mark |

The code like Rec. will show on logger's LCD screen to indicate status.

The red square indicates the red LED light is fashing ;

The green square indicates the green LED light is fashing;

Each individual square indicates how many times it will blink;

Two adjoining squares like indicate both red and green light blinksimultaneously.

The same rules are applied below.

**Note:** For more detailed instructions, please refer to the separate manual.

## 6. System Battery

The logger will continue record data by a Li-ion battery when the appliance is power out.
The Li-ion battery is rechargeable, The power supply of the appliance can charge the battery, it can operate without power supply for at least 48 hours when charged for 8 hours. A fully charged battery will allow the system to continue to record data objects for 10 days without solar or mains power. During longer outages, the battery may drain completely and the logger will no longer function until power is restored or the battery is replaced. Over time, the battery will degrade and lose capacity and will need to be replaced. Replacement batteries are available from Aucma or service providers; refer to maintenance manual for battery replacement instructions.

## 1. Daily maintenance tasks

Confirm that the vaccine chamber is within acceptable temperature range (2°C to 8°C) and remaining holdover is at least 2 days. If temperatures are out of range or holdover is low, follow troubleshooting steps in Chapter 6. Ensure that door is fully closed and latched. Avoid unnecessary door openings.

## 2. Monthly maintenance tasks

- Wipe down any condensation inside the vaccine chamber.
- Remove any surrounding objects around the TCD-188 that might obstruct airflow.
- Clean external condensers at the back of the TCD-188.
- Clean both front and back compressor ventilation covers.
- Clean vaccine chamber door inner and outer gaskets with a soft wet cloth to maintain flexibility and elasticity. Rub the door gasket with talcum powder to prolong its use. Check gaskets for any cracks or gaps that allow airflow through the door. Order spare parts and replace if necessary.

## 3. Annual maintenance tasks

Inspect water level to ensure that water reaches the bottom of the fill tube; top off with clean drinking water if needed. It is normal for ice to be present in the bottom of the fill tube.

## 4. Cautions during maintenance

- Wipe both inner and outer surfaces using a soft cloth. Do not use any brushes, acidic or alkali detergents.
- In order to avoid water leakage to electric component and damage to the exterior, do not pressure-wash or use any hard scrub to clean the TCD-188.
- Before decommissioning or storing the TCD-188, unplug the unit, drain all water, clean the inside thoroughly, use a dry cloth to wipe the interior and leave the door and top lid open for 2 to 3 days until the inside is completely dry.

# 6. Troubleshooting

If TCD-188 does not work properly, please proceed as described in the troubleshooting guide below.

If the problem cannot be resolved, please contact the manufacturer or the service provider.

| Symptom | Possible Cause | Remedy |
|---|---|---|
| Vaccine chamber temperature above 8 °C | Prolonged door opening or door ajar | Avoid prolonged door openings and make sure door is fully closed and latched after use. Vaccine chamber may take some time to cool down again after extended door openings. |
| | Warm objects placed in the vaccine chamber | Do not place food, beverages, or other non-medical items inside the refrigerator. |
| | Door gasket not sealing properly | Check gasket condition; adjust door or replace gasket if necessary. |
| | Improper air flow around condensing unit | Re-arrange to allow proper air circulation; relocate the refrigerator away from heat-generating equipment, direct sunlight, or direct path of air conditioning or heating ducts. |
| | Power cord unplugged | Plug in power cord. |
| | Insufficient mains or solar power | Check solar array and facility wiring or contact electricity supplier. |
| | Improper voltage supplied to refrigerator | Connect to approved solar panels. For power connection, correct the power supply voltage and ensure that the power outlet voltage meets the voltage input requirements of TCD-188. |
| Vaccine chamber temperature is below 2°C | Ambient temperature is below 5 °C | Move the TCD-188 to a warmer location. Note that the TCD-188 is rated from 5 °C to 43 °C. |
| | Malfunctioning control board or mechanical thermostat. | If vaccine chamber temperature is below 2 °C while ambient temperature is above 5°C, call for service. |

# 6. Troubleshooting

| Symptom | Possible Cause | Remedy |
|---|---|---|
| Holdover time not enough | Power cord unplugged | Plug in power cord. |
| | Insufficient mains or solar power unavailable | Check solar array and facility wiring or contact electricity supplier. |
| | Improper voltage supplied to refrigerator | Connect to an approved solar array. For mains connections, correct supply voltage and ensure the power outlet voltage matches the TCD-188's voltage input requirements. |
| | Not enough water in the water tank | Check water level and if needed, add water until level reaches bottom of the fill tube. |
| Compressor does not start (green light will turn on when compressor is running) when the power indicator is always on | Refrigerator is in its normal operating cycle | Compressor only runs occasionally to keep the ice lining fully frozen; every 1 hours to every 24 hours, depending on ambient temperature.<br>If good solar energy is available for multiple days and holdover continues to decrease, refer to maintenance manual or call for service. |
| Compressor does not start when green compressor run light is on. | Refrigeration system or control malfunction | Refer to maintenance manual or call for service. |
| Cover won't close tightly | Latch is blocking the door | Make sure latch is not caught in the door, adjust tension of latch to hold door tightly closed. |
| | Refrigerator is not level | Level refrigerator by shimming underneath TCD-188. |
| | Gaskets are not installed properly. | Make sure gaskets are pressed firmly into door and lie flat. |
| | Damaged or leaking door gasket(s) | Replace damaged gasket(s). |
| Condensation on the body of the refrigerator | High ambient humidity. | Wipe down the condensation with a clean dry cloth. |

| Symptom | Possible Cause | Remedy |
|---|---|---|
| Excess condensation water in the vaccine chamber | Clogged drain hole. | Clean drain hole at the back of the vaccine chamber and tubing down to the drain pan, and empty drain pan. |
| | Prolonged door opening or door ajar. | Avoid long door openings and ensure door is closed after use. |
| | Refrigerator is not positioned on a leveled and stable floor. | Position the refrigerator on a stable floor and level it so that condensate flows to the drain in the back of the chamber |
| Buzzing or dripping sound of liquid | Refrigerant flows within the TCD-188 or condensate flowing to drain pan. | Normal phenomenon, no action required. |
| Popping sound | Thermal contraction and expansion of the refrigeration system may cause occasional popping sound. | Normal phenomenon, no action required. |
| Clicking sounds | Occasional clicking sounds may be generated by relay or other electrical parts during compressor’s starts and stops. | Normal phenomenon, no action required. |

### 7.1.1 Hands-on Installation Training

**1）Training objectives：**

Enable trainees to:

a. Independently complete the installation, debugging, and operation of the TCD-188 data logger system;

b. Understand the functions of M2M interfaces, master data access, downloading, and basic fault diagnosis;

c. Execute equipment debugging and acceptance process;

d. Ability to train subsequent technical personnel.

**2）Training Audience：**

a. Installer system

b. Administrator

c. Appliance maintenance personnel

d. Appliance user

**3）List of Training Venues and Equipment Venue requirements:**

- Flat ground, power sockets, workbench
- Simulated installation environment (indoor + outdoor lighting conditions)

**Equipment List (per group):**

- TCD-188 complete appliance
- USB Type-C data cable
- Laptop (pre installed JSON viewer)
- Digital Multimeter
- Waterproof tape, dust-free cloth,
- Locks and keys (included with the equipment)

**4) Training content and practical operation:**

**A. Appliance unpacking and component verification**

**Objective:** To confirm device integrity and identify all components and interfaces.

**Practical content:**

- Unpack and verify:
  - 2 shelves, 2 plastic vaccine trays Funnel,
  - user manual,
  - technical manual
  - 2 locks and keys
  - M2M backup interface component (Type-C+DC power cord)
- Record and confirm using the Installation Checklist
- Practical task: Each group completes the unpacking of equipment and fills out the inspection checklist

**B. Master the basic operation and data download of data loggers**

**Objective:** To Master the basic operation and data download of data loggers

**Practical content:**

- Interface recognition:
  - Type-C data interface (marked as "Logger Data Access")
  - DC power interface (marked as "5V Monitoring Power")
- Data access process:
  - Connect USB-C to a laptop
  - Identify the root directory file structure:
    - 0123456789_CURRENT_DATA_PnDTnHnMnS.json
    - 0123456789_SYNC_PnDTnHnMnS.json
    - 0123456789_60DTR_SUMMARY_PnDTnHnMnS.pdf
    - DATA_HISTORY folder
- Power off data access: Simulate powering the recorder through USB-C when the battery is depleted
- Practical task: Each group completes data download and saves specified files

## C. Data interpretation and report analysis

**Objective:** Capable of interpreting recorded data and PDF summary reports.

**Practical content:**

- JSON Data Object Analysis:

# Basic Data Objects:

| Data Object | Object ID | Unit of Measure | Value Examples |
|---|---|---|---|
| Appliance PQS device type | ACAT | N/A | "RF05" |
| Appliance date of production | ADOP | YYYY-MM-DD | "YYYY-MM-DD" |
| Appliance manufacturer | AMFR | N/A | "AUCMA" |
| Appliance model | AMOD | N/A | "TCD-188" |
| Appliance PQS code | APQS | N/A | "E003/***" |
| Appliance manufacturer serial number | ASER | N/A | "999999999" |
| Compressor Electronic Unit Manufacturer | CNAM | N/A | "SECOP" |
| Compressor Electronic Unit Product Code | CSER | N/A | "101N0420" |
| Compressor Electronic Unit Software version | CSOF | N/A | "V1.1" |
| Compressor Electronic Unit production date | CDAT | YYYY-MM-DD | "YYYY-MM-DD" |
| Secondary Compressor Electronic Unit Manufacturer | CNAM2 | N/A | "SECOP" |
| Secondary Compressor Electronic Unit Product Code | CSER2 | N/A | "101N0420" |
| Secondary Compressor Electronic Unit Software version | CSOF2 | N/A | "V1.1" |
| Secondary Compressor Electronic Unit production date | CDAT2 | YYYY-MM-DD | "YYYY-MM-DD" |

| Data Object | Object ID | Unit of Measure | Value Examples |
|---|---|---|---|
| Tertiary Compressor Electronic Unit Manufacturer | CNAM3 | N/A | "SECOP" |
| Tertiary Compressor Electronic Unit Product Code | CSER3 | N/A | "101N0420" |
| Tertiary Compressor Electronic Unit Software version | CSOF3 | N/A | "V1.1" |
| Tertiary Compressor Electronic Unit production date | CDAT3 | YYYY-MM-DD | "YYYY-MM-DD" |
| Logger date of production | LDOP | YYYY-MM-DD | "YYYY-MM-DD" |
| Logger manufacturer | LMFR | N/A | "AUCMA" |
| Logger model | LMOD | N/A | "AUHUI-806" |
| Logger PQS code | LPQS | N/A | "E006/***" |
| Logger serial number | LSER | N/A | "999999999" |
| Logger software version | LSV | N/A | "V1.0.7" |

# 7. Training for Logger and M2M

**Objective: Capable of interpreting recorded data and PDF summary reports.**

**Practical content:**

- JSON Data Object Analysis:

Collected data objects:

| Data Object | Object ID | Unit of Measure |
|---|---|---|
| Alarm condition | ALRM | N/A |
| Logger battery remaining | BLOG | DDDD |
| Vaccine compartment - Compressor speed | CMPS | RPM |
| Vaccine compartment -Compressor runtime | CMPR | seconds |
| Vaccine compartment - Compressor electronic unit temperature | TPCB | ℃ |
| Vaccine compartment - Operating speed of compressor cooling fan | FANS | % |
| Water-pack compartment- Compressor speed | CMPS2 | RPM |
| Water-pack compartment- Compressor runtime | CMPR2 | seconds |
| Water-pack compartment- Compressor electronic unit temperature | TPCB2 | ℃ |
| Water-pack compartment- Operating speed of compressor cooling fan | FANS2 | % |
| Dehumidification unit - Compressor speed | CMPS3 | RPM |
| Dehumidification unit -Compressor runtime | CMPR3 | seconds |
| Dehumidification unit - Compressor electronic unit temperature | TPCB3 | ℃ |
| Dehumidification unit - Operating speed of compressor circulation fan | FANS3 | % |

| Data Object | Object ID | Unit of Measure |
|---|---|---|
| DC current drawn by the appliance | DCCD | A |
| DC supply voltage to the appliance | DCSV | V dc |
| Door/lid opening (vaccine compartment) | DORV | seconds |
| Number of door/lid openings (vaccine compartment) | DRCV | N/A |
| Instantaneous door/lid opening (vaccine compartment) | IDRV | seconds |
| Door/lid opening (water-pack freezer compartment) | DORF | seconds |
| Number of door/lid openings (water-pack freezer compartment) | DRCF | N/A |
| Instantaneous door/lid opening (water-pack freezer compartment) | IDRF | seconds |
| Logger Error codes | LERR | N/A |
| Relative Time | RELT | PnDTnHnMnS |
| RTC Wakeup | RTCW | PnDTnHnMnS |
| Ambient temperature | TAMB | ℃ |
| Vaccine Compartment Temperature | TVC | ℃ |
| Control temperature sensor -vaccine compartment | CTVC | ℃ |
| Freezer Compartment Temperature | TFRZ | ℃ |
| Control temperature sensor –water-pack freezer compartment | CTFRZ | ℃ |

# 7. Training for Logger and M2M

**Objective: Capable of interpreting recorded data and PDF summary reports.**

**Practical content:**

- Interpretation of PDF Report:

**60 DAY PERFORMANCE REPORT**
**Device PQS CODE:E003/***
**Device Seria Number: 5Y18809120092EAS0324**
**Report Creation Time:P3H17M**
**Upper alarm limit:Above +8.0 °C for 10h**
**Lower alarm limit:Below -0.5 °C for 1h**
**Door alarm limit: opened for more than 5 minute**

| | | | Low Temperature | | | High Temperature | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | Average storage temp.(°C) | Status | Min temp.(°C) | Total time below -0.5°C (hh:mm) | Total low alarm time (hh:mm) | Max. temp.(°C) | Total time above 8°C (hh:mm) | Total high alarm time (hh:mm) | Door Openings | Door open time (hh:mm) | Compressor1 runtime (hh:mm) | Compressor2 runtime (hh:mm) | Compressor3 runtime (hh:mm) | Average ambient temp | Faults |
| Today | 30.1 | ALARM | 20.0 | 00:00 | 00:00 | 36.5 | 03:00 | 00:00 | 3 | 00:06 | 00:14 | 00:06 | 00:14 | 6552.9 | |

- **Practical task:** Analyze the provided sample data and identify abnormal data points

The high and low temperature alarm information and door opening information only summarize the refrigeration room

**D. System maintenance and fault diagnosis**

**Objective: Master daily maintenance and common fault handling.**

**Practical content:**

- Daily maintenance:
  - Weekly: Clean the M2M interface and check data integrity.
  - Monthly: Measure the DC interface output voltage (4.75-5.25V) and check the battery status.
- Component replacement practice:
  - Battery replacement: Remove the front cover → Remove the battery pressure plate → Replace the battery → Verify 48 hour battery life.
  - Sensor replacement: find protective cover → remove old sensor → install new sensor (no calibration required).
  - M2M interface replacement: Disassemble sheet metal parts → Replace Type-C/DC interface components.
- Fault code interpretation:
  - LERR code (recorder malfunction)
  - ALRM code (device alarm)
  - Temperature controller alarm code
- **Practical task: Simulate sensor faults for diagnosis and replacement**

**E. System administrator operation**

**Objective: Master system configuration, software updates, and training delivery**

**Practical content:**

- Software update process:
  - Download the latest software version to a USB drive
  - Insert the USB-A port at the back of the device
  - Wait for 3 minutes to automatically complete the upgrade
- Equipment information configuration:
  - Edit base_info.txt file
  - Fill in basic information on the reference equipment nameplate
- Trainer skills training:
  - Simulate teaching using the content of Chapter 7 in the training manual
  - Create a simple training checklist
- **Practical task: Complete the software update process and configure information for a "new" device**

### 7.1.2 User training

- **Use of the appliance-logger-M2M system**

Data access connection：

Connect external devices (such as laptops) to the USB Type-C interface of the recorder using a USB Type-C cable.

The recorder will be recognized as a USB Mass Storage device with a file system format of FAT32.

Power interactive connection :

Scenario 1:

The recorder is powered by an external EMD:

Insert the barrel shaped power interface of EMD into the barrel shaped power socket of the recorder.

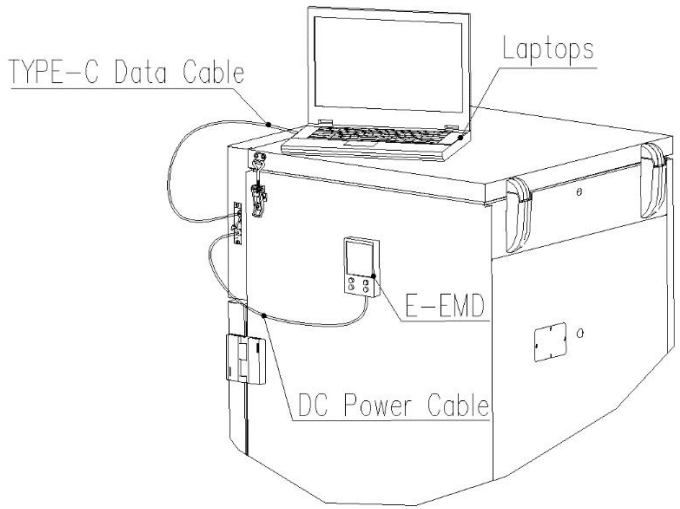
Verify that the EMD power indicator light is on (voltage range: 4.75-5.25V).

Scenario 2:

External devices supply power to the recorder：

When the built-in battery of the recorder is depleted, connect an external power source (such as a portable power bank) through the USB Type- C interface.

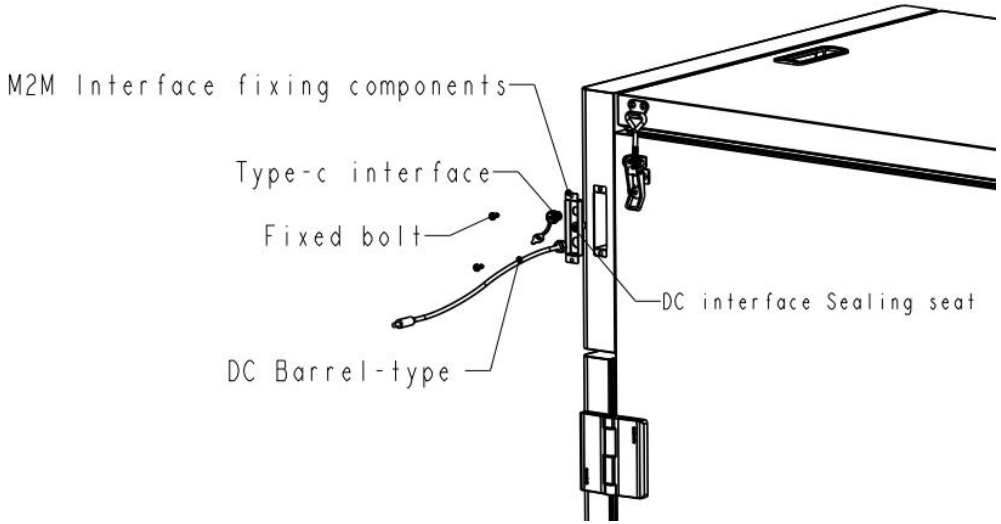
The recorder will automatically start and allow data access (without the need for the device's main power supply).



- **M2M interfaces and maintenance**

  Remove the sheet metal parts that secure the M2M interface.

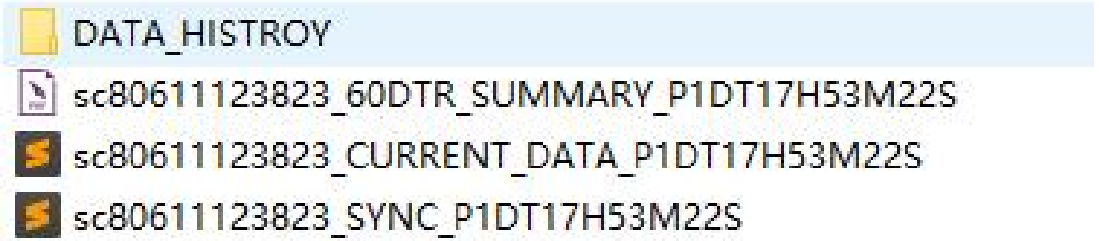
  Both Type-C and DC interfaces are fixed with detachable bolts. Simply unplug the plug to remove the interface and replace it with new accessories.



- **Information on types of files and folders**

| File/folder | Contents |
|---|---|
| 0123456789_60DTR_SUMMARY_PnDTnHnMnS.pdf | 60 day summary report (including temperature, door switch, compressor operation data, etc.) |
| 0123456789_CURRENT_DATA_PnDTnHnMnS.json | The raw data from the past 60 days (in JSON format, compliant with WHO/PQS/E006/DS01 standards). |
| 0123456789_SYNC_PnDTnHnMnS.json | Containing the relative timestamp at time of mount, RTC Wakeup value (RTCW), present door opening data objects |
| 0123456789_DATA_PnDTnHnMnS.json | All historical data |

Root directory file:



## Daily, weekly, and monthly tasks

**Daily tasks:**

Check if the equipment power supply is normal to ensure that the equipment is running properly.

**Weekly tasks:**

Check if the M2M interface is clean and free from physical damage.

Verify the integrity of data records (accessing data from the past 60 days via USB).

Operation steps:

Use a fiber free cloth to clean the surface of the M2M interface and sensor.

Connect external devices via USB and check if the data files are complete (without missing or damaged JSON records).

**Monthly tasks:**

Power system inspection

Measure the output voltage of the M2M interface:

Use a digital multimeter to detect the voltage of the barrel shaped power interface (normal range: 4.75-5.25V).

Check the status of the built-in battery:

Disconnect the main power supply of the device, and the recorder should continuously record for ≥ 48 hours.

If it cannot be met, replace the battery.

Tools: Digital multimeter, Timer.

Physical connection and protection inspection

Check all cables:

Confirm that there is no wear or breakage.

Re seal the interface with waterproof tape (IP64 protection).

Clean the M2M interface:

Use a dust-free cloth dipped in isopropanol to wipe the USB Type-C and barrel interfaces to prevent oxidation.

- **System functionality and troubleshooting**

**System functionality：**

The logger is integrated into the appliance to record operating data and interact with external devices through the M2M interface. The logger is equipped with a 15000mAh battery, and when the battery is fully charged, the logger can continue to record data for 10 days during device power outages.

The Machine to Machine (M2M) interface is the core module for data exchange and power supply between the recorder and external devices such as EMD, laptops, and mobile phones. It includes the following functions:

**Data transmission**: Access the JSON data file stored by the logger through the USB Type-C interface.

**Power interaction**: Provide power to external devices through a barrel shaped power interface, or receive power from external devices to maintain the operation of the recorder.

**Compatibility**: Supports all EMD devices and universal external devices that comply with WHO/PQS/E006/EM01 standards.

- **System functionality and troubleshooting**

Troubleshooting：

| Fault phenomenon | Possible reasons | Solution |
|---|---|---|
| **USB device not recognized** | Interface contamination or cable damage | 1. Clean the USB interface |
| | | 2. Replace the data cable |
| **External EMD unable to supply power** | The polarity of the barrel interface is reversed or the voltage is insufficient | 1. Check the polarity of the interface (positive inside and negative outside) |
| | | 2. Replace hardware or DC power cord |
| **Data files are missing or damaged** | Recorder storage failure or unexpected disconnection | 1. Restart the appliance |
| | | 2. Firmware update - update software through USB interface |
| | | 3. Replace hardware |
| **Data exception** | Sensor malfunction or voltage malfunction | 1. Replace hardware |

- **Standard commissioning procedures**

a) Power on start-up

Connect the power supply and measure the output voltage of the DC power interface (normal range: 4.75-5.25V）

b) File Download and check

Connect to the computer via USB Type-C, access the root directory, and copy relevant files

Check if the file meets the requirements according to section 5.5 of the technical manual.

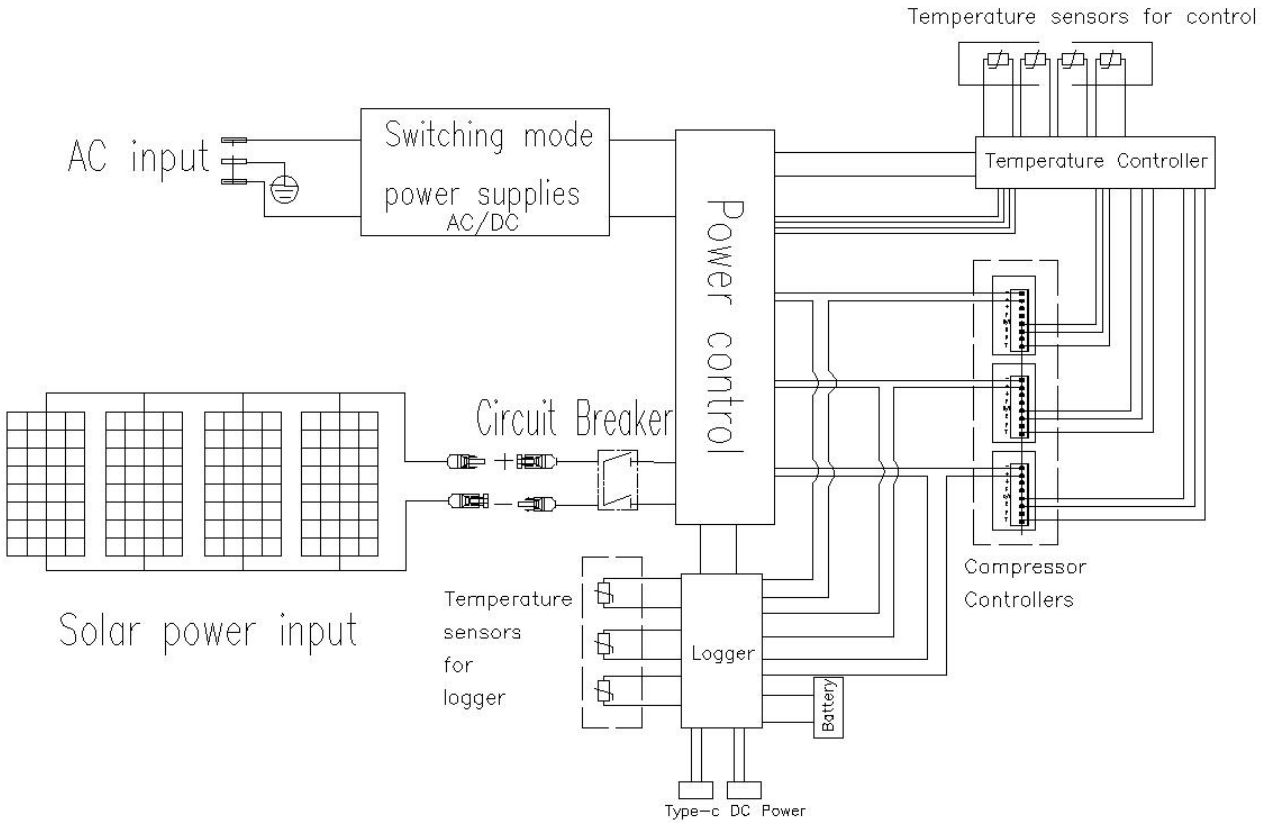
c) Data check

Open the < current. josn > file and check if the relative time increases every 15 minutes, and verify if the basic information is correct, referring to the appliance's nameplate.

## 7.2 Technical and System administrator training

- **Appliance-logger-M2M system**

  Below is the circuit diagram of the system, The system will work automatically when the appliance is powered on. Temperature controller controls compressor operation, the logger records relevant data objects, and the power board is responsible for distributing electrical energy to various parts.



- **Job completion checklists**

| Inspection items | | Inspection results |
|---|---|---|
| Equipment serial number | | |
| Date of manufacture | | |
| Is the Type-C interface installed correctly | | Yes / No |
| Is the DC power interface installed correctly | | Yes / No |
| DC power interface voltage | | |
| M2M interface IP64 level check | | Yes / No |
| Spare parts | Type-C interface component | Yes / No |
| | DC power cord | Yes / No |

- **Use of the appliance-logger-M2M system**

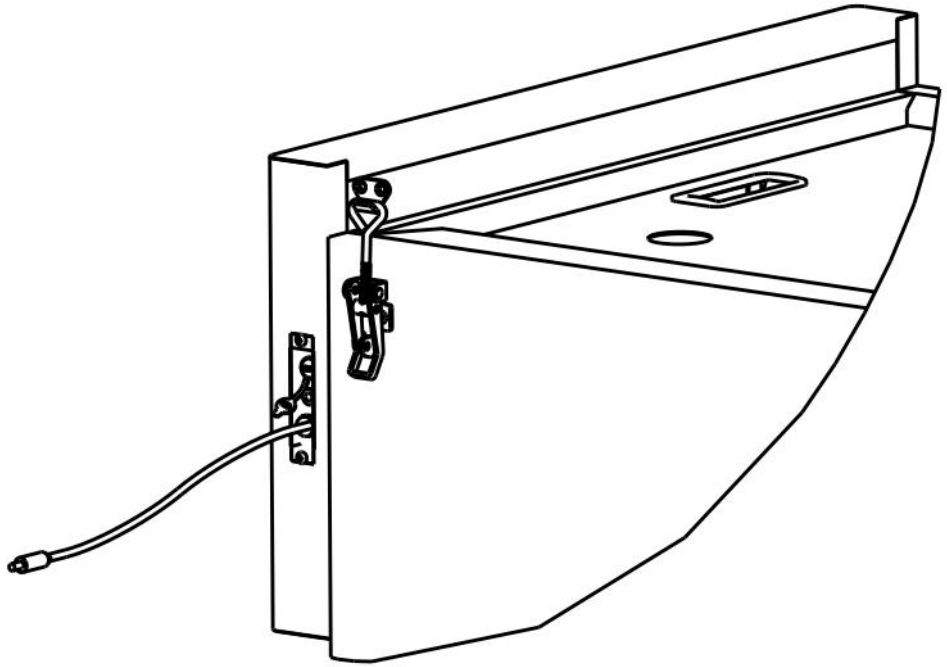
1. Data download process

   Open the file manager on the external device and access the USB storage device of the recorder.

   Copy the required files (such as summary reports, JSON data files) to local storage.

2. Power for E-EMD

Connect E-EMD using a DC barrel power interface， When not in use, insert the interface into DC interface Sealing seat.



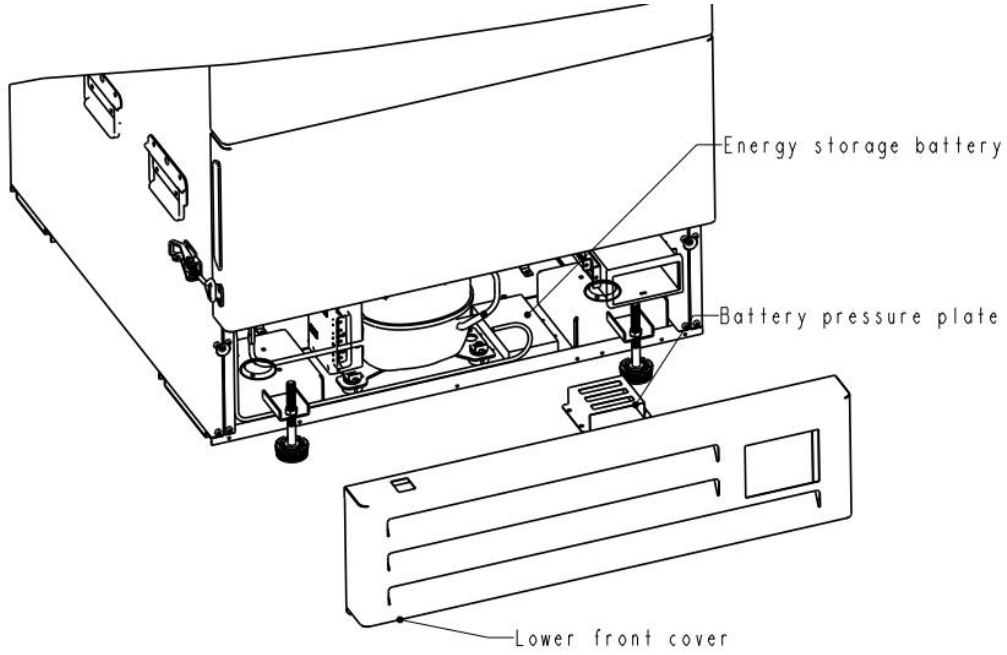
- **Advanced system maintenance, troubleshooting, and repair**

Energy storage component replacement:

Remove the front cover and battery pressure plate to remove the battery.

Disconnect the old component and install the new component (pay attention to the positive and negative pole markings).

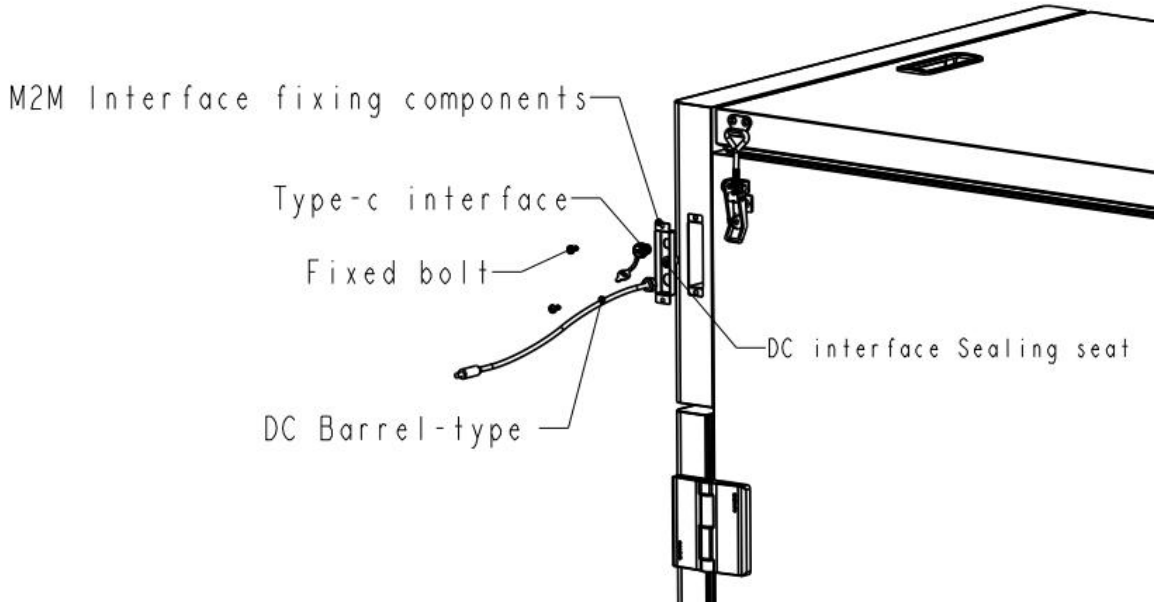
After powering on again, verify that the recorder can continuously record for ≥ 48 hours in the power-off state.



M2M interface replacement:

Remove the sheet metal parts that secure the M2M interface.

Both Type-C and DC interfaces are fixed with detachable bolts. Simply unplug the plug to remove the interface and replace it with new accessories.



Logger software update:

Remove the rear cover, there is a USB-A connection cable in the press room, and upgrade the software by inserting the mobile USB drive into the USB-A port.

The first step is to download the latest software version provided by the manufacturer to the USB drive, ensuring that there are no other files on the drive. Insert the USB drive into the USB-A port and wait for 3 minutes to automatically complete the software upgrade.

Write the basic information of the device into the file provided by the manufacturer,<base_info. txt>. Use the notepad function on your computer to open the<base_info. txt>file. Some information needs to be referenced from the device's nameplate. The basic information includes the following:

| **Data Object** | **Object ID** | Value Examples |
|---|---|---|
| Appliance PQS device type | ACAT | "RF05" |
| Appliance date of production | ADOP | "YYYY-MM-DD" |
| Appliance manufacturer | AMFR | "AUCMA" |
| Appliance model | AMOD | "TCD-188" |
| Appliance PQS code | APQS | "E003/***" |
| Appliance manufacturer serial number | ASER | "999999999" |
| Compressor Electronic Unit Manufacturer | CNAM | "SECOP" |
| Compressor Electronic Unit Product Code | CSER | "101N0420" |
| Compressor Electronic Unit Software version | CSOF | "V1.1" |
| Compressor Electronic Unit production date | CDAT | "YYYY-MM-DD" |
| Secondary Compressor Electronic Unit Manufacturer | CNAM2 | "SECOP" |
| Secondary Compressor Electronic Unit Product Code | CSER2 | "101N0420" |
| Secondary Compressor Electronic Unit Software version | CSOF2 | "V1.1" |
| Secondary Compressor Electronic Unit production date | CDAT2 | "YYYY-MM-DD" |
| Tertiary Compressor Electronic Unit Manufacturer | CNAM3 | "SECOP" |
| Tertiary Compressor Electronic Unit Product Code | CSER3 | "101N0420" |
| Tertiary Compressor Electronic Unit Software version | CSOF3 | "V1.1" |
| Tertiary Compressor Electronic Unit production date | CDAT3 | "YYYY-MM-DD" |
| Logger date of production | LDOP | "YYYY-MM-DD" |
| Logger manufacturer | LMFR | "AUCMA" |
| Logger model | LMOD | "AUHUI-806" |
| Logger PQS code | LPQS | "E006/***" |
| Logger serial number | LSER | "999999999" |
| Logger software version | LSV | "V1.0.7" |

Temperature sensor replacement:

Disconnect the power supply of the device.

Find the sensor, which is fixed in the refrigerator and freezer through a protective cover.

Disassemble the old sensor and install a new sensor (without considering the polarity of the wire sequence) using waterproof tape to seal the joint.

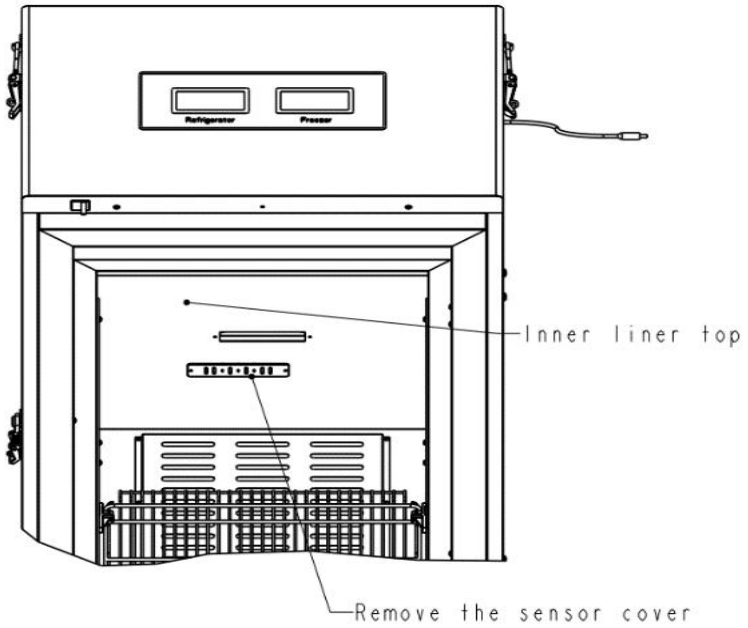
Sensors provided by the manufacturer or sensors of the same specifications are required and do not require recalibration.

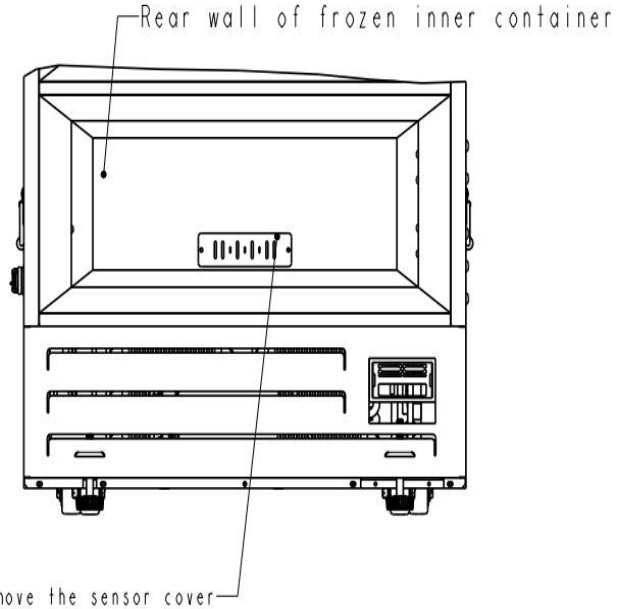
Temperature sensor specifications:

Type： Wire type NTC thermistor

Resistance: 10.0KΩ at 25℃

B VALUE：3435K（25/85）



- **Alarm Message**

Alarm code of Thermostat:

| Display symbols | Symbol description |
|---|---|
| E1 | Refrigerator storage sensor failure |
| E2 | Ice layer sensor failure |
| E3 | Freezing sensor failure |
| E4 | Ambient temperature sensor failure |
| AH1 | High temperature alarm in vaccine chamber |
| AL1 | Low temperature alarm in vaccine chamber |
| AH2 | High temperature alarm for ice |
| AL2 | Low temperature alarm for ice |
| AH3 | Freezer high temperature alarm |
| AL3 | Freezer low temperature alarm |

7.3 System administrator training

- **Alarm Message**

The data object LERR contains code that impair normal operation of the logger.
The following is an explanation of the LERR code.

| Code | Symbol description |
|---|---|
| FTSF | Freezer temperature sensor fault |
| VTSF | Vaccine temperature sensor fault |
| ATSF | Ambient temperature sensor fault |
| COMF | Communication fault |
| OVEV | Over voltage |

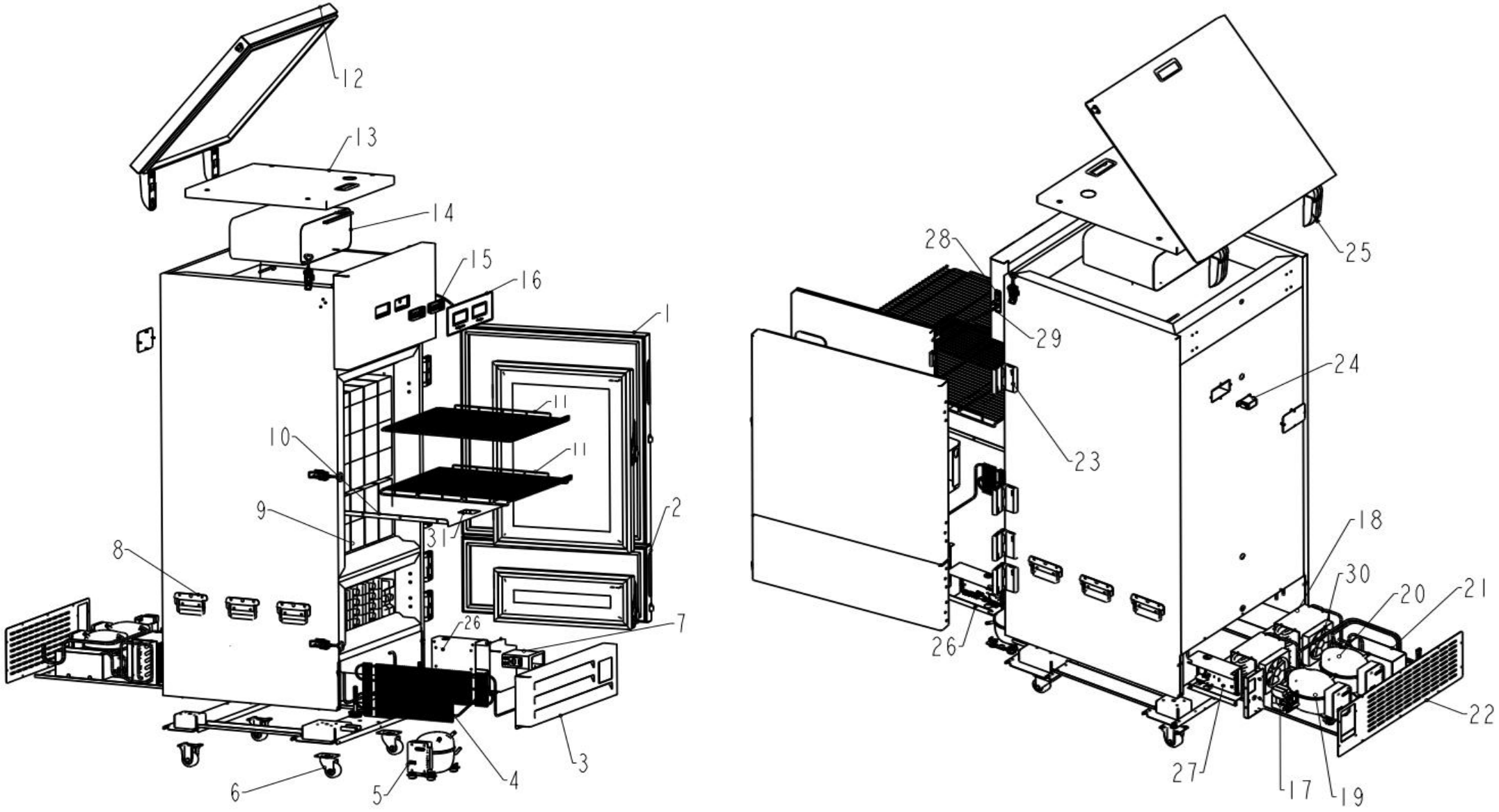
The following is an explanation of the data object ALRM code:

| Code | Symbol description |
|---|---|
| HEAT | Heat alarm |
| FRZE | Freeze alarm |
| DOOR | Door open alarm |
| POWR | Power outage alarm |
| DCNT | EMD disconnect alarm |

Alarm code of Thermostat:

| Display symbols | Symbol description |
|---|---|
| E1 | Refrigerator storage sensor failure |
| E2 | Ice layer sensor failure |
| E3 | Freezing sensor failure |
| E4 | Ambient temperature sensor failure |
| AH1 | High temperature alarm in vaccine chamber |
| AL1 | Low temperature alarm in vaccine chamber |
| AH2 | High temperature alarm for ice |
| AL2 | Low temperature alarm for ice |
| AH3 | Freezer high temperature alarm |
| AL3 | Freezer low temperature alarm |

# 8. Exploded view



# 8. Exploded view

AUCMA

| No. | Part numbers | Name | Remark |
|---|---|---|---|
| 1 | 8303502895 | Refrigeration outer door | |
| 2 | 8303502894 | Frezer outer door | |
| 3 | 8107010035 | Lower front cover | |
| 4 | 3405501275 | Dehumidifying condenser | |
| 5 | 3000001196 | Dehumidification compressor | |
| 6 | 3406001421 | wheel | Universal *2 |
| | 3406001230 | | Directional*2 |
| 7 | 3001001020 | Thermostat | |
| 8 | 3406000427 | Handle*4 | |
| 9 | 3405501276 | Dehumidifying evaporator | |
| 10 | 3504000516 | Heat shield | |
| 11 | 3404002126 | Bottom Shelf | *1 |
| | 3404002125 | Mid shelf | *1 |
| 12 | 8303502893 | Water tank cover | |
| 13 | 8303502890 | Inner cover of water tank | |
| 14 | 3405500960 | Evaporator | |
| 15 | 3006000789 | Solar thermometer | |

| No. | Part numbers | Name | Remark |
|---|---|---|---|
| 16 | 3101008580 | Thermometer facial mask | |
| 17 | 3001000430 | Circuit breaker | |
| 18 | 8109003076 | Condenser*2 | |
| 19 | 3000001714 | Freezer compressor | |
| 20 | 3000001714 | Refrigeration compressor | |
| 21 | 8106030662 | Water pan | |
| 22 | 8107010033 | Compressor room cover | |
| 23 | 3406000126 | Hinge | *4 |
| 24 | 3001000822 | Low temperature protection device | |
| 25 | 8200001401 | Rear hinge | *2 |
| 26 | 3001001125 | Power control board | |
| 27 | 3001001242 | Logger | |
| 28 | 3001001457 | Type-c interface | |
| 29 | 3001001142 | DC power interface | |
| 30 | 3000001653 | Condenser fan | *2 |
| 31 | 8000005031 | Dehumidification fan | |