INDIGO TRANSPORTABLE COLD CHAIN SOLUTION

TRAINING PRESENTATION

NH-81-00006 Rev A



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INDIGO SYSTEM





INDIGO SYSTEM OVERVIEW

INDIGO 201 VACCINE CARRIER

Indigo is a portable, 1.7L, self-powered, multi-day vaccine transport system built to broaden the reach of immunization programs.

Indigo enables healthcare systems to confidently plan and execute long, unpredictable journeys to the most remote communities while ensuring vaccines stay protected.



INDIGO C1 CHARGER

Maintains vaccines between 2 °C and 8 °C for five days, without ice, even in extreme environments

On/off switchable

Cooling power can be stored until needed, enabling flexibility for deployment planning

Data-enabled

Onboard temperature monitoring and recording

PQS-compliant and CE-marked

Freeze-free cooling technology

CE mark achieved, PQS dossier submitted to WHO

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INDIGO SYSTEM COMPONENTS

- Indigo Vaccine Carrier
 - **Cooler**: Integrates evaporative cooling technology with vacuum-insulated stainless steel to maintain temperatures between 2 to 8 °C for five days of continuous use at 43 °C ambient temperature. Recharged using the Indigo Charger.
 - **Cooler Lid**: Insulates the cooler, displays temperature and cold life, and logs data.
 - **Bag**: Bag used for carrying the cooler.
- Indigo Charger: Recharges the cooler after cold life has been depleted using a heating and cooling process and resets the cold life indicator on the lid.



INDIGO SYSTEM COLDLOOP® TECHNOLOGY



The Indigo cooler is a pressurized, water-filled, stainlesssteel container with separate closed chambers, sealed at low pressure, connected by a valve opened-closed with magnetic key.

When the valve is open ("on" position), water passes from the internal chamber to the outer chamber. The water draws heat from its surroundings as it evaporates, and this energy moves to the outer layer; hence, this process cools the vaccine chamber

Due to the low pressure, the water effectively boils/evaporates at a low pre-set temperature (4° - 5°C), resulting in cooling for the vaccine storage chamber.

Temperature in the vaccine storage chamber is consistent from top to bottom throughout the use period.



INDIGO SYSTEM CAPABILITY



- **Cold Life**: extended cold life increases time to reach remote areas.
- **Infrastructure**: does not depend on CCE.
- **Conditioning**: no conditioning necessary to store and transport vaccines.
- Vaccine Safety: vaccinators have constant access to information confirming status of refrigeration.



INDIGO SYSTEM TYPES OF USE

Indigo provides flexible options for use, allowing vaccinators to use the carrier continuously for multiple days, or use daily, turning on/off the device as needed.

Multi-day continuous use

- Vaccinator uses Indigo Carrier continuously for 5 days
- Allows team to store vaccines in carrier overnight and removes requirement to return storage site daily



Intermittent use as needed

- Vaccinator turns Indigo Carrier on each day of deployment for a total of five days
- Traditionally not possible without a significant supply of ice



INDIGO SYSTEM CAPACITY CONSIDERATIONS

- 1. **Carrier Payload**: 1.7L is sufficient to support RI immunization for one week (approximately 250 doses)
- 2. Rotation Rate (charging frequency): 2 3 charges per month, depending on routine immunization or campaign implementations, distances travelled, and transport availability
- **3.** Charger/Carrier Ratio: One charger supports 6 12 carriers (4.5 hr. charging time/5 days use time/carrier)
- **4. Carrier-Health Center Allocation**: For routine immunization, individual carriers are typically used as a shared resource across multiple health centers during the course of one month, cycled across multiple health centers

INDIGO SYSTEM FIELD TRIALS AND USE CASES

The Indigo system has been deployed since 2017 to evaluate performance and requirements for extended CC support in low-resource environments.

USE CASES	DEPLOYMENTS
EPI - Outreach without freezer requirement. Multi-day outreach	CAR, DRC, Nigeria, S. Sudan
Disease surveillance/sample transport - reverse logistics	CAR, DRC
Conflict environments - Switchable, on-demand, enables opportunistic mobilization	Nigeria
EPI: Addressing gaps in stationary CC - Multi-day vaccine storage for fixed sessions at health facilities without power or CCE	Nigeria
Campaigns (PCV, measles, polio) - Reliable multi-day continuous use without dependence on overnight ice-pack freezing	DRC, Niger, Madagascar



DRC Deployment



INDIGO SYSTEM CHARGING FACILITY ORGANIZATION



Establish a charging protocol and set up physical organization of the charging area.

This will ensure that discharged units are not mistaken as charged units. **Identify only 2 personnel as responsible for charging** to ensure quality control and accountability. RI vaccinators should not conduct charges.



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VACCINE CARRIER USE

VACCINATOR TRAINING GUIDE





VACCINE CARRIER USE CARRIER AND BAG COMPONENTS





- **1.** Cooler Inner Lid
- 2. Cooler Outer Lid
- **3.** Display
- 4. Bag
- 5. Vaccine Storage Compartment
- 6. Cold Key
- 7. Valve



- **1. Upper Zipper**: Used to access vaccines
- 2. Lower Zipper: Used for charging
- 3. Top Pocket: Foam vial holder
- 4. Front Pocket
- 5. Strap adjusters
- 6. Tie-down Straps



VACCINE CARRIER USE COOLER LID COMPONENTS

- 1. **Cooler Inner Lid**: Removable to access vaccines.
- 2. **Cooler Outer Lid**: Remains on the cooler during immunization activities and is removable for charging and maintenance.
- **3. Electronics Enclosure**: Houses lid electronics and extra battery and displays vaccine storage compartment temperature and other information.
- 4. **Temperature Probe**: Measures temperature of vaccine storage compartment.
- 5. Cold Key: Turns cooling on and off.
- 6. **Tether**: Secures the cooler outer lid to the cooler.
- 7. USB-A Cable: Connects to the charger during charging and connects to compatible data devices for data download during or after use.



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VACCINE CARRIER USE DISPLAY

Display will turn on when the cooler is turned on. Display will turn off when the cooler is off but can be activated by opening or closing the lid or connecting USB.

- **1. Temperature**: Shows vaccine storage compartment temperature
- 2. Cold life indicator: Shows estimated remaining cold life. Number shows the day of use, counting down from "5 DAYS" to "0 (zero) DAYS". Outer circle shows portion remaining of the current day of use, each segment represents 2.4 hours. After a full charge, estimated cold life will update to "5 DAYS".
- **3. On Indicator**: Shows if cold key is on the cooler valve.



- 4. HIGH / LOW Alarms: Shows alarm status. High alarm limit: above 10 °C for 10 hours. Low alarm limit: below -0.5 °C for 60 minutes. To reset alarms, briefly open and close the inner lid, when vaccine chamber temperature is between 2 and 8 °C.
- **5. USB Connected**: Shows when USB is connected.
- 6. OPEN Indicator / Alarm: "OPEN" shows when the cooler inner lid is open. Alarm symbol "!" appears when the cooler inner lid is open for more than 60 minutes.
- 7. **Replace Battery**: Shows when battery should be replaced.

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VACCINE CARRIER USE NORMAL OPERATION

- 1. Check cold life indicator for cooler charge status: When retrieving carrier from the charging location, open cooler inner lid to display cold life indicator. A fully charged cooler will show "5 DAYS".
- 2. Turn on the cooler: Place the cold key on the circular valve. Allow 20-40 minutes for cool-down to complete and the temperature to reach between 2 and 8 °C. Leave the cold key on the valve throughout use.





VACCINE CARRIER USE NORMAL OPERATION

- **3. Load vaccines**: After the temperature has reached between 2 and 8 °C, load the vaccines below the "FILL LINE", indicated by the label.
- **4. During use**: Monitor the vaccine compartment temperature and cold life shown on the display. Open cooler inner lid to access vaccines.





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VACCINE CARRIER USE NORMAL OPERATION

- **5. Remove any remaining vaccines**: Prior to the display showing "0 DAYS" of cold life, remove any remaining vials and store them in another refrigeration device or a carrier with remaining cold life.
- **6. After use**: After vials have been removed, remove the cold key from the valve. Return carrier to charging location.







DATA DOWNLOAD

COLLECT DATA USING VARO™ AFTER VACCINE CARRIER HAS RETURNED FROM USE





DATA DOWNLOAD AVAILABLE DATA

The cooler lid will store the past two years of data. Although any USB mass storage device can be used to download data, it is recommended to use a compatible equipment monitoring device, such as the Varo[™] app. As the cooler lid stores data using relative time, absolute time will only be automatically recorded with the data when a compatible equipment monitoring device is used. The following files are available for download:

- **60-Day User-Readable Summary**: Shows device summary information for the previous 60 days, in .pdf format.
- **Current Data**: Shows all data recorded on the lid for up to 60 days, in machine-readable .json format.
- **Data History Folder**: Folder containing all data recorded on the lid for the previous two years, in .json format.



DATA DOWNLOAD 60-DAY USER-READABLE SUMMARY

- **Days Ago**: Today, 2 ... 60. Each day includes a 24hour period, counting back from the time of USB mount.
- **Appliance on time**: Total duration during that 24hour period that the cold key was on the valve.
- **Status**: OK or ALARM, based on if there was an alarm during that 24-hour period.
- **Info/Faults**: CHARGE or error code value, based on if the carrier was charged of if an error occurred during that 24-hour period.
- All columns after "Appliance on time," except "Min. cold life" and "Info/Faults", reflect data recorded while the appliance was on (while the cold key was on the valve). If there was no on time recorded during that 24-hour period, the column will be blank.

INDIGO VACCINE CARRIER 60-DAY SUMMARY REPORT

Appliance Model Appliance PQS Code:	Indigo_Vaccine_Carrier_201 E003/tbd	Report Creation Time:	P560DT5H19M2S (Day 560, Hour 5, Minute 19, Second 2 of operation)
Appliance Serial Number:	C3DE5019E0118	Upper alarm limit:	Above +10.0C for 10h
Logger Serial Number:	003100384630501020363837	Lower alarm limit:	Below -0.5C for 1h

					Low Tempe	rature	_	High Temp	erature					
Days	Appliance	Average	Status	Min.	Total time	Total low	Max.	Total time	Total high	Min.	Lid	Lid	Average	Info/Faults
Ago	on time	storage		temp.	below 2C	alarm time	temp.	above 8C	alarm time	cold life	open time	open	ambient	
	(hh:mm)	temp. (C)		(C)	(hh:mm)	(hh:mm)	(C)	(hh:mm)	(hh:mm)	(days)	(hh:mm)	count	temp. (C)	
Today	23:59	32.3	ALARM	30.7	00:00	00:00	33.8	23:59	23:59	0.0	00:00	0	42.4	
2	24:00	28.7	ALARM	26.6	00:00	00:00	30.7	24:00	24:00	0.0	00:00	0	42.2	
3	24:00	24.2	ALARM	21.8	00:00	00:00	26.6	24:00	24:00	0.0	00:00	0	41.9	9
4	24:00	19.1	ALARM	16.4	00:00	00:00	21.8	24:00	24:00	0.0	00:00	0	41.6	
5	24:00	13.5	ALARM	10.7	00:00	00:00	16.4	24:00	16:59	0.0	00:00	0	41.2	
6	24:00	8.3	OK	6.6	00:00	00:00	10.7	12:47	00:00	0.0	00:00	0	40.9	
7	24:00	5.9	OK	5.6	00:00	00:00	6.6	00:00	00:00	0.0	00:00	0	40.7	
8	24:00	5.3	OK	5.2	00:00	00:00	5.6	00:00	00:00	0.0	00:00	0	40.7	
9	24:00	5.1	OK	5.0	00:00	00:00	5.2	00:00	00:00	0.0	00:00	0	40.7	
10	24:00	5.0	OK	4.9	00:00	00:00	5.0	00:00	00:00	0.9	00:00	0	40.7	
11	24:00	4.9	OK	4.9	00:00	00:00	4.9	00:00	00:00	1.9	00:00	0	40.5	
12	24:00	4.8	OK	4.7	00:00	00:00	4.9	00:00	00:00	2.9	00:00	0	40.7	
13	24:00	4.7	OK	4.7	00:00	00:00	5.0	00:00	00:00	3.9	00:00	0	40.5	
14	02:17	9.5	OK	5.0	00:00	00:00	42.8	00:36	00:00	1.1	00:00	0	42.6	CHARGE,6
15	22:16	5.0	OK	4.9	00:00	00:00	5.2	00:00	00:00	1.1	00:00	0	40.2	6
16	24:00	4.9	OK	4.9	00:00	00:00	5.0	00:00	00:00	2.0	00:00	0	40.5	6
17	24:00	4.9	OK	4.9	00:00	00:00	4.9	00:00	00:00	3.0	00:00	0	40.5	6
18	24:00	4.8	OK	4.7	00:00	00:00	6.7	00:00	00:00	4.0	00:00	0	40.7	6
19	00:49	16.5	OK	6.7	00:00	00:00	42.4	00:36	00:00	0.1	00:00	0	43.2	CHARGE,6
20	22:34	5.1	OK	4.9	00:00	00:00	5.3	00:00	00:00	0.1	00:00	0	40.5	6
21	24:00	4.8	OK	4.8	00:00	00:00	4.9	00:00	00:00	1.1	00:00	0	40.4	
22	24:00	4.7	OK	4.7	00:00	00:00	4.8	00:00	00:00	2.1	00:00	0	40.3	
23	24:00	4.7	OK	4.7	00:00	00:00	4.7	00:00	00:00	3.1	00:00	0	40.5	
24	22:39	5.2	OK	4.7	00:00	00:00	42.6	00:37	00:00	4.1	00:00	0	40.8	
25										0.1				CHARGE
26				0						0.1			J	
27	18:41	5.2	OK	5.1	00:00	00:00	5.4	00:00	00:00	0.1	00:00	0	40.4	
28	24:00	5.0	OK	4.9	00:00	00:00	5.1	00:00	00:00	0.8	00:00	0	40.4	
29	24:00	4.9	OK	4.8	00:00	00:00	4.9	00:00	00:00	1.8	00:00	0	40.4	
30	24:00	4.8	OK	4.8	00:00	00:00	4.9	00:00	00:00	2.8	00:00	0	40.4	



- 1. Download Varo Cold Chain Reporting App from the Google Play store.
- **2. Open Varo**: Follow the instructions in the application. No account is needed.



Scan QR Code





FIRST TIME USING VARO™ APP

1:49 PM # 0 0	# 20 中国)	1:50 PM # O O 1	東県市園
	VARG	← More Connection	5
		Airplane mode	
Use Precise	Location	Other Connection	
Permission f	for Reports	VPN	
		None	,
1		Private DNS	
		Automatic	
	2 M	Cast	Closed >
and a second second		Printing	
		(201 tertite 0)	
You Acculian is included in neurr stores is cusside you	n the replicits, bull Varo and ovice: You a truli	OTG	
And privacy mainer to us		Kill sensitively (see 11) if it in terms	and hit 💽
Frankle OTO			
chable 010	and the second second	Corearction areliance as	
Connected with the OTG o and turn on OTG?	cable, go to Settings		
		Chi Connected to other dev	ice successfully
Cancel	Go Sitting OTG	and other	
		Quick Share	

Enable OTG

Use "Precise" location



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3. Connect your phone/tablet to the cooler lid: Remove the USB-A cable from the cooler lid USB slot and connect lid to the Android device using a USB On-The-Go (OTG) adaptor. An OTG adaptor will be included in the front pocket of the bag.

FIRST TIME CONNECTING

Select "Always open Varo when Logger 201 is connected" and press "OK".

0

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Α



B

- Enter name of health facility incharge / manager as charging operator's name and phone number
- 6. Take photo and enter device information as:
 - Choose Model: Unit is Transportable
 - Manufacturer: EMK
 - Model: Indigo 201 Vaccine Carrier

No barcode scanning is required



7. Enter recipient email address and send

FIRST TIME SENDING

Select "Gmail" and "Always" as sharing options.

8. Return cooler lid USB-A cable to cooler lid USB slot







VACCINE CARRIER TROUBLESHOOTING



VACCINE CARRIER TROUBLESHOOTING ERROR CODES

Cooler lid error codes will show on screen when USB is connected and in the PDF report. Errors can be cleared by disconnecting USB, if error is no longer occurring.

ERROR	MEANING	ACTION
Err	The vaccine chamber or ambient temperature sensor has failed.	Try clearing the error by connecting and disconnecting the cooler lid USB to Varo, a computer, or the Indigo Charger. If "Err" still shows, see "Cooler Lid Replacement" in Indigo Technician Manual.
1	The logger battery needs to be replaced.	Replace lid battery. See "Battery Replacement" in Indigo Manual.
2	The vaccine chamber temperature sensor has failed.	Check if "Err" is shown on-screen. If so, follow the action for "Err", listed above.
3	The ambient temperature sensor has failed.	Check if "Err" is shown on-screen. If so, follow the action" for "Err", listed above.
4	The file system has failed.	May be ignored unless the lid is also unable to connect to Varo, a computer, or the Indigo Charger. If the lid is having connectivity issues, see "Cooler Lid Reset" in Indigo Technician Manual. If the issue is not resolved, see "Cooler Lid Replacement" in Indigo Technician Manual.
5	The cooler has taken more than an hour to reach temperature.	Charge the cooler and retry cool-down. If the cooler will still not cool-down, mark as defective and replace.
6	A firmware bug was detected.	May be ignored unless other issues occur. If so, see "Cooler Lid Reset" in Indigo Technician Manual. If the issue is not resolved, see "Cooler Lid Replacement" in Indigo Technician Manual.
7	The appliance serial number is missing.	Plug lid into computer and open "PROV" file. Check "ASER" field. If "ASER" does not match cooler serial number, see "ASER Update Instructions" in Indigo technician manual.

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VACCINE CARRIER TROUBLESHOOTING OTHER ISSUES

ISSUE	ACTION
The vaccine carrier is not cooling after the cold key has been placed on the valve.	Adjust the cold key on the valve to make sure it is seated correctly. The valve should make an audible "click" upon placement and should not be tilted. If the issue persists, charge the cooler and retry cool-down. If the cooler still will not cool-down, mark as defective and replace.
Nothing is shown on the cooler lid display when the cooler inner lid is removed or the cold key is on the valve.	Try opening and closing the cooler inner lid. If the issue persist, replace the cooler lid battery. See "Battery Replacement" section for instructions. If nothing is still shown on screen, see "Cooler Lid Replacement" in Indigo Technician Manual.
When the cooler lid USB is connected to an Android device with the Varo App, the Varo App does not show that the cooler lid has been connected.	Retry after restarting the Android device, then using an alternate OTG adaptor, and finally, using an alternate phone. If issue persists, try connecting lid USB to a computer. If lid file system does not show up on the computer, see "Cooler Lid Reset" in Indigo Technician Manual. If the issue is still not resolved, see "Cooler Lid Replacement" in Indigo Technician Manual.

CHARGING

RECHARGE COOLER AFTER VACCINE CARRIER HAS BEEN RETURNED FROM USE



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CHARGING SAFETY AND GENERAL NOTES



HOT SURFACES INSIDE DURING CHARGING SURFACES CHAUDES À L'INTÉRIEUR PENDANT LA CHARGE

WARNING: During charging, interior surfaces of the charger are hot enough to cause burns. Do not open the charger until it has had sufficient time to cool. The charger will indicate that cooling is complete by the "WARNING: HOT" light turning off and the "COMPLETE" light turning on.

SAFETY NOTES:

- Read instruction manual carefully before use.
- Remove anything in or attached to the cooler, other than the tether and labels on the cooler rim, prior to charging. Cooler tether can withstand charging temperatures.



CHARGING INSTALLATION

See Indigo Instruction Manual for detailed installation instructions.

SAFETY NOTES:

- Remove all packaging prior to use. Open the charger lid to remove foam and cardboard packaging from charger body.
- Do not obstruct air vents.
- The charger is intended for indoor use only. It is recommended that the charger is run in a well ventilated area.
- A working smoke detector and fire extinguisher should be near the charger during use.

GENERAL NOTE: Check that circuit breaker is in the "on" position.





CHARGING DISPLAY

Display

- A. CHARGING Light
- B. START Button
- C. COOLING Light
- D. COMPLETE Light
- E. Screen
- F. ERROR Light
- G. WARNING: HOT Light

Charging and USB Ports

- H. LID Port (USB-A)
- I. DATA Port (MICRO-USB)
- J. (2) CHARGER 5V Ports (power barrel)



CHARGING OPERATION

- 1. Unzip bag lower zipper to open and place cooler lid (both inner and outer lids) on cooler lid holder at front right of charger body. Note: Cooler tether can withstand charging temperatures and should remain attached to the cooler during charging.
- 2. Place cooler in charger and align metal housing at cooler rim with arrow on charger body.





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CHARGING OPERATION

- 3. Remove charger lid from holder, align arrow on charger lid with arrow on charger body, and lower and turn clockwise to close lid.
- 4. Plug cooler lid USB into "LID" USB-A port on charger.



CONNECT COOLER LID

INSERT COOLER AND CLOSE CHARGER LID TO BEGIN



CHARGING OPERATION

- 5. Press START button to begin charging. See charger display for estimated charging time.
- 6. When charger indicates charge is complete, return cooler lid USB to slot, return cooler and cooler lid to the bag, and zip to secure. Check that lid display shows "5 DAYS".



CHARGER TROUBLESHOOTING



CHARGER TROUBLESHOOTING ERROR CODES

If an error occurs, the charge will continue and the error will show on screen. Take actions listed below if errors occur.

ERROR	MEANING	ACTION
1101-1106	Charge interrupted, lid opened during charging	If lid was not opened during charge, try another charge. If error persists, use alternate charger.
1151-1155	Charge interrupted, long button press	No action required, caused by user intentionally ending charge.
1160	Charged interrupted, stopped by user	No action required, caused by user intentionally ending charge.
1201-1204	Charge interrupted, mains power out of range	Check power source to make sure that the power requirements are met.
15001-15005	Cooler lid USB communications issue	Check if cooler lid cold life was updated to "5 DAYS" after the charge. If not, try charging a different carrier. If error persist, use alternate charger.



CHARGER TROUBLESHOOTING FAULT CODES

If a fault occurs, the charge will stop and show the error on screen. Press to clear the fault and restart charge. If the fault persists, use an alternate charger.

FAULT	MEANING
1001, 1003-1006	Mains power issue
1002	Heater over temperature
2001, 2002	Lid fan issue
2003	Internal fan issue
3001-3004	Lid vent issue
4001, 4011-4015	Board temperatures too hot
5001	USB issue
6001, 6002	Power barrel issue
11011-11045	Thermocouple issue
11051-11055	Spring thermocouple issue
12001-12003	IR sensor issue
16001	Heater communications issue



CHARGER TROUBLESHOOTING OTHER ISSUES

ISSUE	ACTION
Charger does not move past "CLOSE CHARGER LID TO BEGIN" screen when charger lid is placed on the charger.	Check that the charger lid is fully seated on the charger. If done correctly, the charger lid will drop into place so that it is flush with the charger body. The charger will not start if the charger lid is not in the charging position. If issue persists, disconnect charger from power, wait 2 minutes, then restart. If the screen still does not change, mark as defective and use alternate charger.
When the cooler lid USB is connected to the charger, the charger does not move past the "CONNECT COOLER LID USB TO BEGIN" screen or cooler lid cold life does not update to "5 DAYS" after charge.	Disconnect charger from power, wait 2 minutes, then restart. If issue persists, try charging a different carrier. If the issue is resolved using a different carrier, try connecting original cooler lid USB to a computer. If lid file system does not show up on the computer, see "Cooler Lid Reset" in Indigo Technician Manual. If the issue is still not resolved, see "Cooler Lid Replacement" in Indigo Technician Manual. If the issue is not resolved using a different carrier, mark charger as defective and use alternate.
Charge successfully completed and screen shows "CHARGE COMPLETE" but cooler lid cold life indicator did not update to "5 DAYS".	Try disconnecting and reconnecting the cooler lid USB from the charger. If the cold life indicator still does not update to "5 DAYS", try connecting lid USB to a computer. If lid file system does not show up on the computer, see "Cooler Lid Reset" in Indigo Technician Manual. If the issue is still not resolved, see "Cooler Lid Replacement" in Indigo Technician Manual. If lid file system does show up, disconnect charger from power, wait 2 minutes, then restart. Try charging a different carrier. If issue is not resolved using a different carrier, mark charger as defective and use alternate.