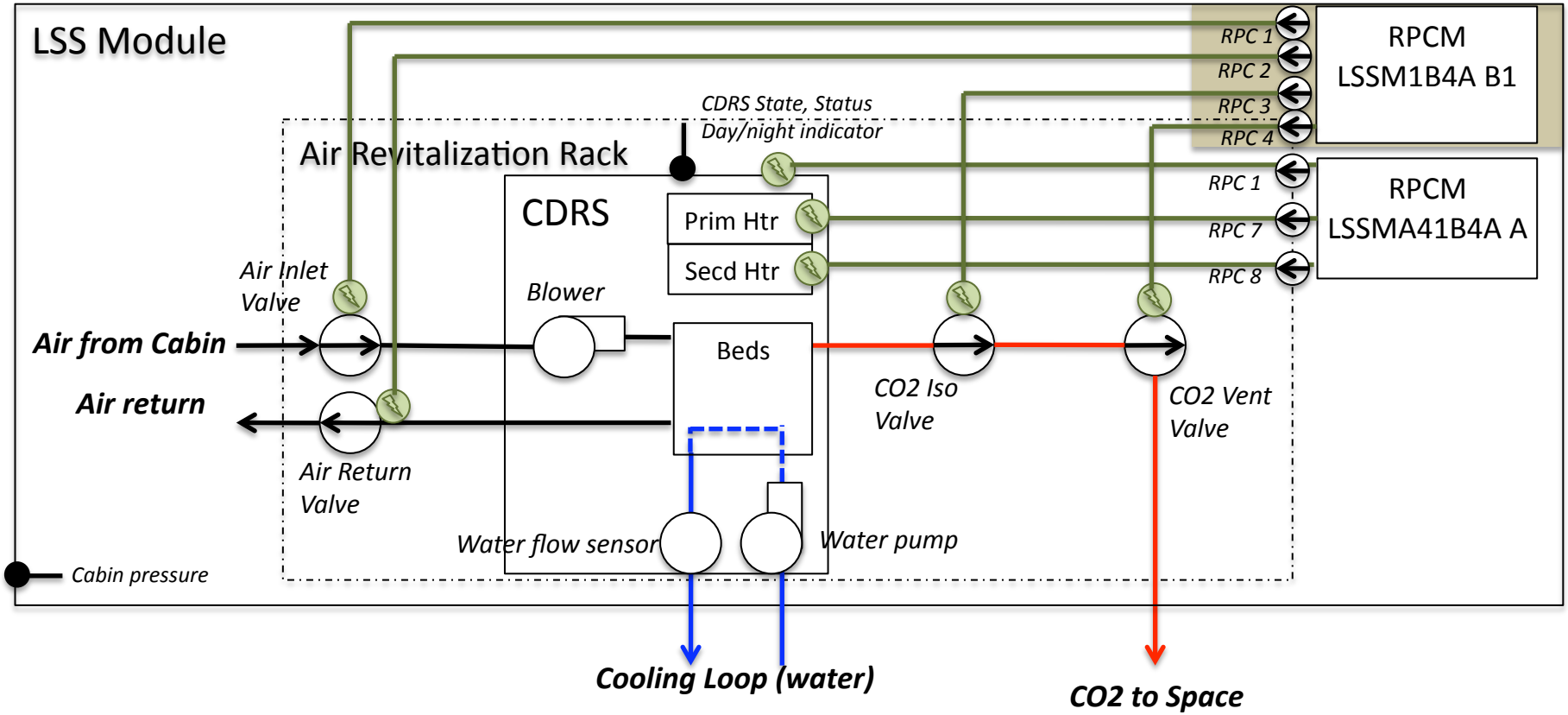
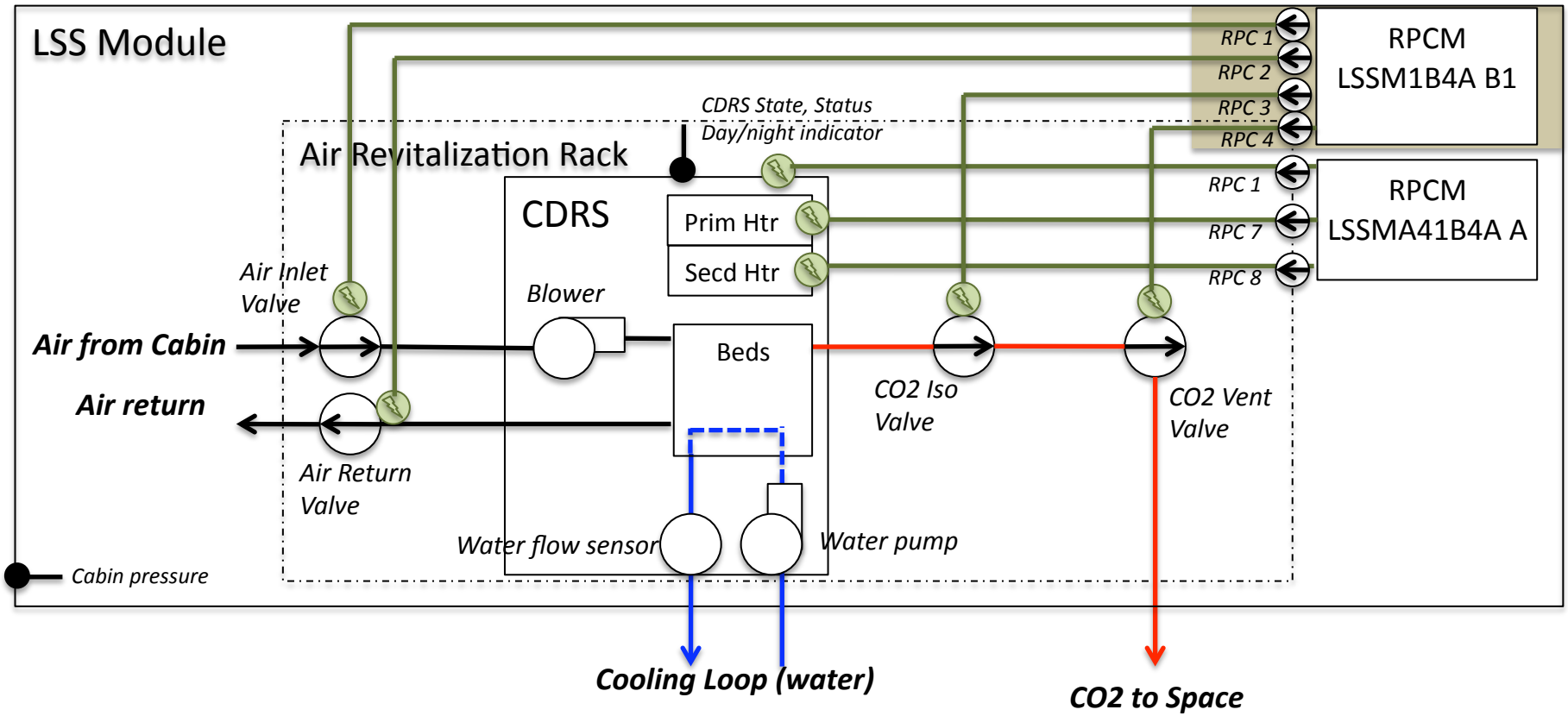
Model for Spacecraft Sim



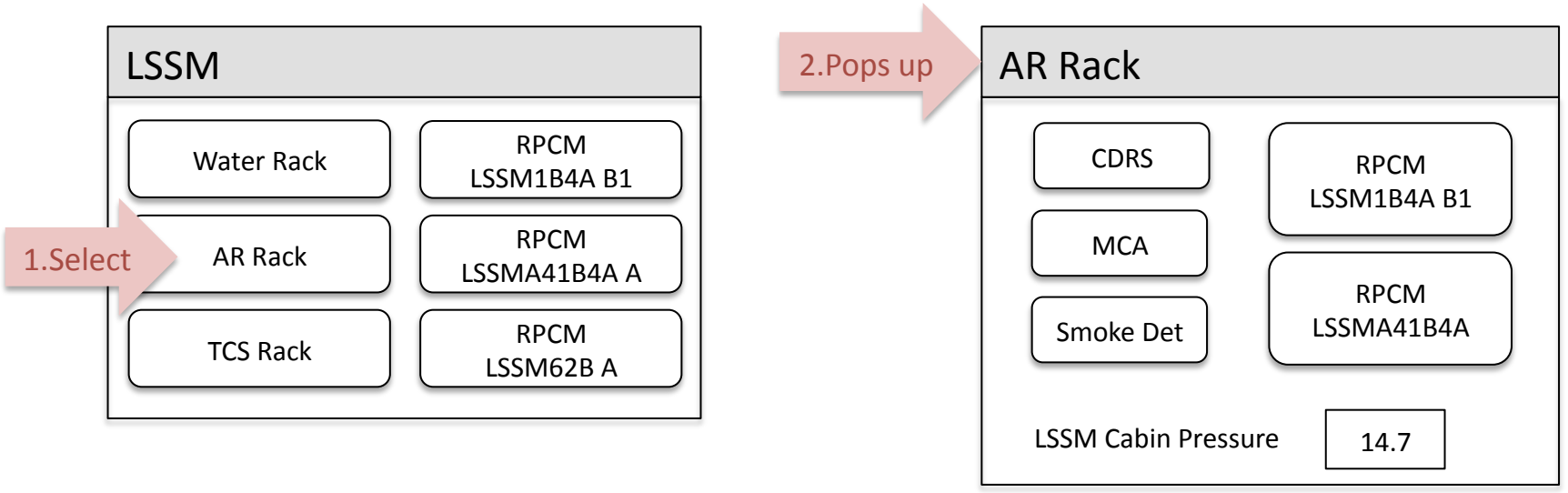
Scenario Overview

- Execute CDRS activation procedure (derived from 1.308 Node 3 CDRA Activation)
- Steps of procedure
  - Step 1: Verify power to Air Revitalization (AR) Rack
  - Step 2 Check CO2 Vent Valve (CVV) Prerequisite
  - Step 3 Check CDRS Air Valve Prerequisite
  - Step 4 Verify Day/Night configuration
  - Step 5 Power up CDRS
  - Step 6 Enable CDRS Blower Motor Controller
  - Step 7 Enable CDRS Cooling Pump
  - Step 8 Set CDRS to Standby
  - Step 9 Check CDRS blower state and air speed
  - Step 10 Check CDRS water pump state and flow rate
  - Step 11 Configure vent line for vacuum
  - Step 12 Configure air inlet valve
  - Step 13 Configure air return valve
  - Step 14 Send CDRS command to start dual bed ops



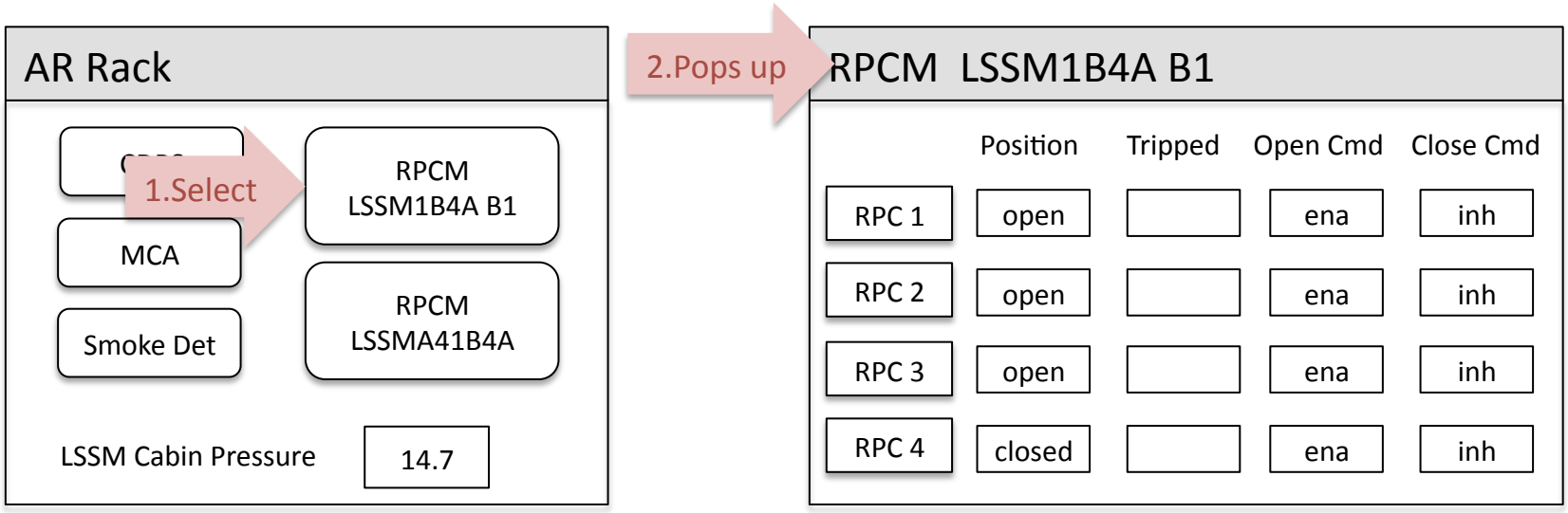
- Step 1: Verify power to Air Revitalization (AR) Rack
  - Note: AR Rack provides power to all input/output valves and pumps for CDRS
  - Navigate to LSSM: AR Rack
  - Select 'RPCM LSSM1B4A B1 ' on "AR Rack"
  - For x = 1-4
    - Verify RPCM LSSM1B4A B1 RPC [x] RPC Position – Closed
  - Note: if RPC [x] is not closed, must go to another procedure for instructions to close it

Step 1



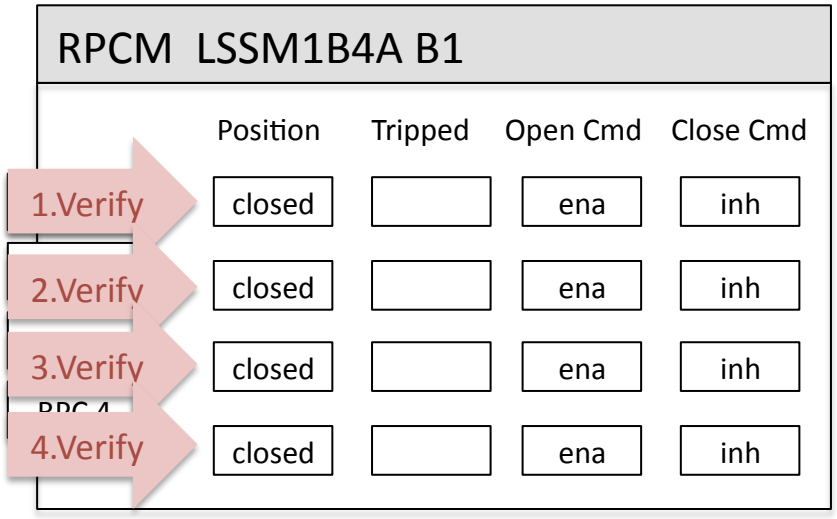
- Step 1: Verify power to Air Revitalization (AR) Rack
  - Note: AR Rack provides power to all input/output valves and pumps for CDRS
  - Navigate to LSSM: AR Rack

Step 1

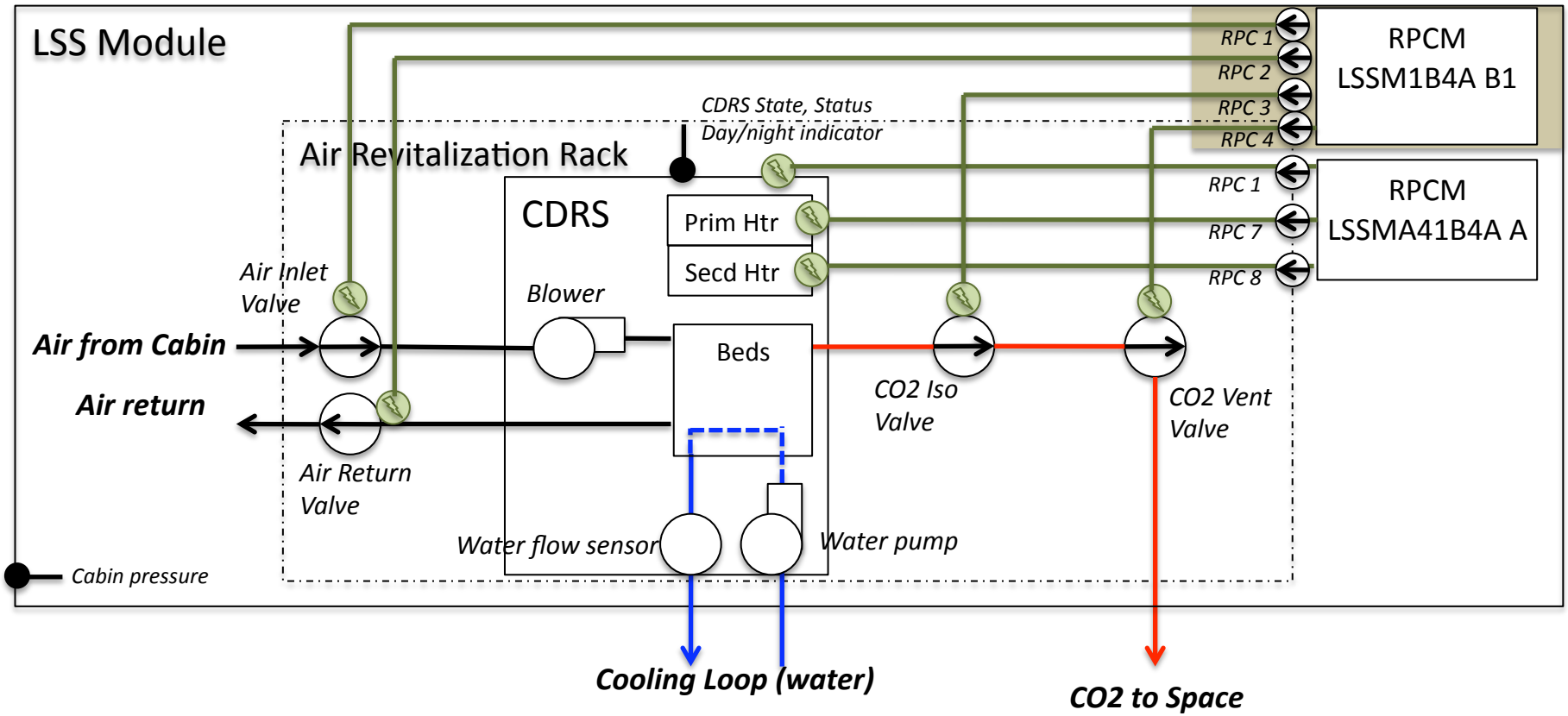


- Step 1: Verify power to Air Revitalization (AR) Rack
  - Select 'RPCM LSSM1B4A B1 ’ on “AR Rack”

Step 1

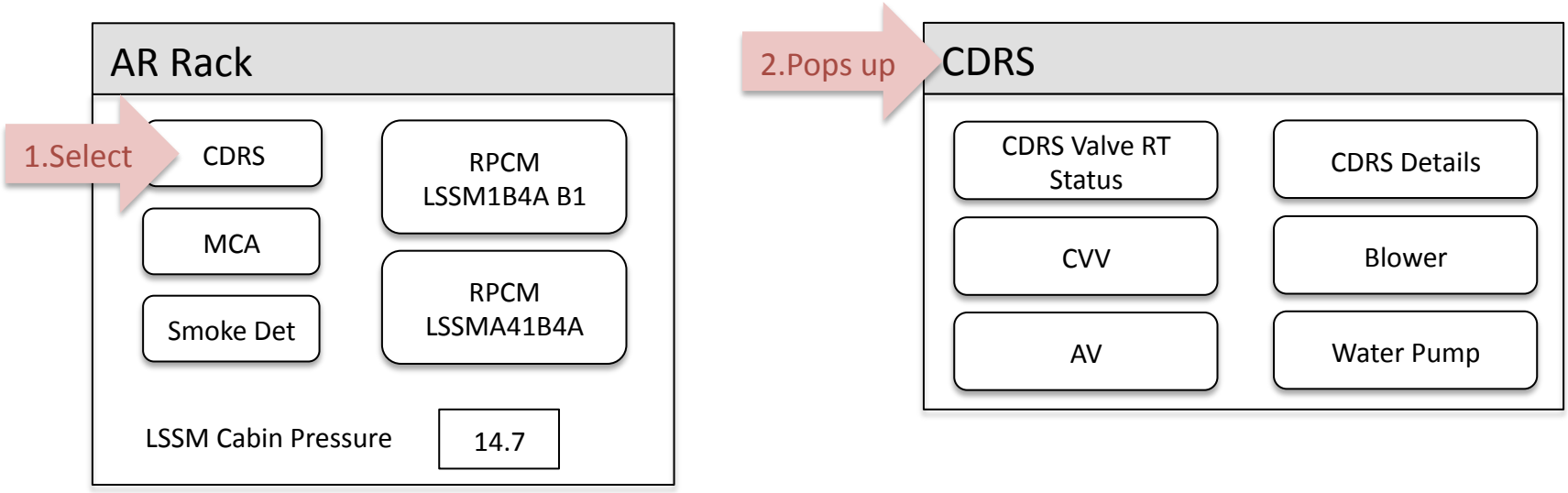


- Step 1: Verify power to Air Revitalization (AR) Rack
  - For x = 1-4
    - Verify RPCM LSSM1B4A B1 RPC [x] RPC Position – Closed
  - Note: if RPC 4 is not closed, must go to another procedure for instructions to close it



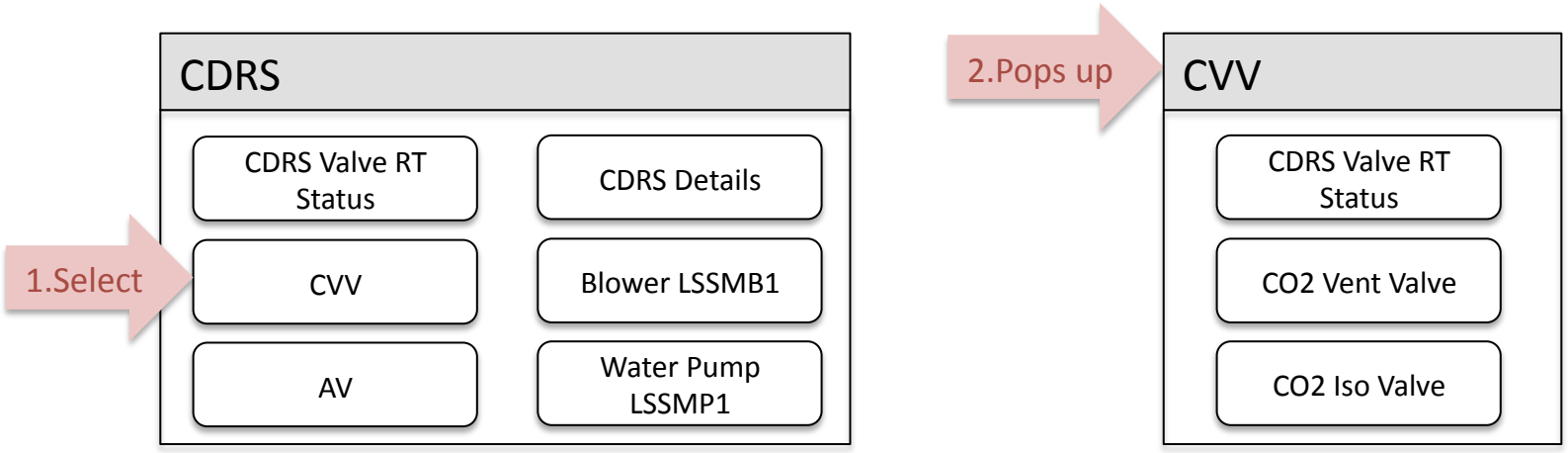
- Step 2 Check CO2 Vent Valve (CVV) Prerequisite
  - Navigate to LSSM: AR Rack: CDRS:CVV:CDRS Valve RT Status
  - cmd CVV RT Status – Enable RT Execute
  - Verify CVV RT Status – Ena
  - cmd CO2 Isolation Valve RT Status – Enable RT Execute
  - Verify CO2 Isolation Valve RT Status – Ena

Step 2



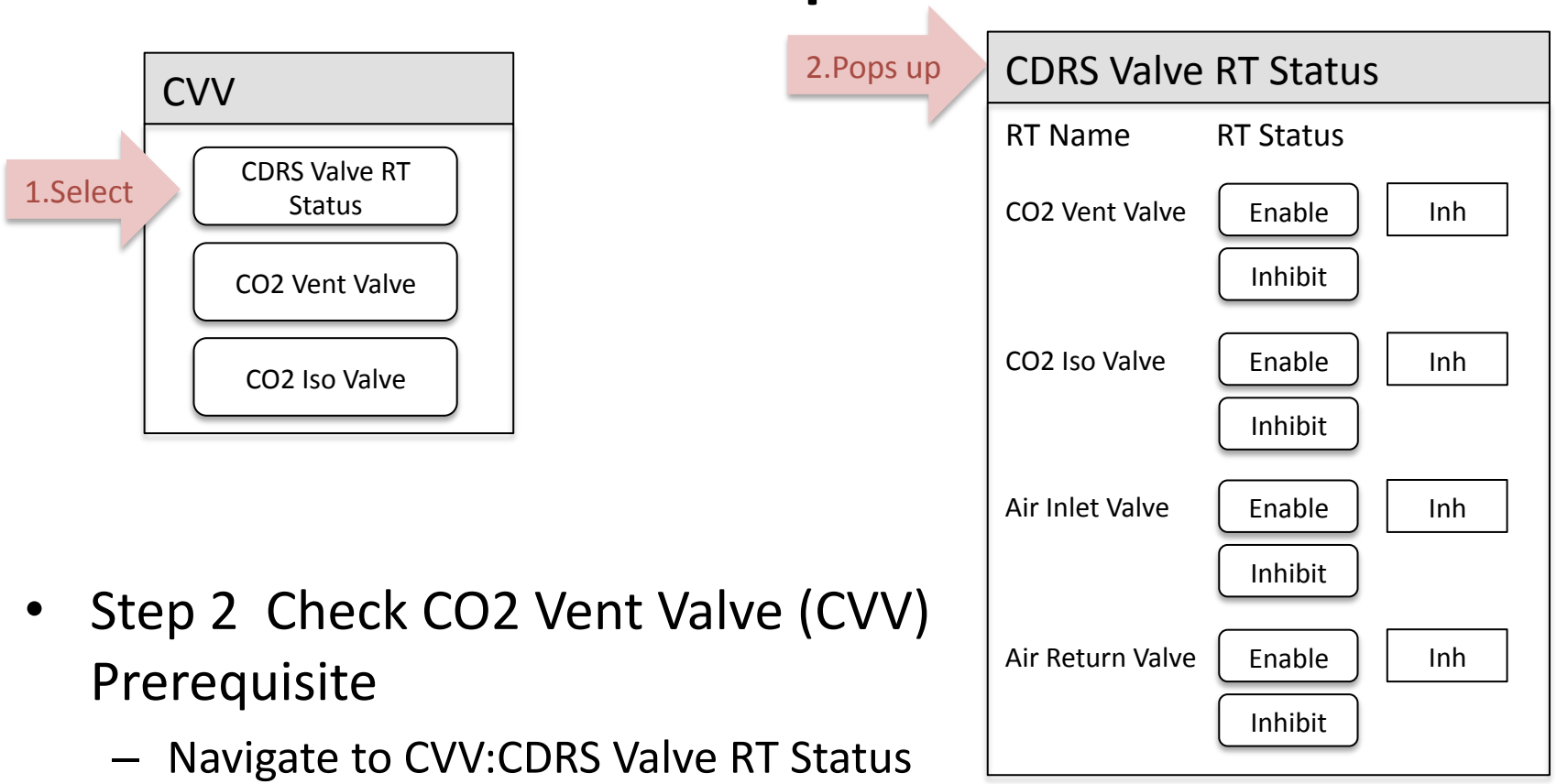
- Step 2 Check CO2 Vent Valve (CVV) Prerequisite
  - Navigate to LSSM: AR Rack: CDRS

Step 2



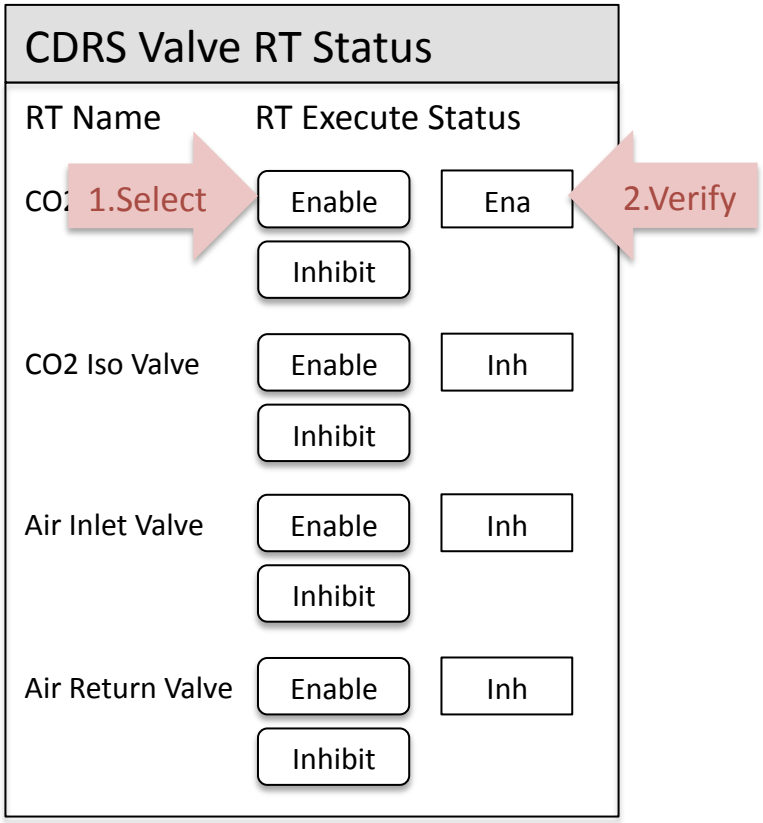
- Step 2 Check CO2 Vent Valve (CVV) Prerequisite
  - Navigate to CDRS:CVV

Step 2



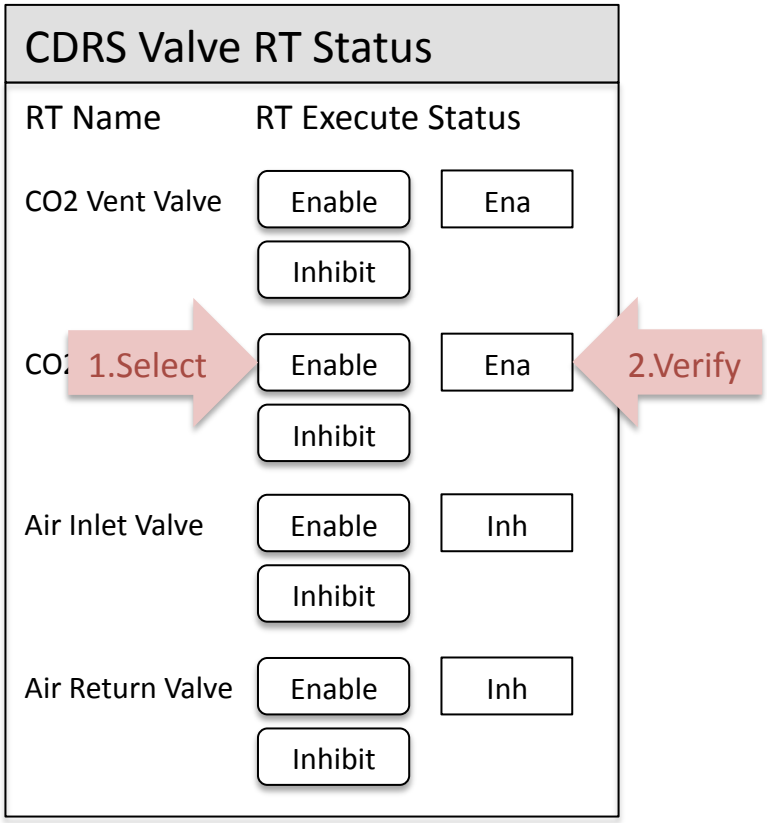
- Step 2 Check CO2 Vent Valve (CVV) Prerequisite
  - Navigate to CVV:CDRS Valve RT Status

Step 2

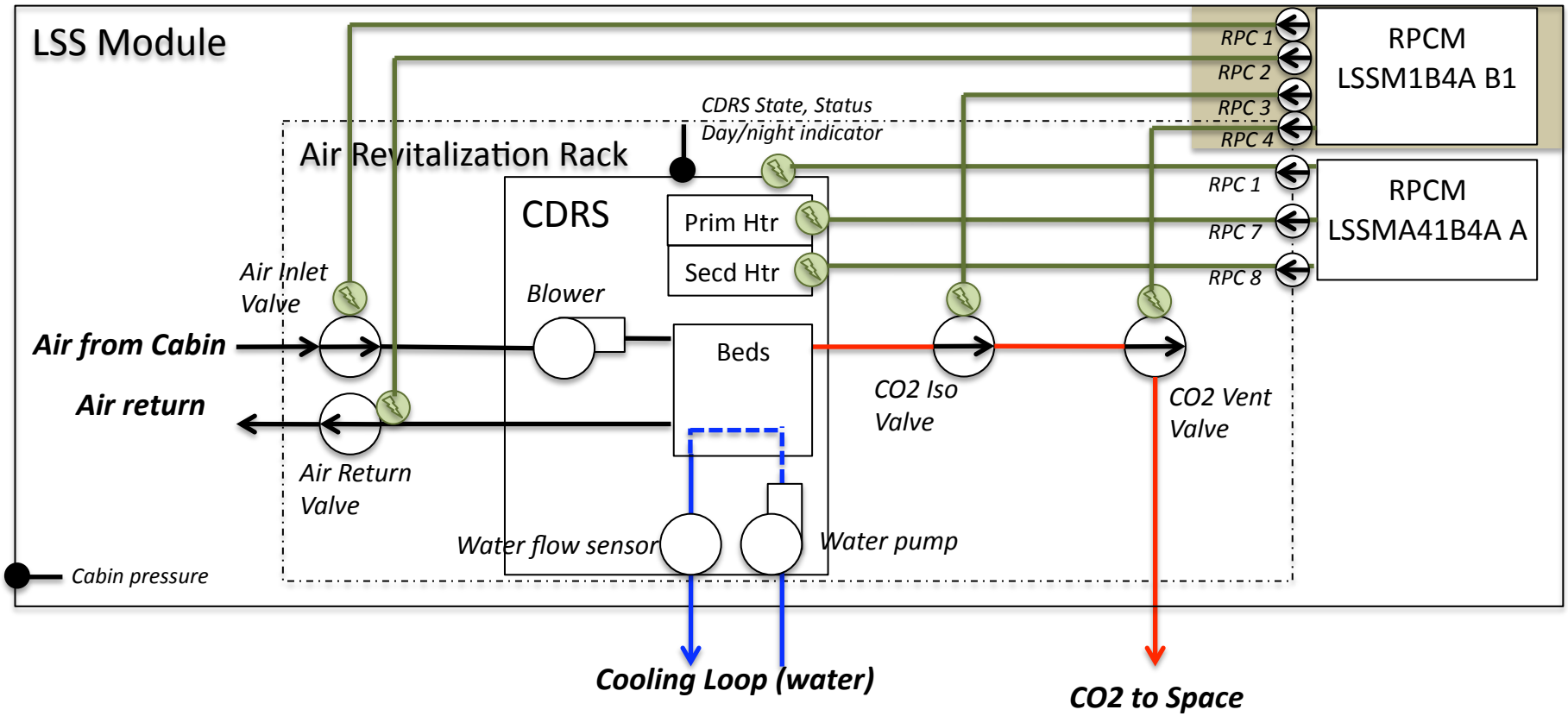


- Step 2 Check CO2 Vent Valve (CVV) Prerequisite
  - cmd CVV RT Status – Enable RT Execute
  - Verify CVV RT Status – Ena

Step 2

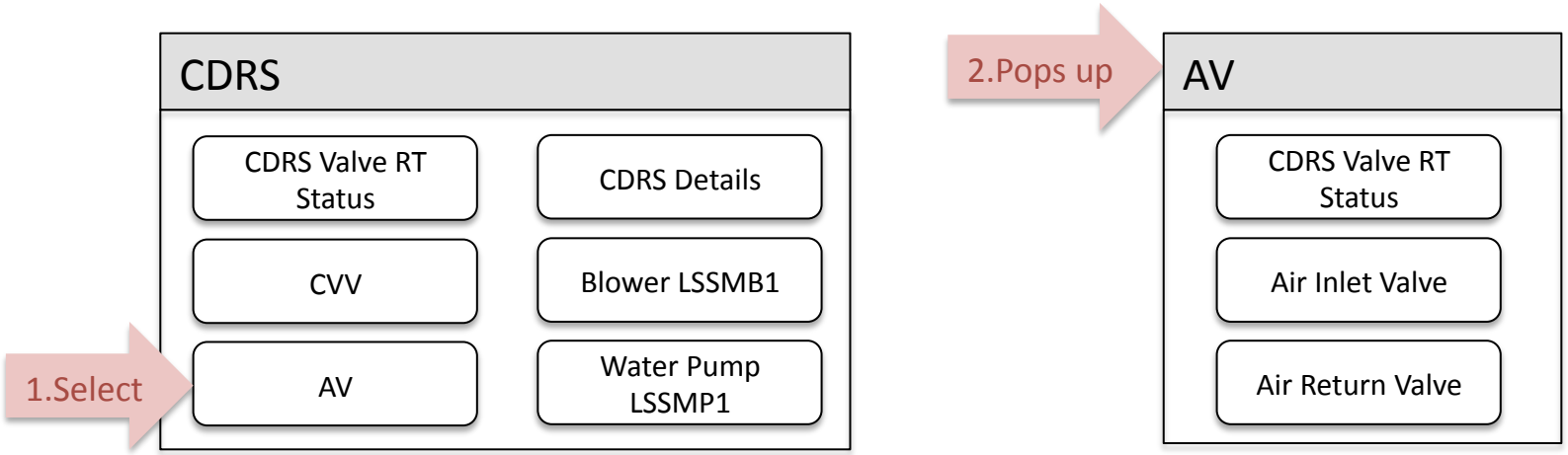


- Step 2 Check CO2 Vent Valve (CVV) Prerequisite
  - cmd CO2 Isolation Valve RT Status – Enable RT Execute
  - Verify CO2 Isolation Valve RT Status – Ena



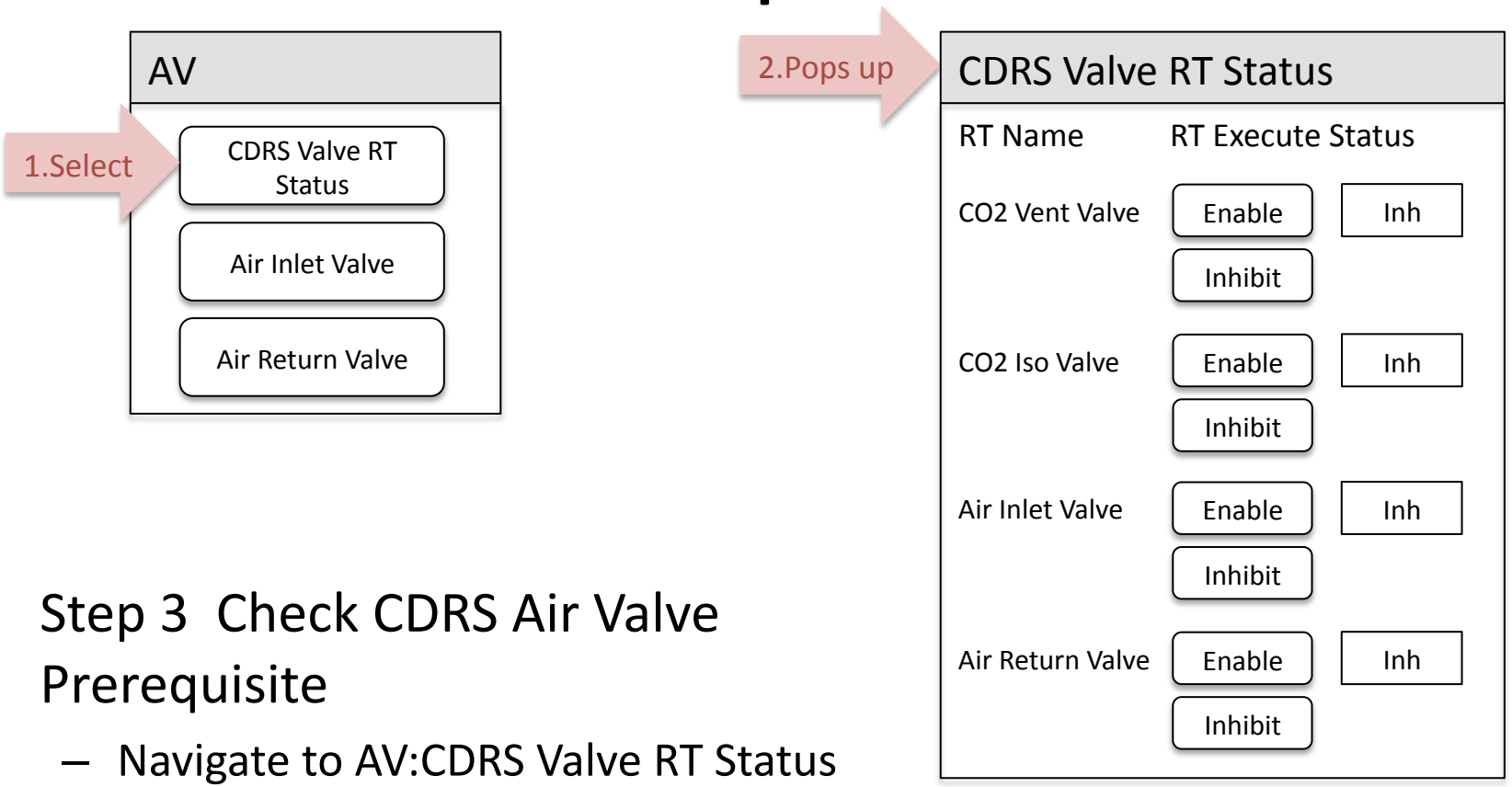
- Step 3 Check CDRS Air Valve Prerequisite
  - Navigate to LSSM: AR Rack: CDRS:AV:CDRS Valve RT Status
  - cmd Air Inlet Valve RT Status – Enable RT Execute
  - Verify Air Inlet Valve RT Status – Ena
  - cmd Air Return Valve RT Status – Enable RT Execute
  - Verify Air Return Valve RT Status – Ena

Step 3



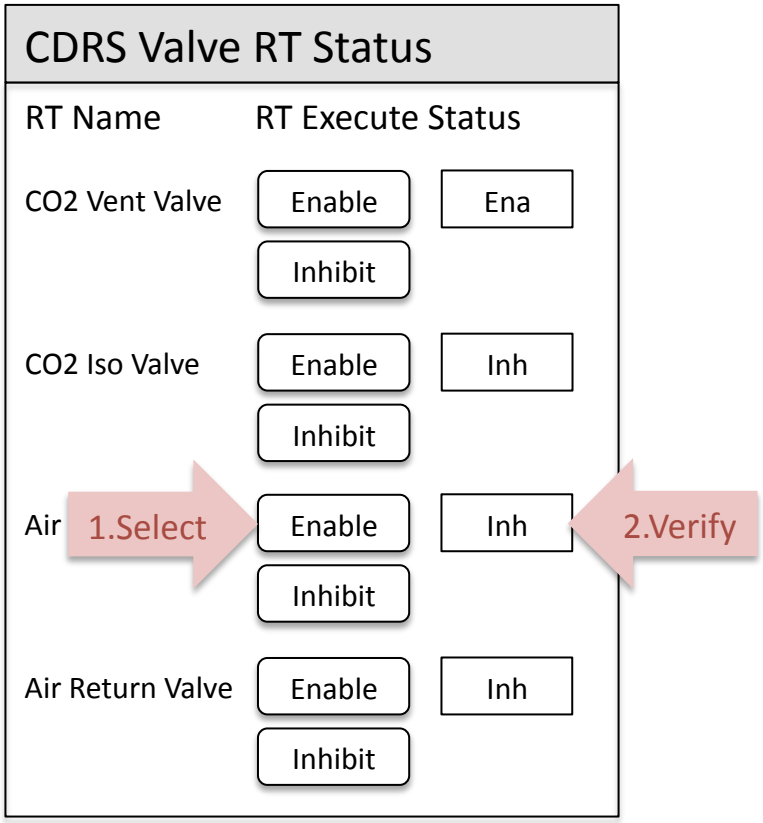
- Step 3 Check CDRS Air Valve Prerequisite
  - Navigate to LSSM: AR Rack: CDRS:AV

Step 3



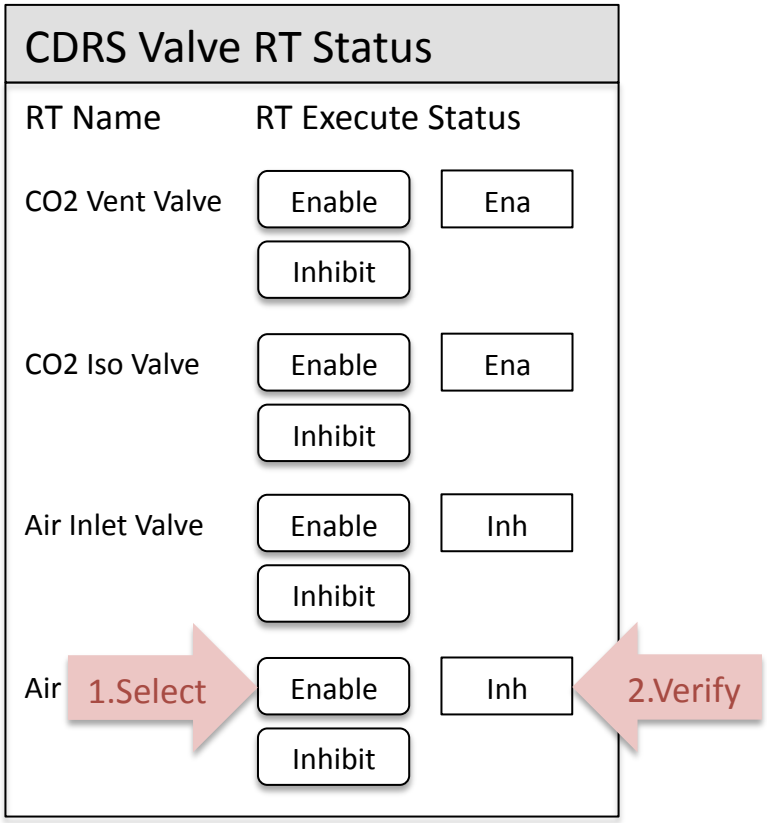
- Step 3 Check CDRS Air Valve Prerequisite
  - Navigate to AV:CDRS Valve RT Status

Step 3

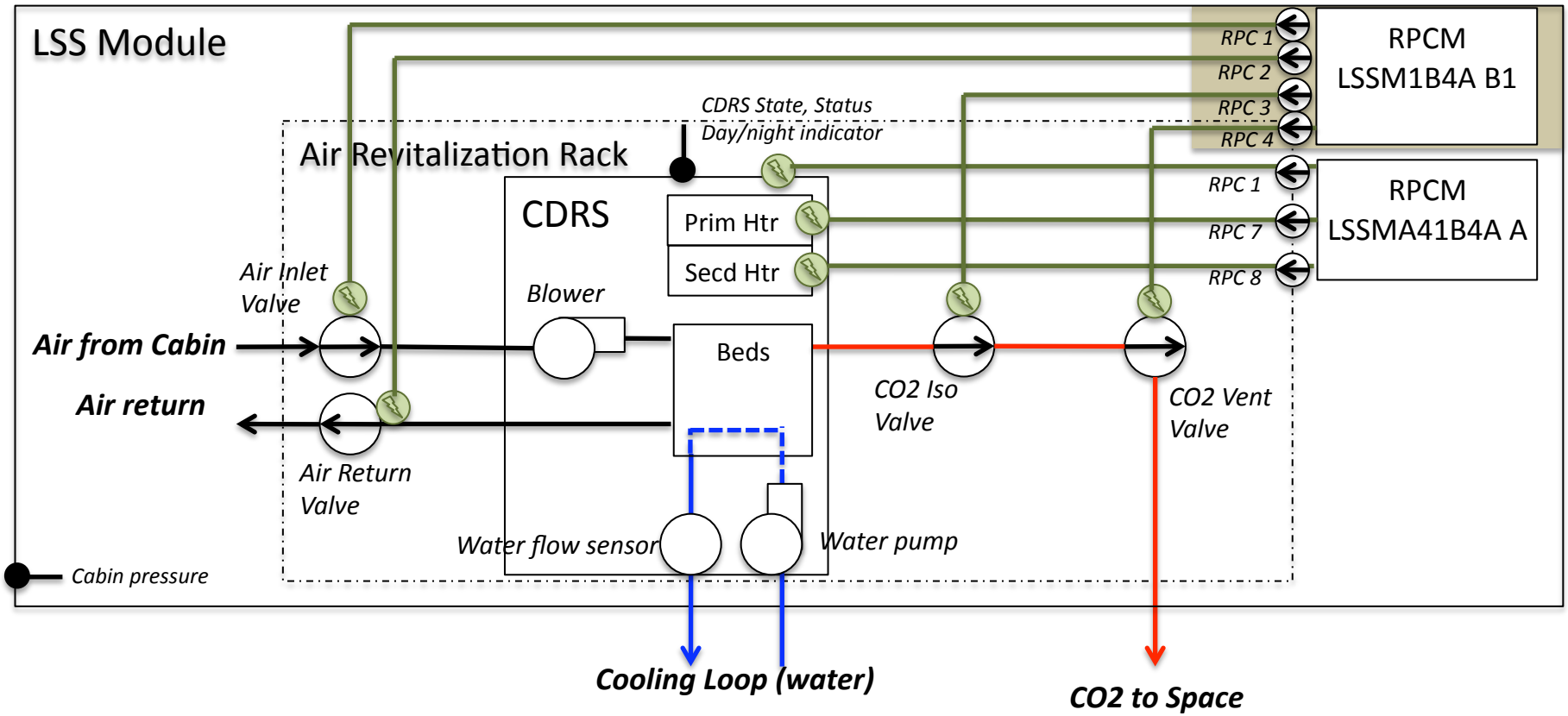


- Step 3 Check CDRS Air Valve Prerequisite
  - cmd Air Inlet Valve RT Status – Enable RT Execute
  - Verify Air Inlet Valve RT Status – Ena

Step 3

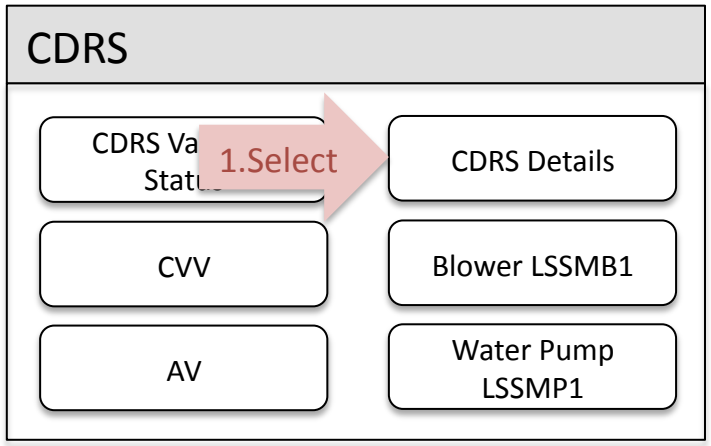


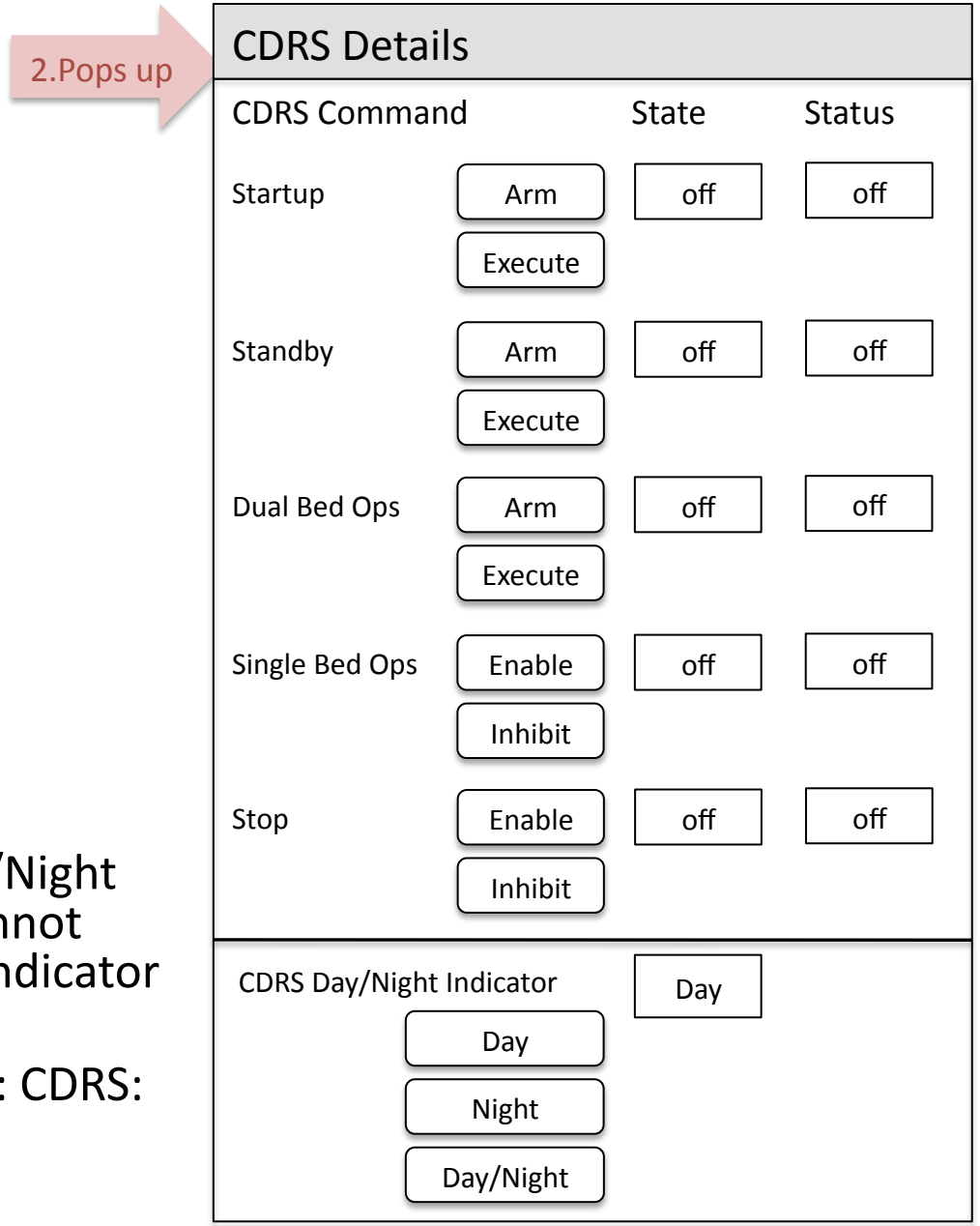
- Step 3 Check CDRS Air Valve Prerequisite
  - cmd Air Return Valve RT Status – Enable RT Execute
  - Verify Air Return Valve RT Status – Ena



- Step 4 Verify Day/Night configuration
  - Note: Whether or not Day/Night cycling is desired, CDRS cannot Startup unless Day/Night Indicator initially reads Day.
  - Navigate to LSSM: AR Rack: CDRS: CDRS Details
  - Verify CDRS Day/Night indicator – Day

Step 4

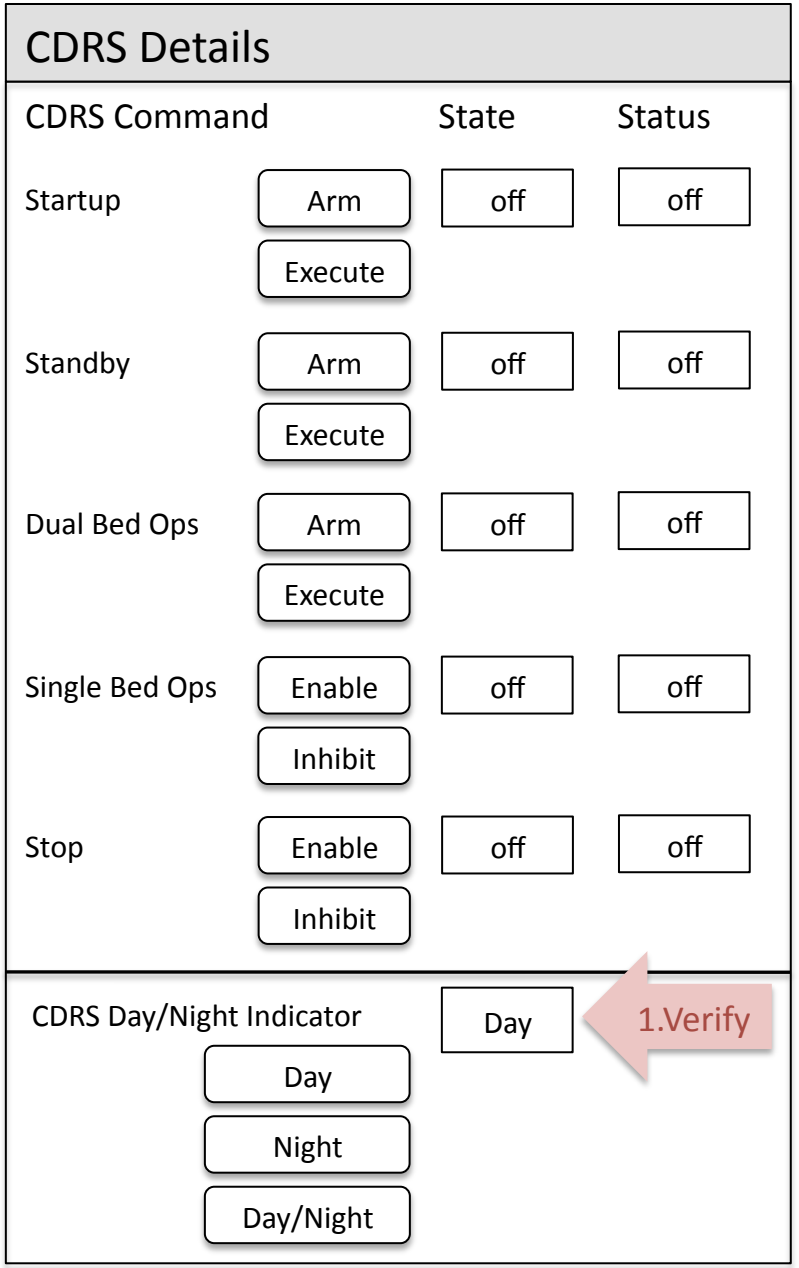


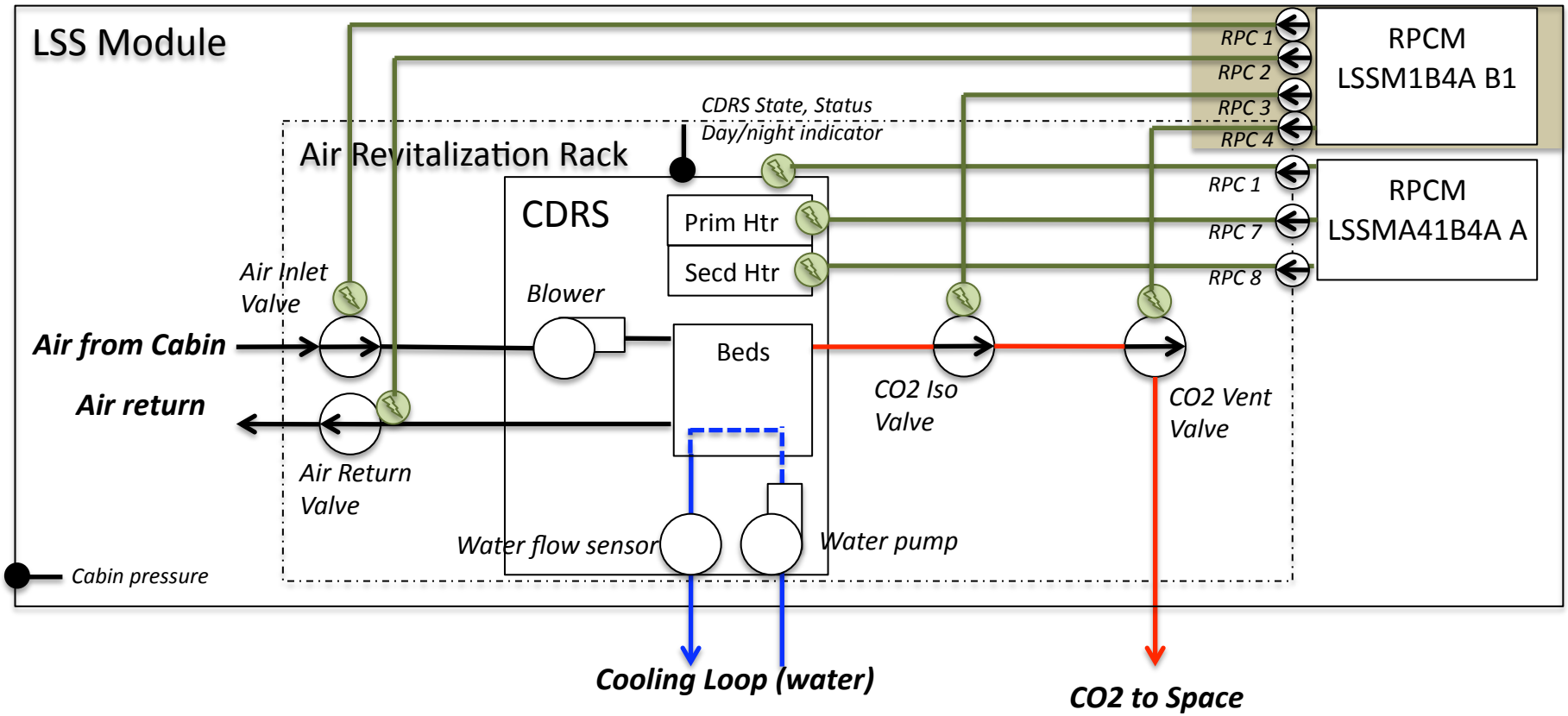


- Step 4 Verify Day/Night configuration
  - Note: Whether or not Day/Night cycling is desired, CDRS cannot Startup unless Day/Night Indicator initially reads Day.
  - Navigate to LSSM: AR Rack: CDRS: CDRS Details

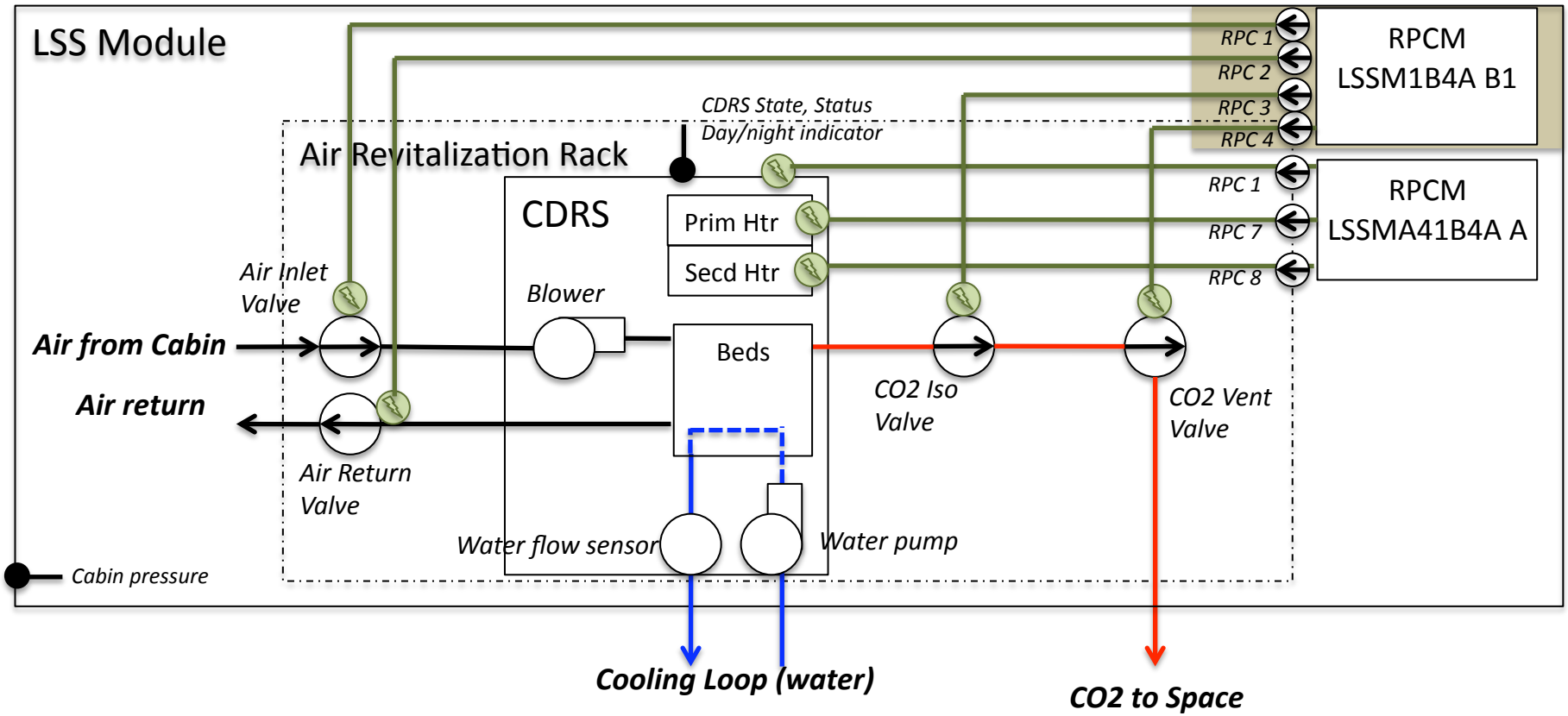
Step 4

- Step 4 Verify Day/Night configuration
  - Verify CDRS Day/Night indicator – Day
  - Note: if not set to Day, must go to another procedure for instructions to close it



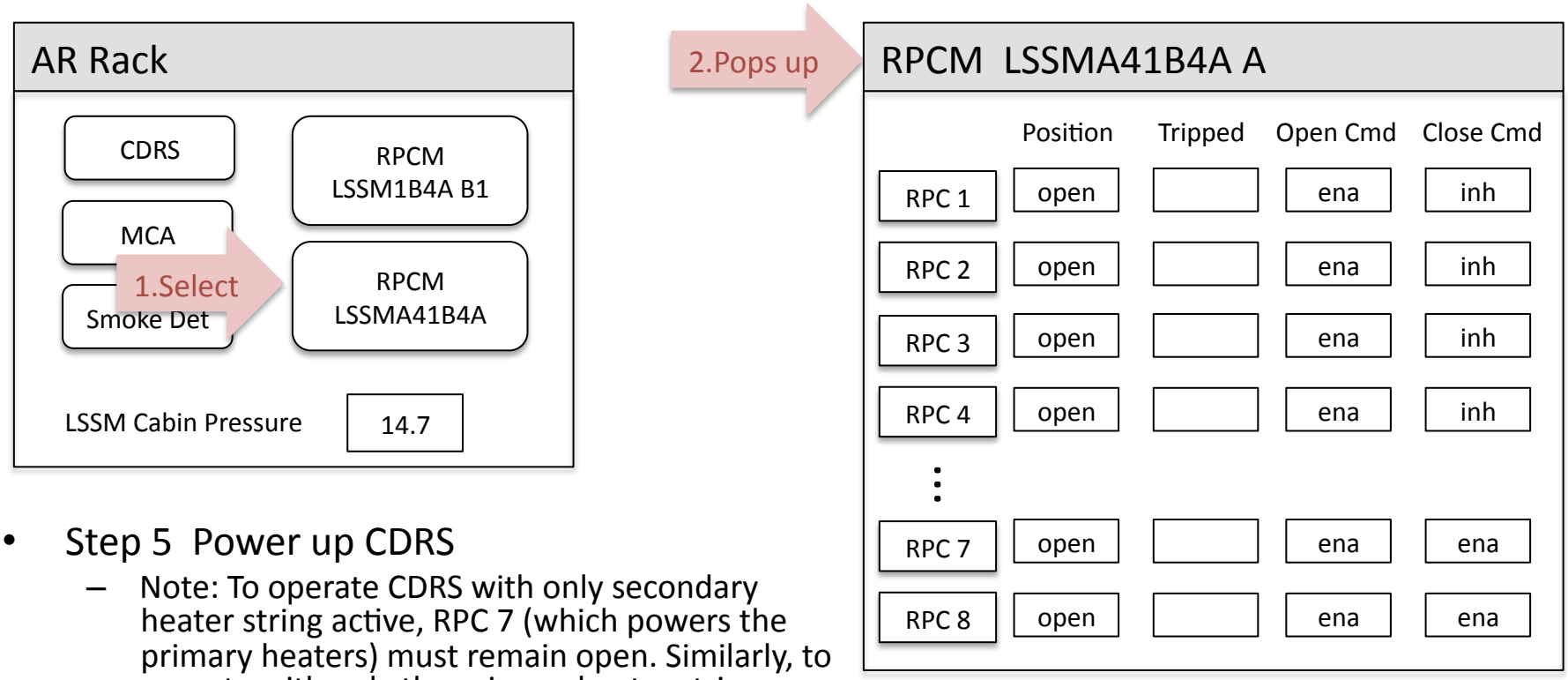


- Step 5 Power up CDRS
  - Note: To operate CDRS with only secondary heater string active, RPC 17 (which powers the primary heaters) must remain open. Similarly, to operate with only the primary heater string active, RPC 18 (which powers the secondary heaters) must remain open.
  - Navigate to LSSM: AR Rack: CDRS
  - Select “RPCM LSSMA41B4A A” button on “CDRS”
  - To operate with secondary heaters only
    - For x={1 and 8}
      - CMD RPC[x] Position – Close
      - Verify RPD[x] – Closed
    - Verify RPC 7 Position – Open



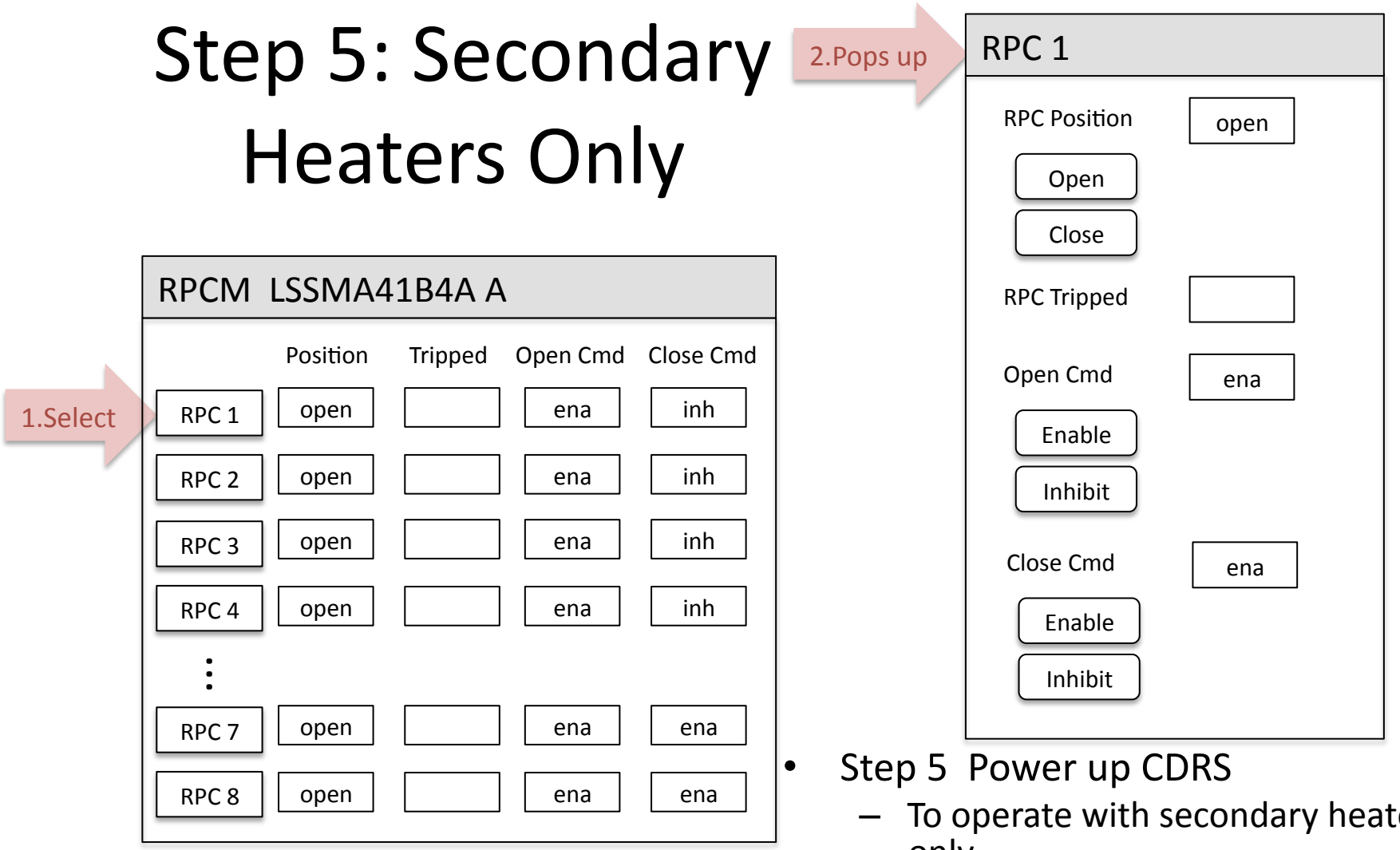
- Step 5 Power up CDRS
  - To operate with primary heaters only
    - For x={1 and 7}
      - CMD RPC[x] Position – Close
      - Verify RPD[x] – Closed
    - Verify RPC 8 Position – Open
  - To operate with both primary and secondary heaters
    - For x={1, 7, and 8}
      - CMD RPC[x] Position – Close
      - Verify RPD[x] – Closed

Step 5



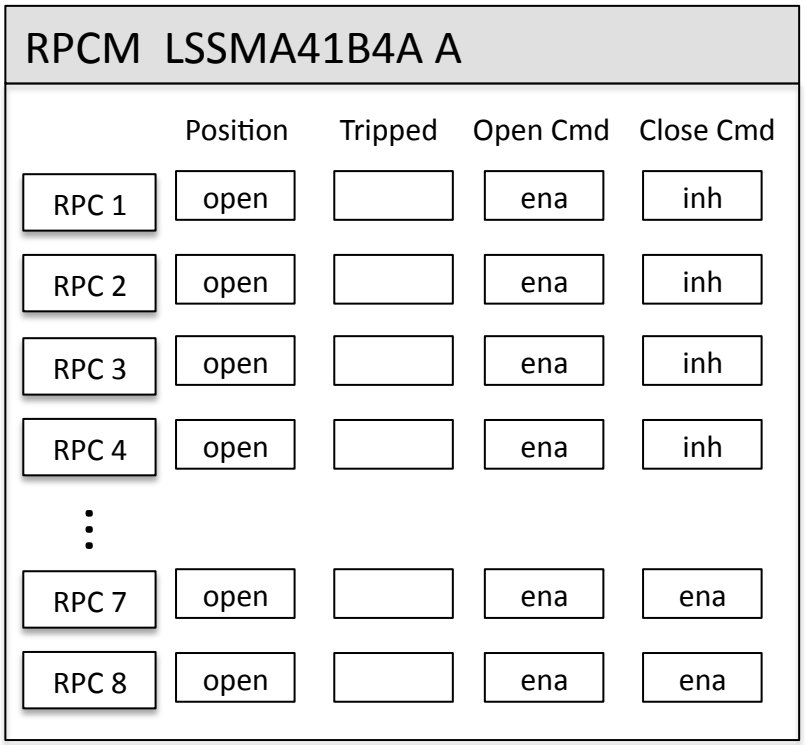
- Step 5 Power up CDRS
  - Note: To operate CDRS with only secondary heater string active, RPC 7 (which powers the primary heaters) must remain open. Similarly, to operate with only the primary heater string active, RPC 8 (which powers the secondary heaters) must remain open.
  - Navigate to LSSM: AR Rack
  - Select “RPCM LSSMA41B4A A” button on “AR Rack”

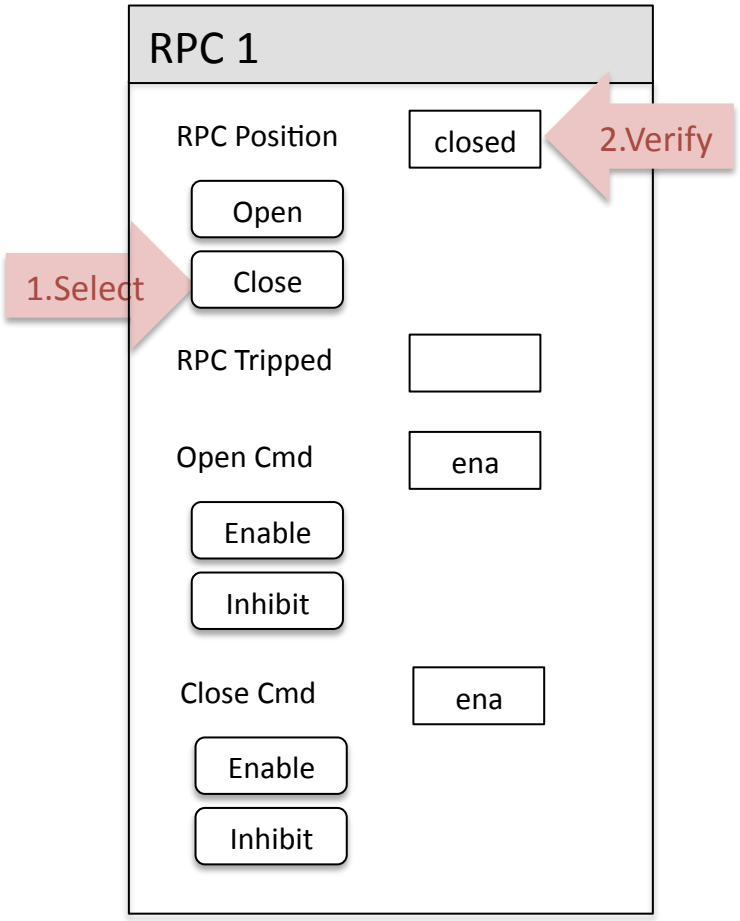
Step 5: Secondary Heaters Only



- Step 5 Power up CDRS
  - To operate with secondary heaters only
    - For x={1 and 8}
      - CMD RPC[x] Position – Close
      - Verify RPD[x] – Closed
    - Verify RPC 7 Position – Open

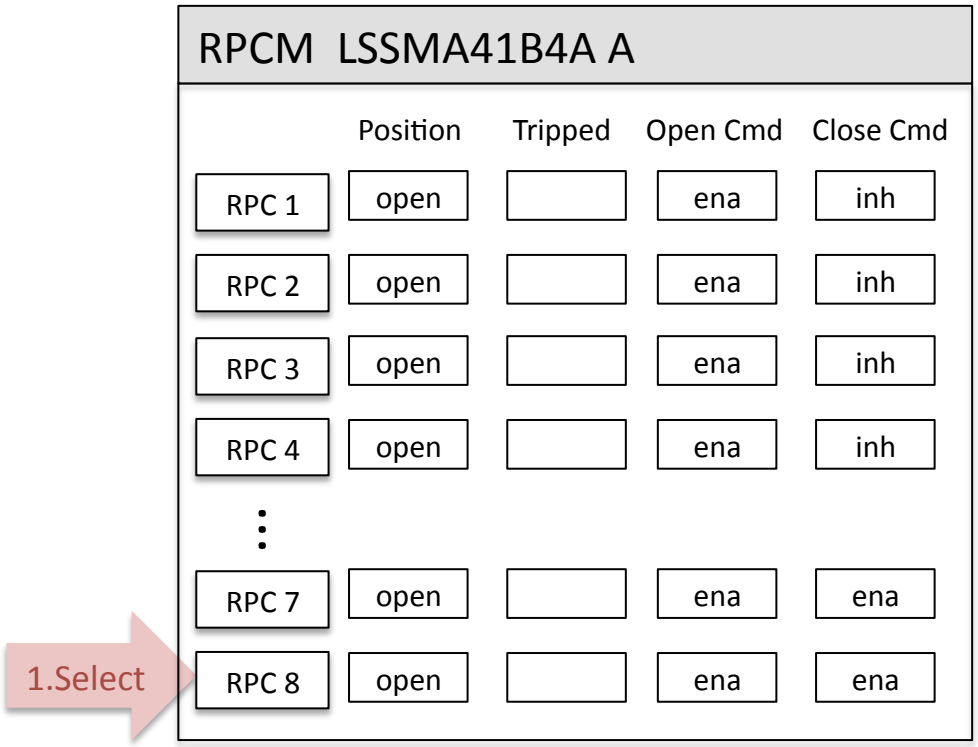
Step 5: Secondary Heaters Only

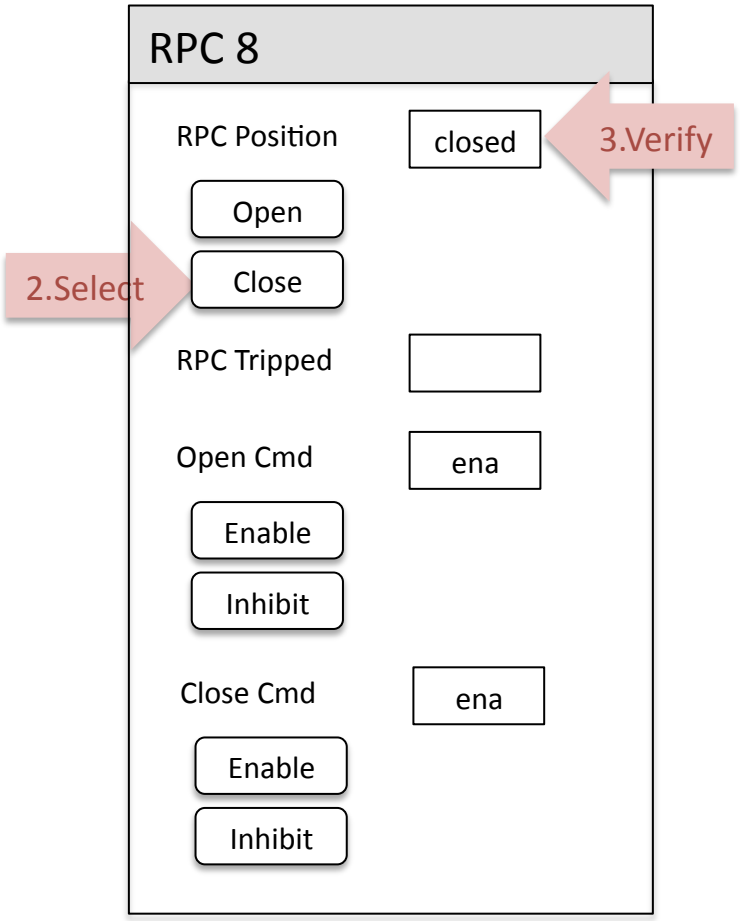




- Step 5 Power up CDRS
  - To operate with secondary heaters only
    - For x={1 and 18}
      - CMD RPC[x] Position – Close
      - Verify RPD[x] – Closed
    - Verify RPC 7 Position – Open

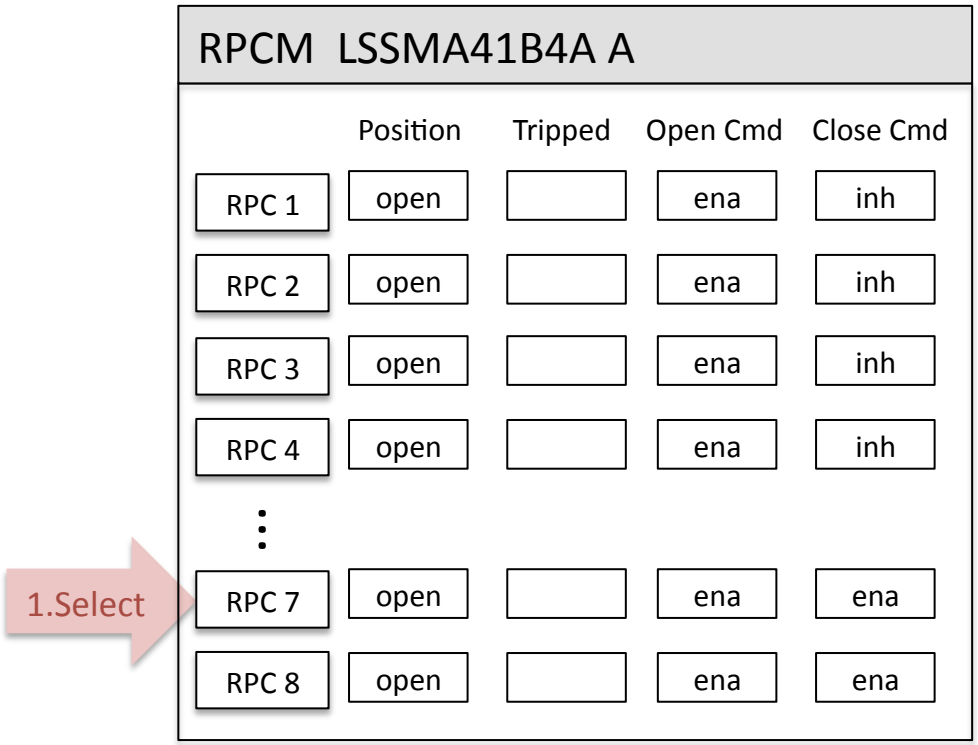
Step 5: Secondary Heaters Only

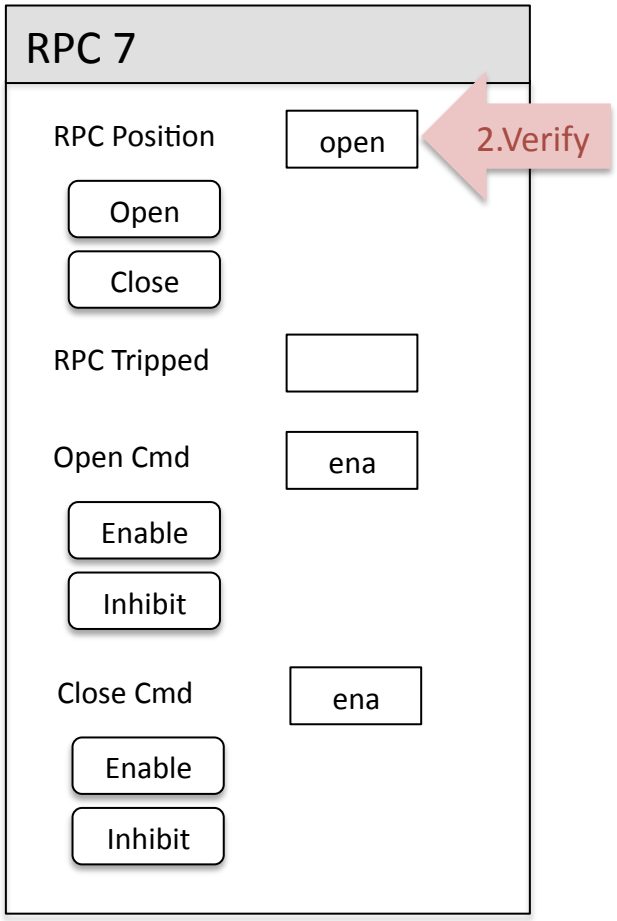




- Step 5 Power up CDRS
  - To operate with secondary heaters only
    - For x={1 and 8}
      - CMD RPC[x] Position – Close
      - Verify RPD[x] – Closed
    - Verify RPC 7 Position – Open

Step 5: Secondary Heaters Only

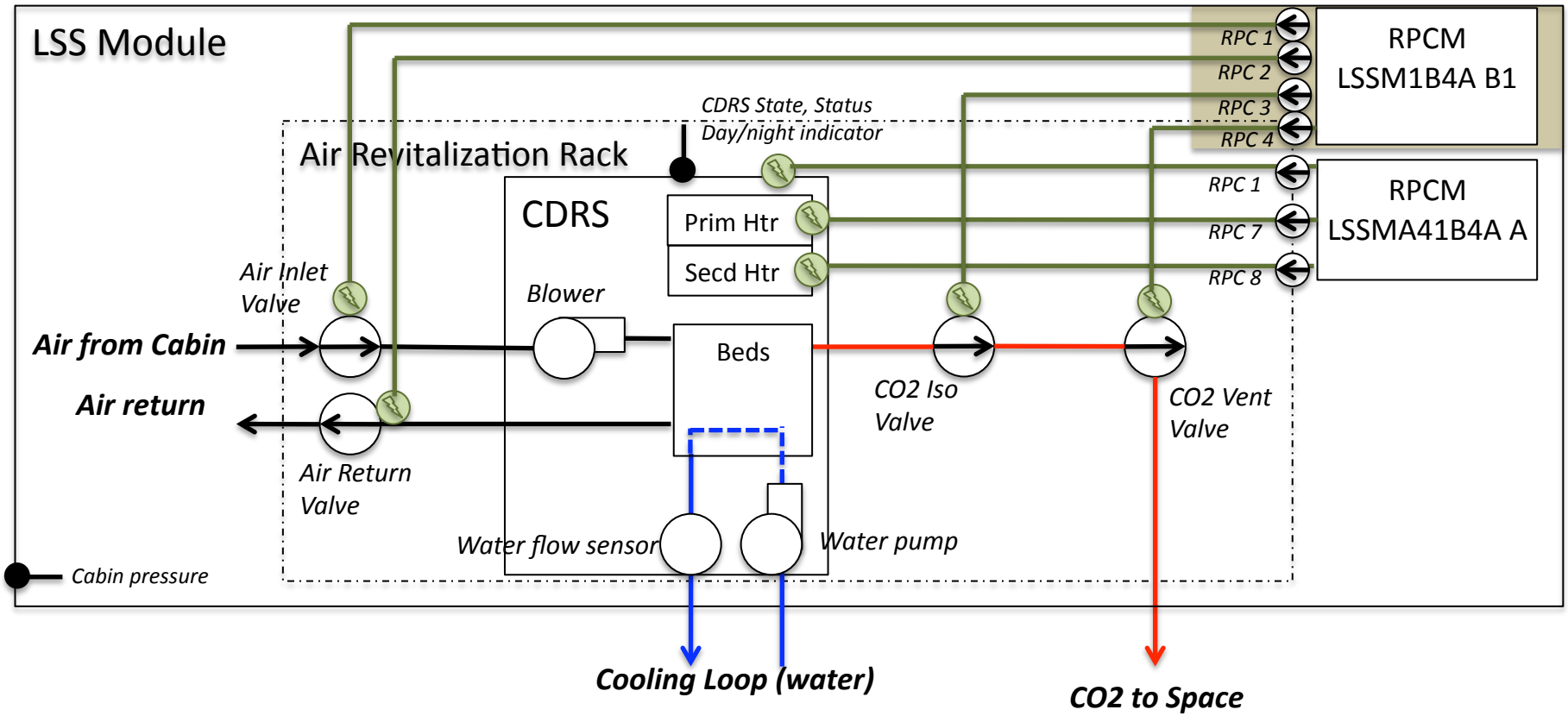




- Step 5 Power up CDRS
  - To operate with secondary heaters only
    - For x={1 and 8}
      - CMD RPC[x] Position – Close
      - Verify RPD[x] – Closed
    - Verify RPC 7 Position – Open

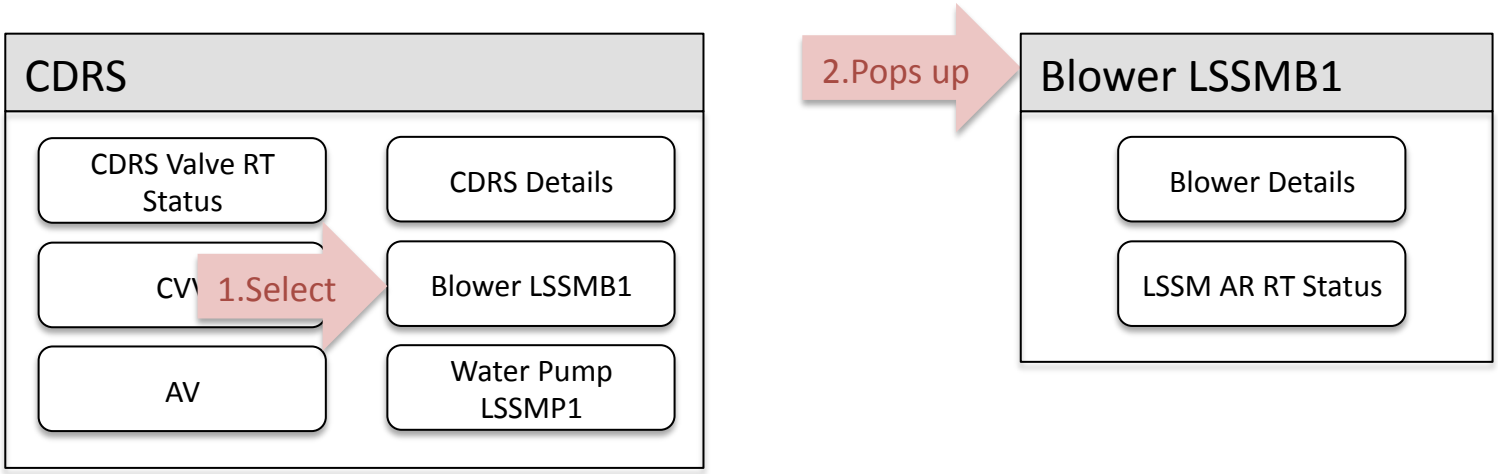
Step 5

- To operate with primary heaters only, perform similar steps to set RPCs 1 and 7 closed and RPC 8 open
- To operate with both primary and secondary heaters, perform similar steps to set RPCs 1, 7, and 8 closed



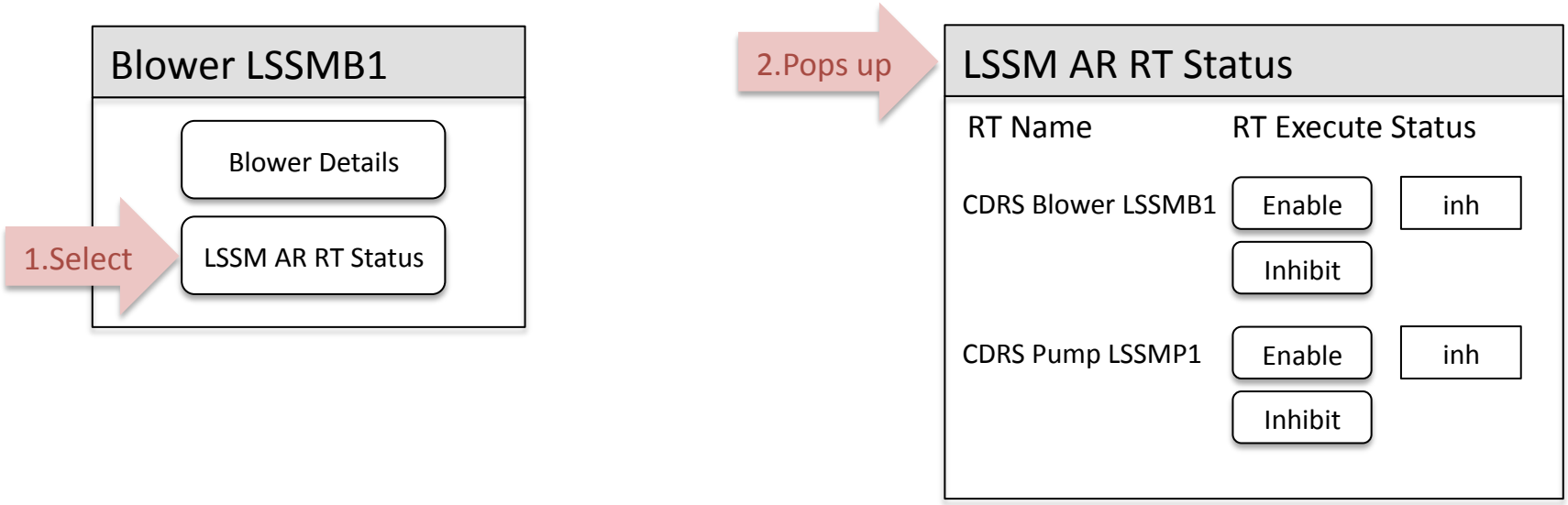
- Step 6 Enable CDRS Blower Motor Controller
  - Navigate to LSSM:AR Rack: CDRS
  - Select “Blower LSSMB1” on “CDRS”
  - Select “LSSM AR RT Status” on “Blower LSSMB1”
  - cmd CDRS Blower LSSMB1 RT Status – Enable RT Execute
  - Verify CDRS Blower LSSMB1 RT Status – Ena

Step 6



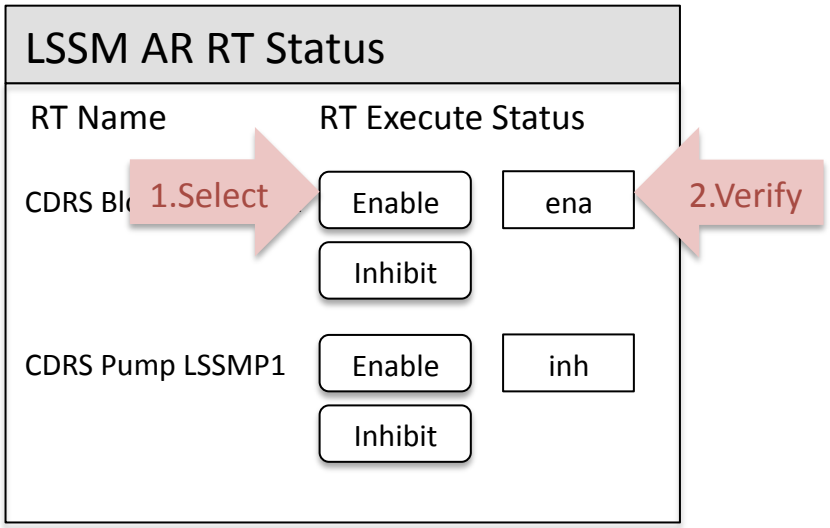
- Step 6 Enable CDRS Blower Motor Controller
  - Navigate to LSSM:AR Rack: CDRS
  - Select “Blower LSSMB1” on “CDRS”

Step 6

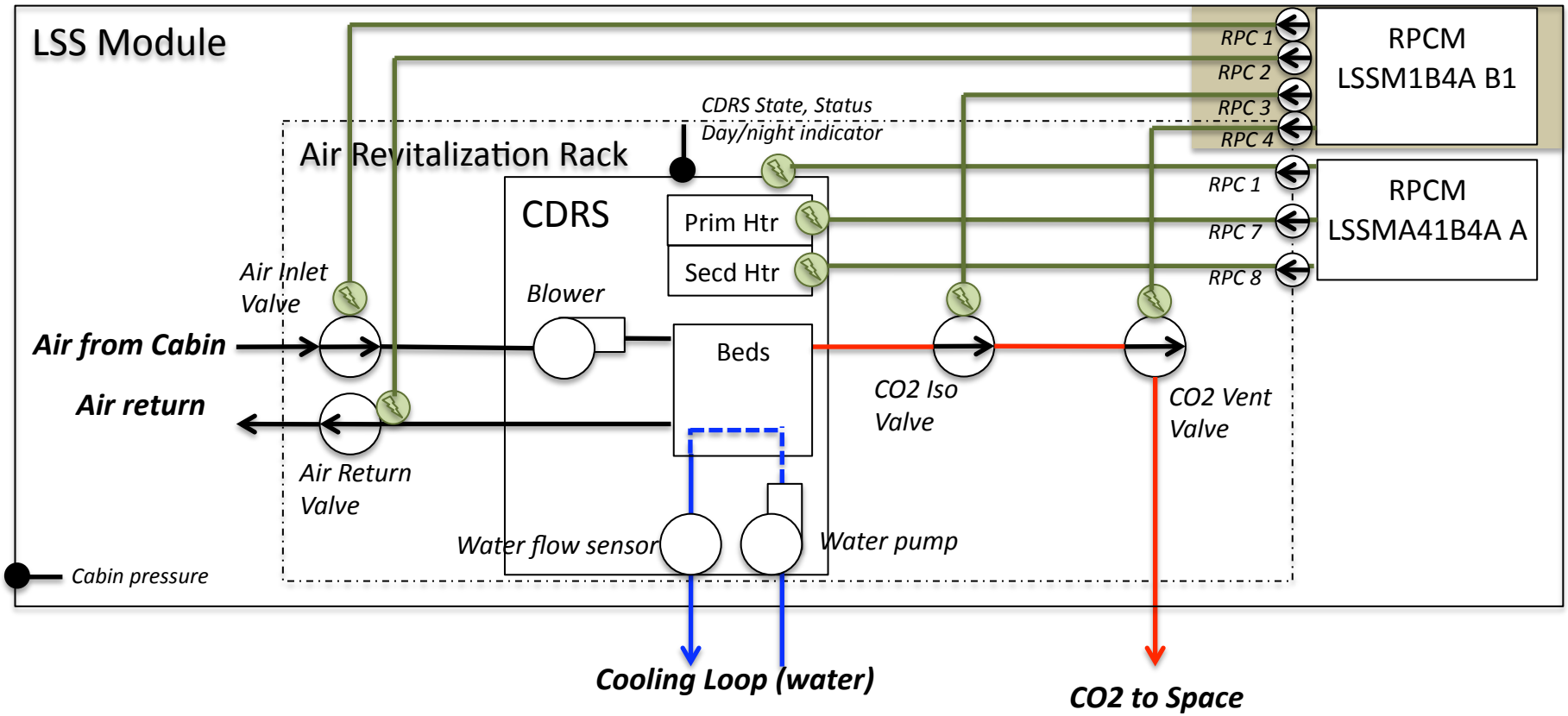


- Step 6 Enable CDRS Blower Motor Controller
  - Select “LSSM AR RT Status” on “Blower LSSMB1”

Step 6

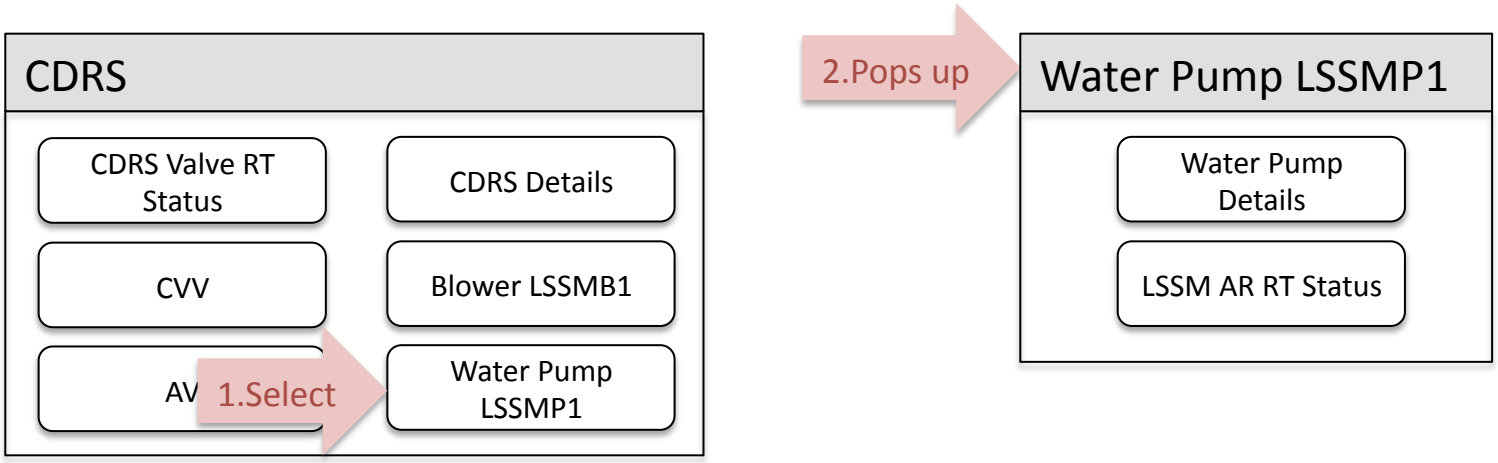


- Step 6 Enable CDRS Blower Motor Controller
  - cmd CDRS Blower LSSMB1 RT Status – Enable RT Execute
  - Verify CDRS Blower LSSMB1 RT Status – Ena



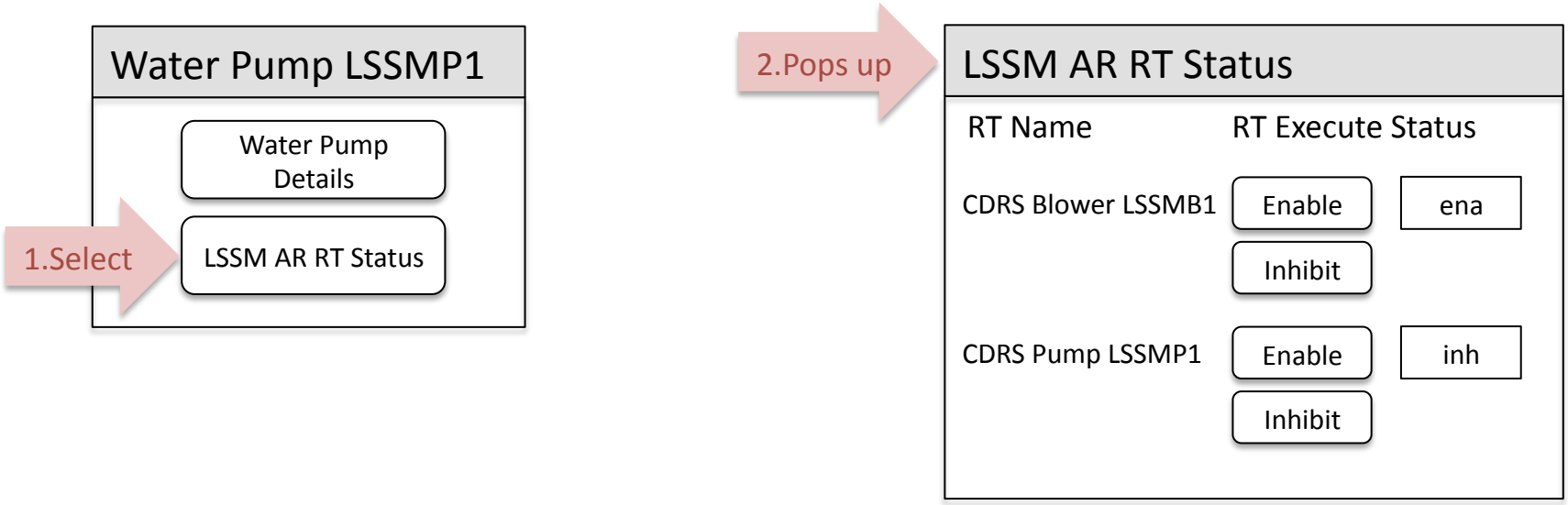
- Step 7 Enable CDRS Cooling Pump
  - Navigate to LSSM:AR Rack: CDRS
  - Select “Water Pump LSSMP1” on “CDRS”
  - cmd Water Pump LSSMP1 RT Status – Enable RT Execute
  - Verify Water Pump LSSMP1 RT Status – Ena

Step 7



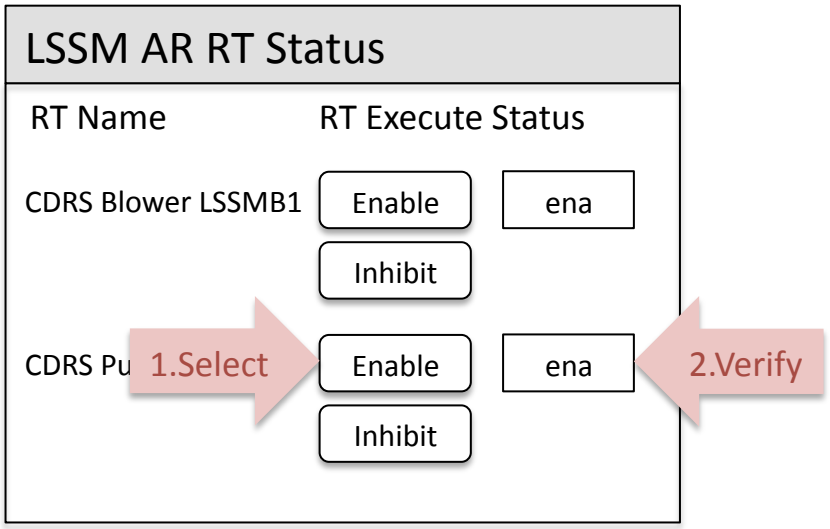
- Step 7 Enable CDRS Cooling Pump
  - Navigate to LSSM:AR Rack: CDRS
  - Select “Water Pump LSSMP1” on “CDRS”

Step 6

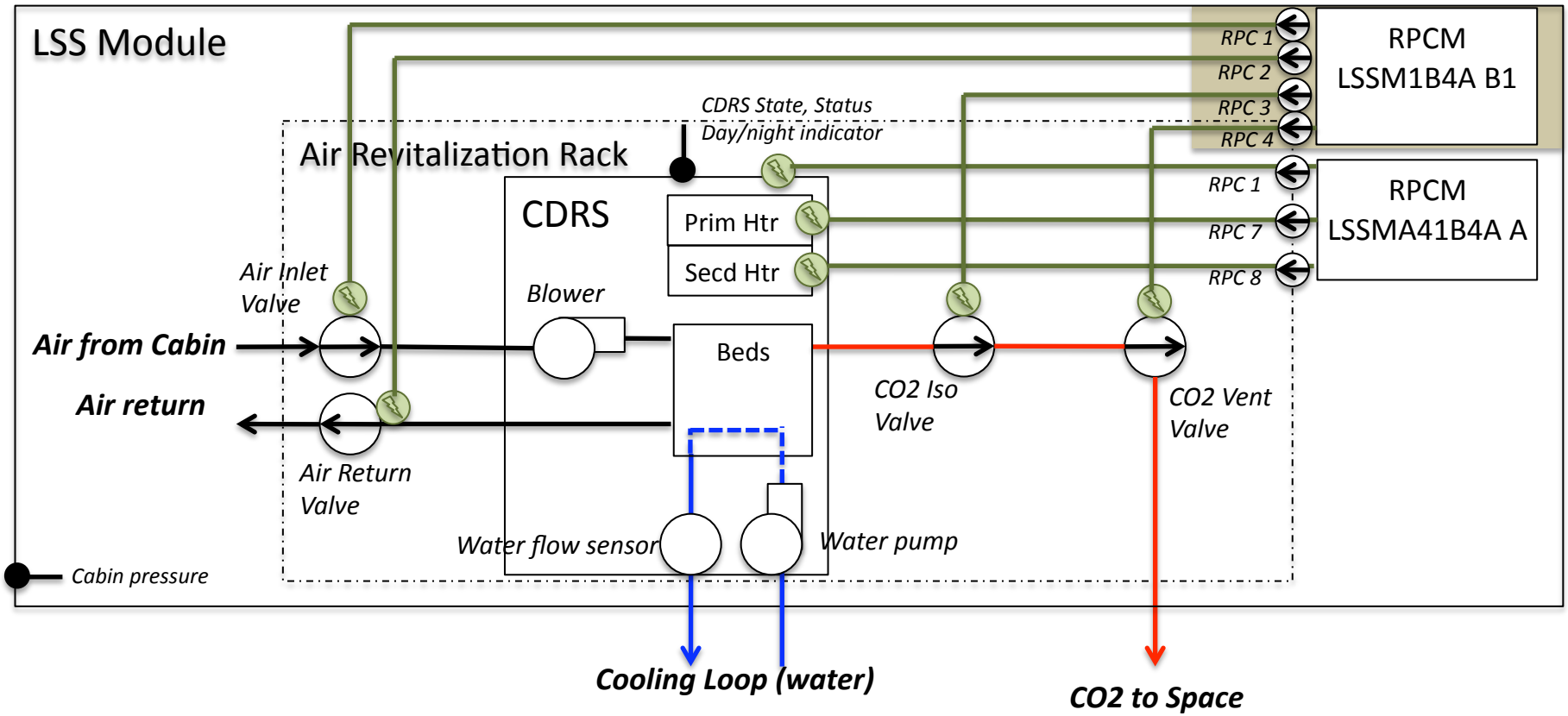


- Step 7 Enable CDRS Cooling Pump
  - Select “LSSM AR RT Status” on “Water Pump LSSMP1”

Step 7



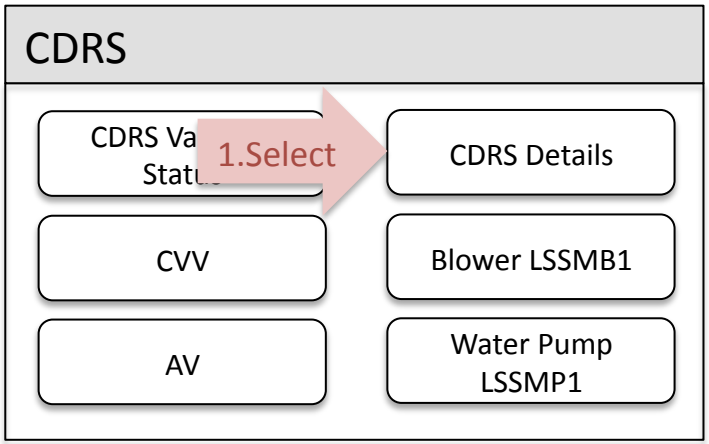
- Step 7 Enable CDRS Cooling Pump
  - cmd Water Pump LSSMP1 RT Status – Enable RT Execute
  - Verify Water Pump LSSMP1 RT Status – Ena

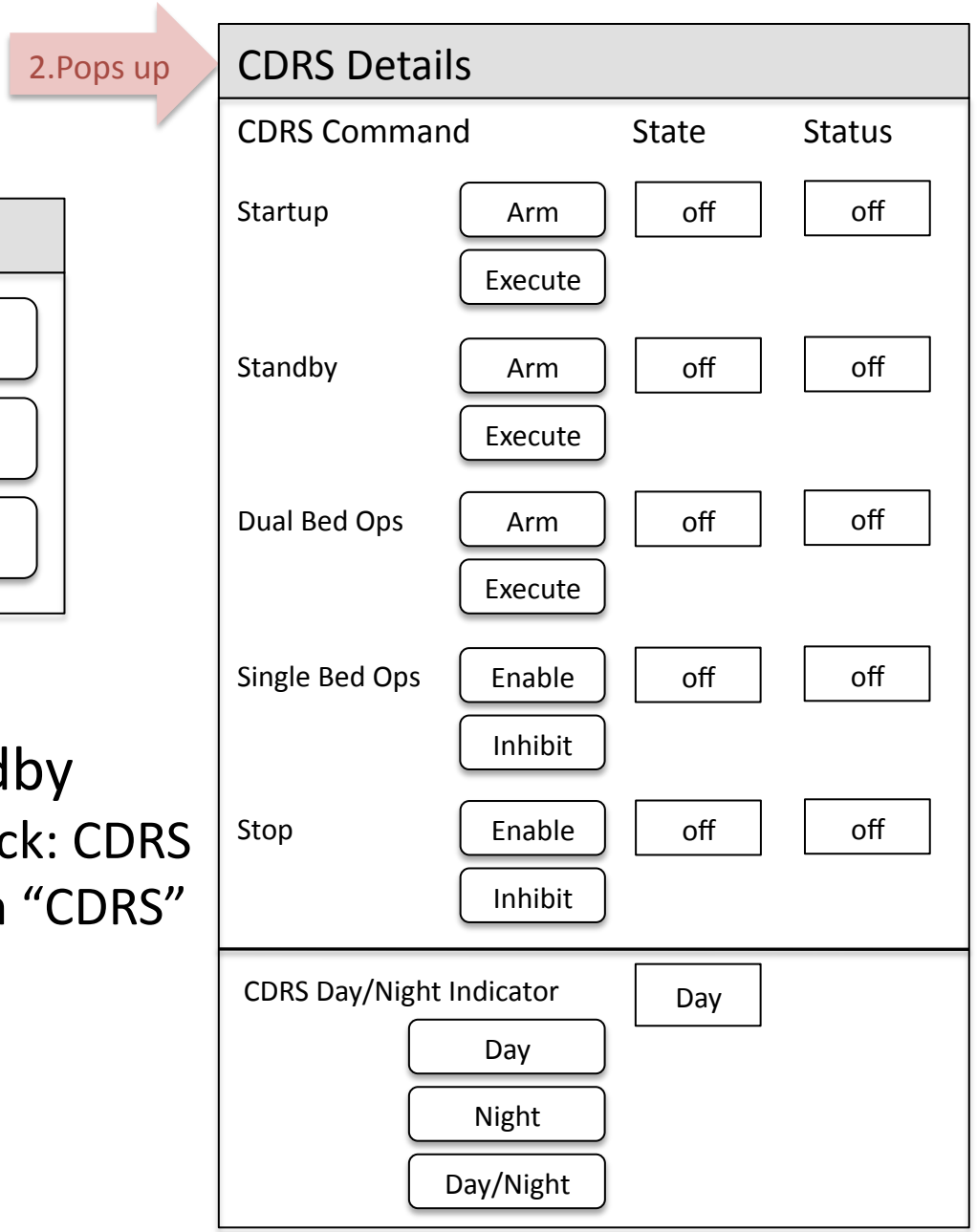


- Step 8 Set CDRS to Standby
  - Navigate to LSSM:AR Rack: CDRS
  - Select “CDRS Details” on “CDRS”
  - Verify CDRS State = off
  - cmd Arm for Startup
  - Verify Status – Armed
  - Cmd Execute Startup

- Step 8 Set CDRS to Standby (cont)
  - Verify Status = Init in Progress
  - Wait until State – Init (1 minute)
  - cmd Arm for Standby
  - Verify Status – Armed
  - cmd Execute Standby
  - Verify CDRS State – Standby in Progress
  - Wait until State - Standby (2 min)

Step 8

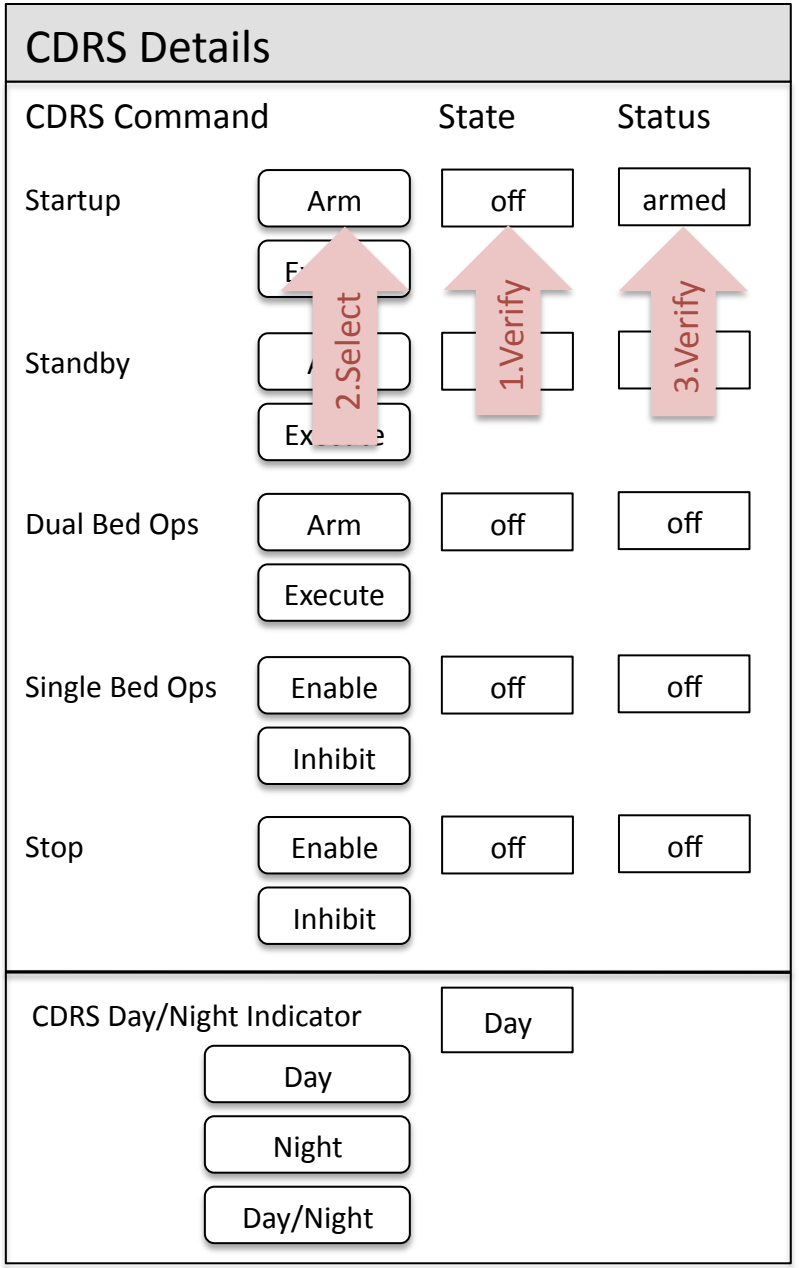




- Step 8 Set CDRS to Standby
  - Navigate to LSSM:AR Rack: CDRS
  - Select “CDRS Details” on “CDRS”

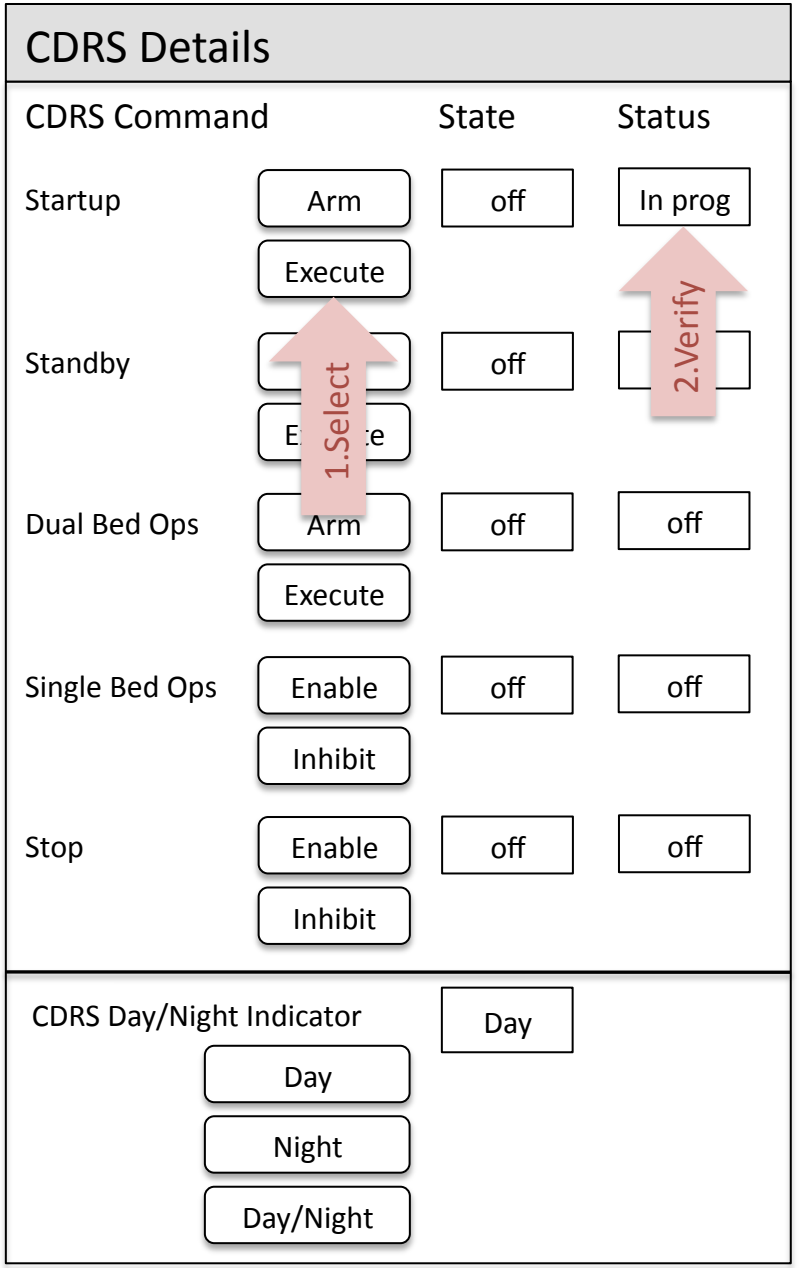
Step 8

- Step 8 Set CDRS to Standby
  - Verify CDRS State = off
  - cmd Arm for Startup
  - Verify Arm Status – Armed



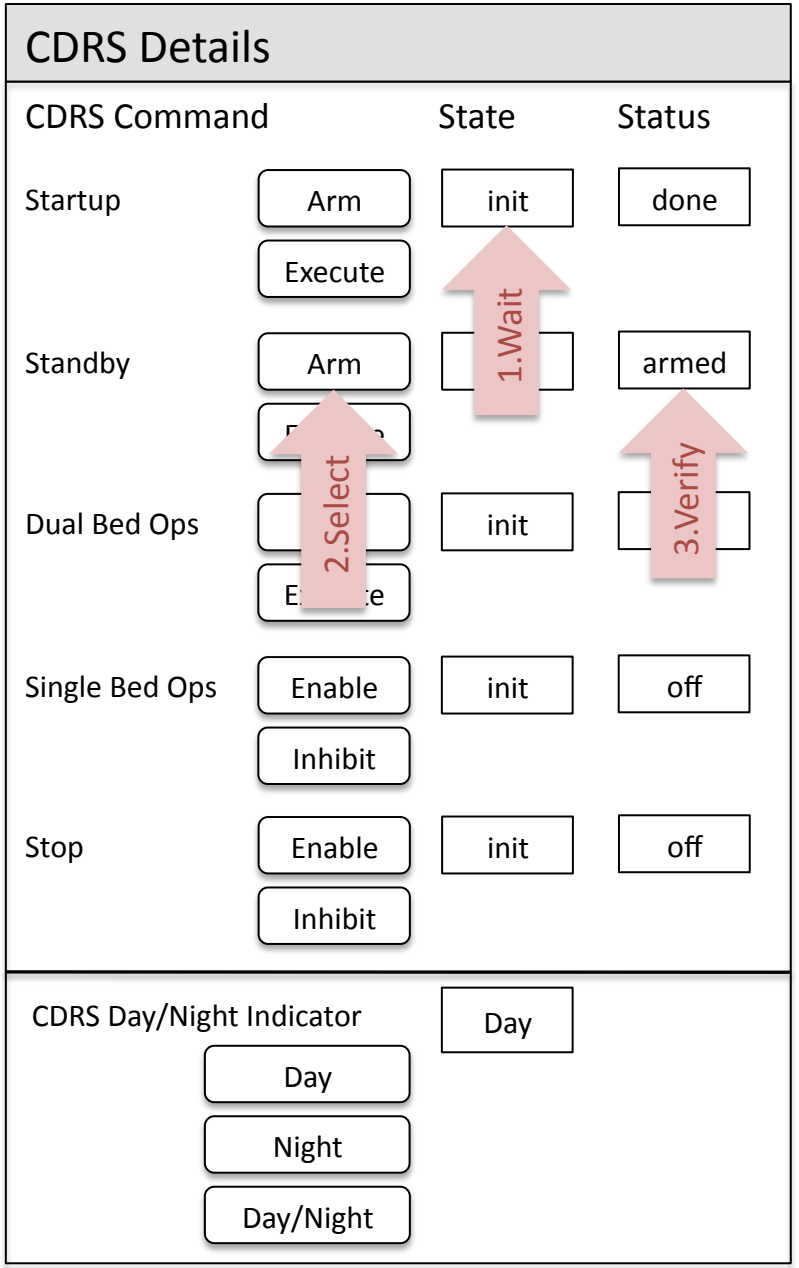
Step 8

- Step 8 Set CDRS to Standby
  - Cmd Execute Startup
  - Verify Status = Startup in Progress



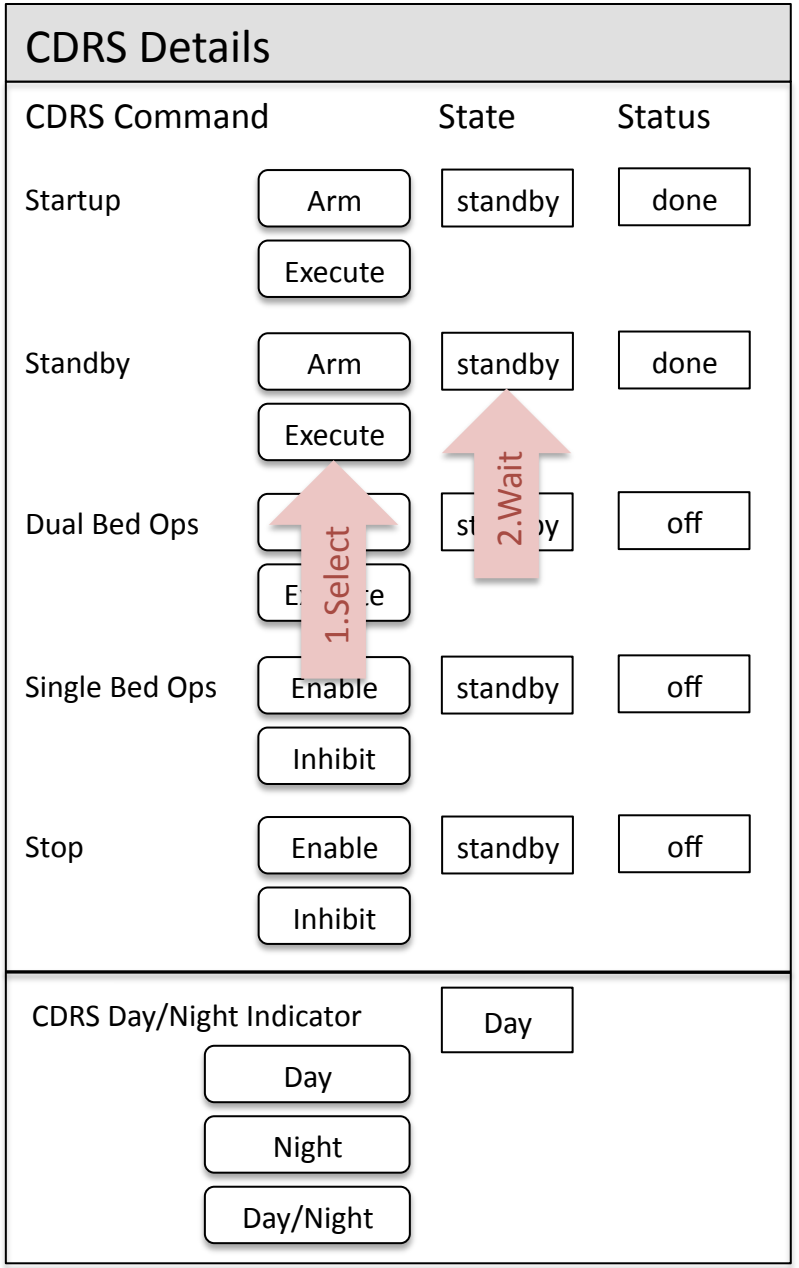
Step 8

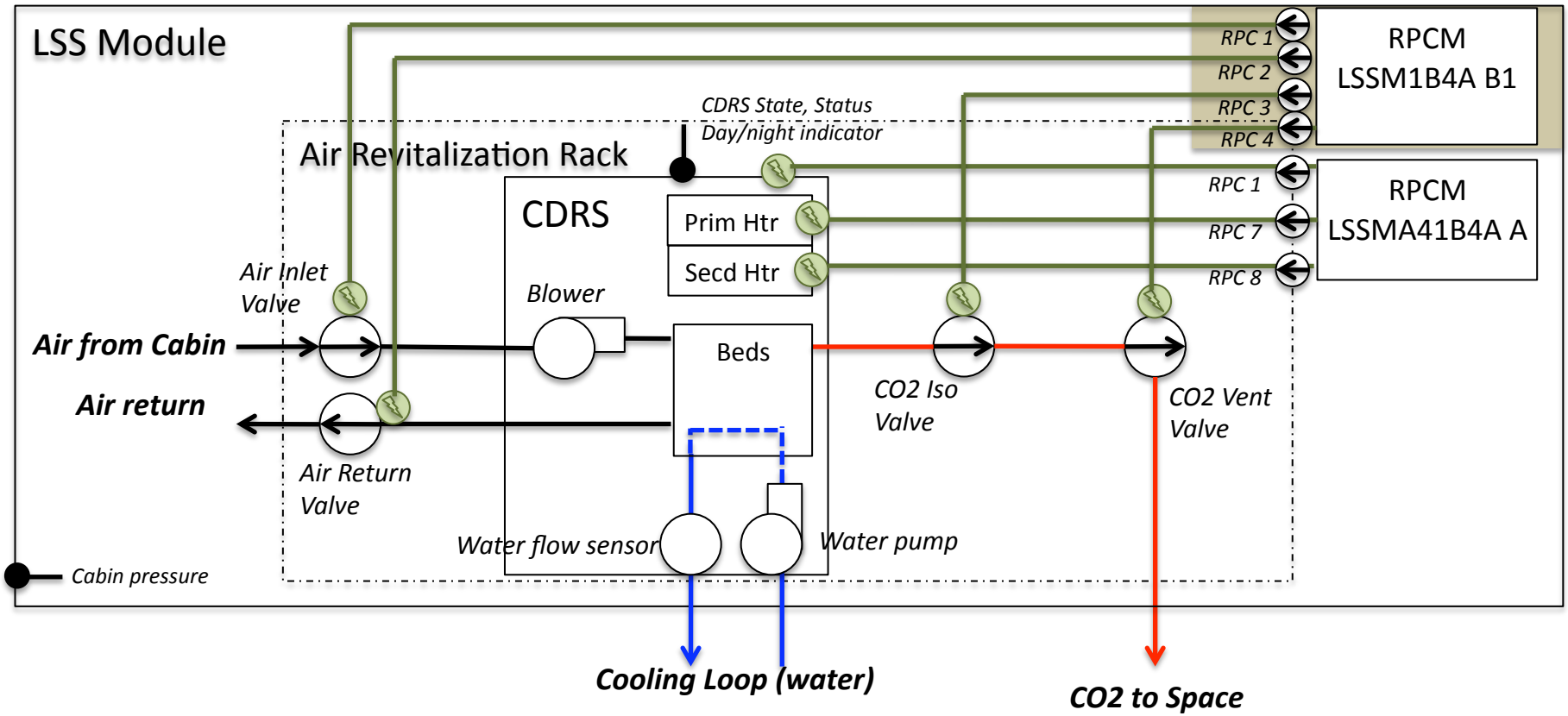
- Step 8 Set CDRS to Standby
  - Wait until State – Init (1 minute)
  - cmd Arm for Standby
  - Verify Arm Status – Armed



Step 8

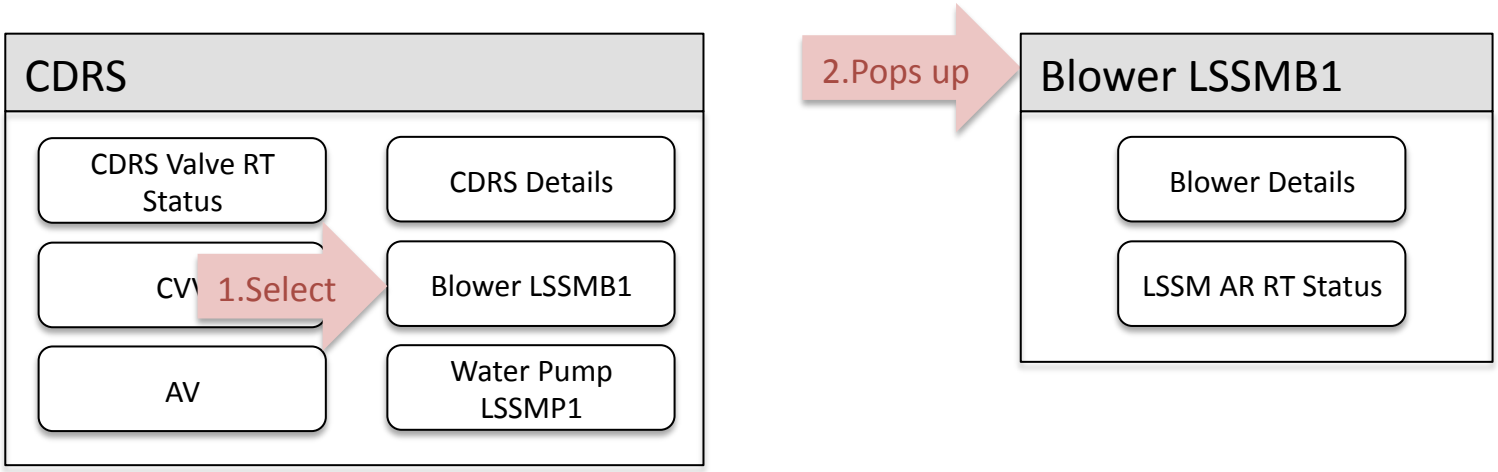
- Step 8 Set CDRS to Standby
  - cmd Execute Standby
  - Verify CDRS State – Standby (takes 2 minutes)





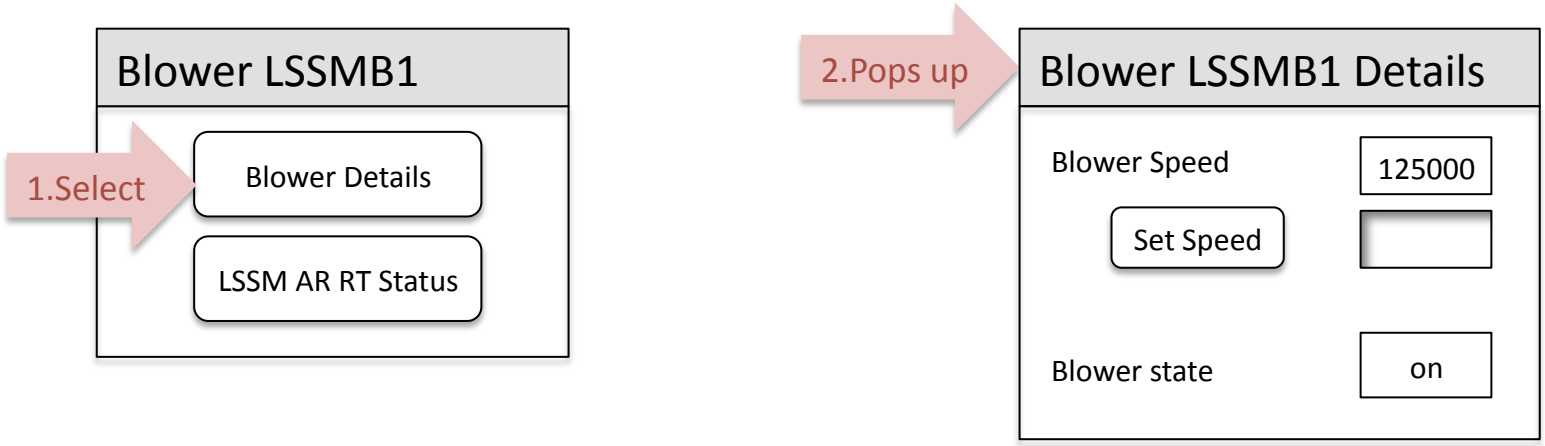
- Step 9 Check CDRS blower state and air speed
  - Navigate to LSSM: AR Rack: CDRS: Blower LSSMB1
  - Select ’Blower Details' button on “Blower LSSMB1”
  - Verify state of Blower LSSMB1 – On
  - Verify speed of Blower LSSMB1 = 125K

Step 9



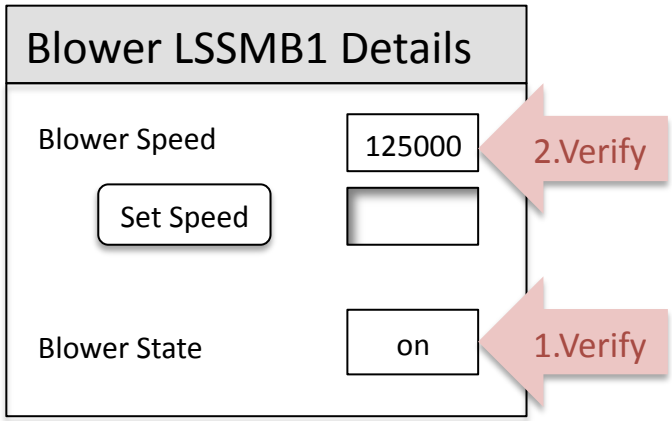
- Step 9 Check CDRS blower state and air speed
  - Navigate to LSSM: AR Rack: CDRS: Blower LSSMB1

Step 9

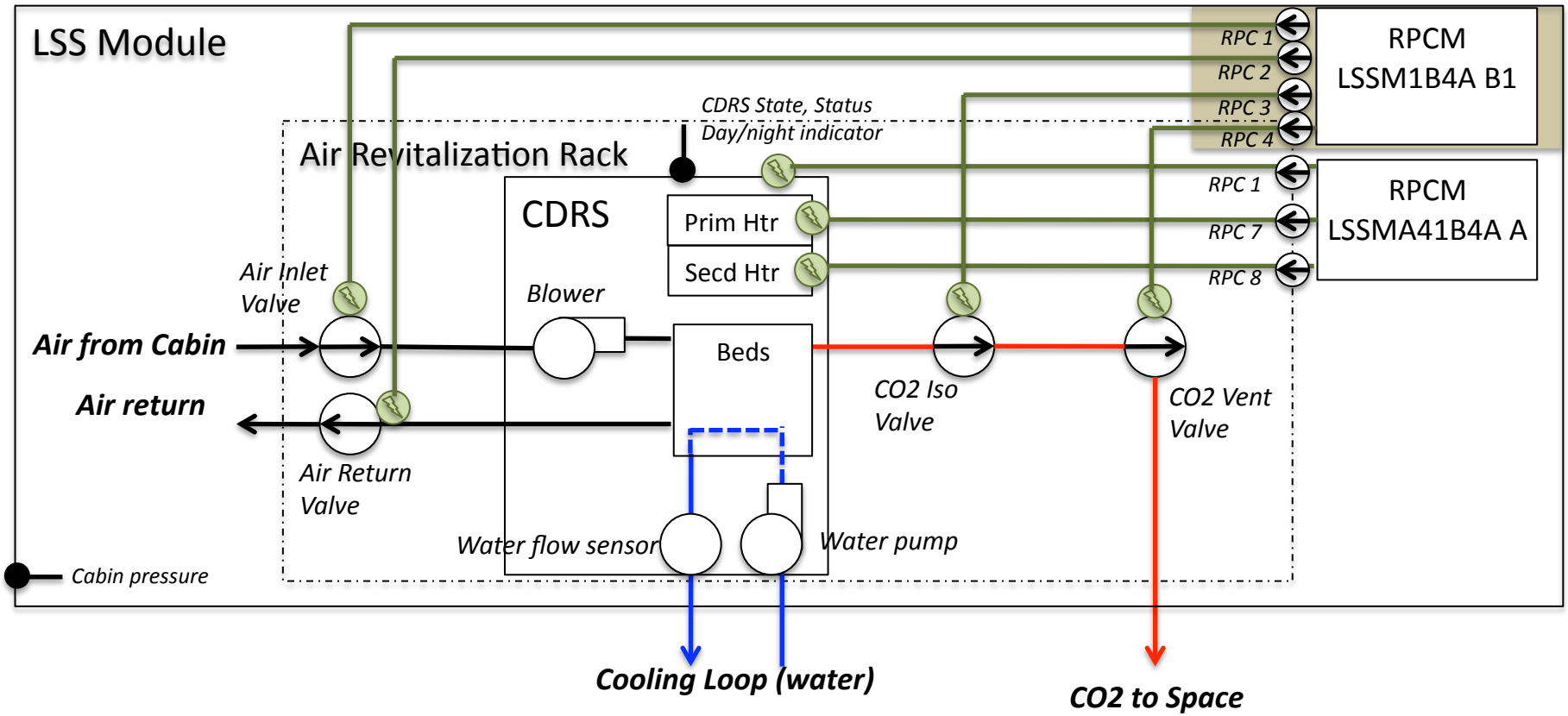


- Step 9 Check CDRS blower state and air speed
  - Select ’Blower Details' button on “Blower LSSMB1”

Step 9

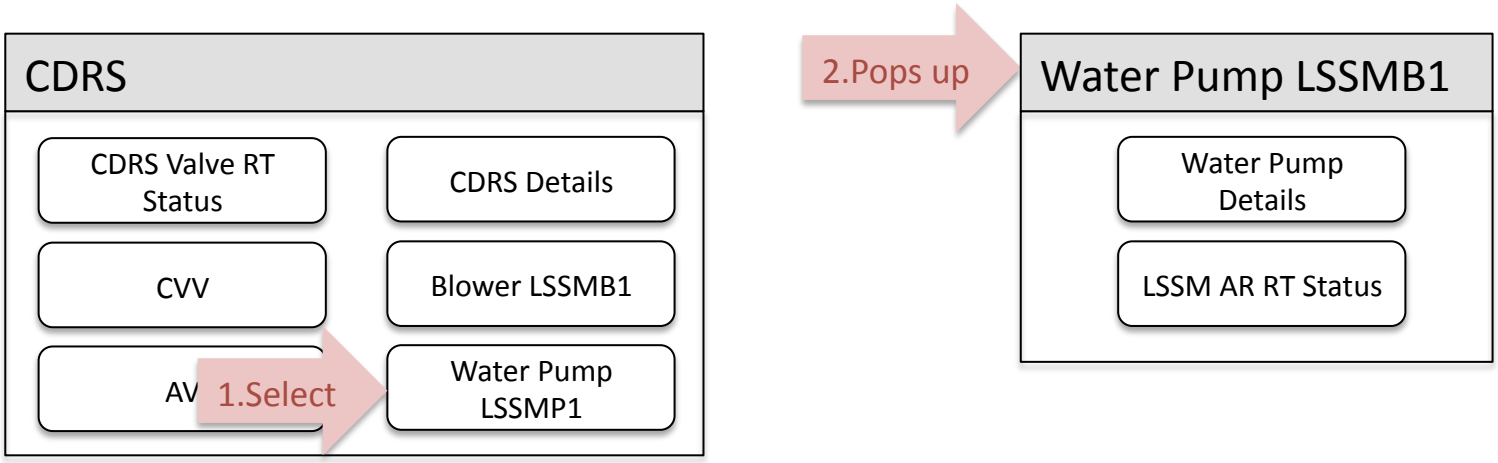


- Step 9 Check CDRS blower status and air speed
  - Verify state of Blower LSSMB1 – on
  - Verify speed of Blower LSSMB1 = 125K



- Step 10 Check CDRS water pump state and flow rate
  - Navigate to LSSM: AR Rack: CDRS: Water Pump LSSMB1
  - Select ’Water Pump Details' button on “Water Pump LSSMB1”
  - Verify state of Water Pump LSSMB1 – On
  - Verify flow rate of water pump LSSMB1 = 125K

Step 10

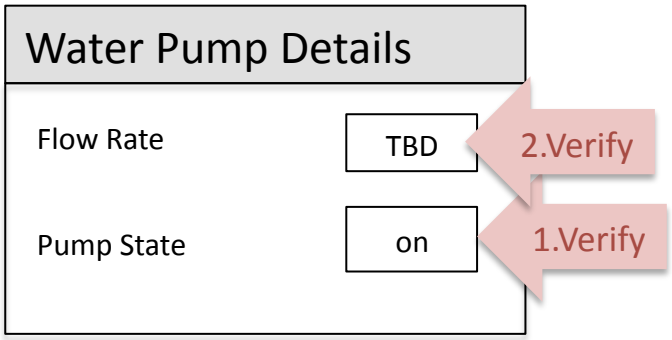


- Step 10 Check CDRS blower state and air speed
  - Navigate to LSSM: AR Rack: CDRS: Water Pump LSSMB1

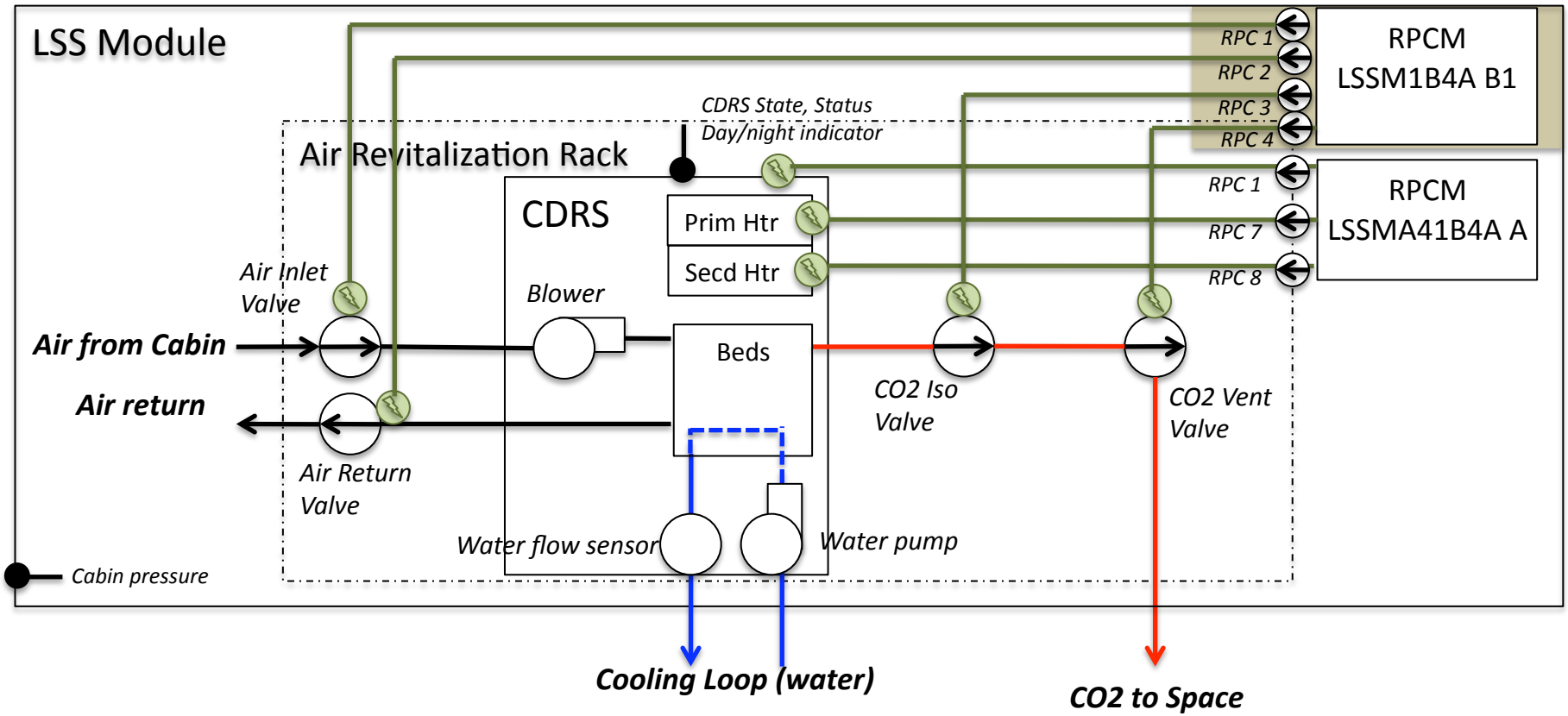
Step 10

- Step 10 Check CDRS water pump state and flow rate
  - Select ’Water Pump Details' button on “Water Pump LSSMB1”

Step 10

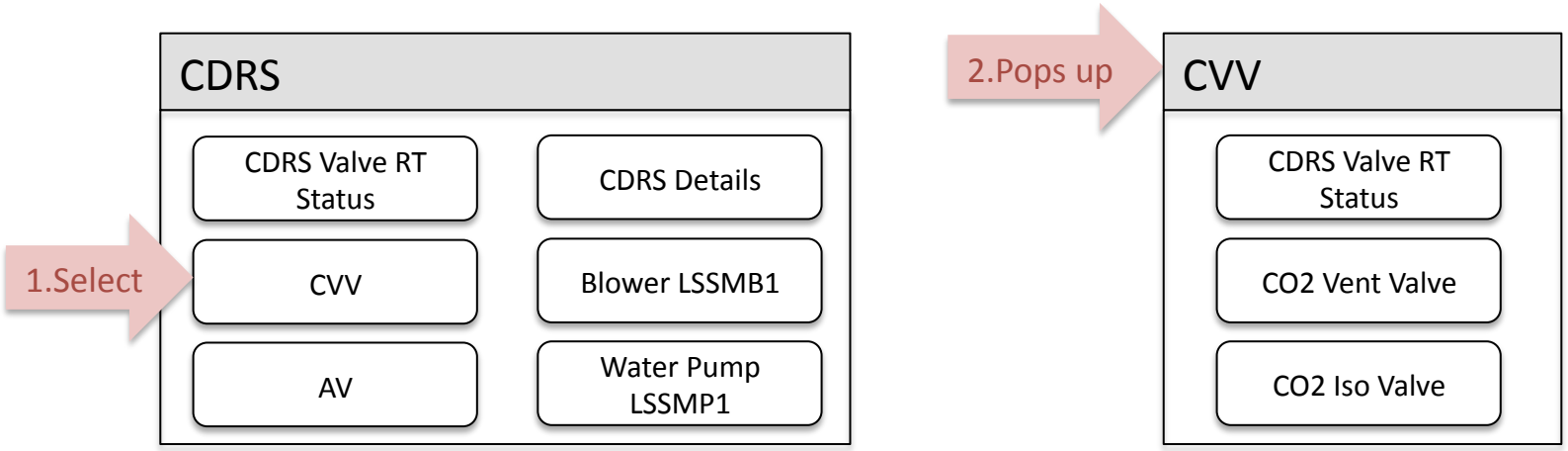


- Step 10 Check CDRS water pump state and flow rate
  - Verify state of Water Pump LSSMB1 – on
  - Verify speed of water flow rate = TBD



- Step 11 Configure vent line for vacuum
  - Navigate to : LSSM: AR Rack: CDRS: CVV
  - Select CO2 Vent Valve on CVV
  - cmd Valve Position Open
  - Verify Position – Open
- Step 10 Configure vent line for vacuum (cont)
  - Select CO2 Iso Valve on CVV
  - cmd Valve Position Open
  - Verify Position – Open

Step 11

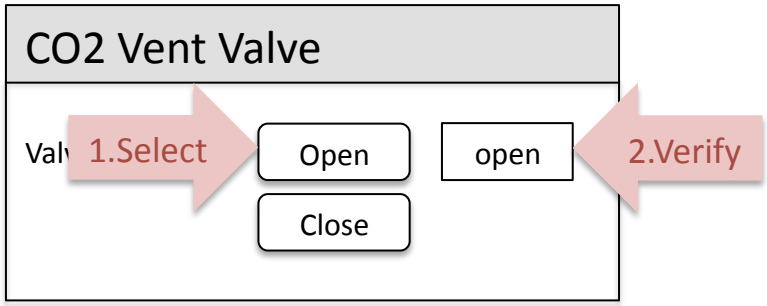


- Step 11 Configure vent line for vacuum
  - Navigate to : LSSM: CDRS: CVV

Step 11

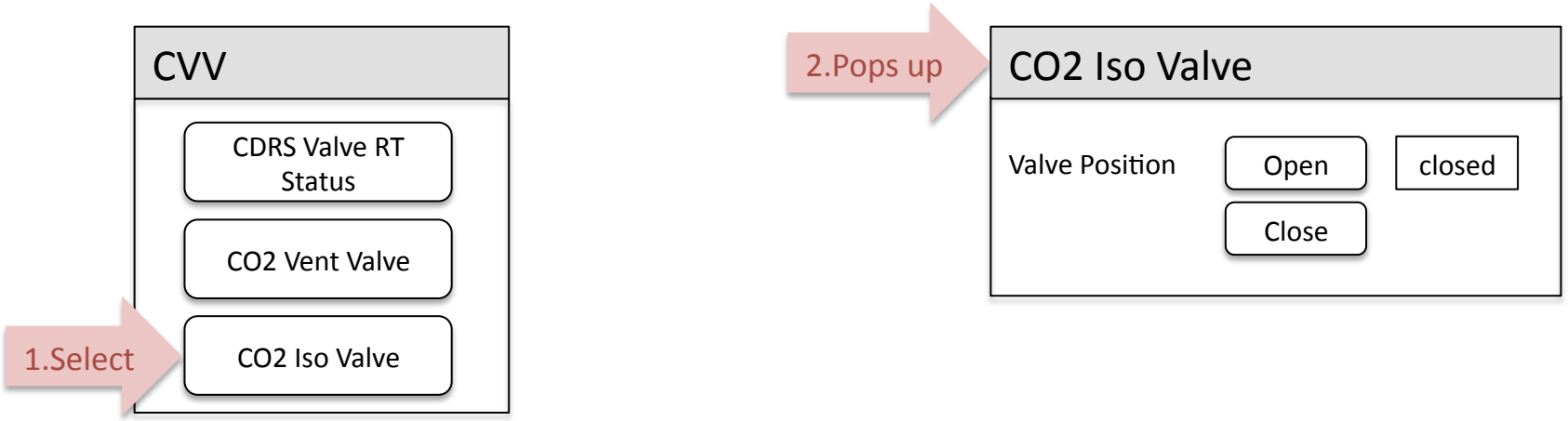
- Step 11 Configure vent line for vacuum
  - Select CO2 Vent Valve on CVV

Step 11



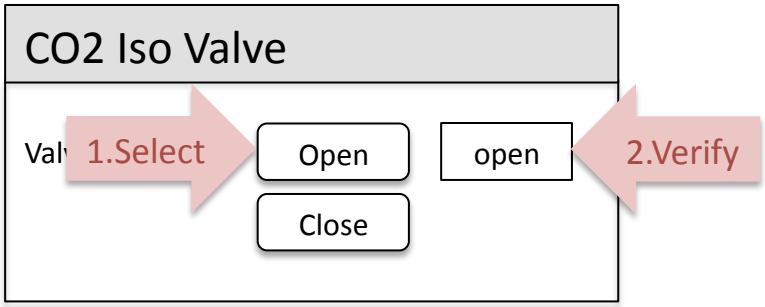
- Step 11 Configure vent line for vacuum
  - cmd Valve Position Open
  - Verify Position – Open

Step 11

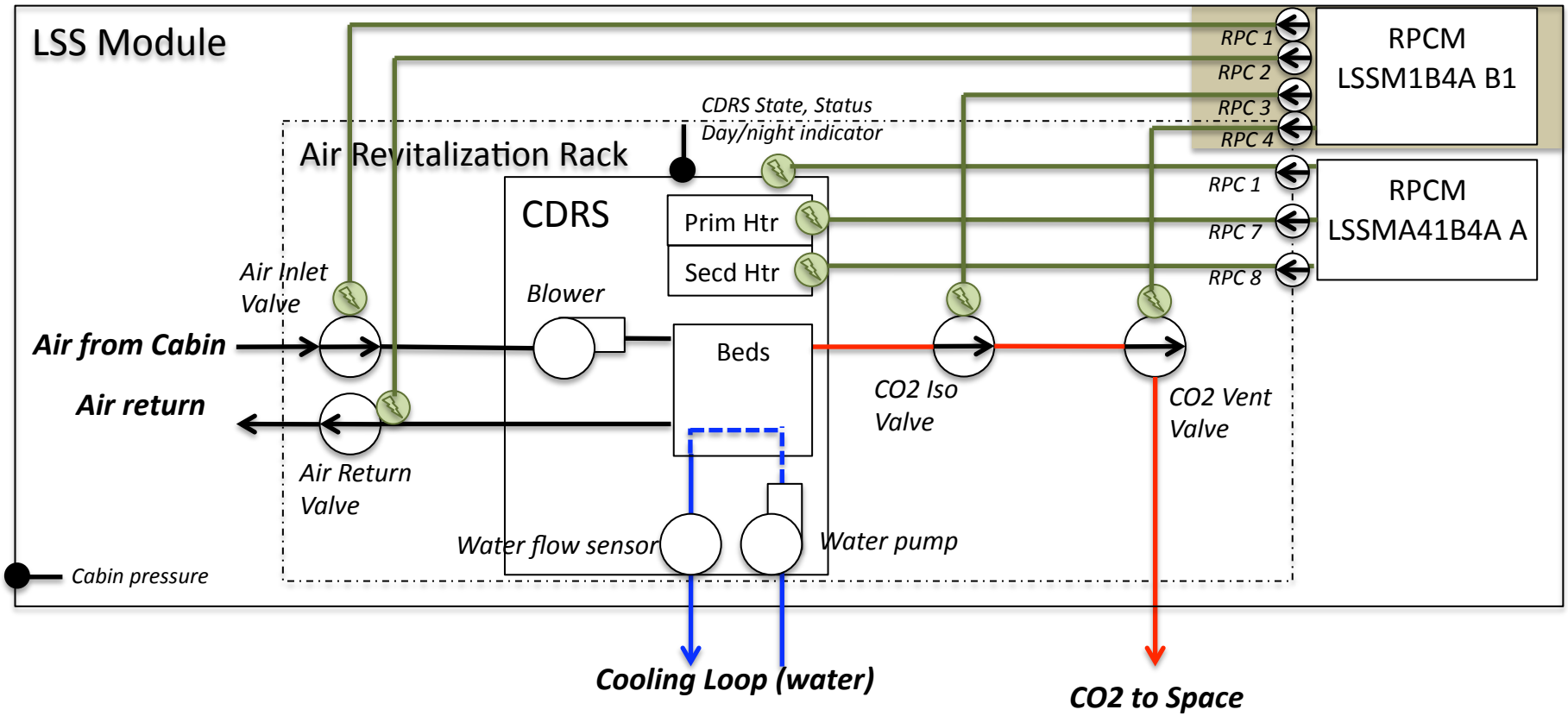


- Step 11 Configure vent line for vacuum
  - Select CO2 Iso Valve on CVV

Step 11

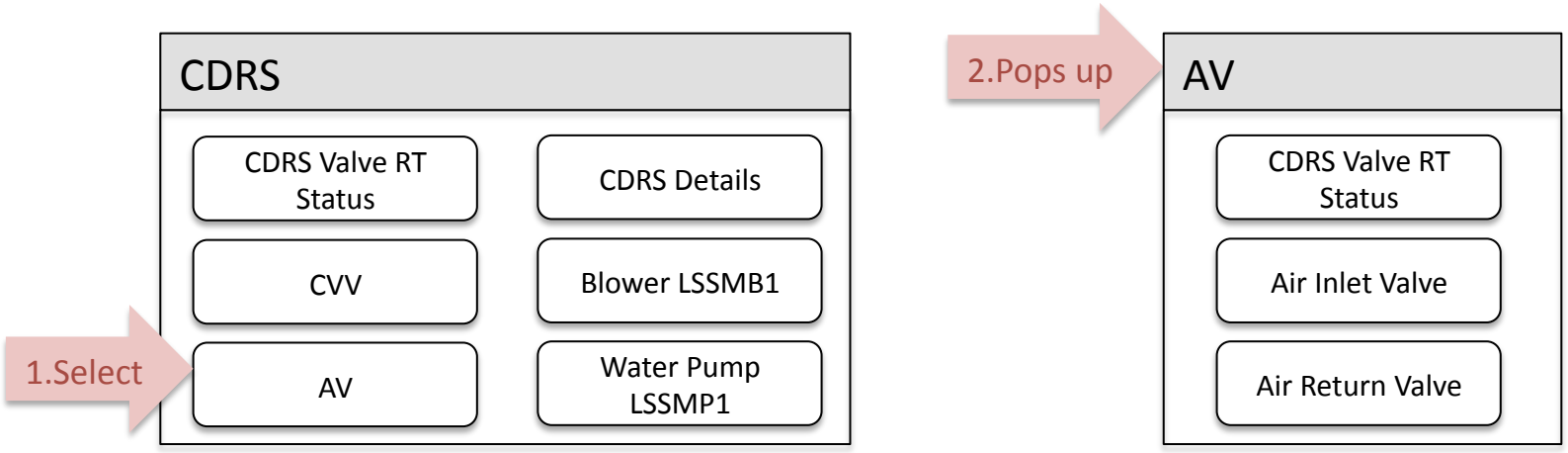


- Step 11 Configure vent line for vacuum
  - cmd Valve Position Open
  - Verify Position – Open



- Step 12 Configure air inlet valve
  - Navigate to LSSM: AR Rack: CDRS: AV
  - Select 'Air Inlet Valve' button on 'AV'
  - cmd Position to Open
  - Verify Position – Open

Step 12

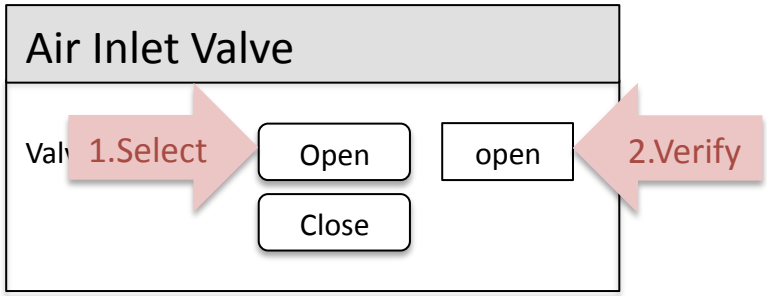


- Step 12 Configure air inlet valve
  - Navigate to LSSM: AR Rack: CDRS: AV

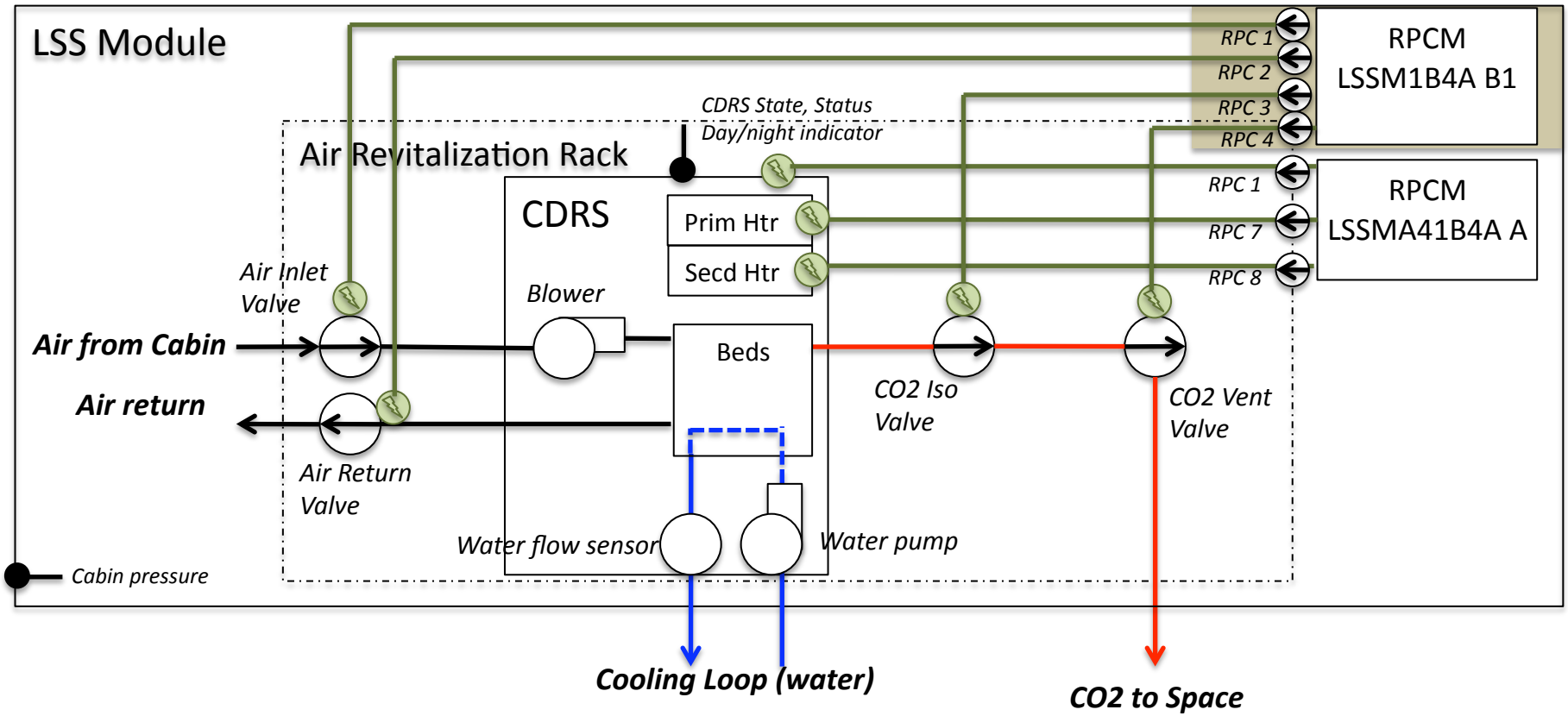
Step 12

- Step 12 Configure air inlet valves
  - Select 'Air Inlet Valve' button on 'AV'

Step 12



- Step 12 Configure air valves
  - cmd Valve Position Open
  - Verify Position – Open

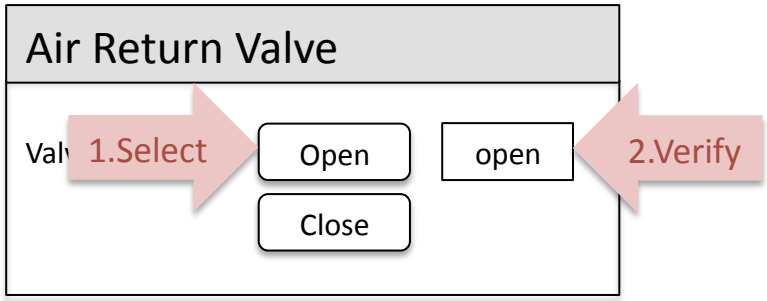


- Step 13 Configure air return valve
  - Navigate to LSSM: AR Rack: CDRS: AV
  - Select ’Air Return Valve’ button on ‘AV'
  - cmd Position to Open
  - Verify Position – Open

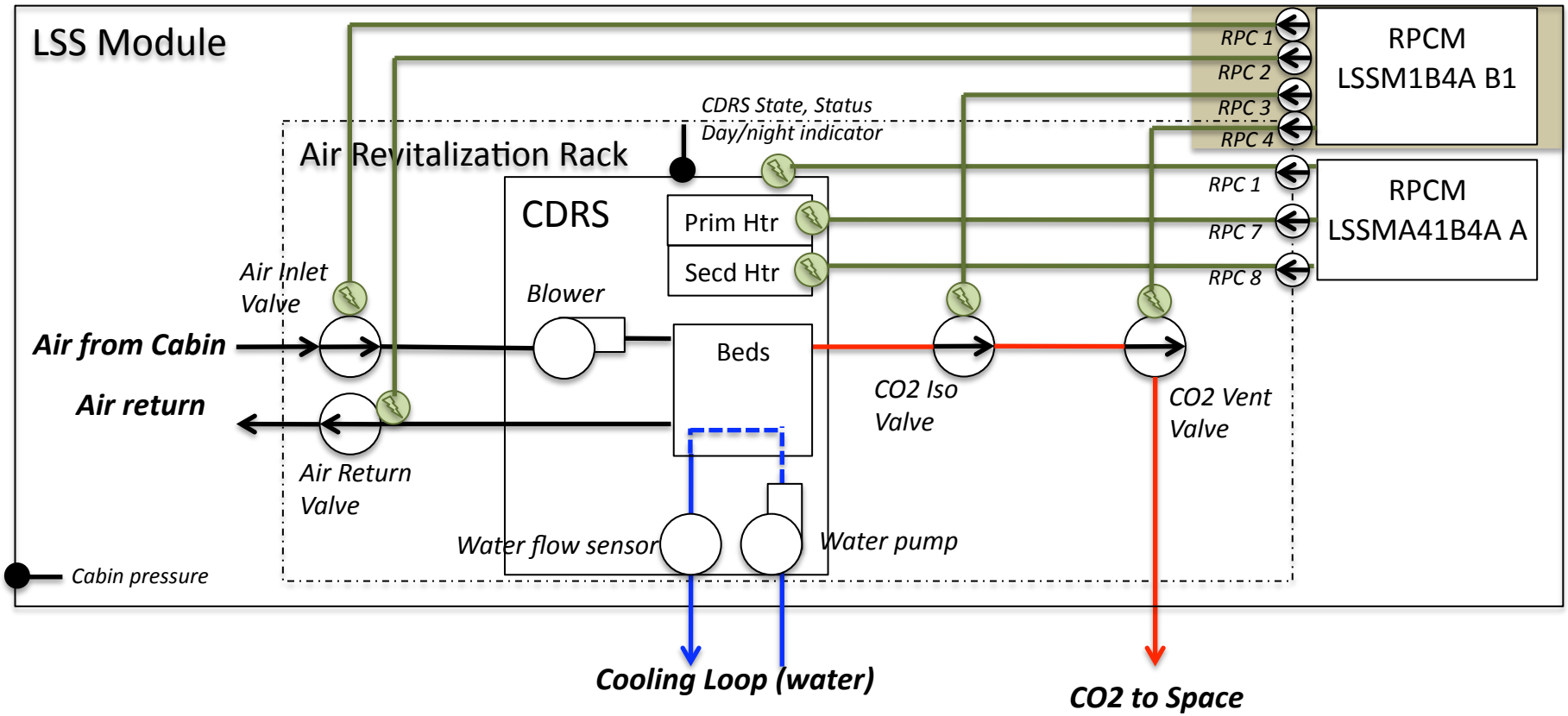
Step 13

- Step 13 Configure air valves
  - Select ’Air Return Valve’ button on ‘AV'

Step 13

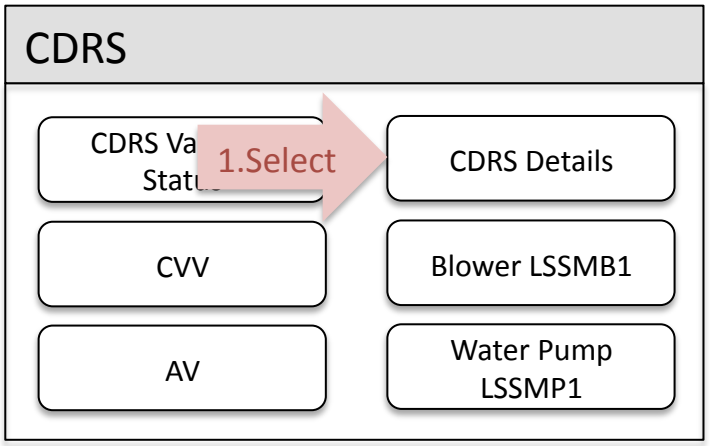


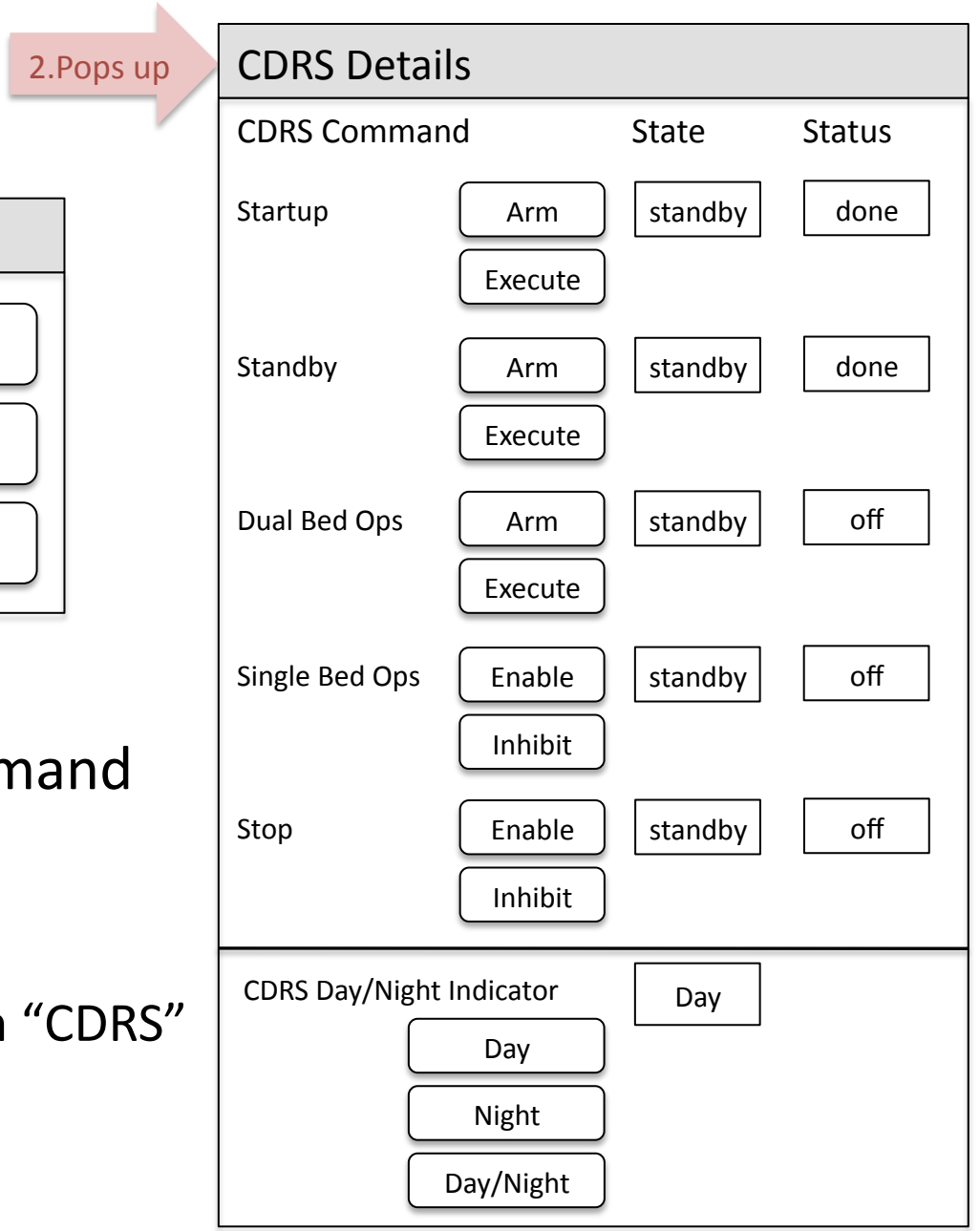
- Step 13 Configure air valves
  - cmd Valve Position Open
  - Verify Position – Open



- Step 14 Send CDRS command to start dual bed ops
  - Navigate to LSSM: AR Rack :CDRS
  - Select “CDRS Details” on “CDRS”
  - Verify CDRS Day/Night Indicator – Day
  - Verify CDRS State - Standby
  - cmd Arm for Dual Bed Ops
  - Verify Status – Armed
  - cmd Execute Dual Bed Ops
  - Verify CDRS State – Dual Bed Ops

Step 14

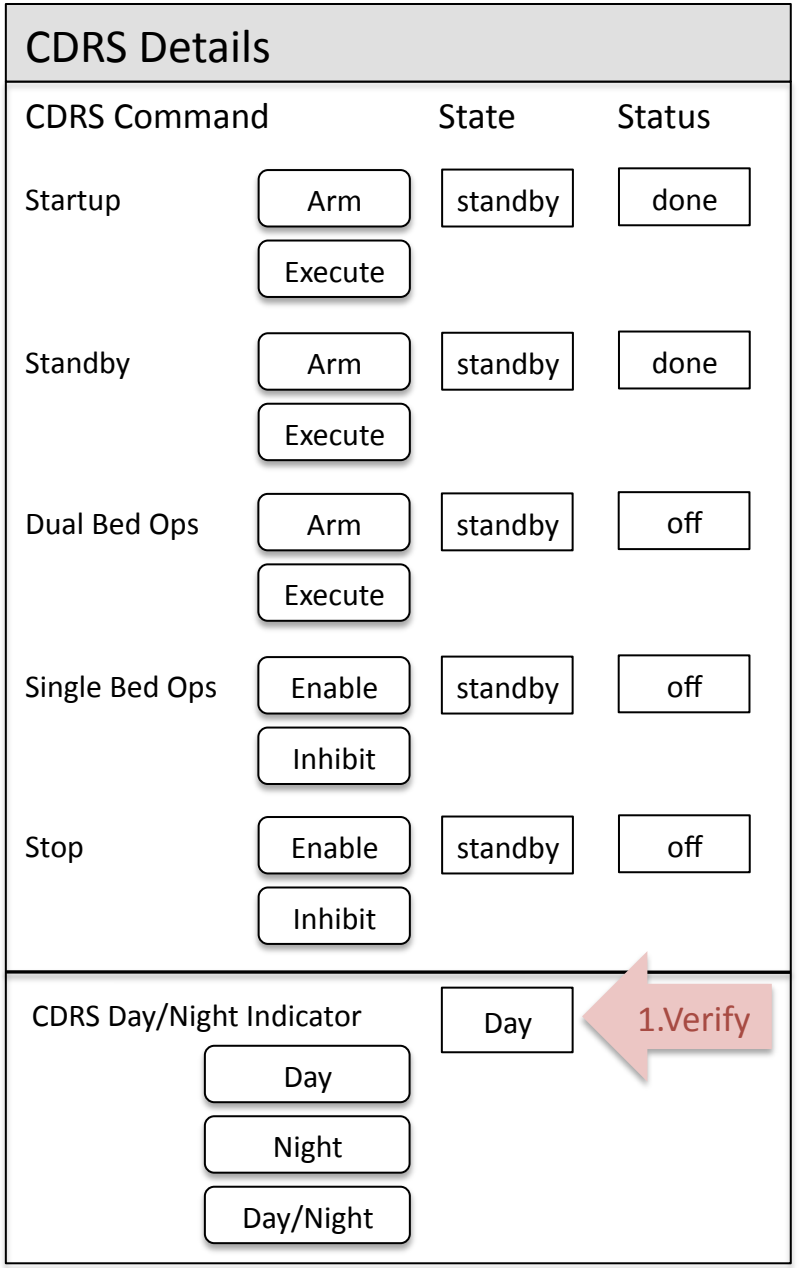




- Step 14 Send CDRS command to start dual bed ops
  - Navigate to LSSM: AR Rack :CDRS
  - Select “CDRS Details” on “CDRS”

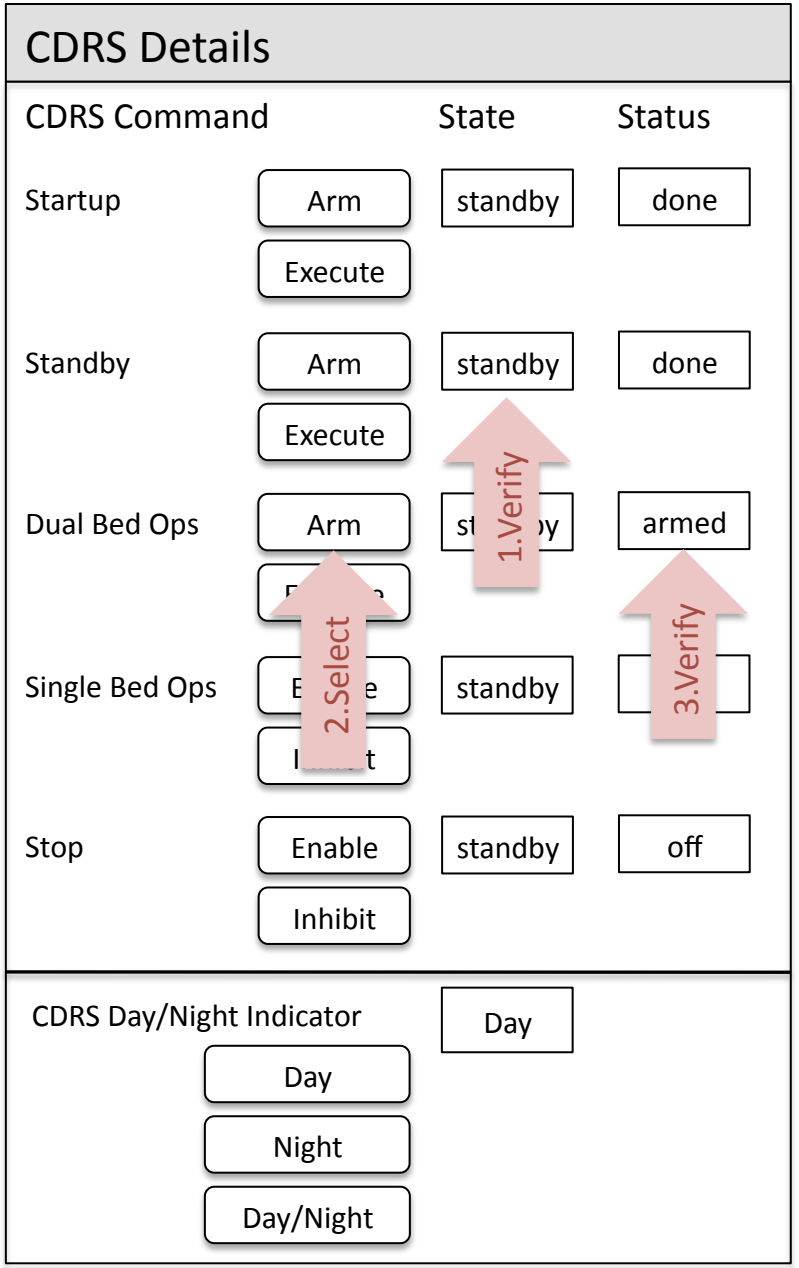
Step 14

- Step 14 Send CDRS command to start dual bed ops
  - Verify CDRS Day/Night Indicator – Day



Step 14

- Step 14 Send CDRS command to start dual bed ops
  - Verify CDRS State - Standby
  - cmd Arm for Dual Bed Ops
  - Verify Arm Status – Armed



Step 14

- Step 14 Send CDRS command to start dual bed ops
  - cmd Execute Dual Bed Ops
  - Verify CDRS State – Dual Bed