

*Reliable Energy.
Smarter Tomorrow.*

Field Installation & Service Manual

INSTALLATION | COMMISSIONING | TROUBLESHOOTING | SERVICE

Complete guide for field engineers on safe installation, commissioning, troubleshooting and customer handover.



Product Platform

Lithium Battery | JK BMS | Daly BMS |
Invergy / Indian Hybrid Inverters



For

Field Engineers & Service Teams



Version

1.0



Release Date

April 2025



SAFE
Installation



RELIABLE
Performance

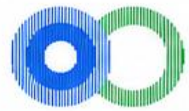


SUSTAINABLE
Energy



SUPPORT
Always





Field Installation & Service Manual

TABLE OF CONTENTS

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1 Pre-Arrival Checklist

- 1.1 Job Information
- 1.2 Customer & Site Information
- 1.3 Existing Solar & Hybrid Inverter Confirmation
- 1.4 Installation Space Readiness
- 1.5 Customer-Provided DC Cable Requirements
- 1.6 Pre-Arrival Readiness & Chronological Field Flow



2 Tools & Safety Checklist

- 2.1 Mandatory PPE
- 2.2 Data & Communication Cables
- 2.3 Tools & Test Equipment
- 2.4 Safety Warnings & Stop-Work Conditions



3 Installation Checklist

- 3.1 Critical Isolation & Electrical Safety Protocol
- 3.2 Mandatory Shutdown & Isolation Sequence
- 3.3 Zero-Voltage Verification
- 3.4 Single-Battery Installation
- 3.5 DC Power Connection
- 3.6 RJ45 BMS Communication
- 3.7 Parallel Multi-Battery Installation
- 3.8 Pre-Parallel Checks
- 3.9 Physical Layout & Thermal Spacing
- 3.10 Parallel DC Power Connection
- 3.11 Parallel BMS Communication
- 3.12 JK / Daly BMS App Configuration



4 Commissioning, Testing & Handover

- 4.1 Final Mechanical & Electrical Checks
- 4.2 Safe Power-Up Sequence
- 4.3 Inverter Screen & BMS Validation
- 4.4 Functional Testing
- 4.5 Final Installation Verification



5 Customer Handover & Sign-Off

- 5.1 Customer Orientation
- 5.2 Operating & Safety Instructions
- 5.3 Warranty, Monitoring & Maintenance Information
- 5.4 Final Sign-Off
- 5.5 Customer Feedback & Closure



6 Installation Quick Troubleshooting

- 6.1 Inverter Does Not Power On
- 6.2 BMS Communication Fault
- 6.3 SOC Not Visible
- 6.4 Missing Battery in Parallel Bank
- 6.5 BMS Alarm
- 6.6 Cable / Terminal Heating
- 6.7 Incorrect SOC
- 6.8 Charge / Discharge Blocked
- 6.9 Grounding / Earthing Safety Checks



7 RJ45 Mapping, Remapping & Crimping

- 7.1 RJ45 Pin Mapping Control
- 7.2 Battery-Side Port Identification
- 7.3 Inverter-Side Port Identification
- 7.4 CAN / RS485 Pin Identification
- 7.5 Cable Continuity Testing
- 7.6 Custom RJ45 Remapping
- 7.7 RJ45 Crimping Procedure
- 7.8 Final Cable Testing & Labelling



8 Staff Training Checklist

- 8.1 Inverter Isolation
- 8.2 Wire Selection
- 8.3 Polarity Check
- 8.4 Battery DC Connection
- 8.5 Grounding
- 8.6 RJ45 Pin Mapping & Crimping
- 8.7 JK / Daly App Protocol Configuration
- 8.8 Inverter Screen Validation
- 8.9 BMS Alarm Triage
- 8.10 Key BMS Parameters
- 8.11 BMS Reset Procedure
- 8.12 Workmanship & Final Safety Inspection



9 Field Service Memo

- 9.1 Site & Equipment Details
- 9.2 Problem Reported by Customer
- 9.3 Safety & Pre-Work Confirmation
- 9.4 Engineer Analysis & Observations
- 9.5 Measurements & Checks Performed
- 9.6 Root Cause Identification
- 9.7 Rectification Action
- 9.8 Key Changes & Settings
- 9.9 Photo Evidence — Before & During Work
- 9.10 Photo Evidence — Fix & Final Handover
- 9.11 Final Testing & Handover Result
- 9.12 Learning Notes
- 9.13 Customer Sign-Off & Closure



10 Battery & Inverter Troubleshooting Manual

- 10.1 First 10 Checks at Site
- 10.2 BMS Communication Fault Flowchart
- 10.3 Hybrid Inverter Alarm Guide
- 10.4 Common Inverter Warning / Fault Codes
- 10.5 Daly BMS Alarm & LED Troubleshooting
- 10.6 Daly RJ45 Pinout
- 10.7 JK BMS Alarm Troubleshooting
- 10.8 JK CAN / RS485 Pinout & DIP Addressing
- 10.9 RJ45 / Protocol Matching
- 10.10 Error 61 Communication Checklist
- 10.11 Reset Rules — What to Do & What Not to Do
- 10.12 Final Field Closure Checklist



Field Staff Installation & Safety Checklist

Flowatt lithium-ion battery installations

WARNING - QUALIFIED PERSONNEL ONLY

Battery installation, inverter isolation, RJ45 remapping, BMS app configuration, and commissioning must be done only by trained and authorized personnel. A failed safety check is a stop-work condition.

Job Information

Field	Details
Project / Site Name	
Customer Contact	
Installation Date	
Flowatt Engineer	
Battery Model / Quantity	
Inverter Make / Model	
Communication Protocol	CAN / RS485 / Other:

How to Use This Checklist

Complete the phases in order. Do not move to the next phase until the current phase is complete and safe. Record deviations, alarms, missing material, or customer instructions in the notes column.

Chronological Field Flow

Phase	Field action	Required output
1	Pre-arrival site assessment and customer readiness	Inverter identified; site ready; cable material confirmed
2	Engineer PPE, tools, RJ45 cables, and test equipment	PPE/tools complete; meter and torque wrench ready
3	Critical isolation and zero-voltage verification	AC, PV, battery isolated; meter confirms safe condition
4A	Single battery mechanical, DC, and RJ45 installation	Battery secure; DC polarity correct; BMS communication connected
4B	Parallel multi-battery installation	Balanced DC links; Master/Slave BMS synchronization done
5	Commissioning, inverter validation, and handover	Inverter reads BMS; no alarms; customer sign-off complete

WARNING - NO SHORTCUT RULE

No customer pressure, time pressure, or production requirement overrides isolation, PPE, zero-voltage verification, correct polarity, correct cable sizing, correct BMS protocol, and safe commissioning.

Phase 1 - Pre-Arrival Site Assessment & Customer Checklist

Complete this by phone or email before dispatch. Ask the customer to send clear photos and written confirmations.

1A. Customer and Site Information

Check	Action required	Initial / Notes
☐	Customer name, site address, site contact, phone number, and access timing received.	
☐	Photos received: inverter label, battery terminals, communication ports, cable route, installation area, and existing batteries if any.	
☐	Shutdown window approved by customer; sensitive loads identified.	
☐	Emergency contact and site access restrictions confirmed.	
☐	Single-line diagram, wiring sketch, or installation photos attached to the job file.	
☐	Confirm customer and channel partner of your arrival date & time	

1B. Existing Solar and Hybrid Inverter Confirmation

Check	Action required	Initial / Notes
☐	Hybrid inverter and Battery make/model confirmed.	
☐	Hybrid inverter Manual Received.	
☐	Inverter battery voltage range checked against Flowatt battery system.	
☐	The inverter supports lithium-ion battery BMS communication.	
☐	From Hybrid Inverter Manual battery communication wire pin mapped	
☐	Battery BMS confirmed from Flowatt Supply Team, BMS Manual Received.	
☐	BMS app installed, Password for log in and changing any setting received from Technical Team	

1C. Installation Space Readiness

Check	Action required	Initial / Notes
☐	Area is clean, dry, and free from water seepage or condensation.	
☐	Area is well ventilated and not exposed to direct sunlight or excessive heat.	
☐	No flammable liquids, gas cylinders, fuel, solvents, paper storage, or combustible waste nearby.	
☐	The floor, wall, rack, or cabinet can support battery weight.	

Check	Action required	Initial / Notes
[]	Service clearance and emergency access are available.	
[]	The cable route from battery to inverter is safe and mechanically protected.	

Customer cable instruction

Single battery: customer provides 1 x Red and 1 x Black flexible copper DC cable, typically 35 Square mm

Parallel battery installation: if more than one battery is installed, customers must provide extra identical 35 Square mm Red and Black cable pairs for battery-to-battery or busbar parallel links.

Final cable size must be validated against inverter current, distance, voltage drop, insulation rating, temperature, protection device, and local code.

1D. Customer-Provided DC Cable Requirement - Communicate & Confirm with Customer before reaching site

Check	Action required	Initial / Notes
[]	1 x Red 35 Square mm flexible copper cable confirmed for single battery positive connection.	
[]	1 x Black 35 Square flexible copper cable confirmed for single battery negative connection.	
[]	Extra Red and Black 35 Square mm cable pairs confirmed for parallel installation if more than one battery is installed.	
[]	Cable length confirmed and suitable for clean routing without strain.	

Phase 2 - Mandatory Engineer PPE & Tools Checklist

The Flowatt Engineer Must Carry Personal Protective Equipments

2A. PPE Checklist

Check	Action required	Initial / Notes
☐	Insulated gloves rated for the applicable DC voltage.	
☐	Safety shoes suitable for electrical work.	
☐	Protective eyewear or face shield.	
☐	Arc-flash/fire-resistant clothing.	
☐	Hard hat if required by site rules.	
☐	Cut-resistant gloves for cable tray, enclosure, and metal edge handling.	
☐	No jewelry, watches, rings, loose chains, or conductive accessories worn during work.	

2B. Data and Communication Cables

Check	Action required	Initial / Notes
☐	Single battery: 1 x RJ45 cable available for battery-to-inverter BMS communication.	
☐	Parallel bank: extra RJ45 battery-to-battery cables available for BMS synchronization.	
☐	Custom RJ45 remap cable materials available if site requires CAN/RS485 pin remapping.	
☐	RJ45 cable tester or continuity meter available for pin-to-pin verification.	

2C. Tools and Test Equipment

Check	Action required	Initial / Notes
[]	Digital multimeter rated for the maximum DC system voltage; probes undamaged.	
[]	Insulated torque wrench with valid calibration.	
[]	Insulated sockets and screwdrivers.	
[]	Wire strippers and cable cutters suitable for 35 Square mm flexible copper cable.	
[]	Hydraulic crimping tool and correct die set for 35 Square mm lugs.	
[]	Approved DC lugs, heat-shrink, Sealant Gun, and labels.	
[]	Laptop or phone app access for JK/Daly/Flowatt BMS setup if required.	
[]	Inverter manual, Flowatt battery manual, and approved communication pinout available offline.	

WARNING - PPE AND TOOLKIT IS MUST BEFORE STARTING FOR THE SITE

Insulated gloves and arc-rated clothing reduce risk but do not replace isolation. Establish a safe electrical condition before touching terminals.

Phase 3 - Critical Isolation & Electrical Safety Protocol

WARNING - MULTIPLE ENERGY SOURCES

Hybrid inverter systems may be energized from AC grid, PV strings, existing batteries, generator input, backup/load terminals, and internal capacitors. Identify and isolate every source.

3A. Mandatory Shutdown and Isolation Sequence

Check	Action required	Initial / Notes
☐	Resident or customer informed that shutdown is starting.	
☐	Turn off All loads	
☐	AC grid mains feeding the inverter turned OFF.	
☐	PV/Solar DC isolators turned OFF.	
☐	Turn off any generator or other battery.	

3B. Zero-Voltage Verification

Check	Action required	Initial / Notes
☐	Multimeter tested on known source before measurement.	
☐	Voltage measured between inverter battery positive and battery negative.	
☐	Multimeter tested again on known source after measurement.	

Phase 4A - Single Battery Installation Checklist

Use this section when one Flowatt battery is connected to one hybrid inverter battery input.

Flowatt Battery Science - Use with approved product datasheet, inverter manual, and site electrical code

4A1 DC Power Connection

Check	Action required	Initial / Notes
☐	Battery switch/breaker confirmed OFF.	
☐	Red 35 Square mm cable connected to battery positive terminal.	
☐	Black 35 Square mm cable connected to battery negative terminal.	
☐	Battery terminals torqued to Flowatt specified values.	
☐	Cables routed safely without strain, sharp bends, or abrasion.	
☐	Red cable connected to inverter battery positive terminal.	
☐	Black cable connected to inverter battery negative terminal.	
☐	Inverter terminals torqued to inverter manufacturer values.	
☐	Terminal covers or insulation boots installed.	
☐	Polarity verified at inverter battery input before energization.	

4A2 RJ45 BMS Communication

Check	Action required	Initial / Notes
☐	Correct inverter communication port identified: CAN / RS485.	
☐	Correct Flowatt BMS port identified.	
☐	1 x RJ45 cable connected from Flowatt battery BMS port to inverter BMS port.	
☐	RJ45 latch seated fully on both ends.	

Check	Action required	Initial / Notes
☐	Communication cable routed away from high-current DC cable where practical.	
☐	Inverter battery protocol selected as approved Flowatt-compatible mode.	

Phase 4B - Parallel Multi-Battery Installation Checklist

Use this section when two or more Flowatt batteries are connected in parallel. Parallel systems require balanced current paths and synchronized BMS communication.

4B1 Pre-Parallel Checks

Check	Action required	Initial / Notes
[]	All batteries are the same approved Flowatt model and voltage class.	
[]	Extra identical Red and Black Square 35 mm cable pairs are available.	
[]	Parallel topology approved: busbar / daisy-chain / Flowatt harness.	
[]	Master/Slave addressing method confirmed before energization.	

4B2 Physical Layout and Thermal Spacing

Check	Action required	Initial / Notes
[]	Batteries aligned for service access and cable symmetry.	
[]	Airflow path and thermal clearance maintained around every battery.	
[]	Battery numbers marked physically using dip switch 01, 02	
[]	All units are mechanically secured against tipping or movement.	

4B3 Parallel DC Power Connection

Check	Action required	Initial / Notes
☐	Positive-to-positive and negative-to-negative linking verified before tightening.	
☐	For busbar method: each battery positive connected to positive busbar and each negative to negative busbar.	
☐	For daisy-chain method: battery-to-battery Red positive links and Black negative links connected exactly as approved.	
☐	Master bank positive connected to inverter positive.	
☐	Master bank negative connected to inverter negative.	

4B4 Parallel BMS Communication

Check	Action required	Initial / Notes
☐	Master battery identified assigned DIP ID =0	
☐	Slave batteries assigned unique addresses or DIP switch positions as required.	
☐	RJ45 battery-to-battery cables connected in approved BMS sync order.	
☐	Master battery RJ45 communication cable connected to inverter CAN/RS485 port.	

WARNING - DO NOT GUESS DIP SWITCH SETTINGS

Incorrect Master/Slave setting can block BMS synchronization or make the inverter read the wrong battery capacity. Use the exact Flowatt model and firmware addressing table.

JK / Daly BMS App Configuration Checklist

Use this checklist for app-based communication protocol setup, parameter verification, and safe reset decision-making. Do not change values outside Flowatt-approved limits.

A. Communication Protocol Setup

Check	Action required	Initial / Notes
[]	Open the correct BMS app and confirm the connection to the intended battery serial number.	
[]	Connect battery using Blue, use password for different BMS, Don't share password to anyone	
[]	Open communication or inverter protocol setting page.	
[]	Select approved protocol required by inverter: Pylontech / Voltronic Power / Deye / CAN / RS485 / other approved mode.	
[]	Confirm UART, CAN, or RS485 selection matches physical wiring.	
[]	Go to the inverter screen, push the enter button for a minute, change [00] to [05] then enter. Scroll last button and set it up to LIB/LIC/LIA based on recommendation from Tech Team or inverter supplier. Press enter and OK.	
[]	After setting change, verify the inverter reads BMS data on screen.	

Phase 5 - Commissioning, Testing and Handover Checklist

Commissioning confirms that the installation is mechanically secure, electrically correct, communicating correctly, and safe for customer operation.

5A. Final Mechanical and Electrical Checks

Check	Action required	Initial / Notes
☐	All battery and inverter covers installed before energization where required.	
☐	All tools, loose screws, cable pieces, and packaging removed from work area.	
☐	All terminals torqued using insulated torque wrench (4.5 NM)	
☐	Terminal covers and insulation boots installed.	
☐	Cable strain relief and mechanical protection complete.	
☐	Polarity verified at battery, busbar, and inverter battery input.	
☐	Grounding/earthing conductor connected to battery cabinet/rack/inverter chassis as per approved design.	
☐	DC negative not bonded to earth unless inverter/manual/site design specifically requires it.	

5B. Safe Power-Up Sequence

Check	Action required	Initial / Notes
☐	Battery BMS powered ON first.	
☐	For parallel systems, Master and Slaves powered in approved sequence.	
☐	Battery LEDs/display/app show normal status and no active alarm.	
☐	Inverter powered ON after the battery BMS is ready.	
☐	Inverter detects battery voltage.	
☐	PV/Solar DC isolators turned ON after the battery and inverter are stable.	
☐	AC grid mains turned ON after battery, inverter, and PV checks are complete.	
☐	No reverse polarity, BMS communication, grid, PV, or battery alarm active.	

5C. Inverter Screen BMS Validation

Check	Action required	Initial / Notes
☐	Inverter battery type set to approved lithium/BMS mode.	
☐	BMS communication status shows normal/connected.	
☐	Battery SOC visible on inverter screen.	
☐	Battery voltage visible and reasonable.	
☐	Battery current visible during charge/discharge test.	
☐	Battery temperature visible if supported.	

Check	Action required	Initial / Notes
☐	Charge current limit and discharge current limit visible if supported.	
☐	Parallel battery quantity or total capacity visible if supported.	
☐	No BMS communication alarm remains active.	

5D. Functional Test

Check	Action required	Initial / Notes
☐	Controlled charge test completed from PV or grid where allowed.	
☐	Controlled discharge test completed using suitable site load.	
☐	BMS permits charge and discharge without protection.	
☐	No abnormal heat at cable lugs, terminals, breakers, or busbars.	
☐	No abnormal sound, smell, smoke, display fault, or alarm.	
☐	Monitoring app/portal configured if part of scope.	
☐	Final installation photos taken.	

Customer Handover and Sign-Off

Give the customer a brief operating orientation. Do not leave the site until the customer knows what is normal, what is unsafe, and whom to call.

Customer Orientation Checklist

Check	Action required	Initial / Notes
☐	Customer shown location of battery switch/breaker and inverter isolators.	
☐	Customer shown normal inverter battery screen and BMS connected status.	
☐	Customer instructed not to open battery enclosure.	
☐	Customer instructed not to modify DC cables, RJ45 cables, DIP switches, BMS app settings, or inverter settings.	
☐	Customer instructed to keep area clean, dry, ventilated, and free of flammable material.	
☐	Customer instructed not to repeatedly reset battery or inverter alarms.	
☐	Customer given Flowatt support contact and escalation process.	
☐	Warranty, monitoring, and maintenance conditions explained.	

Final Sign-Off Sheet

Item	Record / Confirmation
Battery serial numbers	
Final bank voltage	
Inverter BMS status	☐ Connected ☐ Fault
Charge test result	☐ Pass ☐ Fail Notes:
Discharge test result	☐ Pass ☐ Fail Notes:
No active alarms	☐ Confirmed ☐ Not confirmed
Customer orientation complete	☐ Yes ☐ No
Engineer name / signature / date	
Customer name / signature / date	

Installation Quick Troubleshooting Checklist

Use this section when commissioning fails or alarms appear. Do not bypass the BMS, bridge protection devices, or repeatedly reset faults without root-cause verification.

Symptom	Check first	Corrective action
Inverter does not power on from battery	Battery switch, bank voltage, polarity, DC breaker, inverter battery input voltage	Isolate, verify voltage and polarity, check terminal torque and breaker position
Inverter shows BMS communication fault	RJ45 port, pinout, protocol, CAN/RS485 selection, DIP address, cable latch	Use approved RJ45 map, test continuity, select correct protocol, reboot only if required
Battery voltage visible but SOC not visible	BMS communication not established; inverter may be reading DC only	Check CAN/RS485 cable, protocol, firmware, and inverter lithium mode
Parallel bank shows missing battery	Slave address, battery-to-battery RJ45 cable, Master setting, slave power state	Correct DIP/address, replace RJ45 cable, power cycle in approved sequence
BMS alarm active	Cell min/max voltage, temperature, current, MOS status, event log	Record alarm, remove cause, reset only if approved
Cable or terminal heating	Torque, cable size, lug crimp, current sharing, equal cable length	Shutdown safely; correct lug/cable/torque before re-energizing
SOC jumps or inaccurate SOC	Capacity setting, full-charge trigger, RCV, 100 percent SOC setting, reset history	Apply approved Flowatt values; perform controlled full charge if SOP requires
Charge or discharge blocked	BMS protection, inverter limit, temperature, SOC, current limit, cell voltage	Check BMS app and inverter settings; do not force operation outside BMS limit

Grounding / Earthing Safety Checks

Check	Action required	Initial / Notes
☐	Battery enclosure/rack/cabinet connected to protective earth as per approved design.	
☐	Inverter chassis earth connected and verified.	
☐	PV frames and metallic cable trays bonded as per site earthing design.	

RJ45 Mapping, Remapping & Crimping Checklist

This section supports practical field training and troubleshooting for JK BMS, Daly BMS, Deye/Sunsynk/Ensun-style inverters, and Flowatt-approved BMS communication cables.

A. RJ45 Pin Mapping Control

Check	Action required	Initial / Notes
☐	Battery-side port function confirmed from battery manual: CAN / RS485 / UART	
☐	Inverter-side port function confirmed from inverter manual: CAN / RS485.	
☐	CAN-H and CAN-L pins identified if CAN is used.	
☐	RS485-A and RS485-B pins identified if RS485 is used.	
☐	GND or shield requirement checked; do not add ground reference unless specified.	
☐	RJ45 cable pinout checked with continuity tester before connection.	
☐	Cable labeled at both ends with battery side and inverter side.	

B. Custom RJ45 Remap and Crimping

Check	Action required	Initial / Notes
☐	Cut CAT cable to required length without damage.	
☐	Strip jacket carefully without nicking conductors.	
☐	Select only required cores based on the CAN/RS485 pin map.	
☐	Arrange conductors into correct RJ45 positions for battery side.	
☐	Crimp connector fully using RJ45 crimping tool.	

Check	Action required	Initial / Notes
[]	Repeat for inverter side using remapped pin positions if required.	
[]	Continuity test pin-to-pin and verify no short between adjacent pins.	
[]	Keep one approved spare cable in the engineer kit.	

Practical Micro-Video Training Checklist for Field Staff

These are the short practical modules to train field staff before they go to site. The goal is not only to watch videos; each engineer must demonstrate the skill on approved hardware and SOPs.

Training Module Sign-Off

Module	Practical skill to demonstrate	Trainer sign-off
1. Inverter isolation	Turn OFF load if required, AC grid, PV DC, legacy battery; lock/tag; verify zero voltage.	☐ Pass ☐ Repeat
2. Wire selection	Select 35 mm ² flexible copper cable where applicable; confirm current, distance, voltage drop, and insulation rating.	☐ Pass ☐ Repeat
3. Polarity check	Use multimeter to prove positive and negative before connection; identify reverse polarity.	☐ Pass ☐ Repeat
4. Battery DC connection	Connect positive and negative battery cables to inverter safely; torque and cover terminals.	☐ Pass ☐ Repeat
5. Grounding	Identify inverter chassis earth, battery rack/cabinet earth, PV frame earth, and prohibited random bonds.	☐ Pass ☐ Repeat
6. RJ45 pin mapping	Map CAN-H/CAN-L or RS485-A/B between JK/Daly/Flowatt battery and Deye/Sunsynk/Ensun-style inverter.	☐ Pass ☐ Repeat
7. RJ45 remap/crimp	Cut, strip, arrange cores, crimp RJ45, continuity test, and label as custom BMS cable.	☐ Pass ☐ Repeat
8. JK/Daly app protocol	Set CAN/RS485/UART protocol and select Pylontech/Voltronic/Deye-compatible mode where approved.	☐ Pass ☐ Repeat
9. Inverter screen validation	Confirm SOC, voltage, current, temperature, charge/discharge limits, and BMS connected status.	☐ Pass ☐ Repeat
10. JK/Daly alarm triage	Capture alarm, cell min/max, temperature, MOS status, inverter code, and event time before reset.	☐ Pass ☐ Repeat
11. Key BMS parameters	Explain RCV, RCV time/absorption, 100 percent SOC, RFV/re-bulk, capacity, current limits, and temperature limits.	☐ Pass ☐ Repeat
12. BMS reset	Explain when reset is allowed, when it is prohibited, and what must be recorded before reset.	☐ Pass ☐ Repeat

Module	Practical skill to demonstrate	Trainer sign-off
13. Workmanship	Cut wire, crimp lug, heat-shrink, pull-test, torque, PPE check, and final safety inspection.	☐ Pass ☐ Repeat

Field Service Memo Template

For site visit, troubleshooting, rectification, customer handover, and service-learning record

Purpose

This memo is to be completed by the field engineer immediately after a site visit. It records the customer problem, engineer analysis, on-ground rectification, photographs, key settings changed, final result, and learning points for Flowatt central team.

Service Memo No.	FSM-
Date of Visit	Date: Time In: Time Out:
Problem Reported Date	
Customer Name	
Site Location	
Customer Contact Person	Name: Phone:
Flowatt Field Engineer	
Central Team Contacted	☐ Yes ☐ No Name:

1. Site and Equipment Details

Battery Make / Model	Flowatt _____
Battery Quantity / Configuration	Series/Parallel _____ Battery Capacity: _____ kWh
BMS Make	☐ Daly ☐ JK ☐ Other: _____
Battery Serial Number(s)	_____
Inverter Make / Model	_____
Inverter Serial Number	_____
Communication Type	☐ CAN ☐ RS485 ☐ UART ☐ No BMS communication
Inverter Battery Type / Protocol	Pylontech / Voltronic / Deye / Lithium / User-defined / Other: _____
Site System Type	☐ Solar Hybrid ☐ Off-grid ☐ DG Hybrid ☐ Existing Retrofit

2. Problem Reported by Customer

Brief about the problem faced

Write the exact complaint in customer words: error code, alarm, no charging, no backup, communication fault, shutdown, abnormal sound, etc.

3. Safety and Pre-Work Confirmation

Done	Check / Action	Remarks
[]	Engineers wore PPE: insulated gloves, safety shoes, eyewear, and safe clothing.	
[]	AC grid, PV DC, battery, and inverter isolation completed before touching terminals.	
[]	Zero voltage verified at inverter battery terminals where work required opening terminals.	
[]	Battery and inverter area checked for moisture, heat, dust, rodents, and flammable material.	
[]	Customer informed about shutdown and work scope before rectification.	
[]	No live DC terminal work was performed without approved procedure.	

4. Engineer Analysis and Observation

Initial observation at site

Mention what was seen first: inverter screen, BMS alarm, LED pattern, loose RJ45 cable, wrong protocol, low SOC, tripped breaker, reverse polarity risk, overheated lug, etc.

Measurements and checks performed

Record battery voltage, cell min/max, SOC, BMS status, inverter error code, charge/discharge current, RJ45 continuity, DIP switch/address, temperature, torque condition, grounding condition.

Inverter Error / Alarm Code	Code: _____ Screen message: _____
BMS Alarm / LED Status	
Battery Voltage / SOC	Voltage: V SOC: _____ %
Cell Min / Max	Min: _____ V Max: _____ V Delta: _____ mV
Temperature	Min: °C Max: °C
Communication Status	☐ BMS OK ☐ Communication fault ☐ Not checked

5. What the Engineer Did and How It Was Solved

Root cause identified

Write the confirmed cause. Example: wrong battery protocol, RJ45 pin mismatch, loose terminal, BMS protection due to low cell, wrong DIP address, inverter setting mismatch, cable crimp issue, overcurrent trip, temperature protection.

Rectification action performed

Write step-by-step what was done on ground. Example: remapped RJ45 cable, changed inverter battery type, corrected BMS protocol, tightened terminal, replaced cable, charged battery, reset BMS after approval, changed DIP address, cleaned/ventilated installation area.

6. Key Changes Made

Parameter / Setting	Before Visit	After Fix	Reason / Approval
BMS Protocol / Inverter Battery Type			
Charge Current Limit			
Discharge Current Limit			

SOC / Capacity Setting			
BMS Address / DIP Switch			
Other Critical Change			

Important control

Any change in BMS protection setting, inverter voltage/current setting, protocol setting, DIP address, or decision to send battery to service center must be approved by Flowatt central team and recorded above.

7. Photo Evidence - Before and During Work

Paste clear photographs in the boxes below. Keep photos uncropped enough to show screen values, wiring, labels, and physical condition.

Photo 1: Site / installation area before work [Insert / paste photo here]	Photo 2: Battery front / serial label / installation condition [Insert / paste photo here]
Photo 3: BMS screen / app alarm / LED status [Insert / paste photo here]	Photo 4: Inverter screen showing error / alarm / battery status [Insert / paste photo here]

8. Photo Evidence - Fix and Final Handover

Photo 5: What was fixed - cable / RJ45 / terminal / setting [Insert / paste photo here]	Photo 6: Final inverter screen - BMS OK / normal status [Insert / paste photo here]
Photo 7: Final battery / BMS screen after rectification [Insert / paste photo here]	Photo 8: Final picture with customer / happy handover [Insert / paste photo here]

9. Final Testing and Handover Result

Done	Check / Action	Remarks
☐	Battery BMS powered ON normally.	
☐	Inverter powered ON normally.	
☐	Inverter reads battery voltage correctly.	
☐	Inverter reads BMS SOC / current / status where communication is used.	
☐	Charging test completed successfully.	
☐	Discharging / backup test completed successfully.	
☐	No active BMS protection remains after rectification.	

☐	No active inverter fault remains after rectification.	
☐	Customer shown final screen and basic operating status.	
☐	Customer advised what not to touch and when to call Flowatt support.	

Final System Status	☐ Fully resolved ☐ Temporarily resolved ☐ Under monitoring ☐ Escalated
Battery Sent to Service Center?	☐ No ☐ Yes
Further Visit Required?	☐ No ☐ Yes Target date: ____ / ____ / ____
Customer Informed About Cause?	☐ Yes ☐ No

10. Learning Notes for Flowatt Team

What went right?

Mention what helped solve the problem quickly: good photos, clear error code, correct tools, app access, central team support, spare RJ45 cable, customer cooperation.

What went wrong?

Mention delay reasons or mistakes: missing cable, wrong inverter model info, no shutdown window, poor site wiring, unclear pinout, wrong protocol, low battery SOC, no internet/app access.

What should be changed for future installations?

Mention SOP improvement, training video needed, checklist update, spare part requirement, cable color/labeling improvement, BMS parameter default update, or customer pre-arrival instruction.

11. Customer Sign-Off and Closure

Flowatt Engineer Name		Customer Representative Name	
Engineer Signature		Customer Signature	
Date / Time		Customer Feedback	☐ Satisfied ☐ Pending ☐ Escalated
Final Status	☐ Closed ☐ Monitoring Required ☐ Escalated	Next Visit Required	☐ No ☐ Yes: _____

Final closure rule

Do not mark the visit as closed if any fault is still active, the inverter is not reading BMS data where required, any terminal is heating, the battery remains in protection, or the customer has not been informed of the final status.

Attachments / extra notes:

How to Isolate the Inverter and Make Electrical Connection?	https://www.youtube.com/watch?v=WdQcqHTA0HE&list=PLsCr7qtcID6N9uUTq4Ua9pSDZeAxZ2Hmj
How to connect RJ45 to Battery & Inverter - JK BMS?	How to connect JK BMS UART CAN RJ485 Protocol to EASUN INVERTER
How to Change Pin in RJ45 - Voltronic Inverter (Invergy, Sukam, Other)?	How to make a RJ45 cable - for Voltronic Inverter?
<u>How to Properly Communicate an Inverter With a Lithium Battery?</u>	How to Properly Communicate an Inverter With a Lithium Battery
How to make changes on inverter screen - Daly BMS?	https://www.youtube.com/watch?v=mbxxLmkVIng
How to Install JK BMS app?	Install JK BMS app
How to Connect JK BMS with Battery Passwords?	Connecting JK BMS with Battery Passwords
How to Modify RJ45 Cable for Invergy/Sukam/Voltronic Inverter	Modify RJ45 Cable for Invergy/Sukam/Voltronic Inverter





Troubleshooting Manual

Daly BMS | JK Energy Storage BMS | Invergy / Indian Hybrid Inverter Alarms

FIELD USE - Purpose

This field document is for fast diagnosis at installation sites. It tells technicians what the alarm means, what to check first, and how to rectify without guessing. Keep it concise: read the screen, isolate if unsafe, identify root cause, then reset only when approved.

DANGER - Stop-work condition

Stop immediately if there is smoke, burning smell, swelling, wet battery, hot terminal, reverse polarity, unknown wiring, repeated short-circuit trip, or unresolved BMS communication fault.

Item	Detail
Document type	Trouble Shooting Manual
Created by	Bikesh Jha
Battery platforms	16S ESS with Daly & JK BMS
Inverter platform	Invergy / PowerOne/Sukam/Other
Use with	Exact Flowatt pack SOP, BMS app, inverter manual, and site safety checklist

1. On Field: What to Do First

Do these steps before changing any setting or pressing reset. Most site mistakes are polarity, low cell voltage, loose RJ45 cable, wrong protocol, wrong inverter battery type, or over-current from load/surge.

First 10 checks at site

Done	Checkpoint
[]	Photograph inverter screen, BMS app alarm page, battery display/LEDs, RJ45 port, and DC terminal area.
[]	Check smell, smoke, swelling, water ingress, hot cable, hot lug, or loose terminal. If present, isolate system.
[]	Measure battery bank voltage at inverter battery terminals with DC multimeter.
[]	Confirm Red is positive and Black is negative using meter; do not trust color only.
[]	Check DC breaker/fuse state and terminal torque if safe.
[]	Open BMS app/screen: record cell minimum, cell maximum, pack voltage, current, temperature, SOC, MOS status.
[]	Check inverter battery page: SOC, voltage, current, BMS icon/status, warning/fault code.

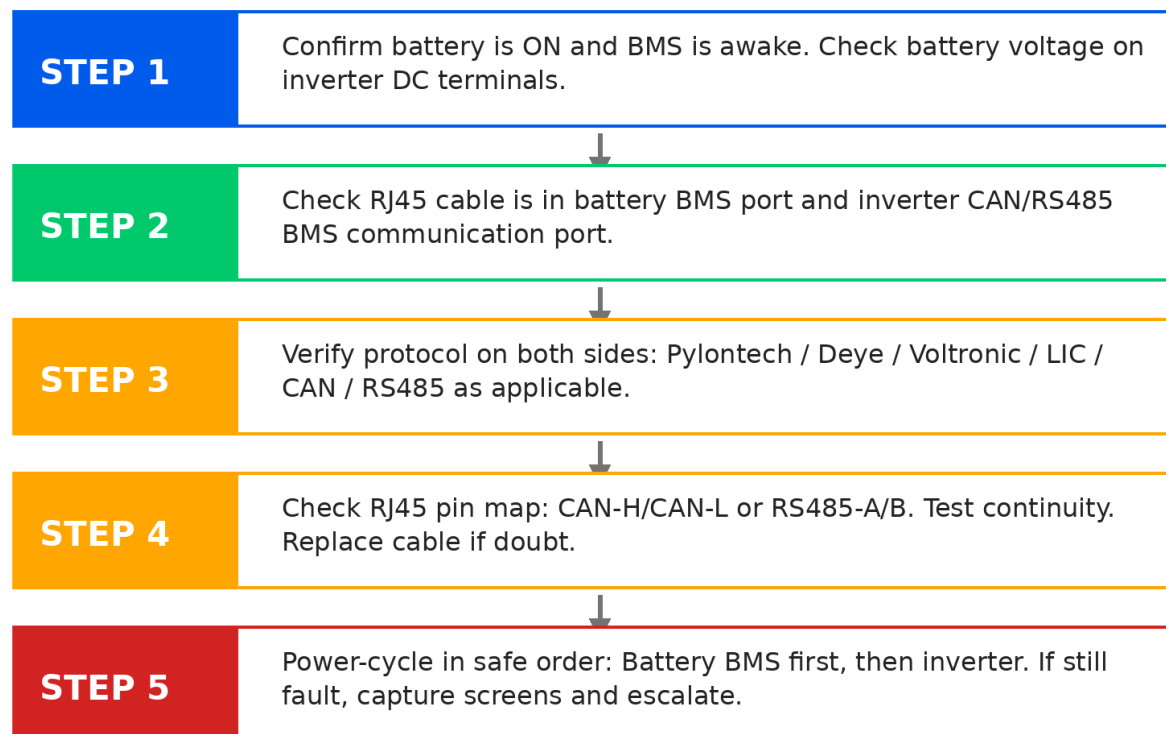
Done	Checkpoint
[]	Check RJ45 cable is in the correct BMS communication port.
[]	Confirm inverter battery type and BMS protocol match BMS setting: Pylontech / Deye / Voltronic / LIC / CAN / RS485.
[]	Do not reset until the cause is identified and recorded.

COLOR CODE - Field color code used in this document

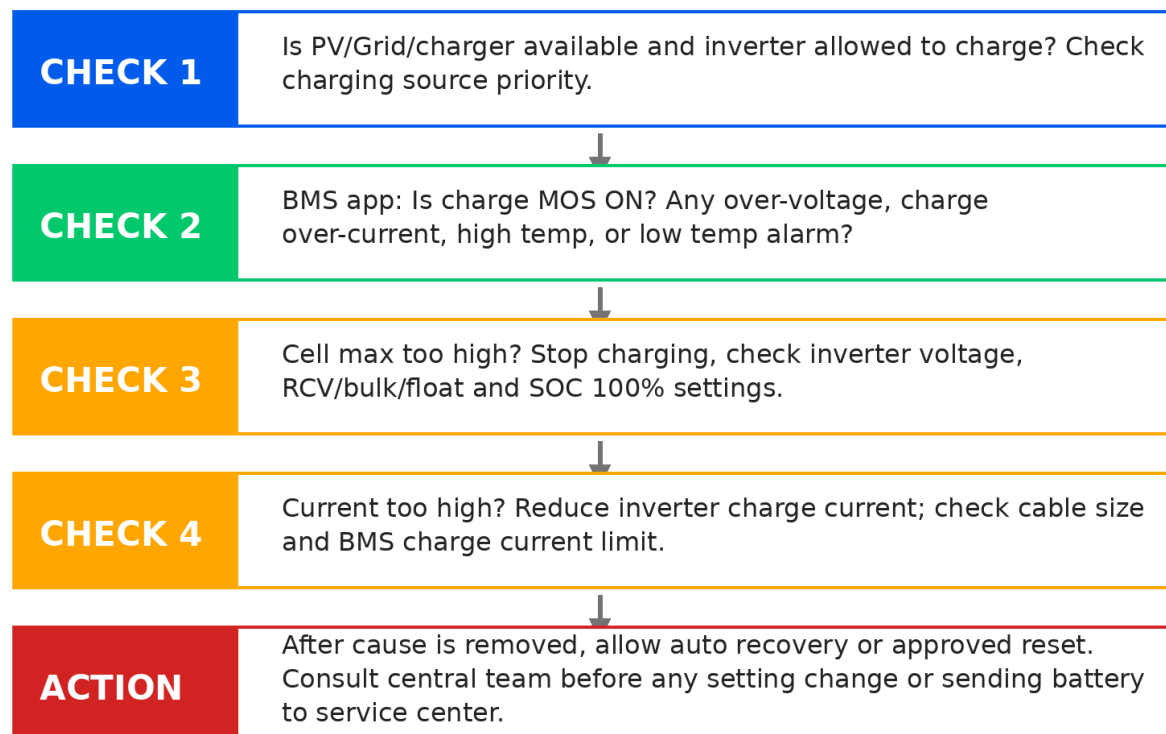
Green = normal / allowed. Amber = warning / inspect. Red = protection / stop and rectify. Blue = communication / inverter screen / protocol.

2. Flowcharts

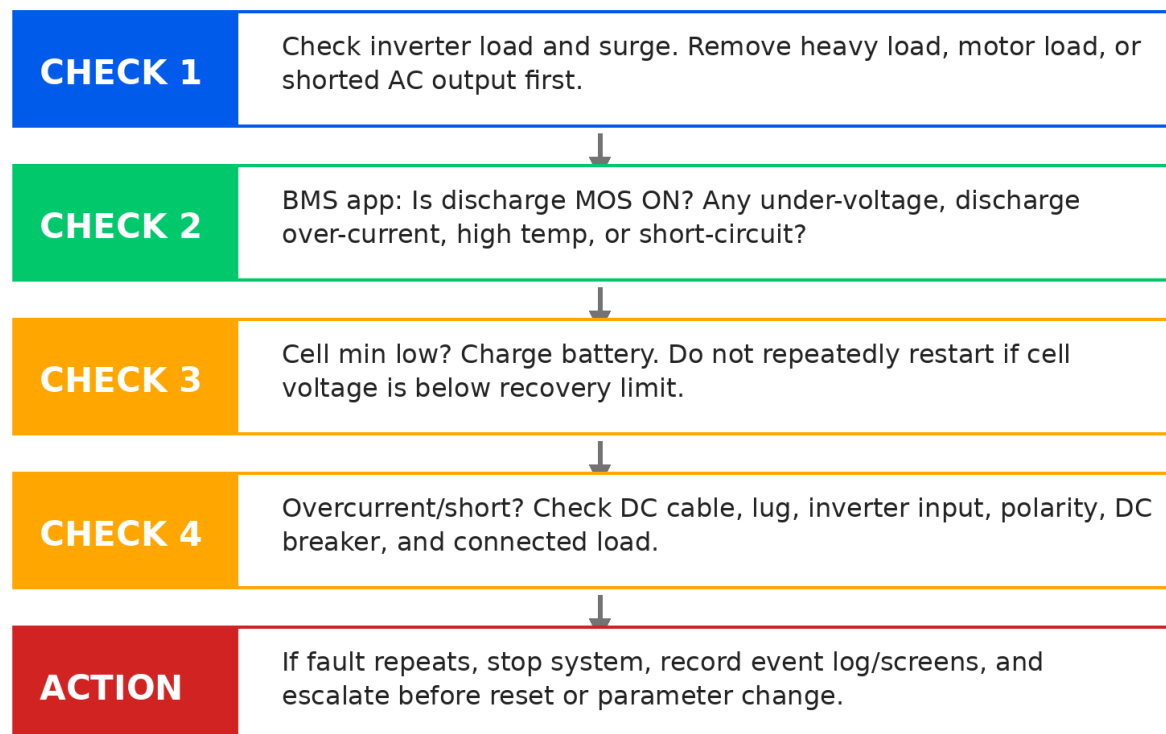
Flowchart 1 - Error 61 on Inverter Screen



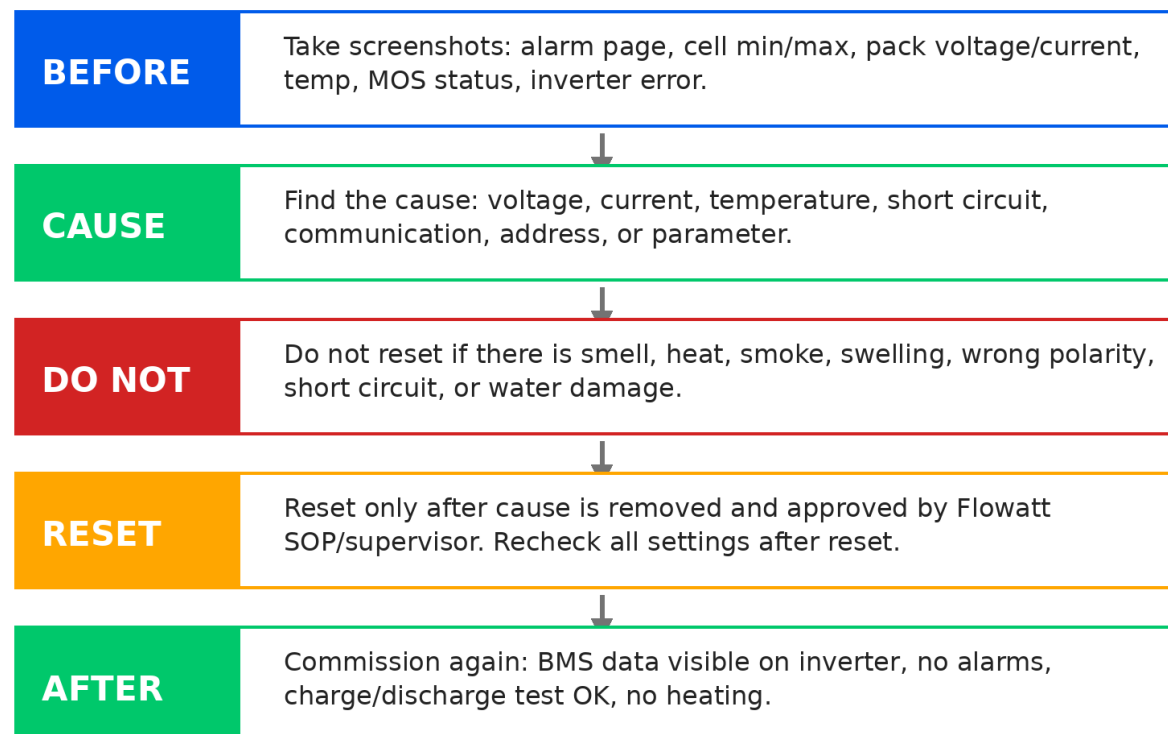
Flowchart 2 - Battery Not Charging



Flowchart 3 - Battery Not Discharging / Load Trips



Flowchart 4 - When to Reset BMS



Flowchart for BMS communication fault / Error 61 on inverter screen / inverter cannot read BMS.

3. Hybrid Inverter Alarm Guide

3A. Inverter screen: BMS communication check

Screen condition	Meaning	Rectification
BMS icon solid / battery data visible	Inverter has established BMS communication.	Proceed to charge/discharge test; verify SOC, voltage, current and charge/discharge limits.
BMS icon flashing / no SOC data	Inverter cannot communicate with BMS.	Check RJ45 cable, CAN/RS485 port, protocol, inverter Program 05, BMS protocol, master/slave address, then power-cycle safely.
Battery voltage visible but no SOC/current/temp	DC power is connected but BMS communication is not valid.	Do not handover. Treat as communication fault and fix RJ45/protocol first.
Battery type wrong in Program 05	Inverter may ignore BMS or use wrong charge logic.	Select matching lithium profile only: PYL / LIC / LIA / LIB / user-defined as per BMS protocol.

Load Information					
OVER LOAD		Indicates overload.			
	 100% 25%	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.			
		0%~24%	25%~49%	50%~74%	75%~100%
					
Mode Operation Information					
		Indicates unit connects to the mains.			
		Indicates unit connects to the PV panel.			
BYPASS		Indicates load is supplied by utility power.			
		Indicates the utility charger circuit is working.			
		Indicates the DC/AC inverter circuit is working.			
Mute Operation					
		Indicates unit alarm is disabled.			
Other Information					
		Indicates BMS communication is established between the inverter and Lithium battery. It flashes while BMS is detected by inverter but communication can't be well established.			
		Indicates the unit is connected to an external energy meter.			
		Indicates the unit is connected with WiFi well if the icon is solid on. It flashes while not be connected.			

Invergy screen reference: BMS icon indicates established communication; flashing indicates BMS cannot communicate.

05	Battery type	User-Defined 05 USE	If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 26, 27 and 29.
		Pylontech battery 05 PYL	If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
		BYD battery 05 BYD	If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
		WECO battery 05 WEC	If selected, programs of 02, 12, 26, 27 and 29 will be auto-configured per battery supplier recommended. No need for further adjustment.
		Soltaro battery 05 SOL	If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
		LIA-protocol compatible battery 05 LIA	Select "LIA" if using Lithium battery compatible to CAN protocol. If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
		Lib-protocol compatible battery 05 LIB	Select "Lib" if using Lithium battery compatible to RS485 protocol. If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting.
		3rd party Lithium battery 05 LIC	Select "LIC" if using Lithium battery not listed above. If selected, programs of 02, 26, 27 and 29 will be automatically set up. No need for further setting. Please contact the battery supplier for installation procedure.
06	Auto restart when overload occurs	Restart disable (default) 06 LFD	Restart enable 06 LFE
07	Auto restart when over temperature occurs	Restart disable (default) 07 EFD	Restart enable 07 EFE

Invergy Program 05 battery type options: User / Pylontech / BYD / WECO / Soltaro / LIA / Lib / LIC.

3B. Common inverter warning / fault codes

Code	Meaning	Likely cause	Rectification
01	Fan fault / fan locked	Fan blocked, dust, failed fan, connector loose	Power down safely, clean fan path, check fan connector, replace fan if repeated.
02	Over temperature	Blocked ventilation, high ambient temp, overload, fan issue	Reduce load, cool inverter, check fan, verify clearance and room temperature.
03	Battery voltage too high	Wrong battery type, BMS charge disabled late, inverter charge voltage too high	Stop charging, check pack/cell max, reduce bulk/float/RCV settings, verify BMS protocol.
04	Battery voltage too low	Battery discharged, cell undervoltage, DC breaker/cable issue	Charge battery under supervision, check cell minimum, check DC cable and breaker.
05	Output short circuit	AC output wiring short, load short, motor/inrush fault	Turn off loads, inspect AC wiring, remove fault load, restart only after short removed.
06	Output voltage abnormal/high	Inverter regulation fault or incompatible load	Remove load, restart after isolation, escalate if repeats.

Code	Meaning	Likely cause	Rectification
07	Overload time-out	Load exceeds inverter rating or motor surge too high	Reduce load, check compressor/motor inrush, stagger loads, size inverter correctly.
08/09	DC bus fault / soft-start fault	Internal inverter DC bus issue, surge, wrong battery voltage, inverter fault	Isolate and restart once. If repeated, do not keep resetting; escalate inverter service.
56	Battery connection open	DC breaker open, loose cable, no battery voltage at inverter	Check DC voltage at inverter, breaker/fuse, cable lug, polarity, BMS discharge MOS.
61	BMS communication fault	Wrong RJ45 pinout, wrong protocol, wrong port, BMS asleep, master/slave issue	Use Flowchart 1. Check Program 05, BMS protocol, CAN/RS485 pins, cable continuity, power-cycle.

4. Daly BMS Alarm / LED Troubleshooting

DALY - Daly LED logic

Daly BMS uses RUN LED, Alarm LED and SOC LEDs. Alarm/protection must be confirmed from app/host computer because LED only tells broad state.

4A. Daly LED meaning and action

Daly state	LED indication	Meaning	Action
Power off / Sleep	RUN off, ALM off, SOC off	BMS asleep or no output	Wake using reset button/charger/load/communication; check pack voltage.
Standby normal	RUN Flash 1, ALM off	Battery ready	Proceed if inverter reads BMS and no app alarm.
Standby with alarm	RUN Flash 1, ALM Flash 3	Alarm/protection triggered	Open app/host software. Record exact fault before reset.
Normal charge	RUN on, ALM off	Charging allowed	Check current and temperature. Continue monitoring.
Over-charge alarm/protection	RUN on, ALM Flash 3 or protection indication	Cell/pack voltage high	Stop charger/inverter charge; check highest cell, reduce charge voltage/current; allow voltage to fall below recovery.
Normal discharge	RUN Flash 3, ALM off	Discharging allowed	Normal.
Over-discharge / under-voltage	RUN/ALM fault indication or sleep	Cell/pack low	Stop load; charge battery under supervision; check cell minimum.
Failure state	ALM on	Temperature, over-current, short-circuit or serious protection	Isolate system. Check cause. Do not reset blindly.

Daly manual screenshot: LED indication and status reference

4B. Daly fault category: meaning and rectification

Alarm	Meaning	Common cause	Rectification
Cell/Pack Over-charge	Charging blocked because one cell or pack is above allowed voltage.	Wrong charge voltage, imbalance, wrong inverter setting.	Stop charging; check cell max; check inverter bulk/float; balance if needed; retry after recovery.
Cell/Pack Over-discharge	Discharge blocked or BMS sleeps because cell/pack is too low.	Battery deeply discharged, load too high, SOC wrong.	Remove load; charge slowly; verify cell min rises above recovery; do not force discharge.
Charge Over-current	Charge MOS closes/limits charge current.	Inverter charge current too high or charger surge.	Reduce inverter charge current; verify BMS current rating and cable; wait/recover.
Discharge Over-current	Discharge MOS closes.	Overload, motor surge, shorted load, undersized inverter.	Remove heavy load; check AC/DC short; restart only after current cause removed.
Short-circuit	Immediate severe protection.	Wrong wiring, reversed cable, shorted inverter/load, loose strands.	Isolate. Inspect DC and AC wiring. Remove load/charger. Do not reset until short is cleared.
Charge High Temp	Charging disabled due to high cell/BMS temperature.	Hot room, no ventilation, high charge current.	Stop charge; cool battery; check airflow and terminal heating.

Alarm	Meaning	Common cause	Rectification
Discharge High Temp	Discharge disabled due to high temperature.	Overload, hot cable/lug, high ambient temp.	Reduce load; cool battery; inspect terminal and cable heating.
Charge Low Temp	Charging blocked in cold condition.	Battery below low-temp charge limit.	Warm battery naturally; use approved heating; do not charge frozen/cold cells.
MOS Over-temp	BMS MOSFET temperature high.	High current, poor heat dissipation, loose terminal.	Stop load/charge; inspect BMS cooling and terminal resistance.
Voltage Difference Alarm	Cell delta high.	Imbalance, weak cell, wrong sensing wire.	Check cell voltages and sensing harness; balance or service pack.
Temperature Difference Alarm	Temperature sensor spread high.	One area hot, sensor issue, poor airflow.	Check hot spot, sensor position, airflow; stop if thermal abnormal.
Communication Fault	Inverter/PC cannot read BMS.	Wrong RJ45 pinout, protocol mismatch, BMS asleep.	Check Daly RJ45 pin map, app protocol, inverter setting, cable continuity.

4C. Daly RJ45 pinout for inverter communication

Flowatt Battery Science - Use with approved product datasheet, inverter manual, and site electrical code

Daly RJ45 pin	External communication function
1	RS485B1
2	RS485A1
3	ISO_GND
4	CAN1_H
5	CAN1_L
6	GND
7	Empty
8	Empty

Daly manual screenshot: RJ45 external communication and internal parallel interface.

5. JK Energy Storage BMS Alarm Troubleshooting

JK - JK essentials

JK PB-series BMS supports app operation, active balancing, CAN, RS485, display interface, LED indication, dry contact, and parallel addressing. Treat the app alarm page as the primary source; LED is a quick indicator only.

5A. JK LED meaning and action

JK state	LED indication	Meaning	Action
Power off	ON/OFF off	No BMS operation	Activate by button/display/charger if pack voltage is safe.
Charging normal	RUN on, ALM off, capacity LEDs by SOC	Charging allowed	Verify current and cell max.
Charging alarm/protection	RUN on, ALM flicker	Over-current / over-temp / over-voltage / charge failure	Open JK app, record alarm, reduce charge current/voltage, check temp and cell max.
Discharge normal	RUN on, ALM off, capacity LEDs by SOC	Discharging allowed	Normal.
Discharge alarm/protection	RUN on, ALM flicker	Over-current / over-temp / under-voltage / discharge failure	Remove load; check cell min, load surge, cable, and temperature.
Other alarm	ALM flicker	Password not changed / short circuit / temperature abnormal	Check app exact alarm. If short-circuit, isolate and inspect wiring before reset.
Parallel status L6	L6 flashes for master address 0; slave flashes after communicating	Parallel communication state	Address 0 = master. Check DIP address and RS485-2 chain if missing slave.

5B. JK alarm category: meaning and rectification

Alarm	Meaning	Common cause	Rectification
Charge Over-voltage	A cell exceeds configured overcharge voltage.	Wrong inverter charge voltage, imbalance, wrong cell count.	Stop charging; check cell max; adjust RCV/bulk/float only to approved Flowatt value.
Discharge Under-voltage	A cell is below configured undervoltage.	Battery depleted, weak cell, wrong SOC.	Remove load; charge under supervision; check cell min and recovery.
Charge Over-current	Charge current exceeds set continuous charge current.	Inverter charge current too high.	Reduce inverter charge current; check BMS app charge current limit.
Discharge Over-current	Load current exceeds set continuous discharge current.	Overload, motor surge, short/low impedance load.	Remove load; check inverter load; stagger motors; do not oversize load.
High Temperature	Charge/discharge temperature above limit.	Hot room, poor ventilation, high current, loose lug.	Stop operation; cool system; check airflow and terminal heating.
Low Temperature Charge	Battery below charge low temperature limit.	Cold battery/cold site.	Warm battery; enable approved heating if installed; do not force charge.
Short Circuit	Instant high current protection.	Wiring short, wrong cable, inverter/load short.	Isolate immediately; inspect wiring; reset only after short is cleared.

Alarm	Meaning	Common cause	Rectification
Communication Fault	Inverter cannot read JK BMS.	Wrong protocol, port, RJ45 pinout, DIP address, BMS asleep.	Check CAN/RS485 pins, JK protocol setting, inverter Program 05, master/slave address.
Parallel Missing Slave	Master cannot see one battery.	Duplicate address, broken RS485-2 RJ45 cable, slave off.	Set unique addresses; check RS485-2 chain; power on in correct sequence.

5C. JK CAN / RS485 pinout and DIP addressing

JK RJ45 / port	Pin mapping
RS485-1 for inverter	Pins 1 & 8 = RS485-B1, pins 2 & 7 = RS485-A1, pins 3 & 6 = GND.

JK RJ45 / port	Pin mapping
CAN for inverter	Pin 4 = CANL, pin 5 = CANH, pin 7 = GND. Other listed pins are NC.
RS485-2 for parallel	Pin 1 = RS485-B2, pin 2 = RS485-A2, pin 3 = GND, pin 7 = RS485-A2, pin 8 = RS485-B2.
DIP address rule	Address 0 is master. Addresses 1-15 are slaves. Every parallel BMS must have unique address.

JK manual screenshot: CAN, RS485-1 and RS485-2 interface definitions

6. RJ45 / Protocol Matching: Daly, JK, Inverter

COMMUNICATION - Most communication failures are not BMS failure

In the field, most BMS communication alarms are caused by wrong RJ45 pin map, wrong port, wrong inverter battery type, wrong protocol, BMS sleep, or parallel address error.

Side	CAN pins	RS485 pins	What technician must do
Daly BMS external RJ45	Pin 4 = CAN1_H, Pin 5 = CAN1_L	Pin 1 = 485B1, Pin 2 = 485A1	Use Daly external communication port. Set protocol in engineering/PC/app mode.
JK BMS inverter port	Pin 4 = CANL, Pin 5 = CANH, Pin 7 = GND	Pins 1/8 = B1, Pins 2/7 = A1, Pins 3/6 = GND	Use RS485-1/CAN port for inverter; RS485-2 is for parallel chain.
Inverter RJ45	Depends on model	Depends on model	Read inverter manual. Do not assume straight LAN cable is correct.

RJ45 communication checklist for Error 61 / BMS fault

Technician must tick every item

Done	Checkpoint
[]	Battery is awake and BMS app/screen is readable.
[]	Inverter battery type is lithium/BMS mode, not AGM/Flooded/User unless intentionally used.
[]	Daly/JK app protocol matches the inverter protocol: Pylontech / Deye / Voltronic / LIC / CAN / RS485.
[]	RJ45 cable continuity tested pin-to-pin.
[]	CAN-H/CAN-L or RS485-A/B are not swapped.
[]	The master battery only is connected to the inverter in parallel installation.
[]	Parallel batteries have unique addresses and the communication chain is complete.
[]	After corrections, safe power-cycle: Battery BMS first, inverter second.

7. Reset Rules: What to Do and What Not to Do

RESET RULE - No blind reset

Reset is not troubleshooting. Reset only clears a state after the cause is removed. If the root cause remains, the same fault will return or safety can be compromised.

Reset allowed when	Reset not allowed when
Communication cable/protocol fixed and no electrical alarm remains.	Smoke, smell, swelling, water ingress, hot cable/lug, or damaged battery is present.
Over-current cause removed and load reduced.	Short-circuit cause is not identified.
Temperature returned to safe range and airflow issue corrected.	Cell over-voltage or under-voltage is still active.
DIP address corrected and all slaves detected.	Wrong polarity, unknown RJ45 pinout, or loose terminal remains.
Flowatt supervisor/SOP allows reset and data is recorded.	Technician wants to reset just to make alarm disappear.

Before reset record these values

Record item	Why it matters
Alarm code / BMS alarm name	Needed to know actual trigger.
Cell minimum and maximum voltage	Separates overcharge/undervoltage/imbalance faults.
Pack voltage and current	Confirms charge/discharge state.
Temperature min/max and MOS temperature	Confirms thermal fault.
Charge MOS / discharge MOS status	Shows what BMS has blocked.
Inverter code and battery screen	Shows whether issue is inverter-side or BMS-side.
RJ45 protocol and battery type setting	Confirms communication setup.

8. Final Field Closure Checklist

Close only when all are true

Done	Checkpoint
☐	No active BMS protection alarm in Daly/JK app or screen.
☐	No active inverter fault/warning code.
☐	Inverter reads BMS SOC, voltage, current, and battery status.
☐	Charge and discharge tests completed without a protection alarm.
☐	No abnormal heating at DC lugs, breaker, busbar, inverter terminal, or BMS power path.
☐	RJ45 cable labeled as BMS communication cable.
☐	Final settings and screenshots saved to job file.
☐	Customer briefed: no repeated reset and no setting changes.

Sign-off

Field	Entry
Site name	
Engineer name	
Battery model / serials	
Inverter make / model	
Fault cleared	☐ Yes ☐ No
BMS communication verified	☐ Yes ☐ No
Customer briefed	☐ Yes ☐ No
Engineer signature / date	
Customer signature / date	