



VL-4Si

4-Channel
Simultaneous Quick Charger

INSTRUCTION MANUAL

ENGLISH·····Pages 2-14

JAPANESE·····Pages 15-27



I·D·X Company Limited

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IDX Technology thanks you for choosing the VL-4Si and is sure that you will benefit from its unique features.

Please utilize this instruction manual to best maximize and safely use your VL-4Si, 4 Channel Simultaneous Quick Charger. If you have any additional questions, please contact the appropriate IDX office or visit our website <http://www.idx.tv>

General Notes and Safety

- Do not attempt to open or modify this unit. All work should be carried out by IDX authorised service personnel only.
- Use only with compatible batteries listed in this manual. Charging non-compatible batteries may cause fire, electrical shock or other incidents.
- When connecting a battery be sure to insert the battery into the battery socket or connector firmly.
- When in use do not place anything on the charger and do not block ventilation holes. Use in a well ventilated area.
- Do not expose to, use or place the unit in direct sunlight, extreme dust, water or other hazardous environments.
- During charging the temperature of the charger will rise, this is normal and not a malfunction.
- A short between the plus (+) and minus (-) charge pins may cause fire, electrical shock or other incidents. Make sure that the charge connector does not touch any metal parts when a battery is not connected.
- Stop charging immediately if the charging does not complete within the designated time. In case of abnormal smell, leak, colour change or case deformity during use turn the power off and unplug the cable from the socket to avoid possible injury.
- Only use the AC cable included with the charger or ones specified. If fused confirm the fuse rating capacity before use.
- For continued protection replace any fuses with specified type and rating.
- This unit contains no user serviceable parts.
- In case of fault or service, please contact your IDX dealer or appropriate IDX office.

Features

- Can charge all IDX ENDURA System Li-Ion batteries. (All IDX NP-Type batteries via optional A-E2NP Charge Adaptor.)
- Full simultaneous quick charging on all 4 channels.
- Optimum charger for high battery usage, fast and powerful charge capabilities.
- Auto safety & protection features for damaged or misused batteries.
- Robust ultra-lightweight polycarbonate case, recessed power switch, built-in AC line spare fuse, convenient carrying handle.
- Universal AC power input for worldwide use.
- LED and LCD display panel gives you status of charger and batteries.
- With "Battery Management System (BMS)" software, the VL-4Si can be connected to a PC to provide various batteries information to help you manage your batteries.

Specifications

- **Input Voltage** : AC100~240V 50/60Hz Automatic
- **Power Consumption** : 310VA max
- **Quick Charge Current** : 2.3A (Li-Ion) *When all 4 Ch's are charging
3.0A (Li-Ion) *When up to 3 Ch's are charging
1.9A (Ni-Cd)
- **Quick Charge System** : Li-Ion Constant Current / Constant Voltage
Ni-CD Constant Current
- **Full Charge Detection System** : Li-Ion Current Control Detect
Ni-CD Minus Delta V Detect System
- **Pre Charge Current** : Approx. 360mA
- **Charge Protection Timer** : Li-Ion Pre-Charge 120 min
Quick Charge 520 min
Ni-CD Pre-Charge 90 min
Quick Charge 240 min
- **Operating Temperature** : -10°C ~ 40°C
- **Dimensions** : Approx. 156(W) × 153(H) × 288(D) mm /
Approx. 6.2(W) × 6.0(H) × 11.4(D) inches
- **Weight** : Approx. 3.2 kg / Approx. 9.6 lbs

Compatible Batteries

- All IDX ENDURA System Li-Ion batteries
- All IDX NP-Type Li-Ion & Ni-Cd batteries*

* NP Type batteries charged via optional A-E2NP Charge Adaptor.

Safety Features

The VL-4Si has built in safety features to protect the charger and batteries from serious damage in the event of an attempt is made to charge a faulty battery. Low voltage batteries are detected prior to applying a quick charge current. If a battery is found to have a low voltage, it will not be quick charged until it reaches the acceptable quick charge level. This prevents any damage to the unit or to the battery. Batteries reaching an over voltage condition during the charge process will also be detected and charging will be stopped automatically.

<Battery "Low Voltage" Protection>

If a battery is detected to have "low voltage" the pre-charge mode automatically starts (Indicated by a Solid Red LED), quick charging will only commence once the battery has reached the required minimum voltage.

Li-Ion (12V) Ni-CD (10.5V)

If a battery fails to reach the required minimum voltage within a set time, all charging will be stopped and "Battery Fault" displayed. (Indicated by a Flashing Amber LED)

Li-Ion (120min) Ni-CD (90 min)

<Over-Charge Protection>

If a battery fails to reach "Full Charge" within a set time period of the quick charge starting, charging will automatically be stopped and "Battery Fault" displayed.

(Indicated by a Flashing Amber LED)

Li-Ion (520min) Ni-CD (240min)

<Over-Charging "Voltage" Protection>

If during the charge process a battery exceeds its charge-voltage limit, charging is automatically stopped and "Battery Fault" displayed.

(Indicated by a Flashing Amber LED)

Li-Ion (17.5V) Ni-CD (21.5V)

Operating Instructions

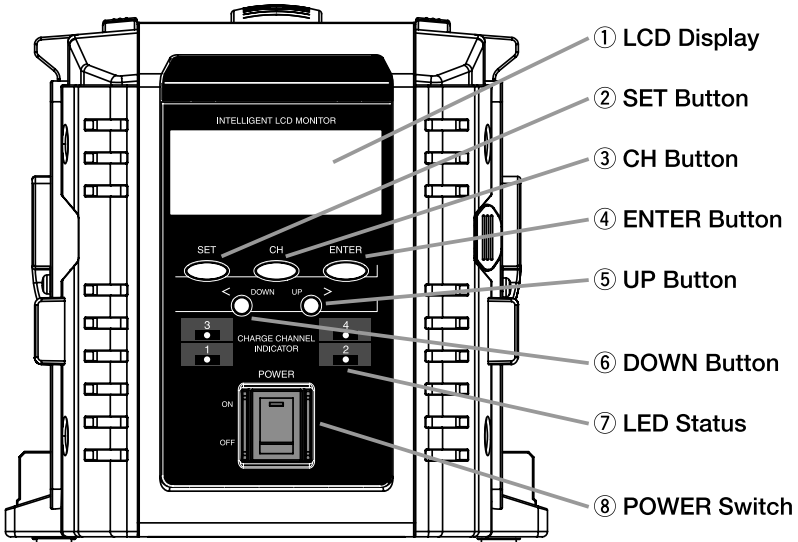
- ① Connect AC power cord firmly.
(If required, use USB cable and connect to a P.C to retrieve BMS data)
- ② Turn the front mounted POWER Switch ON. (Power LED and LCD Display will light)
- ③ Connect a battery: Battery Check Mode starts, the charge channel LED will display solid Red while the charger is checking the battery.
Battery Check: After 5 seconds the LED will remain Red indicating that the VL-4Si is operating in quick charge mode, if a battery has a fault the LED will flash Amber. If a battery cannot initially enter quick charge a recovery program will start, during which time the LED will also remain solid Red.
When the battery has successfully recovered, the VL-4Si will automatically charge to a quick charge program. If a battery cannot be recovered or is detected to be over-charged, the LED will flash Amber indicating a battery fault.
- ④ When a battery has been fully charged the charge channel LED will automatically change to solid Green, indicating that the battery is ready for use.
- ⑤ To remove a battery from the charger, while holding either of the Release Buttons located on top and side of each channel, slide the battery upwards.

LED Colour Status

- Light Off : No Battery Connected
- Solid Red : Battery Check / Quick Charge / Battery Recovery in progress
- Solid Green : Charge Complete
- Flashing Amber : Battery Fault
- Flashing Red : Charger Fault

Identification

■ Parts Name



■ Function

- ① **LCD Display** : The LCD has three modes, [B-Mode] displays battery information, [C-Mode] displays charger information and [S-Mode] displays set up functions.
- ② **SET Button** : Together with the CH Button it is used to switch between S-Mode pages and previously displayed pages (B-Mode or C-Mode).
- ③ **CH Button** : Together with the SET Button it is used to switch between S-Mode pages and previously displayed pages (B-Mode or C-Mode). Together with ENTER Button it is used to switch between B-Mode and C-Mode.
- ④ **ENTER Button** : Together with CH Button it is used to switch between B-Mode and C-Mode.
- ⑤•⑥ **UP & DOWN Button** : Scrolls between pages in each Mode.
- ⑦ **LED Status** : Displays status of charging battery using three colours.
- ⑧ **POWER Switch** : Turns power on / off. (When unit is on the POWER Switch LED will show solid Amber)

How to Operate LCD Display

■ LCD Display Mode

The LCD Display has three modes

B Mode 「B1」～「B7」……………Battery related information

C Mode 「C1」～「C4」……………Charger related information

S Mode 「S1」～「S4」……………Set up functions

■ How to Change LCD Display and Pages

Pressing CH and SET Buttons together, selects **S Mode** 「S1」～「S4」.

Pressing them again reverts back to the previous page.

Pressing CH and ENTER Buttons together, switches between **B Mode** 「B1」～「B7」
and **C Mode** 「C1」～「C4」

■ B Mode : Battery Pages (B1 ~ B7)

Operation …… To scroll between pages, use the UP & DOWN Buttons.

UP Button : scroll pages up

DOWN Button : scroll pages down

「 B1 」 : Status of Each Battery Channel

1 ▶ Charging

B1

2 ▶ Error # 09

3 ▶ None

4 ▶ Charge Done

Charging : Charging in operation

Charging Done : Charge Complete

Error # : Error Code No.

None : No Battery

[B2] : Battery Charge Status in % (Li-Ion Battery Only)

STATUS		B2	
3 ▶	100%	< 80%	◀ 4
1 ▶	< 80%	90%	◀ 2

Different Displays by Battery Type :

- E-10, E-7, E-80, E-50 Shows battery charge status from 0% to 100% in 1% steps.*
- E-10S, E-80S Shows [< 80%] when 80% or less. Shows from 81% - 100% in 1% steps when the charge status is above 80%
- E-7S, E-50S Shows [< 70%] when 70% or less. Shows from 71% - 100% in 1% steps when the charge status is above 70%
- Other batteries Shows [---]

* Note: For E-50, Serial No. F015001 and earlier are non-digital batteries, therefore, it will display the same as E-50S ~ [< 70%]

[B3] : Battery Charge Status in Watt Hours (Wh's)

CAPACITY		B3	
3 ▶	85Wh	63Wh	◀ 4
1 ▶	75Wh	90Wh	◀ 2

Different Displays by Battery Type :

- E-10, E-7, E-80, E-50 Displays Wh from 0Wh in 1Wh steps*
- Other batteries Displays [---]

* Note: For E-50, Serial No. F015001 and earlier are non-digital batteries, therefore, display shows [---] only.

[B4] : Voltage and Current Readings During Charge

1 ▶	16.78V	0.00A
2 ▶	14.00V	2.16A
3 ▶	13.90V	2.18A
4 ▶	16.79V	0.00A

[B5] : Number of Charge Cycles (E-10, E-7, E-80, E-50 Only)

CYCLES		B5
3 ▶ 35	16	◀ 4
1 ▶ 56	---	◀ 2

● Other non-digital Li-Ion battery Shows [---]

* Serial No. A306201 and earlier of E-80 and Serial No. F015001 and earlier of E-50 are non-digital type. Displays shows [---] only.

[B6] : Remaining Charge Time Estimate (Li-Ion Battery Only)

CHG	TIME	LEFT	B6
3 ▶	2:21	1:30	◀ 4
1 ▶	---	1:30	◀ 2

Different Displays by Battery Type :

- E-10, E-7, E-80, E-50 Remaining charge time in minutes to reach full charge.
- Other Li-Ion batteries Shows [---] for Li-Ion, non-digital batteries, until constant voltage charge status is reached, the remaining time is displayed in minutes.

[B7] : Full Battery Information on Single Page

(Digital battery internal IC recorded information available only on CH1-CH4.)

CH1	G024258	B7
16.79V		0.85A
62Wh	99%	0:43
Ver 6.1		12C

Line 1 : Battery Serial No.

(E-10, E-7, E-80, E-50 Only)*

Line 2 : Charge Voltage / Current

Line 3 : Charge Capacity (Wh & %),

remaining charge time to full charge

Line 4 : Battery Version No. / No. of Cycles

- Other non-digital Li-Ion batteries Shos [---]
(Including Serial No. F015001 and earlier of E-50)

* Serial No. A306201 and earlier of E-80 are non-digital type, therefore, cycle No. shows [---] only.

■ C Mode : Charger Pages (C1 ~ C4)

Use the UP & DOWN Buttons to scroll between pages.

「 C1 」 : Number of Charge Units on Each Channel

Charge Units		C1
3 ▶ 2	6	◀ 4
1 ▶ 8	5	◀ 2

Displays the number of charge units the particular charger channel has been used to charge a battery. (1 X charge unit is counted when a battery has been subjected to a charge of 30 minutes or more.)

「 C2 」 : Displays Charge Version Information

Displays the chargers Serial No. / Program Version / Revision No. and Date of Program Install.

IDX	A303030	C2
VAL-4Si	V0.15	
Rev.	05-05110	
Mdate	2005/07/07	

Line 1 : Serial No.

Line 2 : Version No.

Line 3 : Revision No.

Line 4 : Date of Program Install

「 C3 」 : Error Code

1 ▶ Error # 07	C3
2 ▶ Normal	
3 ▶ Normal	
4 ▶ Normal	

When the LED status indicators flashes Red or Amber to warn of a fault, the LCD display will support this by displaying an error code to help identify and solve problems. (The full Error code list is on page 14.)

「 C4 」 : Power Supply Unit (PSU) Voltage

Displays the actual DC voltage. Records the minimum voltage of Power Supply to aid fault finding and service.

P · S · U	Voltage	C4
Real	24.4V	
Min	24.4V	

Real·····Current Voltage

Min·····Display the lowest voltage of Power supply if faulty.

* When output error (minimum output voltage value) is detected, normal display cannot be retrieved by resetting the minimum output voltage value on the charger display. Please contact your IDX dealer or appropriate IDX office for resetting.

■ S Mode : Set Up Pages (S1 ~ S4)

Use the UP & DOWN Buttons to scroll between pages.

[S1] : Setting Up a User Default Page

Any page can be set up as your preferred own default or favorite page. This default page is displayed as the first screen whenever POWER Switch is turned on.

SET - UP	S1
Selection of favorite page B2	

How to Set the Default Page :

For example, if you wish set page B2 as the default page.

- ① From the S1 page, push the CH Button. The current default page will flash.
- ② Scroll pages using UP & DOWN Buttons, and when the required page [B2 in this example] is flashing, push ENTER Button to set up your default page [B2]

[S2] : Change the Charging Voltage

From this page, you can change the charging voltage for Li-Ion batteries, channel by channel.

SET - UP	S2
Charge Voltage	
3 ▶ 16.8V	16.8V ◀ 4
1 ▶ 16.4V	16.4V ◀ 2

* Voltage setting range : 16.4V ~ 16.8V

* Please contact your nearest IDX office to discuss the relative benefits and decision process in changing the charge voltage

How to Operate :

- ① From the S2 page push the CH Button and select a channel. When you push CH Button, voltage figures start flashing from ALL to Ch1, Ch2, Ch3 to Ch4.
- ② After choosing a channel or ALL, use the UP & DOWN Buttons to select the required voltage.
- ③ When the chosen voltage is reached, press the ENTER Button to set.

Remark : When [ALL] is flashing, all channel charging voltages are changed.

[S3] : Channel ID

The channel ID is designed for use with the BMS function.

SET - UP	S3
Channel ID	
999 - 3	999 - 4
999 - 1	999 - 2

* To change Channel ID, refer to the BMS software operation manual.

* Setting of Channel ID can be done via PC & installed BMS software.

Note: The charger does not have a direct setting function.

[S4] : Factory Reset (2 pages)

Various parameters that can be changed through the "User Pages" can be reset to the factory setting.

SET - UP	S4
Rset to Factory setting Yes	

S4 First Page

SET - UP	S4
Confiem	
Yes	No

S4 Second Page

How to Operate :

- ① From the first page of S4, push CH Button.
- ② When the second page is displayed, select Yes / No using UP or DOWN Buttons
Yes : Reset to Factory setting = Push SET Button.
No : Return to the first page of S4 = Push ENTER Button.

* Push ENTER Button to change a page from S Mode page to other mode pages.

Error Code List

VL-4Si / VAL-4Si

ERROR NO.	ERROR	ERROR DETAIL
1	Li-Ion batteries : exceeds pre-charge time limit	Battery Pack does not reach the correct voltage within the pre-charge time limit
2	Li-Ion batteries : incorrect pre-charge current value	Pre-charge current is incorrect (too low or too high)
3	Li-Ion batteries : exceeds charge voltage	Charge voltage exceeds the 17.5V limit for Li-Ion batteries
4	Li-Ion batteries : over-discharged	Battery is over-discharged (during pre-charge a cell was detected with a voltage below 1.5v) and cannot be charged
5	Li-Ion batteries : exceeds quick charge time limit	The quick charge time limit has been exceeded
6	Li-Ion batteries : quick charge current too low	The quick charge current is detected below the minimum level of 15V
7	Li-Ion batteries : exceeds charge voltage	Charge voltage exceeds the 17.5V limit for Li-Ion batteries
8	Ni-CD and N-MH batteries : exceeds pre-charge time limit	Battery Pack does not reach the correct voltage within the pre-charge time limit
9	Ni-CD and Ni-MH batteries : incorrect pre-charge current value	Pre-charge current is incorrect (too low or too high)
10	Ni-CD and Ni-MH batteries : exceeds charge voltage	Charge voltage exceeds 21V during quick charge
11		
12		
13	Ni-CD and Ni-MH batteries : incorrect quick charge current value	Quick charge current is incorrect
14	Ni-CD and Ni-MH Batteries : high temperature detected	Charging stopped as battery pack temperature exceeds 60°C
15	Incorrect Power supply voltage	PSU is supplying incorrect voltage (too low)
61	High temperature on Heat Sink (CH 1 & 3)	Heat Sink temperature exceeds 100°C (CH 1 & 3)
62	Temperature sensor fault (CH 1 & 3)	Thermistor is open (CH 1 & 3)
63	High temperature on Heat Sink (CH 2 & 4)	Heat Sink temperature exceeds 100°C (CH 2 & 4)
64	Temperature sensor fault (CH 2 & 4)	Thermistor is open (CH 2 & 4)
65	Discharge current exceeds the highest limit (VM, CH1)	AC / DC converted current exceeds 300mA
66	Discharge current exceeds the highest limit (VM, CH2)	AC / DC converted current exceeds 300mA
67	Discharge current exceeds the highest limit (VM, CH3)	AC / DC converted current exceeds 300mA
68	Discharge current exceeds the highest limit (VM, CH4)	AC / DC converted current exceeds 300mA
69	Discharge current below the lowest limit (VM, CH1)	AC / DC converted current has dropped below 300mA
70	Discharge current below the lowest limit (VM, CH2)	AC / DC converted current has dropped below 300mA
71	Discharge current below the lowest limit (VM, CH3)	AC / DC converted current has dropped below 300mA
72	Discharge current below the lowest limit (VM, CH4)	AC / DC converted current has dropped below 300mA
73	Discharge current exceeds the highest limit (BP, CH5)	AC / DC converted current exceeds 300mA
74	Discharge current exceeds the highest limit (BP, CH6)	AC / DC converted current exceeds 300mA
75	Discharge current exceeds the highest limit (BP, CH7)	AC / DC converted current exceeds 300mA
76	Discharge current exceeds the highest limit (BP, CH8)	AC / DC converted current exceeds 300mA
77	Discharge current below the lowest limit (BP, CH5)	AC / DC converted current has dropped below 300mA
78	Discharge current below the lowest limit (BP, CH6)	AC / DC converted current has dropped below 300mA
79	Discharge current below the lowest limit (BP, CH7)	AC / DC converted current has dropped below 300mA
80	Discharge current below the lowest limit (BP, CH8)	AC / DC converted current has dropped below 300mA
81~98	Allocated to the system	Allocated to the system
99	P12 LINE FIX LOW	JP1



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