



VER 1.0 TECHNICAL MANUAL

DS-OLBV1-FRS4



Warranty

- If a failure occurs within one year after the product is purchased, and the cause is not related to misuse or improper operation, the unit may be returned to our company by courier or freight service for free repair.
- The repair process may require several working days; we appreciate your understanding.
- If a failure occurs due to improper operation or handling, or if any failure occurs after one year from the purchase date, repair fees will be charged.
- As above, the defective unit may be returned to our company by courier or freight service.
- Please note that repairs also require several working days.
- If this product is used in highly critical systems, we strongly recommend preparing a spare unit to ensure system stability and continuous operation.
- When returning the product for repair, please be aware that our company cannot be held responsible for any damage caused during transportation.
- Before shipping, ensure the product is fully cushioned with protective materials and packaged in a way that prevents excessive vibration (recommended: below 0.5 G).
- The following services are not included in the product price. Additional charges will apply:
 - A) System suitability review and evaluation during machine design
 - B) Trial operation and adjustments
(If motor adjustment is required, the original motor configuration cannot be returned.)
 - C) On-site troubleshooting and repair services

Precautions for Use

- Please operate this product only within the rated specifications and under the environmental conditions stated in this manual.
- This product is not designed or manufactured for applications involving life-critical situations.
- If you intend to use the product for any special purposes, please consult our sales representatives for discussion and confirmation before use.
- Although we are committed to achieving the highest quality and customer satisfaction, users must implement appropriate safety designs, such as redundant protection, fire-prevention measures, and malfunction-prevention mechanisms, to avoid accidents, fire hazards, or social damage resulting from system failures.
- To continuously improve product performance, specifications of this product may be changed without prior notice.

CONTENTS

1. Product Introduction	4
1.1 Functional Features	4
1.2 Technical Specifications	4
1.3 Dimensions	5
2. Diagrams and Interface Definition	5
2.1 Interface Overview Diagram	5
2.2 Power & Motor Interface Definition (CN1)	6
2.3 Control Signal Interface Definition (CN2)	6
3. LED Indicators	6
3.1 Status Display	6
3.2 Alarm Display	7
4. Frequency Modulation Voltage	7
5. Power Supply	7
5.1 Voltage	7
5.2 Current	8
5.3 Regenerative Current	8
6. Signal Inputs	8
6.1 Enable Signal: EN	8
7. Signal Outputs	9
7.1 Alarm Output: ALM	9
8. Wiring Requirements	9
8.1 Wiring Method	9
8.2 Precautions	9
9. Motor Connection	10
9.1 Motor Wiring Method	10
10. Parameter List	11
10.1 Basic Status (Read Only)	11
10.2 Basic Parameter Settings	11
10.3 Motor Parameter Settings	11
10.4 Control Parameters (Category 05)	11
10.5 Input Port Configuration	12
10.6 Output Port Configuration	12

1. Product Introduction

This high-performance intelligent voice-coil motor driver offers simple control, easy implementation, and excellent adaptability. It delivers stable and reliable quality with outstanding performance.

The product supports RS485 communication, motion control, multiple digital I/O channels, and provides low heating, high operating speed, and reduced vibration and noise.

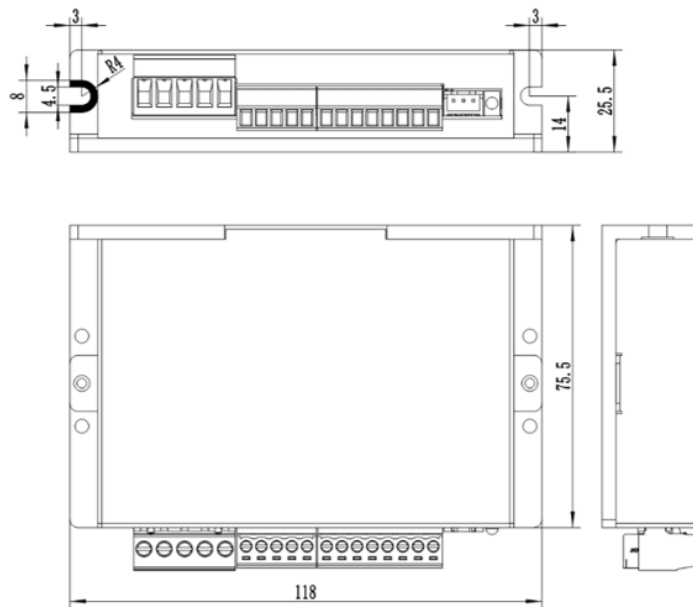
1.1 Functional Features

- Input Power: DC 18V–52V, DC 24V or DC 48V is recommended.
- Maximum Peak Current: 18A, duration \leq 2 seconds.
- Built-in RS485 debugging function, frequency regulator, and current regulator.
- Frequency Adjustment Range: 0.1–500.0 Hz (Actual maximum operating speed depends on motor characteristics; adjustable up to 3000.0 Hz.)
- Protection Functions: Overvoltage, undervoltage, overcurrent, and internal overtemperature alarms.

1.2 Technical Specifications

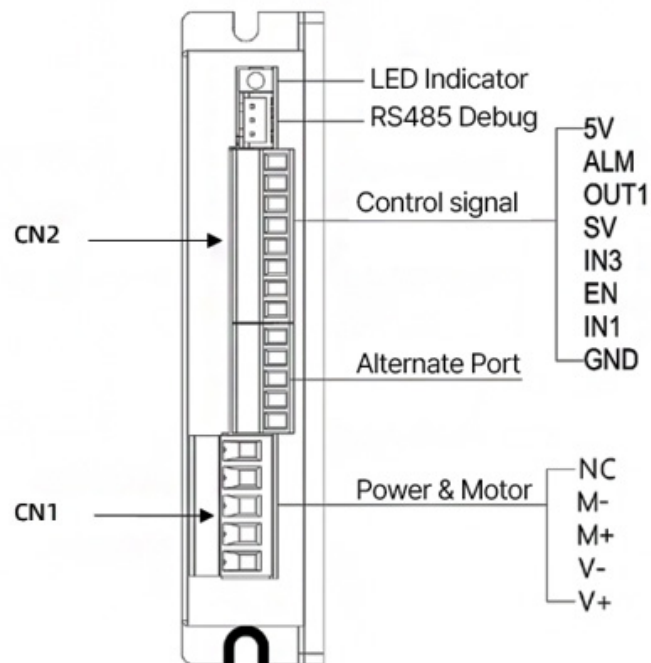
Drive model		DS-OLBV1-FRS4	
Maximum Continuous Current		6A	
Maximum Peak Current		18A (duration \leq 2 seconds)	
Maximum Output Power		100W	
Overvoltage Protection		60 VDC	
Undervoltage Protection		11 VDC	
Internal Overtemperature Point		80°C	
Initialization Time		2 seconds	
Input Signals	3 input channels	General Input IN1	Input voltage H = 4–5V, L = 0–0.8V
		Enable Signal EN	
		General Input IN3	
Output Signals	2 general-purpose output channels	General Output OUT1	Open-collector output, max. voltage 30 VDC, max. current 10 mA
		Alarm Output ALM (default)	
External Frequency Adjustment Input		0–5V, \geq 1 mA, or external 10 k Ω potentiometer. Frequency adjustment range: 0.1–500.0 Hz	
Dimensions (excluding terminal connectors)		118 × 75.5 × 25.5 mm	
Weight		Approx. 300 g	
Environment	Operating Environment	Avoid dust, oil mist, and corrosive gases	
	Humidity	<85% RH, no condensation	
	Operating temperature	–15 to 50°C	
	Heat Dissipation	Install in a ventilated environment	

1.3 Dimensions



2. Diagrams and Interface Definitions

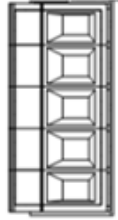
2.1 Interface Overview Diagram



Note 1

The RS485 debugging port uses a 2.5-mm pitch, 3-pin right-angle terminal.

2.2 Power & Motor Interface Definition (CN1)

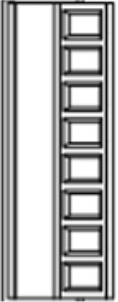
Terminal	Diagram	Pin	Signal Name	Description
CN1		1	NC	-
		2	M-	Motor M-
		3	M+	Motor M+
		4	Power V-	Power supply negative input
		5	Power V+	Power supply positive input
		6	NC	-



Note 2

The power input and motor outputs use a 5-pin, 5.08 mm pitch terminal block. Please ensure correct wiring of the power supply and motor, and pay attention to polarity. (For detailed wiring instructions, refer to the section "Wiring Requirements.")

2.3 Control Signal Interface Definition (CN2)

Terminal	Diagram	Pin	Signal Name	Description
CN2		1	5V	5 VDC output
		2	ALM	Alarm output
		3	OUT1	General-purpose output 1
		4	SV	External speed-adjustment input signal
		5	IN3	General-purpose input 3
		6	EN	Enable signal
		7	IN1	General-purpose input 1
		8	GND	Common ground



Note 3

The control signal interface uses an 8-pin, 3.81 mm pitch right-angle terminal. Please ensure proper wiring. (For detailed wiring instructions, refer to the section "Wiring Requirements.")

3. LED Indicators

This product is equipped with one bi-color LED (red/green) for status indication.

3.1 Status Display

Method : The indicator flashes according to the number of pulses corresponding to each state (0.5s LOW + 0.5s HIGH per cycle), followed by 2 seconds HIGH, then repeats.

Status Function	Code	LED Indication	Description
Motor Stopped	2	Green flashing	Driver is offline
Motor Running	3	Green ON	Motor is running

3.2 Alarm Display

Method : The indicator flashes according to the number of pulses corresponding to each alarm (0.5 s LOW + 0.5 s HIGH per cycle), followed by 2 seconds HIGH, then repeats.

Alarm Function	Code	LED Indication	Description
Motor Overcurrent	10	1 Green + 1 Red	Motor phase overcurrent or driver fault
Overvoltage	14	1 Green + 3 Red	Power input > 60 V
Undervoltage	13	1 Green + 4 Red	Power input < 11 V
Other Faults	Others	1 Green + 5 Red	Other hardware faults

4. Frequency Modulation Voltage

This driver supports frequency control through an external potentiometer.

The motor operating frequency can be adjusted from 0.1 Hz up to the rated maximum frequency (default: 500.0 Hz).

The rated maximum frequency range is 0.1–500.0 Hz; however, the actual maximum frequency depends on the motor characteristics and can be configured via the debugging software, up to a maximum of 3000.0 Hz.

To use an external potentiometer (10 kΩ) for frequency adjustment, connect the two fixed terminals of the potentiometer to GND and 5V, and connect the wiper terminal to the SV pin.

Alternatively, other control units (such as a PLC or microcontroller) may input an analog voltage to the SV pin (referenced to GND) to achieve frequency modulation.

The acceptable input range of the SV port is 0–5 VDC, corresponding to a motor frequency range of 0.1 Hz to the rated frequency.

5. Input Power

5.1 Voltage

The allowable operating voltage range of the driver is DC 18–52 V, and a DC 24 V or DC 48 V power supply is recommended.

A voltage-stabilizing capacitor can absorb current spikes on the power line and prevent false protection triggers.

When operating the driver at the lower end of the voltage range, it is recommended to connect a large stabilizing capacitor in parallel at the power input to avoid undervoltage alarms caused by unstable supply voltage.

It is not recommended to operate the driver with a supply voltage below 11 V, as its operation may become unreliable.

When using a regulated power supply and the supply voltage is close to 52 V, it is advisable to implement a voltage-clamping circuit at the power input to prevent the supply voltage from exceeding 52 V, which would otherwise trigger an overvoltage alarm and stop the driver.

When using an unregulated power supply, ensure the no-load output does not exceed 52 V DC.

5.2 Current

In practice, the required current depends on the motor model, voltage, speed, and load conditions.

The actual input current is typically much lower than this maximum value because the driver adopts a switching-type amplifier, converting a high-voltage / low-current input into a low-voltage / high-current output.

Since the rated winding voltage of most motors is relatively low, the higher the driver's supply voltage (relative to the motor winding voltage), the lower the required input current.

5.3 Regenerative Current

When the motor decelerates, it acts like a generator and converts the load's kinetic energy into electrical energy.

Part of this energy is dissipated by the driver and the motor. However, if your application involves a large load operating at high speed, a substantial amount of kinetic energy may be converted into electrical energy.

A simple linear power supply typically includes a large internal capacitor that can absorb this energy without damaging the system.

Switching power supplies, however, may shut down under overvoltage conditions, and the excess energy may flow back into the driver, which can easily trigger an overvoltage alarm and may even damage the driver.

6. Signal Inputs

6.1 Enable Signal (EN)

The motor can be started or stopped by applying a signal to the EN terminal.

When the terminal is active, the motor runs; when inactive, the motor stops.

When the motor is stopped through the run/stop control terminal, it performs a natural stop, and the stopping behavior depends on the load inertia.

If this function is not required, the enable (offline) terminal may be left floating.

7. Signal Outputs

7.1 Alarm Output (ALM)

This terminal provides the driver's alarm output. It is an open-collector (OC) output, with a maximum withstand voltage of 30 VDC and a maximum saturation current of 10 mA.

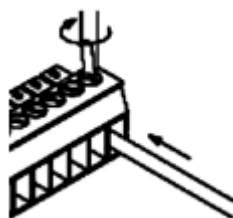
To obtain a valid output signal, connect a 3 k Ω –10 k Ω pull-up resistor between ALM and the power supply.

When no alarm is present, the ALM terminal remains ON (conducting).

8. Wiring Requirements

8.1 Wiring Method

After stripping the wire, insert it into the terminal block until it reaches the end, then tighten the screw clockwise to secure the wire.



[Wiring diagram]

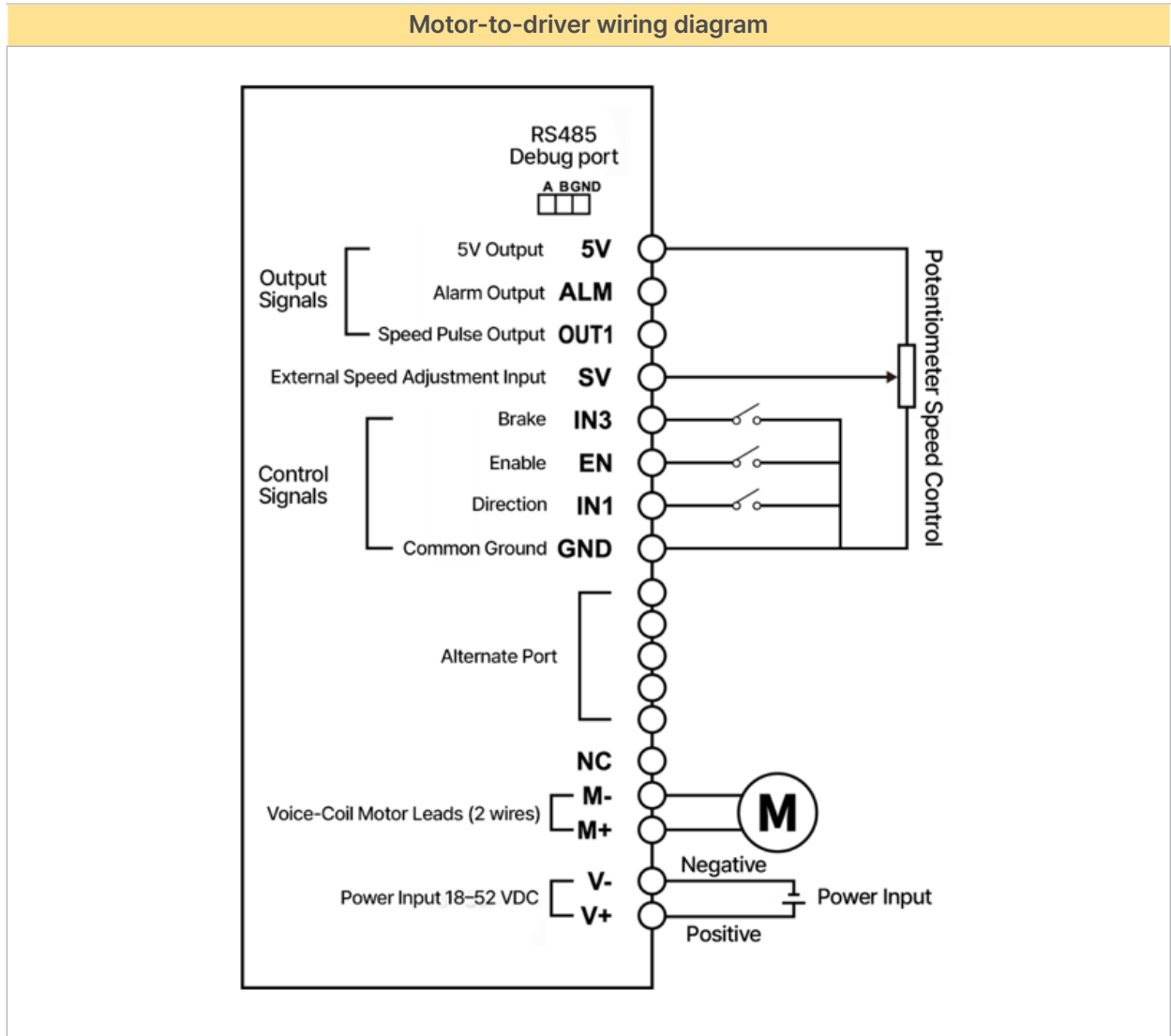
8.2 Warnings

- Ensure correct wiring of the power supply and motor, and observe proper polarity.
- Do not tin the wire ends before inserting them into the terminal; solder coating may cause poor contact.
- Use shielded cables for control signals. Ground the shield at the controller side only and leave it floating at the driver side.
- If multiple grounding points exist or grounding is unreliable, leave the shield unconnected to avoid interference.
- When one power supply feeds multiple drivers, connect each driver in parallel from the power source.
- Daisy-chain (series) wiring between drivers is not allowed.
- Never plug or unplug motor or power terminals while powered. Inductive voltage during stopping may damage the driver.
- Avoid exposed or tinned wire ends; they may cause overheating, poor contact, or accidental short circuits.

9. Motor Connection

i	Warning	<p>Before connecting the motor to the driver, ensure that the driver power is turned OFF. Make sure any unused motor leads are not shorted to other objects. Do not disconnect the motor while the driver is powered. Do not connect motor leads to ground or directly to the power supply.</p>
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9.1 Motor Wiring Method



i	Note 4	<p>The wire colors may vary depending on the motor model; always refer to the motor documentation for correct wiring.</p> <p>The motor wiring method shown above is for general reference only. For the exact wiring requirements, please follow the specifications provided in the motor's datasheet.</p>
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10. Parameter List

10.1 Basic Status (Read Only)

adr	word	Item	Description	Range / Unit								
0100	1	Motor Current	Real-time motor current	1% A								
0101	1	Input Voltage	Current input voltage	1% V								
0108	1	Fault Code	Alarm code; see Section 3.2. "0" indicates no fault	–								
0109	1	Operating Status	Driver operating status	–								
0110	1	Hardware Version	Driver hardware version	–								
0111	1	Software Version	Driver software version	–								
0119	1	Actual Speed Display	–	0.01 rps								
0135	1	Input Port Status	<table border="1"> <thead> <tr> <th>Data Bit</th> <td>Bit3</td> <td>Bit1</td> <td>Bit0</td> </tr> </thead> <tbody> <tr> <th>Input Port</th> <td>IN3</td> <td>IN2</td> <td>IN1</td> </tr> </tbody> </table>	Data Bit	Bit3	Bit1	Bit0	Input Port	IN3	IN2	IN1	
			Data Bit	Bit3	Bit1	Bit0						
Input Port	IN3	IN2	IN1									
<table border="1"> <thead> <tr> <th>Data Bit</th> <td>Bit1</td> <td>Bit0</td> </tr> </thead> <tbody> <tr> <th>Output Port</th> <td>OUT2</td> <td>OUT1</td> </tr> </tbody> </table>	Data Bit	Bit1	Bit0	Output Port	OUT2	OUT1						
Data Bit	Bit1	Bit0										
Output Port	OUT2	OUT1										
0136	1	Output Port Status	<table border="1"> <thead> <tr> <th>Data Bit</th> <td>Bit1</td> <td>Bit0</td> </tr> </thead> <tbody> <tr> <th>Output Port</th> <td>OUT2</td> <td>OUT1</td> </tr> </tbody> </table>	Data Bit	Bit1	Bit0	Output Port	OUT2	OUT1			
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Data Bit	Bit1	Bit0										
Output Port	OUT2	OUT1										

10.2 Basic Parameter Settings

adr	word	Item	Description	Range / Unit
0241	1	Motor Current	Current setting	10~1000/1% A 0.1 A ~ 10 A
0296	1	Operating Mode Selection	1: Internal pulse 4: Analog speed control Default: 1	1, 4
0298	1	Communication Address	Default: 1	1–255
0299	2	Communication Baud Rate	Default: 19200	1600–115200

10.3 Motor Parameter Settings

adr	word	Item	Description	Range / Unit
0200	1	Current Loop Kp	Default: 1000	5–20000
0215	1	Current Loop Ki	Default: 200	5–20000

10.4 Control Parameters (Category 05)

adr	word	Item	Description	Range / Unit
0274	1	Max Analog Speed Value	Maximum value for analog speed control	1–30000 0.1–3000.0 Hz
0307	1	Operating Frequency	Internal control frequency	1–30000 0.1–3000.0 Hz
0323	1	Control Command (internal-control mode only)	0: None 3: Speed mode 6: Deceleration stop Default: 0	0–6

10.5 Input Port Configuration

adr	word	Item	Description	Range / Unit
0400	1	IN1 Function Selection	0: None 3: Start speed mode 6: Deceleration stop 41: Reverse direction switch 45: Enable electromagnetic brake Default: 0	0–50
0401	1	IN2 Function Selection	Same settings as IN1 (Default: 0)	0–50
0402	1	IN3 Function Selection	Same settings as IN1 (Default: 0)	0–50
0429	1	General Digital Input Logic	–	–
0410	1	Virtual Input Setting – IN1	0: OFF (initial value 0) 1: ON (triggers the action assigned to IN1)	0–1
0411	1	Virtual Input Setting – IN2	0: OFF (initial value 0) 1: ON (triggers the action assigned to IN1)	0–1
0412	1	Virtual Input Setting – IN3	0: OFF (initial value 0) 1: ON (triggers the action assigned to IN1)	0–1

10.6 Output Port Configuration

adr	word	Item	Description	Range / Unit						
0420	1	OUT1 Function Selection	100: General output 101: Alarm output (No alarm → output ON; alarm → output OFF) Default: 101	100–101						
0421	1	OUT2 Function Selection	Same settings as OUT1 (Default: 100)	100–101						
0428	1	General Digital Output Control	Output port selection = 100 <table border="1" data-bbox="635 1224 1230 1321"> <thead> <tr> <th>Data Bit</th> <th>Bit1</th> <th>Bit0</th> </tr> </thead> <tbody> <tr> <td>Output Port</td> <td>OUT2</td> <td>OUT1</td> </tr> </tbody> </table>	Data Bit	Bit1	Bit0	Output Port	OUT2	OUT1	0–3
Data Bit	Bit1	Bit0								
Output Port	OUT2	OUT1								
0430	1	Digital Output Logic	Corresponding output logic <table border="1" data-bbox="635 1403 1230 1500"> <thead> <tr> <th>Data Bit</th> <th>Bit1</th> <th>Bit0</th> </tr> </thead> <tbody> <tr> <td>Output Port</td> <td>OUT2</td> <td>OUT1</td> </tr> </tbody> </table>	Data Bit	Bit1	Bit0	Output Port	OUT2	OUT1	0–3
Data Bit	Bit1	Bit0								
Output Port	OUT2	OUT1								



Note 5

1. The EEPROM has a limited write endurance (maximum 1,000,000 write cycles).



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