MITSUBISHI
VVVF TRANSISTOR INVERTER

– INSTRUCTION MANUAL –

Analog Signlal Output Unit

FR - ZLM / ZLME

Instruction Manual

Thank you for choosing the option unit for the Mitsubishi FREQROL series transistorized frequency inverter.
Please read this manual carefully to use the equipment to its optimum.

IMPORTANT NOTE

Analog signal output unit (FR−ZLM/ZLME)

(1) When used with **FR−Z300**, the FR−ZLM/ZLME allows any of the inverter output current (motor current), *output frequency and *output voltage magnitudes to be output as an analog signal. These signals are suitable to use as a monitoring signal of the inverter output state.

(2) When used with FR−Z200, only output current signal is available.

*These two outputs are only available from FR−ZLM/ZLME when used with the Z300 series.

—— please read this manual carefully. Functions and handling are different dependent upon the type of inverter (Z200 or Z300 series) in which **FR−ZLM/ZLME** is installed. ——

*Note : **FR−ZLM** is 0 to 3V output type and **FR−ZLME** is 0 to 5V or 0 to 10V output type.

CONTENTS

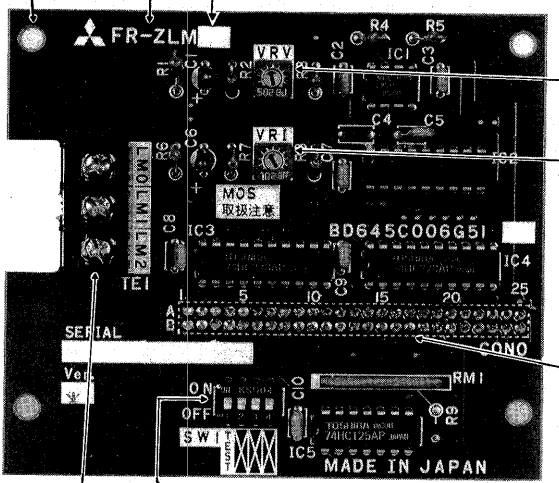
1. STRUCTURES

Installation hole (4 places)

Install onto the printed circuit board of the inverter

Type

When the card type is **FR−ZLME**, a character **E** is stamped here.



Output voltage gain adjusting potentiometer (VRV)

Output current gain adjusting potentiometer (VRI)

Used to fine-adjust the maximum output signal (meter full-scale value). **For adjustment, see page 8.**

Connector (Rear side)

The connector to connect with the mother board.

Test switch

Used to select test output. **For selection, see page 8.**

Terminal block (M3 screw)

Used to connect load meters, etc. **For wiring, see page 4.**

Accessories : Check that eight installation pins are supplied with the unit.
2 sets of pin heights are applied for different mother boards, to ensure main connector sits firmly on P. C. B. location.

2. INSTALLATION

Remove the inverter cover and install the option unit using the following procedure :

2. 1 Pre-Installation Checks

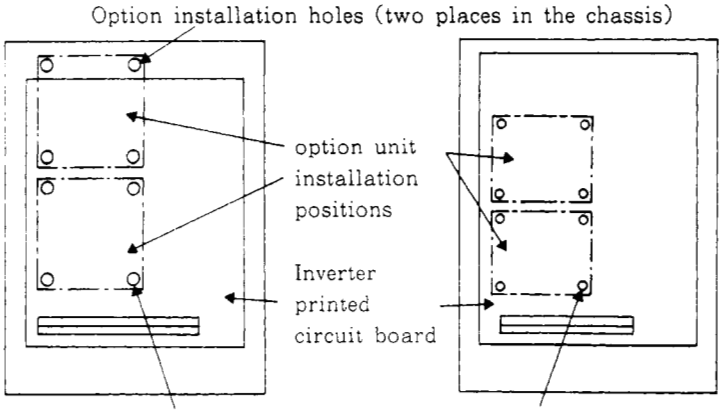
1) Check the inverter type.
   This option unit can be used with the FREQROL−Z300 series and Z200 series inverters.

Note : When this option unit is used with FREQROL−Z200 series, two EPROMs of the inverter have been interchanged with special EPROMs (ROM No. 8029 □. □ is version number) at the factory before shipping.
In case of FREQROL−Z300 series, it is not necessary to change EPROMs.

2) Check that the inverter power is off.
   The inverter may become faulty if the option unit is installed to the inverter with the power on. Dangerous high voltages are present whenever the power on lamp is glowing.

2. 2 Installation Position

The inverter can accommodate up to two option unit. The option unit may be installed at either of the two positions on the printed circuit board as shown below.



FR-Z300/Z200 1.5K or below

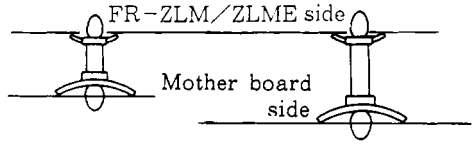
FR-Z320-2.2K to 22K or FR-Z220-2.2K to 55K
FR-Z340-2.2K to 22K or FR-Z240-2.2K to 55K

2. 3 Installation Procedure

(1) **Insert the correct installation pins into the four installation holes in the inverter printed circuit board.**

- **Selecting the installation pin**

  Two pin types (long and short) are supplied with the unit. Determine the pin size in accordance with the inverter model (type) used.

Inverter Model	Other Models	FR－Z320／Z220－2.2K to 11K FR－Z340／Z240－2.2K to 7.5K
installation pin size	Short (4 pieces) Long (4 pieces) 	

- **Direction of pin installation**

  Insert the longer support cushion end of the installation pin into the installation hole in the inverter printed circuit board.

(2) **Securely fit the option unit into the installation pins.**

At this time, the connector of the option unit is fitted into the connector pins on the inverter printed circuit board. Take care not to bend any connector pins. Visually check correct seating alignment of option to connector on mother board.

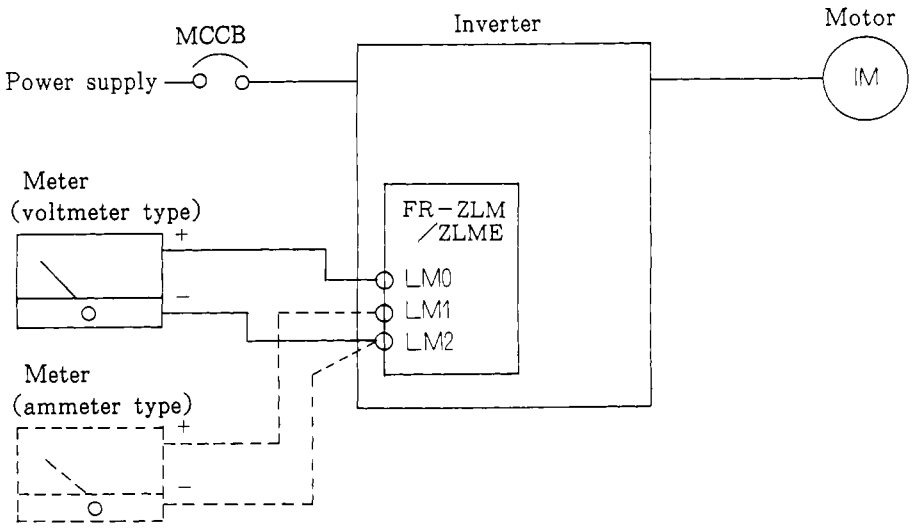
Check point

- Check that the unit connector has been fitted into the inverter connector at the correct position.
- Check that there is no clearance between the connectors.
- Check that the heads of the installation pin have been securely inserted into the installation holes of the inverter printed circuit board and option unit.

3. WIRING

3. 1 Connection of the Appropriate Meter

Connect a voltage or current type meter as shown below :



Note : The wiring distance of the meter must be within 10m of the inverter for accurate results.

3. 2 Terminals

Symbol	Terminal Function
LM0	Voltage output terminal (for connection of the voltmeter)
LM1	Current output terminal (for connection of the ammeter)
LM2	Common terminal for LM0 and LM1.

4. 1 Output Setting (FR−Z300 only)

Any of the inverter output current, output frequency and output voltage can be selected and output to the meter, etc. Set the required output type from the parameter unit.

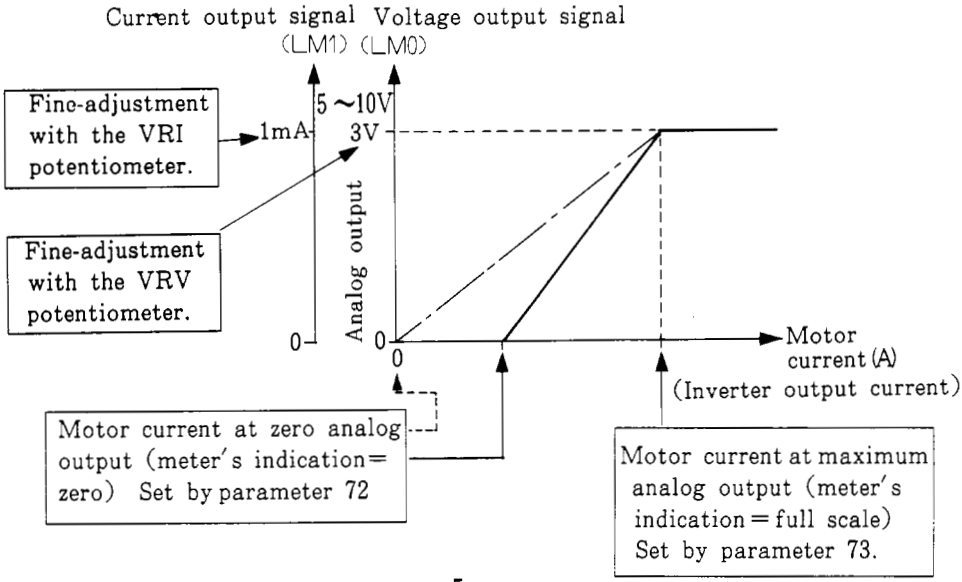
Setting method to select required output signal.

PU OP → SET → 2nd → 7 → 4 → Set value → WRITE

Parameter No.	Set Value	Output Type
7 4	0	Output current
	1	Output frequency
	2	Output voltage

4. 2 Display of the Output Current

Define the zero analog output (meter zero scale) point and maximum analog output (full scale) point as shown below to output the inverter output current (motor current) at the analog output (meter output signal) of 0 to 3 V DC (FR−ZLM), or 0 to 10V DC (FR−ZLME), or 0 to 1 mA DC.

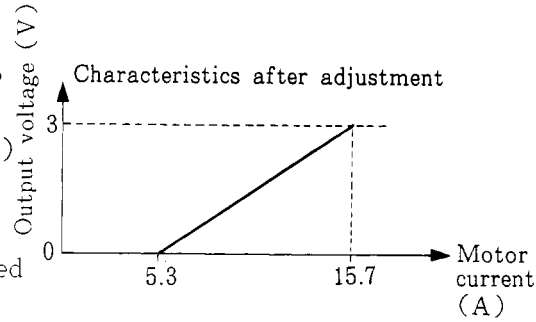


〔Setting example〕

The following example makes adjustment, using a voltmeter (3V full-scale), with **FR−ZLM**, so that zero-scale deflection is produced at the motor current of 5.3 A (no load current) and full-scale deflection is achieved at 15.7 A

Preparations

- Set the output type to the output current (see page 5). Pr−74(0)
- Stop the motor. (Switch off the start signal. The motor need not be connected.)



Set the test switch to ON.

↓

Turn the VRV potentiometer so that the load meter reads the full-scale value.

↓

Set the test switch to OFF.

↓

Set the current at the load meter zero-scale value to 5.3A using the parameter unit (FR−PU01E).

PU OP → SET → 2nd → 7 → 2 → 5 → · → 3 → WRITE

7 2 → Parameter 72

5 · 3 → 5.3A

↓

Set the current at the load meter full-scale value to 15.7A.

PU OP → SET → 2nd → 7 → 3 → 1 → 5 → · → 7 → WRITE

7 3 → Parameter 73

1 5 · 7 → 15.7A

4. 3 Display of the Output Frequency and Output Voltage (FR−Z300 only)

The magnitude of the output frequency or output voltage at the analog output of 0 to 3 V (or 0 to 10V) DC or 0 to 1 mA DC can be set in a manner similar to that in Section 4.2 "Display of the Output Current."

The output type (parameter 74) MUST be set to the output frequency or output voltage BEFORE making the magnitude Setting.

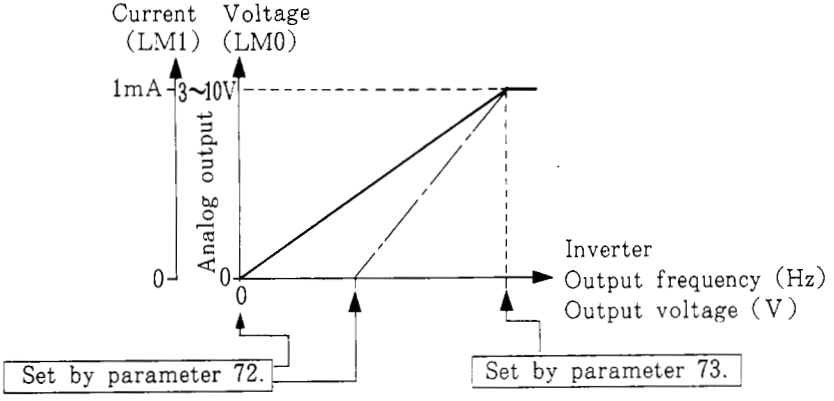


Table 1 Parameter List

1 FR−Z300

Parameter No.	Function	Setting Range	Factory Setting	Remarks
72	zero-scale output current	0 to 500A	50% of the rated inverter output current	Parameter 74 set Value=0
	Zero-scale output frequency	0 to 360Hz	0Hz	Parameter 74 set Value=1
	Zero-scale output voltage	0 to 700V	0V	Parameter 74 set Value=2
73	Full-scale output current	0 to 500A	120% of the rated inverter output current	Parameter 74 set Value=0
	Full-scale output frequency	0 to 360Hz	60Hz	Parameter 74 set Value=1
	Full-scale output voltage	0 to 700V	※1	Parameter 74 set Value=2
74	Output type selection	0, 1, 2	0	0 : output current 1 : output frequency 2 : output voltage

※1 : 200V series inverter 260V, 400V series inverter 520V

2 FR−Z200

Parameter No	Function	Setting Range	Factory Setting
72	zero−Scale output current	0 to 110.0A	50% of the rated inverter output current
73	full−scale output current	0 to 260.0A	120% of the rated inverter output curqent

4. 4 Test switch (SW 1)

By Setting the test switch to ON, the load meter output is maximized independently of the output current value, etc. This is useful When adjusting the meter full-scale value (maximum output signal).

Switch	Application	Factory setting
OFF	Ordinary use	
ON	For the meter full-scale value adjustment	

Note : After adjustment, the test switch MUST be set to OFF.

4. 5 Adjustment Potentioneter (VRI, VRV)

The meter full-scale value can be fine-adjusted by the potentiometer.

FR−ZLM

Potentiometer	Description	Adjustable Range	Factory Setting
VRV	voltmeter	2.0 to 3.9 V	Approx. 3V
VRI	For ammeter	0.95 to 1.2mA	Approx. 1mA

FR−ZLME

Potentiometer	Description	Adjustable Range	Factory Setting
VRV	voltmeter	3.8 to 11.4V	Approx. 5V
VRI	For ammeter	0.95 to 1.2mA	Approx. 1mA

Note : The output of terminal LM 0 or LM 1 does not exceed the voltage or current set by the corresponding potentiometer.

Typical adjusting procedure

Set the test switch to ON, fine-adjust the meter full-scale value, and set the test switch to OFF.

- For voltmeter
  Fine-adjust the meter full-scale value with the VRV potentiometer.
- For ammeter
  Fine-adjust the meter full-scale value with the VRI variable resistor.

Note

Although the maximum output is factory-adjusted to 3V or 5V and 1mA, the meter may not indicate the full-scale value because of the wiring length of the meter, etc. Hence, the meter full-scale value must be fine-adjusted with the corresponding potentiometer before use.

5. INSTRUCTIONS

(1) This option unit is designed for use in the FR−Z300 and FR−Z200 series inverters and cannot be used with any other series of inverters.

(2) When this unit is used on FR−Z200 series, ROMs on the inverter must be changed with exclusive ROMs No. 8029□ (□is version). In most case, these ROMs are changed and FR−ZLM/ZLME card is mounted on the inverter at the factory before shipping.
<When FR−ZLM/ZLME card is mounted on the standard type FR−Z200 by the customer, ROMs must be interchanged by the customer.>

(3) The option unit MUST NOT be used outside the inverter.

(4) The voltage output signal (terminal LM0) and current output signal (terminal LM1) MUST NOT be used (connected) simultaneously.

6. SPECIFICATIONS

(1) Output signals

Voltage output (across terminals LM0 and LM2) : 0 to 3V DC (FR−ZLM)

0 to 10V DC (FR−ZLME)

Current output (across terminals LM1 and LM2) : 0 to 1mA DC

(2) Output resolution

Voltage output : 3 mV

Current output : 1 μA

(3) Display accuracy

10% of the full-scale output value

(4) Applicable meter

- Voltage type : DC voltmeter, 3−10V full-scall.
- Current type : DC ammeter, 1mA full-scale (internal impedance 800 Ω or less)
- Wiring length : Max. 10 m

(5) Output display

Any of the inverter output current (motor current), or output frequency (Z300) , or output frequency only (Z200) .

OTHER OPTIONS AVAILABLE (Maximum−2 per Inverter)

FR−ZDA —— BCD/Binary Digital Input Option.
FR−ZDL —— Datalink Option for MELSEC−NET MINI.
FR−ZNS —— Auto Restart.
FR−ZOR —— Orientation Control.
FR−ZPG —— Pilot (Tacho) Generator Feed back.
FR−ZPI —— P. I. Controller.
FR−ZRA —— Relay Output Card.
FR−ZRS —— RS232, 422, 485 Communications.
FR−ZTA —— Real Time Clock.
FR−ZTO —— Time Schedule Control.
FR−ZTS —— Torque Smoothing.

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