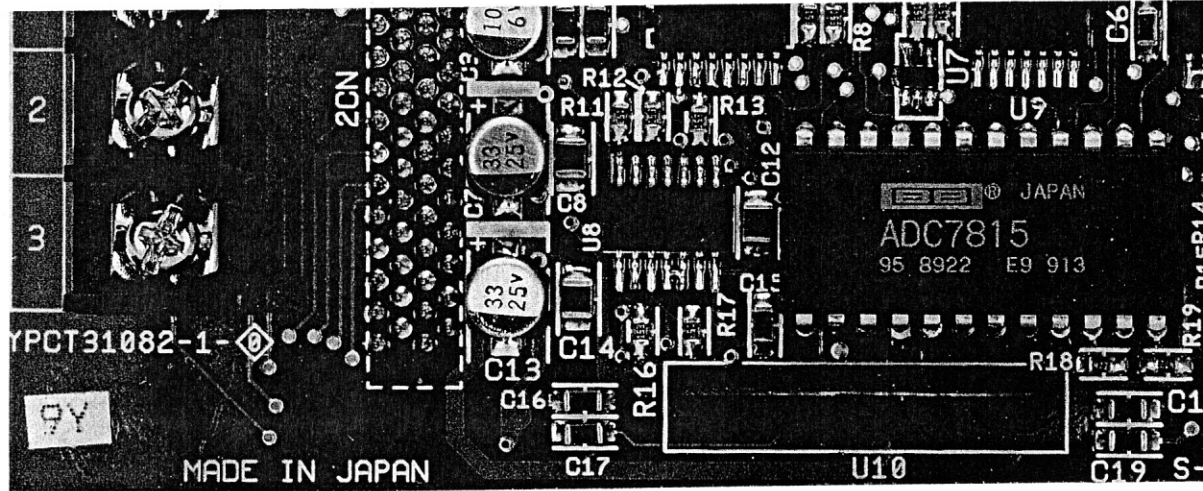


# ANALOG SPEED REFERENCE CARD

FOR Varispeed SERIES OPTION CARD

MODEL AI-14U



Before initial operation, read these instructions thoroughly, and retain for future reference.



YASKAWA

Analog speed reference card AI-14U (hereinafter called AI-14U), an on-board type optional card, is mounted on the inverter control board. This enables analog speed reference setting with higher accuracy and higher resolution.

When the AI-14U is used to set speed reference, select inverter system constant 4 (run signal selection 1) so that external terminal input (analog frequency reference input) will be set as main speed frequency reference. Also select system constant 8 (run signal selection 5) so that frequency reference from the optional card will be effective.

- Sn-04: [ ] 0 Set 0 as the 1st digit, where 1 has been set prior to shipping.
- Sn-08: [ ] 0 Set 0 as the 1st digit, where 0 has been set prior to shipping.

Analog input signal gain of AI-14U can be adjusted by setting program constant bn-05 of the inverter. For details, refer to "INPUT SIGNAL LEVEL SETTING".

This AI-14U is applicable for VS-616G3 or VS-616H3 series.

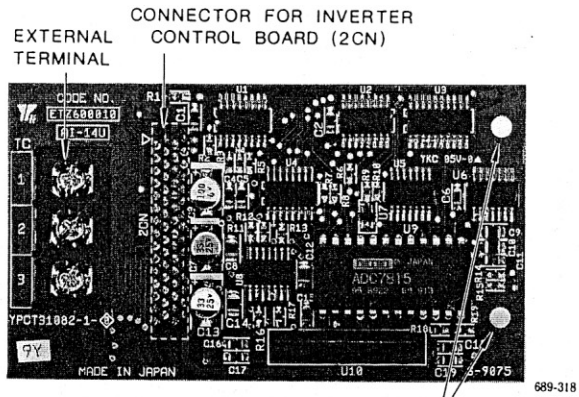
### CAUTION

- (1) Read this instruction paper and the instruction manuals of the inverter (VS-616G3 or VS-616H3) which will be provided with this AI-14U before use.
- (2) When connection from/to AI-14U connector or external terminals is required, turn off the inverter AC main circuit power supply and check that the inverter CHARGE indicator lamp is out.

## INSTALLATION TO INVERTER (Fig. 1)

- (1) Turn off AC main circuit power supply and remove inverter face plate. Then check if CHARGE indicator lamp is out.
- (2) Connect AI-14U connector 2CN to connector 2CN (number of pins: 60 poles) on the inverter control board. Then insert optional card supports on the control board to AI-14U support mounting holes (2 places) completely in order to stabilize AI-14U.
- (3) After mounting AI-14U, perform connection with peripheral equipment. When the connection is completed, replace inverter face plate.

Name	Code No.	Input Method
Analog Speed Reference Card AI-14U	73600-C001X	<ul style="list-style-type: none"> <li>• Input signal level: 0 to 10VDC (input impedance: 20k<math>\Omega</math>)</li> <li>• 4 to 20mA (input impedance: 250<math>\Omega</math>)</li> <li>• Input resolution: 14 bits (1/16384)</li> </ul>



ANALOG SPEED REFERENCE CARD AI-14U

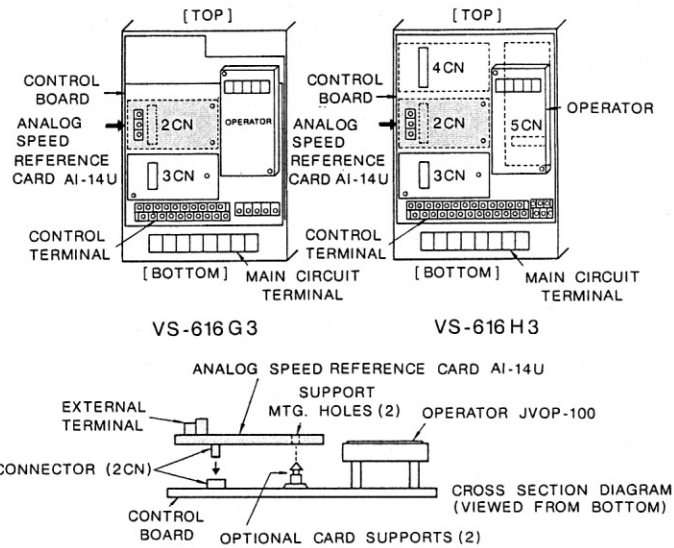
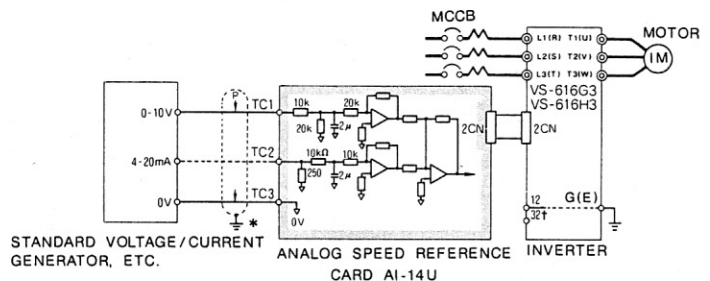


Fig. 1 Installation of Analog Speed Reference Card AI-14U

## INTERCONNECTION BETWEEN EQUIPMENT

Fig. 2 shows the inverter interconnection with AI-14U and peripheral equipment.



\* Connect shielded cable to control terminal ⑫ on the inverter control board.

† For VS-616H3, control terminal ⑬ on the control board can also be used for grounding.

Fig. 2 Interconnection Diagram

## PRECAUTIONS FOR WIRING

- (1) Separate control signal wiring (terminal TC1 to TC3) of AI-14U from main circuit wiring or other power lines.
- (2) Use shielded cable for control signal wiring and prepare its terminal ends as shown in Fig.3 in order to prevent malfunction caused by noise. Wiring length must not exceed 10m.
- (3) Connect terminals, which are not used for control signal input terminal TC1 or TC2, to 0V (terminal TC3).

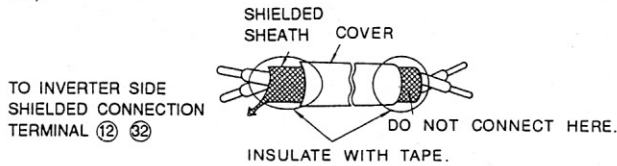


Fig. 3 Preparation of Shielded Cable Ends

## EXTERNAL TERMINAL FUNCTIONS

AI-14U has external terminals (3 poles) for connection with peripheral equipment. Table 1 shows the terminal functions.

Table 1 AI-14U External Terminal Functions

Terminal Symbol	Screw Size	Function	Signal Level	Linearity
TC1	M3	Analog voltage input	Input voltage: 0 to 10V Input impedance: 20k $\Omega$ Input resolution: 1/16384 (14 bits)	$\pm 0.1\%$
TC2		Analog current input	Input current: 4 to 20mA Input impedance: 250 $\Omega$ Input resolution: 1/16384 (14 bits)	
TC3		Common terminal	0V	—

Note : Input signal level (input voltage, input current) of TC1 and TC2 analog signals can be adjusted by setting the inverter program constants. For details, refer to "INPUT SIGNAL LEVEL SETTING."

## PRECAUTIONS FOR ANALOG SPEED REFERENCE ACCURACY

Analog speed reference is converted by 1/16384 resolution. In addition to wirings, voltage source accuracy to be used for analog speed reference must be considered. To improve speed control accuracy, use high-precision stabilized power supply for voltage source.

## INPUT SIGNAL LEVEL SETTING

Input signal gain and bias of external terminal TC1 or TC2 can be adjusted by setting program constant bn-05 or bn-06 respectively. Table 2 shows the setting contents.

Table 2 Adjustment of Input Signal Gain and Bias

Program Constant No.	Contents	Setting Range	Setting Unit	Initial Value	Applicable Inverter
bn-05	Input signal gain (10 V / [XXXX]%)	0.0 to 1000.0%	0.1%	10 V / 100.0%	VS-616G3 VS-616H3
bn-06	Input signal bias	-100 to 100%	1%	0%	VS-616G3
		-100.0 to 100.0%	0.1%	0.0%	VS-616H3

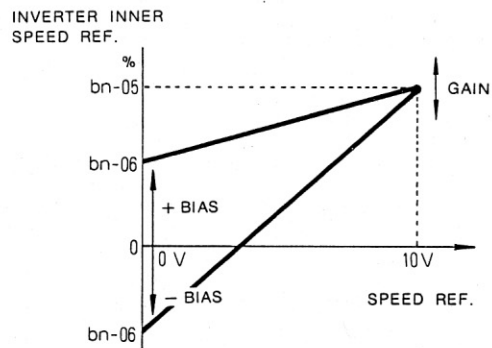


Fig. 4 Gain and Bias in Voltage Input (TC1 - TC3)

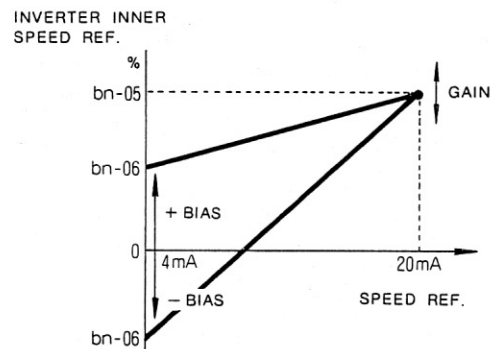


Fig. 5 Gain and Bias in Current Input (TC2 - TC3)

# ANALOG SPEED REFERENCE CARD

FOR Varispeed SERIES OPTION CARD

MODEL AI-14U

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