

# User's Manual

## Model NC220 Ai/CC-Link Converter

IM 77P01D01-01E

Thank you for purchasing the NC220 Ai/CC-Link Converter. For the correct use of this product, read through this manual before use.  
This user's manual should be kept in safety place.

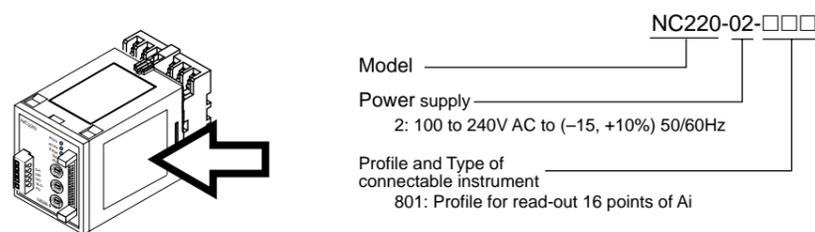
**YOKOGAWA**  
Yokogawa Electric Corporation

IM 77P01D01-01E  
2nd Edition : Jun. 1, 2004

### ■ Checking Product Specifications and Contents of Packing

#### (1) Model Number and Suffix Code Check

Check that the model number and suffix code shown on the nameplate attached on the right side of the product are as ordered.



#### (2) Contents of the Packing Check

Check that the packing contains the following items.

- NC220 main unit : one
- User's Manual (this book: IM 77P01D01-01E) : one

## 1. CAUTIONARY NOTES FOR SAFE USE OF THE PRODUCT

The following safety symbol is indicated on the product and the manual to ensure safe use.

### CAUTION

If this symbol is indicated on the product, the operator should refer to the explanation given in the user's manual in order to avoid personnel injury or death to either themselves or other personnel, and/or damage to the instrument. The manual describes the special care that the operator should exercise to avoid or other dangers that may result in injury or loss of life.

The following symbol marks are used only in this manual.

### IMPORTANT

Indicates that operating the hardware or software in particular manner may damage it or result in system failure.

### NOTE

Draws attention to information that is essential for understanding the operations and/or features of the product.

#### <7> Remote device station number setting switch

Setting of remote device station number within from 01 to 61. (01: when shipping)

### IMPORTANT

One NC220 converter occupies 4 station. Therefore keep attention to the number that is assigned to the CC-Link unit (master unit). For detail refer to the manuals that master unit specify

#### <8> Communication speed setting switch

Maximum overall communication length depends on communication speed.

Setting of switch	Communication speed	Maximum overall communication length
0	156 kbps	1200 m
1	625 kbps	600 m
2	2.5 Mbps	200 m
3	5 Mbps	150 m
4	10 Mbps	100 m

#### <9> Communication connector (CN1)

Connector for the connection of dedicated CC-Link cable

## 2. GENERAL

The Model NC220 Ai/CC-Link Converter inputs 16 points of analog outputs (1 to 5 V DC) from signal converter-(Yokogawa Electric Corporation's D Series, VJ Series Signal Converters)-and converts them to digital signals (0 to 10000). And via CC-Link unit, these digital data are transmitted to PLCs such as MELSEC(Mitsubishi Electric corporation's sequencer) and so on.

Note: When ordering, the scaling of -30000 to 30000 for digital signals can be specified.

## 3. PREPARATION BEFORE OPERATION

Prepare following items before operation.

1. NC220 (required number)
2. NA200 (required number of cables for network signal converters; separate order for relative accessories)
3. Exclusive cables for connection between NC220 and CC-Link (required number)
4. Power line (refer to the followings)

Parts name	Specifications
Power line/grounding wire	600 V vinyl isolated wire JIS3307 0.9 to 2.0 mm <sup>2</sup>

## 4. NAMES AND FUNCTIONS OF FRONT-PANEL

#### <1> Operating condition indicator LED (RDY)

light on : normal  
light off : abnormal

#### <2> Operating condition indicator LED (RUN)

light on : normal communication  
light off : communication interrupted (time out)

#### <3> Operating condition indicator LED (ERR)

light on : communication data error  
light off : normal communication

#### <4> Operating condition indicator LED (SD)

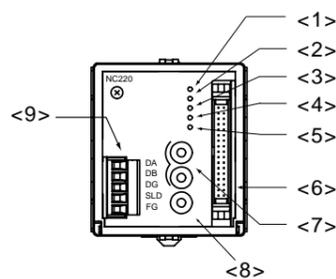
light on : data send

#### <5> Operating condition indicator LED (RD)

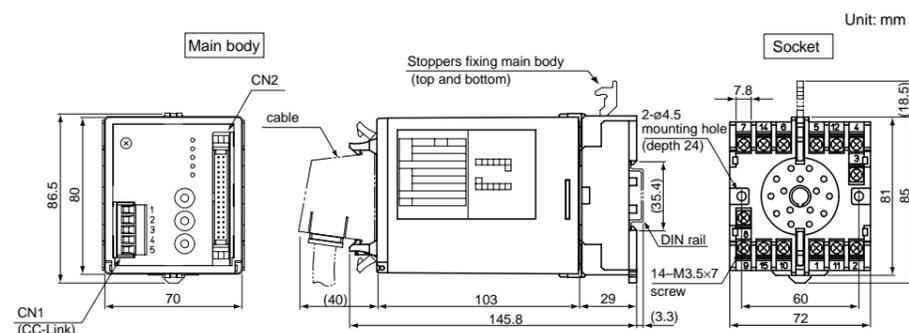
light on : data receive

#### <6> Input connector (CN2)

Connector for analog input signals



## 5. DIMENSIONS



Note : CN1; Connector for CC-Link connection  
CN2; Connector for analog inputs

## 6. MOUNTING METHODS

### ● Wall mounting

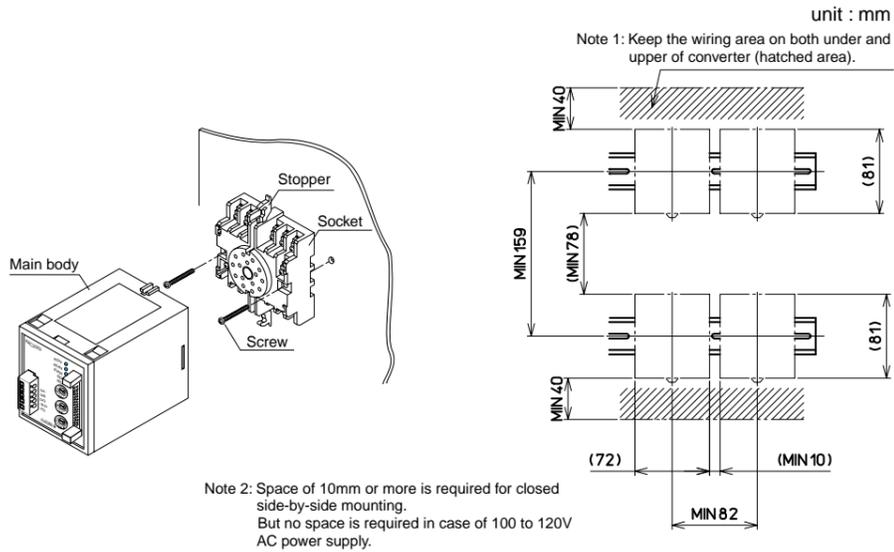


Fig.6-1 Wall mounting

Fig.6-2 Mounting dimensions

Unlock the stoppers (top and bottom), and pull out the main body from the socket. Then fix the socket on wall with two M4 screws. Insert the main body to the socket and fix the body with stoppers (top and bottom).

### ● DIN rail mounting

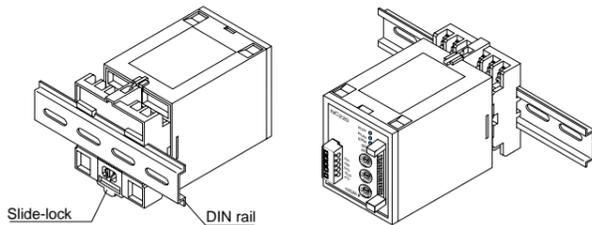


Fig.6-3 DIN rail mounting

Insert DIN rail into the upper portion of the DIN rail groove at rear of socket of the converter and fix the converter to the DIN rail with slide-lock at the lower of the converter.

## 7. INSTALLATION LOCATION

- Avoid installation in such environments as follows.
  - The place to be exposed to the corrosive gas -such as sulfide gas - or sea breeze
  - The place where the visible dust exist
  - The place to be exposed to the direct sunlight
- If there is a possibility that lightning could induce a high surge voltage on the power and signal lines, provide dedicated lightning arrestors for each sides on the lines between the field instrument and indoor instrument in order to protect the product.

## 8. EXTERNAL WIRING

### ⚠ CAUTION

Before carrying out wiring, turn off the power to the converter, and check that the cables to be connected are not alive with the tester or the like because there is a possibility of electric shock. Wiring must be carried out by persons who have basic electrical knowledge and practical experience.

Wires are connected to the terminals of the NC220 converter's socket. M3.5 screw terminals are provided for the connection of external signals. Flexible twisted wires and good contact of durable round crimp-on terminals are recommended for use.

### ⚠ IMPORTANT

- After wiring, check the model and specifications of the NC220 converter's body to be inserted to the socket for no-miss matching. If incorrect unit is inserted, we can't guarantee the operation.
- It may be damage for instrument if the power line is miss wiring.
- Power line and communication lines must be separated from noise occurrences. If so, we may not be guarantee.
- The other terminals excepting power line terminals should not be connected for other inter-connection terminals.

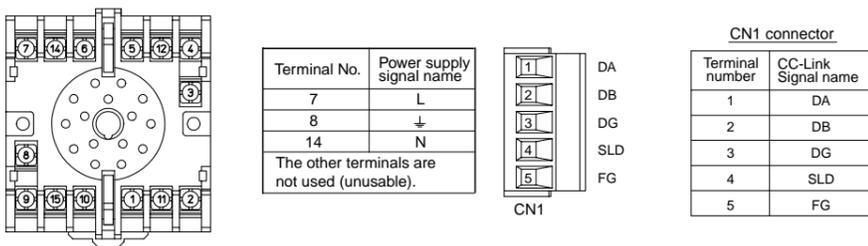
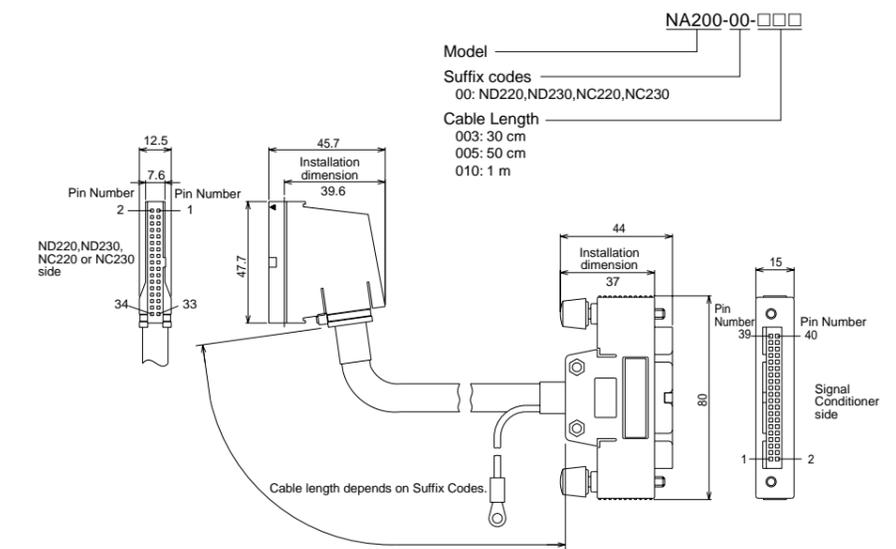


Fig.8-1 Terminal Arrangement

## 9. CABLE FOR NETWORK INSTRUMENT (NA200)



Adaptable Model	Connectable Signal Converter	Adaptable Nest Model
NC220	D series, VJ series	VJCE-011, DCE3□□3, DCP3□□3

## 10. TROUBLE SHOOTING

The followings explain basic trouble shooting methods for the NC220 usage. Refer to the respective user's manuals for the SEQUENCE CPU and the master unit.

### ● ERR lamp light on and off

Check Items	Recovery method
Is the station number or communication speed changed while normal operation?	Recover to the normal operation station number and communication speed.

### ● ERR lamp light on

Check Items	Recovery method
Is the station number or communication speed changed while power off?	Recover to the normal operation station number and communication speed.

### ● RUN lamp light off

Refer to the item of trouble shooting in user's manual for CC-Link master unit

### ● RDY lamp light on and off

It is under trouble.

### ● RDY lamp light off

Check Items	Recovery method
Is the power on?	Check the power line and the power supply. If there are good, it is under trouble.

### ● In case of that the digital data cannot read out or write in.

Check Items	Recovery method
Is the RUN lamp off?	Refer to the item of trouble shooting in user's manual for CC-Link master unit
Does the ERR lamp light on and off, or light off?	Check the contents of trouble by user's manual of the sequence CPU.
Does the RUN lamp of sequente CPU light on and off, or light off?	Check the contents of trouble by user's manual of the sequence CPU.
Does the RUN lamp of master unit light off?	Refer to the item of trouble shooting in user's manual for CC-Link master unit
Do the RD or SD lamps of master unit light on?	Refer to the item of trouble shooting in user's manual for CC-Link master unit
Are there the disconnecting or snapping of wiring for analog input signal line.	Check the wrong place, by means of appearance inspection, conduction test and so on of signal wiring.
Read out digital data by mean of disconnecting the analog input wire and applying test voltage (such as dry battery).	If the check of test voltage is normal, it is effected by the noise etc for external wiring. Check the wiring and grounding.

## 11. PROFILE

Please read out the measured data as following procedure.

### 【PROCEDEUR】

- (1) Read out Remote READY Flag (RX (n+7) B). And check that it is [1].
- (2) Read out the required data from (RWw n+0 ~ RWw n+F).

Remote Register

	(Read out area)		(Write in area)	
	Remote → Master	Contents	Master → Remote	Contents
No.1 input →	RWr n+0	No.1 Measured data + Bias setting data	RWw m+0	No.1 Bias setting data
No.2 input →	RWr n+1	No.2 Measured data + Bias setting data	RWw m+1	No.2 Bias setting data
No.3 input →	RWr n+2	No.3 Measured data + Bias setting data	RWw m+2	No.3 Bias setting data
No.4 input →	RWr n+3	No.4 Measured data + Bias setting data	RWw m+3	No.4 Bias setting data
No.5 input →	RWr n+4	No.5 Measured data + Bias setting data	RWw m+4	No.5 Bias setting data
No.6 input →	RWr n+5	No.6 Measured data + Bias setting data	RWw m+5	No.6 Bias setting data
No.7 input →	RWr n+6	No.7 Measured data + Bias setting data	RWw m+6	No.7 Bias setting data
No.8 input →	RWr n+7	No.8 Measured data + Bias setting data	RWw m+7	No.8 Bias setting data
No.9 input →	RWr n+8	No.9 Measured data + Bias setting data	RWw m+8	No.9 Bias setting data
No.10 input →	RWr n+9	No.10 Measured data + Bias setting data	RWw m+9	No.10 Bias setting data
No.11 input →	RWr n+A	No.11 Measured data + Bias setting data	RWw m+A	No.11 Bias setting data
No.12 input →	RWr n+B	No.12 Measured data + Bias setting data	RWw m+B	No.12 Bias setting data
No.13 input →	RWr n+C	No.13 Measured data + Bias setting data	RWw m+C	No.13 Bias setting data
No.14 input →	RWr n+D	No.14 Measured data + Bias setting data	RWw m+D	No.14 Bias setting data
No.15 input →	RWr n+E	No.15 Measured data + Bias setting data	RWw m+E	No.15 Bias setting data
No.16 input →	RWr n+F	No.16 Measured data + Bias setting data	RWw m+F	No.16 Bias setting data

#### ● Measured data (+ bias setting data) -Area for read out-

The values that converted analog to digital are stored in Read out area.

If there are Bias setting data in Write in area, the values that the measured data plus Bias setting values are stored.

If the measured value is out of range, the correspondent point over-range flag may be [1]. Refer to the following.

The scale range that the analog data are converted to digital data is 0 to 10000 in default when ordering, for shipping.

(For example) When the scale range is 0 to 10000, bias setting data is zero, and input value is 3V, [5000] is stored in Read out area of Remote register.

#### ● Bias setting data — Area for write in —

The bias setting data can be added to the data that are converted analog to digital.

(Setting range : -32767 to +32767)

Remote Input/Output

	(Read out area)		(Write in area)	
	Remote → Master	Contents	Master → Remote	Contents
RX n 0			RY n 0	
RX n 1			RY n 1	
RX n 2			RY n 2	
RX n 3			RY n 3	
RX n 4			RY n 4	
RX n 5	No.1 Positive range-over		RY n 5	
RX n 6	No.1 Negative range-over		RY n 6	
RX n 7	No.1 Burn-out		RY n 7	
RX n 8			RY n 8	
RX n 9	No.2 Positive range-over		RY n 9	
RX n A	No.2 Negative range-over		RY n A	
RX n B	No.2 Burn-out		RY n B	
RX n C			RY n C	
RX n D	No.3 Positive range-over		RY n D	
RX n E	No.3 Negative range-over		RY n E	
RX n F	No.3 Burn-out		RY n F	
RX (n+1) 0			RY (n+1) 0	
RX (n+1) 1	No.4 Positive range-over		RY (n+1) 1	
RX (n+1) 2	No.4 Negative range-over		RY (n+1) 2	
RX (n+1) 3	No.4 Burn-out		RY (n+1) 3	
RX (n+1) 4			RY (n+1) 4	
RX (n+1) 5	No.5 Positive range-over		RY (n+1) 5	
RX (n+1) 6	No.5 Negative range-over		RY (n+1) 6	
RX (n+1) 7	No.5 Burn-out		RY (n+1) 7	
RX (n+1) 8			RY (n+1) 8	
RX (n+1) 9	No.6 Positive range-over		RY (n+1) 9	
RX (n+1) A	No.6 Negative range-over		RY (n+1) A	
RX (n+1) B	No.6 Burn-out		RY (n+1) B	
RX (n+1) C			RY (n+1) C	
RX (n+1) D	No.7 Positive range-over		RY (n+1) D	
RX (n+1) E	No.7 Negative range-over		RY (n+1) E	
RX (n+1) F	No.7 Burn-out		RY (n+1) F	
RX (n+2) 0			RY (n+2) 0	
RX (n+2) 1	No.8 Positive range-over		RY (n+2) 1	
RX (n+2) 2	No.8 Negative range-over		RY (n+2) 2	
RX (n+2) 3	No.8 Burn-out		RY (n+2) 3	
RX (n+2) 4			RY (n+2) 4	
RX (n+2) 5	No.9 Positive range-over		RY (n+2) 5	
RX (n+2) 6	No.9 Negative range-over		RY (n+2) 6	
RX (n+2) 7	No.9 Burn-out		RY (n+2) 7	
RX (n+2) 8			RY (n+2) 8	
RX (n+2) 9	No.10 Positive range-over		RY (n+2) 9	
RX (n+2) A	No.10 Negative range-over		RY (n+2) A	
RX (n+2) B	No.10 Burn-out		RY (n+2) B	
RX (n+2) C			RY (n+2) C	
RX (n+2) D	No.11 Positive range-over		RY (n+2) D	
RX (n+2) E	No.11 Negative range-over		RY (n+2) E	
RX (n+2) F	No.11 Burn-out		RY (n+2) F	
RX (n+3) 0			RY (n+3) 0	
RX (n+3) 1	No.12 Positive range-over		RY (n+3) 1	
RX (n+3) 2	No.12 Negative range-over		RY (n+3) 2	
RX (n+3) 3	No.12 Burn-out		RY (n+3) 3	
RX (n+3) 4			RY (n+3) 4	
RX (n+3) 5	No.13 Positive range-over		RY (n+3) 5	
RX (n+3) 6	No.13 Negative range-over		RY (n+3) 6	
RX (n+3) 7	No.13 Burn-out		RY (n+3) 7	
RX (n+3) 8			RY (n+3) 8	
RX (n+3) 9	No.14 Positive range-over		RY (n+3) 9	
RX (n+3) A	No.14 Negative range-over		RY (n+3) A	
RX (n+3) B	No.14 Burn-out		RY (n+3) B	
RX (n+3) C			RY (n+3) C	
RX (n+3) D	No.15 Positive range-over		RY (n+3) D	
RX (n+3) E	No.15 Negative range-over		RY (n+3) E	
RX (n+3) F	No.15 Burn-out		RY (n+3) F	
RX (n+4) 0			RY (n+4) 0	
RX (n+4) 1	No.16 Positive range-over		RY (n+4) 1	
RX (n+4) 2	No.16 Negative range-over		RY (n+4) 2	
RX (n+4) 3	No.16 Burn-out		RY (n+4) 3	
RX (n+4) 4			RY (n+4) 4	
RX (n+5)			RY (n+5)	
RX (n+6)			RY (n+6)	
RX (n+7) B	Remote READY Flag		RY (n+7) B	

#### ● Positive range-over, Negative range-over

If the measured value is range-over, the over-range flag may be [1].

However in case that it is the result by adding bias setting data, the flag remains [0].

Negative over-range: under 5% of analog input signal range

Positive over-range: over 105% of analog input signal range

(For example) Scale range of analog input: 0 to 10000

Under 500, negative over range flag becomes [1].

Over +10500, positive over range flag becomes [1].

#### ● Burn-out

If the measured value may be under minus 15%, the burn out flag becomes be [1].

## 12. MAINTENANCE

The NC220 main body can be removed from the socket under operating in case of exchange or maintenance of the converter. However before removing the main body of the converter, remove the CC-Link communication cable.



### CAUTION

After remove CC-Link connector from the main body, carry out the maintenance of the converter. There is a possibility of electric shock, so be careful not to touch the terminals of the socket when the NC220 main body is removed from the socket under operating condition.