

## NOTES

## Notice :

1. When unpacking the units, check carefully for any external scratches or other damage. Also, shake the units gently and check for any abnormal sound.
2. Turn OFF the power supply to the PT before mounting or dismounting I/F Units. Correctly mount the I/F Units according to the User's Manual of the PT.
3. Do not touch the PCBs with bare hands. Discharge static electricity accumulated in your body in advance.
4. Tighten the mounting brackets evenly. Make sure the panel is not dirty or warped and that it is strong enough to hold the units.
5. Do not let metal particles enter the units when preparing the panel.
6. Double check all the wiring before turning ON the power supply.
7. Do not perform a dielectric voltage test.
8. Make sure that the connector screws are properly tightened.
9. Always tighten the connector screws after connecting communication cables.
10. The max. pull load for cables is 30N. Do not apply loads greater than this.

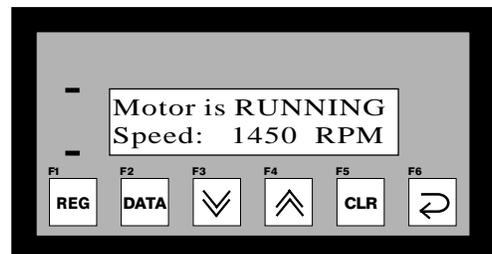
## NOTES

**OMRON**

### NT2S-SF123B-EV2 Programmable Terminal

#### INSTRUCTION SHEET

Thank you for purchasing this OMRON product.  
Please read this Instruction sheet and thoroughly familiarize yourself with functions and characteristics of the product before use. Please retain this sheet for future.  
For more information on specifications and usage, please refer to each PT.



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11. Confirm the safety of the system before turning ON or OFF the supply to the unit.
12. Start actual application only after sufficiently checking screen data and the operation of the program in the PLC.
13. When using the Programming Console functions, confirm system safety and then perform the following operations :
  - Changing monitor data
  - Changing operation modes
  - Forced setting or resetting
  - Changing preset values or set values.
14. Do not press the key switch with a force greater than 30N.
15. Do not accidentally press key switches when the backlight is not lit or when the display does not appear. Confirm the safety of the system before pressing key switches.
16. Do not attempt to disassemble, repair or modify the units in any way.
17. Do not use benzene, paint thinner or other volatile solvents and do not use chemically treated cloths.
18. Signals from the key switches may not be input if the switches are pressed consecutively at high speed. Confirm each input before proceeding to the next one.
19. To ensure greater safety for numeric inputs, first check for proper limits in the PLC.

## NOTES

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# Triggering screens

As can be seen from the above examples, there are two ways to display screens with the *NT2S-SF123B-EV2*:

1. Keep all the message characters in the data memory ( the Omron PLCs have lot of data registers which in most applications involving simple digital controls are not used anyway ) and simply change the offset register to display different screens.

The user can fill the data memory using the “data display editor” menu of the PLC programming software.

2. Note that the data memory as well as the program memory can be used for embedding of data.  
Of course, a combination of the two methods can be used to optimize the memory usage.

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**Note: Specifications subject to change without notice.**

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# Pin Connections

Following are the PLC port pin designations for *NT2S-SF123B-EV2*:

<u>PLC port pin#</u>	<u>Designation</u>
2, 3, 5	GND
4	VCC (+5V)
6	TXD (Transmit CMOS)
7	RXD (Receive CMOS)
1, 8, 9	NC

## 20. Do not install the units in any of the following locations :

- Locations subject to rapid changes in temperature
- Locations subject to temperatures or humidities outside the range specified in the specification
- Locations subject to condensation as the result of high humidity
- Locations subject splashing chemicals or solvents
- Locations subject to oil splashes
- Locations subject to corrosive or flammable gases
- Locations subject to strong shock or vibration
- Locations outdoors subject to direct wind and rain
- Locations subject to strong ultraviolet light

## 21. Take appropriate and sufficient countermeasures when installing systems in the following locations :

- Locations subject to static electricity or other forms of noise
- Locations subject to strong electromagnetic or magnetic fields
- Locations subject to possible exposure to radioactivity

## 22. The whole system may stop, depending on how the power supply is turned ON or OFF. Turn ON or OFF the power supply according to the specified procedure.

# General:

The NT2S-SF123B-EV2 is intended to be used as a low cost Operator interface for PLCs which are rich in program memory or data memory areas such as the Omron C Series PLCs.

The NT2S-SF123B-EV2 has the following features:

Feature	NT2S-SF123B-EV2
Display	Backlit 2X16 LCD
LEDs	2
Keys	6
ASCII screens	32 characters
Embedded variables	16

# Key definitions:

Each key is mapped from work bits 201.00 to 201.05. Every time a key is pressed, the corresponding bit as shown in the table below is held on while the key is pressed. The keys also have alternate functions.

Key	Work Bit	Register mode function
F1/REG	201.00	Changes register prefix
F2/DATA	201.01	Enters data entry mode
F3/DOWN	201.02	Increments register number or data depending on mode
F4/UP	201.03	Decrements register number or data depending on mode
F5/CLR	201.04	Clears data field to 0 / Register field to first register value
F6/ENT	201.05	Accepts new data and sends to the PLC

g. Put 03032E03H in words DM0213 and DM0214. The NT2S-SF123B-EV2 will read data in DM0003 and embed in xx.x format.

h. Move "s" into DM0215. This command completes the screen by appending the "s" to bake time.

This will put the following data in the data words below: ("␣" is used for a space, i.e. 20H)

Word	ASCII	Hex	Word	ASCII	Hex
DM0200	Do	#446F	DM0208	BA	#4241
DM0201	or	#6F72	DM0209	KE	#4B45
DM0202	␣	#3A20	DM0210	TI	#5449
DM0203	CL	#434C	DM0211	ME	#4D45
DM0204	OS	#4F53	DM0212	␣	#3A20
DM0205	ED	#4544	DM0213		#0303
DM0206	␣	#2020	DM0214		#2E03
DM0207	␣	#2020	DM0215	s␣	#7320

# How is the unit panel mounted?

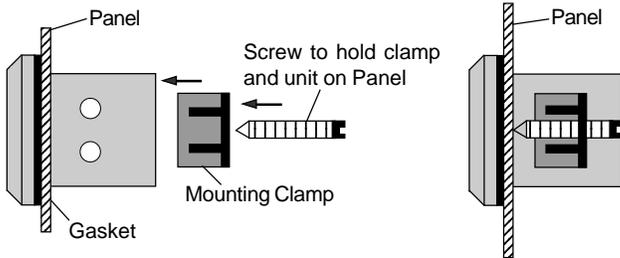
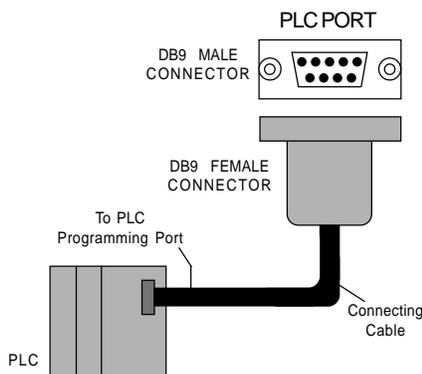


Fig. A

Fig. B

# Power Supply

The power supply to the NT2S-SF123B-EV2 is from the PLC. The figure below shows the connection between the PLC and the unit through a cable.



# Register mode:

In the register mode, the operator can access all the registers and bits in the PLC.

By pressing the REG key, the operator can scroll through the register prefixes. By using the UP / DOWN keys, the register numbers can be accessed. Data can be changed in the registers by pressing the DATA key. The data field will blink to indicate that the unit is ready to accept new data. At this time, the UP / DOWN keys can be used to edit data followed by the ENT key.

It is advisable to create a "password" screen which can block the usage of the register mode.

# Bar Graph:

NT2S-SF123B-EV2 uses DM0012 to DM0015 registers to hold bar graph values to be displayed. If Offset register points to DM0200 then put Hex value 0C0C into DM0200 onwards to display bar graph with the value in DM0012.

## Example:

Put 0C0C into DM0200, DM0201, DM0202, DM0203 and 200 into DM0020. This will display bar graph 8 characters wide. Maximum length is 16 characters. Each character on display can display five vertical lines. To display full bar graph put # 80 into DM0012 and 0C0C from DM0200 to DM0207.

To display Bar Graph with value in DM0013, put 0D0D in DM0200 onwards.

## Example 2: Embed a variable in the screen

Suppose the following screen needs to be displayed on the NT2S-SF123B-EV2:

```
Door:  CLOSED
BAKETIME: 13.6s
```

Suppose the bake time is available in data word DM0100 and the oven status is given by bit 001.00.

To display this screen, do the following:

- a. Move number 200 in DM0020 since the screen will be stored in DM0200 onwards.
- b. Move character string "Door:" into 2 words, i.e. DM0200 and DM0201.
- c. Move characters "OPEN" if bit 001.00 is ON or characters "CLOSED" if 001.00 is OFF.  
This is a way to implement bit sensitive screens.
- e. In a similar manner, embed the characters "BAKETIME:" into 5 words from DM0208.
- f. NT2S-SF123B-EV2 uses DM0000 to DM0011 registers for embedding data. Here we select DM0003 to be used for embedding. So, move the data of DM0100 into DM0003 so that embedding can be done.

## Unit Operations:

The work bits 200.00 to 200.15 control the mode of operation of the unit.

<b>Work Bit</b>	<b>Function</b>
200.00	Controls LED0
200.01	Controls LED1
200.02 & 200.03	Not used
200.04 to 200.07	Reserved for future use
200.08 & 200.09	00: Screen mode      01: Register mode 10: Operator mode    11: Invalid
200.10 & 200.11	Timeout to screen mode from Operator mode 00: 10 seconds      01: 20 seconds 10: 30 seconds      11: 40 seconds
200.12 to 200.14	Reserved for future use
200.15	To disable data entry in Screen mode (ON: Disable)

From the above table, it is clear that the unit will display ASCII text (see section on **Screens** for more details on this) if 200.08 and 200.09 are OFF. To allow operators to view and edit the registers, 200.08 is to be kept ON. If 200.08 is OFF, the unit will not display any registers and the function keys will only act as push buttons mapped to the corresponding bits from 201.00. Refer to "Register Mode" for details. If 200.09 is ON, REG key press will allow an operator to view the registers. The REG key will scroll through the available register types whereas the UP and DOWN arrow keys will scroll through the register/bit numbers. After timeout specified by bits 10 and 11 and if no key is pressed, the unit will switch back to the Screen mode and display screens. Thus Operator mode is a combination of Register as well as Screen modes.

# Screens

The unit displays 32 characters from the PLC memory. These characters are taken from the PLC data registers.

The unit tracks register DM0020 (the Offset register) in the PLC. The number in DM0020 gives the start address of the data register block which contains the characters to be displayed. For example, if DM0020 has number 124 in it, the unit will read 16 registers from DM0124, i.e. from DM0124 to DM0139 and display the corresponding characters.

Each register contains two bytes. Each ASCII character to be displayed is one byte. So, each word contains two characters that can be displayed. All the PLC ladder logic has to do is to put the correct words in the registers being read by the unit so that a proper screen can be displayed.

As mentioned above, the starting address of the screen data block is controlled by the Offset register, i.e. DM0020. Hence, there can be two methods of changing the screen to be displayed. One is to keep the value in DM0020 constant and change the data in the screen registers by the ladder logic. Second is to keep the screen text in the data memory (by editing DM registers) and change the value in DM0020 so as to point to the correct memory address to display the desired screen.

It is possible to embed registers in the screens. The unit reads 16 registers from DM0000 to DM0015 (in which DM0012 to DM0015 are used for Bar Graph) in every scan. The data in these registers can be embedded in the screens. To do so, use hex bytes 0 to B (C to F used for Bar Graph) corresponding to register DM0000 to DM0011 respectively in the screen. Refer to the example given which explains the embedding of registers. It is possible to embed one data entry field in screens. It is similar to embedding register, only instead of 0 to F use 10 to 1F hex bytes to address DM0000 to DM0015. The registers DM0000 to DM0015 can be edited with this feature one at a time in a screen.

# Example 1: Display a static screen

Suppose the following screen needs to be displayed on the NT2S-SF123B-EV2:

```
Last Rinse Cycle
Water pump is on
```

To display this screen, do the following:

- Move number 200 in DM0020 since the screen text will be stored in DM0200 onwards.
- Move character string "Last Rinse Cycle" into 8 words from DM0200.
- 

In a similar manner, the characters "Water pump is on" can be embedded into 8 words from DM0208. (i.e. from DM0208 to DM0215).

This will put the following data in data words below: (" " is used for a space)

Word	ASCII	Hex	Word	ASCII	Hex
DM0200	La	#4C61	DM0208	Wa	#5761
DM0201	st	#7374	DM0209	te	#7465
DM0202	R	#2052	DM0210		#7220
DM0203	in	#696E	DM0211	pu	#7075
DM0204	se	#7365	DM0212	mp	#6D70
DM0205	C	#2043	DM0213	i	#2069
DM0206	yc	#7963	DM0214	s	#7320
DM0207	le	#6C65	DM0215	on	#6F6E