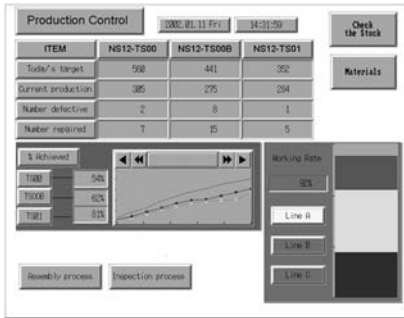# Functions and Operation of Programmable Terminals

The NS and NT series Programmable Terminals (PTs) are sophisticated operator interfaces that can automatically display information and perform operations as required at FA production sites. This guide describes the role and operations of the NS-series PTs for beginning users.

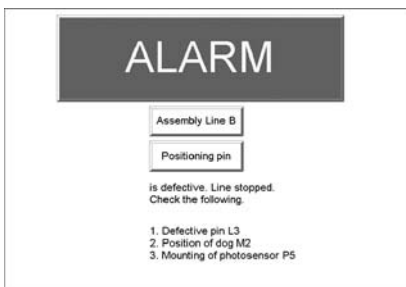## ■Operation of PT at FA production sites

● Monitoring Line Operating Status

The system and device operating status can be displayed in real time. Graphs can be used to improve visual expressions to display data in an easy-to-understand format.
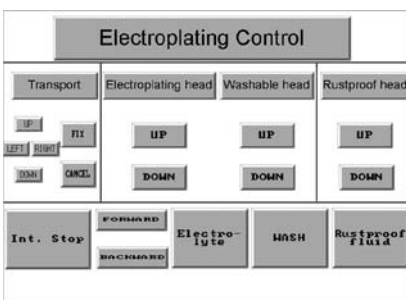

● Instructions for FA Staff

PTs can be used to notify operators if there is a system or device error and provides information on appropriate countermeasures.

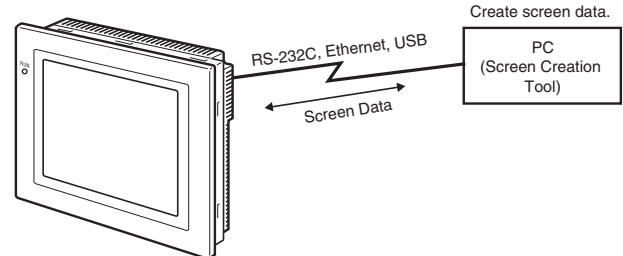
● Control Panel Switches

On the PT screen, a variety of switches can be created, and the data entered on the touch panel can be sent to the host as a result of the operation.
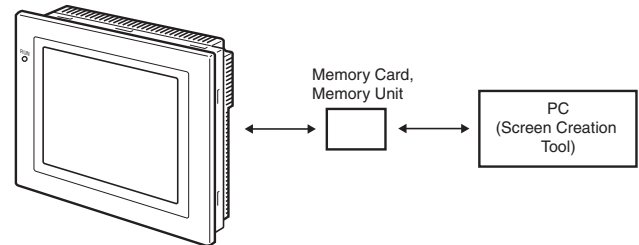

■PT Operation

● Transmission of Screen Data

Screen data displayed on the PT is created by a screen creation tool on a PC, and is transmitted to the PT through RS-232C, Ethernet, or USB.

Also, a memory card (NS Series) or memory unit (NT20/31/631 Series) can be used to transmit screen data at high speed.
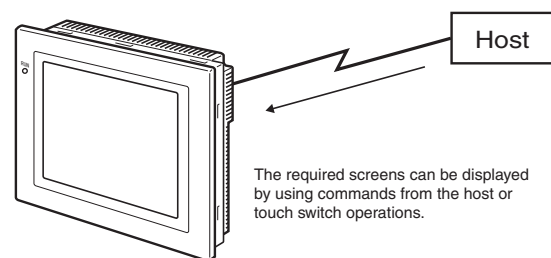

PT	Screen Creation Tool	Communication Route			
		RS-232C	Ethernet	USB	Others
NS Series	CX-Designer	❍	❍ (✴1)	❍ (✴2)	Memory Card
NT Series	NT Series Support Tool	❍	✕	✕	Memory Unit (NT20/31/631 Series)

✴1. Some models do not support Ethernet.
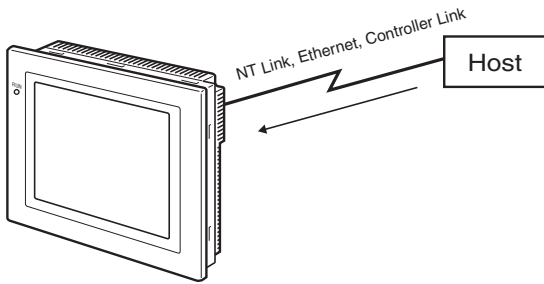✴2. Can be used with any models after the NS-V2.

● Display a screen

Create a content to be displayed (screen data) using a screen creation tool on the PC, and transmit it to the PT. A required screen can be displayed upon a command from the host or by touch switch operation.

The required screens can be displayed by using commands from the host or touch switch operations.
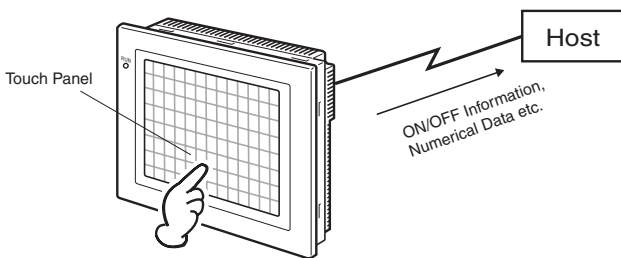
● Read data from host

Connect with the host using a transmission method such as NT link, Ethernet or Controller Link etc., and read required data from the host.

NT Link, Ethernet, Controller Link

Host

Note: Some models do not support Ethernet or Controller Link.

● Send Data to Host

Send data entered on the touch panel,(button ON/OFF status, numerals, and character strings) to the host.

Touch Panel

Host

ON/OFF Information, Numerical Data etc.

■Communication with the HOST

● Communication Method

In addition to using it as a host in connection to the PLC with the direct access, connection can be made using the memory link with a SBC (Single Board Computer) etc.
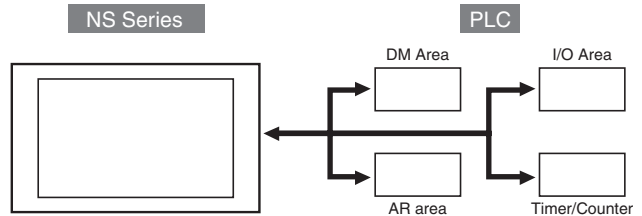The features are as follows

Communication Method	Feature Overview	PT Supported
Direct Access Method	A method that allocates in any area of the PLC words or relays used for referring to the required contents for display with a PLC memory or for storing the entered data. This method does not require the ladder program that is necessary to move data in the DM method, enabling an introduction of a easier program and better maintenance.	NT Series NS Series
Memory Link Method	A method that sends a command from the host to display data and when data is entered, notifies the input as a command to the host from the PT.	NT Series NS Series

● Direct Access Method

With the direct access method, content in the PLC memory that is needed for display can be referred to, and freely allocated to words and relays to save input data in the PLC area.
This method also directly reads/writes the allocated words/relays, changes the display conditions of objects shown on the screen of PT, and controls and notifies the PT status.
Also NS Series has a function to communicate with a number of PLC. All the connected PLCs are registered with a host name and the PLC area can be accessed by specifying the host name and address.

NS Series   PLC

DM Area   I/O Area
AR area   Timer/Counter

Under the direct access method, one of the following methods is used to connect a PT with the host.

Method	Details
Host Link	The host link connects a host PLC with a PT 1 to 1 and reads and writes words/relays using the serial communications(host communication mode). This method allows a variety of PLC models to be connected.
NT Link (1 : 1)	NT Link is a communication method that performs a high-speed communication between OMRON PT and OMRON PLC, using a proprietary protocol. "NT Link (1 : 1)" method refers to the connection of 1 PLC with 1 PT.
NT Link (1 : N) (Standard, High Speed)	"NT Link (1 : N)" is a method that can connect max. 8 NS units to 1 PLC port. This method also can use the "High Speed NT Link (1 : N"), which performs a high speed communication with CS/CJ Series PLC.
Ethernet	A PT can easily read and write data including words/relays using a PLC Ethernet Unit that can be connected to NS series. The Omron standard communication protocol FINS(Factory Interface Network Service) enables a PT to perform a high-speed communication regardless of a protocol.
Controller Link	The Controller Link is an FA network that can transmit a large volume of data between OMRON PLC and an FA computer. This unit can easily read and write data including words/relays with a Controller Link I/F Unit (NS-CLK21 model) which is equipped with an NS Series PT and a connectable PLC Controller Link Unit. The Controller Link can use the "Data Link Function" which constantly shares the proper data for the Controller Link, or the "Message Service Function" which transmits data when required.
CompoWay/F	The CompoWay/F unit can be connected to an OMRON temperature controller using RS-485. Mounting a RS-422A adapter to the NS Series serial port enables the RS-485 communication method for the connection.
Other	A PT can be connected to Mitsubishi PLC and SIEMENS PLC etc.

● Memory Link Method

A micro computer or personal computer can use the Memory Link to also connect to a PT. The PT uses a serial board to connect the host.
The host sends commands to PT so that the PT can change the screen status or inform an input of data to the host when the data is entered.