



# **nanoLine**

The smart,  
simple control system

# nanoLine – Smart, simple, connected, flexible

The nanoLine is a new control platform with easy application programming and flexible, modular configurations. It requires virtually no support and is targeted for basic applications in competitive markets where connectivity is increasingly required.

## Smart

The nanoLine is a smart, compact control system designed to perform many tasks automatically, saving time and preventing errors.

## Simple

The nanoLine controllers are programmed using an intuitive flow chart programming language that requires no programming background to produce a working program.

## Connected

The nanoLine supports a new level of connectivity in its product class. nanoLine controls can be embedded into systems, monitored from a distance, or remotely controlled by a host computer, large PLC or advanced HMI.

## Flexible

Select only the necessary project components with this easy-to-use, tightly-integrated, modular system.

### Base units

The nanoLine has five base units in various power and I/O combinations. A wide variety of options, including additional I/O, communications, operator panel and real-time-clock connect to the base unit.

### Ethernet Modbus TCP

### Connectivity

When the Ethernet expansion module or serial option module (RS-232 or RS-485) is installed, the nanoLine control functions as a Modbus TCP or RTU server. Using one of these options, all I/O points, registers, timers, counters, and system flags can be read and written remotely, independently of the program.

### USB Module

### RS232 Module

### RS485 Module



#### **I/O expansion modules**

Up to three I/O expansion modules can be added in any combination of digital and analog. Mixing digital I/O types is also possible, for example combining an AC control with a DC I/O expansion module.

#### **Flexible operator panel**

The same operator panel can be mounted on the base unit, through a control cabinet or used as a simple hand-held device.

#### **nanoNavigator –**

##### **Fast and easy programming**

Flow chart programming is intuitive and easy to understand. No training is necessary.



# nanoLine – Class leading connectivity

The nanoLine supports a new level of connectivity in its product class with the inclusion of Modbus TCP and Modbus RTU server support. Modbus TCP is used to monitor the nanoLC at a distance by a host computer, larger PLC or advanced HMI, or to integrate the nanoLC into larger systems. Modbus RTU provides connectivity for additional local control or an additional HMI.

With Modbus TCP and RTU, all I/O points, registers, timers, counters, program flags and system flags can be read and written remotely and independently of the program. Multilevel password access control and watchdog timer support are also provided.

The Ethernet communication expansion module supports Modbus TCP. This module is attached to the left side of the nanoLC. Serial communications options modules are inserted into the base unit to provide Modbus RTU connectivity via RS-232 or RS-485.

A USB serial communications option module is also available for configuration, programming and simulation. This module can also provide Modbus RTU connectivity during development and testing.

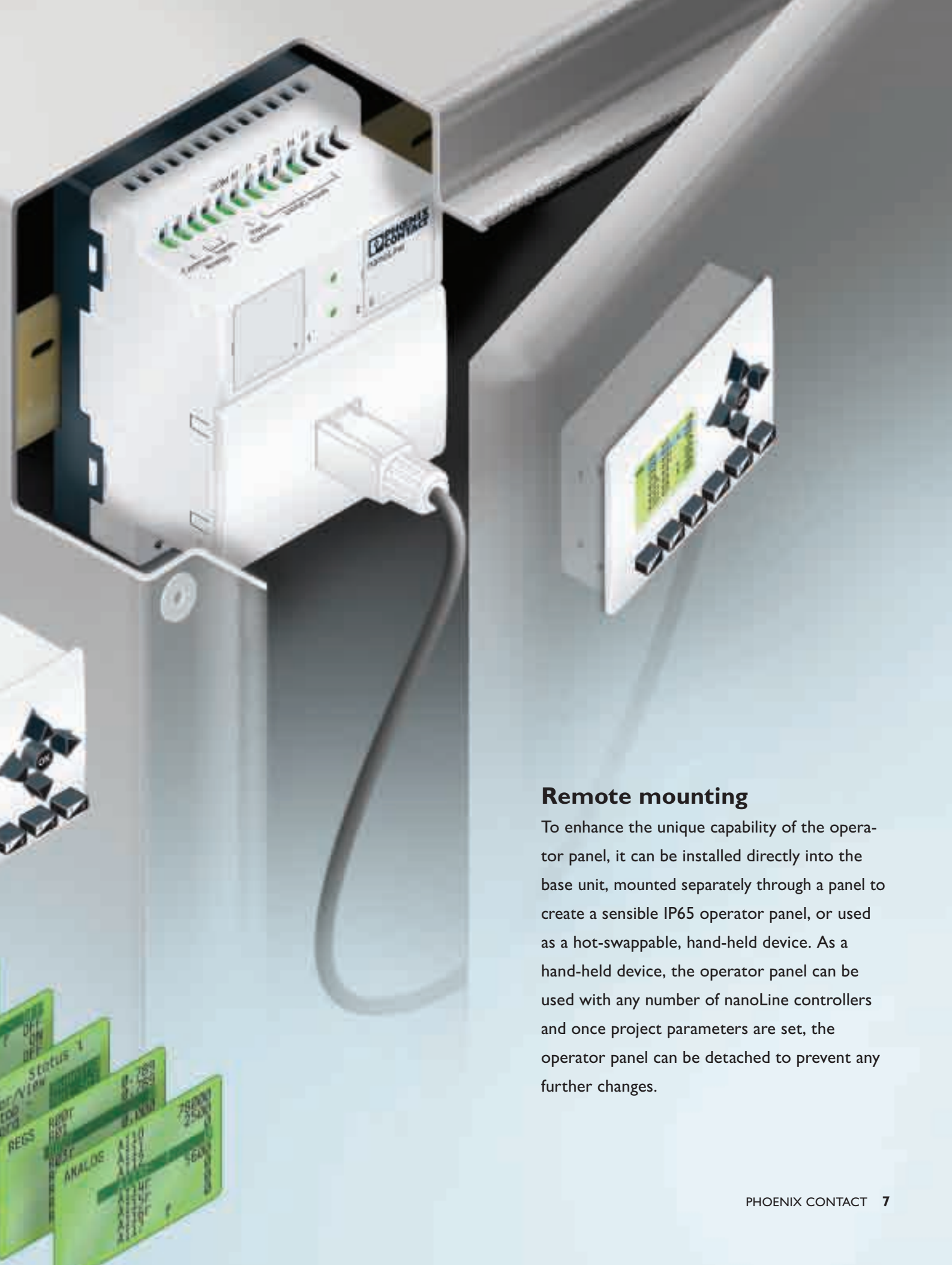




# nanoLine – Flexible operator panel

The nanoLine operator panel is a machine interface that allows the control to interact with the operator. Using the operator panel, the operator can view the status of all I/O points, registers, timers, counters, program flags and system flags. The program also sends messages to the display to provide directions or ask for information. For easy parameter entry, the nanoLine operator panel has a numeric keypad. Each of the 14 keys on the operator panel can also be used within a flow chart to create custom menus. Operator panel message can be up to four lines of 20 characters each. These messages are sharply displayed on the 32 mm backlit graphics display. In addition to text, messages can contain references to I/O points, registers, timers, counters, program flags and system flags for display or data entry.



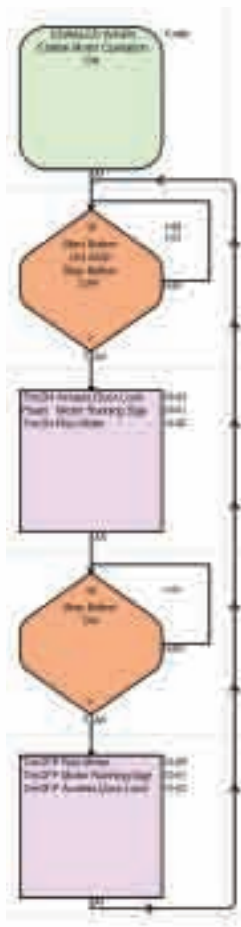


## Remote mounting

To enhance the unique capability of the operator panel, it can be installed directly into the base unit, mounted separately through a panel to create a sensible IP65 operator panel, or used as a hot-swappable, hand-held device. As a hand-held device, the operator panel can be used with any number of nanoLine controllers and once project parameters are set, the operator panel can be detached to prevent any further changes.

# nanoNavigator – Fast, easy programming

No training is necessary to learn nanoNavigator's intuitive flow chart language. There are only six instructions to follow. Even before the nanoLine system is purchased, users can download nanoNavigator for free on the web. With this free download, users will save time by writing and simulating programs before the hardware arrives.



Only 6 instructions:



**Compare** inputs, outputs, program and flags



**Decide** based on registers, timer, counters or analog inputs



**Control** outputs, flags, timers, and counters



**Move** values between registers, timers, counters and analog inputs



**Message** sends text and data to the Operator Panel



**Wait** for a time from milliseconds to hours

## 1 Select your configuration

Begin by selecting which hardware options are required for the application.



## 2 Drop the flow chart blocks

Develop the program by dropping standard flow chart blocks onto the pallet.

## 3 Configure the blocks

Double click on the blocks and fill in the drop down boxes.



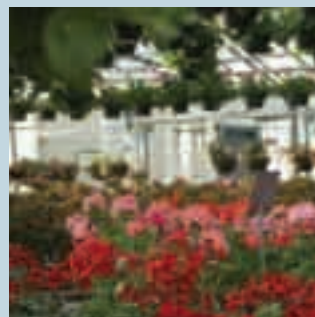
## 4 Connect the flow

Finish the program by connecting the flow chart blocks together.

# nanoLine – Applications

Finding the right solution for small-scale projects is challenging, but the nanoLine product family is a cost-effective solution for a wide-range of applications. Development is fast and easy using the following features:

- Scalable connectivity with both Ethernet and serial options
- True operator panel capabilities with flexible mounting options, including IP65 sealing
- Click-and-drop, flow chart programming and simulation



# nanoLine –

## Technical details

### Real-time-clock

- Three date and time formats
- Summer and winter time

### LED indicators

- Power
- Program running

### Serial communications

- Programming interface
- Modbus RTU server
- USB
- RS-232
- RS-485

### Flexible operator panel

- Remote mountable
- Hot swappable
- Interactive numeric data enter
- IP65 rating when panel mounted

### LCD display

- Up to 24 user messages
- 4 lines x 20 characters
- 32 mm diagonal, high contrast backlit display

### Key pad

- 14 programmable keys
- Numeric keypad
- Navigation keys



### Power Options

- 24 V DC
- 24 V AC/DC
- 100...240 V AC

### Input Options

- 24 V DC
- 24 V AC/DC
- 100...240 V AC

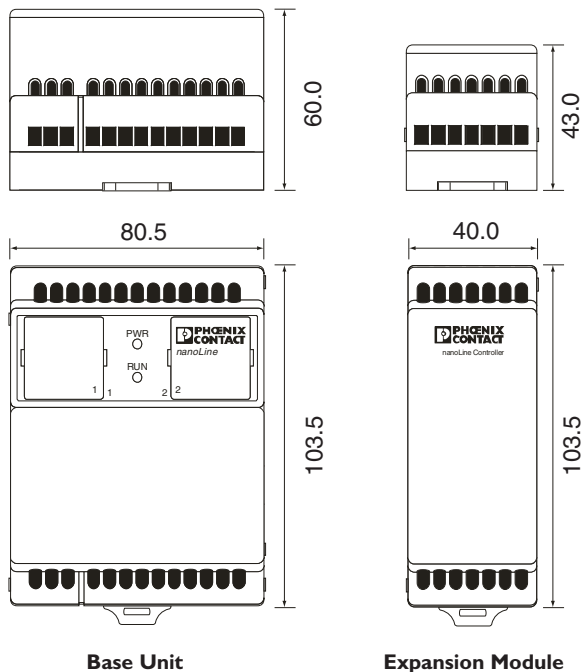
### Output Options

- 24 V DC PNP (current sourcing)
- 24 V DC NPN (current sinking)
- 24 V AC/DC 5 A relay
- 100...240 V AC 5 A relay

# nanoLine –

## Selection guide

| Name           | Power Supply Voltage                                                          | Inputs |                             | Outputs |                  |                | Type                       | Order No. |
|----------------|-------------------------------------------------------------------------------|--------|-----------------------------|---------|------------------|----------------|----------------------------|-----------|
|                |                                                                               | Number | Voltage                     | Number  | Type             | Voltage        |                            |           |
| Base           | 24 V DC                                                                       | 6      | 24 V DC                     | 4       | Transistor (PNP) | 24 V DC        | nLC-050-024D-06I-04QTP-00A | 2701027   |
|                | 24 V DC                                                                       | 6      | 24 V DC                     | 4       | Transistor (NPN) | 24 V DC        | nLC-050-024D-06I-04QTN-00A | 2701030   |
|                | 24 V DC                                                                       | 6      | 24 V DC                     | 4       | Relay            | 24 V DC        | nLC-050-024D-06I-04QRD-05A | 2701043   |
|                | 24 V AC/DC                                                                    | 8      | 24 V AC/DC                  | 4       | Relay            | 24 V AC/DC     | nLC-050-024X-08I-04QRX-05A | 2701056   |
|                | 100...240 V AC                                                                | 8      | 100...240 V AC              | 4       | Relay            | 100...240 V AC | nLC-050-100A-08I-04QRA-05A | 2701069   |
| I/O Expansion  | 24 V DC                                                                       | 6      | 24 V DC                     | 4       | Transistor (PNP) | 24 V DC        | nLC-IO-024D-06I-04QTP-01A  | 2701072   |
|                | 24 V DC                                                                       | 6      | 24 V DC                     | 4       | Transistor (NPN) | 24 V DC        | nLC-IO-024D-06I-04QTN-01A  | 2701085   |
|                |                                                                               | 4      | 0-10 V, $\pm 10$ V, 4-20 mA |         |                  |                | nLC-IO-4AI                 | 2701098   |
| Software       | nanoNavigator, configuration and programming software                         |        |                             |         |                  |                | nLC-NAV-01                 | 2701221   |
| Communications | 10/100 Mbaud Ethernet, Modbus TCP Server                                      |        |                             |         |                  |                | nLC-COM-ENET-MB1           | 2701124   |
|                | USB Communication, Programming port                                           |        |                             |         |                  |                | nLC-MOD-USB                | 2701195   |
|                | RS-232 Communication, Modbus RTU Server, Programming port                     |        |                             |         |                  |                | nLC-MOD-RS232              | 2701179   |
|                | RS-485 Communication, Modbus RTU Server, Programming port                     |        |                             |         |                  |                | nLC-MOD-RS485              | 2701182   |
| Accessories    | LCD Display, 4 lines x 20 char, 32 mm diagonal, high contrast backlit display |        |                             |         |                  |                | nLC-OP1-LCD-032-4X20       | 2701137   |
|                | Panel mounting kit for LCD display                                            |        |                             |         |                  |                | nLC-OP1-MKT                | 2701140   |
|                | Real time Clock module                                                        |        |                             |         |                  |                | nLC-MOD-RTC                | 2701153   |
|                | Memory Module                                                                 |        |                             |         |                  |                | nLC-MOD-MEM 032K           | 2701166   |
| Starter Kits   | Starter kit with nLC-050-024D-06I-04QTN-00A base (NPN Transistor Outputs)     |        |                             |         |                  |                | nLC-START-01               | 2701399   |
|                | Starter kit with nLC-050-024D-06I-04QTP-00A base (PNP Transistor Outputs)     |        |                             |         |                  |                | nLC-START-02               | 2701425   |
|                | Starter kit with nLC-050-024D-06I-04QRD-00A base (Relay Outputs)              |        |                             |         |                  |                | nLC-START-03               | 2701467   |



### Starter kits

Make your development startup fast and easy with a nanoLine starter kit. The kit includes everything you need to begin your project.

- nanoNavigator CD
- nanoLine Base Unit
- Operator Panel
- USB Option Module
- Input and Output Simulators
- USB Cable
- Quick Start Guide



Further information on the products introduced here and on the world of solutions from Phoenix Contact can be found at [www.catalog.phoenixcontact.com](http://www.catalog.phoenixcontact.com)



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