

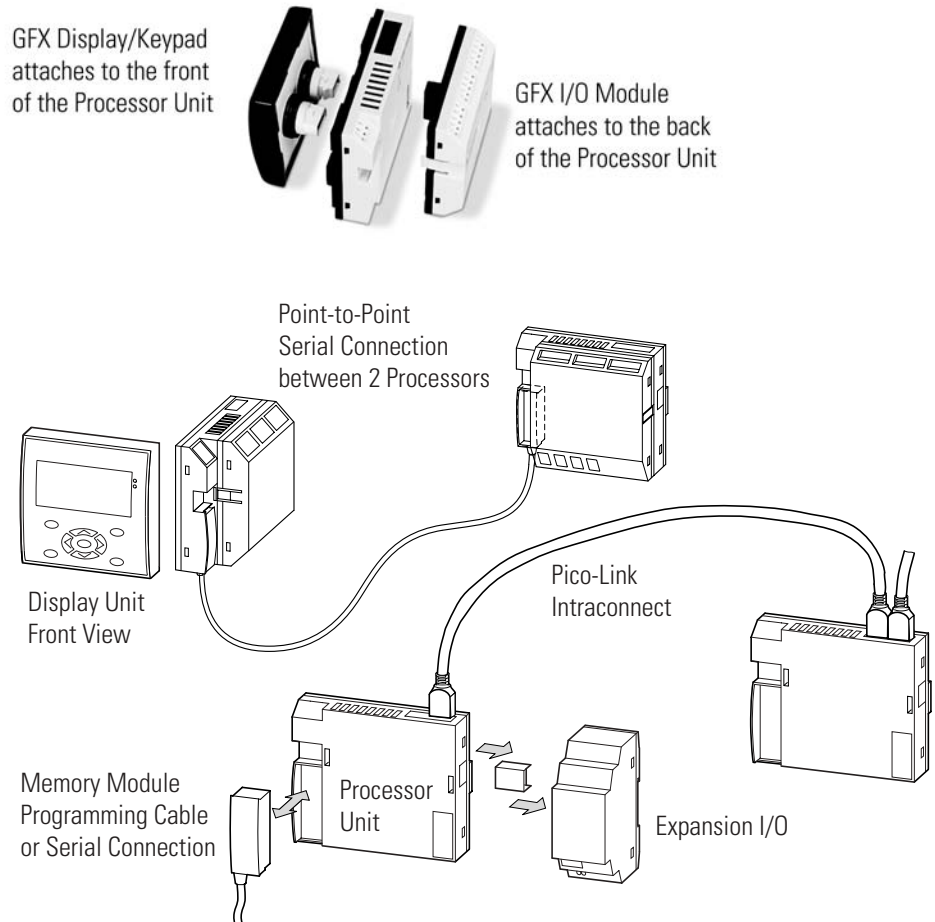
Pico GFX-70 Controllers Selection Guide

1760 series



Specifying a Pico Controller System

Pico GFX Components and Connections



Selection Steps

Follow these steps as you specify your Pico Controller system:

Step	Description	page
1.	Select I/O Modules	3
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Select I/O Modules

GFX I/O Modules

TIP

GFX I/O modules connect to the back of the GFX processor. Pico Expansion I/O connects to side of processor, and can be used with Pico Standard or Pico GFX-70 controllers.

Cat. No.	Number of Inputs (24V dc Digital)	Number of Outputs (Relay)	Number of Outputs (Transistor)	Analog Capability
1760-IB12XOW4IF	12 ⁽¹⁾	4	0	input
1760-IB12XOW4IOF	12 ⁽¹⁾	4	0	input and output
1760-IB12XOB4IF	12 ⁽¹⁾	0	4	input
1760-IB12XOB4IOF	12 ⁽¹⁾	0	4	input and output

(1) Two of the digital dc inputs can alternately be used as 0 to 10V dc analog inputs.

Pico Expansion I/O Modules

Depending on which Pico controller you use, Expansion I/O modules can provide up to 38 I/O points when used with Expansion I/O Blocks.

Cat. No.	Input Voltage Category	Number of Inputs (Digital)	Number of Outputs
1760-IA12XOW6I	120 / 240V ac	12	6 (relay)
1760-IB12XOB8	24V dc	12	8 (transistor)
1760-OW2	n/a	0	2 (relay)

Select the Processor

There are 2 processor versions:

Processor	Description
1760-LDF	GFX CPU Standard
1760-LDFC	GFX CPU with Pico-Link

If your system requires more than 38 I/O, you will need to have multiple processors using the Pico-Link. You can connect up to 8 processors. To use the Pico-Link, select the 1760-LDFC.

Select Connection Topology

The Pico GFX-70 supports 2 connection methods:

- Pico-Link
- Point-to-Point Serial Interface

The Pico-Link intraconnect can be used to connect up to 8 processors. Each processor is considered a Pico-Link station, and they can share all visualization and I/O data.

The serial interface allows connection between two processors. One processor could be located for operator access to a keypad and display to share data with a second processor located behind a panel.

Both connections support 3 modes of operation:

- Run Mode/Stop Mode
- Card Mode (processor starts up using the program stored on the installed memory module)
- Terminal Mode

This allows you to remotely control other devices. This is especially useful if the other device is located in an inaccessible place. Terminal mode can also be used to show the menus and displays of devices that do not have their own display or keypad. Terminal mode can be used both with the serial interface and in the Pico-Link. The serial interface enables you to access a remote device. If you use the Pico-Link network, all other network stations can be addressed.

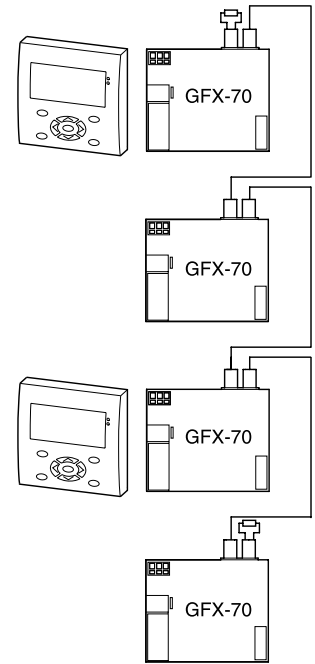
IMPORTANT

Terminal mode is a separate operating mode like RUN mode. It only functions when a program is not running. For this mode to be active, the GFX must be in STOP mode. All connected devices must also support Terminal mode.

Pico-Link with GFX-70 Devices

This topology allows:

- processing of additional inputs and outputs
- faster and improved control using decentralized programs
- synchronize date and time
- read and write inputs and outputs
- send values to other stations
- receive values from other stations
- load a program to or from another station
- high level of real-time capability

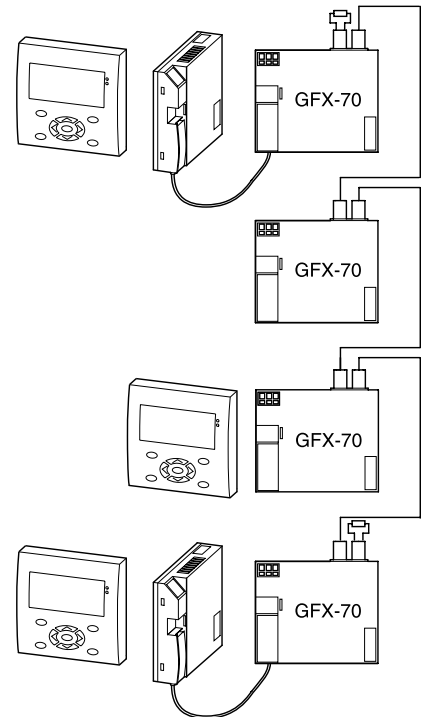


Pico-Link Operation and Serial Interface Connections

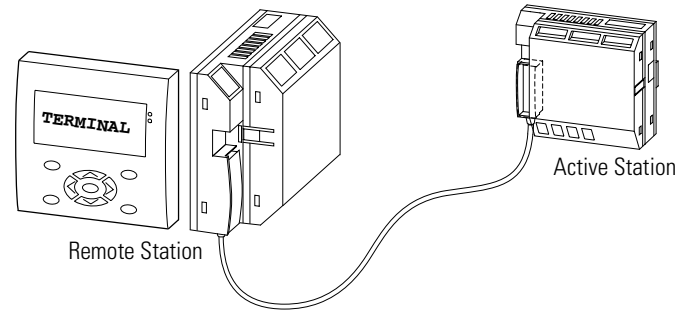
This topology is a combination of Pico-Link operation and serial interface operation. Bear in mind the access rights of the individual Pico-Link devices and in the corresponding point-to-point serial interface.

The same conditions apply here as with serial operation without the Pico-Link. The following data access operations are possible from the active station to the remote station:

- Local inputs and outputs
- Pico-Link diagnostics bits
- Write/read accesses to markers



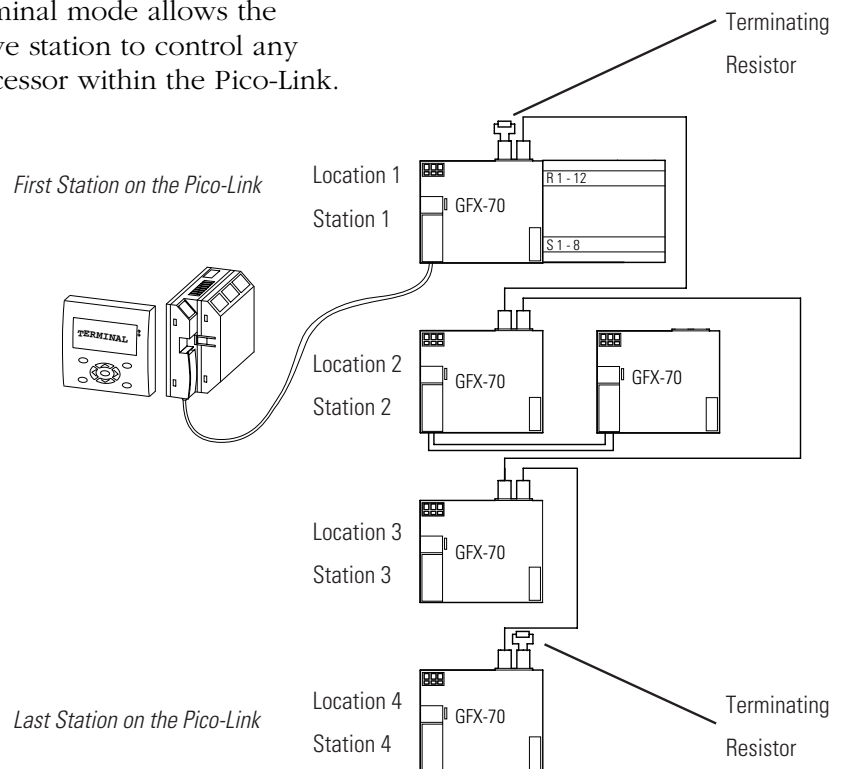
Terminal Mode Using the Point-to-Point Serial Interface



This interface connection allows the reading of input/output states as well as the reading and writing of marker ranges. This data can be used for setpoint entry or for display functions. The stations have different functions. The active station controls the point-to-point connection. The remote station responds to the requests of the active station.

Terminal Mode using the Pico-Link Topology

Terminal mode allows the active station to control any processor within the Pico-Link.



Select Keypad Programming or Programming Software

Pico controllers, with on-board keypad and LCD display, can be programmed from the front keypad. Models without the keypad and LCD display are programmed by using PicoSoft Pro programming software or by installing a pre-programmed memory module.

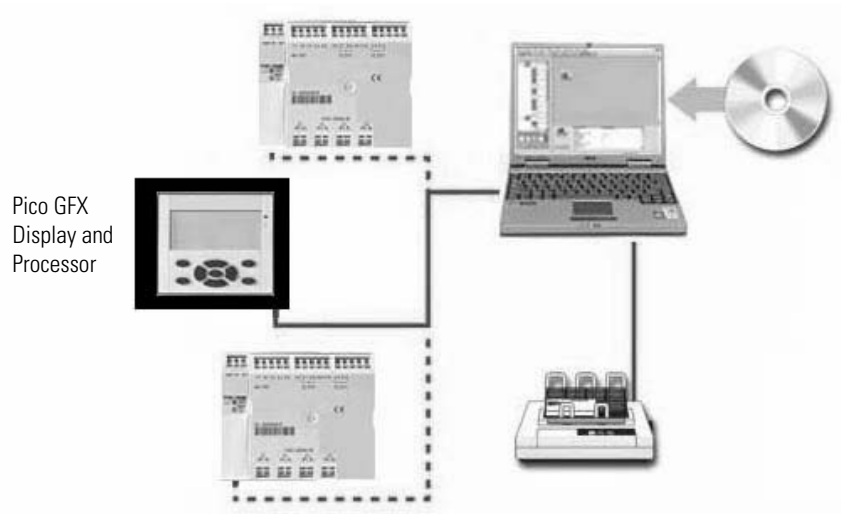
Using the Keypad

The keypad is an option on the display unit which is shown on page 9.

Each program rung may contain three input instructions and one output instruction. The instruction set includes:

- Input Instructions—examine-on and examine-off.
- Output Instructions—output enable (OTE), set (latch), reset (unlatch), and flip-flop (alternating on/off).
- Timer Instructions—on-delay, off-delay, single pulse, flashing.
- Counter Instructions—count up, count down.
- Real-time Clock Instructions—turn on or off based on time-of-day and day-of-week (models with real-time-clock only).
- Analog Compare Instructions—greater than or less than a set point or each other.
- Text Display Instructions—display messages, timers, counters, etc. on the LCD display.

PicoSoft Pro Software



Catalog Number	Description
1760-PICOSOFTPRO	PicoSoft Pro Programming Software
1760-CBL-PC02	Programming Cable, PC to Processor
1760-PICOPRO-PC02	PicoSoft Pro Software and Cable Kit (includes 1760-PICOSOFTPRO and 1760-CBL-PC02)

PicoSoft Pro includes all the features you need to:

- Create a project
- Wire up a circuit diagram
- Test a circuit diagram
- Transfer it
- Print it out

The PicoSoft Pro application is a complete package: it enables users to create the control software, assign parameters to the function blocks used, configure the visualization interface (including customizing the look with your own *.bmp graphic files), use all screens and button functions, and finally configure the entire project including the multi-processor systems.

The software also includes functions for simulating the control program, documenting the project, and also for establishing communication between the PC and the controller.

Select the Display Unit

There are 2 display versions:

Processor	Description
1760-DUB	Display Unit with Keypad
1760-DU	Display Unit without Keypad

TIP

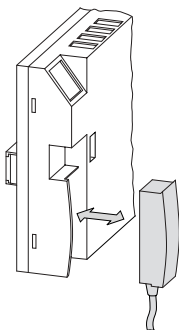
All controllers can be mounted on a panel.

Graphics display units cannot be mounted on a DIN rail. The GFX processor and other components can be mounted on a DIN rail.

Select Accessories

The following table shows a summary of the accessories for Pico GFX. Detailed descriptions for each item follow.

GFX Accessories	
1760-CBL-PC02	Programming Cable, PC to Processor
1760-PICOSOFTPRO	PicoSoft Pro Programming Software (see page 8)
1760-PICOPRO-PC02	PicoSoft Pro Software and Cable Kit (includes 1760-PICOSOFTPRO and 1760-CBL-PC02)
1760-MM3	256K Memory Module
1606-XLP30E	Power Supply
1760-CBL-2M	Point-to-Point Serial Interface Cable, 2m (6.6 ft)
1760-CBL-5M	Point-to-Point Serial Interface Cable, 5m (16.4 ft)
1760-CBL-INT01	Pico-Link Cable, 0.3m (1 ft)
1760-CBL-INT03	Pico-Link Cable 0.8m (2.6 ft)
1760-CBL-INT05	Pico-Link Cable 1.5 m (5 ft)
1760-CBL-INT300	Pico-Link Cable, non-terminated, 100m (300 ft)
1760-CONN-RJ45	Connectors for Pico-Link Cable
1760-TERM1	Network Termination Resistor
1760-NDM	Membrane Protect Display
1760-NDC	Cover to Protect Display
1760-NMF	Mounting Feet
1492-N90	Screwdriver
1492-KWC	Wire Cutter

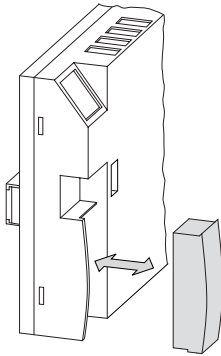


GFX Programming Cable (1760-CBL-PC02)

The programming cable is used to transfer data between the PC and the processor when using PicoSoft Pro Software.

GFX 256K Memory Module (1760-MM3)

Information stored on the memory module is non-volatile. Use the module to archive, transfer, and copy your circuit diagram. Each memory module can store one GFX program. It stores the program, visualization data, and all parameter settings of the circuit diagram.



TIP

Controllers without a keypad and display automatically transfer the circuit diagram from the inserted memory card to the Processor when the power supply is switched on. If the memory card contains an invalid circuit diagram, GFX will keep the circuit diagram still present on the device.

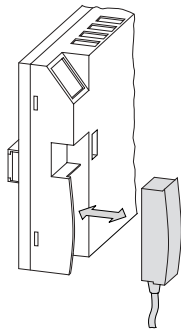
Power Supply (1606-XLP30E)

This 24V dc power supply is sized to provide enough power for any Pico-GFX 70 system. Line power can be 100 to 240V ac or 85 to 375V dc.



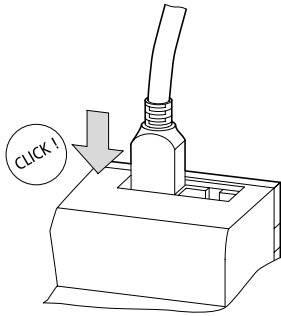
Point-to-Point Serial Interface Cables

The serial interface cables are available in two lengths.



1760-CBL-2M	Point-to-Point Serial Interface Cable, 2m (6.6 ft)
1760-CBL-5M	Point-to-Point Serial Interface Cable, 5m (16.4 ft)

Cables for Pico-Link between Processors



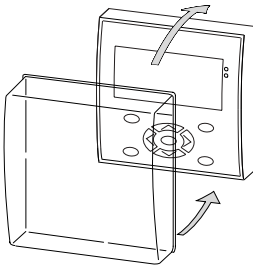
The 1760-LDFC processor has two Pico-Link terminals. Up to 8 of these processors can be connected together. The first and last stations in the network must be provided with a 124 Ω termination resistor.

The 1760-LDFC processors have two RJ45 sockets. Socket 1 in the first station is for the termination resistor. For subsequent stations, socket 1 is used for plugging in the incoming cable. Socket 2 is used for the outgoing cable or for the termination resistor on the last physical station on the network.

The cables are available in several lengths, including a long, non-terminated version that you can cut to fit your needs.

1760-CBL-INT01	Pico-Link Cable, 0.3m (1 ft)
1760-CBL-INT03	Pico-Link Cable 0.8m (2.6 ft)
1760-CBL-INT05	Pico-Link Cable 1.5 m (5 ft)
1760-CBL-INT300	Pico-Link Cable, non-terminated, 100m (300 ft)
1760-CONN-RJ45	Connectors for Pico-Link Cable
1760-TERM1	Network Termination Resistor

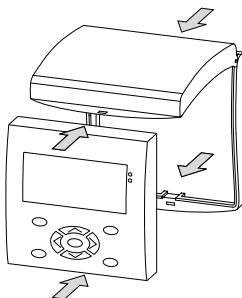
Protective Covers



Protective Membrane (1760-NDM)

For special applications such as in the food industry, the display and keypad must be protected against dust, liquids, etc. The protective membrane has been designed specifically for this purpose.

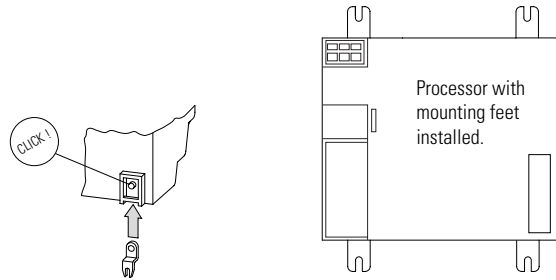
Protective Cover (1760-NDC)



The protective cover is designed to be used in aggressive environments. This protects the display and keypad against mechanical damage or destruction. Protection to IP65 is maintained. The protective cover can be sealed to prevent unauthorized access.

Mounting Feet

Mounting feet are required for attaching processors and I/O modules to a panel. Three mounting feet are sufficient for a device with four mounting points.



Tools

Screwdriver (1492-N90)

Terminal Block screwdriver with hardened 3 mm diameter blade (handle from recycled material).

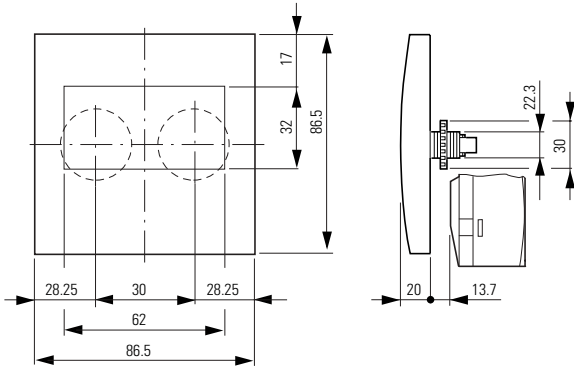
Wire Cutter (1492-KWC)

Wire cutting tool designed to attach directly to the shaft of the 1492-N90 screwdriver.

Review Specifications

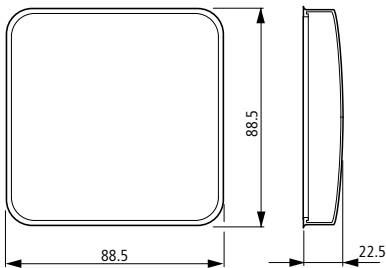
Mounting Dimensions

Figure 1 Display Unit (with and without keypad)



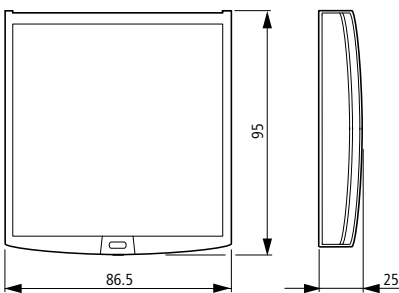
Specification	1760-DU and 1760-DUB
Front dimensions (W x H x D)	1760-DUB (with keys): 86.5 mm x 86.5 mm x 21.5 mm (3.41 in x 3.41 in x 0.85 in) 1760-DU (without keys): 86.5 mm x 86.5 mm x 20 mm (3.41 in x 3.41 in x 0.79 in)
Total dimensions with fixing shaft (W x H x D)	With keys: 86.5 mm x 86.5 mm x 43 mm (3.41 in x 3.41 in x 1.69 in)

Figure 2 Protective Membrane



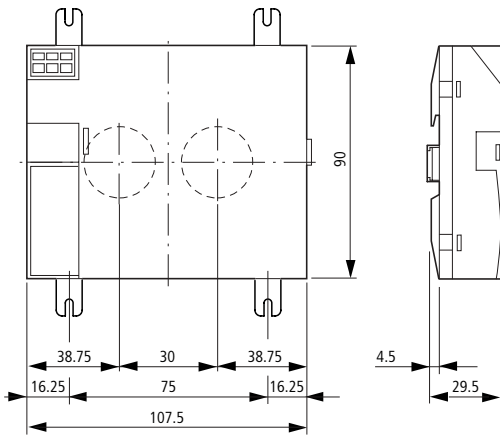
Specification	1760-NDM
Dimensions (W x H x D)	88 mm x 88 mm x 25 mm (3.46 x 3.46 x 0.98)

Figure 3 Protective Cover



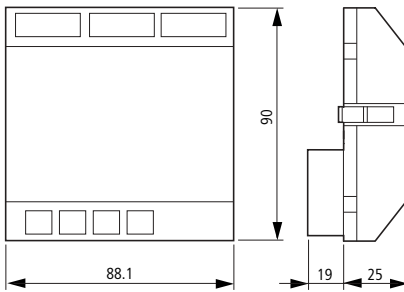
Specification	1760-NDC
Dimensions (W x H x D)	86.5 mm x 94 mm x 25 mm (3.41 in x 3.41 in x 0.98 in)

Figure 4 Processor Unit



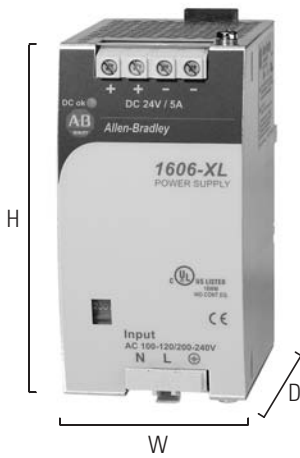
Specification	1760-LNB and 1760-LSB
Dimensions (W x H x D)	107.5 mm x 90 mm x 30 mm (4.23 in x 3.54 in x 1.18 in)

Figure 5 I/O Modules



Specification	1760-IB12XOW4IF 1760-IB12XOW4IOF 1760-IB12XOB4IF 1760-IB12XOB4IOF
Dimensions when fitted (W x H x D)	89 mm x 90 mm x 25 mm (3.5 in x 3.54 in x 0.98 in)
Dimensions when removed (W x H x D)	89 mm x 90 mm x 44 mm (3.5 in x 3.54 in x 1.73 in)

Figure 6 Power Supply



Specification	1760-LNB and 1760-LSB
Dimensions (W x H x D)	45 mm x 75 mm x 91 mm (1.77 in x 2.95 in x 3.58 in)

Table 1 Environmental Specifications

Specification	Pico GFX-70
Operating temperature (Installed horizontally/vertically)	-25°C to +55°C, (-13°F to +131°F)
Display legibility	-5°C to +50°C, (-23°F to +122°F)
Storage/transport temperature	-40°C to +70°C, (-40°F to +158°F)
Relative humidity (IEC 60068-2-30)	5 to 95% non-condensing
Pollution degree	Power supply unit/CPU; inputs/outputs: 2 Display/keypad: 3
Degree of protection (EN50178, IEC 60529, VBG4)	Processor Unit; I/O :IP20 Display Unit: IP65
Vibration (IEC 60068-2-6)	Constant amplitude 0.15 mm: 10 to 57 Hz Constant acceleration 2g: 57 to 150 Hz
Shock (IEC 60068-2-27)	18 shocks, semi-sinusoidal 15g/11 ms
Agency Certification	C-UL-US, CE

Table 2 Power Supply Specifications

Specification	1606-XLP30E
Input Voltage	<ul style="list-style-type: none"> • AC: 100 to 240V, 47 to 63 Hz • DC: 85 to 375V
Output Power	30W
Output Voltage	24 to 28V dc
Rated Output Current	<ul style="list-style-type: none"> • 1.3A at 24.5V • 1A at 28V
Approvals	<ul style="list-style-type: none"> • CE • C-UL-US Listed (UL508) • C-UR-US Listed (UL1950) • Safety Standards IEC/EN 60950 EN50178 • EMC: EN50081-1, EN61000-6-2, EN61000-3-2 • NEC Class 2 • FM Class 1 Div. 2 (T3A)

Table 3 Input Specifications

	1760-IB12XOW4IF, 1760-IB12XOW4IOF, 1760-IB12XOB4IF, 1760-IB12XOB4IOF
Digital inputs	12
Inputs usable as analog inputs	4 (I7, I8, I11, I12)
Rated voltage	24V dc
Off: 0 signal voltage	I1 to I6 and I9 to I10: < 5V dc I7, I8, I11, I12: < 8V dc
On: 1 signal voltage	I1 to I6 and I9 to I10: > 15V dc I7, I8, I11, I12: > 8V dc
On: 1 signal input current	I1 to I6, I9 to I10 at 24V dc: 3.3 mA I7, I8, I11, I12 at 24V dc: 2.2 mA
Analog inputs	4
Input type	DC voltage
Signal range	0 to 10V dc
Resolution analog	0.01V
Resolution digital	10-bit (0 to 1023 counts)
Input impedance	11.2k Ω
Accuracy	Two GFX devices, from actual value: $\pm 3\%$ Within a unit, from actual value, (I7, I8, I11, I12): $\pm 2\%$
Input current	< 1 mA

Table 4 Relay Output Specifications

Specification		1760-IB12XOW4IF, 1760-IB12XOW4IOF, 1760-OW2
Relay Outputs		4 (2 for 1760-OW2)
Uninterrupted current at 240V ac/24V dc		10A/8A
AC	Control Circuit Rating Codes (utilization category)	B300 Light Pilot Duty
	Max. rated operational voltage	300V ac
	Max. thermal uninterrupted current $\cos \phi = 1$ at B300	5A
	Maximum make/break capacity $\cos \phi \leq 1$ (Make/break) at B300	3600 VA/360 VA
DC	Control Circuit Rating Codes (utilization category)	R300 Light Pilot Duty
	Max. rated operational voltage	300V dc
	Max. thermal uninterrupted current at R300	1A
	Maximum make/break capacity at R300	28 VA/28 VA

Table 5 Transistor Output Specifications


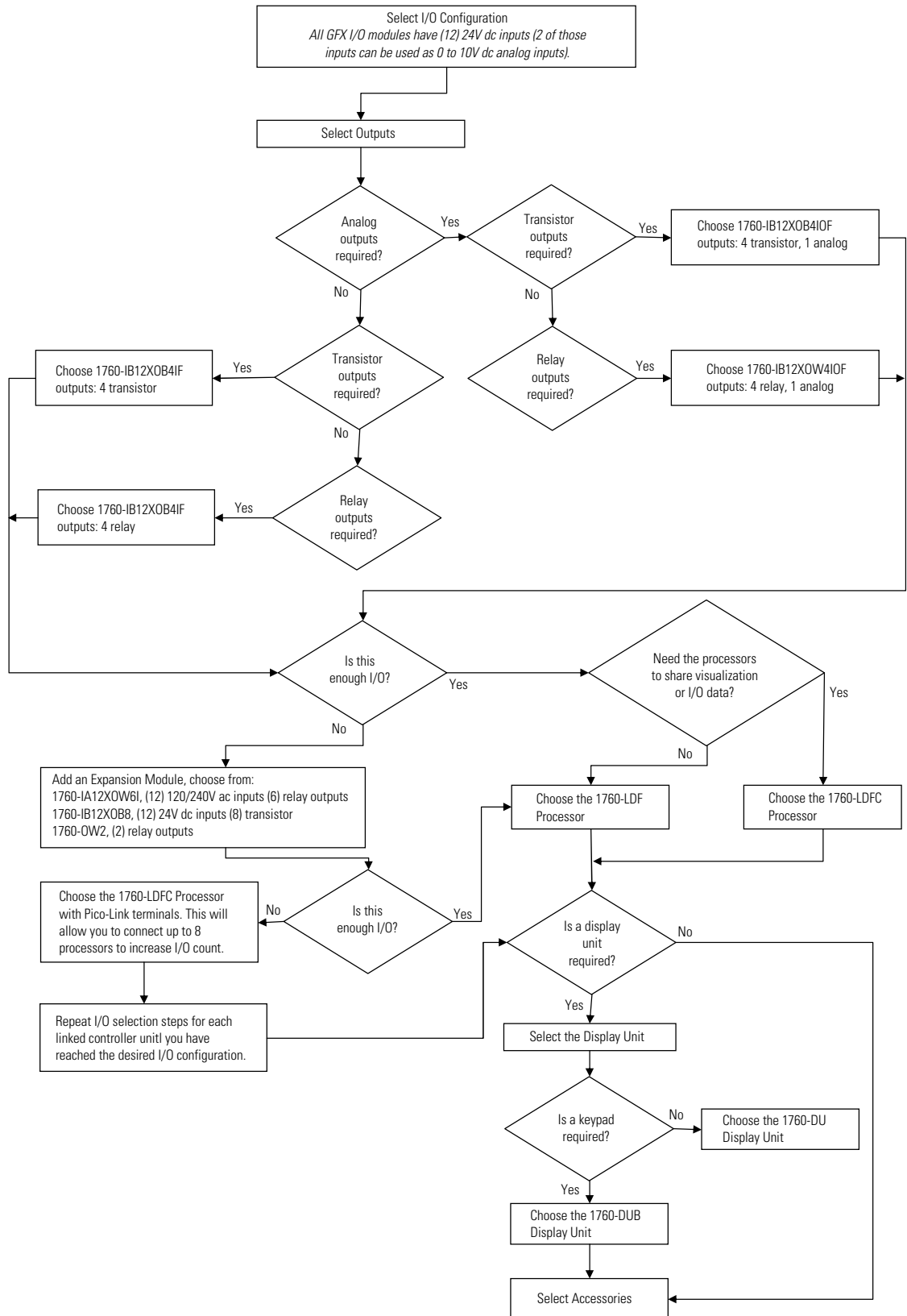
Specification	1760-IB12X0B4IF, 1760-IB12X0B4IOF
Transistor Outputs	4
Voltage Category	24V dc (20.4V dc to 28.8V dc)
Supply current	On 0 state: 18 mA (typical), 32 mA (max.) On 1 state: 24 mA (typical), 44 mA (max.)
Rated current at state 1, maximum	0.5A
Residual current at state "0" per channel	< 0.1 mA
Short-circuit protection	Yes
Thermal (Q1 to Q4)	(evaluation with diagnostics inputs I16, I15)
Maximum total short-circuit current	8A
Peak short-circuit current	16A
Thermal cutout	Yes
Total maximum current	2A
ATTENTION 	Outputs must be actuated simultaneously and for the same time duration.

Table 6 Analog Output Specifications

	1760-IB12X0W4IOF, 1760-IB12X0B4IOF
Analog Outputs	1
Output type	DC voltage
Signal range	0 to 10V dc
Output current max.	10 mA
Load resistor	1k Ω
Short-circuit and overload proof	Yes
Resolution analog	0.01V dc
Resolution digital	10-bit 0 to 1023 counts
Transient recovery time	100 μ s
Accuracy (-25°C to +55°C), related to the range	2%
Accuracy (25°C), related to the range	1%
Conversion time	Each CPU cycle

Selection Flowchart



Selection Worksheet

Catalog Number	Description	Pieces per Package	Quantity Selected
<i>GFX I/O Modules</i>			
1760-IB12XOW4IF	(12) 24V dc inputs, (4) relay output, analog input	1	
1760-IB12XOW4IOF	(12) 24V dc inputs, (4) relay outputs, analog input and output	1	
1760-IB12XOB4IF	(12) 24V dc inputs, (4) transistor outputs, analog input	1	
1760-IB12XOB4IOF	(12) 24V dc inputs, (4) transistor outputs, analog input and output	1	
<i>Expansion I/O Modules</i>			
1760-IA12XOW6I	(12) 120/240V ac inputs, (6) relay outputs	1	
1760-IB12XOB8	(12) 24V dc inputs, (8) transistor outputs	1	
1760-OW2	(2) relay outputs	1	
<i>Processor Units</i>			
1760-LDF	Processor	1	
1760-LDFC	Processor with Pico-Link Terminal	1	
<i>Programming Software and Cable</i>			
1760-PICOSOFTPRO	PicoSoft Pro Programming Software	1	
1760-CBL-PC02	Programming Cable, PC to Processor	1	
1760-PICOPRO-PC02	PicoSoft Pro Software and Cable Kit	1	
<i>Display Units</i>			
1760-DUB	Display Unit with Push buttons	1	
1760-DU	Display Unit without Push buttons	1	
<i>Memory Module</i>			
1760-MM3	256K Memory Module	1	
<i>Power Supply</i>			
1606-XLP30E	DC Power Supply	1	
<i>Point-to-Point Serial Interface Cables</i>			
1760-CBL-2M	Point-to-Point Serial Interface Cable, 2m (6.6 ft)	1	
1760-CBL-5M	Point-to-Point Serial Interface Cable, 5m (16.4 ft)	1	
<i>Cables for Pico-Link between Processors</i>			
1760-CBL-INT01	Pico-Link Cable, 0.3m (1 ft)	5	
1760-CBL-INT03	Pico-Link Cable 0.8m (2.6 ft)	3	
1760-CBL-INT05	Pico-Link Cable 1.5 m (5 ft)	2	
1760-CBL-INT300	Pico-Link Cable, non-terminated, 100m (300 ft)	1	
1760-CONN-RJ45	Connectors for Pico-Link Cable	2	
1760-TERM1	Network Termination Resistor	2	
<i>Protective Covers</i>			
1760-NDM	Membrane Protect Display	1	
1760-NDC	Cover Protect Display	1	
<i>Mounting Feet</i>			
1760-NMF	Mounting Feet (for panel mounting processors and I/O modules)	8	
<i>Tools</i>			
1492-N90	Screwdriver	5	
1492-KWC	Wire Cutter	1	

Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using our products. At <http://support.rockwellautomation.com>, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect Support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://support.rockwellautomation.com>.

Installation Assistance

If you experience a problem with a hardware module within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your module up and running:

United States	1.440.646.3223 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

We test all of our products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned:

United States	Contact your distributor. You must provide a Customer Support case number (see phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for return procedure.

www.rockwellautomation.com

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