A
Common Items

B
Built-in
Positioning
Functions

Apx.
Example
Connection

3. Comparison of Specifications

The specifications for each product with positioning functionality are shown below.

3.1 Comparison of Performance Specifications

3.1.1 Built-in Positioning Function [Main Unit (Transistor Output), High-Speed Output Special Adapter (FX3U-2HSY-ADP)]

Model	FX3G PLC (14-point and 24-point type) and FX3S/FX3GC PLC (Main unit, transistor output)	FX3G PLC (40-point and 60-point type) and FX3U/FX3UC PLC (Main unit, transistor output)	FX3U-2HSY-ADP[*1]
Number of control axes	2 independent axes	3 independent axes	2 independent axes (Connect 2 adapters to the main unit to control 4 axes independently.)
Interpolation	-		
Pulse output form	Transistor		Differential line driver
Pulse output method	"Pulse train + direction" method		"Pulse train + direction" method "Forward/reverse rotation pulse train" method
Maximum frequency[*2]	100,000Hz		200,000Hz
Acceleration /deceleration type	Trapezoidal acceleration/deceleration		
Unit	pulse		
Positioning range	-999,999 to +999,999 (pulse)		
Program language	Sequence program		
Position data	1 point (set in sequence program)		
Connection of manual pulse generator	-		
Detection of absolute position (Reads out the current value of ABS.)	ABS instruction of the PLC		
Others	Pulses can be output from the general-purpose outputs (Y000 and Y001) of the main unit.	Pulses can be output from the general-purpose outputs (Y000, Y001, and Y002) of the main unit.	• To be used when a servo amplifier with a differential line receiver is connected. • To be used when positioning control is performed with a FX3U Series relay output type or triac output type main unit. • Used in place of the general-purpose outputs (Y000 to Y007)[*3] of the main unit.

*1. Can only be connected to the FX3U PLC. Up to 2 adapters can be connected.

*2. Do not exceed the maximum rotation speed of the servo motor or the stepping motor.

*3. If 2 adapters are connected, Y000 to Y007 will be used. If only one adapter is connected, Y000, Y001, Y004, and Y005 will be used. The relation between the output of the FX3U-2HSY-ADP and the output of main unit is described in the following sections.

→ **For high-speed output special adapters, refer to Subsection 1.5.3 and Section 4.9 of "B. Built-in Positioning Function."**

3.1.2 Pulse Output Block [FX3U-1PG, FX2N-1PG(-E), FX2N-10PG]

Model	FX3U-1PG	FX2N-1PG(-E)
Number of control axes	1 independent axis	
Interpolation	-	
Pulse output form	Transistor	
Pulse output method	"Pulse train + direction" method "Forward/reverse rotation pulse train" method	
Maximum frequency[*1]	200,000Hz	100,000Hz
Acceleration/deceleration type	Trapezoidal acceleration/deceleration, approximate S-shaped acceleration/deceleration	Trapezoidal acceleration/deceleration
Unit	pulse, μm, 10^{-4}inch, mdeg	
Positioning range	-2,147,483,648 to +2,147,483,647 [×(Position data magnification[*2]) pulse] -2,147,483,648 to +2,147,483,647 [×(Position data magnification[*2]) μm][*3] -2,147,483,648 to +2,147,483,647 [×(Position data magnification[*2])×10^{-4} inch][*3] -2,147,483,648 to +2,147,483,647 [×(Position data magnification[*2]) mdeg][*3]	-999,999 to +999,999 [× (Position data magnification[*2]) pulse] -999,999 to +999,999 [× (Position data magnification[*2]) μm] -999,999 to +999,999 [× (Position data magnification[*2]) ×10^{-4} inch] -999,999 to +999,999 [× (Position data magnification[*2]) mdeg]
Program language	Sequence program (FROM/TO instruction, BFM direct designation)	
Position data	1 point (set in sequence program)	
Connection of manual pulse generator	-	
Detection of absolute position (Reads out the current value of ABS.)	Using the ABS instruction of the PLC	
Others	• PLC input/output: 8 points occupied (Points can be either input or output points.) • During positioning operation, the operation speed and/or target address can be changed.	PLC input/output: 8 points occupied (Points can be either input or output points.)

*1. Do not exceed the maximum rotation speed of the servo motor or the stepping motor.

*2. The position data magnification sets the 1, 10,10^2 or 10^3 in parameters.

*3. The positioning range can be set in the range from -2,147,483,648 to +2,147,483,647 pulses.

Model	FX2N-10PG
Number of control axes	1 independent axis
Interpolation	-
Pulse output form	Differential line driver
Pulse output method	"Pulse train + direction" method "Forward/reverse rotation pulse train" method
Maximum frequency[*1]	1,000,000Hz
Acceleration/ deceleration type	Trapezoidal acceleration/deceleration, approximate S-pattern acceleration/deceleration
Unit	pulse, μm, 10^{-4}inch, mdeg
Positioning range	-2,147,483,648 to +2,147,483,647 [× (Position data magnification[*2]) pulse] -2,147,483,648 to +2,147,483,647 [× (Position data magnification[*2]) μm][*3] -2,147,483,648 to +2,147,483,647 [× (Position data magnification[*2]) ×10^{-4} inch][*3] -2,147,483,648 to +2,147,483,647 [× (Position data magnification[*2]) mdeg][*3]
Program language	Sequence program (FROM/TO instruction, BFM direct designation)
Position data	1 point (set in sequence program)[*4]
Connection of manual pulse generator	Connectable (Differential line driver, transistor)
Detection of absolute position (Reads out the current value of ABS.)	Using the ABS instruction of the PLC
Others	• PLC input/output: 8 points occupied (Points can be either input or output points.) • From the dedicated start, the high-speed start by 1 ms at shortest is enabled. • During positioning operation, the operation speed can be changed.

*1.   Do not exceed the maximum rotation speed of the servo motor or the stepping motor.

*2.   The position data magnification sets the 1, 10,10^2 or 10^3 in parameters.

*3.   The positioning range can be set in the range from -2,147,483,648 to +2,147,483,647 pulses.

*4.   Up to 200 points (table) can be set for the table operation.

3.1.3 Positioning Special Function Block [FX3U-20SSC-H]

Model	FX3U-20SSC-H
Number of control axes	2 independent/simultaneous axes
Interpolation	2-axes linear interpolation, 2-axes circular interpolation
Pulse output form	SSCNET III
Pulse output method	SSCNET III
Maximum frequency[*1]	50,000,000Hz
Acceleration/ deceleration type	Trapezoidal acceleration/deceleration, approximate S-pattern acceleration/deceleration
Unit	pulse, μm, 10^{-4}inch, mdeg
Positioning range	-2,147,483,648 to +2,147,483,647 [× (Position data magnification[*2]) pulse] -2,147,483,648 to +2,147,483,647 [× (Position data magnification[*2]) μm][*3] -2,147,483,648 to +2,147,483,647 [× (Position data magnification[*2]) ×10^{-4} inch][*3] -2,147,483,648 to +2,147,483,647 [× (Position data magnification[*2]) mdeg][*3]
Program language	Sequence program (FROM/TO instruction, BFM direct designation)[*4]
Position data	1 point (set in sequence program)[*5]
Connection of manual pulse generator	Connectable (Differential line driver)
Detection of absolute position (Reads out the current value of ABS.)	Set in parameters
Others	• PLC input/output: 8 points occupied (Points can be either input or output points.) • During positioning operation, the operation speed and/or target address can be changed.

*1. Do not exceed the maximum rotation speed of the servo motor.

*2. The position data magnification sets 1, 10,10^2 or 10^3 in parameters.

*3. The positioning range can be set in the range from -2,147,483,648 to +2,147,483,647 pulses.

*4. The set data (table information) of the table operation can be set up with FX Configurator-FP Setting/ monitor tool.

*5. Up to 300 points (table) can be set for the table operation of the X-/Y-/XY-axis.