

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

GE 90-30 SERIES PLC

IC693APU301M

AXIS POSITIONING MODULE

Used with the applicable Series 90-30 motion control configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

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IC693APU301/302 Motion Mate Axis Positioning Module (APM)

The Motion Mate APM is an easy-to-use intelligent, fully programmable one-axis (IC693APU301) or two-axis (IC693APU302) motion control module for the Series 90-30 PLC. The APM allows a PLC user to combine high-performance control with PLC logic solving functions in one integrated system. The APM can be configured to operate in either *Standard mode* or *Follower mode*. When used in Standard mode, it combines high-performance motion control with PLC logic solving functions in one integrated system. When used in Follower mode, it provides high-performance “electronic gearing” for continuous master/slave applications. The desired mode is easily selected by configuring a setup parameter in the configuration software.

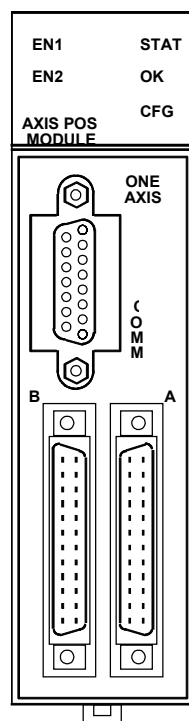


Figure 8-10. Motion Mate APM Module

The Series 90-30 and APM operate together as one integrated motion control package. The APM controls axis motion and handles all direct communications to the drive and machine while the PLC automatically transfers data between PLC tables and the APM.

The PLC also provides a means for connecting Operator Interfaces, which can control and monitor system operation. An example of an APM servo system showing the hardware and software used to configure, program, and operate the system is shown below.

The APM can be installed in any Series 90-30 CPU, expansion, or remote baseplate. For embedded CPUs (311, 313, or 323), you may have up to three APM modules. For a modular CPU (331 or higher), you may have up to eight APM modules in one system, with a maximum of three APM modules per baseplate.

Multiple motion programs may be created and stored in the APM (maximum of 10 may be stored in the APM) with the Motion Programmer software package. The APM is configured and programmed with VersaPro software (Version 1.1 or later) or Logic Developer-PLC.

The APM faceplate (front panel) has two 24-pin high-density connectors for servo connections. The connector labeled A contains connections for Axis 1. Connector B, for a 1-axis APM, contains general purpose connections. Connector B, for a 2-axis APM, has connections for Axis 2 as well general purpose connections. To make wiring easier to the drive and machine, each high-density connector is typically connected by a short cable to a terminal block.

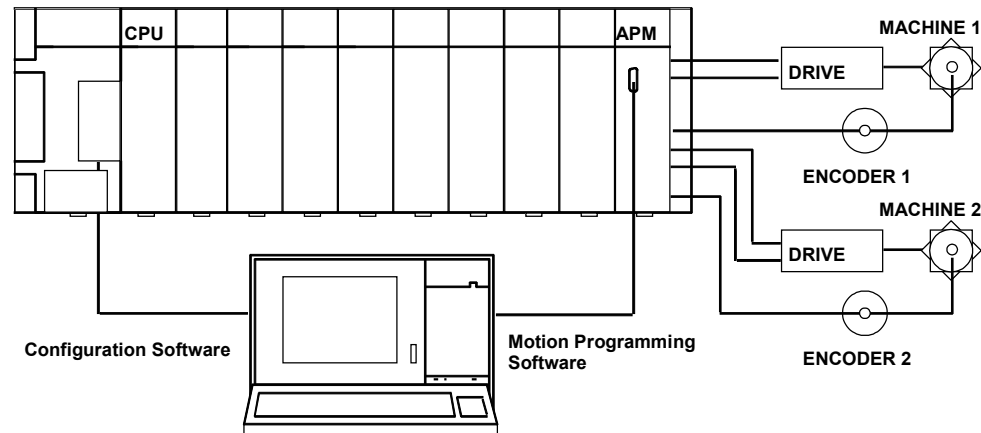


Figure 8-11. Example of Motion Mate APM Servo System

APM Cables

These cables consist of a 24-pin I/O connector, a cable, and a 25-pin D-type terminal block connector. (Cables are documented in Chapter 10.) Available cables are:

- IC693CBL311 (10 feet/3 meters)
- IC693CBL319 (3 feet/1 meter)
- IC693CBL317 (10 feet/3 meters) with an 8" external shield pigtail
- IC693CBL320 (3 feet/1 meter) with an 8" external shield pigtail

For building custom-length cables, the 24-pin I/O cable connector is available in three different kits (solder eyelet receptacle, crimp wire receptacle, and IDC (ribbon) receptacle). The terminal block is Weidmuller RD25 910648 or equivalent (must be compatible with the I/O cable IC693CBL311/319/317/320 - see Chapter 10 for details).

Motion Mate APM Module Documentation

See the following manuals for detailed information on Power Mate APM Modules:

- GFK-0840 *Motion Mate APM for Series 90-30 PLC Standard Mode User's Manual*
- GFK-0781 *Motion Mate APM for Series 90-30 PLC Follower Mode User's Manual*
- GFK-0664 *Series 90 PLC APM Programmer's Manual*

Related servo manual:

- GFK-1581 *SL Series Servo User's Manual*

IC693DSM302 Motion Mate Digital Servo Module (DSM302)

The Motion Mate DSM302 is a high-performance, two-axis motion control module that is highly integrated with the logic solving and communications functions of the Series 90-30 PLC. In digital mode, this module controls GE Fanuc digital servos. Beginning with firmware version 1.40, this module has the ability to control servos with an analog command input, such as the GE Fanuc SL Series Servos, or third party analog servos.

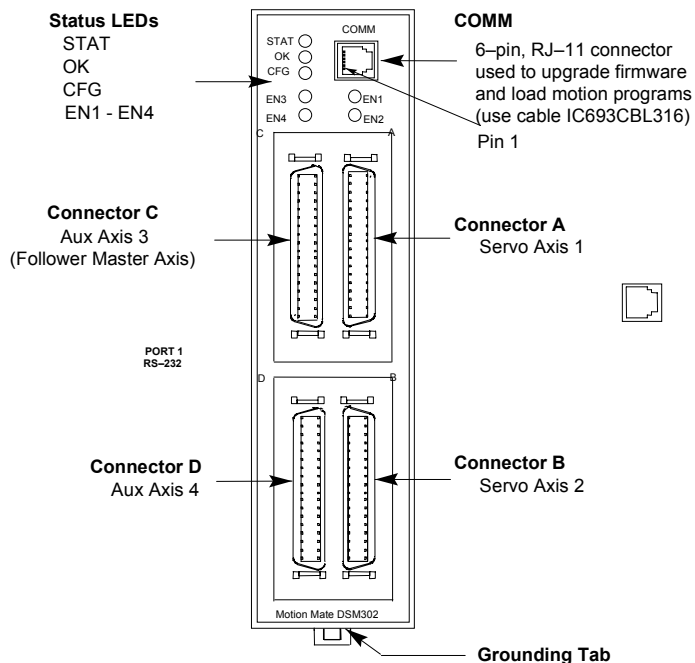


Figure 8-12. Motion Mate DSM302 Module

Features.

- Digital Signal Processor (DSP) control of GE Fanuc Servos
- Block Processing time under 5 milliseconds
- Velocity Feed forward and Position Error Integrator to enhance tracking accuracy
- High resolution of programming units
 - Position: $-8,388,608 \dots +8,388,607$ User Units
 - Velocity: $1 \dots 8,388,607$ User Units/sec
 - Acceleration: $1 \dots 134,217,727$ User Units/sec/sec
- Simple and powerful Motion Program instruction set
- Simple 1- or 2-axis motion programs with synchronized block start
- Program support for a short motion program, called Program 0, which can be created in the configuration software
- Non-volatile storage for 10 programs and 40 subroutines, created with the APM Motion Programming software.
- User scaling of programming units (User Units)
- DSM firmware, stored in Flash memory, is updated via its front panel COMM port.
- Generic programming using command parameters as operands for Acceleration, Velocity, Move, and Dwell Commands
- Automatic Data Transfer between PLC tables and DSM302 without user programming
- Ease of I/O connection with factory cables and terminal blocks as well as a serial port for connecting programming devices. The serial port also allows "soft" upgrades to firmware, which is stored in Flash memory.
- Control of GE Fanuc Digital servos, analog SL Series Servos, or third party analog servos.
- Home and overtravel switch inputs for each Servo Axis
- Two Position Capture Strobe Inputs for each Position Feedback Input
- 5v , 24v and analog I/O for use by PLC
- A Quad B Encoder input for Follower Master axis
- 13 bit Analog Output can be controlled by PLC or used as Servo Tuning monitor

IC693DSM302 Documentation

- GFK-1464, *Motion Mate DSM302 for Series 90-30PLCs User's Manual*.
- GFK-0664, *Series 90-30 PLC APM Programmer's Manual*

Related servo manuals:

- GFK-1581, *SL Series Servo User's Manual*

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- GFH-001, *Beta Series Servo Products Specification Guide*
 - GFZ-65192EN, *Alpha Series Servo Amplifier (SVU) Descriptions Manual*
 - GFZ-65162E, *Control Motor Amplifier, Alpha Series*
 - GFZ-65142E, GFZ-65150E, GFZ-65165E, *Alpha Series Servo Motor Manuals*

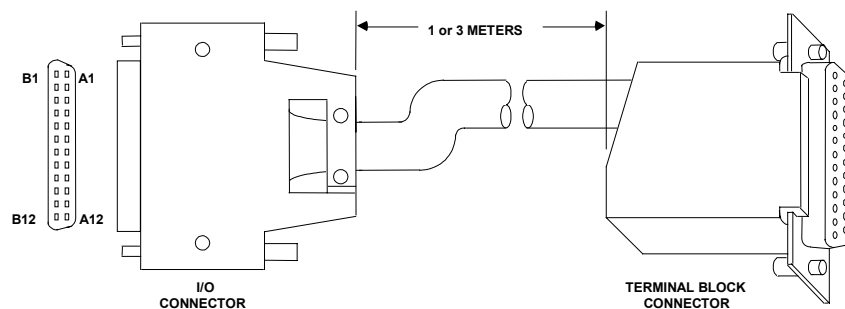
IC693CBL311/317/319/320 I/O Interface Cables for Power Mate APM Modules

Function of cable

The I/O Interface Cable assembly consists of a 24-pin I/O connector, a cable, and a 25-pin D-type terminal block connector. This cable is used to connect the Power Mate APM Modules (IC693APU301 and IC693APU302) to drives and machines. There are two male 24-pin connectors mounted on the front of each Power Mate APM. Two of these I/O Interface cables are required for connections to and from the drive and machine. Catalog number IC693CBL311 is 10 feet (3 meters) in length and IC693CBL319 is 3 feet (1 meter) in length. The cable wire code list for these cables is provided in Table H-4.

An I/O cable assembly similar to IC693CBL311 and IC693CBL319, but with the drain shield wire disconnected from pin B12 and brought outside of the cable housing through an 8" pigtail, is also available in two lengths. Catalog number IC693CBL317 is 10 feet (3 meters) in length and IC693CBL320 is 3 feet (1 meter) in length. *This cable improves the Power Mate APM's noise immunity.* The cable wire code list for these cables is provided in Table 10-5.

To make wiring to the drive and machine easier, each connector on the module is typically connected by a short cable (the I/O Interface cable) to a terminal block. The cable that connects from the I/O connector to an external terminal block can be shortened to meet the requirements of your installation. See manuals GFK-0840 (standard mode) or GFK-0781 (follower mode) for details on APM terminal blocks.



* Cable for IC693CBL311/319 shown. Cables IC693CBL317/320 have 8" external wire connected to drain shield.

Figure 10-30. I/O Connector Cable Specifications

Specifications

Cable Length	10 feet (3 meters) and 3 feet (1 meter)
Connector	24-pin female, Fujitsu part number FCN-363J024 (crimp wire type).

Wiring Information

You must purchase the mating female (socket type) 24-pin connectors (which mate with the I/O Connector on the faceplate of the APM). This connector is available under catalog number IC693ACC317. This connector has a solder eyelet receptacle and is part of an accessory kit. Optionally, other types of the 24-pin connector (for different physical connections) are also available.

Catalog numbers for these connectors and their associated parts are listed in the following table. The list includes catalog numbers for three types of connectors: solder pin, crimp pin, and ribbon cable. *Each accessory kit contains enough components (D-connectors, backshells, contact pins, etc.) to assemble ten single-ended cables of the type specified for each kit.*

Table 10-5. Catalog Numbers for 24-Pin Connector Kits

GE Fanuc Catalog Number	Vendor Catalog Number	Description
IC693ACC316 (Solder Eyelet Type)	FCN-361J024-AU	Solder eyelet receptacle
	FCN-360C024-B	Backshell (for above)
IC693ACC317 (Crimp Type)	FCN-363J024	Crimp wire receptacle
	FCN-363J-AU	Crimp pin (for above, 24 needed)
	FCN-360C024-B	Backshell (for above)
IC693ACC318 (Ribbon or IDC Type)	FCN-367J024-AUF	IDC (ribbon) receptacle, closed cover
	FCN-367J024-AUH	IDC (ribbon) receptacle, open cover

Note: Wire for cables is 12 twisted pairs, #24 AWG (0.22mm²).

Additional tools from Fujitsu are required to properly assemble the crimped contact and ribbon cable type connectors. *The solder eyelet connectors (as provided in IC693ACC316) do not require any special tooling.*

Crimped Contact Connectors (as provided in IC693ACC317) require:

Hand Crimping Tool FCN-363T-T005/H
Contact Extraction Tool FCN-360T-T001/H

Ribbon Cable Connectors (as provided in IC693ACC318) require:

Cable Cutter FCN-707T-T001/H
Hand Press FCN-707T-T101/H
Locator Plate FCN-367T-T012/H

These tools need to be ordered from an authorized Fujitsu distributor. Three of the largest US distributors for Fujitsu connectors are Marshall at (800)522-0084, Milgray at (800)MILGRAY, and Vantage at (800)843-0707. If none of these distributors service your area, contact Fujitsu Microelectronics in San Jose, California, USA via telephone at (408) 922-9000 or via fax at (408) 954-0616 for further information.

It is recommended that you order any necessary connector tooling with sufficient lead time to meet your assembly requirements for these connectors. These tools are generally not stock items and can have significant lead times from distribution. If you have any further questions about this issue, please feel free to contact the GE Fanuc PLC Hotline at 1-800-GE FANUC (1-800-433-2682) or 804-978-6036.