Product Introduction

The motion control solution consists of three essential pieces that form the basic system. The components are an FX Positioning Drive, DX Series Brushless Servo Motor and motor cabling. This basic system can be enhanced with the addition of snap-on application modules or peripheral equipment.

FX Amplifiers and DX Motors

The FX drives are capable of driving motors with torque ratings from 8 to 400 lb-in (pounds per inch) continuous output and speeds to 5000 RPM (revolutions per minute).

DX motors are available in sizes that match each of the FX amplifiers' power output. Many of the motors are available in metric or English flange and shaft combinations. A holding brake is also available with most DX motors.

Most models are available with two standard styles of electrical connections. The first style has "MS" (Military Specification) connectors; the second style has internal terminal strips. Pre-assembled cables for resolver feedback and stator wiring are available for DX motors ordered with MS style connectors. DX motors without MS style connectors meet IP65 waterproofing standards for operation in a wash-down environment. Pre-assembled cables for resolver feedback are also available for DX motors without MS style connectors.

Resolver Cables

Pre-assembled resolver cables that connect the low voltage resolver and motor thermostat signals from the DX motor to the FX amplifier are available in three standard lengths: 15, 25 and 50 feet (100 feet is the maximum cable length allowed without EMERSON Motion Control factory approval.) There are two styles of resolver cables available for DX motors (RC-XXX and ECF-XXX). The RC-XXX cable is used for motors without MS connectors and the ECF-XXX cable is used for motors with MS connectors.

Stator Cables

For DX motors with MS style connectors a stator cable for the three motor phases and ground wires and the optional brake is available in three standard lengths: 15, 25 and 50 feet. For DX motors without MS style connectors, the stator wiring for the three motor phases and ground wires and the optional brake can be ordered from EMERSON Motion Control or can be supplied by the user.

Application Modules

An "application module" can be added to increase the capabilities of the basic FX drive for applications that require more sophisticated motion control. Application modules are mounted on the FX drive by two snap handles located at the top and bottom of the module. When the module is in position, electrical connection is automatically made using a 48 position connector on the FX drive.

Twelve additional optically isolated I/O are available (eight input and four output) using removable terminal blocks with screw terminals. The inputs are numbered 13 through 20 and the outputs are numbered 21 through 24.

A summary of the available features is shown below. Table 1 on page 9 provides a cross reference of available features with appropriate modules.

- **Expanded I/O:** IOM-1 and all application modules. Twelve additional I/O lines (eight input and four output) provide additional I/O capacity.

- **Memory Expansion:** All application modules except IOM-1. Memory to support complex programming and storage.

- **Programs:** All application modules except IOM-1. Programs allow you to link Indexes and other functions together for more complex moves.

- **Parallel Interface:** IOM-1 and PCM-1, 2 and 4. The parallel interface feature allows the use of thumbwheels and T-16 numeric displays for programming and drive information.

- **Ratio Control:** PCM-15, 16, 17, 18, 19, 22, 23, 24 and IBS-15. Ratio Control permits the FX drive to synchronize motion with an external encoder or another FX drive/PCM module combination. A 25 pin socket is provided for connection to an encoder cable. A through connector allows multiple axes to be synchronized to an external encoder or to each other.

- **Suspend/Resume:** All application modules except IOM-1. Suspend/Resume allows you to suspend the motion in progress, move the machine to a position not within that program, perform other operations and then return and complete the remainder of the original program.

- **Web Loop Control:** PCM-18 only. Loop control is used in web control applications to achieve constant web speed when the take-up roll or unwind roll is center wound by an FX drive.

- **Press Feed:** PCM-24 only. The PCM-24 provides sophisticated control of a press feed application with minimal operator programming experience. The PCM-24 synchronizes the feed to the press cycle using a master synchronization encoder which tracks the position of a press ram.

- **Cam Profiler:** PCM-23 only. Electronically simulates a mechanical Cam.

- **Flying Cutoff:** PCM-14, 15 and 24. Flying cutoff provides accurate length cuts for almost any process.

- **Slip Compensation:** PCM-14 and 24. Automatically compensates for product slip to maintain precise positioning.

Application modules should never be installed or removed with power applied to the drive.

Table 1   Features by Module Type

	Expanded I/O	Memory Expansion	Programs	Thumbwheel Display	Ratio Control	Phase Sync	Multiple Axis Ratio Control	Suspend Resume	Web Loop Control
IOM-1	Yes	No	No	Yes	No	No	No	No	No
PCM-1	Yes	Yes	Yes	Yes	No	No	No	Yes	No
PCM-2	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
PCM-4	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No
PCM-5	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No
PCM-11	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No
PCM-14	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No
PCM-15	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No
PCM-16	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
PCM-17	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No
PCM-18	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
PCM-19	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No
PCM-22	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
PCM-23	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No
PCM-24	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No

Peripheral Equipment

Additional peripherals such as thumbwheels, remote display and a fully functioned Data Entry Terminal may also be added to enhance the basic system.

Thumbwheels

Available with the IOM-1, PCM-1, -2, -4 and -5 modules. Thumbwheels allow you alter basic index parameters through the Parallel Interface connector located on the application modules listed. You can set up the thumbwheel to change velocities, distances/positions, dwell times, index counts, etc.

All thumbwheels are mounted in a small self-contained enclosure. Pre-assembled cables may be purchased for electrical connection to the application module.

T-16 Numeric Display

Available with the IOM-1, PCM-1, -2, -4 and -5 modules. The T-16 displays the position or velocity of the FX drive through the parallel interface connector. The large LED's are easily visible at a distance to allow monitoring at different positions on the machine. Pre-assembled cables may be purchased for electrical connection to the application module.

T-21 Data Entry Terminal

The T-21 Data Entry Terminal allows you to enter data and display different motion parameters. The T-21 can also be programmed to display up to 98 user specific messages unique to the application. The T-21 communicates with the FX drive through the serial interface. No application module is required. Consult the *EMERSON Motion Control Product Catalog* (410153-01) or *T-21 Data Entry Terminal Manual* (400192-00) for further details.

T-60 Operator Interface

The T-60 Operator Interface Terminal allows you to quickly and easily set up and operate a FX drive. The T-60 is perfect for providing flexible overall control and operator interface for just about any application which needs an easy to use, intelligent operator interface. The T-60 communicates with the FX drive through the serial interface. No application module is required. Consult the *EMERSON Motion Control Product Catalog* (410153-01) or *T-60 Operator Interface Terminal Manual* (400295-00) for further details.