Schaedler Yesco Expo 2008
Radisson Penn Harris & Convention Center - Camp Hill, PA • April 15 & 16, 2008
Boardwalks & Beaches
Presented by Schaedler Yesco IPS Industrial Piping Systems
Motion Product Summary

Get up to speed with Kinetix Motion Products
Motion Product Summary

- Analog Servo Drives:
  - Ultra1500
  - **Ultra3000**

  *(Requires a motion controller)*

- Stand-Alone Controllers:
  - **Ultra3000 Indexer**
  - Ultra5000 (1-1/2 Axes)

  *(Requires only relay/HMI interface)*

- PLC-Based Motion Controllers:
  - SLC Stepper and Servo
  - CompactLogix SERCOS
  - ControlLogix SERCOS
  - SoftLogix 5800 SERCOS

- Logix and Kinetix Drives:
  - **Ultra3000 SE**
  - Kinetix 2000 System (Low Power)
  - Kinetix 6000 System
  - Kinetix 7000 System (Hi-Power)

- Motors and Actuators
Motion Product Selection

Use the Kinetix Motion Control Selection Guide (publication GMC-SG001M-EN-P) to qualify and select your components.
Ultra1500 Servo Drive

- **Compact**
  - Smaller panel footprint than competitive drives

- **Simple**
  - Plug and play capability
  - Ultraware configuration wizards
  - Built-in operator interface
  - Analog, preset or stepper control

- **Cost-Effective**
  - Provides the level of power and performance you need at an economical price
  - Setup wizards reduce programming time
Ultra3000 Indexer

• Versatile and Compact
  – Wide range of power and connectivity options allowing you to sell globally into a variety of applications, architectures and power platforms
• Easy to configure, commission and integrate
  – Seamless integration into Allen-Bradley and third-party systems
• Networkable
  – DeviceNet option available across platform
• Cost Effective
  – The variety of features available on the Ultra3000 and Ultra3000i indexing version make them a cost effective solution for most applications.
## Index 0 Setup

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
<td>Incremental</td>
</tr>
<tr>
<td>Distance</td>
<td>1000</td>
</tr>
<tr>
<td>Batch Count</td>
<td>1</td>
</tr>
<tr>
<td>Dwell</td>
<td>0</td>
</tr>
<tr>
<td>Velocity</td>
<td>750</td>
</tr>
<tr>
<td>Acceleration</td>
<td>13</td>
</tr>
<tr>
<td>Deceleration</td>
<td>13</td>
</tr>
<tr>
<td>Next Index</td>
<td>0</td>
</tr>
<tr>
<td>Action When Complete</td>
<td>Stop</td>
</tr>
</tbody>
</table>

- **Counts**
- **msec**
- **RPM**
- **Revs/s^2**
Ultra5000 Motion Controller

• High Performance
  – Fully programmable motion controller through ANSI C
  – Stand-alone single axis servo drive

• Versatile
  – Intelligent, high-performance, fully programmable positioning drive
  – Encapsulates the performance and flexibility required by advanced motion applications
  – Perfectly suited for single and master/follower axes system integration
#include <motion.h> // Use Motion Library
#include "Defs.h" // Include definitions file

// Program Global Variables
extern float Scale; // Counts per unit (revs)
extern float Scale2;
extern float CamMasterCycle; // Variables for tracking master cam position

typedef struct Cam Cam;
extern Cam* GlobalCam;
extern long Cam_GetInputPos(Cam* cam, long* pos);
extern long Cam_GetCurrentPos(Cam* cam, long* pos);

void CreateRKCCam(long table)
{
    float
        MotorDist,
        MasterDist,
        ratio;

        CamMasterCycle = FloatArrayGetElement(RKC_Length) * Scale2;
    MotorDist = FloatArrayGetElement(RKC_CutWindow) * Scale;
    ratio = FloatArrayGetElement(RKC_Ratio) * Scale / Scale2;
    MasterDist = MotorDist / ratio;

        CamOpenTable(table,10,5); // Open table (1-3), 10 segments, 5th order
    CamConstantVelocity(MasterDist, MotorDist);
    CamSpline(CamMasterCycle, Scale, ratio, ratio);
    CamCloseTable();
}
Integrated Architecture
CompactLogix L43 & L45 Motion Controllers

Expands the CompactLogix family to address simple to complex motion applications and high performance communications

1768 backplane

1769 backplane

1768-M04SE

Integrated Serial port

Network modules for EtherNet & ControlNet

SERCOS motion module

Rockwell SERCOS Servo Drive

Same I/O bus structure as the L3x system

• Up to 4/8 real axes of motion
• 2/4 additional feedback axes
• 6/6 additional virtual axes for L43 and L45, respectively.
ControlLogix L6x Motion Controllers

1756-L60M03SE (Combo)
1756-M03SE (3-Axis)
1756-M08SE (8-Axis)
1756-M16SE (16-Axis)

ControlLogix Motion supports up to 32 axes. Any combination of real, feedback and virtual.
SoftLogix 5800 Motion Controllers

1784-PM16SE (16 Axis) SoftLogix (PC-Based)

- 1789-L60 (16 slot virtual back plane)
  - Maximum of (6) controllers
  - 64 Axis of Motion (4) 1784-PM16SE cards
  - 8 Axis of Motion (4) 1784-PM02AE cards
  - Maximum of (16) network communications cards
  - Maximum 64 M user program

- 1789-L30 (5 slot virtual back plane)
  - Maximum of (2) controllers
  - 16 Axis of Motion (1) 1784-PM16SE card
  - 4 Axis of Motion (2) 1784-PM02AE cards
  - Maximum of (5) network communications cards
  - Maximum 64 M user program

- 1789-L10 (3 slot virtual back plane)
  - One controller
  - Maximum of (2) network communication cards
  - No motion
  - Maximum 2 M user program

L30, L60 Controller

SERCOS

Rockwell SERCOS Servo Drive
Configuring Motion with RSLogix 5000
Programming Motion with RSLogix 5000

6
incremental_Move
<Local:1.Data:6>

MAKING A MOVE

Motion Axis Move
Axis
Motion Control Move_Command
Move Type INCREMENTAL
Position Move_Position
10
Speed Move_Speed
50
Speed Units % of Maximum

7
Jog_Motor_FORWARD
<Local:2.Data:2>

JOGGING AN AXIS FORWARD

Motion Axis Jog
Axis Motor_X
Motion Control Jog_FWD_Command
Direction FORWARD
Speed Jog_FWD_Speed
30
Speed Units % of Maximum

More >>
SERCOS Connectivity

• Simple and hi-performance.
• Reduces both installation time and wiring costs.

(2) fiber connections replace (18) discrete wires per drive, eliminating 36 terminations per axis.
Ultra3000 SERCOS

- Versatile and compact
- Wide range of power: 1 Nm to over 150 Nm Torque
- Axis configuration and commissioning using RSLogix 5000 over SERCOS
  - Reduces start up costs and integration time
- Reduced wiring with fiber optics
  - Cuts installation time and costs
- Absolute and high resolution system feedback
  - No homing required after power up-increases machine cycle time
  - Improved system bandwidth
- Diagnostics using SERCOS
  - Drive information communicated over SERCOS to RSLogix for easy access to more drive information
Kinetix 2000 Drives

- **Compact**
  - Smaller panel footprint than competitive drives
  - Competes in “stepper” market well

- **Simple**
  - SERCOS interface eliminates up to 18 discrete wires per axis
  - Power rail makes layout and installation fast and easy

- **Familiar**
  - Assembled, configured and programmed just like the Kinetix 6000 drive!
Kinetix 6000 Drives

• Simplicity
  – SERCOS interface **eliminates up to 18 discrete wires per axis.**
  – Power rail makes layout and installation fast and easy.

• Compact design
  – Up to 65% smaller than competitors’ units.
  – Integral features save additional panel space.

• Time saving accessories
  – Line interface module replaces nine components (such as 24 VDC power supply for I/O), **eliminating up to 72 wire terminations** (and mistakes).
Kinetix 7000 - High Power

• **Highlights**
  - Fully supported in RSLogix 5000
  - SERCOS connectivity
  - Built-in Safety (Category 3, SIL 3 safe-off solution as standard)
  - GuardMotion enabled

• **Motor support**
  - New HPK-Series high power asynchronous motor
  - 8720SM
  - MP Line
  - 1326AB
  - 1329L
  - 3rd party motor files
Which Kinetix Drive Do I Use?

Continuous Power Rating

100W 200W 1.2 KW 6.6 KW 15 KW 18 KW 22 KW 93 KW 150 KW

- Kinetix 2000
- Ultra3000
- Kinetix 6000
- Kinetix 7000

Ultra3000 30Amp Servo Drive
What is GuardMotion?

- GuardMotion is integrated safe motion
  - It means safety inside, built in
- It is available in the Kinetix 6000 and 7000 drives, and the first release supports the following applications:
  - Safe-off
  - Prevention against un-expected start
  - Door Locking Control
  - Category one stop
- It means more productivity for your machine
  - Faster recovery time (no bus discharge, no pre-charge limitations, etc.)
  - Higher MTBF – “Gentle” on the product
  - Less components – Simple to design, install, operate and maintain
MP-Series (Low Inertia)

- Extremely high torque in a small package
- Very low rotor inertia
- IEC standard flange and shaft
  - F100, F115, F130, F165, F215, F265 and F300 frames
  - Multiple lengths per frame, up to 200mm stack
- 230 and 460 volt windings standard
- Feedback: High resolution, single- and multi-turn absolute; 2000 line incremental; and 2-pole resolver
- Keyed shafts
  - Non-keyed optional
- 24 volt brake option
MP-Series Food Grade Motors

- Built on the MP-Series high performance platform.
- Specifically designed for use in food and beverage packaging and handling.

(This is NOT washdown).
MP-Series Stainless Steel (Washdown)

- Built on MP-Series high performance platform.
- Specifically designed for use in 1200 psi washdown food and beverage applications.
1326AB Series (460V)

- Medium inertia servo motors for use in applications that require moving large loads with smooth performance.

- Absolute encoder option available
TL-Series

• Compact
  – High torque density in a small footprint
  – Low inertia solution
  – NEMA or JIS Metric flanges
  – Incremental feedback option
    • Absolute feedback option compatible with Ultra 1500 servo drives

• Integrated
  – Compatible with the Kinetix Integrated Motion drives

• Cost-Effective
  – Provides the high performance at an economical price
  – Economical stepper motor replacement
Legacy Motors

- **Y-Series (120/230V)**
  - Small, low-inertia servo motors for use in light applications that require quick acceleration.

- **F-Series (230V)**
  - Medium inertia servo motors for use in applications that require moving large loads smoothly.
MP-Series Integrated Gear Motor/Rotary Actuator

- MP servo motor with integrated gear reducer.
- Space saving design.
- Directly replaces some costly mechanical indexing systems.
MP-Series Linear Actuators; MPAS

- Very Compact
  - Drop-in linear stages in screw and Direct Drive (magnetic) versions
- Integrated
  - Fully integrated servo motor/linear actuator
  - Compatible with the Kinetix and Ultra servo drives
- Cost-Effective
  - Significantly reduces your design engineering, assembly, wiring, and commissioning time
System Combinations are found in Chapters 11 & 12 of the Motion Selection Guide (GMC-SG001M-EN-P).
How do I know which motors and drives to choose for my application?

Visit www.ab.com/motion to download a copy today!

Selecting the correct Servo Motor and Drive is the first step to implementing a successful motion application. An undersized Motor and Drive will not produce optimal performance; an oversized Motor and Drive will add unnecessary cost to the solution.
April 15 Labs (Tuesday)
(2:30 - 3:30) Sizing and Selecting
(3:30 - 4:30) Five Minutes to Motion

April 16 Labs (Wednesday)
(9:00 - 10:00) Five Minutes to Motion
(10:00 - 11:00) Sizing and Selecting