

**2009 Customer Education
Workshop Schedule**Gearmotors and
Gear ProductsMotor
Accessories

Grinders

Generators

Servo Motors
and Controls

Mod Express

Baldor Education
WorkshopsWarranties and
Sales PoliciesCross Reference
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Sales Offices**Advanced Drives: Tools and Options (3 Days)** June 8-10 October 5-7**Understanding Motor Fundamentals (3 Days)** January 19-21 March 2-4
 May 4-6 June 15-17
 October 12-14 November 2-4**Baldor Drives Service Center (4 Days)**** March 16-19 May 18-21**Fundamentals of Drives (3 Days)** February 2-4 April 20-22
 July 20-22**Mint® Programming for MintDrive/NextMove (4 Days)** February 9-12 August 24-27**Selling & Applying Baldor V*S Drives (3 Days)** February 16-18 May 11-13
 September 14-16**Ethernet Technology & Programming (3 Days)** February 23-25**Generator Applications and Sales (2 Days)** February 17-18 July 16-17
Oshkosh, WI**Fundamentals of Servicing Generators** May 12-14
Oshkosh, WI**Sizing & Applying Servo Motion Products (4 Days)** March 23-26 October 19-22**Fundamentals of Mint® Programming (3 Days)** March 30-April 1**Linear Motors & Drives (3 Days)** April 14-16 October 26-28**Fundamentals of Generators (2 Days)** April 7-8
Oshkosh, WI**Advanced Generator Service (3 Days) NEW** March 10-12 September 22-24
Oshkosh, WI

**Attendance for these classes is restricted to Authorized Drives Service Centers.

***Class not available to Baldor•Reliance Distributors who are not authorized by Dodge.

Contact your local Baldor District Office for more information.

CLASS LOCATION: All classes will be held at Baldor's World Headquarters in Fort Smith, Arkansas, unless otherwise indicated.**Class schedules may be subject to change.****For 2009 updates, please visit our website: www.baldor.com/support/custedu.asp.**

REGISTRATION FEE: The fee for each workshop is \$1395.00*. This includes workshop materials, airfare, hotel accommodations, meals and transportation. Registration forms must be received in writing in order to become a participant in a workshop. Registrations must be received 45 days prior to the start date of the desired workshop. Please fill out one registration form per participant/per class and fax to:

Baldor Electric Company

Attn: Education Workshop Coordinator
6040 Ponders Court
Greenville, SC 29615
Phone: (864) 281-2367
Fax: (864) 281-2433

**You may also register on our website www.baldor.com/support/custedu.asp.

*BDSC cost is \$1595.00 (participant receives test meter).

Workshop dates are subject to change or cancellation based on participation. Notification of cancellation or rescheduling will be made within three weeks of workshop start date. Prior to registering, verify class dates by contacting your local Baldor • Reliance district office or by checking Baldor's website www.baldor.com/support/custedu.asp.

RESERVATIONS: Baldor has negotiated special airline arrangements through major airline carriers. Baldor will purchase your airline tickets, with the exception of 5 day workshops. In most cases, you will travel on the Sunday before your class begins and depart for home on Wednesday afternoon. To help us in making your travel plans, please have the person enrolled in the class answer these questions:

Major airport located nearest you:

1st choice _____ 2nd choice _____

Seating preference _____ Frequent Flyer number _____

Note: Pre-assignment not always available.

Hotel room preference: Smoking Non-Smoking Hotel Room

CONFIRMATION: Workshop confirmations will be sent to you upon receipt of your registration. Hotel confirmation and airline tickets will be sent prior to workshops.

Any and all changes or cancellations must go through the Education Workshop Coordinator at the phone number listed above. No changes will be permitted to airline tickets purchased by Baldor. Persons with special dietary or physical requirements are asked to note so on the registration form.

Name _____

Company _____

Work Phone _____

Home Phone _____

Fax _____

Address _____

City _____ State _____ Zip _____

Email _____

Comments:

All Baldor Education Workshop Class Descriptions

Why Offer Training Classes?

To Be the Best...as Determined by Our Customers

...is the cornerstone of Baldor's mission statement. And because you are a part of Baldor, we want to help you be the best also. Baldor is proud to offer a series of intensive 3-day training workshops. Custom designed for you, these thought-provoking training sessions are more than passive seminars. Workbooks, question and answer sessions, and other structured activities assure participant interaction and involvement. "Hands-on" training supplement these true learning experiences that promise to be beneficial in the field. Just one more example of Baldor working to meet your needs.

Advanced Drives - Tools And Options

Recommended student skills or experience:

- Setup and operation of Baldor V*S family drives
- Industrial Motor Controls Experience
- Personal Computer Operation & File Load/Save Skills

Course Highlights:

- Overview and comparison of AC/DC/Servo Drive Technologies such as: Inverter, Vector, DC SCR, and Brushless Servo Drives.
- Analysis of RS-232/485 Serial Communications and networking.
- Use and purpose of V*S family expansion boards for interfacing to PLCs and other factory automation transducers or devices.
- "Hands-On" lab sessions such as: Computer control of drive and upload/download of drive parameters, Encoder following or leader/follower applications, and Closed loop PID control of water pressure using Inverter to vary the pump speed..
- Set-Up, Auto-Tuning and operation of Vector/Servo control for speed/torque/position.
- Understanding the proper use of line reactors, load reactors, isolation transformers and grounding/shielding techniques for closed loop or process control.
- Analysis of Constant Torque, Variable Torque, and Constant Horsepower applications and selection of motors and controls for: conveyors, fans, pumps, machine tool spindles, winder/unwinder and other industrial applications.

Recommended student skills or experience:

- Setup and operation of Baldor drives
- Industrial motor controls repair experience
- Basic electrical and electronic control knowledge
- Experience reading electrical schematics
- Troubleshooting experience using DMM and scope

Fundamentals of Drives

Course Highlights:

- Overview and comparison of DC and AC Drive Technologies such as DC SCR Controls, and Inverter and Vector Controls with AC Induction Motors.
- DC and AC motor factors to consider when used with adjustable speed drives.
- "Hands-On" lab sessions with set-up and operation of DC and AC adjustable speed drives.
- Understanding speed, torque, and horsepower formulas and calculations.
- Open Loop vs. Closed Loop feedback techniques and terminology.
- Reading and interpreting Baldor Matched Performance curves and literature.
- Analysis of Constant Torque, Variable Torque, and Constant Horsepower applications and selection of matching drive technology.
- Learn about Baldor's new V*S Control.

Understanding Motor Fundamentals

Course Highlights:

- "Real life" situations on how to match the motor to your customer's application.
- Learn about different ratings, speeds, and enclosures of motors.
- Recognize different families of motors by sight.
- Identify most basic failure modes including warranty conditions.
- Learn about efficiency and what it means to your customers.
- Discuss NEMA standards, HP, RPM, voltage, service factors and frame sizes and what they mean.
- A Brief overview of AC motor control basics.
- "Hands-on" lab exercises

Baldor Drives Service Center (BDSC)

Course Highlights:

- Select proper equipment to test a PWM drive
- Step-by-step startup technique to start a drive safely
- AC and DC control troubleshooting
- Using the diagnostic screens to isolate a problem
- Understand proper wiring
- Learn to read and understand the control's event log
- Use parameter adjustments to solve application problems
- Review schematics and interconnect drawings
- Apply techniques learned in a "hands-on" lab

Mint®MT Programming for MintDrive" & NextMove"

Highlights Include:

This highly technical course focuses specifically on Baldor's NextMove & MintDrive motion products using the latest version of Baldor's Mint Programming language.

The course reviews Baldor's drive products with emphasis on MintDrive and NextMove motion controllers. It covers hardware features, configuration and tuning of Mint software. This course covers the programming basics and advanced multi-axis motion control commands of Mint. Includes linear/circular interpolation, velocity/position following, electronic gearing. CAMS, flying shear, and networking applications. The how-to's of interfacing VisualBasic® programming, operator keypad/display panels, and remote I/O modules are demonstrated.

Learn how to set-up, tune, and program Baldor NextMove and MintDrive motion control in the hands-on labs. And how to use the powerful new features on Mint, which includes MintMT and Mint Workbench v5.

Recommended Student Skills or Experience:

- Setup and operation of Baldor Servo Drives
- "Working with Servos" course or equivalent experience
- Windows® based PC experience. Operation and file management
- BASIC programming skills, Visual Basic® preferred.

Selling and Applying Baldor V*S Drives**Recommended student skills or experience:**

- Industrial Motor Experience
- Basic Electrical & Horsepower Calculation Skills

Course Highlights:

- Overview and comparison of AC Drive Technologies such as Inverter, Vector and Encoderless Vector controls with AC Induction Motors.
- AC motor basics and factors to consider when used with Inverter and Vector controls.
- “Hands-On” lab sessions with set-up, operation, parameter selection, operating modes, and speed/torque command inputs for Inverter and Vector drives.
- Set-Up, Auto-Tuning, and operation of V*S family vector controls for speed/torque/position of the AC motor.
- Understanding the proper use of line reactors, load reactors, isolation transformers, and grounding/shielding techniques.
- Vector control and motor encoder/resolver feedback techniques and terminology.
- Reading and interpreting Baldor Matched Performance curves and sizing or selection of motors, controls, and dynamic braking resistors.
- Analysis of Constant Torque, Variable Torque, and Constant Horsepower applications and selection of motors and controls for: conveyors, fans, pumps, machine tool spindles, winder/unwinder, and other industrial applications.

Ethernet Technology and Programming

- Recommended student skills or experience:
- In-depth knowledge of MINT programming is a must
- Setup and operation of Baldor Mint Servo Drives
- “Working with Servos” workshop or equivalent experience
- Windows based PC experience: Operation and File Management
- BASIC programming skills, Visual Basic preferred

Course Highlights:

- This highly technical course focuses specifically on Baldor’s Ethernet Powerlink motion products using the latest version of Baldor’s Mint programming language.
- The course reviews Baldor’s Ethernet products, with emphasis on MicroFlex E100 & NextMove E100 motion controllers. This course covers Ethernet basics and the difference between a non-deterministic and a deterministic network. Includes setting up a TCP/IP network, configuring Ethernet Powerlink networks, tuning a networked system, programming in MINT V5.5, and advanced error handling capabilities. The how-to’s of interfacing Visual Basic® programming, operator keypad/display panels, and remote I/O modules are demonstrated.
- Learn how to set-up, tune and program Baldor Ethernet motion controls in the hands-on labs. The students will also learn how to use the powerful new features on Mint, which includes MintMT and the latest Mint Workbench v5.5.

Some features of the new Mint software development tools:

- Configure TCP/IP network
- Configuration of Ethernet Powerlink network
- Host computer communications
- PLC communication
- DS402 capabilities
- Workbench v5.5 Commission Wizard
- Auto-Tuning Wizard for Microflex E100

- Program Editor with color keyword context highlighting
- Online context sensitive help for all MintMT keywords
- Software oscilloscope with 6 channels
- Graphical Input/Output configuration – active level and function selection
- Watch windows for CAN communications and user variables
- Multi-Tasking language, functions/procedures with parameter passing
- MintMT supports code library development with local/global variables

Generator Application and Sales**Course Highlights:**

- Designed for students who understand generator basics
- Identifying customers’ application needs
- Learn features of Baldor’s GLC and IDLC generators
- Review generator and transfer switch sizing and application
- Discuss characteristics and features of different control and fuel systems

Fundamentals of Servicing Generators**Course Highlights:**

- Entry-level course in generator troubleshooting and repair
- Review basic electricity and induction, engine and gaseous fuel systems
- Detail discussion on alternators
- Learn systematic troubleshooting
- Practical lab exercise on a TS80R
- Review transfer switches and generator application safety

Sizing, and Applying Servo/Motion Products

In this workshop you will study several typical automation applications and learn about the benefits of applying servo/motion control. The use of servo technology results in:

- Increased productivity and machine flexibility
- Reduced manufacturing time and labor
- Reduced set-up time
- Improved product consistency and quality

You will learn how to read servo motor nameplate data and speed-torque diagrams to determine the torque/rpm that a motor can deliver reliably with applied volts/amps. In hands-on lab assignments you will analyze several typical machine applications such as direct coupled loads, conveyors, lead/ball screws, rack and pinion, pinch rollers, etc. Given the size of the load, the machine cycle time and motion profile, you will learn to calculate the proper size motor and required servo control voltage/amperage for several typical applications. We will calculate the effects of ambient temperature increase and motor temperature rise on the servo motor’s speed/torque and reliability. We will calculate the necessity of using gear box or timing belt reducers in some applications, for matching load inertia to motor inertia and load rpm to motor rpm, while also improving the control loop response time.

Recommended student skills or experience:

- Basic electrical motor/controls experience
- Basic math and algebra
- Basic Windows PC file management

Fundamentals of Mint® Programming**Highlights Include:**

This workshop will cover basic concepts of programming and the techniques used to solve motion problems. Structured programming and program flow repetition, subroutines, and interrupt events. Concepts of data structure and math operations will be covered, including constants, variables, arrays, math/logical operators, and functions.

The workshop will demonstrate how a motion problem can be divided into a set of program modules. An example application will illustrate the use of operator menus and screens, use of direct and keyboard inputs/outputs, how to establish user variable input as data arrays, how to establish a position reference, and scaling of distance/speed/acceleration for a motion profile.

Baldor's easy to use Mint language will be used as the basis in learning. The Mint "keywords" to make motion control easy, and "keywords" to simplify program flow will be introduced.

In the hands-on labs, you will configure and tune a drive, and write a program for an actual application using absolute/incremental moves and homing. All the concepts discussed in the workshop will be reinforced by programs written, coded and debugged in the lab exercises.

Recommended student skills or experience:

- Experience with computer systems (MS-DOS or Windows):
- Basic mathematical concepts (geometric coordinates and basic algebra)

Linear Motors & Drives: Selection & Application

In this workshop you will learn the features/benefits of the different types of linear motors and drive systems. We will discuss several typical linear motion applications and learn about the benefits of applying linear motors/stages in motion control. The use of linear motors/stages for motion will result in:

- Direct drive from motor to load with zero backlash
- Simplicity, no mechanical linkages to wear out or require maintenance and adjustment
- High speed motion profiles, low accel/decel times, reduced machine cycle times
- High accuracy and predictable repeatability
- Air bearing linear stages are non-contacting/wearing and are clean room capable
- Improved production output, consistency and quality

You will learn about the many types of linear motors, how they produce force and motion and what the features/benefits/trade-offs are for each type. The types of linear motors covered are:

- Single Axis, Linear Stepper Motors
- Dual Axis, Linear Stepper Motors
- Brushless, Cog-Free Linear Servo Motors
- Brushless, Iron-Core Linear Servo Motors
- AC Induction Linear Motors (Servo and Open-Loop)
- AC Polynoid Linear Motors
- Hycore-Hybrid Core Linear Servo Motors
- DC Brushed Linear Servo Motors
- DC Non-Commutated Linear Servo Motors

Recommended student skills or experience:

- Basic servo motor/controls experience
- Basic math and algebra
- Basic Windows PC file management

Servo Motor Repair**Course Highlights:**

- Review servos, controls, and programmable positioners
- Become familiar with servo terminology
- Learn servo motor construction
- Discuss servo controls and positioners and their specific tasks in the servo loop
- Learn about tachometers, Hall sensors, encoders, and resolvers
- Learn tests to perform to help identify servo and feedback problems
- Lab for disassembly and reassembly of servomotors and components
- Discuss equipment needed to repair servos

Fundamentals of Generators**Course Highlights:**

- For students new to generators
- Electrical and power generation theory is discussed
- Gain understanding of engines and gaseous fuel systems
- Become familiar with Baldor's line of generators
- Learn how to size generators for the customer's application
- Transfer switch options and how they work
- Identifying warranty and how to handle submittals

Advanced Generator Service (NEW)

This is an advanced course specific to troubleshooting and diagnostics of Baldor generator controls. It includes programming the control and assessing the diagnostics available through the generator control. We will review schematics and interconnect diagrams specific to our generator systems. Parallel generator application troubleshooting will also be discussed.