

Eaton's Hydraulics Group Training Services
North America products and services catalog



Powering Business Worldwide

Improve Productivity

Reduce Downtime

Get Certified

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Make Your Choice

Eaton's Hydraulics Group Training Services

About Us

Eaton's Hydraulics Group Training Services - North America

Our Commitment to Excellence

Eaton's (formerly Vickers®) Hydraulics Group training center was established in 1945. Since then, our world-class instructors and state-of-the-art facilities have made Eaton the educational standard for the industry. We are the first choice of many customers for their fluid power training needs.

It is a bold statement, but here at Eaton's Hydraulics Training, we live for the world of hydraulics education. Our organization was created to bring you the absolute latest in hydraulic technology, and we are confident that we can do it in the most efficient, cost-effective way possible. Each class is constructed to convey the knowledge you desire, and each instructor is outfitted with years of industry field experience to back it up. Our entire curriculum is focused completely around hydraulics, and we take pride in our ability to offer industry-specific courses and products.

Training Services is able to ensure quality in its courses by maintaining a limited class size, utilizing advanced equipment that includes simulators, cutaways and take-aparts, and by providing materials that directly coincide with the course presentation.

Both product and technology courses are offered which cover a wide array of fluid power related topics. Our courses suit the needs of anyone involved in the industry, from newcomers to application specialists.

This brochure contains complete descriptions of training courses as well as our full line of training products.



Facilities

Our 23,000 ft² state-of-the-art training facility, headquartered in Maumee, OH (Toledo area), can accommodate all training offerings. In addition, we have another training facility in Eden Prairie, MN, which is also fully equipped to offer technical and product training courses.

Improve Productivity

Whether for hydraulic repair personnel, supervisors, engineers, sales or purchasing, our courses will solidify hydraulic knowledge and aid increased job performance. Our technical training instructors are International Fluid Power Society (IFPS) Certified Fluid Power Specialists and Certified Fluid Power Accredited Instructors, ensuring a consistent and high quality experience for our students.

Reduce Downtime

Training in hydraulics from Eaton is an investment in the future, for both your career and your company. Properly trained personnel save employers significant dollars by reducing unplanned downtime, and maximizing the effectiveness of planned downtime. Our program is based on decades of experience in the hydraulics field, as well as the feedback we receive from companies and their employees who are committed to offering the highest quality services available.

Get Certified

Courses offered in this brochure are led by the finest instructors available. Students attending training at our facilities are provided with all of the necessary training materials needed to be successful. We provide Continuing Education Units (CEUs) for students who attend and successfully pass a comprehensive exam. Obtaining a certification from Eaton's Hydraulics Training Services will be recognized by the entire Fluid Power industry as a significant achievement. Continuing your professional development with Eaton will help you continue to build and enhance your ability to operate, maintain and design any hydraulic system. Count on Eaton's Hydraulics Training Services to get you prepared for any of the IFPS Certifications, and to enhance your qualifications for your next opportunity.

Capabilities

Eaton's Hydraulics Group Training Services is continually taking great strides in progressive hydraulics education. In addition to our centralized facilities, our versatile instructors are capable of taking many of their classes on the road to you. At Eaton, we don't just talk about training, we deliver. With a large array of technical and product courses, and numerous training materials which include manuals, multi-media, and hands-on equipment, the investment made in training today can pay off with significant results for the future.



Registration and Payment Policies

Registrations are processed on a first-come, first-served basis and must be accompanied by payment. Accepted payment methods include purchase order or credit card. A seat in class can be reserved only upon receipt of a form of payment for tuition. Registrations made with credit card (Visa, Mastercard, AMEX, Discover) will be billed upon registration to the class. Registrations made with purchase order (for customers with established lines of credit through Eaton Hydraulics, LLC) will be billed upon attendance in class. Form of payment must be received at Eaton's Hydraulics Training Services prior to the first day of class.

All training materials are included in the tuition payment. Lunch and drinks will be provided throughout the class, except when the last day of class ends at noon.

Students are responsible for transportation and lodging expenses/arrangements. Confirmation letters with detailed travel, lodging and class information will be sent via email to registered students approximately 30 days before the start date of the class.

Cancellation Policy

An enrollment can be cancelled up to FOUR weeks prior to the first day of class without penalty. Cancellations occurring within four weeks of the first day of class are subject to a 100% cancellation fee. No tuition refunds will be processed for "no-show" student that registered with a credit card. In addition, students that registered with a purchase order will be charged the full tuition for a "no show."

Students have the ability to cancel their own registrations in the Eaton University system. However, if you are not able to access Eaton University to cancel your registration it is recommended that all enrollment cancellations be communicated via telephone or email.

Class Cancellations

Eaton reserves the right to cancel classes for any reason. If a class cancellation occurs, each registered student will be notified at approximately four weeks prior to the first day of class and receive alternative class dates. If credit card was used for payment, a full refund will be issued back to the credit card used at the time of registration. If purchase order was used for payment during registration, no refund will be required as no billing will have taken place.

It is strongly recommended that students do NOT book any travel arrangements for a class unless they have received the 30 day confirmation letter stating they are registered in the class and expected to attend. Eaton assumes no responsibility for transportation charges incurred relative to cancelled or changed classes.

Prerequisites

Eaton's Hydraulics Training Services offers courses from basic to advanced. Our basic programs will set a foundation for students to build upon as they continue developing their skills in the Fluid Power industry. We believe it is crucial for students to develop a basic understanding of theory and principles in order to be successful in our more advanced classes. As a result, some courses in this brochure will have prerequisites that are strongly recommended or possibly required in order for a student to be allowed to register. Course prerequisites will be noted at the bottom of a course description. If a course does not have a prerequisite noted then none are required. If you have taken formal hydraulics training at another institute and believe you have met the prerequisite of an advanced class, please contact the training department to approve your registration, before trying to register.

Completion Requirements

Unless otherwise stated, successful completion in all courses includes passing written exercises and exams, attendance during the entire class, and participation in all sessions. Certificates will be awarded to students who have met all of the above course completion requirements. Those students in technology courses who are unable to meet the completion requirements will be provided a certificate of attendance and no CEU's will be awarded.

Upon successful completion of a training course, students are issued a certificate to validate and recognize their learning and competency (except for the IFPS certification review courses). The International Fluid Power Society (IFPS) conducts the exam for their respective certifications the day after Eaton's review session is completed. To register for an IFPS certification exam call the IFPS at 800-308-6005 or go to www.ifps.org.

More Information

Classes offered through Eaton's Hydraulics Training Services are very popular and fill quickly. To check availability, cost, locations and dates of our training classes please visit <http://www.eaton.com/Eaton/ProductsServices/Hydraulics/Training/index.htm> or email hydraulicstraining@eaton.com.

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Hydraulics
Training

Contact
Eaton Hydraulics Training
1785 Indian Wood Circle
Munroe, OH 43057
Phone: 1-800-413-8009
Fax: (614) 294-2000
HydraulicsTraining@eaton.com
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7845 Wallace Road Eden
Prairie, OH 43024
Phone: 1-800-413-8009
Fax: (614) 294-2000
HydraulicsTraining@eaton.com

Training
We are the Hydraulic Training Experts!

It is a bold statement, but we here at Eaton Hydraulic Training live for the world of hydraulics education. Our organization was created to bring you the absolute latest in hydraulic technology, and are confident that we can do it in the most efficient, cost-effective way possible. Each class is constructed to convey the knowledge you desire, and each instructor is outfitted with years of industry field experience to back it up. For more information about our history (our version of a resume), visit our About Us page.

Since our entire curriculum is focused entirely around hydraulics, we take pride in our ability to offer industry-specific courses and products. From Mobile Hydraulics to Electrohydraulics, take a minute to browse our Technical Training section to find a course that fits your needs. If you are an Eaton Distributor and wish to take an Eaton Product Training course, please visit our Brand Certifications, Service School and/or Power Motion & Control Training sections. In all cases, our versatility and mobility as an educational unit, also allow us to take our courses on the road to you and your facility. You can reach us toll free at 1-800-413-8009 with your questions.

<http://www.eaton.com/Eaton/ProductsServices/Hydraulics/Training/index.htm>

Registering for Training Courses

1. Log into your account, or create a new account at <http://my.eaton.com>

MyEaton

Login Request Access Support EN

EATON
Powering Business Worldwide

MyEaton.com powers your competitive advantage

Email Address

Password

Forgot Password? Reset Password

☐ Remember me

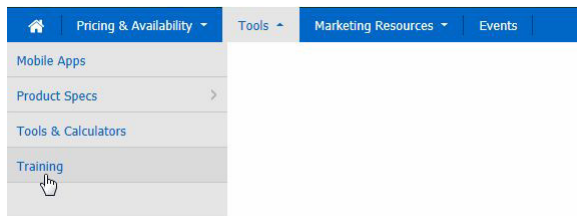
Not registered? Request access now.

MY EATON.COM WEBSITE SUPPORT

Electrical Sector
+1-800-498-1705 Option 3
Electrical Sector Caller Paid
+1-412-893-4100 Option 3
Industrial Sector
+1-896-652-3758 Option 5

View International support contacts
View US/Canada support contacts
Help and FAQ topics

2. Navigate to the Training link.



3. Click on the link to Eaton University



4. Click on the "Learner" tab, if applicable.



5. Search for the course code in the search box.

Search:

Advanced Search Search Tips

6. Click on the "Register" button to proceed with registration for the course.

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Industrial Hydraulics

Description: This two-week course covers the fundamentals and principles of industrial hydraulics with the additional emphasis on hands-on exercises. The construction, operation, and uses of individual hydraulic ...

Categories: Hydraulics Training > 1. Technical Training

Training Organization: Hydraulics External

Content Type: Eaton

Seats Available: Unlimited

Media Type: Classroom

Status: Not Registered

Cost Information: View Details

7. Contact hydraulicstraining@eaton.com with any questions or issues you may have regarding registration procedures.

The Training You Need to Succeed

Course Name	Pg #	Distributor & Eaton Personnel		OEM & End Customers		Available off-site
		Inside Sales	Outside Sales	Field Svc/ Maint. or Technical Service Personnel	Engineers	
Eaton's Aeroquip Fluid Conveying Product School (Level 200)	7	X	X			X
Eaton's Aeroquip Advanced Product Specialist School (Level 300)	7		X			
Eaton's Aeroquip Product Application Specialist School (Level 400)	8		X			
Eaton's Weatherhead Fluid Conveying Product School (Level 200)	9	X	X			X
Eaton's Weatherhead Advanced Product Specialist School (Level 300)	9		X			
Eaton's Weatherhead Product Application Specialist School (Level 400)	10		X			
Eaton's Industrial Hose School	11	X	X			
Eaton's LifeSense® Certification School	11	X	X			
Industrial Basics	12	X	X	X	X	X
Industrial Hydraulics	12	X	X	X	X	X
Mobile Hydraulics	13	X	X	X	X	X
Basic Hose Technology	13	X	X	X	X	X
Troubleshooting	14		X	X	X	X
Cartridge Valves	14	X	X	X	X	
Electrohydraulics Maintenance and Troubleshooting	15	X	X	X	X	
Circuit Design (Industrial Level 400)	15		X	X	X	
Advanced Mobile Hydraulics (Level 400)	16		X	X	X	
Pump Controls	16	X		X	X	
Eaton's Power and Controls Product Training (Level 200/300)	18	X	X			
Eaton's Char-Lynn® Gear/Vane Products Service School	19		X			
Warranty Center Failure Analysis	19		X			
Open/Closed Circuit Piston Products Service School	20		X			
AxisPro™	20		X	X	X	
Eaton's ProFX™ Sales Course	21		X	X	X	
Eaton's ProFX™ Application Course	21		X	X	X	
CANbus Online Training Course	22	X	X	X	X	
IFPS Hydraulic Specialist Certification Review	24	X	X	X	X	
IFPS Connector & Conductor Review & Job Performance	24	X	X	X	X	X
IFPS Electronic Controls Specialist Review	25	X	X	X	X	
IFPS Certified Technician Review & Job Performance	25	X	X	X	X	
IFPS Certified Mechanic Review & Job Performance	26	X	X	X	X	

Customized training is available, please contact us at hydraulicstraining@eaton.com for more information.

Eaton's Aeroquip Fluid Conveying Product School (Level 200)

Course Registration Code: Hyx_ILT_AFCPS
Duration: 3 Days

This course is a three-day session in Maumee, OH, Eden Prairie, MN, or remote locations.

Prerequisites: None

Who Should Attend

For Eaton's authorized Aeroquip product distributors and Eaton employees only. This school is appropriate for all employees and principals of Eaton's authorized Aeroquip product distributors.

Topics Covered

- Hose construction and fitting design analysis
- Hose and fitting selection
- Construction of hose assemblies with hand tools and assembly equipment
- Proper operation and maintenance of reusable and crimp assembly equipment
- Identification and sizing of threads, ports, adapters and fittings (SAE, BSP and metric)
- Introduction to STC® connections
- Ermeto® tube connection products
- Eaton's Aeroquip brand technical and promotional literature
- Product selection to meet customer needs
- MatchMate Global crimp hose assembly system/Triple Crown
- Eaton's authorized Synflex® products
- Eaton's Everflex® PTFE hose products
- Selection of Quick Disconnect™ couplings and swivel joints
- Air-conditioning products for the truck and bus markets
- Eaton's line of brass fittings and valves
- Overview of Eaton's PowerSource® application

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.

Eaton's Aeroquip Advanced Product Specialist School (Level 300)

Course Registration Code: Hyx_ILT_AAPSS
Duration: 2 Days

This two-day school includes expanded training on Eaton's Aeroquip brand's most popular products. This course meets the criteria stated in the Channel Compensation Resources (CCR) program manual.

Prerequisites: Prior to enrollment the student must be current with Eaton's Aeroquip Fluid Conveying Product School (Level 200) certification.

Who Should Attend

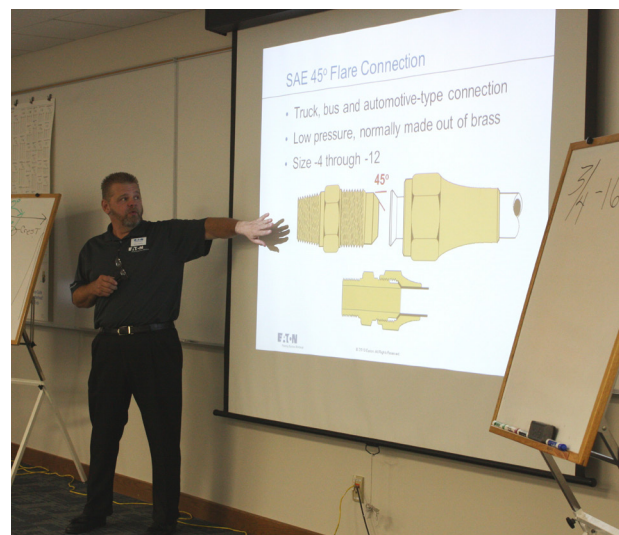
For Eaton's authorized Aeroquip product distributors and Eaton employees only. Eaton's Aeroquip Advanced Product Specialist School is recommended for experienced Aeroquip distributor's inside and outside sales personnel.

Topics Covered

- Extensive hands-on identification of metric, British, French and Japanese thread systems
- Eaton's Walterscheid™ tube fittings and adapters
- Eaton's hydraulic swivel joints
- Eaton's Flexmaster joints
- FLOCS™ fast lube oil change system
- Markets and applications of Eaton's Aeroquip products
- Tour of Eaton's fluid power hose test facility
- Brazing of Eaton's Lifesaver™ fitting
- Product identification techniques
- Extensive assembly equipment review with hands-on assembly practice

Completion Requirements

Students will be required to attend and participate in all sessions, demonstrate proficiency in the course topics, and successfully complete a written exam with a score of 70% or higher.



Eaton's Aeroquip Product Application Specialist School (Level 400)

Course Registration Code: Hyx_ILT_APASS
Duration: 2 Days

This two-day school is designed to illustrate the market and applications into which Eaton's Aeroquip products are installed. Included in the training will be product hands-on identification techniques, procedures for troubleshooting leaks, hose routing techniques, methods to analyze hose failures and how to identify, assemble and install Eaton's Aeroquip products in real life applications. This course meets the criteria stated in the Channel Compensation Resources (CCR) program manual.

Prerequisites: Prior to enrollment the student must be current with Eaton's Aeroquip Advanced Product Specialist School (Level 300) certification.

Who Should Attend

For Eaton's authorized Aeroquip product distributors and Eaton employees only. Eaton's Aeroquip Product Application School is recommended for experienced Aeroquip distributor's inside and outside sales personnel.

Topics Covered

- Leaks, causes and cures for hose and fittings
- Leaks, causes and cures hands-on assembly lab
- Hose routing techniques
- Analyzing hose failures

Completion Requirements

Students will be required to attend and participate in all sessions, demonstrate proficiency in the course topics and successfully complete both a written and hands-on exam with a score of 70% or higher.



Eaton's Aeroquip Conveying Product School (Level 200) Test-Out Option

Course Registration Code: Hyx_AFCPS_EXAM

Eaton Hydraulics Training Services has partnered with PSI Services LLC to offer an examination at testing services throughout the US and Canada to qualified candidates, as an alternative to attending an instructor-led course prior to taking the final exam.

Recommended Prerequisites: None

Who Should Attend

For Eaton's authorized Aeroquip product distributors and Eaton employees only. This exam is intended for experienced personnel. If you feel that you need to study for the exam for any reason, we suggest attending an instructor led class instead.

Topics Covered

- Hose construction and fitting design analysis
- Hose and fitting selection
- Construction of hose assemblies with hand tools and assembly equipment
- Proper operation and maintenance of reusable and crimp assembly equipment
- Identification and sizing of threads, ports, adapters and fittings (SAE, BSP and metric)
- Introduction to STC® connections
- Ermeto® tube connection products
- Eaton's Aeroquip brand technical and promotional literature
- Product selection to meet customer needs
- MatchMate Global crimp hose assembly system/Triple Crown
- Eaton's authorized Synflex® products
- Eaton's Everflex® PTFE hose products
- Selection of Quick Disconnect™ couplings and swivel joints
- Air-conditioning products for the truck and bus markets
- Eaton's line of brass fittings and valves
- Overview of Eaton's PowerSource® application

Completion Requirements

Students will need to obtain a score of 70% or higher on the written exam in order to test out of the 200 level Fluid Conveying Product School. Students that are unsuccessful in obtaining a passing score would then be required to attend an Instructor-Led class.

Eaton's Weatherhead Fluid Conveying Product School (Level 200)

Course Registration Code: Hyx_ILT_WFCPS
Duration: 3 Days

This course is a three-day session in Maumee, OH, Eden Prairie, MN, or remote locations.

Prerequisites: None

Who Should Attend

For Eaton's authorized Weatherhead product distributors and Eaton employees only. This school is appropriate for all employees and principals of Eaton's authorized Weatherhead product distributors.

Topics Covered

- Hose construction and fitting design analysis
- Hose and fitting selection
- Construction of hose assemblies with hand tools and assembly equipment
- Coll-O-Crimp® system features
- Identification and sizing of threads, ports, adapters and fittings (SAE, BSP and metric)
- Introduction to STC® connections
- Ermeto® tube connection products
- Eaton's Weatherhead brand technical and promotional literature
- Product selection to meet customer needs
- Eaton's Weatherhead Diamond Advantage
- Eaton's authorized Synflex® products
- Eaton's Everflex® PTFE hose products
- Selection of Quick Disconnect™ couplings
- Air-conditioning products
- Eaton's line of brass fittings and valves
- Overview of Eaton's PowerSource® application

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.



Eaton's Weatherhead Advanced Product Specialist School (Level 300)

Course Registration Code: Hyx_ILT_WAPSS
Duration: 2 Days

This two-day school includes expanded training on Weatherhead brand's most popular products. This course meets the criteria stated in the Channel Compensation Resources (CCR) program manual.

Prerequisites: Prior to enrollment the student must be current with Eaton's Weatherhead Fluid Conveying Product School (Level 200) certification.

Who Should Attend

For Eaton's authorized Weatherhead product distributors and Eaton employees only. Eaton's Weatherhead Advanced Product Specialist School is recommended for experienced Weatherhead distributor's inside and outside sales personnel.



Topics Covered

- Extensive hands-on identification of metric, British, and Japanese thread systems
- Eaton's Walterscheid™ tube fittings and adapters
- Eaton's hydraulic swivel joints
- Eaton's Flexmaster joints
- FLOCS™ fast lube oil change system
- Markets and applications of Eaton's Weatherhead products
- Tour of Eaton's fluid power hose test facility
- Brazing of Eaton's Lifesaver™ fitting
- Product identification techniques
- Extensive assembly equipment review with hands-on assembly practice

Completion Requirements

Students will be required to attend and participate in all sessions, demonstrate proficiency in the course topics, and successfully complete a written exam with a score of 70% or higher.

Eaton's Weatherhead Product Application Specialist School (Level 400)

Course Registration Code: Hyx_ILT_WPASS
Duration: 2 Days

This two-day school is designed to illustrate the market and applications into which Eaton's Weatherhead products are installed. Included in the training will be product hands-on identification techniques, procedures for troubleshooting leaks, hose routing techniques, methods to analyze hose failures and how to identify, assemble and install Eaton's Weatherhead products in real life applications. This course meets the criteria stated in the Channel Compensation Resources (CCR) program manual.

Prerequisites: Prior to enrollment the student must be current with Eaton's Weatherhead Advanced Product Specialist School (Level 300) certification.

Who Should Attend

For Eaton's authorized Weatherhead product distributors and Eaton employees only. Eaton's Weatherhead Product Application School is recommended for experienced Weatherhead distributor's inside and outside sales personnel.



Topics Covered

- Leaks, causes and cures for hose and fittings
- Leaks, causes and cures hands-on assembly lab
- Hose routing techniques
- Analyzing hose failures

Completion Requirements

Students will be required to attend and participate in all sessions, demonstrate proficiency in the course topics and successfully complete both a written and hands-on exam with a score of 70% or higher.

Eaton's Weatherhead Fluid Conveying Product School (Level 200) Test-Out Option

Course Registration Code: Hyx_WFCPS_EXAM

Eaton Hydraulics Training Services has partnered with PSI Services LLC to offer an examination at testing services throughout the US and Canada to qualified candidates, as an alternative to attending an instructor-led course prior to taking the final exam.

Recommended Prerequisites: None

Who Should Attend

For Eaton's authorized Weatherhead product distributors and Eaton employees only. This exam is intended for experienced personnel. If you feel that you need to study for the exam for any reason, we suggest attending an instructor led class instead.

Topics Covered

- Hose construction and fitting design analysis
- Hose and fitting selection
- Construction of hose assemblies with hand tools and assembly equipment
- Coll-O-Crimp® system features
- Identification and sizing of threads, ports, adapters and fittings (SAE, BSP and metric)
- Introduction to STC® connections
- Ermeto® tube connection products
- Eaton's Weatherhead brand technical and promotional literature
- Product selection to meet customer needs
- Eaton's Weatherhead Diamond Advantage
- Eaton's authorized Synflex® products
- Eaton's Everflex® PTFE hose products
- Selection of Quick Disconnect™ couplings
- Air-conditioning products
- Eaton's line of brass fittings and valves
- Overview of Eaton's PowerSource® application

Completion Requirements

Students will need to obtain a score of 70% or higher on the written exam in order to test out of the 200 level Fluid Conveying Product School. Students that are unsuccessful in obtaining a passing score would then be required to attend an Instructor-Led class.

Eaton's Industrial Hose School

Course Registration Code: Hyx_ILT_EIHS
Duration: 2.5 Days

This two-and-a-half-day session is offered in Maumee, OH. Included in the training will be a complete product catalog review and hands-on equipment training.

Recommended Prerequisites: None

Who Should Attend

For Eaton's authorized Industrial Hose product distributors and Eaton employees only. End customers may attend with prior approval from their Eaton Area Sales Manager Representative.



Topics Covered

- Hose construction designs
- Compounds & elastomer options
- Industrial hose master catalog review
- New hose offerings
- Hose coupling selection techniques
- Assembly equipment options
- Hands-on hose preparation and assembly
- Hands-on build session using Eaton approved hose couplings
- Hose failures analysis
- Overview of Eaton's PowerSource® application

Completion Requirements

Students will be required to attend and participate in all sessions and exercises. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.

Eaton's LifeSense® Certification School

Course Registration Code: Hyx_ILT_LS
Duration: 2 Days

This two-day session is offered in Maumee, OH. It is designed to qualify Eaton distributors to successfully manufacture, test and install Eaton LifeSense® systems and hose assemblies.

Recommended Prerequisites: Prior to enrollment, the student must have a current Aeroquip or Weatherhead Fluid Conveying Product School (Level 200) certification. The student must also be an employee from an active Eaton platinum distributor.

Who Should Attend

For distributors' experienced inside and outside sales personnel and Eaton employees.

Topics Covered

- Introduction to LifeSense®
- Building a hose assembly with hands-on assembly practice
- Wired design technology with hands-on assembly practice
- Wireless design technology with hands-on assembly practice
- How to sell

Completion Requirements

Students will be required to attend and participate in all sessions and exercises and demonstrate proficiency in the course topics. In addition, successful completion of this course will require passing a written exam and a hands-on exam with a score of 70% or higher.



Industrial Basics

Course Registration Code: Hyx_ILT_IB
Duration: 4.5 Days

This four-and-a-half-day course is a condensed version of the Industrial Hydraulics course that includes hands-on exercises which focus on industrial component construction and operation, as well as on the role of the individual components in an operating industrial hydraulic system. Basic hydraulic formulas will be used for enhancing understanding.

Recommended Prerequisites: None

Customized In-Plant Training

Eaton Hydraulics Training Services also has the ability and equipment to perform this training at a customer location. In addition, we can tailor the curriculum to specific applications and concepts of the customer's choosing and incorporate a customer's schematics to enhance the employees' understanding of specific systems.

Who Should Attend

This course is appropriate for operations, sales, design, maintenance, and repair personnel who work with industrial machinery.

Topics Covered

- Hydraulic principles and fundamentals
- Reservoirs and fluids
- Gear, vane, and piston pumps
- Pressure controls
- Directional controls
- Flow controls
- Cylinders
- Vane and piston motors
- Contamination control
- Proportional and servo valves
- Cartridge valves
- Accumulators

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.



Industrial Hydraulics

Course Registration Code: Hyx_ILT_IH
Duration: 9.5 Days

This two-week course covers the fundamentals and principles of industrial hydraulics with the additional emphasis on hands-on exercises. The construction, operation, and uses of individual hydraulic components are a major focus of this program. Basic hydraulic formulas will be used for enhancing understanding.

Recommended Prerequisites: None

Customized In-Plant Training

Eaton Hydraulics Training Services also has the ability and equipment to perform this training at a customer location. In addition, we can tailor the curriculum to specific applications and concepts of the customer's choosing and incorporate a customer's schematics to enhance the employees' understanding of specific systems.

Who Should Attend

This course is appropriate for operations, sales, design, maintenance, and repair personnel who work with industrial machinery.

Topics Covered

- Hydraulic principles and fundamentals
- Basic system troubleshooting
- Fluids
- Reservoirs
- Pumps and pumping principles
- Pressure controls
- Directional controls
- Flow controls
- Cartridge valves
- Contamination control
- Filters
- Accumulators
- Gear, vane, and piston motors
- Electrohydraulic systems
- Hydraulic circuits

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.



Mobile Hydraulics

Course Registration Code: Hyx_ILT_MH
Duration: 4.5 Days

This four-and-a-half-day course is a condensed version of the Industrial Hydraulics course, but focuses solely on mobile hydraulic components and applications. In addition, this course will include hands-on exercises which teach students how to make hydraulic circuits, component tear-down exercises, and the individual role of each component in a circuit. Basic hydraulic formulas will be used for enhancing understanding.

Recommended Prerequisites: None

Customized In-Plant Training

Eaton Hydraulics Training Services also has the ability and equipment to perform this training at a customer location. In addition, we can tailor the curriculum to specific applications and concepts of the customer's choosing and incorporate a customer's schematics to enhance the employees' understanding of specific systems.

Who Should Attend

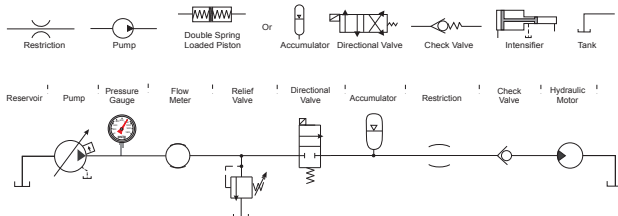
This course is appropriate for operations, sales, maintenance, and repair personnel.

Topics Covered

- Hydraulic principles and fundamentals
- Reservoirs and fluids
- Actuators
- Fixed pump principles
- Variable pump principles
- Hydrostatic transmissions
- Pressure controls
- Directional valves
- Flow controls
- Contamination controls
- Cartridge valves
- Steering
- Accumulators
- Mobile hydraulic circuits

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.



Basic Hose Technology

Course Registration Code: Hyx_ILT_BHT
Duration: 2 Days

This two-day course is designed for individuals interested in learning about the technology selection and application of hose and fittings in hydraulic systems.

Recommended Prerequisites: None

Who Should Attend

This course is appropriate for hydraulic mechanics, technicians and installers working with hydraulic hose and fittings or tube assemblies.

Topics Covered

- Hose construction
 - Terminology
 - Tube, reinforcement and cover materials
- Hose specifications overview
 - SAE, CEN & ISO
- Fitting design
 - Review of hose end designs
 - Attachment methods and assembly machine options
- Port & line connections, STC & metrics
 - Definition of port and lines
 - Identification tools and use
 - NPT/NPTF pipe threads
 - BSP pipe threads
 - SAE o-ring boss
 - SAE split flange
 - SAE 45 and 37 degree flare
 - JIS 30 degree flare
 - SAE flat face o-ring seal
 - Threadless connectors
 - DIN connections
 - ISO connections
- Hose routing and safety
 - Leaks, causes and cures
 - Hose failure analysis
 - Proper hose selection using S-T-A-M-P-E-D

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.



Troubleshooting

Course Registration Code: Hyx_ILT_TS
Duration: 4.5 Days

This four-and-a-half-day course is designed for those individuals involved with troubleshooting hydraulic systems in the industrial environment. The objective of this course is to familiarize students with the proper techniques to perform systematic troubleshooting from symptom identification to fault isolation. Hands-on training is utilized to provide students the opportunity to perform troubleshooting techniques.

Recommended Prerequisites: Students should have completed either Industrial Hydraulics or Industrial Basics, or equivalent training.

Who Should Attend

This course is appropriate for application engineers, maintenance and repair personnel.

Topics Covered

- Hydraulic fundamentals
- Component functions and failures
- Graphic symbology review
- Circuit and control analysis
- Clamp and work circuits
- Contamination control
- Diagnostic instruments
- Systematic troubleshooting procedures

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.



Cartridge Valves

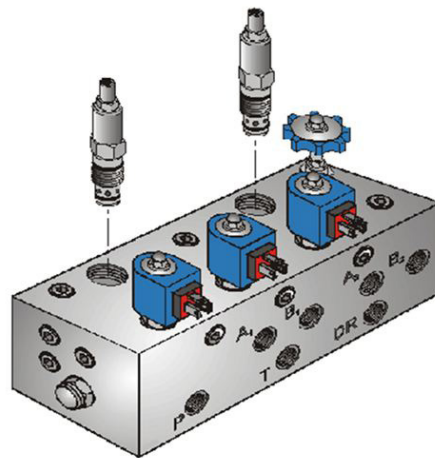
Course Registration Code: Hyx_ILT_CV
Duration: 3 Days

This three-day course covers both the theory and operations of DIN (slip-in) and screw-in cartridge valves. Operating principles of the most commonly used cartridge valves will be described and students will perform lab exercises to reinforce the concepts of how these components are used in both mobile and industrial hydraulic circuits.

Recommended Prerequisites: Students should have completed Industrial Hydraulics, Industrial Basics, Mobile Hydraulics or equivalent training.

Who Should Attend

This course is appropriate for personnel involved with the maintenance and application of hydraulic systems and for product application specialists. It is not intended to be an engineering design level course.



Topics Covered

- Cartridge valve basics
- Pressure control concepts
- Load holding - over center and pilot operated
- Systemic contamination control
- Flow control concepts
- Directional valve concepts
- Proportional valves
- Logic valves
- Check valves

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.

Electrohydraulics Maintenance and Troubleshooting

Course Registration Code: Hyx_ILT_EHMT
Duration: 4.5 Days

This four-and-a-half-day course emphasizes the fundamentals and principles of electrohydraulic system components and circuit operation. The course focuses on open and closed loop proportional as well as servo control systems. Attendees will work hands-on with a wide series of control products in a laboratory environment to set-up, tune and troubleshoot flow, direction, and pressure control circuits. In addition, students will learn how to properly maintain their hydraulic system to maximize efficiency and reduce system downtime by learning various troubleshooting techniques. Basic electrical/electronics formulas will be used for enhancing understanding.

Recommended Prerequisites: Students should have completed Industrial Hydraulics, Industrial Basics, Mobile Hydraulics or equivalent training.

Who Should Attend

This course is appropriate for application engineers, and maintenance and repair personnel. Attendees are encouraged to have a background in hydraulics, but electronics knowledge is not a requirement.

Topics Covered

- Hydraulic and electronic principles and equivalents
- Operational amplifiers
- Proportional solenoids
- Proportional flow, directional and pressure controls
- Servo valves and amplifiers
- Proportional power plugs
- Proportional amplifiers: types A, B, C and D
- On-board electronic proportional valves
- DIN-rail mounted electronic controls
- Slip-in and screw-in proportional cartridge valves

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.



Circuit Design (Industrial Level 400)

Course Registration Code: Hyx_ILT_CD
Duration: 4.5 Days

This four-and-a-half-day course will cover how to select and properly size components used in industrial hydraulic circuits. It will not cover mobile applications. Students will learn the correct methods for properly sizing components selected, and not relying on “general rules” to optimize the energy use within a system. The course is math intensive, as basic math and physics are used to calculate required performance requirements for applications.

Recommended Prerequisites:

Eaton’s distributor’s personnel should complete all authorized brand certifications (either on-line or by instructor led courses) through level 300, as well as Industrial Hydraulics/Industrial Basics, Electrohydraulics Maintenance & Troubleshooting and Troubleshooting.

Non-distributor personnel should have completed Industrial Hydraulics/Industrial Basics or Mobile Hydraulics, Electrohydraulics Maintenance & Troubleshooting and Troubleshooting.

Who Should Attend

This course is appropriate for personnel involved with the application and design of hydraulic systems and for product application specialists.

Topics Covered

- Reservoir selection and sizing
- Pump selection
- Pump sizing & control analysis (pressure comp and torque limiting)
- Pressure controls (reducing, unloading, counterbalance, sequence, back-pressure) - selection and sizing
- Directional controls - selection and sizing
- Flow controls - selection and sizing
- Cylinders - selection, sizing, and mounting styles
- Motors - selection and sizing
- Heat load calculations
- Heat exchanger sizing
- Filtration selection and sizing
- Fluid conductor sizing
- Power units

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.

Advanced Mobile Hydraulics/Circuit Design (Level 400)

Course Registration Code: Hyx_ILT_AMH
Duration: 4.5 Days

This four-and-a-half-day course will cover how to select and properly size components used in mobile hydraulic circuits. It will not cover industrial applications. Students will learn the correct methods for properly sizing components selected and not relying on "general rules" to optimize the energy use within a system. The course is math intensive, as basic math and physics are used to calculate required performance requirements for applications.

Recommended Prerequisites:

Eaton's distributor's personnel should complete all authorized brand certifications (either on-line or by instructor led courses) through level 300, as well as Industrial Hydraulics/Industrial Basics, Electrohydraulics Maintenance & Troubleshooting and Troubleshooting.

Non-distributor personnel should have completed Industrial Hydraulics/Industrial Basics or Mobile Hydraulics, Electrohydraulics Maintenance & Troubleshooting and Troubleshooting.

Who Should Attend

This course is appropriate for personnel involved with the application and design of hydraulic systems and for product application specialists.

NOTE: This course will meet the requirements for the Eaton 400 level certification for distributors and employees as part of the Channel Compensation Resource (CCR) program. Certification is valid 3 years.

Topics Covered

- Pump energy utilization
- Open circuit pump controls including pressure comp, load sensing and torque limiting
- Pump sizing
- Pressure controls (reducing, unloading, sequencing, counterbalance) selection and sizing
- Directional controls - selection and sizing
- Flow controls - selection and sizing
- Light/medium/heavy duty transmission sizing and selection
- Cylinders - selection, sizing and mounting styles
- Motors - selection and sizing
- Hydrostatic steering selection and sizing
- Heat load calculations
- Heat exchanger sizing
- Filtration selection and sizing
- Reservoir selection and sizing

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.

Pump Controls

Course Registration Code: Hyx_ILT_PC
Duration: 3 Days

This three-day course will familiarize students with the theory of operation of variable displacement pumps (both open and closed circuit). Students will learn the principles of operation for pressure compensation, load-sensing, and torque limiting for open loop pumps. Mechanical, hydraulic, and electro-hydraulic controls for closed loop pump applications will be taught as well as the differences between a pressure override control and power limiting. In addition, students will gain an understanding of how to optimize a fixed displacement pump system to minimize energy loss during operation.

Recommended Prerequisites: Mobile Hydraulics, Industrial Hydraulics or Industrial Basics

Who Should Attend

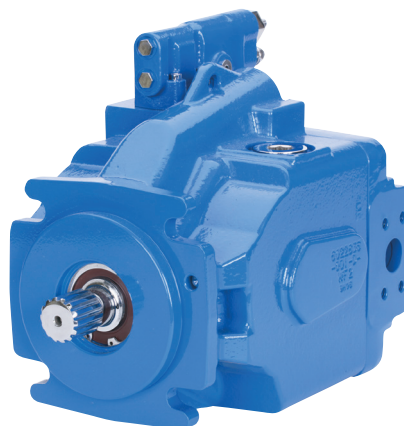
This course is ideal for anyone that has a need to understand the proper application and use of pump controls in open and closed circuit applications.

Topics Covered

- Benefits of variable displacement vs. fixed displacement pumps
- Pressure compensation
- Load sensing (flow compensation)
- Torque limiting
- Horsepower regulation
- Manual pump controls
- Master slave arrangements
- Hydraulic remote
- Electro-hydraulic
- Constant pressure (mooring) control
- Multiple pump systems

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.



Eaton's Power, Motion & Control Product Certifications

Each course in this category is an e-Learning activity available in Eaton University and requires a brand authorization for an Eaton distributor to be able to register. All activities listed below are certification assessments. The respective Eaton University certification assessment course registration codes are included.

Inside Sales Level 200 Certifications

All personnel working towards a 200 level certification for a specific Eaton brand should be able to perform and/or explain the following:

- Product offerings and features
- Where to locate catalog information
- Model coding based on given criteria
- Interpreting catalog tables

Below is a list of all Eaton 200 level brand courses.

Eaton's Char-Lynn Brand

Char-Lynn® for Inside Sales Certification Assessment (Hyx_ADBPS_CL200AC)

Char-Lynn® G/G Motor Products

Char-Lynn® Steering Control Unit Products

Eaton's Brand

Eaton Brand for Inside Sales Certification Assessment (Hyx_ADBPS_ET200AC)

Eaton's Hydro-Line Brand

Hydro-Line Inside Sales Certification (Hyx_ADBPS_HL200AC)

Eaton's Vickers Brand

Vickers® Inside Sales Certification Assessment (Hyx_ADBPS_VK200AC)

Eaton's Vickers Cylinder Brand

Vickers® Cylinder Products Course (Hyx_CSAV_VKC206C)

Vickers® Cylinder Inside Sales Certification Assessment (Hyx_ADBPS_VKC200AC)

Outside Sales Level 300 Certifications

All personnel working towards a 300 level certification for a specific Eaton brand should be able to meet all the 200 level objectives as well as:

- Features and benefits of specific Eaton product offerings
- Key application selection criteria
- Major competitor names
- Key selling differentiators
- Appropriate product selection based on application criteria

Below is a list of all Eaton 300 level brand courses.

Eaton's Char-Lynn Brand

Char-Lynn® Outside Sales Certification (Hyx_ADBPS_CL300AC)

Char-Lynn® G/G Motor Products

Char-Lynn® Steering Control Unit Products

Eaton's Brand

Eaton Brand for Outside Sales Certification Assessment (Hyx_ADBPS_ET300AC)

Eaton's Hydro-Line Brand

Hydro-Line Outside Sales Certification (Hyx_ADBPS_HL300AC)

Eaton's Vickers Brand

Vickers® Outside Sales Certification Assessment (Hyx_ADBPS_VK300AC)

Eaton's Vickers Cylinder Brand

Vickers® Cylinder Products Course (Hyx_CSAV_VKC306C)

Vickers® Cylinder Outside Sales Certification Assessment (Hyx_ADBPS_VKC300AC)

Application Specialists Level 400 Certifications

All personnel working towards a 400 level certification for either the mobile or industrial markets which Eaton services should expect to be able to meet all of the 200 level and 300 level objectives, as well as:

- Understand correct methods for properly sizing components
- How to optimize energy use within a system
- Component selection, sizing and mounting for hydraulic circuits
- Strong analytical and mathematic skills

Below is a list of the Eaton 400 level certification assessments.

Mobile Hydraulics Application Assessment (Hyx_CSAV_MH401A)

Industrial Hydraulics Application Assessment (Hyx_CSAV_IA402A)

Eaton's Power and Controls Product Training (Level 200/300)

Course Registration Code: Hyx_ILT_PCPT

Duration: 4.5 days

This four-and-a-half-day class covers Eaton branded power and control products. Participants will gain knowledge needed to recognize and identify the products offered under the Eaton, Vickers, Hydroline and Char-Lynn brand names. This class will fulfill both level 200 (required for inside sales) and level 300 (required for outside sales).

Recommended Prerequisites: Mobile Hydraulics, Industrial Basics, Industrial Hydraulics, or equivalent experience

Who Should Attend

For authorized Eaton hydraulic components distributors and Eaton employees only. This class is recommended for distributors, sales representatives, service personnel and sales support staff.

Topics Covered

Vickers

- Product features and offering
- Vane and piston pumps and motors
- Valves - proportional, servo, screw-in, slip-in cartridge and industrial
- Cylinders
- Locating catalog information
- Model coding based on given data
- Interpreting catalog tables
- Determining part numbers for components and/or kits

Char-Lynn

- Product features and offering
- Geroter and Geroler® (spool, disc valve, VIS and HP 30 motors)
- Steering control units
- Torque generators
- Locating catalog information
- Model coding based on given data
- Interpreting catalog tables
- Determining part numbers for components and/or kits

Topics Covered (cont.)

Eaton

- Series one heavy duty closed circuit variable piston pumps, fixed and variable piston motors
- Series two heavy duty closed circuit variable piston pumps
- ME fixed displacement piston motors
- Gear products
- Mobile valve products
- Hydroline cylinders
- Filters and accumulators
- Model coding based on given data
- Interpreting catalog tables
- Determining part numbers for components and/or kits

Completion Requirements

Students will be required to attend and participate in all sessions to successfully complete this course. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.



Eaton's Gear, Vane and Char-Lynn® Products Service School

Course Registration Code: Hyx_ILT_CLSS
Duration: 4 Days

This four-day service and repair school covers all of Eaton's gear and vane products as well as Char-Lynn® brand low-speed, high-torque motors and steering control units. This school combines both classroom and hands-on lab time. Students will review the principle of operation, product catalog information, and parts and service bulletins in a classroom setting. They will also learn first-hand how to tear down, repair and reassemble each of the different products.

Recommended Prerequisites: Mobile Hydraulics, Industrial Basics or Industrial Hydraulics

Who Should Attend

This class is for Eaton's Char-Lynn® and Eaton brand authorized distributors and Eaton employees only. This class is recommended for sales and service personnel who sell and/or repair Char-Lynn® and Eaton Brand products.

Topics Covered

- Product function and identification
- Model coding
- Disassembly and reassembly
- Repair kits
- Performance data
- Total servicing
- Troubleshooting

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.



Warranty Center Failure Analysis

Course Registration Code: Hyx_ILT_FA
Duration: 2.5 Days

This two-and-a-half-day failure and warranty analysis class focuses on typical causes of component failures, warranty analysis, product testing requirements and a review of how to process warranty claims. This course incorporates both hands-on exercises and lectures to ensure students get a good understanding of how to analyze component failures. The products covered in class include piston, vane, and gear pumps, directional control valves, low-speed high torque motors, light duty hydrostatic transmissions and steering valves.

Recommended Prerequisites: Industrial Hydraulics/Industrial Basics, Mobile Hydraulics or equivalent. Complete all level 200 Eaton certifications for Vickers®, Eaton, and Char-Lynn® product schools. We also recommend that students attend the available Eaton and Char-Lynn® service schools.

Who Should Attend

For Eaton's authorized warranty center personnel only and Eaton employees. This course is intended for technical service and repair personnel who work for Eaton's authorized warranty centers.

Topics Covered

- Failures covered by warranty
- Failures caused by contamination
- Failures caused by bad material
- Failures that cause leakage
- Failures caused by improper assembly
- Failures that cause parts to break
- Root cause of failures that show signs of smearing, seizing, sticking or gulling
- Failure diagnoses
- Product test procedures
- Warranty analysis program
- Identify product manufacturing locations
- Best practices for populating a warranty reimbursement form

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.

Open/Closed Circuit Piston Products Service School

Course Registration Code: Hyx_ILT_CCOC
Duration: 4 Days

This four-day service and repair school covers all of Eaton's light, medium and heavy-duty open and closed circuit hydrostatic pumps, motors, and transmission products. This school combines both classroom and hands-on lab time. Students will review the principle of operation, product catalog information, parts and service bulletins in a classroom setting. They will also learn first-hand how to tear down, repair and re-assemble each of the different products. The products covered will be series one pumps and motors, series two pumps, medium duty 70160, 70360, 72400, light duty model 600, 700, and 1100. We will also cover the x20 series and PVM pumps.

Recommended Prerequisites: Mobile Hydraulics, Industrial Hydraulics or Industrial Basics

Who Should Attend

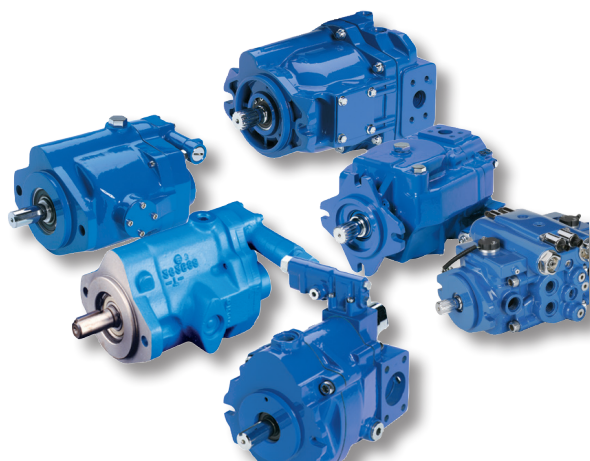
This class is for Eaton customers, authorized distributors and Eaton employees only. This class is recommended for sales & service personnel who sell and/or repair Eaton's hydrostatic products.

Topics Covered

- Closed circuit principle of operation
- Open circuit principle of operation
- Product function and identification
- Model & assembly coding
- Disassembly & reassembly
- Closed circuit controls
- Open circuit controls
- Performance data
- Troubleshooting
- Servicing

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a written exam with a score of 70% or higher.



AxisPro™

Course Registration Code: Hyx_ILT_APRO
Duration: 2 Days

This two-day course is designed for those individuals who have intimate working knowledge of high performance proportional valves and how they should be applied in the field of electro-hydraulics. The foundation of this course assumes the attendee is familiar with Servo Proportional Valve Technology; PID theory and application and principles of open and closed loop systems as it applies to electro-hydraulics. The AxisPro valve levels one through four are discussed, identifying key features and benefits with heavy concentration on the level 2 and 3 valve. In addition to a classroom setting, attendees will work hands-on in a laboratory environment with AxisPro utilizing Eaton's ProFx Configure software. The final measure of this course is the effective commissioning of an AxisPro valve which includes the exporting and importing of valve parameters and performing basic valve functions.

Recommended Prerequisites: Industrial Hydraulics or Mobile Hydraulics course; CANbus Basics; Electro-Hydraulics Maintenance and Troubleshooting course or equivalent advanced electro-hydraulic training

Who Should Attend

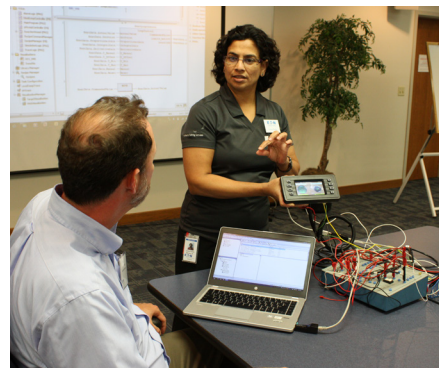
This course is appropriate for personnel who have working knowledge of high performance proportional valves and how they should be applied in the field of electro-hydraulics. Attendees should already be familiar with Servo Proportional Valve Technology; PID theory and application and principles of Open and Closed loop systems as it applies to electro-hydraulics.

Topics Covered

- ProFX Configure Software
- Initialization
- Operation
- Data Plotting
- VSC Mode
- DPC Mode
- DSC Mode
- DFPC Mode

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments. In addition, successful completion of this course will require passing a comprehensive written exam with a score of 70% or higher.



Eaton's ProFX™ Sales Course

Course Registration Code: Hyx_ILT_FXS

Duration: 1 day

Eaton offers this one-day course designed to introduce participants to the Eaton ProFX product line. It includes overview of basic concepts of Electrohydraulics for better understanding of the role of the product. Features of the programming software, HFX controllers and VFX displays are discussed. Example project with real hardware is demonstrated for familiarity of software capabilities.

Recommended Prerequisites: None

Who Should Attend

This course is for sales team personnel who need introductory knowledge of the ProFX product line and its capabilities.

Topics Covered

- HFX controller
- VFX displays
- ProFX Control software
- Components of Electrohydraulic system
- Factors affecting proportional valves
- Feedback transducers overview
- Data communication networks

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments.



Eaton's ProFX™ Applications Course

Course Registration Code: Hyx_ILT_CFX

Duration: 2 Days

Eaton offers this two-day course designed to introduce participants to the Eaton ProFX Control software which is based on the IEC 61131-3 compliant CoDeSys version 3.5 integrated development environment. Functions and features of the programming software, HFX controllers and VFX displays are covered. The ProFX libraries are introduced and many of the capabilities are discussed. Visualization capabilities within ProFX Control library are addressed. Attendees will create, download, and test hands on project with real hardware.

Recommended Prerequisites: None

Who Should Attend

This course is appropriate for personnel involved in design and/or creation of electrohydraulic systems. A basic understanding of PLC's or microprocessors, as well as familiarity with programming languages, is highly recommended for attendees.

Topics Covered

- ProFX Control user interface
- Keywords, character set and identifiers
- Data types, variables, and arrays
- Function block library overview
- Tasks in ProFX
- Structured text overview
- Using Eaton's Function Block libraries
- Logic development with real life example
- HFX Controller configuration and setup
- VFX configuration and setup
- Creating visualizations
- Communicating with CAN interface
- Compiling/downloading/debugging project

Completion Requirements

Students will be required to attend and participate in all sessions, exercises, and assignments.

CANbus Online Training Course

Course Registration Codes:

Hyx_CANbus_Mod1
Hyx_CANbus_Mod2
Hyx_CANbus_Mod3
Hyx_CANbus_Mod4

This online, self-paced course emphasizes the fundamentals and principles of Controller Area Network communication protocol known as CANbus. The course, delivered in four separate modules, focuses on computer number systems, hardware connections, message formats, the CANbus Protocols and error handling methods along with associated messages. It is a good primer to familiarize learners with the CANbus Communication Standard in preparation for setting up a CANbus controlled system. Each module in this curriculum is between 1-2 hours in length.

Recommended Prerequisites: None

Who Should Attend

This course is appropriate for application designers and engineers, electronic technicians and system maintenance staff with appropriate electrical background.

Topics Covered

- Electronic signal transmission
- Voltage vs. current signals
- Analog vs. digital signals
- Common number systems
- Signal transmission methods
- Transmission industry standards
- Communication buses and types of networks
- Message types
- CANbus transmission rates and cabling
- Message frame types
- Error handling and associated messages
- Higher level protocols

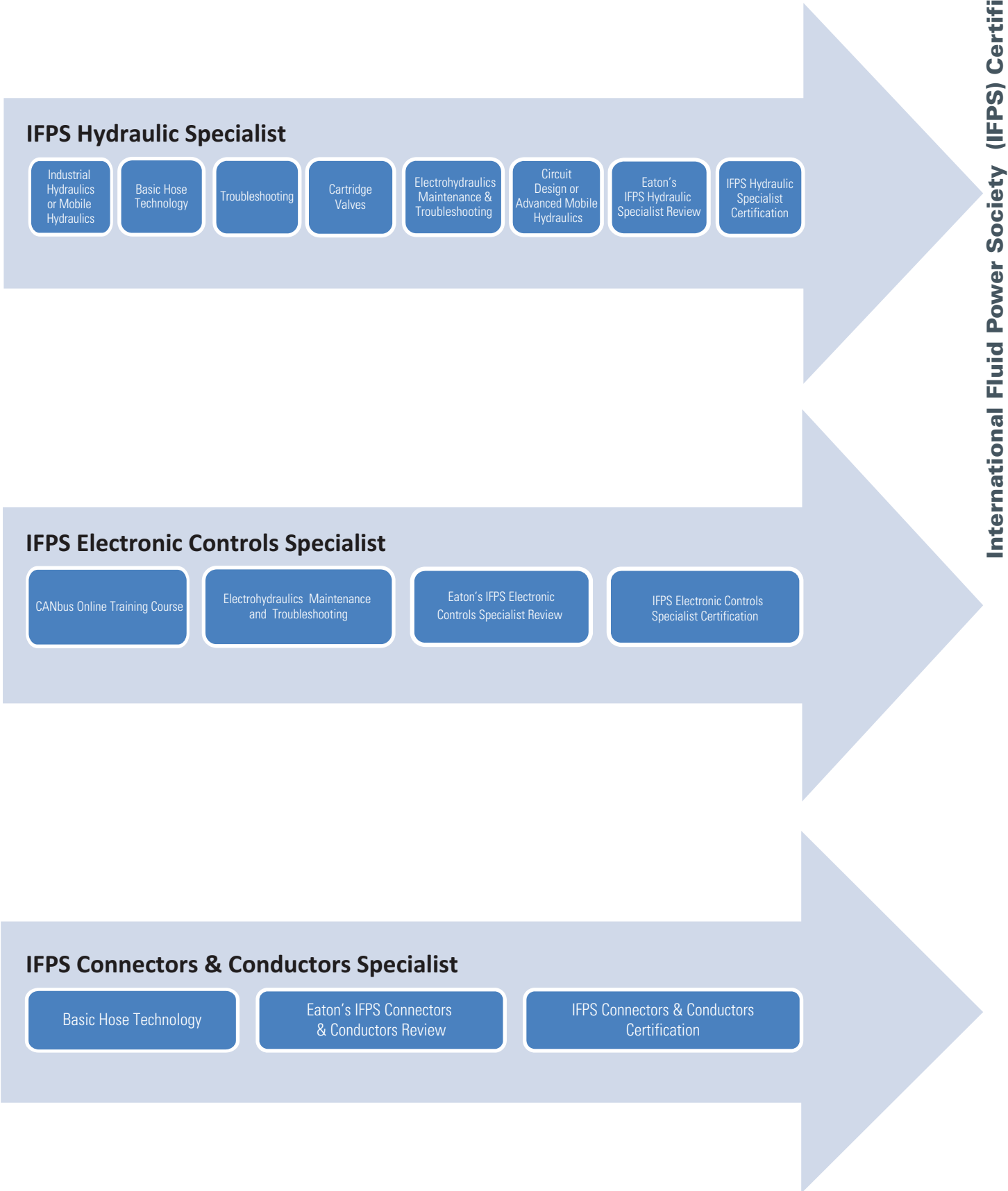
Completion Requirements

Students will be required to study all modules, complete review questions and successfully complete a comprehensive final knowledge check to successfully complete this course. Certification will be awarded to students who have met all course completion requirements.

Recommended Course Progressions for Industry Certifications

Professional Development: Eaton’s Technical Training Course Progressions

Courses Listed in Recommended Sequence



IFPS Hydraulic Specialist Review

Course Registration Code: Hyx_ILT_FPS-SP

Duration: 3 Days

This three-day review course is appropriate for individuals who have been trained and work in the field of fluid power and need to sharpen their skills in various areas to become certified as an International Fluid Power Society Hydraulic Specialist.

Recommended Prerequisites: IFPS has created a study manual for candidates who wish to prepare for the Hydraulic Specialist exam. This course is a review session and students should prepare themselves by reviewing this manual prior to attending.

Who Should Attend

Any fluid power professional involved in application, design or sales of hydraulic systems.

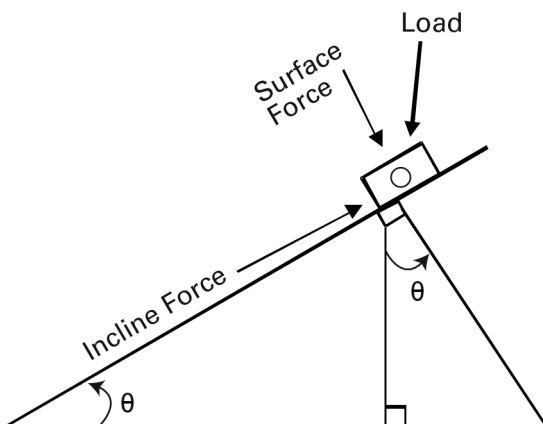
Topics Covered

- Hydraulic symbols
- Circuit diagrams, size components, recognizing functions
- System parameters
- Force, distance, work, torque, speed, velocity and power
- Load calculations
- Motor characteristics
- Hydraulic pump and motor applications
- Valve sizing for hydraulic circuits
- Electrohydraulics: prop valves & amplifier cards
- Accumulators, intensifiers & boosters
- Heat exchangers & fluid conductors
- Filtration, fluids and lubricants
- Troubleshooting

IFPS Exam

The three (3) hour written test will be offered at the same location on the following day after the review.

Test registrations must be made through the International Fluid Power Society at www.ifps.org for both the job performance and the written test, and are charged separately from the review session.



IFPS Connector & Conductor Review & Job Performance

Course Registration Code: Hyx_ILT_FPS-CC

Duration: 1.5 Days

This one-and-a-half day course is appropriate for individuals who have been trained in the field of fluid power and need to sharpen their skills by achieving Fluid Power Connector & Conductor Certification. The Connector & Conductor certifications require a three (3) hour job performance (hands-on) test and a three (3) hour written test.

Recommended Prerequisites: IFPS has created a study manual for candidates who wish to prepare for the Connector & Conductor Certification exam. This course is a review session and students should prepare themselves by reviewing this manual prior to attending.

Who Should Attend

Any fluid power professional involved in the selection, application, installation or sales of connectors and components.

Topics Covered

- Product identification
 - Hose and coupling identification
 - Identifying threads and selecting the proper O-ring
- Assembly component selection
 - S-T-A-M-P-E-D method for selecting proper tubing & fittings
 - Selecting abrasion protection
 - Converting English and metric units - pressure conversions
- Assembly procedure and operation
 - Measuring hose assemblies
 - Cutting and skiving hose
 - How to measure using a dial caliper or micrometer
 - Determining displacement angles
 - Cleaning of hose assemblies and cleanliness levels
 - Flaring tubing and brazing assemblies
 - Nomographic chart
- Related topics
 - Leakage safety
 - Fastener standards, specifications and markings
 - Basic fastener types, terminology, measurements and strength classes
 - Hose assembly routing tips

IFPS Exam

The corresponding three (3) hour job performance (hands-on) test will follow the conclusion of the 1½ day review session on the afternoon of the second day. The three (3) hour written test will be offered at the same location on the following day after the job performance (hands-on) test.

Test registrations must be made through the International Fluid Power Society at www.ifps.org for both the job performance and the written test, and are charged separately from the review session.

IFPS Electronic Controls Specialist Review

Course Registration Code: Hyx_ILT_FPS-EC

Duration: 4.5 Days

This four-and-a-half-day course is appropriate for individuals who have been trained in the field of fluid power and electronics that need to sharpen their skills by achieving IFPS Electronic Controls Specialist Certification. Eaton's review will help prepare students for the IFPS certification that is designed to review and test understanding, specification, and application of the full breadth of electronics used in the fluid power industry from simple sensors and limits to HMIs, controllers, and networks. It includes a brief review of applicable pneumatic and hydraulic principles, as well as in-depth examples of the electronics for both mobile and industrial fluid power equipment.

Recommended Prerequisites: IFPS has created a study manual for candidates who wish to prepare for the Electronic Controls Specialist exam. This course is a review session and students should prepare themselves by reviewing this manual prior to attending.

Who Should Attend

Any fluid power professional involved in application, design or sales of hydraulic and electrohydraulic systems.

Topics Covered

- Fluid power systems
- Electronic and electrical solutions
- Input/output devices
- Applying control theory
- Interacting with controllers
- Utilize industrial networks

IFPS Exam

The three (3) hour written test will NOT be offered at the same location due to this review ending on a Friday. Students attending the review should register for the exam at a time and location that will best fit their schedule.

Test registrations must be made through the International Fluid Power Society at www.ifps.org for both the job performance and the written test, and are charged separately from the review session.



IFPS Certified Technician Review & Job Performance

Course Registration Code: Hyx_ILT_FPS-TC

Duration: 2.5 Days

This two-and-a-half-day course is appropriate for individuals who have been trained in the field of fluid power and need to sharpen their skills by achieving Fluid Power Certified Technician. Four different mechanic certifications exist: Industrial, Mobile, Pneumatic & Master level. Training Services with Eaton's Hydraulics Group will provide reviews for the Industrial and Mobile Certified Technician. A hydraulic technician applies fluid power theory and related knowledge to test and troubleshoot operational hydraulic systems and applications. They also read schematics, perform basic cylinder and hydraulic motor calculations and are able to supervise system installations and commissioning.

Prerequisites: IFPS has created a study manual for candidates who wish to prepare for the job performance and written exam. This course is a review session and students should prepare themselves by reviewing this manual prior to attending.

Who Should Attend

Any fluid power professional involved in the selection, application, installation or sales of hydraulic equipment.

Topics Covered

- Set-up and tests systems and components under direction of engineering and scientific staff
- Recommends modifications to circuit and components to improve performance
- Supervises system installation, flushing and commissioning
- Provides leak-free piping
- Knows how, where and when to take fluid samples and read lab reports
- Can establish ISO cleanliness level for a system
- Target Cleanliness Chart
- Understands accumulator use and operation
- Understands hydrostatic drives
- Sets pump load sensing and compensator controls
- Understands basic electrical controls and their application
- Calculates decompression volume
- Understands regenerative circuits and their use
- Understands sequence and counterbalance circuits and associated valving

IFPS Exam

All Technician certifications require a three (3) hour written and a three (3) hour job performance (hands on) test taken in the afternoon of the third day.

Test registrations must be made through the International Fluid Power Society at www.ifps.org for both the job performance and the written test, and are charged separately from the review session.

IFPS Certified Mechanic Review & Job Performance

Course Registration Code: Hyx_ILT_FPS-MC

Duration: 2.5 Days

This two-and-a-half-day course is appropriate for individuals who have been trained in the field of fluid power and need to sharpen their skills by achieving Fluid Power Certified Mechanic. Four different mechanic certifications exist: Industrial, Mobile, Pneumatic & Master level. Training Services with Eaton's Hydraulics Group will provide reviews for the Industrial and Mobile Certified Mechanic. The mechanic fabricates, assembles, services, maintains, and tests hydraulic equipment. They also understand hydraulic symbols, read system schematics, understand electrical principles, and are skilled in using hand tools, power tools, micrometers, and testing equipment.

Prerequisites: IFPS has created a study manual for candidates who wish to prepare for the job performance and written exam. This course is a review session and students should prepare themselves by reviewing this manual prior to attending.

Who Should Attend

Any fluid power professional involved in the selection, application, installation or sales of hydraulic equipment.

Topics Covered

- Read hydraulic symbols and circuit diagrams
- Use dial calipers and micrometers
- Know various tube fittings and select the proper replacement
- Make up tube assemblies
- Know how to prevent and repair system leaks
- Perform contamination control
 - Add fluid to system with filter cart
 - Aid in system flushing and commissioning
 - Know how, when, and where to take fluid samples
 - Use "Target Cleanliness Chart" for each system
 - Check condition of hydraulic filters
 - Check systems for water
- Make up a crimped hose assembly
 - Replace a hose assembly
 - Inspect hose applications for twist and minimum bend radius
- Service and charge accumulators
- Assist technicians in start-up and commissioning
- Promote safe working conditions with pressurized systems

IFPS Exam(s)

All Mechanic certifications require a three (3) hour written and a three (3) hour job performance (hands-on) test done during the afternoon of the third day of the review.

Test registrations must be made through the International Fluid Power Society at www.ifps.org for both the job performance and the written test, and are charged separately from the review session.

Instructor Symposium

History

Eaton's Hydraulics Training Services has a long and distinguished history in the fluid power education arena, ever since the original Vickers® training center was founded in 1945. Through various technology and product related classes, as well as the variety of training materials that we offer, Eaton strives to lead the industry in fluid power education. We applaud and salute the efforts of personnel involved with educating students in the fluid power industry. To all of us, maintaining high educational standards is important to ensure students are well prepared when they enter the working environment. To show our appreciation in maintaining these high quality educational programs, we host an Instructor Symposium, held annually at our facility in Maumee, OH. We will present a number of varied topics that we hope you will find of interest.

Prerequisites

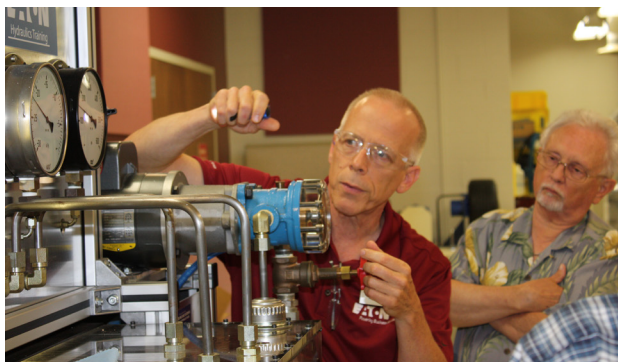
Professionals who are actively teaching fluid power concepts at an educational institute or fluid power company that have a desire to improve their programs.

Who Should Attend

This symposium is appropriate for instructors and educators involved with educating students in the fluid power industry. Instructors with vocational schools, technical colleges and universities are encouraged to attend.

This seminar is typically held in June or July. There is no cost to attend this session but space is limited. Early registration is encouraged to ensure your seat is reserved. Multiple registrations from the same organization/institution will be considered based on seat availability.

We provide lunch and a continental breakfast on all three days. A group dinner is also included one night. While transportation and lodging will be the participant's responsibility, we have special rates available with a number of local lodging providers. Directions and lodging information will be provided upon confirmation of your registration. Business casual attire is recommended for the entire event.



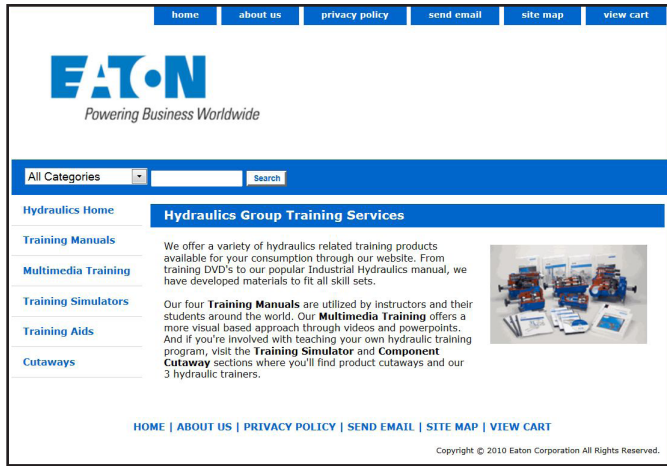
Registration in the Instructor Symposium is by invitation only. If you are interested in attending our annual training seminar, please feel free to contact Eaton's Hydraulics Training Services by emailing us at hydraulicstraining@eaton.com or by phone at 800-413-8809.

Topics vary annually, previously covered topics include:

- Closed circuit transmission sizing
- Open circuit pump – torque limiting control
- Leaks, causes, and cures
- Hose routing and failure analysis
- Hose assembly (lab)
- CAN - basic primer
- CBT (computer based training) demo
- Counterbalance valves
- Proportional amplifier tuning and troubleshooting (lab)
- Cavitation and aeration (lab)
- Fluid power trainer demo
- Gerotor/Geroler – application considerations
- Steering controls primer (lab)
- PID control concepts
- "Rules of thumb" = thumbs down
- Thread and port ID
- Advanced pump controls
- Sensor technology
- Systemic contamination control with black & white kit to particle counter comparison exercise
- Logical troubleshooting - bar trim & simulators
- Proportional valve control technology with amp lab
- LifeSense® hose health monitoring system

Training Products - Overview

Training Services with Eaton's Hydraulics group has long been a leader in the hydraulics training market for textbooks, cutaways and simulators. Our full line of textbooks, multimedia and other materials give instructors a turn-key solution to developing an entire curriculum from scratch or updating their existing content.



<http://www.hydraulicsliteraturestore.com>

Order & Shipping Policy

Orders can be placed online at www.hydraulicsliteraturestore.com via MasterCard, VISA or purchase order. In addition, orders are also accepted via fax at 952-906-3731 from companies with an established line of credit with Eaton Hydraulics, LLC.

To avoid delays in order processing, purchase orders should include:

- Billing/shipping address
- Contact name, phone number and email address
- Item number and quantity
- Eaton customer account number

Typically, all products (except simulators and cutaways) are in stock at all times. Most orders received during normal business hours will ship the same day, depending on quantity. However, shipments can be delayed around certain holidays.

Shipping and handling will be charged and added to all invoices as estimated by the e-commerce store. If a purchase order is faxed, Eaton will estimate the shipping charges via UPS and add the shipping charges to a customer's invoice.

If a customer prefers to use their preferred carrier for shipping, the carrier's name and valid customer account number must be provided on the order. If a customer does not provide their preferred carrier and account number, Eaton will use the e-commerce store estimate or UPS estimate and add the cost to the invoice.

International shipments will follow the same procedures as noted above. In addition, the customer will be responsible for paying the duties and taxes on their shipments. Eaton will not attempt to estimate these charges.

Discount Policy

Training Services offers a 25% discount on the following items if a quantity of 6 or more are ordered per item:

- Industrial Hydraulics Manual (5th edition, 2nd printing)
- Mobile Hydraulics Manual (2nd edition)
- Closed Loop Electrohydraulics Systems Manual
- Bird Bones & Sludge: Comprehensive Guide to Filtration

Return Policy

Return Requests must be submitted within 181 days of the invoice date.

Only the following items qualify for return:

- Industrial Hydraulics Manual (5th edition, 2nd printing)
- Mobile Hydraulics Manual (2nd edition)
- Closed Loop Electrohydraulics Systems Manual
- Bird Bones & Sludge: Comprehensive Guide to Filtration

Any return shipments must include written authorization from Eaton Hydraulics Training Services to be accepted for credit.

To receive written authorization to return manuals:

- Return request must be from a paid invoice.
- Manuals must be in "like new" condition to be accepted and credited
- Return requests for damaged manuals must be made within 15 days of the shipment date
- Return request must be submitted in writing (via mail, fax or email) and include:
 - Number of books to be returned
 - Eaton invoice number
 - Reason for return
 - Customer contact information (name, phone, email)

All items must be returned to the address noted on the "Authorization to Return" form and this form must accompany return shipment. Failure to return materials to this address will delay issuance of credit and any additional shipping charges incurred by Eaton to redirect shipment will be deducted from customer's credit. If P.O.D. is unable to be provided, the credit will NOT be authorized.

Customer is responsible for return shipping charges.

Books MUST be bubble wrapped, lying cover/back down in a tight fitting box, and received in "like new" condition. No credit will be issued for books received damaged.

All manual returns meeting these requirements will result in a credit memo being issued to the customer account, less a 25% re-stocking fee (based on list price, not discount price). Refund checks will only be issued on request.

HTS-2 - Hydraulics Training Simulator

Training Services of Eaton's Hydraulics group redesigned the Hydraulic Training Simulator (HTS-2). This latest model is based on changes in technology and many years of experience in producing the highest quality and most effective training aids for the marketplace. This fluid power training simulator is designed to ensure that those involved with the study of hydraulics have the most cost effective, hands-on method of presenting a practical demonstration of the principles taught within the classroom. The HTS-2 unit has been designed, built and is exclusively available through the Eaton Hydraulics Group Training Services department, with a 1-year limited warranty.

The HTS-2 is a dual operator station simulator with a central power unit that supplies one or both sides and can accommodate up to 4 students at a time. The power unit is capable of supplying a total flow of 3 GPM at 500 PSI and will operate on a standard 120VAC 15 amp lighting circuit.

The components mounted on each panel are representative of those found in today's hydraulic applications and allow the students to visually reinforce the learning concepts. Each HTS-2 comes with a detailed instructor guide that explains the exercises, provides a pictorial guide to ensure proper assembly, and a video demonstrating the proper performance of each exercise.

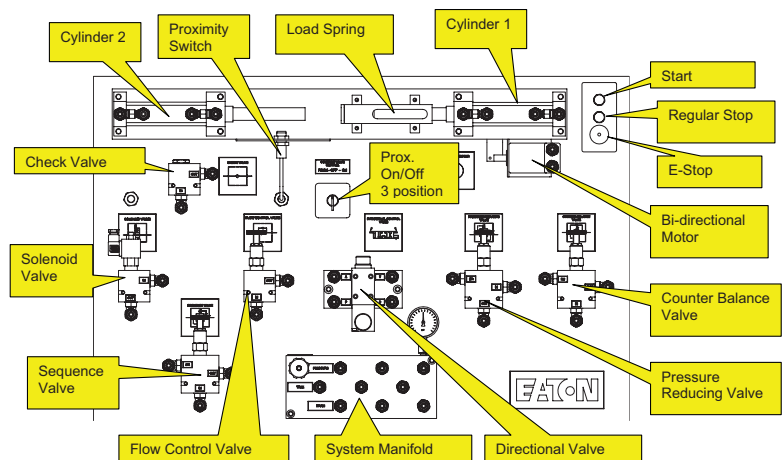
Components can be easily connected together through flexible hoses and leak-free quick disconnects to configure many variations of basic hydraulic circuits which reinforce the theory and principles of operations taught in class. Each operator station panel is equipped with the following hydraulic components:

- Directional control valve – lever operated, 4-way, three position, tandem center
- Sequence valve
- Pressure reducing/relieving valve
- Check valve
- Pressure compensated flow control valve
- Counterbalance valve
- Normally open 2-position solenoid valve
- Two cylinders - one equipped with adjustable proximity switch and another equipped with resistive spring load
- Fixed volume Vickers® V10 vane pump
- Pressure gages
- 2 plumbing tees



Using the HTS-2, students will become familiar with the principles of aeration and cavitation, sequencing circuits, operation of components in series and parallel, flow control characteristics and types of applications, hydraulically counterbalancing an actuator and many other fundamental concepts.

To obtain a quotation, please contact Training Services at 800-413-8809 or hydraulicstraining@eaton.com.



MTS-1 - Mobile Training Simulator

The Mobile Hydraulics Training Simulator is the newest simulator offered by Eaton Hydraulics Training Services. This simulator is based on many years of instructional and field experience, and was designed to ensure those involved with the study of hydraulics, specifically mobile applications, have the most cost effective, hands-on method of presenting a practical demonstration of the principles taught within the classroom. In addition, this simulator is designed to allow an instructor to easily place a fault within the unit at the flick of a switch. There are 7 faults that can be selected to provide advanced training for troubleshooting. The MTS-1 has been designed, built, and is exclusively available through Eaton's Hydraulics Training Services.

The MTS-1 is a single operator simulator with a hydrostatic propel circuit and auxiliary charge circuit that also supplies steering, and lift/tilt functions to simulate the operation of a fork lift. The power unit is capable of supplying a total flow of 3 GPM at 500 PSI (propel only or combination of propel, steering and lift/tilt functions) and will operate on a standard 120VAC, 20 amp lighting circuit.

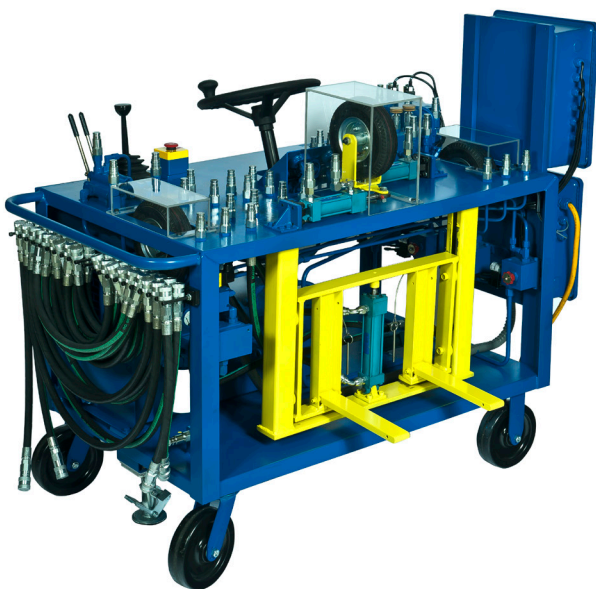
The components mounted on the unit are representative of those found in today's mobile hydraulic equipment and allows the students to visually reinforce the learning concepts. Eaton's MTS-1 comes with a detailed instructor's manual that explains the exercises, provides a pictorial guide to ensure proper assembly, and a video demonstrating the proper performance of each exercise.

Components can be easily connected together through flexible hoses and leak-free quick disconnects to configure many variations of mobile hydraulic circuits which reinforce the theory and principles of operations in class. The Mobile Hydraulics Training Simulator is equipped with the following hydraulic components:

- Orbital steering valve
- Hydrostatic transmission pump
- Priority flow control valve
- Orbital propel motors
- Steering and work cylinders
- Hoses with quick disconnects and built-in storage rack
- Control panel with gauges and tachometer
- Instructor control box for troubleshooting scenarios
- Tees, gages, and a flow meter equipped with quick disconnects
- Steering column and wheel
- Propel and steering wheels and tires
- Hot oil shuttle valve
- Replenishing relief valve
- 2-section monoblock valve with power beyond
- Pilot operated check valves
- Cross port relief valves
- Charge/auxiliary vane pump
- Charge relief valve with remote control
- Aeration valve
- Suction valve
- Remote reservoir fill connection through filter
- Heat exchanger

By using the MTS-1 students will become familiar with the principles of aeration and cavitation, steering, drive and operations of mobile equipment used in the field. The unit comes with a 1-year limited warranty.

To obtain a quotation, please contact Training Services at 800-413-8809 or hydraulicstraining@eaton.com.



PETS-II - Portable Electrohydraulic Training Simulator

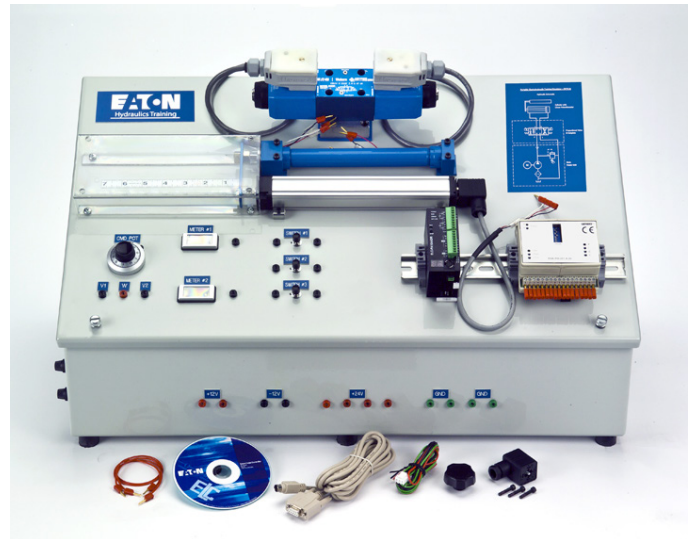
The recently redesigned Portable Electrohydraulic Training Simulator (PETS-II) is based on many years of instructional experience and our previous, highly acclaimed designs. This fluid power training simulator is designed to ensure that those involved with the study of electrohydraulics have the most cost effective, hands-on method of presenting a practical demonstration of the principles taught within the classroom. The PETS-II unit has been designed, built, and is exclusively available through the Eaton Hydraulics Training Services Department, with a 1-year limited warranty.

The PETS-II is a portable desktop simulator with a compact power unit that supplies flow to the directional control valve in order to accommodate up to 2-3 students at a time. The power unit is capable of supplying a total flow of 0.25 GPM at 200 PSI and will operate on a standard 120VAC, 15 amp lighting circuit.

The components mounted on each panel are representative of those found in today's hydraulic applications and allow the students to visually reinforce the learning concepts. Each PETS-II unit comes with a detailed instructor guide that explains the exercises and provides a pictorial guide to ensure proper assembly.

The PETS-II unit comes complete with the following components:

- Motor/pump with 1 liter tank, 0.25 GPM pump at 300 PSI
- Extruded aluminum enclosure with carrying handles
- Non-feedback proportional directional control valve
- 7" hydraulic cylinder
- 5K Ohm linear potentiometer (cylinder position feedback)
- 5K Ohm 10 turn command potentiometer on the front panel
- 3 push button switches on the front panel for enable and step command signals
- DIN-rail mounted Eaton ELC programmable controller with digital and analog I/O
- DIN-rail mounted PID amplifier
- Patch cord set to connect proportional lab experiments



Using the PETS-II unit, students will become familiar with the principles of electrohydraulic control of position, velocity and the electrical wiring, tuning, and troubleshooting of the proportional amplifier. The lab experiments include both open and closed loop control of the cylinder position or velocity. Students will wire the proportional amplifier and adjust the gain, deadband compensation, and acceleration and deceleration of the cylinder using on board ramps. The PID amplifier will demonstrate the adjustment of proportional, integral, and derivative gains for proper closed loop control of the cylinder.

To obtain a quotation, please contact Training Services at 800-413-8809 or hydraulicstraining@eaton.com.



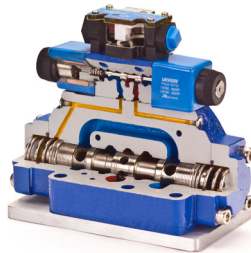
Component Cutaways

Eaton Hydraulics Training Services offers a full line of the most commonly used hydraulic components as a way to supplement your hydraulics presentations and curriculum. They are designed to help students better understand internal operations, without the mess! Orders can be placed by contacting Hydraulic Training Services at 800-413-8809, or by using our e-commerce store (www.hydraulicsliteraturestore.com).



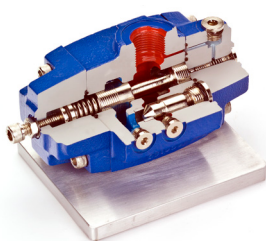
Pressure Control: Balanced Piston Relief Valve

Item #: CAW-CS06
Model Code: CS-06-B-50
Assembly #: 572263
Lead Time: 28 Weeks



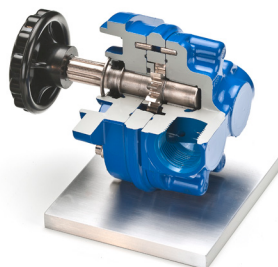
Solenoid Controlled, Pilot Operated Directional Control Valve

Item #: CAW-DG5S-8-8C
Model Code: DG5V-8-H-8C-T-R-
VM-FTWL-B-10
Assembly #: 02-395303
Lead Time: 20 Weeks



Pressure Control Valve (Multi-Function 'R' Valve)

Item #: CAW-RCS06
Model Code: RCS-06-B1-30
Assembly #: 675204
Lead Time: 28 Weeks



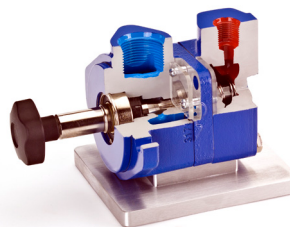
26000 Series Pump

Item #: CAW-26000
Model Code:
ACNAL01ABA0010000000000A
Assembly #: 26001-LZA
Lead Time: 15 Weeks



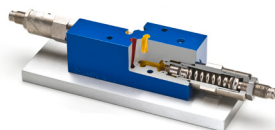
Pressure Reducing Valve

Item #: CAW-XCS-03
Model Code: XCS-03-1B-30
Assembly #: 590387
Lead Time: 28 Weeks



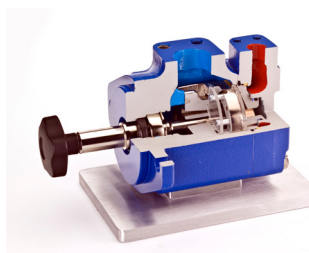
Fixed Volume Vane Pump

Item #: CAW-V10
Model Code: V10-1S1S-1C20-3
Assembly #: 386496-3
Lead Time: 14 Weeks



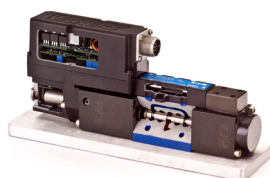
Stack Valve - Aluminum Sandwich Crossover Relief Valve

Item #: CAW-RV3-A321W
Model Code: RV3-10-NS-A321W-
A-03-B-3618 0000A
Assembly #: 615AA00015A
Lead Time: 15 Weeks



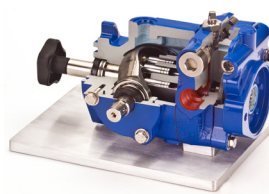
20V IntraVane Pump

Item #: CAW-20V
Model Code: 20V-02-A-1C-10
Assembly #: 02-348426-3
Lead Time: 14 Weeks



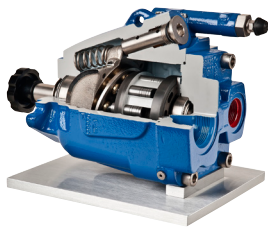
Proportional Directional Control Valve with Feedback and On-Board Electronics

Item #: CAW-KBFDG4V
Model Code: KBFDG4V-3-
2C07N-Z-M-1-PC7-H7-11
Assembly #: 5995968-001
Lead Time: 18 Weeks



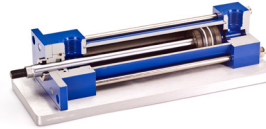
Manually Operated Variable Piston Pump

Item #: CAW-70160
Model Code:
ADB14L1FRC11HH1
POA00301A00000A0C
Assembly #: 70160-LAG-03
Lead Time: 30 Weeks



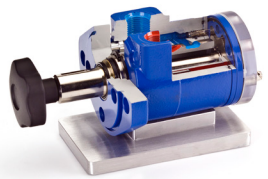
420 Piston Pump w/Pressure and Flow Compensation

Item #: CAW-420-041
Model Code: ADU041R02AE
10C43000000100100CD0B
Assembly #: 421AK00031B
Lead Time: 19 Weeks



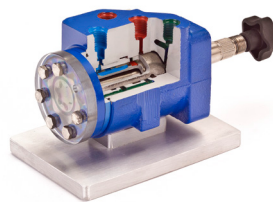
Hydraulic Cylinder: 1.5" Bore X 5/8" Rod X 6" Stroke

Item #: CAW-15-063-6
Model Code: N5F-1.50X6.00-N-
0.63-2-S-H-V-1-1
Lead Time: 12 Weeks



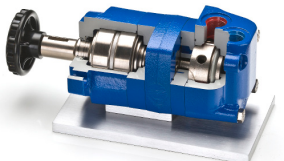
Low Speed High Torque Motor ('H' Series Spool Valve Motor)

Item #: CAW-MHO-022
Model Code: MHO 022 AA 01
000 00 0 0 00 0 0 0 J
Assembly #: 101-2808-009
Lead Time: 12 Weeks



Series 5 Hydrostatic Steering Control Unit

Item #: CAW-ABR1
Model Code: ABR1CA350AA
0100004AAN3A0AA10AB
Assembly #: 291-1196-002
Lead Time: 14 Weeks



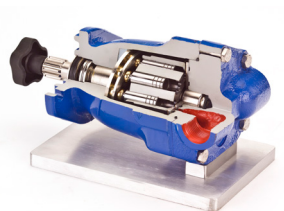
2K Disc Valve Motor

Item #: CAW-104-1003
Model Code:
M0208C01A0000F Assembly #: 104-1003-006
Lead Time: 16 Weeks



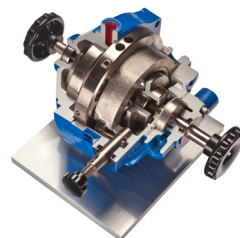
Bladder Accumulator

Item #: CAW-A2-30-B
Model Code: A2 30 B 060 BN M
21
Assembly #: 5003930
Lead Time: 14 Weeks



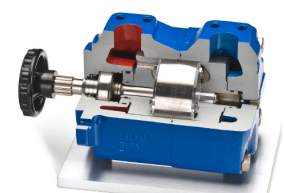
Medium Duty Fixed Displacement Piston Motor

Item #: CAW-74111-DAS
Model Code:
AAVAABA0B000A0B
Assembly #: 74111-DAS-01
Lead Time: 27 Weeks



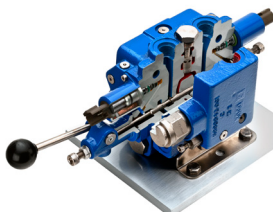
Model 1100 Transmission

Item #: CAW-1100
Assembly #: 1100-003
Lead Time: 15 Weeks



25M Vane Motor

Item #: CAW-25M
Model Code: 25M42A-11B20
Assembly #: 313457-2
Lead Time: 14 Weeks



CML60 2-Section Valve

Item #: CAW-CML60-2
Model Code: CML601CS1L0200
-EMSP1H30-E000010
Assembly #: 220AP00063A
Lead Time: 14 Weeks



Industrial Hydraulics Manual Item # TC-101-05-E-2

Edition: 5th, Published 2010 (6th Edition available Spring 2015)
ISBN-13: 978-0-9788022-0-2
ISBN-10: 0-9788022-0-9

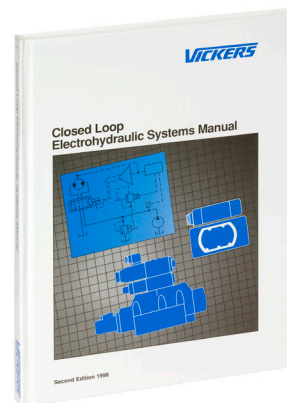
Our color-illustrated, 600+ pages, hardbound textbook covers everything you need to know about hydraulics. Learn about the principles of basic hydraulics, electronics, amplifiers, pumps, cartridge valves and circuits. A systems chapter focuses on the operation of industrial hydraulics circuits and injection molding systems. Included in the appendices are commonly used formulas, conversion charts, tables that can be used as on-the-job reference materials and much more. This manual is perfect for individuals who are just starting in the hydraulics industry as well as those with years of experience. The end of each chapter contains review questions to test comprehension of the material as you progress.



Mobile Hydraulics Manual Item # TC-102-02-E

Edition: 2nd, Published 2010
ISBN-10: 0-9634162-5-1

Our 2nd Edition Mobile Hydraulics Manual was reprinted in 2010. It is hardbound with over 500 pages and 475 colored illustrations. This edition has improved graphics and new end of chapter test questions. Every major aspect of mobile hydraulics theory and application is covered, including basic hydraulic theory, basic electrical theory, hydrostatic transmissions, and fixed and variable displacement pumps. If you work on mobile applications or are teaching a fluid power course with mobile concepts, this manual is the perfect companion to support your professional development and curriculum.



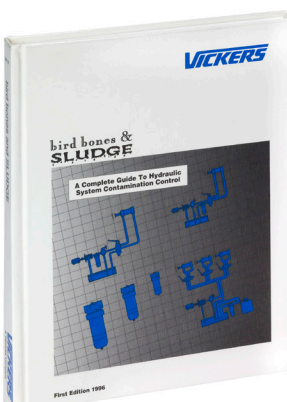
Closed Loop Electrohydraulics Systems Manual Item # TC-103-01-E

Edition: 2nd, Published 1998
ISBN: 0-9634162-1-9

This text was designed to help people involved with closed loop electrohydraulic control systems. Because the discussion of the fundamental principles of amplifiers, ramp generators and comparators requires a working knowledge of electronics, the student will learn about voltage, current, resistance and capacitance in DC circuits. The manual covers the operation of open and closed loop servo valve and proportional valve systems, and design considerations such as valve sizing, actuator selection and feedback transducers. It was prepared assuming the reader has a solid understanding of fluid power concepts.

Electrohydraulics Applications Manual - Coming Soon!

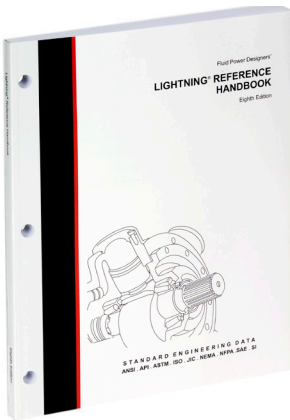
Edition: 1st, Available Spring 2015



Bird Bones & Sludge: Comprehensive Guide to Filtration Item # TC-104-01-E

Edition: 1st, Published 1996
ISBN: 0-9634162-4-3

You'd be surprised what you'll find in a hydraulic system. Bird bones, feathers, sandwiches and shop rags are just a few of the items routinely found. In fact, just about anything that's used on a typical shop floor can end up in a hydraulics system as contamination. Bird Bones and Sludge is a book published by Eaton's Hydraulics Training Services that provides a comprehensive reference on contamination control of hydraulic systems. Written for individuals with a basic knowledge of hydraulics, the book's purpose is to help people find ways to identify and eliminate particles as small as a few microns in order to prolong hydraulic machine and component life.



Lightning Reference Handbook (8th Edition) Item # LRH-8

The Fluid Power Designers' Standard Engineering Data handbook is, quite simply, the best fluid power engineering reference book in existence. Complete with full conversion tables, formulas and shortcut component size tables, as well as current graphic symbology for several different applications. It covers standards and practices, fluid power data, fluids, actuators, conductors, valves, connectors, seals...etc. If you are in the fluid power industry you should have this manual, no excuses.



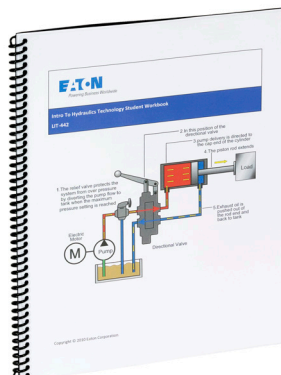
Answer Book - Industrial Hydraulics Manual (5th Edition) Item # TC-101

This book contains the answers to all of the questions shown in the fifth edition of the Industrial Hydraulics Manual. It was written as a training aid for instructors who are currently using our textbook.



Answer Book - Mobile Hydraulics Manual (2nd Edition) Item # TC-102

This book contains the answers to all of the questions shown in the second edition of the Mobile Hydraulics Manual. It was written as a training aid for instructors who are currently using our textbook.



Intro to Hydraulics Technology - Student Workbook Item # LIT-442

This workbook was designed to complement our Industrial Hydraulics Manual. It is a perfect guide for students wanting extra practice in graphic symbols, circuits, reinforcing principles and fundamental concepts. Complete with test questions for each section and answers in back to validate comprehension. New students to the fluid power industry will be able to reduce the amount of time required to learn and master basic fluid power concepts when this workbook is added to their library.



Graphics CD – Industrial Hydraulics Manual (5th Edition) Item # TC-101-05-CD

The Industrial Hydraulics textbook is a great resource for instructors and students. Available for purchase, this graphics CD contains all of the textbook images, which have proven to be valuable visual aids for instructors. We have converted the images to convenient to use PowerPoint® slides. The Industrial Hydraulics Manual graphics CD consists of over 600 images from the Industrial Hydraulics Manual. These slides are divided by chapter and are in order as they exist in the Industrial Hydraulics Manual. It is the perfect companion for anyone who wishes to teach from the best textbook in the fluid power training industry.



Graphics CD – Mobile Hydraulics Manual (2nd Edition) Item # TC-102-01-CD

The Mobile Hydraulics textbook is a great resource for instructors and students. Available for purchase, this graphics CD contains all of the textbook images, which have proven to be valuable visual aids for instructors. We have converted the images to convenient to use PowerPoint® slides. The Mobile Hydraulics Manual graphics CD consists of over 400 images from the Mobile Hydraulics Manual. These slides are divided by chapter and are in order as they exist in the Mobile Hydraulics Manual. It is the perfect companion for anyone who wishes to teach from the best textbook in the fluid power training industry.



Aeration & Cavitation Demonstration DVD Item # AC-V

Completely redone in 2012, this DVD demonstrates the effects of an aerated system using the Eaton Hydraulics Training Services' aeration simulator. This simulator permits air to be introduced into a hydraulic system under controlled circumstances. Cavitation is a similar problem created when a vacuum arises upstream of the pump producing bubbles from air coming out of the fluid. This DVD is approximately six (6) minutes long.

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