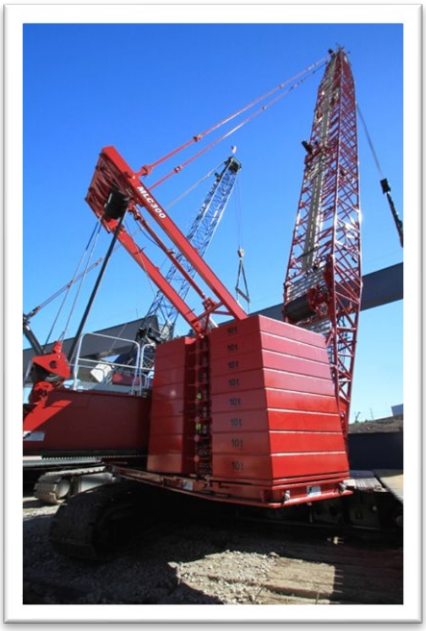
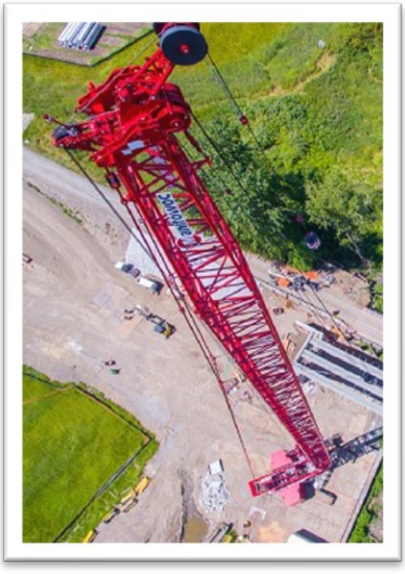
TRAINING 2024

Course catalog

Manitowoc – Wisconsin, USA
Shady Grove – Pennsylvania, USA





Contacts and Trainers

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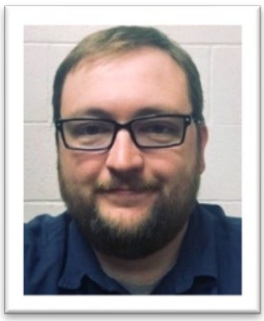


Josh Garrington
Global Training Manager
josh.garrington@manitowoc.com

Training Center Info

Our Capabilities:

Our factory-certified instructors offer operating systems, components, maintenance and repair training on all our products: Grove, GMK, Manitowoc, National Crane, and Potain.

The Manitowoc Product Support Training Center is an innovative leader in advanced crane industry training. Our onsite and online training curriculum is designed with your profits and your safety in mind. With professional and experienced instructors, our training helps you develop the product knowledge you need to be as productive as possible.

Please contact us if you are interested in Spanish-language instruction.

Our Facilities:

Shady Grove, PA: This site offers multiple state of the art classrooms. A large hands-on simulator lab to include simulators of multiple generations of Grove domestic, GMK All Terrain and National Boom Truck operating systems. A multiple bay training building is also used to accommodate multiple products for troubleshooting and is currently equipped with a GMK4100L-1 dedicated solely for training purposes. A current CCS Potain tower crane is onsite dedicated solely for training purposes.

Available lab workstations:

- Three generations of GMK simulators to include RCL's
- Four generations of Grove domestic RCL simulators
- Four generations of Grove domestic simulators
- GHC simulator to include the RCL
- Multiple National Boom Truck simulators to include RCL's
- EPIC Hydraulic/Electrical Simulators
- Hydraulic and Electrical workstations
- Tower crane erection / dismantling / troubleshooting
- Mobile crane operation
- CCS equipped immersive operator simulator

Manitowoc, WI: This site offers multiple state of the art classrooms. 2 large hands-on simulators labs to include simulators of multiple generations of Manitowoc EPIC, Canbus and Crane Control Systems.

Available lab workstations:

- 4 generations of Lattice Crane simulators, from conventional cranes to CCS generation;
- 8 hydraulic benches with pumps and motors that can simulate the function of the machines.
- Small Crawler simulator for the small Crawler range.
- A CCS cabin simulator with wireless remote
- Also available in Portugal, Dubai and Brazil:
    - Epic Simulators
    - Canbus Version 1 and version 2 Simulator;
    - Crane in the box Simulator
    - CCS Simulator

Contact us for more information about our global training centers located in Wilhelmshaven, Germany; Monterrey, Mexico; Sao Paulo, Brazil and Dubai, UAE.

Travel Arrangement Info

Shady Grove, PA

Our Address:

1565 Buchanan Trail East
Shady Grove, PA 17256

Local Airports:

Baltimore/Washington (BWI) International Airport
Washington Dulles (IAD) International Airport
Harrisburg, PA (MDT) International Airport
Hagerstown Regional Airport (HGR)

Rental Car: A rental car will be required for transportation to and from the airport. A rental car will also be required for daily transportation to and from the Manitowoc Training Facility.

If transportation service is required; arrangements must be made prior to the start of class by contacting Toni Pagliaro at Toni.Pagliaro@manitowoc.com. **Please note** all transportation fees incurred will be billed in addition to the cost of the training course you are attending.

Recommended Hotels:

1. Homewood Suites, 1650 Pullman Lane, Hagerstown, MD 21740
   Phone: (301) 665-3816
2. Springhill Suites by Marriott, 17280 Valley Mall, Hagerstown, MD 21740
   Phone: (301) 582-0011
4. Holiday Inn Express, 241 Railway Lane, Hagerstown, MD 21740
   Phone: (301) 745-5644
4. Courtyard by Marriott, 17270 Valley Mall Road, Hagerstown, MD 21740
   Phone: (301) 582-0043

Hotel arrangements, hotel expenses, transportation, breakfast and evening meals are the student's responsibilities.

Manitowoc does provide a catered lunch Monday-Thursday. No lunches are served on Fridays. Coffee, sodas, and bottled water are available daily in the training cafeteria at no cost to the students. Snacks are available anytime in the Training Cafeteria vending machine.

Travel Arrangement Info

Manitowoc, WI

Our Address:

3733 Dewey Street
Manitowoc, WI 54220

Local Airports:

Green Bay Austin Straubel Airport
Milwaukee's Mitchell Field Airport

Rental Car: A rental car will be required for transportation to and from the airport. A rental car will also be required for daily transportation to and from the Manitowoc Training Facility.

Recommended Hotels:

1. Cobblestone Hotel & Suites, 1407 16th Street, Two Rivers, WI 54241
   Phone: (920) 553-3632

2. Inn on Maritime Bay, 101 Maritime Drive, Manitowoc, Wisconsin, 54220
   Phone: (920) 682-7000
   **Discounted rate: $85/night! Enter Special Rates: Corporate Code 10000010563. Free YMCA passes given to students staying at the Inn on Maritime Bay if you mention you're staying for a Manitowoc Training class!*

Hotel arrangements, hotel expenses, transportation, breakfast and evening meals are the student's responsibilities.

Manitowoc does provide a catered lunch Monday-Thursday. No lunches are served on Fridays. Coffee, sodas, and bottled water are available daily in the training cafeteria at no cost to the students.

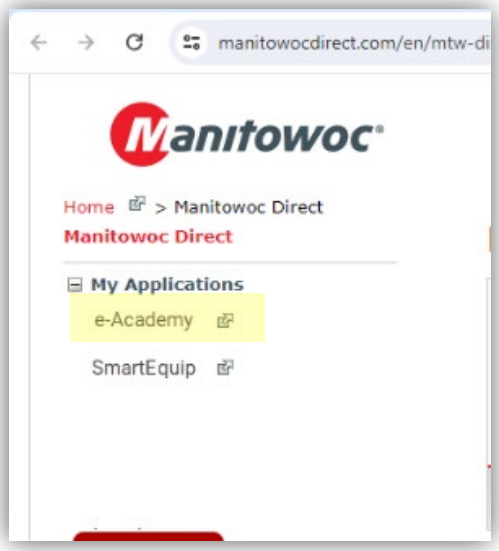
Registration

Request an Account:

To register to attend a training class, students must have a Manitowoc Direct account with access to the Manitowoc e-Academy application. Please visit this website and complete the required fields:

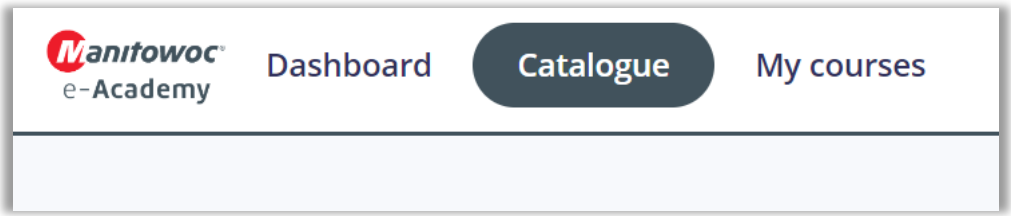
http://www.manitowoccranes.com/en/manitowoc-direct/manitowoc-direct-request-access

Once registered, users should login to Manitowoc Direct, click to expand My Applications, then select e-Academy to enter our website.



Manitowoc e-Academy:

Once logged in, you will see a Catalogue section where you will find our available courses, with upcoming dates listed.



Any registration/payment questions should be directed to Toni Pagliaro by calling 717-593-5918, or by email: toni.pagliaro@manitowoc.com.

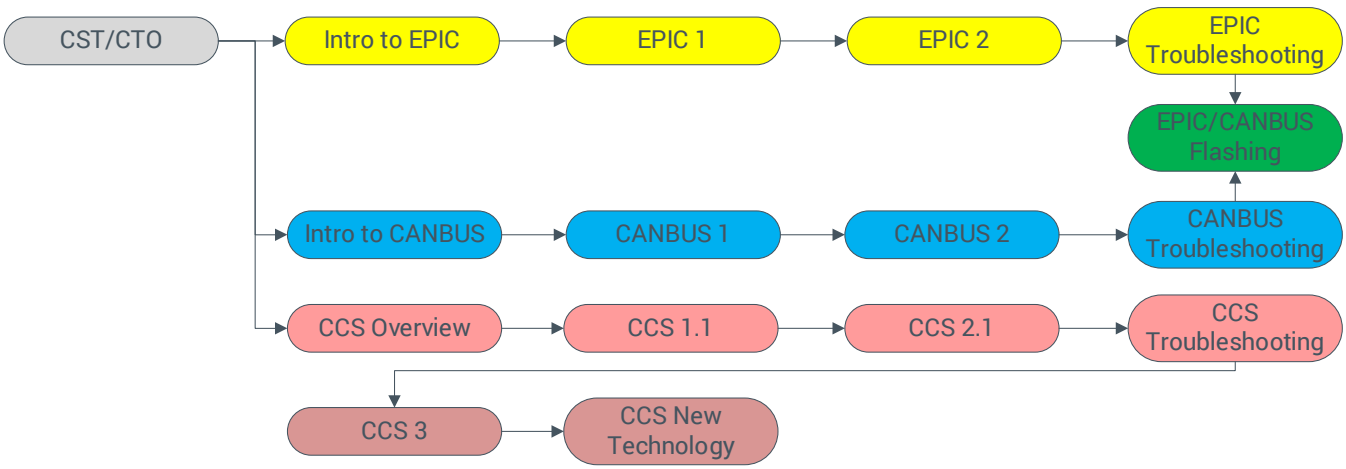
Index

EPIC

For customers & dealers

Course	Page	Course name
CST/CTO Combo	09	Crane Systems Theory and Crane Technology & Operation of lattice crawler cranes
Intro to EPIC	10	Introduction to the EPIC control system
EPIC 1	11	EPIC Level 1
EPIC 2	12	EPIC Level 2
EPIC Troubleshooting	13	Troubleshooting

These courses are available to Manitowoc customers and dealers. To register for a course please use the Manitowoc e-Academy in Manitowoc Direct. Instructions for requesting an account are found on page 6 of this catalog.



Manitowoc Lattice Boom Crawler Crane Training Paths

CST/CTO Lattice Combo

Aim of training course:

The course acts as a technical introduction to all Manitowoc lattice crane systems and will be used as a prerequisite for all other lattice courses.

The course covers terminology and technologies relating to mechanical, hydraulic, and electronic systems. Manitowoc load charts and rigging drawings are explained along with exercises on how load charts are constructed, read, and used. The class will introduce all Manitowoc crane control systems. Exercises teach use of the main crane operator's display and the RCI.

The course covers how hydraulic, electrical, and pneumatic systems are used to achieve crane functions, emphasizing maintenance and troubleshooting. Students learn the use of Manitowoc schematics. Hydraulic and Electrical test benches are used for hands-on exercises.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- Assorted eLearning modules

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 7 participants

Program:

- Know common Manitowoc crane models and terminology.
- Be able to read and explain load charts.
- Understand rigging drawings.
- Familiarization with CCS, CANBUS, and EPIC control systems.
- RCI configuration and operation.
- Read Manitowoc schematics.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, eLearning modules, homework.

Hardware/Software Provided:

None

Equipment:

- Training room
- Technical Documents
- Simulators
- Hydraulic & electric test benches

Cost:

- $2,300 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

Intro to EPIC

Aim of training course:

The course will showcase the operational systems of the 999 crane.

The service technicians will be guided through the electrical and hydraulic systems by studying the systems' schematics and manuals, and by participating in actual hands-on sessions.

The Load Indicator Systems will be covered to allow technicians to build the system knowledge and confidence to troubleshoot system problems. Specific Lab Units cover the 90 Series pump and 90 Series motor, Central Processing Unit (CPU), and breaking down the swing circuit. Additional units include understanding pressure vs. voltage as well as electrical and hydraulic systems for fixed and variable displacement pumps and motors.

Program:

- Understand EPIC as used on 999.
- Use hydraulic and electrical schematics for troubleshooting.
- Use pressure gauges and flow meters for troubleshooting.
- Use Manitowoc Service Manual.
- Understand 999 hydraulic system.
- Set the hydraulic system pressure.
- Check and test transducers, multi-function valves, and pump control.
- Understand 999 electrical system.
- Check EPIC computer diagnostics.
- Perform calibrations.
- Set up the rated capacity indicator on the 999 crane.
- Understand 999 basic operation, troubleshooting and maintenance.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, eLearning module homework.

Hardware/Software Provided:

None

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- CST/CTO Lattice

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 7 participants

Equipment:

- Training room **dealer pricing may vary*
- Technical Documents
- Simulators & test benches

Cost:

- $2,300 per student course fee*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

EPIC 1

Aim of training course:

The course will showcase the operational systems of 777 and 888 cranes. Students will learn the 777 electrical and hydraulic systems by studying the systems' schematics, manuals; and by participating in actual hands-on sessions for travel, boom hoist and hoist. We will review faults, limits, troubleshooting and the 777 boom hoist leakage test.

Students will be taught the RCI to build the system knowledge and confidence to troubleshoot system problems. Appropriate diagnostic cables and adapters will be provided. Lab units will include 90 Series pump and 51 Series motor, Central Processing Unit (CPU), and breaking down the travel, boom hoist and hoist circuits plus changing data in the RCI. Specific classroom units include understanding the electrical and hydraulic systems for 777 pumps and motors.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- Intro to EPIC

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 7 participants

Program:

- Understand EPIC system used on model 777/888.
- Use schematics to troubleshoot.
- Use pressure gauges and flow meters for troubleshooting.
- Navigate the Service Manual.
- Understand the model 777 boom hoist cylinder.
- Set the hydraulic system pressure.
- Check and test transducers, multi-function valves, and pump control.
- Understand the electrical systems.
- Check EPIC computer diagnostics.
- Perform calibrations.
- Set up LMI on 777/888 cranes.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, eLearning module homework.

Hardware/Software Provided:

Canbus Breakout Cable, Peak Adaptor, CST software (customer)

Equipment:

- Training room
- Technical Documents
- Simulators & test benches

Cost:

- $2,800 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

EPIC 2

Aim of training course:

The course will showcase the operational systems of M250, Travel divert to hoist, and 2250 Main Hoist.

The service technicians will be guided through the M250 and 2250 electrical and hydraulic systems, by studying the systems' schematics and manuals, participate in actual hands-on sessions for boom hoist and hoist and divert, and review faults, limits, troubleshooting and the 2250. The Rated Capacity Indicator and CraneSTAR will be reviewed, which will allow technicians to build the system knowledge and confidence in setting and troubleshoot system problems. In addition, the Central Processing Unit (CPU) and breaking down the boom hoist and hoist circuits plus building the luffing jib hydraulic circuit. Specific classroom units include understanding the electrical and hydraulic systems for M250 and 2250 pumps and motors.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- EPIC 1

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 7 participants

Program:

- Understand EPIC system as used on the model 2250.
- Use schematics to troubleshoot.
- Use pressure gauges and flow meters for troubleshooting.
- Use the Service Manual.
- Understand the hydraulic system.
- Set the hydraulic system pressure.
- Check and test transducers, multi-function valves and pump control.
- Understand the electrical system.
- Check EPIC computer diagnostics.
- Perform calibrations.
- Use 2250 LMI system.
- Understand 2250/M250 operation, troubleshooting and maintenance.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, eLearning module homework.

Hardware/Software Provided:

None

Equipment:

- Training room
- Technical Documents
- Simulators & test benches

Cost:

- $2,500 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

EPIC Troubleshooting

Aim of training course:

The course will cover troubleshooting the Manitowoc EPIC control system. It will consist of an in-depth look at the onboard diagnostics including the RCI/RCL system. An overview of using the CST tool as well as harness and cable repair will also be covered. The 999 crane will be used for the hands-on and classroom. All classroom presentations will be reinforced with practical hands-on operation of the car body and upper works systems. Appropriate diagnostic cables and adapters will be provided for each student to keep.

Program:

- Have an understanding of the On-board diagnostic system.
- Enhance troubleshooting skills.
- Understand the Different EPIC RCI/RCL systems.
- Using CST for EPIC Diagnostics.
- Repair harness and cables.
- Understand diagnostic screens
- Locate information in the Test voltages pages.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises.

Hardware/Software Provided:

None

Equipment:

- Training room
- Technical Documents
- Simulators & test benches

Cost:

- $1,200 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- EPIC 2

Duration

- 3 days
- Tuesday 7:30 am to Thurs 4:00 pm

Number of participants

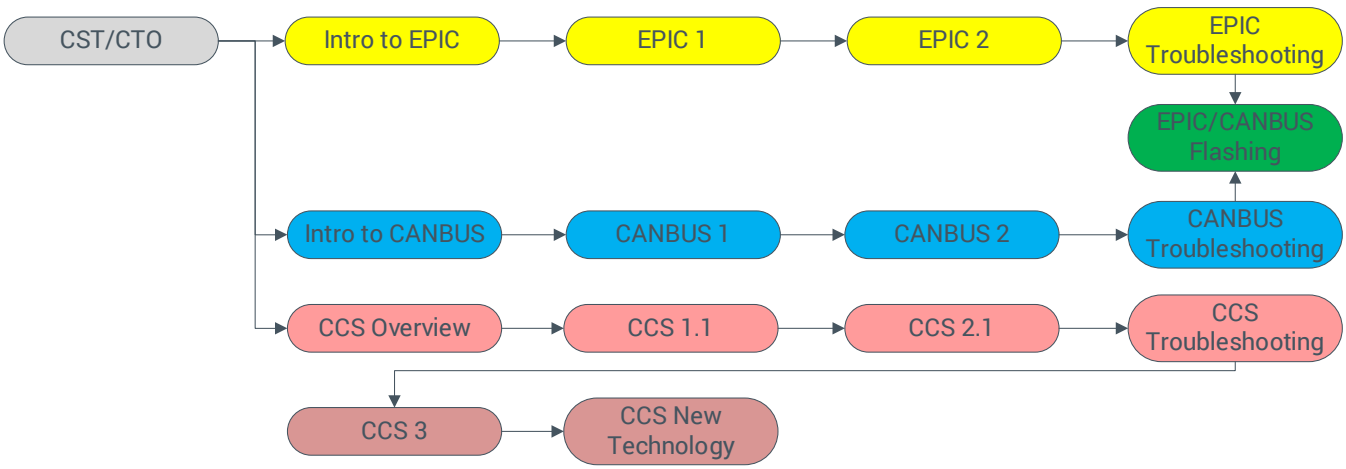
- 7 participants

CANBUS

For customers & dealers

Course	Page	Course name
CST/CTO Combo	15	Crane Systems Theory and Crane Technology & Operation of lattice crawler cranes
Intro to CANBUS	16	Introduction to the CANBUS control system
CANBUS 1	17	CANBUS Level 1
CANBUS 2	18	CANBUS Level 2
CANBUS Troubleshooting	19	Troubleshooting

These courses are available to Manitowoc customers and dealers. To register for a course please use the Manitowoc e-Academy in Manitowoc Direct. Instructions for requesting an account are found on page 6 of this catalog.



Manitowoc Lattice Boom Crawler Crane Training Paths

CST/CTO Lattice Combo

Aim of training course:

The course acts as a technical introduction to all Manitowoc lattice crane systems and will be used as a prerequisite for all other lattice courses.

The course covers terminology and technologies relating to mechanical, hydraulic, and electronic systems. Manitowoc load charts and rigging drawings are explained along with exercises on how load charts are constructed, read, and used. The class will introduce all Manitowoc crane control systems. Exercises teach use of the main crane operator's display and the RCI.

The course covers how hydraulic, electrical, and pneumatic systems are used to achieve crane functions, emphasizing maintenance and troubleshooting. Students learn the use of Manitowoc schematics. Hydraulic and Electrical test benches are used for hands-on exercises.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- Assorted eLearning modules

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 6 participants

Program:

- Know common Manitowoc crane models and terminology.
- Be able to read and explain load charts.
- Understand rigging drawings.
- Familiarization with CCS, CANBUS, and EPIC control systems.
- RCI configuration and operation.
- Read Manitowoc schematics.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, eLearning modules, homework.

Hardware/Software Provided:

None

Equipment:

- Training room
- Technical Documents
- Simulators
- Hydraulic & electric test benches

Cost:

- $2,300 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

Intro to CANBUS

Aim of training course:

The course will showcase the operational systems of the version 1 Canbus system. The students will be guided through the electrical and hydraulic systems. This will be done by studying the crane schematics. Extensive in-depth sessions of the machine's Rated Capacity Indicator (RCI) system will allow technicians to build the necessary system knowledge and confidence to troubleshoot system problems.

Quizzes and tasks will be assigned to give technicians another opportunity to gain and retain the daily information covered in these sessions. Specific Lab Units covered will be 90 Series pump, Master Node, Universal Node, Boom Node and breaking down the swing, and RCI circuits. Specific classroom units include understanding pressure vs. voltage, electrical and hydraulic systems for fixed and variable displacement pumps and motors.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- CST/CTO Lattice

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 6 participants

Program:

- Troubleshoot using schematics.
- Use of gauges and flow meters.
- Use the Service Manual.
- Understand the MLC165's Version 1 CANBUS system.
- Tell the difference in a version 1 and version 2 CANBUS machine.
- Understand hydraulic system.
- Set the system pressure.
- Check and test transducers, multi-function valves, and hydraulic pump controls.
- Understand electrical system.
- Check nodes with ohm meter.
- Test harnesses, bin nodes, and CANBUS shorting plugs.
- Do calibrations on v1 CANBUS.
- Set up the RCI on v1 CANBUS.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises.

Hardware/Software Provided:

None

Equipment:

- Training room
- Technical Documents
- Simulators & test benches

Cost:

- $2,800 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

CANBUS 1

Aim of training course:

The course will cover the theory of operation for the travel, drum 4, crane wireless systems and rate capacity indicator. It will consist of the version 1-style Canbus machines. The 555, 1015 and 18000 will be covered during this class. The 18000 crane will be used for the hands-on and classroom.

All classroom presentations will be reinforced with practical hands-on operation of the car body and upper works systems.

Students will build the complete electrical and hydraulic for the 18000 travel system, the 18000 drum 4, and the 555 freefall.

Program:

- Understand v1 CANBUS system on the 555, 1015 and 18000.
- Enhance troubleshooting skills.
- Understand 18000 cranes with and without supercharge pump.
- Identify the cab differences on version 1 cranes.
- Understand electrical system.
- Check Canbus communication.
- Set thresholds and pressure compensation overrides.
- Understand the 555 and 1015 freefall operation.
- Perform calibrations v1 Canbus.
- Set up the v1 Canbus RCI.
- Set up boom system with wired and wireless load links.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises.

Hardware/Software Provided:

CAN Breakout Cable, PEAK Adaptor, CST software (customer)

Equipment:

- Training room
- Technical Documents
- Simulators & test benches

Cost:

- $2,800 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- Intro to CANBUS

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 6 participants

CANBUS 2

Aim of training course:

The course will cover the theory of operation of the Travel, Drum 4, and Rate Capacity Indicator. It will consist of the version 2 style Canbus machines. The European 15000, 14000, and 16000 will be covered during this class. The 14000 and 16000 cranes will be used for the hands-on program and classroom lecture.

All classroom presentations will be reinforced with practical hands-on operation of the car body and upper works systems.

Students will build the complete electrical and hydraulic for the 16000 travel system, the 16000 drum 4, and the 14000 drum 1.

Program:

- Understand v2 Canbus system on 15000, 16000, and 14000.
- Set the hydraulic pressures.
- Understand electrical system.
- Check Canbus communication.
- Set thresholds & pressure compensation over-rides.
- Use the 14000 cab test bench for troubleshooting experience.
- Understand the 14000 freefall.
- Set up the RCI on v2 cranes.
- Know difference between gen 1 and gen 2 displays.
- Perform calibrations.
- Build on their troubleshooting skills on Canbus system cranes.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises.

Hardware/Software Provided:

None

Equipment:

- Training room
- Technical Documents
- Simulators & test benches

Cost:

- $2,700 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- CANBUS 1

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 6 participants

CANBUS Troubleshooting

Aim of training course:

The course will cover troubleshooting the Manitowoc CANbus Version 1 and Version 2 control system. It will consist of an in-depth look at the onboard diagnostics including the RCI/RCL system. An overview of using the CST tool as well as harness and cable repair will also be covered.

All classroom presentations will be reinforced with practical hands-on operation of the car body and upper works systems. Appropriate diagnostic cables and adapters will be provided for each student to keep.

Program:

- Have an understanding of the On-board diagnostic system.
- Enhance troubleshooting skills.
- Understand the RCI/RCL systems.
- Using CST for Diagnostics.
- Repair harnesses and cables.
- Understand diagnostic screens
- Locating diagnostic information in the Service manual

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises.

Hardware/Software Provided:

None

Equipment:

- Training room
- Technical Documents
- Simulators & test benches

Cost:

- $1,200 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- CANBUS 2

Duration

- 3 days
- Tuesday 7:30 am to Thurs 4:00 pm

Number of participants

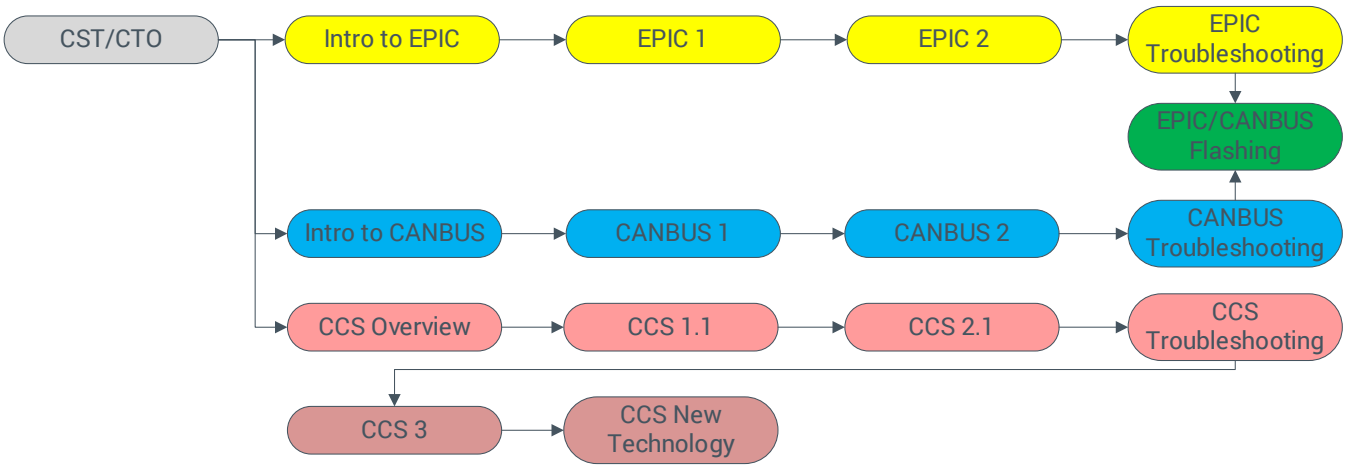
- 6 participants

EPIC & CANBUS

For dealers

Course	Page	Course name
EPIC/CANBUS Flashing	21	Flashing for EPIC and CANBUS cranes

This course is available to Manitowoc dealers. Manitowoc customers may attend this course with prior approval from their dealer.



Manitowoc Lattice Boom Crawler Crane Training Paths

EPIC/CANBUS Flashing

Aim of training course:

The course will cover the use of the crane service tool to program the three operating systems used on the Manitowoc lattice products. All classroom presentations will be reinforced by hands on lab exercises and in class work sheets.

The topics that will be covered are installation of the service tool, File management and use of Kiteworks, programming of the EPIC CPU and RCL. Programming master nodes and universal nodes for the CAN Bus cranes.

Program:

- Use the crane service tool and related cables to program CPU boards, 4X40 displays, master nodes, and universal nodes.
- Identify the software versions for the different model cranes.
- Verify that the proper software was installed in the crane.
- View the configuration file values to ensure the crane options are correct.
- Check the RCL for correct software version and chart data.
- Know the correct reporting procedure to update the Product Support Team on software updates made in the field.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises.

Hardware/Software Provided:

CST Software (Dealer level)

Equipment:

- Training room
- Technical Documents
- Simulators & test benches

Cost:

- $2,800 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- EPIC or CANBUS Troubleshooting

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

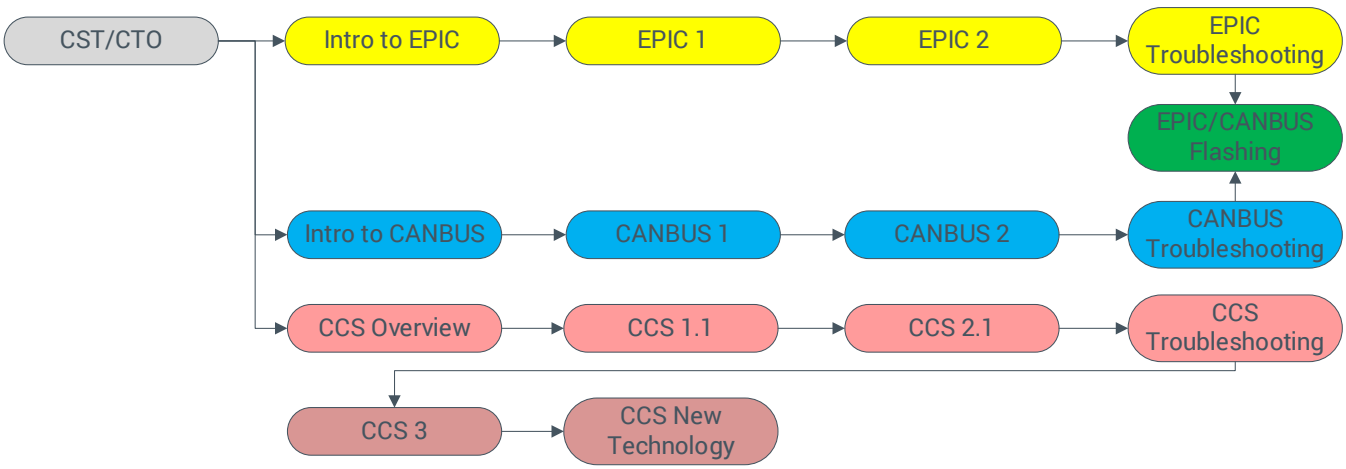
- 8 participants

CCS

For customers & dealers

Course	Page	Course Description
CST/CTO Combo	23	Crane Systems Theory and Crane Technology & Operation of lattice crawler cranes
CCS Overview	24	Introduction to the CCS control system on Manitowoc lattice boom crawler cranes
CCS 1.1	25	CCS Lattice Level 1
CCS 2.1	26	CCS Lattice Level 2
CCS Troubleshooting	27	CCS Lattice Troubleshooting

These courses are available to Manitowoc customers and dealers. To register for a course please use the Manitowoc e-Academy in Manitowoc Direct. Instructions for requesting an account are found on page 6 of this catalog.



Manitowoc Lattice Boom Crawler Crane Training Paths

CST/CTO Lattice Combo

Aim of training course:

The course acts as a technical introduction to all Manitowoc lattice crane systems and will be used as a prerequisite for all other lattice courses.

The course covers terminology and technologies relating to mechanical, hydraulic, and electronic systems. Manitowoc load charts and rigging drawings are explained along with exercises on how load charts are constructed, read, and used. The class will introduce all Manitowoc crane control systems. Exercises teach use of the main crane operator's display and the RCI.

The course covers how hydraulic, electrical, and pneumatic systems are used to achieve crane functions, emphasizing maintenance and troubleshooting. Students learn the use of Manitowoc schematics. Hydraulic and Electrical test benches are used for hands-on exercises.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- Assorted eLearning modules

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 8 participants

Program:

- Know common Manitowoc crane models and terminology.
- Be able to read and explain load charts.
- Understand rigging drawings.
- Familiarization with CCS, CANBUS, and EPIC control systems.
- RCI configuration and operation.
- Read Manitowoc schematics.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, eLearning modules, homework.

Hardware/Software Provided:

None

Equipment:

- Training room
- Technical Documents
- Simulators
- Hydraulic & electric test benches

Cost:

- $2,300 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

CCS Overview

Aim of training course:

The course includes the analysis of information contained in the several crane manuals, for the Crane Control System that is now implemented in the cranes built by Manitowoc. During the course, the Crane Assembly Procedure will be explained, as well the fundamentals of the CCS; how the different components are distributed throughout the crane; the steps to configure the RCI/RCL system and set it up. This class will feature the Manitowoc Lattice Crane model MLC100-1. The following subjects will be covered:

- Assembly procedure as shown in the Operator's Manual, from offloading trailers, to boom rigging and assembly to RCI/RCL setup.
- Layout and functional properties of all cab controls.
- Specific Lab Units covered will be IOL, IOS, CCM and SCM modules and breaking down the swing and travel circuits.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- CST/CTO Lattice

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 8 participants

Program:

- Learn safe assembly of crane as shown in the Operator's Manual.
- Identify operators Cab Controls.
- Proper configuration of RCI/RCL based on load chart specifications, and navigation of the CCS menus.
- Know the components, and layout of the Canbus structure of the CCS.
- Understand both closed and open loop hydraulic systems equipped on the model MLC100-1.
- Calibrate hydraulic system.
- Identifying and connecting the modules for each crane network
- Build the MLC100-1 swing and travel circuits electronically and hydraulically.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, eLearning modules, homework.

Hardware/Software Provided:

None

Equipment:

- Training room
- Technical Documents
- Simulators

Cost:

- $2,500 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

CCS Lattice Level 1.1

Aim of training course:

course will cover the theory of operation for the travel, drum 4 and rate capacity indicator. The MLC150-1 and MLC100-1 with related models will be covered during this class.

The MLC150-1 crane will be used for the hands-on and classroom. All classroom presentations will be reinforced with practical hands-on operation of the car body and upper works systems. Appropriate diagnostic cables and adapters will be provided for each student to keep.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- CCS Overview

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 8 participants

Program:

- Understand the CCS system used on the MLC150-1 and MLC100-1.
- Enhance troubleshooting skills.
- Understand electrical schematic.
- Check Canbus communication.
- Build MLC150-1 travel complete electrical and hydraulic system.
- Set thresholds and pressure compensation over-rides.
- Build both the MLC150-1 Drum 4, and Drum 1 complete electrical and hydraulic system in the lab.
- Set the drum motor threshold adjustment in the lab.
- Perform calibrations.
- Set up a complete boom system.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, eLearning modules, homework.

Hardware/Software Provided:

CCS CAN Cable and PEAK Adaptor, CST software (customer)

Equipment:

- Training room
- Technical Documents
- Simulators

Cost:

- $2,800 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

CCS Lattice Level 2.1

Aim of training course:

The course will cover the theory of operation for the travel, drum 4, crane wireless systems and rated capacity indicator. The MLC300 and MLC650 will be covered during this class.

The MLC650 crane will be used for the hands-on labs and classroom. All classroom presentations will be reinforced with practical hands-on operation of the car body and upper works systems.

Hands-on labs include building the MLC650 travel complete electrical and hydraulic system. Building the MLC650 Drum 4 complete electrical and hydraulic system. And building the Variable Position Counterweight system.

Program:

- Have an understanding of the CCS system on MLC300 and MLC650.
- Enhance troubleshooting skills.
- Use the crane service tool with customer level access.
- Understand electrical system.
- Check Canbus communication by information covered in this class.
- Set threshold and pressure compensation overrides.
- Troubleshoot the VPC system.
- Understand the in-cab ground-bearing pressure estimator.
- Explain and work with the Locked Counterweight feature
- Perform calibrations.
- Set up the RCI.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, eLearning modules, homework.

Hardware/Software Provided:

None

Equipment:

- Training room
- Technical Documents
- Simulators

Cost:

- $2,500 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- CCS Lattice Level 1.1

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 8 participants

CCS Lattice Troubleshooting

Aim of training course:

The course will give students further troubleshooting experience with the CCS control system as used on the MLC100-1, MLC150-1, MLC250, MLC300, and MLC650. This course is designed for students who have not had the opportunity to spend time on the aforementioned equipment and would benefit for more hand-on time with lattice CCS.

This course will provide an overview of CCS electrical and hydraulic troubleshooting documents and will offer hands-on troubleshooting opportunities using CCS training simulators. Common troubleshooting procedures will be discussed pertaining to the following topics:

- RCI setup
- VPC operation
- Control module diagnostics
- Fault code reading
- Angle and load sensor diagnostics
- Hydraulic pump and motor troubleshooting

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- CCS Lattice Level 2.1

Duration

- 4 days
- Monday 7:30 am to Thurs 4:00 pm

Number of participants

- 8 participants

Program:

- Understand cab/display controls and features for troubleshooting
- Complete proper configuration of RCI/RCL based on load chart specifications, and RCI/RCL fault diagnostics
- Practice diagnosis of problems in the Canbus structure of a CCS machine
- Complete hands-on lab exercises on the following topics:
- Identifying and connecting CCS modules for each Canbus network
- Building a travel, Boom Hoist, and Hoist Drum hydraulic and electrical troubleshooting circuits

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, eLearning modules, homework.

Hardware/Software Provided:

None

Equipment:

- Training room
- Technical Documents
- Simulators

Cost:

- $1,200 per student course fee*

**dealer pricing may vary*

Dates:

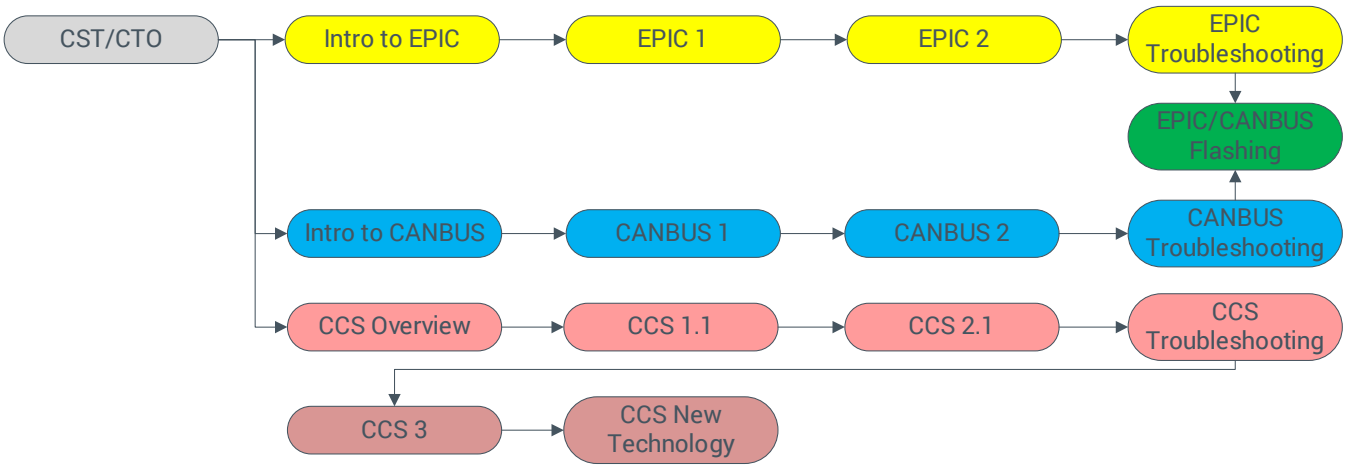
- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

CCS

For dealers

Course	Page	Course Description
CCS 3	29	CCS Lattice Level 3
CCS New Technology	30	CCS Lattice New Technologies

These courses are available to Manitowoc dealers. Manitowoc customers may attend these courses with prior approval from their dealer.



Manitowoc Lattice Boom Crawler Crane Training Paths

CCS Lattice Level 3

Aim of training course:

The course will cover the theory of operation for the Luffing drum operation, VPC Max used, on the MLC650 and MLC300. The MLC300 crane will be used for the hands-on and classroom. Students will be given the dealer access software.

All classroom presentations will be reinforced with practical hands-on operation of the car body and upper works systems.

Labs include building MLC300 Luffing drum complete electrical and hydraulic system and building the MLC300 VPC max complete electrical and hydraulic system in the lab.

Program:

- Understand the CCS control system as used on the Model MLC300 and MLC650 cranes with Variable Position Counterweight with the Max attachment.
- Understand the Luffing Jib Drums and Operation.
- Use the dealer level crane service tool with programming level will be taught to dealer technicians.
- Check Canbus communication by information covered in this class.
- Perform VPC Max calibration.
- Perform VPC tray calibration.
- Set up the Manitowoc rated capacity indicator to the VPC Max and VPC Luffing configuration.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, eLearning modules, homework.

Hardware/Software Provided:

CST software (Dealer level)

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- CCS Lattice Troubleshooting

Duration

- 4.5 days
- Monday 7:30 am to Friday 12:00 pm

Number of participants

- 8 participants

Equipment:

- Training room
- Technical Documents
- Simulators

Cost:

- $2,500 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

CCS Lattice
New Technology

Aim of training course:

The class was designed for students that have been through the CCS Program. The course is designed to keep attendees informed on the current and upcoming crane and CCS Lattice system.

This class is an ongoing and changing program in order for the attendees to stay on top of the CCS Crawler changes. There will be extensive hands-on for this program. The systems can vary based on new technology.

All classroom presentations will be reinforced with practical hands-on operation of the carbody and upper works systems.

Program:

- Be brought up to date on the latest crane systems.
- Be taught the latest RCI systems.
- Have a chance to bring up topics for discussion based on changes from the last time at school.
- Be taught the newest hydraulic motor controls based on changes from the last time at school.
- Be taught the newest hydraulic pump controls based on changes from the last time at school.
- Be tested by a hands-on shop exercise.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, eLearning modules, homework.

Hardware/Software Provided:

CST software (Dealer level)

Equipment:

- Training room
- Technical Documents
- Simulators

Cost:

- $2,800 per student course fee*

**dealer pricing may vary*

Dates:

- Check the Manitowoc e-Academy in Manitowoc Direct for available course sessions.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- CCS Lattice Level 3

Duration

- 4 days
- Monday 7:30 am to Thurs 4:00 pm

Number of participants

- 8 participants

Quick Start Red

For Manitowoc dealers only

Course	Page	Course name
QSP Course 1	32	CST/CTO Combo for QSP
QSP Course 2	32	Manitowoc CCS Lattice
QSP Course 3	32	Manitowoc CANBUS
QSP Course 4	32	Manitowoc EPIC
QSP Course 5	32	Manitowoc Flashing

The Quick Start Program is only available to Manitowoc dealers and direct accounts.

Quick Start Red

Aim of Training Program:

To help newly hired technicians obtain a 'generalist' education in a given curriculum, we have created the 'Quick Start' program. Quick Start is designed for "green" technicians with little to no crane industry experience or prior training.

Students enrolled in the program will be attending an in-person training class with us every 3 months and will be assigned multiple e-learning (online) courses to complete in between the in-person classes. The in-person classes are pre-scheduled and mandatory: you will sign up once for all 5 classes, so the dates are known from the onset of the program.

The in-person classes are fast-paced, and students are required to have hands-on time with the machines in between training classes to ensure the knowledge taught in the classroom is applied on the job.

Prerequisites

- Must be over 18 years old
- Must bring their PPE
- Must be employed by Manitowoc dealer or direct account

Duration

- 5 one-week of training over 15 months

Number of participants

- 8 students per cohort

Program:

- Provide a basic level of competence in the all electric over hydraulic control systems found on Manitowoc crawler cranes.
- Instill confidence in a new technician.
- Provide the technician with the tools they need to support customer needs safely.
- Provide and train on use of diagnostic software for EPIC, CANBUS, and CCS controls systems for Manitowoc product.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, homework assignments, supplemental eLearning materials, and working with a mentor.

Hardware/Software Provided:

Various throughout program

Equipment:

- Training room
- Technical Documents
- Simulators & test benches

Cost:

- Contact Global Training Coordinator for more information

Dates:

- Contact Global Training Coordinator for more information

Model-Specific Courses

For Manitowoc customers

Course	Page	Course name
Model-Specific 1	34	*Model* Customer Level 1
Model-Specific 2	34	*Model* Customer Level 2

Theses courses are designed specifically for Manitowoc customers.

Model-Specific

Aim of Training Program:

Manitowoc offers training courses for the specific model of crane operated by our customers. These courses are designed to provide an overview of the key systems of the crane, crane documentation, basic maintenance principles, and function operation.

Model-specific classes are not part of the full technician development curriculum and do not satisfy any prerequisites in the training program.

Model-specific classes can be held in our training center using hydraulic and electrical test benches for the hands-on portion, or at a customer location using their crane.

Model-specific classes are commonly offered for current production cranes but can be offered for any Manitowoc model.

Larger models may require two weeks to cover the material.

Prerequisites

- Must be over 18 years old
- Must bring their PPE

Duration

- Varies depending on model and location

Number of participants

- Varies depending on model and location

Program:

- Provide a basic understanding of the crane's main display and LMI/RCI display use.
- Teaches an overview of the specified model's control system.
- Review the travel, swing, hoist, boom hoist, and VPC (if applicable) functions on the specified model.

Teaching Methods:

Detailed theoretical classroom instruction, hands-on exercises, homework assignments.

Hardware/Software Provided:

Varies by model

Equipment:

- Training room
- Technical Documents
- Test benches OR crane

Cost:

- Contact Global Training Coordinator for a quote

Dates:

- Quote will include available dates for the customer to choose from.

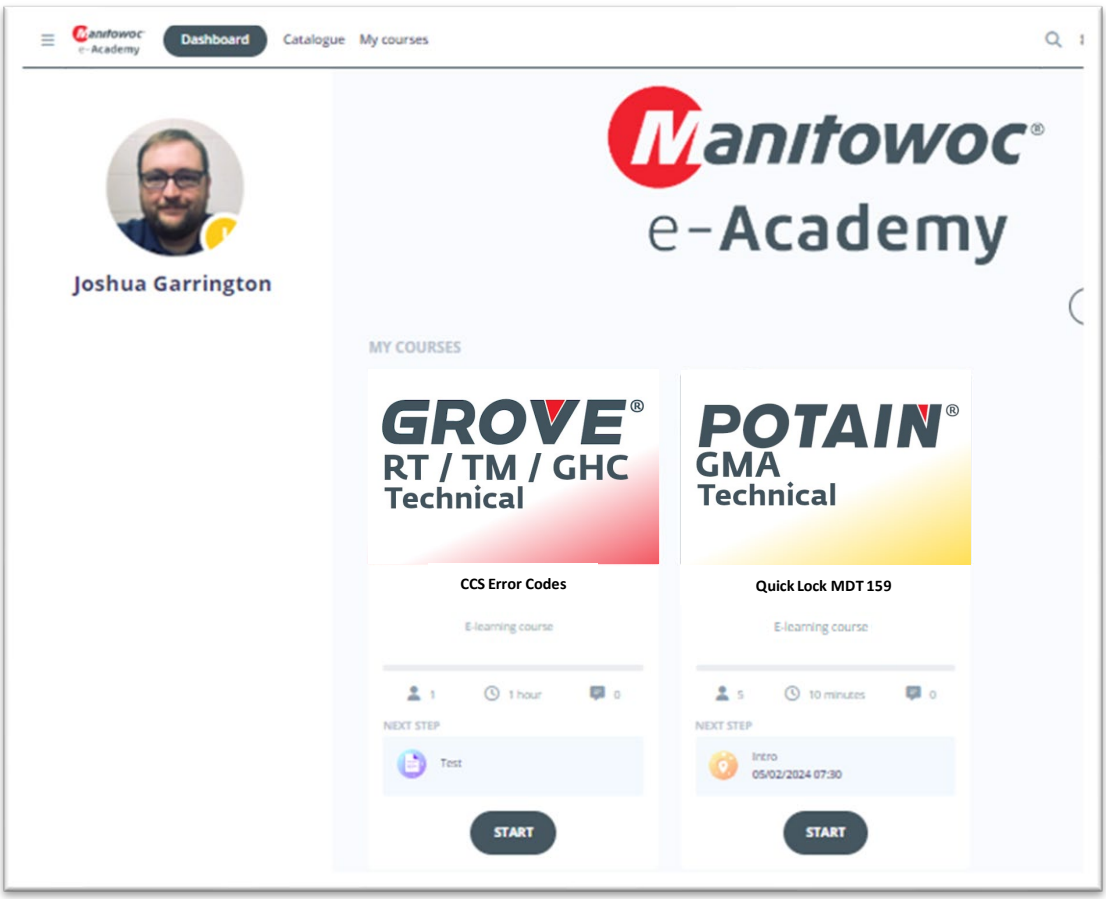
e-Learning Modules

Supplemental Training Materials:

Manitowoc e-Academy includes dozens of approximately 15-30 minute long technical e-Learning modules for all skill levels.

These materials are best used to supplement, reinforce, or review the material covered during instructor-led training courses.

e-Learning modules are free of charge.



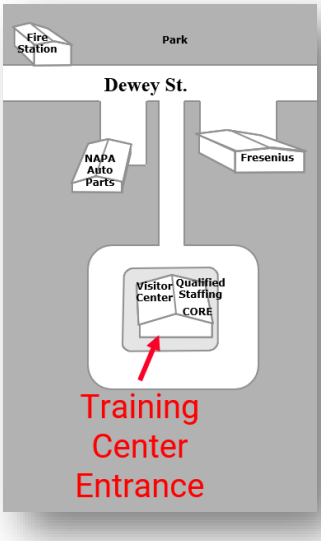
Address/Map

Manitowoc Training Center - PA

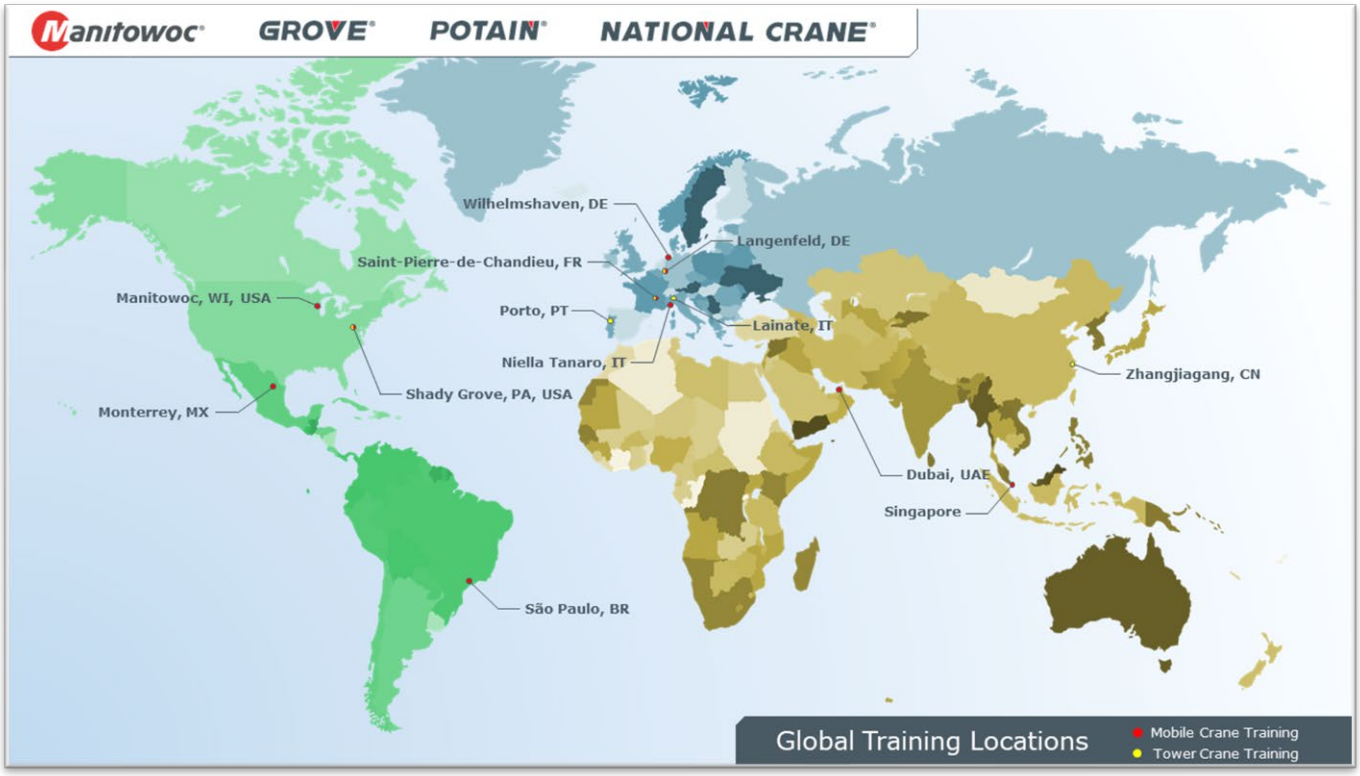
1565 Buchanan Trail East
Shady Grove, PA 17256
www.manitowoccranes.com

Manitowoc Training Center - WI

3733 Dewey Street
Manitowoc, WI 54220
www.manitowoccranes.com



Manitowoc Training Centers



Manitowoc Customer Support when you need it.
The assurance of the world's most advanced crane service and support to get you back to work fast.

Manitowoc Finance helps you get right to work generating profits for your business.
Financial tools that help you capitalize on opportunity with solutions that fit your needs.