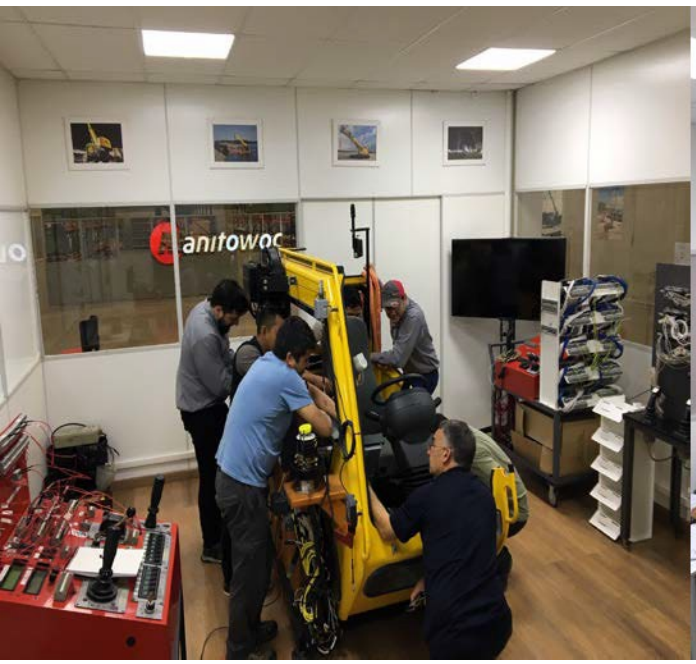
Manitowoc Crane Care Training
Dealers Course Catalog

2022 Europe Training Center



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Training Center Objectives

Dear Customers and Dealers,

At Manitowoc Crane Care we understand the need for technical training. Providing your service technicians with training increases your productivity, reduces costs and increases your bottom line.

The 2022 training schedule offers a comprehensive line up of technical courses for Manitowoc Lattice machines. These courses will provide your technicians with the skills and knowledge necessary for the execution of preventive maintenance; failure analysis and an overview of security systems and equipment operation.

Our trainers are certified trainers from MTW USA trainings centers, so you will have available at your region the same level of knowledge

We offer modules all levels, from 3 to 1 week in:
- Crane Operating;
- Crane safety;
- Crane erection and rigging;
- Crane technology
- Or in any specific courses according to your needs.

We strive to provide a personalized training session for each customer, customized to your needs; and we are always available to discuss our training program and any questions you may have.

If you can not find the training courses or program you need, please do not hesitate to contact us, we are always looking to meet any special requirements that you may have.

If you want the training at your facility, we'll send one of our "flying trainers"!

Training Arrengements

Registrations:

1 – If you have access to Manitowoc Direct / Factory trainings

You can aplly online for all the trainings that are listed for the several product lines.

- Go to your Manitowoc Direct page;
- Select "**My Applications**"
- Select "**Technical Learning Center↑**"
- Select "**Course Catalogs**"
- Select "**Tecnical**"
- Then you choose the Product Line and trainings that you want to attend

2 – If you don't have yet access to Manitowoc Direct/ Factory Training option, please contact us via e-mail to jorge.campanico@manitowoc.com for more information about the Manitowoc Direct and training center access.

Registrations can be made up to one week prior to the scheduled training. Bookings will only be confirmed upon advance payment.

Participants should be those who work directly or indirectly with the equipment or those who have a basic knowledge of equipment operation. All participants must be 18-years-old.

Training Arrengements

Training Shedules:

All training classes will begin at 8:30 a.m. and end at 5:30 p.m. with a one hour lunch break. Training duration depends on the training selected.

Training Locations:

Trainings will be held at the Manitowoc Training Center located in Porto Portugal (30 kms away from Porto)

The classrooms for theoretical training are organized by Manitowoc as well the teaching materials and meals. Each training class requires a minimum of 2 two participants.

Accommodations, transport, travel and meals (outside of class) are the responsibility of the participant.

Training Costs:

Final training costs will be communicated to the registrants when the class has met the minimum number of participants.

Training Locations)

TRAINING LOCATIONS:

Trainings will be held at the Manitowoc Training Center for Europe – Located in Porto (30 km of O'Porto) Portugal. The classrooms for theoretical only training are organized by Manitowoc as well the teaching materials and meals and can be done on the MTW offices in Europe. Each training class requires a minimum of four participants. **Accommodations, transport, travel and meals (outside of class) are the responsibility of the participant.**

TRAINING COSTS:

Final training costs will be communicated to the registrants when the class has met the minimum number of participants.

Training Equipment

Equipment, tools of differentiation, on top support:

1 training rooms,

1 crane simulators rooms,

4 different types of crane simulators for EPIC, CANbus, Small Crawler & CCS for practical teaching.

If you want the training at your facility, we'll send one of our "flying trainers"!

Find us on our web site:

www.manitowoc.com

http://training.manitowoccranes.com/MCG_CARE/Services/EN/Training.asp

Contact us:

jorge.campanico@manitowoc.com

Lattice Cranes

Course Summary

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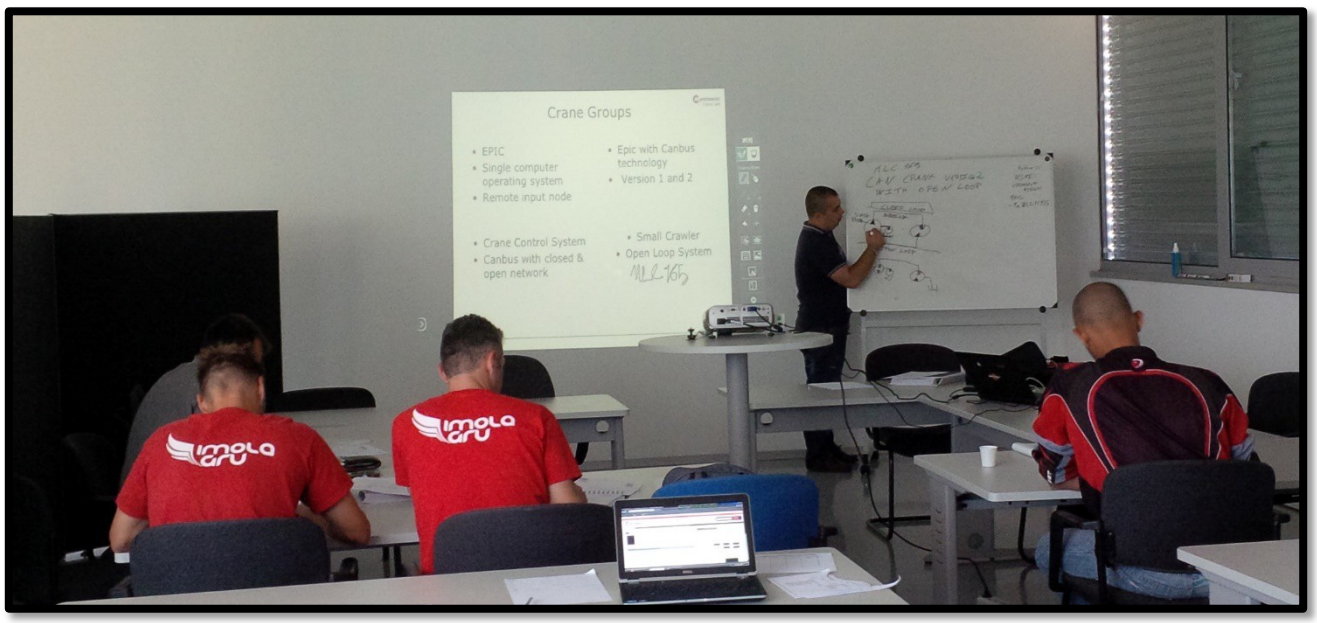

Lattice Crane System Theory

Contents:

This 4 ½ day course requires no service knowledge of Grove, Manitowoc, GMK or National crane systems and will be used as a prerequisite for all introductory level courses.
The course is designed to provide a basic understanding of hydraulics, electrical and pneumatic principles and how they are applied on the different mobile crane product lines. The course will consist of classroom time utilizing programs covering the basics of hydraulics, electrical and pneumatics along with their components and how these components operate and interact with each other. Schematics are used to help the students gain a basic understanding of schematic layouts and component symbols used on the different mobile product lines.
Hydraulic and Electrical test benches are incorporated into the course to help give the student a better understanding of the hydraulic and electrical theories learned in the classroom portion of the training. Manitowoc Crane Care online systems for parts, service and maintenance will be covered to help the students understand basic navigation and content of the different systems.

Course Benefits:

At the end of the course, technicians will be able to:

- Have the basic understanding of hydraulic, electrical and pneumatic principles.
- Have a basic understanding of how hydraulic, electrical and pneumatic principles relate to the different mobile crane systems.
- Have a basic understanding of schematic design and layout for the different mobile crane product lines.
- Have a basic understanding of hydraulic, electrical and pneumatic symbols used on mobile crane schematics.
- Have a basic understanding of Manitowoc Crane Care online systems navigation and content.

Prerequisites
None

Duration
5 days

Capacity
4 students

Dates available:

Available Upon Request

CTO – Crane Crane Technology & Operation -Lattice

Lattice

Contents:

This 4 ½ day course is designed for individuals who are new to Lattice Manitowoc cranes but would also be an excellent refresher course for more experienced technicians. The course covers the setup and operation focused toward current production EPIC, Canbus cranes, also covering cranes equipped with CCS

The course features a an overview of the cabin controls and continue through the proper use of several funcions and driving controls, and RCI RCL Systems.
During day two, fundamental safety for crane operators' overview will be covered followed by load charts; load charts explanations and calculations.

Day three will began with an overview of the several Operations display and

Day four will primarily be used for hands-on RCL navigation accross the product lines. . Each student will be expected to demonstrate proficiency in all aspects of crane setup and operation. Each student will also be given tasks to complete during the week to include load charts and working modes

Course Benefits:

At the end of the course, technicians will be able to:

- Have a basic understanding of how to read and interpret load charts and RCI RCL
- Be able to calculate the deductions necessary for a correct calibration
- Have knowledge of basic error codes for Operation and RCL systems.

Prerequisites
None

Duration

Dates available:

23 May – 27 May (Porto)
+
Available Upon Request

Intro to EPIC

Manitowoc Lattice

Content:

This 4.5 day course will showcase the operational systems of the 999 crane. The class size will be limited to eight (8) students. All classroom presentations will be reinforced with practical hands-on electrical systems. The course will be approximately 60% classroom and 40% practical. The service technicians will be guided through the electrical and hydraulic systems by studying the systems' schematics, 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, electrical and hydraulic systems for fixed and variable displacement pumps and motors. The swing and calibration of the EPIC system will be used for the hands-on final testing. Quizzes and tasks will be assigned on material covered.

Course Benefits:

At the end of the course, technicians will be able to:

- Understand the operating system as used on the Lattice crane Model 999.
- Use hydraulic and electrical schematics for troubleshooting.
- Use pressure gauges and flow meters for troubleshooting.
- Use the Manitowoc Service Manual.
- Understand the operating system as used on the 999 Lattice cranes.
- Be guided through the Manitowoc Hydraulic system used on the EPIC 999 crane.
- Set the hydraulic system pressure.
- Check and test transducers, multi-function valves, and hydraulic pump controls.
- Understand the electrical schematic from the battery to the boom top.
- Check EPIC computer diagnostics.
- Perform pressure calibrations, and controls calibrations.
- Understand the basic operation, troubleshooting, and maintenance on the 999 crane.

Prerequisites
CST & CTO

Duration
5 days

Dates available:

30 May – 03 June (Porto)
+
Available Upon Request

EPIC 1

Content:

This 4.5-day course will showcase the operational systems of 777 and 888 cranes. The service technicians will be guided through 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. The class size will be limited to eight (8) students. All classroom presentations will be reinforced with practical hands-on electrical systems. The course will be approximately 60% classroom and 40% practical. Covering the Rated Capacity Indicator (RCI) will allow technicians to build the 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 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.

Course Benefits:

At the end of the course, technicians will be able to:

- Understand the operating system as used on the Lattice Crane Model 777/888.
- Use hydraulic and electrical schematics for troubleshooting.
- Use pressure gauges and flow meters for troubleshooting.
- Navigate the Manitowoc Service Manual.
- Understand the Manitowoc Hydraulic system used on the Epic 777 crane.
- Set the hydraulic system pressure.
- Check and test transducers, multi-function valves and hydraulic pump controls.
- Understand the electrical schematic from the battery to the boom top.
- Check EPIC computer diagnostics.
- Perform pressure calibrations and controls calibrations.
- Set up the Manitowoc LMI on the 777/888 cranes.

Prerequisites
Intro to EPIC

Duration
5 days

Dates available:

Available Upon Request

EPIC 2

Content:

This 4.5 day course will showcase the operational systems of 2250, M250 and the Maxer 2000. The class size will be limited to eight (8) students. All classroom presentations will be reinforced with practical hands-on electrical systems. The course will be approximately 60% classroom and 40% practical. The service technicians will be guided through the 2250 and Maxer 2000 electrical and hydraulic systems, by studying the systems' schematics and manuals, participate in actual hands-on sessions for boom hoist and hoist and Maxer 2000, 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 dual CPU's for the Maxer 2000. Specific classroom units include understanding the electrical and hydraulic systems for 2250, Maxer 2000 pumps and motors. Quizzes and tasks will be assigned on material covered.

Course Benefits:

At the end of the course, technicians will be able to:

- Understand the operating system as used on the Lattice Crane Model 2250.
- Use hydraulic and electrical schematics for troubleshooting.
- Use pressure gauges and flow meters for troubleshooting.
- Understand the Manitowoc Hydraulic system used on the EPIC 2250 and Maxer 2000.
- Set the hydraulic system pressure.
- Check and test transducers, multi-function valves and hydraulic pump controls.
- Understand the electrical schematic from the battery to the boom top.
- Check EPIC computer diagnostics.
- Perform pressure calibrations and controls calibrations.
- Input data in the Manitowoc LMI on the 2250 cranes.
- Understand the operation, troubleshooting and maintenance on the 2250, M 250 and the Maxer 2000.

Prerequisites
EPIC 1

Duration
5 days

Capacity
4 students

Dates available:

Available Upon Request

EPIC - Troubleshooting

Content:

This 3 day 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. The class size will be limited to four (4) students. 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. The course will be approximately 40% classroom and 60% practical.

Course Benefits:

At the end of the course, technicians will be able to:

- Understand the operating system as used on the Lattice Crane Model 999.
- Use hydraulic and electrical schematics for troubleshooting.
- Use pressure gauges and flow meters for troubleshooting.
- Understand the Manitowoc Hydraulic system used on the EPIC 999 .
- Set the hydraulic system pressure.
- Check and test transducers, multi-function valves and hydraulic pump controls.
- Understand the electrical schematic from the battery to the boom top.
- Check EPIC computer diagnostics.
- Perform pressure calibrations and controls calibrations.
- Input data in the Manitowoc LMI on the 999 cranes.
- Understand the operation, troubleshooting and maintenance on the 999

Prerequisites
EPIC 2

Duration
5 days

Capacity
4 students

Dates available:

Available Upon Request

EPIC - 3

Content:

This 4.5 day course will showcase the operational systems of 999, 21000 plus 111/222. The class size will be limited to eight (8) students. All classroom presentations will be reinforced with practical hands-on electrical systems. The course will be approximately 60% classroom and 40% practical.

The service technicians will be guided through the 999 and 21000 electrical and hydraulic systems by studying the systems' schematics, manuals; and by participating in actual hands-on sessions for the 999 hoist, with Free Fall, plus 21000 travel and hoist. Faults, limits and troubleshooting on the 999 and 21000 will also be reviewed along with up-load charts into the Rated Capacity Indicator and Cranestar on the 999. Appropriate diagnostic cables and adapters will be provided for each student to keep. Specific Lab Units covered will be 90 Series pump and 51 Series motor, Central Processing Unit (CPU) and breaking down the hoist and 999 hoist circuits, plus build the dual CPU's for the 21000 for travel and hoist. Additional classroom units include understanding the electrical and hydraulic systems for 999 and 21000 pumps and motors.

Prerequisites
EPIC 2

Duration
5 days

Capacity
4 students

Dates available:

28 Fev – 4 March (Porto)

EPIC – NEW TECH

Content:

This class was designed for students that have been through EPIC 3 or have completed the EPIC Certification class. Once they are certified, the technician must attend this class once every three years to keep their Certification valid. Failure to do this means the EPIC Certification class must be retaken and passed to be reinstated.

The course is designed to keep attendees informed on the current and upcoming crane and EPIC systems. New crane systems can be covered for models not yet released. This class is an ongoing and changing program in order for the attendees to stay on top of the EPIC Crawler changes. There will be extensive hands-on for this program. The systems can vary based on new technology. The class size will be limited to four (4) students. All classroom presentations will be reinforced with practical hands-on operation of the carbody and upper works systems. The course will be approximately 60% classroom and 40% practic

Prerequisites
EPIC 3

Dates available:

USA

EPIC – Certification

Content:

This 4.5 day course will be used to test the students on each of the Epic systems they might encounter working on our product line. The class size will be limited to four (4) students. All classroom presentations will be reinforced with practical hands-on operation of the carbody and upper works systems. The course will be approximately 5% classroom and 95% practical.

The instructor will pick different crane systems of the Epic cranes and have the student build them based on the knowledge they have gained from the previous classes.

When the instructor approves the students' knowledge of the circuit, simulated crane faults will be given so the student can repair. Points will be awarded based on completion of the faults. A grade of 100% will be earned if the student repairs 30 total faults and completes all 10 random crane circuits.

Prerequisites
EPIC New Tech

Dates available:

USA

Intro to CANBUS

Content:

This 4.5 day course will showcase the operational systems of the version 2 CANBUS system. The service technicians 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. The class size will be limited to eight (8) students. Quizzes and tasks will be assigned to give technicians another o$_1$pportunity 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. The course will be approximately 60% classroom and 40% practical.

Course Benefits:

At the end of the course, technicians will be able to:

- Use hydraulic and electrical schematics for troubleshooting.
- Use pressure gauges and flow meters for troubleshooting.
- Have an understanding of the operating system as used on the Lattice cranes Version 2 CANBUS software as used on the Model MLC 165.
- Tell the difference in a version 1 and version 2 CANBUS machine.
- Understand the Manitowoc Hydraulic system used on the CANBUS machines.
- Set the hydraulic system pressure; check and test transducers, multi-function valves, and hydraulic pump controls.
- Understand the electrical schematic from the battery to the boom top.
- Check the master, side console, and universal nodes with ohm meters.
- Test harnesses, bin nodes, and CANBUS shorting plugs.
- Perform pressure calibrations on version 2 CANBUS cranes.
- Perform controls calibrations on version 2 cranes.
- Set up the Manitowoc Rated Capacity Indicator on version 2 cranes.
- Be prepared for advancing to the Level 1 class.

Prerequisites
CST & CTO

Duration

Dates available:

22 Aug – 26 Aug (Porto)
+
Available Upon Request

CANBUS 1

Content:

This 4.5 day 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. The class size will be limited to eight (8) students. All classroom presentations will be reinforced with practical hands-on operation of the car body and upper works systems. The course will be approximately 40% classroom and 60% practical.

Course Benefits:

At the end of the course, technicians will be able to:

- Have an understanding of the operating system as used on the Model 555, 1015 and 18000 cranes. (Version 1 Lattice Cranes)
- Enhance their troubleshooting skills.
- Understand the 18000 cranes with and without a supercharge pump system.
- Identify the cab differences on version 1 cranes.
- Understand the electrical schematic from the battery to the boom top.
- Check Canbus communication by information covered in this class.
- Build 18000 travel complete electrical and hydraulic system.
- Set the travel threshold and pressure compensation over-ride adjustment in the lab.
- Build the 18000 Drum 4 complete electrical and hydraulic system in the lab.
- Set the drum 4 threshold and pressure compensation over-ride adjustment in the lab.
- Understand the 555 and 1015 freefall operation.
- Perform pressure calibrations on version 1 Canbus cranes.
- Perform controls calibrations on version 1 cranes.
- Set up the Manitowoc rated capacity indicator.
- Be prepared for advancing to the Level 2 class.
- Set up a complete boom system and wired and wireless load links..

Prerequisites
INTRO TO CANbus

Dates available:
07 Nov – 11 Nov (Porto)
+
Available Upon Request

CANBUS 2

Content:

This 4.5-day 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 crane will be used for the hands-on program and classroom lecture. The class size will be limited to four (4) students. All classroom presentations will be reinforced with practical hands-on operation of the car body and upper works systems. The course will be approximately 40% classroom and 60% practical.

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Course Benefits:

At the end of the course, technicians will be able to:

- Have an understanding of the operating system as used on the Version 2 CANBUS Lattice cranes software as used on the Model 15000, 16000 and 14000.
- Set the hydraulic pressure for the travel and drum 4 system.
- Understand the electrical schematic from the battery to the boom top 14000 and 16000.
- Check CANBUS communication by information covered in this class.
- Build 16000 travel complete electrical and hydraulic system.
- Set the travel threshold and pressure compensation over-ride adjustment in the lab.
- Build the 16000 Drum 4 complete electrical and hydraulic system in the lab.
- Set the drum 4 threshold and pressure compensation over-ride adjustment in the lab.
- Build the 14000 Drum 1 complete electrical and hydraulic system in the lab.
- Set the 14000 drum 1 threshold and electronic compensation over-ride adjustment in the lab.
- Use the complete 14000 cab test bench for troubleshooting experience.
- Understand the 14000 freefall operation.
- Be prepared for advancing to the Level 3 class.

Prerequisites
CANBus 1

Dates available:

Available Upon Request

Manitowoc Lattice

CANBUS Troubleshooting

This 4-day 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. The class size will be limited to four (4) students. 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. The course will be approximately 40% classroom and 60% practical.

Prerequisites
CANbus 2

Duration
4 days

Capacity

4 students

Dates available:

Available Upon request

CANBUS 3

Content:

This 4.5-day course will cover the theory of operation for the 16000 and 18000 luffing drums along with wheeled Maxer operations for both models. The class will consist of the MAXER, Luffing Jib, and CANbus computer downloads for the 18000 and 16000 crane models.
. The class size will be limited to four (4) students. All classroom presentations will be reinforced with practical hands-on operation of the carbody and upper works systems. The course will be approximately 40% classroom and 60% practical

Course Benefits:

At the end of the course, technicians will be able to:

- Have an understanding of the operating system as used on the Version 1 CANBUS Lattice cranes software as used on the Model 18000,
- Set the hydraulic pressure for the luffing and MAXER system.
- Understand the electrical schematic from the battery to the boom top 18000 and 16000.
- Check CANBUS communication by information covered in this class.
- Build 18000 MAxer complete electrical and hydraulic system.
- Build 16000 MAxer complete electrical and hydraulic system.
- Be prepared for advancing to the Level 4 class.

Prerequisites
CANbus 2

Duration
5 days

Capacity

Dates available:

07 March – 11 March (Porto)

CANBUS 4 – NEW TECH – Virtual

Content:

This 3-day 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. The class size will be limited to eight (8) students. 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. The course will be approximately 40% classroom and 60% practical.

Course Benefits:

At the end of the course, technicians will be able to:

- Have an understanding of the operating system as used on the Version 1 CANBUS Lattice cranes software as used on the Model 18000,
- Set the hydraulic pressure for the luffing and MAXER system.
- Understand the electrical schematic from the battery to the boom top 18000 and 16000.
- Check CANBUS communication by information covered in this class.
- Build 18000 MAxer complete electrical and hydraulic system.
- Build 16000 MAxer complete electrical and hydraulic system.
- Be prepared for advancing to the Level 4 class.

Prerequisites
CANbus 3

Duration
3 days

Capacity
Virtual

Dates available:

USA

CANBUS 5 – Certification

Content:

This 4.5-day course will be used to test the students on each of the CANbus systems they might encounter working on our product line. The Instructor will pick different crane systems of the CANbus cranes and have the student build them based on the knowledge they have gained from the previous classes. When the instructor approves the students' knowledge of the circuit, simulated crane faults will be given so the student can repair. Points will be awarded based on completion of the faults. If the student repairs 30 total faults and completes all 10 random crane circuits, a grade of 100% will be earned. To pass the class and earn the Crane Care Certification rating a 90% is required. The Student must continue to attend the CANbus Level 4 New Technologies class once every 3 years after passing to maintain their rating. The class size will be limited to three (3) students. All classroom presentations will be reinforced with practical hands-on operation of the car body and upper works systems. The course will be approximately 5% classroom and 95% practical.

Prerequisites
CANbus 4

Duration
5 days

Capacity
4 students

Dates available:

USA

CCS Lattice Overview

Content:

This 5-day 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 it will be explained the Crane assembly procedure, as well the fundamentals of the CCS; how the different components are distributed along the crane; what are the steps to configure and set it up.

Class size is limited to eight (8) students. This class will feature the Manitowoc Lattice Crane models 100 & MLC-150. (Physical Crane will not be used. Training simulators will substitute for actual crane.) The following subjects will be covered during daily classroom lecture time:

•A safe assembly procedure, of the crane components, as shown in the Operator's Manual, from off loading from trailers, to boom rigging and assembly to RCI/ RCL configuration based on load charts specs.
• 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 circuit
- Quizzes and tasks will be assigned to give technicians another opportunity to gain and retain the daily information covered in these sessions. The course will be approximately 60% classroom and 40% practical.

Course Benefits:

At the end of the course(s) , technicians will be able too:

- Establish and perform a safe assembly of crane components, as shown in the Operator's Manual;
- Identify the new operators Cab Controls;
- Proper configuration of RCI/RCL based on load chart specifications, and navigation trough the CCS menus ;
- Know the components, and layout of CANbus structure of the CCS;
- How to make an onboard calibration of hydraulic system;
- Hands-on lab exercises will include:
- Connecting the modules for each crane network;
- Connect the module identifications in the proper network;
- There will be a limited amount of hands-on during this class.

Prerequisites
CST & CTO

Dates available:

Available Upon Request

CCS Lattice Level 1.1

Content:

This 4.5-day 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. The class size will be limited to four **(4)** students. 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. The course will be approximately 40% classroom and 60% practical.

Course Benefits:

At the end of the course(s) , technicians will be able to:

- Understand the operating system as used on the Model MLC150-1 and MLC100-1 and related crane models.
- Enhance their troubleshooting skills.
- Understand the electrical schematic from the battery to the boom top.
- Check CANbus communication by information covered in this class.
- Build MLC150-1 travel complete electrical and hydraulic system.
- Set the travel threshold and pressure compensation over-ride adjustment in the lab.
- Build the MLC150-1 Drum 4 complete electrical and hydraulic system in the lab.
- Build the MLC150-1 Drum 1 complete electrical and hydraulic system in the lab.
- Set the drum motor threshold adjustment in the lab.
- Perform pressure calibrations on CCS CANbus cranes.
- Perform controls calibrations on CCS CANbus cranes.
- Perform charge pressure tests on CCS CANbus cranes.
- Perform pump pressure test on CCS CANbus cranes.
- Set up the Manitowoc rated capacity indicator.
- Be prepared for advancing to the Level 2 class.
- Set up a complete boom system.

Prerequisites
CCS Lattice Overview

Duration

Dates available:

Available Upon Request

CCS Lattice Level 2.1

Content:

This 4.5-day course will cover the theory of operation for the travel, drum 4, crane wireless systems and rate capacity indicator. The MLC300 and MLC650 will be covered during this class. The MLC650 crane will be used for the hands-on and classroom. The class size will be limited to fourt **(4)** students. 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. The course will be approximately 40% classroom and 60% practical.

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Course Benefits:

At the end of the course(s) , technicians will be able to:

- Have an understanding of the operating system as used on the Model MLC300 and MLC650 cranes;
- Enhance their troubleshooting skills;
- Use the crane service tool with customer level access;
- Understand the electrical schematic from the battery to the boom top;
- Build MLC650 VPC MAX complete electrical and hydraulic system;
- Understand how the MLC 300 VPX works
- Set the drum 4 threshold and pressure compensation over-ride adjustment in the lab;
- Perform pressure calibrations on CCS CANbus cranes;
- Perform controls calibrations on CCS CANbus cranes;
- Perform charge pressure tests on CCS CANbus cranes;
- Perform pump pressure test on CCS CANbus cranes;
- Set up the Manitowoc rated capacity indicator;
- Be prepared for advancing to the Level 2 class:
- Set up a complete boom system and troubleshoot it

Prerequisites
CCS Lattice 1.1

Duration

4 students

Dates available:

Available Upon Request

CCS Lattice Troubleshooting

Content:

This 3 day course will give students further troubleshooting experience with the CCS control system as used on the MLC100-1, MLC300, and MLC650. This course is designed for students who have not had the opportunity to spend time on the aforementioned equipment and would like to be better prepared to service and maintain CCS cranes.

This course will provide an overview of CCS electrical and hydraulic troubleshooting documents and will offer many 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
Quizzes and tasks will be assigned to give technicians additional opportunities to gain and retain the daily information covered in these sessions. The course will be approximately 50% classroom and 50% practical.

Prerequisites
CCS Lattice 2.1

Duration
5 days

Capacity
4 students

Dates available:

Available Upon Request

CCS Lattice – Level 3

Content:

This 4.5 day 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. The dealer students will be given the dealer access software. The class size will be limited to four **(4)** students. All classroom presentations will be reinforced with practical hands-on operation of the car body and upper works systems. The course will be approximately 40% classroom and 60% practical.

Course Benefits:

At the end of the course(s) , technicians will be able to:

- Understand the 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.
- Build MLC300 Luffing drum complete electrical and hydraulic system.
- Build the MLC300 VPC max complete electrical and hydraulic system in the lab.
- Perform VPC Max calibration on the MLC300 crane
- Perform VPC tray calibration on the MLC300 crane
- Set up the Manitowoc rated capacity indicator to the VPC Max and VPC Luffing configuration.

Prerequisites
CCS Lattice 2.1

Duration
5 days

Capacity
4 students

Dates available:

Available Upon Request

CCS Lattice 4 – NEW TECH

Content:

This 4 day 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. The class size will be limited to eight (8) students. All classroom presentations will be reinforced with practical hands-on operation of the carbody and upper works systems. The course will be approximately 60% classroom and 40% practical.

Course Benefits:

At the end of the course(s) , technicians will be able to:

- Have an understanding of the operating system as used on the Model MLC300 and MLC650 cranes;
- Enhance their troubleshooting skills;
- Use the crane service tool with customer level access;
- Understand the electrical schematic from the battery to the boom top;
- Build MLC650 VPC MAX complete electrical and hydraulic system;
- Understand how the MLC 300 VPX works
- Set the drum 4 threshold and pressure compensation over-ride adjustment in the lab;
- Perform pressure calibrations on CCS Canbus cranes;
- Perform controls calibrations on CCS Canbus cranes;
- Perform charge pressure tests on CCS Canbus cranes;
- Perform pump pressure test on CCS Canbus cranes;
- Set up the Manitowoc rated capacity indicator;
- Be prepared for advancing to the Level 2 class:
- Set up a complete boom system and troubleshoot it

Prerequisites
CCS Lattice 3

Duration
4 days

Dates available:

USA

CCS Lattice – Level 5 - Certification

Content:

This 4.5-day course will be used to test the students on each of the CCS Lattice systems. The instructor will pick different crane systems of the CCS cranes and have the student build them based on the knowledge they have gained from the previous classes. When the instructor approves the students' knowledge of the circuit, simulated crane faults will be given so the student can repair. Points will be awarded based on completion of the faults. If the student repairs 30 total faults and completes all 10 random crane circuits, a grade of 100% will be earned. To pass the class and earn the Crane Care Certification rating a 90% is required. The Student must continue to attend the CCS Lattice New Technologies class and then the CCS Re-Certification Class to maintain their rating. The class size will be limited to four (4) students. All classroom presentations will be reinforced with practical hands-on operation of the car body and upper works systems. The course will be approximately 5% classroom and 95% practical.

Prerequisites
CCS Lattice 4

Duration
5 days

Capacity
4 students

Dates available:

Available Upon Request

Small Crawler 1

Content:

This 4.5-day course that will showcase the operational systems of Model 10000. The class size will be limited to eight (8) students and will be mostly classroom presentation.

The technicians will be guided through the 10000 electrical and hydraulic systems by studying the systems' schematics and manuals. We will review faults, limits, troubleshooting and the on the 10000. Technicians will learn about Load Moment Indicator plus review LMI setup screens, which will allow technicians to build the system knowledge and confidence in setting and troubleshoot system problems. Specific classroom units will cover these new 10000 items, including cab controls, energy saving AIS and G winch and engine systems, gauge cluster, main controllers (2), relay boxes (2), touch panel monitor, redesigning of most components, safety updates, additional load charts and electrical schematics. We will talk about the new 8500-1 crane download cables and software for the main controllers, touch panel monitor and LMI. Information will be supplied on the new Tier 4 Hino engine diagnostic codes, troubleshooting plus DPR and EGR systems. Quizzes and tasks will be assigned on the material covered in these sessions.

Course Benefits:

At the end of the course, technicians will be able to:

- Understand the operating system as used on the Model 8500- including cab controls, gauge cluster, total controller, relay box and electrical schematics.
- Interpret ISO and ANSI Electrical, hydraulic symbols.
- Use hydraulic and electrical schematics for troubleshooting.
- Use the Manitowoc Service Manual.
- Understand the Manitowoc Hydraulic system used on the Model 10000.
- Understand the electrical schematic from the battery to the boom top.
- Check Model 10000 computer diagnostics.
- Understand the operation, troubleshooting and maintenance on the Model 10000.

Prerequisites
CST

Duration
5 days

Capacity
4 students

Dates available:

Available Upon Request

Small Crawler 2

Content:

This 4.5-day course that will showcase the operational systems of Model 10000-1. The class size will be limited to eight (8) students and will be mostly classroom presentation.

The technicians will be guided through the 10000-1 electrical and hydraulic systems by studying the systems' schematics and manuals. We will review faults, limits, troubleshooting and the on the 8500-1. Technicians will learn about Load Moment Indicator plus review LMI setup screens, which will allow technicians to build the system knowledge and confidence in setting and troubleshoot system problems. Specific classroom units will cover these new 10000-1 items, including cab controls, energy saving AIS and G winch and engine systems, gauge cluster, main controllers (2), relay boxes (2), touch panel monitor, redesigning of most components, safety updates, additional load charts and electrical schematics. We will talk about the new 10000-1 crane download cables and software for the main controllers, touch panel monitor and LMI. Information will be supplied on the new Tier 4 Hino engine diagnostic codes, troubleshooting plus DPR and EGR systems. Quizzes and tasks will be assigned on the material covered in these sessions.

Course Benefits:

At the end of the course, technicians will be able to:

- Understand the operating system as used on the Model 8500- including cab controls, gauge cluster, total controller, relay box and electrical schematics.
- Interpret ISO and ANSI Electrical, hydraulic symbols.
- Use hydraulic and electrical schematics for troubleshooting.
- Use the Manitowoc Service Manual.
- Understand the Manitowoc Hydraulic system used on the Model 10000-1.
- Understand the electrical schematic from the battery to the boom top.
- Check Model 10000-1 computer diagnostics.
- Understand the operation, troubleshooting and maintenance on the Model 10000-1.

Prerequisites
CST

Dates available:

Available Upon Request

Register form Paper Version

Course Registration. Send a purchase order to:
E-mail: Jorge.campanico@manitowoc.com

TRAINING DATA - *Datos del entrenamiento*

TRAINING:
CURSO _____

DATE:
Periodo _____

INSTRUCTOR:
Instructor _____

LOCAL:
Local _____

PERSONAL DATA - *Datos Personales*

NAME:
Nombre _____

ID #:
DNI _____

ADDRESS:
Dirección _____

St., Av., Highway:
Calle, Avenida, Carretera _____

NEIGHBORHOOD
Barrio _____

CITY:
Ciudad _____

STATE:
Estado _____

ZIP CODE:
CEP _____

RESIDENTIAL PHONE:
Teléfono residencial _____

PROFESSIONAL DATA - *Datos profissionales*

COMPANY NAME:
Empresa _____

PHONE:
Teléfono _____

EXTENSION LINE:
Extension _____

CURRENT POSITION:
Cargo _____

SCHOLARITY:
Escolaridad

ELEMENTARY SCHOOL: *Educación básica*	( )	Complete *Terminado*	( )	Not Complete *No terminado*
HIGH SCHOOL: *Escuela secundaria*	( )	Complete *Terminado*	( )	Not Complete *No terminado*
UNIVERSITY / COLLEGE: *Universidad*	( )	Complete *Terminado*	( )	Not Complete *No terminado*

DID YOU PARTICIPATE OF SOME MANITOWOC COURSE? ( ) Yes *Si* ( ) No *No*
Ha participado de curso em la Manitowoc

IF YES, WICH COURSE?
Se si, quales? _____

WHAT IS THE RELATION BETWEEN YOUR POSITION AND THE EQUIPMENT?
Qual la relacion de su actividad com el equipo?

_____

Training Arrangements for Porto, Portugal :

Our Address:

Rua Do Parque Industrial
De Baltar, S/N Parada,
4585-013 Baltar

Local Airports:

Porto Airport / Francisco Sá Carneiro International Airport (OPO, LPPR)

Lisbon Airport / Humberto Delgado International Airport (LIS, LPPT)

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 jorge.campanico@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:

- AC Porto Hotel, Rua Jaime Brasil, 4350-005 Porto
  +351 (0) 22 507 2650 - acporto@ac-hotels.com
- HOTEL PENAFIEL PARK HOTEL & SPA , Quinta das Lajes, 4560-232 Penafiel, Portugal
  +351 255 710 100 reservas@penafielparkhotelspa.com
- HOTEL STAR INN PORTO, R. Sra. Porto 930, 4250-453 Porto, Portugal
  +351 22 834 7000 res.porto@hotelstarinn.com

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

Manitowoc does provide a lunch Monday-Friday at 12:00 PM and ends at 1:00 PM. Coffee, sodas, and bottled water are available daily in the training room at no cost to the students. Snacks are available anytime in the Training Cafeteria vending machine.

Manitowoc Cranes

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Manitowoc Finance™

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