

Skill Boss - Logistics

Hands-on Skills Assessment and Training for the CT-SCA Certification

Skill Boss Logistics Collaboration

Certified Technician – Supply Chain Automation

Collaboration between NCSCA, MHI, MHEDA, MSSC, Amatrol



National Center for Supply Chain Automation



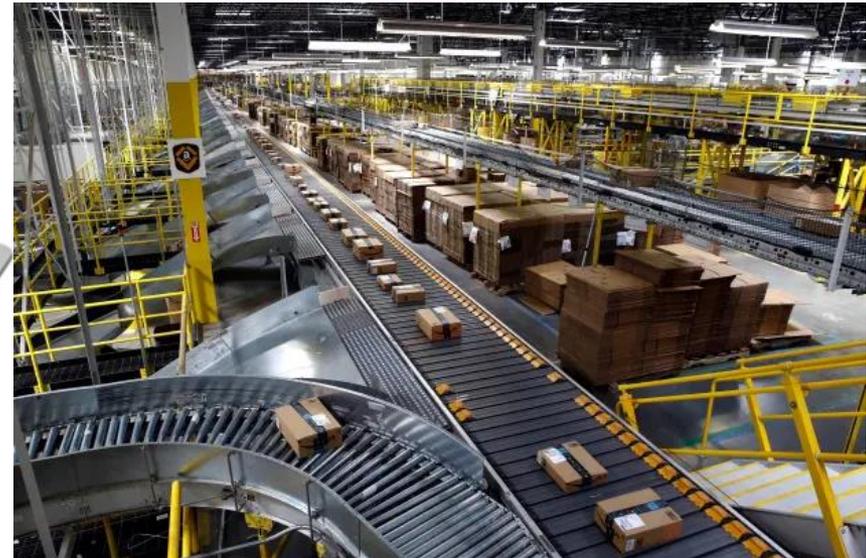
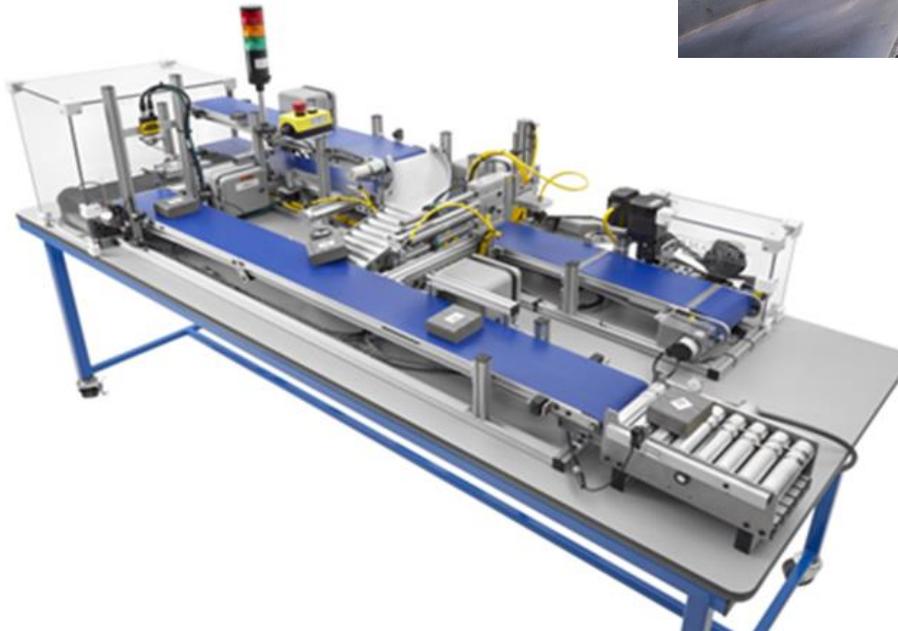
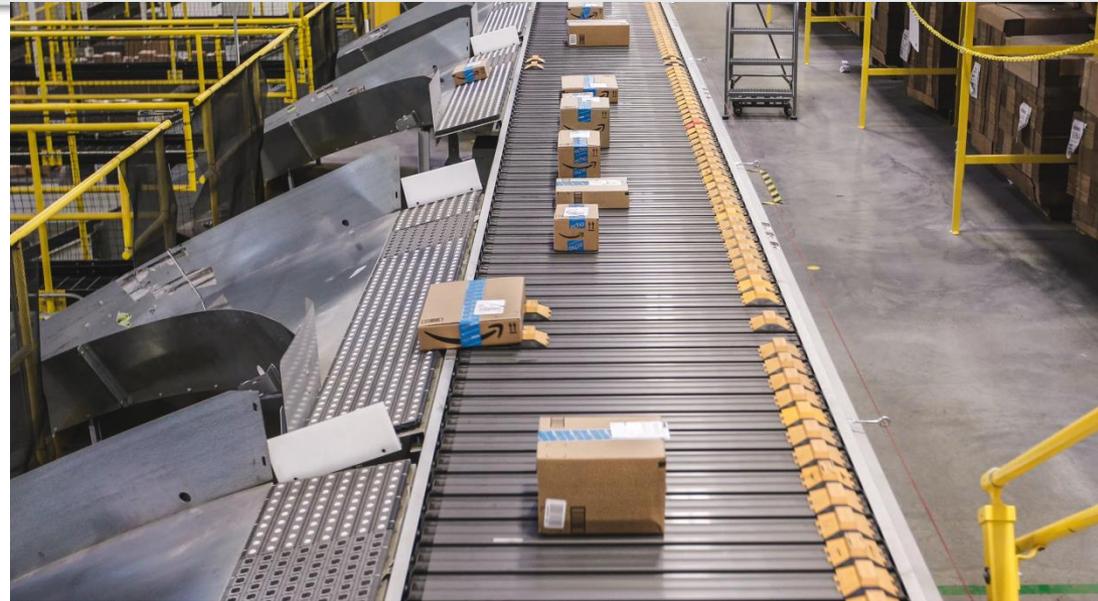
Skill Boss Logistics Industry Advisors

Industry Partners that helped in the Development Process



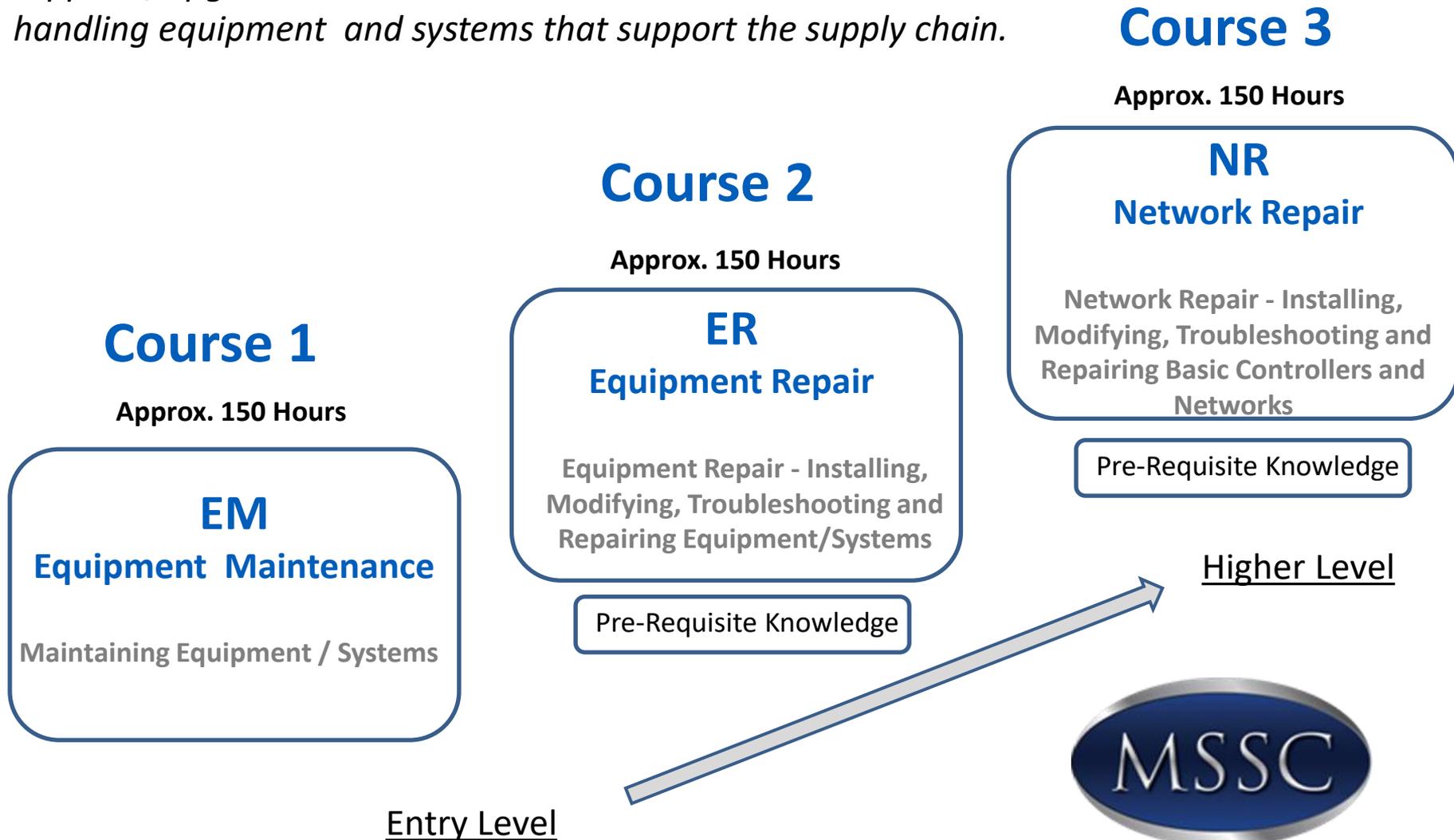
Skill Boss Logistics

- Designed to simulate a modern Sortation System
- Packages are loaded/scanned/routed and re-routed through an automated process



CT-SCA Certification Courses

Supply Chain Technician: *A person who installs, operates, supports, upgrades or maintains the automated material handling equipment and systems that support the supply chain.*



CT-SCA E-Learning Courses

- Meets MSSC CTSCA Standards
- 150 hour preparation per course

Industrial Internet of Things Applications
Objective 1: Describe How IoT is Applied in Lean Manufacturing

Improving Jidoka

Jidoka is an approach that builds quality into manufacturing processes so errors are avoided. Collaborative robots (cobots) work closely with people and adjust what they do to mesh with their human co-workers to make better products.

For example, Fanuc cobots have sensing ability and soft skin so they can safely share workspaces with people.

Also IoT-connected Andon systems send notifications to devices (tablets, smart phones, etc.) so more people can help solve problems.



Pneumatic DCV Applications
Objective 4: Describe Three Methods of Decelerating a Pneumatic Cylinder

Pneumatic Cylinder Deceleration Methods

Three methods that can be used to decelerate a pneumatic cylinder are:

- Two-Speed Control with Cam Valve
- Power Braking
- Shock Absorbers

Click on each deceleration method for more information about it.



Basic Electrical Circuits
Objective 4: Describe the Function of the Four Basic Components of an Electrical Application

Components of an Electrical Circuit

An electrical circuit includes the components necessary to deliver the electricity to the point of use for an application. The four basic components of an electrical circuit are:

- Power Supply
- Input Device
- Output Device
- Conductor

You will learn more about each component and how it fits with the rest of this module.

Output Device
This component produces a desired output. It is also referred to as a load. A common output device is a lamp.



Power Transmission Systems
Objective 4: Describe the Function of a Bearing and Give an Application

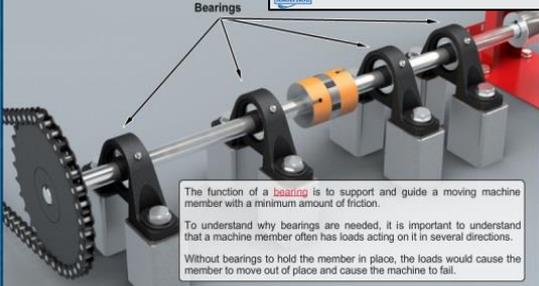
The Function and an Application of a Bearing

Bearings

The function of a bearing is to support and guide a moving machine member with a minimum amount of friction.

To understand why bearings are needed, it is important to understand that a machine member often has loads acting on it in several directions.

Without bearings to hold the member in place, the loads would cause the member to move out of place and cause the machine to fail.



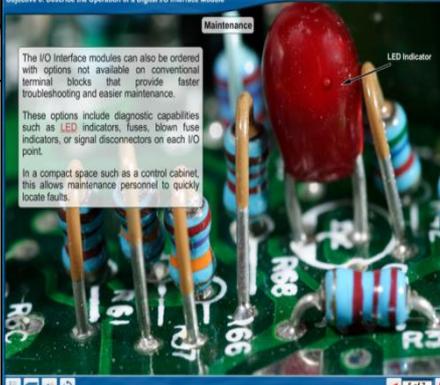
Basic Component Adjustments (Allen-Bradley CompactLogix)
Objective 6: Describe the Operation of a Digital I/O Interface Module

Maintenance

The I/O interface modules can also be ordered with options not available on conventional terminal blocks that provide faster troubleshooting and easier maintenance.

These options include diagnostic capabilities such as LED indicators, fuses, blown fuse indicators, or signal disconnectors on each I/O point.

In a compact space such as a control cabinet, this allows maintenance personnel to quickly locate faults.



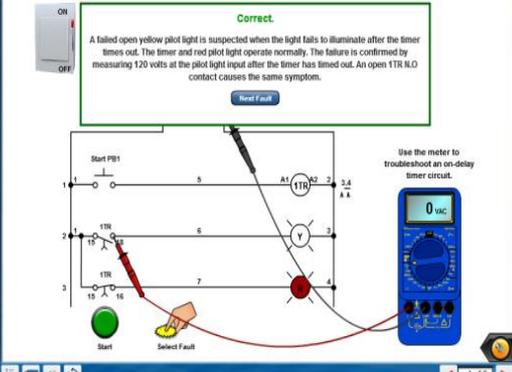
On-Delay and Off-Delay
Objective 4: Describe the Function of an On-Delay Timer and an Off-Delay Timer

On-Delay Meter Simulation

Correct.

A failed open yellow pilot light is suspected when the light fails to illuminate after the timer times out. The timer and red pilot light operate normally. The failure is confirmed by measuring 120 volts at the pilot light input after the timer has timed out. An open ITR I/O contact causes the same symptom.

Next Fault



CT-SCA E-Learning Courses

- Virtual Trainer Simulation

Procedure Skill 7: Connect and Operate an Electrical

Step 3 of 4

You are finished with this circuit. If you would like to save this circuit before continuing, do so now.

Recommended file name: B707_LAP1_SK7_Circuit_1

Back Next

Step Graphic

2C

2D

2E

3

Graphic 3 Enlarge

Connect and Operate an On-Delay Timer Circuit

5: Click the safety switch lever to turn it off and install a lockout/tagout.

6: Perform the following substeps to connect and operate an on-delay timer starting circuit.

A: Wire the motor for low voltage operation.

B: Connect the circuit shown in graphic 7. **Graphic 7**

A pictorial is shown in graphic 8. **Graphic 8**

C: Set the timing wheel to 10.

D: Click the safety switch lever to remove the lockout/tagout and turn the switch on.

E: Observe the status of the yellow indicator lamp and the motor.

Yellow Indicator Lamp Status (On/Off)

Motor Status (On/Off)

The yellow indicator lamp should be on because it is connected to the N.C. contacts of the timer.

Zoom: RESET VIEW ADD LEADS REMOVE LEADS REMOVE ALL LEADS

Procedure Skill 8: Use a Micrometer to Measure the Outside

Step 7 of 10

Read the sleeve and thimble scales.

Back Next

Step Graphic

4

5

6

7

Graphic 4 Enlarge

Zoom: RESET VIEW REMOVE ITEMS ORIENT ITEMS

Enter and Operate a PLC Program That Uses Internal Input and Output Instructions

Print the Step-by-Step Instructions

Scene 3

1: Open Scene 3 - Single Motor.

Scene 3 will load with an empty ladder logic program in the Logic Program Workspace.

This scene contains a single motor and an operator panel with two pushbuttons, NO pushbutton PB1 and NC pushbutton PB2.

Graphic 1

The IO diagram for the scene is shown in the graphic. **Graphic 2**

2: Perform the following substeps to enter and operate a program that uses internal input and output instructions.

A: On Rung 1, enter two NO contact instructions and an output instruction.

B: Enter a branch onto the rung around the second NO contact instruction.

C: Add a normally open contact instruction to the middle of the branch.

The program should appear similar to the graphic. **Graphic 3**

D: Enter address I_1 to the NO contact instruction on the

IO Status	Variable	Status
●	I_1	True
●	I_2	True
●	I_3	True
●	I_4	True
●	I_5	True
●	I_6	True
●	I_7	True
●	I_8	True
●	I_9	True
●	I_10	True
●	I_11	True
●	I_12	True
●	I_13	True
●	I_14	True
●	I_15	True
●	I_16	True
●	I_17	True
●	I_18	True
●	I_19	True
●	I_20	True
●	I_21	True
●	I_22	True
●	I_23	True
●	I_24	True
●	I_25	True
●	I_26	True
●	I_27	True
●	I_28	True
●	I_29	True
●	I_30	True
●	I_31	True
●	I_32	True
●	I_33	True
●	I_34	True
●	I_35	True
●	I_36	True
●	I_37	True
●	I_38	True
●	I_39	True
●	I_40	True
●	I_41	True
●	I_42	True
●	I_43	True
●	I_44	True
●	I_45	True
●	I_46	True
●	I_47	True
●	I_48	True
●	I_49	True
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●	I_87	True
●	I_88	True
●	I_89	True
●	I_90	True
●	I_91	True
●	I_92	True
●	I_93	True
●	I_94	True
●	I_95	True
●	I_96	True
●	I_97	True
●	I_98	True
●	I_99	True
●	I_100	True

Zoom: RESET VIEW ADD HOSES REMOVE HOSES REMOVE COMPS Power On

Procedure Skill 5: Use a Tee to Connect Two Circuits

Step 1L of 16

The circuit should look similar to shown in graphic 8.

Back Next

Step Graphic

1L

1J

1K

1L

Graphic 8 Enlarge

Zoom: RESET VIEW ADD HOSES REMOVE HOSES REMOVE COMPS Power On

Skill Boss Logistics

100 Hands-On Skills

Course 1

EM Equipment Maint.

- Safety
- Measurement
- Nomenclature
- Hand Tools
- System Operation
- Adjust Elect/Pneu
- Maintain Machines
- Adjust Scanners
- Adjust Automation Equipment

Course 2

ER Equipment Repair

- Install Mechanical Systems
- Interpret Specifications
- Troubleshoot Machines
- Install Electrical Systems
- Install Fluid Power Systems
- Interpret Blueprints

Course 3

NR Network Repair

- Check indicators Operation
- Adjust Systems
- Edit a PLC Program
- Program a PLC
- Operate a PLC
- Troubleshoot a PLC
- Install Networks/Scanners
- Administer a Network

Higher Level

Entry Level



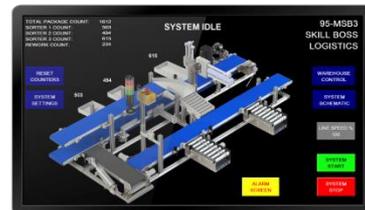
Skill Boss Logistics Major Elements



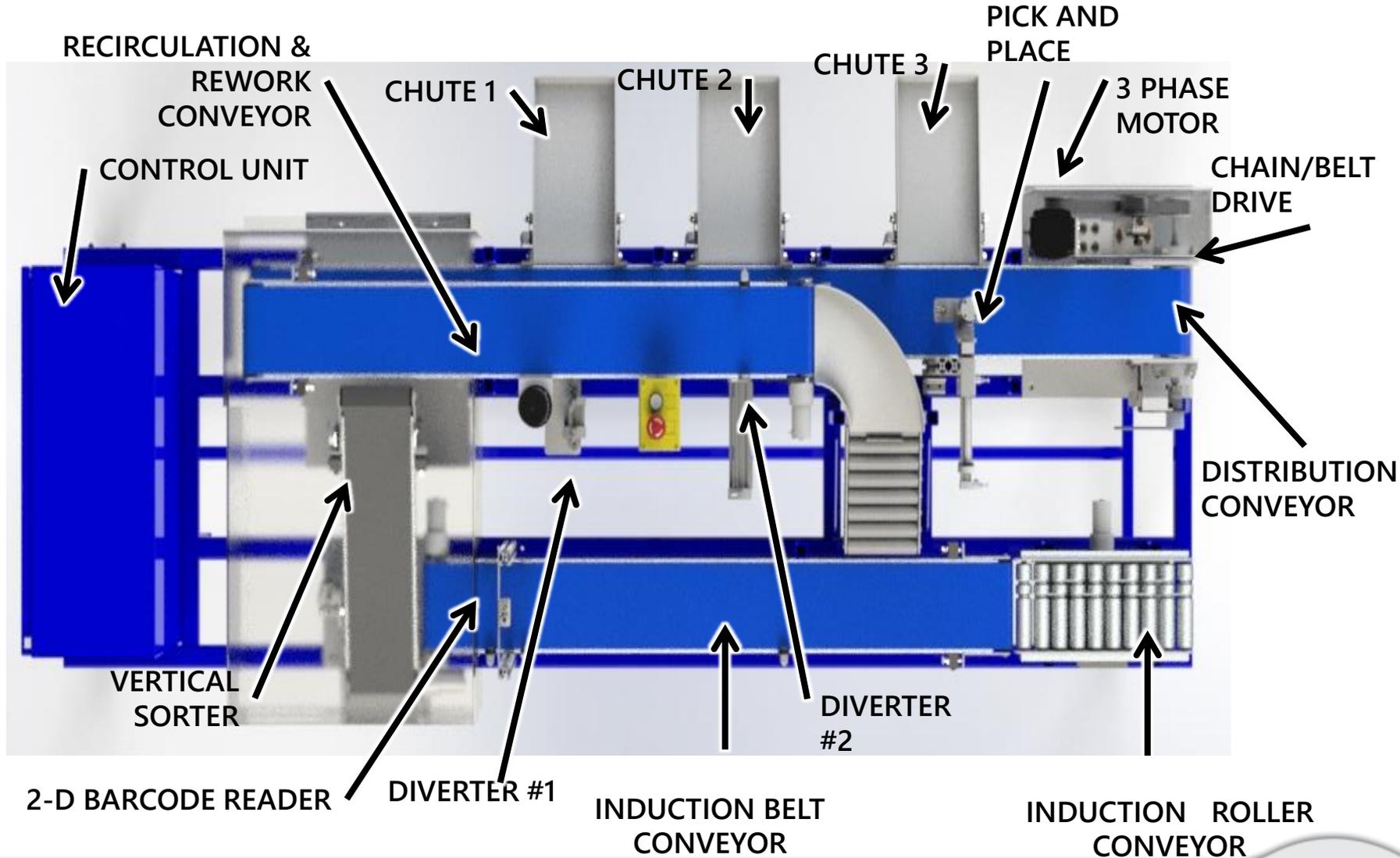
Control Unit

Workstation

HMI with Warehouse Control Software



Skill Boss Logistics Layout





Wide Range of Technology

Many Types of Sensors

AC and DC Motors



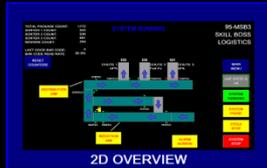
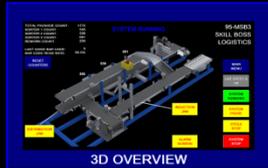
Discrete and Analog IO, High Speed Counter, Ethernet

Belt and Chain Drive



Warehouse Control Software

95-MSB3 SKILL BOSS LOGISTICS



TOTAL PACKAGE COUNT: 1772
 SORTER 1 COUNT: 555
 SORTER 2 COUNT: 536
 SORTER 3 COUNT: 681
 REWORK COUNT: 250

LAST GOOD BAR CODE: 3
 BAR CODE READ RATE: 92.0%

RESET COUNTERS

95-MSB3 SKILL BOSS LOGISTICS

SYSTEM RUNNING

555, 536, 681

INDUCTION JAM

DISTRIBUTION JAM

ALARM SCREEN

MAIN MENU

LINE SPEED %
100

SYSTEM RUNNING

SYSTEM PAUSE

CYCLE STOP

SYSTEM STOP

ORDER SELECTION

CUSTOMER	CHUTE	STATUS	PART	QUANTITY	PART	QUANTITY	PART	QUANTITY
Bob Smith	1	PENDING	1	3	0	0	0	0
Jim Hall	2	PENDING	2	3	0	0	0	0
Jay McAllister	3	PENDING	1	1	2	1	3	1
Connor Giles	1	PENDING	1	2	2	2	3	2
John Lloyd	1	PENDING	3	2	0	0	0	0
Ace Waters	2	PENDING	1	1	0	0	0	0
Ned Potts	3	PENDING	2	1	3	1	0	0
Mathew Griffin	1	PENDING	3	1	0	0	0	0
Bjorn Finnegan	3	RELEASED	1	1	0	0	0	0
Kaine Broadhur*	1	QUEUED	1	2	2	1	0	0
Marco Larsen	1	PENDING	1	3	2	2	3	1

RELEASE MANUFACTURING ORDER

HOLD MANUFACTURING ORDER

ORDER SCREEN

PICKING SCREEN

DELETE MANUFACTURING ORDER

Computer-Based Fault Insertion

FaultPro Included!

Amatrol's FaultPro computer-based fault insertion software provides electronic troubleshooting training by inserting "real-life" faults into the system.



FAULTPRO

COMPUTER-BASED FAULT INSERTION SOFTWARE

Examples of 50+ Faults:

- E-Stop Pushbuttons
- Induction Sensor
- Limit Switch
- Photoelectric Sensors
- Magnetic Reed Switches
- Barcode Scanner
- Master Control Relay
- Programmable Controller I/O
- Power Supply
- Variable Frequency Drive
- Pneumatic Valve Solenoids
- Pneumatic Valves
- AC and DC Motors
- Encoder
- Main Power Breaker
- Ethernet Switch

Student Options

Student: James Doe

- Class: 95-MSB3 Skill Boss Logistics CTSCA-Equipment Repair
 - Lap 8: Install and Repair Electrical Systems
 - Lap 11: Install and Repair Fluid Power Systems
- Class: 95-MSB3 Skill Boss Logistics CTSCA-Network Repair
 - Lap 13: Check Indicators for Correct Operation
 - Skill 1: Use Status and Diagnostic Indicators to Troubleshoot a PLC
 - Skill 2: Use a Force Function to Test PLC Discrete Outputs
 - Skill 3: Use a Multimeter to Troubleshoot PLC Inputs and Outputs** (Completed)
 - Skill 4: Troubleshoot a PLC Power Distribution
 - Skill 6: Troubleshoot a PLC System
 - Lap 14: Operate and Troubleshoot VFDs
 - Lap 15: Program and Troubleshoot PLC-Controlled DC Motor Drives
 - Lap 16: Program and Troubleshoot PLC-Controlled Encoder-Based Product Sorting
 - Lap 17: Install Networks and Scanners

FaultPro Assistant

Select the desired Skill from the tree above. Skills are grouped by Class and Lap. Then choose the fault insertion mode, either Single Fault Mode or Random Fault Mode. Completed Skills are noted by a red checkmark next to the Skill name in the tree.

Single Fault Mode

Random Fault Mode

View Grades

Logout

- *Real World Problem Solving*
- *Safe Fault Insertion*
- *Automated Fault Insertion*
- *Student Record Database Analysis*

Master Teacher Instructor Training Fall 2020

Amatrol Inc. Jeffersonville, Indiana



Skill Boss Logistics

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