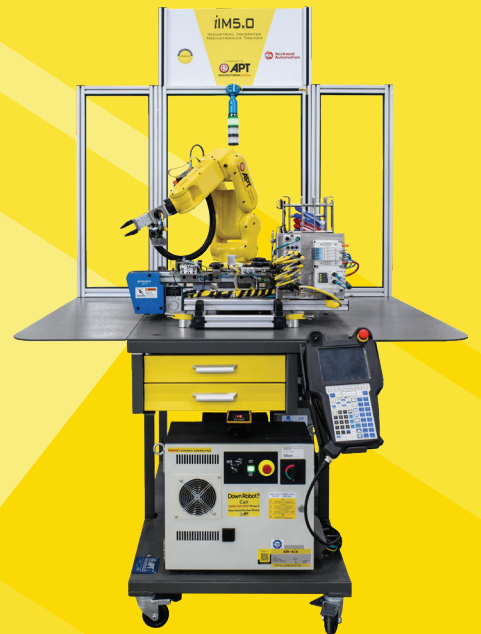
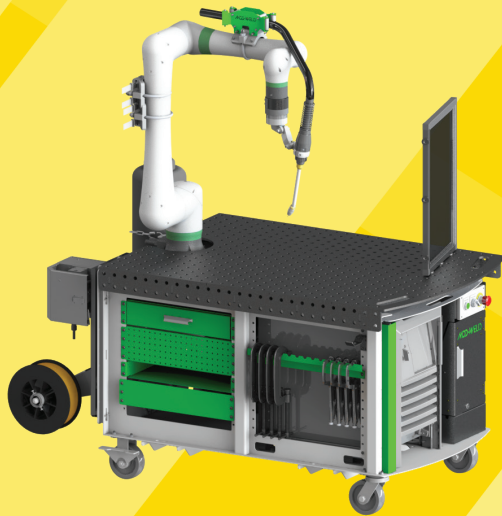


# INDUSTRIAL EDUCATION SOLUTIONS



**FANUC**

 **APT**  
MANUFACTURING solutions

# TABLE OF CONTENTS

CERTIFICATIONS, CURRICULUM, & SOFTWARE ..... 2

USE OUR ONLINE TOOL TO NAVIGATE EQUIPMENT AND PROGRAMS ..... 4

ADVANTAGES OF OUR INDUSTRIAL TRAINING EQUIPMENT ..... 6

**ROBOTICS**

    STAND-ALONE PRODUCTS FOR YOUR CLASSROOM ..... 8

    CERT CART ..... 9

**CNC**

    FANUC ROBODRILL CNC ..... 10

    MTEC - ROBOT MACHINE TENDER ..... 12

    MTEC-SIM - ROBOT WITH CNC SIMULATOR ..... 14

**MECHATRONICS**

    iCC INDUSTRIAL CONTROLS CENTER - PLC/HMI TRAINER ..... 16

    iIM5.0 - MECHATRONICS CERT CART ..... 18

    AM-CERT - INDUSTRIAL MATERIAL HANDLING TRAINER ..... 20

    iLS - INDUSTRIAL LEARNING SYSTEM ..... 22

        iLSM - INDUSTRIAL LEARNING MODULES ..... 23

    CSM™ - SMART MANUFACTURING TRAINING SYSTEM ..... 26

CONTROLS INTEGRATION ..... 30

**WELDING**

    ROBOT ARC-MATE 50 ..... 32

    COBOT CRX10 ..... 32

ROBOT ACCESSORIES ..... 36

CLASSROOM DESIGN SERVICES ..... 40

For most current information, see [aptmfg.com/education](http://aptmfg.com/education)


"This system was developed to bring alignment between Industry and Education to directly tie into the FANUC CERT program, foundational skills in robotics, vision, and integrated solutions."

- **Paul Aiello**  
Director of Education, FANUC America Corporation




"The success of our training programs has allowed us the opportunity to share the best practices to help other training programs develop the same student outcomes."

- **Anthony Nighswander**  
President, APT Manufacturing Solutions




"Our goal is to integrate Rockwell products with robots to bridge the learning gap. We piece parts together into one great learning system where students can not only learn the technology, but can also understand how to apply it as a system and understand the steps. That's what our customers really want!"

- **Michael Cook**  
Director, University Partnership Rockwell Automation



"At ITW Welding/Miller Electric we are proud to work with industry partners pairing industrial welding solutions in the educational arena to develop the workforce of tomorrow that is prepared to adapt to the demands of the marketplace."

- **Dave Lambert**  
Group President - North American Sales & Marketing, ITW Welding



"At Fronius, we are proud to be recognized as a global technology leader in the field of welding. We believe that it is our responsibility to bring passion and education to students, as they are the future of the industry."

- **Christopher Bliven**  
Head Of Sales – Partner Program, Fronius



# CERTIFICATIONS, CURRICULUM, & SOFTWARE



FANUC America Corporation  
3900 W. Hamlin Road  
Rochester Hills, MI 48309-3253

Telephone: (248) 377-7000  
Customer Service Center: (888)-FANUC-US  
www.fanucamerica.com

## FANUC EDUCATION GRANT

The FANUC America Corporation Certified Education Training (CERT) Program certifies instructors at educational institutions to train their students to program FANUC robots. To accompany the FANUC CERT Program, new school locations receive (1) CERT Instructor Training and Tool Kit and (1) CERT School Comprehensive Educational Package.

All CERT Program Robots include the Advanced CERT Software Configuration for education, which includes: **MH** - Advanced Ethernet I/P Scanner, Advanced Dual Check Safety (DCS), 4D Graphics, Motion Package, PC Remote iPendant, Collision Guard Pack, Interface Panel, Maintenance Package, Menu Utility, Remote iPendant, ROBODRILL Interface. **AT** - Torch Guard, Torch Mate, Collision Guard, 4D Graphics, Payload ID, Touch Sensing and TAST (Through Arm Seam Tracking). Auto Error Recovery, Bump Box, Constant Path, Password Protection, Panel Wizard, KAREL, Menu Utility, Lincoln or Miller Weld Library.

**The Industry Value of the Advanced CERT Software Configuration is \$15,240**

The (MH or AT) CERT Instructor Training and Tool Kit provides your designated instructor training materials and includes the following deliverables:

- (1) online seat to take CERT Cart Safety Features web course
- (1) online seat to take Robot Operations web course
- (1) online seat to take HandlingTool or ArcTool Operation and Programming web course
- (1) online seat to take HandlingPRO or WeldPRO web course
- (1) seat to take a live HandlingTool or ArcTool Operation and Programming class at a FANUC facility
- (1) ROBOGUIDE Simulation Software license
- (1) FANUC Robot Operations Manual
- (1) FANUC HandlingTool or ArcTool Operations and Programming Manual
- (1) FANUC HandlingPRO (ROBOGUIDE Simulation) Manual

**The Industry Value of the CERT Instructor Training and Tool Kit is \$15,500.**

The (MH or AT) CERT School Comprehensive Educational Package provides students training tools and ensures your instructor has the necessary tools to effectively teach their students. This package includes the following deliverables:

- (25) concurrent-user seat to take Robot Operations web course
- (25) concurrent-user seat to take HandlingTool or ArcTool Operation and Programming web course
- (25) concurrent-user seat to take HandlingPRO or WeldPRO web course
- (25) ROBOGUIDE Simulation Software license

**Industry Value of the CERT School Comprehensive Educational Package is \$290,610(MH) / \$403,240(AT)**

To become a certified (MH or AT) CERT instructor, the designated instructor must:

1. Successfully complete the CERT Cart Safety Features web course
2. Successfully complete the Robot Operations web course
3. Successfully complete the HandlingTool or ArcTool Operation and Programming web course
4. Successfully complete the HandlingPRO or WeldPRO web course
5. Attend the live HandlingTool or ArcTool Operation and Programming class at a FANUC facility
6. Pass the online Certified Education Robot Training Test via FANUC eLearn
7. **PASS the NOCTI FANUC (FCR-01) EXAM - Test Fee required through NOCTI (MH only)**
8. Provide an outline of their robotic syllabus/curriculum
9. Provide a video to FANUC of a module/chapter being presented to an audience or faculty staff



## SOFTWARE

### Rockwell Automation EDU Toolkit Bundle

- Studio 5000 Logix Designer®
- Studio 5000 View Designer,
- plus over 100 more pieces of Rockwell software

*Available through your local Rockwell distributor.*

## CURRICULUM

### Learning+ course content

*Available through your local Rockwell distributor.*



OpenBook™

learning management software



### Integration Project-Based Learning (PBL) Curriculum

- Daily lesson plans
- Assessment and grade charts

# USE OUR ONLINE TOOL TO NAVIGATE EQUIPMENT AND PROGRAMS

[aptmfg.com/products/program-overview/](http://aptmfg.com/products/program-overview/)

FANUC Robotics Courses	FANUC CNC Courses	Rockwell Automation Courses
Miller Welding Courses	APT Integration Courses	Industry Recognized Certifications

Learning Level	Career Path	Description	Cert. Type	ROBO-DRILL	CERT Cart	MTEC-SIM	MTEC	Weld CERT Cart	iCC (PLC/HMI)	AM-CERT	CSM	iIMS.0	iLS	
Level 1	FANUC Robot Operator - Material Handling	F FANUC: HandlingTool Operation and Programming			✓	✓	✓		✓*	✓	✓	✓		
		F FANUC: HandlingPRO			✓	✓	✓		✓*	✓	✓	✓		
		I FANUC Certification administered by NOCTI: FCR-01 - Written			✓	✓	✓	✓			✓	✓	✓	
		I FANUC Certification administered by NOCTI: FCR-02 - Performance			✓	✓	✓	✓			✓	✓	✓	
	FANUC Robot Operator - Arc Welding	F FANUC: ArcTool Operation and Programming						✓						
		F FANUC: WeldPRO						✓						
		M Miller OpenBook: Robotic Welding Fundamentals						✓						
		M Miller OpenBook: Gas Metal Arc Welding (MIG)						✓						
	CNC Operator	C FANUC CNC Concepts: Machining, Programming, Setup, and Operation		✓		✓	✓					✓		
		C FANUC CNC Concepts: Turning, Programming, Setup, and Operation		✓		✓	✓					✓		
		I NIMS Certification: CNC Mill Programming Setup, and Operation		✓			✓					✓		
	PLC / Controls Operator	A Schematic Reading Fundamentals								✓	✓	✓	✓	✓
		A Panel Building Lab								✓				✓
		R Rockwell CCP 183: Ethernet / IP Configuration and Troubleshooting								✓	✓	✓	✓	
		R Rockwell CCP 146: Logix 5000 System Fundamentals								✓	✓	✓	✓	
		A Introduction to Integration - Labs and Exercises								✓	✓	✓	✓	✓

<p><b>Level 1</b></p> <p>This coursework will train entry level operators and provide a basic understanding of industrial equipment. This is perfect for a high school, vocational school, or school starting up industrial training.</p> <p> - Training Certificate upon successful completion of e-learning.  - Recognized industry certification issued by an independent credentialing authority.</p>	<p><b>Level 2</b></p> <p>This coursework will train technician level employees with troubleshooting fundamentals. This could be used in an advanced vocational school, but is best suited for a community college or school program that is trying to grow from the operator level training and begin teaching troubleshooting and integration.</p>	<p><b>Level 3</b></p> <p>This coursework will train system integration in areas for robotics, PLC, process engineering, controls architecture, and machine design. This is perfect for an advanced technical school training students to apply theoretical knowledge of industrial systems, or a university that is looking to teach engineering and integration of industrial components and equipment.</p>
<p>*iCC must be integrated with CERT cart, MTEC, or MTEC-SIM to teach robotics courses **Must purchase vision options in order to teach FANUC iRVision</p>		

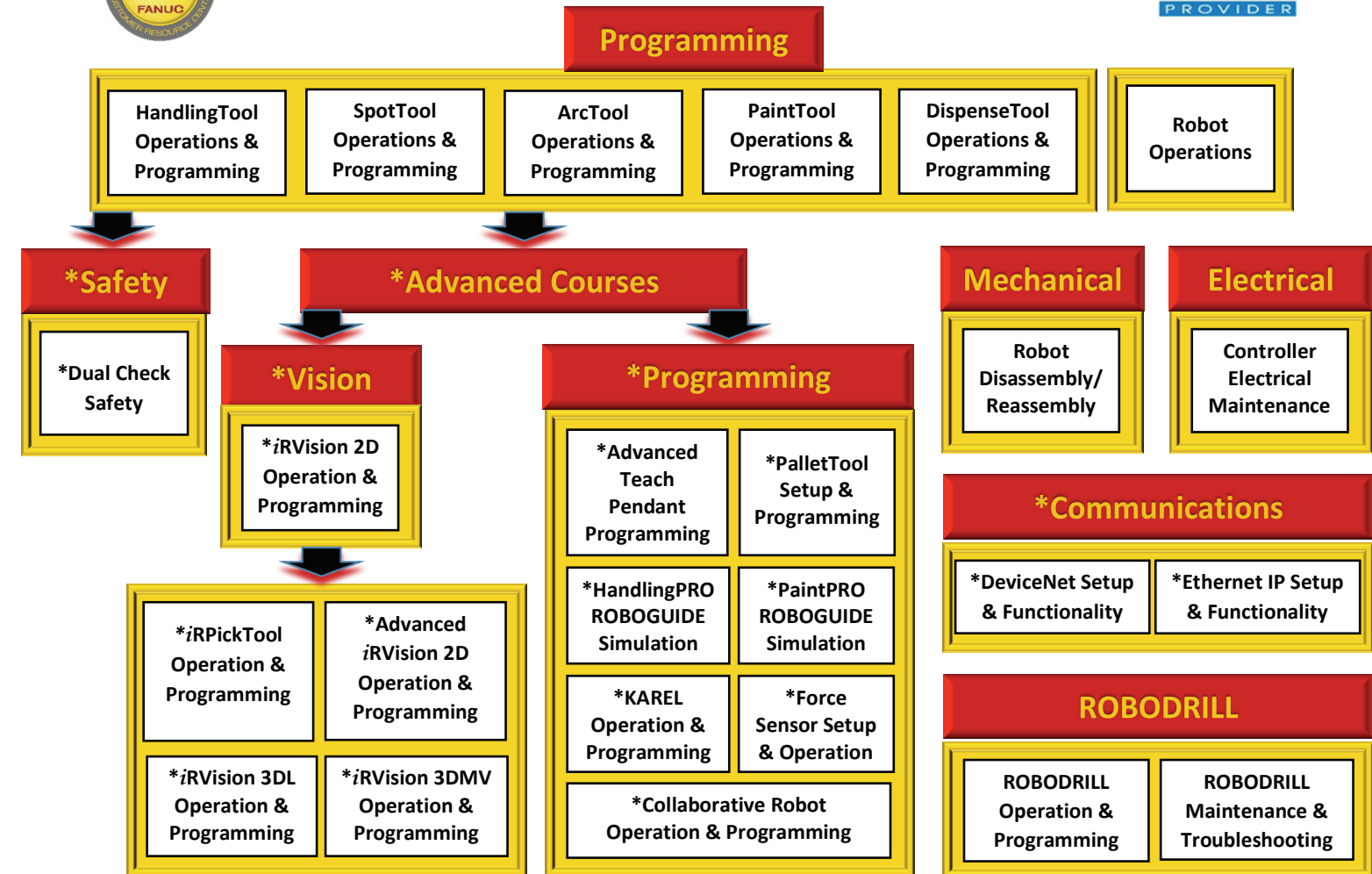
Learning Level	Career Path	Description	Cert. Type	ROBO-DRILL	CERT Cart	MTEC-SIM	MTEC	Weld CERT Cart	iCC (PLC/HMI)	AM-CERT	CSM	iIMS.0	iLS	
Level 2	FANUC Robot Technician	F FANUC: iRVision 2D			✓**	✓**	✓**	✓**		✓	✓	✓		
		I FANUC Certification administered by NOCTI: FCR-T1			✓	✓	✓	✓		✓	✓	✓		
	CNC Machine Technician	C FANUC CNC Concepts: FANUC Simulator Exercises					✓					✓		
		I NIMS Certification: CNC Mill Operations						✓				✓		
	Robotic Welding Technician	M Miller OpenBook: Applied Knowledge - Robotic Welding Labs							✓					
		I American Welding Society: CRAW Certification							✓					
	Maintenance Technician	C TRRBD40-501 - Understanding the FANUC ROBODRILL		✓				✓				✓		
		C TRCNC40-501 - FANUC ROBODRILL Usage & Maintenance		✓				✓				✓		
		R Rockwell CCP153: Maintenance and Troubleshooting								✓	✓	✓	✓	✓
		A Intermediate Concepts: Maintenance and Troubleshooting of Industrial Equipment			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PLC / Controls Technician	A Introduction to Industrial Automation and Integration					✓	✓		✓	✓	✓	✓	✓	
	R Rockwell CCP 151: Basic Ladder Logic Programming								✓	✓	✓	✓	✓	
	R Rockwell CCP 143: Ladder Logic Project Development								✓	✓	✓	✓	✓	
	R Rockwell CCV 204-A: FactoryTalk View ME & PanelView Plus Programming								✓	✓	✓	✓	✓	
	R Rockwell INA 201: Industrial Network Architecture Foundation								✓	✓	✓	✓	✓	
	R Rockwell INA 202: Industrial Network Architecture Intermediate								✓	✓	✓	✓	✓	
	R Rockwell CCP 251: Advanced Logix 5000 Programmer								✓	✓	✓	✓	✓	
	R Rockwell CCP 154: Studio Logix Designer Level 4 ST & SFC								✓	✓	✓	✓	✓	
	R Rockwell SAF LOG 104: Guard Logix (and Banner) Application Development								✓*	✓	✓	✓	✓	
	A Basic Integration Labs: PLC, HMI, Robot, Ancillary Components					✓	✓	✓	✓*	✓	✓	✓	✓	
Robot Integration	A Introduction to Safety Systems								✓*	✓	✓	✓	✓	
	R Rockwell CCA 185: PowerFlex 525 Drive Startup and Configuration								✓*		✓		✓	
	A Robot to CNC: Integration Fundamentals and Labs		✓			✓	✓				✓			
	R Rockwell INA 203: Industrial Network Architecture Advanced Part 1								✓*		✓		✓	
	R Rockwell INA 204: Industrial Network Architecture Advanced Part 2								✓*		✓		✓	
	R Rockwell CCN 130: Motion Control Fund								✓*		✓		✓	
	R Rockwell CCN 144: Studio 5000 Logix Designer Level 4: Kinetix 5500/6500 (CIP) Programming								✓*		✓		✓	
	A Safety Systems, Standards Design, and Application					✓	✓	✓		✓	✓	✓	✓	
	Applied Engineering of Robotics, Automation, and Industrial Systems	A Integration: Part Traceability								✓*		✓		✓
		A Integration: I/O Link Technology								✓*		✓		✓
A Integration: RFID Technology									✓*		✓		✓	
A Integration: Advanced Integration of Industrial Equipment									✓		✓		✓	
A Integration: Advanced Part Tracking and Messaging									✓		✓		✓	
A Integration: Industrial 4.0 and IIoT									✓		✓		✓	
I FANUC - Rockwell Level 3 Systems Integrator Certification											✓	✓		

# Advantages of Our Industrial Training Equipment

	OUR TRAINERS	OTHER TRAINERS
Trainers built for manufacturing training	✓	✓
Equipment built with exact same standards as industrial equipment	✓	
Curriculum with labs to apply knowledge	✓	✓
Curriculum comes directly from manufacturer; not rewritten	✓	
Labs are derived from industry practices, like live panel building utilizing industry standard wiring practices	✓	
Certificates upon completion of classwork or modules	✓	✓
Certifications directly from industry leaders like FANUC, Rockwell, and Miller Welding that carry over to the first day on the job	✓	
Rockwell MicroLogix basic PLC	✓	✓
Rockwell CompactLogix advanced PLC integration with Studio 5000	✓	
Advanced courses in FANUC TPP, iRVision, Advanced TPP, DCS	✓	
Advanced courses in integration of area scan, RFID, wireless I/O	✓	
<b>8 YEARS ZERO MAINTENANCE</b> FANUC CRX 8 Years Zero Maintenance	✓	



## FANUC Recommended Training Curriculum Path



*Please note: All courses marked \* require completion of all prerequisites. Please view prerequisite requirements within individual course descriptions.*



# STAND-ALONE PRODUCTS FOR YOUR CLASSROOM



SCARA SR-3iA



CRX-10iA / CRX-5iA



ER4iA



M-1iA



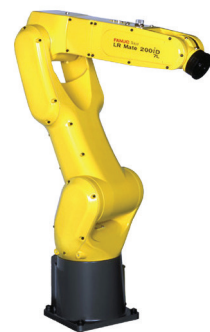
iCC PLC/HMI



ArcMate 50iD/7L



Collaborative CR-7iA



LR Mate 200iD/7L



ROBODRILL CNC



CNC Simulator Controller

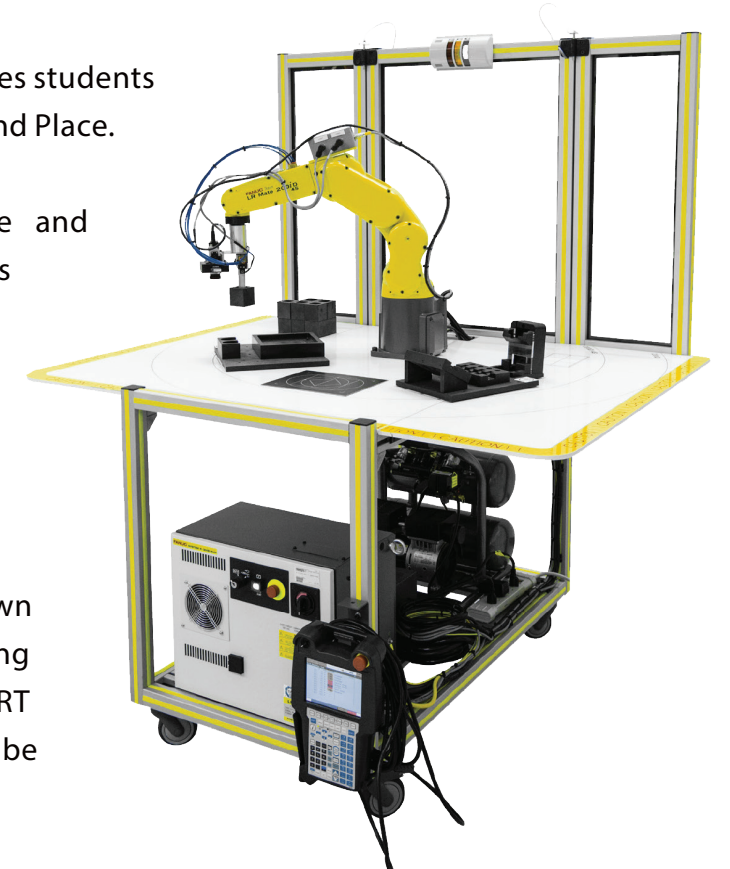
All FANUC robots are available. Contact your education solutions provider.  
Also see accessories on next pages.

# CERT CART

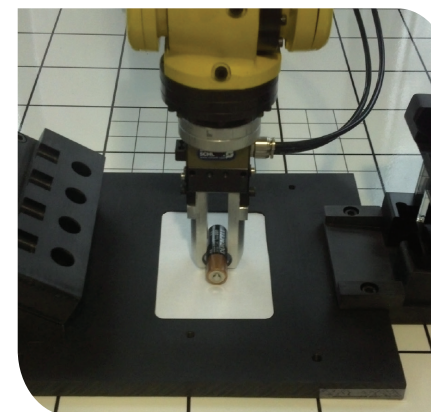
FANUC's CERT Cart is an entry level cart that teaches students basic tool handling skills as well as iRVision Pick and Place.

Instructors benefit from both FANUC's online and instructor led training, which are the same skills taught at the FANUC Robotics training facility. As an educator attending training, you'll be sitting beside industry programmers and learning the same course material that is being used in industry to apply in your classroom.

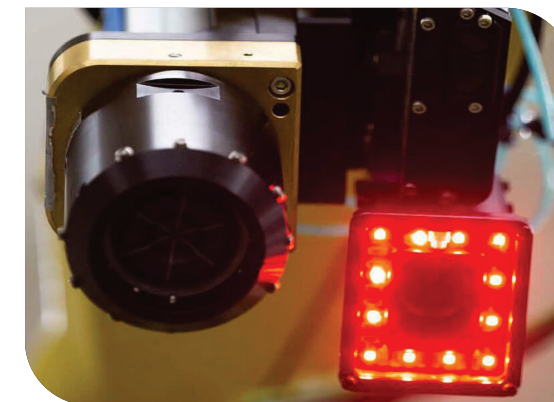
This is real world equipment, not a watered-down version. FANUC America provides this training opportunity to instructors as part of its CERT program allowing the industrial certification to be passed on to students.



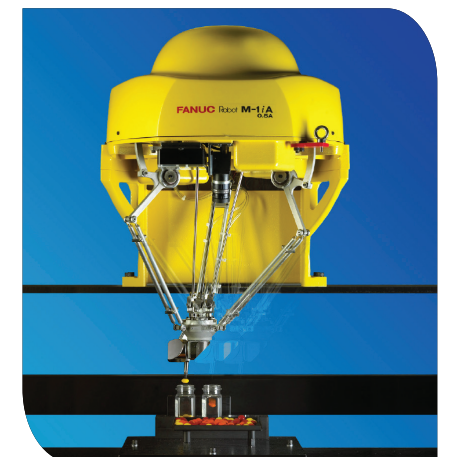
## PROJECT-BASED LEARNING (PBL) KITS



Battery Package



iRVision



Pill Kit

# FANUC ROBODRILL CNC

**Industry-Rated, Priced for Education**

The FANUC ROBODRILL is a high-performance machining center, known worldwide as the most reliable machine manufactured today. The ROBODRILL makes quick work out of any milling, drilling, or tapping jobs. FANUC CNC controls are the most used CNC controls with over 5 million installed worldwide. FANUC is a leading supplier of CNC technology and factory automation systems, and their CNCs are used in many manufacturing applications. The ROBODRILL is the preferred machine in any manufacturing facility large or small.



## ROBODRILL 3-axis

- FANUC ROBODRILL α-D14MiB series
- NRTL for ROBODRILL MiB5/LiB5 without breaker box (ONLY NRTL)
- 31iB/B5 - Additional 1 slot board
- Touch panel screen
- Right side auto pneumatic door
- Robot interface 2 for side door (CNC with built-in multi-function Ethernet type) or without hub (with robot interface creen), includes 3-76 FL-net, robot connection function and safety function by FL-net
- Side window and basic top cover of splashguard
- Automatic oil lubricating (standard)
- Illumination (standard)
- Coolant unit with chip flush - tank capacity 100L
- Outer coolant piping
- Fast data server (with compact flash memory 4GB)

## ROBODRILL ECO 3-axis

- FANUC ROBODRILL α-D14MiB series
- NRTL for ROBODRILL MiB5/LiB5without breaker box (ONLY NRTL)
- No coolant tank included
- Part program storage size 2Mbyte
- Ethernet function

**Add an optional Industrial or Cobot robot tender to ROBODRILL 3-axis or 5-axis (Not available for ECO 3-axis)**



# ROBODRILL Accessories

## Tooling Package

- BT30 tool holder tightening fixture



- ER20 wrench



- (10) retention knobs



- (10) BT30 ER20 collet holders



- ER20 15-piece collet set



1/16" - 1/2"

- 1/2" carbide endmill



- 3/8" carbide endmill



- 1/4" carbide endmill



- 1/8" chamfer mill



- Edge finder

## Vise Kit

- 4" Vise



- 4" Handle



- 4" Aluminum jaws



- (2) 3/8 tee nuts



- (2) Hold down bolts

## Other Accessories

- 5 gallon TRIM MicroSol 585XT coolant
- Brix refractometer coolant testing
- Vactra No. 2 way oil, 5 gallon pail
- 0.25 GPH 8" reach belt oil skimmer
- 4" aluminum jaws

# ROBOT MACHINE TENDER

## MTEC - MACHINE TENDING EDUCATIONAL CELL



Shown with FANUC ROBO DRILL D14MiB5

- Students familiar with CNC and/or robots have the opportunity to learn real world advanced automation integration
- FANUC CNC controller Interface between robot and CNC for seamless integration
- Preconfigured load and unload program templates for simple build with no complex programming needed

## MTEC Features

### FANUC ROBOTICS

#### FANUC LR Mate 200iD/7L long-arm 6-axis robot

- R30iB Plus robot controller

#### OR FANUC CRX-10iA collaborative 6 Axis robot

- R30iB Mini Plus robot controller

#### Optional 2D iRVision Available

### CNC

- Smart Trouble Shooting Function
- Memory card slot plus USB port
- Built-in interlock function for safety
- Enables robot operation and system status display on the robot operation screen
- Custom PMC to create, read, and write ladder programs



- Fold-up work table for laptop, textbook, etc.
- Safety area scanner for fenceless operation of LR Mate 200iD/7L robot work area
- 3-color beacon operation indicator light
- FANUC CRX operates in collaborative mode without safety area scanner
- Swivel casters with brakes and rotation lock
- Part locating template for NIMS mill block or dual conveyor in/out for parts blanks
- Single 2-jaw EOAT for NIMS mill block (3/4" x 2 1/2" x 3 1/2" aluminum, 50 pcs included)

MTEC FEATURES	ROBO DRILL CNC α-D14MiB5 FANUC 31i-B5	FANUC LR Mate Machine Tender	FANUC CRX Machine Tender
Pricing	\$\$\$	\$	\$
Integrated industrial production line	✓	✓	✓
Industry 4.0	✓	✓	✓
FANUC Certification	✓	✓	✓
FANUC CNC controls	✓		
Machine actual parts	✓		
CNC tool holder type	BT-30		
Coolant	✓		
Spindle RPM	10000		
FANUC robot machine tender	✓		
FANUC iRVision for inspection and sort		✓	✓
Fenceless robot cells with safety area scan		✓	
Fluid power pneumatics		✓	✓
Portable (fits in classroom)		✓	✓
Fault insertion		✓	✓
Robot end-of-arm tool		gripper	gripper
APT integration curriculum	✓	✓	✓
120V 20 amp		✓	✓





# ROBOT WITH CNC SIMULATOR

MTEC-SIM - MACHINE TENDING EDUCATIONAL CELL



- FANUC ROBODRILL Interface between robot and CNC simulator for integration training
- 120 VAC power connection to MTEC-SIM with on-board air compressor for self-contained cell operation
- Fits through 36" door
- Optional *iR*Vision 2D for error proofing and guidance



- Built-in toolbox for storage
- Students have the opportunity to learn real world advanced automation integration
- Preconfigured w/ load & unload program templates for simple build with no complex programming needed
- 3-axis mill and 2-axis lathe simulation

## MTEC-SIM Features

### FANUC

#### CNC

FANUC's CNC simulator is designed specifically for educational purposes, ensuring affordable access to the latest FANUC CNC platform in a compact and portable package, easily integrated into any classroom.

- Switchable mill and lathe system in one simulator
- 3-axis milling / 2-axis turning system + 1 spindle
- Conversational programming and 3D simulation (MGi)
- Inch / metric switchable
- 32 tool offset pairs
- Work piece coordinators G52-G59 + 48 additional on mill

#### ROBOTICS

##### FANUC ER4iA 6-axis robot

- R30iB Mate Plus controller

##### OR FANUC CRX-5iA collaborative 6 Axis robot

- R30iB Mini Plus robot controller

##### Optional 2D *iR*Vision Available

FANUC's new R30iB Plus robot controllers feature the new *iPendant* with enhanced screen resolution and processing capability.

The new user interface, *iHMI*, can display guides for setup and programming, as well as tutorials from the main home page which as a design common to FANUC CNCs, enabling easier use of robots.



- Modular robot cart
- Welded steel construction
- Fits through standard doorway
- Single 2-jaw EOAT for mill blank and lathe blank
- Fold-up work table for laptop, textbook, etc.
- Safety area scanner for fenceless operation of ER4iA robot work area
- FANUC CRX operates in collaborative mode without safety area scanner
- 3-color beacon operation indicator light
- Swivel casters with brakes and rotation lock



# PLC/HMI TRAINER

Rockwell Automation (Allen Bradley)  
CompactLogix control panel electrical project kit



- Rockwell CompactLogix 5380 controller w/ Integrated Motion (5069-L306ERM) w/ 16 24VDC digital inputs & 16 24VDC digital outputs
- Rockwell AB 10" PanelView 5000 Graphic Terminal (PanelView 5310)
- 5 Port Stratix Ethernet Switch
- Dual Ethernet Access Ports & Cable Glands for external device connections
- Pre-loaded with structured program template
- Endless possibilities - can connect to almost any device!
- PLC robot integration program template installed
- Also sold in kit form for student build-out

The PLC/HMI Trainer is ready to use as standalone OR integrate to any FANUC robot



Ready to interface with your FANUC CERT robot over Ethernet IP protocol or optional discrete I/O

Ask about your custom needs.  
Prices may vary.

## iC industrial Controls Center Features

### INCLUDES:

- NEMA 12 steel industrial enclosure
- 120V, 24 VDC power supply
- 120V 10' power cord
- 5 port ethernet switch
- Wireless ethernet bolt
- 4 pushbuttons
- 1 selector switch

### PLC: Compact Logix 5000 Series

- 32 task
- Dual IP mode (2 diff network connections)
- DLR, start and linear topologies supported
- 16 ethernet node connections max
- 32 socket connections max
- 2 CIP drive axis connections (position loop/servo control)
- Ladder structured text, function block diagram
- Sequential function chart programming interfaces
- 0.6 MB user memory
- 8 local I/O Modules max

### HMI: Panelview 5000

- 10.4" SVGA TFT color touch display
- 4:3 aspect ratio
- 800 x 600 pixel resolution
- 1GB RAM / 1 GB user memory



### OPTIONS:

- » Student build kit
- » Discrete I/O kit to FANUC LR Mate peripheral I/O board for robots without ethernet
- » Mobile workbench - adjustable height with power
- » Replenishment parts kit
- » Panel rebuild master kit

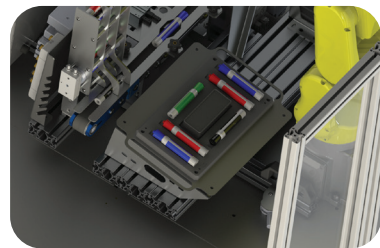
Hands-on PLC/HMI training available, visit [aptmfg.com/product-training](http://aptmfg.com/product-training) for more information.

# MECHATRONICS CERT CART

iIM5.0 - INDUSTRIAL INTEGRATED MECHATRONICS TRAINER



- FANUC ER4iA 6-axis robot -or- FANUC CRX-5iA collaborative 6 Axis robot
- Brushless DC motor and drive
- Power transmission via belt drive
- Conveyor part transport
- Fluid power (pneumatics)
  - Direction control valves
- Rotary actuator
- Escapement actuator
- Guided linear actuator
- Sensor technology
  - Optic
  - Laser
  - Solid state hall effect
  - Proximity
  - Inspection
- *Optional iCC PLC/HMI trainer*



## PBL (Project-based Learning)

- Product manufacturing with sortation and package assembly
- Bulk material infeed
- Color Sortation
- Robotic packaging/assembly



## iIM5.0 Features

### FANUC

#### FANUC ER4iA 6-axis robot

- R30iB Mate Plus controller

#### OR FANUC CRX-5iA collaborative 6 Axis robot

- R30iB Mini Plus robot controller

#### Optional 2D iRVision Available

FANUC's new R30iB Plus robot controllers feature the new *iPendant* with enhanced screen resolution and processing capability.

The new user interface, *iHMI*, can display guides for setup and programming, as well as tutorials from the main home page which as a design common to FANUC CNCs, enabling easier use of robots.



- Fold-up work table for laptop, textbook, etc.
- Safety area scanner for fenceless operation of ER4iA robot work area
- FANUC CRX operates in collaborative mode without safety area scanner
- 3-color beacon operation indicator light
- Swivel casters with brakes and rotation lock
- Dry-erase marker PBL
- On-board air compressor
- Plugs into 20 amp 120vac power
- NEMA 12 steel industrial enclosure
- 120V, 24 VCD power supply
- 5 port ethernet switch
- Wireless ethernet bolt



(Included with optional iCC PLC/HMI trainer)

#### PLC: Compact Logix 5000 Series

- Dual IP mode (2 diff network connections)
- DLR, start and linear topologies supported
- 16 ethernet node connections max
- 32 socket connections max
- 2 CIP drive axis connections
- Ladder structured text, function block diagram
- Sequential function chart programming interfaces
- 8 local I/O Modules max

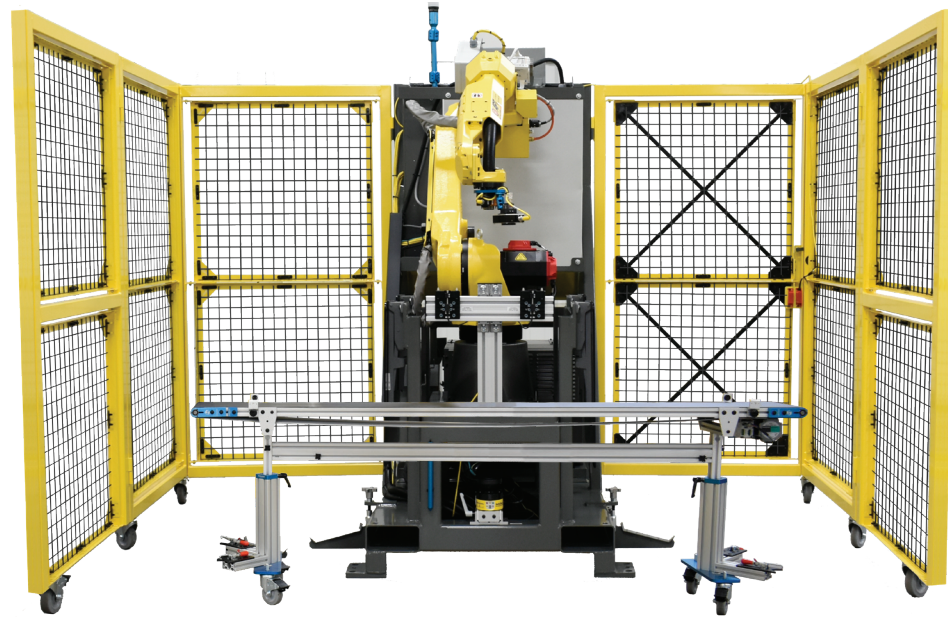
#### HMI: Panelview 5000

- 10.4" SVGA TFT color touch display



# INDUSTRIAL MATERIAL HANDLING TRAINER

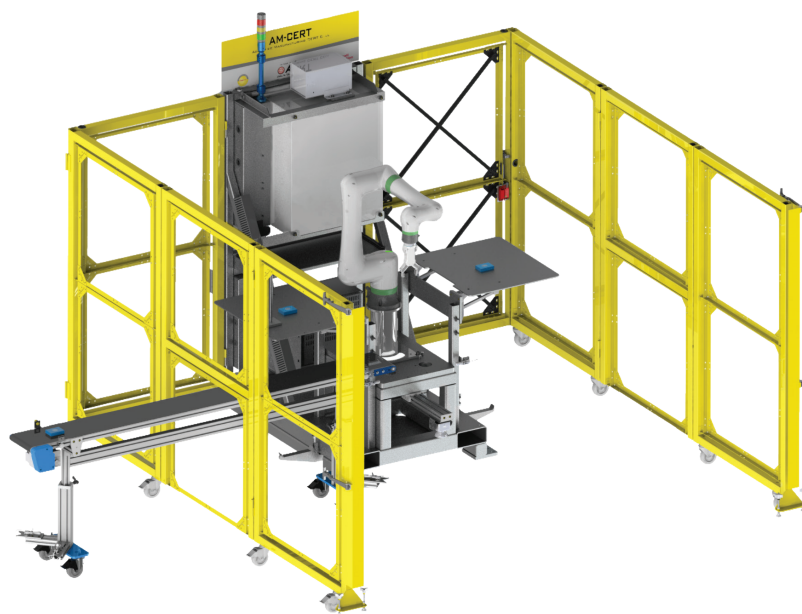
## AM-CERT - ADVANCED MANUFACTURING CERT CELL



Open: 10' deep x 10' wide x 88" high



Folded: 72" deep x 54" wide x 88" high



Rockwell PLC • FANUC Robot • FANUC *i*RVision • Swivellink® Conveyor  
Robotics • PLC • Safety • Pneumatics • I/O • Vision

### Product Options

AM-CERT-10	Material Handling CERT Cell with M10 Robot
AM-CERT-20	Material Handling CERT Cell with M20 Robot
AM-CERT-CRX	Material Handling CERT Cell with CRX Robot
Option 1	Swivellink® Conveyor
Option 2	Area Scanner 270° Protection (Standard on CRX)
Option 3	Automatic Tool Change (M10iD/M20iD only)
Option 4	Safety PLC Option
Option 5	Transformer 208V, 220V, or 240V 3-Phase Power (for M10iD or M20iD, CRX standard 120 VAC)

## FANUC

### FANUC M10iD or M20iA 6-axis robot

- R30iB Plus robot controller

### FANUC CRX-10iA 6 Axis robot

- R30iB Mini Plus robot controller

### Optional 2D *i*RVision Available

FANUC's new R30iB Plus robot controllers feature the new *i*Pendant with enhanced screen resolution and processing capability.

The new user interface, *i*HMI, can display guides for setup and programming, as well as tutorials from the main home page which as a design common to FANUC CNCs, enabling easier use of robots.



- Folding perimeter fencing
- Access panel for conveyor through the perimeter fence
- Slide out programming laptop desk w/ 110 VAC power supply
- Fold down pick and place tables
- SMC pneumatics, filter/regulator
- SMC valve bank wired to robot I/O
- SMC two-jaw robot gripper on M10iD, or M20iD robots, collaborative two jaw gripper on CRX robot
- Available ATI automatic tool change with separate gripper and vacuum tool on M10iD or M20iD robots
- Portable with pallet jack or forklift
- Safety interlocked entry door
- Light curtain or area scan safety for robot work area
- Area scan safety on CRX integrated for collaborative and non-collaborative robot operation
- Main power choice of 208 VAC 3 phase, 220 VAC 3 phase, or 480 VAC 3 phase
- 120 VAC 20 amp with CRX10iA



- 16 remote accessible configurable I/O points
- PLC control panel with viewing window, main power disconnect, program access port on outside of panel
- Rockwell CompactLogix™ or Compact GuardLogix® PLC cell control
- Rockwell PanelView™ 10" touch screen interface with cell function screens

# iLS - INDUSTRIAL LEARNING SYSTEM

This industry approved equipment is designed to use a single workstation with interchangeable learning lab modules. It will grow with your teaching preference, just add a different module to the existing workstation when you're ready to teach a new lab in your class.

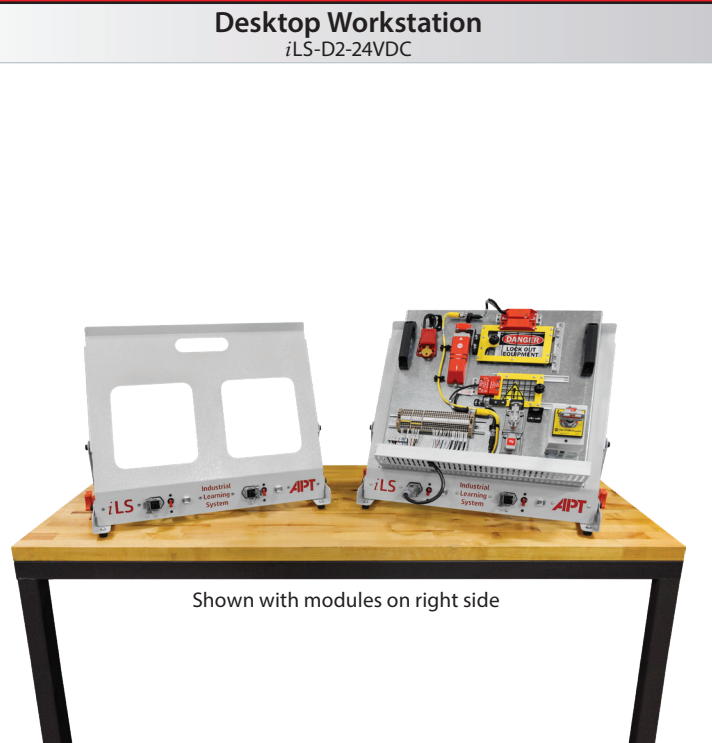
## Base Units

Both base units are customizable to fit your teaching and learning needs. Simply hang, connect, and test. The modules can then be interconnected to create a working industrial control system. Designed for multiple students with the same or different curriculum at one time.



Shown with modules on left side

1. Additional 120VAC Power Strip For Accessories
2. Quick Disconnect Plugs w/ 5A Breaker For 24VDC Module Power
3. On-Board Air Compressor
4. Wire Drawer
  - Holds up to eight (8) 500 ft reels of wire
5. Spare Drawer
  - Contains three (3) terminal screwdrivers, wire strippers, crimper, fluke meter, tube cutter, hex wrench
7. 120VAC, 15A Power Cord plugs into wall outlet for power
8. Overall dimensions: 72" L x 28.5" D x 77.25" H
9. Simple hanging cleat design

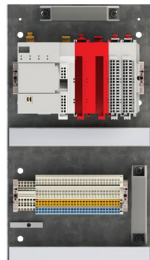
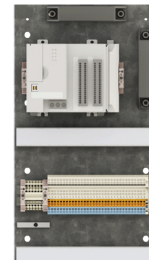


Shown with modules on right side



- DeskTop Unit holds
  - (2) Size 1 Modules
  - or
  - (1) Size 2 Modules
- Includes 120VAC Power Cord
- Quick Disconnect Plugs w/ 5A Breaker For 24VDC Module Power
- Non-Skid Feet.
- Simple hanging cleat design
- Dimensions:
  - Deployed: 25-3/4" W x 16" D x 19" H
  - Folded for Storage: 25-3/4" W x 20-7/8" D x 4-5/8" H

Hands-on iLS (Industrial Learning System) training available, visit [apmfg.com/product-training](http://apmfg.com/product-training) for more information.

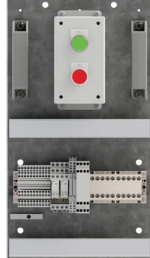
## Logic Systems

PLC Module - Guardlogix iLSM-W1-E-RAGLX	PLC Module - CompactLogix iLSM-W1-E-RACLX
 <p><b>Size 1 Hanging Module</b> 9-7/8" W x 18" H</p> <p>The GuardLogix module features a safety PLC which allows instructors to teach learners how to program safety devices and can be used with the light curtain, area scanner, and door interlock modules.</p> <p>Includes: Rockwell Automation GuardLogix 5380 Series Safety PLC, (1) Safety Input Module (1) Safety Output Module, (1) Standard Input Module, (1) Standard Output Module. Prewired I/O (50%) to Terminal Strip</p>	 <p><b>Size 1 Hanging Module</b> 9-7/8" W x 18" H</p> <p>The module features a Compact Logix PLC which allows instructors to teach introductory level PLC programming. The PLC includes both discrete &amp; analog cards with 16 input &amp; 16 output ports in each card. Can be used in combination with the RAPV10 module to teach a full course on HMI programming. It can also be used in combination with many of the other ILS modules to expand its potential for learning experiences.</p> <p>Includes: Rockwell Automation CompactLogix 5370 Series PLC and 16/16 Built-In I/O Also equipped with Analog I/O &amp; a high speed counter. Discrete I/O prewired to terminal strip</p>

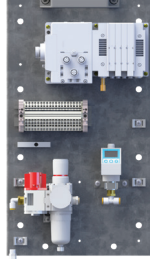
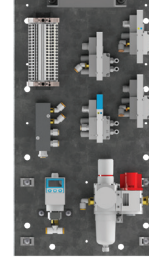
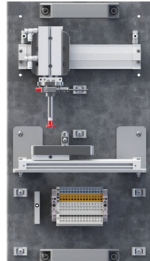
## Operator Interface

Push Button Interface Module iLSM-W1-I-RAPB9	HMI Module iLSM-W2-I-RAPV10
 <p><b>Size 1 Hanging Module</b> 9-7/8" W x 18" H</p> <p>The PB9 module is a push button interface panel with 9 devices, including push buttons, selector switches, E-stop button, and more. This is an excellent tool for teaching introductory lessons on panel wiring. It can be combined with other modules to expand its capabilities such as RARLY2B, RACOC, RAPFXVFD, and many others. The module is delivered unwired, which allows it to be transformed into the perfect use at the right moment.</p> <p>Includes: Rockwell Automation Pushbutton Enclosure For (9) Devices, Illuminated Buttons, Selector Switches, E-Stop Button, Potentiometer, Joystick, Bubble Light, &amp; Buzzer.</p>	 <p><b>Size 2 Hanging Module</b> 19-7/8" W x 18" H</p> <p>The HMI module features a PanelView 5310 mounted on a hinged door, allowing easy access to the data ports on the rear of the HMI. This module is ideal for teaching introductory and advanced HMI programming and can easily be combined with either the RAGLX or RACLX modules.</p> <p>Includes: Rockwell Automation PanelView 5000 HMI. Includes 10" HMI Mounted To Hinged Door.</p>

## Electrical

Relay Module iLSM-W1-E-RARLY2B	
 <p><b>Size 1 Hanging Module</b> 9-7/8" W x 18" H</p> <p>The Relay module features a selection of multiple relays, such as ice cube relays, a timer relay, and 2 terminal relays. It also includes a 2-button push button panel for START-STOP circuits. This module can be used in combination with many other modules to expand its potential in learning experiences.</p> <p>Includes: Rockwell Automation Relay Module, (2) Illuminated Buttons, (2) Contactors, (2) Ice Cube Relays, (2) Terminal Relays, and (1) Timing Relay. Can be used for various Relay Logic Circuits &amp; Conveyor Controls. Conveyor Not Included</p>	

## Pneumatics

Pneumatic Module - Ethernet IP iLSM-W1-P-SMC4PV	Pneumatic Module - Discreet iLSM-W2-P-SMC4VIND
 <p><b>Size 1 Hanging Module</b> 9-7/8" W x 18" H</p> <p>The Pneumatic Valve Manifold module includes 4 unique valve types that can be controlled via ethernet through a PLC. This module allows for more advanced instruction in pneumatic systems and must be integrated with either the RAGLX or RACLX PLC modules. Further extensions in learning experiences could be made by including the use of safety devices such as the INTLK, RALC300, &amp; HKSCAN modules</p> <p>Includes: SMC Pneumatic Valve Manifold. Includes (4) Unique Valve Types and Ethernet Protocol Communications. Requires PLC</p>	 <p><b>Size 1 Hanging Module</b> 9-7/8" W x 18" H</p> <p>The 4-valve Pneumatic module contains four different valves, each of which is used on the Mechatronics cart. It also contains a flow regulator. Each valve is pre-plumbed to the flow regulator and pre-wired to the terminal. This module is best used to teach introductory pneumatic systems concepts when used in combination with the SMC4PV and SMC4VIND modules.</p> <p>Includes: SMC Pneumatic Individual Valves (4) Of Various Types Prewired To Terminal Strip, &amp; FRL Unit With Pressure Switch. Requires either the RAPB9 or RARLY modules for controls</p>
<p><b>Project Module: Pneumatic Pick &amp; Place</b> iLSM-W1-P-SMCPNP4V</p>  <p><b>Size 1 Hanging Module</b> 9-7/8" W x 18" H</p> <p>Module brings the pneumatic systems boards full circle with a project-based focus. Learners design a pneumatic system to pick up a quarter-sized disc &amp; move it to a new location. Must be controlled using the RAPB9 or RARLY modules, it can also be controlled using the RAGLX or RACLX PLC modules. DOES NOT include any valves &amp; must be used in combination with either the SMC4PV or SMC4VIND module.</p> <p>Includes: Pneumatics automation project illustrates a common industrial pick &amp; place application, pneumatic actuators w/ sensors &amp; vacuum suction cup w/ pressure sensor. Requires some form of control logic (e.g. PLC, 9PB Button Module, Relay Module, etc.) AND either the iLSM-W1-P-SMC4PV or iLSM-W2-P-SMC4VIND Module</p>	

## Safety Devices

### E-Stop Module *iLSM-W1-S-RAESTOP*

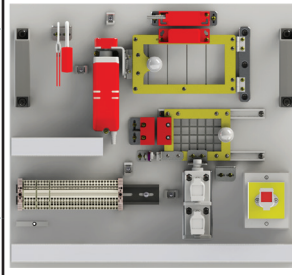


#### Size 1 Hanging Module 9-7/8" W x 18" H

The E-stop module features a safety controller and safety relays. Instructors can teach learners how to wire discreet safety circuits. It can also be used in combination with other equipment such as the conveyor or 3-phase motor.

Includes: Rockwell Automation E-Stop. Includes E-Stop Button, Safety Relays, (2) Illuminated Buttons.  
Conveyor Not Included

### Door Interlock Module *iLSM-W2-S-INTLK*



#### Size 2 Hanging Module 19-7/8" W x 18" H

The Door Interlock Module consists of multiple interlock devices including door interlocks, solenoid locks, and trapped key locking. This module can be used to demonstrate how to program and troubleshoot safety interlock devices. All devices are pre-wired to the terminal strip, making it easier for learners to focus on the programming and troubleshooting. It is recommended to use this module in combination with the RAGLX module.

Includes: Rockwell Automation various types of door interlocks, non-contact coded magnet, solenoid locking, & trapped key. All devices pre-wired to terminal strip.

### Light Curtain Module *iLSM-T4-S-RALC300*



#### Desktop Module

Deployed: 25-1/2" W x 13-1/2" H x 8-1/4" D  
Folded for storage: 25-1/2" W x 4-5/8" H x 8-1/4" D

The Light Curtain module uses 300mm long light curtains, which fold down for easy storage. Students will learn how to program safety circuits with the RAGLX module. They also will learn how to make alignments and troubleshoot error messages related to light curtains. The base of the module comes with a handle making it easier to transport. It can be used in combination with many other modules, especially when using the RAGLX & RAPV10 modules.

Includes: Rockwell Automation 450L-Series Light Curtain Emitter/Receiver Pair, 300mm Length, & Cables  
Requires *iLSM-W1-S-RAESTOP* for Full Utilization

### Area Scan Module *iLSM-T4-S-HKSCAN*



#### Desktop Module

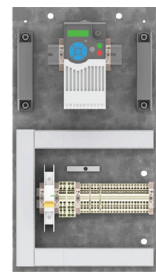
5-1/2" W x 6-1/2" H x 5-1/2" D

The Area Scanner module consists of a Hokoyu area scanner set in a small base. The Hokoyu area scanner is the same scanner used on the Mechatronics Cart and CSM stations. Students will learn how to program and setup the area scanner in combination with the RAGLX module. The Hokoyu area scanner requires an app through Hokoyu to complete the setup process.

Includes: Hokoyu Area Scanner, w/ E-Stop and Warning OSSD Outputs. 270 Degree Scan.

## Motor Control

### VFD Module *iLSM-W1-D-RAPFXVFD*



#### Size 1 Hanging Module 9-7/8" W x 18" H

The VFD module uses a PowerFlex VFD to allow modifications to power sources to meet the needs of the circuit. It is best used in combination with the OR3PHGM and RACOC modules in regards to motor control circuits. The VFD utilizes 120 VAC power, which is provided by the power strip on the ILS base. Students learn how to change settings within the VFD to create the power supply they need such as 3-phase 240 VAC

Includes: Rockwell Automation Powerflex Variable Frequency Drive (VFD). Converts 120VAC From Power Strip To 240VAC 3 Phase To Control Motor.  
Note: Requires *iLSM-T4-M-OR3PHGM*.

### Contactor / Overload Module *iLSM-W1-D-CONOL*

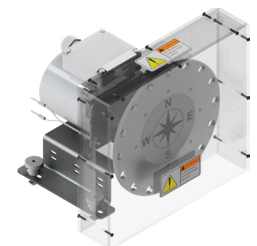


#### Size 1 Hanging Module 9-7/8" W x 18" H

The Contactor/Overload Module is perfectly designed to teach motor control circuits. It combines both forward & reverse motor starters with a basic motor starter. The basic motor starter circuit uses 3 breakers with an overload sensor to teach students how to safely wire 3-phase motor circuits. The forward/reverse motor circuits use a motor starter protector with 2 motor starters. Board comes unwired with all components. This module is designed to be used in combination with either the RARLY2B or RAPB9 module to control the start sequence. Use the RAPFXVFD and OR3PHGM modules to then operate the motor. It can also be used with the RAGLX or RACLX modules for PLC programming w/ motor controls

Includes: Rockwell Automation Contactor and Overload Module. Includes (1) Non-Reversing Contactor With Motor Starter Protector, and (1) Reversing Contactor With Traditional Circuit Breaker/Overload Device.  
Note: Requires *iLSM-T4-M-OR3PHGM*.

### 3-Phase Gear Motor Module *iLSM-T4-M-OR3PHGM*



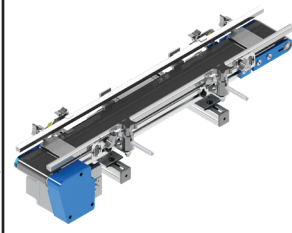
#### Desktop Module

10-1/4" W x 9-1/4" H x 8-3/4" D

The 3-phase Gear Motor module is a 3-phase, 230VAC motor which includes a proximity sensor and a photoeye to provide coarse and fine positioning. The motor is mounted to the tabletop of the iLS base using two bolts.

Includes: Inverter-Duty Gearmotor, 230VAC, 3PH, Aluminum disc with holes. A proximity sensor & photoeye provide coarse & fine positioning.

### Conveyor Module *CON-4536TNM-BL-E*



#### Desktop Module

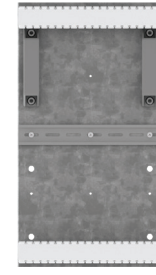
36-1/2" L x 16-1/2" W x 9-7/8" H

The Conveyor module is a 36" conveyor which is mounted to the ILS tabletop. It uses an EIP Remote I/O block to communicate with a PLC such as the RAGLX and RACLX modules. It can also be wired discreetly when combined with the RAPFXVFD RACOC modules. This is a tremendously versatile module and can be used to teach a wide range of concepts.

Includes: Belt conveyor with pre-wired brushless DC motor & variable speed control. Measures 4-1/2" W x 36" long. Photo eyes at each end prewired to EIP Remote I/O Block. Can be used stand-alone or connected to other modules.

## Accessories

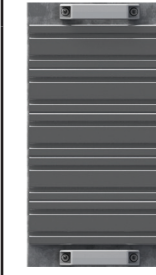
### Blank Module - Size 1 *iLSM-W1-G-APTBLNK*



#### Size 1 Hanging Module 9-7/8" W x 18" H

Blank Module For Customizing.  
Includes Handles, Wire Duct, and DIN Rail.

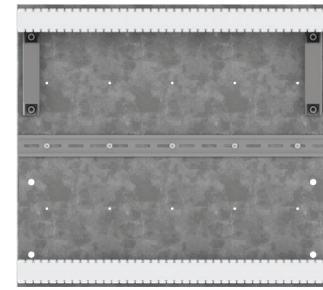
### T-Slot Hanging Module *iLSM-W1-G-TSLOT*



#### Size 1 Hanging Module 9-7/8" W x 18" H

T-Slot Mounting Board

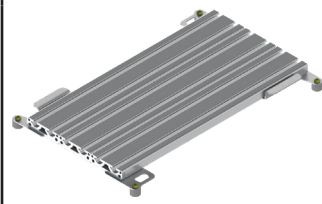
### Blank Module - Size 2 *iLSM-W2-G-APTBLNK*



#### Size 2 Hanging Module 19-7/8" W x 18" H

Blank Module For Customizing.  
Includes Handles, Wire Duct, and DIN Rail.

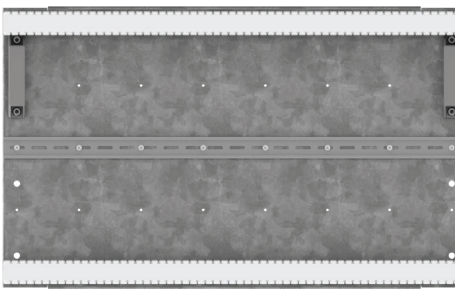
### T-Slot Desktop Module *iLSM-T4-G-TSLOT*



#### Desktop Module 9" x 18"

T-slot mounting board is designed to be used on a table top or work bench allowing the students to set up and build what they would like. It is equipped with rubber feet for stability and scratch resistant to the desk.

### Blank Module - Size 3 *iLSM-W3-G-APTBLNK*

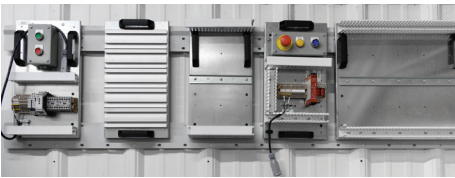


#### Size 3 Hanging Module 29-7/8" W x 18" H

Blank Module For Customizing.  
Includes Handles, Wire Duct, and DIN Rail.

## Storage

### Wall Mount Storage Rails *iLSM-WSR72*



72" W x 18" H x 1/2" D

Wall Mount Storage Rails made from steel and powder coated for protection (Shown with Modules)

### Stand Alone Storage Rack *iLSM-MSR*

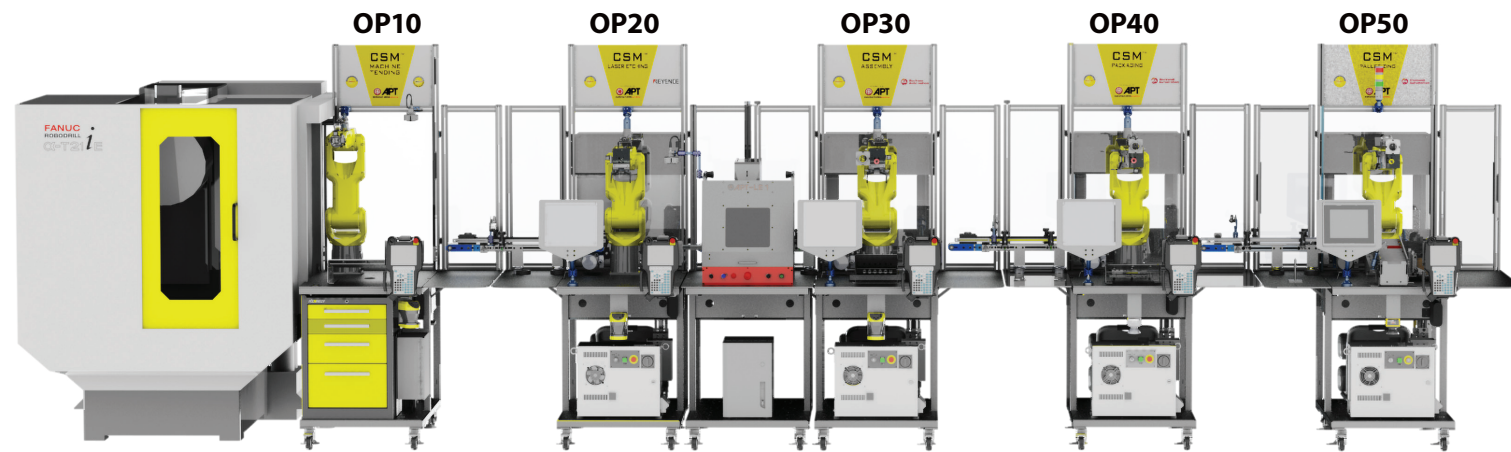


42-1/4" W x 78" H x 26-1/2" D

Stand Alone Storage Rack with castors for ease of moving and storing. The rack contains (4) Size 3 storage panels on the inside and (6) Size 2 panels on sides, providing storage for up to 24 Size 1 panels. The Storage Rack also has two stationary shelves for extra storage. (Shown with Modules)

# SMART MANUFACTURING TRAINING SYSTEM

## CSM™ - CONNECTED SMART MANUFACTURING



Individual OPs can be purchased with OP30



\*\*The OP10 cannot be separated from the CNC once mated through the controls



Shown with ROBODRILL CNC



CSM FEATURES	FANUC CNC Controls			FANUC Industrial Robot				
	CNC Simulator O/F Plus Controls	Level CNC LMV-400 O-i-MF Controls	ROBODRILL CNC α-D14Mi/B5 FANUC 31i-B5	OP10 Machine Tender	OP20 Laser Part Marking	OP30 Assembly Station	OP40 Packaging Station	OP50 Palletizing Station
Pricing	\$	\$\$	\$\$\$	\$	\$\$\$	\$\$	\$\$	\$\$
Integrated industrial production line	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Production line flow	Right	Left	Right	Follows CNC flow				
Industry 4.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Project-based mechatronics					Yes	Yes	Yes	Yes
FANUC Certification	Yes	Yes	Yes	Yes	Yes	Yes		Yes
FANUC CNC controls	Yes	Yes	Yes					
Machine actual parts		Yes	Yes					
CNC tool holder type		S20T ER-16	BT-30					
Coolant		Yes	Yes					
Spindle RPM		14000	10000					
FANUC robot machine tender	Yes	Yes	Yes					
FANUC iRvision	Yes			Yes	Yes	Yes	Yes	Yes
Vision-guided pick and sort						Yes	Yes	
Vision inspection				Yes	Yes	Yes	Yes	Yes
Fenceless robot cells with safety area scan				Yes	Yes	Yes	Yes	Yes
Rockwell Studio 5000 Logix PLC					Slave	Master	Slave	Slave
Rockwell Safety PLC				Yes	Yes	Yes	Yes	Yes
Rockwell HMI PanelView™ touchscreens					Yes	Yes	Yes	Yes
Rockwell e-learning subscription					Yes	Yes	Yes	Yes
Fluid power pneumatics				Yes	Yes	Yes	Yes	Yes
Part traceability and marking					Yes			Yes
Modular work cells (can be used independently)	Yes	Yes	Yes	**	Yes	Yes	Yes	Yes
Portable (fits in classroom)	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Wired or wireless between stations				Yes	Yes	Yes	Yes	Yes
Fault insertion				Yes	Yes	Yes	Yes	Yes
Smart sensor technology I/O link with diagnostics					Yes	Yes	Yes	Yes
Dual robot end-of-arm tool vacuum/mechanical grip					Yes	Yes	Yes	Yes
Conveyors with VFD (variable speed drives)					Yes	Yes	Yes	Yes
RFID manufacturing process tracking					Yes	Yes	Yes	Yes
APT integration curriculum	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
120V 20 amp	Yes	Yes		Yes	Yes	Yes	Yes	Yes

## FANUC

### Robotics

#### Robot Options Include:

- FANUC LR Mate 200iD/7L
- LR Mate 200iD
- CRX-10iA
- SCARA SR-6iA

FANUC's new robot controllers feature the new *iPendant* with enhanced screen resolution and processing capability. The new user interface, *iHMI*, can display guides for setup and programming, as well as tutorials from the main home page which has a design common to FANUC CNCs, enabling easier use of robots.

Using the programming guide, even first-time robot users can create a program for a simple handling task and execute it in just 30 minutes! Easier usage also improves efficiency by facilitating system setup and maintenance.

### ROBODRILL - CNC

High-Performance Vertical Machining Center  
α-D14MiB(5)

The ultimate all-round vertical machining center

Model M, perfect for milling and drilling tasks requiring maximum precision, versatility and reliability.

- Optimal acceleration and deceleration control
- Rigid Design
- Easy maintenance and operation
- Extremely Fast .9 second tool change
- High Precision Control
- Designed for easy automation



### Controls

- Rockwell CompactLogix or GuardLogix PLC cell control
- Rockwell PanelView 10" touch screen interface with cell function screens
- Safety interlocked entry door
- 16 remote accessible configurable I/O points
- 3 color beacon light
- Main power disconnects
- Program access port on outside of panel
- Area scan safety for robot work area



### Integration

This system is truly like no other Industrial System for Education Institutions.

Your students will use FANUC/Rockwell products on a factory system to understand a fully integrated line. Each cart can also be detached for individual learning.

#### Integration from:

- FANUC CNC Machine Making Product
- OP10 Machine Tending the CNC
- OP20 Laser Marking the product
- OP30 Assembly of the product
- OP40 Packaging the product in boxes





# CONTROLS INTEGRATION

Controls integration is the key to connected systems, IIoT, and industry 4.0. In order to continue to advance in manufacturing technology, we must continue to train connected systems, hardware and software, and integration of control systems.

APT equipment is designed specifically to teach advanced electrical hardware, software development, and integration of control systems. We are using the same equipment and software that is being used in the majority of industrial equipment; not what is cheapest or has free software. We are using the latest technology and hardware.

We have partnered with FANUC America to offer EDU grants and Rockwell Automation to provide Learning+, where applicable, to schools who want to get involved on this advanced manufacturing training.

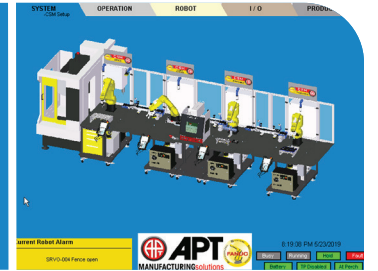
APT provides all programs, drawings, templates, and design documentation unlocked and free of charge. The school has access to every part of the controls system and access to any passwords and security setup within the equipment to develop and teach curriculum that best suits the industry in their region. Our sample programs and templates have been developed by observing and taking the best programming methods observed over 25 years of industry practice. The HMI interface and PLC code and structure focus on simple core programming methods that make operating, maintaining, and troubleshooting easy to perform. Our hope is that this focus on ease of use and simple programming gets distributed through all students that learn on our equipment.

Our design allows for students and instructors to have fully functional industrial grade safety systems that allow the system to run at greater speeds than typical education system should be allowed to run. The safety systems also allow for students and instructors to work closely with the equipment and remain safe. Our fenceless versions of equipment allow personnel to approach the equipment and the equipment will slow down or stop accordingly and then resume once it is safe.

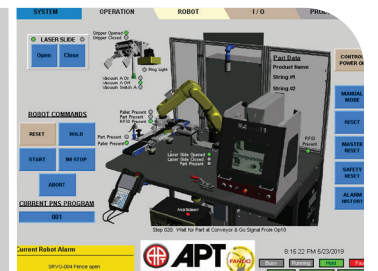
# AN IN-DEPTH LOOK AT THE OPERATOR INTERFACE

The HMI is broken into 5 color coded tabs with enhanced diagnostics on the system. 3D graphics are put on the different screens just as we would in the industry.

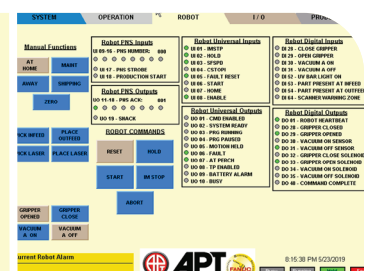
**SYSTEM** - These screens are used for general machine setup. A majority of the functions available on the systems require security requirements to access them. Several functions on the System HMI screens include: VFD frequency setup; Recipe Management System, Inspection Limits, I/O Link Setup, Login, and System Security Settings.



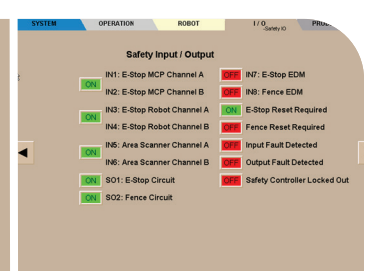
**OPERATIONS** - These screens are used for general machine operation and functionality. 3D model images are used to aid with the intuitiveness and ease of use. Status Indicators, Mode Control, and Manual Operations, along with Operational and Fault Messages are displayed on these screens.



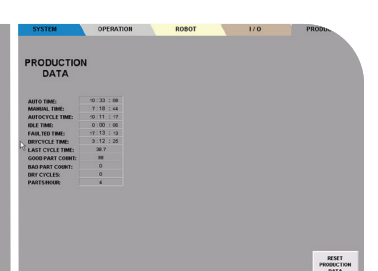
**ROBOT** - This screen displays all communication and I/O interface between the system PLC and robot. Users may also manually control the functions of the robot and call a specific robot program to run from this screen.



**I/O** - On this screen users can see all I/O within the system, its present status on/off to run diagnostics and aid in troubleshooting.



**PRODUCTION** - From these screens the user can view and capture production data to be used for business analytics. Recipe management and the production scheduler allow the users to edit the parameters and schedule all products the system can run.



# ROBOTIC WELDING TRAINER

CHOOSE  
YOUR  
**FANUC**  
ROBOT



Products	Fenced Robot Cart	Fenceless Cobot Cart
Products	Fenced Robot Cart	Fenceless Cobot Cart
System Model	APT ARC50	CART 10S
6-Axis Robot	ARC Mate 50iD Traditional Robot	CRX-10S Collaborative Robot
Robot Reach	36"	49"
Robot Power	120v 20 amp	120v 20 amp
Robot Programming	Traditional Teach Pendant	FANUC Tablet
Robot Torch Guidance	Traditional Teach Pendant	Clever Torch Teach Guidance
Torch Roller Dress-out	Custom	MOD-WELD Rollers
Fume Extractor	Standard	Option
Cart Footprint	57-1/4"W x 73-1/4"D	40"W x 78"D
Cart Table Work Space	19-1/2" x 24"D fixture plate, 54"W x 51"D	40"W x 58-1/2"D
Cart Table Hole Size	16mm Dia, 2x2 Hole Pattern	16mm Dia, 2x2 Hole Pattern
Approx Weight w/ Welder	1,150 lbs	1,300 lbs
Torch	22.5 degree torch angle	22.5 degree torch angle
Grant	Both carts can qualify for FANUC \$403,000 Grant, see Grant Specs	
FANUC Software	Both carts come with the FANUC ARC Tool EDU Software Bundle	
Tips & Tricks	FANUC CRX Welding Tips & Tricks	

## Choose Your Options

Products	Fenced Robot Cart	Fenceless Cobot Cart
Vision	Yes	No
PHV Fume Extractor	Included	Optional with Fenceless Cart
Handheld Torch	All-in-one manual to robotic MIG wire weld gun. Remove the gun going to the robot and plug the optional 15' handgun into the existing power source to get 2 ways to weld. Robot welding will not work while handheld torch is being used.	
PPE	<ul style="list-style-type: none"> <li>Weld Helmet</li> <li>Weld Gloves</li> <li>Safety Glasses</li> </ul>	
Work Holding	<ul style="list-style-type: none"> <li>(1) Pivot Angle 150 Mini – Included 6" x 15" x 6"</li> <li>(1) Mini Multi Angle – Included 3.6" x 1.7" x 3.4"</li> <li>(1) Mini Angle – Included 2.3" x 1.3" x 2.1"</li> </ul>	

Hands-on FANUC CRX cobot welding training available, visit [aptmfg.com/product-training](http://aptmfg.com/product-training) for more information.

## Choose Your Power Supply



400i	TPSi, air-cooled torch for welding steel. Comes with .035 wire feed rollers 3PH Power and PMC Software. Optional consumable or replacement parts up to 1/16
400i-C-S	TPSi, cooler, water-cooled torch, push/pull CMT ready package (CMT Software not included) for both steel (hard wire) & aluminum (soft wire) Equipped with 3/64 start-up consumables & drive wheels for aluminum welding. 3PH Power. PMC Software included.

### Fronius Options

CMT	Fronius Cold Metal Transfer (CMT) welding, only available in CMT ready machines. Ideal for high performance welding in the areas of thin materials, brazing, visual aesthetics, cladding & WAAM welding consisting of all ranges of materials from Aluminums, Steels, Coppers, Titanium, & Nickel alloys
LSC	Fronius Low Spatter Control, achieves high-quality weld seams with minimal spattering and increased deposition rate, as the LSC principle is based on the short circuit occurring at a low current level. This leads to soft reignition and a stable welding process.

## Fronius TPS/i

### The Ultimate in Flexibility

The TPS/i can be equipped with different software packages, known as Welding Packages—from the introductory package to the high-end solution. The modular structure and regular software updates expand the system's range of functions, providing the user with the perfect configuration to suit every challenge. The standard or pulse processes are available as basic packages. The advanced Welding Packages LSC, PMC, or CMT, are available for particularly demanding welding tasks.

### Customizable

- All required welding parameters are directly accessible

### At a glance

- All work parameters can be accessed via the first menu level

### Immediate access to 5 EasyJobs and more

- Recurring welding tasks can be set quickly & easily

### Just 2 clicks

- Quick change between characteristics/process parameters

### 7" color display

- With plain text display and touchscreen

### Practical

- Can be easily operated with welding gloves

### Languages

- Over 30 languages can be selected for operation



350D	Auto Deltaweld 1PH, air-cooled torch for welding steel. Comes with .035 wire feed rollers. Optional consumable or replacement parts up to 1/16
------	--

### Miller Options

Available Training	Miller OpenBook
--------------------	-----------------

## Auto Deltaweld™ Systems

### Take your welding to the next level.

The Miller® Auto Deltaweld™ Basic is an easy-to-integrate, easy-to-operate, automated welding power supply. It's an innovative solution for collaborative robot (cobot) customers who are looking to reap the benefits of automated welding without the cost and complexity of traditional automation power supplies.

### Easy to use

- Programming and operation is driven to the cobot pendant to allow for a single-point user interface.

### Pulse capable

- Accu-Pulse offers a more forgiving arc and compensates for variations in operator technique, providing a wider operating window.

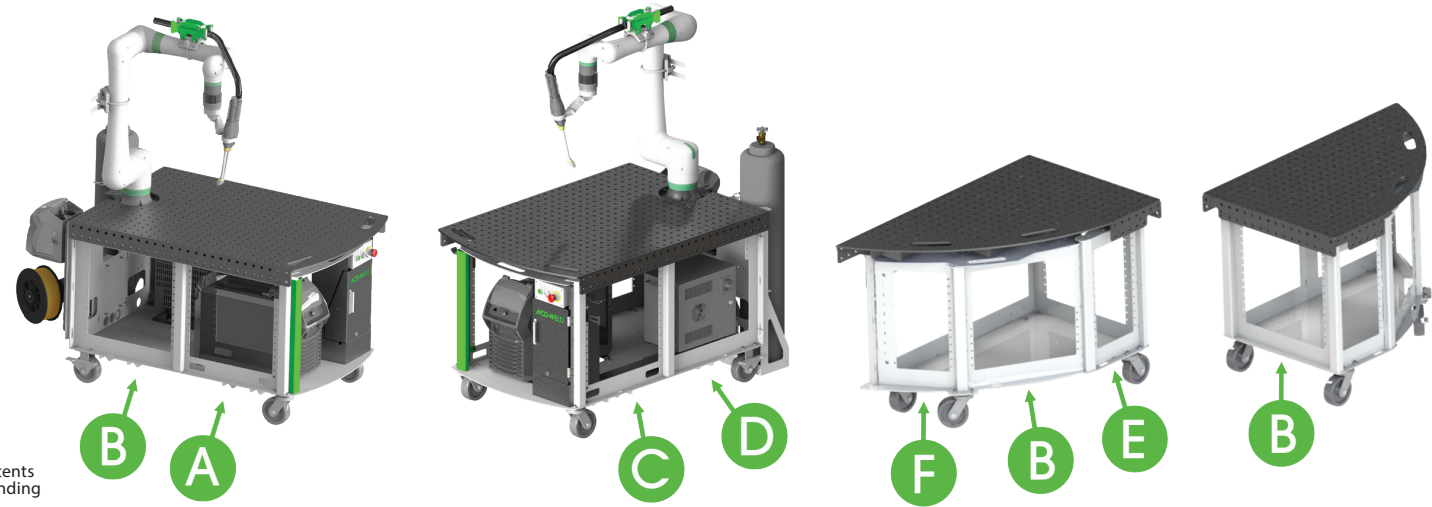
### Easy to integrate

- Auto Deltaweld provides both Modbus TCP & EtherNet/IP for direct communications to your cobot.

## OpenBook™

OpenBook™ is Miller's learning management software. It's designed to help you plan, offer, and assess student learning. It provides welding instructors, learners, and management with an easy tool to teach welding concepts and techniques to a variety of students - from those just starting out to professionals in the field who'd like to learn new skills or refresh their current techniques.

# COBOT CART ACCESSORIES



Patents Pending

Side carts have locations for "wide" and "narrow" accessories  
Accessories are built with 14 ga steel, powder coated for durability.

## Drawers and Shelves

All drawers have ball bearing slides for smooth function.

DW1025		DW2025	
	Shallow drawer - Narrow Inner Dimensions: 8.8"W x 14.8"L x 2.4"H		Shallow drawer - Wide Inner Dimensions: 18.8"W x 14.8"L x 2.4"H
DW1040		DW2040	
	Medium drawer - Narrow Inner Dimensions: 8.8"W x 14.8"L x 3.9"H		Medium drawer - Wide Inner Dimensions: 18.8"W x 14.8"L x 3.9"H
DIVS10		DIVS20	
	Drawer divider set for narrow drawers Fits in: DW1025, DW1040		Drawer divider set for wide drawers Fits in: DW2025, DW2040
SH1025		SH2025	
	Storage shelf - Narrow 10"W x 15.75"L x 2.5"H		Storage shelf - Wide 20"W x 15.75"L x 2.5"H
SCSH10		SCSH20	
	Spray can storage shelf - Narrow 12"W x 3.625"D		Spray can storage shelf - Wide 22"W x 3.625"D

## Collaborative Positioners

Collaborative Manual Index Positioner for Collaborative Robot Welding

MIT40



Shown with WS 1826 Weld Screen

Shown on Mod-Weld Cart

Heavy Duty locking w/ hardened blocks

- Manual index positioning table with locking slide in 4 locations.
- Built with a 5/8 steel plate with fixture holes on 2" centers.
- Industrial heavy duty bearing for ease of rotation with a load.
- Grounding block engaged at all time includes a 6' grounding cable.

## Storage, Bin, Clamps and Pins

BINP10		BINP20	
	Bin box panel - Narrow, Includes 2 bins Bin size: 4 1/8"W x 5 3/8" L x 3" H		Bin box panel - Wide, Includes 4 bins Bin size: 4 1/8"W x 5 3/8" L x 3" H
CR1007		CR2013	
	Clamp Hanger - Narrow 7 clamp notches		Clamp Hanger - Wide 13 clamp notches
PB1006		PB2006	
	Pegboard Panel - Narrow Ø.25 holes, 1" spacing, Hole array 10 x 6		Pegboard Panel - Wide Ø.25 holes, 1" spacing, Hole array 20 x 6

## Blank Covers

BP1045		BP2045	
	Blank plate - Narrow 10" x 4-1/2" Tall		Blank plate - Wide 20" x 4-1/2" Tall

## Holder

AGHG45	
	Angle Grinder Holder with Cord Wrap Fits 4-1/2" Grinder

## Safety

PCMC-8



Pull curtain - #8 plastic curtain  
Magnets secure curtain seam together for added arc flash safety.  
This is not a safety shield from the robot

WS1826



Tabletop Magnet Screen - #8 Dark Shield  
Mounts in 2 directions, 18" x 26"

# ROBOT ACCESSORIES

## Pedestals

We stock pedestals for the CRX and LR Mate robots.

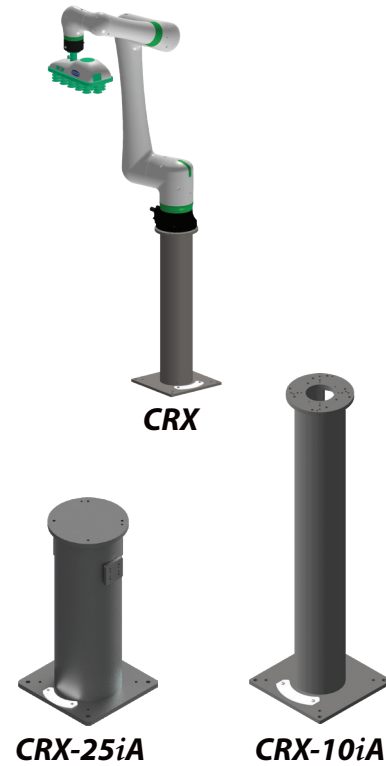
- Holes for leveling and anchoring
- Steel welded construction
- Powder coat finish
- LR Mate sizes from 24" to 48" tall in 6" increments
- CRX-10iA sizes from 12" to 48" tall in 6" increments
- CRX-20iA sizes from 18" to 30" tall in 6" increments

When mounting the LR Mate we recommend guarding (see page 42).

*Always be safe when operating a robot.*



LR Mate



CRX

CRX-25iA

CRX-10iA

## Mobile Cart

- 27 1/2" wide x 47 1/4" long
- Optional wings fold to fit through standard 36" door
- Out-of-the box solution for FANUC CRX as a mobile training system.



Add wings to expand work area to 57" wide x 47 1/4" long

## Mobile Pedestal

Kit includes:

- CRX pedestal (see above for pedestal sizes)
- Mobile base
- Controller bracket
- Teach tablet holder

- Heavy duty welded steel construction
- Standard gray powder coated finish
- Total locking swivel and wheel brakes
- Industrial swivel leveling feet for stability
- Non-slip pads on each leveling foot
- Large footprint for stability

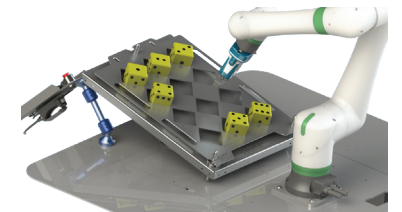


CRX-25iA Kit

## Mobile Cart Optional Add-ons

### Parts Feeder Kit with 3" Foam Dice Blocks

- Fixed grid, 12 location diamond template with six (6) 3" foam dice cubes

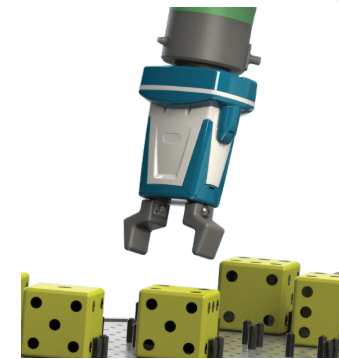


- Pegboard reconfigurable template with 50 locator pegs and six (6) 3" foam dice cubes



### Robot End-of-Arm Tool

- Schunk CoAct collaborative EOAT
- Parallel gripper kit with 2 jaws for 3" blocks
- Ready to connect to FANUC CRX



Parts Feeder Kit sold separately  
CRX-10iA Kit

# ROBOT ACCESSORIES

## Swivellink® 4-1/2"W X 36"L Variable Speed Conveyor

- Swivellink® belt conveyor with variable speed capability (conveyor mounted speed control)
- 4-1/2" wide bed, 4-1/4" wide belt, 36" overall length conveyor
- Hard stop each end of conveyor
- Optical sensor at idle end of conveyor on adjustable mount
- Optical sensor at drive end of conveyor on adjustable mount
- Sensor cables and motor control forward / reverse terminated in small junction box
- 120 VAC Power cable



### Free Standing Conveyor

- Free standing conveyor base with adjustable height stands
- Locking swivel casters for portability
- Adjustable side rails

### Magnetically Mounted Tabletop Conveyor

- Conveyor base with switchable magnetic mounts
- Side rails, one side fixed, opposite side adjustable



## Safety Fencing

### Create a "Lab Environment Work Cell" for Robots

This is industrial guarding "STRONGUARD®" used in industry for perimeter guarding around robot cells. We offer this to education for students to safely run the robot and additional students see over the top of the guarding for instructional purposes. All the standard guarding is 53" tall for visibility, we offer a few kits that we feel would be best used for these robots:

- 5' x 5' for SCARA or FANUC LR Mate
- 7' x 7' for FANUC M10
- 10' x 10' for FANUC M20
- Additional sizes also available

The safety mesh is 2" x 2" black coated, the post and frames are made of steel and are powder coated Safety Yellow. We offer several safety options that include:

- Gated entry with latch and interlock switch.
- Light curtain, three-sided guarding with one open side.
- Area scanner kit with narrower side panels.

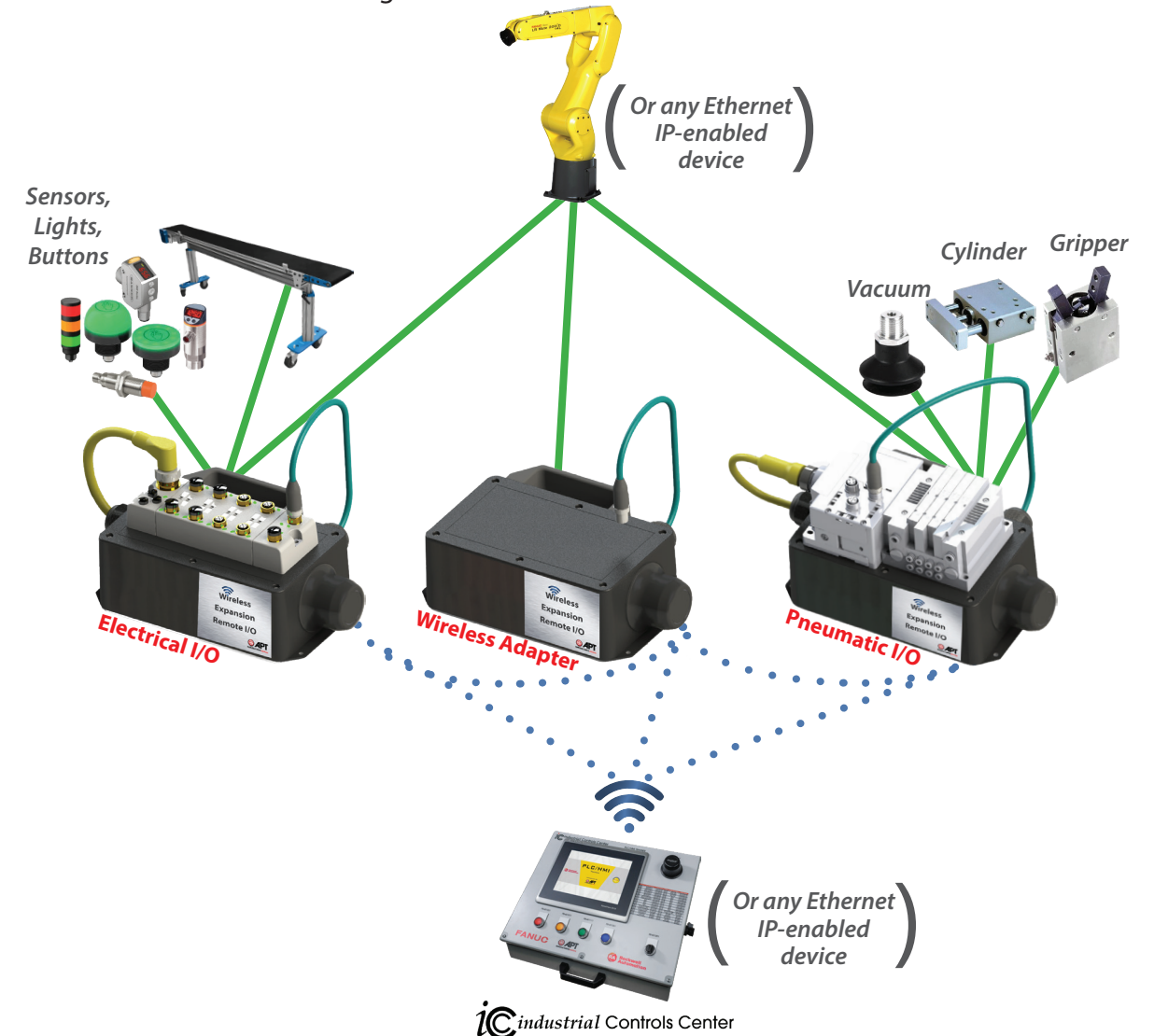


Ask about your custom needs. Prices may vary.

## Wireless Expansion Remote I/O

### Add a wireless network to your robot or other training equipment.

Configure with remote modules and untether!



### Wireless

- » WEP, WPA, and WPA2 security protocols
- » Anybus wireless bolt
- » Add network communication to your FANUC robot

### Electrical

- » Configurable 16 points of input/output (using splitters on 8 access ports)
- » Industry standard M12 5-pin port

### Pneumatic

- » Four individually controllable valves
  - ♦ Double solenoid, 2 position, blocked center ports
  - ♦ Double solenoid, 2 position, open center ports
  - ♦ Double solenoid, 2 position, detent
  - ♦ Single solenoid, 2 position, spring return
- » Great for testing and understanding fluid power
- » Use for temporary setups and testing or permanent installation
- » Valves are triggered over Ethernet

# CLASSROOM DESIGN SERVICES

Let us design your classroom  
with industry-recognized equipment and curriculum

APT's Design Team is comprised of field experts with years of experience.  
Engineering • Automation • Management • Material Handling • Mechanical • Design

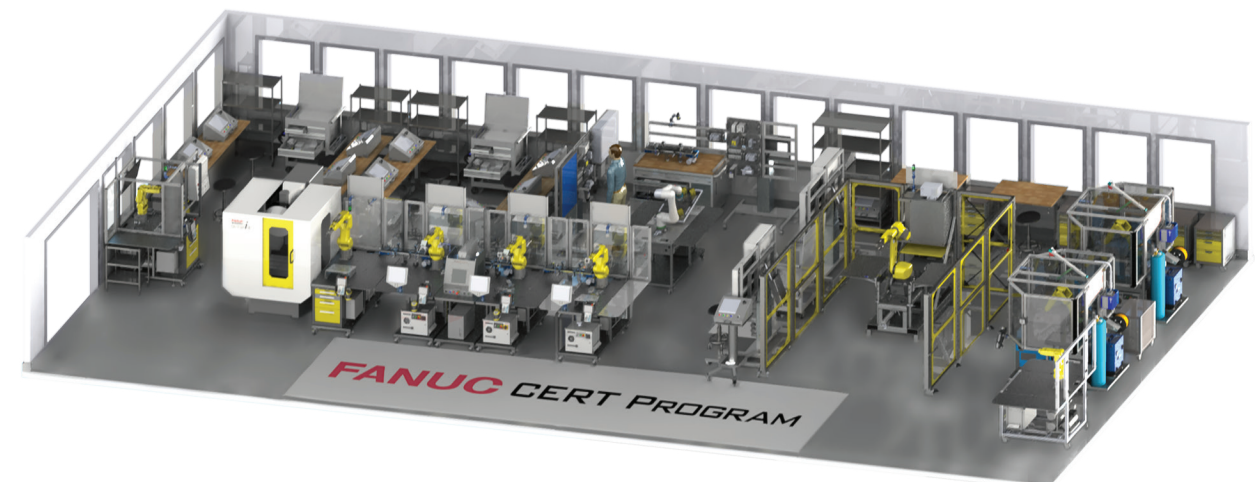
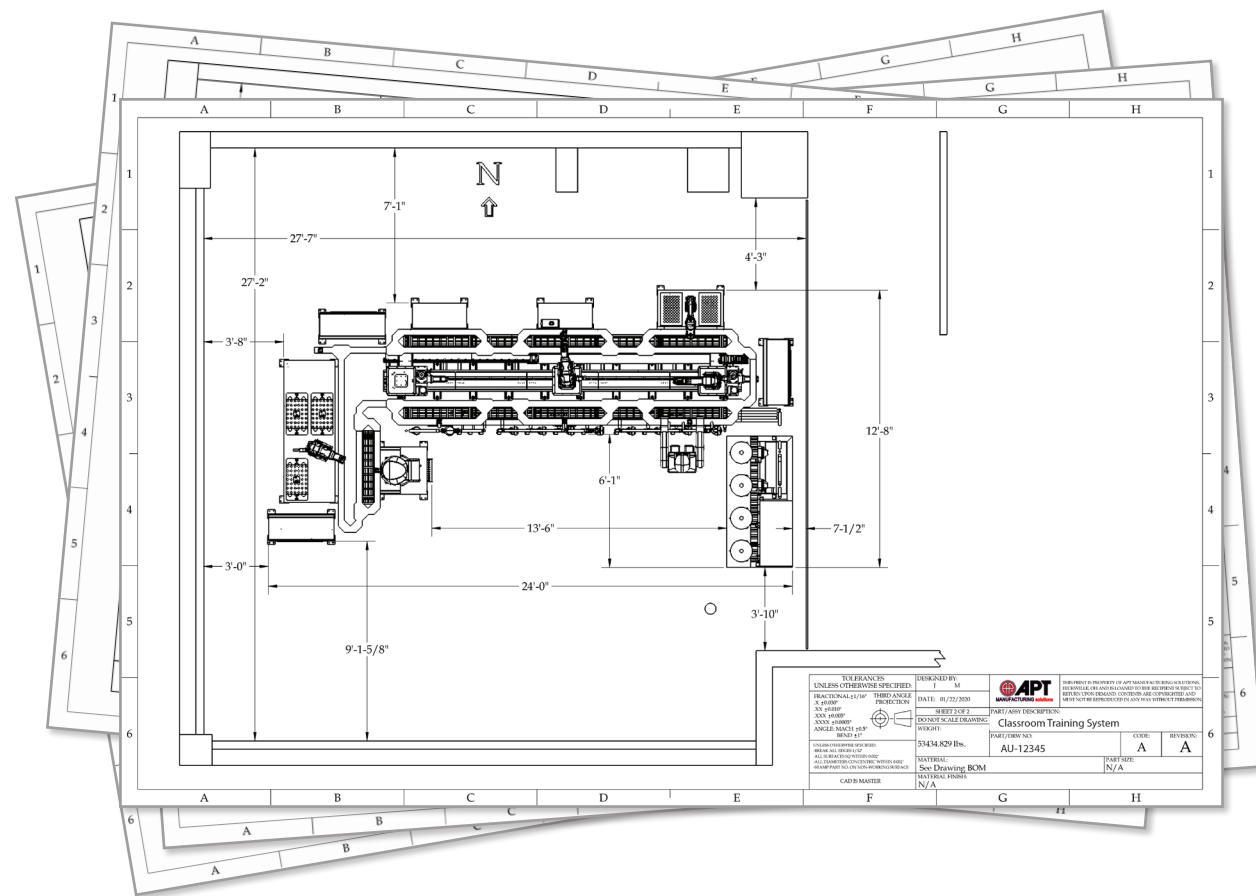
Our design team will talk to you to get an understanding of your initiatives and goals.

We will then design a classroom with automation and robotics equipment and curriculum to make your students a valuable candidate to employers.

We will align education solutions with your budget requirements, with consideration for local industry reliability, software licensing requirements and maintenance costs.

## Considerations

- Long-term plan
- Variety of learning options
- Environmental and lighting requirements
- Utility requirements and locations
- Enough space for equipment and collaboration
- Plan for future growth
- Understanding local industry needs







Contact your authorized FANUC education solutions provider  
for more information



Published November 2024

[fanucamerica.com/education](https://fanucamerica.com/education)  
[aptmfg.com/education](https://aptmfg.com/education)