Use our online tool to navigate equipment and programs

https://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	*i*CC (PLC/HMI)	AM-CERT	CSM	*i*IM5.0
Level 1	FANUC Robot Operator - Material Handling	F	FANUC: HandlingTool Operation and Programming			✓	✓	✓		✓*	✓	✓	✓
		F	FANUC: HandlingPRO			✓	✓	✓		✓*	✓	✓	✓
		I	FANUC Certificaiton administered by NOCTI: FCR-01 - Written			✓	✓	✓	✓		✓	✓	✓
		I	FANUC Certificaiton 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 Weldig (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							✓	✓	✓	✓

Level 1

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.

Level 2

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.

Level 3

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.

- Training Certificate upon successful completion of e-learning.
- Recognized industry certification issued by an independent credentialing authority.

*ICC must be integrated with CERT cart, MTEC, or MTEC-SIM to teach robotics courses

**Must purchase vision options in order to teach FANUC *i*RVision

Learning Level	Career Path		Description	Cert. Type	ROBO-DRILL	CERT Cart	MTEC-SIM	MTEC	Weld CERT Cart	*i*CC (PLC/HMI)	AM-CERT	CSM	*i*IM5.0
Level 2	FANUC Robot Technician	F	FANUC: *i*RVision 2D			✓**	✓**	✓**	✓**		✓	✓	✓
		I	FANUC Certificaiton administered by NOCTI: FCR-T1			✓	✓	✓	✓		✓	✓	✓
	CNC Machine Technician	C	FANUC CNC Concepts: FANUC Simluator Exercises				✓					✓	
		I	NIMS Certification: CNC Mill Operations					✓				✓	
	Robotic Welding Technician	M	Miller OpenBook: Applied Knowledge - Robotic Welding Labs						✓				
		I	American Welding Society: CRAW Certificaiton						✓				
	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				✓	✓	✓	✓*	✓	✓	✓
		A	Introduction to Safety Systems							✓*	✓	✓	✓
		R	Rockwell CCA 185: PowerFlex 525 Drive Startup and Configuration							✓*		✓	
Level 3	Robot Integration	A	Robot to CNC: Integration Fundamentals and Labs		✓		✓	✓				✓	
	Industrial Controls Integrator	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, *i*RVision, Advanced TPP, DCS	✓	
Advanced courses in integration of area scan, RFID, wireless I/O	✓	

FANUC

Recommended Training Curriculum Path

- **Programming**
  - HandlingTool Operations & Programming
  - SpotTool Operations & Programming
  - ArcTool Operations & Programming
  - PaintTool Operations & Programming
  - DispenseTool Operations & Programming
  - Robot Operations
- ***Safety**
  - *Dual Check Safety
- ***Advanced Courses**
  - ***Vision**
    - ****i*RVision 2D Operation & Programming**
      - ****i*RPickTool Operation & Programming**
      - ***Advanced *i*RVision 2D Operation & Programming**
      - ****i*RVision 3DL Operation & Programming**
      - ****i*RVision 3DMV Operation & Programming**
  - ***Programming**
    - *Advanced Teach Pendant Programming
    - *PalletTool Setup & Programming
    - *HandlingPRO ROBOGUIDE Simulation
    - *PaintPRO ROBOGUIDE Simulation
    - *KAREL Operation & Programming
    - *Force Sensor Setup & Operation
    - *Collaborative Robot Operation & Programming
- **Mechanical**
  - Robot Disassembly/ Reassembly
- **Electrical**
  - Controller Electrical Maintenance
- ***Communications**
  - *DeviceNet Setup & Functionality
  - *Ethernet IP Setup & Functionality
- **ROBODRILL**
  - ROBODRILL Operation & Programming
  - ROBODRILL Maintenance & Troubleshooting

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

Stand-Alone Products for your Classroom

CRX-10*i*A

M-1*i*A

Collaborative CR-7*i*A

*i*CC PLC/HMI

SCARA SR-3*i*A

LR Mate 200*i*D/7L

ROBODRILL CNC

CNC Simulator Controller

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

FANUC

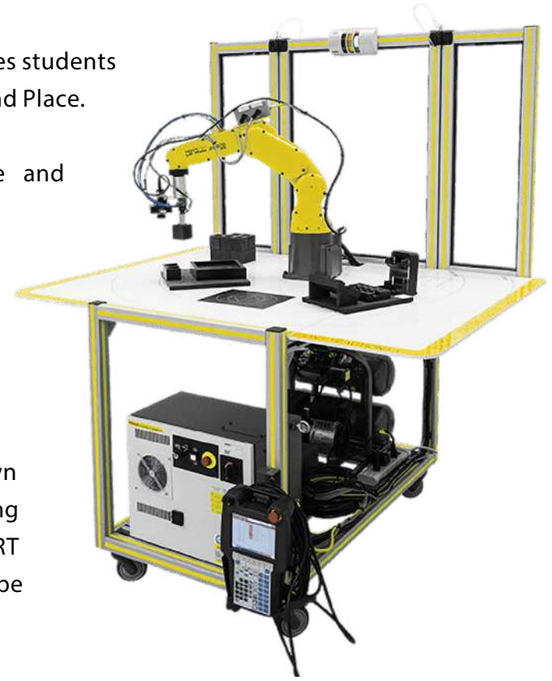
Rockwell Automation

CERT CART

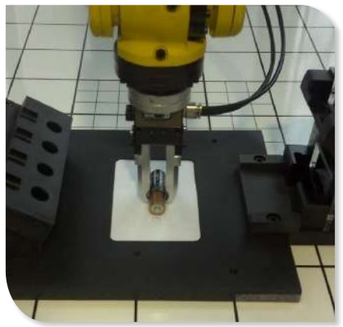
FANUC's CERT Cart is an entry level cart that teaches students basic tool handling skills as well as *i*RVision Pick and Place.

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

Pill Kit

I/O Simulation Box

APT MANUFACTURINGsolutions

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. ROBODRILLs make quick work out of any milling, drilling or tapping jobs. Reliability has also been addressed in all areas of the machine design. Coupled with the latest Fanuc 31i-B control, the ROBODRILL is the preferred machine in any manufacturing facility large or small.

ROBODRILL 3-axis

- FANUC ROBODRILL α-D14M*i*B series
- NRTL for ROBODRILL M*i*B5/L*i*B5 without breaker box (ONLY NRTL)
- 31*i*B/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 5-axis

- Available with custom order

ROBODRILL ECO 3-axis

- FANUC ROBODRILL α-D14M*i*B series
- NRTL for ROBODRILL M*i*B5/L*i*B5without 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)

FANUC CERTIFIED CNC TRAINING

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

Project-Based Learning (PBL)

Clock

Business Card Holder

ROBOT MACHINE TENDER

MTEC - Machine Tending Educational Cell

LR Mate machine tender

Shown with FANUC ROBODRILL 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	ROBODRILL CNC α-D14M*i*B5 FANUC 31*i*-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 *i*RVision 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		✓	✓

MTEC Features

FANUC ROBOTICS

FANUC LR Mate 200*i*D/7L long-arm 6-axis robot

- R30*i*B Plus robot controller

OR FANUC CRX-10*i*A collaborative 6 Axis robot

- R30*i*B Mini Plus robot controller

Optional 2D *i*RVision 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

APT MANUFACTURINGsolutions

- Fold-up work table for laptop, textbook, etc.
- Safety area scanner for fenceless operation of LR Mate 200iD/7L robot work area3-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)

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 *i*RVision 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 ER4*i*A 6-axis robot

- R30iB Mate Plus controller

OR FANUC CRX-5*i*A collaborative 6 Axis robot

- R30*i*B Mini Plus robot controller

Optional 2D *i*RVision Available

FANUC's new R30*i*B 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.

APT MANUFACTURINGsolutions

- 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 and Cable Glands for external device connections
- Pre-loaded with structured program template
- Also sold in kit form along with Rockwell curriculum
- Endless possibilities - can connect to almost any device!
- PLC robot integration program template installed

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.

MECHATRONICS

INCLUDES:

- NEMA 12 steel industrial enclosure
- 120V, 24 VCD 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

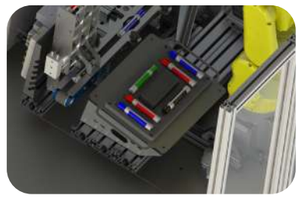
» Replenishment parts kit

» Panel rebuild master kit

MECHATRONICS CERT CART

*i*IM5.0 - Industrial Integrated Mechatronics Trainer

- FANUC ER4*i*A 6-axis robot -or- FANUC CRX-5iA collaborative 6 Axis robot
- Brushless DC motor and drive
- Power transmisson 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

*i*IM5.0 Features

FANUC

FANUC ER4*i*A 6-axis robot

- R30iB Mate Plus controller

OR FANUC CRX-5*i*A collaborative 6 Axis robot

- R30*i*B Mini Plus robot controller

Optional 2D *i*RVision Available

FANUC's new R30*i*B 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.

Rockwell Automation

(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

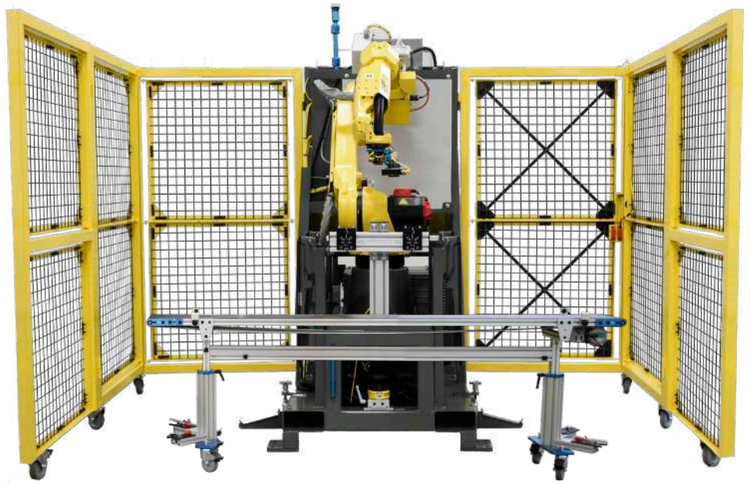
- 10.4" SVGA TFT color touch display

APT MANUFACTURINGsolutions

- 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

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

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)

Rockwell PLC • FANUC Robot • FANUC *i*RVision • Swivellink® Conveyor

Robotics • PLC • Safety • Pneumatics • I/O • Vision

AM-CERT Features

FANUC

FANUC M10*i*D or M20*i*A 6-axis robot

- R30*i*B Plus robot controller

FANUC CRX-10*i*A 6 Axis robot

- R30*i*B Mini Plus robot controller

Optional 2D *i*RVision Available

FANUC's new R30*i*B 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.

Rockwell Automation

- 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

APT MANUFACTURINGsolutions

- 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

MECHATRONICS

*i*LS - INDUSTRIAL LEARNING SYSTEM

PATHWAY	CATEGORY	MODULE	DESCRIPTION
Controls	Electrical	AB Relay Start/Stop	The AB Relay Start/Stop module teaches relay logic with start/stop circuit board.
	Motion Control	AB PowerFlex 525	The AB PowerFlex 525 module will allow labwork with variable frequency drive and motor control.
	Safety	AB E-stop Safety Circuit *(hard-wired)*	AB E-stop Safety Circuit (hard-wired) - can be paired with other modules to learn the integration of an E-stop circuit.
	PLC & IO	Compact GuardLogix PLC	This board teaches beginning, intermediate, and advanced PLC programming and troubleshooting.
	Switches, Buttons, Lights	Operator Interface	The operator interface can be wired into the PLC and programmed for various input and output devices.
	PBL (Project-Based Learning) Kits	AC Motor Kit	This AC Motor Kit is a bench-mounted motor that works with VFD and relay board. This is a base kit for additional labs and exercises.
	Miscellaneous	32" Display	This display allows connection of laptop or desktop computer for easy viewing of LMS, curriculum, or videos.
		*i*CC *(Industrial Controls Center)*	The *i*CC Trainer can be integrated to allow additional functionality of PLC, step sequence logic, and additional i/o.
Industrial	Industrial	5S Drawer Tools	This allows students to learn the importance of organization when storing tools and equipment.
	Mounting Solutions	Swivellink®	Swivellink allows for easy manipulation of sensors, lights, & cameras on any of the modules.
	PBL (Project-Based Learning) Kits	Swivellink® Conveyor	The conveyor teaches part movement, sequencing, and motor control.
Fluid Power	Fluid Power	SMC Manifold	This module allows students to learn pneumatic control in conjunction with projects and labs.
Robotics	PBL (Project-Based Learning) Kits	Pneumatic Pick & Place	The FANUC robot project guides students through pick and place of parts in conjunction with fluid power, conveyor, PLC, safety, and other modules.

*i*LS Features

Start with the base...

- Overhead work light
- 110VAC 24v power strip
- On-board air compressor
- Programmable LED lighting
- Ample storage space
- Wire drawer
- Welded cart w/ casters for mobility

Optional module storage rack

...then add modules

Multiple Size Options

Fully Configurable Learning Module Examples

PLC

SAFETY

MOTION CONTROL

FLUID POWER

OPERATOR INTERFACE

See website for full list of modules

SMART MANUFACTURING TRAINING SYSTEM

CSM™ - Connected Smart Manufacturing

Buy individually or as a complete system

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

Shown with ROBODRILL CNC

CSM FEATURES	FANUC CNC Controls: CNC Simulator 0iF Plus Controls	FANUC CNC Controls: Levil CNC LMV-400 0i-MF Controls	FANUC CNC Controls: ROBODRILL CNC α-D14MiB5 FANUC 31i-B5	FANUC Industrial Robot: OP10 Machine Tender	FANUC Industrial Robot: OP20 Laser Part Marking	FANUC Industrial Robot: OP30 Assembly Station	FANUC Industrial Robot: OP40 Packaging Station
Pricing	$	$$	$$$	$	$$$	$$	$$
Integrated industrial production line	✓	✓	✓	✓	✓	✓	✓
Production line flow	Right	Left	Right	Follows CNC flow	Follows CNC flow	Follows CNC flow	Follows CNC flow
Industry 4.0	✓	✓	✓	✓	✓	✓	✓
Project-based mechatronics					✓	✓	✓
FANUC Certification	✓	✓	✓	✓	✓	✓	
FANUC CNC controls	✓	✓	✓				
Machine actual parts		✓	✓				
CNC tool holder type		S20T ER-16	BT-30				
Coolant		✓	✓				
Spindle RPM		14000	10000				
FANUC robot machine tender	✓	✓	✓				
FANUC *i*RVision	✓			✓	✓	✓	✓
Vision-guided pick and sort						✓	✓
Vision inspection				✓	✓	✓	✓
Fenceless robot cells with safety area scan				✓	✓	✓	✓
Rockwell Studio 5000 Logix PLC					Slave	Master	Slave
Rockwell Safety PLC				✓	✓	✓	✓
Rockwell HMI PanelView™ touchscreens					✓	✓	✓
Rockwell e-learning subscription					✓	✓	✓
Fluid power pneumatics				✓	✓	✓	✓
Part traceability and marking					✓		
Modular work cells (can be used independently)	✓	✓	✓	**	✓	✓	✓
Portable (fits in classroom)	✓	✓		✓	✓	✓	✓
Wired or wireless between stations				✓	✓	✓	✓
Fault insertion				✓	✓	✓	✓
Smart sensor technology I/O link with diagnostics					✓	✓	✓
Dual robot end-of-arm tool vacuum/mechanical grip					✓	✓	✓
Conveyors with VFD (variable speed drives)					✓	✓	✓
RFID manufacturing process tracking					✓	✓	✓
APT integration curriculum	✓	✓	✓	✓	✓	✓	✓
120V 20 amp	✓	✓		✓	✓	✓	✓

MECHATRONICS

CSM™ - Connected Smart Manufacturing

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 *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 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-D14M*i*B(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

Rockwell 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

APT MANUFACTURINGsolutions

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.

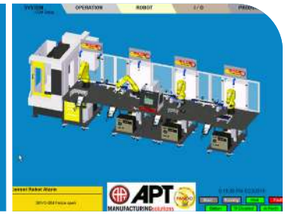
APT provides all programs, drawings, templates, and design documentation unlocked and free of charge. The school has access to every part of the controls system and access to any passwords and security setup within the equipment to develop and teach curriculum that best suits the industry in their region. 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.

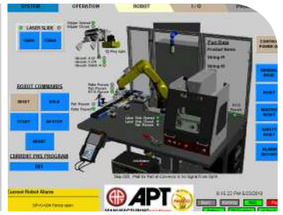
AN IN-DEPTH LOOK AT THE OPERATOR INTERFACE

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.

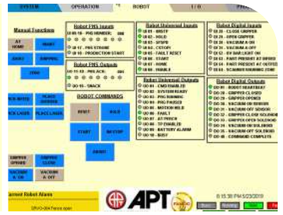
SYSTEM - These screens are used for general machine setup. A majority of the functions available on the systems require security requirements to access them. Several functions on the System HMI screens include: VFD frequency setup; Recipe Management System, Inspection Limits, I/O Link Setup, Login, and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

Both versions include:

• Welded construction

• Miller Welding Power Supply Training Program
(brand-specific; see program details)

ArcMate Cart Features:

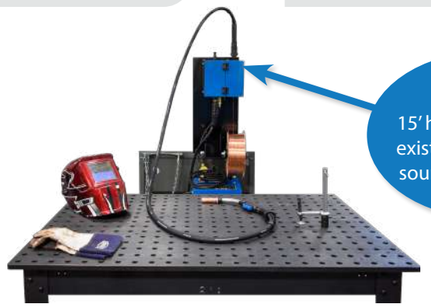
- Tinted sides to protect classroom
  (helmet required for viewing)
- FANUC Arc Mate 50*i*D/7L
- FANUC R30*i*B Mate plus controller
- Robot work area guarded for student safety

FANUC ARC CERT:

- FANUC ARC CERT Gift in Kind Package for qualified schools
  (Ask education solutions provider for details)
- FANUC Advanced Academic Software/ARC Bundle
- FANUC ARCTool Student Certificate Program

CRX Cart Features:

- Fenceless *(helmet required for viewing)*
- FANUC CRX-10*i*A
- FANUC R30iB Plus Mini controller



Plug the optional 15' handgun into the existing Miller power source to get 2 ways to weld!

Optional Miller all-in-one manual to robotic MIG wire weld gun designed for versatility and ease-of-use. Can be used with either cart's welding supply

FANUC

Miller WELD CERT CART Features

Integrated Weld Educational Cart

Education & Software

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.

Insight Core™ (Standard)

Simplified, Internet-based welding information solution that reports cell productivity and weld parameter verification.

- Provides basic production metrics such as amps, volts, wire feed speed, arc on time and arc on time percentage

Transform data into actionable information that drives continuous improvement.

Learn more at MillerWelds.com/insight

Features

Auto-Continuum™ Systems

Take your welding to the next level.

The adaptive arcs of Versa-Pulse™ and Accu-Pulse instantly make adjustments to handle weld tacks, large gaps and inconsistent parts. The result is higher quality welds and fewer weld defects.

Better weld quality

Versa-Pulse™
- Fast, low-heat, low-spatter process
- Great for gap filling
- Shortest arc length/ lowest pulse voltage

Accu-Pulse®
- The most popular process for majority of industrial welding applications
- Most adaptive arc on 16+ gauge
- Designed for all weld positions

RMD®
- Lowest heat process, best for gap handling
- Limited travel speed

Auto-Continuum 350
11,000 watts

More power, better reliability

- **Easily add new processes and custom programs**
- **Parameter flexibility**

Easy to add capabilities

Best for	Standard Spray	High-Deposition MIG	Accu-Pulse	Versa-Pulse	MIG Short Circuit	RMD
Deposition	A	A	A	B	D	D
Gap Filling	D	D	B	B	A	A
Low Heat Input	D	C	B	A	A	A
Out-of-Position Welds			A	B	B	B
Low Spatter	A	A	A	A	C	B
Thick Metals	A	A	A	C	D	D
Thin Metals			B	A	A	A
Increased Travel Speed	A	A	A	A	B	C
	HOT					COLD

Manufacturing Equipment

FILTAIR® 130
- High-efficiency filter designed to capture weld fume
- FilTek™ XL cleanable filters last longer
- Lightweight and portable
- Quieter for a safer, more productive work area

Included: Work Holding Kit (APT88001132)

6" x 1.5" x 6" (1) Pivot Angle 150 Mini

3.6" x 1.7" x 3.4" (1) Mini Multi Angle

2.3" x 1.3" x 2.1" (1) Mini Angle

Optional: PPE Kit (APTWELDPPE) or Student Saftey Pack

Optional:
15' Industrial MIG Gun with 15' ground cable

10% Graduate Discount at Mag Tools
Use APTWELDCELL at mag-tools.com

Miller

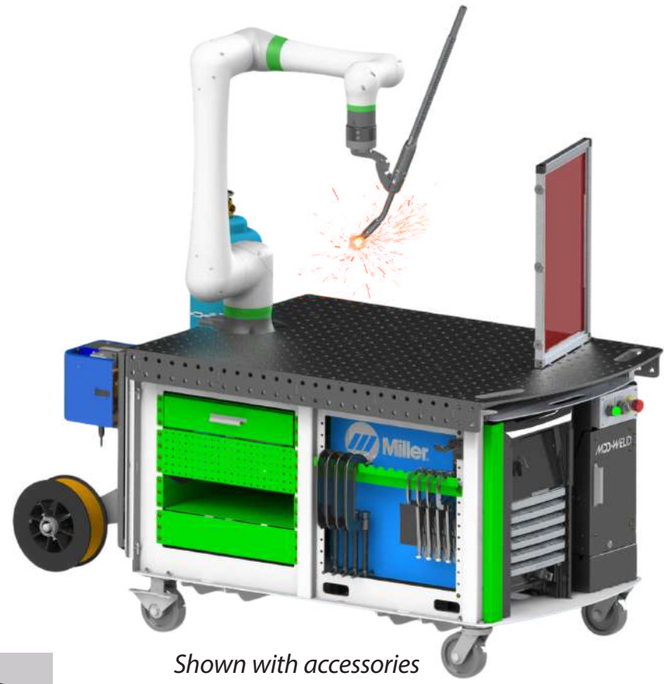
APT MANUFACTURINGsolutions

Cobot MAC Cart

Collaborative Robot for Arc Welding

The MOD-WELD is designed and manufactured around the FANUC CRX-10iA industrial collaborative robot. The CRX models come from a long line of reliable FANUC products that are extremely easy to setup, program, and operate – even if it's your first robot.

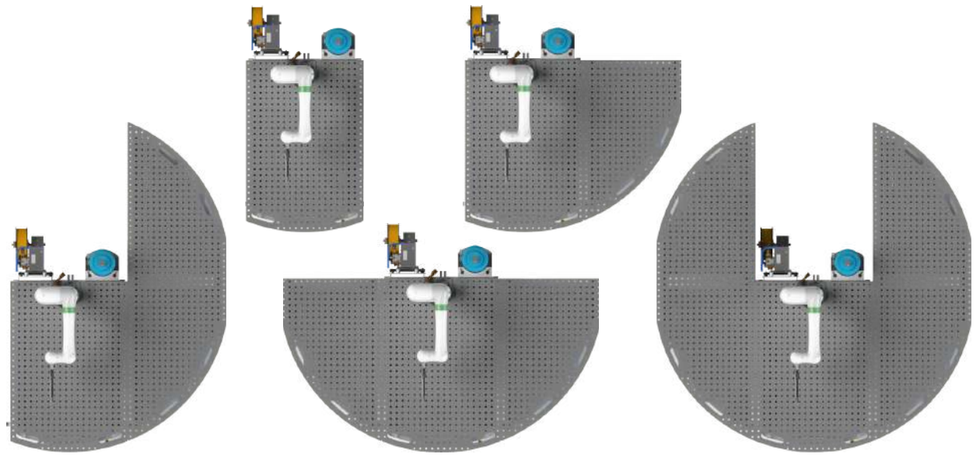
The system includes the Miller Auto-Continuum™. The new power source is a smart and powerful digital design, it has the fast response needed to deliver the most stable welding performance for better welding results.



Shown with accessories

Customize to your needs

Add up to 4 side carts in different configurations for customizing your work space.



MOD-WELD

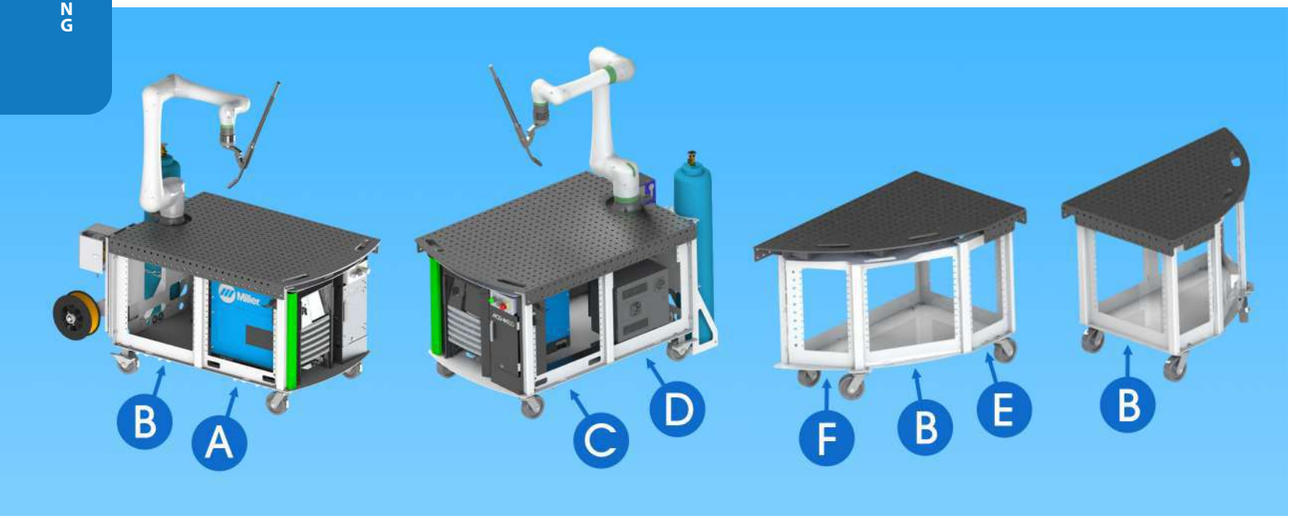
FEATURES & SPECS

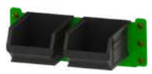
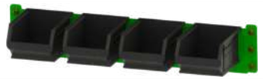
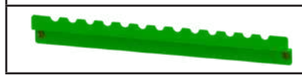
MAC Cart	
Model	**CART10-350**
6-Axis Robot	FANUC CRX-10iA
Miller Power Source	Auto-Continuum ™ 350
Welding material type	millerwelds.com/technologies/advanced-welding-processes
Footprint	40"W x 78" D
Payload	10kg
Table Work Space	40"W x 58-1/2" D
Clever Torch Teach Guidance	✓
Miller Hand Torch Option	✓
Robot Programming	Tablet Only
FANUC Robot reach	49"
Power Needed FANUC	110v 20 amp
Power Needed Miller	230–575 V 3-phase, 50/60 Hz
Holes for Fixture Clamps	2" x 2" Hole Pattern 16mm Dia
Main Welder Weight	Approximately 1300 lbs
Custom Weld Fixture	✓

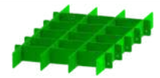
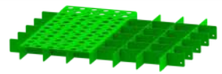
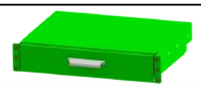
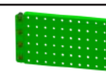
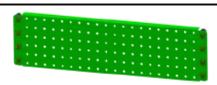
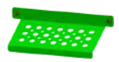
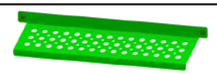
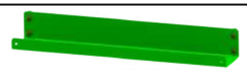
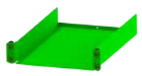
MAC Cart - *Accessories and Options*	
Part #	**Part Description**
SCLFRR	Side Cart Left Front or Right Rear. Work space 34 3/8" W x 54" D with 16mm holes
SCRFLR	Side Cart Right Front or Left Rear. Work space 34 3/8" W x 54" D with 16mm holes
500	Miller Auto-Continuum™ 500. Replaces the Auto-Continuum™ 350

FANUC's ARC Tool software is the industry standard for robotic arc welding operations.

MAC Cart Accessories



MAC Cart - *Accessories*			
Image	**Part #**	**Description**	**Location**
	**AGHG45**	4-1/2″ Angle grinder hanger with cord wrap	A, B, C, E, F
	**BINP10**	Bin box panel, 2 bins (4-1/8″x5-3/8″x3″), narrow	E, F
	**BINP20**	Bin box panel, 4 bins (4-1/8″x5-3/8″x3″), wide	A, B, C, D
	**BP1045**	Blanking close out plate, 4-1/2″ tall, narrow	E, F
	**BP2045**	Blanking close out plate, 4-1/2″ tall, wide	A, B, C, D
	**CR1007**	Clamp hanger rail, 7 notches, narrow	E, F
	**CR2013**	Clamp hanger rail, 13 notches, wide	A, B, C

MAC Cart - *Accessories*			
Image	**Part #**	**Description**	**Location**
	**DIVS10**	Drawer divider set for narrow drawers	DW1025, DW1040
	**DIVS20**	Drawer divider set for wide drawers	DW2025, DW2040
	**DW1025**	Shallow drawer, 2-1/2″ deep, narrow	E
	**DW1040**	Medium drawer, 4″ deep, narrow	E
	**DW2025**	Shallow drawer, 2-1/2″ deep, wide	B, D
	**DW2040**	Medium drawer, 4″ deep, wide	B, D
	**PB1006**	Pegboard panel, 6″ tall, narrow	E, F
	**PB2006**	Pegboard panel, 6″ tall, wide	A, B
	**PR1021**	Fixture setup pin rail, 21 places, narrow	E, F
	**PR2045**	Fixture setup pin rail, 45 places, wide	A, B, C, D
	**SCSH10**	Spray can shallow shelf, narrow	E, F
	**SCSH20**	Spray can shallow shelf, wide	A, B, C, D
	**SH1025**	Storage shelf, narrow	E
	**SH2025**	Storage shelf, wide	B, D
	**WS1826**	Tabletop temporary weld screen, 18″ x 26″	Tabletop

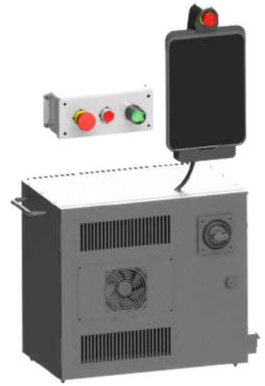
WELDING

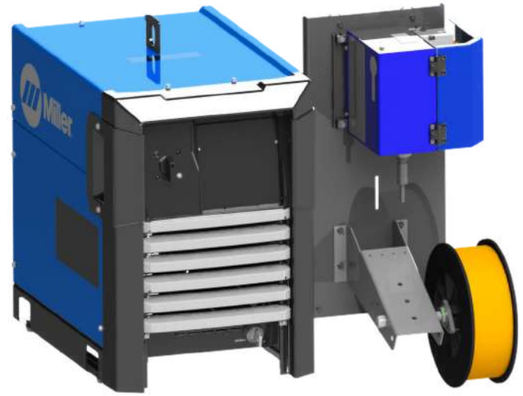
Cobot MAC Traveler

MAC Traveler	
Model	TRAVELER-MW25-350
6-Axis Robot	FANUC CRX-25iA
Miller Power Source	Auto-Continuum™ 350
Welding material type	millerwelds.com/technologies/advanced-welding-processes
Footprint (for Mobility)	40"W x 76"L
Footprint (outriggers deployed)	89"W x 95"L
CleverTorchTeachGuidance	✓
Miller Hand Torch Option	✓
Robot Programming	Tablet Only
FANUC Robot reach	74"
Power Needed FANUC	110v 20 amp
Power Needed Miller	230–575 V 3-phase, 50/60 Hz
Weight	1,700 lbs approx.
Custom Weld Fixture	✓

MAC Traveler - *Options*	
Part #	Part Description
500	Miller Auto-Continuum™ 500. Replaces the Auto-Continuum™ 350
COOLER	Miller Continuum™ Cooler and water-cooled torch. Replaces the standard air cooled torch
SRVT	Servo Torch Gun - FANUC option for pulling soft wire. Replaces the Miller Wire Feeder
HWST	Heavy Weld Seam Track - FANUC Touch Sense and Multi Pass Software. Allows the robot path to automatically correct for part variation or out of location parts.
CTRM	Collaborative Tip Reamer. Allows the user to program in cycles to automatically clean the weld

Cobot MAC Bundle



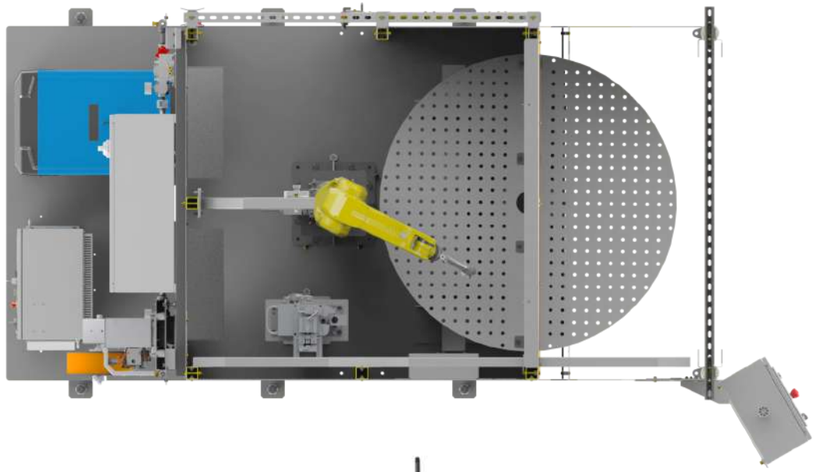


MAC Bundle	
Model	BUNDLE-10-350
6-Axis Robot	FANUC CRX-10iA
Miller Power Source	Auto-Continuum™ 350
Welding material type	millerwelds.com/technologies/advanced-welding-processes
Payload	10kg
Clever Torch Teach Guidance	✓
Miller Hand Torch Option	✓
Robot Programming	Tablet Only
FANUC Robot reach	49”
Power Needed FANUC	110v 20 amp
Power Needed Miller	230–575 V 3-phase, 50/60 Hz

FANUC CRX-10iA with Miller Auto-Continuum™ 350, Miller wire feeder, and torch for end user addition to table. The Cobot has a reach of 1,249mm (49.1 in) and a payload of 10kg.

Robot ARC MATE Cell

Dual Station Rotary Table



MOD-WELD

FEATURES & SPECS

MATE - Dual Station Rotary Table			
Model	**DSRT-48-AM50**	**DSRT-72-AM100**	**DSRT-96-AM120**
6-axis robot	FANUC ARC Mate 50iD	FANUC ARC Mate 100iD	FANUC ARC Mate 120iD
Miller power source	Auto-Continuum™ 350	Auto-Continuum™ 350	Auto-Continuum™ 350
Welding material type	millerwelds.com/technologies/advanced-welding-processes		
Footprint	60" x 120"	84" x 144"	108" x 168"
Power needed	480VAC 3-Phase 60 AMP	480VAC 3-Phase 60 AMP	480VAC 3-Phase 60 AMP
Table size	Auto Index Ø 48"	Auto Index Ø 72"	Auto Index Ø 96"
Available I/O	8 In 8 Out	8 In 8 Out	8 In 8 Out
Available valve bank space	4 closed-center valves and 4 blanks	4 closed-center valves and 4 blanks	4 closed-center valves and 4 blanks
Enclosed cell	✓	✓	✓
Crane accessible	✓	✓	✓

MATE - Accessories	
Part #	**Part Description**
ABIO-8	Additional Allen Bradley I/O, 8 in 8 out
SY7301-5U1-NA	Additional 3 position closed center valve
500	Miller Auto-Continuum™ 500. Replaces the Auto-Continuum™ 350
MW-48-EX-HOOD	48” Exhaust Hood with 8" duct
MW-72-EX-HOOD	72” Exhaust Hood with 8" duct
MW-96-EX-HOOD	96” Exhaust Hood with 8" duct
RANC	Robotic auto nozzle cleaner, wire cut, spatter removal, and spatter spray

The rotary table allows the operator to load/unload the product outside of the weld cell, then the rotary table will bring the product into the cell for welding. When the robot has completed the welds on side “A” it will rotate table and begin welding side “B”

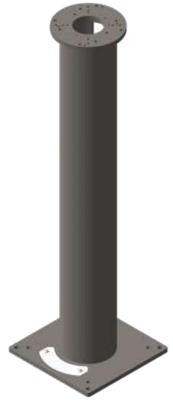
WELDING

ROBOT ACCESSORIES

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

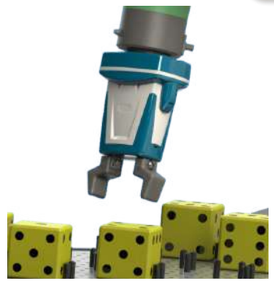
Kit includes:

- 24″ CRX pedestal
- Mobile base
- Controller bracket
- Teach tablet holder.

Parts Presentation Kit sold separately

- 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

Mobile Cart Optional Add-ons



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 Presentation 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

CRX

Pedestals

We stock pedestals for the CRX and LR Mate robots.

- Range from 24″ to 48″ tall in 6″ increments
- Holes for leveling and anchoring
- Steel welded construction
- Powder coat finish

When mounting these robots we recommend guarding (see next page).

Always be safe when operating a robot.

LR Mate

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:

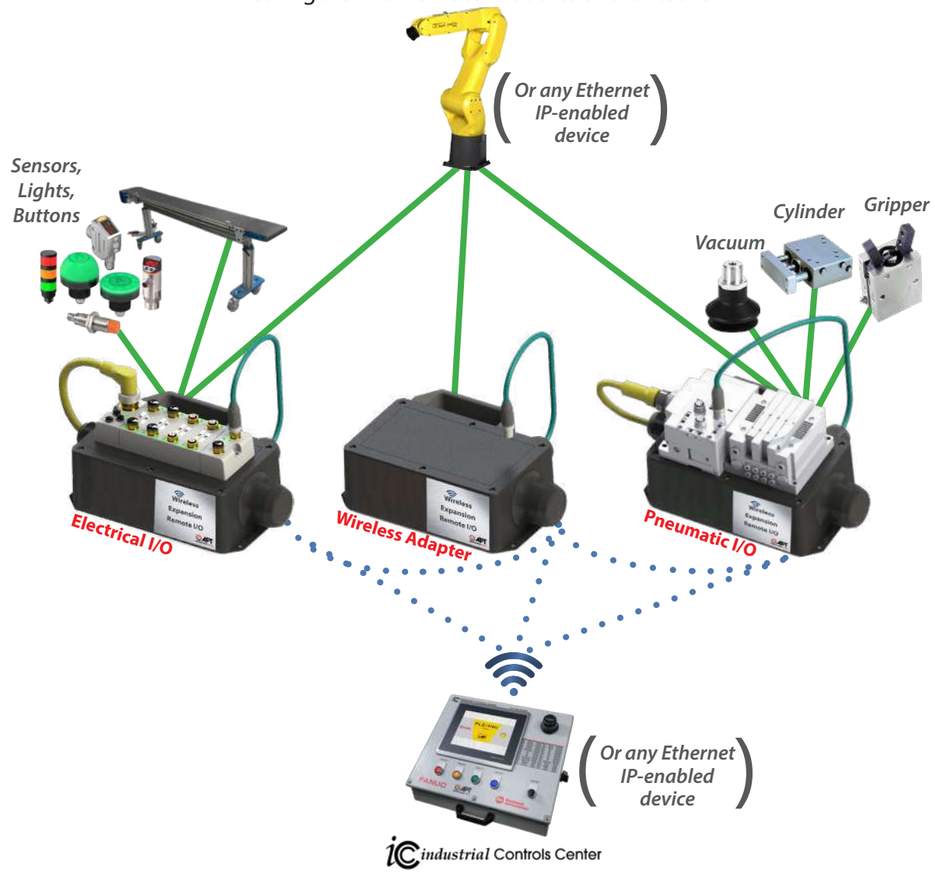
- Gated entry with latch and interlock switch.
- Light curtain, three-sided guarding with one open side.
- Area scanner kit with narrower side panels.

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 communicatoin to your FANUC robot

Electrical

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

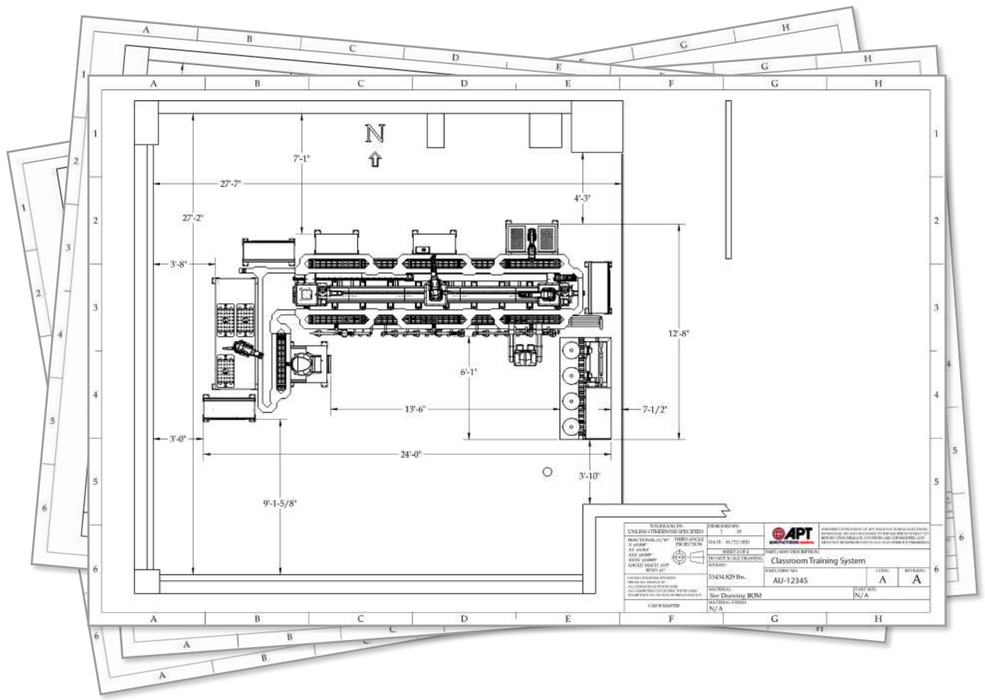
Pneumatic

» 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 relatability, 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*