MotoLogix

Interface for MOTOMAN Robot Programming and Control via PLC

Supported platforms:

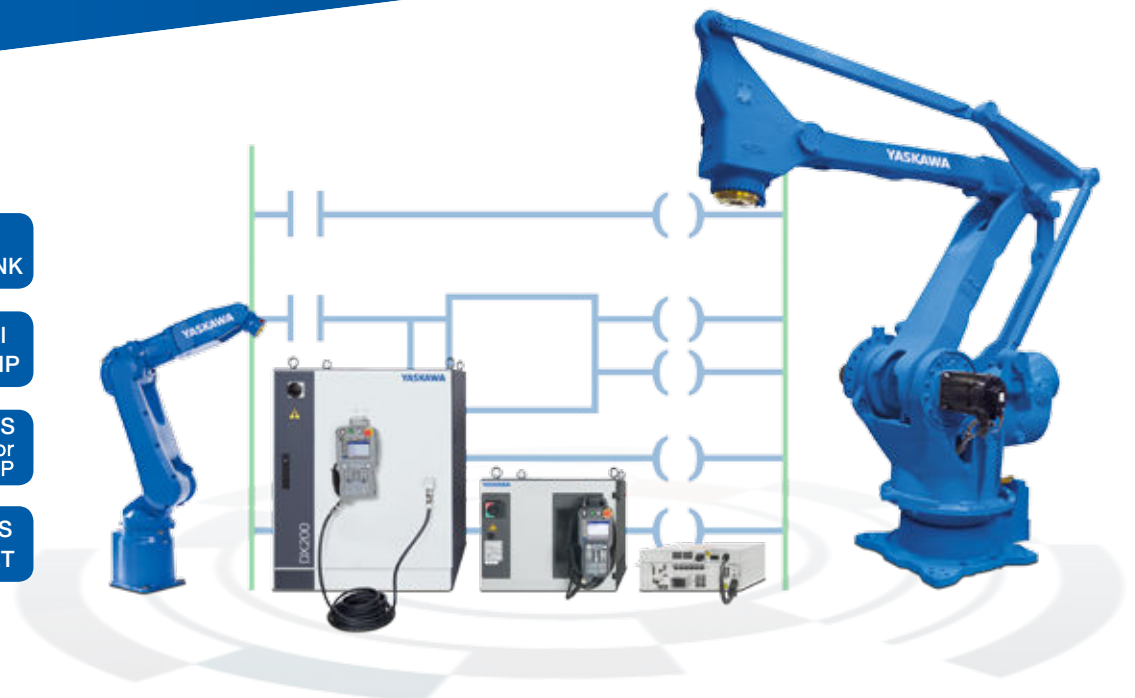|	
YASKAWA PROFINET	B&R POWERLINK
SIEMENS TIA S7-300/1500 PROFINET	Rockwell EtherNet/IP
SIEMENS SIMOTION PROFINET	CODESYS EtherCAT or EtherNet/IP
Beckhoff EtherCAT	CODESYS PROFINET

MotoLogix is a software interface for programming and control of YASKAWA robots by PLC. Being available for all major PLC brands and fieldbuses it is designed with two primary objectives:

- Enable deep integration of YASKAWA robot systems in PLC controlled machinery.
- Easy programming/commissioning/teaching/operating of robots in a machine, without need of specialized knowledge.

MotoLogix has two components

1. **MotoLogix Runtime**
   Enables the MotoLogix interface on the YASKAWA robot controller, using the fieldbus for communication with the PLC.

2. **MotoLogix PLC Library + Examples**
   Comprehensive set of function blocks for writing the robot application logic in the PLC (example programs).

KEY BENEFITS

- Robot programming carried out in PLC language – unified for the whole system
- Connects all peripheral devices (sensor, camera, conveyor) through PLC
- Robot completely integrated in the PLC and HMI environment
- Testing of the complete PLC/HMI robot application using virtualization (MotoSim)
- Assurance of a YASKAWA path accuracy (calculation in MOTOMAN controller)
- All YASKAWA DX200, YRC1000 and YRC1000micro robots can be controlled. This includes the collaborative types such as HC10.
- No Teach pendant nor YASKAWA robotics knowledge is required for robot programming and operation
- Data stored in the PLC, not in the robot controller
- Control multiple robots with one MotoLogix interface
- MotoLogix on a OPC-UA equipped PLC can act as a convenient gateway to PC based systems such as LabView
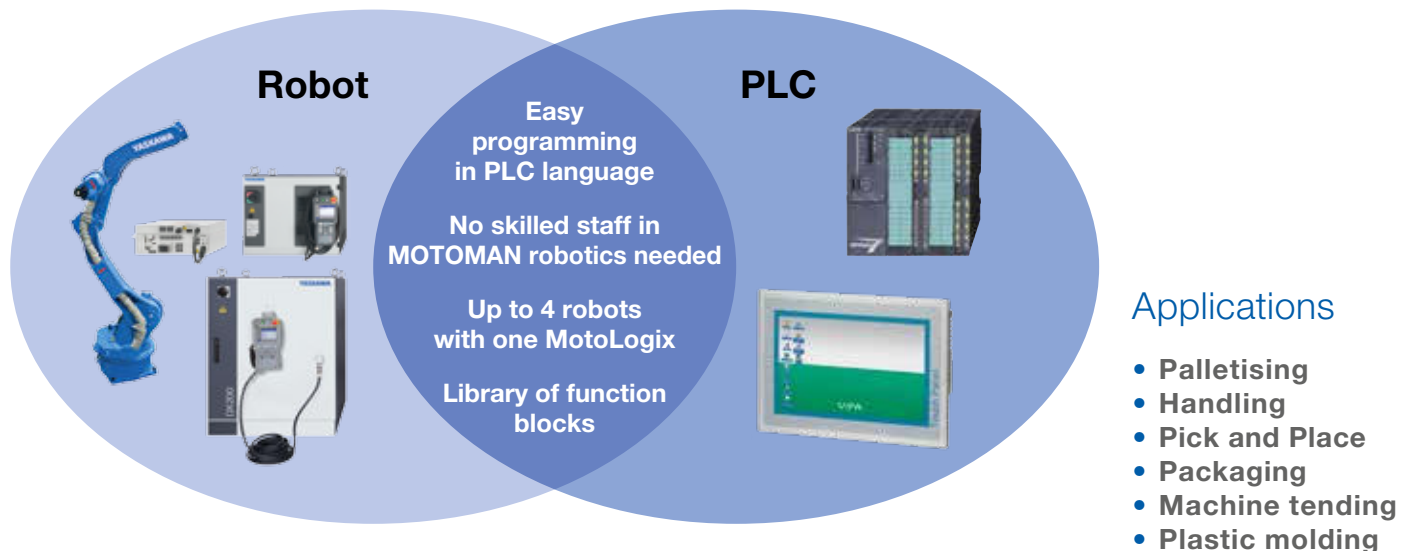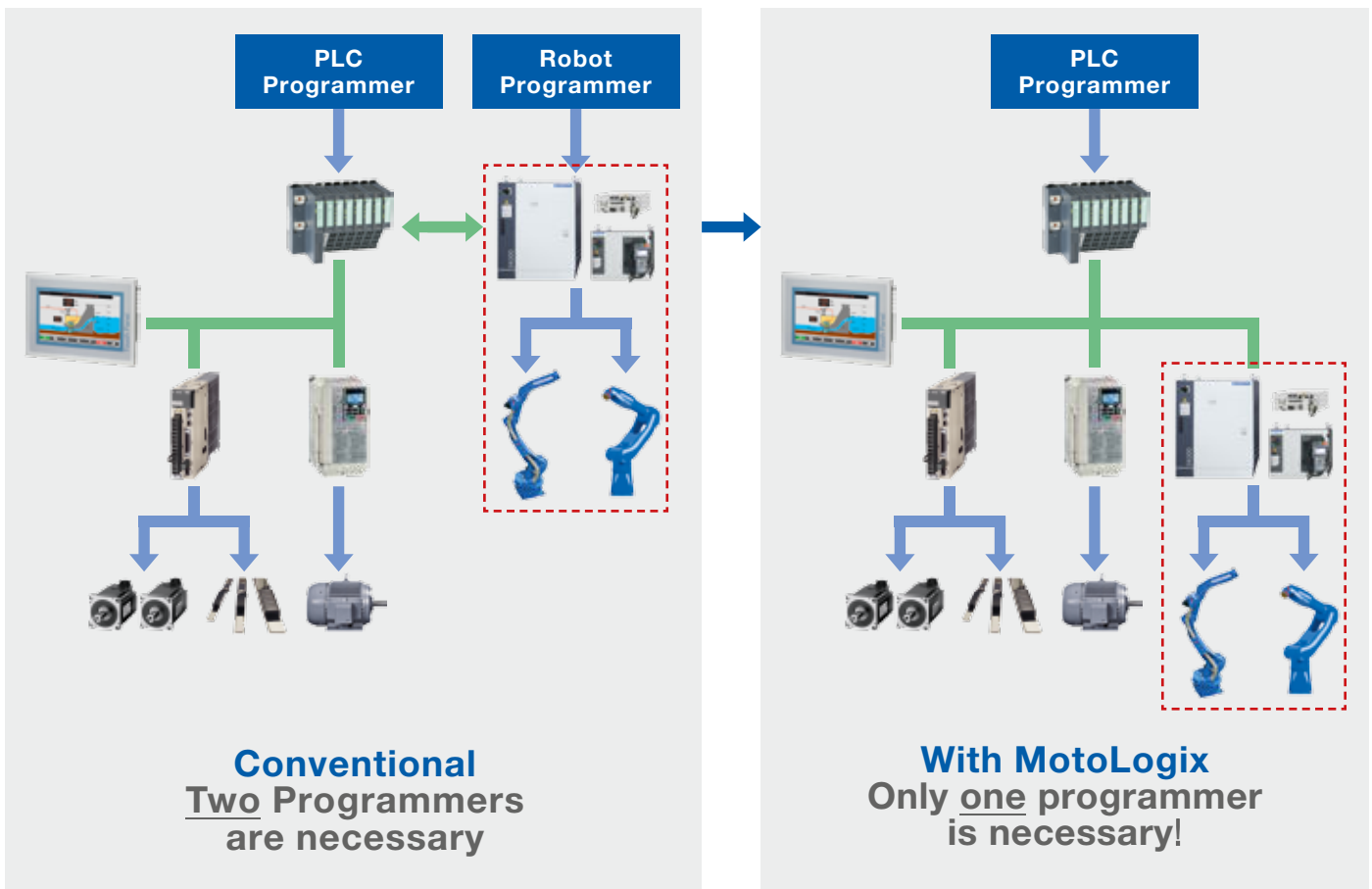
MotoLogix

MotoLogix represents a software and hardware interface that enables users to control and program the robot through PLC and offers an innovative approach for a control of all-axis coordinated robot motion, similarly to traditional robot controller.

The difference between PLC controlled robot and conventional robot control is that PLC issues the motion commands for the robot, while the robot controller performs calcula-

tions of motion kinematics. The YASKAWA robot controller is reduced to the role of a motion controller and the actual program execution and the definition of the motion are carried out by the PLC. This therefore eliminates the need to learn the robot language and allows the programmer to use the PLC language he already knows.

Control Overview – conventional and with MotoLogix

PLC Programmer **Robot Programmer**

**Conventional
Two Programmers
are necessary**

PLC Programmer

**With MotoLogix
Only one programmer
is necessary!**

Robot **PLC**

Easy programming in PLC language

No skilled staff in MOTOMAN robotics needed

Up to 4 robots with one MotoLogix

Library of function blocks

Applications

- **Palletising**
- **Handling**
- **Pick and Place**
- **Packaging**
- **Machine tending**
- **Plastic molding**

MotoLogix PLC Library

The MotoLogix library offers a comprehensive set of function blocks for a wide range of tasks.

Summary:

- **Motion instructions**
  - Different kinds of moves
  - Jog
  - Conveyor tracking
- **System commands**
  - Enable, Abort, Hold etc
  - Error handling
  - IO handling
- **Robot configuration**
  - Tools, Userframes
  - Interference zones
  - Absolute data (home positions)
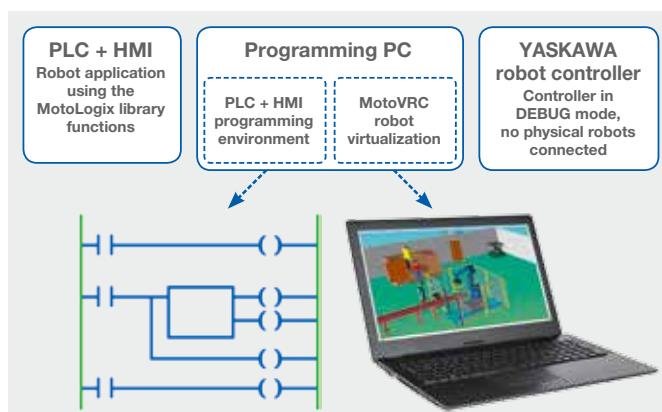- **Get off to a quick start using the supplied example programs and documentation**

Example program name	Description
General	General program for communication, Error Handling and reading current position
Jog	Example program for jogging the robot
ConveyorTracking	Program example for using the conveyor tracking functionality of the robot (suitable for pick and place applications)
PickPlace	Program example to execute an easy Pick and Place task
PosTable	Example program where a trajectory is created by entering data in a table (array) instead of programming each motion command. It includes the execution of actions (e.g. pneumatic gripper) and external axis control (e.g. for servo gripper). This dynamic approach results in one piece of code which handles any kind- and size of trajectory.

Virtualization

Using the powerful combination of MotoLogix and MotoVRC you can test your entire PLC/HMI robot application without the need of the completely assembled machine. (A YASKAWA robot controller is needed.)

KEY BENEFITS

- **Unified programming approach by IEC 61131 standard**
  - Possibility to program a robot in an environment known by the PLC programmer (Ladder Diagram, Structured Text, Function Block Diagram,
  - No YASKAWA specific knowledge needed
- **Robot program and configuration data created and stored in the PLC**
  - Easy system back-up
  - Easy robot integration and exchange in the complete system
- **Path quality stays the same**
  - Robot kinematics calculation in MOTOMAN robot controller
  - Path interpolation in MOTOMAN robot controller
- **Periphery wiring and control via PLC**
  - Gripper, conveyor, sensors

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MotoLogix specifications	
Supported robots	All DX200, YRC1000 and YRC1000micro types
Number of robots	Up to 4 robots (or 16 external axes) for each MotoLogix system
Number of MotoLogix systems per PLC	Only limited by PLC and fieldbus capacity
Number of motions, userframes, tools	Only limited by PLC memory*
Number of interference zones	32
Number of conveyors for Conveyor tracking	Only limited by PLC hardware and memory
Robot controller cycle time	4 ms
Data exchange for one MotoLogix system	436 byte consistent data is cyclically exchanged between PLC and each MotoLogix system
Required available PLC memory	> 512 kb (depends on complexity of application)

* If the robot controller is equipped with a Functional Safety Unit (FSU) the amount of tools is limited to 16.