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YASKAWA
Robot software

YASKAWA software solutions
offer greater performance,
easier integration into
production systems, further
control functions and additional
benefits for your robot!





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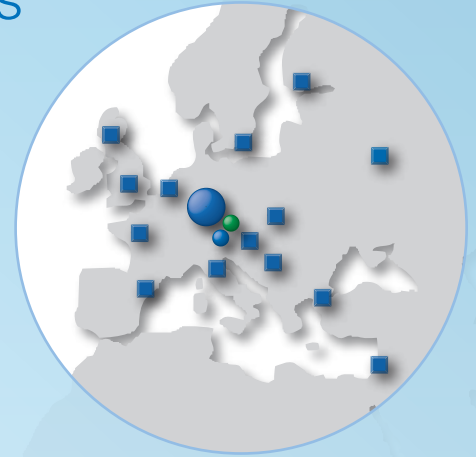
Other software

- MotoCalvEG34

YASKAWA – Global Leader in Automation, Drive Technology and Robotics

YASKAWA Electric is one of the world's leading manufacturers in the fields of drive technology, industrial automation and robotics. Founded in 1915, we see ourselves as a pioneer in these sectors, always striving to optimise the productivity and efficiency of machines and industrial systems with our innovations.

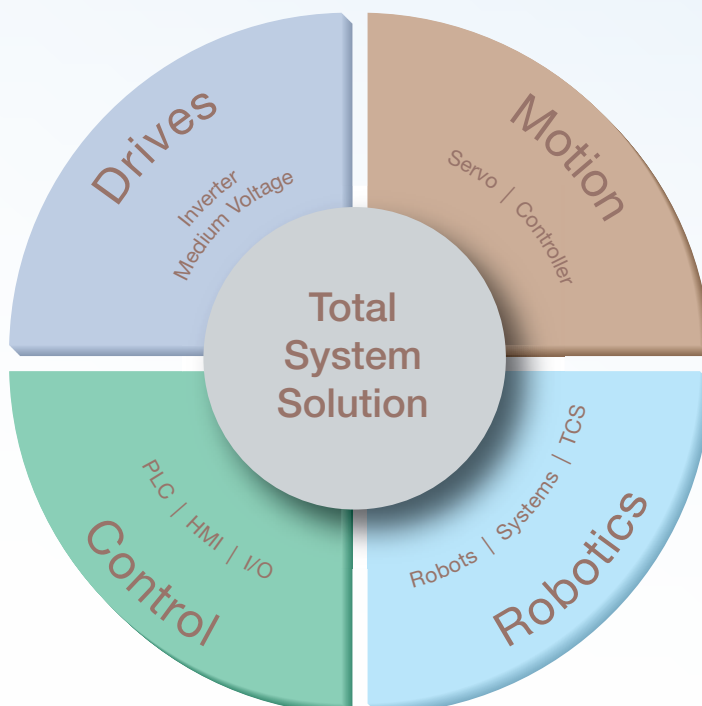
Today we produce more than 1.8 million inverters per year. Furthermore, with a yearly production of more than 800,000 servo motors and 20,000 robots we offer a wide range of products for drive automation processes in many different industries like the automotive, packaging, wood, textile, and semi-conductor industry.



VIPA – Specialist for Automation Technology and System Solutions

The company VIPA, founded in 1985, with headquarters in Herzogenaurach, is a global player with branches in 60 countries. VIPA ideally complements the YASKAWA product portfolio. As a developer of the most advanced products in the PLC-field and some of the world's fastest hard PLCs of their class, VIPA offers exactly those components which combine proven YASKAWA products to a highly efficient total solution.

VIPA now is not only a strong and worthy member of the YASKAWA family, it is a full-fledged One-Stop-Shop of all important components and possesses the know-how to master almost any challenge in automation.



YASKAWA, Allershausen

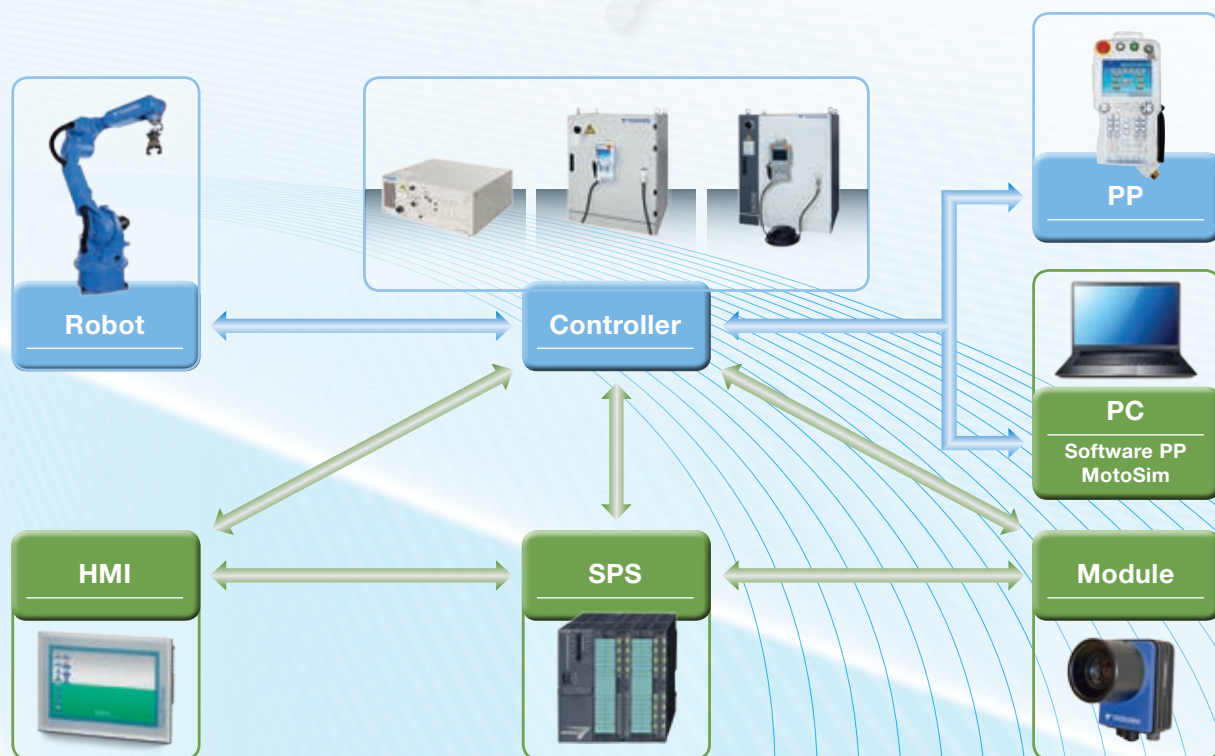


VIPA, Herzogenaurach

Expand the horizon of your robot and your system!

MOTOMAN software offers user-friendly functions in a variety of application fields and provides uncomplicated and efficient assistance in every production phase.

Overview of communication functions



MOTOMAN robot controllers are open controllers. From the NX100 controller generation onwards, both the RS232 interface and the Ethernet interface have come as standard. Depending on the specific controller generation, many expansion cards are optionally available in addition to these interfaces, as both master and slave versions, for sup-

porting industrial bus communication. Bus communication replaces conventional 24 V I/O wiring. With some exceptions (e.g. MOTOMAN Sync), access is accordingly restricted to the I/O level. While the bus interfaces are thus generally used for exchanging Boolean data values (On/Off), RS232 and Ethernet are used for exchanging higher-level data types (such as positions, status messages, etc.).

Standard interfaces RS232 and Ethernet

The standard interfaces RS232 and Ethernet initially describe the lower levels (refer to OSI-layer model) of a communication. The decisive factor for communication however is the application level, i. e. the protocols of the upper level. MOTOMAN controllers have a whole range of application protocols enabling communication with the outside world. These include standard protocols such as FTP and HTTP as well as YASKAWA-specific protocols BSC, Ethernet Server, High Speed Ethernet Server, etc. The available protocols can be grouped in client and server protocols. The client, as the communication master, initiates communication by sending queries to a server. The server returns the requested data. Between the queries the server is in standby mode.

Server protocols

Server protocols serve to retrieve data from the robot controller by means of an external device. These can be different data. For example, server protocols are used to connect HMIs. MOTOMAN controllers have the following server protocols:

FTP Server

The FTP protocol is a protocol for file transfer. In the case of MOTOMAN robots these can be program data (job files), system data (tool data, conditional files, etc.) or parameter data.

BSC Server (Host mode)

The BSC protocol is the earliest YASKAWA communication protocol. The advantage of this is that the protocol has been continuously supported by all controller generations since ERC. This guarantees investment security since created applications can be transferred to other controller generations with no or only minor modifications. The BSC Server protocol is a „General Purpose“ protocol. It offers functions for access to variables, IO signals, files, motions, alarms, etc. The protocol supports Ethernet and RS232. Only the RS232 variant (Data Transmission Function) is open. The MotoCom SDK however is an implementation in the form of a Windows Functional Library (DLL).

Ethernet Server

The Ethernet Server protocol is an improvement of the BSC protocol in terms of performance and Multiclient support. The functionality is identical to that of the BSC Server protocol. The protocol exclusively supports the Ethernet interface. It is open and also finds an implementation MotoCom SDK. Only there is also a high compatibility with the BSC protocol. In most cases, earlier BSC-based MotoCom applications can therefore be quickly incorporated in Ethernet server-based applications.

High Speed Ethernet Server

The High Speed Ethernet Server protocol is the current „General Purpose“ protocol of the MOTOMAN robot controllers. Compared with the Ethernet Server protocol, performance and functionality are improved. The High Speed Ethernet Server protocol is the standard protocol of the controller types DX100, DX200 and FS100 and future generations.

A simple application of the protocol can also be achieved here using MotoCom SDK.

MOTOMAN Sync

MOTOMAN Sync is only available for MOTOMAN FS100 controllers. The special feature of MOTOMAN Sync is the Motion API. It allows for complete control of a MOTOMAN manipulator using an external system (PC, machine controller, PLC, etc.). In this way, no more jobs have to be carried out on the robot controller itself.

Path calculation of the robot motion is still performed by the robot controller in order to ensure high YASKAWA precision standards. Client implementations of the corresponding MOTOMAN Sync protocols (complete with SDKs) are available for, but certainly not limited to, Windows PCs, Siemens PLCs and Rockwell PLCs. In addition to the standard Ethernet interface MOTOMAN Sync server supports also Ethernet/IP and Profinet.

Client protocols

Client protocols serve to retrieve data from an external device. A frequent example of the robot as a client is e.g. the communication with vision systems.

FTP Client

In addition to the FTP Server function, MOTOMAN controllers also have FTP Client function. It cooperates with common FTP servers (IIS, Filezilla, etc.). The FTP protocol is a special favourite of system administrators since it is an internet standard protocol with a wide range of experiences and tools.

BSC Client (DCI mode)

In the Client mode of the BSC protocol only variables and files can be transferred. This is done in the course of a job (Data Communication by Instruction). This means that the transfer is started by a corresponding instruction (e. g. LOADJ) and carried out synchronously with execution of the program. One application example is the dynamic reloading during program transfers to PCs. Corresponding server components can be created by the user on the basis of MotoCom SDK or purchased (see MotoDCI). The properties of the protocol correspond to those of the server variant.

Vision interface

VSTART is an inform instruction. Inform is the programming language of the MOTOMAN controllers. It maps the vision interface of the MOTOMAN robot controllers. It maps the communication protocols of a variety of selected vision systems and works, dependent on these, on the basis of Ethernet or RS232. Compatible cameras are systems from YASKAWA (Cognex Insight Native Mode), Keyence and Omron to name but a few. In practice, this instruction is used to trigger the image recording within job application programs and to transfer the position data.

Socket communication

Socket communication refers to the communication using arbitrary sockets on the basis of user-defined protocols. Unlike the above mentioned permanently defined protocols, this allows for free communication on TCP/IP Ethernet (or RS232). This enables the connection of any kind of device (vision systems, sensors, etc.)

The robot can optionally act as client as well as server. MOTOMAN robot controllers allow socket communication via MotoPlus technology. From the user's point of view, the protocols can either be implemented in the form of a MotoPlus application or a MotoGSI application. Beyond this, the corresponding SDKs (Software Development Kits) are available (see MotoPlus SDK or MotoGSI SDK). In the case of MotoGSI, implementation is carried out on the job level in the programming language Inform. In the case of MotoPlus, on the other hand, in the high-level programming language C using a PC-based development environment (MotoPlus IDE in the package of MotoPlus SDK).



MOTOMAN Sync

MOTOMAN Sync is the interface between the FS100 robot controller and a PC or PLC. Unlike in the case of conventional input/output communication, it is not just data that are transferred.

The robot job is saved directly onto the PC or PLC and the motion commands are transferred to the robot in real time. The FS100 robot controller is thus reduced to the role of a motion controller; the actual program execution and the definition of the motion are carried out by the PC or PLC.

This therefore also eliminates the need to learn the robot language.

Programmers use the high-level PLC or PC language they are familiar with to create their programs. This considerably reduces the complexity of the programming in a system line. Particularly when a system that is in operation worldwide, as is standard practice these days, it is a major advantage for all local programmers to be able to work in their customary programming language.

The communication to other system components, such as cameras or sensors, is thus greatly simplified – robot and camera are in the same programming environment.

Key benefits

- Robot programming on PLC or PC
- Same programming language for the entire system
- Simple communication with sensor or camera
- YASKAWA path quality
- All MOTOMAN robots can be controlled

Robot Controller



PLC

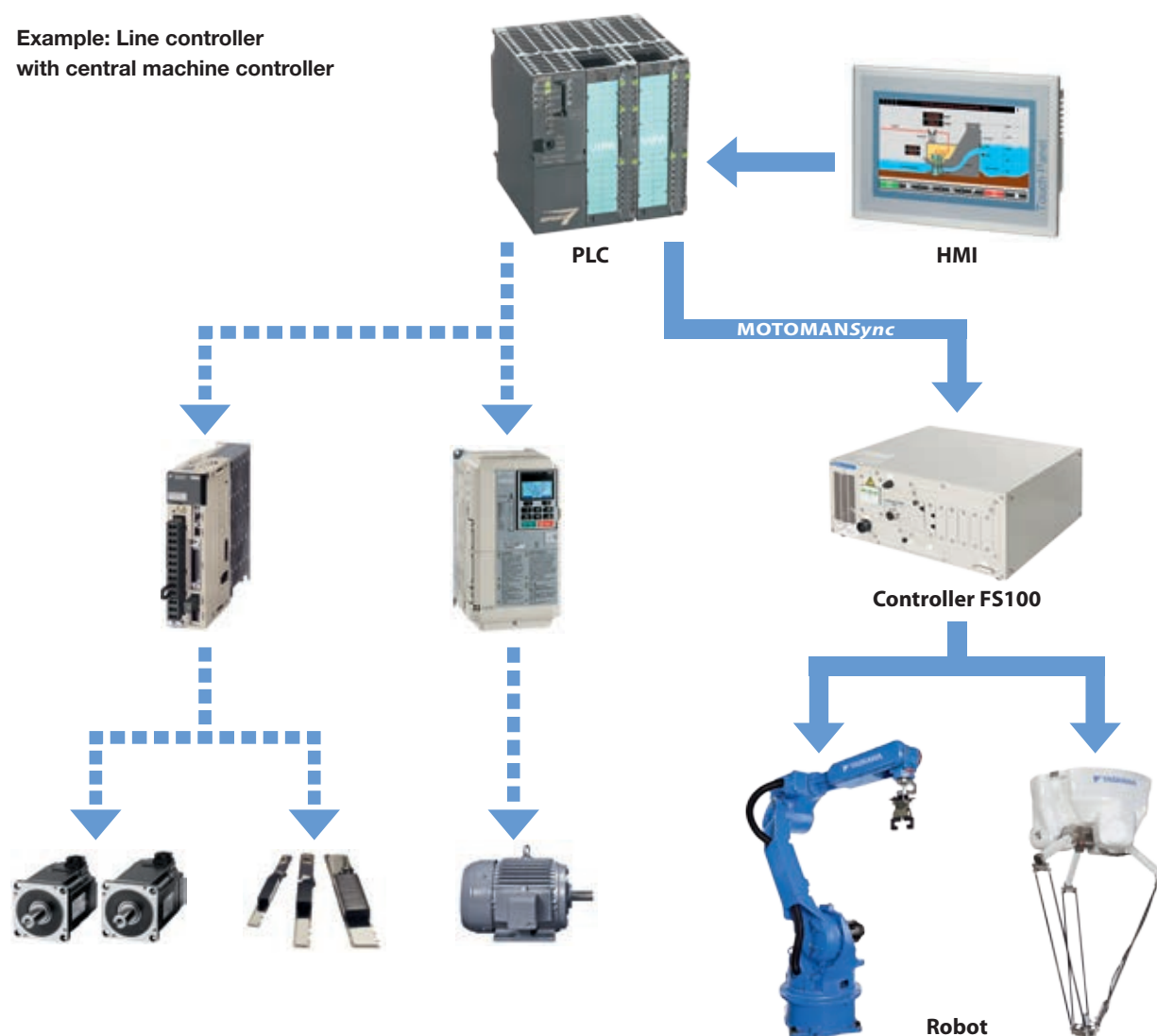


MOTOMAN Sync is offered in 2 versions: Ethernet based for PCs (UDP) and real-time Ethernet based (Ethernet/IP or ProfiNet) for PLCs or other controllers.

All FS100 based MOTOMAN robots can be controlled using this function. With your programming, you fill the loop on the FS100 robot controller in which the path motion is saved. This gives you direct access to the robot motions without having to reinvent the mathematics or the motion quality of the robot. The quality of the motion is comparable to that of a program saved conventionally on the robot controller.

Communication with the FS100 robot controller via MOTOMAN Sync is carried out with a cycle time of 8 ms in the case of MOTOMAN Sync PLC and a maximum of 16 ms (Windows limitation) in the case of MOTOMAN Sync PC. Path point transfer takes 2 cycles. MOTOMAN Sync integrates the robot into your overall machine. The machine controller thus serves as a central control point for all components, such as sensors, servomotors, frequency-controlled motors and robots, within a standardised programming environment.

**Example: Line controller
with central machine controller**



Main functions

- Communication between controller (FS100) and PC/PLC
- Direct saving of robot jobs via PC/PLC
- Real time transfer of motion commands
- Individual program generation
- Integration of robot in system

Scope of supply

- CD-ROM
- 1 Dongle (PC-Version)

System requirements PC

- WindowsXP/7 32-Bit and 64-Bit (PC-Version)
- FS100

Product name	Description	Art. No.
Software MOTOMAN Sync PC SDK	Development tool for Windows-PC	157168
Function FS100 MOTOMAN Sync PC	Runtime for controller	158295
Software MOTOMAN Sync PLC ProfiNet SDK	Development tool for Siemens/VIPA-PLC	157169
Function FS100 MOTOMAN Sync PLC Ethernet IP	Runtime for controller	158297
Software MOTOMAN Sync PCL EthernetIP SDK	Development tool for Allen-Bradley PLC	158298
Function FS100 MOTOMAN Sync PLC ProfiNet	Runtime for controller	158299



A diagram illustrating an FTP connection. On the left, a PC (monitor, keyboard, mouse) is shown in a box. On the right, a blue robotic arm is shown next to a control unit, also in a box. A red line connects the two boxes, passing through a central red box labeled "FTP".

[illegible]

Product name	Description	Art. No.
Function FS100 FTP	Control function of FS100 for file access via FTP	156432
Function DX100 FTP	Control function of DX100 for file access via FTP	150243
Function DX200 FTP	Control function of DX200 for file access via FTP	164060

MotoOPC Server

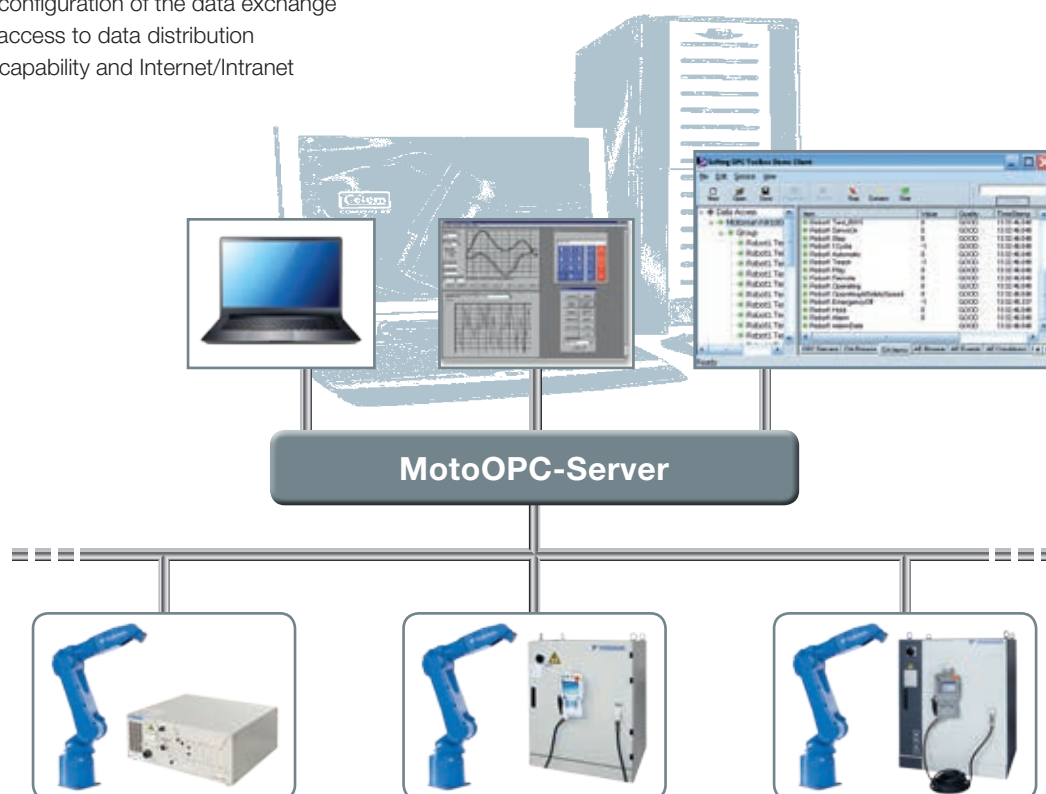
OPC Server software

OLE for Process Control – or OPC – is based on COM/DCOM technology. The OPC provides a general simplified view of the connection of production and process applications with business or office applications.

OPC has the following advantages:

- No more dependency on hardware and software suppliers
- Plug & Play configuration of the data exchange
- Multi-Client access to data distribution
- Networking capability and Internet/Intranet

This software supports NX100 robot controller from software version 3.30 as well as the DX100, DX200 and FS100 robot controller.



MotoOPC Server
OPC Server software



Main functions

- The MotoOPC Server has a Data Access interface which supports the OPC specifications Data Access V1.0A, V2.05, V3.0. Only read access is possible.
- In addition to precisely defined robot state items, any kind of variables and I/O data can be defined as OPC items.
- An OPC client is not included in this software package. OPC clients use the standardised OPC interface of the MotoOPC Server to access process data.

Languages

- Independent

Scope of supply

- CD-ROM
- 1 Dongle
- 1 Manual (on CD-ROM)

System requirements PC

- PC with Windows 2000/XP/7
- Network card
- 100 MByte free hard disc space

Product name	Description	Art. No.
MotoOPC Server	OPC Server software	103363



MotoModbus

With MotoModbus, YASKAWA opens up a standard interface to almost any HMI (Human-Machine Interface = connection/hardware between human and machine).

The adjustable interface can transfer variables and information via inputs/outputs. This allows easy, direct communication between the robot controllers DX100, DX200 or FS100 and any HMI with a suitable Modbus TCP client interface. Additional field bus hardware is not necessary.

Key benefits

- Direct communication
- Configurable
- Universally deployable for virtually all HMIs
- No long route via field bus



For Ethernet, MotoModbus uses the standard port 502.

Via this port variables such as B (byte), I (integer), R (real) and D (double) can be read and written.

Internal registers and universal inputs and outputs can also be read and written.

The number of variables used for each group can be predefined using a simple initialisation file.

The only precondition for HMIs is an Ethernet connection and an optional Modbus protocol.

Main functions

- Reading and writing of variables
- Reading and writing of IOs
- Direct communication between robot controller and HMI on the basis of Modbus/Ethernet

Scope of supply

- CD-ROM

System requirements PC

- DX100, DX200 or FS100

Product name	Description	Art. No.
Software MotoModbus	ModbusTCP Server Implementation	162968

Interfaces at a glance

FTP Server/Client

• Function FS100 FTP	Art. No. 156432
• Function DX100 FTP	Art. No. 150243
• Function DX200 FTP	Art. No. 164060

Ethernet Server

• Function FS100 Ethernet Server	Art. No. 158301
• Function DX100 Ethernet Server	Art. No. 150241
• Function DX200 Ethernet Server	Art. No. 164063

High Speed Ethernet Server

• Function FS100 High-Speed Ethernet Server	Art. No. 158303
• Function DX100 High-Speed Ethernet Server	Art. No. 150239
• Function DX200 High-Speed Ethernet Server	Art. No. 164062

MOTOMAN Sync

• Software MOTOMAN Sync PC SDK	Art. No. 157168
• Function FS100 MOTOMAN Sync PC	Art. No. 158295
• Software MOTOMAN Sync PLC EthernetIP SDK	Art. No. 158298
• Function FS100 MOTOMAN Sync PLC EthernetIP	Art. No. 158297
• Software MOTOMAN Sync PLC ProfiNet SDK	Art. No. 157169
• Function FS100 MOTOMAN Sync PLC ProfiNet	Art. No. 158299

VStart Vision interface

• Function DX100 Vision Cognex In-Sight Series	Art. No. 154738
• Function DX100 Vision Keyence CV Series	Art. No. 145345
• Function FS100 Vision Cognex In-Sight Series	Art. No. 158304
• Function FS100 Vision Keyence CV Series	Art. No. 159468
• Function DX200 Vision	Art. No. 164068

Proface runtime	Art-Nr. 160950
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Software MotoOPC Server	Art. No. 103363
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Software MotoModbus	Art. No. 162968
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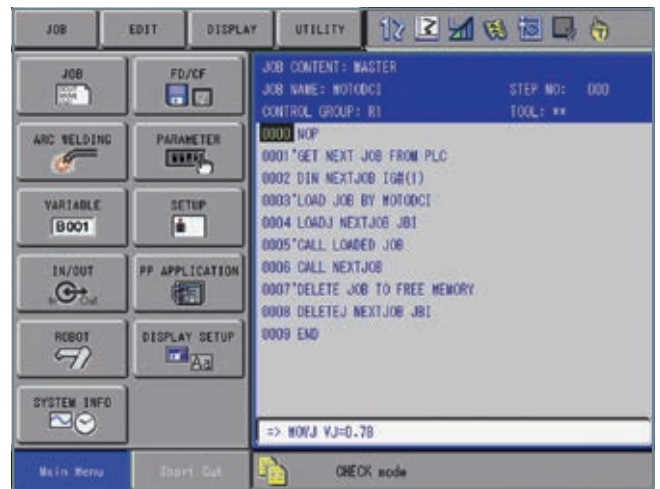
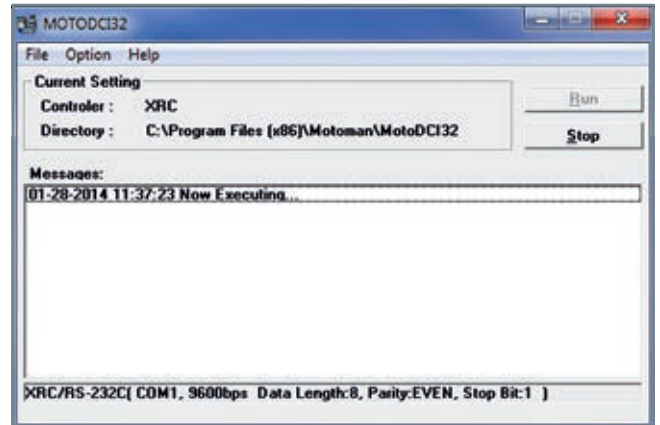
MotoDCI/MotoJob

Software for externally saving robot jobs

The software tools MotoDCI/MotoJob are used for externally saving robot jobs on a PC. This allows memory to be expanded. If requested by the robot controller, the jobs saved on the PC can be loaded onto the controller (Data Communication by Instruction or DCI) and then carried out.

For MotoDCI, the request is carried out using the job name. For MotoJob, the request is carried out using an access number (which means that the jobs must be registered beforehand). However, the jobs here are deleted automatically since the same job names are always used.

The connection to the robot controller is carried out via the serial interface or via TCP/IP Ethernet. The software supports the MOTOMAN controllers ERC, MRC, XRC, NX100, DX100, DX200 and FS100.



Main functions

- External saving of robot jobs
- Activation via RS232 or Ethernet
- Logging

Languages

- Support of several languages

Scope of supply

- CD-ROM
- 1 Dongle
- 1 RS232 adapter cable: Robot controller (9-pole) – PC (9-pole)
- 1 Manual (on CD-ROM)

System requirements PC

- PC with Windows 2000/XP/7
- Min. 1 COM-Port
- 100 MByte free hard disc space
- CD-ROM drive for installation

Product name	Description	Art. No.
MotoDCI/MotoJOB	Software for externally saving robot jobs	129534



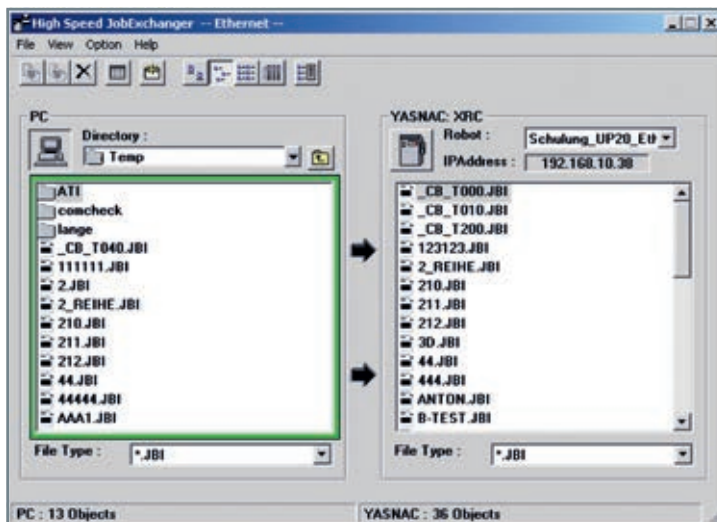
JobExchanger

Software for remote data backup serially and via Ethernet

JobExchanger allows the saving and loading of robot files (Backup & Restore). It is operated from the PC. This means that from one PC working place several robot controllers can be managed centrally. In this case, the robot controller is in remote mode.

JobExchanger is primarily used for the exchange of job files between PC and robot controller. Parameter and system files can be saved, whereas restoring is only possible under certain conditions (if at all).

The connection between PC and robot controller is carried out serially or via TCP/IP Ethernet. FS100, DX100, DX200, NX100, XRC, MRC or ERC controllers (only serially) can be controlled.



Main functions

- Saving of robot data
 - Robot jobs
 - Parameter files
 - Application data
 - System data
 - Tool data etc.
- Loading of robot data
 - Robot jobs
 - Parameter files cannot be loaded
 - System data can only be loaded with limitations
- Displays
 - Display file contents

Languages

- Support of several languages

Scope of supply

- CD-ROM
- 1 Dongle
- 1 RS232 adapter cable:
Robot controller (9-pole) – PC (9-pole)
- 1 Manual (on CD-ROM)

System requirements PC

- PC with Windows 2000/XP/7
- Min. 1 COM-Port
- 100 MByte free hard disc space
- CD-ROM drive for installation

Product name	Description	Art. No.
JobExchanger	Software for remote data backup serially and via Ethernet	103185

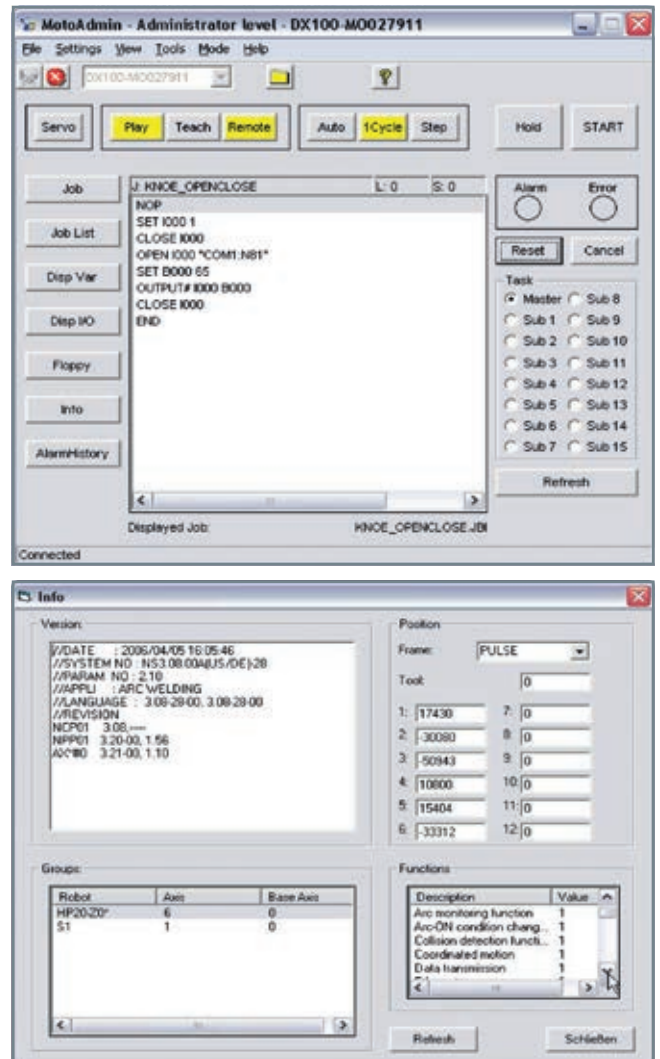


MotoAdmin

Remote access software

MotoAdmin provides the option of remote control or fault diagnosis of the robot from a PC. MotoAdmin thus, for example, enables remote maintenance from a distant location.

The connection to the robot controller is carried out via the serial interface or via TCP/IP Ethernet. The software supports the following robot controllers: MOTOMAN XRC, NX100, DX100, DX200, FS100.



Main functions

- File access, i.e. loading, saving and deleting of job files and, in a limited capacity, of system files
- Backup profiles for One-Button-Backup can be defined
- Display and editing of global variables
- Display of the I/O signals (only indirect setting of outputs possible)
- Control of the robot job execution (servo, start jobs/interrupt jobs, etc.)
- Display and limited reset of alarms and faults. Retrieval of alarm history
- Retrieving of system information such as software version, installed functions, robot type, stations, axes, positions
- Job editing (without syntax control)

Languages

- Support of several languages

Scope of supply

- CD-ROM
- 1 Dongle
- 1 RS232 adapter cable: Robot controller (9-pole) – PC (9-pole)
- 1 Manual (on CD-ROM)

System requirements PC

- PC with Windows 2000/XP/7
- 100 MByte free hard disc space
- CD-ROM drive for installation

Product name

Description

Art. No.

MotoAdmin

Remote access robot software serial and via ethernet

103227

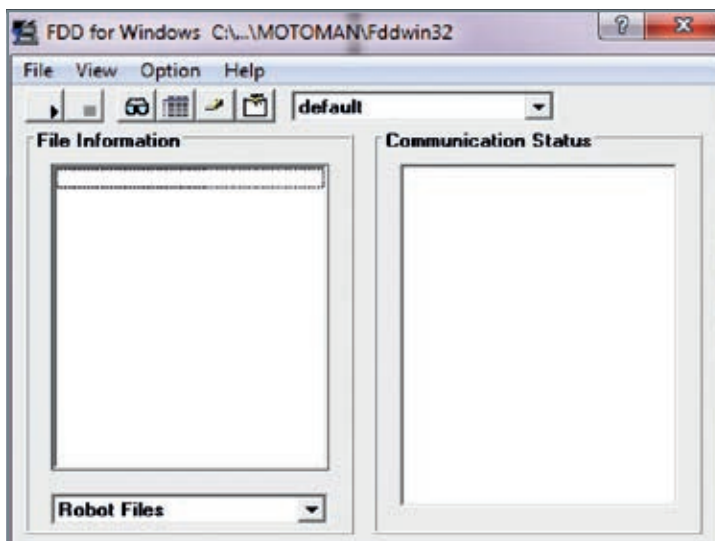
FDDWin

Windows PC software for data backup on the robot

FDDWin allows the administration of all robot data with a PC. All relevant files can be transferred from the robot controller to the PC or in the opposite direction (Backup & Restore).

FDDWin works as a server and is connected to the PC/laptop via the serial interface. Optionally, Com Servers can also be used to integrate the serial interface into Ethernet networks. Files are backed up and loaded using the teach pendant.

The software supports ERC, MRC, XRC, NX100, DX100, DX200 and FS100 robot controllers. For the ERC and MRC controllers, FDDWin can substitute the external floppy disc drive. In this case, data can be stored directly to the PC drives or to connected network drives. For new controller generations it can be used as an alternative to the storage media.



Main functions

- Loading/saving of robot data
- Robot jobs
- Parameter files
- Application data
- System data
- Tool data etc.
- Displays
- Display file contents

Languages

- Support of several languages

Scope of supply

- CD-ROM
- 1 Dongle
- 1 RS232 adapter cable:
Robot controller (9-pole) – PC (9-pole)
- 1 Manual (on CD-ROM)

System requirements PC

- PC with Windows 2000/XP/7
- Min. 1 COM-Port
- 20 MByte free hard disc space
- CD-ROM drive for installation



Product name	Description	Art. No.
FDDWin	Windows PC software for data backup on the robot	103171



Software Pendant

Virtual Teachbox

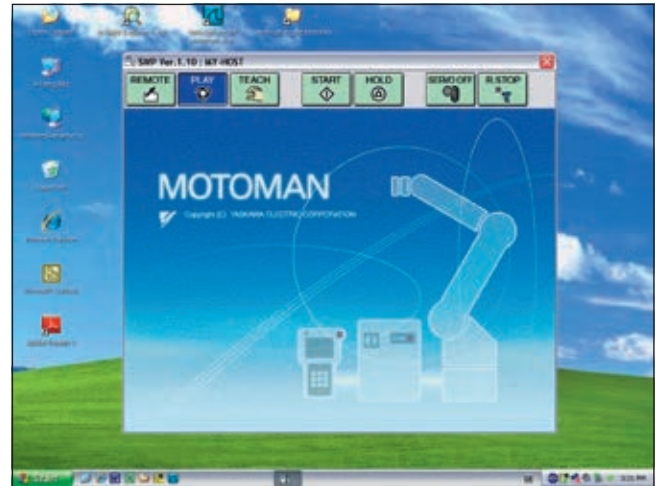
Software Pendant is a PC solution for Windows which maps the teach pendant on the PC. The teach pendant is thus not necessary in a robot system.

The robot is programmed using the normal "Teach-In" method, in the same way as with the teach pendant (visual contact between HMI and robot is necessary). Especially in systems with a Windows PC as the HMI, the number of components can be reduced. Programming with a touch screen-guided PC is particularly easy. This enables the system manufacturer to display the operation of the process machine and the robot in a station. Multiple robots in a system can be programmed using the same PC.

It must be noted here that an Emergency Stop button must be installed in the immediate vicinity of the monitor. The enabling switch is not necessary, since the robot is only moved with the protective enclosure closed.

Key benefits

- "Teach-In" on PC
- Reduced number of components
- System molded to your needs
- Several robots on one HMI possible



Main functions

- Representation of the teach pendant on PC
- Programming in "Teach-In" mode

Languages

- English
- Further languages (beta)

Scope of supply

- Dummy connector for FS100 Teachbox
- CD with PC software
- USB Hardware Key
- Operating instructions

System requirements PC

- Windows7 (32 bit)
- CPU Intel Core2 2 GHz or more
- Memory 2 Gbyte min.
- Hard disc 500 Mb min.

Product name	Description	Art. No.
Software Pendant	PC solution for Windows	158090



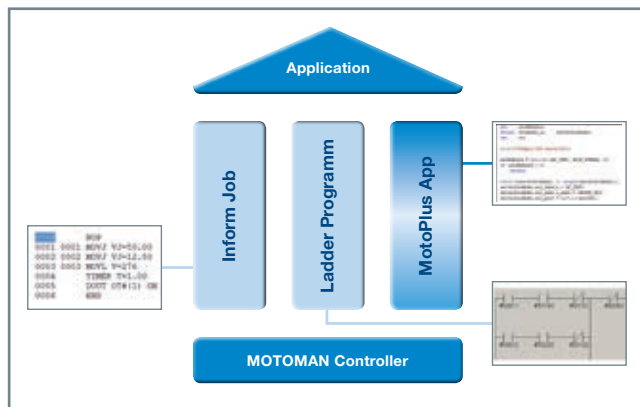
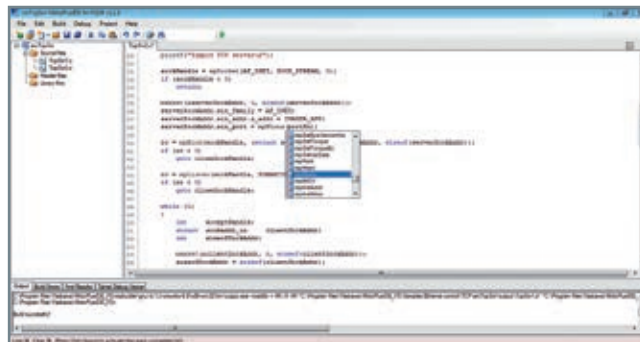
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MotoPlus SDK

Development tool for MotoPlus Apps

MotoPlus SDK is a software package for the development of expansion modules (MotoPlus Apps) for MOTOMAN controllers. User-defined modules enhance the functionality of MOTOMAN robot controllers through functions which are not available with the standard Inform motion command/Ladder. Corresponding modules allow, for example, communication protocols to other devices, complex mathematical calculations, etc. The expansion modules are created externally on the PC using the familiar programming language C and are integrated in a compiled form. The transfer in compiled form allows for the encapsulation of the functionality, thus protecting intellectual property. Access to the controller resources (such as variables, I/O signals, files, etc.) is realised via a powerful API. Furthermore, numerous libraries are available from VxWorks, C Standard, Open Source, etc. For the MOTOMAN controllers DX100, DX200 and FS100 these products are available separately.



Main functions

■ Integrated development environment

With MotoPlus IDE, MotoPlus SDK already contains a development environment for the creation of the C-based expansion modules. MotoPlus IDE integrates a program editor, compiler and linker into one powerful IDE. This dispenses with the need for external development tools.

■ MotoPlus library

The MotoPlus library or "MotoPlus API" provides the connection to the controller resources and functions. The following APIs are available (partially optional):

- Task Control API
- Network API
- Serial Communication API
- System Monitor/Control API
- Motion Monitor/Control API
- Sensor API (optional, on request)
- File API (optional, on request)

■ Collection of examples

The MotoPlus SDK already contains examples for common programming tasks, thus significantly simplifying the first programming steps.

Optional components

■ MotoPlus runtime

MotoPlus SDK is a Software Development Kit for the creation of expansion modules – so-called MotoPlus Apps which require MotoPlus runtime as runtime environment. It is important to note that MotoPlus runtime must be licensed for each controller.

Scope of supply

- CD ROM
- Dongle

System requirements PC

- Windows XP/7
- 2 GHz processor
- 2 GB RAM
- 256 MB graphics card
- 10 GB hard disc space

Product name	Description	Art. No.
MotoPlus SDK FS100	Development tool for MotoPlus Apps	158302
MotoPlus runtime FS100	Runtime for controller FS100	156863
MotoPlus SDK DX100	Development tool for MotoPlus Apps	147961
MotoPlus runtime DX100	Runtime for controller DX100	153655
MotoPlus SDK DX200	Development tool for MotoPlus Apps	167681
MotoPlus runtime DX200	Runtime for controller DX200	164065

Advanced PP Customization SDK

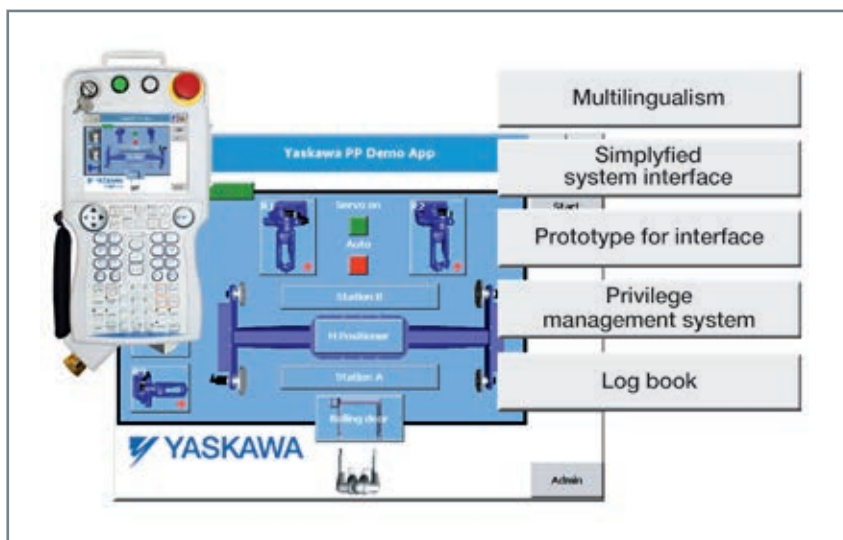
Development kit for the creation of application-specific user interfaces

The Advanced PP Customization SDK offers a collection of modules for the quick and easy creation of application-specific user interfaces for the teach pendant (PP). Adapted user interfaces allow for central and readily accessible positioning of important information and control elements. The operator control concept can be standardised irrespective of the device. New branding also enhances the recognition value.

Using the Advanced PP Customization SDK, you can easily add the support of a language switching function, a logbook function or several authorisation levels to your application.

By combining the simplified system interface with the basic interface framework, you will automatically receive messages from the standard interface.

Instead of reading the variables yourself, simply register a graphical element and receive a message whenever the corresponding variable has changed. The Advanced PP Customization SDK comes in the form of a library for the development with the Microsoft Compact Framework V2.0 and is available for the DX100, DX200 and FS100 controller. It contains classes, a basic framework for graphical interfaces with several display pages as well as a design recommendation for the interaction of the modules.



Components:

- API module
- Logging module
- GUI module
- Language module
- User level module
- Input module

Optional components

■ Advanced PP Customization runtime

The Advanced PP Customization SDK is a Software Development Kit for the creation of application-specific user interfaces which require Advanced PP Customization runtime as runtime environment. It is important to note that Advanced PP Customization runtime must be licensed for each controller.

Languages

- German
- English

Scope of supply

- CD-ROM
- 1 Manual (on CD-ROM)

Voraussetzungen

- DX100, DX200 or FS100 controller
- Visual Studio 2008 development environment
- Application development on the basis of .Net Compact Framework V2.0



Product name	Description	Art. No.
Advanced PP SDK	Development kit for the creation of application-specific user interfaces	154768
Advanced PP Customization runtime	Runtime for controller	149628

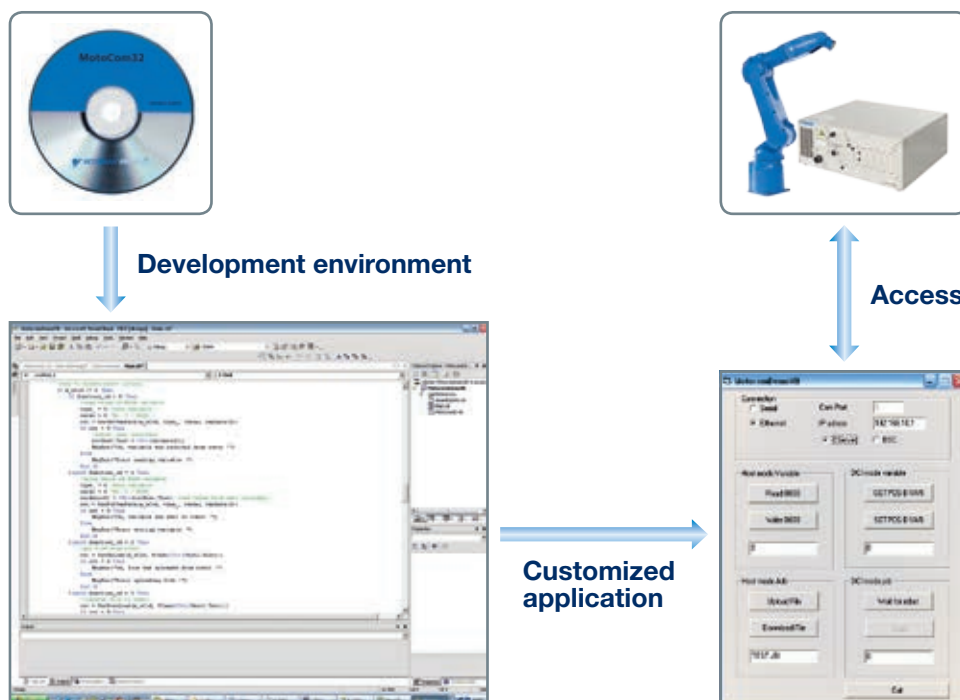


MotoCom SDK

Development package for PC developers SDK

The development package for PC offline software MotoCom SDK is a functional library in the form of a Windows DLL (Dynamic Link Library) encapsulating the data access to MOTOMAN controller types such as ERC, MRC, XRC, NX100, DX100, DX200 and FS100.

This simplifies data exchange with the robot controller from user applications, without the need to implement the communication protocol of the controller. For this, the software package contains small examples on the use of the DLL with the programming tools VisualBasic, VisualC++, VB.Net and VC# (unmanaged). Communication is optionally carried out either via the serial interface or via an Ethernet network (MOTOMAN ERC: serial connection only).



Main functions

- File transfer
- Robot control functions
 - Status information
 - System control
- Setting or reading of I/O signals
- Communication control
- DCI functions for job-related PC communication (LOADV, SAVEV etc.)

Languages

- English

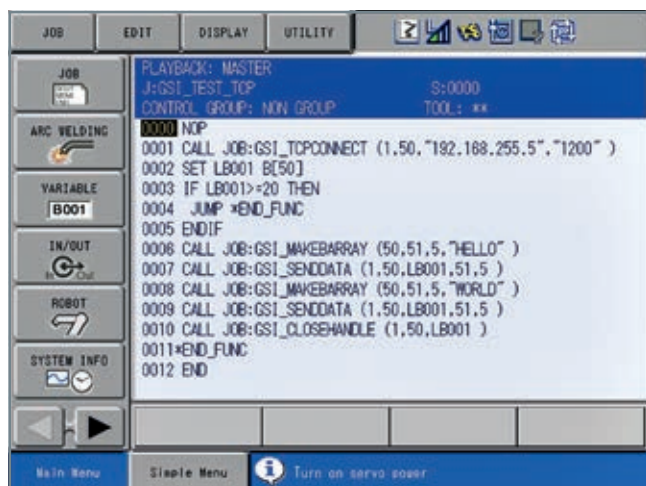
Scope of supply

- CD-ROM
- 1 Dongle
- 1 RS232 adapter cable: Robot controller (9-pole) – PC (9-pole)
- 1 Manual (on CD-ROM)

System requirements PC

- PC with Windows 2000/XP/7
- Network card or min. 1 COM Port
- 100 MByte free hard disc space
- CD-ROM drive for installation

Product name	Description	Art. No.
MotoCom SDK	Development package for PC developers SDK	103186
MotoCom runtime	Runtime for PC	131950



MotoGSI SDK

Interface programming

MotoGSI SDK is a development package for creating job level communication interfaces. The primary component of MotoGSI is an inform command set extension that enables the establishment of communication connections (socket connections) to external devices. The function currently supports interfaces based on Ethernet/TCP (client), Ethernet/UDP and RS232 connections. This enables data connection of most systems via Ethernet and/or serial RS232 interface for the robot programmer.

MotoGSI requires MotoPlus runtime and is available for MOTOMAN DX100, DX200 and FS100 controllers.

Key benefits

- Allows the connection of any device or camera via TCP/IP or RS232
- Implementation of specific protocols
- Standard protocols already available (FTP, SMTP, Telnet)

Main functions

■ Establishing a connection

For this are available the instructions TCPConnect, UDPBind, RS232Open corresponding to the used protocol. These return an access handle which is subsequently referenced for further operations.

■ Sending data

Data are sent using the SendData function in a synchronous process.

■ Receiving data

A receive buffer is available for receiving data. Data are received asynchronously. MotoGSI provides commands for access to this receive buffer. These include, for example, the option of checking the receive buffer for specific data patterns.

■ Utility functions for data preparation

MotoGSI uses byte arrays for transmission of user data. Utility functions are available, e.g. for the conversion of strings to bytes arrays and vice versa.

Additional components required

■ MotoPlus runtime

MotoGSI SDK is a software development package for creating MotoGSI communication applications – so-called MotoGSI.Apps. These require MotoPlus runtime as runtime environment. It is important to note that MotoPlus runtime must be licensed for each controller.

Languages

- English

Scope of supply

- CD ROM

System requirements PC

- PC with USB stick or memory card interface for transferring data to the robot controller
- MOTOMAN DX100, DX200 or FS100 robot controller



Product name	Description	Art. No.
MotoGSI SDK	Software for interface programming	154082
MotoPlus runtime DX100	Runtime for controller DX100	153655
MotoPlus runtime FS100	Runtime for controller FS100	156863
MotoPlus runtime DX200	Runtime for controller DX200	164065

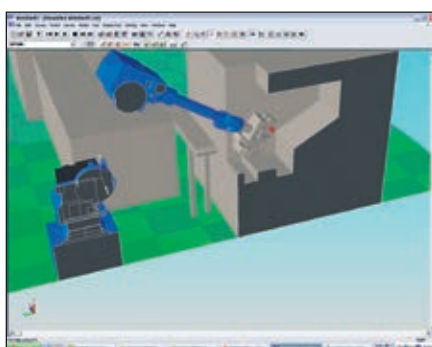
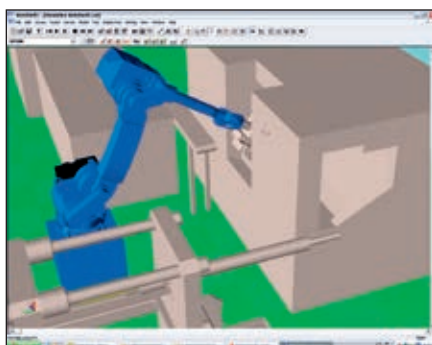
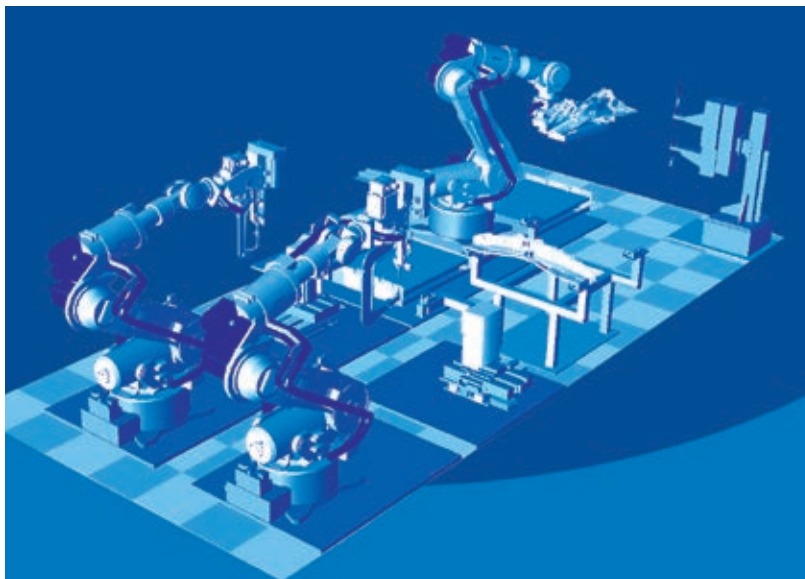


MotoSim

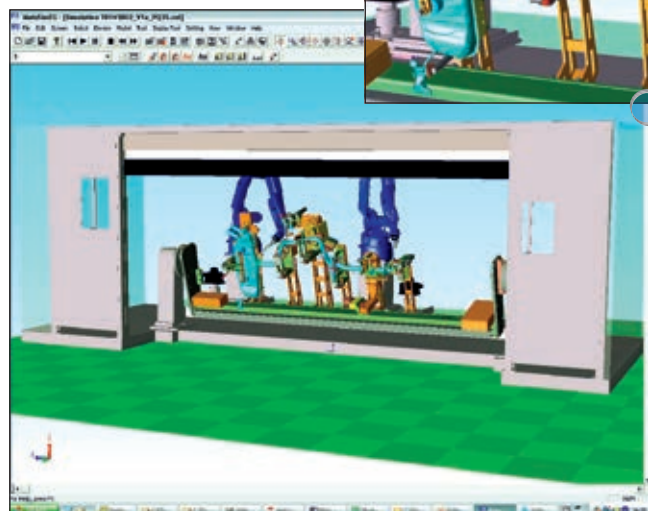
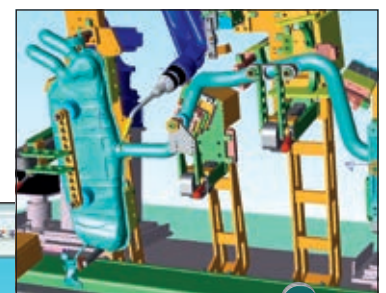
Offline programming and simulation

MotoSim is a comprehensive software package for simulation and planning of MOTOMAN robot systems. MotoSim uses the 3D HOOPS graphics engine – one of the leading graphics engines on the market. Import filters for IGES, SAT, HSF and other formats allow trouble-free importing of your CAD models. The internal model editor additionally allows the creation of CAD models within MotoSim.

MotoSim ensures reliable planning already in early project phases when the real system is not yet available. Problems can be detected early on. This enables smooth process sequences during the implementation phase. Moreover, MotoSim offers functions for offline programming of robotic cells. All MOTOMAN controller generations are compatible with MotoSim, from the ERC type to the new DX100, DX200 and FS100 controllers¹.



3D Coordination steps



Detailed graphic: HOOPS-Graphic-Engine



Main functions

■ Reach and accessibility investigations

MotoSim enables the quick setup and analysis of system layouts. MotoSim benefits here from the underlying HOOPS graphics engine. Important dimensions can be measured here directly. The user interface contains convenient tools, such as collision check and user-defined 3D views.

■ Cycle time analysis

As a native manufacturer tool, MotoSim guarantees high accuracy of the calculated cycle times. Cycle times can be optimised by adapting the system layouts, the robot path and the robot type used (if required) accordingly.

■ Offline programming

Motion programs are created in MotoSim and can then be transferred directly to the real robot controller. Points on the path are taught directly on the work piece in CAD models with a simple mouse click (OLP function). The MotoCalVEG calibration tool, available as an option, can then be used to adapt the virtual system layout within MotoSim to the real circumstances. This minimises the need for reprogramming on the real system.

Additional components

■ Model library

In addition to the robot models², the library contains a wide range of models of peripheral devices, such as positioners, welding equipment, conveyors, etc.

■ Example cells

MotoSim contains a number of example cells. These can be used, for example, to demonstrate more complex system configurations.

■ Job transfer module

This allows the transfer of jobs between different manipulator types. This is necessary, for example, if robot programs are to be transferred from an old manipulator type to a new one or if production is transferred from one manipulator type to another.

■ Remote Monitoring function

Representation of the motion of a real robot in MotoSim.

■ MotoSim Viewer function

MotoSim simulations can be exported as web applications. This means that the completed simulations can be played in a browser without having to install MotoSim. This allows distribution of completed simulations to clients or partners.

Optional components

■ JobEditor

JobEditor is available as a separate software package. In conjunction with MotoSim, it allows the convenient editing of jobs.

■ Inovate

CAD system for data conversion of CAD data formats that are not supported and for reducing the depth of detail of models.

■ MotoCalVEG

Calibration tool for MOTOMAN robots. In addition to robot and tool calibration, MotoCalVEG also enables layout calibration in which the virtual system layout is adapted to the real system layout.

Scope of supply

- CD ROM
- Dongle (hardware-supported software key)

System requirements

- Windows XP/7 (32 bit, for 64 bit systems: execution in 32 Bit mode)
- OpenGL-capable graphics card (Nvidia Quadro, ATI)
- For simulation of multi-robot-systems, CPUs with higher processing power should be used (Quad-Core)
- Use standard monitors (not CAD monitors); the higher the resolutions to be displayed, the greater the required processing power of the CPU
- Main memory: 4 GB
- 10 GB hard disc space

Related products

- MotoCalVEG
- JobEditor
- Inovate

¹ MotoSim currently only supports single-robot systems.

² It is not currently possible to guarantee 100% coverage of all available robot types.

Product name	Description	Art. No.
MotoSim	Offline programming and simulation	152355

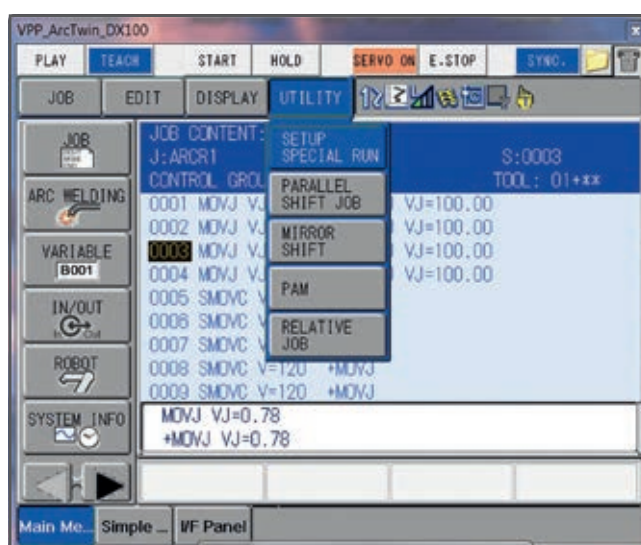
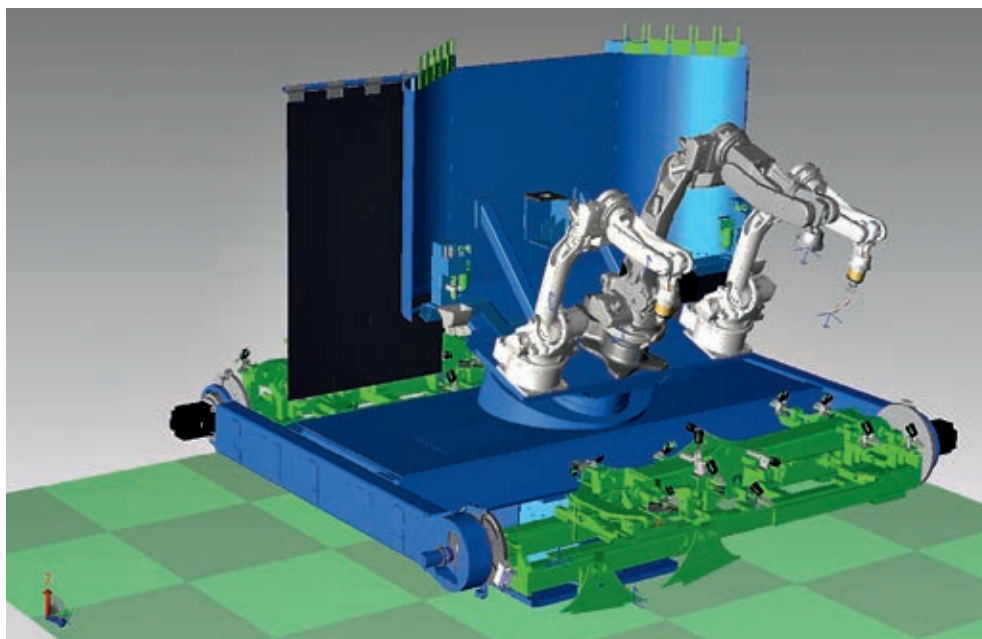


MotoVRC

Offline programming and simulation

MotoVRC is a comprehensive software package for virtualisation of robot systems based on NX100, DX100, DX200 and FS100. MotoVRC not only allows graphical virtualisation of the robot cell, but also virtual representation of the robot system itself. Operation of the virtual robot system is analogous to that of the real robot, using a virtual teachbox corresponding to that of the real robot system in appearance and performance. MotoVRC supports multi-robot systems (twin or triple configurations, etc.).

The MotoVRC software package also includes the MotoSim software package as a self-contained module (cf. MotoSim data sheet). While MotoSim stands out as a powerful planning and simulation tool, MotoVRC scores highly as an offline programming tool. Once again, the robot cell is built up using the 3D HOOPS graphics engine, one of the leading graphics engines in the field of modern CAD/CAM systems.





Main functions

■ Virtual robot controller

Configuration and operation of the virtual controller are analogous to those of the real controller. 1:1 mapping of the real teachbox on the PC screen. This applies for the creation of programs, the editing of conditional files as well as the configuration of the robot system in maintenance mode. Multi-robot configurations are also supported. Thus MotoVRC is ideally suited for the familiarisation with the real controller, but also for training purposes and in the event of missing hardware.

■ Graphical simulation

The integrated CAD import filter for IGES, SAT and HSF files allows the simple adoption of graphical models. The internal model editor also enables the creation of models in MotoVRC.

■ Offline programming

Motion programs can be created in MotoVRC. These can then be transferred directly to the real robot controller. Provided that corresponding CAD models are available, points on the path can be taught directly on the work piece with a simple mouse click (OLP function). The MotoCalVEG calibration tool, available as an option, can then be used to adapt the virtual system layout within MotoSim to the real circumstances. This minimises the need for reprogramming on the real system.

■ Reach and accessibility investigations

MotoSim enables the quick setup and analysis of system layouts. MotoSim benefits here from the underlying HOOPS graphics engine. Distances can be measured directly. The user interface contains convenient tools, such as collision check and user-defined 3D views.

Additional components

■ MotoSim (see also pages 24/25 MotoSim data sheet)

The MotoVRC installation package includes a full version of MotoSim, the proven planning and simulation tool. MotoSim is an integral part of the MotoVRC license and can thus not be operated separately from MotoVRC.

■ Model library

In addition to the robot models¹, the library contains a wide range of models of peripheral devices, such as positioners, welding equipment, conveyors, etc.

■ Example cells

MotoVRC contains a number of example cells. These can be used, for example, to demonstrate more complex system configurations.

■ MotoSim Viewer function

MotoSim simulations can be exported as web applications. This means that the completed simulations can be played in a browser without having to install MotoSim. This allows the easy distribution of completed simulations to clients or partners.

■ Integrated CAM system

Computer-Aided Manufacturing in MotoVRC supports software-based, automated application creation for a wide field of applications in industry.

Robot programs for arc and laser welding, laser cutting, painting and general applications can be created automatically using the CAM function. Useful functions, such as automated path planning by means of edge selection on the simulation model, or the setting of numerous weld parameters prior to program creation, simplify and accelerate the implementation of complex welding tasks.

Optional components

■ CAD import filter for SolidWorks

In addition to the formats IGES, SAT and HSF, this filter enables the optional import of SolidWorks CAD data.

■ CAD import filter for CATIA V5

In addition to the formats IGES, SAT and HSF, this filter enables the optional import of Catia V5 CAD data.

■ CAD import filter for Autodesk Inventor

In addition to the formats IGES, SAT and HSF, this filter enables the optional import of Autodesk Inventor CAD data.

■ CAD import filter for Pro/Engineer

In addition to the formats IGES, SAT and HSF, this filter enables the optional import of Pro/Engineer CAD data.

■ CAD import filter for STEP

In addition to the formats IGES, SAT and HSF, this filter enables the optional import of STEP CAD data.

Scope of supply

- CD ROM
- Dongle

System requirements

- Windows XP/7 (32 bit, for 64 bit systems: execution in 32 Bit mode)
- OpenGL-capable graphics card (Nvidia Quadro, ATI)
- For simulation of multi-robot-systems, CPUs with higher processing power should be used (Quad-Core)
- Use standard monitors (not CAD monitors); the higher the resolutions to be displayed, the greater the required processing power of the CPU
- Main memory: 4 GB
- 10 GB hard disc space

¹ It is not possible to guarantee 100 % coverage of all available robot types.

Product name	Description	Art. No.
MotoVRC	Offline programming and simulation (with virtual teachbox)	152357
MotoVRC Solidworks	Software option	166475
MotoVRC Catia V5	Software option	166476
MotoVRC Inventor	Software option	166477
MotoVRC Pro/Engineer	Software option	166478
MotoVRC Step	Software option	166479

RobCAD RCS-Modul

Enables the use of MOTOMAN robots in RobCAD



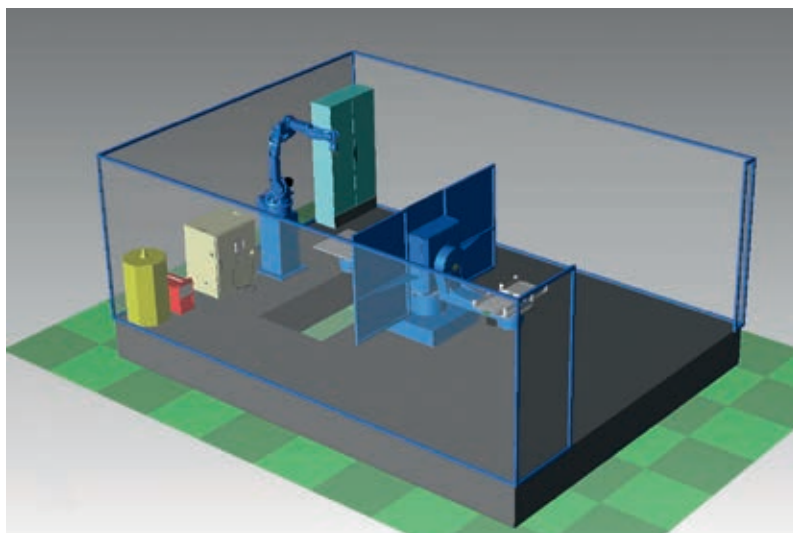
RobCAD RCS-Modul

Enables the use of MOTOMAN robots in RobCAD

The RobCAD offline programming and robot simulation program from Siemens (previously UGS and Tecnomatix) enables the creation of robot programs without direct contact to the robot concerned. Motion simulations can be performed with a view to accessibility and possible collisions. The created programs are then compiled by RobCAD in the required robot programming language. For exact simulation and offline programming of a specific make of robot, the manufacturers provide standardised virtual controller maps in the form of

so-called RCS modules (Robot Controller Simulation). This allows much more precise simulation of the motion sequences, which is particularly important in the case of cycle time calculation. YASKAWA offers RobCAD RCS modules and robot models for controller and robots of the XRC, NX100, DX100 and DX200 generations. Various fields of application are covered (PAINT, ARC, SPOT). The RCS modules from YASKAWA implement the so-called RRS1 standard.

Use of YASKAWA MOTOMAN RCS modules within RobCAD presupposes that corresponding OLP modules are present; these can be obtained directly from Siemens.



Main functions

- Creation of robot programs
- Precise simulation of motion sequences
- Translation of the programs to the corresponding programming language

Available products

- RCS module RobCAD PC (EMWorkpl.) including 1 robot model
- Robot model RobCAD (PC)

When ordering, please specify the application, controller type, robot model and MAC address of the workstation. A quotation for additional RCS

modules (Delmia IGRIP, Process Simulate, RobotExpert etc.) can be provided on request.

Languages

- English

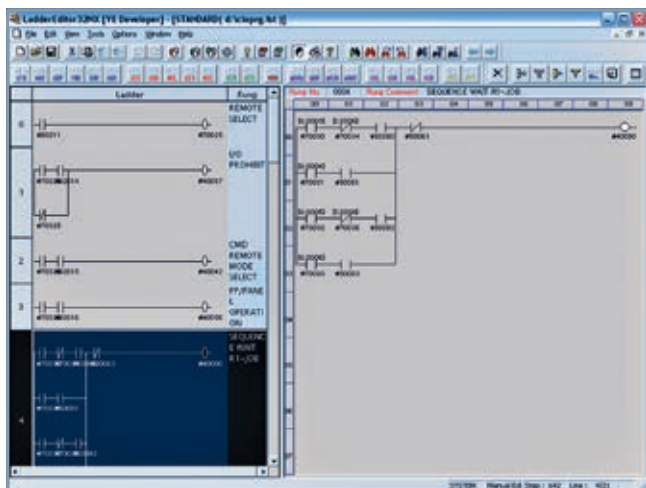
Scope of supply

- CD ROM
- 1 Manual (on CD-ROM)

System requirements PC

- PC with Windows 2000/XP/7
- 20 MByte free hard disc space
- CD-ROM drive for installation of OLP modules (obtained directly from SIEMENS)

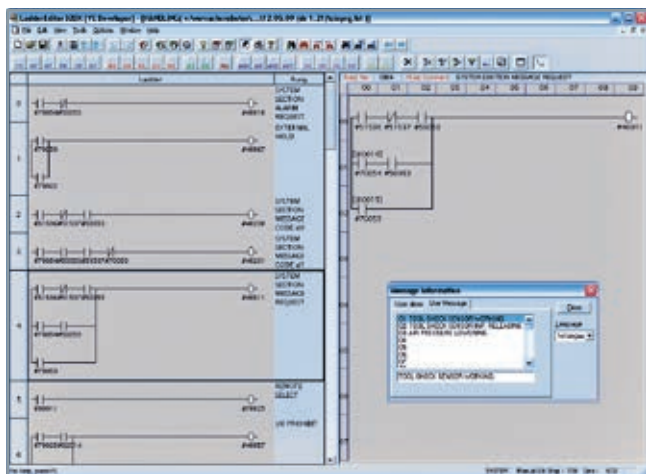
Product name	Description	Art. No.
RobCAD RCS-Modul	Robot model RobCAD	129499
	EM Workplace (PC) incl. 1 special robot model	129476



LadderEditor

Editor for the ladder program

The integrated PLC (Concurrent I/O) function of the MOTOMAN robot controller processes I/O signals independently of and parallel to manipulator operations. LadderEditor enables the creation and editing of the corresponding PLC program in ladder diagram format (Ladder Logic). Editing is carried out simply by means of "Drag and Drop" with the mouse. An automatic syntax check is carried out when the ladder program is compiled. Extensive search functions are also available.



Main functions

- Simple editing of the ladder mnemonic code
- Supported graphic representation
- Preview function for displaying the complete line of the ladder program
- Simple drag & drop function for editing links
- Copy and paste between different ladder programs possible
- Extensive cross-reference functions
- Recording of jump operations
- Access protection by means of password
- Extensive range of print functions
- No simulation function

Languages

- English

Scope of supply

- CD-ROM
- 1 Dongle

System requirements PC

- Windows XP/7
- 2 GHz processor
- 2 GB RAM
- 256 MB graphics card
- 10 GB hard disc space

LadderEditor
Editor for the ladder program



Product name	Description	Art. No.
LadderEditor FS100	Editor for ladder program controller FS100	156423
LadderEditor DX100	Editor for ladder program controller DX100	145768
LadderEditor DX200	Editor for ladder program controller DX200	167680



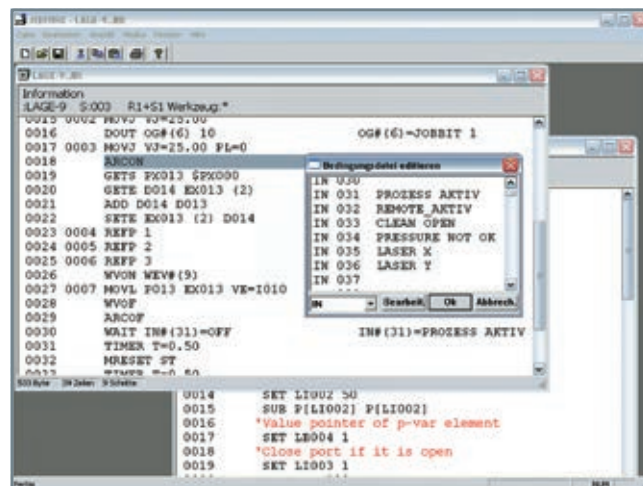
JobEditor

Editing of robot programs on the PC

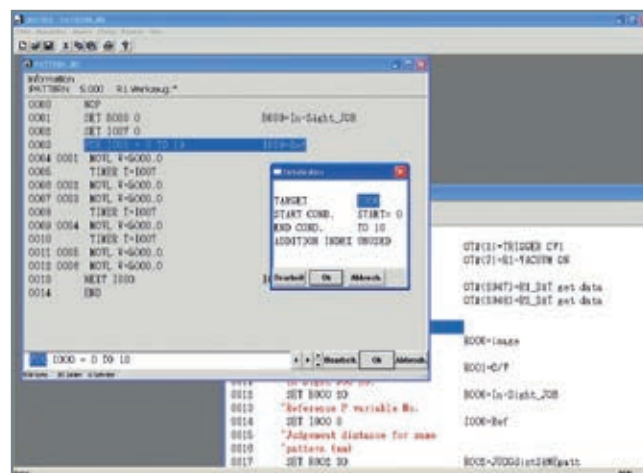
JobEditor is a software package for editing MOTOMAN robot programs (Inform jobs).

JobEditor allows the user to create or modify jobs without taking the robot out of production (offline). The integrated syntax check guarantees the integrity of the created robot programs.

Separate versions are available for the YASKAWA MOTOMAN controller generations XRC, NX100, FS100, DX100 and DX200.



Screen JobEditor for NX



Screen JobEditor for DX

Main functions

- Job creation and editing with syntax check
- Insert/delete command lines
- Edit command line
- Cut/copy/paste
- Display/edit job header
- Edit names of variables and I/Os
- Print job
- Rename job
- Search for job contents

The command set (instruction list) largely corresponds to that of the real controller. The editing of taught position data is only possible via the teach pendant, however.

Languages

- English

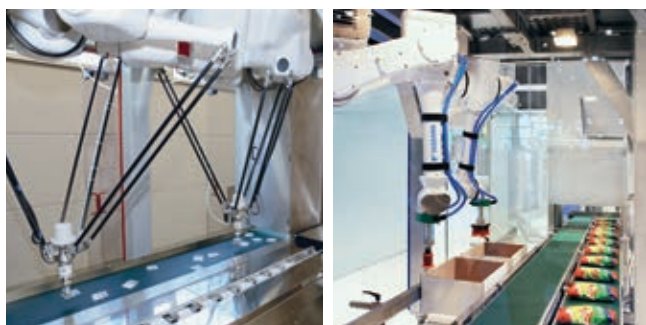
Scope of supply

- CD-ROM
- 1 Dongle

System requirements PC

- Windows XP/7
- 2 GHz processor
- 2 GB RAM
- 256 MB graphics card
- 10 GB hard disc space

Product name	Description	Art. No.
JobEditor FS100	Software for controller FS100	156422
JobEditor DX100	Software for controller DX100	145765
JobEditor DX200	Software for controller DX200	167681



MotoPick

Order-picking/management software for controlling picking processes

MotoPick coordinates and simplifies complex packaging processes and is characterised by ease of handling. The interplay of product recognition by means of a camera with conveyor tracking and the correct setdown of the product in the desired position in the right tray is controlled by MotoPick. The simple programming reduces start-up times and enables quick product changes. The operator only requires minimal knowledge of the direct programming of an individual robot, as all processes can be controlled centrally via MotoPick.

MotoPick
Order-picking software
Management software



Main functions

- Division of the picking task between up to 4 robots, including with multiple grippers
- Simple teaching of new products via integrated Cognex interface
- Simple programming – e.g. setdown position, pick height – by means of intuitive input masks

Languages

- English
- German
- Italian
- Others on request

Scope of supply

- CD-ROM
- 1 Dongle

System requirements PC

- Windows XP/7, 32 bit
- FS100 robot controller

Product name	Description	Art. No.
Software MotoPick	Order-picking software / Management software	152495



Palletising software MotoPal

Management software for controlling palletising applications

MotoPal, the palletising interface on the teachbox, enables the presentation and control of a complete palletising cell.

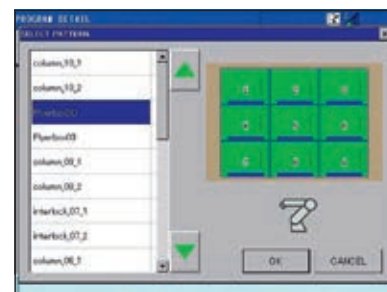
New products can be set up without programming effort. The robot not only assumes responsibility for palletising the products, but also checks the incoming conveyors and the changes of pallets in the individual stations.

The operator receives a precise overview of the system on the teachbox, including the status of the individual components, e.g. the packing degree of the individual pallets. This makes it possible to dispense with the PLC for controlling the cell.



Key benefits

- User-friendly interface
- Simple operation
- No external PC required
- No knowledge of robotics required
- Possibility to dispense with PLC and additional visualisation
- Control of the entire palletising cell via a single controller



Main functions

- Control of palletising applications
- Direct management of all processes
- Control of up to six incoming conveyors and pallet stations
- Supports suction grippers, clamp grippers (opening on one side or two), complete modular gripper systems and sack grippers

Languages

- English

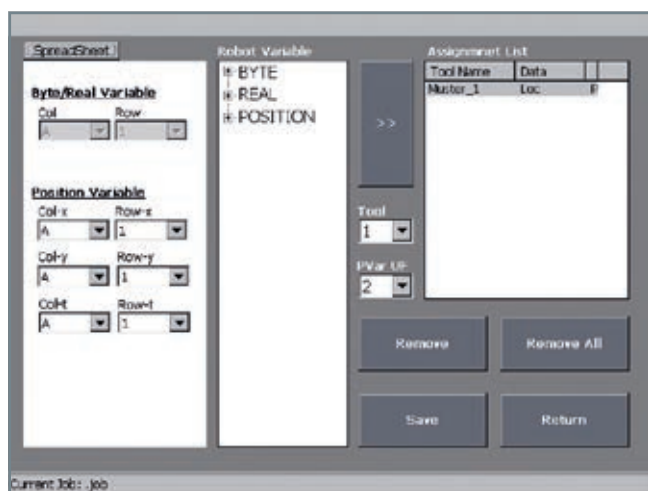
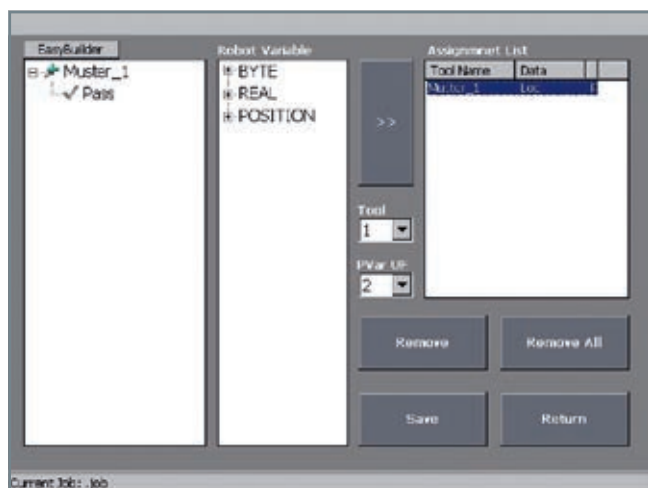
Scope of supply

- CD-ROM

System requirements PC

- Windows XP/7, 32 bit (Pattern Editor)
- DX100 robot controller (requires special firmware)

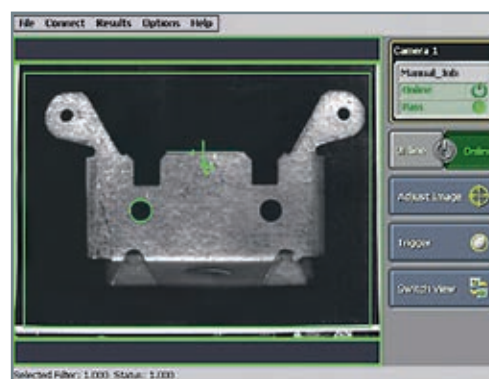
Product name	Description	Art. No.
Software MotoPal	Management software for controlling palletising applications	152024



Function MotoSight2D Interface

Controlling and operating of camera applications

MotoSight2D Interface is a software expansion of the DX100, DX200 and FS100 for controlling and operating Cognex Insight EasyBuilder-based YASKAWA camera applications.



MotoSight2D Interface

Controlling and operating
of camera applications



Main functions

- Monitoring of up to 4 cameras
- Display camera image (live) on robot teach pendant
- Simple assignment of vision results to robot variables
- Macros for triggering and transferring results
- Display and editing of threshold values
- Display of good/bad results
- Display of graphical result elements
- Customized/flexible display and editing
- Storage of current jobs and images
- Vision Pattern

Languages

- English

Scope of supply

- MotoSight2D IF CDRom
- Manual (on CD-ROM, English only)

Available as an option

- YASKAWA camera systems in various performance classes

System requirements YASKAWA camera

- EasyBuilder and spreadsheet on Cognex InSight

Product name	Art. No.
Function MotoSight2D-DX100 Interface	163033
Function MotoSight2D-DX200 Interface	164070
Function MotoSight2D-FS100 Interface	163548

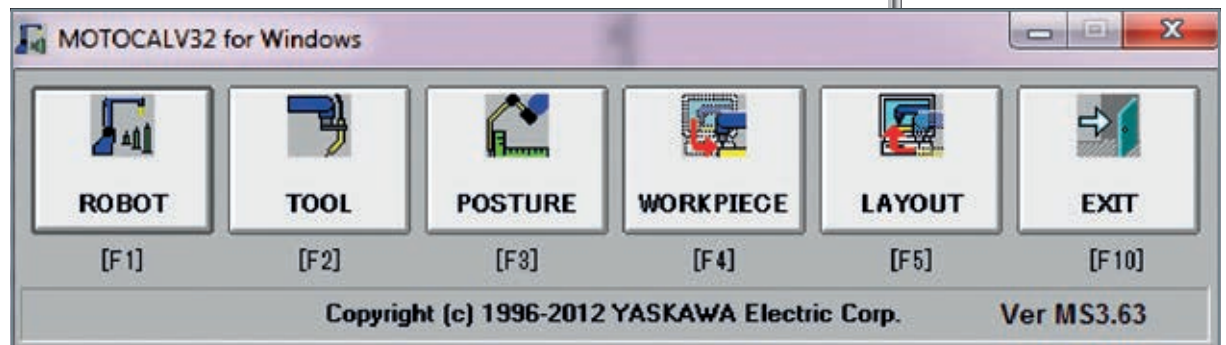


MotoCalvEG

Software for robot and tool calibration

MotoCalvEG is a PC software package for improving the absolute accuracy of MOTOMAN robots. Various calibrations can be performed: Calibration of the robot, tool, tool angle, work piece and layout. The main function is calibration of the robot. This enables you to redefine the absolute data and tool data following a collision or exchange of a motor or gear unit, and thus to restore the accuracy of the TCP (tool center point) to the original level. The robot calibration is based on a 25-point job created by the operator on the robot that is to be calibrated.

The software supports the ERC, MRC, XRC, NX100, DX100, DX200 and FS100 robot controllers.



Main functions

- Robot calibration
- Improvement of the absolute positioning accuracy
- Tool calibration
- Tool angle calibration
- Work piece calibration
- Layout calibration

Languages

- German
- English

Scope of supply

- CD-ROM
- 1 Dongle
- 1 Manual (on CD-ROM)

System requirements PC

- PC with Windows 2000/XP/7
- 100 MByte free hard disc space
- CD-ROM drive for installation

Product name	Description	Art. No.
MotoCalvEG	Software for robot and tool calibration	103167

This investment will certainly pay off.

Our modular designed training concept offers courses in robot programming, application-specific programming, software, maintenance, servicing and planning for beginners, experienced personnel and experts.

Every course consists of theoretical and practical training units. The focus is placed on practical exercises to ensure effective learning. In this way, the acquired knowledge is practical and can be applied directly upon return to your company.

Through continuous on-the-job training, our team of trainers is always current with respect to the state to robot technology. Upon request, the trainers of the YASKAWA academy will create for you a training concept customised to suit your individual requirements. Motivate your employees, increase operator safety and confidence, and reduce downtime with our YASKAWA academy training program.

With our training program we want to:

- Improve safety and confidence in your equipment
- Train and improve the qualifications of you and your staff to ensure the highest level of availability of your robot equipment
- Support you at an early stage to prevent problems from occurring in the first place
- Support you with your processes so that we can help you increase and optimise the productivity of your equipment
- Help you achieve a high quality facility
- Secure your success. Because your SUCCESS is our MOTIVATION.

We provide the right training module:

- System operators
- Programmer
- Maintenance and service personel
- Robot PLC and fieldbus systems
- Offline programming with MotoSimEG and VRC
- Customised training for specific requirements
- Training on site

