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SoMachine Motion, Programming software for PacDrive 3 Automation solution

Catalog

March 2016

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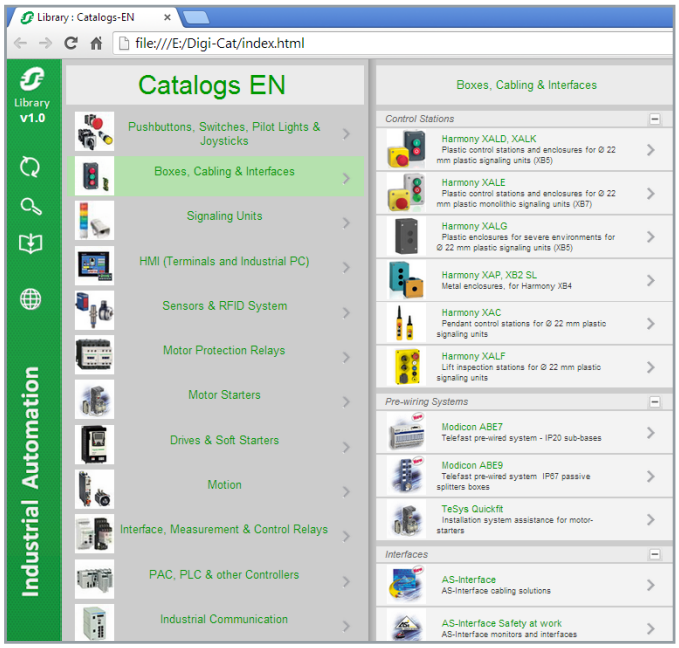

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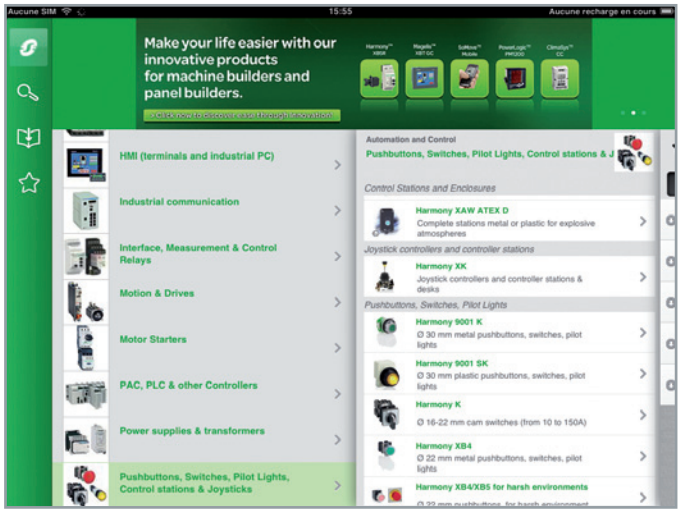

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SoMachine Motion
Programming software for PacDrive 3 Automation solution

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Presentation

Software solution

SoMachine Motion programming software

SoMachine Motion programming software is compliant with IEC 61131-3. It can be used to develop, configure, and commission entire PacDrive systems.

■ SoMachine Motion proposes one project file, managed through the Central (new project) and is aligned with SoMachine V4.1 (same look and feel).

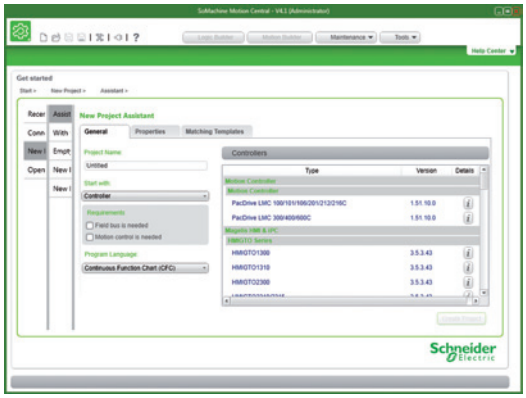
■ SoMachine Motion engineering tools can be accessed through this single project file:

- **Logic Builder**: a programming environment for PacDrive controllers
- **Motion Builder**: motion design and sizing software for drives, motors, gearboxes, power supplies
- **SoSafe Programmable**: a programming environment for Modicon TM5SLC safety logic controllers.
- **Vijeo Designe**r: the HMI configuration software for Magelis panels *(1)* is integrated in SoMachine Motion. Vijeo Designer can be used without the need for a separate license.

■ **SoMachine Motion** maintenance tools, which can be started from the Central or stand-alone, provide the following functions:

- **Diagnostics**: obtain a snapshot of the current machine status, including loggers, device parameters, I/O status, and a graphical architecture view of the Sercos ring. Additional user-defined data can be provided by the machine.
- **Controller assistant**: backup and image management; firmware update for controllers; Fast Device Replacement can also update the firmware of Sercos devices
- **Device Assistant**: for direct updates of Sercos device firmware

Nota: For the Embedded safety or standalone safety solution software, Please refer to our catalog "Pacdrive 3 automation solution - Safety Modicon TM5-TM7".



Create a new project through the central

General characteristics

Feature	Description
Logic Builder	
IEC 61131-3 programming languages	■ IL (Instruction List) ■ LD (Ladder Diagram) ■ SFC (Sequential Function Chart) ■ ST (Structured Text) ■ FBD (Function Block Diagram) ■ + CFC (Continous Function Chart)
Programming services	■ Multi-tasking: Cyclic, Fast, Event ■ Functions (Func) and Function Blocks (FBs) ■ Data Unit Types (DUTs) ■ On-line changes ■ Watch windows ■ Graphical monitoring of variables (trace) ■ Breakpoints, step-by-step execution ■ Visualization for application and machine set-up
Motion services	■ Embedded device configuration and commissioning ■ CAM profile editor ■ Sample application trace ■ Visualization screens ■ Logical encoder
Global services	■ User access and profile ■ Project documentation printing ■ Project comparison (control) ■ Variable sharing based on publish/subscribe mechanism ■ Library version management
Advanced software development	■ Source Code Management with Subversion (SVN) ■ ETEST Unit Testing Framework ■ Scripting with Python ■ Import/Export in PLC Open format

(1) Please refer to our catalog "Human/Machine Interface, HMI configuration software".

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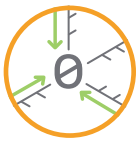
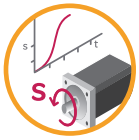
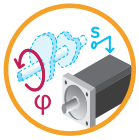
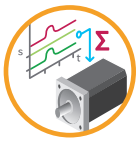
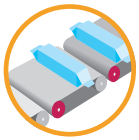
General characteristics

Feature		Description
Motion centric machine application development		
Homing		■ Supported homing modes: - Touchprobe input - Digital signal - Hardware limit switch - Torque - Move to absolute position - Set axis position - Set encoder position - Set axis and encoder position - Restore axis position from retain - Restore axis position from axis encoder - Write axis encoder and set axis position *Available as AFB (Application Function Block) and included in the Axis Module.*
Positioning		■ Endless feed, jogging, positioning ■ Motion profile with defined velocity, acceleration, deceleration, and jerk limit ■ Positioning modes: endless, relative, absolute *Available as AFB (Application Function Block) and included in the Axis Module.*
Cam motion		■ Graphical cam diagram editor and direct access to cam segment data through data structures ■ An axis in cam mode can follow any position source as its master, including other axes and encoders ■ Cam segment types: - straight - general 5th degree polynomial - simple sinus - inclined sinus - modified sinus - modified acceleration trapezoid - standard 5th degree polynomial - quadratic parabola - general modified sinusoid - general modified acceleration trapezoid - harmonic combination - sinus-straight combination - user-defined cam profile ■ Different cold start and warm start modes ■ Active cam diagram can be changed on the fly *Available as AFB (Application Function Block) and included in the Axis Module.*
Intelligent line shaft		■ Dynamically reduce the speed of the master axis according to the speed and acceleration limitations of the slave axes - achieve higher overall machine speed - increase machine lifetime - limit forces that act on the product ■ Multiple independent intelligent line shafts in one machine are possible *Available as AFB (Application Function Block) and included in the Axis Module.*
Software motion generator (SMG)		■ Overlay motion profiles of different types and with different masters (up to 3 position channels, resulting position profile is the sum of the component channels) ■ Additional motion laws (e.g. 7th degree polynomial) ■ Custom motion laws, implemented by the user (e.g. 11th degree polynomial) *Available as AFB (Application Function Block) that can be connected to the Axis Module.*
Multi-belt		■ For dual-belt and multi-belt applications, e.g. for grouping or infeed: - up to 8 belts - up to 8 stations - multiple trains per belt - up to 127 compartments per train - almost all parameters can be adjusted while the system is running - sensor signal filtering - collision prevention - warm start *Available as AFB (Application Function Block) and EM (Equipment Module), usage requires runtime license points, see page 7 for details.*
Smart infeed		■ Basis for rapid development of various product feed applications with 1 to 10 belts in series *Available as AFB (Application Function Block) and EM (Equipment Module), usage requires runtime license points, see page 7 for details.*

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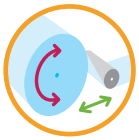
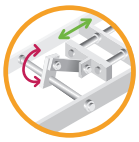
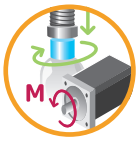
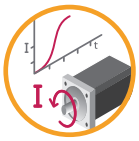
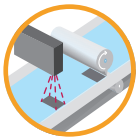
General characteristics

Feature	Description
Motion centric machine application development *(continued)*	
Unwinder 	■ For winding and unwinding foils, with or without a dancer roll *Available as AFB (Application Function Block) and EM (Equipment Module), currently available only as "obsolete" library conforming to the PacDrive M programming conventions. PacDrive 3 version planned.*
Crank 	■ Motion can be stated as the linear motion of the crank slide. This linear motion profile is transformed into a rotary motion profile of the crank shaft *Available as AFB (Application Function Block) and EM (Equipment Module).*
Robotics 	■ Supported kinematics: - Portal/Cartesian robots - 2-axis delta robots - 3-axis delta robots - Articulated robots - SCARA robots - Custom transformation for non-standard robots - Additional axes possible (e.g. rotary axis) - Additional wrist transformation possible ■ Different interpolations: linear, circular, spline. Blending of segments possible ■ Monitoring of work envelope (including obstacles) ■ Synchronous belt tracking (synchronizing to a linear or rotary motion, in any spatial orientation) ■ Acceleration limitation *Available as AFB (Application Function Block) and EM (Equipment Module), usage requires runtime license points, see page 7 for details.* *AFB currently available only as "obsolete" library conforming to the PacDrive M programming conventions. PacDrive 3 version planned.*
Torque control 	■ Move axes with torque control instead of position control *Available as AFB (Application Function Block).*
Current control 	■ Directly send acceleration reference values to the drive in every Sercos cycle, for applications in which direct control of drive current is desired *Available as a firmware feature.*
Print mark control 	■ Absolute correction for each individual product, or tendential correction of small deviations e.g. on a continuous foil feed ■ Indexed mode or synchronized operation *Available as AFB (Application Function Block).*
PackML 	■ Optionally represent the machine state in conformance with the PackML standard (ISA-TR88.00.02-2008) *Currently available only as "obsolete" library conforming to the PacDrive M programming conventions. PacDrive 3 version planned.*
PLCopen MC 	■ As an alternative to PacDrive style motion control, FBs conforming to PLCopen MC are also available: □ Multi-axis - MC_CamIn - MC_CamOut - MC_Cam_Id - MC_Cam_Ref - MC_GearIn - MC_GearOut - MC_PhasingAbsolute - MC_StartMode □ Single-axis - MC_Direction - MC_Home - MC_MoveAbsolute - MC_MoveAdditive - MC_MoveRelative - MC_MoveVelocity - MC_Stop

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Feature	Description
Motion Builder	
Mechanical modeling	■ Load cases: - Rotary table - Roll feed - Conveyor belt - Spindle drive - Rack and pinion gear - Crank - General load case ■ Additional transformations: - Additional gearbox - Belt drive - Coupling ■ In Logic Builder, mechanical drive parameters can be generated from the mechanical parameters: - FeedConstant - GearIn, GearOut - J_Gear - StaticFriction - ViscousFriction - J_Load (mechatronic data exchange)
Motion profile	■ Cam diagram, with the following motion laws: - straight line - quadratic parabola - 5th degree polynomial - simple sinus - modified sinus - modified acceleration trapezoid - general 5th degree polynomial - user defined motion profile ■ Positioning (planned) ■ Multiple motion profiles per axis possible ■ Synchronization of motion profiles with Logic Builder (mechatronic data exchange) ■ Import (*.asc, *.trace, *.txt) and export (*.asc, *.dat) of motion profiles ■ Dynamic load: M(phi) or F(phi) as a separate profile
Mechanical sizing	■ Product database: - Drives - Motors (user-defined motors possible) - Gearboxes (user-defined gearboxes possible) - Reserve settings - Sizing results: - Velocity, acceleration, torque, inertia in different parts of the machine - J_{load} : J_{motor} - Torque over time - Torque over speed - Analysis of peak torque for different gearbox factors
Electrical sizing	■ Power circuit calculation: - Calculation of current and power, depending upon actual motion profiles - Multiple power circuits possible, each with or without shared DC bus

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Presentation

Product offer

SoMachine Motion software is delivered on a DVD as a fully-functional 21-day trial version. After the 21-day trial period, a license is required for continued use.

- SoMachine Motion is available in two languages: English, German
- Processor: Intel® Core™ 2 Duo or equivalent (recommended: Intel® Core™ i7 or equivalent)
- RAM Memory: 2 GB (recommended: 4 GB)
- Hard Disk: 6 GB (recommended: 10 GB)
- OS: Microsoft Windows 7 SP1, Microsoft Windows 8.1, Microsoft Windows 10
- Drive: DVD reader
- Display: 1280 × 1024 pixel resolution or higher
- Peripherals: mouse or compatible pointing device, USB interface, Ethernet Network interface
- Web Access: Web registration requires Internet access
- The documentation is supplied in electronic format: complete on-line help plus complementary documentation in pdf format.

References

SoMachine Motion software

Description	Reference		
	SoMachine Motion DVD *(1)*	**License** *(2)* / number (Type)	**SoMachine Motion Service Disc**
■ A license is required to use the engineering tools (Central, Logic Builder, Motion Builder, Vijeo). ■ Without a license, the engineering tools can be used as a trial version for 21 days. ■ Maintenance tools (Diagnostics, Controller Assistant, Device Assistant) and other tools (Gateway, OPC server, etc.) included on the DVD do not require a separate license, and can be installed and used indefinitely even without a license. ■ In addition, these tools are as well available separately on the SoMachine Motion Service Disc.	**VSWETSQMM000430** + Trial V4.3 license (21 days)	**SOMMACCZXSPAZZ** / 1 (Single)	**VSWETSQMMS00430** V4.3
		SOMMACCZXTPAZZ / 10 (Team)	–
		SOMMACCZXEPAZZ / 100 (Entity)	–
		SOMMACCZZEPBZZ /100 (Floating License)	–

License update from previous version

Software version type	Reference to update SoMachine Motion V4.1	
SoMachine Motion V4 Single update (1)	**SOMMADCZXSPAZZ**	Single license
SoMachine Motion V4 Entity update (100)	**SOMMADCZXEPAZZ**	Entity license

(1) The DVD is mandatory and delivered with a trial license.

(2) One of the 4 types of license is mandatory.

Presentation

Runtime licensed features and license points

Some features require license points in order to function fully. License points are checked when such features are run. The controller works normally as long as sufficient license points are available. If the features in use exceed the available license points, the features can be used in demo mode for only 6 hours. The following features require licenses:

Feature	License point cost
Smart Infeed	25 license points per instance
Multi-belt	60 license points per instance
Robotics (base functionality)	30 license points per instance *(1)*
Robotics (transformation)	25 license points per instance *(1)*
Robotics (wrist transformation)	25 license points per instance *(1)*
Robotics (acceleration limitation)	25 license points per instance *(1)*
Use of 3rd party drives on Sercos 3 (SercDrive)	15 license points per drive

(1) To control a robot and qualify for free robotic support, the purchase of a robotic controller is required. The robotic controller comes pre-loaded with license points that can be used for robotic and other features.

Separate memory cards with pre-loaded license points are also available. These are intended as spare parts or replacement parts for robotic controllers. License points are linked to a controller's memory card. License points cannot be returned or transferred. Additional license points can be purchased separately and added to existing memory cards (either robotics or regular). License points purchased separately are linked to a specific memory card during the purchasing process.

References

License points without flash card

Delivered as activation code only. These can be added to a flash card without license points, or can be used to add more license points to a flash card that already contains license points (see below).

Number of license points	Reference
	License points without flash card
1	**VSWRTPT00100000**
160	**VSWRTPT16000000**
240	**VSWRTPT24000000**
320	**VSWRTPT32000000**

Flash card with license points included, for use with PacDrive LMC controllers for non-robotic applications

These flash cards come pre-loaded with a number of license points and replace the flash card that comes with the controller, thus eliminating the need to activate license points.

Number of license points	Reference					
	SD-card with license points		Compact flash card with license points			
	For LMC Eco controller	Capacity	For LMC Pro controller	Capacity	For LMC Pro2 controller	Capacity
0 *(1)*	**VW3E70360AA00**	512 MB	**VW3E70340AA00**	128 MB	**VW3E7038000000**	128 MB
			VW3E70350AA00	512 MB	**VW3E7037000000**	512 MB
10	–		–	–	**VW3E7037000100**	512 MB
20	–		–	–	**VW3E7037000200**	512 MB
30	–		**VW3E70351AA00**	512 MB	–	–
40	–		**VW3E70352AA00**	512 MB	**VW3E7037000400**	512 MB
55	–		**VW3E70353AA00**	512 MB	–	–
60	–		**VW3E70354AA00**	512 MB	–	–
80	–		**VW3E70355AA00**	512 MB	**VW3E7037000800**	512 MB
105	–		**VW3E70356AA00**	512 MB	–	–
160	–		**VW3E70357AA00**	512 MB	**VW3E7037001000**	512 MB
240	–		**VW3E70358AA00**	512 MB	–	–
320	–		**VW3E70359AA00**	512 MB	**VW3E7037002000**	512 MB
330	–		**VW3E7035AAA00**	512 MB	–	–
420	–		**VW3E7035BAA00**	512 MB	–	–
465	–		**VW3E7035CAA00**	512 MB	–	–
999	–		**VW3E7035DAA00**	512 MB	–	–

(1) References of spare parts (Flash card supplied with the controller).

Flash cards with license points: spare parts for robot controllers

Number of license points	Reference			
	SD-card with license points		Compact flash card with license points	
	Spare part for LMC Eco Robot controller *(1)*	Capacity	Spare part for LMC Pro Robot controller *(1)*	Capacity
80	**VW3E70365AARC**	512 MB	**VW3E70355AARC**	512 MB
160	**VW3E70367AARC**	512 MB	**VW3E70357AARC**	512 MB
240	–		**VW3E70358AARC**	512 MB
320	–		**VW3E70359AARC**	512 MB
999	–		**VW3E7035DAARC**	512 MB

(1) Robot controllers already come with a memory card with the necessary license points included. Please refer to our catalog "PacDrive 3 Automation Solution, PacDrive Delta robots".

S

SOMMACCZXEPAZZ	6
SOMMACCZXSPAZZ	6
SOMMACCZXTPAZZ	6
SOMMACCZZEPBZZ	6
SOMMADCZXEPAZZ	6
SOMMADCZXSPAZZ	6

V

VSWETSQMM000430	6
VSWETSQMMS00430	6
VSWRTPT00100000	7
VSWRTPT16000000	7
VSWRTPT24000000	7
VSWRTPT32000000	7
VW3E7035AAA00	7
VW3E7035BAA00	7
VW3E7035CAA00	7
VW3E7035DAA00	7
VW3E7035DAARC	7
VW3E70340AA00	7
VW3E70350AA00	7
VW3E70351AA00	7
VW3E70352AA00	7
VW3E70353AA00	7
VW3E70354AA00	7
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VW3E70367AARC	7
VW3E7037000000	7
VW3E7037000100	7
VW3E7037000200	7
VW3E7037000400	7
VW3E7037000800	7
VW3E7037001000	7
VW3E7037002000	7
VW3E7038000000	7

The Next Generation

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