

IndraMotion MLC – controller-based solution with motion, robot and logic control

The compact Rexroth IndraMotion MLC motion logic system gives you any freedom you wish for your consistent and modern machine automation. Innovative software and firmware functions, easy engineering and open system interfaces provide maximum flexibility in all motion applications.

By combining motion, robot and logic control with technology functions, you can synchronize multi-axis applications very easily – freely scalable for central or decentralized solutions with a flexible control platform. Motion functions, such as master axes, electronic gears, electronic cams and the innovative FlexProfile for complex motion sequences, can be used quickly and transparently. Robot control provides full functionality for multi-axis path interpolation in space. Hydraulic axes can be integrated into the automation solution just as fast and just as simply, with the same tools and functions. The engineering framework IndraWorks with intuitive operation and the PLCopen-compliant software interface with standardized function blocks according to IEC 61131-3 facilitate integration in various machine designs.

Regardless whether you are using electric or hydraulic drive technology: The motion logic system IndraMotion MLC is the answer for all tasks demanding easy engineering, flexible process adjustments, and cost-optimized automation.

Your benefits

- ▶ Quick integration in various processes, machines and systems
- ▶ Compact and powerful control platform IndraControl L
- ▶ Scalable for centralized and distributed architectures with maximum performance
- ▶ Open communication interfaces for integration in heterogeneous control topologies
- ▶ Integrated runtime system with motion, robot and logic controls
- ▶ Extensive software libraries in conformity with IEC 61131-3 and PLCopen
- ▶ Industry-specific library functions
- ▶ Innovative motion function FlexProfile for complex motion sequences
- ▶ IndraWorks – one tool for all engineering tasks



IndraMotion MLC is the integrated controller-based system solution from Rexroth. Ready-to-use technology functions accelerate engineering, for example in packaging and handling applications.



Simple, open and flexible

- ▶ Overall solution with integrated motion logic
- ▶ Simple in use and scalable in performance and function
- ▶ Optimum performance for all mechatronic solutions



As a centralized motion logic system, IndraMotion MLC can be used for all single- and multi-axis applications with the highest synchronicity and optimum motion design:

- ▶ Up to 64 axes
- ▶ Synchronous movements with time and position-dependent segments
- ▶ Support of hydraulic axes
- ▶ Robot control with multi-axis path interpolation
- ▶ Electronic programmable limit switches with sampling rates of up to 125 μ s and 64 outputs



With an open system architecture, IndraMotion MLC is the ideal system solution for all automation tasks, such as:

- ▶ Packaging
- ▶ Printing
- ▶ Moving
- ▶ Positioning
- ▶ Forming
- ▶ Pressing
- ▶ Assembly and handling



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IndraMotion MLC – technical data

		MLC L40 1G	MLC L65 1G	MLC L25	MLC L45	MLC L65
Control						
System						
Runtime system	Integrated motion logic system	●	●	●	●	●
Multitasking		●	●	●	●	●
Data management for code, data, retentive data, user data		●	●	●	●	●
Boot project storage		●	●	●	●	●
Storage of control projects as packed archive file		●	●	●	●	●
Storage of user data to the internal memory and a removable storage medium		●	●	●	●	●
Support of function modules		4	4	2	4	4
Support of system events		●	●	●	●	●
Probe function, control		●	●	○	●	●
User memory	Total: code, data	24 MB	36 MB	12 MB	24 MB	36 MB
Retentive memory	Total: system, user	128 kB	256 kB	256 kB	256 kB	256 kB
On-board diagnosis and settings						
Status display	LED	●	●	●	●	●
Status display (boot, sercos, test)	Display	●	●	●	●	●
Errors, warnings, messages, system reset	Display, keys	●	●	●	●	●
Ethernet settings (IP address)	Display, keys	●	●	●	●	●
Voltage monitoring, watchdog	LED	●	●	●	●	●
Relay output ready for operation	LED	●	●	●	●	●
IndraMotion Service Tool	Web-based engineering	–	–	●	●	●

● Default ▼ In preparation ○ Optional



		MLC L40 1G	MLC L65 1G	MLC L25	MLC L45	MLC L65
On-board communication interfaces						
sercos III	Real-time Ethernet bus	–	●	●	●	●
sercos II	Real-time motion bus	●	○	○	○	○
Master axis grouping	sercos II	○	○	○	○	○
	sercos III	○	○	○	○	○
	Number of controls in control link	64	64	64	64	64
PROFIBUS	Master	●	●	–	●	●
	Slave	●	–	–	●	●
PROFINET IO	Controller (master)	–	–	○	○	○
	Device (slave)	–	–	○	○	○
EtherNet/IP	Scanner (master)	–	–	▼	▼	▼
	Adapter (slave)	–	–	○	○	○
Ethernet TCP/IP		●	●	●	●	●
Control link	Ethernet TCP/UDP/IP	●	●	●	●	●
RS232		●	–	–	–	–
Function modules						
Number		4	4	2	4	4
PROFIBUS master/slave		○	○	–	–	–
Real-time Ethernet/PROFIBUS		–	–	○	○	○
DeviceNet master		○	○	–	–	–
Real-time Ethernet/DeviceNet		–	–	▼	▼	▼
sercos III/master axis grouping		○	○	○	○	○
sercos II/master axis grouping		○	○	○	○	○
Programmable limit switches		○	○	○	○	○
SRAM		○	○	○	○	○
Fast I/O		○	○	○	○	○
HMI						
IndraControl VCP, VCH	Ethernet TCP/IP, OPC	○	○	○	○	○
IndraControl VEP, VEH	Ethernet TCP/IP, OPC	○	○	○	○	○
IndraControl VSP, VPP, VSB/VDP, VPB/VDP	Ethernet TCP/IP, OPC	○	○	○	○	○
Inputs/outputs						
On-board						
High-speed digital inputs	Interrupt capability, typ. 50 μs	8	8	–	8	8
High-speed digital outputs	0.5 A, typ. 500 μs	8	8	–	8	8

● Default ▼ In preparation ○ Optional – Not available

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Inputs/outputs						
Local						
High-speed digital inputs (FAST I/O function module)	Interrupt capability, typ. 40 µs	o	o	o	o	o
High-speed digital outputs (FAST I/O function module)	0.5 A, typ. 70 µs	o	o	o	o	o
Inline (digital, analog, relay, technology)	64 bytes, max. 512 I/O	o	o	o	o	o
Distributed via Inline (IP20)						
sercos III	On-board/function module	-/o	o/o	o/o	o/o	o/o
PROFIBUS	On-board/function module	o	o	o	o	o
DeviceNet	Function module	o	o	-	-	-
Distributed via Fieldline (IP67)						
PROFIBUS	On-board/function module	-/o	o/o	o/o	o/o	o/o
DeviceNet	Function module	o	o	-	-	-
Distributed via IndraControl S67 (IP67)						
sercos III	On-board/function module	-/o	o/o	o/o	o/o	o/o
PROFIBUS	On-board/function module	-/o	o/o	o/o	o/o	o/o
DeviceNet	On-board/function module	o	o	-	-	-
Logic control						
PLC runtime system						
PLC kernel - IndraLogic 1G	Conforming with IEC 61131-3	●	●	-	-	-
PLC kernel - IndraLogic 2G	Conforming with IEC 61131-3 with extensions	-	-	●	●	●
Program organization	According to IEC 61131-3	●	●	●	●	●
Loading and executing IEC 61131-3 applications		●	●	●	●	●
Task management						
Freely configurable tasks (priority 1-20)	Cyclic, free-running, event-controlled, externally event-controlled	8	8	8	8	8
Cycle-synchronous processing of the I/O process image		●	●	●	●	●
sercos III-synchronous processing of the I/O process image		-	-	●	●	●
Min. PLC cycle time	Synchronous to the system cycle	1 ms	1 ms	1 ms	1 ms	1 ms
	Synchronous to the sercos cycle	-	-	1 ms	0.5 ms	0.25 ms
Min. motion cycle time	Set value generation	1 ms	1 ms	2 ms	1 ms	1 ms
PLC processing times						
Command mix (real, integer, word, bool, etc.)	Per 1,000 instructions	50 µs	5 µs	35 µs	30 µs	5 µs
Bool operations	Per 1,000 instructions	50 µs	5 µs	20 µs	30 µs	5 µs
Word operations	Per 1,000 instructions	50 µs	5 µs	20 µs	30 µs	5 µs

● Default ▼ In preparation o Optional - Not available

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Motion control						
Number of axes	Virtual, real, encoder, grouped	32	64	16	32	64
Control axis	Centrally controlled	–	–	4	8	32
Synchronization (ELS – electronic line shaft)	Virtual axes (virtual masters)	●	●	●	●	●
	Encoder axes (real axis)	●	●	●	●	●
	Real axes (servo drives)	●	●	●	●	●
	Grouped axes (cross communication)	●	●	●	●	●
	Dynamic synchronization	●	●	●	●	●
	Master axis cascading	●	●	●	●	●
Positioning	Single-axis	●	●	●	●	●
Electronic gears		●	●	●	●	●
Electronic cams	Intermediate point tables (in the drive, max. 1,024 intermediate points)	4	4	4	4	4
	Electronic motion profile (in the control, motion profile with max. 16 segments)	2	2	2	2	2
	FlexProfile (in the control, master/time-based motion profiles with max. 16 segments)	4	4	4	4	4
Motion commands according to PLCopen (choice)	MC_MoveAbsolute	●	●	●	●	●
	MC_MoveRelative	●	●	●	●	●
	MC_MoveVelocity	●	●	●	●	●
	MC_Home	●	●	●	●	●
	MC_CamIn, MC_CamOut	●	●	●	●	●
	MC_GearIn, MC_GearOut	●	●	●	●	●
Extended motion commands (choice)	MB_ReadListParameter	●	●	●	●	●
	MB_WriteListParameter	●	●	●	●	●
	MB_GearInPos	●	●	●	●	●
	ML_PhasingSlave	●	●	●	●	●
	MB_ClearAxisError	●	●	●	●	●
	MB_ClearSystemError	●	●	●	●	●
Hydraulics functions						
Best-in-class control		–	–	●	●	●
Synchronizer (active/passive)		–	–	●	●	●
Control transfer		–	–	●	●	●
Force ramps/curves		–	–	●	●	●
Travel-dependent deceleration		–	–	●	●	●
FcP/SvP control		–	–	●	●	●

● Default ▼ In preparation ○ Optional – Not available



IndraMotion MLC – technical data

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Robot control						
Number of axes per kinematic		16	16	16	16	16
Multi-axis kinematics	Incl. auxiliary axes	16	16	16	16	16
Kinematics transformations		●	●	●	●	●
LINEAR, CIRCULAR, PTP types of interpolation		●	●	●	●	●
Configurable block transitions		●	●	●	●	●
Override		●	●	●	●	●
Teach-in function		●	●	●	●	●
Approximate positioning		●	●	●	●	●
Late blending		–	–	●	●	●
Belt synchronization		●	●	●	●	●
Jogging/single step		–	–	●	●	●
Speed limitation	For path and axes	●	●	●	●	●
Acceleration limitation	For path and axes	●	●	●	●	●
Safety zones		▼	▼	▼	▼	▼
Extended system functions (choice)						
Programmable limit switches		●	●	●	●	●
PID control		●	●	●	●	●
Temperature control		●	●	●	●	●
Technology functions (choice)						
Crank kinematics		●	●	●	●	●
Cross cutter		●	●	●	●	●
Flying shear		●	●	●	●	●
Sag control		●	●	●	●	●
Tension control		●	●	●	●	●
Register control		–	–	●	●	●
Winder		●	●	●	●	●
Magic belt		–	–	●	●	●
Smart belt		–	–	●	●	●
Hydraulic axes		–	–	●	●	●

● Default ▼ In preparation ○ Optional – Not available

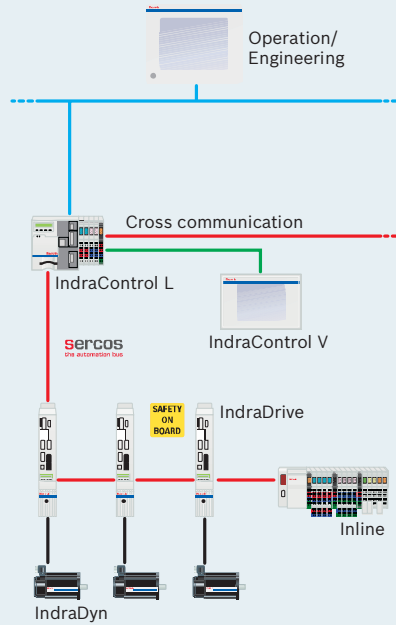


		MLC L40 1G	MLC L65 1G	MLC L25	MLC L45	MLC L65
Diagnosis						
Status, warnings, errors	Function blocks (software)	●	●	●	●	●
	Parameter access to diagnosis memory (software)	●	●	●	●	●
	Locally via display (control hardware)	●	●	●	●	●
	Axis monitoring (e.g. capacity, encoders, limit values)	●	●	●	●	●
	Diagnosis memory (64 kB, max. 999 messages)	●	●	●	●	●
Debugging monitor for IEC 61131-3 application	●	●	●	●	●	
Engineering						
IndraWorks		○	○	○	○	○
IndraMotion Service Tool (IMST)		-	-	○	○	○
Drive systems						
Electric axes						
IndraDrive	BASIC and ADVANCED with MPB/MPH firmware	●	●	●	●	●
	Dual-axis control units with MPD firmware	●	●	●	●	●
IndraDrive Mi	With MPB firmware	●	●	●	●	●
IndraDrive Cs		●	●	●	●	●
EcoDrive Cs		●	●	●	●	●
sercos pack profiles		●	●	●	●	●
Master communication	sercos III	●	●	●	●	●
Min. sercos III cycle time		1 ms	1 ms	1 ms	0.5 ms	0.25 ms
Hydraulic axes						
HNC100.3	Hydraulic drive	●	●	●	●	●

● Default ▼ In preparation ○ Optional - Not available

IndraMotion MLC – system configuration

Example configuration



System configuration

Software		Page(s)
Engineering framework	IndraWorks	60 – 79
Control components		
Control hardware	IndraControl L25	128
	IndraControl L40	129
	IndraControl L45	130
	IndraControl L65	131
Function modules	Cross communication/sercos II	133 – 136
	sercos III	133 – 136
	PROFIBUS master	133 – 136
	DeviceNet master	133 – 136
	Real-time Ethernet/PROFIBUS	133 – 136
	Programmable limit switches	133 – 136
	Fast I/O	133 – 136
	SRAM	133 – 136
HMI/PC technology		
Visualization devices, controller-based	IndraControl VCP, VCH	84 – 91
Visualization devices, embedded PC	IndraControl VEP	92 – 97
Visualization devices, high-end industrial PC	IndraControl VPP	100 – 103
Standard interfaces	Ethernet TCP/IP, PROFIBUS	–
I/O modules		
Local and distributed input/output modules in IP20	Inline	140 – 175
Distributed input/output modules in IP67	IndraControl S67, Fieldline	188 – 201
Standard interface	PROFIBUS, sercos III	–
Drives and motors		
Control/drive system	IndraDrive and IndraDyn	See "Drive System Rexroth IndraDrive"
Standard interface	sercos II (IndraControl L40)	–
	sercos III (IndraControl L25, L45, L65)	–



IndraMotion MLC¹⁾ – ordering data

Ordering data for firmware	
Description	Type code
Firmware for IndraControl L40	FWA-CML402-MLC-xxVRS-D0
Firmware for IndraControl L65	FWA-CML65*-MLC-xxVRS-D0
Ordering data for software	
Description	Type code
Single license, Engineering framework IndraWorks MLC	SWA-IWORKS-ML*-xxVRS-D0-CD650
Multiple license (25), Engineering framework IndraWorks MLC	SWA-IWORKS-ML*-xxVRS-D0-CD650-MUL
Single license, IndraWorks CamBuilder	SWS-IWORKS-CAM-xxVRS-D0
Software CD, technology functions for IndraMotion for Handling	SWA-IM*ML*-LHA-xxVRS-D0-CD650-COPY
Ordering data for hardware	
Description	Type code
Control hardware IndraControl L40 with sercos II and PROFIBUS	CML40.2-SP-330-NA-NNNN-NW
Control hardware IndraControl L65 with sercos III, PROFIBUS and real-time Ethernet	CML65.1-3P-500-NA-NNNN-NW
Control hardware IndraControl L65 with SRAM, sercos III, PROFIBUS and real-time Ethernet	CML65.1-3P-504-NA-NNNN-NW
IndraControl L function module, sercos III	CFL01.1-R3
IndraControl L function module, cross communication (sercos II)	CFL01.1-Q2
IndraControl L function module, PROFIBUS master	CFL01.1-P1
IndraControl L function module, DeviceNet master	CFL01.1-V1
IndraControl L function module, programmable limit switches	CFL01.1-N1
IndraControl L function module, Fast I/O	CFL01.1-E2
IndraControl L function module, SRAM	CFL01.1-Y1

xx = software/firmware version

¹⁾ Based on 1st generation PLC kernel

Current documentation can be found in the Internet at www.boschrexroth.com/mediadirectory.



IndraMotion MLC²⁾ – ordering data

Ordering data for firmware

Description	Type code
Firmware for IndraControl L25	FWA-CML25*-MLC-xxVRS-D0
Firmware for IndraControl L45	FWA-CML45*-MLC-xxVRS-D0
Firmware for IndraControl L65	FWA-CML65*-MLC-xxVRS-D0
Single license, Extended Register Controller	FWS-IM*MLC-TEC-12VRS-NN-REGI*EXT
Single license, Extended Register Controller	FWS-IM*MLC-TEC-12VRS-NN-REGI*ADV
Single license, Advanced Tension Controller	FWS-IM*MLC-TEC-NNVRS-NN-TENS*ADV
Multiple license (10), Advanced Tension Controller	FWS-IM*MLC-TEC-NNVRS-NN-TENS*ADVM10
Multiple license (25), Advanced Tension Controller	FWS-IM*MLC-TEC-NNVRS-NN-TENS*ADVM25

Ordering data for software

Description	Type code
Software DVD, Engineering framework IndraWorks	SWA-IWORKS-ML*-xxVRS-D0-DVD
Single license, IndraWorks Engineering	SWL-IWORKS-ML*-xxVRS-D0-ENG
Multiple license (25), IndraWorks Engineering	SWL-IWORKS-ML*-xxVRS-D0-ENG*M25
Single license, IndraWorks TeamServer	SWL-IWORKS-ML*-xxVRS-D0-TEAMSERVER
Single license, IndraWorks OPC server	SWL-IWORKS-ML*-xxVRS-D0-COM
Multiple license (25), IndraWorks OPC server	SWL-IWORKS-ML*-xxVRS-D0-COM*M25
Single license, IndraWorks Operation	SWL-IWORKS-ML*-xxVRS-D0-OPD
Multiple license (25), IndraWorks Operation	SWL-IWORKS-ML*-xxVRS-D0-OPD*M25
Single license, IndraWorks CamBuilder	SWS-IWORKS-CAM-xxVRS-D0
Multiple license (25), IndraWorks CamBuilder	SWS-IWORKS-CAM-xxVRS-D0-M25
Single license, IndraWorks TeamClient (VCS)	SWS-IWORKS-VCS-xxVRS-D0
Multiple license (10), IndraWorks TeamClient (VCS)	SWS-IWORKS-VCS-xxVRS-D0-M10
Multiple license (25), IndraWorks TeamClient (VCS)	SWS-IWORKS-VCS-xxVRS-D0-M25

Ordering data for hardware

Description	Type code
Control hardware IndraControl L25 with sercos III	CML25.1-3N-400-NN-NNC1-NW
Control hardware IndraControl L45 with sercos III, PROFIBUS and real-time Ethernet	CML45.1-3P-500-NA-NNNN-NW
Control hardware IndraControl L45 with SRAM, sercos III, PROFIBUS and real-time Ethernet	CML45.1-3P-504-NA-NNNN-NW
Control hardware IndraControl L65 with sercos III, PROFIBUS and real-time Ethernet	CML65.1-3P-500-NA-NNNN-NW
Control hardware IndraControl L65 with SRAM, sercos III, PROFIBUS and real-time Ethernet	CML65.1-3P-504-NA-NNNN-NW
IndraControl L function module, sercos III	CFL01.1-R3
IndraControl L function module, cross communication (sercos II)	CFL01.1-Q2
IndraControl L function module, real-time Ethernet + PROFIBUS	CFL01.1-TP
IndraControl L function module, programmable limit switches	CFL01.1-N1
IndraControl L function module, Fast I/O	CFL01.1-E2
IndraControl L function module, SRAM	CFL01.1-Y1

xx = software/firmware version; ²⁾ Based on 2nd generation PLC kernel

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