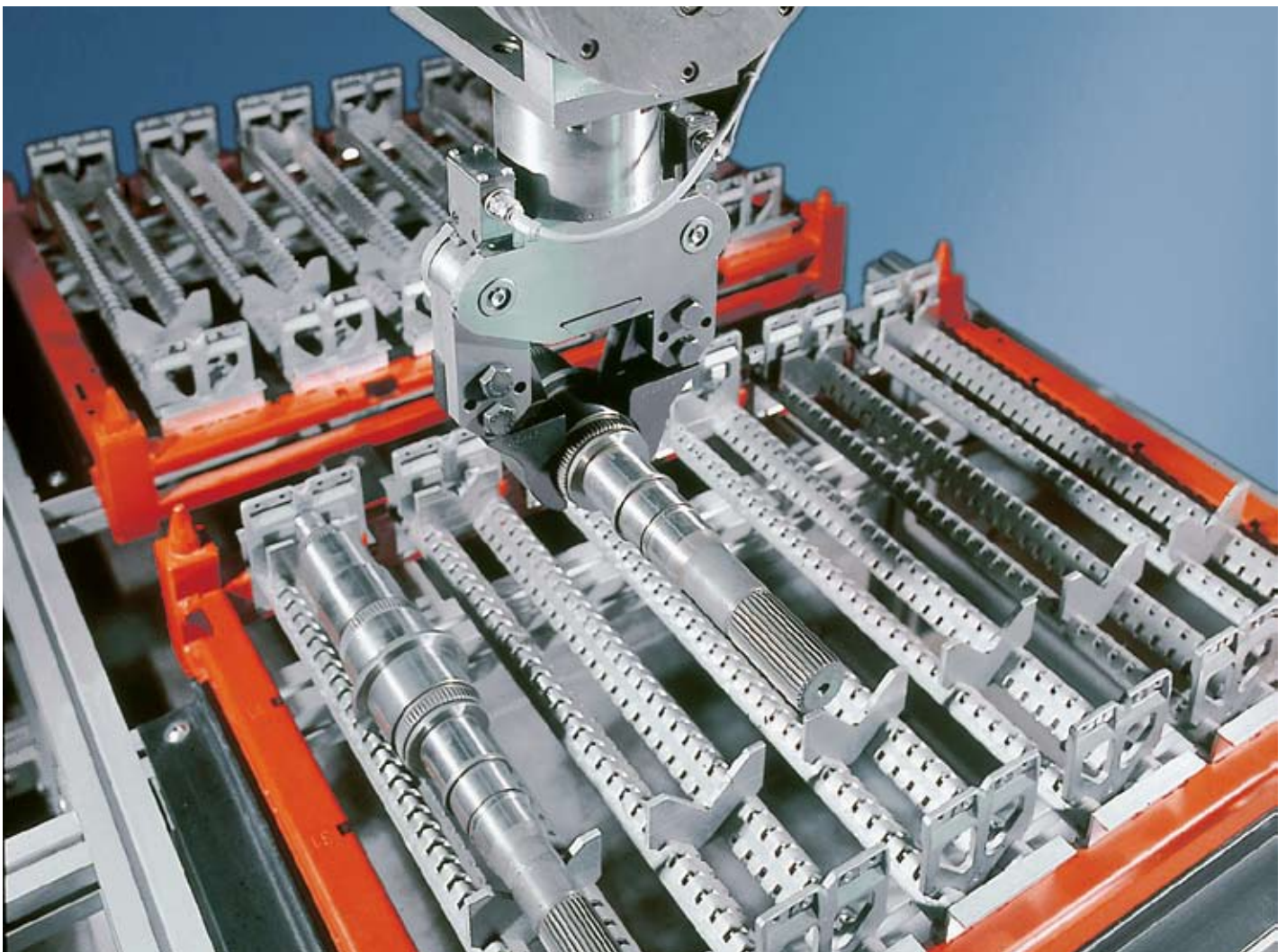


IndraMotion for Handling

The turnkey automation solution



IndraMotion for Handling – for time-optimized multiple axis motion

IndraMotion for Handling is the system solution for efficient coordination of axis movements in fully automated production. This intelligent design is based on uniform control and drive platforms and on international software standards. The precisely matching components allow you to implement your handling applications in any configuration you desire.

The essential highlights of IndraMotion for Handling are: easy operation, teaching and programming of time-optimized motion sequences to ensure highest product quality. This turnkey automation solution with open-source software facilitates engineering and maximizes the flexibility in your individual application.

With the multi-channel system structure it allows up to 4 machines to be controlled with just a single control system. And the high degree of system scalability ensures that the optimum level of automation can be achieved for every application – whatever your preferred architecture:

- ▶ drive-based
- ▶ controller-based
- ▶ embedded-PC-based

Versatility for your applications

IndraMotion for Handling is the ideal solution in applications such as:

- ▶ handling
- ▶ loading and unloading
- ▶ assembly
- ▶ logistics
- ▶ palletizing systems
- ▶ cartesian robots
- ▶ pick-and-place systems
- ▶ processing machines
- ▶ special machines



▲ **IndraMotion for Handling is the turnkey automation solution from Control City – your control technology capital**

www.control-city.com

More productivity thanks to industry specific functions

Rexroth is an innovative specialist supplier of control and drive systems for factory automation. You too can enjoy the benefit of our industry expertise through IndraMotion for Handling, whether it's a standardized single-axis or extensive multikinematic applications you want to realize.

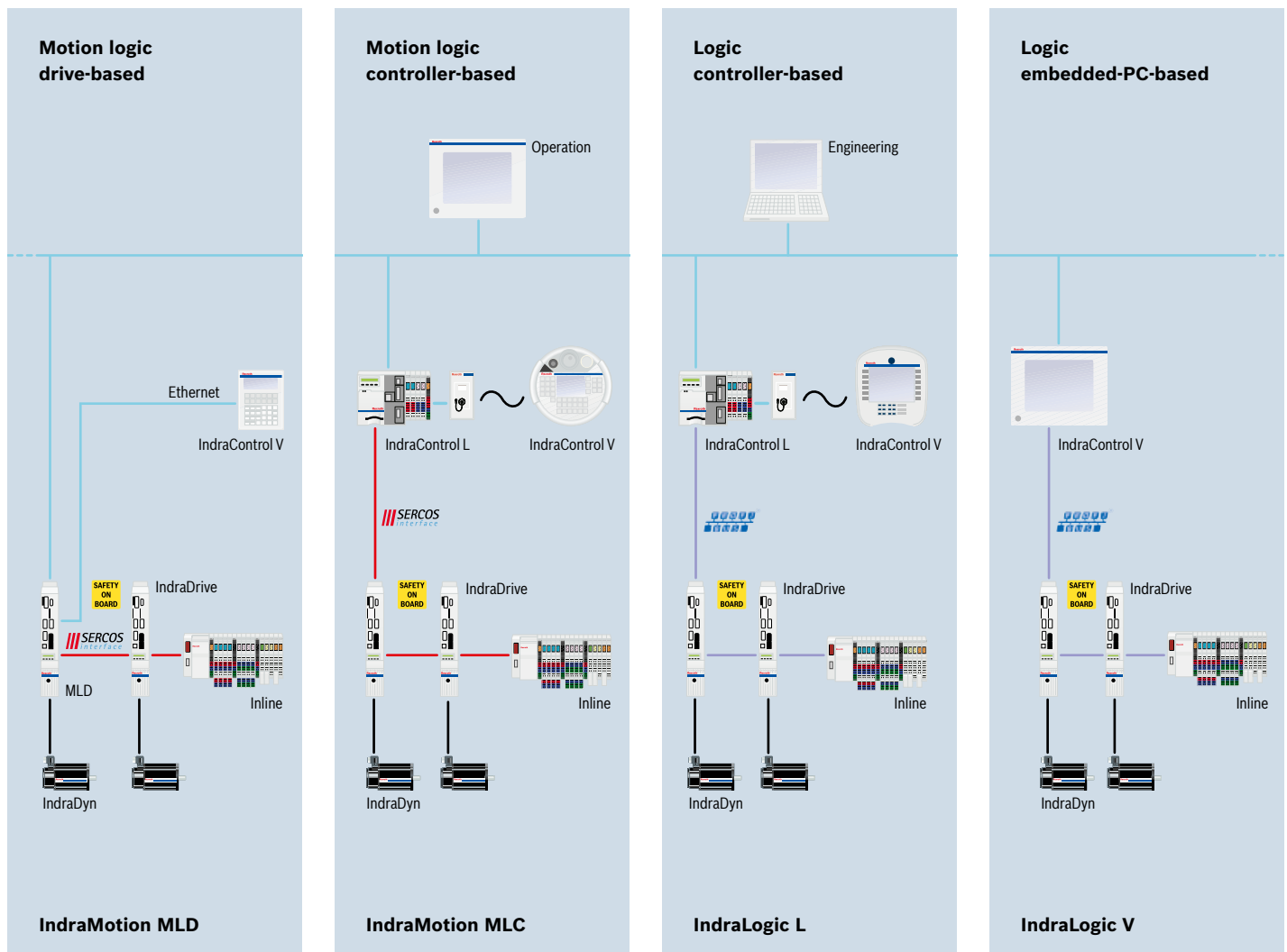
▼ **IndraMotion for Handling – the perfect automation design for time-optimized multi-axis movements in handling and assembly applications**

The outstanding features of IndraMotion for Handling include:

- ▶ maximum performance and functionality through innovative control platform
- ▶ free PLC functionality according to IEC 61131-3
- ▶ open standardized communication interfaces
- ▶ flexible scalability for various HMI devices
- ▶ easy teaching, defining and programming of motion sequences through HMI, PC or PLC
- ▶ turnkey open-source solution with PLC basic program
- ▶ complete PLC library and PLCopen function blocks
- ▶ multiple kinematics for various applications
- ▶ quick expansion and easy connection of I/O and function modules
- ▶ drive-integrated, certified safety technology according to EN ISO 13849-1 and EN 62061
- ▶ intuitive engineering with IndraWorks



Cost-effective automation solutions with scalable hardware architectures



- ▶ consistent automation system for drive-based, controller-based and Embedded-PC-based applications
- ▶ open communications standards and standardized IEC 61131-3 compliant PLC platform
- ▶ drive-integrated certified safety technology, according to EN ISO 13849-1 und EN 62061
- ▶ standardized IndraWorks engineering framework for motion, logic, HMI and drives
- ▶ turnkey system solution and application-specific technology functions

Control platform		Drive-based		Controller-based		Embedded-PC-based
Automation system		IndraMotion MLD	IndraMotion MLC	IndraLogic L20	IndraLogic L40	IndraLogic VEP
1	Number of axes					
1.1	Number of axes per kinematic	6	6	6	6	6
1.2	Number of kinematics	1	4	1	4	4
2	Operator control units					
2.1	IndraControl VEH 30 (handheld operator control unit)	–	○	○	○	–
2.2	IndraControl VCH 08 (handheld operator control unit)	○	○	○	○	–
2.3	IndraControl VCP 08 (small operator control unit)	○	○	○	○	–
2.4	Operation from the PC interface	–	○	○	○	–
3	Functionality					
3.1	PTP motion	●	●	●	●	●
3.2	Linear motion	●	●	●	●	●
3.3	Movements with blending	●	●	●	●	●
3.4	Motion programming with HMI	●	●	●	●	●
3.5	Teaching and definition of 3-dimensional points	●	●	●	●	●
3.6	Protected areas and software limit switches	●	●	●	●	●
3.7	Gantry axes	●	●	●	●	●
3.8	Speed override	●	●	●	●	●
3.9	Number of protected areas	4	4	4	4	4
3.10	Modulo axis with endless rotation	●	●	●	●	●
3.11	Diagnostic systems	●	●	●	●	●
4	Motion programs					
4.1	Number of motion programs	256	256	256	256	256
4.2	Subroutine techniques	●	●	●	●	●
4.3	Single block	●	●	●	●	●
4.4	Number of points	50	50	50	50	50
4.5	Number of traversing blocks	200	200	200	200	200
4.6	Number of integer/real variables	100/50	100/50	100/50	100/50	100/50
5	Interfaces					
5.1	Ethernet TCP/IP	●	●	●	●	●
5.2	SERCOS 2 master	–	●	–	–	–
5.3	SERCOS III master	●	●	–	–	–
5.4	PROFIBUS master	–	●	●	●	●
5.5	PROFIBUS slave	○	●	–	●	●
5.6	EtherNet/IP adapter (slave)	●	●	●	●	●
5.7	DeviceNet master	–	○	–	○	–
5.8	DeviceNet slave	○	–	–	–	–
5.9	OPC	●	●	●	●	●
6	Drive technology					
6.1	IndraDrive	●	●	●	●	●
6.2	IndraDrive Cs	●	●	●	●	●
6.3	Drive-integrated, certified safety technology according to EN ISO 13849-1 and EN 62061	○	○	○	○	○

All functions for the automation process

Complete functionality

IndraMotion for Handling is the innovative system solution for efficient axis motion coordination in fully automated production environments:

- ▶ time-optimized point-to-point motion and path-optimized linear motion with up to 6 axes
- ▶ movements with blending
- ▶ incremental and continuous jogging of the axes
- ▶ user-friendly commissioning and debugging of the motion programs in single block mode
- ▶ easy teaching and programming with mobile handheld operator control units
- ▶ variable speed override
- ▶ master/slave axes in gantry couple
- ▶ safely monitored axes with software limit switches
- ▶ 4 freely definable protected areas
- ▶ transparent drive diagnostics with clear text display and user-friendly status messages

Transparent programming

The IndraMotion for Handling motion programs use the command syntax which is the standard in the robot industry. With the number of commands kept to a minimum and intuitive input masks on the mobile handheld operator control units, operator initiation times are reduced to a minimum.

- ▶ commands for single-axis and multiple-axis motion
- ▶ motion stopping by event
- ▶ specification of speeds and acceleration
- ▶ direct access to inputs/outputs
- ▶ activation of outputs during motion
- ▶ structuring of the motion programs with subroutine techniques
- ▶ comments for greater transparency
- ▶ integer and real variables
- ▶ conditional jumps
- ▶ unrestricted adaptation of syntax, item names and input/output designations

Motion:	Parameter:	I/O Access:	Organization:
MOVE P ^{XY}	V_PTP=100%	OUT ¹ =0/1	WAIT 1. 23s
MOVE_REL P ^{XY}	A=100%	WAIT IN ¹ =0/1	LABEL1
MOVE VIA P ^{XY}	R=12	X=12.34 OUT ¹ =0/1	JMP LABEL1
MOVE_REL VIA P ^{XY}	INT=PTP/LINEAR		IF IN ¹ =0/1 JMP LABEL1
MOVE P ^{XY} TIL IN ¹ =0/1	OVERRIDE ON/OFF		IF INT ¹ </>/=123 LABEL1
MOVE X=12.34			IF X</>12.34 LABEL1
MOVE VIA X=12.34	REAL_VAR_1=1.2		(* Comment *)
MOVE X= P ^{XY}	INT_VAR_1=123		CALL_SUB ROUT1
MOVE VIA X= P ^{XY}	INC INT_VAR_1		CALL_PROG PRG1
	DEC INT_VAR_1		BEGIN ROUT1
			END_SUB
			END_PROGRAM

Cost-effective multiple-machine operations

With the multikinematic function up to 4 machines can be controlled with just a single control system. In addition to the major saving on the cost of additional control hardware and associated complex networking, multikinematic operation also offers decisive advantages in terms of engineering.

Distributed motion control

IndraMotion for Handling can of course be used as a sub-system below a higher-level third-party control system as well. Particularly suitable for this type of use as a field bus slave is the drive-based system solution IndraMotion MLD. Here the motion sequences of the axes are controlled on a distributed basis by the drive-integrated PLC. This means that you can standardize your motion processes independently of the control system used.

Simple palletization

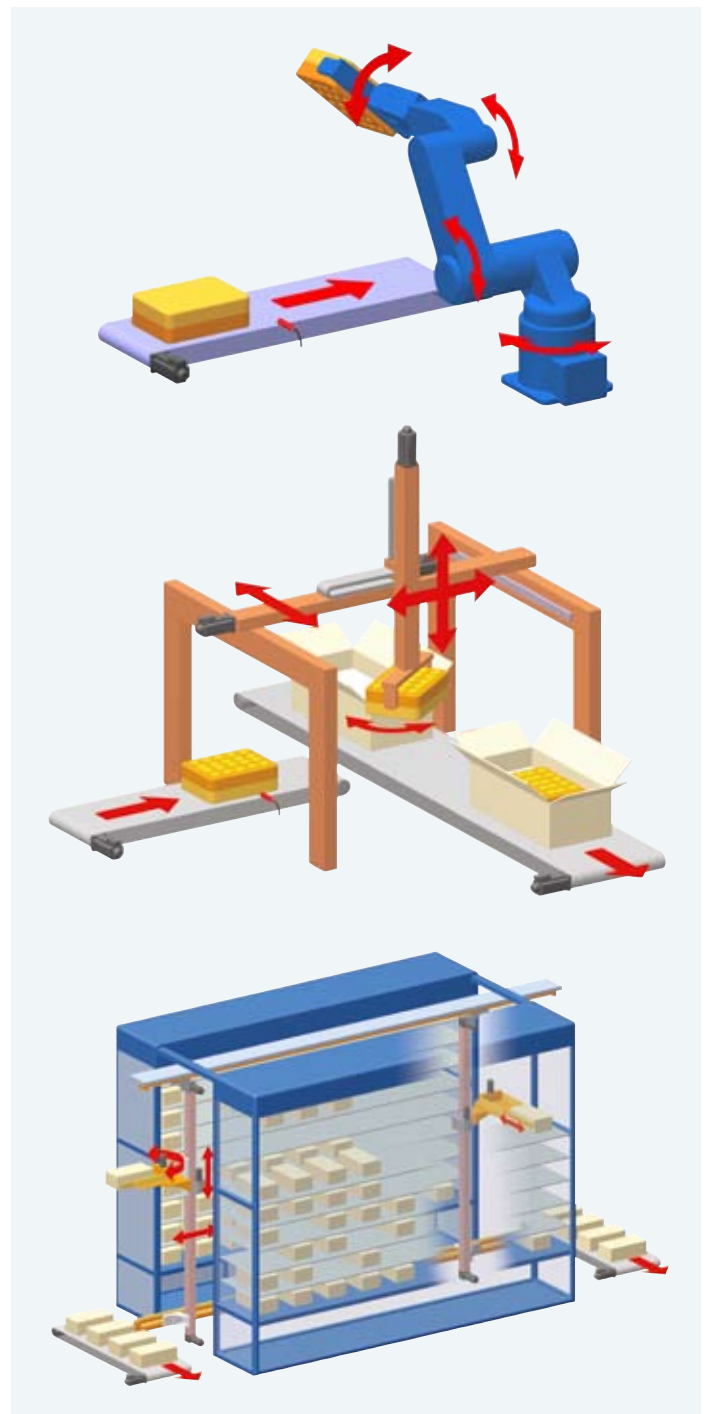
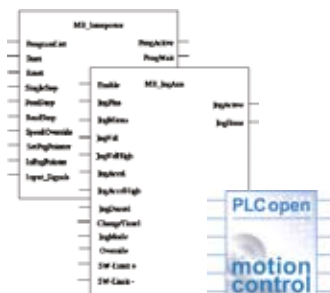
IndraMotion for Handling already has all functions for palletization on board:

- ▶ complete palletizing algorithms
- ▶ simple connection of vision systems
- ▶ specification of palletizing models by expert systems
- ▶ zero offset shifts

User-friendly engineering

IndraMotion for Handling is a turnkey, open source solution:

- ▶ custom-tailored technology functions integrated in the open source application examples
- ▶ basic PLC program including HMI and motion tasks
- ▶ complete PLC library with motion interpreter as well as jog and PLCopen modules
- ▶ programming interface for various HMI devices



Greater transparency thanks to innovative visualization

With IndraControl VCH 08 and VEH 30 you can choose between two powerful, mobile handheld operator control units for programming, operating, teaching and diagnostics for your application. Hot plugging means that you can connect and disconnect it during ongoing operations. An automatic stop function bypass is also provided. Thanks to its ergonomic design and high degree of user-friendliness the device ensures that handling is undertaken without tiring and the integrated accept and stop buttons ensure

maximum safety. As an alternative to the mobile handheld operator control units the IndraControl VCP 08 built-in unit can be also used for the visualization system. The controller-based small operator control unit changes the production data with just the press of a key. Complete operator and programming interfaces are also available for the visualization units in the form of open source applications. Using comprehensive configuration software you can adapt the operator interfaces to your particular application.

Visualization solutions for IndraMotion for Handling				
1	Operator panel	IndraControl VCP 08	IndraControl VCH 08	IndraControl VEH 30
1.1	Number of axes in the standard menu	4	4	6
1.2	Number of kinematics	4	4	4
1.3	Teaching and defining	●	●	●
1.4	Motion programming	●	●	●
1.5	Diagnostics system	●	●	●
2	Device features			
2.1	Display	9.7 cm (3.8") 5 gray levels	9.7 cm (3.8") 5 gray levels	21.3 cm (8.4") TFT
2.2	Resolution	320 x 240	320 x 240	800 x 600
2.3	Graphics-capable	●	●	●
2.4	Keys/touch screen	●/–	●/–	●/●
2.5	Override potentiometer	–	○	○
2.6	Handwheel	–	○	○
2.7	STOP button (dual circuit)	–	●	●
2.8	Accept button (3-step, dual circuit)	–	●	●
2.9	PROFIBUS	●	–	–
2.10	Ethernet TCP/IP	●	●	●
2.11	CE-certified	●	●	●
2.12	UL-certified	●	●	●
2.13	CSA-certified	●	●	●
2.14	Protection category	IP65	IP65	IP65
2.15	Hot plugging	–	●	●

● Standard ○ Option – Not available

Easy engineering with intuitive programming and operation

User-friendly programming

IndraMotion for Handling simplifies engineering requirements because all you have to do is simply enter your commands for the machine in the intuitive programming interface on the operator control unit. Or you can use the integrated teach-in function, which allows you to move directly to the positions you require and save with just the press of a button. And with parameters such as “Speed”, “Acceleration” and “Movements with Blending”, you can adapt the program so that it is perfectly tailored to your particular application requirements. In the background an integrated interpreter module converts all entries into a PLC program and saves it on the control system.

- ▶ simple motion programming of the motional sequences – independent of the PLC
- ▶ user-friendly teaching and definition of traversing positions
- ▶ very simple programming with user-friendly command selection for prevention of syntax errors
- ▶ self-explanatory command syntax
- ▶ 256 programs on Flash Card
- ▶ 10 programs online in the memory
- ▶ 200 blocks per program (expandable)
- ▶ 50 positioning points per program (expandable)
- ▶ 100 integer/50 real variables
- ▶ fast program backup via FTP, Ethernet or card reader
- ▶ user-friendly commissioning by online block display, single block and feed override

Ease of operation

Operating your machine is also made extremely easy with IndraMotion for Handling:

- ▶ easy to set up the machine thanks to special jog masks
- ▶ integrated user administration for allocating different user rights for all functions
- ▶ unambiguous clear text displays and user-friendly status messages for straightforward drive and system diagnostics



Flexible automation with scalable system components

IndraControl L – the controller-based control platform

- ▶ central assembly for DIN rail mounting
- ▶ maximum performance in ultra-compact terminal format
- ▶ 8 rapid I/Os on board
- ▶ interfaces SERCOS III, SERCOS 2, PROFIBUS, PROFINET IO, Ethernet/IP, Ethernet TCP/IP and RS232
- ▶ direct connection of local inline I/Os
- ▶ easy expansion using function modules for communication and technologies



IndraControl L

IndraControl VCP, VCH, VEP and VEH – the convenient HMI terminals

- ▶ economic HMI solutions for all applications
- ▶ IndraControl VCP and VCH controller-based terminals – from the text-oriented keypad unit to the fully graphics-capable touchscreen
- ▶ IndraControl VEP embedded-PC-based terminals with 21.3 cm (8.4”), 30.7 cm (12.1”) or 38.1 cm (15”) touch screen
- ▶ IndraControl VEH embedded-PC-based handheld operator control unit for mobile use
- ▶ interfaces for Fieldbus, RS232 and Ethernet connection



IndraControl VCP, VCH, VEP and VEH

IndraControl VSP, VPP, VSB, VPB and VDP – the forward-looking industrial PCs

- ▶ top performance thanks to the latest PC technology
- ▶ high investment protection through standardized hardware and software
- ▶ IndraControl VSP – cost-effective PC technology for industrial use
- ▶ IndraControl VPP – compact PC technology for industrial use
- ▶ IndraControl VSB – economic control cabinet PC featuring the latest new technology
- ▶ IndraControl VPB – compact control cabinet PC featuring special hardware
- ▶ IndraControl VDP – flat screen displays optionally with keys or touch screen



IndraControl VSP, VPP, VSB, VPB and VDP

IndraDrive and IndraDyn – the intelligent drive platform

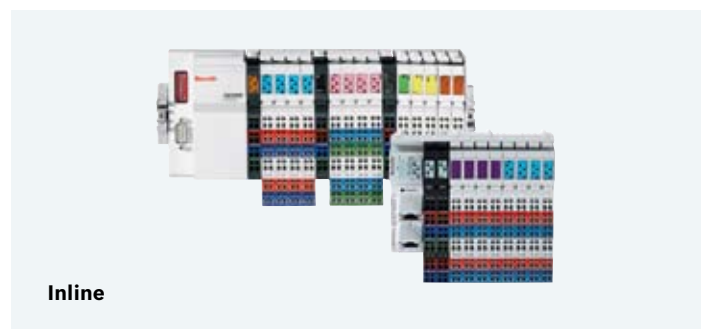
- ▶ Safety on Board according to EN ISO 13849-1 and EN 62061
- ▶ a wide power range from 1 kW to 120 kW
- ▶ openness for international interfaces
- ▶ integrated motion control and IEC 61131-3 compliant PLC
- ▶ highest performance and precision
- ▶ scalable power and functionality
- ▶ fast initial startup
- ▶ power regeneration and direct connection to mains supply from 400 V to 480 V
- ▶ integrated mains contactor and braking resistor

Inline – the modular I/O system in IP20

- ▶ scalable I/O system for the central or distributed connection
- ▶ high granularity of the digital modules with 2, 4, 8, 16 or 32 channels
- ▶ comprehensive portfolio with digital, analog, function, relay and feeder terminals
- ▶ toolless assembly
- ▶ detailed diagnosis of all modules
- ▶ space-saving design
- ▶ fieldbus couplers for SERCOS III and all standard bus systems

Fieldline/IndraControl S67 – the robust I/O system in IP67

- ▶ scalable I/O system for distributed connection
- ▶ maximum reliability under tough conditions of use
- ▶ rapid assembly with ready-made fieldbus cables
- ▶ sensors/actuators connected by means of M8 or M12 connectors
- ▶ detailed diagnosis of all modules
- ▶ fieldbus couplers for PROFIBUS, DeviceNet and PROFINET IO



Bosch Rexroth AG

Electric Drives and Controls

P.O. Box 13 57

97803 Lohr, Germany

Bgm.-Dr.-Nebel-Str. 2

97816 Lohr, Germany

Phone +49 9352-40-0

Fax +49 9352-40-4885

www.boschrexroth.com/electrics