Rexroth IndraControl L –
The clever way to automate

Scalable, future-proof and flexible
Rexroth IndraControl L –
The clever way to automate

Automating can be easy, flexible and consistent – with Rexroth IndraControl L, the controller-based PLC platform for all central and distributed architectures. In conjunction with our innovative system solutions IndraLogic and IndraMotion you get exceptionally compact PLC systems with the necessary openness and consistency to provide all the freedom you need for modern and future-proof factory automation.

IndraControl L is the future-proof, controller-based hardware platform for modular system solutions from Rexroth in the following applications:
- machine tools
- printing and paper converting machines
- food and packaging machines
- handling and assembly systems
- general automation

Using standardized interfaces and IndraControl L from the Rexroth modular system you can build a perfect PLC system consisting of:
- scalable controllers
- user-friendly control and visualization hardware
- modular I/O peripherals

With IndraControl L and our innovative IndraWorks engineering software framework you will implement your forward-pointing automation concepts easily and quickly. The components are optimized in both technical and economical terms to offer a host of advantages for machine manufacturers as well as end users. For example, IndraControl L is:
- consistent in the use of automation components
- open through standardized communication interfaces
- scalable in power and functionality
- user-friendly in terms of installation and maintenance
- expandable through connection of I/O peripherals

IndraControl L is the modular PLC platform from our own unique modular system containing all the components needed for successful automation concepts – from drives and controllers to a high-performance software framework for engineering and user-friendly operation. This innovation is the result of our many years of applications-related experience and provides you with all the freedom you expect of modern automation technology – consistent, intelligent and future-proof.
Consistent
Be it motion, logic or PLC – Indra-Control L is the universal hardware platform for all controller-based Rexroth control systems. What this means to you: uniform hardware regardless of your application. Your application is defined solely by the firmware used.

Easy
The components can be installed quickly on standard DIN rails, without having to use any tools: Snap on the controller, plug in the function modules on the left and connect up the I/O modules on the right – that’s all there is to it!

Open
Function modules for expanding IndraControl L make integration in heterogeneous system architectures simpler. The many different connection modules and technology functions maximize your flexibility:
- fieldbus masters
- fieldbus slaves
- cam groups
- cross communication
- encoder interface

Scalable
IndraControl L is available in a choice of different performance classes for optimum adaptation of the system to your application as the basis for individual solutions with high profitability.

Expandable
With Inline and Fieldline from Rexroth you can expand the system’s I/O peripherals in exact accordance with your requirements, whether centrally in the control cabinet or locally on the machine.
**Rexroth IndraControl L – The intelligent compact control system**

IndraControl L allows you to automate your individual applications flexibly and consistently. It is available in the power classes L20 and L40 and with a large choice of expansion options. Simple handling and a uniform connection technique provide all the freedom expected of modern factory automation. What this means to you: You can implement the most diverse topologies and plant structures with maximum flexibility.

---

**Open for your architecture**

Applications as master or slave (in distributed control architectures) are made possible by configurable interfaces. IndraControl L40 can be easily expanded with function modules in order to meet special requirements imposed on system integration and technology functions. Sensors and actuators are connected either centrally using Inline modules designed for direct end-to-end mounting or locally using Inline modules with a corresponding fieldbus interface and Fieldline modules for near-machine use.

**Performing automation tasks perfectly**

Connecting our IndraDrive drive system is a piece of cake with IndraControl L: Positioning tasks are performed with the integrated fieldbus interface. Applications with demanding real-time requirements are implemented via the integrated SERCOS interface.

**Communicating intelligently**

For controller-to-controller communication, visualization and programming, IndraControl L is networked over Ethernet. For operation and monitoring, our IndraControl V range of HMI devices covers everything from simple text visualization to full-graphic machine operation.

**User-friendly engineering**

The IndraWorks engineering software framework makes working with IndraControl L easy. It is tailor-made for all system solutions and standardizes configuration, parameterization and diagnostics in a uniform environment.

---

With openness and continuity, IndraControl L from Rexroth helps you down the road to maximum flexibility.
**Interfaces already on board**
The comprehensive interface portfolio includes:
- Ethernet
- PROFIBUS DP (configurable as master or slave)
- SERCOS interface (optional)
- RS232
- ready contact (optional)
- digital inputs and outputs
- function module interface (IndraControl L)

**User programs and firmware**
All programs and the system firmware are stored on an easily accessible CompactFlash card that can be replaced in next to no time. Changing devices without a PC is therefore possible at any time and quickly finished.

**Always well informed**
An integrated display means that you have the system's status in sight at all times. User-friendly diagnostics and setting options enable fast localization and rectification of any plant malfunctions.

---

<table>
<thead>
<tr>
<th>Function modules for even more flexibility</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>IndraControl L20</th>
<th>IndraControl L40</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>CML20.1-120-NP</td>
<td>CML40.1-220-NP</td>
</tr>
<tr>
<td><strong>CPU</strong></td>
<td>Microcontroller</td>
<td>266 MHz, Pentium-compatible</td>
</tr>
<tr>
<td><strong>RAM</strong></td>
<td>16 MB</td>
<td>32 MB</td>
</tr>
<tr>
<td><strong>NvRAM</strong></td>
<td>64 kB</td>
<td>64 kB</td>
</tr>
<tr>
<td><strong>Storage medium</strong></td>
<td>removable</td>
<td>removable</td>
</tr>
<tr>
<td></td>
<td>CompactFlash</td>
<td>CompactFlash</td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>RS232 Ethernet 10/100 MBit/s PROFIBUS DP master/slave</td>
<td>RS232 Ethernet 10/100 MBit/s PROFIBUS DP master/slave</td>
</tr>
<tr>
<td><strong>I/O</strong></td>
<td>8DI, interrupt-enabled 8DO</td>
<td>8DI, interrupt-enabled 8DO</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>1-line, 4 buttons</td>
<td>1-line, 4 buttons</td>
</tr>
<tr>
<td><strong>I/O expansion</strong></td>
<td>Inline I/O modules (256 I/O)</td>
<td>Inline I/O modules (512 I/O)</td>
</tr>
<tr>
<td><strong>Function modules</strong></td>
<td>–</td>
<td>●</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>175 x 120 x 76 mm</td>
<td>175 x 120 x 76 mm</td>
</tr>
<tr>
<td><strong>Connector set</strong></td>
<td>R-IB IL CML S01-PLSET</td>
<td>R-IB IL CML S01-PLSET</td>
</tr>
</tbody>
</table>
Rexroth Inline is the flexible, scalable and modular I/O system for time-saving control cabinet installation – be it locally on the IndraControl L itself or as a distributed I/O station. Rexroth Inline is available in two different versions for all standard fieldbus systems:

- Inline Modular – with fine scalability for individual configuring
- Inline Block – a bus coupler with integrated I/Os as the ideal solution for nodes with a limited number of I/Os

Advantages
- user-friendly operation and application
- fully-featured as fieldbus or local I/O
- open for all standard bus systems
- flexible thanks to greatest modularity
- reliable through insensitivity to temperature
- time-saving due to tool-less assembly and user-friendly diagnostics
- space-saving due to high-density modules

Reliable collection of analog signals
Measured value collection is performed with 16-bit resolution and very high interference and common-mode rejection. A direct shield connection option provides protection in environments with electromagnetic emission.

Fast communication
Inline serial communication modules make it easy to read information from scanners, printers and scales.

Collection of digital signals
The range of digital I/O modules covers 1-, 2-, 4-, 8-, 16- and 32-channel modules.

Counting and position scanning
Function modules are available for realizing many different applications which require events to be counted and routes or positions to be scanned.
Rexroth Inline – For quick and easy assembly

Time-saving combination of bus couplers and modules

The bus coupler is the head of an Inline station. The I/O modules are simply connected to it end-to-end. All the voltages needed for these modules and the sensors/actuators are automatically cross-wired via the lateral contacts within an Inline station.

Cost-effective multi-wire connection technique

With the multi-wire connection technique there are no longer any strapping terminals in the control cabinet – this saves money and cuts installation time. The 1-wire connection technique provides you with particularly compact high-density modules with 32 channels.

Flexible connection through permanent wiring

Using snap-on connectors you can quickly make connections to sensors/actuators in the field and release them again without any complex labeling of individual cores. Shielded cables can be connected directly to functional ground using connectors with an integrated shield connection.

Easy connection of conductors

Conductors with stripped ends are simply inserted in the spring-loaded terminals of the Inline connectors without any connector sleeves. Connection cross-sections in the range from 0.2 mm² to 1.5 mm² are possible.

4-wire connection technique

The multi-wire connection technique minimizes your wiring costs
Rexroth Inline – With intelligent voltage distribution

Rexroth Inline convinces with its intelligent distribution concept for all voltages. The internal contacts of the modules automatically see to the cross-wiring for the internal local bus as well as for the voltage supply to the logic, analog modules, sensors and actuators. Separate protection arrangements, electrical isolation and the formation of segments can be implemented very easily.

What this means to you: All voltages can be directly taken from the Inline modules and no additional distribution modules are necessary. This saves space, reduces costs and prevents wiring errors.

**Supply to the bus coupler and provision of primary voltage**

The voltages $U_L$ for the logic circuit and $U_{ANA}$ for analog modules are generated from the supply voltage $U_{BK}$ which is connected to the bus coupler.

The 24 V voltage supply to the main circuit $U_M$ is fed in likewise at the bus coupler.

**Main and segment circuits**

The signal and actuator supply to the digital I/Os is effected by the segment voltage $U_S$. It is diverted from the main circuit $U_M$ at the bus coupler via a bridge, an external fuse or a switch. Through the separation of $U_M$ and $U_S$ it is very easy to form segments which can be separately switched or protected. Neighboring terminals and their I/Os continue to be supplied when, for example, a single segment circuit is switched off.

**Supply and segment modules**

$U_M$ and $U_S$ can be fed in by means of supply modules if the power required by the signal and actuator supply exceeds the maximum distributable value. It is also possible to construct electrically-isolated main circuits within an Inline station.

Inline segment modules enable several segment circuits to be constructed within a main circuit.


### Inline Modular

<table>
<thead>
<tr>
<th>Fieldbuses</th>
<th>Bus couplers</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROFIBUS DP-V1 slave, D-Sub</td>
<td>R-IL PB BK DP/V1</td>
</tr>
<tr>
<td>Connectors: R-IB IL SCN-PWR-IN-CP</td>
<td></td>
</tr>
<tr>
<td>INTERBUS slave</td>
<td>R-IBS IL 24 BK-T/U</td>
</tr>
<tr>
<td>Connectors: R-IB IL BK-PLSET</td>
<td></td>
</tr>
<tr>
<td>INTERBUS slave, D-Sub</td>
<td>R-IBS IL 24 BK-DSUB</td>
</tr>
<tr>
<td>Connectors: R-IB IL SCN-PWR-IN-CP</td>
<td></td>
</tr>
<tr>
<td>DeviceNet slave, D-Sub</td>
<td>R-IL DN BK</td>
</tr>
<tr>
<td>Connectors: R-IB IL SCN-PWR-IN-CP</td>
<td></td>
</tr>
<tr>
<td>CANopen slave</td>
<td>R-IL CAN BK-TC</td>
</tr>
<tr>
<td>Connectors: R-IB IL SCN-PWR-IN-CP</td>
<td></td>
</tr>
<tr>
<td>SERCOS slave, FOC (Fiberoptic Cable)</td>
<td>R-IL SE BK</td>
</tr>
<tr>
<td>Connectors: R-IB IL SCN-PWR-IN-CP</td>
<td></td>
</tr>
</tbody>
</table>

The bus coupler forms the first module of an Inline station and is the interface to the fieldbus system. Individual I/O modules can then be connected to it end-to-end.

### Inline Block

<table>
<thead>
<tr>
<th>Fieldbuses</th>
<th>Digital inputs/outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROFIBUS DP-V1 slave, D-Sub</td>
<td>16 inputs and 16 outputs, 0.5 A, 24 V DC, 2- and 3-wire connection, D-SUB</td>
</tr>
<tr>
<td>Connectors: R-ILB PB 24 Di16 Do16</td>
<td></td>
</tr>
<tr>
<td>INTERBUS slave</td>
<td>16 inputs and 16 outputs, 0.5 A, 24 V DC, 2- and 3-wire connection</td>
</tr>
<tr>
<td>Connectors: R-ILB IB 24 Di16 Do16</td>
<td></td>
</tr>
<tr>
<td>DeviceNet slave, D-Sub</td>
<td>16 inputs and 16 outputs, 0.5 A, 24 V DC, 2- and 3-wire connection</td>
</tr>
<tr>
<td>Connectors: R-ILB DN 24 Di16 Do16</td>
<td></td>
</tr>
</tbody>
</table>

Inline Block – The ideal solution for a limited number of I/Os and minimum complexity. The bus couplers are already equipped with digital inputs and outputs. It is not planned to add any more Inline modules.

### Accessories

The connectors are color-coded according to their function. Hence it is easy to see during wiring work how the modules are assigned.

**Connectors**

<table>
<thead>
<tr>
<th>Connectors</th>
</tr>
</thead>
</table>

Labels can be used to identify the individual modules in accordance with your needs.

**Labels (optional)**
**Rexroth Inline – The flexible, modular I/O system**

<table>
<thead>
<tr>
<th>Channels</th>
<th>Digital input modules</th>
<th>Digital output modules</th>
<th>Analog input modules</th>
<th>Analog output modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 relay changeover contact  5 - 253 V AC, 12.2 mm</td>
<td>1 output, 0 - 20 mA, 4 - 20 mA  0 - 10 V, 24.4 mm</td>
<td>R-IB IL 24/230 DOR1/W  Connector: R-IB IL SCN-8-AC-REL</td>
<td>R-IB IL AO 1/SF  Connector: R-IB IL AO/CNT-PLSET</td>
</tr>
<tr>
<td>2</td>
<td>2 inputs 24 V DC  4-wire connection, 12.2 mm</td>
<td>2 outputs, 24 V DC, 2 A  4-wire connection, 12.2 mm</td>
<td>2 inputs, 0 - 20 mA, 4 - 20 mA  ± 20 mA, 0 - 10 V, ± 10 V, 12.2 mm</td>
<td>R-IB IL 24 DO 2-2A  Connector: R-IB IL SCN-8-CP</td>
</tr>
<tr>
<td>4</td>
<td>4 inputs, 24 V DC  3-wire connection, 12.2 mm</td>
<td>4 outputs, 24 V DC, 0.5 A  3-wire connection, 12.2 mm</td>
<td>8 outputs, 24 V DC, 0.5 A  4-wire connection, 48.8 mm</td>
<td>R-IB IL 24 DO 4  Connector: R-IB IL SCN-12-OCP</td>
</tr>
<tr>
<td>8</td>
<td>8 inputs, 24 V DC  4-wire connection, 48.8 mm</td>
<td>8 outputs, 24 V DC, 0.5 A  4-wire connection, 48.8 mm</td>
<td>8 outputs, 24 V DC, 2 A  4-wire connection, 48.8 mm</td>
<td>R-IB IL 24 DO 8-2A  Connector: R-IB IL SCN-8-CP</td>
</tr>
<tr>
<td>16</td>
<td>16 inputs, 24 V DC  3-wire connection, 48.8 mm</td>
<td>16 outputs, 24 V DC, 0.5 A  3-wire connection, 48.8 mm</td>
<td>32 outputs, 24 V DC, 0.5 A  1-wire connection, 48.8 mm</td>
<td>R-IB IL 24 DO 16  Connector: R-IB IL SCN-12-OCP</td>
</tr>
<tr>
<td>32</td>
<td>32 inputs, 24 V DC  1-wire connection, 48.8 mm</td>
<td>32 outputs, 24 V DC, 0.5 A  1-wire connection, 48.8 mm</td>
<td>R-IB IL 24 DO 32  Connector: R-IB IL DI/DO 8-PLSET</td>
<td>R-IB IL DOR LV-SET  Connector: R-IB IL DOR LV-PLSET</td>
</tr>
</tbody>
</table>

**Misc.**

- Voltage clearance modules
  - 24 V DC/253 V AC, 12.2 mm
  - R-IB IL DOR LV-SET  Connector: R-IB IL DOR LV-PLSET
Easy configuration
Configuring your Inline station is easy. Proceed as follows:

1. Select the bus coupler
2. Specify the I/O modules
3. Choose the supply/segment module
4. Select the connectors
5. Define the labels

Selecting the Inline components

Select the bus coupler which matches your preferred bus system. More modules can be connected to this coupler end-to-end. Important factors to consider when selecting these modules are the functionality and the type of connection. Modules with 1-, 2-, 3- and 4-wire connections are available.

The current loads of the voltage supplies are subject to the following limit values:
- logic (U_L) < 2 A
- analog modules (U_ANA) < 0.5 A
- main and segment circuits (U_M + U_S) ≤ 8 A

A supply module – and hence the power to the attached I/Os – is already contained in the bus coupler.

Another supply module is required if one of the limit values is exceeded. More I/O modules can then be connected to it end-to-end.

Given an exact knowledge of the power consumed by the actuator supply and of the actuators and their simultaneity it is possible to minimize the number of supply modules and configure the Inline station to optimum effect.

After you have specified the modules, select the necessary connectors and, if required, the corresponding labels.

If the relay modules are used in the 230 V AC range, you will need voltage clearance modules for separation from the 24 V environment.
Rexroth Fieldline – The robust I/O technology for field use

Rexroth Fieldline enables on-machine installation with particularly high operational reliability even in harsh environments – thanks to the IP67 enclosure rating. User-friendly operation, easy installation and flexible assembly enable I/Os to be connected over shorter wiring distances and without a control cabinet. Whatever your choice of fieldbus you can obtain the stand-alone modules in three different versions:

- digital inputs
- digital outputs
- digital inputs and outputs

Advantages

- easy handling
- flexible mounting
- simple operation and application
- fast and convenient diagnostics
- intelligent voltage concept
- open for standard bus systems:
  - PROFIBUS DP
  - INTERBUS
  - DeviceNet

Cost-saving installation

All Fieldline modules have a connection for both the incoming and the outgoing fieldbus. What this means to you: cash savings because T-connectors are no longer required for wiring.

Convenient diagnostics

Intelligent diagnostic functions keep you informed on the status of your plant.

Screw-fitted rather than molded

The modules are not molded in order to prevent mechanical stresses on the electronics during rapid changes of temperature. Operational reliability is thus assured even in extreme ambient conditions.

Whether it’s an input, output, or combination module – Rexroth Fieldline enables the reliable transmission of I/O signals directly on the machine.
Rexroth Fieldline – For cost-effective assembly

Flexible mounting
Fieldline can be mounted on any level base. Mounting holes are integrated so that the installation is adapted to the application and not vice versa. The modules can be mounted from the front as well as from the side.

Simple operation
The bus parameters are set without the use of any additional equipment or tools. A standard screwdriver is all you need to set the bus address – even in difficult assembly conditions.

Easy handling
Connections are arranged for Fieldline to be installed easily, quickly and error-free. This is why we have opted for the M12 connection system in an ideally prepared layout – this saves time and money.

Well thought-out voltage concept
The three voltages for logic (U_L), sensor (U_S) and actuator (U_A) are separated from each other.

The actuator voltage can be broken down into 4 groups (U_AXX), each interruptible on its own. This means that if one actuator suffers a short-circuit, the other groups will still be fully functional.

The well thought-out voltage concept enables the flexible grouping of actuators
Rexroth Fieldline – Distributed I/O technology with IP67

<table>
<thead>
<tr>
<th>Digital inputs</th>
<th>Digital outputs</th>
<th>Digital inputs/outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
</tbody>
</table>
| 8 inputs, 24 V DC  
RF-FLS PB M12 DI 8 M12 | 8 outputs, 24 V DC, 2 A  
RF-FLS PB M12 DO 8 M12-2A | 4 inputs, 4 outputs, 24 V DC, 2 A  
RF-FLS PB M12 DIO 4/4 M12-2A |

<table>
<thead>
<tr>
<th><img src="image4.png" alt="Image" /></th>
<th><img src="image5.png" alt="Image" /></th>
<th><img src="image6.png" alt="Image" /></th>
</tr>
</thead>
</table>
| 8 inputs, 24 V DC  
RF-FLS IB M12 DI 8 M12 | 8 outputs, 24 V DC, 2 A  
RF-FLS IB M12 DO 8 M12-2A | 4 inputs, 4 outputs, 24 V DC, 2 A  
RF-FLS DN M12 DIO 4/4 M12-2A |

<table>
<thead>
<tr>
<th><img src="image7.png" alt="Image" /></th>
<th><img src="image8.png" alt="Image" /></th>
<th><img src="image9.png" alt="Image" /></th>
</tr>
</thead>
</table>
| 8 inputs, 24 V DC  
RF-FLS DN M12 DI 8 M12 | 8 outputs, 24 V DC, 2 A  
RF-FLS DN M12 DO 8 M12-2A | 4 inputs, 4 outputs, 24 V DC, 2 A  
RF-FLS DN M12 DIO 4/4 M12-2A |

**Complete range of accessories**

A comprehensive offering of cables and connectors for connecting Fieldline components is available:
- fieldbus cables
- sensor/actuator cables
- M12 connectors

You can choose between using our preassembled cables with molded connectors or you can assemble the cables and connectors yourself. This is done without soldering or crimping – either with the QUICKCON fast-connection technique or by screw-fitting the individual strands in the connector.
### Selection of fieldbus and power supply cables

A large cable portfolio is available for wiring all IndraControl L components. 

Procedure for selecting your cable and connectors:

1. Specify the stations n (header column)
2. Specify the stations n + 1 (header line)
3. Select preassembled cable (on gray background), partly preassembled cable or connectors
4. Define the bus terminating resistance

---

1) Connector is required if neither IKB0033 nor IKB0034 is used on the preceding module.
2) 5-pin DeviceNet connector included in delivery of modules.
3) Bus termination resistor required if fieldbus is not continued (PROFIBUS INS762/CNN, DeviceNet INS763/CNN).
4) Assumes there is a functional module on the IndraControl L40.

**xxx**: length of cable in meters

---

**Selection example for PROFIBUS DP**

[Diagram showing cable selection for PROFIBUS DP]