

RIO

IP20 Field Bus Modules

The RIO system provides the connection between the field devices and the controller. RIO's modular structure guarantees made-to-measure application and a high degree of flexibility.

Digital and analog I/O modules and expert modules for temperature detection, counter and positioning are available for connecting the periphery. Field device wiring to the I/O modules does not depend on the field bus type. The bus coupler connects the modules to a Profibus-DP, InterBus, CAN DeviceNet or CANopen field bus. This means that you can change the bus system without any effect on the existing wiring.

Up to eight modules can be connected in any combination at one bus node. The internal bus connection and voltage supply are provided by integrated slide contacts. The 24 V supply is provided through external terminals and can be passed from module to module, or fed separately if more current is required. This concept does without lateral connectors and power contacts, allowing a module to be changed easily without removing the other modules. Similarly, special feed, separation and terminator modules are also unnecessary.

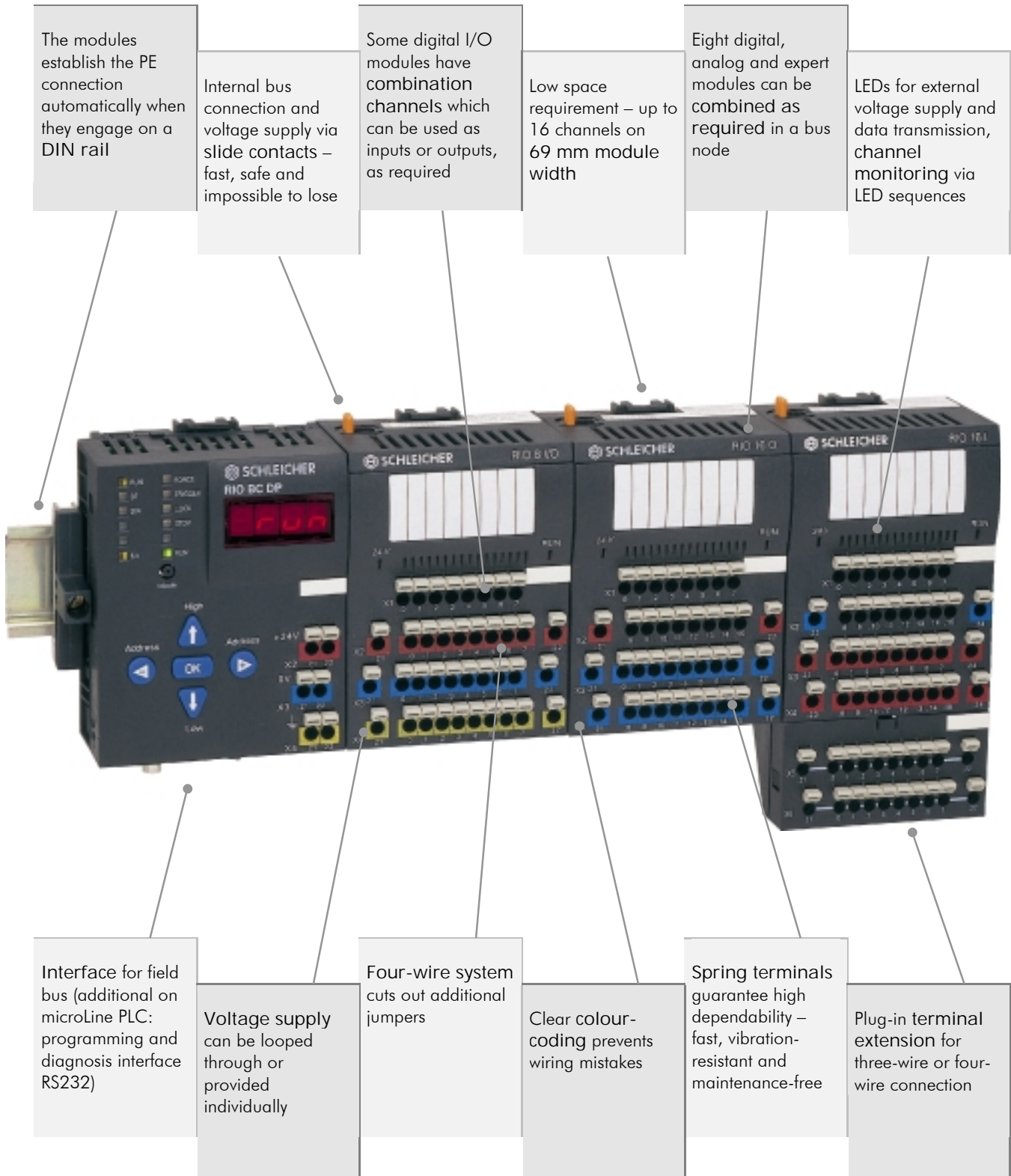
The bus couplers can optionally be supplied with comprehensive functions for on-the-spot commissioning and diagnosis without other aids. With the microLine PLC mini-controller SCHLEICHER also offers a synthesis of bus coupler and powerful PLC, which can undertake data (pre-)processing controller tasks and thus reduce the load on the field bus.

We have digital compact modules with integrated bus coupler for plant-floor applications with relatively few channels.

The RIO modules received the 1998 Product Design Award for their superb design.



A Well Thought-out System – in the Concept ...

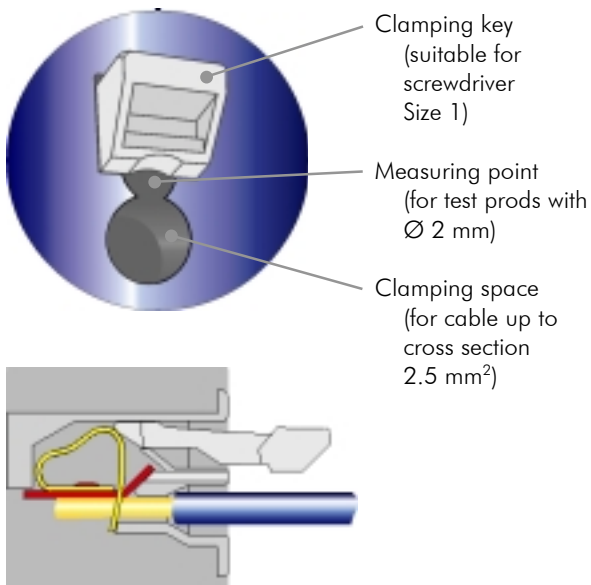


... and in the Detail

Spring-Loaded Clamping Key System

The spring-loaded clamping key system of the terminals on the RIO modules makes for simple fast wiring and thus saves on installation costs.

The spring is pre-tensioned by pressing in the clamping key. The clamping space is open. Insert the cable and push the clamping key up. Finished. The pre-tensioned spring terminals guarantee vibration-resistance and constant clamping force. Each terminal is equipped with a measuring point for a test prods with $\varnothing 2$ mm.



Replacing the Module Electronics



Electronics can be replaced without detaching wiring. So there is no additional work for rewiring and minimized costs through reduced stoppage times. Mechanical coding prevents insertion of incorrect electronics.

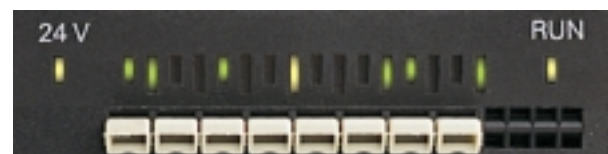
LEDs and Display

Bus couplers from the BC series use LEDs and a four-position display to provide data on module status, mode, bus connection and errors.



- ▶ Left row of LEDs:
 - ▷ RUN – bus coupler processor running
 - ▷ 5V – internal power supply works fine
 - ▷ Inbetween, bus-specific diagnosis LEDs
- ▶ Right row of LEDs
 - ▷ FORCE, TRIGGER, LOCK, STOP – special commissioning and diagnosis modes
 - ▷ RUN – "normal" mode
- ▶ Display
 - ▷ Active operating mode display
 - ▷ Number of a selected I/O channel
 - ▷ Value of the channel (high/low for digital channels, voltage or current for analog channels)
 - ▷ Setting service functions (e.g. user lockout with password)
 - ▷ Error messages

On the expansion modules a two-colour LED sequence gives information on module status and switching states of inputs/outputs.



- ▶ 24 V – DC 24 V supply voltage connected
- ▶ RUN – internal data transfer to bus coupler is running
- ▶ Channel LEDs
 - ▷ display the channel selected on the bus coupler by lighting yellow
 - ▷ on digital modules, also display switching state of channels (high/low) by lighting green

Components in the RIO System



microLine PLC

Powerful mini-controller with integrated CANopen bus coupler for data processing within the node.

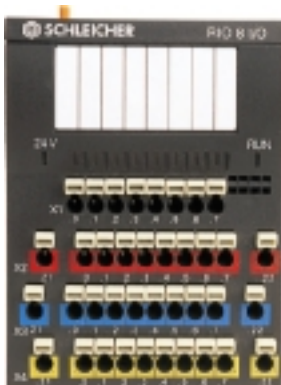
- ▶ PLC programs directly in the bus node
- ▶ Multitasking operating system
- ▶ Integrated commissioning and diagnosis functions.
- ▶ Up to 8 modules can be attached locally
- ▶ Expansion with RIO modules via CANopen field bus
- ▶ Also available as stand-alone controller without field bus connection



RIO Bus Couplers

The bus coupler connects the modules to Profibus-DP, InterBus, CAN DeviceNet or CANopen field buses.

- ▶ 8 RIO I/O modules can be connected in any combination (digital, analog, expert modules)
- ▶ Up to 128 digital or 56 analog I/Os can be connected locally
- ▶ Field bus diagnosis via LEDs
- ▶ BC series with display, keypad and integrated commissioning and diagnosis functions
- ▶ EC series as low-cost economy version



Expansion Modules

- ▶ Digital modules with 8 or 16 input/output channels
- ▶ Max. output current per channel 1 A
- ▶ Outputs can be connected in parallel, short-circuit-proof and overcurrent-protected
- ▶ Analog modules with 4 input/output channels for voltage or current
- ▶ Short-circuit-proof outputs
- ▶ Voltage inputs as differential inputs with $\pm 10\text{ V}$
- ▶ Current inputs single-ended, range 0..20 mA or 4..20 mA
- ▶ Expert modules for temperature, counter and positioning
- ▶ High-frequency data recording and process control directly at the machine
- ▶ Module has own configuration memory, parameterizable via PLC and bus coupler
- ▶ Reduced load on field bus
- ▶ Reduced load on central controller



Compact I/Os

Digital compact I/Os for bus nodes with few channels

- ▶ Integrated bus coupler for Profibus-DP, InterBus, CAN DeviceNet and CANopen field buses
- ▶ Channels isolated from internal bus by optocouplers
- ▶ Signal delay of inputs typ. 2 ms (hardware)
- ▶ Signal delay of outputs $< 100\ \mu\text{s}$ (hardware)
- ▶ Max. output current per channel 1 A
- ▶ Outputs can be connected in parallel, short-circuit-proof and overcurrent-protected