

XCx micro



PLC Automation Systems Mini-Controllers

System Description

Contents

Introduction

- 4 Automation Solutions**
Controllers, Software and Networking
- 6 Controllers Compared**
From Low Cost to High End
- 10 Modular Field-Bus Mini-Controller**
Distributed, Networked, Intelligent
- 11 Inner Values**
Multitask and OPC Server
- 12 System Overview XCx micro**
Controller, Expansion Modules, Bus Couplers
- 14 Field Buses**
Introduction to Profibus-DP and CANopen
- 15 I/O Interface XRIO**
Bus Nodes and Coupling Modules

Control Units

- 16 XCS 20C**
PLC Controller • CANopen
- 18 XCS 20P**
PLC Controller • Profibus-DP
- 20 XNT24**
Power Supply Unit for Control Units

Expansion Modules

- 21 X14DI**
Digital • 14 Inputs • DC 24 V
- 22 X14DO**
Digital • 14 Outputs • DC 24 V
- 23 X6DI8DIO**
Digital • 6 Inputs • 8 Inputs/Outputs • DC 24 V
- 24 X2AI**
Analog • 2 Inputs • 0 ... 20 mA • ±10 V
- 25 X2AO**
Analog • 2 Outputs • 0 ... 20 mA • ±10 V
- 26 X2CT24**
Counter Module • 2 Counters • 24 V
- 26 X2CT05**
Counter Module • 2 Counters • 5 V
- 28 X1RIO**
Coupling Module • RIO Modules to XCx micro
- 29 X2RIO**
Coupling Module • XCx micro to XCx 300

Bus Couplers

- 30 XBCX**
Bus Coupler • XRIO
- 31 XBCC**
Bus Coupler • CANopen
- 32 XBCP**
Bus Coupler • Profibus-DP

Software

- 33 Multiprog**
Programming System to IEC 61131-3
- 33 Service Pack**
Utilities and Updates
- 34 PLC Operating System**
to IEC 61131-3
- 34 ProCANopen**
CANopen Network Configuring Software
- 34 CANcard Y**
CANopen Field Bus Card
- 34 GSD/EDS files**
Files for configuring Profibus-DP and CANopen

Accessories, Technical data

- 35 Cables, Connectors, Small Parts**
for Operating the XCx
- 35 Publications**
Operating Manuals and System Descriptions
- 36 General Technical Data**
Data and Dimensions

XCx micro— the Small PLC



With the powerful XCx micro Schleicher offers uncompromising quality in the market for “small” controllers. Matched for the special needs of the many machine-builders who supplement their product ranges with low-price or compact versions, the XCx micro offers all the advantages of our “big” controllers. In terms of performance and functionality they do everything you require of a Schleicher product.

The small XCx micro is fully integrated in the Schleicher system. It, too, offers the proven multitasking operating system and plenty of program memory. Real-time multitasking allows defined processing of time-critical cyclical processes in high-priority program sections. Less time-critical parts of the program can be dealt with at lower priority.

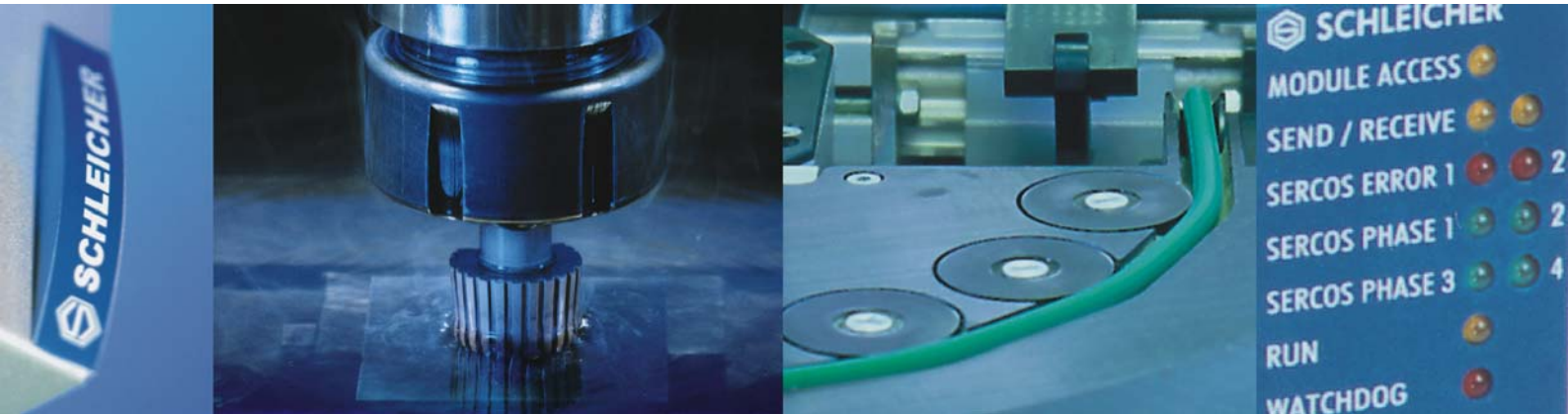
From XCx micro to IPC, Schleicher supplies well thought-out solutions for the different requirements of industrial production. And with Schleicher your investment in your own program library is safe as houses, because all our controllers work with the same programming environment. Schleicher system solutions offer scalable performance for every task.

The XCx micro wins through with its proven functionality. The automatic I/O configuration with comprehensive software support saves valuable working time, because you can start programming while others are still configuring. The standard plug-in terminals on the XCx-micro make installation, prefabrication and replacement of electronic parts easy. It has one diagnosis LED per channel and is ideal for use in space-saving plant designs. At the same time the modular system and the combination channels (useable as inputs or outputs) offer economic advantages: You only pay for what you really need.

Schleicher developed the narrow XCx micro I/O modules specially for the XCx micro. The controller also connects up to the whole range of tried-and-tested RIO modules – thermoelement modules, relay modules, counter and axis modules, as well as three-wire connection. The slim XCx micro modules can also be used to expand the XCx 300.

Automation Solutions

for machine tools and production machines, robots and handling



Integration

Complicated PLC programming of simple axis control? Doing without the convenience of a PLC in complex CNC applications? The answer is XCx. Its big feature is the integrated PLC that allows simple operation of complex CNC applications. Permanent CNC/PLC synchronization on the XCx creates unimagined new possibilities for solving complex control problems.

For example, on a production line you often need coordinated control of feed axes – and programming that just with a PLC is complicated. On the other hand, CNC machine tools often require path-dependent dynamic control of parameters, for example in order to allow for heat expansion measured by the PLC or for exact-position valve switching. Using XCx gives you elegant solutions for these kinds of problem in a wide variety of situations:

grinding • sharpening • milling • drilling • turning • cutting
 • machining edges and profiles • spring twisting machines •
 crane control • wave soldering systems • welding • painting
 and polishing robots • feed and removal on injection
 moulding and metal-bending machines • stacking and
 palleting • insertion and mounting work ...

Software

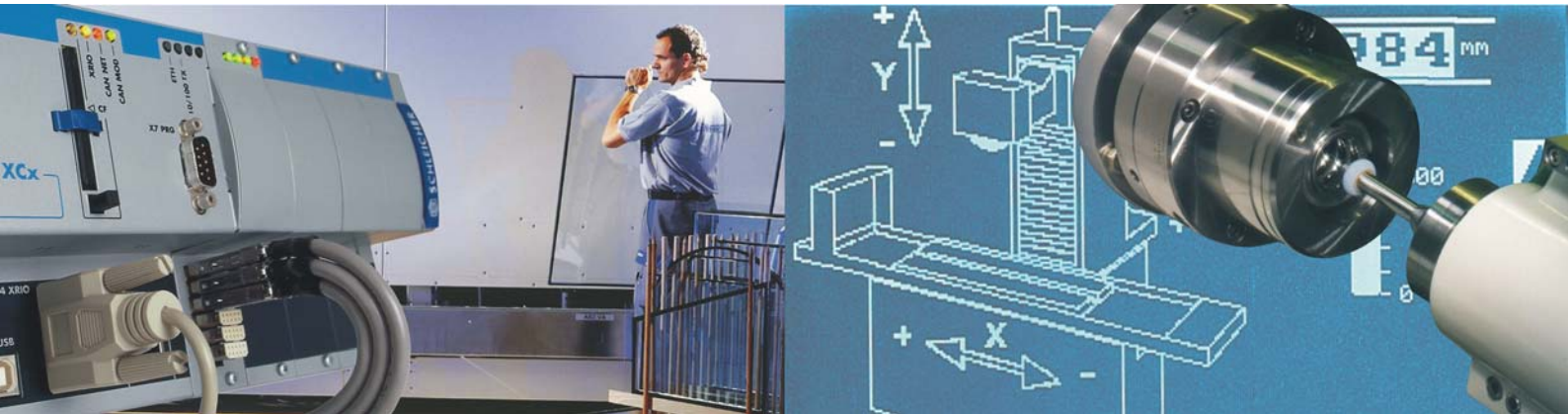
Integration in functionality and software is a fundamental characteristic of Schleicher controllers.

The real-time multi-tasking properties of the IEC 61131-3 operating system allow you to optimally adapt the controller to the process by executing time-critical functions with highest priority. The Motion Control function block library enables easy-to-parameterize axis controls even with a PLC.

The optional CNC operating system to DIN 66025 gives the XCx controllers a broad additional spectrum of standard and special Schleicher functions, such as multidimensional freeform interpolation and path optimization with Nerthus software.

For all controllers, configuring is carried out consistently with the programming system Multiprog according to IEC 61131-3. Hence, utilisation of software blocks and program libraries developed by the user is guaranteed across-the-controller. Multiprog is matched to the resources of the XCx to ensure easy operation.

The NC-Dialog PC tool is available for starting up and operating the XCx. It communicates with the controller via Ethernet. The program automatically detects which operating system is on the controller (pure PLC or CNC/PLC) and selects the appropriate input and display masks.



Networking

XCx controllers are true communication professionals, open in all directions and easy to connect. Controllers can be connected via Ethernet to manage even complex and widely distributed processes.

Furthermore, the classic field buses CANopen and Profibus-DP as well as the upcoming Profinet no longer serve exclusively for networking but increasingly for controlling drives. Communication via Ethernet and TCP/IP with OPC server and integrated webserver means you can run visualization and data entry on any standard browser. The parameterizing, diagnosis and test functions can be called directly on site, in the local network or on the Internet. The higher factory level can easily request production data from the XCx and integrate it elsewhere.

Concentration

The XCx unites the advantages of the IPC – many interfaces, interchangeable memory media, high performance – with the efficiency and long-term stability of a conventional controller. Supported by a wide selection of digital and analog I/Os and intelligent function modules it represents a controller system that can be flexibly adapted to almost any task. XCx gains its clear speed advantage by concentrating on the essentials in combination with convenient day-to-day use.

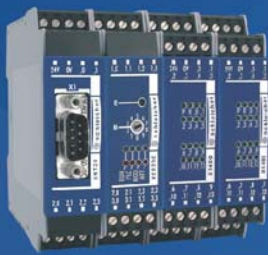


Controllers Compared

Family Ties

As a supplier of automation solutions with decades of experience, Schleicher can offer a broad spectrum of controllers in all performance classes, together with the associated I/O periphery.

Performance and functionality rise with demand and complexity of the production process. By means of modularity and networking the XCx matches the tasks and offers automation solutions all of a piece.



XCx micro

The spectrum of controllers starts with the low-cost **XCx micro** controller for simpler automation tasks and distributed data (pre)processing. The small PLC with 22.5 mm housing especially matches the requirements of many machine manufacturers who want to add economic and compact versions to their array of products. The controllers connect to the field bus via CANopen or Profibus-DP. In addition to the XCx micro expansion modules you can also connect modules of the RIO series.

- Interfaces:
CANopen or Profibus-DP,
2x RS232

XCx 300

The low-cost **XCx 300** is the obvious choice for higher demanding requirements. It is available in a range of versions as PLC and CNC/PLC. You can connect eight RIO I/O modules directly to the DIN rail via the integrated RIO interface. Via an coupling module you can also connect I/O modules from the XCx micro series. A free slot allows you to connect drives, additional I/Os or field bus interface.

- Up to 4 NC axes / 2 NC subsystems
- Additional axes via Motion Control blocks
- From 2 ms CNC interpolation cycle
- Interfaces:
Ethernet, RS232, RS422, XRIO, 2x interrupt, Compact Flash
- Additional interface (CANopen, Profibus-DP, Sercos, XRIO) via card

XCx 500 / XCx 540

The **XCx 500** is available as PLC and CNC/PLC versions, too. The controllers offer multiple interfaces for easy integration in the widest variety of production conditions. Digital, analog and function modules from the comprehensive RIO or XCx micro system connect the I/O level via the XRIO high-speed interface.



The **XCx 540** expansion version has all the features of the XCx 500, as well as 4 expansion slots for additional XRIO nodes and field bus and drive interfaces.

- Up to 16 NC axes / 8 NC subsystems
- Additional axes via MC blocks
- From 1 ms CNC interpolation cycle
- Interfaces:
CANopen, Ethernet, USB, RS232, RS422, XRIO, 2x interrupt, IrDA, Compact Flash
- Additional interface (Sercos, Profibus-DP, Profinet, XRIO) via card (XCx 540 only)

Typology

XCx stands for **eX**perienced **C**ontroller. The controllers are available in a range of versions with PLC and CNC/PLC operating system.

- **XCS** with PLC operating system
- **XCM** with PLC operating system and additional Motion Control functions (MC)
- **XCN** with CNC and integrated PLC operating system
- **XCN+MC** with CNC and PLC operating system and additional MC functions



XCx 700

The **XCx 700** is the CNC/PLC controller for complex tasks and high requirements of speed and precision. It connects the I/O level with a wide range of digital and analog input, output and combination modules from the proven Promodul-U series. Relay modules, function modules for analog value processing and temperature control, and modules for axle positioning with Sercos interface or analog setpoint interface round off the periphery range.

- Up to 32 NC axes / 16 NC subsystems
- Additional axes via Motion Control blocks
- From 1 ms CNC interpolation cycle
- Interfaces: CANopen, Ethernet, 2x RS232, RS422/RS485, Compact Flash
- Additional interface (Sercos) via expansion module

XCx 1100

The **XCx 1100** connects the advantages of the classic controller with those of the modern IPC with CPUs up to Intel Core 2 Duo for extreme high performance. Passive cooling and solid state disk instead of rotating mechanical devices guarantee steady operation even in rough environment. There is also no need for an uninterruptible power supply. The operating system VxWorks with Windows XP embedded saves process data permanently, so it always starts from a defined condition. Expansion modules are available from the Promodul-U series.

- Up to 64 NC axes / 32 NC subsystems
- Additional axes via Motion Control blocks
- From 1 ms CNC interpolation cycle
- Interfaces: CANopen, 5x Ethernet, 4x USB, RS232, RS422/RS485, DVI-I
- Additional interface (Sercos III, Profinet) via PCIe expansion moduls

ProNumeric

ProNumeric is an IPC-based high performance CNC/PLC automation system where even complex applications are easy to operate. It consists of a computer box and a separate operator panel. Four slots for PCI cards allow you to run multi-axis applications with 64 Sercos drives in up to 32 subsystems. Fully tested hardware / software systems guarantee steady operation.

As **ProSyCon** the system is available as pure PLC without CNC functionalities.

- Up to 64 NC axes / 32 NC subsystems
- Additional axes via Motion Control blocks
- From 1 ms CNC interpolation cycle
- Interfaces: 2x USB, 2x RS232, 2x PS/2
- Slots: 4x PCI, 3x ISA, 1x AGP
- CANopen and Sercos interfaces via cards

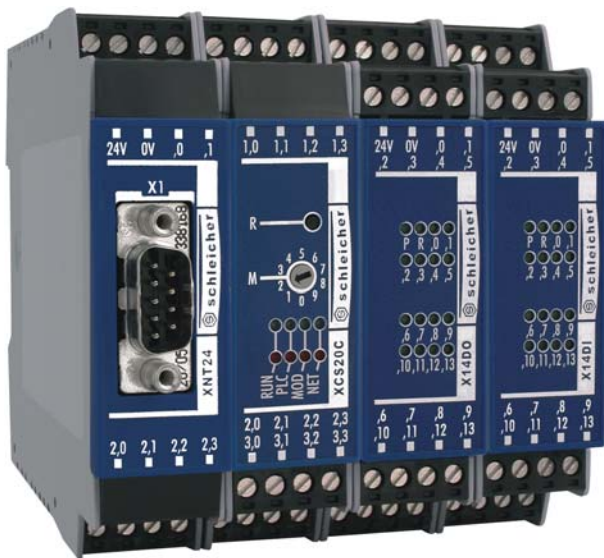
XCx micro



Modular Field-Bus Mini-Controller

Field Bus Is Standard

Periphery connection via field bus has largely superseded conventional parallel cabling for automation, because distributed I/O circuitry offers considerable advantages. The field devices, sensors and actuators are wired directly to I/O modules, while the signals are processed and sent to the controller on the field bus. Expensive and confusing cable routes are a thing of the past. Segmentation of individual bus nodes makes installation and plant diagnostics a great deal easier.



With the XCx micro Schleicher offers a cutting-edge concept for the interface between controller and field peripherals. Modular I/O nodes – distributed on the plant floor – are networked by field bus. If required, modules from the XCx micro series with PLC capabilities and intelligent function modules can undertake data (pre)processing directly in the bus station and thus release resources on the field bus and controller.

Modular

Modules form the interface between PLC/CNC or bus coupler and the field. With modules you can adapt flexibly to different tasks and requirements.

- Digital and analog inputs/outputs can be combined as required. In tune with requirements, the process-specific signal mix is picked up, passed on and output.
- Modules can be changed quickly and simply.
- Sensors and actuators can be wired independently of the field bus.
- You can change to a different field bus system by just changing the bus coupler.

Distributed

Distributed on-the-spot connection instead of wiring in the central enclosure offers decisive advantages.

- Wiring costs are reduced because cable routes are not required.
- The transparency of the system is increased and servicing is easier.
- Segmented start-up of plant and machine components is possible.
- Doing without large central units reduces costs.

Networked

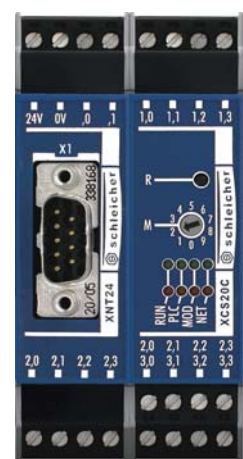
XCx micro is a consistent complete system for machine-building and plant engineering for various field bus systems.

- CANopen
real-time-capable multi-master network
- PROFIBUS-DP
Communication with remote periphery devices
- XRIO
Setting up plant-floor I/O nodes

Intelligent

XCx micro allows networked automation to tap the enormous rationalization potential of remote intelligence.

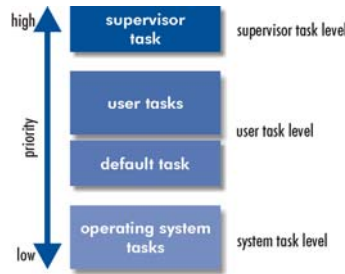
- The control units and function modules give you optimized control performance.
- Local data processing without field bus delay results in short response times and thus increases precision and reproducibility of results.
- Parallel data processing reduces bus load.
- Intelligent components improve emergency running properties if the field bus fails.



Inner Values

Multitask

In a real-time multi-tasking operating system the PLC is priority-controlled to optimize computing capacity for each task. A task is made up of program modules and is assigned precisely the amount of time required to process it. This means that valuable performance is not wasted in unnecessary waiting cycles. Furthermore, the tasks are assigned different priorities that ensures they are processed in order of importance.



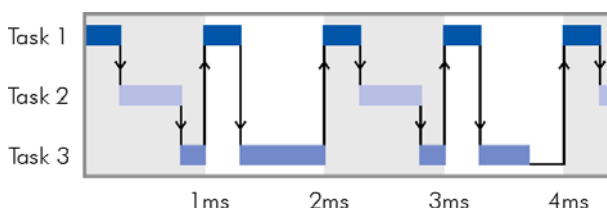
- **Supervisor tasks** (supervisor task level) detect errors (division by zero, task overrun, etc.) and activate the corresponding operating system task.
- **User and default tasks** (user task level)
 - *Cyclical tasks* execute the programs assigned to them within a defined interval under a defined priority. The task with the highest priority is called first.
 - *Event tasks* are started by the XCx operating system when particular events occur, for example interrupt signal, CANopen task or interpolation task.
 - *Default task* is activated when all higher-priority user tasks have been processed.
- **Operating system tasks** (system task level) such as communication, debugging, memory management and system control run outside the control of the user.

Task Priorities

The XCx supports 8 user tasks. The time-critical programs of the machine process are controlled in the fast high-priority tasks. Comprehensive user guidance can be processed in the mid-range tasks, and non-time-critical monitoring programs in the low priority tasks. Tasks are processed in order of priority, ensuring that the critical processes are handled first, and completely. The less critical processes are handled in the remaining time according to their priority.

Example: PLC program with three tasks

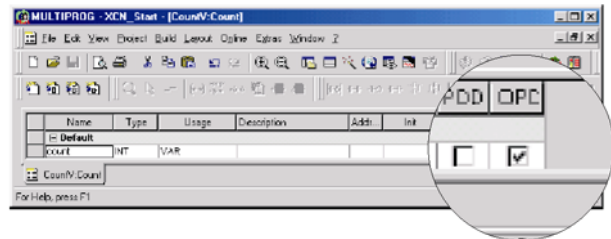
- Task 1 • Cycle time 1 ms • Processing time 0.3 ms
- Task 2 • Cycle time 2 ms • Processing time 0.5 ms
- Task 3 • Cycle time 4 ms • Processing time 1.5 ms



OPC Server

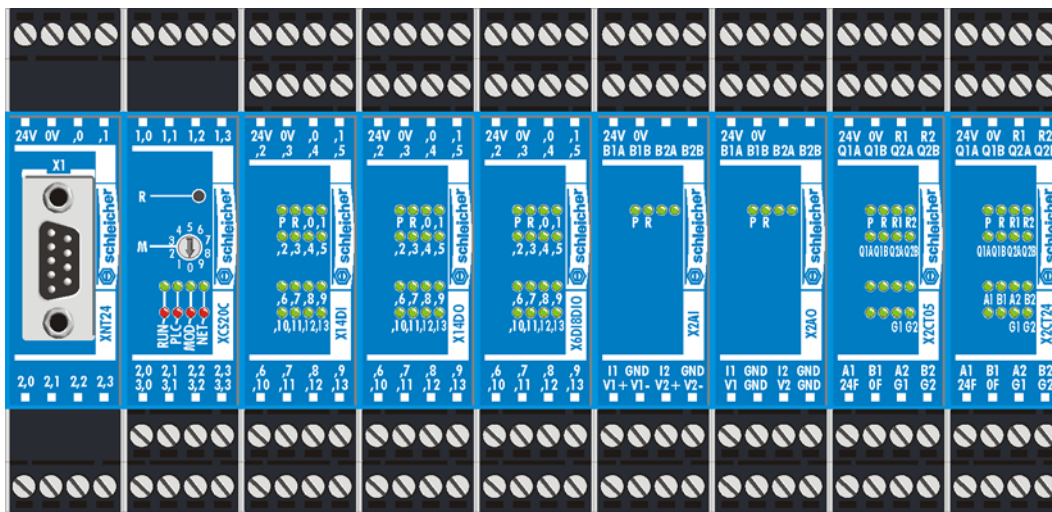
OPC (OLE for Process Control) is a defined set of interfaces, based on OLE/COM and DCOM technology, for open data exchange between automation and controller applications, field periphery and business/office applications. OPC is based on COM (Microsoft Component Object Model), a software architecture that allows a program to use another program's interface in order to obtain data from it (if it is also programmed as a COM component). DCOM (Distributed Component Object Model) is the network version of the COM system.

The OPC server is part of the Multiprog programming system (see page 33) and is installed on the PC together with it. It allows process data exchange between the XCx and e-manufacturing programs such as standard visualization programs and Visual Basic applications.



In the variable dialogs on Multiprog the controller data and variables where the OPC server requires read/write access are simply designated OPC.

System Overview XCx micro



1 A Well Thought-out System

- Bus stations with bus couplers or control units for flexible configurations
- Interface for various field buses
- Eight digital, analog and function modules can be combined as required in one bus station
- Digital I/O module with combination channels which can be used as inputs or outputs, as required
- Complex function modules for independent data processing
- Low space requirement – up to 14 channels on 22.5 mm width
- Internal bus connection via lateral integral connectors
- Pluggable screw terminals for fast secure connection
- Internal 5 V voltage supply via bus
- The modules establish the PE connection automatically when they engage on a DIN rail
- LEDs for external voltage supply and channel control

1 Power Supply Unit

A power supply unit must always be used if control units are used. It provides the internal 5 V supply voltage for the control unit and the expansion modules. It is equipped with a serial interface (in addition to that on the control unit) as well as two fast digital inputs that are suitable for time-critical applications and can be processed in the PLC program.

2 Control Units

The control units combine the capabilities of a PLC with the functionality of the XCx micro remote I/O system.

- Powerful PLC with multitasking operating system
- Controllers with field bus interface
- 8 I/O modules can be connected in any combination (digital, analog, function modules)
- Up to 112 digital or 16 analog I/Os can be connected locally
- Multiprog programming system to IEC 61131-3
- Software-compatible with Schleicher's XCx controller series
- Connection of additional components for configuring, process visualization and terminal mode via two serial RS232 interfaces

Networked in a field bus, data processing is distributed and parallel. Here, rather than increasing the performance of a central control system by increasing the clock-pulse rate and the throughput rate of the master PLC.

- Program memory and computing capacity grow with the number of networked units.
- Local data processing with parallel handling of tasks produces fast response times with low bus load. Field bus delay does not interfere with time-critical machine functions.
- The autonomous components have safe emergency running properties. If the field bus should fail, the nodes continue to operate with appropriate emergency control functions - important from the process and safety perspectives.
- The availability and fault-tolerance of the whole system is increased.

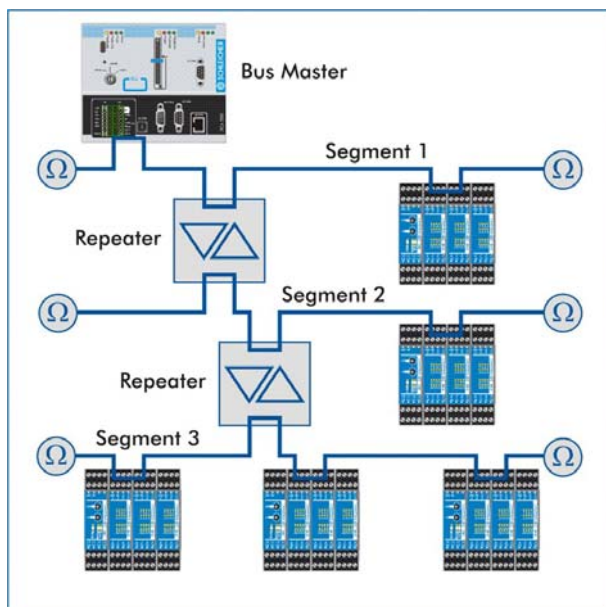
The Field Buses



Profibus is an open and internationally standardized field bus, whose technology (in various versions) is developed by the Profibus user organization. Profibus-DP (distributed periphery) has been specially designed for speed-optimized communication with remote periphery sensor and actuator devices and conforms to EN 50170.

The bus topology is a linear structure comprising a shielded 2-wire cable with active bus terminator at both ends. According to the Profibus RS485 specification, up to 32 stations can be connected per bus segment. To operate a greater number of Profibus-DP stations, the system must be segmented with repeaters.

Repeaters connect bus segments electrically and amplify/refresh the data signals. Repeaters can be used in addition to isolation of bus segments or sections. Each repeater allows you to add another full-length bus segment complete with the full complement of field devices to the Profibus system. The possible bus lengths are 100 m at 12 Mbit/s up to 1200 m at 94 kbit/s.



The station-specific data is defined in a standardized equipment master file, allowing easy application of plug-'n'-play. If individual slaves fail or are shut off during bus operation the others continue to operate.

CANopen

CAN (Controller Area Network) is a multi-master bus system in which all the nodes communicate directly with each other without going through the central master. In this system, known as the broadcasting method, the nodes are not addressed as in other bus systems. Instead, a message from a master is received by all the nodes in the network. Each node decides independently whether to accept the received message. This decision is based on the message identifier, which also defines its priority. High-priority data is sent immediately, lower priority data has to wait until bus capacity is free.

This control of bus access is necessary because by preference the CAN bus operates asynchronously. Process data is sent not in a fixed cycle, but by event control. A message is sent only by a bus station which actually has "something to say", for example because an input value has changed. These two factors, direct and eventcontrolled communication between nodes, greatly reduce the load on the bus and shorten response times.

CANopen is based on the CAN Application Layer for industrial CAL applications. The CANopen communications profile CiA DS-301 specifies the mechanisms for configuring and communication between devices in realtime environments.

CANopen defines four types of message, which allow data exchange between the bus nodes: Network services control the operating states of the nodes and the data transmission mechanisms. Service data objects (SDOs) are used, for example, to configure nodes, set device parameters and load programs. SDOs have low priority and unrestricted length. Process data objects (PDOs) are used where possible for high-priority transmission of process data. Because their length is restricted to 8 bytes and they allow event-controlled data transmission they provide extremely short response times. Predefined messages are used, for example, in synchronization - simultaneous operation of nodes and their applications.

CAN is based on a linear topology with shielded 2-wire cable and terminating resistors at both ends of the bus. Data transmission rates range from 10 kbit/s (>1000 m) to 1 Mbit/s (25 m). Device details are described by the Electronic Data Sheet (EDS), as used by every standard bus configurator.

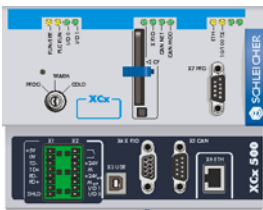
I/O Interface XRIO

Bus Nodes

The "big" XCx controllers connect the direct I/O level via the classical field buses as well as via the Schleicher-specific XRIO bus. The high-speed interface provides external accessibility of the internal controller bus. This connection reduces the PLC signal propagation time from input terminal to output terminal to less than 1 millisecond. Connecting the bus nodes to the XRIO interface on the controller is done using two different bus couplers:

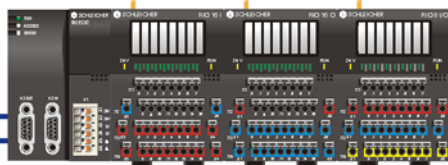
- **RIO EC X2** – connects directly to RIO modules or to micro modules via X2RIO coupling module (→ operating manual XCx 300/500/540, page 35)
- **XBCX** – connects directly to micro modules or to RIO modules via X1RIO coupling module (→ page 30)

Both bus couplers can be mixed within a bus segment, as well as the I/O modules from the RIO or micro series within a bus node (using a coupling module, see right).

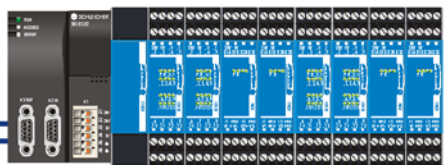


The bus couplers provide interfaces for incoming and outgoing data links. The max cable length is 10 meters between two connection points.

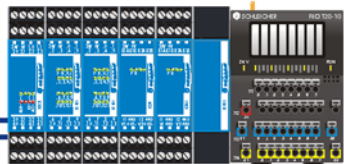
RIO EC X2 + RIO I/Os



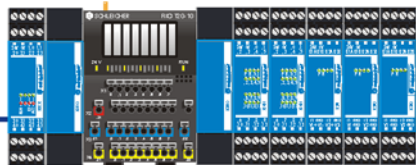
RIO EC X2 + micro I/Os



XBCX + micro I/Os + RIO I/Os



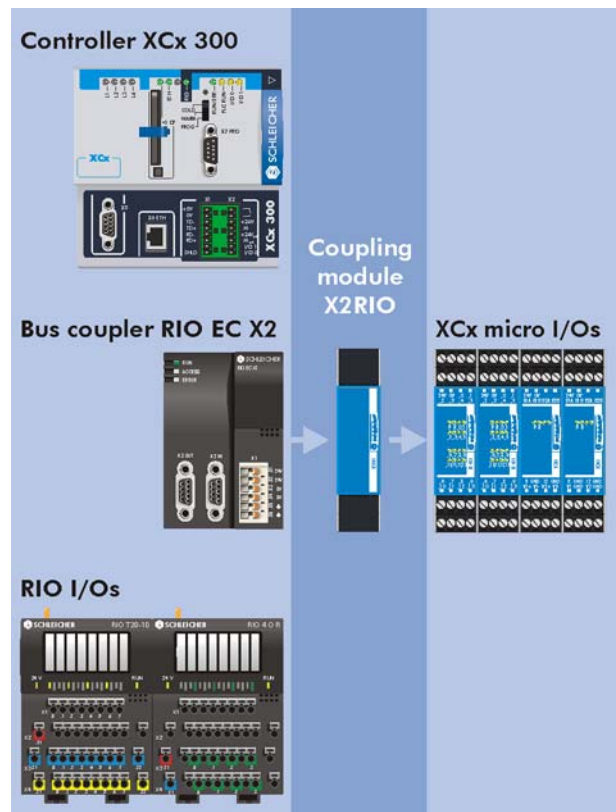
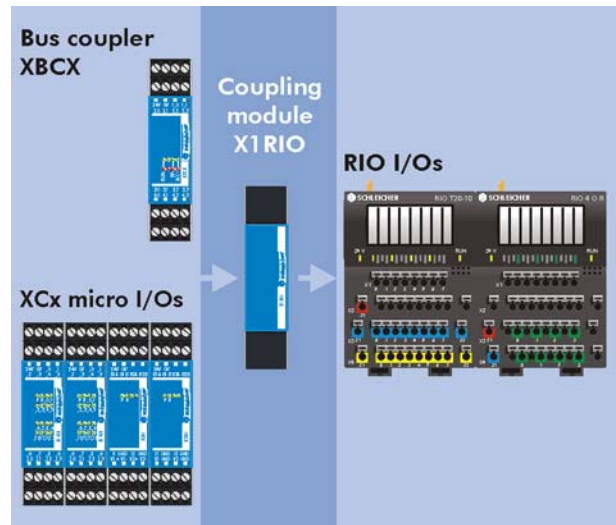
XBCX + RIO I/Os + micro I/Os

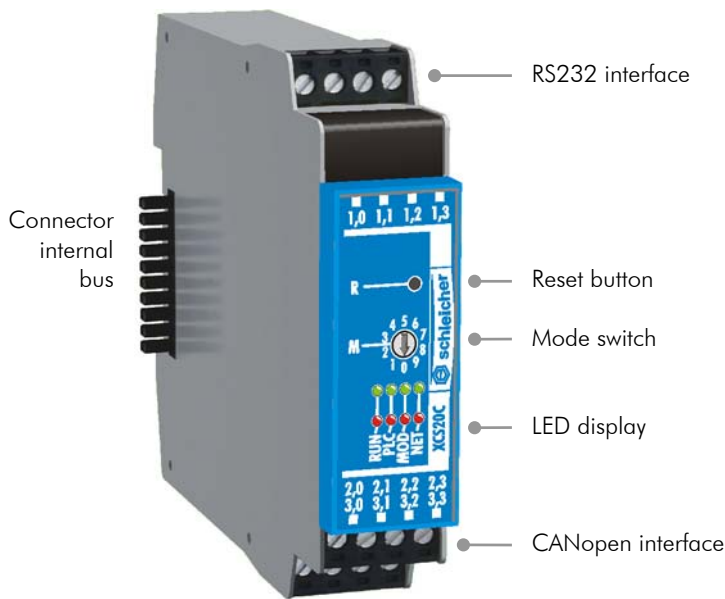


Coupling Modules

The expansion modules of the RIO and micro series can be mixed within a bus node if required. Two coupling modules are available; both have no electronic components and require no power supply:

- **X1RIO** couples from micro to RIO (→ page 28)
- **X2RIO** couples from RIO to micro (→ page 29)





The XCS20C is a combination of bus coupler and powerful PLC with multitask operation system. The bus coupler connects up to eight digital or analog expansion modules to the CANopen bus. The PLC provides intelligence in the field bus and allows distributed data (pre-)processing.

The control unit has two serial interfaces for programming and operation. The first interface is on the power supply unit (→ S. 20), the second one on the control unit. They are connected via the internal bus. The PLC can set the baud rate of each interface using parameterizing and diagnostic functions.

Configuring is carried out with the Windows programming system Multiprog according to IEC 61131-3 (→ S. 20). It is matched to the resources of the XCx micro to ensure easy operation.

Terminals

- **1,0 – 1,3**
Second serial RS232 interface
- **2,0 – 2,3**
3,0 – 3,3
CANopen interface
(Terminals 2.x and 3.x are individually bridged internally. That is, CAN-H with CAN-H etc.)

Reset button

The Reset button causes a hardware reset, equivalent to power off.

Mode switch

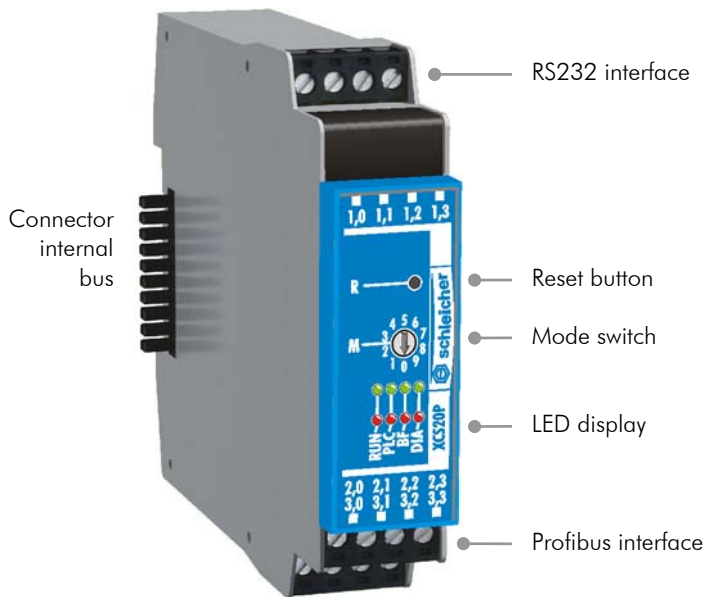
The switch position can be requested via the PLC program.

- **0**
Test / Init, expanded diagnosis, PLC-Stop
- **1 PROG**
Programming mode, PLC-Stop
- **2 WARM**
PLC warm start
- **3 COLD**
PLC cold start (re-initialization of the retain variables)
- **4**
Update mode (for servicing purposes, operating software update)
- **5 Output**
Boot project and CAN configuration
- **6 Read in**
Boot project and CAN configuration
- **7 – 9**
PLC warm start

LED display

- **RUN**
Controller state (CPU)
- **PLC**
PLC state
- **MOD**
Module state
- **NET**
Net state

Technical data		XCS20C
Article number	R4.391.0020.0	
Field bus	CANopen	
Hardware and memory		
CPU	Motorola MC68LC302, 24 MHz	
RAM	1 MB, of which approx. 256 KB for PLC programs and 64 KB for retain variables	
Flash memory	1024 kB, 512 kB for operating system and 512 kB for user data (User data: Boot project 192 KB, program source 256 KB, CANopen configuration 64 KB)	
Real-time clock	Battery-buffered with calendar and leap year, resolution: 1 s	
Buffer element	Vanadium pentoxide lithium cell, 3V / 50 mAh + SuperCAP	
Buffer time	Min. 3 months (Assumes cell is fully charged, which is achieved if the control unit is operated without interruption for 4 hours.)	
Node-ID	Address range 0 ... 127, set via software	
Baud rate	Up to 1 MBit/s	
Number of attachable I/O modules	8	
Interfaces		
2x RS232	1x 9-pin subminiature plug connector (on the power supply unit) 1x 4-pin plug-in terminal (on the control unit)	
CANopen	2x 4-pin plug-in terminal	
PLC properties		
Processing time for 1000 instructions	Data type	BOOL: 2,62 ms BYTE: 2,77 ms WORD: 1,94 ms DWORD: 2,02 ms
Function blocks	Max. 256	
Operating system	VxWorks, multitasking operating system (time-driven / priority-driven)	
Number of tasks	16	
Task cycle times	Programmable ≥ 1 ms (whole number)	
Memory management	Dynamic	
Max. number of I/O data	64 bytes input data 64 bytes output data	
Times and counters	Any number programmable from 1 ms ... 290 h (number limited only by memory capacity)	
Configuring	Multiprog (programming environment to IEC 61131-3)	
For general technical data see page 36.		



The XCS20P is a combination of bus coupler and powerful PLC with multitask operation system. The bus coupler connects up to eight digital or analog expansion modules to the Profibus-DP as slave. The PLC provides intelligence in the field bus and allows distributed data (pre-)processing.

The control unit has two serial interfaces for programming and operation. The first interface is on the power supply unit (→ S. 20), the second one on the control unit. They are connected via the internal bus. The PLC can set the baud rate of each interface using parameterizing and diagnostic functions.

Configuring is carried out with the Windows programming system Multiprog according to IEC 61131-3 (→ S. 20). It is matched to the resources of the XCx micro to ensure easy operation.

Terminals

- **1,0 – 1,3**
Second serial interface RS232
- **2,0 – 2,3**
3,0 – 3,3
Interface Profibus-DP
The terminating resistors for the Profibus interface are provided in the module. These can be connected with jumpers from 3.0 to 3.1 and 3.2 to 3.3.

Resettaster

Der Resettaster löst einen Hardware-Reset aus, gleichbedeutend mit Power-Off.

Mode switch

The switch position can be requested via the PLC program.

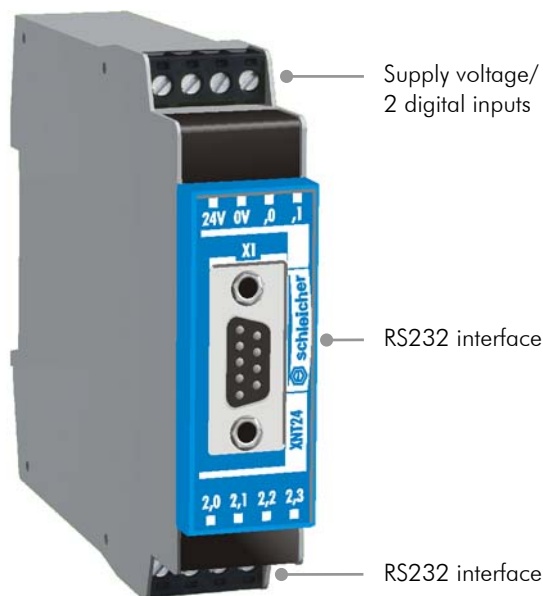
- **0**
Test / Init, expanded diagnosis, PLC-Stop
- **1 PROG**
Programming mode, PLC-Stop
- **2 WARM**
PLC warm start
- **3 COLD**
PLC cold start (re-initialization of the retain variables)
- **4**
Update mode (for servicing purposes, operating software update)
- **5 – 9**
reserved

LED display

- **RUN**
Controller state (CPU)
- **PLC**
PLC state
- **BF**
Bus state
- **DIA**
Diagnosis

Technical data		XCS20P
Article number	R4.391.0020.0	
Field bus	Profibus-DP	
Hardware and memory		
CPU	Motorola MC68LC302, 24 MHz	
RAM	1 MB, of which approx. 256 KB for PLC programs and 64 KB for retain variables	
Flash memory	1024 kB, 512 kB for operating system and 512 kB for user data (User data: Boot project 192 KB, program source 256 KB)	
Real-time clock	Battery-buffered with calendar and leap year, resolution: 1s	
Buffer element	Vanadium pentoxide lithium cell, 3V / 50 mAh + SuperCAP	
Buffer time	Min. 3 months (Assumes cell is fully charged, which is achieved if the control unit is operated without interruption for 4 hours.)	
Slave address	Address range 0 ... 125, set via software	
Baud rate	Up to 12 MBit/s	
Number of attachable I/O modules	8	
Interfaces		
2x RS232	1x 9-pin subminiature plug connector (on the power supply unit) 1x 4-pin plug-in terminal (on the control unit)	
Profibus-DP	2x 4-pin plug-in terminal	
PLC properties		
Processing time for 1000 instructions	Data type	BOOL: 2,62 ms BYTE: 2,77 ms WORD: 1,94 ms DWORD: 2,02 ms
Function blocks	Max. 256	
Operating system	VxWorks, multitasking operating system (time-driven / priority-driven)	
Number of tasks	16	
Task cycle times	Programmable ≥ 1 ms (whole number)	
Memory management	Dynamic	
Max. number of I/O data	64 bytes input data 64 bytes output data	
Times and counters	Any number programmable from 1 ms ... 290 h (number limited only by memory capacity)	
Configuring	Multiprog (programming environment to IEC 61131-3)	
For general technical data see page 36.		

Power Supply Unit

XNT24


Terminals

- **24V / 0V**
Supply voltage
- **,0 / ,1**
Digital inputs
(The two fast digital inputs can be processed in the PLC program.)
- **2,0 – 2,3**
First RS232 serial interface
(The serial interface is routed out in parallel to the 9-pin sub-miniature connector.)

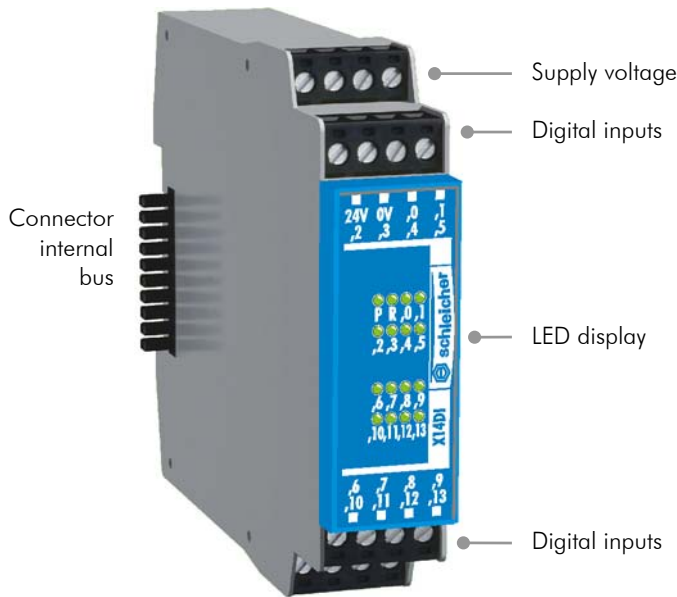
A power supply unit must always be used if control units are used. It provides the internal 5 V supply voltage for the control unit and the expansion modules. It also has the first serial interface for the control unit (both 9-pin subminiature plug connector and plug-in terminal) as well as two digital inputs.

The two fast digital inputs can be processed in the PLC program. Their fast response times are independent of the load on the control unit, making them suitable for time-critical applications.

Technical data	XNT24
Article number	R4.390.0010.0
Operating voltage	DC 24 V \pm 20%
Residual ripple	Max. 5%
Power consumption	< 3 W (with XCS20C or XCS20P, without I/O modules)
Digital inputs	
Number	2
Switching level	H-level: +15 V ... +30 V L-level: -30 V ... +5 V
Input current	Min. H-level(+15 V): \geq 2.0 mA Max. L-level(+5 V): \leq 2.0 mA Typ. (+24 V): 8.0 mA Max. (+30 V): \leq 15.0 mA
Signal delay	< 300 μ s (hardware)
Triggering	Edge triggering
Serial interface	
Type	RS232, full duplex (TxD, RxD, CTS, RTS, GND)
Transmission range	RS232: max. 15 m
Transmission rates	300, 600, 1200, 2400, 4800, 9600, 19200, 38400 Bit/s
Bit transmission	ISO 8482 / DIN 66259-4
For general technical data see page 36.	

Digital • 14 Inputs • DC 24 V

X14DI



Terminals

- **24V / 0V**
Supply voltage
- **,0 – ,13**
Digital inputs

LED display

- **P Power**
Supply voltage
- **R Run**
Data transmission
- **,0 – ,13**
Signal state of channels

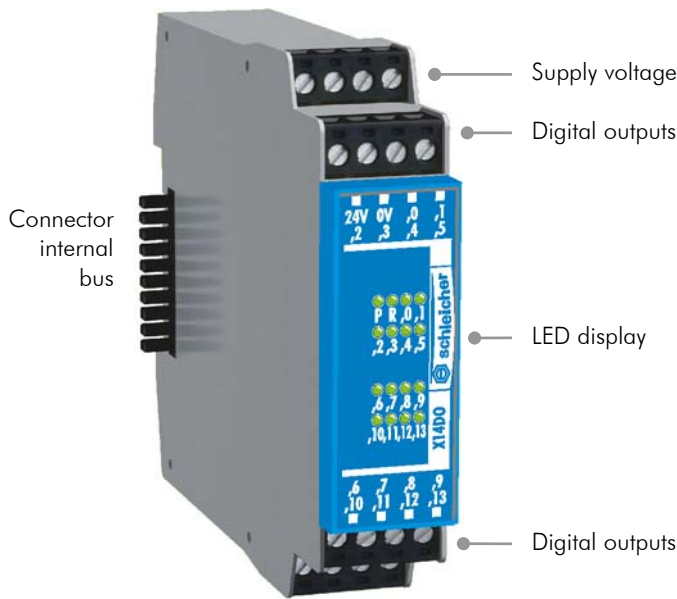
The digital input module X14DI provides 14 input channels for binary DC signals with 24 V level. The signal state of each channel is indicated by an LED.

Technical data	X14DI
Article number	R4.392.0010.0
Number of inputs	14
Supply voltage external	DC 24 V \pm 20%, max. 5% residual ripple
Power consumption	From external 24 V supply: < 2 W (without input current) From internal 5 V supply: < 0,2 W
Inputs	
Switching level	H-level: +15 V ... +30 V L-level: -30 V ... +5 V
Input current	Min. H-level(+15 V): \geq 2.0 mA Max. L-level(+5 V): \leq 2.0 mA Typ. (+24 V): 2.8 mA
Isolation	From internal bus, each channel separately via optocouplers
Signal delay	< 300 μ s (hardware)

For general technical data see page 36.

Digital • 14 Outputs • DC 24 V

X14DO



Terminals

- **24V / 0V**
Supply voltage
- **,0 - ,13**
Digital outputs

LED display

- **P Power**
Supply voltage
- **R Run**
Data transmission
- **,0 - ,13**
Signal state of channels

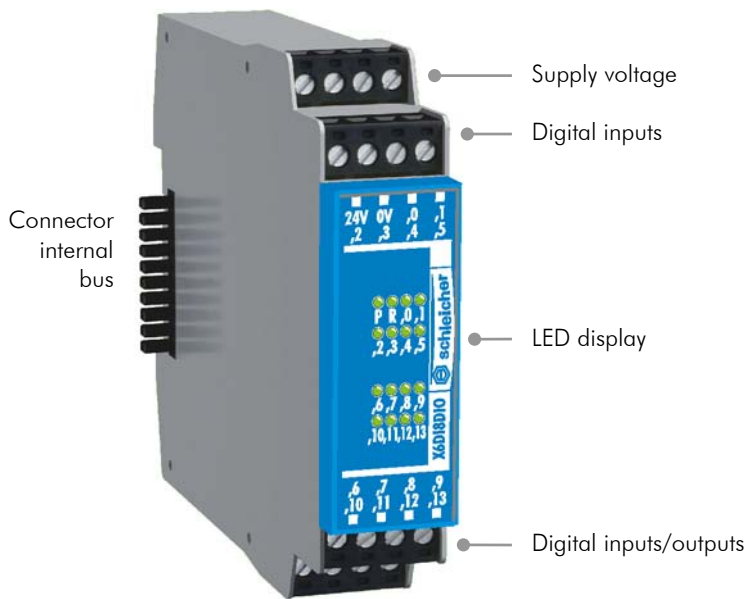
The digital output module X14DO provides 14 output channels for binary position signals with 24 V level. The channels are isolated from the internal bus, overcurrent-proof and short-circuit-proof. Max. output current per channel 0.5 A, if more current is required the outputs can be connected in parallel in groups of four. The signal state of each channel is indicated by an LED.

Technical data	X14DO
Article number	R4.392.0020.0
Number of inputs	14
Supply voltage external	DC 24 V \pm 20%, max. 5% residual ripple
Power consumption	From external 24 V supply: < 2 W (without input current) From internal 5 V supply: < 0,2 W
Outputs	
Output current per output	Max. 0.5 A, short-circuit-proof and overcurrent-protected
Total current for whole module	Max. 7 A
Switching level	H-level: Supply voltage – 0.5 V ($I_L < 1$ A) L-level: ≤ 1 V ($I_L = 0$ A)
Isolation	From internal bus, each channel separately via optocouplers
Simultaneity	100%
Free-wheeling diode	Integrated
Signal delay	< 300 μ s (hardware)

For general technical data see page 36.

Digital • 6 Inputs • 8 In/Outputs • DC 24 V

X6DI8DIO



Terminals

- **24V / 0V**
Supply voltage
- **,0 – ,5**
Digital inputs
- **,6 – ,13**
Digital inputs/outputs
(If more current is required the outputs can be connected in parallel in two groups.)

LED display

- **P Power**
Supply voltage
- **R Run**
Data transmission
- **,0 – ,13**
Signal state of channels

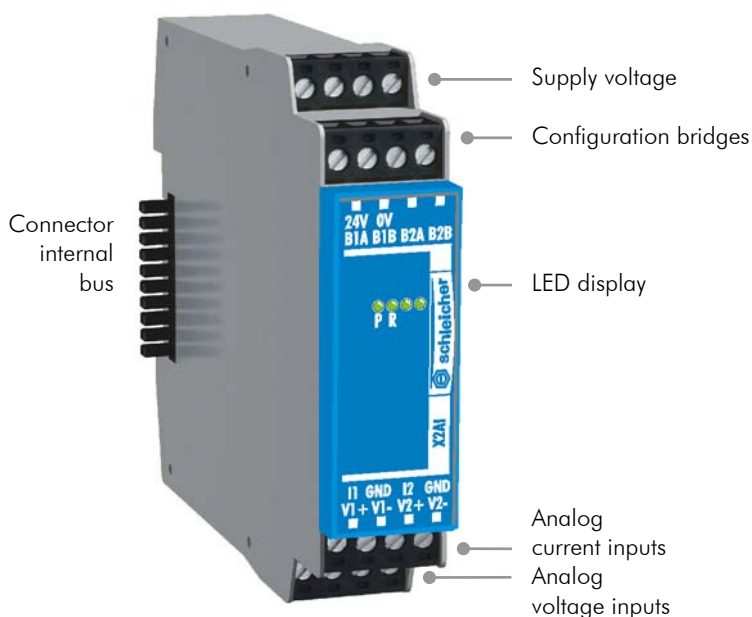
The X6DI8DO digital module provides 6 inputs and 8 combination channels. Each combination channel can be used as input or output as required, the module automatically detects which is the case. The channels are isolated from the internal bus, the signal state of each channel is indicated by an LED. Max. output current per channel 0.5 A, if more current is required the outputs can be connected in parallel in groups of four. The signal state of each channel is indicated by an LED.

Technical data	X6DI8DIO
Article number	R4.392.0030.0
Number of inputs/outputs	6 inputs and 8 combination I/Os which can be used individually as input or output
Supply voltage external	DC 24 V ± 20%, max. 5% residual ripple
Power consumption	From external 24 V supply: < 2 W (without input current, without load current) From internal 5 V supply: < 0,2 W
Inputs	
Switching level	H-level: +15 V ... +30 V L-level: -30 V ... +5 V
Input current	Min. H-level(+15 V): I ≥ 2.0 mA / I ≥ 3.0 mA* Max. L-level(+5 V): I ≤ 2.0 mA / I ≤ 3.0 mA* Typisch (+24 V): I = 2.8 mA / I = 4.7 mA* * for combination I/O
Isolation	From internal bus, each channel separately via optocouplers
Signal delay	< 300 μs (hardware)
Outputs	
Output current per output	Max. 0.5 A, short-circuit-proof and overcurrent-protected
Total current for whole module	Max. 4 A
Switching level	H-level: Supply voltage – 0.5 V L-level: ≤ 1 V
Isolation	From internal bus, each channel separately via optocouplers
Simultaneity	100%
Free-wheeling diode	Integrated
Signal delay	< 300 μs (hardware)

For general technical data see page 36.

Analog • 2 Inputs • 0 ... 20 mA • ±10 V

X2AI



Terminals

- **24V / 0V**
Supply voltage
- **B1A / B1B**
Configuration bridge channel 1
open: voltage input
closed: current input
- **B2A / B2B**
Configuration bridge channel 2
open: voltage input
closed: current input
- **I1 / GND**
Current input channel 1
- **I2 / GND**
Current input channel 2
- **V1+ / V1-**
Voltage input channel 1
- **V2+ / V2-**
Voltage input channel 2

LED display

- **P Power**
Supply voltage
- **R Run**
Data transmission

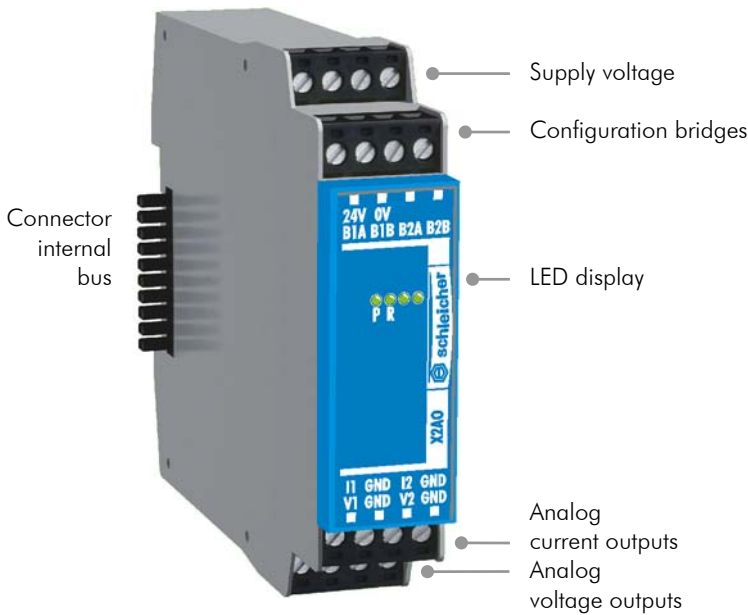
The X2AI analog module provides two differential input channels, which can be used as DC input channels in the range $-10\text{ V} \dots +10\text{ V}$ or $0 \dots 20\text{ mA}$. The analog signals are digitized at 12 bit within 2 ms. Configuring the channels as voltage inputs or current inputs is done with the help of jumpers or by software.

Technical data	X2AI
Article number	R4.392.0040.0
Number of inputs	2 voltage inputs (differential) or current inputs
Supply voltage external	DC 24 V $\pm 20\%$, max. 5% residual ripple
Power consumption	From external 24 V supply: < 2 W (without input current) From internal 5 V supply: < 0.5 W
Voltage inputs	
Input range	$-10 \dots +9.995\text{ V}$
Resolution	12 Bit / 4.88 mV
Conversion time	2 ms
Input resistance	200 k Ω (input against GND)
Common-mode range	$\pm 40\text{ V}$ (against GND)
Maximum overall error	$\pm 40\text{ mV} \pm 0.35\%$ from measured value
Isolation	From internal bus, analog channels not separated from each other
Current inputs	
Input range	0 ... 19,995 mA
Resolution	12 Bit / 4.88 μA
Conversion time	2 ms
Input burden	100 $\Omega \pm 0,1\%$ (current input against GND) permitted cont. load $\leq 200\text{ mW}$ permitted cont. current $-40 \dots +40\text{ mA}$ permitted cont. voltage $-4 \dots +4\text{ V}$
Maximum overall error	$\pm 40\text{ }\mu\text{A} \pm 0.35\%$ from measured value
Isolation	From internal bus, analog channels not separated from each other

For general technical data see page 36.

Analog • 2 Outputs • 0 ... 20 mA • ±10 V

X2AO



Terminals

- **24V / 0V**
Supply voltage
- **B1A / B1B**
Configuration bridge channel 1
open: voltage output
closed: current output
- **B2A / B2B**
Configuration bridge channel 2
open: voltage output
closed: current output
- **I1 / GND**
Current output channel 1
- **I2 / GND**
Current output channel 2
- **V1+ / V1-**
Voltage output channel 1
- **V2+ / V2-**
Voltage output channel 2

LED display

- **P Power**
Supply voltage
- **R Run**
Data transmission

The X2AO analog module provides two differential output channels, which can be used as DC output channels in the range $-10\text{ V} \dots +10\text{ V}$ or $0 \dots 20\text{ mA}$. The analog signals are digitized at 12 bit within 2 ms. Configuring the channels as voltage outputs or current outputs is done with the help of jumpers or by software.

Technical data	X2AO
Article number	R4.392.0050.0
Number of outputs	2 voltage outputs (differential) or current outputs
Supply voltage external	DC 24 V $\pm 20\%$, max. 5% residual ripple
Power consumption	From external 24 V supply: < 2 W (without load current) From internal 5 V supply: < 0.5 W
Voltage outputs	
Output range	$-10 \dots +10\text{ V}$
Resolution	12 Bit / 4.88 mV
Conversion time	2 ms
Output current	$-10 \dots +10\text{ mA}$ (against GND)
Common-mode range	$\pm 40\text{ V}$ (against GND)
Maximum overall error	$\pm 40\text{ mV} \pm 0,35\%$ from measured value
Isolation	From internal bus, analog channels not separated from each other
Current outputs	
Input range	$0 \dots 20\text{ mA}$
Resolution	12 Bit / 4.88 μA
Conversion time	2 ms
Load	$\leq 500\ \Omega$
Output voltage	$0 \dots 10\text{ V}$
Maximum overall error	$\pm 40\ \mu\text{A} \pm 0,35\%$ from measured value
Isolation	From internal bus, analog channels not separated from each other

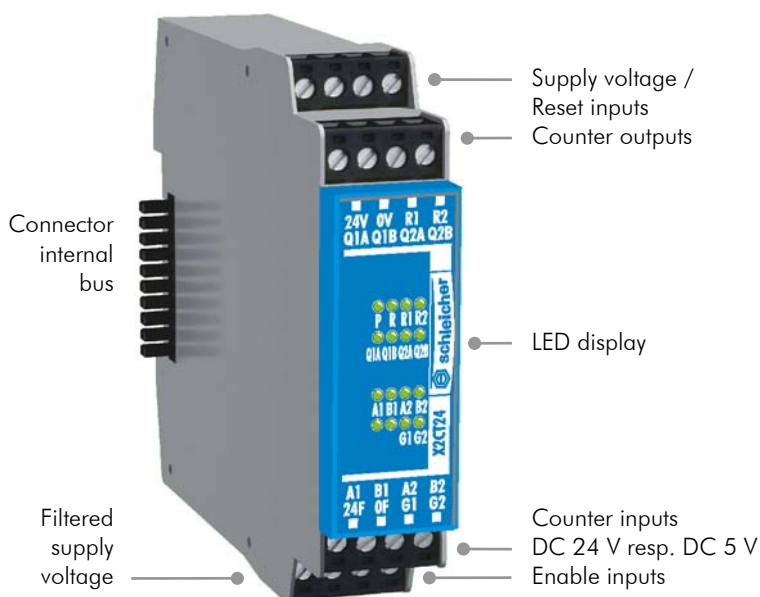
For general technical data see page 36.

Counter Module • 2 Counters • 24 V

X2CT24

Counter Module • 2 Counters • 5 V

X2CT05



Terminals

- **24V / 0V**
Supply voltage
- **R1 / R2**
Reset counter 1/2 (DC 24 V)
- **Q1A / Q1B**
Output A/B counter 1 (DC 24 V)
- **Q2A / Q2B**
Output A/B counter 2 (DC 24 V)
- **A1 / B1**
Count signal A/B counter 1 (DC 24 V resp. DC 5 V)
- **A2 / B2**
Count signal A/B counter 2 (DC 24 V resp. DC 5 V)
- **24F / 0F-**
Filtered supply voltage DC 24 V / 0 V
- **G1 / G2-**
Gate counter 1/2 (DC 24 V)

LED display

- **P Power**
Supply voltage
- **R Run**
Data transmission
- **R1, R2, Q1A, Q1B, Q2A, Q2B, G1, G2**
Signal state of channels
- **A1, B1, A2, B2**
Signal state of channels (X2CT24 only)

The counter modules X2CT24 and X2CT05 provide two mutually independent up/down counters with 24 V resp. 5 V counter inputs. The counter value is compared with up to two thresholds. If the value exceeds or falls below the threshold the outputs switch.

- Two 32-bit up/down counters
 - X2CT24 with 24 V counter inputs
 - X2CT05 with 5 V counter inputs
- Counting frequency up to 200 kHz
- Software-settable interference suppression with digital filters
- Software-settable thresholds
- Signal outputs DC 24 V
- Enable inputs DC 24 V (gate)
- Reset inputs DC 24 V (reset)
- Software-adjustable by counting
 - Up/down counting signals
 - Count/direction signals
 - Incremental encoder signals

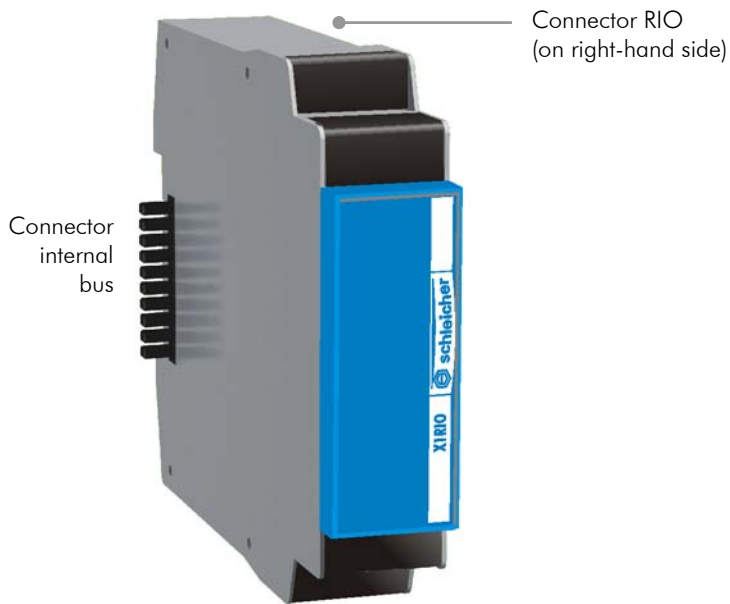
The reset inputs are configurable up to max. 20 kHz, while the enable inputs and counter signals are configurable up to max. 200 kHz.

- Maximum count frequency up to 20 kHz:
When interference suppression is switched on for count frequencies up to 20 kHz, all lines of the module can be left unshielded. The voltage supply for the encoder can be left unfiltered (terminals 24F and 0F are not used). Reference earths 0V and 0F must be connected with each other.
- Maximum count frequency greater than 20 kHz:
The signal lines of the upper module terminals require no shielding, terminal 0 V is reference earth. All lines of the lower module terminals must be shielded, including the filtered voltage supply for the encoders. This is accomplished with terminals 24F (DC 24 V filtered) and 0F (0 V filtered), which provide a maximum current of 1 A, not short-circuit proof. The reference earth for the signal lines of the upper module terminals is terminal 0F. Terminals 0V and 0F must not be connected with each other.

Technical data	X2CT24	X2CT05
Article number	R4.392.0070.0	R4.392.0110.0
Number of counters	2 with 32 bits each	
Counting frequency	Max. 200 KHz Interference suppression settable 200 Hz, 2 kHz, 20 kHz, 200 kHz	
Number of inputs/outputs	8 inputs, 4 outputs	
Supply voltage external	DC 24 V \pm 20%, max. 5% residual ripple	
Power consumption	From external 24 V supply: < 2 W (without input current, without load current) From internal 5 V supply: < 0.8 W	
Inputs		
Switching level 24 V signals	H-level: +15 V ... +30 V L-level: -30 V ... +5 V	
Switching level 5 V signals (Counter inputs A1, B1, A2, B2)	-	H-level: +3 V ... +5 V L-level: -5 V ... +0.8 V
Input current 24 V signals	Min. H-level (+15 V): $I \geq 3.5$ mA Max. L-level (+5 V): $I \leq 1.0$ mA Typically (+24 V): $I = 7.5$ mA	
Input current 5 V signals (Counter inputs A1, B1, A2, B2)	-	Typically (+5 V): $I = 9.5$ mA
Isolation	From internal bus, each channel separately via optocouplers	
Signal delay	< 1 μ s (hardware)	
Outputs		
Output current per output	Max. 0.5 A, short-circuit-proof and overcurrent-protected	
Total current for whole module	Max. 2 A	
Switching level	H-level: Supply voltage - 0.5 V L-level: ≤ 1 V	
Isolation	From internal bus, each channel separately via optocouplers	
Simultaneity	100%	
Free-wheeling diode	Integrated	
Signal delay	< 300 μ s (hardware)	
Power supply for fast encoders (24F, 0F)		
Voltage	DC 24 V	
Current	Max. 1 A, not short-circuit-proof or overcurrent-protected	

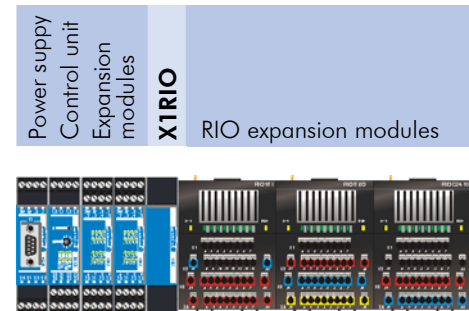
For general technical data see page 36.

Coupling Module • RIO modules to XCx micro **X1RIO**



Application example

The X1RIO coupling module provides connection between the XCx micro and the RIO expansion modules (→ page 15).



The X1RIO module interfaces the XCx micro modules with all RIO expansion modules. The module has no electronic components and requires no power supply.

Technical data	X1RIO
Article number	R4.390.0020.0
Bus type	Internal controller bus
Supply voltage external	Passive module, no supply voltage
Number of attachable I/O modules	Overall a bus node comprises up to eight expansion modules (XCx micro or RIO)

For general technical data see page 36.

Coupling Module • XCx micro to XCx 300

X2RIO

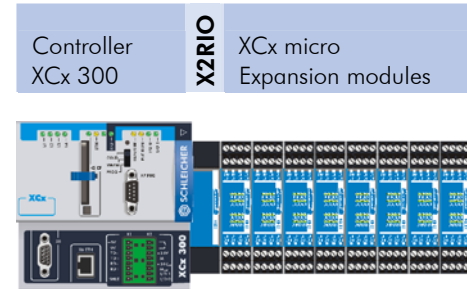
RIO
Connector
for
coupling
to XCx 300



Connector internal XCx
micro bus
(on right-hand side)

Application example

The X2RIO coupling module provides connection between the XCx 300 or RIO modules and XCx micro expansion modules (→ page 15).



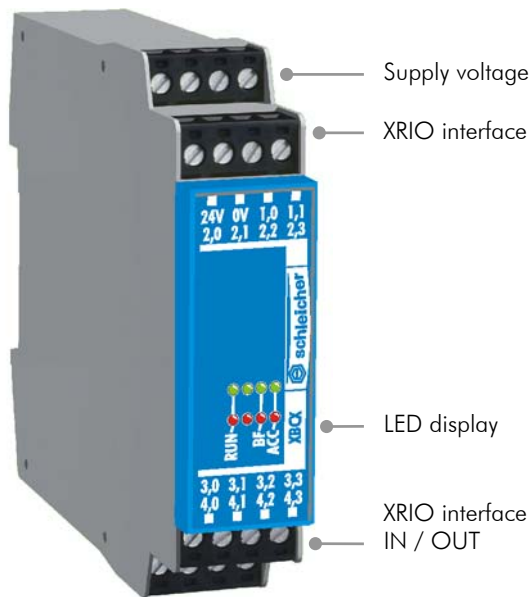
The X2RIO module interfaces between the XCx 300 or RIO modules and XCx micro expansion modules. The module has no electronic components and requires no power supply.

Technical data	X2RIO
Article number	R4.390.0030.0
Bus type	Internal controller bus
Supply voltage external	Passive module, no supply voltage
Number of attachable I/O modules	Overall a bus node comprises up to eight expansion modules (XCx micro or RIO)

For general technical data see page 36.

Bus Coupler • XRIO

XBCX



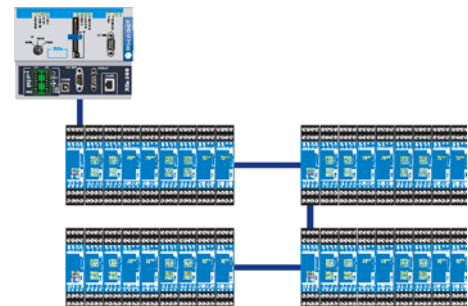
Terminals

- **24V / 0V**
Supply voltage
- **1,0 4,3**
XRIO interface IN/OUT

LED display

- **RUN**
Controller state (CPU)
- **BF**
Bus state
- **ACC**
Receive data

Application example



The XBCX bus coupler connects XCx micro expansion modules to XCx controllers. A bus node comprises the bus coupler and up to eight expansion modules with 112 digital or 16 analog channels. This allows you to harness the full performance of the XCx micro for XCx controllers.

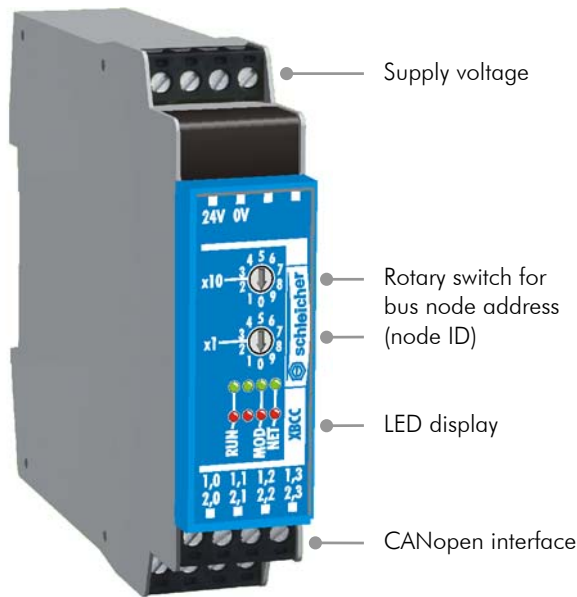
The XBCX bus coupler allows you to cascade four bus nodes (see application example).

Technical data	XBCX
Article number	In preparation
Interface	XRIO
Transmission rate	500 kBit/s
Bus connection	4x 4-pin plug-in terminal
Max. I/O range internal	64 bytes input data / 64 bytes output data
Supply voltage external	DC 24 V (± 20 %, max. 5 % residual ripple)
Power consumption	Bus coupler: 5 W from external 24 V supply connected modules: max. 5 W via internal 5 V supply
Number of attachable I/O modules	8
Cable length	Max. 10 m (between two connecting points)

For general technical data see page 36.

Bus Coupler • CANopen

XBCC



Terminals

- **24V / 0V**
Supply voltage
- **1,0 – 1,3**
2,0 – 2,3
CANopen interface
(Terminals 2.x and 3.x are individually bridged internally. That is, CAN-H with CAN-H etc.)

Rotary switch

- **x10**
Node ID (tens)
- **x1**
Node ID (units)

LED display

- **RUN**
Controller state (CPU)
- **MOD**
Module state
- **NET**
Net state

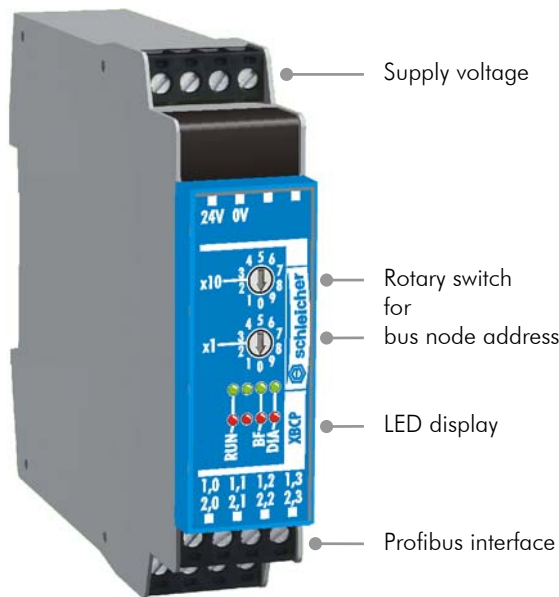
The XBCC bus coupler connects up to 8 XCx micro expansion modules to the CANopen field bus. This allows you to set up remote I/O nodes with 112 digital or 16 analog channels.

Technical data	XBCC
Article number	In preparation
Interface	CANopen
Node ID	Address range 0 ... 99, set via rotary switch
Baud rate	Up to 1 MBit/s
Bus length	Up to 1000 m (→ page 14)
Max. number of I/O data	64 bytes input data 64 bytes output data
Supply voltage external	DC 24 V ± 20%, max. 5% residual ripple
Power consumption	Bus coupler: 5 W from external 24 V supply Connected modules: max. 5 W via internal 5 V supply
Number of attachable I/O modules	8

For general technical data see page 36.

Bus Coupler • Profibus-DP

XBCP



Terminals

- **24V / 0V**
Supply voltage
- **1,0 – 1,3**
2,0 – 2,3
Profibus interface
(The terminating resistors for the Profibus interface are provided in the module. These can be connected with jumpers from 3,0-3,1 and 3,2-3,3.)

Rotary switch

- **x10**
Bus node address (tens)
- **x1**
Bus node address (units)

LED display

- **RUN**
Controller state (CPU)
- **BF**
Bus state
- **DIA**
Diagnosis

The XBCP bus coupler connects up to 8 XCx micro expansion modules to the Profibus-DP field bus. This allows you to set up remote I/O nodes with 112 digital or 16 analog channels.

Technical data	XBCP
Article number	In preparation
Interface	Profibus-DP
Node ID	Adressbereich 0 ... 99, Einstellung über Drehschalter
Baud rate	Up to 12 MBit/s, setting automatic
Bus length	Up to 1200 m (→ page 14)
Max. number of I/O data	64 bytes input data 64 bytes output data
Supply voltage external	DC 24 V ± 20%, max. 5% residual ripple
Power consumption	Bus coupler: 5 W from external 24 V supply Connected modules: max. 5 W via internal 5 V supply
Number of attachable I/O modules	8
For general technical data see page 36.	

Programming System to IEC 61131-3 Multiprog

Configuring is carried out with the Windows programming system Multiprog according to IEC 61131-3. It is matched to the resources of the XCx to ensure easy operation. This means you have a clearly structured, easily operated tool for editing, compiling, debugging, managing and printing PLC applications in all the development phases.

You can choose from five programming languages, which can be mixed as required for the task or programming style.

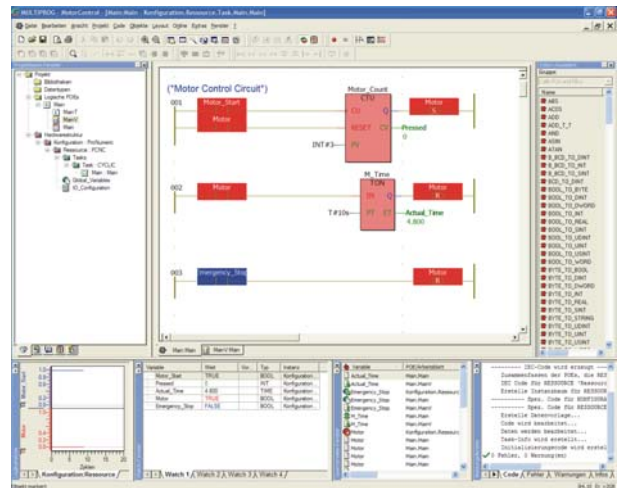
- Text languages
 - Structured text (ST)
 - Instruction list (IL)
- Graphic languages
 - Function block diagram (FBD)
 - Ladder diagram (LD)
 - Sequential function chart (SFC)

Multiprog is based on modern 32-bit Windows technology. It can be used with a mouse or via a keyboard and is easy to use thanks to tools like zoom, scroll, special toolbars, drag & drop, a shortcut manager and dockable windows. The complex structure of the IEC 61131-3 standard is presented simply and clearly. The clear structure of the Multiprog user interface makes it easy to operate.

An OPC server is included in the Multiprog package (→ page 11).

The main features:

- Easy creation of applications for multitasking systems
- Integrated simulation makes it possible to test projects offline (without a connected PLC)
- Clear project management through a project tree based on the Windows Explorer directory structure
- Easy-to-use Edit Wizards for creating programs
- Powerful documentation system with graphic editor, print preview and cross-reference printout
- Context-sensitive help for program, target system, instruction set and language elements



Multiprog 4.0	
Article number	R4.320.0640.0
Contents	CD 1: Programming software, OPC server CD 2: Service Pack (see below)
Operating system	Windows 95/98/ME/NT4.0 (SP5 and later)/2000/XP
System requirements	Pentium PC 133 MHz, 32 MB RAM, 80 MB hard disk capacity, graphics 800 x 600 pixels / 256 colours, RS232 interface optional, mouse recommended

Utilities and Updates Service Pack

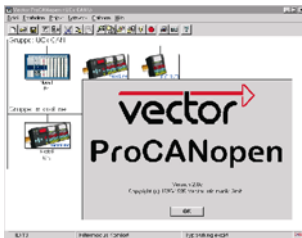
Article number	R4.320.0590.0
Contents	1 CD: Controller software for all Schleicher controllers, AddOns, Schleicher-Dialog, documentations and service informations

PLC Operating System

The real-time multi-tasking properties of the IEC 61131-3 operating system allow you to optimally adapt the controller to the process.

- Suitable for ultra-fast process controllers
- Constant cycle times
- Event tasks and cyclical tasks
- Extremely short reaction time for sporadic events via interrupt I/Os
- Supports wide range of field bus and drive interfaces
- Visualization via integrated OPC server (V.1.0a Specification)

CANopen Network Configuring Software ProCANopen



The ProCANopen program allows convenient configuring of the CANopen network on a PC under Windows. ProCANopen is suitable for systems with a central controller (master-slave architecture) as well as for

systems with distributed intelligence (several PLCs, industrial PC, other intelligent nodes).

To operate it you need a PCMCIA card (CANcardY, see below).

The network topology is depicted graphically. When you set up a new project you select the required devices (nodes) from a list which contains the EDS (Electronic Data Sheet) files of all available devices. You can then combine and configure the network nodes by dialog control or graphically. You can use the scan function to read in and reconfigure an existing network.

ProCANopen covers the following tasks:

- Depicting and configuring network topology and addressing
- Configuring network master
- Configuring global network variables
- Configuring all field bus devices and control devices
- Documenting configuration

ProCANopen	
Article number	R4.320.0500.0
Operating system	Windows 95 or higher
System requirements	Pentium-PC 133 MHz, 20 MB free hard disk capacity, PCMCIA-Slot (min. type I) for operating the CANcardY, CD drive for installation
CANcardY	
Article number	R4.321.0020.0
Type	Single CANopen interface, PCMCIA card

XCx micro GSD/EDS files

Free downloads from www.schleicher-electronic.com:

- GSD equipment master files for configuring Profibus-DP
- Electronic Data Sheet EDS for configuring DeviceNet/CANopen

Cables, Connectors, Small Parts

Article number	Designation	Comment
RN.114.2401.0	End clamp	For fixing XCx micro modules on DIN rails
RN.114.1401.0	Laplink cable	XCx – PC cable, 2x 9-pin subminiature, jack contact, length 2 m

Operating Manuals

Article number	Designation
R4.322.2270.0	XCx micro Controller
R4.322.2290.0	XCx micro Expansion Modules
R4.322.2140.0	XCx 300 / 500 / 540
R4.322.2220.0	XCx 700
R4.322.1920.0	microLine IEC 61131-3 ¹⁾
R4.322.1850.0	RIO Bus Couplers BC / EC
R4.322.1730.0	RIO Expansion Modules
R4.322.1830.0	RIO Compact I/O
R4.322.1800.0	RIO Documentation Package
R4.322.1610.0	Commissioning Field Bus Systems
R4.322.2090.0	CNC Programming for XCx and ProNumeric
R4.322.1070.0	EMC Guidelines

¹⁾ for MCS 20-20R / MCS 20-21R

The operating manuals can be downloaded from the products pages at www.schleicher-electronic.com.

System Descriptions

Designation
XCx micro
XCx 300 / 500 / 540
XCx 700
RIO Field Bus System / microLine PLC

The system descriptions can be downloaded from the products pages at www.schleicher-electronic.com.

Technical Data

Housing and installation

Housing	Polycarbonat Makrolon 6265
Installation	On 35 mm DIN rail EN 50022-35, vertical orientation

Climatic conditions

Ambient operating temperature	0 ... +55 °C, free air circulation
Storage temperature	-25 ... +70 °C
Relative humidity	10 ... 95 %, no condensation
Air pressure in operation	860 ... 1060 hPa

Electrical safety

Protection type	IP 20 to EN 60529
Clearance/creepage distance	to EN 61131-2 and EN 50178
Overload category	II
Contamination level	2

Electromagnetic compatibility

Electrostatic discharge	to EN 61000-4-2 8 kV air discharge, 4 kV contact discharge
Interference fields, HF fields	to EN 61000-4-3 Field intensity 10 V/m, 26 ... 1000, 1400 ... 2000 MHz
Rapid transients (burst)	to EN 61000-4-4 2 kV on DC supply lines, 1 kV on signal and serial interface lines
High-energy transients (surge) DC supply Analogue or DC inputs/ outputs, unshielded All shielded lines	to EN 61000-4-5 1 kV asymmetrical (CM) / 0,5 kV symmetrical (DM) 0,5 kV asymmetrical (CM) / symmetrical (DM) 1 kV asymmetrical (CM)
Interference emissions, HF fields	to EN 55011, Limit category A, Group 1 30 ... 230 MHz with 40 dB (µV), 230 ... 1000 MHz with 47 dB (µV)

Mechanical strength

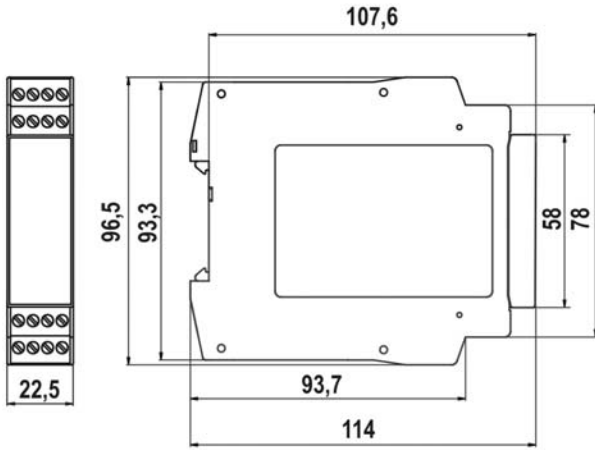
Vibration	to DIN EN 60068-2-6 5 ... 9 Hz constant amplitude 3.5 mm 9 ... 150 Hz constant acceleration 1 g
-----------	---

Connection technology

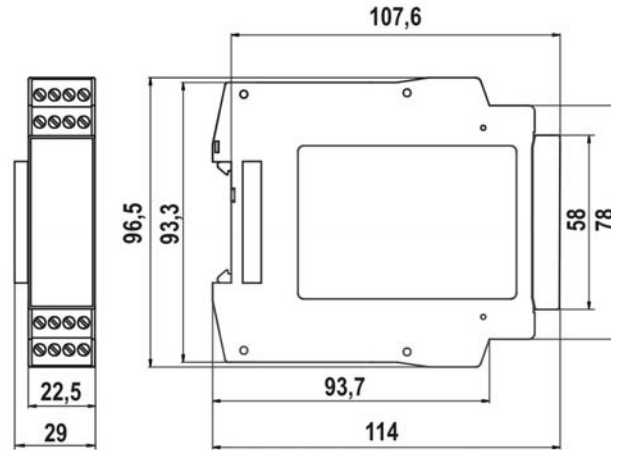
Terminals	Pluggable screw terminals
Conductor sizes Single-core or finely stranded Stripping length Finely-stranded with wire-end ferrule to DIN 46228	1 x 0.14 mm ² to 2.5 mm ² or 2 x 0.14 mm ² to 0.75 mm ² max. 8 mm 1 x 0.25 mm ² to 2.5 mm ² or 2 x 0.25 mm ² to 0.5 mm ²
Maximum tightening torque on screw terminals	0.5 to 0.6 Nm

Dimensions

**Power Supply Unit
Bus Couplers
Coupling Modules**



**Control Units
Expansion Modules**



Notes



Always There for You

Schleicher stands for more than just convincing products. We also tailor them to your needs in perfect engineering solutions.

Desire and Reality

Do you have special requirements not covered by the range of modules presented here? Do you need special interfaces for digital or analog field peripherals, different voltage levels, input signals or output currents? Are you looking for suitable I/O interfaces for your field buses or networks?

As an innovative medium-sized company, we are in a position to respond to your requests and manufacture customized devices, even in small numbers.

Service and Solutions

If you so wish, our specialists will of course also complete configuring and startup and service the installed system.

We help you on-the-spot with integrating our components in your existing system and developing solutions for specific tasks. With our know-how we can assist you to make the most cost-effective and efficient use of your plant, machines and systems.

Theory and Practice

Decades of practical expertise and experience and cooperation with our customers flow into our training programmes, where you can learn how to exploit the features of our products for your application.

Question and Answer

If you would like to know more, please call our competent hotline: tel. +49 30 33005-304. You can also find operating manuals, service information, example applications and other documentation round the clock on the Schleicher website.

www.schleicher-electronic.com

Schleicher

Electronic GmbH & Co. KG
Pichelswerderstrasse 3-5
13597 Berlin, Germany

Tel. +49 30 33005-0
Fax +49 30 33005-378
www.schleicher-electronic.com
info@schleicher-electronic.com