

Remote Terminal Unit RTU560

for Energy System Operation



ABB

The Application Requirements

Transmission and distribution networks are frequently being expanded and reinforced, often resulting in more complex networks. This is valid for electrical transmission and distribution networks, as well as for gas, oil, water, wastewater and district heating grids.

The task of monitoring and controlling the energy transportation in order to achieve an economical operation control requires an ongoing penetration of the grid down to the lowest levels.

The **increasing availability requirements of energy** and its distribution and transportation also increases the demand of control systems. New and improved communication possibilities with higher transmission bandwidths and new transmission media allow telecontrol technology to manage this.

Continually increasing capabilities of **decentralized control and closed-loop control solutions**, based on higher performance microcontroller technology, also allows more functions to run directly in the station. This is valid not only for new remote stations, but also in stations which have to be upgraded due to a higher demand for information or station that need to be modernized due to age (retrofit).

In all cases, the **telecontrol interface** is the basic functional package.

The **adaptation of new Intelligent Electronic Devices (IED)** and expansion with application functions based on Programmable Logic Controller (PLC) solutions must also be possible. It is the task of modern RTU's to provide the right solution to these requirements.

The deregulation activities in the energy market, especially the metering tasks, requires **more online information** in order to control the energy flow and energy consumption. Municipal utility companies, responsible for the electrical, gas, water and wastewater grids, are moving towards controlling these networks in a **more centralized** fashion, i.e. in one central control center utilizing only one control system. This requires the **different telecontrol communication links** to be harmonized.

The process data object model has to be coordinated between the different grid types.

The **standardization of telecontrol protocols** and the increasing capabilities of communication networks makes this possible.

A new RTU must be able to support demands of higher flexibility by adapting ANSI and IEC telecontrol protocol standards. The new RTU shall have the capacity to be connected to new communication media and digital communication networks.

Our strengths

- Usable for different applications
 - Remote Control
 - Station Automation
 - Communication Gateway
- Process-oriented configuration with open data exchange concept and MS-Excel™-Integration
- Integrated Human Machine Interface with basic monitoring and control functions
- No special tool for diagnoses required due to utilisation of web server technologies
- Programmable PLC functions
- Support of standard transmission/communication protocols
- Events detection with a time resolution of 1 ms
- Real-time acquisition with DCF77, GPS, SNTP or IRIG-B
- Flexible system concept
 - scalable redundancy
 - scalable I/O
 - scalable communication
- High performance central processing units with 32-bit processor and multiple interfaces
- Distributed input/output units with high degree pre-processing functions
- Only a few types of different I/O modules
- Same I/O modules used in RTU200 and RTU232
- Applicable from medium voltage to highest voltage level
- Local presence of ABB in more than 50 countries
- 2'000 worldwide RTU560 installations per year, more than 10'000 RTU560 installations in total

Your benefits

- Security of investment
 - Step by step investment possible
 - Easy functional extension
- Reduced engineering costs
- Reduced engineering costs and no need of an additional monitoring and control system
- Reduced maintenance costs
- No need of an additional PLC system
- Communication with existing control systems and subordinated IEDs
- Precise analysis of disturbances
- Precise system wide analysis of network incidents
- Reduced investment costs
- High processing capacity and flexibility
- Reduced system costs
- Reduced maintenance and spare part costs
- Cost efficient migration to RTU560
- Reduced maintenance and spare part costs due to same hardware components
- Close to our customers all over the world
- Security of investment

The engineering work is an important cost factor that can be reduced by standardizing the process object model and ensuring that it supports state-of-the-art engineering tools. The engineering tool of the RTU must be able to perform the task of a single, stand-alone RTU, as well as be able to be integrated into an **overall data engineering concept** for a network control system.

In addition to the basic functions, (i.e. data acquisition and control) modern telecontrol systems are required to provide a higher degree of functionality within the stations e.g.:

- **High functional scope for telecontrol** application functions
- Execute **control and closed-loop applications** using PLC capabilities
- **Archive features** to provide process data availability over longer periods for recovering or decoupling, e.g. the storing of disturbance files recorded by protection relays in an archive and analyzing them later, after transferring them to an Office PC
- **Communication with multiple Network Control Centers (NCC)** of process data filtering according to the demands of the NCC. Possible with different telecontrol protocols for each NCC
- **Extended diagnosis functionality** of the RTU equipment to reduce the costs for problem analysis and maintenance by accessing the information via Internet or Intranet options. This should be possible independent of the directly connected telecontrol links
- **Interfacing various types of IEDs**, such as digital protection relays or new transducers via field-bus interfaces, etc
- **Flexibility and space for future demands** to extend the RTU for additional installed primary process units and/or higher demands in terms of control



The architecture of a telecontrol system must be designed in such a way that it, thanks to its modularity and flexibility, can be adapted to the conditions and sizes of the different stations. It should also be open for later extensions of any type.

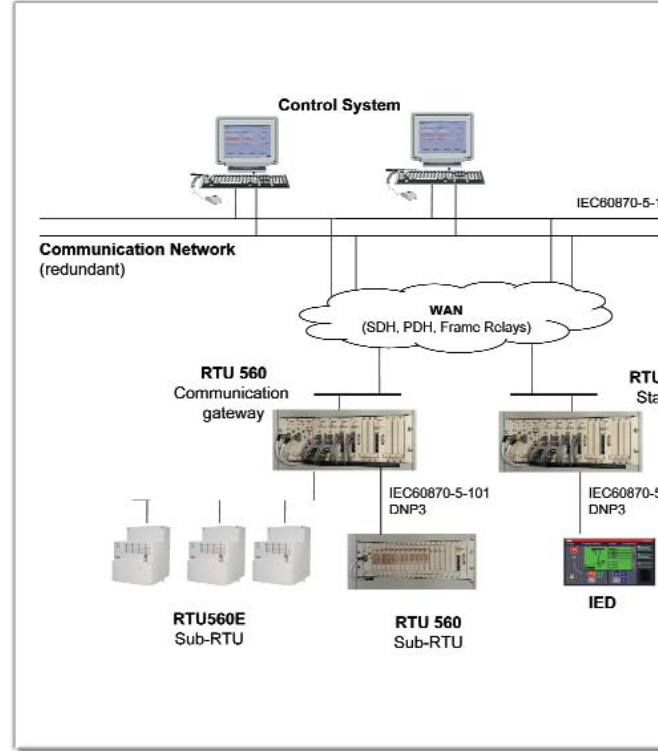
Our Solution for different Applications – the RTU560

ABB's solution to different application requirements is the Remote Terminal Unit system RTU560.

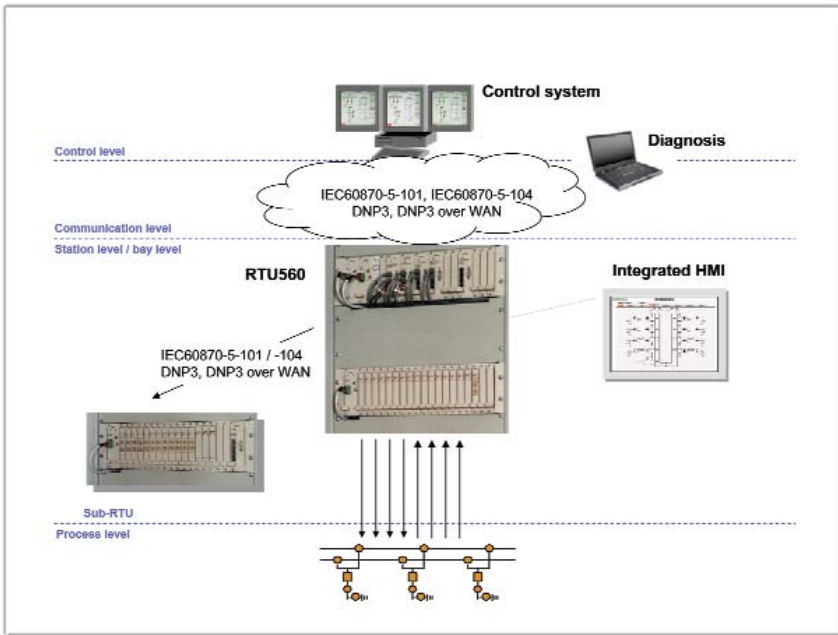
A key feature of the RTU560 concept is the extended possibility to integrate the various communication demands in a highly flexible and cost-optimized way. The capability of RTUs has increased significantly over the last few years. This has provided the opportunity to use remote terminal units for different applications. The RTU560 uses the same components to provide specific functions for the different applications. Since all applications are served out of the same product family a future upgrade to a different application is always possible. This goes in line with the ABB strategy to reuse I/O modules of ABB RTUs 200/232 for upgrading to RTU560.

The various functional requirements can be grouped to the following three applications:

- Remote Control
- Communication Gateway
- Station Automation



Application Communication Gateway



Application Remote Control

Remote Control

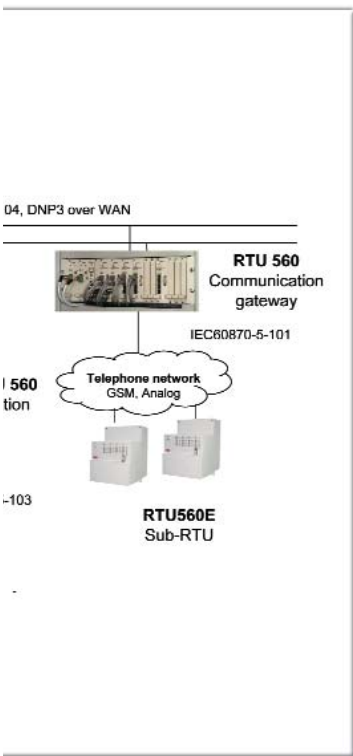
One of the main tasks of the remote control application is the data collection of hard wired information and provision of those to a higher level Control System.

The RTU560 uses multi processor architecture to achieve high performance data processing. The scalable platform, together with the modular IO-components guarantee the highest flexibility for different signal appearance. The direct binary IO-interface for up to 110-220 V DC requires no additional interposing relays.

The demand to communicate to various sub RTUs, IEDs and control centers is covered by the highly advanced communication capabilities. PLC-Functions according to IEC 61131-3 enable the user to get automation functionality without using an additional product.

Benefits:

- Security of process control
- Modules with years of experience
- Cost optimized solutions from large and complex stations down to small stations
- Combined functionality all in one product
- Security of investment
- Easy adaptations of additional functionality by using PLC functions



Communication Gateway

The RTU560 with its highly sophisticated communication capabilities can also be used as a communication gateway.

By using TCP/IP networks and decentralized station communication gateways, the complex front-end structures can be simplified.

Shifting of centralized communication functions to station level utilizes the available bandwidth more efficiently and reduces the required communication lines at the same time.

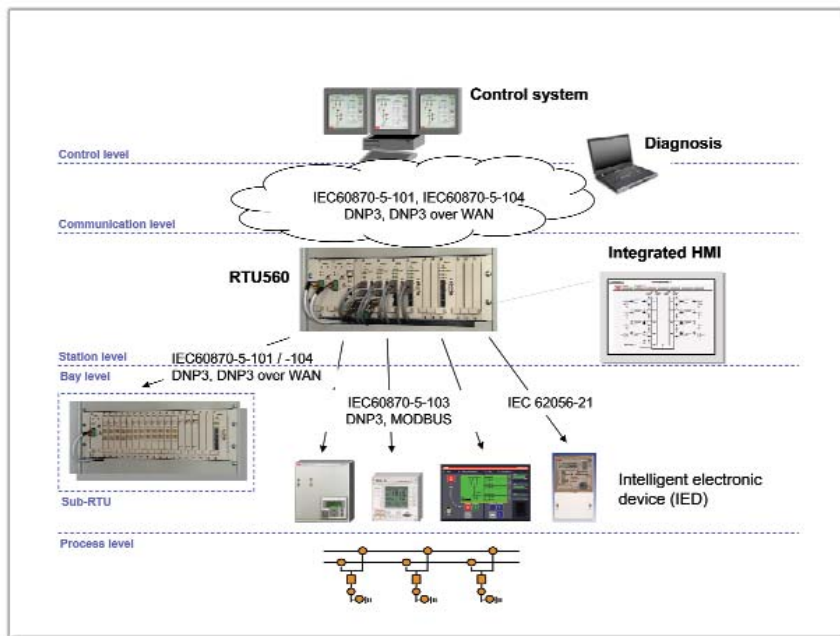
High availability is a common requirement today. The RTU560 accommodates this with its decentralized structure compared to PCs or workstations.

The flexible redundancy concepts support different levels. The system approach of the RTU560 allows having redundant power supplies, redundant communication lines and redundant communication modules according to the customer specific demand. A combination of the various redundancies is also possible.

For communication gateways, minimal engineering and implementation of standard and non standard protocols is crucial. The RTU560 with its open architecture and user friendly tools satisfies these requirements.

Benefits:

- Reduction of complex front-end systems
- Higher availability of WAN networks
- Reduced costs for data engineering
- Redundancy concept adaptable to availability requirements



Application Station Automation

Station Automation

The station automation application consists of interfaces to a mixture of protection and control equipment as well as metering devices and other automation products. The Human Machine Interface integrated into the RTU560 allows a basic local control and monitoring.

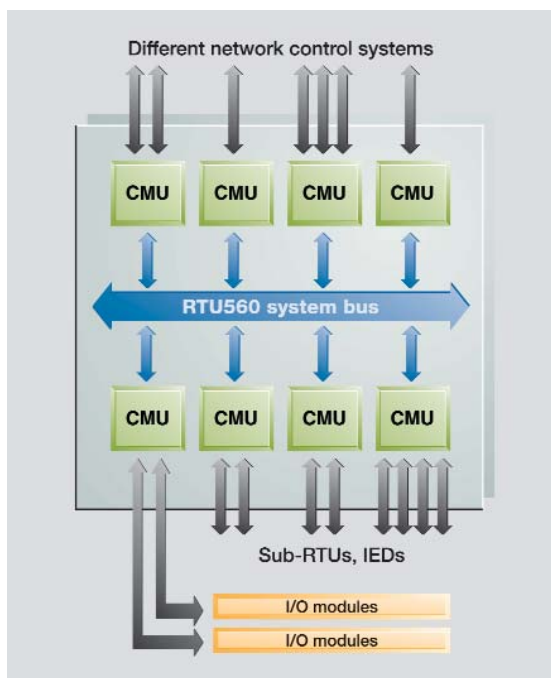
Transmission of disturbance records and load profiles by using the communication network of the RTU560 are also available functions

Benefits:

- Cost optimized station automation with IEC 60870-5-103
- Data engineering for RTU and HMI in one step
- Use of the RTU560 communication network for disturbance data and load profiles
- Retrofit with digital bay controllers possible step by step

Flexible System Concept

The software and hardware concept is based on modularity. The software application tasks can be organized in such a way as to be distributed over different communication units (CMU boards). This is possible due to an internal communication concept that keeps all CMU boards informed about the contents of the process data interface. There is one process and system database which is available in adapted copies for each CMU board. The internal communication system ensures that all process data are consistent. The different CMU boards run the communication tasks for the connected serial links. This allows the type and number of different communication links running on one CMU board to be defined. System performance is defined by the configuration of the CMU boards.



RTU560 hardware concept

Benefits:

- High availability
- Online configuration download
- Boards can be plugged or pulled out during operation

Communication

The RTU560 has a highly flexible capacity for adaptation to telecontrol communication protocols. Due to the standardized internal interface for system and process information, the integration of a new protocol is mainly oriented towards the new protocol component.

The RTU560 is able to communicate with different hierarchical levels of a network control system, with subordinated RTUs or any other intelligent electronic devices (IEDs), or with the test and diagnostic system.

The most important standard protocols supported by RTU560 for communication with the control system are:

- IEC 60870-5-101
- IEC 60870-5-104
- DNP 3.0 (also on ethernet)
- Modbus
- RP 570/71
- Indactive 23/ 33/ 35
- TG 800
- Sinaut 8FW
- Conitel 300

For communication with subordinated RTUs and IEDs such as protection relays, local control units, etc., the following protocols, among others, are available:

- IEC 60870-5-101
- IEC 60870-5-102
- IEC 60870-5-103
- IEC 60870-5-104
- DNP 3.0
- SPA-Bus
- Modbus
- RP570/71
- Indactive 21

The connection of the respective communication lines can be carried out in several ways:

- Direct links with RS 232-C interfaces (local communication)
- Voice-frequency telegraphy over leased telecommunication lines, private lines with narrow bandwidth modems or power line carriers
- Radio links
- Dial-up modem
- Fiber-optic cables
- Digital communication networks

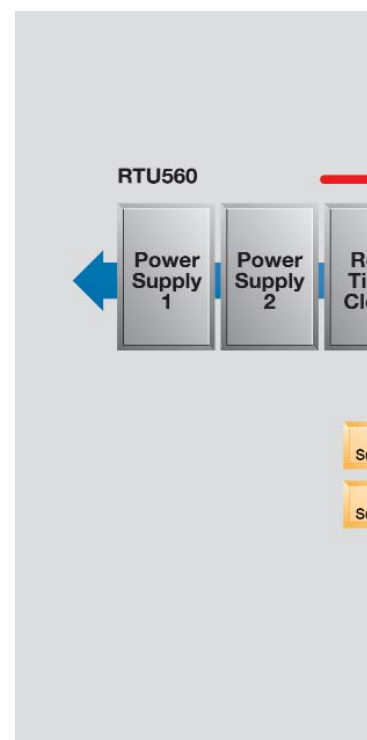
Benefits:

- Easy adaptation to control centers and IEDs
- Connection to existing infrastructure

Redundancy

For energy transmission and distribution networks it is important to maintain the access to stations. RTU560 manages this requirement by providing a sophisticated redundancy concept offering the following features:

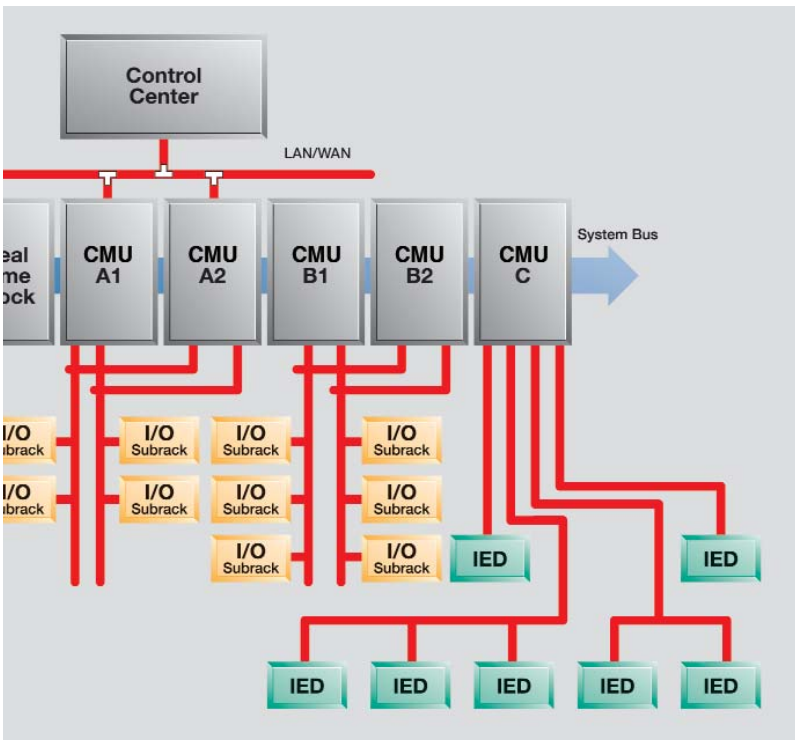
- Redundant communication lines or links
- Redundant communication units (CMU)
- Redundant Power Supply



With this concept the RTU560 fulfills the highest availability requirements.

Technical features

- Redundant communication lines or links; communication via 2 communication lines in a parallel mode (multi host with all available protocols) or in an active/standby switchover mode (redundant line/network with IEC 60870-5-101/104)



Configuration example with redundant power supplies, redundant CMUs and redundant communication lines

- Redundant CMU performance; 2 sets of CMU boards in an active/standby switchover mode
- Redundant power supply 2 redundant power supply; boards for the supply of the communication subrack

Due to modular architecture of the RTU560 it is possible to use parts or combination of the redundancy elements.

Benefits:

- Excellent reliability in performance and communication
- High reliable remote control of important substations
- Reduction of service and maintenance cost
- Scalable redundancy and cost optimized concepts

Time Synchronization

The accuracy and resolution of the time stamp for a process event is important for analysing a process disturbance, especially when it is necessary to analyse events from and between different stations. The RTU560 meets this requirement. The internal time management is controlled by the CMU communication boards.

The time resolution of the RTU560 is 1 ms for events, scanned by the directly connected I/O boards. Synchronization with absolute time can be achieved by one of the following four methods:

- Time synchronization by the network control center (NCC) via a periodically transmitted synchronization instruction with a communication protocol supporting this function
- Time synchronization using a real-time clock that receives the date and time from the GPS system
- Time synchronization using a real-time clock that receives date and time information from the DCF 77 time standard
- Time synchronization using SNTP V4 (RFC2030) on a LAN/WAN network

The RTU560 time management system synchronizes the RTU with the supplied absolute time with a high degree of accuracy. The absolute accuracy is mainly provided by the source for synchronization used, whereby GPS and DCF 77 allow an accuracy of 5 ms and better. The accuracy of time synchronization by the NCC depends on transmission speed, and the method used within the NCC

A time synchronized RTU560 can synchronize subordinate RTUs and IEDs via:

- a periodically transmitted synchronization instruction with a communication protocol supporting this function
- Time synchronization using SNTP V4 (RFC2030) on a LAN/WAN network

Special hardware and software logic with a high control quality has been incorporated on each of the CMU communication boards to manage real time within the RTU560. Once the RTU560 is synchronized, the RTU560 can maintain a time accuracy of about 2 PPM, even if the time synchronization source is lost for a certain period.

Benefits:

- Flexible adaptation of time synchronization to system circumstances
- High time accuracy over the total network

RTU560 web server

Integrated Human Machine Interface

For basic local monitoring and basic control an Human Machine Interface was integrated into the RTU560. The HMI-functionality itself is an integrated part of the RTU560 functionality; no additional SCADA product is needed. Single line pictures with active monitoring and control elements are stored on the CMU of the RTU560.

Event and alarm lists are also available and exportable as CSV format for documentation. The data of the lists are stored on the flash which makes it power failure proof.

The only software requirement for visualization on a PC is the Java Virtual Machine Freeware. The single line diagram allows an instant overview of the substation. The picture editor has a symbol library with predefined dynamic symbols. The picture editor contains different language and character sets. The component editor enables the user to create customer specific symbols in case they are not available in the standard libraries.

The editor allows easy linking of dynamic symbols to the RTU560 runtime data to prevent engineering faults. Access authority for different users or groups together with command authority is essential for secure operation. Therefore this feature is also an integrated component of the RTU560.

Diagnosis

RTU560 diagnosis system is based on the web server technology. Therefore no special tools are required to analyse the RTU560. The diagnosis could be carried out either locally or remote via LAN/WAN.

All RTU560 modules are maintenance free. Due to the small numbers of different modules, spare part stock is kept to a minimum. Since the application data is stored on Compact Flash Cards™ it is possible to exchange modules without new configuration download.

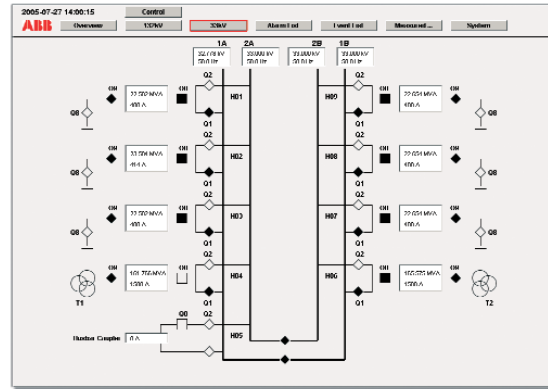
The functional operation of the RTU560 is guaranteed by a comprehensive monitoring concept. The hardware and software is continuously monitored from the I/O boards throughout the entire RTU.

The hardware and software monitoring is carried out by active checks at several levels.

The diagnosis concept of the RTU560 is consequently adapted to the possibilities of modern communication. Once access to the RTU560 by Intranet has been established, all of the RTU560's relevant information can be read out from any location by a laptop.

This system can be used for a checkup of the configuration or signal values and statuses.

It allows service personnel to analyse and possibly solve a RTU problem from their office rather than making an unnecessary visit to the station.



Integrated HMI – Single line diagram

Benefits:

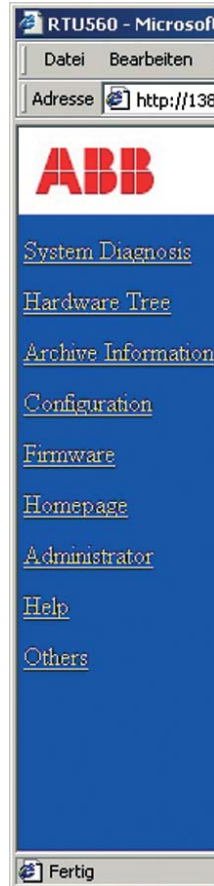
- Station visualization and control with no additional system required
- Cost optimized solution
- Less engineering efforts
- Easy modifications and extensions
- Integrated HMI with data engineering only once
- Local and remote access to HMI
- Only Web Browser and Java extension needed on remote PC

On the other hand, when travelling to the site is inevitable, the required spare parts can be determined beforehand.

Remote access via Intranet is combined with authority privileges for the user. It is possible to:

- Monitor the RTU-produced internal error messages
- Monitor and check the RTU560 configuration and the status of all connected process signals
- Check the current version of the configuration file
- Down- or upload the RTU560 configuration file
- Check and download revised software files for the RTU560 CMU boards
- Upload the archive files

Access to each communication board is granted individually. The presentation of process information about statuses and values is presented in such a way that the service personnel are able to work with the same designations (object identification keys) as the operator in the control station.



RTU 560 web server



Diagnosis – Monitoring interface

Benefits:

- Same user interface
- Detailed diagnosis local with PC or remote via Internet
- Precise analysis
- No additional software
- Reduced spare parts

PLC functions

The RTU560 can optionally be equipped with a Programmable Logic Control (PLC) software package. This allows sequential control or closed-loop application functions that are processed in parallel to the telecontrol activities.

The PLC programming package fully complies to the IEC 61131-3 programming standard. The modularity of the RTU560 in hardware and software allows PLC programs to be run either on the same CMU central board, parallel to the telecontrol task, or on a separate CMU central board used only for the PLC application. PLC programs have access to all process signal values as well as the process signal qualifiers such as invalid, time, etc.. PLC programs running distributed applications may use the qualifiers for secure and safe operation.

PLC programs update the process signal values via the process data interface. The telecontrol task will be informed about changes and updates the new output values either to the process output boards or via the communication line to the network control centers and subdevices.

PLC programs are developed by a powerful PLC programming tool MULTIPROG® wt.

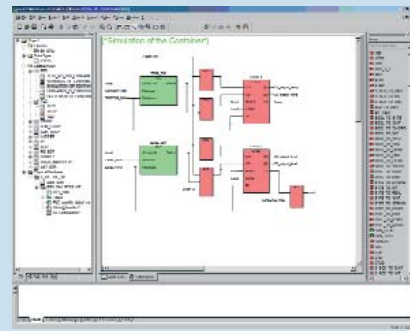
The PLC package allows programming in the programming languages defined in IEC 61131-3:

- Function Block Diagram (FBD)
- Ladder Diagram (LD)
- Sequential Function Chart (SFC)
- Instruction List (IL)
- Structured Text (ST)

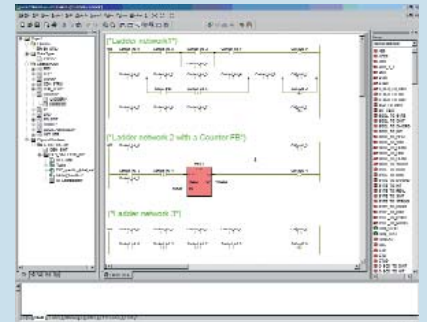
The function block RTU library contains function blocks to interface with the process I/Os values, attributes and qualifiers. Additionally it is also possible to create user-specific function blocks or functions for various applications.

Benefits:

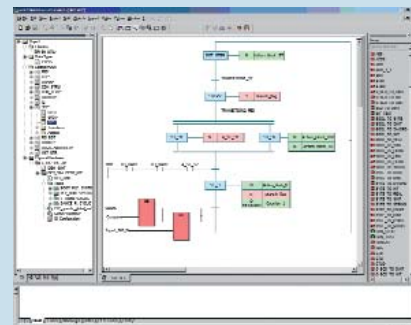
- No need of additional PLC systems
- Flexible method to adapt to customer specific requirements
- Reduced education cost due to compatibility to IEC 61131-3 programming standard



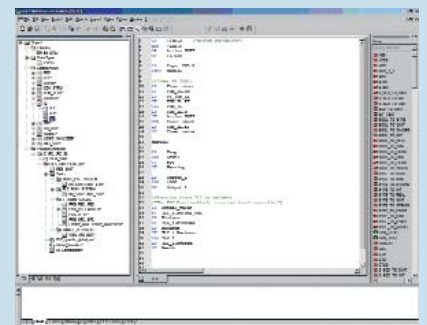
IEC 61131-3: function block diagram (FBD)



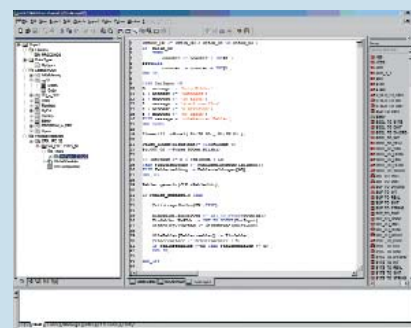
IEC 61131-3: ladder diagram (LD)



IEC 61131-3: sequential function chart (SFC)



IEC 61131-3: instruction list (IL)



IEC 61131-3: structured text (ST)



Mechanical Layout and Cabinets

Mechanical Layout

Depending on where the RTU560 is used, it is not always necessary to support multiple communication links. The RTU560 concept allows the configuration of three types of RTU.

- The Standard RTU560A
- The Compact RTU560C
- The Economic RTU560E

The Compact RTU560C allows a maximum of two CMU main boards to be plugged into a standard I/O subrack. The standard version is one CMU main board with one or two links to the NCCs or one NCC link and one link for IEDs. The residual part of the I/O subrack can be used for I/O boards. The Compact RTU560C also supports the full volume of I/O boards distributed over the four peripheral I/O bus segments.

If more communication lines are required, the Standard RTU560A must be used. One or two central communication subracks can be used with their full range of flexibility and configuration capabilities.

The Remote Terminal Unit RTU560E is an integral part of the remote terminal unit RTU560. It is well suited for applications with small and medium-sized datapoint volumes, for instance in local network stations or in small distribution substations. Due to the compact design and the flexible configuration possibilities the RTU560E is suitable for centralised or de-centralised system architectures.



RTU560E

	RTU 560A	RTU 560C	RTU 560E
Multiprocessor architecture	++	+	○
Multiple communication links	++	+	+
Big number of datapoints (>1000)	++	++	○
Medium number of datapoints (100...1000)	++	++	○
Small number of datapoints (<100)	○	+	++
++ excellent performance + good performance ○ not suitable			

Cabinets

The concept of the RTU560 with its module concept and 19" set up, allows the use of different housing arrangements. According to the place restrictions and local (country specific) isolation requirements the cubicles/cabinets can be designed accordingly.

Swing frame solution

A swing frame set up gives a maximum of flexibility for different process connections. Terminal blocks on the back plane with or without disconnecting possibilities, external marshalling cabinets or cross wiring within the cubicles are just a few to mention



Mounting plate solution

The back plane mounting of the RTU560 rack is hard to beat in terms of reduced wiring costs. Since the terminals are already integrated into the rack no wiring from the modules to the terminals is needed.

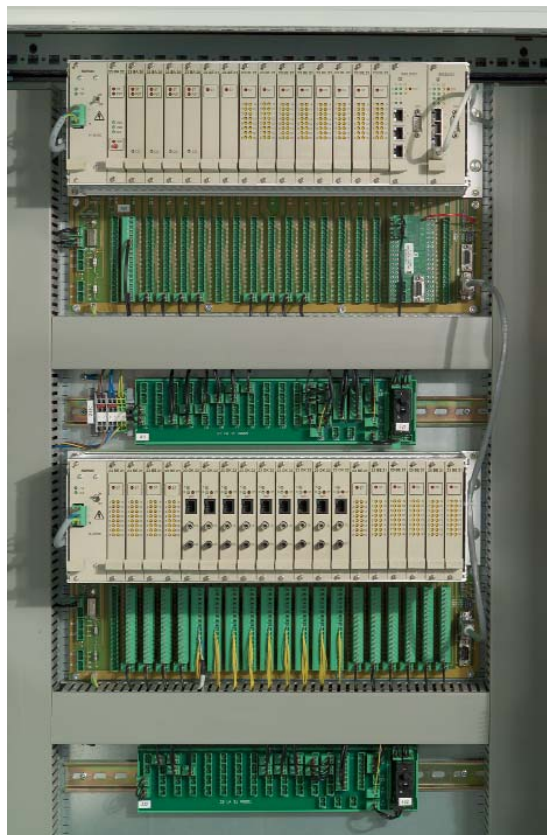
For both set ups, floor standing and wall mounted cubicles as swing frame or back plane mounting construction are available.

Benefits:

- Housing design according to isolation needs and space restrictions
- 19" racks insures a high standardisation
- High flexibilities according to process connection requirements
- 19" racks with integrated terminals reduce wiring efforts



RTU560A - swing frame solution



RTU560C - mounting plate solution

Hardware



Serial Line Interface
560 SLI 02

The modules conform to the standard European format for insertion in a 19" rack. By utilizing surface-mounted devices and multi-layer circuit boards, a high integration density is achieved on the modules. These high-density printed circuit boards result in compact terminals, thus providing a highly functional capability.

The RTU560 hardware system includes all the boards and modules needed for an RTU. The basic boards are listed in this brochure in the Technical Data chapter. Additional boards and modules can be found in the hardware documentation.

The RTU560 can be supplied with an input voltage between 24 and 220V DC or 110 ... 230V AC via an additional AC/DC converter.

The RTU560 is designed to run redundant power supplies. The two power supplies are each designed for 100% of the load. During normal operation, they share the load. Each module can be plugged in or pulled out during operation.

The RTU560 is approved to be CE compliant and checked to the EMC/EMI standards specified for telecontrol units in IEC 60870-2-1.

Communication Modules

The RTU560 CMU boards are based on the PC 104 concept. A PC 104 main board contains the kernel of a personal computer (PC) and has become standard recently. It allows the easy integration of standard PC-based software as well as easy adaptation to specific hardware extensions.

Following these standards secures your investment and ensures the easy adaptation to subsequent CMU generations by simply replacing the PC 104 main board with the current version.

CMU modules available:

- Serial Line Interface board 560SLI02
- Ethernet Adapter board 560ETH03
- Communication Unit 560CMU04
- Communication Unit 560CMU80

Each CPU communication board has an additional serial interface for MMI to a PC. The MMI is used for diagnostics, up and download of configuration files, etc.

I/O Boards

Only five I/O board types are needed to cover the main requirements for the I/O signals connected to the RTU. This is possible because of a microprocessor-controlled kernel module which is identical on all types of I/O boards, whereas the individual I/O function is provided by type specific hardware circuit extensions to the kernel.

- Binary Input Board 23BE21
- Binary Output Board 23BA20
- Binary Output Supervision Board 23BA22
- Analog Input Board 23AE21
- Analog Output Board 23AA20

Direct interfacing of 110-220 V DC binary IO without interposing relays is possible with:

- Binary Input Board 23BE40
- Binary Output Board 23BA40

Modems

For communication with telecontrol lines different types of FSK Modems are available:

- Universal FSK Modem 23WT22
- V.23 Modem 23WT23
- 9600 bps FSK Modem 23WT24

For fibre optic communication are available:

- fibre optic coupler 23OK22

RTU560 does also provide interfaces to all kind of analog and digital communication equipment.



Ethernet Adapter
560 ETH 03



Communication Unit
560 CMU 04



I/O module
23BE40 / 23BA40



I/O modules and modems

Technical Data

Configurable Process Data Points

Overall total per RTU560 approx. 3000 directly connected data points, including data points from IEDs and subordinate RTUs. Higher volumes are possible on request.

I/O Boards

Binary Input Board 23BE21

Inputs: 16, optically isolated
Input voltage: 24 ... 60 V DC

Binary Output Board 23BA20

Outputs: 16, relay single pole
max. operating voltage: 60 V DC
Switching capacity: 40 VA (L/R=30 ms)

Analog Input Board 23AE21

Inputs: 8 differential inputs
Input range: 2/5/10/20/40 mA
uni-, bipolar or live zero
+/-2 V DC, 0..20 V DC

Accuracy: < 0,1%

Resolution: 12 bit + sign

Analog Output Board 23AA20

Outputs: 2, galvanically isolated
Output current: 2,5/5/10/20mA
uni-, and bipolar,
4 ... 20 mA

Multi I/O Board 560MIO80 (RTU560E)

Binary Inputs: 16, optically isolated
Input voltage: 24 ... 60 V DC or
110 ... 220 V DC

Binary Outputs: 8, relay single pole
Max. operating voltage: 60 V DC or 220 V DC
Switching capacity: 40 VA (L/R =30 ms) or
50 VA (L/R=40 ms)

Analog Inputs: 4 differential inputs
Accuracy: < 0,1%
Resolution: 12 bit + sign

Binary Input Board 23BE40

Inputs: 16, optically isolated
Input voltage: 110 ... 220 V DC

Binary Output Board 23BA40

Outputs: 16, relay single pole
Max. operating voltage: 220 V DC
Switching capacity: 50 VA (L/R=40 ms)

Communication Board

Serial Line Interface 560SLI02

Serial Line Interfaces: 2 x RS 232C or RS 485
2 x RS 232C or RS 422
1 x MMI RS 232C

Ethernet Interface 560ETH03

Ethernet: 10 Mbit/s, 10 Base T
Serial Line Interfaces: 2 x RS 232C or RS 485
1 x MMI RS 232C

Communication Unit 560CMU04

Ethernet: 100Mbit/s, 10/100 BaseT
Serial Line Interfaces: 4 x RS 232C or RS 485
1 x MMI RS 232C

Communication Unit 560CMU80 (RTU560E)

Serial Line Interfaces: 2 x RS232C, 1 x RS485
1 x MMI RS 232C
Ethernet (Option): 10 Mbit/s, 10 Base T

Modems

FSK Modem 23WT22: FSK Modem, CCITT channels
50 ... 2400 bit/s

V.23 Modem 23WT23: CCITT V.23, 1200 bit/s
2/4 wire, half- or full duplex

FSK Modem 23WT24: 9600 bit/s
2/4 wire, half- or full duplex

V23 Modem 560MOD80
(RTU560E): CCITT V.23, 1200 bit/s
2 wire, half duplex

Analog Modem 560MOD81
(RTU560E): CCITT V.34+, 33.600 Bit/s

Opto-Coupler 23OK22: 1 fiber optic channel to various serial
interaces configurable max. distance
2600 m

Real Time Clock Boards

GPS Board 560RTC01: with external antenna
DCF 77 Board 560RTC02: with external antenna

Power Supply Boards

Power Supply Board 560PSU01
for redundant operation: 24 ... 60 V DC or 110 ... 220 V DC
- 20% / + 15%

RTU560E Power Supply
560PSU80: 24 ... 60 V DC or 110 ... 220 V DC
- 20% / + 15%

RTU560E Power Supply
560PSU81: 115 ... 230 V AC

Mechanics

RTU Board Type: Single European Standard
Communication Subrack
560CSR01: 19" Rack, max. 8 CPU + 2x PS + RTC
max. 2 per RTU560
I/O subrack for hinged
frame 23ET23: 19" Rack, max. 19 I/O boards + PS
I/O subrack mouning
plate 23TP21: 19" Rack, max. 19 I/O boards + PS
Number of I/O subracks: max. 28 per RTU560
RTU560E compact housing
366x258x310 mm (HxWxD)

CE Declaration

EMC Immunity: EN 50082-2: 1995
EMI Emmission: EN 50081-2: 1993
Safety: EN 60950: 1999

Environmental Conditions

Temperature: - 10 ... + 55 °C
- 20 ... + 55 °C (RTU560E)
Relative humidity: 5 ... 95 % non-condensing



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