System Hardening

ABB strives to improve the security and robustness of its products by performing security testing and hardening. RTU500 series has been systematically hardened, e.g. unused services have been removed and unused ports closed. Furthermore RTU500 series has been thoroughly tested at ABB‘s dedicated, independent security test center using state-of-the-art commercial and open source security testing tools. Hardening steps as well as the resulting configurations, e.g. open ports and services, are documented in detail. Security testing and hardening are integrated parts of the development process.

Network Access Control (Authentication)

RTU500 series supports the authentication and authorization in TCP/IP-based networks, according to the standard IEEE 802.1X. Thanks to the option of using an authentication server, the access rights for the devices can centrally be managed, to ensure only known devices are allowed to communicate.

ABB Power Grids Germany AG
Power Grids
P.O. Box 10 01 64
68128 Mannheim, Germany

+49 621 381-3000
+49 621 381-7622
rtu-sales-support@de.abb.com

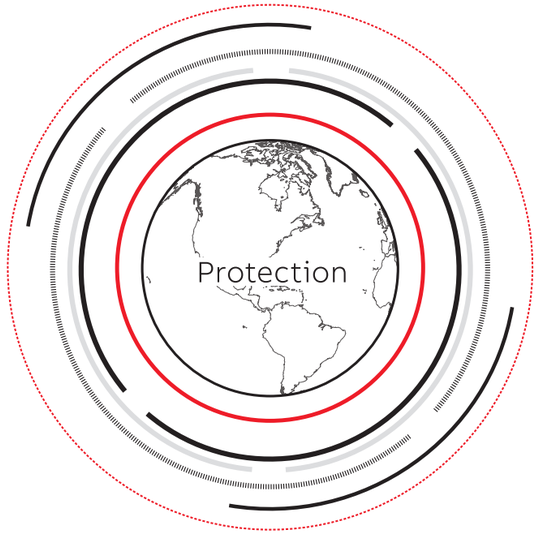
www.abb.com/substationautomation

Document ID DEABB171011 (2019)

GRID AUTOMATION PRODUCTS

RTU500 Series Cyber Security

Secure your RTU against attacks.



Focus on cyber security has steadily increased in the electric sector over the last couple of years. ABB fully understands the importance of cyber security and has identified it as a key requirement.

ABB is committed to provide customers with products and systems that clearly address cyber security and thus constantly adapts its products and systems to the latest developments in cyber security.

The electric power grid has changed significantly over the past decade and continues to change with technology enhancements. The new generation of control systems is more and more based on open standards and commercial technology, e.g. Ethernet and TCP/IP based communication protocols such as IEC 60870-5-104, DNP 3.0 or IEC 61850. This change in technology has not only brought huge benefits from an operational point of view, it also introduced cyber security concerns known from office or enterprise IT systems. ABB anticipates the security challenges and constantly adapts its systems to the latest developments in security.

Our RTUs respond to the needs of the power industries and assure a high level of cyber security. User access control, security logging, hardware hardening are implemented according to NERC-CIP and IEEE 1686. Different algorithms and various encryption standards according to ENISA report are used for all kinds of file storage.

The implemented cyber security functions support users to fulfill the requirements of the BDEW Whitepaper: “Requirements for secure control and telecommunication systems”

User Access Control

User Account Management
RTU500 series supports user authentication and authorization on an individual user level. User authentication is required and authorization is enforced for all interactive access to the device.

User Accounts
RTU500 series allows to fully manage user accounts, i.e. creating, editing and deleting them freely. User names and passwords can be configured according to customer‘s requirements.

Central Account Management
RTU500 supports customer owned CAM systems like Windows active directory server. The implementation is based on a LDAP server and complies to IEC 62351-8. Different fall back solutions are available with the RTU500 series in case CAM is not available.

Role Based Access Control
RTU500 series supports Role Based Access Control (RBAC) according to IEC 62351. Every user account can be assigned different roles and the user roles can be added, removed and changed as needed.

Password Complexity
RTU500 series offers the possibility of enforcing password policies that can be customized by specifying minimum password length, maximum password lifetime, as well as usage of lower case, upper case, numeric and special characters.

Secure Communication

Web Server
RTU500 series permits encrypted communication between the web browser and the RTU. A standard browser can be utilized such as Internet Explorer or Firefox. Furthermore the operator can select between https:// and http:// by configuration. In addition, self-signed certificates and customer certificates (X509), can be used.

VPN Function
RTU500 series offers an encrypted channel based on the hash algorithms SHA256/384/512 between the RTU and the IPsec Router on customers side. The VPN provides confidentiality and integrity and authenticity. A secure communication via public networks is possible. The authentication is handled by pre-shared keys or customer certifications (X509). A diagnosis interface for encrypted channels is available and can be activated on request for commissioning and troubleshooting. Deactivation of VPN channels in customer networks is not required.

Secure IEC 60870-5-104 Communication (IEC 62351-3)
RTU500 series allows point-to-point data traffic encryption for TCP/IP-based communication. This is enabled thanks to Transport Layer Security (TLS) with respective authentication of client and server using X.509 certificates.

Secure IEC 60870-5-104 Authentication (IEC 62351-5)
RTU500 series prevents “spoofing, modification and replay” of telegrams using IEC 60870-5-104 by adding secure authentication mechanisms. This protocol extension is optimized for low bandwidth consumption and for environments with limited access to authentication servers.

Secure DNP3 Communication (IEC 62351-5)
RTU500 series provides a secure implementation for serial and TCP IP communication based on DNP3. This part of IEC 62351 focuses on application layer authentication. All application layer messages are defined as critical.

Integrated Firewall

RTU500 enables different services on dedicated Ethernet interfaces (E1, E2, USB, PPP). The configuration of the firewall is automatically created from the RTU configuration.

Manipulation Protection

RTU installation and RTU documentation are protected by signatures against manipulation. Manipulated RTU download files, e.g. configuration files, are detected and refused.

Device Supervision via SNMP V3

Simple Network Management Protocol (SNMP) is one of the most commonly used technologies for network monitoring.

By implementing SNMP, the RTU500 becomes a managed device that can share:
- Diagnosis information (e.g. CPU load and telegram traffic load)
- System events (RTU and sub devices)
- Configurable Single Indications

RTU500 Series can be integrated in Network monitoring systems in parallel to a SCADA system.

Patch Management

Security patches provided for the RTU500 series can be implemented without changing the running configuration. This way, vulnerabilities and cyber security findings can be handled in a fast and efficient way, as no release upgrade is required. Patch management is also simplified for large numbers of RTU’s in the project by script interface.

Security Logging

Local Logging
RTU500 series creates audit trails (log files) of all security relevant user activities. Security events that are being logged include user login, logout, change of parameters, configurations, or updates of firmware. For each event date and time, user, event ID, outcome and source of event are logged. Access to the audit trail is available to authorized users only.

External Security Clients
Security events of the RTU can be sent to external security log clients such as the System Data Manager (SDM600). SDM600 is a monitoring and response application, which enables visibility of real time security events. Syslog UDP/TCP and ArcSight TCP - standard protocols for logging of security events - are supported by RTU500 series. Furthermore up to 3 clients per ethernet port can be configured.

Security Events To Control System
Security events and alarms can be sent via host protocol to the control systems. “Security indication” and “security alarm” are supported. Settings of security alarms are part of the configuration. Up to 32 security events can be mapped to one single alarm. Security events are available in host protocols, PLC, HMI and process archives.