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 Business Unit ABB Oy, Distribution Solutions
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Firmware update release 2.0.12 for 620 series product version 2.0 (F) protection relays

Scope

Firmware update release 2.0.12 is for the following 620 series protection relays:

- REF620
- REM620
- RET620

To verify that the firmware update applies to the protection relay version, ensure that the first two characters and the last two characters of the order code on the label on top of the human-machine interface (HMI) match the corresponding characters of the order code in Fig. 1.

```
xBXXXXXXXXXXXXXXXXXF
  ↑                    ↑↑
xCXXXXXXXXXXXXXXXXXF
  ↑                    ↑↑
```

Fig 1. Order code of the 620 series protection relays

To identify the current firmware (SW) revision of the 620 series protection relay, please refer to Fig. 2.

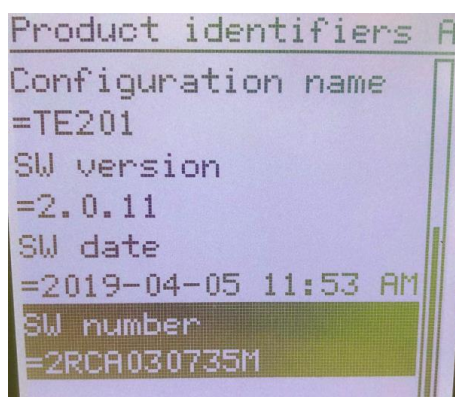


Fig. 2. The firmware revision of the 620 series protection relay

Implemented usability improvements

The firmware update release includes usability and operational improvement. The following improvements has been implemented:¹

Firmware update release 2.0.12:

Cyber Security

- Cyber Security improvements to the "Ripple20" vulnerability in TCP/IP communication stack for normal product usage conditions. Following vulnerabilities has been identified in the product and fixed by the update:
 - CVE-2020-11907
 - CVE-2020-11909
 - CVE-2020-11910
 - CVE-2020-11911
 - CVE-2020-11912

Note! Some of the security scanners might still report existence of Ripple20 vulnerability after the update. This is a false positive, since the scanners indicate the presence of the IP stack, without being able to check the vulnerability and its fixes.

Supervision

- Improving Time counter rollover in relay's communication module that may have caused internal relay fault with error code *IRF116 COM card error* and relay to self-reboot after time interval(s) which is divisible by ~50 days from previous restart.
- Improvement to relay CPU FPGA (IRF 83) internal fault supervision – the supervision interval speed is fastened to reach faster issue detection.
- Enhancement to relay self-supervision – improved IRF counter clearing to enable faster temporary fault clearing and fault recovery.
- Internal diagnostic improvement for the self-supervision during startup.

Communication

- Improvement on GOOSE receiving. In a system where one relay is receiving GOOSE communication from multiple senders, it is possible that a communication break in one sender might impact handling of received values from other senders.
- Improving IEEE 1588 (PTPv2) Time synchronization when using non-zero (ID>0) PTP Domain ID. Enhancement at transparent clock peer-to-peer measurement and improving Path delay compensation. (Compensating delay for long communication cables).
- Improvement to the Frequency measurement FMMXU avoids unnecessary reporting during momentary vector shift situations.

¹ The relay firmware update may also include some minor usability improvements not listed in this note.

Firmware update release 2.0.11:

Control

- Relay setting group change via SPCGGIO outputs control improved.
- Application function Autorecloser (DARREC) final trip during discrimination time improved.

Communication

- SNTP time synchronisation with masters taking occasionally time sync from GPS improved.
- Relay time synchronisation behavior with inaccurate SNTP masters improved.

Supervision

- Relay supervision behavior with Load profile function improved.

HMI

- Relay internal supervision for LHMI communication improved.
- Improvement to relay event pop-ups to display.

Other

- Limitation to the maximum number of files that can be opened by the MMS client. This improves the behavior in situations where MMS clients are stressing the relay file system.
- Improvement to relay virtual file handling.
- Disturbance recorder (DREC) in periodic trig mode improved.
- Relay real-time clock startup improved.

Firmware update release 2.0.10:

Measurement

- Improved ALARM output activation of voltages total harmonics distortion and current total demand distortion in short disturbances.

Communication

- Improved SNTP time synchronization tolerance for inaccurate time sync masters.
- Open port 30301 for One-time password delivery functionality closed.

Supervision

- Self-supervision recovery time improved in case of IRF code 83.

HMI

- Improved Local HMI firmware to avoid some rare HMI freezing in very short and repetitive auxiliary power interruptions.

Firmware update release 2.0.9:

Control

- Improvement to the synchrocheck (25) function for preventing unexpected short-period reset of SYNC_OK output. The reset could have been seen in some start-up situations with high load currents even when the synchronism conditions were fulfilled and voltages were aligned on both sides of the breaker.

Supervision

- Important correction of fuse failure supervision (SEQSPVC) function – solving an issue in 620 series firmware revision 2.0.8

The fuse failure supervision function is typically used to block an activation of under voltage and/or voltage based unbalance protection if there is a failure in the external voltage measurement circuit (e.g. blown fuse or broken wire), resulting in a too low or completely lacking voltage measured by the protection relay. The fuse failure supervision function in 2.0.8 does not measure properly the supervised voltages. If the fuse failure supervision function is taken into use in the protection relay, it can lead to a situation of a voltage based protection operation at faults occurring in the external voltage measurement chain. This means that the protection relay will work in the same way as if there would not be a fuse failure supervision function in use.

Please note that this issue solved in 2.0.9 is only in firmware revision 2.0.8 and not in older revisions. If you have this supervision function in use with 2.0.8, we recommend to make an update with 2.0.9 firmware at your earliest convenient time.

The software revision 2.0.8 is in relays delivered from factory in the time period of August - December 2017.

Firmware update release 2.0.8:

Measurement

- Improvement to load profile storing in short AC aux voltage interruption.

Protection

- Improvement to intermittent earth-fault protection function in “Intermittent_EF” mode with very small earth fault current I_0 and high earth fault voltage U_0 .
- Improvements to high-impedance earth fault detection (PHIZ) function operation with Security settings 8 and 9 – and with circuit breaker in intermediate state.

Supervision

- Improvement to fuse failure supervision (SEQSPVC) function operation minimum current blocking when voltages and currents applied to function.
- Improvement to relay internal self-supervision of arc protection functionality.

Communication

- Improvement to current and voltage harmonics demand value reporting for Modbus communication.
- Improvement to MM File Transfer Services reading COMTRADE files from relays.
- Improvement to performance of system communication (MMS) event sending during extremely high load conditions.

Firmware update release 2.0.7:

Control

- Improvement to the synchrocheck function for preventing unexpected short-period reset of SYNC_OK output. The reset could have been seen in very rare situations even when the synchronism conditions were fulfilled and voltages were aligned on both sides of the breaker.

Cyber Security

- Improvement to relay communication stack software to handle if IEC 61850 Edition 2 fixed length GOOSE messages is wrongly configured to the relay.

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Update procedure

Firmware updates represent an integral part of ABB's life cycle management of distribution protection and control relays. The updates ensure optimized usability throughout the relay's entire life cycle by offering the latest improvements. The ideal time for a firmware update would be during periodical testing or a maintenance break.

All 620 series version 2.0 (F) products manufactured later than 17st of March 2021, include the stated relay firmware update 2.0.12.

Please note that ABB will not be liable for any direct or indirect costs related to the firmware update procedure. The update procedure shall be performed at the sole responsibility of the possessor of the installed base.