



ELECTRIFICATION PRODUCTS DISTRIBUTION SOLUTIONS (EPDS) SERVICE NORWAY – WEBINAR APRIL 2018

RMU Digital Upgrade

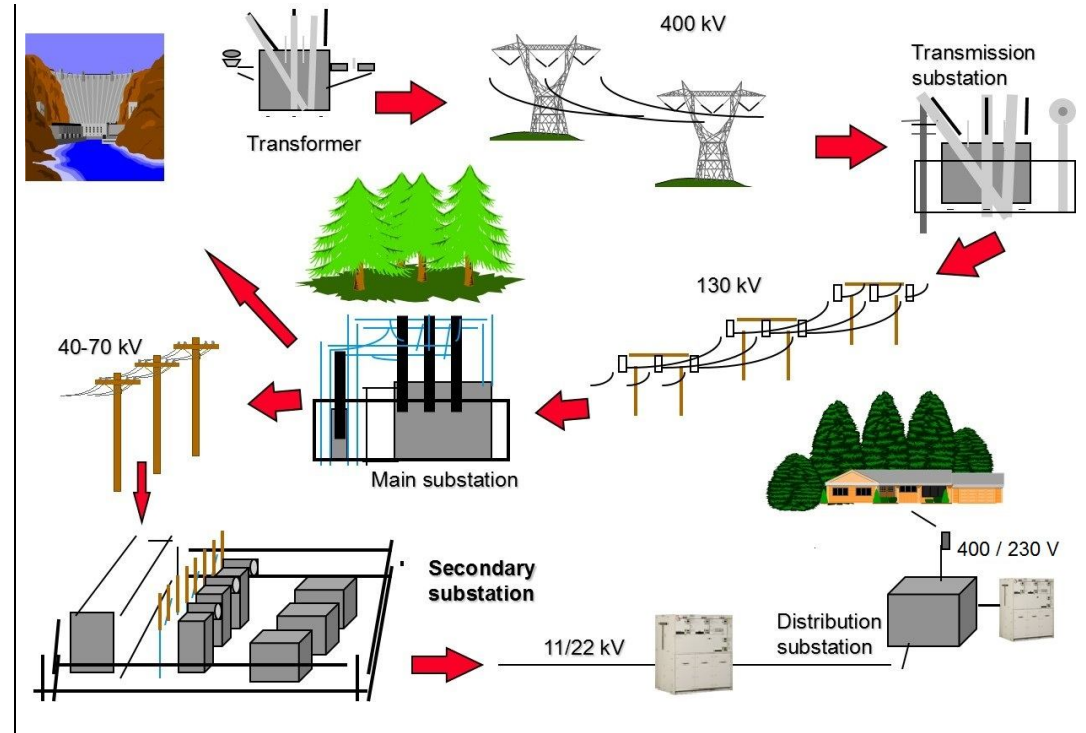
SafeRing / SafePlus 12-24kV

Automating secondary distribution network



Content

- Introduction.
- WebEx and Definitions.
- SafeRing/SafePlus.
- Changing face of the grid.
- Automation levels and Concept.
- Packages and options.
- Customer benefits.
- Product page and Distribution Solutions, Finland.
- Spare parts policy and Business Online (BOL).
- Q&A and Webinar.



Introduction

Introduction

- Primary Service Center (PSC) for SafeRing / SafePlus, located in Skien, Norway.
- Part of EPDS Service (previously 3442 EPMV) Norway.
- Asgeir S. Elvestad, asgeir.elvestad@no.abb.com , Service Product Manager.
 - Project Manager.
 - Product Owner.
- Jonathan Groa, jonathan.groa@no.abb.com , Service Technician.
 - Relay / RTU and communication specialist.
 - Technical lead.
- Jørgen Johannessen, jorgen.johannessen@no.abb.com, Service Sale Manager.
 - Product Sale.



WebEx and Definitions

Before we start

WebEx – Normal view

Use the Q&A box for both questions and chat.

The screenshot displays a WebEx webinar interface. The main content area shows a presentation slide with the following text: "ELECTRIFICATION PRODUCTS DISTRIBUTION SOLUTIONS (EPDS) SERVICE NORWAY – WEBINAR APRIL 2018", "RMU Digital Upgrade", "SafeRing / SafePlus 12-24kV", and "Automating secondary distribution network". Below the text is the ABB logo. The slide also features three images of electrical equipment. A red arrow points from the text "your questions here" to the Q&A panel on the right. Another red arrow points from the text "Full screen view" to the "Full Screen" button in the bottom left corner of the slide area. The Q&A panel on the right is titled "Q&A" and contains a text input field with the instruction "Select a question, and then type your answer here. There is a 256-character limit." and "Send" and "Send Privately..." buttons. The interface also shows a "Participants" list on the right with "Panelists: 3" (Host, me, Asgeir Elvestad, Jorgen Johannessen) and "Attendee: 0".

WebEx – Full screen

To go back to normal view, click <Esc>

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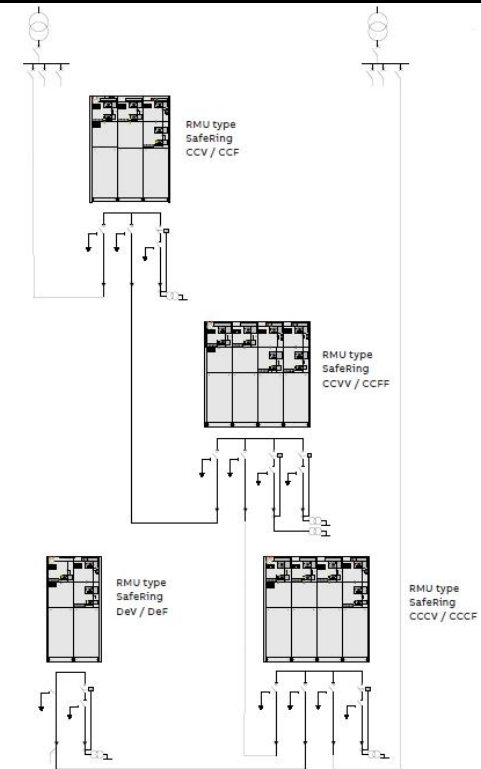
RMU Digital Upgrade

SafeRing / SafePlus 12-24kV

Definitions

RMU Digital Upgrade

- **Ring Main Unit (RMU):** Sealed and gas-insulated compact switchgear, used at the load connection points of a ring-type secondary distribution network.
- **Smart Grid:** Leverages digital technology to improve reliability, security, transparency, connectivity, interoperability, and efficiency. It enables information collection and communication throughout the system, from generation to transmission and distribution to end users
- **Digital:** ABB's prefix to components and systems that fits in a Smart Grid.
- **Upgrade:** Raise to a higher grade or standard.
- **RMU Digital Upgrade:** Gives the customer the flexibility to remotely Monitoring, Controlling and Measurement of SafeRing / SafePlus.



SafeRing / SafePlus

Introduction

SafeRing / SafePlus

Gas-Insulated Ring Main Unit and Secondary Switchgear

- SafeRing is a Medium voltage (MV) gas-insulated Ring Main Unit (RMU) for secondary distribution network upto 40.5 kV, 630A
 - SafeRing: 12-24kV, 630A (SF6-insulated gas)
 - SafeRing 36: 40,5kV, 630A (SF6-insulated gas)
 - SafeRing Air: 12kV, 630A (Air-insulated gas)
 - SafeRing AirPlus: 12-24kV, 630A (Mix of C5 and Air insulated gas)
- SafePlus is a gas-insulated compact switchgear system for secondary distribution network upto 40.5 kV, 630A
 - SafePlus: 12-24kV, 630A (SF6-insulated gas)
 - SafePlus 36: 40,5kV, 630A (SF6-insulated gas)
 - SafePlus Air: 12kV, 630A (Air-insulated gas)
 - SafePlus AirPlus: 12-24kV, 630A (Mix of C5 and Air insulated gas)
- SafeRing combined with the SafePlus concept represent a complete solution for 12-24kV secondary distribution networks.
- More than 200 000 units delivered worldwide
 - Manually operated.
 - Automated.
- RMU Digital Upgrade solutions are available for manually operated SafeRing / SafePlus.



SafeRing / SafePlus

Applications

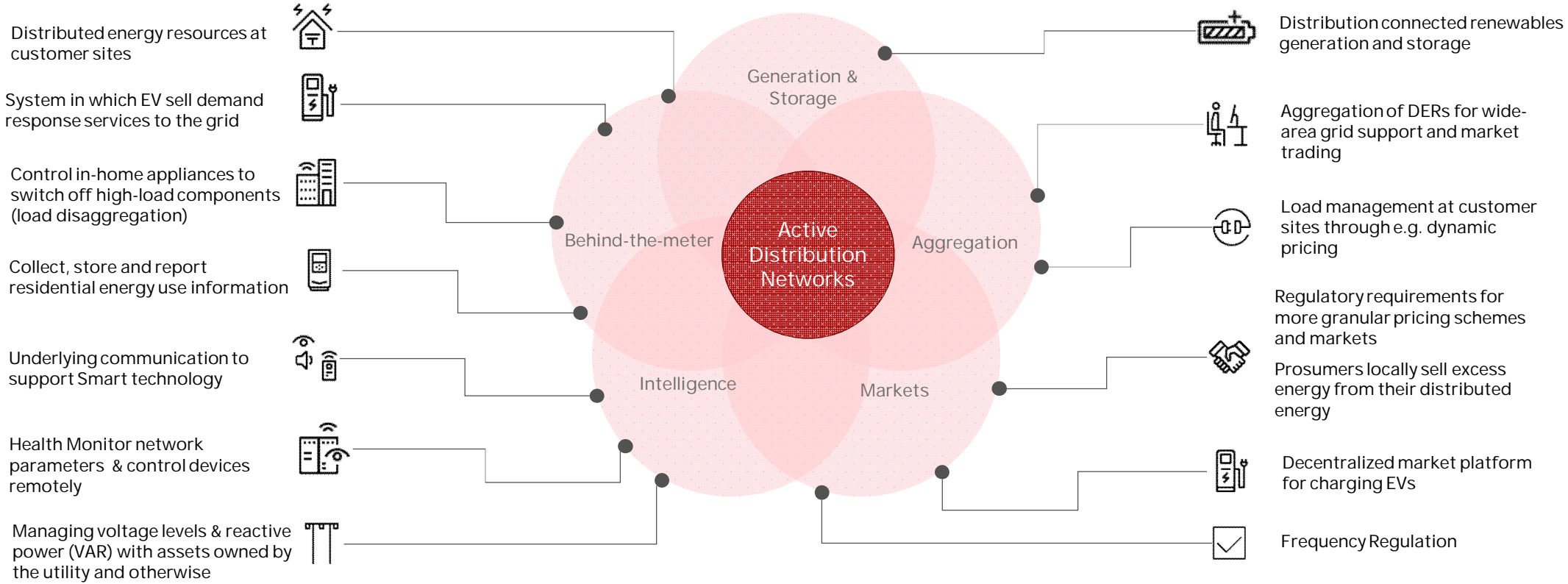
- Distribution
- Wind power
- Hydro power
- Generator
- Solar
- Infrastructure
- Industry
- Marine



Changing face of the grid

Increasing complexity in Distribution Networks

New challenges for traditional paradigms for control and commerce



Grid of the future

Rapid rate of change requires higher velocity of decision making

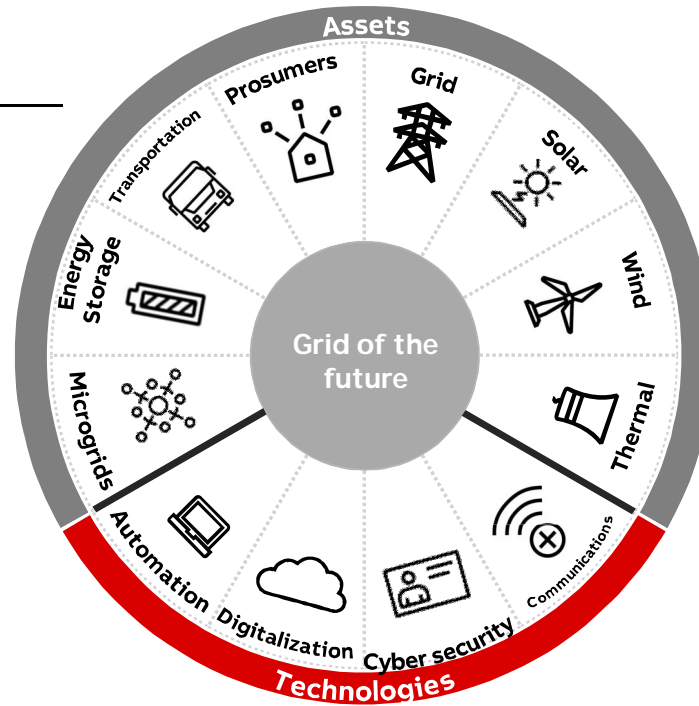
The world of energy is changing

Supply

- Dramatic renewables growth
- Increasing intermittency
- Greater volatility, less predictability
- More feed-in, take-off points (e.g. data centers and EV-charging)
- Increasing complexity, need for stability. On- and off-grid control
- Automation on "local" level Energy storage is key

Demand

- Continuing electrification of society
- Emerging market consumption growth



Customers will increasingly have to deal with very dynamic environments

The need for faster decisions and real-time action requires visibility of the entire business

Digitalization is the answer for the necessary agility and decision-making velocity

Control & information flow is key

Next generation Smart Secondary Switchgear

Key features

- Quick and accurate location of outages.
- Directional fault indication.
- Communication SCADA / DMS.
- Flexibility.
- Remote control of switches.
- "Self-healing" network.
- Surveillance of the network.
- Sensor Technology (MV / LV).
- Components monitoring.
- Battery backup.
- Safe communication.



Automation levels and Concept

RMU Digital Upgrade

Key Functionalities for the RMU Digital Upgrade

RMU Digital Upgrade covers up to Level 3 of the ABB switchgear automation portfolio

Automation Levels

Level 1 - Monitoring

- MV switch position indication.
- LV measurement.
- MV network faults.

Level 2 – Control (plus Level 1)

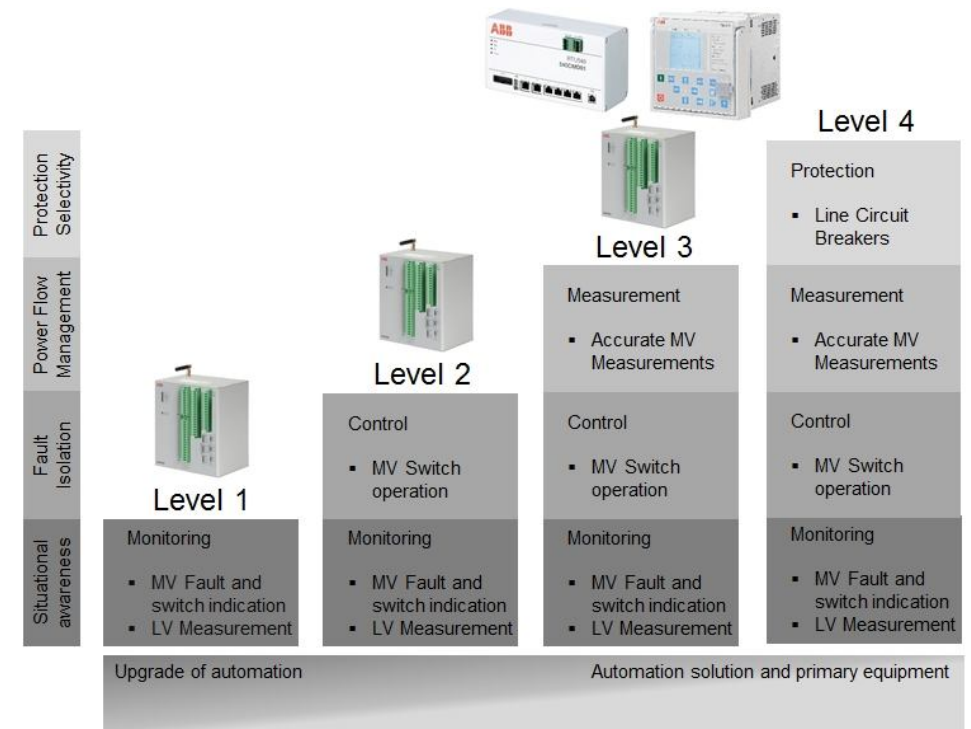
- MV switch operation.
- MV network non-directional faults.

Level 3 – Measurement (plus Level 2)

- MV network directional faults.
- MV network analog values measurements.
- Earth switches position indication.

Level 4 – Protection (plus Level 3)

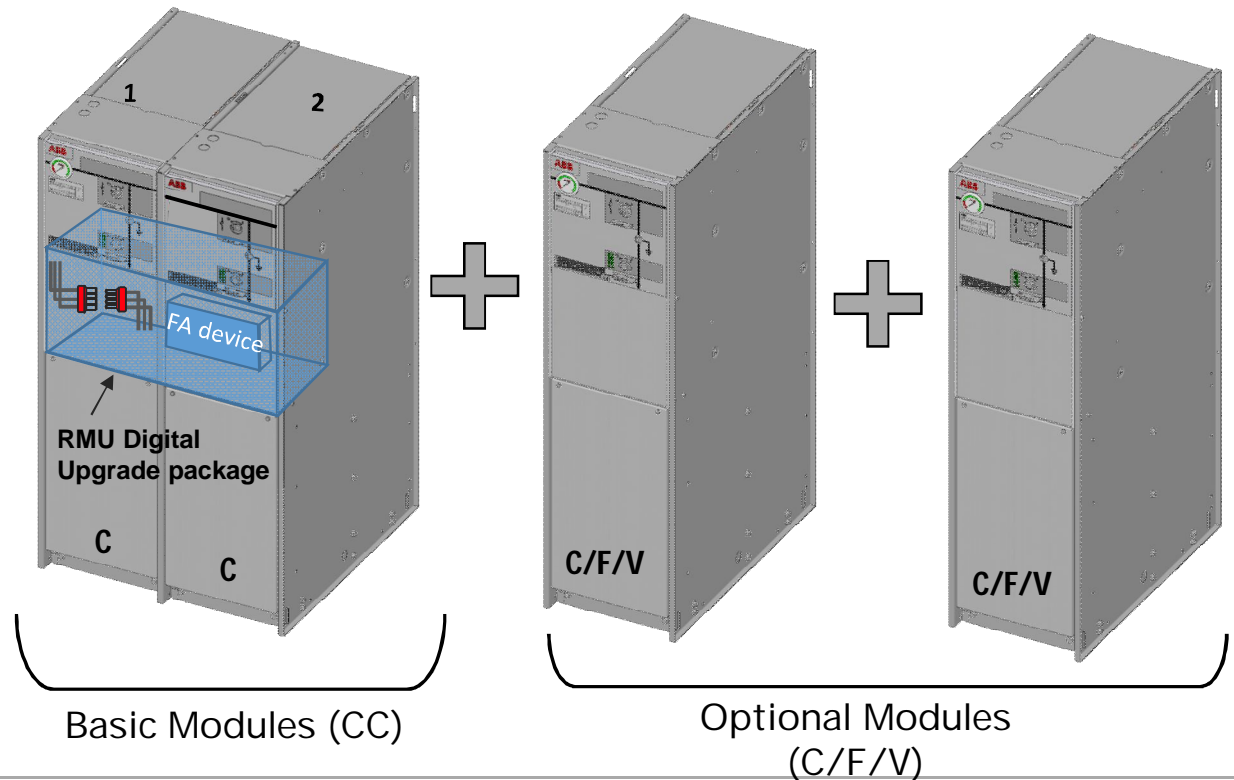
- Selectivity using the circuit breakers.
- “Self-healing”.
- Prediction.



RMU Digital Upgrade

Application concept

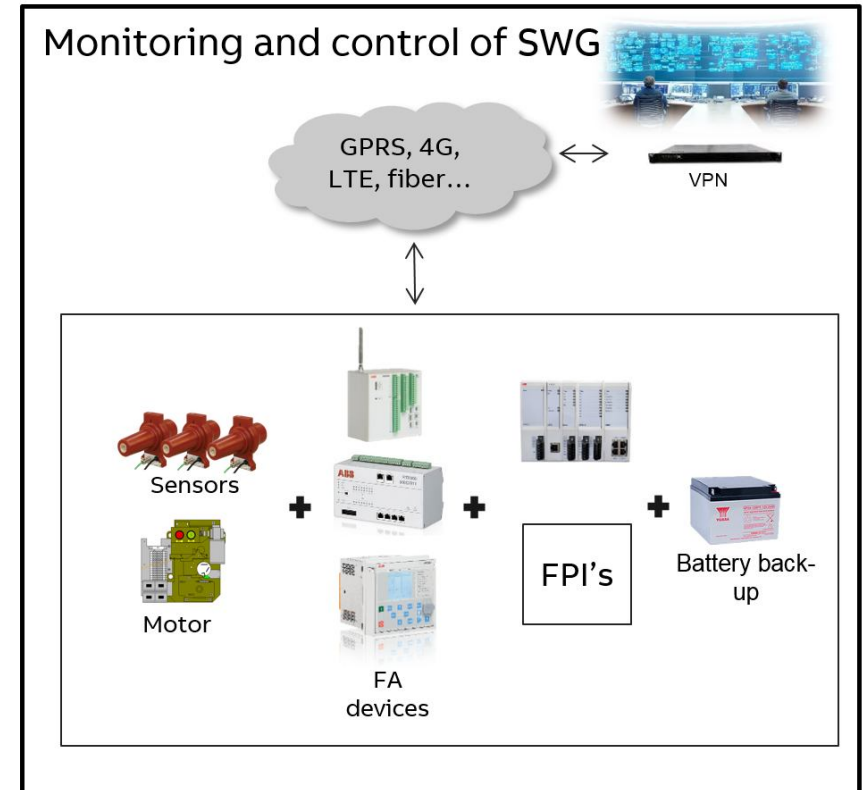
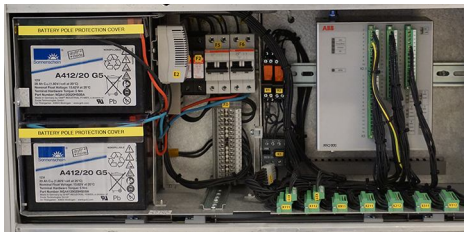
- RMU Digital Upgrades are ready-made packages easily pluggable to existing RMUs.
- RMU Digital Upgrade is applicable only for **internal mounting** arrangement.
- RMU Digital Upgrade application is only available for SafeRing / SafePlus 12-24kV switchgears having the first two C-modules next to each other. (There must e.g. neither be test points in these two C-modules.)
- Standard RMU Digital Upgrade supports up to 4-way SafeRing / SafePlus unit. The additional one or two modules can be any configuration of C/F/V-module(s).



RMU Digital Upgrade

Feeder Automation (FA) device – Integrated solution

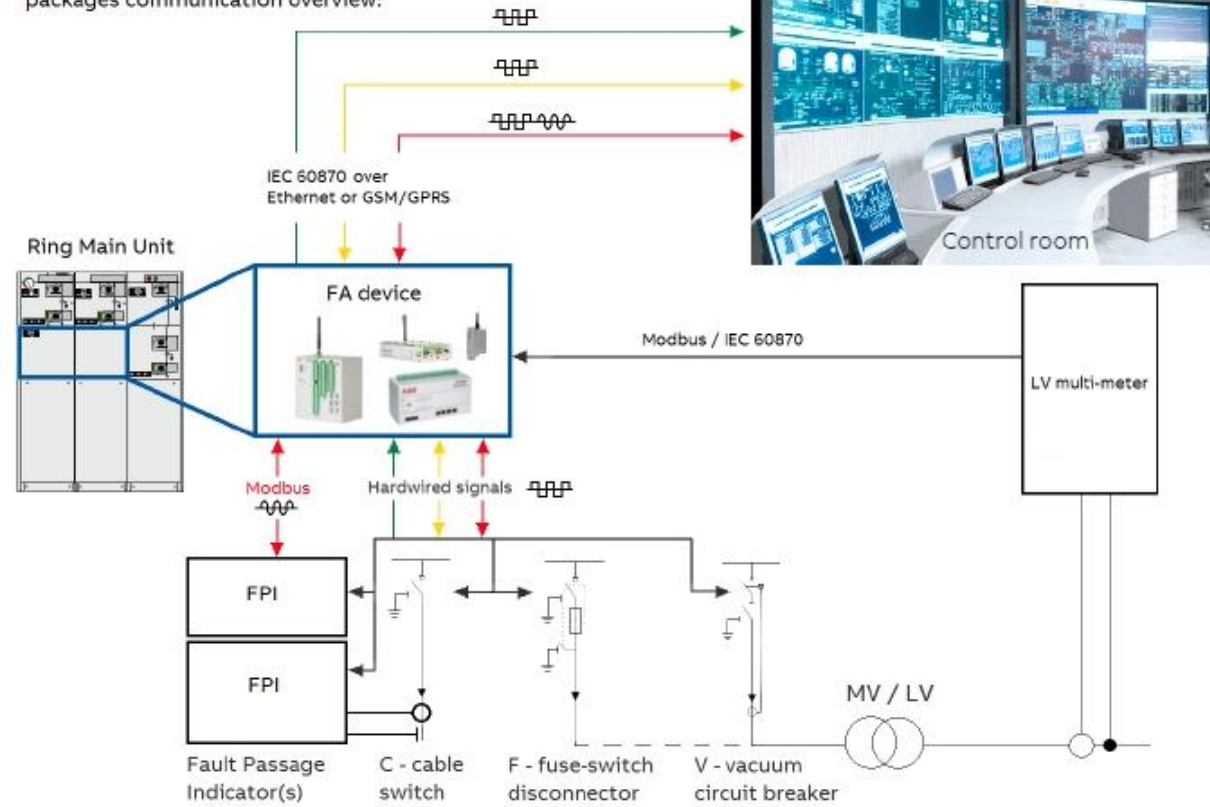
Digital Upgrades are ready-made packages easily pluggable to existing RMUs



RMU Digital Upgrade

Communication overview

Monitoring, Control, Measurement packages communication overview:





Packages and options

RMU Digital Upgrade

Packages and options

RMU Digital Upgrades

Packages

Three different packages:

- RMU Digital Upgrade ARC600 FA Box (Level 1, 2 & 3)
- RMU Digital Upgrade RTU 540CID01 FA Box (Level 3)
- RMU Digital Upgrade REC615 FA Box (Level 3)

All standard packages always include:

- Power supply backup source for automation devices (24V DC batteries and charger)

Communication:

- Ethernet port/connection on all FA devices
- Wireless GSM/GPRS communication is included in the ARC600
- Wireless communication comes with IEC 60870-5-104 host (slave) communication protocol among others

Options

- Wireless GSM/GPRS communication as option with ARG600 for the RTU540 and the REC615
- FPI remote reset
 - After remote resetting of fault indication, the FPI is again ready to catch, indicate and report another fault.
- Distribution transformer feeders “Emergency open” remote command
 - Fast trip in case of emergency situations like local flooding, fire etc.
- Supervision of the LV side of the Distribution transformer
 - Energy quality, I, U, P, cos phi.
- Configuration SW
 - Basic, Basic plus and Advanced.

RMU Digital Upgrade ARC600

Functionality solution: Level 1, 2 & 3

Base Unit

- ARC600: Main controller, internal charger and wireless modem.
- Enclosure and heater.
- 2 x batteries.



External

- Local remote switch: Motor operation.

- LV multi-meter:



- Fault Passage Indicator (FPI):
 - OC and EF non directional.
 - OC and EF directional.

RMU Digital Upgrade RTU 540CID01

Functionality solution: Level 3

Base Unit

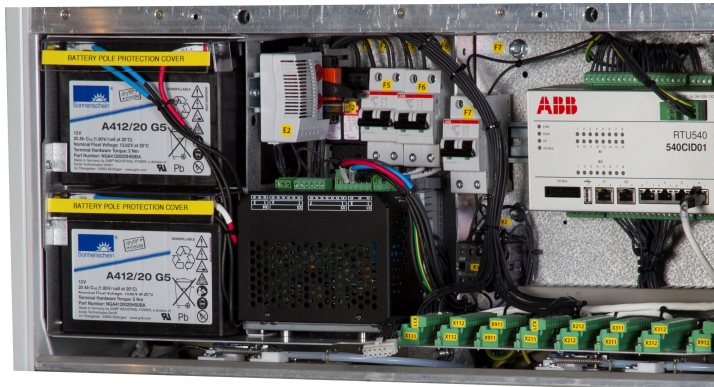
- RTU 540: Main controller and license.
- (Optional) Wireless gateway (ARG600).
- Enclosure and heater.
- 2 x batteries and charger.




ARG 600



RTU 540



External

- Local remote switch: Motor operation.
- LV multi-meter:
 - OC and EF non directional.
 - OC and EF directional.

RMU Digital Upgrade REC615

Functionality solution: Level 3

Base Unit

- REC615: Main controller and internal FPI.
- (Optional) Wireless gateway (ARG 600).
- Enclosure and heater.
- 2 x batteries and charg



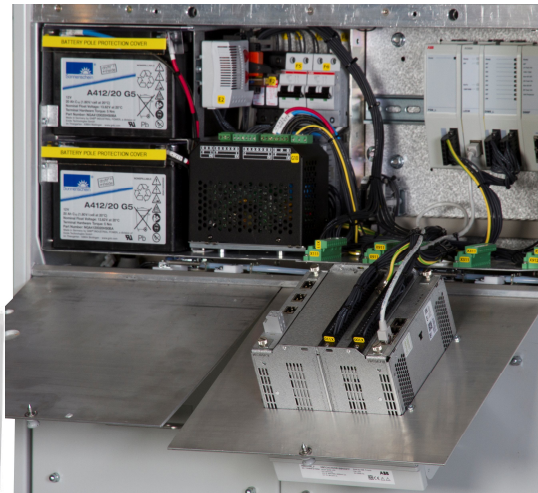
ARG 600



REC615



RIO600



External

- Local remote switch: Motor operation.
- LV multi-meter:
- Fault Passage Indicator (FPI):
 - 1 x inbuilt , plus RIO600.
 - OC and EF directional (functions in REC615).
- Sensors
 - Indoor current sensor: KECA.
 - Indoor voltage sensor: KEVA.



Customer Benefits

RMU Digital Upgrade

Customer Benefits

The fastest way to align with the Smart Grid and the demand for cost efficiency.

Feeder Automation box inside the RMU/Switchgear

- Fully integrated solution in the RMU, less space consuming.
- Fewer maintenance objects.
- Less affected by the environment.
- Fast and plugable installation.
- No impact on compact secondary substation IP rating.

Benefits of Compact Secondary Substation (CSS) automatization

- Improved quality of the power supply:
 - Less and shorter outages.
 - Improvement of the operational efficiency.

Optimal utilization of the distribution network

- Utilize the network more efficiently, minimize the network losses.
- Optimal asset management.
- Measurements of power flows/quality.
- Improves overview of power network.
- Extends life cycle of the earlier investments.

Improves efficiency and safety of operating personnel

- Less need to travel to places that are difficult to reach.
- Less need to work in dangerous environments.

Benefits

Scalable solutions – from basic monitoring to more advanced measurement functionality

RMU Digital highlights

- Gain more efficient utilization of the secondary distribution network through automation and thus minimize the effect of power outages.
- Wireless modem GPRS/3G/LTE communicating with your DMS or SCADA system.

RMU Digital Upgrade functionalities enable network operators to

- Obtain real time data for analyzing and decision making, in order to optimize operations and improve power quality.
- Monitor the grid to enable remote fault localization.
- Reconfigure the network so that the faulty part of the network is isolated and ensure faster power restoration reducing the cost of energy loss.

Product page and Distribution Solutions, Finland

RMU Digital Upgrade

RMU Digital Product page

How to find more information

Internal release page

- Released the 23.03.2018
- Link to the internal release note:
 - [Internal RMU Digital Upgrade release web page](#)

RMU Digital Product page

- [RMU Digital Upgrade product page](#)



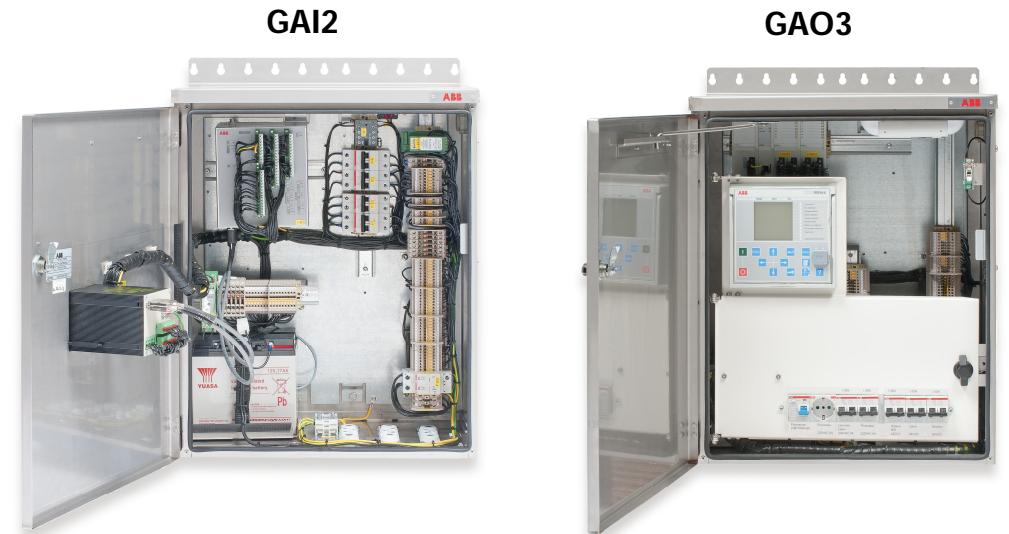
Are you looking for support or purchase information?

Grid automation control cabinet

Distribution Solutions - ABB Oy, Vaasa, Finland

Grid automation control cabinet

- External solution.
- Covering all 4 automation levels.
 - GA01, GA02, GA03 or GA04.
 - GA01, GAI2, GAI3 or GAI4.
- Definition.
 - GA = grid automation solutions.
 - O = outdoor (for pole mounted equipment).
 - I = Indoor solution (CSS, RMU, secondary switchgear etc.).
- [Product page](#).
- Contact information.
 - Johan Nilsson, johan.nilsson@fi.abb.com, Sales Manager.
 - Soren Mattback, soren.mattback@fi.abb.com.



Spare parts policy and Business Online (BOL)

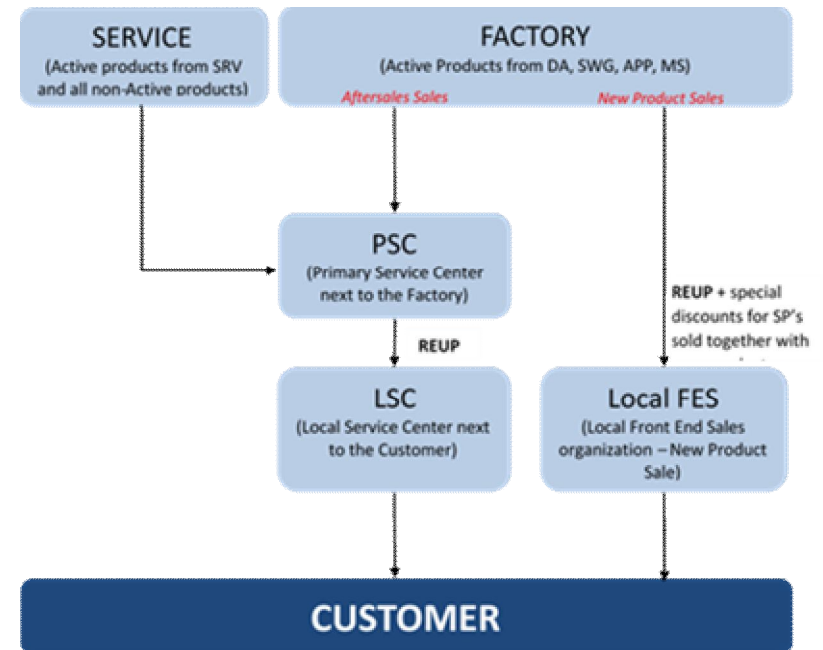
RMU Digital Upgrade

EPDS spare parts policy

Overview

In short it says

- All General questions, Request for Quotation (RFQ) or Orders should ONLY come from your local EPDS Service (EPMV 3442) center or some pre-approved Small Countries through Business Online ([BOL](#)).
- This means if you are NOT a part of EPDS Service center or a Small Countries, you should contact them for Service, spare parts, or e.g. RMU Digital Upgrade.
- All EPDS Service center or Small Countries must have an pre-setup organization in BOL.



EPDS spare parts policy

Overview

Spare parts category

- Spare parts are divided into four categories with excepted delivery times.
- The RMU Digital Upgrade is categorized as 4 (Other Spares only made to order): 6-8 weeks delivery time.

Category	Description	Normal Delivery	Emergency Delivery **			
			Time A	Premium on list price	Time B	Premium on list price
1	Strategic spares for Active/Classic products	3 days*	---	---	24hrs*	25%
2	Other Spares for Active products	2 week	1 week	10%	48hrs	25%
	Other Spares for Classic products	3 week	2 week	10%	1 week	20%
3	Spares for Limited products	3-4 week	2 week	30%	1 week	50%
4	Spares for Obsolete products	By quotation	---	---	---	---
	Other Spares only made to order	By quotation	---	---	---	---

Business Online (BOL)

How to find RMU Digital Upgrade in BOL

How to find RMU Digital Upgrade in BOL

- Log into [BOL](#).
- Hint: In the Search filed always start with "PUNOAAS001" (our supplier organization).
- Search our three different packages in BOL:
 - "PUNOAAS001 2RAA037059A0001 RMU DIGITAL UPGRADE ARC600 FA BOX".
 - "PUNOAAS001 2RAA037058A0001 RMU DIGITAL UPGRADE RTU 540CID01 FA BOX".
 - "PUNOAAS001 2RAA037057A0001 RMU DIGITAL UPGRADE REC615 FA BOX".
- Add the your preferred FA Box to "Add to cart". Click on "RFQ".

The screenshot displays the ABB Business Online interface. At the top, the ABB logo and 'Business Online' text are visible. Below this is a navigation bar with links for HOME, OFFERINGS, SERVICE (PARTS), MY CATALOGS, REQUEST FOR QUOTATION, QUOTATIONS, and ORDER HISTORY. A search bar is present with the text 'Search for offerings' and a magnifying glass icon. To the right of the search bar, there is a dropdown menu for 'Customer' showing 'PUNOAAS001 (EPMV Service NO - PUNOAAS001) (PUNOAAS001)' and a 'Change customer' link. Below the search bar, there are several filter buttons: 'Favorite Views', 'Favorite Categories', 'Categories', 'Filters', and 'Search options'. The main content area shows 'All Offerings' with a message 'No favorite views'. Below this, there is a 'Selections' section with a search filter 'Search - PUNOAAS001 RMU Digital Upgrade' and options for 'Clear filters' and 'Save view'. The results section shows '3 Results' sorted by 'Relevance' with a page size of '10'. The results are displayed in a table with columns for 'Quick View', 'Product', 'Information', 'Actions', 'Availability', 'Price', and 'Front'. The table contains three rows of results, each with a search icon, a product ID, a description, an 'Add to cart' button, a 'More Info' button, and a price status of 'On Request'.

Quick View	Product	Information	Actions	Availability	Price	Front
	2RAA037058A0001	RMU DIGITAL UPGRADE RTU 540CID01 FA BOX	Add to cart	More Info	On Request	
	2RAA037059A0001	RMU DIGITAL UPGRADE ARC600 FA BOX	Add to cart	More Info	On Request	
	2RAA037057A0001	RMU DIGITAL UPGRADE REC615 FA BOX	Add to cart	More Info	On Request	

Business Online (BOL)

Price is "On Request" in BOL

Price is "On Request" in BOL

- This is due to that there are so many possible configuration that can't offer them all.
- E.g. some customers would like to use the FPI Compass B and the VPIS WEGA from Hörstmann, while other would like to use the FPI IKI-50 and the VPIS Capdis-S1+ from Kries.

The screenshot displays the ABB Business Online interface. At the top, there is a navigation bar with the ABB logo and the text 'Business Online'. Below this is a search bar with the text 'Search for offerings' and a magnifying glass icon. To the right of the search bar, there is a dropdown menu for 'Customer' showing 'PUNOAA5001 (EPMV Service NO - PUNOAA5001) (PUNOAA5001)' and a 'Change customer' link. Below the search bar, there are several tabs: 'Favorite Views', 'Favorite Categories', 'Categories', 'Filters', and 'Search options'. The 'All Offerings' section shows 'No favorite views'. Below this, there is a 'Selections' bar with a search filter 'Search - PUNOAA5001 RMU Digital Upgrade' and buttons for 'Clear filters' and 'Save view'. The '3 Results' section shows a table with columns for 'Quick View', 'Product', 'Information', 'Actions', 'Availability', 'Price', and 'Front'. The table contains three rows of results, all with a price of 'On Request'.

Quick View	Product	Information	Actions	Availability	Price	Front
	2RAA037058A0001	RMU DIGITAL UPGRADE RTU 540CID01 FA BOX	Add to cart	More Info	On Request	
	2RAA037059A0001	RMU DIGITAL UPGRADE ARC600 FA BOX	Add to cart	More Info	On Request	
	2RAA037057A0001	RMU DIGITAL UPGRADE REC615 FA BOX	Add to cart	More Info	On Request	

AABB