High-efficiency and intelligent to improve performance
Upgrade RMU intelligent and automation solution

Zhiguo Zhao, EPMV-PdM, ABB high voltage switchgear Co.Ltd., Beijing, Nov. 2016
Catalogue

- Upgrade RMU
- Reliability primary equipment
- Intelligent RMU
- Automation solution
- Cloud service
- Integration solution
Upgrade RMU

Industry 1.0 – 1712
First practical steam engine

Industry 2.0 – 1870
First elevated conveyor belts

Industry 3.0 – 1969
Electronics / software based control

People

Things

Services
Reliability:
Safe series product and new product Unisec.

Intelligent:
ABB intelligent RMU can monitor many key switchgear parameters. Such as temperature, pressure and circuit monitor.

Automation:
High-speed network self-healing smart distributed automation solution.

Cloud service:
customer can monitor RMU monitors anytime, everywhere.
Reliability primary equipment

- CTC
- RGC
- 12/24 kV Safe
- 40.5 kV Safe
- 12 kV SafeAir


SF6 → Dry Air
Intelligent RMU Integration temperature monitor device

Solution:
When cable connector’s temperature is above the device setting, the device will alarm. If temperature variation is more than 10°C. The device also alarm. And it can send the signal to center station.

Feature
Can find the fault earlier and cut down fault ration.
Maintenance-free and install easily
Centralization temperature monitor

**Intelligent measure unit**

Through high precision infrared measuring temperature sensor, can get cable connector temperature data. And send all data to monitor unit by wireless communication method.

**Intelligent monitor unit**

Intelligent monitor unit can support six measure units. Can also can achieve over temperature alarm, temperature variation alarm and so on.
Intelligent RMU
Electrical SF6 monitor device

Electrical SF6 monitor

Monitor tank gas’s density, customer can get SF6 density on real-time. When the density over the setting value, it will alarm on monitor center.

- With temperature compensation and highly measuring accuracy
- Perfect combine machinery and electronics
- RS485 communication port, system execute easily.
- Can display value on site, output signal is not affected by outside environment such as altitude.
- Up to three auxiliary, can realize overpressure alarm, interlock with lower pressure
### Intelligent RMU Electrical sensor

**High person safety**
Secondary output of sensor is millivolt level (mV), will not harm the operator

**High equipment safety**
Using advanced Rogowski instead of traditional CT, avoid the fault by iron core saturation

**More reliable and more green**
Instead of traditional transformer, electrical sensor is more compact, less loss and can greatly reduce the impact on the environment

**Higher flexibility**
Adjustable transformer ratio of CT any moment

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KEVCR
Automation solution
High-speed network self-healing distributed automation solution

Feature analyze

Self-healing distributed automation
- needn’t center station
- high-speed self-healing

Reliability optic communication
- Point to point GOOSE communication type. Up to 3 ms communication time.
- Reliability HSR communicate net
- Economical self-healing net, no need switch.

Adapt any distribute net, toward to future
Adapt any input new energy.
Easily debug, standardization engineering
- Digital test, standard project
Automation solution
CB close loop solution

The fastest self-healing solution

Net application
- Quincunx distribute net
- Reliability 99.9999%

Automation solution
- Distribute direction protection
- Optional differential protection

Self-healing net time

Fault isolate time:
- Protect time (50 ms) + CB trip time (50 ms) = 100 ms
- Line fault, millisecond self-healing
- Busbar fault, fault area is power outage
- Feeder fault, only feeder power outage
Automation solution
CB open loop solution

Faster self-healing solution

Net application
- Grade power net, sigle ring network, double ring network
- Reliability 99.999%

Automation solution
- Distribute direction protect + Distribute automation

Self-healing time
Fault isolated time: Protect time (50 ms) + trip time (50 ms) = 100 ms
- Load transfer time: GOOSE (3ms) + internal time (<40ms) + trip time (<50ms) < 100ms
- Total time: 200ms
- Line fault, millisecond self-healing
- Busbar fault, fault area is power outage
- Feeder fault, only feeder outage
Automation solution
CB and LBS open loop solution

Fast self-healing and economical

Net application
- Grade power net, Main line is CB, Feeder is LBS
- Reliability 99.999%

Automation solution
- Distribute direction protect + Distribute automation

Self-healing time
- Main line restore time: 200ms
- Feeder isolate time: second
- Line fault, millisecond self-healing
- Busbar fault, fault area is power outage
- Feeder fault, only feeder outage
Automation solution
LBS open loop solution

Fast self-healing and more economical

Net application
- Grade power net, Main line is CB, Feeder is LBS
- Reliability 99.999%

Automation solution
- Distribute direction protect + Distribute automation

Self-healing time
- Main line restore time: second determined by LBS
- Line fault, second self-healing
- Busbar fault, fault area is power outage
- Feeder fault, only feeder outage
Automation solution
LBS open loop solution

Fast self-healing and the most economical

Net application
- Grade power net, Main line is CB, Feeder is LBS
- Reliability 99.999%

Automation solution
Intelligent centralization solution

Grade self-healing time
- Main line restore time: second determined by LBS
- Line fault, second self-healing
- Busbar fault, fault area is power outage
- Feeder fault, only feeder outage
One outdoor distribute automation solution

- Feeder has fault, only trip feeder switch
- Ensure other feeder can supply power normally
- Reduce power outage area and time
- Find fault location easily
- Improve power network reliability
Cloud service solution

Held terminal

- Based on the advanced apple IOS system, customer can get RMU state anywhere and any time
- Parameter:
  - Gas tank density
  - Cable connector temperature
  - Monitor battery voltage and state
  - Current fault
  - Switch state

Cloud service solution

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<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Status</th>
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<tr>
<td>Gas pressure</td>
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<tr>
<td>Battery voltage</td>
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<td></td>
<td>Normal</td>
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<tr>
<td>Switch state</td>
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设备信息: 文昌南路0号环网柜

确认
Cloud service solution

### Function panel

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<th>Function</th>
<th>Description</th>
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<tr>
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<td>实时运行状态</td>
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<td>关键点温度监测</td>
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<td>升级您的智能开关，实现更多功能...</td>
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### Real-time state

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<td>温升报警</td>
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Integration project solution

Integration design
- Considering the secondary device when begin to project design. It will become easier to debug and install.
- Primary and secondary become more suitable.
- Considering many secondary parameter when begin to design switchgear.

Integration produce
- During production, can combine primary and secondary in factory workshop.
- Can holistic debug in factory. Avoid much debug working on site.

Integration service
- Will be same service team for switchgear and secondary. It can avoid too much communicate on site.
- During product service time, it can fast deal any issue on site.

Higher reliability, faster response, more easily maintain, thereby can reduce cost during whole lifecycle.