ABB lead the intelligent revolution
Intelligent technology (Part 1)
ABB Vision
Power and productivity for a better world
Innovation address global challenges
ABB technology change the world

Xiluodu zhexi ±800kV HVDC transmission line
Zhangbei Guojiang Fengguang trial project
Rudong offshore wind power plant trial project
Innovation address global challenges
ABB technology change world
ABB Intelligent technology
Innovation and technology change world

01 Unattended substation
02 Switchgear expert system
03 GOOSE smart solution
04 Digital application
Pioneering mindset for unattended substation

Current situation

- Lockset to prevention from malfunction
- Need two or more operators to checkout
- Long process
- Impossible to see inside situation of metal-enclosed switchgear
- Impossible to monitor the internal running condition
- Impossible to predict the health of switchgear
Pioneering mindset for unattended substation Sequence operation

COM600 Switchgear management system
Relion family Digital relay
Intelligent component Of control
Friendly man-machine conversation

Sequence operation
Pioneering mindset for unattended substation
Sequence operation

Sequence operation

SCADA

Video on-line monitoring

COM600
Switchgear management

Switch

Sequence operate 1#, 3# switchgear

Execute programming command, 1# switchgear

Video on-line monitor #1 switchgear synchronously

Execute programming command, 3# switchgear

Video on-line monitor #3 switchgear synchronously
Pioneering mindset for unattended substation
Video on-line monitoring
Pioneering mindset for unattended substation
Sequence control and video on-line monitoring

Smart control
Switchgear expert system
CB mechanical characteristic detection

Hall coil sensor  RFID Technology  CB mathematical modeling

COM600 Switchgear management  friendly man-machine conversation

CB mechanical characteristic detection system
Switchgear expert system
CB mechanical characteristic detection

- On-line monitor CB mechanical characteristic
- Change periodic maintenance to condition based maintenance
- Reduce the amount of work
- Reduce the cost of maintenance
- Provide data to calculate life cycle of switchgear
Switchgear expert system
Circuit breaker life estimator

- MDC4 intelligent terminal
- Vacuum Interrupter life model
- COM600 Switchgear management
- Friendly man-machine conversation

CB life estimator
Switchgear expert system
Temperature rise diagnosis

- Temperature detecting
  With embedded design
- RFID Technology
- Base on TR mathematic model
- COM600
  Switchgear management
- friendly man-machine conversation

Switchgear TR diagnosis
Switchgear expert system
Temperature rise diagnosis

Product Life Management
(preliminary stage)

Real time estimate
switchgear health

Collect data to calculate
cycle life of switchgear

On-line monitor
temperature rise

Foundation of
switchgear life estimator

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consectetuer adipiscing elit.
Maecenas porttitor congue massa.
Fusce posuere,
Switchgear expert system

Benefits

1. Intelligent monitor and diagnosis
2. From periodic maintenance to condition based maintenance
3. Reduce the amount of work
4. Reduce cost of maintenance
5. Foundation of switchgear life estimator
Switchgear expert system
Smart management of switchgear
Innovation for MV switchgear
Technology development

- Excellent structure design with mechanical and electrical interlocks
- Embedded sensors with maintenance-free
- Mathematical modeling based on condition diagnosis
- Conventional switchgear
- Switchgear with sensors
- Switchgear with condition diagnosis

大数据统计
趋势预测寿命分析

开关柜寿命分析系统
Intelligent GOOSE solution
IEC61850/GOOSE communication

Object-oriented

Supervising the signal quality & status

3ms point-to-point transmission

No limitation linking modes

Heart-beat cycle

Cost-efficient solutions
Intelligent GOOSE solution
Current selective tripping for metro
Intelligent GOOSE solution
Current selective tripping for metro
Intelligent GOOSE solution
Current selective tripping for metro

Tripping logistics

- \( I_{F1} \Rightarrow \text{Start} \)
- \( I_{F2} \Rightarrow \text{Start} \)
- \( I_{F3} \Rightarrow \text{No start} \)

GOOSE OC

- Trip F2 CB
- Trip F3 CB
Intelligent GOOSE solution
Current selective tripping for metro

01
Native support for the IEC 61850 standard

02
Fast trip within 50 ms

03
600ms trip when N-4 mode

04
Supervising & self-inspection & self-healing

05
Flexible

Metro selective Tripping

ABB Relion Intelligent relay

IEC61850 GOOSE

IEC 61850 COMPLIANT

Flexible

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Intelligent GOOSE solution
Intelligent distributed solution

Self-healing
Reliable
High-availability seamless redundancy
redundant communication
Easy Maintenance & extend

Switch

FTU/DTU

SCADA

Intelligent distributed solution
Intelligent GOOSE solution
Intelligent distributed solution

- High-availability seamless redundancy (HSR) protocol
- Apply to any network, face the future application
- Project standard, easy to test and maintenance
Intelligent GOOSE solution
Arc protection

1. Sensor detect fault & transfer signal
2. Incoming feeder detect overcurrent
3. "B" Relay transfer arc signal to "A" relay
4. "A" relay trip incoming feeder
Intelligent GOOSE solution
Make power system stronger
Intelligent GOOSE solution
Digital application
Intelligent GOOSE solution
Digital Application

IEC 61850-9-2
IEC 61850-8-1

GOOSE
SMV
Intelligent GOOSE solution
Digital switchgear

Safety
• Increases equipment reliability
• Increases safety level in your substation

Flexibility
• Provides flexibility towards varying load flows
• Offers possibility of late customizations and changes

Efficient
• Minimizes lifetime costs
• Quicker delivery time

Green
• Lowers energy consumption up to 250 MWh
• Saves up 150 tons of CO2
ABB Intelligent technology
Innovation

Smart control
Unattended substation

Smart management
Switchgear expert system

Information integration
Intelligent GOOSE solution

Intelligent and ready for the future
Digital application
ABB Intelligent technology
Innovation

Sequence control
Metro selective tripping
GOOSE
Arc protection

Intelligent

On-line video monitoring
Switchgear Expert system
Life estimator
Digital application

Efficiency

Reliability
ABB Intelligent technology
In china, for china and world
Power and productivity for a better world™