

# 7SJ61 - ABB REF 610 feeder protection

## Introduction

- REF 610 is a low-end non-directional feeder protection relay, it offers no control functionality
- REF 610 is most likely the successor of SPAJ 14x relays
- Since REF 610 is a low-end relay it should be compared to 7SJ60 series, anyhow this is the comparison to 7SJ61
- With REF 610 feeder protection the REM 610 motor protection relay was introduced as well (same design, same housing)



Introduction

Strength 7SJ61

Strength REF610



# Strength 7SJ61 compared to ABB REF 610

## Hardware / Construction

7SJ61 provides:

- The option of 3, 8, 11 binary inputs  
Ref 610 provides only 2 or 5 binary inputs
- Two rear communication ports for SCADA and/or PC-operating-tool  
Ref 610 provides only one rear port, either for SCADA or PC-op.-tool
- A time synchronization port (IRIG B, DCF77)  
No such option for REF 610
- The option to connect 1 or 2 RTD boxes for temperature measurement with a max. of 12 temp. sensors  
No such option for REF 610 (REM 610 must be used -> max. 6 RTDs)
- 4 programmable functions keys on the front  
No such option for REF 610
- A large 4\*20 characters text display  
REF 610 display size is only 2\*16 characters

Strength 7SJ61



# Strength 7SJ61 compared to ABB REF 610

Functions: protection

7SJ61 provides:

- the option of two separate earth short circuit functions (50N/51N and 50G/51G): one operates with the measured IE the other in parallel with the calculated 3I0  
REF 610 provides only one 50N/51N function which operates with the measured IE current
- Disc Emulation for the Reset of IDMT (inverse curve)  
REF 610 provides a settable definite reset time, which is not the behaviour of a disc
- Inrush stabilisation via 2nd harmonic detection  
REF 610 provides only a pickup threshold increase for I>> stage (times 2) in case of switching on (the I>/I<sub>p</sub> stage has to be blocked by I>> stage)
- Neg. Seq. protection (46, phase disc. protec.) with definite time and inverse time characteristic  
REF 610 offers only definite time characteristic

Strength 7SJ61



# Strength 7SJ61 compared to ABB REF 610

Functions: protection

7SJ61 provides:

- Intermittent earth fault protection  
No such option for REF 610
- Dynamic setting change function for O/C thresholds and delay times  
No such option for REF 610
- High impedance restricted earth fault function (87N)  
No such option for REF 610
- Motor protection as an option  
REF 610 offers no motor protection functions, a different relay (REM 610) has to be ordered




Strength 7SJ61



# Strength 7SJ61 compared to ABB REF 610

Functions: monitoring / measurement  
7SJ61 provides:

- Supervision functions as “current sum”, “current symmetry”  
No such options for REF 610

- extended “Circuit breaker wear” monitoring via different methods:
  -   $\Sigma I^x$ , with  $x=1..3$
  -  2P (remaining life time measurement, NEW principle)
  -  CB active time counter

No such option for REF 610

- Operational Measurement values as primary/secondary and unit values  
REF 610 provides only primary values
- Pulse Counter Inputs  
No such option for REF 610

Strength 7SJ61



# Strength 7SJ61 compared to ABB REF 610

Functions: Control / user defined logic / communication  
7SJ61 provides:

- Control functionality for CB and further switch elements; interlocking logic  
No such options for REF 610
- User definable logic (e.g. for interlocking) via a graphic, easy-to-use logic editor  
No such options for REF 610
- User definable logic with measurements and thresholds  
No such options for REF 610
- SCADA communication standards
  - IEC 61850
  - Profibus DPREF 610 does not support these protocols

Strength 7SJ61

# Strength ABB REF 610 compared to 7SJ61

## Hardware / Construction

REF 610 provides:

- A wireless PC-operating-tool front interface (via the PC standard “IrDA”)

No wireless option for 7SJ61 via the front (only RS 232 available)

- A quite little mounting depth of 149.3 mm

7SJ61 mounting depth is 206 mm

- A detachable plug-in (draw-out) unit

No such option for 7SJ61; the whole device has to be moved



Strength REF610



# Strength ABB REF 610 compared to 7SJ61

Functions: protection, monitoring

REF 610 provides:

- “Arc protection”: function detects arc situation in air insulated metal-clad switchgears; REF 610 local light detection sensors require an optional external arc light detection hardware

No such option for 7SJ61

- Trip circuit supervision (TCS), supported by relay hardware: no binary inputs are necessary

No such option for 7SJ61, but: REF’s TCS is allocated to one fixed contact

Strength REF610