

**INDEPENDENT POWER TRANSMISSION OPERATOR S.A.**

**TNPRD/ SUBSTATION SPECIFICATION SECTION**

March 2019

**SPECIFICATION SS-55 / 9**

# NUMERICAL

**BUSBAR DIFFERENTIAL PROTECTION SYSTEM**

# “ATTACHMENT A”

1. Type :………...…………………………

2. Manufacturer :………...…………………………

1. System operation voltage and

number of bays :………...…………………………

1. Tripping time (from occurrence of fault

to energizing of circuit breaker trip coil) :………...…………………………

1. Is the busbar differential protection system extremely stable against external faults even

in the case of saturated CTs? :………...…………………………

1. Is the sensitivity for internal faults, adjustable

and unaffected by the number of feeders? :………...…………………………

1. Measuring principle (low-impedance) :………...…………………………
2. Is secure operation provided against

false tripping? :………...…………………………

1. Operational criteria to be fulfilled in order

to achieve tripping :………...…………………………

1. Does the protection adjust itself automatically to all switching operating

conditions without interruption? :………...…………………………

1. Does the busbar protection system include a function to a form a replica of the busbar

switching arrangements (VIII-8)? :………...…………………………

1. Is the busbar differential protection system equipped with breaker failure protection

according to paragraph VIII-9? :………………………………………

1. Does the busbar protection system include an independent overcurrent function according

to paragraph VIII-10? :……………………………………

1. Does the busbar differential protection system respond and trip only the breakers of

the bus section which is affected by the fault? :………...………………………

1. Is the busbar differential protection system capable of overcoming the blind spot between current

transformers and bus coupler? :………...…………………………

1. Does the protection scheme permit expansion? :……………....………..………….
2. Is there a continuous monitoring function included that produces an alarm even in the case of D.C. control voltage failure? :………...…………………………
3. Is the protection system immune against

any external interference? :………...…………………………

1. Trip output contacts:

- Current carrying capacity (A) :………...…………………………

- Making capacity (L/R=40 ms) (W/VA) :………...…………………………

- Braking capacity (L/R=40 ms) (W/VA) :………...…………………………

- Number of trip outputs :………...…………………………

1. Can all the settings and programming be performed by an embedded keyboard and

display as well as by a PC? :………...…………………………

-Is the software WINDOWS based, user

friendly and menu driven? :………………...…………………

-Can all analog waveforms and digital

signals be displayed on screen? :………………...…………………

-Is the relevant software provided? :………………...…………………

1. Does the offer include cables for the

communication of the relay with a PC? :………...…………………………

1. Communication protocols of the system :………...…………………………
2. Is the busbar differential protection system equipped with event and disturbance

recording capability? :………...…………………………

1. Is the busbar differential protection system of

the centralized or distributed type? :………...…………………………

1. Protection class (IP) of the relays which

constitute the busbar differential system: :………...…………………………

1. Cabinets of the protection system housing:

- Number :………...…………………………

- Dimensions :………...…………………………

- Protection class (IP) :………...…………………………

1. Are the means provided in order to have the system tested during

maintenance? :………...…………………………

1. Are test sockets for the voltage, current

and tripping protection circuits included? :………...…………………………

1. Are the required test plugs included in the offer? :………...…………………….………
2. Is the offered system completely wired tested and ready for connection to the

external circuits? :………...…………………………

1. Can the busbar differential relays be connected to an IEC 61850 substation control system with PRP redundancy through optical ports? :………...………………………..……
2. Deviations, if any, from the present

specification and the reasons thereof :………...…………………………

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………...…………………………