ID model for installation document

Installation document model in accordance with the NRA Order no. 176 of 07.09.2019 approving the Notification Procedure for the connection of demand facilties/nodes and verification of compliance of demand facilties/nodes with technical requirements for connection to the public electricity networks

The Installation document (ID) for demand facility contains the following documents:

a) request for the energisation for the beginning of the testing period;
b) the electrical single line scheme of the demand facility, distribution facility or distribution system;
c) an itemised statement of compliance by points relating to:
   (i) equipaments;
   (ii) reactive power exchange in the conmection point;
d) technical data according to the provisions of annexes no. 1÷6 from the NRA Order;
e) equipement certificates issued by an authorised certifier, requested by TSO, for the transmission-connected demand facilities, transmission-connected distribution facility and transmission-connected distribution system;
f) simulation models or equivalent informations provided in the connection technical norm and required by TSO, which completely simulates the behavior of the transmission-connected demand facility or transmission-connected distribution system or both of them, in stationary and dynamic conditions, including for transient electromagnetic phenomena, exchange of active and reactive power in the connection point, power quality provided in the connection point, as appropriate. The format and calculation program in which the models are provided are: Eurostag, PSSE or Neplan. Other programs may be used with the condition that one of the three specified programs is provided for a converter. The content of mathematical models includes conditions / settings for permanent and dynamic controls, network topology and single line diagram.
g) studies demonstrating expected performance on a permanent and dynamic regime, including reactive power exchange studies for lower active power circulation 25% of the maximum active power absorption capacity at connection / delimitation, as appropriate;
h) the tests program and the details of the practical method used in performing the verification tests of conformity, their performer and the technical data of the measuring equipment with which he performs the tests;
i) documents attesting to the completion of the preceding works of the energisation for the beginning of the testing period, including the results of the verification tests for the functioning of the communication path and integration of the new installation in EMS-SCADA system, provided in Annex no. 6 from the NRA Order;
j) the file of the installation of use.

ANNEX 1

Technical data of the demand facility connected to the transmission system and of the distribution system connected to the transmission system in the connection/interface poit, as the case may be

1. The owner of the demand facility connected to the transmission system and the DSO of the distribution system connected to the transmission system are obliged to transmit to the relevant network operator the technical data provided in table 1 in accordance with the provisions of this technical norm.
2. In the notification procedure for the connection of a demand facility / distribution system to the transmission system and also for the verification of the conformity to the requirements for their connection to the transmission system, the relevant network operator can ask for additional data for each stage of the notification and verification of the conformity.
3. The standard planning data (S), communicated in the connection demand and used in the solution studies (forms) represent all the general technical data which characterise the demand facility connected to the transmission system and the distribution system connected to the transmission system.
4. The detailed planning data (D) are technical data enabling special analysis of static and transient stability, the sizing of automation installations and protection control, as well as other necessary data for operative scheduling; the detailed planning data (D) are transmitted to the relevant network operator by minimum 1 month before commissioning.
5. The data validated and filled in upon commissioning are confirmed during the verification of conformity with the connection requirements (R).

Table 1. Technical data of the transmission-connected demand facility and the transmission-connected distribution system, at the connection/interface point, as the case may be

Description of data	Measuring units	Data category
Absorbed power	**MW**	**D, S**
Frequency:		
Frequency range in which the distribution system/demand facility remains operational	Hz	D

Nominal frequency	Hz	D
Dependence of absorbed power depending on network frequency	kW/df	
Operational time depending on the frequency range	min	D
Voltage:		
Nominal voltage	kV	S, D
Minimum/maximum voltage which the distribution system/demand facility stays operational for in the connection point to the transmission system	kV	D
Dependence of absorbed power depending on network frequency		
Operational time depending on the voltage range	s	D
Insulation coordination:		
Lightning-impulse withstand voltage	kV	D
Power-frequency withstand voltage (50 Hz)	kV	D
Switching withstand voltage	kV	D
Current:		
Maximum current	kA	S, D
Short-term maximum charging current	kA for time frames of seconds	D
Environmental conditions to which these types of current apply (temperature, pressure)	Text	S, D
Earthing:		
Earthing method	Text	D
Insulation performance under pollution conditions - pollution level	IEC 815	D
Data control and acquisition system:		
Communication channel (type, technical performance etc.)	Text	D
Remote control and transmitted data	Text	D
Current metering transformers	A/A	D
Voltage metering transformers	kV/V	D
Characteristics of the metering system	Text	R
Metering transformers - details of testing certificates	Text	R
Network configuration:		
Diagram of electrical circuits for existing and new installations, including arrangement of busbars, neutral treatment, switching equipment and operating voltages	Single-line diagram	S, D, R
Network impedance:		
Positive, negative and zero sequence impedance values	Ω	S, D, R
Short-circuit currents:		
Maximum short-circuit current	kA	S, D, R
Transfer capability:		
User or groups of users supplied through alternative connection points	Text	D, R
Demand normally supplied from connection point X	MW	D, R
Demand normally supplied from connection point Y	MW	D, R
Transfer switches under planned or incident conditions	Text	D, R
Transformers in the connection point:		
Saturation curve	Diagram	R
Data on transformer units (number of taps, voltage ratio, tap change mode, etc.)	Diagram, text	S, D, R

AVR data/logical diagram for transformers with automatic on load tap changer		

ANNEX no. 2

Technical data on reactive power compensation systems (SVC, STATCOM, shunt reactors, compensation batteries, synchronous compensators, etc.)

Description of data	Measuring unit	Data category
Single-line connection diagram and type of compensation equipment	Text	S, D, R
Nominal reactive power of the compensation equipment and range of variation of the reactive power	MVAr	S, D, R
Nominal voltage of the compensation equipment	kV	S, D, R
Single-line connection diagram and type of compensation equipment	Text	S, D, R
Location of the compensation equipment	Text	S, D, R
Switching /controlling mode	Text	S, D, R

ANNEX no. 3

Technical data of the equipment used to connect the demand facilities/distribution systems to the transmission systems

A. <u>Technical data model for an electric cable</u>

Cable material: (Cu or Al)		
Manufacturing: Text		
Type: Text		
Section: [mm^2]		
V_n: [kV]		
Length: [km]		
Direct and homopolar sequence settings (the temperature at which they are measured is specified):		
R_+ = [Ω/km]	X_+ = [Ω/km]	C_+ = [μF/km]
R_0 = [Ω/km]	X_0 = [Ω/km]	C_0 = [μF/km]
Mutual coupling settings (if the case may be):		
Coupling length: [km]		
R_{m0} = [Ω/km]	X_{m0} = [Ω/km]	

B. <u>Technical data model for an OHL</u>

Type: (single circuit/double circuit)
V_n: [kV]
Length: [km]

Majority tower type (code/dimensions)		
Active conductors:		
-Type: Text		
-Number of subconductors/phase: [piece]		
-Rdc_20°C= [Ω/km]		
-Range= [cm]		
-Nominal section= [mm^2]		
Protective conductors:		
-Type: Text		
-Number of conductors: [piece]		
-Rdc_20°C= [Ω/km]		
-Range= [cm]		
-Nominal sections= [mm^2]		
Direct and homopolar sequence settings (the temperature at which they are measured is specified):		
R_+ = [Ω/km]	X_+ = [Ω/km]	C_+ = [μF/km]
R_0 = [Ω/km]	X_0 = [Ω/km]	C_0 = [μF/km]
Mutual coupling settings (if the case may be):		
Coupling length: [km]		
R_{m0} = [Ω/km]	X_{m0} = [Ω/km]	

Note: Where applicable, technical data for OHL shall be specified for each section of line.

C. Technical data for transformers

C.1. Technical data model for 3-winding transformer

Transformer: Text			
Manufacturing: Text			
Type: Text			
Tank: Text			
Core: pillars	Connection:		
S_{nom1}[MVA]	V_{nom1} [MVA]	*$V_{sc.IM}$ [%]	$P_{sc.IM}$ [kW]
S_{nom2}[MVA]	V_{nom2} [MVA]	*$V_{sc.IJ}$ [%]	$P_{sc.IJ}$ [kW]
S_{nom3}[MVA]	V_{nom3} [MVA]	*$V_{sc.MJ}$ [%]	$P_{sc.MJ}$ [kW]
* *The power at which they are measured is specified.*			
I_{gol}[%]	P_{gol} [kW]		
Control windings			
Voltage control:	V_{pmax}[kV]	V_{pmin}[kV]	V_{plot}[kV]
	$V_{sc.pmax}$[%]	$V_{sc.pmin}$[%]	$V_{sc.pmed}$[%]
Neutral treatment level:			
Neutral treatment: Note: If the neutral of the star connection of the transformer windings is earthed by an impedance, the values of resistance and reactance of the earthing impedance shall be specified.			

C.2. Technical data model for 2-winding transformer

Manufacturing: Text			
Type: Text			
Neutral treatment level: Text			Conexiune
S_{nom}= [MVA]	$V_{nom\ I}$= [kV]	$V_{nom\ J}$= [kV]	$V_{scc\ IJ}$= [%]
$I_{gol\ I}$= [%]	$I_{gol\ J}$= [%]		
P_{agol} = [kW]	P_{ascc} = [kW]		
V_{pmax}= [kV]	V_{pmin}= [kV]	V_{plot} = [kV]	Rap. Tens. IJ:
$V_{scc\ max}$= [%]	$V_{scc\ min}$= [%]	$V_{scc\ nom}$= [%]	
Neutral treatment: Note: If the neutral of the star connection of the transformer windings is earthed by an impedance, the values of resistance and reactance of the earthing impedance shall be specified.			