

### Planning and project management in line with regulations

As a general principle, low-voltage switchgear and distributors should be planned to meet the operating conditions of their final installation site. To this end, the operator of the plant, in collaboration with the manufacturer, should stipulate the operating and ambient conditions. Moreover, as a general rule, the operator or planning office should also supply the manufacturer with full electrical specifications of both the mains supply end and the distributor outlet end. This makes it possible to plan and manufacture a cost-effective system with optimum adaptation to the technical requirements.

### Important operating and ambient conditions

- Rated operating voltage  $U_e$
- Mains frequency  $f_N$
- Rated insulation voltage  $U_i$
- Busbar rated current  $I_{sas}$
- Rated current for the supply end  $I_{zu}$
- Rated surge current resistance  $I_{pk}$
- Rated short-time current resistance  $I_{cw}$
- Ambient temperature condition  $\vartheta$
- Atmospheric climatic stress, specifying the relative humidity and temperature
- Protection category of the overall system IP . . .
- Specification to DIN EN 60 529
- Protection category

### Important basic data for planning and project management

- Applicable regulations and standards, both regional and international
- Electricity supply company conditions
- Operator-specific regulations
- Mains-specific protective measures/mains type
- Rated voltage and frequency
- Rated current with due regard for the number of conductors (infeed and busbars)
- Rated insulation voltage
- Short-circuit current at the point of installation
- Location of incoming cables, from above or below
- Number of incoming cables, specifying the type and cross-section
- Number of outlets, specifying the operating load and the envisaged outgoing cables with type and cross-section
- For the outlet side, specification of the simultaneity factor and rated load factor of the relevant equipment items

### Rated load factor

The rated load factor of a switchgear enclosure or part thereof (e.g. a field) comprising several main circuits refers to the ratio between the largest sum total of all currents anticipated at any given time in the affected main circuits and the sum total of the rated currents of all main circuits of the switchgear enclosure or observed part thereof.

Number of main circuits	Load factor
2 and 3	0.9
4 and 5	0.8
6 and 7	0.7
10 or more	0.6

### Rated currents and short-circuit currents of standard transformers

Rated voltage $U_N = 400\text{ V}$	400 V		
Short-circuit voltage $U_k$	4 % <sup>1)</sup>		6 % <sup>2)</sup>
Power consumption $S_{NT}$ [kVA]	Rated current $I_N$ [A]	Short-circuit current $I_k^{(3)}$ [kA]	
50	72	1.89	1.20
100	144	3.61	2.41
160	230	5.77	3.85
200	288	7.22	4.81
250	360	9.02	6.01
315	455	11.36	7.58
400	589	14.43	9.62
500	722	18.04	12.03
630	910	22.73	15.15
800	1156	28.86	19.24
1000	1444	36.08	24.05
1250	1805	45.09	30.06
1600	2312	57.72	38.48
2000	2882	72.15	48.10

<sup>1)</sup>  $U_k = 4\%$  standardised to DIN 42 503 for  $S_{NT} = 50 \dots 630\text{ kVA}$

<sup>2)</sup>  $U_k = 6\%$  standardised to DIN 42 511 for  $S_{NT} = 100 \dots 1600\text{ kVA}$

<sup>3)</sup>  $I_k^{(3)}$  = Initial symmetrical short-circuit current of transformer when connecting to a mains supply with unlimited short-circuit lead