4 Technical data

4.1 LI system in general

System-specific data	Unit	LI...
Standards and regulations		IEC 61439-1 / -6, EN 61439-1 / -6
Resistance to extreme climates		
Damp heat, constant, acc. to IEC 60068-2-78	-	40 °C / 93 % RH / 56d
Damp heat, cyclic, acc. to IEC 60068-2-30	-	56 x (25 … 40 °C / 3 h; 40 °C / 9 h; 40 … 25 °C / 3 … 6 h; 25 °C / 6 h) / 95 % RH
Cold according to IEC 60068-2-1	-	-45 °C, 16 h
Temperature change in accordance with IEC 60068-2-14	-	-45 °C … 55 °C; 5 cycles (1 °C / min); holding time at least 30 min
Salt spray test in accordance with IEC 60068-2-52	-	Degree of severity 3
Ice formation acc. to IEC 60068-2-61	-	Testing based on a combination of moist heat, cyclic + low temperature
Environmental classes in accordance with IEC 60721 (as derived from climatic proofing tests)		
Climatic:	-	1K5 (storage) = 3K7L (operation without direct sunlight); 2K2 (transport)
Chemically active:	-	Salt spray, other contaminants optional, 1C2 (storage) = 3C2 (operation) = 2C2 (transport)
Biological:	-	Covered by IP degrees of protection and packaging method 1B2 (storage) = 3B2 (operation) = 2B2 (transport)
Mechanically active:	-	Covered by IP degrees of protection and packaging method 1S2 (storage) = 3S2 (operation); 2S2 (transport)
Ambient temperature min. / max. 24 h average[1)]	°C	-5 / +40 / +35 (all positions)
Degree of protection	-	IP55, IP66[2)]
Mounting positions	-	horizontal edgewise, horizontal flat, vertical
Torque for bolt terminal (reuse)	Nm	50 ± 5
Busbar surface treatment	-	Insulated along entire length. Aluminium nickel-plated and tinned at the current transitions Copper tinned at the current transitions Current transitions at the tap-off points silver-coated
Insulation (thermal class)	-	Mylar;
Protection class against external mechanical stress	-	IK 08 (IP55)[3)]
Trunking unit material	-	Aluminium powder-coated
Tap-off unit material	-	Sheet steel with powdered paint finish

System-specific data	Unit	LI...
Colour of trunking units, tap-off units	-	RAL 7035 (light grey)
Dimensions	-	See "Dimensions"
Weight	-	See "Weight data per system"
Rated insulation voltage in acc. with IEC 61439-1	V AC	Up to 1000
Rated operating voltage (power transmission) with overvoltage category III/3	V AC	1000
Rated operating voltage (power distribution with tap-off units) with overvoltage category III/3	V AC	Up to 690
Rated frequency	Hz	50 / 60[4)]

1) Temperature factor k1 for min. and max. ambient temperature on request; higher temperatures are also permitted depending on the mounting position (values on request)

2) For power transmission and interior installation

3) Not applicable to built-in devices in tap-off units, the measuring device box and the cover of the tap-off points.

4) In accordance with IEC 61439-1, a reduction to 95 % must be taken into account for currents > 800 A at a frequency of 60 Hz.

Load factors									
Ambient temperature (24-hour average)	25 °C	30 °C	35 °C	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C
All mounting positions; 50 Hz	1.05	1.025	1	0.95	0.9	0.85	0.8	0.75	0.665
Harmonics	On request								
Frequencies not equal to 50 Hz, direct current	Factor of 0.95 at 60 Hz; at higher/lower frequencies, direct current on request								

4.2 Trunking units LI-A

System			LI-A.	0800	1000	1250	1600	2000
System-specific data			**Unit**					
Rated current	-	I_{nA}	A	800	1 000	1 250	1 600	2 000
Conductor material	-	-	-	Aluminium				
Conductor impedance								
At 50 Hz and ambient temperature +20 °C	Resistance	R_{20}	mΩ/m	0.090	0.063	0.053	0.037	0.027
At 50 Hz, final heat development of the busbars and ambient temperature +35 °C	Resistance	R_1	mΩ/m	0.125	0.88	0.074	0.052	0.038
	Reactance	X_1	mΩ/m	0.021	0.016	0.014	0.010	0.008
	Impedance	Z_1	mΩ/m	0.127	0.089	0.075	0.053	0.038
Impedance of PE path as pure return conductor								
At 50 Hz and ambient temperature +20 °C	Resistance	R_{20}	mΩ/m	0.045	0.042	0.041	0.039	0.034
Short-circuit rating 3-pole phases, 1-pole N (PEN), 1-pole PE bar (100 %)								
Rated short-time withstand current	rms value t = 1 s	I_{CW}	kA	35	50	60	65	80
	rms value t = 0.5 s[1)]	I_{CW}	kA	49	71	85	92	113
Rated impulse withstand current	Peak value	I_{pk}	kA	74	105	132	143	176
Max. thermal load	Amount of heat (1 s)	I^2t	$A^2s\ 10^6$	1 225	2 500	3 600	4 225	6 400
Short-circuit rating 1-pole PE housing								
Rated short-time withstand current	rms value t = 1 s	I_{CW}	kA	21	30	36	39	48
	rms value t = 0.5 s[1)]	I_{CW}	kA	30	42	51	55	68
Rated impulse withstand current	Peak value	I_{pk}	kA	44	63	76	82	106
Max. thermal load	Amount of heat (1 s)	I^2t	$A^2s\ 10^6$	441	900	1 296	1 521	2 304
Conductor cross-section								
	L1, L2, L3, N, CPE, 100 % PE = busbar	A	mm^2	350	499	599	849	1 185
	200 % N	A	mm^2	[2)]	[2)]	[2)]	[2)]	[2)]
	PEN	A	mm^2	350	499	599	849	1185
Voltage drop dU[3)]								
		cos φ						
		1	mV/m/A	0.1139	0.0800	0.0670	0.0471	0.0342
		0.9	mV/m/A	0.1109	0.0783	0.0658	0.0463	0.0338
		0.8	mV/m/A	0.1026	0.0726	0.0611	0.0430	0.0315
		0.7	mV/m/A	0.0934	0.0663	0.0558	0.0394	0.0289

1) Calculated values
2) Available soon
3) Voltage drop applies after final heat development of the busbars and with evenly distributed load in the case of power distribution (k ~ 0.5). The values must be doubled in the case of power transmission (k = 1).

System			LI-A.	2500	3200	4000	5000
System-specific data			**Unit**				
Rated current	-	I_{nA}	A	2 500	3 200	4 000	5 000
Conductor material	-	-	-	Aluminium			
Conductor impedance							
At 50 Hz and ambient temperature +20 °C	Resistance	R_{20}	mΩ/m	0.020	0.019	0.013	0.010
At 50 Hz, final heat development of the busbars and ambient temperature +35 °C	Resistance	R_1	mΩ/m	0.027	0.026	0.018	0.013
	Reactance	X_1	mΩ/m	0.006	0.005	0.004	0.003
	Impedance	Z_1	mΩ/m	0.028	0.027	0.018	0.014
Impedance of PE path as pure return conductor							
At 50 Hz and ambient temperature +20 °C	Resistance	R_{20}	mΩ/m	0.032	0.021	0.019	0.015
Short-circuit rating 3-pole phases, 1-pole N (PEN), 1-pole PE bar (100 %)							
Rated short-time withstand current	rms value t = 1 s	I_{CW}	kA	100	120	150	150
	rms value t = 0.5 s 1)	I_{CW}	kA	141	170	212	212
Rated impulse withstand current	Peak value	I_{pk}	kA	220	264	330	330
Max. thermal load	Amount of heat (1 s)	I^2t	$A^2s\ 10^6$	10 000	14 400	22 500	22 500
Short-circuit rating 1-pole PE housing							
Rated short-time withstand current	rms value t = 1 s	I_{CW}	kA	60	72	90	90
	rms value t = 0.5 s 1)	I_{CW}	kA	85	102	127	127
Rated impulse withstand current	Peak value	I_{pk}	kA	132	158	198	198
Max. thermal load	Amount of heat (1 s)	I^2t	$A^2s\ 10^6$	3 600	5 184	8 100	8 100
Conductor cross-section							
	L1, L2, L3, N, CPE, 100 % PE = busbar	A	mm^2	1 652	1 699	2 370	3 304
	200 % N	A	mm^2	2)	2)	2)	2)
	PEN	A	mm^2	1 652	1 699	2 370	3 304
Voltage drop dU 3)							
		cos φ					
		1	mV/m/A	0.0248	0.0238	0.0163	0.0121
		0.9	mV/m/A	0.0246	0.0234	0.0162	0.0121
		0.8	mV/m/A	0.0230	0.0218	0.0151	0.0113
		0.7	mV/m/A	0.0211	0.0200	0.0138	0.0104

1) Calculated values
2) Available soon
3) Voltage drop applies after final heat development of the busbars and with evenly distributed load in the case of power distribution (k ~ 0.5). The values must be doubled in the case of power transmission (k = 1).

4.3 Impedances LI-A for calculating fault currents according to the method of the impedances

System				LI-A.	0800	1000	1250	1600	2000
Rated current			I_{nA}	A	800	1000	1250	1600	2000
Conductor configurations	**Ambient temperature**			**Unit**					
Impedance of fault loops, phase with PE and phase with PEN at 50 Hz									
3Ph-PE(H) 3Ph-N-PE(H) 3Ph-200%N-PE(H) 3Ph-N-PE(H)-CPE 3Ph-200%N-PE(H)-CPE	20 °C	Resistance	$R_{b20\text{-}ph\text{-}PE}$	mΩ/m	0.136	0.106	0.095	0.076	0.061
		Reactance	$X_{b20\text{-}ph\text{-}PE}$	mΩ/m	0.053	0.044	0.039	0.031	0.024
		Impedance	$Z_{b20\text{-}ph\text{-}PE}$	mΩ/m	0.146	0.115	0.102	0.082	0.066
3Ph-N-100%PE(B)	20 °C	Resistance	$R_{b20\text{-}ph\text{-}PE}$	mΩ/m	0.127	0.096	0.083	0.062	0.047
		Reactance	$X_{b20\text{-}ph\text{-}PE}$	mΩ/m	0.045	0.035	0.030	0.023	0.016
		Impedance	$Z_{b20\text{-}ph\text{-}PE}$	mΩ/m	0.134	0.102	0.088	0.066	0.050
3Ph-PEN	20 °C	Resistance	$R_{b20\text{-}ph\text{-}PEN}$	mΩ/m	0.127	0.096	0.083	0.062	0.047
		Reactance	$X_{b20\text{-}ph\text{-}PEN}$	mΩ/m	0.045	0.035	0.030	0.023	0.016
		Impedance	$Z_{b20\text{-}ph\text{-}PEN}$	mΩ/m	0.134	0.102	0.088	0.066	0.050
Impedance of fault loops, phase with N and phase with phase at 50 Hz									
3Ph-N-PE(H) 3Ph-N-100%PE(B) 3Ph-N-PE(H)-CPE	20 °C	Resistance	$R_{b20\text{-}ph\text{-}N(ph)}$	mΩ/m	0.190	0.134	0.113	0.081	0.058
		Reactance	$X_{b20\text{-}ph\text{-}N(ph)}$	mΩ/m	0.052	0.043	0.033	0.025	0.019
		Impedance	$Z_{b20\text{-}ph\text{-}N(ph)}$	mΩ/m	0.197	0.141	0.117	0.084	0.061
3Ph-200%N-PE(H) 3Ph-200%N-PE(H)-CPE	20 °C	Resistance	$R_{b20\text{-}ph\text{-}N}$	mΩ/m	[1]	[1]	[1]	[1]	[1]
		Reactance	$X_{b20\text{-}ph\text{-}N}$	mΩ/m	[1]	[1]	[1]	[1]	[1]
		Impedance	$Z_{b20\text{-}ph\text{-}N}$	mΩ/m	[1]	[1]	[1]	[1]	[1]
	20 °C	Resistance	$R_{b20\text{-}ph\text{-}ph}$	mΩ/m	0.183	0.128	0.108	0.076	0.054
		Reactance	$X_{b20\text{-}ph\text{-}ph}$	mΩ/m	0.036	0.030	0.023	0.017	0.015
		Impedance	$Z_{b20\text{-}ph\text{-}ph}$	mΩ/m	0.186	0.131	0.110	0.078	0.056

1) Available soon

System				LI-A.	2500	3200	4000	5000
Rated current			I_{nA}	A	2500	3200	4000	5000
Conductor configurations	Ambient temperature			Unit				
Impedance of fault loops, phase with PE and phase with PEN at 50 Hz								
3Ph-PE(H) 3Ph-N-PE(H) 3Ph-200%N-PE(H) 3Ph-N-PE(H)-CPE 3Ph-200%N-PE(H)-CPE	20 °C	Resistance	$R_{b20\text{-}ph\text{-}PE}$	mΩ/m	0.052	0.032	0.033	0.025
		Reactance	$X_{b20\text{-}ph\text{-}PE}$	mΩ/m	0.018	0.016	0.012	0.007
		Impedance	$Z_{b20\text{-}ph\text{-}PE}$	mΩ/m	0.055	0.042	0.035	0.026
3Ph-N-100%PE(B)	20 °C	Resistance	$R_{b20\text{-}ph\text{-}PE}$	mΩ/m	0.035	0.032	0.024	0.018
		Reactance	$X_{b20\text{-}ph\text{-}PE}$	mΩ/m	0.012	0.012	0.009	0.006
		Impedance	$Z_{b20\text{-}ph\text{-}PE}$	mΩ/m	0.037	0.034	0.026	0.019
3Ph-PEN	20 °C	Resistance	$R_{b20\text{-}ph\text{-}PEN}$	mΩ/m	0.035	0.032	0.024	0.018
		Reactance	$X_{b20\text{-}ph\text{-}PEN}$	mΩ/m	0.012	0.012	0.009	0.006
		Impedance	$Z_{b20\text{-}ph\text{-}PEN}$	mΩ/m	0.037	0.034	0.026	0.019
Impedance of fault loops, phase with N and phase with phase at 50 Hz								
3Ph-N-PE(H) 3Ph-N-100%PE(B) 3Ph-N-PE(H)-CPE	20 °C	Resistance	$R_{b20\text{-}ph\text{-}N(ph)}$	mΩ/m	0.042	0.040	0.029	0.021
		Reactance	$X_{b20\text{-}ph\text{-}N(ph)}$	mΩ/m	0.013	0.014	0.009	0.008
		Impedance	$Z_{b20\text{-}ph\text{-}N(ph)}$	mΩ/m	0.044	0.042	0.030	0.022
3Ph-200%N-PE(H) 3Ph-200%N-PE(H)-CPE	20 °C	Resistance	$R_{b20\text{-}ph\text{-}N}$	mΩ/m	[1]	[1]	[1]	[1]
		Reactance	$X_{b20\text{-}ph\text{-}N}$	mΩ/m	[1]	[1]	[1]	[1]
		Impedance	$Z_{b20\text{-}ph\text{-}N}$	mΩ/m	[1]	[1]	[1]	[1]
	20 °C	Resistance	$R_{b20\text{-}ph\text{-}ph}$	mΩ/m	0.040	0.037	0.028	0.020
		Reactance	$X_{b20\text{-}ph\text{-}ph}$	mΩ/m	0.009	0.010	0.006	0.005
		Impedance	$Z_{b20\text{-}ph\text{-}ph}$	mΩ/m	0.041	0.038	0.028	0.020

[1] Available soon

4.4 Impedances LI-A for calculating fault currents according to the method of the symmetrical components

System				LI-A.	0800	1000	1250	1600	2000
Rated current			I_{nA}	A	800	1000	1250	1600	2000
Conductor configurations	Ambient temperature			Unit					
Zero impedance of the phases with PE and phase with PEN at 50 Hz									
3Ph-PE(H) 3Ph-N-PE(H) 3Ph-200%N-PE(H) 3Ph-N-PE(H)-CPE 3Ph-200%N-PE(H)-CPE	20 °C	Resistance	$R_{0\ b20\text{-}ph\text{-}PE}$	mΩ/m	0.229	0.192	0.179	0.154	0.129
		Reactance	$X_{0\ b20\text{-}ph\text{-}PE}$	mΩ/m	0.126	0.108	0.096	0.078	0.060
		Impedance	$Z_{0\ b20\text{-}ph\text{-}PE}$	mΩ/m	0.262	0.220	0.203	0.173	0.142
3Ph-N-100%PE(B)	20 °C	Resistance	$R_{0\ b20\text{-}ph\text{-}PE}$	mΩ/m	0.202	0.163	0.143	0.112	0.088
		Reactance	$X_{0\ b20\text{-}ph\text{-}PE}$	mΩ/m	0.102	0.078	0.069	0.051	0.039
		Impedance	$Z_{0\ b20\text{-}ph\text{-}PE}$	mΩ/m	0.226	0.181	0.158	0.123	0.096
3Ph-PEN	20 °C	Resistance	$R_{0\ b20\text{-}ph\text{-}PEN}$	mΩ/m	0.202	0.163	0.143	0.112	0.088
		Reactance	$X_{0\ b20\text{-}ph\text{-}PEN}$	mΩ/m	0.102	0.078	0.069	0.051	0.039
		Impedance	$Z_{0\ b20\text{-}ph\text{-}PEN}$	mΩ/m	0.226	0.181	0.158	0.123	0.096
Zero impedance of fault loops, phases with N at 50 Hz									
3Ph-N-PE(H) 3Ph-N-100%PE(B) 3Ph-N-PE(H)-CPE	20 °C	Resistance	$R_{0\ b20\text{-}ph\text{-}N}$	mΩ/m	0.387	0.273	0.231	0.165	0.120
		Reactance	$X_{0\ b20\text{-}ph\text{-}N}$	mΩ/m	0.117	0.096	0.075	0.054	0.048
		Impedance	$Z_{0\ b20\text{-}ph\text{-}N}$	mΩ/m	0.404	0.289	0.243	0.174	0.129
3Ph-200%N-PE(H) 3Ph-200%N-PE(H)-CPE	20 °C	Resistance	$R_{0\ b20\text{-}ph\text{-}N}$	mΩ/m	[1]	[1]	[1]	[1]	[1]
		Reactance	$X_{0\ b20\text{-}ph\text{-}N}$	mΩ/m	[1]	[1]	[1]	[1]	[1]
		Impedance	$Z_{0\ b20\text{-}ph\text{-}N}$	mΩ/m	[1]	[1]	[1]	[1]	[1]

1) Available soon

System				LI-A.	2500	3200	4000	5000
Rated current			I_{nA}	A	2500	3200	4000	5000
Conductor configurations	Ambient temperature			Unit				
Zero impedance of the phases with PE and phase with PEN at 50 Hz								
3Ph-PE(H) 3Ph-N-PE(H) 3Ph-200%N-PE(H) 3Ph-N-PE(H)-CPE 3Ph-200%N-PE(H)-CPE	20 °C	Resistance	$R_{0\ b20\text{-}ph\text{-}PE}$	mΩ/m	0.116	0.080	0.073	0.055
		Reactance	$X_{0\ b20\text{-}ph\text{-}PE}$	mΩ/m	0.045	0.039	0.030	0.033
		Impedance	$Z_{0\ b20\text{-}ph\text{-}PE}$	mΩ/m	0.124	0.089	0.079	0.064
3Ph-N-100%PE(B)	20 °C	Resistance	$R_{0\ b20\text{-}ph\text{-}PE}$	mΩ/m	0.067	0.058	0.046	0.035
		Reactance	$X_{0\ b20\text{-}ph\text{-}PE}$	mΩ/m	0.030	0.039	0.018	0.015
		Impedance	$Z_{0\ b20\text{-}ph\text{-}PE}$	mΩ/m	0.074	0.070	0.049	0.038
3Ph-PEN	20 °C	Resistance	$R_{0\ b20\text{-}ph\text{-}PEN}$	mΩ/m	0.067	0.058	0.046	0.035
		Reactance	$X_{0\ b20\text{-}ph\text{-}PEN}$	mΩ/m	0.030	0.039	0.018	0.015
		Impedance	$Z_{0\ b20\text{-}ph\text{-}PEN}$	mΩ/m	0.074	0.070	0.049	0.038
Zero impedance of fault loops, phases with N at 50 Hz								
3Ph-N-PE(H) 3Ph-N-100%PE(B) 3Ph-N-PE(H)-CPE	20 °C	Resistance	$R_{0\ b20\text{-}ph\text{-}N}$	mΩ/m	0.087	0.081	0.060	0.042
		Reactance	$X_{0\ b20\text{-}ph\text{-}N}$	mΩ/m	0.030	0.030	0.018	0.018
		Impedance	$Z_{0\ b20\text{-}ph\text{-}N}$	mΩ/m	0.092	0.086	0.063	0.046
3Ph-200%N-PE(H) 3Ph-200%N-PE(H)-CPE	20 °C	Resistance	$R_{0\ b20\text{-}ph\text{-}N}$	mΩ/m	[1]	[1]	[1]	[1]
		Reactance	$X_{0\ b20\text{-}ph\text{-}N}$	mΩ/m	[1]	[1]	[1]	[1]
		Impedance	$Z_{0\ b20\text{-}ph\text{-}N}$	mΩ/m	[1]	[1]	[1]	[1]

[1] Available soon