

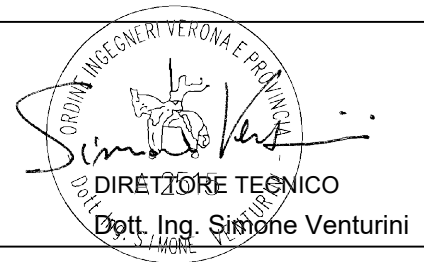


PROGETTO DEFINITIVO DI UN IMPIANTO AGRO-FOTOVOLTAICO DELLA POTENZA COMPLESSIVA DI 104,4 MWp, E RELATIVE OPERE DI CONNESSIONE ALLA RETE, DOTATO DI SISTEMA DI ACCUMULO CON POTENZA DI 17,6 MW DA REALIZZARSI NEL COMUNE DI TORREMAGGIORE (FG)

PROGETTO DEFINITIVO

COMMITTENTE: EPSILON SOLAR s.r.l.

PROGETTISTA:



TITOLO ELABORATO:

BROCHURE SCARICATORE AT

ELABORATO n° :

BI026F-D-TM00-IMP-SH-11-00

NOME FILE :

SCALA : -

DATA : Marzo 2024

	N.	DATA	DESCRIZIONE	ELABORATO	CONTROLLATO	APPROVATO
REVISIONE	00	Marzo 2024	Emissione	N.Ostoich	M.Palvarini	S. Venturini
	01					
	02					
	03					
	04					

3EL2 Surge arrester with silicone rubber housing and Cage Design™

Technical datasheet

Protection of:

- Transformers
- Circuit breakers
- Generators
- Motors
- Capacitors
- Traction vehicles
- Bushings
- Switchgear
- Transmission lines



Maximum values		3EL2	3EL2	3EL2	3EL2
Highest voltage of the system	kV	362	420	420	420
Maximum rated voltage	kV	288	360	360	360
Nominal discharge current	kA	10	10	20	20
Line discharge class		2	3	3	4
Energy absorption capability	kJ/kV	5.0	8.0	8.0	10.0
Long duration current impulse	A	1100	1100	1200	1200
Rated short-circuit current	kA	65	65	65	65
High current impulse	kA	100	100	100	100
Bending moment dynamic	kNm	4.0	4.0	4.0	4.0

3EL2 – order numbers

Data position	1	2	3	4	–	5	6	7	–	8	9	10	11	12	–	13	14	15	16			
Order number	3	E	L	2		x	x	x		2	P	J	3	1		4	D	A	1	–	Z	
Product line																						
Silicone rubber-housed surge arrester, cage design	3	E	L	2																		
Rated voltage in kV							x	x	x													
Long duration current impulse, energy absorption capability																						
$I_{zms} = 1100$ A, $E_{th} = 5$ kJ/kV _r , line discharge class 2										2			2									
$I_{zms} = 1100$ A, $E_{th} = 8$ kJ/kV _r , line discharge class 3										2			3									
$I_{zms} = 1200$ A, $E_{th} = 8$ kJ/kV _r , line discharge class 3										6			3									
$I_{zms} = 1200$ A, $E_{th} = 10$ kJ/kV _r , line discharge class 4										6			4									
Application																						
Line surge arrester (For more details refer to catalog Line Surge Arresters)											L											
Phase surge arrester											P											
Neutral point surge arrester											S											
Housing size, number of units. Refer to »Mechanical characteristics« on page 45																						
Housing »C«, 1 unit												C	1									
Housing »F«, 1 unit												F	1									
Housing »J«, 1 unit												J	1									
Housing »M«, 1 unit												M	1									
Housing »C+J«, 2 units												P	2									
Housing »F+J«, 2 units												Q	2									
Housing »F+M«, 2 units												R	2									
Housing »2xJ«, 2 units												J	2									
Housing »J+M«, 2 units												W	2									
Housing »2xM«, 2 units												M	2									
Housing »F+J+J«, 3 units												X	3									
Housing »3xJ«, 3 units												J	3									
Form of sheds and color of silicone rubber																						
Alternating sheds, gray silicone rubber, upright mounting																		4				
Alternating sheds, gray silicone rubber, suspended mounting																		8				
High-voltage terminal																						
Metal plate																		A				
Bolt, 30 mm diameter, 80 mm length, stainless steel																		D				
Bolt, 30 mm diameter, 100 mm length, stainless steel																		E				
Bolt, 40 mm diameter, 80 mm length, stainless steel																		G				
Bolt, 40 mm diameter, 120 mm length, stainless steel																		J				
Flat DIN/NEMA, 40x40 ... 50x50, 20 mm, hot dip galvanized steel																		L				
Flat DIN/NEMA, 40x40 ... 50x50, aluminum																		T				
Flat DIN/NEMA, 40x40 ... 50x50, hot dip galvanized steel																		X				
Flat DIN/NEMA, 40x40 ... 50x50, stainless steel																		Y				
Bolt, 26 mm diameter, 100 mm length, stainless steel																		Z				P1A
Bolt, 30 mm diameter, 80 mm length, aluminum																		Z				P1C
Bolt, 35 mm diameter, 120 mm length, stainless steel																		Z				P1F
Bolt, 38 mm diameter, 125 mm length, stainless steel																		Z				P1G
Bolt, 40 mm diameter, 80 mm length, aluminum																		Z				P1H
Bolt, 40 mm diameter, 125 mm length, aluminum																		Z				P1L
Bolt, 40 mm diameter, 150 mm length, aluminum																		Z				P1N
Bolt, 40 mm diameter, 80 mm length, copper																		Z				P1Q
Flat, 4xD=16, aluminum																		Z				P5A
Flat, 4xD=14/50, Palm 5, aluminum																		Z				P5G
Flat, 2xD=18/60, Palm 7, aluminum																		Z				P5J
Flat, 4xD=18/60, Palm 8, aluminum																		Z				P5K
Flat, 6xD=18/70, Palm 13, aluminum																		Z				P5P
Flat, 6xD=18 60/60, hot dip galvanized steel																		Z				P5S

3EL2 – order numbers

Data position	1	2	3	4	-	5	6	7	-	8	9	10	11	12	-	13	14	15	16			
Order number	3	E	L	2		x	x	x		2	P	J	3	1		4	D	A	1	-	Z	
Nameplate																						
German/English (standard)																			A			
French																			B			
Czech																			C			
Slovene																			D			
Russian																			E			
Spanish																			F			
Portuguese																			G			
Arabic																			R			
Brazil																			T			
CFE (Mexico)																			U			
Customized version																			Z			
Mounting																						
D=140 mm, grounded, stainless steel																			0			
D=200 mm–276 mm, insulated, stainless steel																			1			
200 mm x 200 mm, insulated																			2			
310 mm x 310 mm, insulated																			3			
D=200 mm–276 mm, grounded, stainless steel																			5			
170 mm x 170 mm, insulated																			9			R1B
Accessories																						
Refer to table »Optional accessories« on page 110																			-	Z		

Ratings and specifications

Electrical characteristics – phase arresters													
Highest voltage of the system	Rated voltage	Continuous operating voltage	Line discharge class	Long duration current 2ms	Maximum values of the residual voltages at discharge currents of the following impulses							Arrester type	Minimum housing size
					30/60 μ s 0.5 kA kV	30/60 μ s 1 kA kV	30/60 μ s 2 kA kV	8/20 μ s 5 kA kV	8/20 μ s 10 kA kV	8/20 μ s 20 kA kV	8/20 μ s 40 kA kV		
12	9	7.2	2	1100	16.2	16.6	17.4	19.0	20.3	22.5	25.5	3EL2 009 - 2 P. 2 . -	C
	9	7.2	3	1100	16.9	17.3	18.2	19.9	21.2	23.5	26.6	3EL2 009 - 2 P. 3 . -	C
	9	7.2	4	1200	17.5	17.9	18.8	20.3	21.6	23.8	25.9	3EL2 009 - 6 P. 4 . -	C
	12	9.6	2	1100	21.6	22.1	23.2	25.4	27.0	30.0	34.0	3EL2 012 - 2 P. 2 . -	C
	12	9.6	3	1100	22.6	23.1	24.3	26.5	28.2	31.3	35.5	3EL2 012 - 2 P. 3 . -	C
	12	9.6	4	1200	23.3	23.9	25.1	27.1	28.8	31.7	34.6	3EL2 012 - 6 P. 4 . -	C
17.5	15	12.0	2	1100	27.0	27.7	29.0	31.7	33.8	37.5	42.5	3EL2 015 - 2 P. 2 . -	C
	15	12.0	3	1100	28.2	28.9	30.3	33.1	35.3	39.1	44.4	3EL2 015 - 2 P. 3 . -	C
	15	12.0	4	1200	29.2	29.9	31.3	33.8	36.0	39.6	43.2	3EL2 015 - 6 P. 4 . -	C
	18	14.4	2	1100	32.4	33.2	34.8	38.1	40.5	45.0	51.0	3EL2 018 - 2 P. 2 . -	C
	18	14.4	3	1100	33.8	34.7	36.4	39.8	42.3	47.0	53.3	3EL2 018 - 2 P. 3 . -	C
	18	14.4	4	1200	35.0	35.9	37.6	40.6	43.2	47.5	51.8	3EL2 018 - 6 P. 4 . -	C
	24	19.2	2	1100	43.2	44.3	46.4	50.8	54.0	59.9	68.0	3EL2 024 - 2 P. 2 . -	C
	24	19.2	3	1100	45.1	46.2	48.5	53.0	56.4	62.6	71.1	3EL2 024 - 2 P. 3 . -	C
24	21	16.8	2	1100	37.8	38.7	40.6	44.4	47.3	52.4	59.5	3EL2 021 - 2 P. 2 . -	C
	21	16.8	3	1100	39.5	40.5	42.4	46.4	49.4	54.8	62.2	3EL2 021 - 2 P. 3 . -	C
	21	16.8	4	1200	40.8	41.8	43.8	47.4	50.4	55.4	60.5	3EL2 021 - 6 P. 4 . -	C
	30	24.0	2	1100	54.0	55.4	58.1	63.5	67.5	74.9	85.1	3EL2 030 - 2 P. 2 . -	C
	30	24.0	3	1100	56.4	57.8	60.6	66.3	70.5	78.3	88.8	3EL2 030 - 2 P. 3 . -	C
	30	24.0	4	1200	58.3	59.8	62.6	67.7	72.0	79.2	86.4	3EL2 030 - 6 P. 4 . -	C
36	30	24.0	2	1100	54.0	55.4	58.1	63.5	67.5	74.9	85.1	3EL2 030 - 2 P. 2 . -	C
	30	24.0	3	1100	56.4	57.8	60.6	66.3	70.5	78.3	88.8	3EL2 030 - 2 P. 3 . -	C
	30	24.0	4	1200	58.3	59.8	62.6	67.7	72.0	79.2	86.4	3EL2 030 - 6 P. 4 . -	C
	45	36	2	1100	81.0	83.0	87.1	95.2	101	112	128	3EL2 045 - 2 P. 2 . -	C
	45	36	3	1100	84.6	86.7	90.9	99.4	106	117	133	3EL2 045 - 2 P. 3 . -	F
52	42	34	3	1100	79.0	80.9	84.9	92.8	98.7	110	124	3EL2 042 - 2 P. 3 . -	C
	42	34	4	1200	81.6	83.7	87.7	94.8	101	111	121	3EL2 042 - 6 P. 4 . -	F
	45	36	3	1100	84.6	86.7	90.9	99.4	106	117	133	3EL2 045 - 2 P. 3 . -	F
	45	36	4	1200	87.5	89.6	94.0	102	108	119	130	3EL2 045 - 6 P. 4 . -	F
72.5	54	43	3	1100	102	104	109	119	127	141	160	3EL2 054 - 2 P. 3 . -	F
	54	43	4	1200	105	108	113	122	130	143	156	3EL2 054 - 6 P. 4 . -	F
	60	48	3	1100	113	116	121	133	141	157	178	3EL2 060 - 2 P. 3 . -	F
	60	48	4	1200	117	120	125	135	144	158	173	3EL2 060 - 6 P. 4 . -	F
	66	53	3	1100	124	127	133	146	155	172	195	3EL2 066 - 2 P. 3 . -	F
	66	53	4	1200	128	131	138	149	158	174	190	3EL2 066 - 6 P. 4 . -	F
	72	58	3	1100	135	139	146	159	169	188	213	3EL2 072 - 2 P. 3 . -	F
	72	58	4	1200	140	143	150	162	173	190	207	3EL2 072 - 6 P. 4 . -	F

Ratings and specifications

Electrical characteristics – phase arresters														
Highest voltage of the system	Rated voltage	Continuous operating voltage	Line discharge class	Long duration current 2ms	Maximum values of the residual voltages at discharge currents of the following impulses								Arrester type	Minimum housing size
					30/60 μ s 0.5 kA kV	30/60 μ s 1 kA kV	30/60 μ s 2 kA kV	8/20 μ s 5 kA kV	8/20 μ s 10 kA kV	8/20 μ s 20 kA kV	8/20 μ s 40 kA kV			
123	96	77	3	1100	180	185	194	212	226	250	284	3EL2 096 - 2 P. 3 . -	J	
	96	77	4	1200	187	191	200	217	230	253	276	3EL2 096 - 6 P. 4 . -	J	
	102	82	3	1100	192	197	206	225	240	266	302	3EL2 102 - 2 P. 3 . -	J	
	102	82	4	1200	198	203	213	230	245	269	294	3EL2 102 - 6 P. 4 . -	J	
	108	86	3	1100	203	208	218	239	254	282	320	3EL2 108 - 2 P. 3 . -	J	
	108	86	4	1200	210	215	226	244	259	285	311	3EL2 108 - 6 P. 4 . -	J	
	154	123	3	1100	290	297	311	340	362	402	456	3EL2 154 - 2 P. 3 . -	M	
145	120	96	3	1100	226	231	243	265	282	313	355	3EL2 120 - 2 P. 3 . -	J	
	120	96	4	1200	233	239	251	271	288	317	346	3EL2 120 - 6 P. 4 . -	J	
	132	106	3	1100	248	254	267	292	310	344	391	3EL2 132 - 2 P. 3 . -	M	
	132	106	4	1200	257	263	276	298	317	348	380	3EL2 132 - 6 P. 4 . -	M	
	144	115	3	1100	271	277	291	318	338	376	426	3EL2 144 - 2 P. 3 . -	M	
	144	115	4	1200	280	287	301	325	346	380	415	3EL2 144 - 6 P. 4 . -	M	
170	138	110	3	1100	259	266	279	305	324	360	409	3EL2 138 - 2 P. 3 . -	M	
	138	110	4	1200	268	275	288	311	331	364	397	3EL2 138 - 6 P. 4 . -	M	
	144	115	3	1100	271	277	291	318	338	376	426	3EL2 144 - 2 P. 3 . -	M	
	144	115	4	1200	280	287	301	325	346	380	415	3EL2 144 - 6 P. 4 . -	M	
	150	120	3	1100	282	289	303	331	353	391	444	3EL2 150 - 2 P. 3 . -	M	
	150	120	4	1200	292	299	313	338	360	396	432	3EL2 150 - 6 P. 4 . -	M	
245	192	154	3	1100	361	370	388	424	451	501	569	3EL2 192 - 2 P. 3 . -	Q	
	192	154	4	1200	373	382	401	433	461	507	553	3EL2 192 - 6 P. 4 . -	Q	
	198	158	3	1100	372	382	400	437	465	516	586	3EL2 198 - 2 P. 3 . -	Q	
	198	158	4	1200	385	394	413	447	475	523	570	3EL2 198 - 6 P. 4 . -	Q	
	228	182	3	1100	429	439	461	504	536	595	675	3EL2 228 - 2 P. 3 . -	R	
	228	182	4	1200	443	454	476	514	547	602	657	3EL2 228 - 6 P. 4 . -	2xJ	
300	228	182	3	1100	429	439	461	504	536	595	675	3EL2 228 - 2 P. 3 . -	R	
	228	182	4	1200	443	454	476	514	547	602	657	3EL2 228 - 6 P. 4 . -	2xJ	
	240	192	3	1100	451	462	485	530	564	626	711	3EL2 240 - 2 P. 3 . -	2xJ	
	240	192	4	1200	467	478	501	541	576	634	691	3EL2 240 - 6 P. 4 . -	2xJ	
362	276	221	3	1100	519	532	558	610	649	720	817	3EL2 276 - 2 P. 3 . -	W	
	276	221	4	1200	537	550	576	623	662	729	795	3EL2 276 - 6 P. 4 . -	W	
	288	230	3	1100	541	555	582	636	677	751	853	3EL2 288 - 2 P. 3 . -	2xM	
	288	230	4	1200	560	574	601	650	691	760	829	3EL2 288 - 6 P. 4 . -	2xM	
420	336	269	3	1100	632	647	679	742	790	876	995	3EL2 336 - 2 P. 3 . -	3xJ	
	336	269	4	1200	653	669	702	758	806	887	968	3EL2 336 - 6 P. 4 . -	3xJ	
	360	288	3	1100	677	694	728	795	846	939	1066	3EL2 360 - 2 P. 3 . -	3xJ	
	360	288	4	1200	700	717	752	812	864	950	1037	3EL2 360 - 6 P. 4 . -	3xJ	

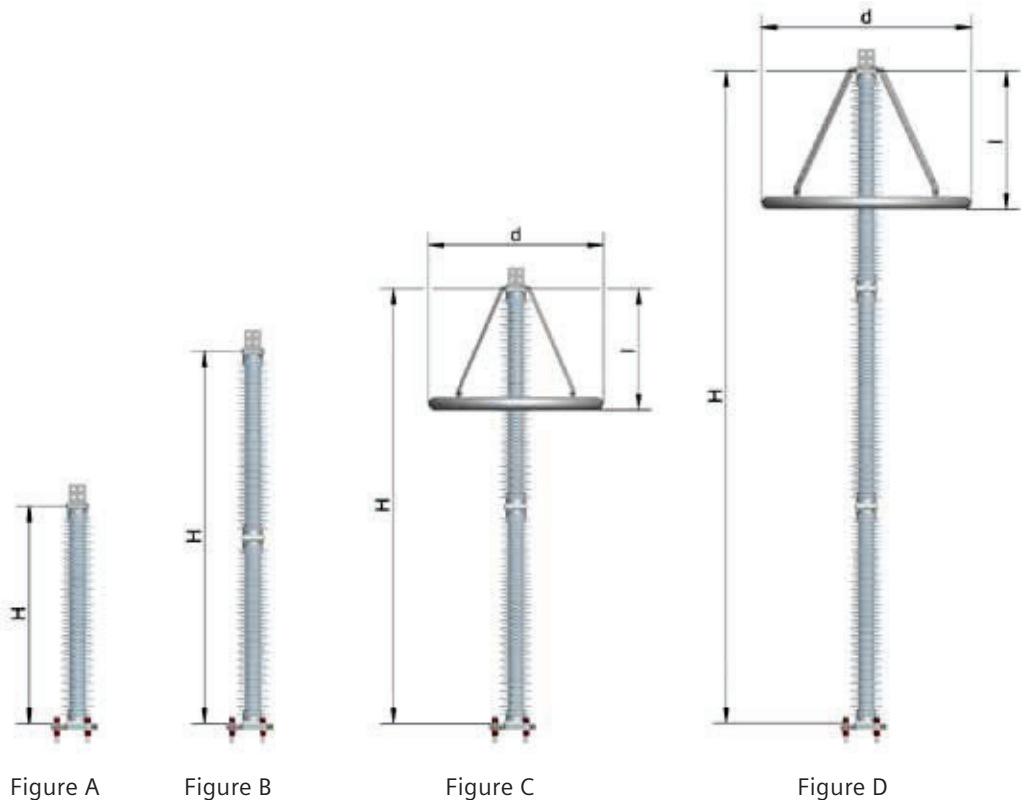
Ratings and specifications

Electrical characteristics – neutral ground arresters														
Highest voltage of the system	Rated voltage	Continuous operating voltage	Line discharge class	Long duration current 2ms	Maximum values of the residual voltages at discharge currents of the following impulses								Arrester type	Minimum housing size
U _s kV	U _r kV	U _c kV	LD Class	A	30/60 μs 0.5 kA kV	30/60 μs 1 kA kV	30/60 μs 2 kA kV	8/20 μs 5 kA kV	8/20 μs 10 kA kV	8/20 μs 20 kA kV	8/20 μs 40 kA kV			
72.5	30	24.0	3	1100	56.4	57.8	60.6	66.3	70.5	78.3	88.8	3EL2 030 - 2 S . 3 . -	C	
	30	24.0	4	1200	58.3	59.8	62.6	67.7	72.0	79.2	86.4	3EL2 030 - 6 S . 4 . -	C	
	45	36	3	1100	84.6	86.7	90.9	99.4	106	117	133	3EL2 045 - 2 S . 3 . -	F	
	45	36	4	1200	87.5	89.6	94.0	102	108	119	130	3EL2 045 - 6 S . 4 . -	F	
123	51	41	3	1100	95.9	98.3	103	113	120	133	151	3EL2 051 - 2 S . 3 . -	F	
	51	41	4	1200	99.1	102	106	115	122	135	147	3EL2 051 - 6 S . 4 . -	F	
	60	48	3	1100	113	116	121	133	141	157	178	3EL2 060 - 2 S . 3 . -	F	
	60	48	4	1200	117	120	125	135	144	158	173	3EL2 060 - 6 S . 4 . -	F	
	66	53	3	1100	124	127	133	146	155	172	195	3EL2 066 - 2 S . 3 . -	F	
	66	53	4	1200	128	131	138	149	158	174	190	3EL2 066 - 6 S . 4 . -	F	
	72	58	3	1100	135	139	146	159	169	188	213	3EL2 072 - 2 S . 3 . -	F	
	72	58	4	1200	140	143	150	162	173	190	207	3EL2 072 - 6 S . 4 . -	F	
	90	72	3	1100	169	173	182	199	212	235	266	3EL2 090 - 2 S . 3 . -	J	
90	72	4	1200	175	179	188	203	216	238	259	3EL2 090 - 6 S . 4 . -	J		
145	80	64	3	1100	150	154	162	177	188	209	237	3EL2 080 - 2 S . 3 . -	J	
	80	64	4	1200	156	159	167	180	192	211	230	3EL2 080 - 6 S . 4 . -	J	
245	102	82	3	1100	192	197	206	225	240	266	302	3EL2 102 - 2 S . 3 . -	J	
	102	82	4	1200	198	203	213	230	245	269	294	3EL2 102 - 6 S . 4 . -	J	
	108	86	3	1100	203	208	218	239	254	282	320	3EL2 108 - 2 S . 3 . -	J	
	108	86	4	1200	210	215	226	244	259	285	311	3EL2 108 - 6 S . 4 . -	J	
420	168	134	3	1100	316	324	340	371	395	438	497	3EL2 168 - 2 S . 3 . -	P	
	168	134	4	1200	327	335	351	379	403	444	484	3EL2 168 - 6 S . 4 . -	Q	

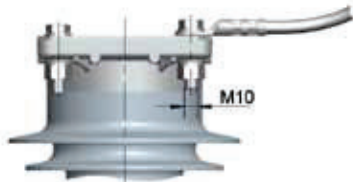
Ratings and specifications

Mechanical characteristics												
Housing size	Height [H]	Creepage distance	Housing insulation			Specified short-term load SSL	Specified long-term load SLL	Grading ring diameter [D]	Maximum weight of arrester	Flash-over distance	Arrester type	Figure
			Lightning impulse withstand voltage 1.2/50µs kV	Switching impulse withstand voltage 250µs/2500µs, wet kV	Power frequency withstand voltage 1 min., wet kV							
C	482	1470	235	170	109	8290	5800	-	17.7	405	3EL2 ... - .. C . 1 -	A
F	705	2340	365	265	170	5670	3970	-	23.5	630	3EL2 ... - .. F . 1 -	A
J	1062	3820	571	414	266	3760	2630	-	32.3	985	3EL2 ... - .. J . 1 -	A
M	1240	4495	676	489	315	3220	2250	-	37.6	1165	3EL2 ... - .. M . 1 -	A
P	1544	5290	806	584	375	2590	1810	-	46.2	1390	3EL2 ... - .. P . 2 -	B
Q	1767	6160	936	678	436	2260	1580	-	51.3	1615	3EL2 ... - .. Q . 2 -	B
R	1945	6835	1041	754	485	2050	1430	-	56.9	1795	3EL2 ... - .. R . 2 -	B
2xJ	2124	7640	1142	827	532	1880	1310	-	57.2	1970	3EL2 ... - .. J . 2 -	B
W	2302	8315	1247	903	581	1730	1210	600	63.6	1905	3EL2 ... - .. W . 2 -	C
2xM	2480	8990	1352	979	629	1610	1120	800	69.6	1925	3EL2 ... - .. M . 2 -	C
X	2829	9980	1507	1093	702	1410	980	800	79.8	2250	3EL2 ... - .. X . 3 -	D
3xJ	3186	11460	1713	1242	798	1250	870	1000	86.7	2470	3EL2 ... - .. J . 3 -	D
3xM	3720	13485	2028	1467	945	1070	750	1000	93.2	2950	3EL2 ... - .. M . 3 -	D

The maximum arrester weight can vary depending on rated voltage and line discharge class.



Line terminals



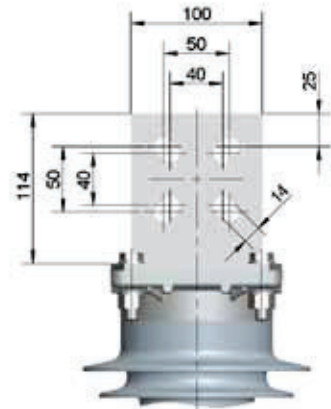
Plate

3EL2 ...-.....-A..



Bolt

3EL2 ...-.....-D..



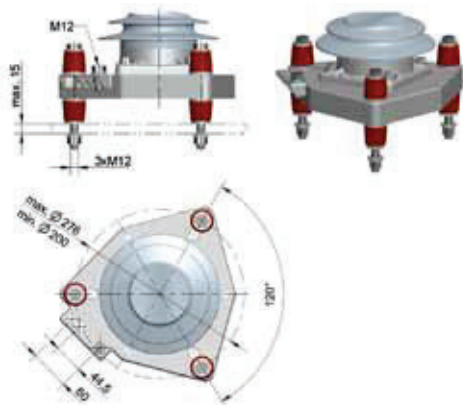
DIN/NEMA flat terminal

3EL2 ...-.....-T.. (aluminum)

3EL2 ...-.....-X.. (hot dip galvanized)

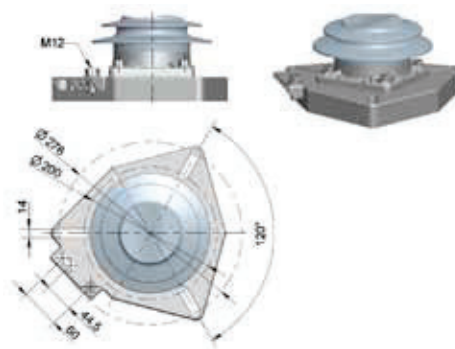
3EL2 ...-.....-Y.. (stainless steel)

Mounting



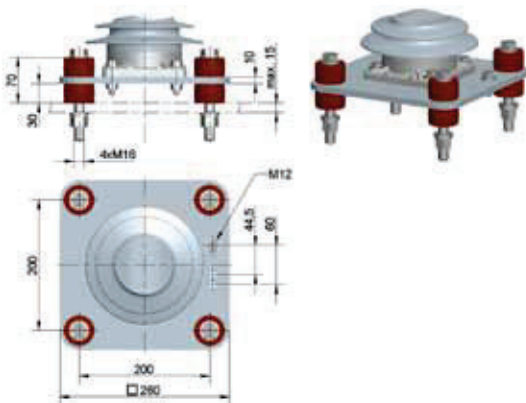
Insulated

3EL2 ...-.....-...1



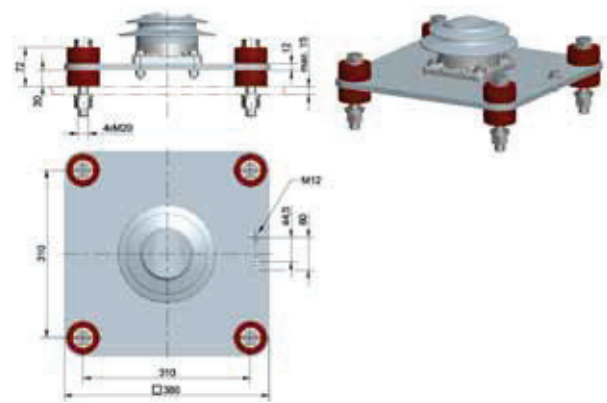
Grounded

3EL2 ...-.....-...5



Insulated

3EL2 ...-.....-...2



Insulated

3EL2 ...-.....-...3