



## ABOUT US

EMI A.S. was established as one of the leaders in manufacture of electrical components and equipments in 1978. Since that time, we have steadily expanded our product range and quality standards. We operated in 1st Industrial Park and Izmir Atatürk Industrial Zone from 1992 to 2002.

The manufacture has been continued in 5th Industrial Park in Bornova, Izmir since 2002. EMI A.S. aims to produce high quality equipments and supply them just in time for the best prices for the clients.

Our certifications are; TSE (Turkish Standard Institutions), TSEK and CESI Quality Standardization Certificates

The equipments and machines are produced with ISO 9001:2000 Quality Management Guarantee in EMI Design and Production.

- Medium Voltage Indoor and Outdoor Disconnectors
- Low Voltage and Double Throw Disconnecting Switches
- Low Voltage Load Disconnecting Switches
- Low Voltage Fuse Disconnecting Switches
- Earthing Plates
- Earthing Rods
- Earthing Bonds
- Faraday Cage
- Copper connectors
- Lighting Fixtures
- Alpek Iron Equipments

### **For more Information**

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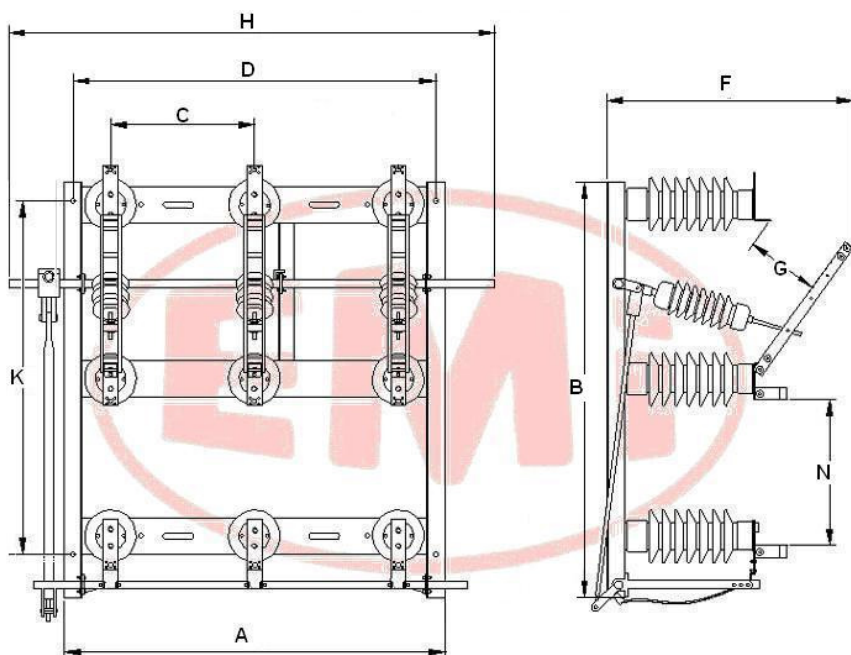
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# Medium Voltage Outdoor Switch Disconnectors



TYPE	Rated Voltage (kV)	Rated Current (A)	A	B	C	D	F	G	H	K	N
Outdoor Normal (HNA)	12	630A	1080	690	400	1020	680	265	1280	470	--
	17,5 – 24		1220	790	490	1160	1030	430	1280	570	--
	36		1220	790	490	1160	1030	430	1280	570	--
Outdoor Earthing (HTA)	12	630A	1080	790	400	1020	680	265	1280	570	--
	17,5 – 24		1220	900	490	1160	1030	430	1280	680	--
	36		1220	900	490	1160	1030	430	1280	680	--
Outdoor Fuse (HSA)	12	630A	1080	1095	400	1020	680	265	1280	875	296
	17,5 – 24		1220	1360	490	1160	1030	430	1280	1140	546
	36		1220	1360	490	1160	1030	430	1280	1140	546
Outdoor Fuse Earthing (HSTA)	12	630A	1080	1195	400	1020	680	265	1280	975	296
	17,5 – 24		1220	1470	490	1160	1030	430	1280	1250	546
	36		1220	1470	490	1160	1030	430	1280	1250	546

## GENERAL INFORMATION

Medium voltage outdoor disconnectors are manufactured by using high quality materials and provide a safe area to work. For the best volution of main and earthing shafts; the shaft bearings are produced of brass. Using brass also prevents molding. Shafts, frames, joints, control mechanism, pipetongs and shaft couplings of the disconnectors are hot-dip galvanized. Other hardware materials of the product are zinc and cadmium plated.

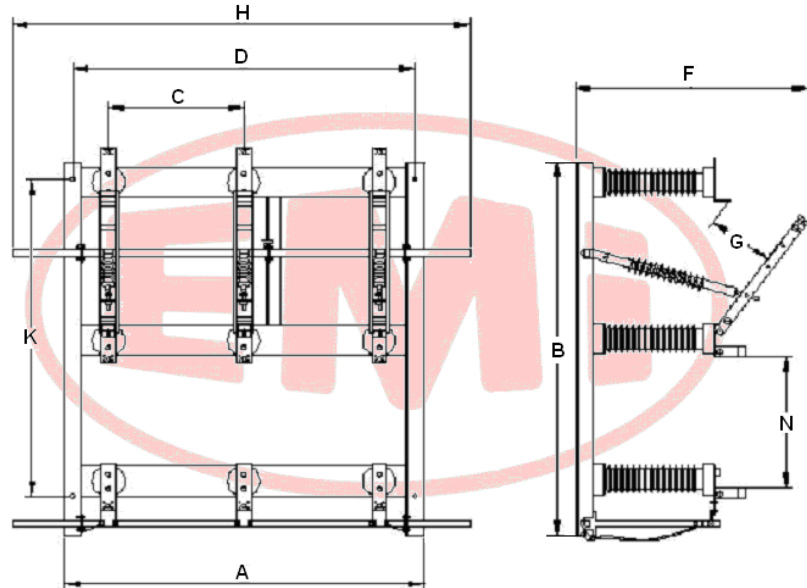
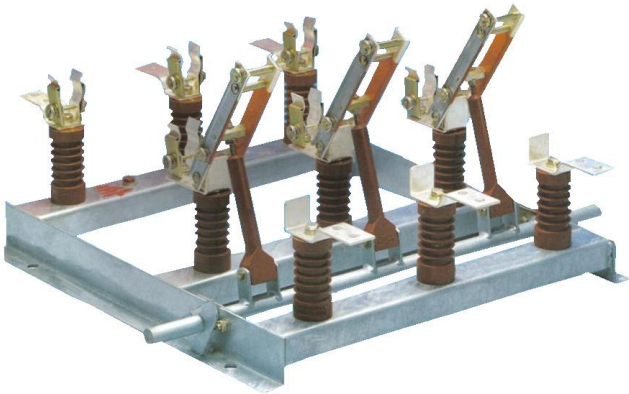
20mm/kV porcelain insulators are used for the disconnectors. All coper terminals and surface of copper handles that touch the terminals are electro-silver plated. Double coil springs are used in order to ensure that copper handles touch terminals properly.

MV Disconnectors should be used only for switching on and off unloaded circuits. It is extremely dangerous to switch it on/off under electric load. Disconnectors are packed with control mechanism, joints, pipetongs, shaft couplings. To ensure product safety, wooden packages are used for delivery.

Our disconnectors are certified by TSE, TSEK standards and tested in CESI laboratories. The products are manufactured under the guarantee of ISO-9001:2008 and also suitable for specification of electric companies.



## Medium Voltage Indoor Switch Disconnectors



TYPE	Rated Voltage (kV)	Rated Current	A	B	C	D	F	G	H	K	N
Indoor Normal (DNA)	12	630A	905	415	300	860	455	160	1140	195	--
	17,5 - 24		1285	660	490	1240	860	380	1720	440	--
	36		1285	660	490	1240	860	380	1720	440	--
Indoor Earthing (DTA)	12	630A	905	505	300	860	455	160	1140	285	--
	17,5 - 24		1285	770	490	1240	860	380	1720	550	--
	36		1285	770	490	1240	860	380	1720	550	--
Indoor Fuse (DSA)	12	630A	905	821	300	860	455	160	1140	601	296
	17,5 - 24		1285	1325	490	1240	860	380	1720	1105	546
	36		1285	1325	490	1240	860	380	1720	1105	546
Indoor Fuse Earthing (D TSA)	12	630A	905	921	300	860	455	160	1140	701	296
	17,5 - 24		1285	1425	490	1240	860	380	1720	1205	546
	36		1285	1425	490	1240	860	380	1720	1205	546

### GENERAL INFORMATION

Medium voltage indoor disconnectors are manufactured by using high quality materials and provide a safe area to work. For the best evolution of main and earthing shafts; the shaft bearings are produced of brass. Using brass also prevents molding.

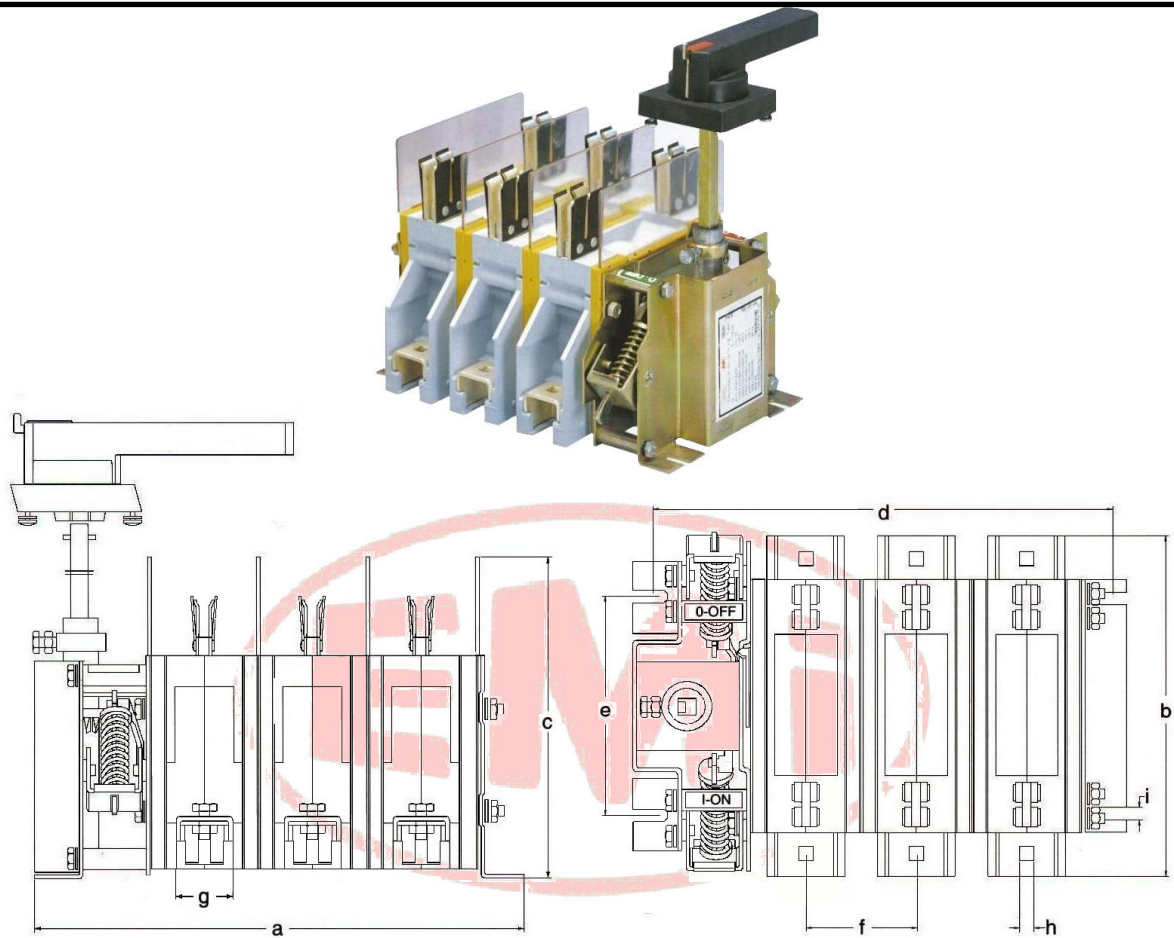
Shafts, frames, joints, control mechanism, pipetongs and shaft couplings of the disconnectors are hot-dip galvanized. Other hardware materials of the product are zinc and cadmium plated. All copper terminals and surface of copper handles that touch the terminals are electro-silver plated. Double coil springs are used in order to ensure that copper handles touch terminals properly.

To ensure product safety, wooden packages are used for delivery. MV Disconnectors should be used only for switching on and off unloaded circuits. It is extremely dangerous to switch it on/off under electric load.

Our disconnectors are certified by TSE, TSEK standards and tested in CESI laboratories. The products are manufactured under the guarantee of ISO-9001:2008 and also suitable for specification of electric companies.



# Low Voltage Fused Load Breaking Switches



Type	Rated Operating Voltage	Rated Insulating Voltage	Rated Operating Current	Main Thermic Current	Rated Closing Capacity	Rated Cutting Capacity	Rated Short Time Withstand Current	Rated Short Circuit Closing Capacity	Fuse Type	Mechanical Withstand	a	b	c	d	e	f	g	h	i	Connecting Bolt	Weight (kg)
160 SYKS	400V	600V	160A	160A	500A	500A	50kA	85kA	NH 00	5000	224	196	180	207	119	45	32	8.5	7	M8x20	5.5
250 SYKS	400V	600V	250A	250A	750A	750A	50kA	85kA	NH 1	5000	270	196	180	253	119	60	32	8.5	7	M8x20	6.3
400 SYKS	400V	600V	400A	400A	1200A	1200A	50kA	85kA	NH 2	5000	270	196	180	253	119	60	32	8.5	7	M8x20	6.3

## GENERAL INFORMATION

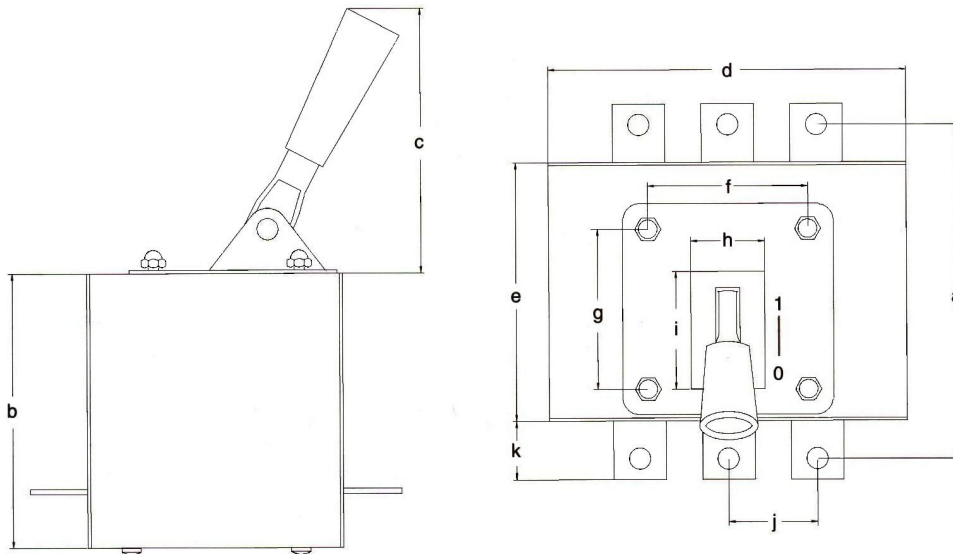
EMi L.V. fused disconnecting switches are produced according to IP 31 protection category and AC-22 class. Products are manufactured by using high quality and from durable materials. Our L.V. fused disconnecting switches are particularly used at light distribution panels safely. As there are 4 different components for switching on/off function, changing of fuses can be done safely.

If a breakdown occurs in the panel that connected to the switch, it is possible to create safety working area by using the lock mechanism on the switch handle.

Our switches certified by ISO-9001:2008 Quality Assurance System and tested in CESI laboratories.



# Low Voltage Load Breaking Switches



Type	Rated Operating Voltage	Rated Insulating Voltage	Rated Operating Current	Pre-Fuse Current	Short Circuit Current "Eff" 0.3 second	Short Circuit Current "Peak" 0.3 second	Breaking Time	a	b	c	d	e	f	g	h	i	j	k	Connecting Bus	Connecting Bolt	Weight (kg)
160	380V	500V	160A	300A	10kA	25kA	12ms.	164	135	125	170	120	70	70	36	56	43	32	25x2,5	M8x20	3,4
250	380V	500V	250A	400A	12kA	30kA	12ms.	164	135	125	170	120	70	70	36	56	43	32	25x5	M8x20	3,6
400	380V	500V	400A	630A	12kA	40kA	12ms.	164	140	125	210	120	70	70	36	56	66	36	33x5	M8x20	4,6

## GENERAL INFORMATION

EMİ L.V. Disconnecting Switches and Double Throw Disconnecting Switches are produced AC-20 class and ISO 9001 Quality Assurance System. EMI L.V.

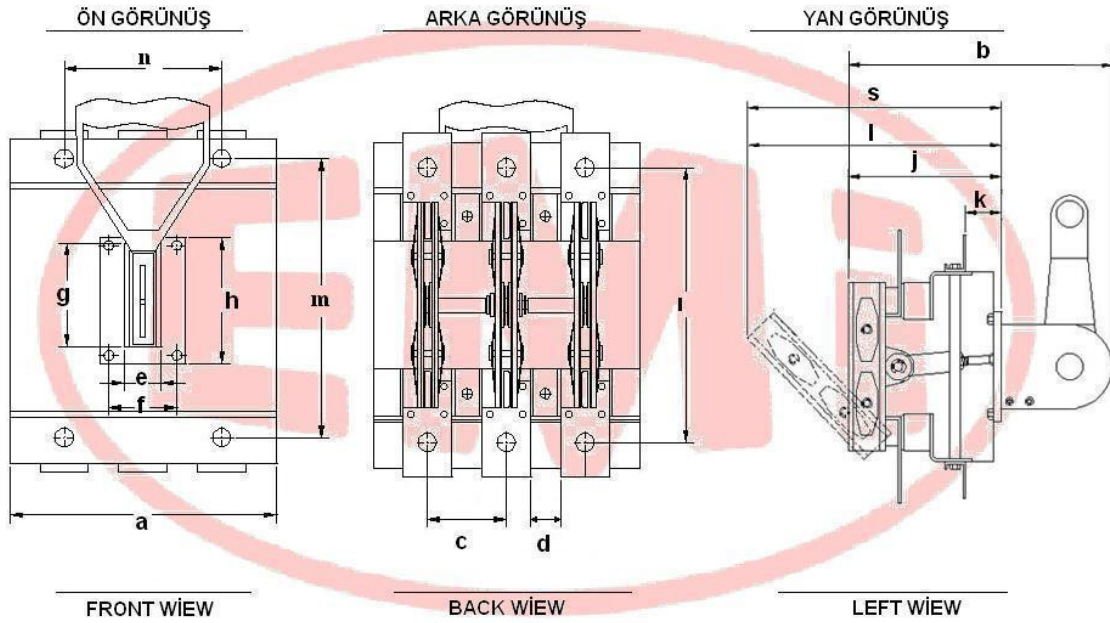
Switches we produce can be easily fit to the distribution panel boards. Frames of the switches are made from electro cadmium plated sheet iron to be long lasting. Operating bodies and handles are made from special strong plastics for isolation.

Fixed and moving terminals are made from electrolytic copper and silver plated for minimizing of transition resistance. In case of to prevent unwanted switched on/off, control panels can be removable.

L.V. Disconnecting Switches and Double Throw Disconnecting Switches are designed for off load operations. Using them on load operations is dangerous. EMI LV disconnecting switches and double throw disconnecting switches are suitable for electric companies' specifications.



# Low Voltage Disconnecting Switches and Double Throw Disconnecting Switches



Type	Rated Operating Voltage	Rated Insulating Voltage	Rated Operating Current	a	b	c	d	e	f	g	h	i	j	k	l	m	n	Inverter		Connecting Bus	Connecting Bolt	Weight (kg)
																		a	s			
125	400V	600V	125A	130	197	43	18	30	50	85	94	145	88	-	163	-	-	154	185	25x1,5	M8x20	1,6
160	400V	600V	160A	130	197	43	18	30	50	85	94	145	88	-	163	-	-	154	185	25x1,5	M8x20	1,7
200	400V	600V	200A	130	197	43	18	30	50	85	94	145	88	-	163	-	-	154	185	25x2,5	M8x20	1,8
250	400V	600V	250A	130	197	43	18	30	50	85	94	145	88	-	163	-	-	154	185	25x2,5	M8x20	1,8
400	400V	600V	400A	220	250	70	30	30	50	85	94	250	140	38	230	230	143	220	295	40x2,5	M10x25	5,3
630	400V	600V	630A	220	250	70	30	30	50	85	94	250	140	38	230	230	143	220	295	40x5	M10x25	6,2
1000	400V	600V	1000A	400	331	120	40	30	50	85	94	370	222	67	325	312	240	450	430	80x5	M10x30	22,7
1500	400V	600V	1500A	400	346	120	40	30	50	85	94	375	237	67	350	312	240	450	440	80x10	M10x35	26,5
2000	400V	600V	2000A	570	349	200	100	30	50	85	94	385	234	67	480	380	400	620	480	100x10	M10x35	41,2
2500	400V	600V	2500A	570	349	200	80	30	50	85	94	435	242	67	535	455	400	620	500	120x10	M10x35	50,5

## GENERAL INFORMATION




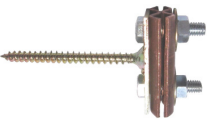
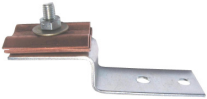











EMİ L.V. Disconnecting Switches and Double Throw Disconnecting Switches are produced AC-20 class and ISO 9001 Quality Assurance System.

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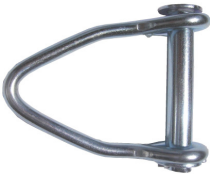




## Lightning Rods and Installation Equipments

		<b>Lightning Arresters and Equipments</b>			
		<b>Order Code</b>	<b>Type</b>	<b>Dimension</b>	<b>Height</b>
	Ø20600CU	Copper, Cr-Ni Plated	Ø 20mm	60cm	
	Ø20800CU	Copper, Cr-Ni Plated	Ø 20mm	80cm	
	Ø16600P	Stainless 304	Ø 16mm	60cm	
	Ø16800P	Stainless 304	Ø 16mm	80cm	
	Customize production is available upon your needs				
	EYUAA	Lightning Arrester Foot Plate (adjustable)			
EYUAS	Lightning Arrester Foot Plate (fixed)				
	<b>EMI Ground Enhancement Materials For Soil Floors</b>				
	<b>Order Code</b>	<b>Type</b>			
	EDDT	Emi Ground Enhancement Material (10 kg)			
	<b>Plastic Test Connector</b>				
	<b>Order Code</b>	<b>Type</b>			
	ETKLM	Plastic covered testing connector			
	<b>Conductor Clamp</b>				
	<b>Order Code</b>	<b>Type</b>			
	EDKV	Screw Wall Clamp (single - pairwise)			
	EDKL	Straight Wall Clamp (single - pairwise)			
EDKV	EÇKV	Screw Roof Clamp			
	EPLON	Plon Clamp ( for I-iron and angle iron)			
	EMK	Roof Ridge Clamp (single - pairwise)			
	EKK	Roof Tile Clamp (single - pairwise)			
	EBİK	Conductor Pipe Clamp			
EDKL	EDT	Pole Plate (Medium – Wall – Corner)			
					
ECKV	EPLON	EMK	EKK	EBİK	EDT
	<b>Earthing Clamps</b>				
	<b>Order Code</b>	<b>Type</b>			
	ETK	Earthing Clamp (2mm)			
ETK	ETK3	Earthing Clamp (3mm)			
	ETK.T	Earthing Clamp Single (1mm)			
	ETK.T15	Earthing Clamp Single (1,5mm)			
	ETK.T 2	Earthing Clamp Single (2mm)			
ETK.T					
	<b>Pole Lock Clamps</b>				
	<b>Order Code</b>	<b>Type</b>			
	EBTKB	Pipe Lock Clamp 2-3" (concrete)			
	EBTKT	Pipe Lock Clamp 2-3" (brick)			
EBTKB	EBYUTK	Lock Clamp (fixing pipe and lightning arresters) 2-3"			
					
EBTKT				EBYUTK	






## Alpek Hardwares and Fixture Consoles


### Alpek Hardware Materials

Order Code	Type	
EOZD	Stirrup Iron	
EOZM	Stirrup Shaft	
EJ	J – Hook (for Alpek Hardwares)	
EMIPL	Roller Insulator Plate (for tensioning)	
EMIZ	Roller Insulator	
EJ KAN	J – Hook (for mounting disconnectors)	
		
EOZM-EOZD	EJ	EMIZ
		
EMIPL	EJ KAN	

### Fixture Consoles

Order Code	Type	
SLS101	Fixture Consoles (Wall)	
SLS102	Fixture Consoles (Column)	
SLS103	Fixture Consoles (Gooseneck) 42X600X1,5 mm	
SLS104	Fixture Consoles (Gooseneck) 42X500X1,2 mm	
SLS105	Gooseneck Clamp Kit	
		
SLS101	SLS103	SLS102



### “Danger of Death” Warning Signs

Order Code	Type
EMIATL	“Danger of Death” Warning Sign
ETLMC	“Danger of Death” Warning Sign Montage Materials
 Please ask for other languages	







## Earthing Materials

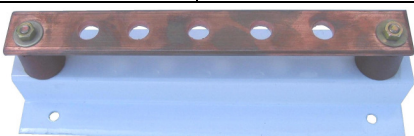

### Earthing Electrode, Plate and Strip

Order Code	Type
ETK	<b>Earthing Electrode Hot Dip Galvanized</b> 50x50x5mm 1 Mt. – 1,5 Mt. – 2 Mt. 60x60x4mm 1 Mt. – 1,5 Mt. – 2 Mt. 60x60x5mm 1 Mt. – 1,5 Mt. – 2 Mt. 60x60x6mm 1 Mt. – 1,5 Mt. – 2 Mt. 65x65x5mm 1 Mt. – 1,5 Mt. – 2 Mt. 65x65x6mm 1 Mt. – 1,5 Mt. – 2 Mt. 65x65x7mm 1 Mt. – 1,5 Mt. – 2 Mt.
ETL	<b>Earthing Plate Hot Dip Galvanized</b> 2x400x1000mm 2x500x1000mm 2,5x500x1000mm 3x500x1000mm
ETS	<b>Earthing Strip Hot Dip Galvanized</b> 30x2mm 30x3mm 30x3,5mm 30x4mm 30x5mm 35x3mm 40x3mm 40x4mm 40x5mm 50x5mm
	
ETS	ETK

### Earthing Materials

Order Code	Type		
ESK-SS	Strip Clamp strip/strip 60x60x2mm		
ESK-SD	Strip Clamp strip/iron 60x60x2mm		
ESKB-SS	Strip Clamp (Cross) strip/strip 80x80x3mm		
ESKB-SD	Strip Clamp (Cross) strip/iron 80x80x3mm		
EPDB	Potential Balance Bus Bar (tin plated) 3x30x1000mm		
ETKR	Earthing Clamps (carrying the strip on the wall)		
			
ESK-SS	ESK-SD	ESKB	ETKR

### Outdoor Earthing Bus Bar

Order Code	Type
EDTBT	Outdoor Earthing Bus Bar (equipotential)
EDTB	Outdoor Earthing Bus Bar
	
EDTBT	EDTB



## Medium Voltage Porcelain Fuses

Rated Voltage kV	Rated Current A	Dimensions		Breaking Current A	Minimum Weight Kg.
		Length mm	Width mm		
7,2	2	192	53	8	1,1
7,2	4	192	53	14	1,1
7,2	6	192	53	25	1,1
7,2	10	192	53	40	1,1
7,2	16	192	53	56	1,1
7,2	20	192	53	80	1,1
7,2	25	192	53	100	1,1
7,2	30	192	53	110	1,1
7,2	40	192	53	160	1,1
7,2	50	192	75	190	1,9
7,2	63	192	75	260	1,9
7,2	80	192	75	330	1,9
7,2	100	192	75	400	1,9
7,2	125	192	75	580	1,9
7,2	160	192	75	640	1,9
7,2	200	192	75	840	1,9
12	2	292	53	8	1,6
12	4	292	53	14	1,6
12	6	292	53	25	1,6
12	10	292	53	40	1,6
12	16	292	53	56	1,6
12	20	292	53	80	1,6
12	25	292	53	100	1,6
12	30	292	53	110	1,6
12	40	292	53	160	1,6
12	50	292	75	190	3
12	63	292	75	260	3
12	80	292	75	330	3
12	100	292	75	400	3
12	125	292	75	580	3
12	160	292	75	640	3
12	200	292	75	840	3



Rated Voltage kV	Rated Current A	Dimensions		Breaking Current A	Minimum Weight Kg.
		Length mm	Width mm		
17,5	2	367	53	8	1,9
17,5	4	367	53	14	1,9
17,5	6	367	53	25	1,9
17,5	10	367	53	40	1,9
17,5	16	367	53	56	1,9
17,5	20	367	53	80	1,9
17,5	25	367	53	100	1,9
17,5	30	367	53	110	1,9
17,5	40	367	53	160	1,9
17,5	50	367	75	190	3,6
17,5	63	367	75	260	3,6
17,5	80	367	75	330	3,6
17,5	100	367	75	400	3,6
17,5	125	367	75	580	3,6
17,5	160	367	75	640	3,6
17,5	200	367	75	840	3,6
24	2	442	53	8	2,3
24	4	442	53	14	2,3
24	6	442	53	25	2,3
24	10	442	53	40	2,3
24	16	442	53	56	2,3
24	20	442	53	80	2,3
24	25	442	53	100	2,3
24	30	442	53	110	2,3
24	40	442	53	160	2,3
24	50	442	75	190	4,5
24	63	442	75	260	4,5
24	80	442	75	330	4,5
24	100	442	75	400	4,5
24	125	442	75	580	4,5
24	160	442	75	640	4,5
24	200	442	75	840	4,5
36	2	537	53	8	2,8
36	4	537	53	14	2,8
36	6	537	53	25	2,8
36	10	537	53	40	2,8
36	16	537	53	56	2,8
36	20	537	53	80	2,8
36	25	537	53	100	2,8
36	30	537	53	110	2,8
36	40	537	53	160	2,8
36	50	537	75	190	5,1
36	63	537	75	260	5,1
36	80	537	75	330	5,1
36	100	537	75	400	5,1



## XLPE Clamps – Transformer Oil– Clamps – Silicagel

### XLPE Clamps (Antimagnetic)



Order Code	Type
NBU:35	XLPE Clamp 35mm
NBU:38	XLPE Clamp 38mm
NBU:40	XLPE Clamp 40mm
NBU:42	XLPE Clamp 42mm
NBU:48,3	XLPE Clamp 48,3mm
NBU:44,50	XLPE Clamp 44,50mm



### Transformer Oil

Order Code	Type
TYV	Transformer Oil (Mineral) 1 barrel = 182 Kg.
TY	Transformer Oil (Mineral) 1 tinware = 18 Lt.

### Concrete Pole Clamps



Order Code	Type
DK-1	Concrete Pole Clamp No:1
DK-2	Concrete Pole Clamp No:2
DK-3	Concrete Pole Clamp No:3
DK-4	Concrete Pole Clamp No:4
DK-5	Concrete Pole Clamp No:5
DK-6	Concrete Pole Clamp No:6
DK-7	Concrete Pole Clamp No:7



### Silicagel

Order Code	Type
SLCGLMV1	Silicagel (blue) Packaging - 25 Kg. Bag
SLCGLMV1	Silicagel (blue) Packaging- 1 Kg. Parcel
SLICAGEL	Silicagel (Orange – Organic) Packaging - 25 Kg. Bag
SLICAGEL	Silicagel (Orange – Organic) Packaging 1 Kg. Parcel





## Insulator– Bushing – Gasket– Transformer Accessories

### Insulators (Porcelain)

Specifications	Unit Weight	Quantity of Boxes
E-80 Post Insulators	0,40 Kg.	90
E-95 Post Insulators	0,60 Kg.	60
E-92 Post Insulators	0,63 Kg.	60
VHD-35 Pin Type Insulator 20mm/kV	9,00 Kg.	3
VHD-35 Pin Type Insulator 25mm/kV	10,10 Kg.	3
VKS-35 Line Post Insulator	7,90 Kg.	3
K-1 String Insulator	1,36 Kg.	6
K-2 String Insulator	3,95 Kg.	6
K-2 String Insulator (fog type)	5,90 Kg.	6
K-3 String Insulator	4,50 Kg.	6
K-3 String Insulator (fog type)	6,80 Kg.	6
K-4 String Insulator	5,75 Kg.	6

- \* Price list is also available for silicon insulator requests.
- \* Insulators are made by porcelain or epoxy and their rods are made aluminum or copper.
- \* We can also provide insulator irons and other insulator accessories.



### Transformer Bushing and Gaskets

Bushing Specifications
AB-250 1kV Low Voltage
AB-630 1kV Low Voltage
AB-1000 1kV Low Voltage
AB-2000 1kV Low Voltage
AB-3150 1kV Low Voltage
10F-250 10kV 20mm/kV Medium Voltage (You can also supply as 630A 1000A 3150A )
20F-250 20kV 20mm/kV Medium Voltage (You can also supply as 630A 1000A 3150A)
30F-250 30kV 20mm/kV Medium Voltage (You can also supply as 630A 1000A 3150A)

- \* Bushing gasket and other transformer equipments are also available.





# Power and Distributions Transformers



**DISTRIBUTION TRANSFORMERS SPECIFICATIONS for OIL IMMersed TYPE**

**Maximum A- 15kV**

Power (kVA)	LOSS (W)		Stray Current (%)	Relative Short circuit impedance (%Uk)	Cos F =1		DIMENSIONS (mm)				WEIGHT	
	No-Load (Iron)	On-load (Copper) (75 °C)			Efficiency (%)	Voltage drop (%)	A height	B width	H highth	Distance Btw wheels (mm)	Oil (kg)	Total (kg)
50	190	1100	2,3	4	97,48	2,5	1000	653	1343	520	140	486
100	320	1750	2,1		97,97	1,81	1000	671	1408		160	665
160	460	2350	1,9		98,27	1,53	1006	766	1453		190	831
250	650	3250	1,6		98,46	1,37	1100	836	1583	670	240	1055
400	930	4600	1,5		98,63	1,22	1176	1016	1695		310	1450
500	1100	5500	1,4		98,69	1,17	1475	1038	1650		355	1736
630	1300	6500			98,77	1,1	1743	1048	1760		410	2018
800	1550	8300	1,3		98,78	1,15	1613	1348	1835	535	2505	
1000	1850	10000	1,2	5	98,82	1,12	1613	1468	1908	820	595	2895
1250	2200	12000	1,2	5	98,87	1,08	1660	1150	1968		715	3431
1600	2600	14500	1,1	6	98,94	1,08	1758	1480	2104		835	4054

**Maximum B - 36kV**

Power (kVA)	LOSS (W)		Stray Current (%)	Relative Short circuit impedance (%Uk)	Cos F =1		DIMENSIONS (mm)				WEIGHT	
	No-Load (Iron)	On-Load (Copper) (75 °C)			Efficiency (%)	Voltage drop (%)	A height	B width	H highth	Distance btw wheels	Oil (kg)	Total (kg)
50	230	1050	2,76	4,5	97,47	2,26	1080	731	1535	520	170	559
100	380	2100	2,27		97,65	2,06	1150	794	1595		225	791
160	480	2800	2		98,99	1,83		854	1695		285	1008
250	700	3500	1,8		98,13	1,7	1250	930	1827	670	390	1319
400	900	5850	1,7		98,34	1,55	1276	1076	1931		460	1712
500	1250	6750	1,6		98,42	1,44	1813	1098	1949		525	2052
630	1350	8000			98,53	1,39	1823	1208	2012		600	2342
800	1520	9700	1,5		6	98,61	1,38	1903	1368	2021	820	754
1000	1600	12200	1,4	98,63		1,36	1908	1400	2140	875		3414
1250	1950	14000		98,74		1,29	2043	1420	2240	1000		3981
1600	2350	16500	1,3	98,8		1,2	2055	1480	2335	1125	4720	
2000	3000	21000	1,1	99,85		1,2	2300	2150	2350	1135	4820	
2500	3800	24000	1	99,85		1,1	2450	2200	2400	1150	6700	