

GENERAL CATALOG

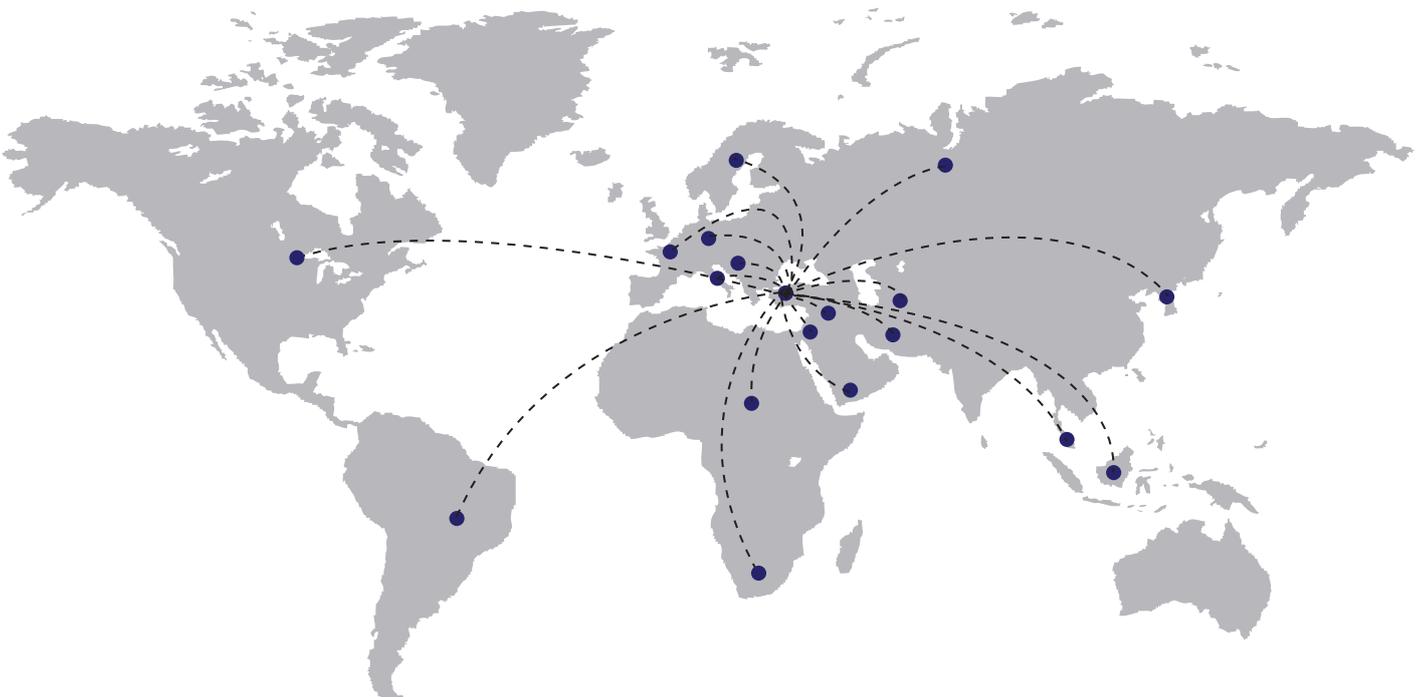
2019



Our Trademarks



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Group Companies



Aktif Elektroteknik A.Ş.

Aktif Elektroteknik was established in 1981 manufacturing Switchgears, Compact Substations, Mobile Substations and operates in Ankara residing at 6000 m² closed facility with more than 100 employees.

Aktif Elektroteknik is the first company manufactured MV Switchgears and Mobile Substations in Turkey.

Friem S.p.A (Italy) became significant shareholder of Aktif Elektroteknik in 2009 and has been managed by the synergy of internationally experienced group companies of Aktif and Friem.

Aktif Mühendislik A.Ş.

Aktif Mühendislik was established in 1996 and provides solutions to Power Quality, Submetering, Renewable Energy, Railway and operates in İstanbul residing at 2200 m² headquarters with more than 50 employees.

Since its foundation, company has been supplying high quality engineering services in the energy sector with its high-quality products, state-of-art systems, energy saving and cost analysis.

Aktif Mühendislik has been providing custom and standard solutions for its exclusive customers with its more than 20 years of experience.



Aktif Güç Elemanları A.Ş.

Aktif Güç Elemanları was established in 2009 as Elektres for the manufacturing of Power Resistors and operates in Sakarya residing at 3500 m² factory with more than 50 employees.

Company produces Anti-Condensation Heaters, Load Banks, Motor Control / Braking, Neutral Grounding, Filter and Charge / Discharge Resistors that proved to be one of the most important players in the industry.

After acquisition, Elektres kept being used as brand name. R&D activities were also initiated to enlarge its product range to manufacture all power elements.

Aktif Kompanzasyon ve Harmonik Filtre Sistemleri A.Ş.

Aktif Kompanzasyon ve Harmonik Filtre Sistemleri company was established in 2018 though it was a department of Aktif Mühendislik since 1996 to provide solutions to Power Quality applications which operates at headquarters of Aktif Group.

Over 20 years experienced staff has more than 4000 measurement and reporting services, over 1500 field applications and technical solutions.

Company continues its high-quality service and engineering activities for power quality and applications within Aktif Group.



Üçgenler Enerji A.Ş.

Solar plant has been established on 220.000 m² field to generate 10MW electricity from the solar power.

Plant generates electricity according to Turkish Ministry of Energy regulations, designed and built to operate for 25 years under electricity purchasing warranty of government for 10 years.

Plant is designed to operate with 87.5% efficiency to provide 20 GWh annually and has been running with 3% higher performance compared to the initial energy production analysis, and Üçgenler is the owner of 4MW.

Values



Vision

Energy is one of the basic requirements for worldwide economic development but the greenhouse gases effect depends to great extent on how the energy is produced. We as AKTİF Group, do endorse Global compact and sustainable development as one of the pillars of our business approach.

We want to be recognized by our stakeholders as the very best performer in competitive energy market in order to achieve the greatest possible returns by innovating, designing, expositing and placing competitive products and services for sustainable and habitable environment by enhancing the standards of living for our planet.



Mision

In order to contribute our stakeholder's success and to improve our footprint in terms of technology, price, quality, environment and delivery performances, our mission is to bring the most competitive product and service solutions making energy simple for our customers through with offering possible broadest portfolio.

Values

AKTİF values are the group commitment to our customers, our employees, our shareholders and all of the communities at which we play role directly or indirectly.

Our Values are;

- Customer Satisfaction
- Loyalty
- Profitability
- Liability
- Totality
- Equity
- Corporation



Service Continuity

The service continuity means efficiency of power and consequently, the profitability of the business.

Our products are designed and manufactured in order to ensure energy sustainability and provide the best service availability.

Quality and Environment

One step beyond, high quality and environmentally-conscious green products. Providing energy continuity and measurable energy efficiency. Also supplying products which hard work simplified, easy to use, smart control logic available.



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A

Switchgears & Substations



Energy



Industry



Building



Air Insulated Metal Enclosed Switchgears

SME series Metal Enclosed Switchgears are the switching and control cubicle manufactured up to 40.5 kV according to IEC 62271-200 and type tested in the accredited international laboratories.

There are two types of SME series metal enclosed switchgears.

- SME/0 : with fixed type circuit breaker
- SME/1 : with withdrawable type of circuit breaker

Advantages

- LSC-2A loss of service continuity
- PI partition class
- AFL internal arc classification
- 3 separated and earthed accessible compartments
- Internal arc test up to 25 kA/1s
- Electrical and mechanical safety interlocks systems do not allow to operational faults
- Optional withdrawable circuit breaker allows fast and easy servicing
- Air insulated rotary disconnecter switch option
- Reliable design and low maintenance cost
- 2 mm steel sheet

Technical Characteristics

- Rated Voltage : 3.6...40.5 kV
- Power Frequency Withstand Voltage : 10...90/120 kV
- Lightning Impulse Withstand Voltage : 40...190/210 kV
- Rated Frequency : 50/60 Hz
- Rated Current : 630...1250 A
- Short Time Withstand Current : 16...25 kA (1 s)
- Internal Arc Withstand Current : 16...25 kA (1 s)
- Protection Class (doors are closed) : IP3X
(between compartment) : IP2X



Applications

Metal Enclosed Switchgears are especially used in the transformer centers, distribution systems, renewable energy production and industrial plants where the rated current up to 1250 A and short circuit current up to 25 kA.

- Energy Distribution Centers
- Hydroelectric and Wind Energy Applications
- Diesel and Natural Gas Power Plants
- Transformer Substations
- Cement Factories
- Auto Industry
- Petroleum and Chemical Industry
- Iron and Steel Industry
- Rolling Mills
- Pipe Lines
- Shipyards
- Emergency Situation and Stand-by Power Facilities
- Mining Industry
- Railway Substations

Voltage	Current	Type	Width	Depth	Height
12 kV	≤ 630 A	LBS	375 mm	900 mm	2000 mm
	≤ 1250 A	C/B Measure	750 mm		
24 kV	≤ 630 A	LBS	500 mm	1000 mm	2000 mm
	≤ 1250 A	C/B Measure	1000 mm		
36/40.5 kV	≤ 630 A	LBS	750 mm	1400 mm	2250 mm
	≤ 1250 A	C/B Measure	1000 mm		

Air Insulated Metal Enclosed Switchgears

Technical Specifications								
Description		SME 3,6	SME 7,2	SME 12	SME 17,5	SME 24	SME 36	SME 40,5
Rated Voltage	kV	3.6	7.2	12	17.5	24	36	40.5
Rated Insulation Voltage	kV	3.6	7.2	12	17.5	24	36	40.5
Rated Power Frequency Withstand Voltage	kV	10	20	28	38	50	70	90/120
Rated Lightning Impulse Withstand Voltage	kV	40	60	75	95	125	170	190/210
Switchgears Insulation		Air						
Circuit Breaker Type		SF6 Gas insulated						
Loss of Service Continuity		LSC-2A						
Partition Class		PI						
Internal Arc Classification		AFL						
Rated Frequency	Hz	50/60						
Rated Short Time Withstand Current	kA	16/25						
Short Time Withstand Duration	s	1						
Internal Arc Withstand Current	kA	16/25						
Internal Arc Withstand Duration	s	1						
Rated Main Busbar Current	A	630 / 1250						
Rated Feeder Current	A	200...1250						
Protection Class (when doors are closed)		IP3X						
Protection Class (between compartments)		IP2X						
Colour (Front/Sides)		RAL 9003 / 7035						
Standards Complied		IEC 62271 - 200						

	SME-0	SME-1
Mechanical Interlock		
Between Disconnecter / Withdrawer / Track and Earthing Disconnecter		✓
Between Disconnecter / Withdrawer / Track and Circuit Breaker		✓
Between Disconnecter / Withdrawer / Track and CB Compartment Door		✓
Between CB Compartment Door and Earthing Disconnecter		✓
Disconnecter/Load Break at Low Gas Pressure Breaker / Load Break Locking		✓
Functional Properties		
Circuit Breaker Type		SF6
Insulation of Main Disconnecter		SF6 / Air
Withdrawable Circuit Breaker	-	✓
Withdrawable Voltage Transformer		-
Control Cable Entries from Top, Bottom and Sides		✓
Ready to Scada Connection		Optional
Remote CB On/Off		Optional
Hinged CB Compartment Door		✓
Manual Spring Charging when Circuit Breaker at Test Position		-
Manual Spring Charging when Circuit Breaker at Service Position		✓
Manual On/Off when Circuit Breaker at Service Position		✓
Manual On/Off when Circuit Breaker at Test Position		-
Mimic Single Line Diagram and Positioning Indication of Switching Equipment		✓
Disability of Putting in to Service Position without Fixing the Withdrawer/Truck to Panel		-
Disability of Putting in to Service Position without Closing Circuit Breaker Door		✓
Disability of Opening Earthing Switch without Closing Circuit Breaker Door		✓
Disability of Circuit Breaker Doors Closing without CB Socket Plugging In		-
Disability of Circuit Breaker Operation when Circuit Breaker is not on Test or Service Position		Optional
Disability of Disconnecter's Closing while Disconnecter is Open		✓
Fast and Easy Changing of Same Valued Circuit Breakers Between Each Other		✓
Disability of A Circuit Breaker Connecting Inside to Different Valued Cubicle.		✓
Exhaust Options		
Exhaust from Top Inside Substation		-
Exhaust from Rear Inside Substation		✓
Exhaust to Outside of Substation by Using Front, Rear or Lateral Arc Channel		-

Air Insulated Metal Clad Switchgears

SMC Series Metal Clad Switchgears are switching and control cabinets manufactured between 1kV to 40.5 kV in conformity with IEC 62271-200 standard.

SMC series Metal Clad Switchgears are manufactured in compliance with passed type tests successfully in the accredited international laboratories in Europe according to IEC 62271-200 and TSE EN 62271-200 standard, successfully completed type tests.

Advantages

- LSC-2B Loss of Service continuity
- PM Partition Class
- AFLR internal arc classification
- 4/5 separated and earthed accessible compartments
- Internal arc test up to 31.5 kA/1s
- Electrical and mechanical safety interlocks systems do not allow operational faults
- High level safety and energy continuity
- Quick and easy service with withdrawable Vacuum/SF6 CB
- Reliable design and low maintenance cost
- 3 mm steel sheet

Technical Characteristics

- Rated Voltage : 3.6...40.5 kV
- Power Frequency Withstand Voltage: 10...85 kV
- Lighting Impulse Withstand Voltage : 40...185 kV
- Rated Frequency : 50/60 Hz
- Rated Current : 630...4000 A
- Short Circuit Withstand Current : up to 31.5 kA (3 s)
- Internal Arc Current : up to 31.5 kA (1 s)
- Protection Class (doors are closed) : IP4X
(between compartment) : IP2X



Application Areas

- Energy Transmission and Distribution Centers
- Hydroelectric Power Plants
- Diesel and Natural Gas Power Plants
- Transformer Substations
- Cement Factories
- Auto Industry
- Petroleum and Chemical Industry
- Iron and Steel Industry
- Rolling Mills
- Pipelines
- Electro Chemical Facilities
- Shipyards
- Emergency Situation and Stand-by Power Plants
- Mines
- Railway Substations

Air Insulated Metal Clad Switchgears

SMC Series Metal Clad Switchgear								
Technical Characteristics								
Description		SMC 3.6	SMC 7.2	SMC 12	SMC 17.5	SMC 24	SMC 36	SMC 40.5 (*)
Rated Voltage	kV	3.6	7.2	12	17.5	24	36	40.5
Rated Insulation Voltage	kV	3.6	7.2	12	17.5	24	36	40.5
Rated Power Frequency Withstand Voltage	kV	10	20	28	38	50	70	85
Rated Lightning Impulse Withstand Voltage	kV	40	60	75	95	125	170	185
Switchgear Insulation		Air						
Circuit Breaker Type		Vacuum / SF6 Gas						
Loss of Service Continuity		LSC-2B						
Partition Class		PM						
Internal Arc Classification		AFLR						
Rated Frequency	Hz	50/60						
Rated short time Withstand Current	kA	16/25/31.5						
Short Time Withstand Duration	s	3						
Internal Arc withstand Current	kA	16/25/31.5						
Internal Arc withstand duration	s	1						
Rated Main Busbar Current	A	630...4000*						
Rated Feeder Current	A	200...4000*						
Protection Class (when doors are closed)		IP4X						
Protection Class (between compartments)		IP2X						
Colour (Front/Sides)		RAL 9003 / 7035						
Standards Complied		IEC 62271-200						

(*) Please ask for detailed information

Mechanical Interlock	SMC-1	SMC-2
Between Disconnecter / Withdrawer / Track and Earthing Disconnecter		✓
Between Disconnecter / Withdrawer / Track and Circuit Breaker		✓
Between Disconnecter / Withdrawer / Track and CB Compartment Door		✓
Between CB Compartment Door and Earthing Disconnecter		-
Between Circuit Breaker and Withdrawer's Position		✓
Accessibility to Cable Compartment With Special Tool / Lock		✓
Between Shutter and CB Withdrawer / Truck (with Padlock)		✓
If the Circuit Breaker is Open, it can be Taken to the Service Position		✓
If the Circuit Breaker is Open, it can be Taken from the Service Position		✓
Functional Properties		
Circuit Breaker Type	Vacuum / SF6	
Withdrawable Circuit Breaker	✓	
Withdrawable Voltage Transformer	-	✓
Control Cable Entries from Top, Bottom and Sides	✓	
Ready to Scada Connection	Optional	
Remote CB On/Off	Optional	
Hinged CB Compartment Door	✓	
Manual Spring Charging when Circuit Breaker at Test Position	✓	
Manual Spring Charging when Circuit Breaker at Service Position	-	
Manual On/Off when Circuit Breaker at Service Position	-	
Manual On/Off when Circuit Breaker at Test Position	✓	
Mimic Single Line Diagram and Positioning Indication of Switching Equipment	✓	
Disability of Putting in to Service Position without Fixing the Withdrawer/Truck to Panel	✓	
Disability of Putting in to Service Position without Closing Circuit Breaker Door	✓	
Disability of Opening Earthing Switch without Closing Circuit Breaker Door	-	
Disability of Circuit Breaker Door's Closing without CB Socket Plugging In	-	
Disability of Circuit Breaker Operation when Circuit Breaker is not on Test or Service Position	✓	
Disability of Earthing Disconnecter's Closing while Circuit Breaker at Service Position	✓	
Fast and Easy Changing of Same Valued Circuit Breakers Between Each Other	✓	
Disability of A Circuit Breaker Connecting Inside to Different Valued Cubicle.	✓	
Disability of Circuit Breaker Withdrawer/Truck Putting in to Service Position while Earthing Switch is Closed	✓	
Removing of Interlock Between Circuit Breaker and Earthing Switch while Circuit Breaker in Test Position	✓	
Exhaust Options		
Exhaust from Top Inside Substation	✓	
Exhaust from Rear Inside Substation	-	
Exhaust to Outside of Substation by Using Front, Rear or Lateral Arc Channel	Optional	

Air Insulated Metal Clad Switchgears

A

SNC series Metal Clad Switchgears are switching and control cabinets manufactured between 1kV to 36 kV in conformity with IEC 62271-200 standard.

SNC series Metal Clad Switchgears are manufactured in compliance with passed type tests successfully in the accredited international laboratories in Europe according to IEC 62271-200 standard.

Advantages

- LSC-2B Loss of Service continuity
- PM Partition Class
- AFLR internal arc classification
- 4 or 5 separated and earthed accessible compartments
- Internal arc test up to 40 kA
- Electrical and mechanical safety interlocks
- Quick and easy service with with drawable Vacuum/SF6 CB
- Quick and easy service with withdrawable voltage transformer (optional)
- 3 mm steel sheet

Technical Characteristics

- Rated Voltage : 3.6...36 kV
- Power Frequency Withstand Voltage : 10...70 kV
- Lighting Impulse Withstand Voltage : 40...170 kV
- Rated Frequency : 50/60 Hz
- Rated Current : 630...3150 A
- Short Circuit Withstand Current : up to 40 kA (3 s)
- Internal Arc Current : up to 40 kA (1 s)
- Protection Class (doors are closed) : IP4X
(between compartment) : IP3X



SNC



Applications

- Energy Transmission and Distribution Centers
- Hydroelectric Power Plants
- Diesel and Natural Gas Power Plants
- Transformer Substations
- Cement Factories
- Automotive Industry
- Chemical Industry
- Iron and Steel Industry
- Rolling Mills
- Pipelines
- Electro Chemical Facilities
- Shipyards
- Emergency Situation and Stand-by Power Plants
- Mining Industry
- Railway Substations
- Oil and Gas Industry

Air Insulated Metal Clad Switchgears

A

SNC Series Metal Clad Switchgear							
Technical Characteristics							
Description		SNC 3.6	SNC 7.2	SNC 12	SNC 17,5	SNC 24	SNC 36
Rated Voltage	kV	3.6	7.2	12	17.5	24	36
Rated Insulation Voltage	kV	3.6	7.2	12	17.5	24	36
Rated Power Frequency Withstand Voltage	kV	10	20	28	38	50	70
Rated Lightning Impulse Withstand Voltage	kV	40	60	75	95	125	170
Switchgear Insulation		Air					
Circuit Breaker Type		Vacuum / SF6 Gas					
Loss of Service Continuity		2B					
Partition Class		PM					
Internal Arc Classification		AFLR					
Rated Frequency	Hz	50/60					
Rated Short Time Withstand Current	kA	16/25/31.5/40					
Short Time Withstand Duration	s	3					
Internal Arc Withstand Current	kA	40			31.5		
Internal Arc Withstand Duration	s	1					
Rated Main Busbar Current	A	630...3150					
Rated Feeder Current	A	200...3150					
Protection Class (when Doors Are Closed)		IP4X					
Protection Class (Between Compartments)		IP3X					
Colour (Front/Sides)		RAL 9003 / 7035					
Standards Complied		IEC 62271 - 200					

Mechanical Interlock	SNC-1	SNC-2
Between Disconnecter / Withdrawer / Track and Earthing Disconnecter		✓
Between Disconnecter / Withdrawer / Track and Circuit Breaker		✓
Between Disconnecter / Withdrawer / Track and CB Compartment Door		✓
Between CB Compartment Door and Earthing Disconnecter		-
Between Circuit Breaker and Withdrawer's Position		✓
Accessibility to Cable Compartment With Special Tool / Lock		✓
Between Shutter and CB Withdrawer / Truck (with Padlock)		✓
If the Circuit Breaker is Open, it can be Taken to the Service Position		✓
If the Circuit Breaker is Open, it can be Taken from the Service Position		✓
Functional Properties		
Circuit Breaker Type	Vacuum / SF6	
Withdrawable Circuit Breaker		✓
Withdrawable Voltage Transformer	-	✓
Control Cable Entries from Top, Bottom and Sides		✓
Ready to Scada Connection	Optional	
Remote CB On/off	Optional	
Hinged CB Compartment Door		✓
Manual Spring Charging when Circuit Breaker at Test Position		✓
Manual Spring Charging when Circuit Breaker at Service Position		-
Manual On/Off when Circuit Breaker at Service Position		✓
Manual On/Off when Circuit Breaker at Test Position		✓
Mimic Single Line Diagram and Positioning Indication of Switching Equipment		✓
Disability of Putting in to Service Position without Fixing the Withdrawer/Truck to Panel		✓
Disability of Putting in to Service Position without Closing Circuit Breaker Door		✓
Disability of Opening Earthing Switch without Closing Circuit Breaker Door		-
Disability of Circuit Breaker Door's Closing without CB Socket Plugging In		✓
Disability of Circuit Breaker Operation when Circuit Breaker is not on Test or Service Position		✓
Circuit Breaker Closing while Disconnecter is Open		N/A
Disability of Earthing Disconnecter's Closing while Circuit Breaker at Service Position		✓
Disability of Disconnecter's Closing while Disconnecter is Open		N/A
Fast and Easy Changing of Same Valued Circuit Breakers Between Each Other		✓
Disability of A Circuit Breaker Connecting Inside to Different Valued Cubicle.		✓
Disability of Circuit Breaker Withdrawer/Truck Putting in to Service Position while Earthing Switch is Closed		✓
Removing of Interlock Between Circuit Breaker and Earthing Switch while Circuit Breaker in Test Position		✓
Exhaust Options		
Exhaust from Top, Inside Substation		Optional
Exhaust from Rear, Inside Substation		-
Exhaust to Outside of Substation by Using Front, Rear or Lateral Arc Channel		Optional

Air Insulated Metal Clad Switchgears

Double Busbar

SNC series Double Busbar Metal Clad Switchgears are switching and control cabinets manufactured up to 36 kV in conformity with IEC 62271-200 standard.

SNC series double busbar metal clad switchgears are manufactured in compliance with passed type tests successfully in the accredited international laboratories in Europe according to IEC 62271-200 standard.

Advantages

- LSC 2B Loss of Service continuity
- PM Partition Class
- AFLR internal arc classification
- 4 or 5 separated and earthed accessible compartments
- Electrical and mechanical safety interlocks
- Quick and easy service with withdrawable Vacuum/SF6 CB
- Quick and easy service with withdrawable voltage transformer (Optional)
- 3 mm steel sheet

Technical Characteristics

- Rated Voltage : 3.6...36 kV
- Power Frequency Withstand Voltage : 10...70 kV
- Lighting Impulse Withstand Voltage : 40...170 kV
- Rated Frequency : 50/60 Hz
- Rated Current : 630...3150 A
- Short Circuit Withstand Current : up to 40 kA (3 s)
- Internal Arc Current : up to 40 kA (1 s)
- Protection Class (doors are closed) : IP4X
(between compartment) : IP3X



Applications

- Energy Transmission and Distribution Centers
- Hydroelectric Power Plants
- Diesel and Natural Gas Power Plants
- Transformer Substations
- Cement Factories
- Automotive Industry
- Chemical Industry
- Iron and Steel Industry
- Rolling Mills
- Pipelines
- Electro Chemical Facilities
- Shipyards
- Emergency Situation and Stand-by Power Plants
- Mining Industry
- Railway Substations
- Oil and Gas Industry

Metal Clad Switchgears Dimensions

SNC Series

Voltage	Current	Width	Depth		Height
			SNC-1	SNC-2	
12 kV*	630 A	650 mm	1400 mm	1750 mm	2445 mm
	1250 A				
	1600 A	800 mm			
	2000 A				
	2500 A	1000 mm			
	3150 A				
24 kV	630 A	800 mm	1750 mm	1750 mm	2570 mm
	1250 A				
	1600 A	1000 mm			
	2000 A				
	2500 A				
36 kV	630 A	1100 mm	2350 mm	2350 mm	2820 mm
	1250 A				
	1600 A				
	2000 A				
	2500 A				

*: Tested and certified for 13,8 kV
Ask for dimensions for SNC series of Double Busbar Switchgears

SMC Series

Voltage	Current	Width		Depth		Height	
		Vacuum CB	SF6 CB	Vacuum CB	SF6 CB		
12 kV	630 A	800 mm	1100 mm	2000 mm	2250 mm	2100 mm	
	1250 A						
	1600 A						
	2000 A	1000 mm					
	2500 A						
	3150 A	-					
24 kV	630 A	1000 mm	1100 mm	2000 mm	2250 mm	2100 mm	
	1250 A						
	1600 A						
	2000 A	1100 mm		-			
	2500 A						
	3150 A	-					
36 kV	630 A	1200 mm	1400 mm	3000 mm	3000 mm	2300 mm	
	1250 A						
	1600 A						
	2000 A						
	2500 A	1400 mm		-	3550 mm	-	2550 mm
	3150 A						
	4000 A						
40.5 kV	630 A	1400 mm	-	3550 mm	-	2550 mm	
	1250 A						
	1600 A						
	2000 A						
	2500 A						

Switching Equipment and Accessories

Rotary Disconnectors

SRS type Rotary Disconnector Switches are manufactured according to IEC 62271-102 standard.

SRS type Rotary Disconnector are manufactured as 3 poles and 2 positions. Together with SES type earthing switches, it can be used as 3 poles and 3 positions.

When on-load switching operation isn't necessary, the disconnecting operation can be done safely without requiring any other switching equipment.

In case of on-load switching operation the disconnecting operation can be done safely together with connectors or circuit breakers.

Technical Characteristics

- Rated Voltage : 3.6...36 kV
- Power Frequency Withstand Voltage : 10...70 kV
- Lighting Impulse withstand Voltage : 40...170 kV
- Rated Frequency : 50/60 Hz
- Rated Current : 630/1250 A
- Short Circuit withstand Current : 16...25 kA (1 s)
- Internal Arc Current : 16...25 kA (1 s)
- Mechanical Endurance : 1.000 Operation Cycle



Earthing Switches

SES series Earthing Switches are used for earthing the medium voltage systems in safety.

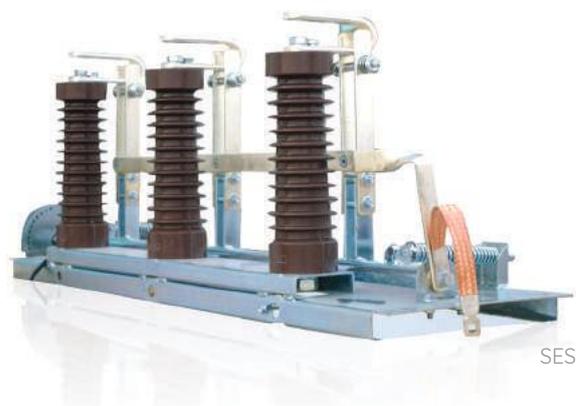
SES series Earthing Switches can operate with all type of disconnector mechanism. Thanks to the air insulated type, disconnector contact position can be observed easily.

SES series Earthing Switches are manufactured according to class E2-B to have 5 times making capacity.

SES series Earthing Switches are manufactured according to IEC 62271-102 standard.

Technical Characteristics

- Rated Voltage : 3.6...40.5 kV
- Power Frequency Withstand Voltage : 10...90-120 kV
- Lighting Impulse Withstand Voltage : 40...190-210 kV
- Rated Frequency : 50/60 Hz
- Rated Current : 630...4000 A
- Short Circuit Withstand Current : 16...40 kA
- Rated Short Circuit Withstand Time : 1/3 s
- Mechanical Endurance : E2-B



Switching Equipment Dimensions

SRS series Rotary Disconnecter

Product Type	Ur*	Ir	Ik	tk	Ud	Up	Ip
SRS-12/630-1601	12 kV	630 A	16 kA	1 s	28 kV	75 kV	40 kA
SRS-12/630-2001			20 kA				50 kA
SRS-12/630-2501			25 kA				63 kA
SRS-12/1250-1601		1250 A	16 kA				40 kA
SRS-12/1250-2001			20 kA				50 kA
SRS-12/1250-2501			25 kA				63 kA
SRS-36/630-1601	36 kV	630 A	16 kA		70 kV	170 kV	40 kA
SRS-36/630-2001			20 kA				50 kA
SRS-36/630-2501			25 kA				63 kA
SRS-36/1250-1601			16 kA				40 kA
SRS-36/1250-2001			20 kA				50 kA
SRS-36/1250-2501			25 kA				63 kA

* Available with and without earthing mechanism.

SES series Earthing Switches

Product Type	Ur	Ik*	Ud	Up	Ip
SES-12/0000-1601	12 kV	16 kA	28 kV	75 kV	40 kA
SES-12/0000-2001		20 kA			50 kA
SES-12/0000-2501		25 kA			63 kA
SES-12/0000-3101		31.5 kA			80 kA
SES-12/0000-4001		40 kA			100 kA
SES-12/0000-5001		50 kA			125 kA
SES-24/0000-1601	24 kV	16 kA	50 kV	125 kV	40 kA
SES-24/0000-2001		20 kA			50 kA
SES-24/0000-2501		25 kA			63 kA
SES-24/0000-3101		31.5 kA			80 kA
SES-24/0000-4001		40 kA			100 kA
SES-24/0000-5001		50 kA			125 kA
SES-36/0000-1601	36 kV	16 kA	70 kV	170 kV	40 kA
SES-36/0000-2001		20 kA			50 kA
SES-36/0000-2501		25 kA			63 kA
SES-36/0000-3101		31.5 kA			80 kA
SES-36/0000-4001		40 kA			100 kA
SES-36/0000-5001		50 kA			125 kA
SES-40/0000-1601	40.5 kV	16 kA	90-120 kV	190-210 kV	40 kA
SES-40/0000-2001		20 kA			50 kA
SES-40/0000-2501		25 kA			63 kA
SES-40/0000-3101		31.5 kA			80 kA
SES-40/0000-4001		40 kA			100 kA
SES-40/0000-5001		50 kA			125 kA

* : Available with 3 seconds.

Mobile Substations

SMS series Mobile Substations are transformer and distribution substations, offer flexible and efficient solutions.

SMS series mobile substations are used for applications like temporary power demands, mining applications, military camps, industrial facilities, emergency power demands and additional power requests.

SMS series mobile substations can be mounted on trailer, platform, wagon, vessel according to the application and HV switching equipment can be chosen as gas insulated or air insulated. Complete substation can be equipped with remote control systems. SMS series mobile substations can be produced in a short time and low cost in comparison with fixed type substations.

Advantages

- Mobile design
- Operation in safety
- Easy and quick transport and installment
- Special design solutions for different applications
- Different applications on trailer, platform, wagon, vessel
- Quick solution for emergency power or additional power requests

Technical Characteristics

- SMS 1 : 3.6 – 40.5 kV / 0.23 - 0.69 kV, 50/60 Hz, 0.5 - 4 MVA
- SMS 2 : 3.6 – 40.5 kV / 1 - 24 kV, 50/60 Hz, 1 - 31.5 MVA
- SMS 3 : 52 - 245 kV / 3.6 - 40.5 kV, 50/60 Hz, 1 - 45 MVA



SCK-1 Series

SCK-1 series compact substations are made of galvanized sheet steel with requested dimensions, according to IEC 62271-202 standard.

Advantages

- Internal arc classification in compliance with IAC A and B
- IP23D protection class
- Galvanized sheet steel construction, hot-dip galvanized steel frame, electrostatic powder coat and NPU base profiles
- Optional HVAC, fire detecting and extinguishing system
- Suitable design for each type LV and MV panels.

Technical Characteristics

- Altitude : 1000 m
- Ambient temperature : -5 ... +50 °C
- Pollution degree : Class 3
- Maximum Solar Radiation : 1000 W/m²
- Earthquake Resistance : 0.5 g horizontal and vertical
- Inner wall thickness : 1 mm Galvanized steel sheet
- Outer wall thickness : 2 mm Galvanized steel sheet
- Frame thickness : 3 mm Hot-dip Galvanized steel sheet
- Wall Thickness : 40 mm
- Insulation material : EPS (Expanded Polystyrene Foam)
- Insulation density : 1.8 kg/m³
- Incombustibility degree : E
- R Value : 7



SCK-1

SCK-2 Series

SCK-2 series compact substations are produced in compliance with Zone 2 area conditions for distribution and MV - LV Transformer station.

Advantages

- Internal arc classification in compliance with IAC A and B
- Protection class from IP23D up to IP54
- Suitable insulation material to ambient conditions
- NPU or NPI base profiles made by hot-dip galvanized against corrosion
- Doors can be opened 120° outside and designed against to 20 J mechanical shock
- Rubber floor covering at level of 50kV and has A1 incombustibility degree
- HVAC, fire detecting and extinguisher system
- Special design and production to application

Technical Characteristics

- Altitude : 1000 m
- Ambient Temperature : -25 ... +50 °C
- Earthquake Resistance: 0.5 g horizontal and 0.4 g vertical
- Ur : max 40.5 kV
- Fr : 50/60 Hz
- IAC : A and B
- IP : up to IP54
- Hazardous Area : Zone2



SCK-2

Related standards for SCK-2 series compact substations

- IEC 62271-202 : Prefabricated substations
- IEC 60076 : Distribution Transformers
- IEC 62271-200 : MV Panels
- IEC 60529 : IP Protection Class
- IEC 60721-1 : Environmental Classification

E-House / Compact Substations

Made by Concrete

SMK series monoblock concrete kiosks are used for transformer and distribution substations manufactured up to 1600 kVA transformer power.

SMK series monoblock concrete kiosks are manufactured in compliance with type tests received from international accredited laboratories, IEC 62271-202 standard and TEDAŞ MYD standard.

Advantages

- Modular design
- Operation in safety
- Easy transport and start up
- Long service life
- High strength due to C35 concrete
- Internal arc classification in compliance with IAC A and B
- Safety and tested earthing circuits
- Different product solutions to special projects
- Suitable design for each type LV and MV panels.

Technical Characteristics

- Altitude : 1000 m
- Ambient temperature : -5...+50 °C
- Pollution degree : Class 3
- Maximum solar radiation : 1000 W/m²
- Earthquake withstand Resistance : 0.5 g horizontal and vertical
- IAC : A and B
- IP : IP23D
- CI : 10
- Compressive strength class : C35



SMK

E-House / Compact Substations

Made by Concrete

A

SPK series prefabricated concrete kiosks are used for transformer and distribution substations manufactured up to 2500 kVA transformer power.

SPK series prefabricated concrete kiosks are manufactured in compliance with type tests received from international accredited laboratories, IEC 62271-202 standard and TEDAŞ MYD standard.

Advantages

- Easy assembly and disassembly on site
- High strength due to C35 concrete
- Internal arc classification in compliance with IAC A and B
- Safety-tested earthing circuits
- Suitable depth dimensions for installment of metal clad switchgear
- Different product solutions to special projects
- Manufacturing in compliance with internal arc test received from accredited laboratories
- Suitable design for each type LV and MV panels.

Technical Characteristics

- Altitude : 1000 m
- Ambient temperature : -5...+50 °C
- Pollution degree : Class 3
- Maximum solar radiation : 1000 W/m²
- Earthquake Resistance : 0.5 g horizontal and vertical
- IAC : A and B
- IP : IP23D
- CI : 10
- Compressive strength class : C35



Power Resistors

B

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B

Power Resistors



Energy



Industry



Building



Medical Plants



Traction



Solar Systems



Grounding Solutions

Neutral Grounding Resistors

Our resistors are manufactured against harsh weather and industrial conditions with the range from Low Voltage to High Voltage at 52 kV insulation level and from low currents up to high currents of 10 kA.

The most common requirements are manufactured with the line of standard products and the others are designed and developed as tailor made according to the project characteristics.

Technical Characteristics

- Nominal Voltage up to 52 kV insulation class
- Fault Current up to 10 kA
- Fault Duration

Other Parameters

- Continuous current rating; important for the resistor performance especially at high IP degrees
- Protection degree of enclosure; standard IP23, available from IP00 (w/o enclosure) to IP55,
- Enclosure; hot dip galvanized is standard, AISI304 / AISI316 stainless steel and RAL 7035 color are options
- Auxiliary components; like Switches, Disconnectors, Current Transformers, etc.

How to ground an electrical system is an important decision for the electricity generation and distribution system.



SRG



The purpose of system grounding is;

- to control the system's voltage with the respect to ground, within predictable limits,
- to provide for a flow of current that will allow detection of a short-circuit between phases and ground and disable the voltage source (such as transformer or generator).

The Basic Methods of Neutral Grounding are as follows and each has its own purpose, advantage and disadvantage;

1. Through a Resistance
 - Low-resistance
 - High-resistance
2. Through a Reactance
3. Through a Peterson Coil (Resonant Grounding)
4. Through a Solidly grounded system
5. Through a Transformer
 - Consist of a Single-Phase Transformer and Resistor,
 - Ziz-Zag Transformer,
 - Wye-Delta Transformer,
 - Wye-Open Delta Transformer

Grounding Solutions

Neutral Grounding Transformers

Neutral Grounded System Through a Single-Phase Transformer and a Resistor

A single-phase grounding transformer and neutral grounding resistor are used together in this system. This system is particularly suitable for grounding of generators, because this system behaves normally as a non-grounded system but limits the fault current when a phase to ground fault occurs. The primary winding of the grounding transformer is connected to the neutral winding of the system and neutral grounding resistor is connected to the secondary winding of grounding transformer.

Obtain the System Neutral with Zig-zag Transformer

In the case of delta-connected systems with no neutral point or if the neutral point cannot be reached in some way, an earthing transformer is used to create an artificial neutral point and system can be grounded via this neutral point. Most grounding transformers are designed to expose fault current below 1 min (usually 10 s), so they are much smaller in size than an ordinary three-phase continuously rated transformer with the same rating and cheaper. One of these grounding transformers is zig-zag transformers.



Obtain the System Neutral with Wye-Delta Transformer

A wye-delta connected three-phase transformer or transformer bank can also be utilized for system grounding. The primary phase windings are connected to the phases of the system and the neutral point is connected directly or via a resistance to the ground. The delta connection must be closed to provide a path for the zero-sequence current, and the delta voltage rating is selected for any standard value. When a phase neutral fault occurs, the fault current is limited to the sum of the transformer leakage reactance and neutral resistance as the transformer has zero sequence in the primary Wye windings and the secondary delta is a closed series circuit.

Obtain the System Neutral with Wye-Open Delta Transformer

In this application, the neutral side of the primary of the Wye open delta earthing transformer is directly connected to the ground. A limiting resistor is connected to the open ends of the open delta which is connected secondary windings. When a phase earth fault occurs in the system, this resistance limits the current in closed secondary delta windings. In this way, the fault current in the primary windings of the earthing transformer is also limited.

Load Banks

B

Load Banks are used performance tests of generators, UPS, voltage regulators, power transformers, alternators and test laboratories and also ensure to operate the generators safely (dummy load) Aktif manufactures all type of load banks with the required;

- Characteristics (R, L, C)
- Electric characteristics (AC, DC, V, A, kW)
- Stage precision
- Control (manual, HMI-controlled or automatic)
- Measuring methods
- Installation (indoor or outdoor)
- Rack mounted, portable, stationary and trailer mounted alternatives

Applications

Load Banks are used in many industrial areas and applications. As energy needs become more and more important day by day, testing, protecting and maintaining the resources that provide this energy temporarily or continuously is becoming more and more important. Major areas of use of Load Banks are listed below.

- Testing whether the products such as power transformer, generator, alternator, UPS, regulator provide the design values and reporting the electrical values read or recorded during the test.
- Testing the generators, UPS or regulators after maintenance or repair on site or workshop.
- No-load operation of generators is not requested. in this case, automatically providing artificial load when the load supplied by a generator falls below a certain level (ideally 30%)
- Automatic damping of the regenerative power which is created when facilities where high-power motors are driven by regenerative drives are supplied by generators.
- Load dispatch test at power plants
- Testing of alternators used by military or civil air, road or marine vehicles
- Controlled discharge and capacity testing of batteries
- Electrical and heat simulation and performance tests of data centers with load banks
- Invertor performance tests



6.6 kW 230 V 19" Data Center Load Bank



2 MW, 400 V, 50 Hz Load Bank

Technical Characteristics

Load Banks can be manufactured for AC (50/60/400 Hz) or DC and AG or OG operating voltages.

Load banks based on load characteristics;

- Resistive (kW-cosφ: 1)
- Inductive (kVAr)
- Resistive + Inductive (kVA-cosφ: requested)

Special designs can be made for different frequency and cosφ values.

AC Load Banks are designed in kW, kVAr or kVA and DC Load Banks are designed in Current (A).

Physical Properties

Load Banks can manufactured IP 20 protection level for indoor use, IP20 / IP 23 for outdoor use under shelter or IP 55 for outdoor use on open area.

Load banks are manufactured portable and case-type up to 100 kW. Load banks up to 500 kW are manufactured with wheels. Over than 500 kW load banks are usually fixed on the ground. Load banks can be installed on a trailer and transported by a vehicle on demand.

There are two types of load banks according to cooling direction.

- horizontal air flow
- vertical air flow

Use of power electronic equipment (HVDC, SVC etc.) with technological developments and non-linear loads such as arc and induction ovens have caused to the harmonics (magnitudes different than the network frequency) and have decreased the power quality.

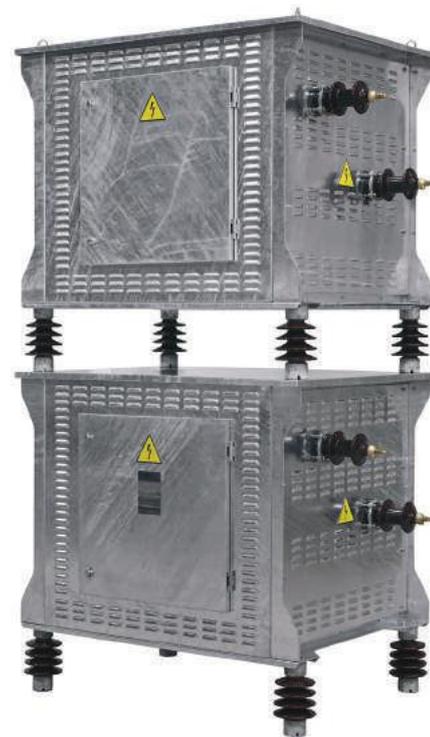
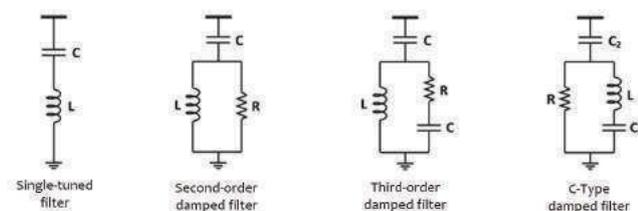
This issue affects other linear loads which do not cause harmonics and causes overheating, insulation problems, short operating life and significant loss of efficiency. Harmonics do not result in any benefits but cause significant power losses at the network.

Passive harmonic filtration is the most efficient and cost-effective method to eliminate harmonics. the harmonic filter systems can only consist of capacitor and reactor (LC) in principle. However, in this case, a change in the value of the capacitor or reactor due to manufacturing defect, aging or temperature can affect the filtering severely and may cause the parallel resonance to increase even more harmonics. This sensitivity can be controlled by adding resistance to the filter circuit and the harmonic filter system so that it can continue to work with the same efficiency for a long time.

For low-voltage systems, harmonic filtering with a capacitor and a reactor is a more optimal solution due to low risk. However, considering the risk of changing the capacitance of the capacitor and the damage that may occur using harmonic filter resistance is a more optimum solution in medium voltage and high voltage systems.

Technical Characteristics

- Suitable up to 36 kV rated voltage
- Stainless steel resistance material suitable for extreme ambient conditions, resistant to oxidation and corrosion, low resistance variation against to temperature and low inductance
- Special mechanical and electrical design to withstand high temperature and inrush current
- Design and tests in accordance with IEC 60071-1 and CIGRÉ WG 14.30 Section 17 Resistors and other special specifications
- Insulated from ground and suitable for the isolation level between the input terminal and the ground, between the output terminal and the ground and between the input and output terminals



Resistor Element

- Spring-wound, edge-wound or grid resistor elements with low inductance and a cross-section suitable for the nominal current
- Fully-modular, banded and stainless steel bolt connections in order to ensure electrical continuity at high temperature
- High conductivity for high current with banded and cascaded terminal connectors suitable for serial and/or parallel connections with high cross-section, low contact resistance
- High internal insulation and high mechanical resistance against to shocks and sagging thanks to the use of large surface sated bushings and M16 shear connectors
- Special designed to dissipate the thermal and mechanical effects of overcurrent to the surface grid resistors

Enclosure

- Standard IP23 Protection Level suitable for outdoor usage and perfect cooling
- Standard hot-dipped galvanized steel
- Frame suitable for side by side (horizontal) or stacked (vertical) installation
- Side or top entry or exit with bushings based on insulation level
- Fully-modular, rigid, strong enclosure design with resistor blocks mounted to the frame for safety lifting from the upper or lower side
- Easy access and maintenance to the resistor blocks on site thanks to blocks independently mounted to the frame
- Corrosion-resistant handling rings and connectors
- Stainless steel product and warning labels

Motor Control and Braking Resistors

Dynamic Braking Resistors

“Dynamic Braking Resistors” are used to ensure fast stopping or decrease the speed of AC and DC electric motors controlled by speed drives (speed control devices).

Aluminum Resistors

The resistor made of stainless steel wire is placed in an aluminum case with a larger surface which allows good heat dissipation. The space between the resistor and the case is filled with a material which has high thermal conductivity and electrical insulation. Resistors manufactured using this technology can be used as braking resistors or capacitor discharge resistors, constant load tester, wind power plants, hybrid vehicles and other industrial applications.

As standard aluminum resistors are manufactured with 1 meter length fiber glass braided silicone cable, suitable to rated current and connections resistant to high temperature. They can be manufactured with connectors or terminals on request.



BRA Series Aluminum Resistors

Technical Characteristics

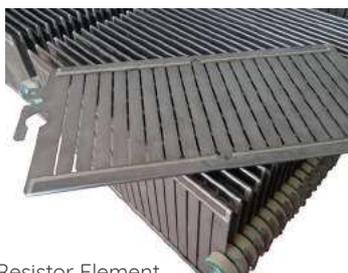
Maximum operating voltage	: 1000 V
Resistance tolerance @ 20°C	: ± 5%
Protection class	: IP5X (Indoor only)
Insulation	: 2 kV, 50/60Hz, 1 min



Spring Wound Resistor Element



Edge Wound Resistor Element



Grid Resistor Element

Frame Resistors

As the name states, Frame Resistors are resistors mounted inside an enclosure where resistor elements are positioned in an open space environment. It is possible to connect resistors in serial or parallel according to the requirements. Besides the connection type wire cross-section or grid size are calculated by an engineering software to perfectly fit the application.

Frame resistor types are defined according to the type of resistor design used in the enclosure. Different series are defined as:

Resistor Type	Our Indication
Spring Wound Resistor	S Series
Edge Wound Resistor	E Series
Grid Resistor	G Series

The Frame Resistors can be manufactured to be used in outdoor applications as well as indoor applications when the frame is manufactured accordingly.

When galvanized steel is used at indoor use frame resistors, stainless steel is used at outdoor use for higher durability and life-time instead of painted frames which causes corrosion thus low quality and short-life time.

All S, E and G series frame resistors can be manufactured either as indoor or outdoor type. As stated in the type designation at page 11, the indicator for Outdoor/Indoor selection is the third letter of the product code. “K” stands for Indoor type and “P” stands for Outdoor type.

Motor Control and Braking Resistors

Dynamic Braking Resistors

Application	Our Indication
Indoor	D
Outdoor	H

Spring Wound Resistors

Spring wound (wire wound) resistor elements are used inside S series frame resistors. This type is perfectly suitable for short-time overloads due to its spiral form. Heated wire absorbs any expansion thanks to spiral form and gets back to its colder form. With this feature, the spring resistor ensures safety and a long operating life for especially the braking resistors.

Technical Characteristics

Maximum operating voltage	: 1000 V
Resistance tolerance @ 20°C	: ± 5%
Protection class	(Indoor) : IP20 (Outdoor) : IP23
Insulation:	: 3 kV, 50/60Hz, 1 min
Frame Material	(Indoor) : Galvanized steel (Outdoor) : Stainless steel



BRS-D06b

Edge Wound Resistors

Edge Wound Resistors are used for E-series frame resistors. In Edge Wound Resistor type, the resistor element is in the form of stainless steel stripe plate. This stripe plate is wound on an electro-ceramic frame vertically. Large cross-section and the capability of fast cooling offers an optimal solution for high power - low resistance braking resistors.

Technical Characteristics

Maximum operating voltage	: 1000 V
Resistance tolerance @ 20°C	: ± 5%
Protection class	(Indoor) : IP20 (Outdoor) : IP23
Insulation	: 3 kV, 50/60Hz, 1 min
Frame material	(Indoor) : Galvanized steel (Outdoor) : Stainless steel



BRE-D28n



BRG-D04a



BRG-H02a

Grid Resistors

G series braking resistors are manufactured in blocks by connecting in serial or in parallel with the desired power and resistance value by the stainless steel grid type resistors specially designed according to the desired current density. They are generally used for high power and low resistance applications.

Technical Characteristics

Maximum operating voltage	: 1000 V
Resistance tolerance @ 20°C	: ± 5%
Protection class	(Indoor) : IP20 (Outdoor) : IP23
Insulation	: 3 kV, 50/60Hz, 1 min
Frame material	(Indoor) : Galvanized steel (Outdoor) : Stainless steel

Power Quality & Power Factor Correction C

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Power Quality & Power Factor Correction



Energy



Industry



Building



Solar Systems



Power Quality Engineering

Power quality engineering is application of measuring and reporting in national/international standards with equipments that can measure and analyze in conformity with related standards by our professional engineers who are the competent in their field of activity.

The right method of measurements is capturing all parameters at the correct measuring points with appropriate periods and sampling sensitivity according to EN 50160, IEC 61000-4-7, IEC 61000-4-15 and IEC 61000-4-30 standards.

Aktif Mühendislik has been providing designing, commissioning, solution suggestions and manufacturing of all kind of power quality services with its 19 years experience and absolute product range.

Advantages

- Analyzing electric network and determining the problems.
- Designing best solutions according measurement data.
- Reactive penalty is prevented.
- Applying individual compensation in systems with many distributed loads with reactive power requirements is the most economic solution.
- It allows more effective usage of the transformer.
- It relieves the transformer.

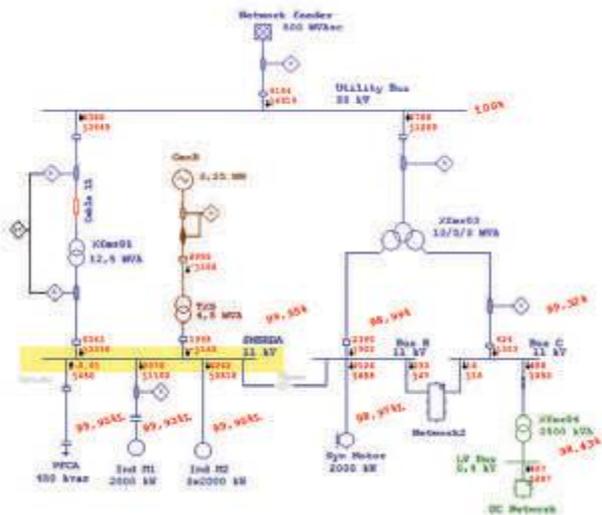


The following data should be recorded during the measurement;

- Voltage Sag
- Voltage Swell
- Voltage Interruption
- Voltage Unbalance
- Power Frequency
- Flicker - Pst, Plt
- Notch
- Transient
- Harmonics

In addition to above measurements, the following data should be recorded during measuring;

- Voltage Measurements
Vrms, VR, VS, VT, V0, VPOZ, VNEG
- Current Measurements
Irms, IR, IS, IT, I0, IPOZ, INEG
- Crest Factor Measurements
CF-VR, CF-VS, CF-VT
CF-IR, CF-IS, CF-IT



Harmonic Filter Reactors

Asset AR series low voltage harmonic filter reactors are used in the high level of harmonic distortion in facilities for compensating of reactive power and protecting of capacitors. Which is the main staff in compensation systems and annihilating other negative effects. Asset AR series harmonic filter reactors are manufactured as single phase and three phase. AR series reactors have 3 poles and 6 poles options. Furthermore, reactors have aluminum and copper coil options.

Advantages

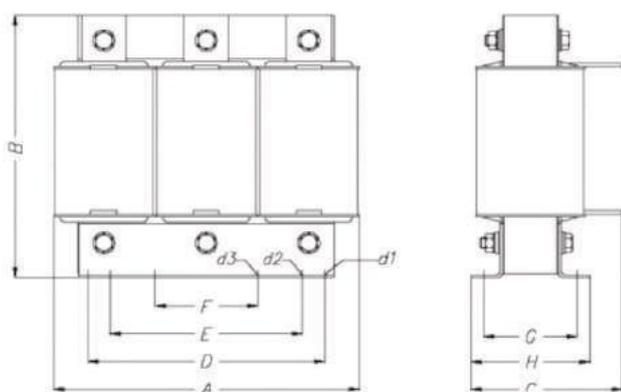
- Manufactured according to customer's request
- Aluminum and copper coil options
- Easy mounting to different type of panels
- High quality and long life period

Technical Characteristics

- Rated Voltages : 230...1000 V AC
- Rated Frequency : 50 / 60 Hz
- Resonance Frequency : 134 / 189 / 210 / 225 Hz
- Degree of protection : IP 00
- Power Range : 0.83...150 kVAr
- Over Current : 1.35 x I_n
- Linearity Current : 2.1 x I_n
- Inductance Tolerance : Max %3
- Rated Temperature : ta 40 oC
- Standards : EN 61558-1 ,
EN 60076-6, VDE 0550



AR3 4450-F70



Reactors are also available with your requirements and specifications. Please contact for further details us.

Power (kVAr)	Nominal Voltage (V)	Accord frequency (%p)	Phase Number	Aktif Model Type	L (mH)	I _{rms} (A)	I _{lin} (A)	Width (mm)	Depth (mm)	Height (mm)	Monunting Width (mm)	Monunting Depth (mm)	Mounting Hole (mm)	Weight (kg)
								A	C	B	D	H	d	
6.25	400	7	3	AR3 4406-F70-D	3x6.90	10.02	16.83	185	120	170	95	85	7x13.5	10.2
12.5	400	7	3	AR3 4412-F70-D	3x3.45	20.04	33.67	240	155	210	130	74	8.5x17	12.4
25	400	7	3	AR3 4425-F70-D	3x1.73	40.08	67.34	240	175	210	130	94	8.5x17	19.3
50	400	7	3	AR3 4450-F70-D	3x0.86	80.17	134.68	300	180	230	170	110	8.5x17	29.9
100	400	7	3	AR3 44100-F70-D	3x0.43	160.33	269.35	360	200	280	200	120	8.5x17	51.7

Shunt Reactors

SR series shunt reactors have been used to compensate capacitive reactive power generated by long and unloaded transmission / distribution lines, thus allowing the flow of more active power through the system and avoiding penalties resulting from increasing of capacitive reactive power/active power ratio. These shunt reactors are the most effective method of compensating capacitive reactive power.

Advantages

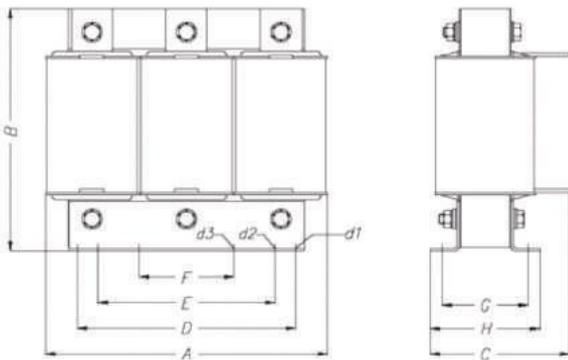
- Manufactured according to customer's request
- Aluminum and copper coil options
- Easy mounting to different type of panels
- High quality and long life period

Technical Characteristics

- Rated Voltages : 230...1000 V AC
- Rated Frequency : 50 / 60 Hz
- Degree of protection : IP 00
- Power Range : 0.1 ... 50 kVAr
- Over Current : 1.35 x I_n
- Linearity Current : 2.35 x I_n
- Inductance Tolerance : Max 3%
- Rated Temperature : to 40 °C
- Standards : EN 61558-1, EN 60076-6, VDE 0550



SR - 5040



Reactors are also available with your requirements and specifications. Please contact for further details us.

Power (kVAr)	Nominal Voltage (V)	Phase Number	Aktif Model Type	L (mH)	I _{rms} (A)	I _{lin} (A)	Width (mm)	Depth (mm)	Height (mm)	Monunting Width (mm)	Monunting Depth (mm)	Mounting Hole (mm)	Weight (kg)
							A	C	B	D	H	d	
1	400	3	SR-140	3x509.27	1.73	2.89	240	175	220	130	94	8.5x17	18.1
2	400	3	SR-240	3x254.63	3.46	5.77	240	175	220	130	114	8.5x17	25.3
5	400	3	SR-540	3x101.85	8.66	14.43	300	220	280	170	150	8.5x17	50.9
10	400	3	SR-1040	3x50.92	17.32	28.87	360	250	260	200	170	8.5x17	78.0
25	400	3	SR-2540	3x20.37	43.30	72.17	480	215	360	250	175	11x26	140.2

Shunt Reactor Banks

SRS series shunt reactor banks have been designed by using SR series shunt reactors, high technology digital reactive power control relay, protection and control equipment. Application areas of the shunt reactor banks are industrial zones which have long transmission / distribution lines or cables, capacitive load characteristic plants, subway and light rail systems etc.

Advantages

- Designed for different voltage and power levels
- It helps us in installation and maintenance period thanks to its modular design
- Remote monitoring and controlling with Scada system
- Power can be increased by adding panels thanks to its modular design

Technical Characteristics

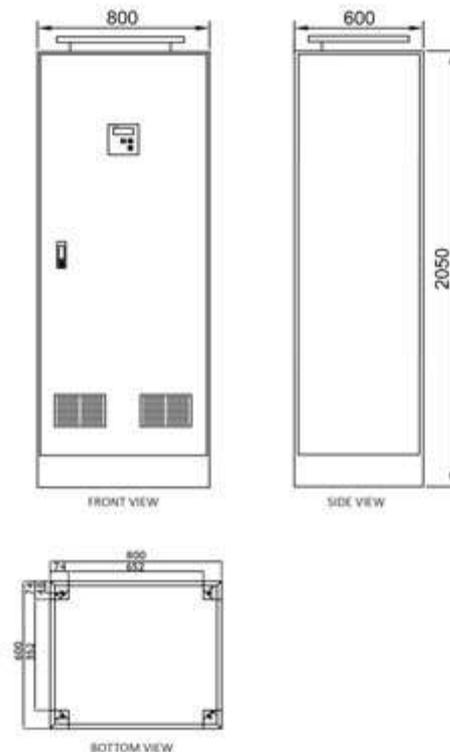
- Rated Voltages : 400/690 V
- Nominal Frequency : 50/60 Hz
- Max Power for 1 panel : 100 kVAR
- Ambient temperature : -40°C / 55°C
- Mechanical resistance for high short circuit powers



SRS- 10040



Dimensions



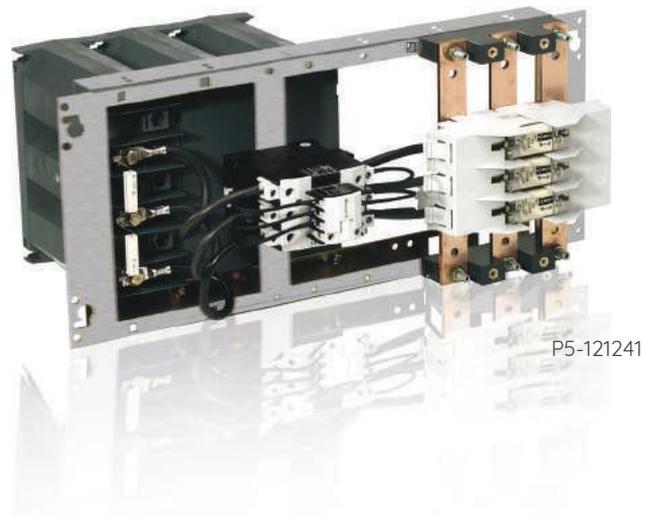
Compensation Rack Units

Compensation Rack Units P5

P5 series compensation racks provide customers different power level options thanks to its modular design. This modular design provides rapid and effective solution during installation, maintenance and system development period.

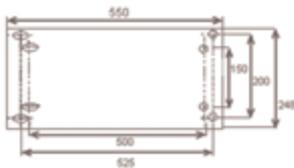
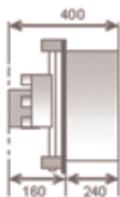
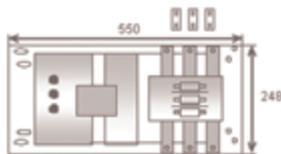
Production and test periods of P5 series compensation racks comply with International IEC standards. Racks are ready to use and there is no need to add any extra component. Electrical safety of plant is guaranteed thanks to its resist to voltage and current rise.

P5 series compensation racks are suitable to install all kind of panels, save labor and time, have possibility to increase power by additional racks thanks to its modular design.



P5-121241

Dimensions for P5 Rack Unit



Advantages

- It helps us in installation and maintenance period thanks to its modular design.
- Withstand $1,18 \times V_n$ over voltage and $1,50 \times$ in over current thanks to Asset VCB series capacitors.
- No additional material is required.

Technical Characteristics

- Rated Voltage : 400/415 V
- Nominal Frequency : 50/60 Hz
- Environment Temperature : $-10... +45^\circ\text{C}$
- Switching : Contactors

Nominal Power (kvar)	Reference	Number of Steps	Weight (kg)
6.25	P5-06141	1	5
2x6.25	P5-06241	2	10
12.5	P5-12141	1	6
2x12.5	P5-12241	2	11
25	P5-25141	1	9
2x25	P5-25241	2	16
50	P5-50141	1	16
2x50	P5-50241	2	24

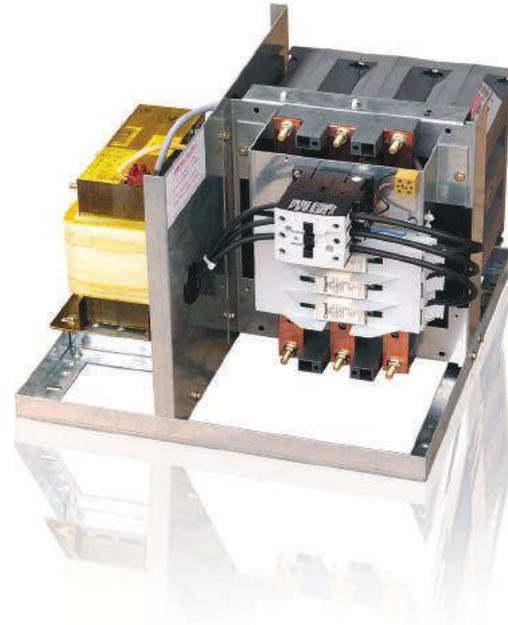
Standard types (400 V, 50/60 Hz)

Compensation Rack Units

Compensation Rack Units R7

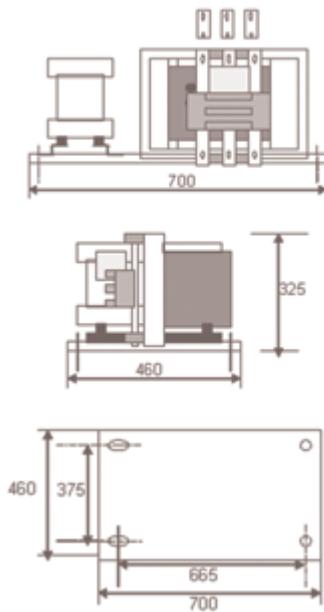
R7 series compensation racks provide to customers different power level option thanks to its modular design. This modular design provides rapid and effective solutions in installation, maintenance and system development period.

Because of capacitors should be protected against to harmonics, harmonic filter reactors are connected to the capacitors in serie and protect them against the dangerous harmonic current flows. Asset VCB series capacitors are able to work with %18 over voltage and %50 over current continuously. Electrical safety of plant is guaranted thanks to its resist to voltage and current rise.



R7-250044

Dimensions for R7 Rack Unit



Advantages

- It helps us in installation and maintenance period thanks to its modular design.
- Withstand $1.18 \times V_n$ over voltage and $1.50 \times$ in over current thanks to Asset VCB series capacitors.
- No additional material is required.
- Compensation rack has harmonic filter reactor which protects capacitors against to harmonics.

Technical Characteristics

- Rated Voltage : 400 / 415 V
- Nominal Frequency : 50/60 Hz
- Resonance Frequency : 189 Hz, 210 Hz, 215 Hz
- Switching : Contactors

Nominal Power (kVAr)	Reference	Number of Steps	Weight (kg)
6.25	R7-06144	1	20
12.5	R7-12144	1	30
2x12.5	R7-12244	2	35
25	R7-25144	1	35
2x25	R7-25244	2	45
50	R7-50144	1	50
2x50	R7-50244	2	60
100	R7-10044	1	80

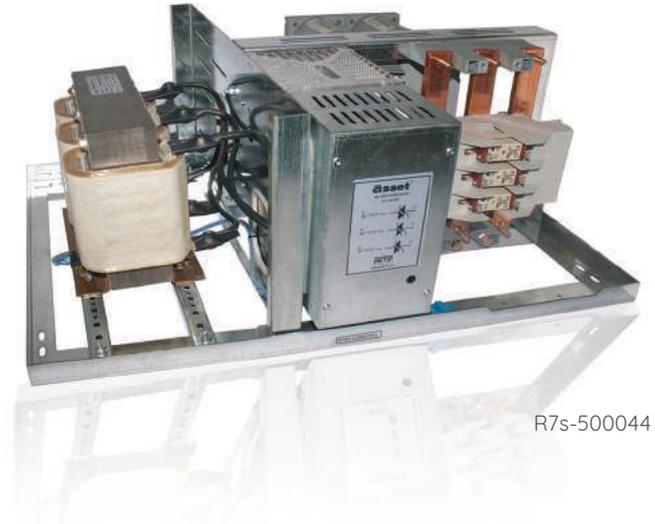
Standard types (400 V, 50/60 Hz)

Compensation Rack Units

Compensation Rack Units R7s

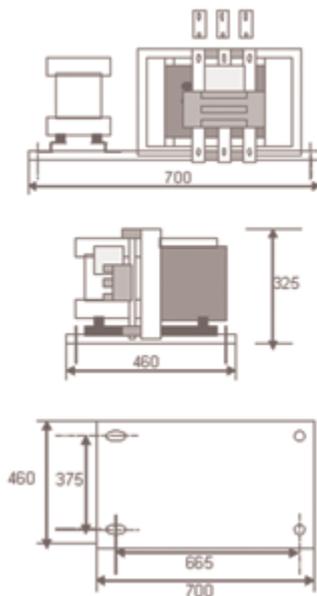
R7s series compensation racks provide to customers different power options with its modular design. It's modular design provides rapid and effective solutions in installation, maintenance and system development period. Thyristor switching provides very fast switching and response instantly.

Some of facilities have fast changing loads. It means current level increase / decrease rapidly. when compensating these type of plants, using contactor is not a good way switching because design of a mechanical contactor is not suitable for fast switching and fault in a short time. So, using thyristor is the best way as a switching equipment. Electrical safety of plant is guaranteed thanks to its resist to voltage and current rise.



R7s-500044

Dimensions for R7s Rack Unit



Advantages

- It helps us in installation and maintenance period thanks to its modular design.
- It has strength 1.18 x Vn over voltage and 1.50 x in over current thanks to Asset VCB series capacitors.
- Protection against to harmonics.
- Fast switching.

Technical Characteristics

- Rated Voltage : 400 / 415 V
- Nominal Frequency : 50/60 Hz
- Resonance Frequency : 189 Hz, 210 Hz, 215 Hz
- Switching : Thyristor

Nominal Power (kVar)	Reference	Number of Steps	Weight (kg)
6.25	R7s-06144	1	20
12.5	R7s-12144	1	30
2x12.5	R7s-12244	2	35
25	R7s-25144	1	35
2x25	R7s-25244	2	45
50	R7s-50144	1	50
2x50	R7s-50244	2	60
100	R7s-10044	1	80

Standard types (400 V, 50/60 Hz)

Capacitor Banks

Asset M series capacitor banks consist of Asset P5 series compensation racks and high technology digital reactive power control relays.

M series capacitor banks provide customers different power level options thanks to its racks which have modular design. That modular design provides rapid and effective solutions in installation, maintenance and system development period.

Asset M series capacitor banks switch on / off the steps softly and instantly thanks to high technology digital reactive power control relays. Relay determines to switch on / off the capacitors according to the feedback calculations coming from CT and VT.

Advantages

- Easy montage / maintenance thanks to its modular design
- Withstand $1.18 \times V_n$ over voltage and $1.50 \times$ in over current thanks to Asset VCB series capacitors.
- 5 compensation racks can be put into panel easily thanks to its efficient cooling system. Its power level can be raised up to 500 kVAr.
- Protection against touching.

Technical Characteristics

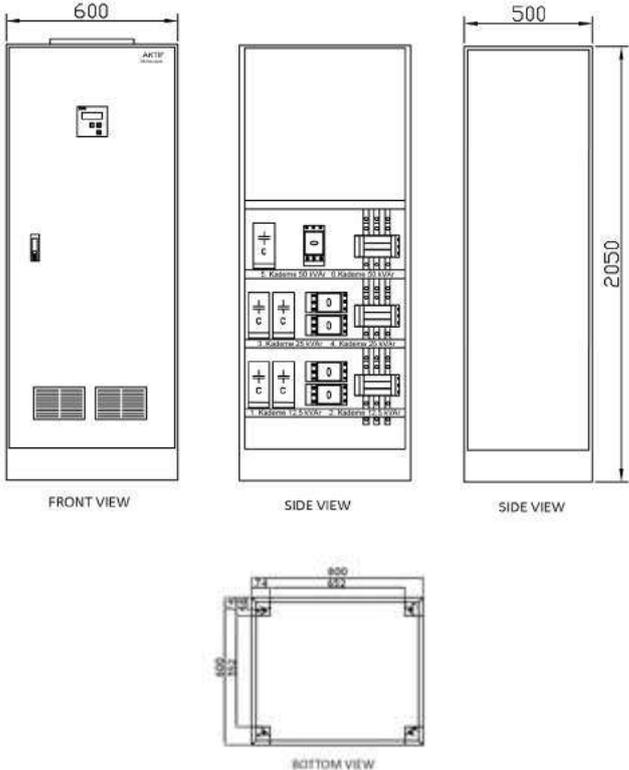
- Rated Voltage : 400 / 415 / 690 V
- Nominal Frequency : 50/60 Hz
- Max. Power for 1 panel : 500 kVAr
- Up to 5 racks in one panel
- Standarts : EN 61439-1/2, EN 60831-1/2, EN 60076-6, EN 60529, EN 60255-1, EN 60947-4-1



M 30041



Dimensions



Capacitor Banks

Capacitor Banks with Detuned Harmonic Filters

Asset MS series capacitor banks consist of Asset R7 series compensation racks and high technology digital reactive power control relays.

MS series capacitor banks provide customers different power level options thanks to its racks which have modular design. That modular design provides rapid and effective solutions in installation, maintenance and system development period.

Asset MS series capacitor banks switch on / off the steps softly and instantly thanks to high technology digital reactive power control relays. Inrush current limiting features of MS series capacitor banks help not to increase the inrush when capacitor units switched on.

Advantages

- Easy installation / maintenance thanks to its modular design.
- Withstand $1.18 \times V_n$ over voltage and $1.50 \times I_n$ in over current thanks to Asset VCB series capacitors.
- Compensation racks have harmonic filter reactor which protects capacitors against to harmonics.

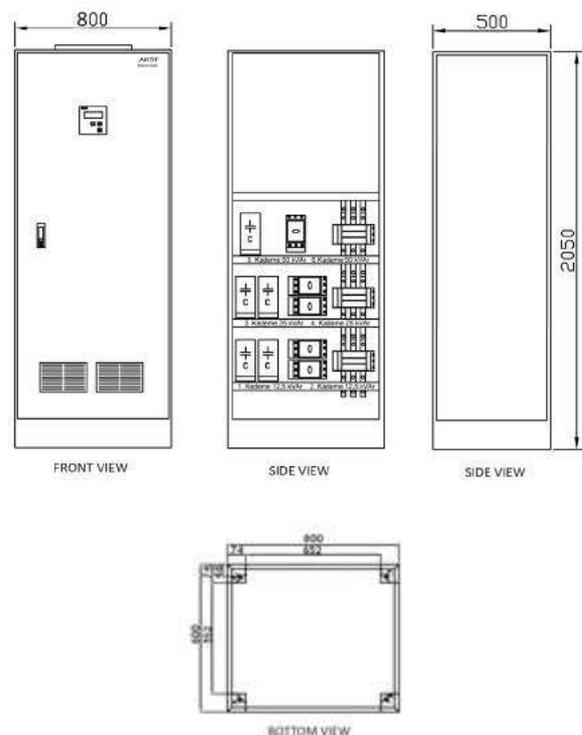
Technical Characteristics

- Nominal Voltage : 440 V
- Nominal Frequency : 50/60 Hz
- Resonance Frequency : 189 Hz, 210 Hz, 215 Hz (and optional other frequencies)
- Over Voltage : 520 V Continuous
- Standarts : EN 61439-1/2, EN 60831-1/2, EN 60076-6, EN 60529, EN 60255-1, EN 60947-4-1



MS 30044

Dimensions



Capacitor Banks

Thyristor Controlled Capacitor Banks with Detuned Filters

Some of facilities have fast changing loads. It means current level increase and decrease rapidly. when compensating these type of plants, using contactor is not a good way of switching because design of a mechanical contactor is not suitable for fast switching and fault in a short time. the best way using thyristor is using it as a switching equipment.

Asset MST series capacitor banks are used in facilities which have PLC equipments, industrial type computers etc. which are breakable devices easily. Production and test periods of MS panels are appropriate to international IEC standards. Racks do not need additional materials. Racks are sent to end users when its all connections are ready to energize.

Advantages

- Easy installation / maintenance thanks to its modular design.
- Withstand $1.18 \times V_n$ over voltage and $1.50 \times I_n$ in over current thanks to Asset VCB series capacitors.
- MST series capacitor banks uses thyristor to switch so it provides static switching continuously.

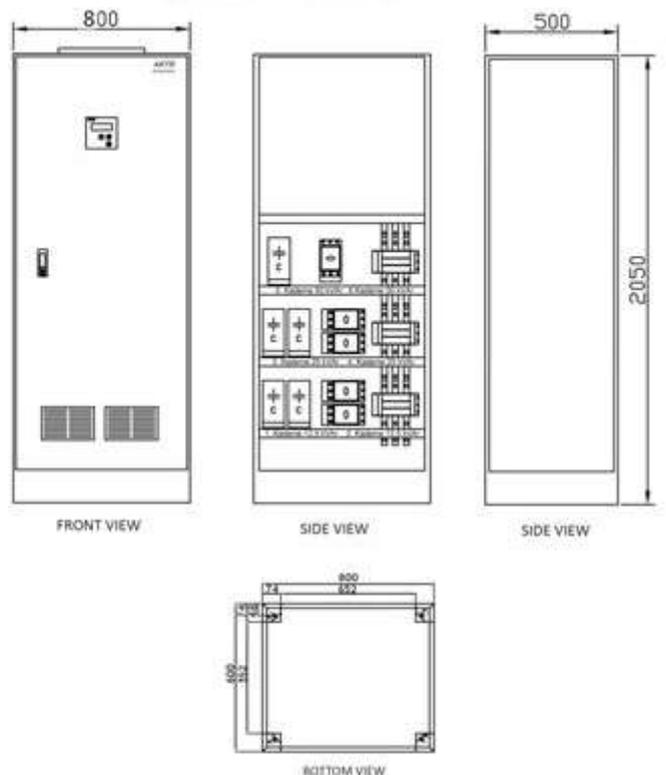
Technical Characteristics

- Nominal Voltage : 440 V
- Nominal Frequency : 50/60 Hz
- Over Voltage : 520 V (24 hours / day)
- Over Current : 1.5 I_n
- Standarts : EN 61439-1/2, EN 60831-1/2, EN 60076-6, EN 60529, EN 60255-1, EN 60947-4-1



MST 50044

Dimensions



Capacitor Banks

MV Capacitor Banks

Open type MV capacitor banks are used for power factor correction, voltage support, harmonic suppression and to maximize network capacity in industrial applications and distribution systems. Medium voltage capacitor banks are built up from medium voltage, all-film dielectric capacitor units with separate internal fuses for each element. The impregnation liquid is both non-PCB and non-chlorine. Galvanized steel enclosures are available for indoor and outdoor installations. Design and testing complies with the requirements of the latest edition of relevant standards and the specific technical requirements set by the customers.

Advantages

- Modular, compact and robust design optimized for easy future expansion of the system, facilitating transport, storage and installation.
- Galvanized steel or aluminum open type construction available for indoor and outdoor installations.
- Design and testing complies with the requirements of the latest edition of relevant standards and the specific technical requirements set by the customers.
- Use of simplified design and proven components ensures high reliability and low maintenance costs.
- Optimized to give a low environmental load by using recycled materials.
- The banks are supplied as fully assembled units, factory tested and ready for connection.



Thymod Series Static Electronic Switches

Asset Thymod series Static Electronic contactors are the electronic switching units that used for the capacitor banks without any discharge delay in the plants where switching the capacitor banks according to load variation cannot be possible and changes load variation fast.

ThyMod series static electronic contactors have been developed according to the related IEC standards to balance the reactive power and solve the energy quality problems in complex industrial plants where used devices that are sensitive to voltage changes such as PLCs, industrial computers, industrial robots, welding machines.

Advantages

- Ultra-rapid power factor compensation
- Zero crossing technology
- Transient free switching
- Silent capacitor switching
- No need to wait for discharge time before re-switching
- Theoretically unlimited number of switching operations
- Modular and compact standardized design
- Easy to install and replace
- Long life time
- Power steps up to 100 kVAr
- Direct connection up to 480 V

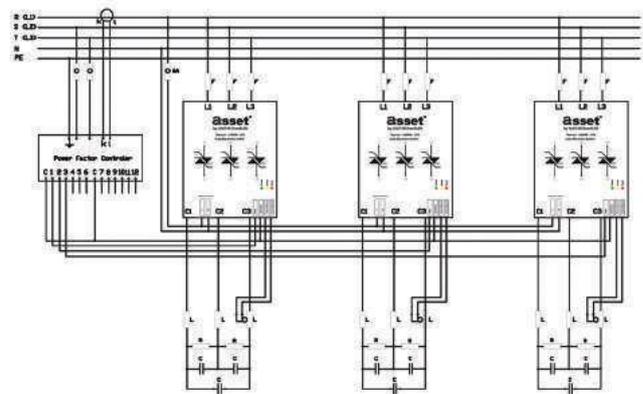
Technical Characteristics

- Rated Voltages : 400 V AC
- Max. Operation Voltage : 480 V AC
- Rated Frequency : 50 / 60 Hz
- Rated Current : Up to 160 A
- Response time : <40 ms
- Degree of protection : IP 20
- Operation Temperature : -10 oC / + 55 oC
- Type of Semiconductor : Thyristor - Thyristor Module
- Mass : 6100 g
- Dimensions (WxDxL) : 125 x 225 x 240 mm
- Mounting : Vertical Mounting to mounting base
- Standards : EN 60429-1, IEC 60439-1, IEC 60439-2

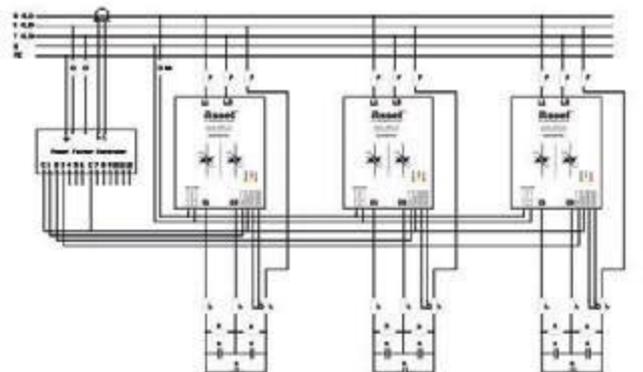


Thymod

2 Phase Control Connection Schema



3 Phase Control Connection Schema



Product Range		
Model	Connection Type	Maximum power at 400V rated voltage
Thymod-25400-3P2	2 phase	25 kVAr
Thymod-50400-3P2	2 phase	50 kVAr
Thymod-100400-3P2	2 phase	100 kVAr
Thymod-25400-3P3	3 phase	25 kVAr
Thymod-50400-3P3	3 phase	50 kVAr
Thymod-100400-3P6	3 phase	100 kVAr

Medical Power & Control Panels

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Medical Power & Control Panels



Medical Plants



Operating Room Control Panels

OCP series operator control panel is a modern and reliable device designed in order to provide optimal operation conditions that are necessary in operational theatres and to form the most comfortable environment that is possible for surgery team. Touch screen LCD display having easy cleanable IP67 protection standard, room difference pressure and filter pollution level measures are the part of “smart care” checking feature of OCP-21 panel. All electrical controls can be done on touch display manually; music broadcast and air conditioner mechanism can be controlled. Communication having high quality sound ensured by digital sound processor with freehand telephone system on the same touch screen LCD display is possible.

Another feature of OCP-21 is that it can do all data exchange necessary for automation and that it can undertake all automation duty in environment that are not central automation by itself.



OCP 21

Digital Input	10	10	10	10
Digital Output	-	-	-	4
Relay Output	11	13	13	13
Analog Input	4	4	4	4
Analog Output	7	7	7	8



OCP 21

IP65 stainless steel enclosure

- 21.5 inch capacitive touch screen
- Internet Access via TCP/IP
- Touch controlled IP Phone
- Customizable user profiles

Technical Characteristics

- LINUX based operating system
- DIN 4301 stainless steel front panel
- 21.5 inch capacitive touch screen
- Smart care warning system
- RS-485, Modbus, TCP/IP communication infrastructure
- External RS232 and CanBus Support
- Scada and PACS Integration
- Internet Access
- Hands-Free VoIP phone
- Hands-Free Analogue telephone
- Video Conference
- PDF viewer
- Camera, MP3, USB features
- Internal speaker
- General illumination control
- Control of Operation, UV, Busy, Negatoscope lamp
- Electrical interruption protection with latching in-rush relay
- Customizable registration & user profile
- Embedded assembly
- Event recording and system status
- 6 channel music broadcast channel selection
- 15 Watt power amplifier
- Digital clock and chronometer
- Temperature, humidity, room difference pressure,hepa filter pollution monitoring and setting, audible and luminous warning when set value is exceeded
- Damper open-close manual control
- Electrical heater (automatic) control
- 10 channel medical gas alarm panel
- AGS (Anaesthetic Gas Discharge) button
- Operating on / off information
- Illumination dimmer control
- External speaker support
- Hour and chronometer (Central hour integration-NTP)
- Analog input / output protections
- External RS232 and CanBus Support
- Device control over voice
- Adress book feature
- Music volume adjustment

Operating Room Control Panels

Feature	MODEL			
	OCP - 9	OCP - 10	OCP - 11	OCP - 21
7 inch resistive touch screen	✓			
21.5 inch capacitive touch screen		✓	✓	✓
DIN 4301 stainless steel front panel	✓	✓	✓	✓
LINUX based operating system	✓	✓	✓	✓
Scada and PACS Integration			✓	✓
RS-485, Modbus, TCP/IP communication infrastructure			✓	✓
Ethernet connections	1	1	2	2
Operation, Negatoscope, UV, Busy lamp control	✓	✓	✓	✓
Music channel broadcasting system	4	4	4	6
General illumination control	✓	✓	✓	✓
Audio amplifier power	3W	12W	12W	15W
Temperature, moisture, hepa filter pollution, room differential pressure indicator	✓	✓	✓	✓
Video Conference			✓	✓
Hands-Free Analogue telephone	✓	✓	✓	✓
Hands-Free VoIP phone			✓	✓
AGSS (Anaesthetic Gas Scavenging Systems) button	✓	✓	✓	✓
Operating on / off information	✓	✓	✓	✓
Event recording and system status	✓	✓	✓	✓
Illumination dimmer control	✓	✓	✓	✓
Analog input / output protections				✓
Electrical heater (automatic) control	✓	✓	✓	✓
Communications	1xRS485	2xRS485	3xRS485 1xRS232	2xRS485 1xRS232 1xCanBUS
Hour and chronometer (Central hour integration)	✓	✓	✓	✓
Electrical interruption protection with latching in-rush relay		✓	✓	✓
Internal speaker	5W	10W	10W	13W
Telephone book feature		✓	✓	✓
Internet access			✓	✓
PDF viewer, Camera, MP3, USB features				✓
Device control over voice				✓
External speaker support	✓	✓	✓	✓
Customizable login profiles			✓	✓
Embedded assembly	✓	✓	✓	✓



Isolated Power Panels

Isolated power systems are used in group 2 rooms in medical locations, and they consist of auxiliary devices and test combinations such as isolated power panels and isolating transformer, isolation monitoring device, insulation fault location devices, remote alarm indicators.

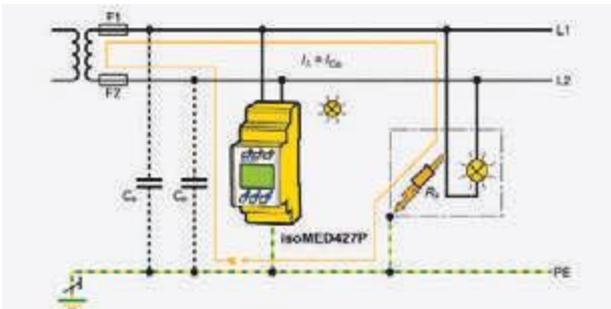
The following medical locations that carrying vital importance in hospitals and where medical devices are directly connected to patients are defined as group 2 room in accordance with IEC 60364-7-710 standard and isolated power systems are used in these rooms.

The following rooms are of special concern

- Operating theatres
- Intensive care rooms
- Anesthetic rooms
- Premature baby rooms
- Operating preparation rooms
- Operating recovery rooms
- Heart catheterization rooms
- Angiographic examination rooms

Technical Characteristics

- Power of system 3.15 / 4 / 5 / 6.3 / 8 / 10 kVA
- According to IEC 60364-7-710
- Monitoring insulation resistance, load current and temperature of the transformer
- Dimension of panel 420 x 410 x 1750 mm
- Color of panel RAL 7035 / RAL 9003



IT system with insulation monitoring by ISOMETER® isoMED427P



IGTP

Technical Characteristics	
Brand name	ASSET
Type	IGTHP 0710/1P-XX
Standards	IEC 60364-7-710
Rated power of outgoing	3.15 / 4 / 5 / 6.3 / 8 / 10 kVA
Power supply unit	Double single phase lines
Rated voltage line 1	230 Vac
Rated voltage line 2	230 Vac
Rated frequency	50 / 60 Hz
Rated insulation level	3 kV / 1 min
Input protection	gL fuse
Secondary output voltage	230 Vac
Output protection	2 pole fuses
Monitoring	isolation resistance with LCD display
Alarm output	isolation fault, over load, over temperature, switchover failure
Functional Test	advanced isolation fault and switchover test
Leakage current to enclosure	<0.5 mA
Response range	50 - 500 kΩ
Isolation fault detection time	<1 s
Switchover time	<200 ms
Operating temperature	5.....+50 °C
Storage temperature	25.....+60 °C
Panel sizes	420 x 410 x 1750
Distribution outlet	6 - 12 pieces as standard
Cooling system	With fan
Protection class	IP 31
Color	RAL 7035 / RAL 9003

Isolated Power Panels

Isolated Power Systems

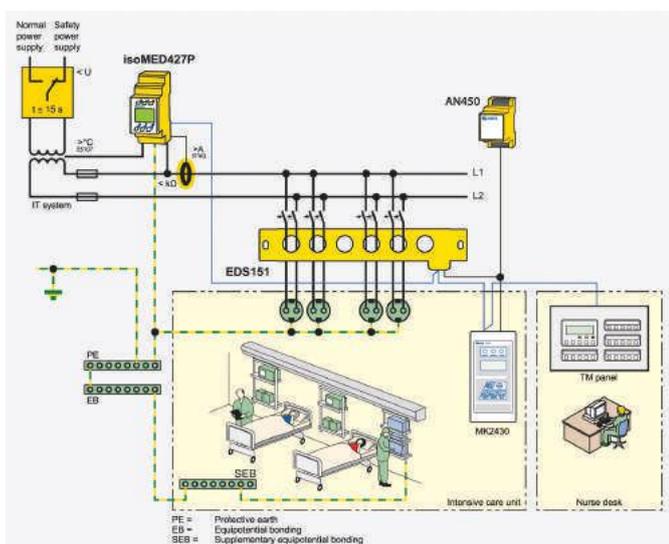
IT System Distribution Boards

Double line isolated power panels with insulation fault location units are the most comprehensive isolated power panels formed from equipments providing determination, of line-based speed of any isolation failure in group 2 rooms. the panel includes insulation fault evaluator, insulation fault test device and toroidal current transformers and determine where the failure is sourced from in a short time and provide realizing the intervention with minimum time loss via rapid communication and examination capacities of isolation transformers, isolation monitoring device, load current transformer and switchover module.

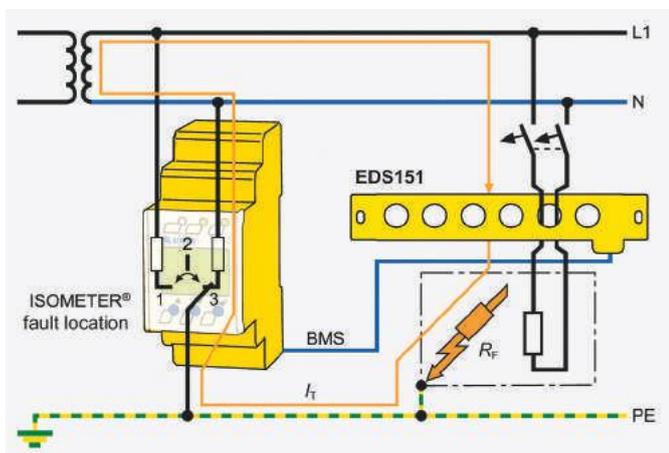
The process is completed by determining the failure as a result of the evaluation of current signal formed by test current generator and size current transformers provided that it forms a response signal after determining a failure by isolation monitoring device and switchovering it to remote monitoring devices.



Isolated Power System



EDS151 insulation fault location system applied in an intensive care unit



Function principle of the EDS151 system

The EDS151 system works in combination with a central insulation monitoring device with integrated pulse generator, e. g. an ISOMETER® isoMED427P. After an insulation fault the isoMED427P starts automatically the fault location by generating a test signal. Its amplitude and duration are limited. the signal flows through the location of the insulation fault and all measuring current transformers within the insulation fault path. the EDS151 system scans all measuring current transformers.

The EDS151 with its LEDs or the central control and indicating device (e.g. MK2430) provides fault location information.

Advantages:

- Insulation fault location during operation
- Fast localisation of faulty circuits/equipment
- Reduced maintenance costs
- Central indication via LC text display at remote alarm indicator and operator panels.

Technical Characteristics

- Indication of faulty branch circuits.
- Easily retrofitting with existing installations due to the modular design.
- Measuring current transformers in different sizes and designs.
- Up to 528 sub circuits can be monitored.
- Communication via two-wire connection.
- Universally applicable for all IT systems.

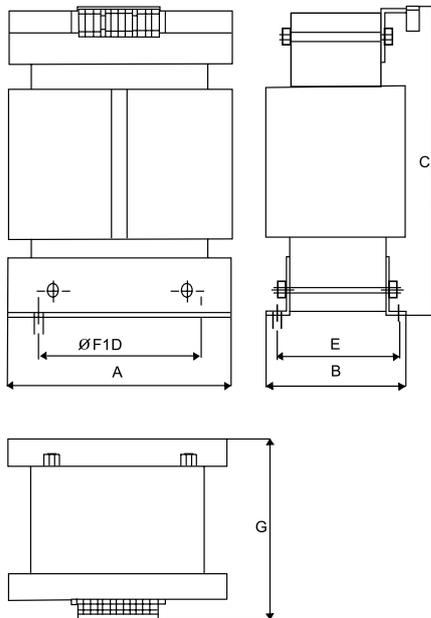
Isolating Transformers

Asset Medical Isolating Transformers are designed compatible with IEC 60364-7-710 standards for power supply of single phase IT systems and produced in accordance with IEC 61558-2-15 standards. Constant angles are isolated from transformer core thanks to a static display placed among primary and secondary coils.

Asset Medical Isolating Transformers having galvanic isolated coils provide possibility of monitoring the temperature thanks to PTC thermistors placed into coils. Asset medical isolating transformers designed at 6 different power value between 3.15 to 10 kVA with high excessive load capacities.



IT 0710
Standard Version



Dimension diagram IT 0710

Technical Characteristics	
Brand	ASSET
Type	IT 0710
Power range	3.15 / 4 / 5 / 6.3 / 8 / 10 kVA
Frequency	50 / 60 Hz
Primary Voltage	230 Vac
Secondary Voltage	230 Vac
Inrush current (Ie)	< 12.I _n
Leakage current	< 0,5 mA
No-load input current (I ₀)	< 3%
No-load output voltage (U ₀)	< 236 V
Short-circuit voltage (U _k)	< 3%
Operating mode	continuous operation
Connections	separate terminal block
Max ambient temp.	40 °C
Isolation class	40/B
Cooling	Air cooling
PTC resistor	1 resistor per transformer winding
Protection class	IP 00
Standards	IEC 603647-710, IEC 61558-2-15

Type	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (kg)	Power
IT 0710-3.15	265	195	325	200	155	8.5x17	220	51	3.15 kVA
IT 0710-4	280	195	370	240	155	8.5x17	220	57	4 kVA
IT 0710-5	280	205	370	240	165	8.5x17	230	61	5 kVA
IT 0710-6.3	280	220	370	240	180	8.5x17	245	65	6.3 kVA
IT 0710-8	280	235	370	240	195	8.5x17	260	74	8 kVA
IT 0710-10	320	235	420	270	195	8.5x17	280	100	10 kVA

Automatic Transfer Relays

Transfer relays are used for transferring power source between two independent sources in order to provide continuous energy flow for critical loads.

Generally, independent sources are uninterruptable power source (UPS) and mains power. in normal operation, critical loads are supplied from the mains power as the primary. when there is a problem with the primary source like low/high voltage or blackout, transfer relays detect the failure and automatically transfers the source to a secondary supply.

Automatic transfer relays are often used in supplying medical loads in hospitals especially the equipment that are used in operating theatres and intensive care rooms but could be used in any place where constant power is vital.



Technical Characteristics

Electrical Specifications	
Auxiliary Voltage	220 VAC ± %25
Mechanical Specifications	
Height	90 mm
Width	152 mm
Depth	60 mm
Weight	420 gr
Mechanical Protection Class	IP 20
Environmental Conditions	
Relative Humidity	% 20-90 Condensing
Operating Altitude	2000m Maximum
Operating Temperature	0 °C / + 45 °C
Standarts	
EN 60974-6-1	
IEC 60364-7-710	

Advantages

- Switching between independent sources
- LCD Screen
- Selected source priority
- Automatically and manually transfer
- Fast diagnostic solution by microprocessor control
- Easy maintenance and installation facility
- High efficiency
- RS 485 Serial Communication port (optional)

Traction Substation

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E

Traction Substation



Traction



Traction Rectifiers

Air Cooled Diode Rectifiers are designed for Train Lines, Metro Lines and Tram Lines. the range is completed with a complete line of inverters and bidirectional converters, using thyristor, IGBT or GTO, to comply with the recent requests of braking energy recovery. Traction converters are fully comply with IEC or ANSI/IEEE standards and the most severe standards for heavy traction service. Low losses, low operating temperatures, reduced maintenance and noise are granted by the specific design of the power section.

Advantages

- High Efficiency thanks to the reduced losses
- Short circuit High Withstand Capacity thanks to the Robust Structure
- Production continuity and long operation life achieved with the low operating temperature
- Reliability and reduced maintenance

Technical Characteristics

- Connection : Bridge - Double Bridge (Series or Parallel)
- Type : Diode, Thyristor, IGBT
- Cooling : Natural Air, Forced Air, Water-to-Air
- DC Output Voltage : Up to 3300V
- DC Output Current : Up to 5000A
- Pulses : 6, 12
- Standards : IEC 60146 - ANSI/IEE



T-RECT

DC Switchgears

DC Circuit Breaker Cubicles

DC Metal Clad Switchgears are designed for Industrial application with the switching capacity of 750 V/1500 V/3000 Vdc up to 10,000 A.

In the mass production the DC Switchgears are conforming the IEC standards as well as conforming other standards if required.

DC Circuit Breaker Cubicles has 4 accessible compartments

- Low Voltage Compartment
- High Speed Circuit Breakers Compartment
- Cable Compartment
- Busbar Compartment

DC Metal Clad Switchgears can continue to operate in three positions (service/test/withdrawn). As additionally Switchgears have the Interlocking system against the misoperation.

DC Switchgears are suitable for below applications according to the EN 50123, IEC77, ANSI C 37-14, ANSI C37-16 standards.

- Up to 10,000 A in 750 Vdc systems
- Up to 10,000 A in 1200 Vdc systems
- Up to 8,000 A in 1500 Vdc systems
- Up to 3,000 A in 3000 Vdc systems



NCA 1500



DC Switchgears

DC Negative Panels

For the security reason, the negative panels have an earthing position visible from outside and lockable for negative maintenance at the Substations or at lines of the Traction applications.

Negative Panels are consisting of earthing disconnecter, transducers and the measuring instruments.

Negative panel are integrated with over current relays and some applications with over voltage relays where the Negative panels includes (over voltage protection devices).

Technical Characteristics

- Rated Voltage : 750 - 1500 - 3000 Vdc
- Making Capacity : 35 - 50 - 100 kA
- Rated Insulation voltage : 4.8 kV
- Rated Impulse Voltage : 40 kV
- Insulation Class : IP30

As indicated in the EN 50122-1 and 2 standards, the negative circuit must not be connected to the earth but it must be connected to the short circuit when the voltage limit value is dangerous.

SCR static switch for fast operation (<1ms) when the voltage exceeds the dangerous level of 300 V or 600 V. For the security reason the device earthing position visible from outside and lockable for negative maintenance. OVPD panels are integrated with over voltage protection relays and self test functions.



LBR-n

DC Disconnectors

DC Disconnecting Cubicles

In DC Traction applications one disconnect or load break switch is normally installed downstream each High Speed Circuit Breakers, and for the security reasons one motorized load break switch is installed as parallel.

To comply with these requirements LBD panels are developed as a very versatile and compact design. According to the requirements, the LBD panel can be supplied as motorized and remote controlled.

Segregated compartment for each Disconnecter and/or Load Break Switch and for each cable incoming/outgoing, withdrawable execution are on request.

Segregated low voltage compartments including protective relays and PLC/RTU for SCADA connection in cable or fiber optic. Motor or manual operated Switches with manual emergency operation. Main contact position visibility.

Voltage presence relays and surge arrestors are available in the panels.

Technical Characteristics

- Rated Voltage : 750 - 1500 - 3000 Vdc
- Rated Insulation Voltage : 4.8 kV
- Rated Impulse Voltage : 48 kV
- Rated Current : 3000 - 4000 A
- Breaking Capacity : 3000 - 4000 A
- Making Capacity : 100 kA
- Rated short-circuit Current : 100 kA



DC Disconnectors

Track-side and Depot Disconnecting Units

- Equipped with motorized disconnectors or Load Break Switches, the track side and depot disconnecting units allow isolating portion of the track systems.
- Available for different executions as Indoor, Outdoor, Pole mounting and are suitable for tram, metro, trolley bus and railway applications.
- Also suitable for the mounting in the town and tunnel alcoves. They used to automatic earthing of the line.
- It's Equipped with Voltage presence relay.
- Motor control with manual emergency operation possibilities. Two poles version for positive and negative isolation. Remote control through PLC, Modem and GSM radio and battery with self powered recharge on request.
- Depends on the requirements, self powered version is available.

Technical Characteristics

- Rated Voltage : 750 - 1500 - 3000 Vdc
- Rated Insulation Voltage : 4.8 kV
- Rated Impulse Withstand Voltage: 48 kV
- Rated Current : 1250 - 1800 - 3400 A
- Rated short-circuit Current : 50 kA



Traction Transformers

Cast Resin Traction Transformers

TESAR has been designing and manufacturing Cast Resin Transformers for more than 30 years. TESAR transformers are designed and manufactured in conformity to E2 C2 F1 classes in accordance with IEC 60076-11 standards.

Technical Characteristics

TRP Series Distribution Transformers

- Power from 100 up to 3150 kVA and primary voltage up to 36 kV.
- Power increase up to 40% with forced cooling system.
- TSX1 temperature protection and TSX6 fan control and protection relays.
- Indoor and outdoor enclosures (IP21, IP31, IP23, etc.).

Custom Transformers

- Power up to 20 MVA and primary voltage up to 52 kV.
- Double primary or secondary winding design.
- Customize design for vector groups and tap changers.

Advantages

- High Security Standards.
- Minimum Maintenance Costs.
- Easy and Economy of Installation.
- Maximum Reliability and High Quality.
- Environmental and Efficient Working.



TRP



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F

Smart Grid



Energy



Industry



Building



Solar Systems



Energy Management Systems

Actwin Smart Energy Management Software

Actwin Smart is an energy management and AMR software that automatically gathers data from devices like meters (electricity, water, gas etc.), analyzers, relays, remote IOs and prepares reports and invoices.

- Multi language support
- Ability to use commonly used and secure Microsoft SQL, Oracle databases...
- Distributed structure like “server”, “client”, and “internet” interface.
- “Server” is the main engine as working at background and collects data from devices.
- “Client” is the application part which management is done with interaction to server. Server and client interfaces are desktop applications.
- “Internet interface” provide, users (like factories) to enter the system and monitor consumption, energy quality and create reports of their own devices.

Software Modules

- Communication and data validation
- Reporting
- Billing
- Loss/Leakage Detection
- Single-Line Diagram and Map presentation
- Integration with web services
- Alarm Management, SMS and e-mail notification
- Internet interface
- User Management and Inventory
- Authentication



Communication

Actwin Smart has modular structure to provide different new protocols to be found in the future. Supported protocols are listed below.

Communication principle is compatible with “push” and “pull” structure. Data collection schedule, result saving to the database schedule can be defined and measurement parameters that will be read from each the device can be defined independently.

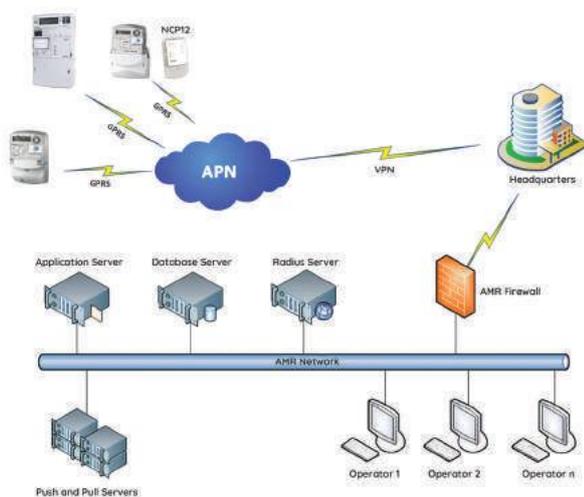
Communication module starts automatically when server starts as windows service. This prevents users from accidentally closing the data collection application.

Communication Protocols

- IEC 62056-21 Mod C and constant baud rate
- DLMS/Cosem
- Modbus-RTU
- Modbus-TCP/IP
- M-Bus
- Wireless M-Bus

Communication Interfaces

- Serial communication (RS485, RS232)
- GPRS
- M-Bus
- Ethernet
- PLC (DLC)
- RF



Energy Management Systems

Reporting

Reports can be prepared as below with collected data. The modular structure provides capability to add new reports to the software when needed. There is no need to upgrade or modify the software when a new report is requested. All reports can be exported as MS Excel, MS Word, HTML and PDF.

- Reporting as a table of all selected device measurements. Also measurements to be reported can be selected.
- Graphic display of desired device measurements. Multiple device measurements can be drawn on the same chart.
- Measurement points can be compared with algorithms like consumption, average values etc...
- Active and reactive energy ratio reports for electricity meters.
- Consumption reporting for electricity meters according to energy tariffs.
- Distribution network load reports (Transformer, gas stations)
- Measurement point daily, monthly, and yearly consumption reports.
- Map display, showing the measurement points with filters (Reactive energy, low consumption, loss/fraud situations, no communicated points etc...).
- Transformer loss report
- Total consumption of distribution network as monthly and yearly, import/export with comparison between time periods.
- Defined gas component reports.
- Natural gas minimum/maximum hourly, daily consumption report.
- Measurement point inventory report
- Measurement point communication performance report
- Water meters low/extreme consumption report



Loss/Leakage Detection

- Loss/Leakage reports can be prepared manually and automatically. Automatically prepared reports can be sent to defined person as e-mail.
- Electricity meter parameters (events, current/voltage/power/ power factor/phase angle etc...) can be monitored continuously and alert operators if an unexpected measurement or ratio is measured.
- Unexpected consumption differences are detected between main distribution points and points connected to that distribution point.
- The interventions to meter and panel covers can be detected and operators can be alerted.

Data Validation

Measurements should not be used on invoices and reports before data validation. For that reason some data validation methods like below are used.

- Checking the measurement in specific limits
- The ratio of measurement according to consumptions of previous periods consumptions
- The change ratio according to last measurements
- Checking in or not in standard deviation according to average value of last billing periods
- Check between measurement unit and measurement

Integration

Synchronization to other systems like ERP, accounting, geographic informative, bank etc... can be provided with Web Services.

Energy Management Systems

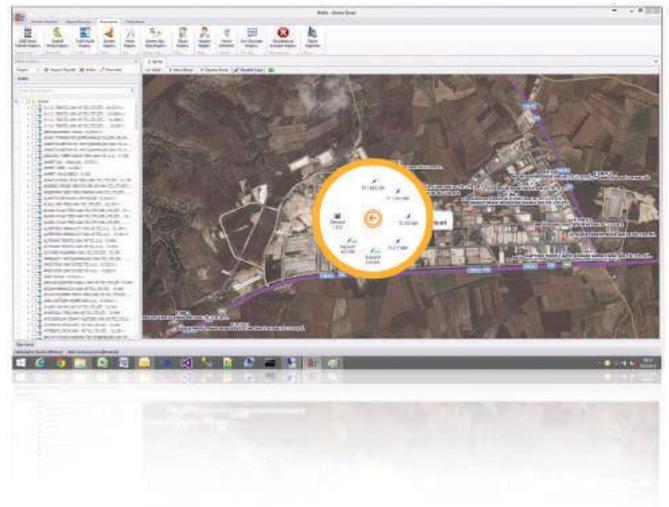
Customer Management and Inventory

Report can be generated from all type records that are saved in database like defined measurement points, customers and groups.

- New user and/or measurement point can be defined without professional skills with copy paste method.
- There is no limit in user defined information on measurement point and customer cards.

Some predefined information are:

- > Customer Number
 - > User Name
 - > Address/Parcel Information
 - > User Type
 - > Start in operation date
 - > Authorized Person
 - > Contact information like phone, fax, e-mail etc.
 - > GPS coordinates
- Reports can be taken from these defined information, and then allowed to grouping, listing and filtering can be made.



Single-line Diagram

- Electrical distribution network can be showed on single-line diagrams like SCADA systems and the information of instruments like electrical meters, secondary protection relays on this network can be monitored.
- Electrical meter's power-current/voltage values, secondary protection relay's on/trip situations and quality recorder's power-current/voltage values can be monitored with digital and analog instrument display.
- Gas meters, measurement values, filter impurity situations, door/valve situations belong to type B and C stations can be displayed.
- Drag and drop support.
- Infinite number of screens can be created.

Web Interface

Internet interface have customers monitor their own consumptions and energy quality parameters. Accessing to interface is done by entering username and password and users can only reach their own measurement points.

For security, there is no direct connection through the system in internet. There is a safe web service level between internet interface and database.

- Users can view historical measurement values of their own measurement points
- Users can view common or personal messages from management.
- Natural gas consumers can send to AMR system their forecasts and check their forecasts reports.
- Users may have alerts like reactive penalty, maximum demand exceeding, minimum and maximum gas consumption.

Authorization

- The roles can be defined with the pre-defined permissions on system. Users can be defined and roles can assigned to users.
- Operators can make authentication based on measurement points. They can define which users can reach to which measurement points.

Alarm Management

- Event record on measurement instruments can be saved and reported on database.
- System watches reactive energy consumptions and if there is a measurement or over the limits, system informs the users with e-mail and SMS.
- E-mail and SMS notification can be saved on database and reported later.



Metering and Submetering

GPRS Communication Unit

Asset NCP12 industrial communication device is used to monitor and control electricity, water, gas meters and other control equipment over GSM/GPRS and Ethernet network.

Modem supports commonly use protocols like IEC 62056-21, DLMS/Cosem, Modbus-RTU, M-Bus (with module) etc. This enables NCP12 to communicate and transfer read values to Head-End systems with almost all meters in the market.

Five different simultaneous connections can be opened to the modem. Each connection may send and receive from different serial interfaces like RS485, RS232 and USB. the connections may even send to the same interface and modem will queue and process them in timely fashion and respond to the connection that sent the data.

- Ability to work and notify head-end system for 15 minutes after energy cut off
- Two expansion slots for additional communication and IO ports
- Wide range ac/dc auxiliary supply.

Technical Characteristics

- ARM Cortex M3 processor, Telit GSM/GPRS module
- 1 MB internal memory
- 85 – 265 Vac, 120 – 370 Vdc auxiliary supply
- 2 pcs digital output (expandable and can be used as relay output)
- 2 pcs digital input (expandable)
- 25F Super capacitor to notify energy cut off while de-energized for 15 minutes.
- Remote firmware update



NCP12



Power Analyzers and Quality Recorders

Energy Meters, Analyzers and Quality Recorders

The first step of the efficiency and continuity is to monitor the quantity and quality of the used energy. While monitoring your consumption and quality with our power and energy measurement devices such as energy analyzers, energy meters, and energy quality analyzer, you may also analyze the data with Actwin Smart Energy Management. Nowadays, it has great importance to monitor the energy consumptions with energy meters because of limited energy resources. Electricity distribution companies and settlements like Shopping Malls, Residences etc, uses electricity meters for billing the distributed or imported energy in order to fairly distribute the cost of energy. In addition, it has common use of electricity meters to find the actual product cost reflecting energy cost to the product costs in factories.

The first condition for using high quality energy is the use of energy analyzers and quality recorders to measure and evaluate all parameters of electricity which is invisible power. The true method of measurements is capturing all parameters at the correct measuring points with appropriate periods and sampling sensitivity according to EN 50160, IEC 61000-4-7, IEC 61000-4-15 and IEC 61000-4-30 standards. During the measurement, the data to be received from a quality recorder and, an energy analyzer should be as follows;



NQM 550N-PQ

- Voltage Sag
- Voltage Swell
- Voltage Interruption
- Voltage Unbalance
- Power Frequency
- Flicker
- Notch
- Transient
- Harmonics

In addition to above measurements, the following data should be recorded during measuring;

- Voltage Measurements
- Current Measurements
- Crest Factor
- Power Measurements
- Power Factors Measurements

In addition to our brand Asset, we also distribute “Contrel” and “Bender” products for power measurement, we distribute energy meters of Iskraemeco and EMU brands in Turkey in order to fairly distribute the cost of energy.

We choose the most suitable products according to your requirements, and offer complete Energy Monitoring and Management, and Meter Automation solutions covering energy and power meters, the required communication equipment, and monitoring software.

F



PEM735

Protection Devices

Earth Leakage Relays & Transformers

Power systems must be protected against faults (such as residual current) to ensure quality and reliable generation, transmission and distribution of power systems. For all the power systems, the protection relay is a smart device that receives inputs, compares them to set points, and provides output. The open/close devices controlled by the protection relay is the contactor in low-voltage, the circuit breaker in medium and high-voltage.

Why are protection devices important? Each system supplied with electricity has risks and should be checked continuously and intervened in very short periods of time when an emergency or unexpected situation occurs. In this respect, protection devices are important. Unexpected situations should be automatically corrected in a short time period.

Many factors must be followed regularly like over and under voltage, over current, leakage detection etc. Bender protection relays and Aktif brand Asset® Leakage Protection devices are developed to serve this purpose.



Watt White!

White...
Color of the beginning...
White, color of the purity, honesty and clarity...

Color of the stability and continuity, trust and quality...

Since 2010, we decided to apply white color which symbolizes all of these values to all of our products.



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