

ضمیمه شماره 1 شرطنامه (مشخصات تخنیکي) پروژه تهیه تجهیزات مختلف النوع

مورد نیاز سب ستیشن های مرکز و ولایات

شماره داوطلبی : NPD/DABS/1403/G-634/NCB

مشخصات تخنیکي پروژه تهیه تجهیزات مختلف النوع مورد نیاز سب ستیشن های مرکز و ولایات

ملاحظات	مشخصات تخنیکي	اسم تجهیزات و وسایل	شماره
	<p><u>220kV Live Tank sf6 Gas Circuit Breaker { Gang (1 common Operating mechanism) } with Standard Support structure & without Terminal Connector as per IEC 62271 - 100</u></p> <p>Highest System voltage: 245kV, Rated voltage: 220kV, Rated current: 2500Amp, STC: 40kA for 3second, BIL: 460kVrms / 1050 kVp, Frequency: 50Hz, Procelain Insulator, Operating sequence: O -0.3 sec - CO - 3 min - CO, Creepage distance: 31mm/kV, Control voltage: 110VDC, with Spring Charging mechanism and with support Structure, without terminal connector, suitable above 1500 meters sea level, Tripolat, GO, Gang Operated.</p> <p>Mandatory Spares</p> <ol style="list-style-type: none"> 1. Trip Coil - 2set 2. Close Coil - 2set 3. Motor for Operating Mechanism - 1Nos. 4. Sf6 Gas filling Device - 1set 5. MCB, Auxiliry Relay and contactor - 1set 6. Anti condensation heater. 1 Nos. 	sf6 Gas Circuit Breaker 220kV	1
	<p><u>220kV Live Tank sf6 Gas Circuit Breaker { Gang (1 common Operating mechanism) } with Standard Support structure & without Terminal Connector as per IEC 62271 - 100</u></p> <p>Highest System voltage: 245kV, Rated voltage: 220kV, Rated current: 2500Amp, STC: 40kA for 3second, BIL: 460kVrms / 1050 kVp, Frequency: 50Hz, Procelain Insulator, Operating sequence: O -0.3 sec - CO - 3 min - CO, Creepage distance: 31mm/kV, Control voltage: 220VDC, with Spring Charging mechanism and with support Structure, without terminal connector, suitable above 1500 meters sea level, Tripolat, GO, Gang Operated.</p> <p>Mandatory Spares</p> <ol style="list-style-type: none"> 1. Trip Coil - 2set 2. Close Coil - 2set 3. Motor for Operating Mechanism - 1Nos. 4. Sf6 Gas filling Device - 1set 5. MCB, Auxiliry Relay and contactor - 1set 6. Anti condensation heater. 1Nos. 	sf6 Gas Circuit Breaker 220kV	2

	<p><u>220kV Live Tank sf6 Gas Circuit Breaker {Single pole Operated (3 Operating Mechanism)} with Standard Support structure & without Terminal Connector as per IEC 62271 - 100</u></p> <p>Highest System voltage: 245kV, Rated voltage: 220kV, Rated current: 2500Amp, STC: 40kA for 3second, BIL: 460kVrms / 1050 kVp, Frequency: 50Hz, Procelain Insulator, Operating sequence: O -0.3 sec - CO - 3 min - CO, Creepage distance: 31mm/kV, Control voltage: 110VDC, with Spring Charging mechanism and with support Structure, without terminal connector, suitable above 1500 meters sea level, Unipolat, SPR single pole operated.</p> <p>Mandatory Spares</p> <ol style="list-style-type: none"> 1. Trip Coil - 2set 2. Close Coil - 2set 3. Motor for Operating Mechanism - 1Nos. 4. Sf6 Gas filling Device - 1set 5. MCB, Auxiliry Relay and contactor - 1set 6. Anti condensation heater. 1 Nos. 	sf6 Gas Circuit Breaker 220kV	3
	<p><u>220kV Live Tank sf6 Gas Circuit Breaker { Single pole Operated (3 Operating Mechanism)} with Standard Support structure & without Terminal Connector as per IEC 62271 - 100</u></p> <p>Highest System voltage: 245kV, Rated voltage: 220kV, Rated current: 2500Amp, STC: 40kA for 3second, BIL: 460kVrms / 1050 kVp, Frequency: 50Hz, Procelain Insulator, Operating sequence: O -0.3 sec - CO - 3 min - CO, Creepage distance: 31mm/kV, Control voltage: 220VDC, with Spring Charging mechanism and with support Structure, without terminal connector, suitable above 1500 meters sea level, Unipolat, SPR single pole operated. . . Mandatory Spares1. Trip Coil - 2set2. Close Coil - 2set3. Motor for Operating Mechanism - 1Nos.4. Sf6 Gas filling Device - 1set5. MCB, Auxiliry Relay and contactor - 1set6. Anti condensation heater. 1 Nos.</p>	sf6 Gas Circuit Breaker 220kV	4
	<p><u>132kV Live Tank SF6 Gas Circuit Breaker (Gang Operated { 1 common operating mechanism}) with Standard Support Structure & Teminal connector as per IEC 62271 -100</u></p> <p>Highest System voltage: 145kV, Rated voltage: 132kV, Rated current: 1600Amp, STC: 31,5kA for 3second, BIL: 275kVrms / 650 kVp, Frequency: 50Hz, Procelain Insulator, Operating sequence: O -0.3 sec - CO - 3 min - CO, Creepage distance: 31mm/kV, Control voltage: 110VDC, with Spring Charging mechanism and with support Structure, without terminal connector, suitable above 1500 meters sea level, Tripolat, GO, Gang Operated.</p> <p>Mandatory Spares</p> <ol style="list-style-type: none"> 1. Trip Coil - 2set 2. Close Coil - 2set 3. Motor for Operating Mechanism - 1Nos. 4. Sf6 Gas filling Device - 1set 5. MCB, Auxiliry Relay and contactor - 1set 6. Anti condensation heater. 1 Nos. 	sf6 Gas Circuit Breaker 132kV	5

	<p><u>132kV Live Tank SF6 Gas Circuit Breaker (Gang Operated { 1 common operating mechanism}) with Standard Support Structure & Terminal connector as per IEC 62271 - 100</u></p> <p>Highest System voltage: 145kV, Rated voltage: 132kV, Rated current: 1600Amp, STC: 31,5kA for 3second, BIL: 275kVrms / 650 kVp, Frequency: 50Hz, Procelain Insulator, Operating sequence: O -0.3 sec - CO - 3 min - CO, Creepage distance: 31mm/kV, Control voltage: 220VDC, with Spring Charging mechanism and with support Structure, without terminal connector, suitable above 1500 meters sea level, Tripolat, GO, Gang Operated.</p> <p>Mandatory Spares</p> <ol style="list-style-type: none"> 1. Trip Coil - 2set 2. Close Coil - 2set 3. Motor for Operating Mechanism - 1Nos. 4. Sf6 Gas filling Device - 1set 5. MCB, Auxiliry Relay and contactor - 1set 6. Anti condensation heater. 1 Nos. 	sf6 Gas Circuit Breaker 132kV	6
	<p><u>132kV Live Tank SF6 Gas Circuit Breaker (Single Pole Operated { 3 operating mechanism}) with Standard Support Structure & Terminal connector as per IEC 62271 - 100</u></p> <p>Highest System voltage: 145kV, Rated voltage: 132kV, Rated current: 1600Amp, STC: 31,5kA for 3second, BIL: 275kVrms / 650 kVp, Frequency: 50Hz, Procelain Insulator, Operating sequence: O -0.3 sec - CO - 3 min - CO, Creepage distance: 31mm/kV, Control voltage: 110VDC, with Spring Charging mechanism and with support Structure, without terminal connector, suitable above 1500 meters sea level, Unipolar, SPR Single Pole Operated.</p> <p>Mandatory Spares</p> <ol style="list-style-type: none"> 1. Trip Coil - 2set 2. Close Coil - 2set 3. Motor for Operating Mechanism - 1Nos. 4. Sf6 Gas filling Device - 1set 5. MCB, Auxiliry Relay and contactor - 1set 6. Anti condensation heater. 1 Nos. 	sf6 Gas Circuit Breaker 132kV	7
	<p><u>132kV Live Tank SF6 Gas Circuit Breaker (Single Pole Operated { 3 operating mechanism}) with Standard Support Structure & Terminal connector as per IEC 62271 - 100</u></p> <p>Highest System voltage: 145kV, Rated voltage: 132kV, Rated current: 1600Amp, STC: 31,5kA for 3second, BIL: 275kVrms / 650 kVp, Frequency: 50Hz, Procelain Insulator, Operating sequence: O -0.3 sec - CO - 3 min - CO, Creepage distance: 31mm/kV, Control voltage: 220VDC, with Spring Charging mechanism and with support Structure, without terminal connector, suitable above 1500 meters sea level, Unipolar, SPR Single Pole Operated.</p> <p>Mandatory Spares</p> <ol style="list-style-type: none"> 1. Trip Coil - 2set 2. Close Coil - 2set 3. Motor for Operating Mechanism - 1Nos. 4. Sf6 Gas filling Device - 1set 5. MCB, Auxiliry Relay and contactor - 1set 6. Anti condensation heater. 1 Nos. 	Sf6 Gas Circuit Breaker 132kV	8
<u>Detailed Specs. is attached.</u>	<p><u>220kV Current Transformer as per IEC 61869</u></p> <p>Nominal System voltage: 220kV, Highest System voltage: 245kV</p>	Current Transformer 220kV	9
<u>Detailed Specs. is attached.</u>	<p><u>110kV Current Transformer as per IEC 61869</u></p> <p>Nominal System voltage: 110kV, Highest System voltage: 145kV</p>	Current Transformer 110kV	10
<u>Detailed Specs. is attached.</u>	<p><u>220kV Capacitor Voltage Transformer as per IEC 61869 - 5</u></p> <p>Rated Primary voltage: 220/√3 kV , Rated Secondary Voltage: 110/√3 volt</p>	220kV Capacitor Voltage Transformer	11

<u>Detailed Specs. is attached.</u>	<u>110kV Capacitor Voltage Transformer as per IEC 61869 - 5</u> Rated Primary voltage: 110/ $\sqrt{3}$ kV , Rated Secondary Voltage: 110/ $\sqrt{3}$ volt	110kV Capacitor Voltage Transformer	12
<u>Detailed Specs. is attached.</u>	<u>220kV Surge arrester with LCM Counter Monitor and accessories As per IEC 60099 - 4</u> Type: Metal Oxide, Nominal system voltage: 220kV, Rated Operating voltage (Ur): 192kV, Rated continuous Operating voltage (UC): 154kV	220kV surge Arrester	13
<u>Detailed Specs. is attached.</u>	<u>110kV Surge arrester with LCM Counter Monitor and accessories As per IEC 60099 - 4</u> Type: Station Class Heavy duty, Nominal system voltage: 110kV, Rated Operating voltage (Ur): 120kVrms, Max. continuous Operating voltage (UC): 78kV	110kV surge Arrester	14
	<u>220kV Disconnected Switch with one side Earth Switch & without Supporting Steel Structure as per IEC 62271 - 102</u> Type: Single Break Double Rotate, Rated system voltage: 245kV, Rated Current: 2000Amps, Frequency: 50Hz, Ambient Temp. - 25 to 50°C, Short time withstand Current (KA) rms/peak: 40/ 100, Duration of Short Circuit: 3sec, Lightning impulse withstand voltage (KVp): 1050, Power frequency withstand voltage: 460kV, Type of Drive: Motor, Aux. voltage (VDC): 110, Motor Voltage(VDC): 110, Creepage Distance: 31kv/mm	220kV Disconnected Switch	15
	<u>220kV Disconnected Switch with one side Earth Switch & without Supporting Steel Structure as per IEC 62271 - 102</u> Type: Double Break Single Rotate, Rated system voltage: 245kV, Rated Current: 2000Amps, Frequency: 50Hz, Ambient Temp. - 25 to 50°C, Short time withstand Current (KA) rms/peak: 40/ 100, Duration of Short Circuit: 3sec, Lightning impulse withstand voltage (KVp): 1050, Power frequency withstand voltage: 460kV, Type of Drive: Motor, Aux. voltage (VDC): 220, Motor Voltage(VDC): 220, Creepage Distance: 31kv/mm	220kV Disconnected Switch	16
	<u>110kV Disconnected Switch with one side Earth Switch & without Supporting Steel Structure as per IEC 62271 - 102</u> Type: Double Break Single Rotate, Rated system voltage: 145kV, Rated Current: 1600Amps, Frequency: 50Hz, Ambient Temp. - 25 to 50°C, Short time withstand Current (KA) rms/peak: 31.5/ 80, Duration of Short Circuit: 3sec, Lightning impulse withstand voltage (KVp): 650, Power frequency withstand voltage: 275kV, Type of Drive: Motor, Aux. voltage (VDC): 220, Motor Voltage(VDC): 220, Creepage Distance: 31kv/mm	110kV Disconnected Switch	17
	<u>110kV Disconnected Switch with one side Earth Switch & without Supporting Steel Structure as per IEC 62271 - 102</u> Type: Single Break Double Rotate, Rated system voltage: 145kV, Rated Current: 1600Amps, Frequency: 50Hz, Ambient Temp. - 25 to 50°C, Short time withstand Current (KA) rms/peak: 31.5/ 80, Duration of Short Circuit: 3sec, Lightning impulse withstand voltage (KVp): 650, Power frequency withstand voltage: 275kV, Type of Drive: Motor, Aux. voltage (VDC): 110, Motor Voltage(VDC): 110, Creepage Distance: 31kv/mm	110kV Disconnected Switch	18
<u>Detailed Specs. is attached.</u>	<u>Rectifier</u> Input: 3phase AC Supply 400VAC \pm 20% 50Hz \pm 6% Output: 220VDC Regulated with \pm 5% (Adjustable), 0 - 100 Amps	Rectifier 220VDC	19
<u>Detailed Specs. is attached.</u>	<u>Rectifier</u> Input: 3phase AC Supply 400VAC \pm 20% 50Hz \pm 6% Output: 110VDC Regulated with \pm 5% (Adjustable), 0 - 100 Amps	Rectifier 110VDC	20

SPECIFICATIONS CURRENT TRANSFORMER -220KV	UNITS	REQUIRED VALUE
220 kV Current Transformer	pcs	3
Model / Type		
Standard		IEC-61869
Rated frequency	Hz	50
Nominal system voltage	kV	220
Highest system voltage	kV	245
Insulation level	kV	460/1050
Short Time Thermal Current		40kA 1sec
POWER FREQUENCY WITHSTAND VOLTAGE SECONDARY (IES)-GROUND (1 min.)		3 kV
Temperature range	°C	(-30) to (+50)
Rated Nominal current	A	1200
Insulator Made of PORCELAIN, Colour		Brown
Short Time Dynamic Current	KA	100
Altitude	M	2400
		Dead tank, oil immersed
		Outdoor
CORE-1		
Ratio		400-800-1200/1-1-1
Rated Burden	VA	15
Accuracy Class		0.2Fs
ALF/ISF		<2
CORE-2		
Ratio		400-800-1200/1-1-1
Rated Burden	VA	30
Accuracy Class		PX
CORE-3		
Ratio		400-800-1200/1-1-1
Rated Burden	VA	30
Accuracy Class		PX
CORE-4		
Ratio		400-800-1200/1-1-1
Rated Burden	VA	30
Accuracy Class		5P20



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SPECIFICATIONS CURRENT TRANSFORMER -110KV	UNITS	REQUIRED VALUE
110 kV Current Transformer	pcs	3
Model / Type		
Standard		IEC 61869
Rated frequency	Hz	50
Nominal system voltage	kV	110
Highest system voltage	kV	145
Insulation level	kV	275-650
Short Time Thermal Current		40kA 1sec
		3 kV
POWER FREQUENCY WITHSTAND VOLTAGE SECONDARY (IES)-GROUND (1 min.)		
Temperature range	°C	(-30) to (+50)
Rated Nominal current	A	1200
Insulator Made of PORCELAIN, Colour		Brown
Creepage Distance Minimum		3625 mm
Short Time Dynamic Current	KA	100
Altitude	M	2400
		Dead tank, oil immersed
		Outdoor
CORE-1		
Ratio		400-800-1200/1-1-1
Rated Burden	VA	15
Accuracy Class		0.2Fs
ALF/ISF		<2
CORE-2		
Ratio		400-800-1200/1-1-1
Rated Burden	VA	30
Accuracy Class		PX
CORE-3		
Ratio		400-800-1200/1-1-1
Rated Burden	VA	30
Accuracy Class		PX
CORE-4		
Ratio		400-800-1200/1-1-1
Rated Burden	VA	30
Accuracy Class		5P20



Technical Data for 220 kV Capacitor Voltage Transformer

Description	Minimum Requirements	
	Unit	Data
Manufacturer		
Manufacturer's model		
Rated primary voltage	kV	220/v3
Highest system voltage	KV	245
Rated secondary voltage	V	110/v3
Lightning impulse withstand voltage	kV	950 KV @ 1000 m 1123 KV @ 2400 m
Power frequency withstand voltage	kV	395 KV @ 1000 m 467 KV @ 2400 m
Rated frequency	Hz	50
Insulator made of porcelain color		Brawn porcelain
Type		Outdoor
Rated voltage factor		1.2 cont./ 1.5 30 sec
Ambient temperature	C°	-30 to 50
No. of phases		1
No. of core		3
Accuracy class:		
Core 1		0.2
Core 2		3P
Core 3		3P
Rated secondary burden		50
- Metering	VA	
- Protection	VA	50
- Protection	VA	50
Degree of protection for secondary box		IP54
Altitude	m	2400
Creepage distance minimum	mm	6125
Insulator housing:		
- Voltage rating	kV	123
standards		IEC- 61869-5
- Capacitor voltage transformer	IEC	60044-5
- HV porcelain bushing	IEC	62155
- Degree of protection of enclosure	IEC	60529
- Insulating oil	IEC	60296 & 60867

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Technical Data for 110 kV Capacitor Voltage Transformer

Description	Minimum Requirements	
	Unit	Data
Manufacturer		
Manufacturer's model		
Rated primary voltage	kV	110/V3
Rated secondary voltage	V	110/V3
Rated frequency	Hz	50
Lightning impulse withstand voltage	kV	550-650
Power frequency withstand voltage	kV	230
Type		Outdoor
Rated voltage factor		1.2 cont./ 1.5 30 sec
No. of phases		1
No. of core		3
Accuracy class:		
Core 1		0.2
Core 2		3P
Core 3		3P
Rated secondary burden		50
- Metering	VA	50
- Protection	VA	50
- Protection	VA	50
Degree of protection for secondary box		IP54
Creepage distance minimum	mm	3625
Altitude	m	2400
Insulator housing:		
- Voltage rating	kV	123
standards		IEC- 61869-5
- Capacitor voltage transformer	IEC	60044-5
- HV porcelain bushing	IEC	62155
- Degree of protection of enclosure	IEC	60529
- Insulating oil	IEC	60296 & 60867



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Technical Data for 220 kV Surge Arrester

Description	Requirements	
	Unit	Data
Manufacturer		
Model		Gapless
Nominal System voltage	kV	220
Highest system voltage	kV	245
Rated frequency	Hz	50
Rated voltage	kV	198
Installation type		Outdoor type
Altitude of Installation	meters	2000
Class		Station class
Nominal discharge current	kA	10
TOV capability (after rated energy)	kV _{rms}	1s: 229 2s: 217
Minimum creep age distance of arrester housing	mm	6336
Continuous leakage current at MCOV	μA	Resistive – 400 Capacitive- 1500
Pressure Relief Capability (0.2sec)	KA _{rms}	65
Max. Continuous operating voltage (Uc)	kV _{rms}	156
Standard		IEC 60099 – 4



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Technical Data for 110 kV Surge Arrester

Description	Requirements	
	Unit	Data
Manufacturer		
Manufacturer's model		
Nominal System voltage	kV	110
Highest system voltage	kV	145
Rated frequency	Hz	50
Installation type		Outdoor type
Altitude of Installation	meters	2000
Class		Station class
Nominal discharge current	kA	10
Power frequency withstand voltage	kV _{rms}	230
Lighting impulse withstand voltage	kV _{peak}	550
Minimum creep age distance of arrester housing	mm	3075
Continuous leakage current at MCOV	μA	Resistive - 400 Capacitive- 1500
Pressure Relief class		Class A
Max. Continuous operating voltage (Uc)	kV _{rms}	78
Standard		IEC 60099 - 4



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Belong to Item# 19

Technical Spec for DABS Rectifiers

General: -

- Three-phase industrial rectifier and/or battery chargers, specifically designed and customized to supply constant DC supply (Voltage and Current) to critical loads (Protection Relay and SCADA RTU's).
- To recharge any types of rechargeable batteries (for instance: vented or sealed, lead-acid, Ni-Cd). The three-phase rectifiers, employ a 6-pulse thyristor bridge, fully controlled by PCB board.
- Limit the output by dropping Diodes
- Isolation transformer and Harmonic filters
- Applicable international standard: IEC 60950-1
- Panel IP and panel thickness: IP20 Indoor, 2mm
- Rectifier efficiency: $\geq 90\%$
- AC & DC short circuit current: TBD based on design and below specs.
- Mode of controlling output voltage current specify it should be manual / automatic: Both (Manual & Automatic, but the output voltage should be regulated.
- Rectifier transformer overload capacity: The Max. rectifier capacity
- Type of metering indicators: Both (Analog & Digital)
- Installation type: Indoor
- Type of Earthing: Solidly

Input: -

- 3 phase AC Supply 400VAC $\pm 20\%$
- 50Hz $\pm 6\%$
- Power Factor Approx. (0.7-1)
- Isolation transformer

Output: -

- 220VDC Regulated with $\pm 5\%$ (Adjustable)
- 0-100A
- DC Filter
- Output Ripple voltage Max 5% rms nominal DC voltage

Charging Mode Selector Switch: -

The charging mode should be Automatic and Manual with independently adjustable of charging via selector switch as;

- Float (Trickle) Charge
- Hi-Rate (Boost) Charge
- Current Limit Setting
- Float and boost Charge Rating capacity: Adjustable for the batteries with capacity of (100AH – 600AH)

Slow-Start: -

The Slow Start function is used to prevent high current surge during powering up of the rectifier and the Circuit only operate during the start-up of the rectifier.



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Typically, the design is chosen to give the slow-start ramp of 10seconds from start up.

Operation Environment

- Audible Noise 55 dBA @ 1.5m±10%
- Temperature Range -25°C to + 55°C continuous
- Humidity 0 to 95% @ 25°C
- Altitude ≥2000m above sea level.

Cooling System

- Low noise Fan with Air Filter

Protection: -

- AC DC Surge Suppressers
- AC Input Over and Under Voltage Protection
- AC over Current Protection
- DC output Over Voltage Protection
- DC output over Current Protection
- DC Output Earth Fault Protection

Metering: -

- AC Input Voltage Indicator
- AC Input Current Indicator
- DC Output Voltage Indicator (Load)
- DC Output Current Indicator (Load)
- DC Output Voltage Indicator (Batteries)
- DC Output Current Indicator (Batteries)
- Battery Status LED (Rate of Charge)

Multi Alarm system and LED Indications

- Rectifier Normal Operation
- Alarm sounder and Silence button
- AC Input Reverse Phase Sequence LED
- AC Input phase failure and Low Voltage Alarm and LED
- Low Voltage Output Alarm and LED (Adjustable)
- Input and Output MCB or Fuses trip Alarm
- High Temp. Inside the Charger or semiconductor
- Colling Fan has Failed
- Ground Fault "-VE"
- Ground Fault "+VE"
- Charger Fail

Terminal and cabling connections

- Bottom connected
- Separate Terminal Block for the Input, Load and Batteries



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Applications

- DABS Substations.
- DABS Junction Stations.

Spare Parts should be included

1. Thyristor Bridge: 1 set
2. Firing Circuit for Bridge module: 1 PCB
3. Main Three phase Control Card: 1 PCB
4. Multi Alarm Card: 1 PCB
5. Input Surge suppressers: 1 set
6. DC Filter: 1 set
7. Manufacturer suggestion(option)

Documents

- Full Installation Manual includes system test and commissioning
 - Service, Troubleshooting and Maintenance Manual
 - Schematic Diagram for each card and interconnection
- Type test report or verification certificate from any international LAB

Warranty Period

Below Options

1. One year after energization or operation.

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Belong to Item# 20

Technical Spec for DABS Rectifiers

General: -

- Three-phase industrial rectifier and/or battery chargers, specifically designed and customized to supply constant DC supply (Voltage and Current) to critical loads (Protection Relay and SCADA RTU's).
- To recharge any types of rechargeable batteries (for instance: vented or sealed, lead-acid, Ni-Cd). The three-phase rectifiers, employ a 6-pulse thyristor bridge, fully controlled by PCB board.
- Limit the output by dropping Diodes
- Isolation transformer and Harmonic filters
- Applicable international standard: IEC 60950-1
- Panel IP and panel thickness: IP20 Indoor, 2mm
- Rectifier efficiency: $\geq 90\%$
- AC & DC short circuit current: TBD based on design and below specs.
- Mode of controlling output voltage current specify it should be manual / automatic: Both (Manual & Automatic, but the output voltage should be regulated.
- Rectifier-transformer-overload capacity: The Max. rectifier capacity
- Type of metering indicators: Both (Analog & Digital)
- Installation type: Indoor
- Type of Earthing: Solidly

Input: -

- 3 phase AC Supply 400VAC $\pm 20\%$
- 50Hz $\pm 6\%$
- Power Factor Approx (0.7-1)
- Isolation transformer

Output: -

- 110VDC Regulated with $\pm 5\%$ (Adjustable)
- 0-100A
- DC Filter
- Output Ripple voltage Max 5% rms nominal DC voltage

Charging Mode Selector Switch: -

The charging mode should be Automatic and Manual with independently adjustable of charging via selector switch as:

- Float (Trickle) Charge
- Hi-Rate (Boost) Charge
- Current Limit Setting
- Float and boost Charge Rating capacity: Adjustable for the batteries with capacity of (100AH – 600AH)

Slow-Start: -

The Slow Start function is used to prevent high current surge during powering up of the rectifier and the Circuit only operate during the start-up of the rectifier.



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Typically, the design is chosen to give the slow-start ramp of 10seconds from start up.

Operation Environment

- Audible Noise 55 dBA @ 1.5m±10%
- Temperature Range -25°C to + 55°C continuous
- Humidity 0 to 95% @ 25°C
- Altitude ≥2000m above sea level.

Cooling System

- Low noise Fan with Air Filter

Protection: -

- AC DC Surge Suppressers
- AC Input Over and Under Voltage Protection
- AC over Current Protection
- DC output Over Voltage Protection
- DC output over Current Protection
- DC Output Earth Fault Protection

Metering: -

- AC Input Voltage Indicator
- AC Input Current Indicator
- DC Output Voltage Indicator (Load)
- DC Output Current Indicator (Load)
- DC Output Voltage Indicator (Batteries)
- DC Output Current Indicator (Batteries)
- Battery Status LED (Rate of Charge)

Multi Alarm system and LED Indications

- Rectifier Normal Operation
- Alarm sounder and Silence button
- AC Input Reverse Phase Sequence LED
- AC Input phase failure and Low Voltage Alarm and LED
- Low Voltage Output Alarm and LED (Adjustable)
- Input and Output MCB or Fuses trip Alarm
- High Temp. Inside the Charger or semiconductor
- Colling Fan has Failed
- Ground Fault "-VE"
- Ground Fault "+VE"
- Charger Fail

Terminal and cabling connections

- Bottom connected



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- Separate Terminal Block for the Input, Load and Batteries

Applications

- DABS Substations.
- DABS Junction Stations.

Spare Parts should be included

1. Thyristor Bridge: 1 set
2. Firing Circuit for Bridge module: 1 PCB
3. Main Three phase Control Card: 1 PCB
4. Multi Alarm Card: 1 PCB
5. Input Surge suppressers: 1 set
6. DC Filter: 1 set
7. Manufacturer suggestion(option)

Documents

- Full Installation Manual includes system test and commissioning
- Service, Troubleshooting and Maintenance Manual
- Schematic Diagram for each card and interconnection
- Type test report or verification certificate from any international LAB

Warranty Period

below Options

1. One year after energization or operation.

موسس زاره



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