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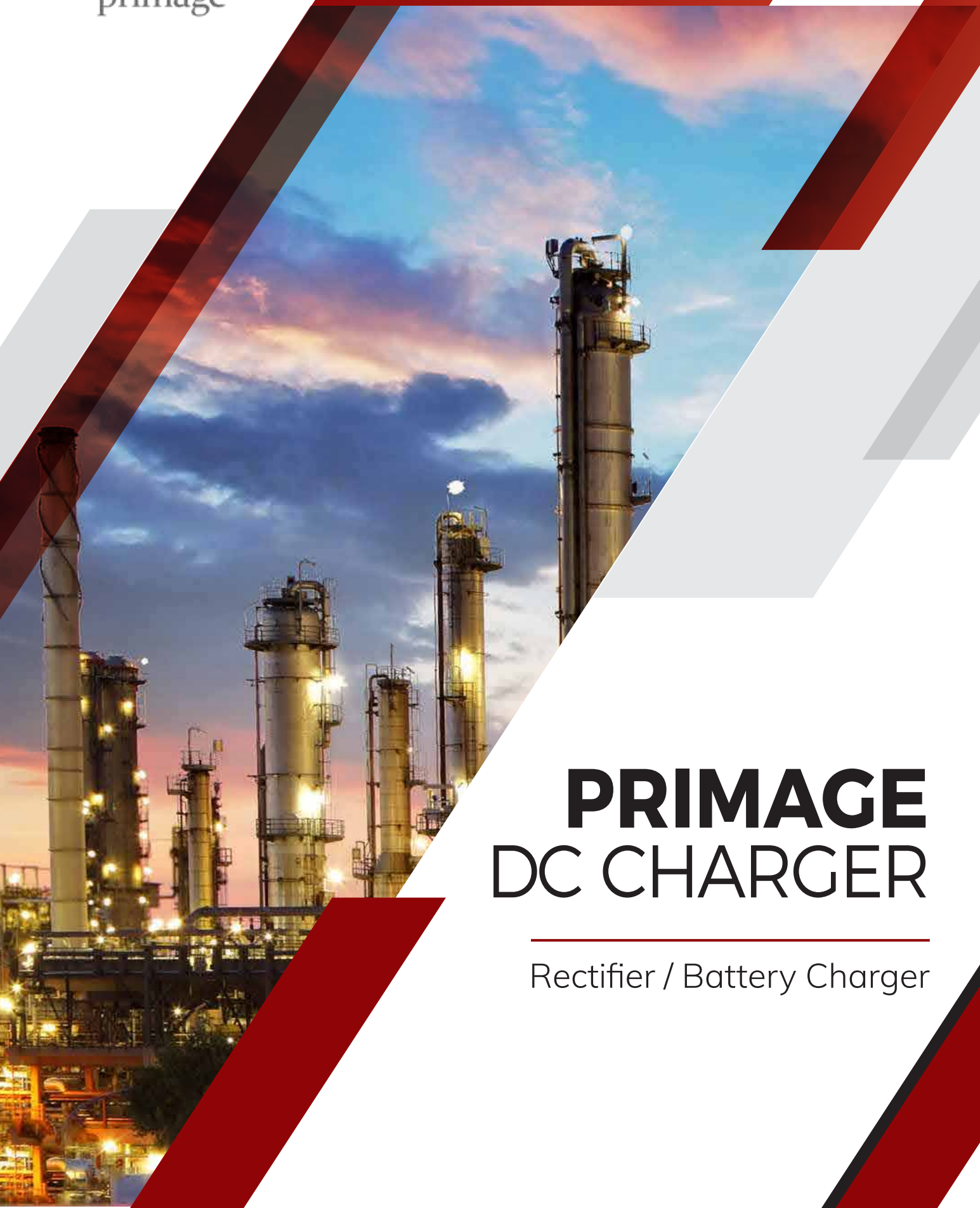


PRIMAGE
DC CHARGER

Rectifier / Battery Charger

Battery Charger Application

A mere split second of interrupted power could spell disaster for industries operation depends on a constant supply. Based on years of experience, **Primage** has a range of chargers that provide practical and economical solutions to almost any types of applications.

▪ Process Control

Where control and regulating equipment must operate to a predetermined schedule, (even during an AC supply failure Primage DC system is the natural choice. When application parameters demand that voltage deviations be controlled, the system can be enhanced with an output voltage regulator.

▪ Engine Starting

Engine starting batteries may be associated with auxiliary generator sets, fire pumps and main propulsion engines as locomotives. In all cases, the battery must provide a high current for sufficient time to crank the engine before firing takes place. Primage charges keeps the batteries in an optimal charge condition, allowing engines to start in a split second.

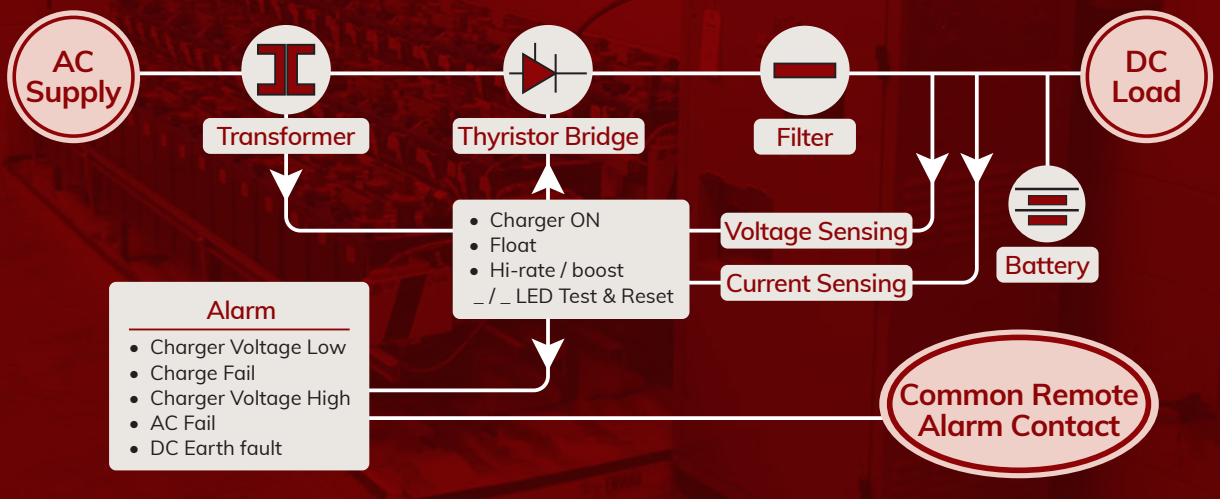
▪ Utility

Primage DC system consists of a thyristor (SCR) controlled rectifier operating in parallel with a battery bank and can supply a varying load. Normally, the rectifier supplies the load, while the battery handles short peak loads and takes over in the event of power failure.

▪ Telecommunications

The comprehensive Primage DC system with telecom filtering provides low ripple essential for telecommunications. This includes rectifier modules from 3 - 1200 amps in both 24 and 48 volt configurations, specified in accordance to CCITT>P53 for the exact requirements of telephone systems.

DC System Diagram



Technical Features - Standard Product

Primage DC system consists of an isolation transformer, fully controlled thyristors bridge, control printed circuit board, alarm monitoring board and battery bank. Single phase rectifier employs two pulse fully controlled bridge whereas three phase rectifier has a six pulse fully controlled thyristors bridge. A twelve pulse bridge configurations is supplied to reduce the level of mains harmonics current.

Enclosure

Electro galvanized sheet metal treated with chemical rust inhibitor and rust resisting primer coat and finally painted with epoxy powder forms the enclosure. The index of protection is IP20 (IEC 529).

- The A Series cabinets are made of 1.5mm thick electro galvanized sheet steel.
- The B36 and B47 cabinets are made of 1.5mm and 2 mm thick electro galvanized sheet steel for the panel and frame respectively.
- The B60 series cabinets are made of 2mm and 3mm thick electro galvanized sheet steel for the panel and frame respectively.

Conventional Ventilation

Forced air cooling is employed for higher capacity charger, clearance of at least 100mm is required above and in front (wall-mounted) or back (floor standing) of the cabinet.

AC Input Supply

The input supply voltage:

- 120, 208, 220, 230, 240 Vac ± 10% (Single phase)
- 208, 380, 400, 415, 480 Vac ± 10%
  (Three Phase - Three Wires + Earth)

Frequency:

- 50 or 60 Hz ± 6%

Ripple Voltage

The rectifier output has a maximum of 5% rms ripple (typically 2.5%) without battery connected.

Protection

- The rectifier is protected against surges by surge absorber.
- Overload protection of the rectifier is accomplished by its current limiting characteristic.
- The rectifier is short circuit proof when it is started with a short at the output.
- A slow ramp up (3s) to reduce power in-rush upon starting up.
- Internal DC fuse is installed for added protection.
- Loss of phase or incorrect phase rotation inhibits the operation of the rectifier (applicable for 3-phase only)

System Control

- Rectifier on / off by main power switch located inside the cabinet.
- Constant voltage charging with a selector switch (Float / Manual Hi-Rate / Auto).
- Adjustable rectifier current limit potentiometers.
- Adjustable float and high rate voltage potentiometers.

Status Indicators

Three bridge LEDs on the front door

- Rectifier on - green colour
- High rate charge - orange colour
- Float charge - green colour

Instrumentation

Charger output analogue voltmeter and ammeter have 1.5% accuracy with 90 degrees deflection.

- The A series, B36 and B47 cabinets have meters of size 72mm x 72mm.
- The B60 series cabinets have meters of size 96mm x 96mm.

Technical Features - Optional

In order to meet the specific needs of each application, Primage offers a wide range of options which includes alarms, breakers, filters etc.

Alarms

- Charger Fail (True detection of charger failure by detecting the voltage and current components)
- Charger Voltage Low
- Charger Voltage High
- DC Earth Fault (Common or individual - 10mA sensed)
- AC / Mains Failure (Voltage dropout or average level detection)
- Low Electrolyte Level Alarm
- Fuses Failure
- MCCB Tripped
- Load Voltage High
- Load Voltage Low
- Battery Discharging
- Charger Overload
- Heat Sink Temperature High
- Cabinet Temperature High
- Battery Circuit Breaker Open
- Fan Failure

These alarms shall have a red LED display respectively. A reset push button is included to reset the alarms.

Remote Contact

A set of voltage free contacts for remote monitoring of individual or common alarm respectively can be provided.
Maximum contact rating 125Vdc / 250Vac, 5A
Maximum switching capacity 100Vdc / 120W

Audible Buzzer

An audible buzzer can be incorporated for annunciating an alarm. A reset push button is included to reset the buzzer.

Input EMI Filter

An input EMI filter is installed if requirement specify a normalized limited for conducted Electrical Magnetic Interference (EN50082-2).

High and / or Low Voltage Trip

The voltage at the battery terminal can vary widely, from a high voltage which is when the battery is performing high rate to restore the battery capacity, to a low voltage which is when it is near to its end of discharge. There are equipment which may not be able to tolerate such voltage tolerance. The solutions is to introduce one of the following complementing configuration into the system:

- Dropper diode voltage regulator
- Hi-Rate charge interlocking system (dual charger only)
- High power DC-DC converter

Battery Current Limit

This option is used to prevent excessive charging current to the connected battery. Whenever the battery current reaches a preset value, the rectifier will be current limited independent of the load current.

Battery Temp. Compensation

This options is used whenever a battery needs charge compensation with respect to the ambient temperature. The charge voltage decreases automatically when the ambient temperature of the battery increases.

Telecom Filter

Psophometric ripple voltages are measured within a specific bandwidth described under the CCITT norms which state that for telecom purposes, the requirements must match the “C” curve. The ripple voltage requirement is 0.1% of the nominal output and 2mV psophometric value.

TEB Three - Phase Battery Charger

Type	Nom. Volt. Vdc	Nom. Cur. Adc	Cabinet	Wgt Kg
TEB 12-25	12	25	B36	60
TEB 12-35	12	35	B36	70
TEB 12-50	12	50	B36	70
TEB 12-75	12	75	B36	100
TEB 12-100	12	100	B36	120
TEB 12-125	12	125	B36	135
TEB 12-150	12	150	B36	150
TEB 12-175	12	175	B36	175
TEB 12-200	12	200	B36	190
TEB 12-250	12	250	B36	220
TEB 12-300	12	300	B36	370
TEB 12-400	12	400	B36	480
TEB 24-25	24	25	B36	80
TEB 24-35	24	35	B36	100
TEB 24-50	24	50	B36	120
TEB 24-75	24	75	B36	185
TEB 24-100	24	100	B36	190
TEB 24-125	24	125	B36	200
TEB 24-150	24	150	B36	210
TEB 24-175	24	175	B47	230
TEB 24-200	24	200	B47	250
TEB 24-250	24	250	B60	385
TEB 24-300	24	300	B60	410
TEB 24-400	24	400	B60	525
TEB 24-500	24	500	B61	650
TEB 24-600	24	600	B61	720
TEB 24-700	24	700	B62	850
TEB 24-1000	24	1000	B62	1200
TEB 24-1200	24	1200	B62	1350
TEB 48-25	48	25	B36	125
TEB 48-35	48	35	B36	130
TEB 48-50	48	50	B36	150
TEB 48-75	48	75	B36	220
TEB 48-100	48	100	B36	245
TEB 48-125	48	125	B36	300
TEB 48-150	48	150	B47	380
TEB 48-175	48	175	B47	410
TEB 48-200	48	200	B47	420
TEB 48-250	48	250	B60	515
TEB 48-300	48	300	B60	555
TEB 48-400	48	400	B61	610
TEB 48-500	48	500	B62	720
TEB 48-600	48	600	B62	870
TEB 48-700	48	700	B62	950
TEB 48-1000	48	1000	B63	1270
TEB 48-1200	48	1200	B62D	1480

Type	Nom. Volt. Vdc	Nom. Cur. Adc	Cabinet	Wgt Kg
TEB 110-25	110	25	B36	150
TEB 110-35	110	35	B36	170
TEB 110-50	110	50	B36	270
TEB 110-75	110	75	B36	400
TEB 110-100	110	100	B47	425
TEB 110-125	110	125	B47	455
TEB 110-150	110	150	B60	500
TEB 110-175	110	175	B60	520
TEB 110-200	110	200	B60	630
TEB 110-250	110	250	B60	720
TEB 110-300	110	300	B60	920
TEB 110-400	110	400	B62	1090
TEB 110-500	110	500	B62	1120
TEB 110-600	110	600	B62	1350
TEB 110-700	110	700	B62	1450
TEB 110-1000	110	1000	B63	1750
TEB 110-1200	110	1200	B62D	1890
TEB 220-25	220	25	B36	190
TEB 220-35	220	35	B36	210
TEB 220-50	220	50	B47	390
TEB 220-75	220	75	B47	490
TEB 220-100	220	100	B47	530
TEB 220-125	220	125	B60	570
TEB 220-150	220	150	B60	750
TEB 220-175	220	175	B60	810
TEB 220-200	220	200	B60	860
TEB 220-250	220	250	B62	1000
TEB 220-300	220	300	B62	1275
TEB 220-400	220	400	B62	1600
TEB 220-500	220	500	B62	1900
TEB 220-600	220	600	B63D	2200
TEB 220-700	220	700	B63D	2680
TEB 220-1000	220	1000	B63D	2780
TEB 220-1200	220	1200	B63D	2780

Cabinet	H (mm)	W (mm)	D (mm)
A14	110	25	150
A18	110	35	170
A21	110	50	270
B36	110	75	400
B47	110	100	425
B60	110	125	455
B61	110	150	500
B62	110	175	520
B63	110	200	630

SEB single - Phase Battery Charger

Type	Nom. Volt. Vdc	Nom. Cur. Adc	Cabinet	Wgt Kg
SEB 12-3	12	3	A14	13
SEB 12-6	12	6	A14	15
SEB 12-10	12	10	A14	17
SEB 12-15	12	15	A14	20
SEB 12-20	12	20	A18	25
SEB 12-25	12	25	A18	30
SEB 12-35	12	35	A21	35
SEB 12-50	12	50	A21	40
SEB 12-75	12	75	B36	45
SEB 12-100	12	100	B36	92
SEB 12-125	12	125	B36	103
SEB 12-150	12	150	B36	113
SEB 12-175	12	175	B36	133
SEB 12-200	12	200	B47	150
SEB 12-250	12	250	B47	165
SEB 24-3	24	3	A14	17
SEB 24-6	24	6	A14	19
SEB 24-10	24	10	A18	27
SEB 24-15	24	15	A18	32
SEB 24-20	24	20	A18	35
SEB 24-25	24	25	A21	42
SEB 24-35	24	35	A21	45
SEB 24-50	24	50	B36	95
SEB 24-75	24	75	B36	115
SEB 24-100	24	100	B36	130
SEB 24-125	24	125	B47	150
SEB 24-150	24	150	B47	185
SEB 24-175	24	175	B61	230
SEB 24-200	24	200	B61	265
SEB 24-250	24	250	B61	310
SEB 30-3	30	3	A14	17
SEB 30-6	30	6	A14	19
SEB 30-10	30	10	A18	27
SEB 30-15	30	15	A18	32

Type	Nom. Volt. Vdc	Nom. Cur. Adc	Cabinet	Wgt Kg
SEB 48-3	48	3	A14	20
SEB 48-6	48	6	A14	24
SEB 48-10	48	10	A18	24
SEB 48-15	48	15	A18	39
SEB 48-20	48	20	A21	80
SEB 48-25	48	25	A21	83
SEB 48-35	48	35	A21	90
SEB 48-50	48	50	B36	135
SEB 48-75	48	75	B36	200
SEB 48-100	48	100	B47	230
SEB 48-125	48	125	B47	250
SEB 48-150	48	150	B61	275
SEB 48-175	48	175	B61	295
SEB 48-200	48	200	B61	320
SEB 48-250	48	250	B61	400
SEB 110-3	110	3	A14	25
SEB 110-6	110	6	A14	30
SEB 110-10	110	10	A18	45
SEB 110-15	110	15	A18	80
SEB 110-20	110	20	A21	90
SEB 110-25	110	25	A21	125
SEB 110-35	110	35	B36	220
SEB 110-50	110	50	B47	250
SEB 110-75	110	75	B47	290
SEB 110-100	110	100	B61	340
SEB 110-125	110	125	B61	400
SEB 110-150	110	150	B61	460
SEB 110-175	110	175	B61	485
SEB 110-200	110	200	B61	510
SEB 110-250	110	250	B61	550
SEB 220-3	220	3	A21	20
SEB 220-6	220	6	A21	45
SEB 220-10	220	10	A21	90
SEB 220-15	220	15	A21	140

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PRIMAGE ENERGY SDN. BHD. (1249964-W)

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