A fully regulated battery charger / rectifier

AUTOMATIC CURRENT LIMIT

CONSTANT VOLTAGE CHARGING

SOFT START CIRCUIT

SURGE PROTECTION IN / OUTPUT

REVERSE BATTERY PROTECTION

FULL RANGE OF OPTIONS

GIYIK

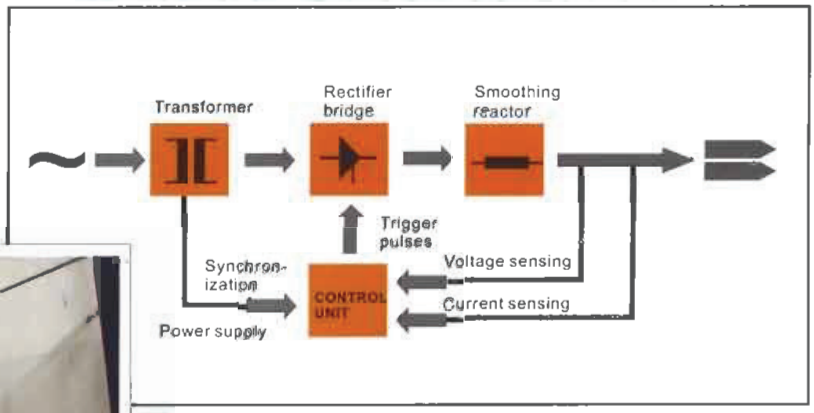
Power Electronics
Quality and Reliable

ECR Charger / Rectifiers

Based upon more 30 years of experience in development and manufacturing of emergency power supply we have developed a generation of charger / rectifiers, emphasizing on compact size, outstanding features, and built-in reliability.

In case of malfunction easy access to all components and well identified wiring and components allows quick check and repair. The charger / rectifiers are of a failsafe design, they are designed to be self-protected as well as protecting the system to which they are connected.

With our international and regional expertise in all markets we are able to fully customised our charger / rectifier to meet any of your requirements.

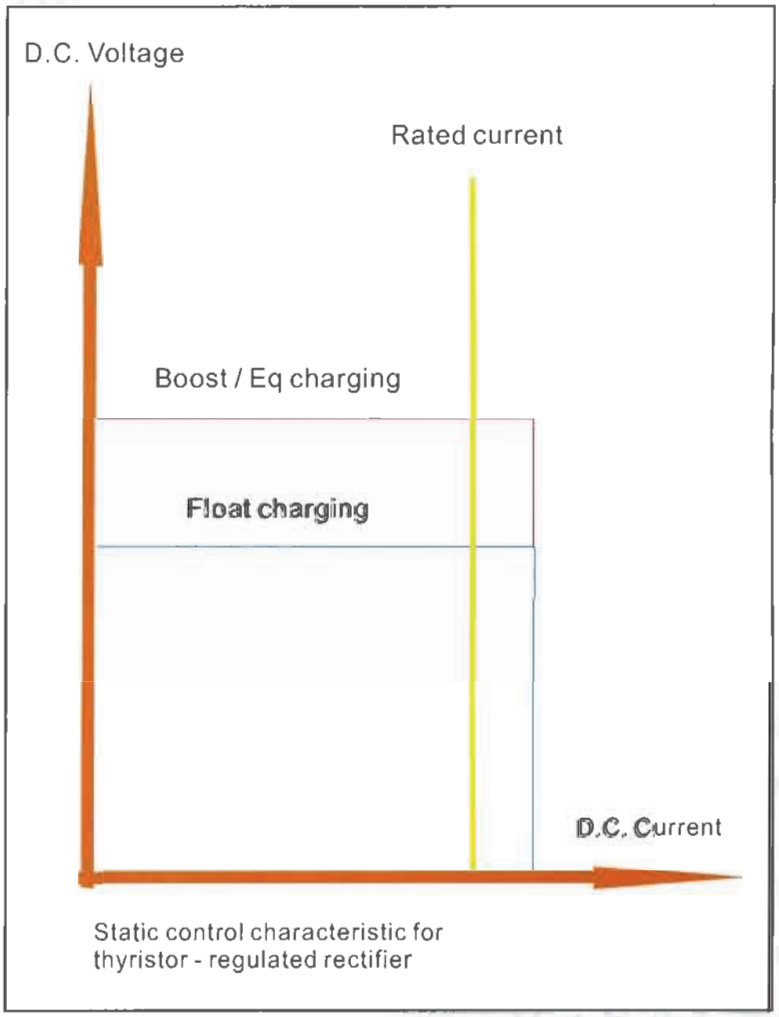


Function

The mains voltage is transformed to a suitable level and fed to the rectifier bridge, which consist of thyristors and diodes. The thyristors are made to conduct by 'trigger pulses' from control circuits. The duration of conduction per half period determines the d.c. Voltage. The voltage is fed via a smoothing reactor to the output of the rectifier. Control circuits vary the conduction time of the thyristors so that the output voltage is kept consistent regardless of variations in load and main voltage.

The rectifiers are protected against overload by current limitation.

The thyristor rectifiers are equipped with a device for 'slow start'. This ensures the gradual increase of the rectifier output voltage up to the preset value. This limits the starting current and protects the rectifiers in the event that they are turned on with a short-circuited output. All rectifiers are provided with surge suppressors protecting against transient mains voltage.



Static control characteristic for thyristor - regulated rectifier

Typical Applications

Engine Starting

In a complete DC system the rectifier ensures that the battery is always fully charged and ready to give instant service.

Control Applications

Where control and regulating equipment must operate to a predetermined schedule, even during an AC supply failure, ECR DC systems are the natural choice. When the application demands limited voltage variations, the system can be supplemented with an output voltage regulator.

Emergency Lighting

An ECR DC system is the ideal power source for emergency lighting. A power contractor is used to connect the unit to the load. When the main lighting fails the emergency lighting comes on automatically.

Switchgear

ECR DC system offer first - rate protection in power generating stations and transformer substation. The rectifier supplier the normal load current while the battery handles short peak loads and takes over in the event of a power failure

Telecommunications

An ECR DC system with suitable filtering provides the voltage stability and low ripple demanded by telecommunications system.

System Configuration

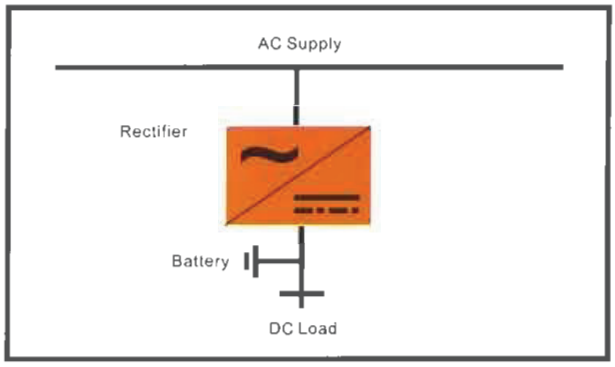
Depending on the project specification, voltage tolerance, load and safety requirements, various configuration might be selected to cope with customers' requirements.

Single DC System

There are at least two charging rates :

1. Float charge for normal use
2. Boost / Eq charge for use when the batteries have become discharged.

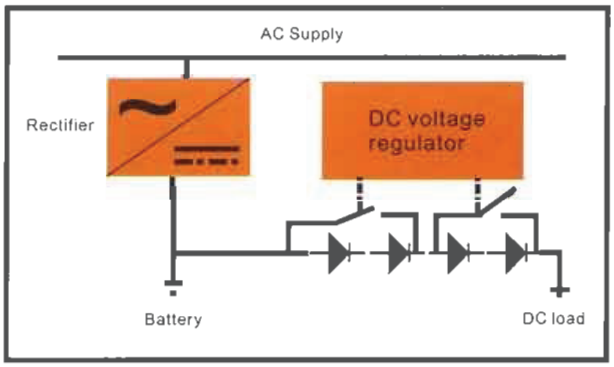
When the mains fail, battery takes over supply to the load.



System with dropping diode device

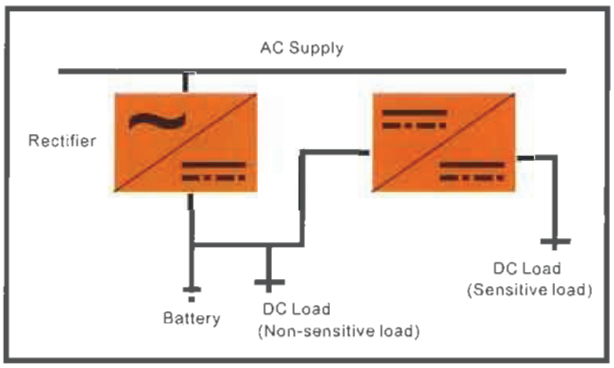
Rectifier connected to the load side, consists of a number of diode groups, which are switched in or out of the circuit by a voltage sensing control.

The diode groups are made up of series-connected silicon diodes, keeping the output voltage within the specified tolerance. The electronic control unit of the dropping diode device is a stand-alone unit.

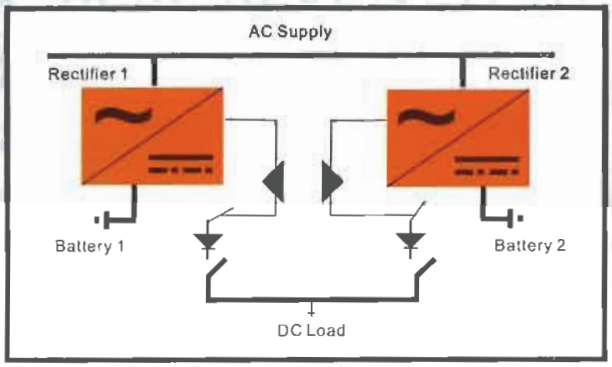


System with voltage regulator / voltage compensator

In order to protect the sensitive load against the voltage variation during the boost mode operation, the rectifier is designed with a DC-DC converter.

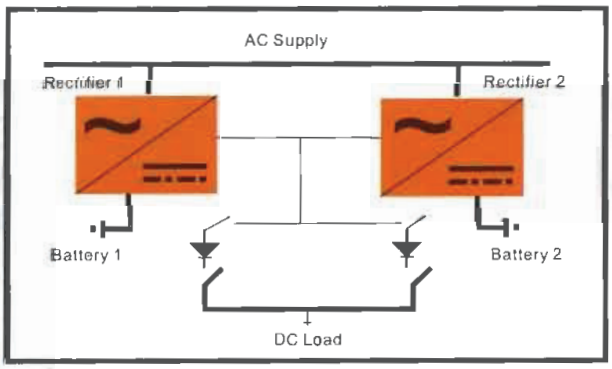


System Configuration



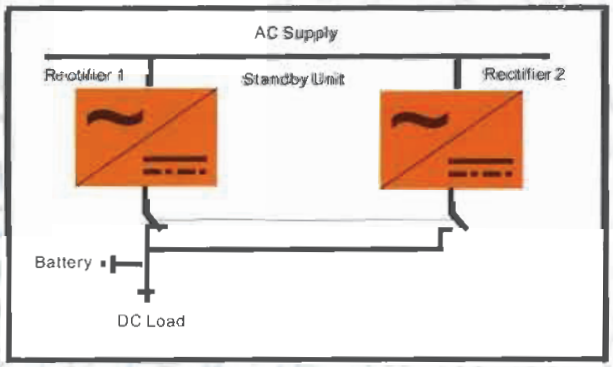
System with Off-Load Switch

This parallel redundant system provide 100% standby power if rectifier and batteries are designed for the full load. Two sections, each with one rectifier and one battery bank, are connected to a common bus bar and can operate independently or in parallel. With the boost charge can take place in one section, when isolated from the load with a switch. At the same time, the other section will be on floating charge and supplying to the load.



System with Boost Interlocking Facility

A parallel system consists of two rectifiers and batteries rated at 100%. Under the normal condition, the two rectifiers share load current and charges the respective battery. With the boost interlocking circuitry, batteries will automatically boost charge, take place from one after the other. The interlocking device precludes both rectifiers set to boost at the same time.



Hot Standby System

The DC system comes with two rectifiers and one battery. One designated as 'Main' and the other as 'Standby'. The standby rectifier is always ready to back up if the main rectifier fails. The Automatic Switching Device will transfer the dc supply of the standby unit to the failed rectifier without interruption to the load.

Standard Rectifier Specifications

Single Phase System	Three Phase System
Model : ECR XXX - XX	Model : ECR XXX - XX - TP
Input AC voltage XXX (V) + / - 10%	Input AC voltage XXX (V) + / - 10%
Input frequency 50Hz or 60 Hz + / - 5%	Input frequency 50Hz or 60 Hz + / - 5%

Output

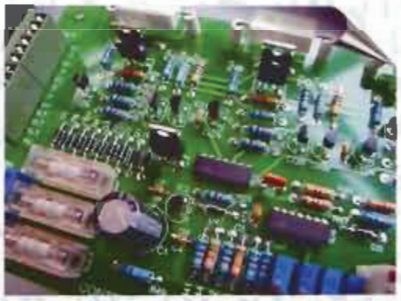
Rectifier output voltage	12V, 24V, 48V, 110V & 220Vdc (nominal)
Float adjustment	80% to approx. 135% of V nominal
Boost / Eq adjustment	80% to approx. 145% of V nominall
Output characteristic	Constant Potential type (Constant voltage with current limit)
Output voltage stability	Static + / - 1% with 10 - 100% load variation, input voltage of + / - 10% and input frequency of + / - 6% Dynamic + / - 5% with 10 - 100% load variation, Recovery time to static within typically 200 ms.
Current regulation	< + / - 2% Vr.m.s. With battery connected
Ripple filter	G according to VDE 0875 / EN 50081 - 2
RFI / EMC	Rectifier On, Float & Boost LEDs

Environment

Operating temperature	-10C degree to + 40C to 55C by lowering the output current with 1.25% per C degree
Storage temperature	-25C degree to + 70C degree
Altitude	Up to 1000m, derate from 1000m to 5000m by lowering the output current with 6.7% per 1000m
Relative humidity	Operation from 0 - 95% (non - condensing)
Acoustic noise	Typically 45 - 65dB (A)

Instrument

Rectifier output voltage	Voltmeter, 1.5%, accuracy 90 deflection
Rectifier output current	Ammeter, 1.5%, accuracy 90 deflection



Protection

Rectifier input	Soft start function and Suppressor
Rectifier output	Protected against short circuit
Battery output	Polarity reversal of batteryl
Current limiting	105% reversal of battery

Rectifier Control

Rectifier input	Input fuse / switch
Rectifier output	DC output fuse
Battery	Battery DC fuse
Charge mode	Float / Auto / Manual boost switch
Indication	LED test button
Alarm	Standard with delay function

Magnetic

High voltage insulation	2KV AC for 1 min between in / output and electrical earth
Insulation resistance	10 Mohms with 500VDC between in / output and electrical earth

Mechanical

Paint finish	Epoxy powder coat with chemical rust resisting primer
Colour	RAL 7032, Light Grey
Degree of protection	IP 20 according to IEC 60529

Optional / Specific options

To meet the specific needs of each application, ECR systems offers a wide range of options.
(Please tick / cross as appropriate)

[ ] wide input range + _____/ - _____%

[ ] higher Current limit _____%

[ ] Mains auto change-over switch

[ ] filter 1% Vr.m.s w/o battery

[ ] filter 0.1% Vr.m.s. W/o battery

[ ] Input EMI filter

[ ] RFI to 'N' level

[ ] 12 - pulse rectifier w / isol. Transformer

[ ] rectifier input breaker

[ ] rectifier output breaker / switch

[ ] battery fuse +/- in external fuse box

[ ] battery breaker / switch

[ ] battery breaker in EEx'd' box

[ ] load output breaker

[ ] Alarms

[ ] Charger fail

[ ] Charger DC High / Low

[ ] Load DC High / Low

[ ] Battery High / Low

[ ] DC earth fault

[ ] AC mains failure

[ ] Fan fail

[ ] Fuse blown

[ ] MCCB tripped

[ ] Battery discharged

[ ] Charger overload

[ ] Low electrolyte level

[ ] Cabinet over temperature

[ ] Battery disconnected

[ ] Diode droppers fault

[ ] Audible buzzer

[ ] Mimic diagram in front panel

[ ] Individual remote alarm

[ ] Battery temperature compensation

[ ] Battery symmetry fault

[ ] AC fail with rectifier tripped

[ ] High DC voltage trip

[ ] Low volt disconnect contactor

[ ] AC monitoring relay

[ ] Additional analog meters

_____

[ ] Digital metering for measurement

Optional / Specific options

[ ] Transducer for measurements

_____

[ ] Battery test facility

[ ] Interior cabinet light

[ ] Cabinet space heater

[ ] Redundant fans

[ ] Voltage droppers circuit, rate _____A
for output voltage range ____V +/- ____%

[ ] Boost inhibit upon battery room fan fail

[ ] Remote communication RS 232 or 485

[ ] Protection IP _____(IP 21 - IP 5X)

[ ] Open-door cabinet IP 20

[ ] Other colour RAL _____or _____

[ ] Top cable entry

[ ] Top and bottom cable entry

[ ] Earth bar

[ ] Flame retardent, low smoke,
halogen-free wiring

[ ] Special marking

[ ] Stainless steel tag & name plates

[ ] Custom made cabinet
_____X _____X _____ mm

Applicable Standards

GIYIK LTD and / or sub-assemblies is designed and build according to the latest applicable sections of IEC standards.

IEC 60146 Semiconductor converter

IEC 60269 Low-voltage fuses

IEC 60445 Identification of apparatus terminals and general rules for a uniform system of terminals marking, using an alpha-numeric notation.

IEC 60478 Stabilized power supplies DC output

IEC 60529 Classification of degree of protection provided by enclosure (IP code)

IEC 60947 Low-voltage switchgear and control gear

IEC 60051 Electrical measurement instruments

IEC 60076 Power transformers

IEC 60204 Electrical equipment of industrial machines

IEC 60228 Conductors of isulated cables

IEC 60255 Electrical relays

IEC 60439 Low-voltage switchgear & control gear assemblies

IEC 61010 Safety requirements for electrical equipment for measurement, control and laboratory use

(Please consult us for other manufacturing standards for specific customer options)

ECR Series - Single Phase Battery Charger

Type	Output voltage nominal Vdc	Output current nominal Adc	Input power KVA	Input current Aac	Dimension (mm) H	W	D	Weight (kgs)
ECR 12 - 5	12	5	0.14	0.60	500	400	260	13
ECR 12 - 10	12	10	0.32	1.41	500	400	260	17
ECR 12 - 15	12	15	0.48	20.7	500	400	260	20
ECR 12 - 20	12	20	0.63	2.73	500	400	320	25
ECR 12 - 25	12	25	0.78	3.39	600	400	320	30
ECR 12 - 30	12	30	0.90	2.31	600	400	320	35
ECR 12 - 50	12	50	1.54	6.70	800	600	320	45
ECR 12 - 75	12	75	2.30	10.00	1000	600	450	92
ECR 12 - 100	12	100	3.06	13.30	1280	600	450	110
ECR 12 - 125	12	125	3.82	16.61	1280	600	450	125
ECR 12 - 150	12	150	4.58	19.91	1280	600	450	135
ECR 12 - 200	12	200	6.10	26.52	1280	600	450	145
ECR 24 - 5	24	5	0.23	0.97	500	400	260	20
ECR 24 - 10	24	10	0.58	2.53	600	400	260	28
ECR 24 - 15	24	15	0.86	3.76	600	400	320	35
ECR 24 - 20	24	20	1.15	4.98	600	400	320	45
ECR 24 - 25	24	25	1.43	6.21	600	400	320	50
ECR 24 - 30	24	30	1.65	7.78	800	600	320	65
ECR 24 - 50	24	50	2.84	12.33	800	600	450	90
ECR 24 - 60	24	60	3.56	17.35	1280	600	450	105
ECR 24 - 75	24	75	4.24	18.45	1280	600	500	120
ECR 24 - 100	24	100	5.65	24.57	1280	600	500	145
ECR 24 - 125	24	125	7.06	30.68	1280	600	500	155
ECR 24 - 150	24	150	8.47	36.80	1280	600	500	170
ECR 24 - 200	24	200	11.28	49.04	1280	600	600	195

ECR Series - Single Phase Battery Charger

Type (TP)	Output voltage nominal Vdc	Output current nominal Adc	Input power KVA	Input current Aac	Dimension (mm) H	W	D	Weight (kgs)
ECR 30 - 5	30	5	0.32	1.52	600	400	320	20
ECR 30 - 10	30	10	0.75	3.28	600	400	320	28
ECR 30 - 15	30	15	1.12	4.87	600	400	320	35
ECR 30 - 20	30	20	1.49	6.47	600	400	320	45
ECR 30 - 25	30	25	1.86	8.07	600	400	320	50
ECR 30 - 30	30	30	2.23	10.05	800	600	450	70
ECR 30 - 50	30	50	3.69	16.04	1000	800	450	90
ECR 30 - 75	30	75	5.53	24.02	1280	600	500	120
ECR 30 - 100	30	100	7.36	32.0	1280	600	500	145
ECR 30 - 125	30	125	9.20	39.98	1280	600	500	155
ECR 30 - 150	30	150	11.03	47.96	1280	600	500	170
ECR 30 - 200	30	200	14.70	63.91	1280	800	500	195
ECR 48 - 5	48	5	0.56	2.23	600	400	320	60
ECR 48 - 10	48	10	1.10	4.79	600	400	320	70
ECR 48 - 15	48	15	1.64	7.14	800	600	320	90
ECR 48 - 20	48	20	2.18	9.49	800	600	320	95
ECR 48 - 25	48	25	2.72	11.84	800	600	320	105
ECR 48 - 30	48	30	3.20	14.45	800	600	320	115
ECR 48 - 50	48	50	5.43	23.59	1000	800	450	140
ECR 48 - 60	48	60	7.13	32.14	1280	600	500	195
ECR 48 - 75	48	75	8.13	35.34	1280	600	500	210
ECR 48 - 100	48	100	10.83	47.09	1280	600	500	235
ECR 48 - 125	48	125	13.53	58.84	1280	600	500	245
ECR 48 - 150	48	150	16.24	70.59	1280	600	500	260
ECR 48 - 200	48	200	21.64	94.09	1280	600	500	310

ECR Series - Single Phase Battery Charger

Type	Output voltage nominal Vdc	Output current nominal Adc	Input power KVA	Input current Aac	Dimension (mm) H	W	D	Weight (kgs)
ECR 110 - 5	110	5	1.23	5.23	800	600	260	45
ECR 110 - 10	110	10	2.37	10.31	1280	600	450	105
ECR 110 - 15	110	15	3.55	15.42	1280	600	450	120
ECR 110 - 20	110	20	4.72	20.53	1280	600	450	130
ECR 110 - 25	110	25	5.90	25.64	1280	600	500	150
ECR 110 - 30	110	30	7.85	30.86	1480	700	500	190
ECR 110 - 50	110	50	11.78	51.20	1680	800	600	210
ECR 220 - 5	220	5	2.72	10.10	800	600	320	95
ECR 220 - 10	220	10	4.67	20.28	1280	600	450	150
ECR 220 - 15	220	15	6.99	30.38	1280	600	500	190
ECR 220 - 20	220	20	9.31	40.48	1280	600	500	210
ECR 220 - 25	220	25	11.63	50.58	1280	600	500	230
ECR 220 - 30	220	30	15.48	61.21	1480	700	500	250
ECR 220 - 50	220	50	23.25	101.07	1680	800	600	300

ECR Series - Three Phase Battery Charger

Type (TP)	Output voltage nominal Vdc	Output current nominal Adc	Input power KVA	Input current Aac	Dimension (mm) H	W	D	Weight (kgs)
ECR 12 - 60	12	60	1.73	3.75	1280	600	450	100
ECR 12 - 85	12	85	2.36	4.82	1280	600	500	110
ECR 12 - 100	12	100	3.06	6.17	1280	600	500	125
ECR 12 - 120	12	120	3.62	7.25	1280	600	500	135
ECR 12 - 150	12	150	4.58	9.20	1280	700	600	150
ECR 12 - 200	12	200	5.34	12.24	1680	700	600	190
ECR 24 - 60	24	60	1.85	3.98	1280	600	500	170
ECR 24 - 85	24	85	2.66	6.54	1280	600	500	185
ECR 24 - 100	24	100	2.70	7.10	1280	600	500	190
ECR 24 - 120	24	120	3.20	8.35	1280	600	600	200
ECR 24 - 150	24	150	4.04	10.62	1280	700	600	215
ECR 24 - 200	24	200	5.38	14.15	1680	700	600	250
ECR 48 - 60	48	60	2.84	8.56	1280	600	600	160
ECR 48 - 85	48	85	4.56	11.68	1280	600	600	230
ECR 48 - 100	48	100	5.10	13.42	1280	600	600	245
ECR 48 - 120	48	120	5.83	15.76	1280	600	700	300
ECR 48 - 150	48	150	7.64	20.10	1680	800	800	380
ECR 48 - 200	48	200	10.18	26.78	1680	800	800	420

ECR Series - Three Phase Battery Charger

Type (TP)	Output voltage nominal Vdc	Output current nominal Adc	Input power KVA	Input current Aac	Dimension (mm) H	W	D	Weight (kgs)
ECR 110 - 60	110	60	7.95	17.56	1280	600	500	380
ECR 110 - 85	110	85	9.35	26.30	1680	600	500	425
ECR 110 - 100	110	100	10.99	28.92	1680	700	500	440
ECR 110 - 120	110	120	12.59	35.14	1680	700	500	455
ECR 110 - 150	110	150	16.48	43.36	1680	800	600	500
ECR 110 - 200	110	200	21.96	57.79	1680	800	600	630
ECR 220 - 60	220	60	14.76	31.50	1280	800	500	430
ECR 220 - 85	220	85	19.21	49.50	1680	800	500	520
ECR 220 - 100	220	100	21.61	56.87	1680	800	600	530
ECR 220 - 120	220	120	26.23	68.34	1680	800	600	580
ECR 220 - 150	220	150	32.41	85.28	1680	800	600	750
ECR 220 - 200	220	200	43.20	113.68	1680	800	600	860

Specifications are subject to modification without prior notice