

BWrug-V

Rectifier systems
in thyristor technology

Battery backed up DC-power supply systems which are securing the power supply for monitoring and regulation of manufacturing processes and electronic devices are widely used in nearly all fields of public life and industry.

In these areas safety and reliability against mains failures play an important role. Considering this we have designed the rectifier series *BWrug-V* that combines the proven and robust thyristor technology with most reliable single monitoring units and meets the highest requirements of nowadays DC-power supply installations.

BWrug-V



Your advantages:

- Best price/performance relation
- Highest reliability thanks to
 - the use of state-of-the-art and robust thyristor technology
 - the separation of regulating and monitoring units
In case of failure of one monitoring unit the regulating unit keeps on working at full available power
- Flexible monitoring accessories
 - measuring instruments for a fast overview and an exact display of the values
 - LED-indication of all alarms
 - remote contacts for each alarm
- Made in Germany

Versions

We offer the right solution for a big variety of applications:

- Complete power supply system including rectifier, inverter and AC/DC-distribution panels
- Parallel operation of rectifiers
- Stem and additional cell technology
- Possibility of linking into an existing system
- Three phase D400 and single phase E230 systems
Different mains voltages and 50Hz, 60Hz or 16,7Hz



Description of operation

The rectifier has a regulated output IU-characteristic according to DIN 41773.

The output voltage will be kept constant at the set value with a deviation of $\pm 1\%$ within the load range of 0 to 100 % of the nominal current of the rectifier. Fluctuations of the mains voltage of $\pm 10\%$ and of the mains frequency of $\pm 4\%$ will be stabilised.

The measuring instruments in the front door show voltage and current of the rectifier (optionally battery voltage, charging/discharging current of the battery, load voltage and current and mains voltage) and the LED's show each alarm with engraved label descriptions.

The series *BWrug-V* is available in a voltage range between 24V and 220V and suitable for the use in power plants, power supply facilities, railway and traffic installations, plant constructions, chemical and heavy industries.

Monitoring and signalling

Operational report with LED in the front door Remote contacts on terminals

- $U > U_{max}$ / Voltage too high
- $U < U_{min}$ / Voltage too low
- Battery total discharge
- Collecting failure (Option)
- Mains failure (Option)
- Fault of battery circuit (Option)
- Earth failure (Option)

- $U > U_{max}$ / Voltage too high
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- Battery total discharge
- Collecting failure (Option)
- Mains failure (Option)
- Fault of battery circuit (Option)
- Earth failure (Option)
- Rectifier On (Option)
- Fuse trip (Option)
- Contact for battery room ventilator (Option)

Single phase rectifier systems of series BWrug-V

Table of Types E230 G.../... BWrug-V

Also available as E220 (1 x 220VAC), 50Hz or 60Hz.

Type of Rectifier	Input Voltage [V-AC]	Input Current max. [A-AC]	Output Voltage [V-DC]	Output Current [A-DC]	Cabinet	Weight [kg]
24 / 5	230	1,1	24	5	WS 2	22
24 / 10	230	2,2	24	10	WS 2	25
24 / 20	230	4,3	24	20	WS 2	31
24 / 30	230	6,5	24	30	WS 2	35
24 / 40	230	8,7	24	40	WS 2	46
24 / 50	230	10,7	24	50	WS 3	51
24 / 60	230	13,0	24	60	WS 3	54
24 / 80	230	10,7	24	80	ST8.20	130
24 / 100	230	13,0	24	100	ST8.20	150
48 / 15	230	6,5	48	15	WS 2	33
48 / 20	230	8,7	48	20	WS 2	48
48 / 25	230	10,9	48	25	WS 3	51
48 / 30	230	13,0	48	30	WS 3	54
48 / 40	230	17,4	48	40	WS 2	48
48 / 50	230	21,6	48	50	ST8.20	130
48 / 60	230	25,8	48	60	ST8.20	150
60 / 5	230	2,7	60	5	WS 2	24
60 / 10	230	5,4	60	10	WS 2	31
60 / 15	230	8,2	60	15	WS 2	42
60 / 20	230	10,9	60	20	WS 2	48
60 / 25	230	13,6	60	25	WS 3	54
60 / 30	230	16,3	60	30	WS 3	62
60 / 40	230	21,6	60	40	ST8.20	130
60 / 50	230	25,2	60	50	ST8.20	150
60 / 60	230	30,2	60	60	ST8.20	170
110 / 5	230	5,0	110	5	WS 2	32
110 / 10	230	10,0	110	10	WS 2	46
110 / 15	230	15,0	110	15	WS 3	54
110 / 20	230	20,0	110	20	WS 3	62
110 / 30	230	29,0	110	30	ST8.20	150
110 / 40	230	38,0	110	40	ST8.20	180
220 / 5	230	10,0	220	5	WS 3	46
220 / 10	230	20,0	220	10	WS 3	62
220 / 15	230	29,0	220	15	ST8.20	150
220 / 20	230	38,0	220	20	ST8.20	180

Three phase rectifier systems of series BWrug-V

Table of Types D400 G.../... BWrug-V

Also available as D380 (3 x 380VAC), 50Hz or 60Hz.

Type of Rectifier	Input Voltage [V-AC]	Input Current max. [A-AC]	Output Voltage [V-DC]	Output Current [A-DC]	Cabinet	Weight [kg]
24 / 60	3 x 400 / 230	4,3	24	60	WS 3	78
24 / 80	3 x 400 / 230	5,7	24	80	WS 3	83
24 / 100	3 x 400 / 230	7,1	24	100	WS 3	99
24 / 120	3 x 400 / 230	8,5	24	120	WS 3	107
24 / 150	3 x 400 / 230	10,4	24	150	ST 5.21	168
24 / 200	3 x 400 / 230	13,6	24	200	ST 5.21	172
24 / 300	3 x 400 / 230	20,3	24	300	ST 8.21	238
24 / 400	3 x 400 / 230	28,2	24	400	ST 8.21	271
24 / 500	3 x 400 / 230	34,9	24	500	ST 8.21	325
48 / 40	3 x 400 / 230	5,7	48	40	WS 3	85
48 / 50	3 x 400 / 230	7,1	48	50	WS 3	99
48 / 60	3 x 400 / 230	8,5	48	60	WS 3	105
48 / 80	3 x 400 / 230	11,2	48	80	ST 5.21	168
48 / 100	3 x 400 / 230	14,4	48	100	ST 5.21	175
48 / 120	3 x 400 / 230	16,0	48	120	ST 5.21	184
48 / 150	3 x 400 / 230	29,8	48	150	ST 8.21	238
48 / 200	3 x 400 / 230	26,6	48	200	ST 8.21	271
60 / 40	3 x 400 / 230	7,1	60	40	WS 3	88
60 / 50	3 x 400 / 230	8,9	60	50	WS 3	102
60 / 60	3 x 400 / 230	10,6	60	60	ST 5.21	163
60 / 80	3 x 400 / 230	14,1	60	80	ST 5.21	175
60 / 100	3 x 400 / 230	17,6	60	100	ST 5.21	185
60 / 120	3 x 400 / 230	21,2	60	120	ST 5.21	192
60 / 150	3 x 400 / 230	26,6	60	150	ST 8.21	248
60 / 200	3 x 400 / 230	31,2	60	200	ST 8.21	277
60 / 300	3 x 400 / 230	46,8	60	300	ST 8.21	313
60 / 400	3 x 400 / 230	62,4	60	400	ST 8.21	352
60 / 500	3 x 400 / 230	77,9	60	500	ST 10.21	402
110 / 30	3 x 400 / 230	9,2	110	30	ST 5.21	150
110 / 40	3 x 400 / 230	12,3	110	40	ST 5.21	170
110 / 50	3 x 400 / 230	15,3	110	50	ST 5.21	190
110 / 60	3 x 400 / 230	18,3	110	60	ST 5.21	200
110 / 80	3 x 400 / 230	25,7	110	80	ST 8.21	240
110 / 100	3 x 400 / 230	31,4	110	100	ST 8.21	280
110 / 120	3 x 400 / 230	37,1	110	120	ST 8.21	300
110 / 150	3 x 400 / 230	42,4	110	150	ST 10.21	340
110 / 200	3 x 400 / 230	55,1	110	200	ST 10.21	380
110 / 300	3 x 400 / 230	82,4	110	300	ST 10.21	470
110 / 400	3 x 400 / 230	109,9	110	400	ST 10.21	570
110 / 500	3 x 400 / 230	137,4	110	500	ST 10.21	660
220 / 20	3 x 400 / 230	12,3	220	20	ST 5.21	160
220 / 30	3 x 400 / 230	18,3	220	30	ST 5.21	180
220 / 40	3 x 400 / 230	25,7	220	40	ST 5.21	200
220 / 50	3 x 400 / 230	31,4	220	50	ST 8.21	230
220 / 60	3 x 400 / 230	37,1	220	60	ST 8.21	250
220 / 80	3 x 400 / 230	49,5	220	80	ST 10.21	300
220 / 100	3 x 400 / 230	55,1	220	100	ST 10.21	340
220 / 120	3 x 400 / 230	66,2	220	120	ST 10.21	380
220 / 150	3 x 400 / 230	82,4	220	150	ST 10.21	420
220 / 200	3 x 400 / 230	109,9	220	200	ST 11.21	500
220 / 250	3 x 400 / 230	137,4	220	250	ST 11.21	580
220 / 300	3 x 400 / 230	164,8	220	300	ST 11.21	700
220 / 400	3 x 400 / 230	219,8	220	400	ST 11.21	900
220 / 500	3 x 400 / 230	273,3	220	500	ST 11.21	1100

General Technical Data of the Series BWRug-V

- ▶ Standard Type of cabinet, protection class IP20
 - Standing / Wall Cabinet WS 2 (HxWxD) 750 x 550 x 410 mm
 - Standing Cabinet WS 3 (HxWxD) 900 x 600 x 500 mm
 - Standing Cabinet ST 5.21 (HxWxD) 1400 x 800 x 600 mm
 - Standing Cabinet ST 8.20 (HxWxD) 1800 x 600 x 600 mm
 - Standing Cabinet ST 8.21 (HxWxD) 1800 x 800 x 600 mm
 - Standing Cabinet ST 10.21 (HxWxD) 1800 x 800 x 800 mm
 - Standing Cabinet ST 11.21 (HxWxD) 1800 x 1000 x 800 mm
- ▶ Further standing cabinets (ST...) or combined cabinets with battery compartment (STK...) are available.
- ▶ Smoothing of the output voltage 5% eff. without battery
- ▶ Characteristic IU according DIN 41773
- ▶ Permanently short circuit proof
- ▶ Protection class 1
- ▶ Cooling: self cooling
- ▶ Ambient conditions:
 - a) Ambient temperature.: -10°C to +40°C
 - b) Relative humidity: 5% to 90%, without condensation
 - c) Pollution grade: 2
- ▶ Installation altitude max. 1000m a.s.l.
- ▶ Noise level: <60 dB(A) at 1m distance
- ▶ Finishing in RAL 7035

Norms and Regulations:

- ▶ CE certified, manufactured according to ISO9001
- ▶ Safe electrical separation acc. to EN 60742
- ▶ Safety measures acc. to VDE 0100 Part 410
- ▶ Accident prevention regulation BGV A3
- ▶ EMV (electro-magnetic tolerance) acc. to EN 55011 limiting class A (optional B)
- ▶ Low-Voltage Power Supply Devices acc. to EN 60439 Part 1
- ▶ Semiconductor-Rectifier, Fixing of the main requirements acc. to EN 60146 Part 1-1
- ▶ Fitting with high voltage installations with electronic operating means acc. to EN 50178

Standard equipment

- ▶ Measuring instruments of voltage and current of the rectifier
- ▶ Rectifier monitoring with automatic switch off if output voltage is too high
- ▶ Output voltage too low
- ▶ Battery total discharge

Options

Regulations

- ▶ Automatic/boost charge with IUoU-characteristic up to 2,40V/c (NC 1,55V/c), voltage controlled (Lu) or voltage and time controlled (Lt)
- ▶ Equalizing charge up to 2,65 V/c resp. 1,75 V/c with IUI-characteristic
- ▶ Temperature controlled charging voltage

Monitoring

- ▶ DC-Voltage too high
- ▶ Battery circuit failure
- ▶ DC earth fault / isolation monitoring
- ▶ Mains failure
- ▶ Collecting failure

Further Options

- ▶ Mains fuses
- ▶ Battery fuses
- ▶ Blocking diode in the output for parallel operation of >1 devices
- ▶ Battery protection of total discharge with switch off contactor for the consumer (LVD)
- ▶ Silicon dropper diodes to reduce consumer voltage
- ▶ Load fuses (2-poles) wired on terminals
- ▶ Output voltage smoothing to 2%/1% eff. without battery or acc. to CCITT