# 2. Characteristics and Features

- Input voltage 3 x 530 V AC ±15%
  1 x 230 V AC ±15%
- Safety according to VDE 0805/EN 60950
- Surge voltage stability according to EN 6100-4-5
- High stability of output voltage
- Low residual ripple
- High efficiency
- Screw type and plug-in connectors
- Suppression of radio interferences acc. to VDE 0875/T11/EN 55011, class B
- Interference immunity according to EN 50082-2
- Short-circuit and no-load proof
- Compact housing
- Low weight (1.9 kg)
- Snap-on fastening on DIN rail
- Indication of working condition (via LED)

# 3. Functions and Adjustments

Apart from the lower plug-and-socket connector, the BL18 is equipped with a trimming potentiometer for the adjustment of the output voltage (see fig. 3.1). By means of a normal slotted screwdriver, the output voltage can be adjusted within a range of 24 v to 27.5 V and from 12 V to 14 V. Turning the screwdriver to the left reduces and turning it to the right increases the out-put voltage. The LED at the front plate of the unit indicates readiness for operation.

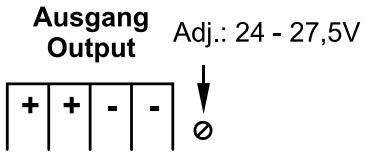


*Figure 3.1: Secondary side connecting terminals and trimming potentiometer for the output voltage*

## 3.1 Mounting and Connecting

To allow best possible cooling, the proper mounting position has to be unconditionally observed taking into account that input terminals (L1/L2/L3/PE or L1/N/PE) have to be placed on top and the output terminals (±) at the bottom.

There must be a head space of at least 100 mm above and below and of at least 30 mm at both sides of the BL18 device.
The inlet air temperature must not exceed the admissible ambient temperature specified in the technical data.
Connection of the three-phase input voltage is to be made according to the scheme that is printed on the housing of the unit. For this purpose it is not necessary to observe the indicated phase sequence. The feed lines (= primary sides?) of the unit should be protected by either a three-pole L-miniature circuit breaker or via a three-pole motor protecting switch (adjusted to 2.5 A). It is not allowed to operate the unit if one of the phases had failed. The protected earth (PE) of the BL18 and protected earth of the switchboard have to be connected. Installation of the switchboard has to be carried out in compliance with the regulations VDE 0100 and VDE 0160.

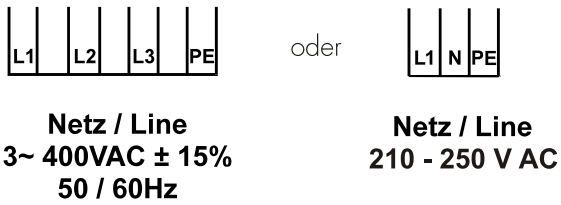


*Figure 3.2: Mains Connection*

**Attention!**
For all servicing or installation works, the locally valid safety instructions have to be observed.

The secondary side plug connectors have two parallel connection terminals per pole (±) but the current can also be carried by one terminal only.

## 3.2 Application as stabilized power pack supply unit

As a stabilized power pack supply unit, the BL18 pro-vides a constant output voltage that – each depending on the selected adjustment value - ranges from 24 V to 27.5 V/DC or from 12 V to 14 V/DC.

The output voltage is maintained up to the rated cur-rent's load value. If this value is exceeded, the output voltage will automatically be reduced.

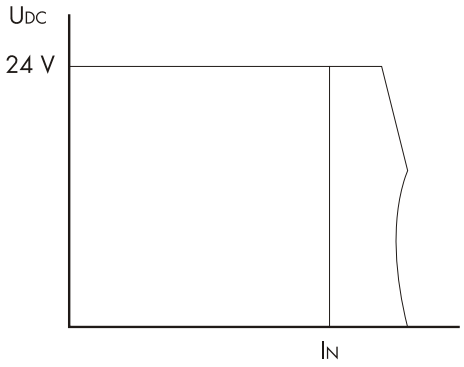


*Figure 3.3: Current limitation*

## 3.3 Application as battery charger

For the loading of lead acid batteries at normal temperatures up to 30°C, the trickle charge voltage recommended by battery manufacturers is 2.25 V per cell, i.e. the trickle charge voltage for a 24 V lead-acid battery would be 27 V per cell. At higher ambient temperatures, charging voltages have to be reduced and must be increased accordingly in case of external voltage losses. The factory default setting for the units BL18-400-24 and BL18-230-24 is an output voltage of 27 V/DC.

### 3.3.1 Battery charging in compliance with I-V – Characteristics

Charging is effected according to I-V characteristics (see fig. 3.4). The initial discharge capacity / rating is high, i.e. approx. 21 – 23 A (I-charge). During discharging of batteries a high initial charg-ing current of approx. 21-23 A (I-charge) flows that is limited by the BL18. As soon as the charging voltage reaches the adjusted value (trickle charge voltage) there is transition to charging at con-stant voltage (U-charge). In doing so the charging current will decrease until the unit supplies a lower trickle current and the current that is possibly required by connected consumers. In this case the ad-vantage of this charging method - compared to loading at constant current - becomes quite obvious: The reduction of current upon reaching of the trickle charge voltage avoids overcharge of the battery thus preventing inadmissibly high generation of gas which would be the case if a high charging continued flowing after the battery's full charge.

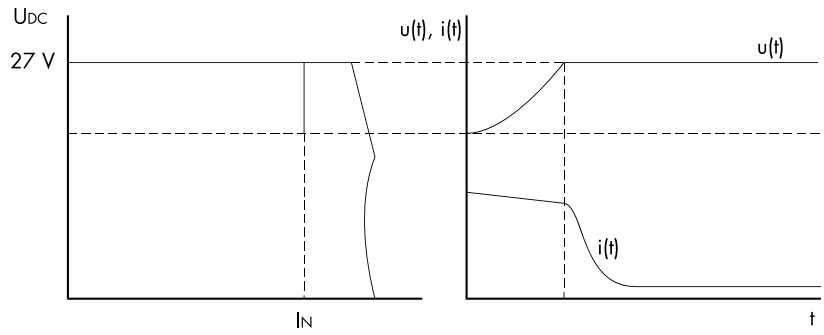


*Figure 3.4: Charging acc. to IU-characteristic*

## 3.4 Reduction of the power output

At an ambient temperature of more than 60°C the load capacity of the unit will decrease proportional as shown in the diagram below.

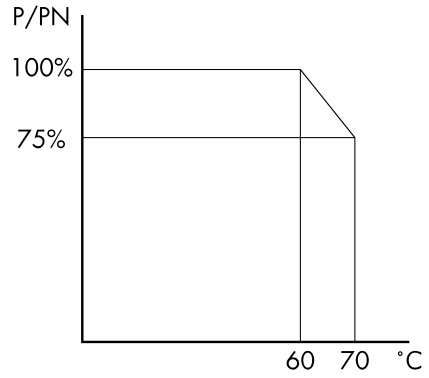


*Figure 3.5: Reduction of the power output*

To avoid overheating of the units, it is necessary to re-duce the consumer load accordingly.

# 4. Technical Data

**General Data**

| | |
|---|---|
| Type: | BL18 |
| Permissible operating time: | continuous operation |
| Connection terminals: | max. 2.5 mm² (wire connection) |
| Type of cooling: | convection cooling |
| Maintenance: | none |
| Short circuit: | sustained short circuit proof |
| No-load: | sustained no-load proof |
| Mounting position: | wall mounting, input terminals on top, output terminals at bottom |

**Input Circuit (three-phase)**

| | |
|---|---|
| Input voltage : | 3 x 530 V AC ±15% at $U_{sec}$ = 24 V DC/18 A,<br>+15%/-10% at $U_{sec}$ = 27.5 V DC/18 A |
| Over voltage protection: | star connected metal-oxide varistors (MOV) S14K320 |
| Application (1 mA-value): | 510 V (single varistor) |
| Energy absorbtion: | 84 J (2 ms) (single varistor) |
| Input rated current: | 3 x 1.5 A (24 V type)/3 x 0,8 A (12 V type) |
| Frequency range: | 47 - 63 Hz |
| In-rush current: | <50 A |
| Power factor cosφ: | 0.55 capacitive |
| Fuse: | three-pole miniature c.b. or motor protection switch (setting 2.5 A) |

**Input Circuit (single-phase)**

| | |
|---|---|
| Input voltage : | 1 x 230 V AC ±15% at $U_{sec}$ = 24 V DC/18 A,<br>+15%/-10% at $U_{sec}$ = 27.5 V DC/18 A |
| Input rated current: | 4.4 A (24 V type)/2.4 A (12 V type) |

**Output Circuit**

| | |
|---|---|
| Output voltage: | 27 V DC ±1% / 13,5 V DC ±1% (preset by manufacturer) |
| Setting range: | 24 - 27.5 V (24 V type)/12 - 14 V (12 V type) |
| Max. output current: | 18 A |
| Limitation of current: | typically 20 A, starting point at 18.5 ... 21.5 A<br>limit point at 20.0 ... 26.0 A |
| Output: | 480 W |
| Residual ripple: | <100 mV |
| Efficiency: | 90% |
| Max. power loss: | 53 W |
| Load capacity of output terminals: | ≤20 A at TU = 0°C up to +45°C<br>0.2 A- reduction/°C from +45°C to ≤17 A at $T_U$ = +60°C |

**Regulation**

| | |
|---|---|
| Mains regulation: | <0.1% of the output voltage at $U_{mains}$ ±15% |
| Load regulation: | <0.1% of the output voltage between 0 and 20 A |
| Correction time: | <2 ms at a load change from 10 to 90% of rated current, overshooting <2% |
| Mains failure bridging time: | >5 ms at $U_{mains}$ = 400 V AC and $U_{sec}$ = 24 V DC / 16 A |