Product Description

Stabilized Battery Charging Unit AL....-PF Ranges: 12V, 24V 5A, 10A, 15A, 20A, 35A

With power-fail signal ( relay output )

- Power supply: 231 or 400V mains
- High efficiency ( 80 - 90% )
- Resistant to sustained short-circuit
- Soft start of power circuit
- Heavy charging up to 33V
- Overheating protection
- Characteristics acc. to DIN 41773
- LED-monitoring for “Power OK”
- Mains transformer acc. to EN 61558

Application

The battery charging unit AL is used for charging high-quality lead, lead-gel or nickel-cadmium batteries and for the DC supply of standing loads in switch cabinets. The charging unit is suitable for emergency power supplies and diesel engine batteries whose starter and control batteries must be loaded according to the DIN characteristic curve. Special attention was given to the operating safety and long-term stability of the charging unit, the components having been selected and dimensioned accordingly. The charging unit can be used with normal mains (0-231V) and three-wire mains supplies (0-400V) and at increased environmental temperatures of up to 55°C (see temperature derating diagram).

The output of the battery charging unit is connected directly to the battery or DC supply via protective equipment and mounted to the angles provided for it on the assembly plate of the switch cabinet.

Charging

Normal Charging: The empty battery is first charged at the constant current set. Before the preset final charging voltage is reached, the current gradually decreases. The gasing of the battery is limited and the continually reduced current causes the voltage to rise slowly until it reaches the final charging voltage. This characteristic curve ensures the gradual charging of the battery.

Heavy Charging: At intervals specified by the manufacturer, nickel-cadmium batteries are subjected to heavy charging at an increased charging voltage up to 33V. For this purpose the heavy charging terminal ST is short-circuited, it being necessary to ensure that the charging process is terminated via automatic opening of the contact on completion of heavy charging. The equipment connected must not be impaired by the voltage used for heavy charging. The height of the final charging voltage used for heavy charging is set via the potentiometer ST (in no-load operation). It must be sure that a charger with suitable power will be used because on same current but higher voltage the rated power consumption will overdriven up to 37% (see temperature derating diagram).

Power Supply Operation

The battery charging unit AL can also be used for power supply operation or mixed applications. Here please note that in case of mixed application a continuous dc current load should not be higher than 30% of maximum load. If the remaining current for charging is to low the next bigger charging unit should be used. Because of too low remaining charge current a next greater battery charger should be choosen. When only power supplying will be used the unit should be loaded only to 50% of its rated power (see temperature derating diagram).

Settings

The AL charging unit is set to a battery voltage of 26.6V (13.5V) in no-load operation and the charging current is set to Imax before the unit leaves the factory. The controls for this are located under the removable aluminium data plate. The final charging voltage is adjusted in no-load operation via the adjuster U with aid of a 1-class meter. A suitable load resistance (or empty battery) should be used to set the current (Adjuster I). Remark: For compensation charging acc. to DIN57510 following values are recommended for lead batteries 2,23V (+/-1%) / cell and for nickel-cadmium batteries 1,38 – 1,40V / cell.
Series / Parallel Connection

The output current or output voltage can be increased by connecting any desired number of AL charging units to the outputs in parallel or in series. In order to ensure that the units are subjected to the same load in parallel operation, the final charging voltage in each case must be set to the same value and in serial connection the same adjustment of maximum currents.

Charge monitoring (Power fail)

The AL charging unit is equipped with an electronic circuit for monitoring the battery voltage and the working of charging function. This will be indicated by the lighting of a LED, at same time the contacts of the relay will be closed. In case of trouble the potentialfree contacts opens without delay. With this circuit the customer gets much safety against battery undervoltage and failure of battery charging. In case of battery malfunction the start of aggregate is in danger so also the supply of other control units. When the LED and output relay switches off, there will certainly be an failed charging function but in this moment the battery maybe full charged, but a discharging is foreseeing when the failure will not be repair.

In following cases a ‘‘power-fail’’ will be indicated by relay output:
1. by battery undervoltage of appr.10% lower than the final charging voltage when the charging unit operates well and
2. be switched on.
3. by fall of mains voltage ( but in this state the battery voltage will not be monitored )
4. by fall of the charging because of AL - unit failures
5. by not enough charging as a result of too much current consuming
6. by overheating of charging unit AL. because of high current consuming and high environmental temperature.

Technical Data

<table>
<thead>
<tr>
<th>Type</th>
<th>Final Charging max</th>
<th>Consumption Current (max)</th>
<th>P (max)</th>
<th>Prim. (Q1) an 231V</th>
<th>Fusing 400V (acc. EN 60898)</th>
<th>Sec. (Q2)</th>
<th>Weight (max)</th>
<th>Dimensions (mm, B x H x T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL0512-PF</td>
<td>12 - 16V</td>
<td>5A</td>
<td>100W</td>
<td>4AC</td>
<td>4AB</td>
<td>10AB</td>
<td>5,5kg</td>
<td>120x125x155</td>
</tr>
<tr>
<td>AL0524-PF</td>
<td>12 - 33V</td>
<td>5A</td>
<td>200W</td>
<td>6AC</td>
<td>4AC</td>
<td>10AB</td>
<td>5,5kg</td>
<td>120x125x155</td>
</tr>
<tr>
<td>AL1012-PF</td>
<td>12 - 16V</td>
<td>10A</td>
<td>200W</td>
<td>6AC</td>
<td>4AC</td>
<td>16AB</td>
<td>5,5kg</td>
<td>120x125x155</td>
</tr>
<tr>
<td>AL1024-PF</td>
<td>12 - 33V</td>
<td>10A</td>
<td>400W</td>
<td>8AC</td>
<td>6AC</td>
<td>16AB</td>
<td>5,5kg</td>
<td>120x125x155</td>
</tr>
<tr>
<td>AL1524-PF</td>
<td>12 - 33V</td>
<td>15A</td>
<td>600W</td>
<td>10AC</td>
<td>8AC</td>
<td>20AB</td>
<td>7,3kg</td>
<td>120x125x180</td>
</tr>
<tr>
<td>AL2024-PF</td>
<td>12 - 28V</td>
<td>20A</td>
<td>600W</td>
<td>16AC</td>
<td>8AC</td>
<td>25AB</td>
<td>7,3kg</td>
<td>120x125x180</td>
</tr>
<tr>
<td>AL2033-PF</td>
<td>12 - 33V</td>
<td>20A</td>
<td>850W</td>
<td>16AC</td>
<td>8AC</td>
<td>25AB</td>
<td>10,2kg</td>
<td>150x155x185</td>
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<tr>
<td>AL3524-PF</td>
<td>12 - 33V</td>
<td>35A</td>
<td>1400W</td>
<td>16AD</td>
<td>16AD</td>
<td>50AB/C</td>
<td>18,1kg</td>
<td>180x185x250</td>
</tr>
</tbody>
</table>

In case of fuse falling under unfavorable conditions (e.g. inrushcurrent of transformer or on-switching of starter during discharged battery) a bigger rated fusing could be choosen without getting safety problems.

Supply voltage 231V 50/60Hz und 400VAC (-10 +15%), Other voltages available on request
Charging parameters IU (Wa)-param. Acc. to DIN 41773 (< +/- 1% tolerance) and DIN 57510
Wa = dropping characteristic in U-range (appr. 2% drop) with off setting
MTBF (lifetime) Continuous operation, MTBF according to power consumption and environmental temperature
30.000 to more than 100.000 h.
Efficiency 80 - 90%
Softstart Appr.0,5 sec. after switching on the load current will be switched on
Correction time Load dependent, appr. 100 to 500 msec.
Rated Output Power AL0512 = 60W, AL1012 = 120W, AL1024 = 240W, AL1524 = 360W
(See derating diagram) AL2024 = 384W (80%), kurzzeitig 100% (480W)
AL2033 = 480W, AL3524 = 840W
Output hum with ohmic load (half rated load) appr. 2VAC (battery not connected)
Overload Automatic power limitation, short circuit proof, charger switches on again after overload condition is cleared (fold back) without output overvoltage swing
Automatic switch on after overload with < 50% ohmic load in other case 100%
Temperature overload In case of overheating the load current will be limited, after the overheating has been cleared the fully output current is available again
Polarity protection Appr. 6A oder 50A (100ms) [battery feedback current]
Final charging voltage Tolerance 0,1% / 10°C
Ambient temperatures -20°C bis +55°C, up to 70°C with full operation but output current falls to low values
Storing temperatures -40°C bis + 85°C
Relative air humidity 95%
Kind of protection IP00
Maintenance Maintenancefree
Mains isolating EN 61 558 (Savety transformers)
General regulations EN 50 178 (Units in power current installation)
Radio interference EN 55 022 / Class B
EMV EN 61000 und EN V 50 140

Mounting: The charging unit can be mounted in any desired position. In order to ensure a maximum service life, it is recommended to mount the unit in such a way that the aluminum cooling plate is perpendicular (to the earth’s) surface. Because on the open metal parts of charging unit the temperature rise to 70°C in case of maximum power consumption the customer should look to precautions i.e. against application of plastic materials in the near environment.
Safety Remarks

Before installation of battery charger the user should look to the preset final charging voltage and the maximal charging current whether it fits with the chosen type of battery. Otherwise higher gassing or overheating of battery could be occurred with risk of detonate or fire. Fire could also develop from spark discharge i.e. by disconnections of the wiring to the battery or the current from battery flows without any protection (fuse F1 be missing) into the battery charger i.e. by wrong terminal connection or short circuit inside the secondary section of charger.

Temperature – Derating

For the current consumption from battery charger / power supply unit it is recommended to choose the maximum long time power depending on ambient temperatures directly beside the unit by the following diagram. The derating values refer to the rated load power = rated output voltage x rated current. With this a rough indication for the chosen charger / power supply unit to be made.

The output current of unit is be fixed to the maximum rated value (see technical data). But with rising of output voltage up to 33V (heavy charging) a higher output power occurred and leads to higher temperatures of unit on the long run. With internal temperature measurements the maximum temperature of unit will be hold (no overheating or damage be occurred) but the output current goes down. To avoid too low output current, calculation of the output power should be done and in doubt it is better to choose a bigger unit.