

OPERATING INSTRUCTIONS

Introduction

The AXIgo-type chargers are intended for industrial applications, mainly for charging of traction batteries (lead batteries with liquid electrolyte) for electric high lift trucks and manipulation and cleaning technology devices. With regard to the perfect electric parameters, they are suitable even for different types of batteries (e.g. maintenance-free batteries, gel batteries, AGM etc.).

Safety Instructions

- the charger is intended for usage in well-ventilated interiors
- the charger can be connected only to the standard electric power mains
- it is necessary to avoid sparking and making a fire near the battery; explosion hazard during the process of charging
- the charger must not be operated without a cover, an electric shock hazard
- only batteries intended for charging with the parameters (voltage, capacity ranges) suitable for the specified type of charger can be charged
- during charging, it is dangerous to touch the supply leads to the battery poles
- the transport of the charger during the charging process is prohibited
- the supply leads to the battery must not be disconnected during the process of charging
- the charger can be operated only by a respectively qualified person



Usage and characteristics

The chargers are designed to be used in interiors with standard conditions (humidity, temperature, dustiness). When operated in a place with a higher level of dustiness, the interval of service inspections must be shortened.

They should be connected to one-phase or three-phase power mains with a standard moveable lead cable with a three-pole or a four-pole connector. The suitable protection must be carried out in the installation of the charging station.

They are intended for cycle charging of traction batteries and they can be continuously operated. Cooling is provided by fans placed inside the charger.

The rated (maximum) charging current is in the range of 25 – 110A. The standard output voltage is 12 – 96V (chargers with higher output voltages on request).

The respective types enable to set the output current in a step operation in the range of ca (50-100)% Inom.

The AXIgo chargers use the principles of high-frequency technology. They are based on power units operating in high switching frequency. The charging process is controlled by a microprocessor control system. Important statuses are indicated by indicator lamps.

According to their sizes, the AXIgo chargers are installed in three types of boxes – S, M, L (see chapter Technical specifications).

Technical specifications

AXIgo charger	Nom. output voltage (V)	Max. output current (A)	Mains voltage (VAC)**	Mains current (A)	Recom. circuit breaker (A)*	Case	Weight (kg)
12-30	12	30	230	1,7	6	S	3,7
12-60	12	60	230	3,5	6	M	6,6
24-30	24	30	230	3,5	6	S	3,7
24-60	24	60	230	7,2	10	M	6,6
24-100	24	100	3x400	4	6	M	8,8
24-200	24	200	3x400	8	10	L	17,0
36-30	36	30	230	5,4	10	M	6,6
36-55	36	55	3x400	3,3	6	M	8,8
36-110	36	110	3x400	6,6	10	L	17,0
36-165	36	165	3x400	9,9	16	XL	26,0
48-30	48	30	230	7,2	10	M	6,6
48-50	48	50	3x400	4	6	M	8,8
48-100	48	100	3x400	8	10	L	17,0
48-150	48	150	3x400	12	16	XL	26,0
72-27	72	27	3x400	3,2	6	M	8,8
72-55	72	55	3x400	6,6	10	L	17,0
72-80	72	80	3x400	9,9	16	XL	26,0
80-27	80	27	3x400	3,6	6	M	8,8
80-55	80	55	3x400	7,3	10	L	17,0
80-80	80	80	3x400	10,8	16	XL	26,0
96-25	96	25	3x400	4	6	M	8,8
96-50	96	50	3x400	8	10	L	17,0
96-75	96	75	3x400	12	16	XL	26,0

* Char. C or D

** Mains tolerance +15% -10%, 1f chargers \pm 15%.

Specifications

Starting current	<10 A, 0,1 ms
Efficiency	až 95%
Output voltage stability	\pm 1%
Protection	IP20
Protection class	I
Cooling	forced ventilation
Operating conditions	-10 to +40 °C, max. rel. humidity 80%, non-condensing
Standards	EN 61000-6-4, N 61000-6-2, EN 60950-1

Case colour: typical black, other colours on request.

Other voltage, current, case on request.

Chargers AXIgo 110-22 and 120-20 on request.

Dimensions and weights of chargers

Case / dimensions	S	M	L
Wide	172 mm	235 mm	235 mm
High	237 mm	349 mm	420 mm
Deep	82 mm	82 mm	155 mm
Montage: 4 Screws Ø 5 mm wide x high	110x265 mm	110x375 mm	110x446 mm
Weight	3,7 kg	6,9 kg (230 V) 9,1 kg (3x400 V)	15,4 kg

Box colour is black as standard or arbitrary at customer's request.

Installation of the charger

The box of the AXIgo chargers is intended to be hung on the wall (on a stand or on a bracket) in the vertical working position.

However, the charger may be operated in the horizontal position, laid on its rear side, on a table or a base etc.

To secure the correct functioning of the charger, it is necessary to keep the distance of at least 100 mm on both the sides of the charger as well as on the front side from other devices in order to provide sufficient ventilation. The slots for air suction must not be covered.

With regard to the possibility of dust suction, the placement of the device on the floor or in a low position above the floor is not suitable.

The charger cannot be used in an extremely dusty environment. The deterioration in cooling of internal parts could occur.

The charger is equipped with a three-conductor lead 3 PE, in a one-phase design with a three-conductor lead 1 N PE ex - factory. It should be connected to the power mains by means of the respective four-pin (five-pin) or three-pin plug. The socket for the connection must be protected with a suitable circuit breaker. Cables for battery connection are conducted from the charger outlet. The positive outlet is indicated by red colour, whereas the negative outlet is coloured blue or it does not have any colouring. Voltage dropping in these cables is taken into consideration during the process of charging. In order to avoid the change in charging parameters, it is forbidden to adjust the length of the outgoing cables.

Charger functions, charging process

In addition to the main charging, the charger enables to take care of the battery by means of the regeneration mode (see below).

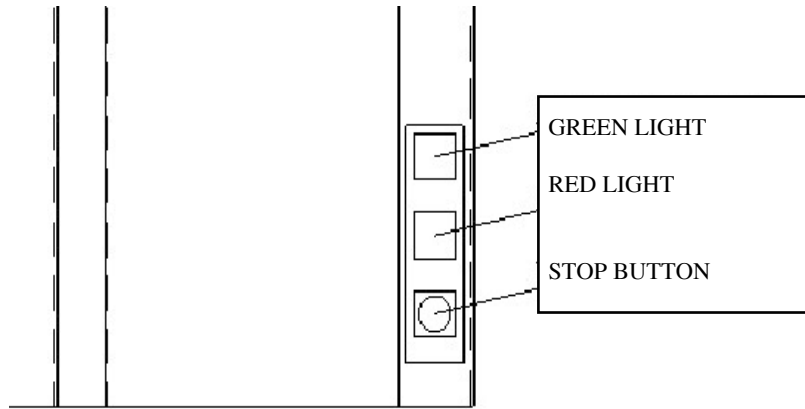
During the process of charging (whether in a standard mode or in a regeneration one), it is necessary to keep the following sequence of operations:

- connect the charger to the power mains – it is indicated by single flashing of both the indicator lamps (AXIgo 24-30, 12-30 – see below);
- connect to the battery charger;
- after the 15 seconds waiting period, battery charging will start automatically;
- during the waiting period, start the regeneration mode by pushing the button for approximately 3 seconds (both the indicator lamps will start flashing);
- after the battery has been charged (the green indicator lamp is continuously shining) disconnect the battery, the green indicator lamp will switch off ;
- if it is necessary to disconnect the battery during the process of charging (the green indicator lamp is flashing), stop charging by means of the STOP pushbutton and subsequently disconnect the battery;
- disconnect the charger from the power mains (it is suitable for a rather long operational break; when employed regularly, it is not necessary);

Note:

Having been connected to the power mains of 230VAC (with no connected battery at the outlet), the AXIgo charger type 24-30 (12-30) is in the stand-by mode (min. consumption at idle running – ca 1.5 W); the indicator lamps are not shining. As soon as the battery is connected to the charger output terminals, both the indicator lamps flash for a while. The green indicator lamp will stop shining within 15 seconds from the moment when the charging process has been finished and the battery has been disconnected from the charger. After following 1.5 minutes, the bridging input relay will be disconnected, and thus the charger will enter the stand-by mode. Bearing the minimal consumption in mind, the charger can be continuously connected to the power mains.

The following figure indicates the control and indicating elements of the AXIgo type chargers:



Main charging

The charger is set for the special battery ex-factory according to the request (output voltage, charging current and selected characteristics) The start of the main charging process automatically begins after the waiting period of 15 seconds since the battery has been connected (without pressing the button). The charging process is indicated by a flashing green indicator lamp. As soon as the battery has been charged, the charging process will be finished automatically. The finished charging process is indicated by a continuously shining green indicator lamp.

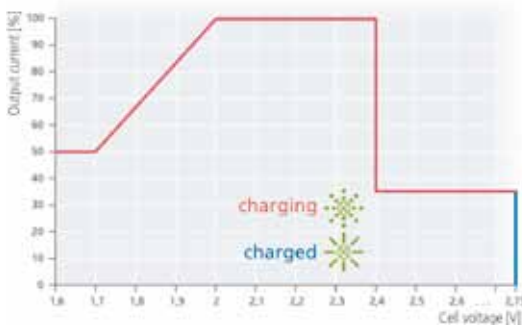
When the charging process has been finished, it is possible to disconnect the battery from the charger. Disconnection of the battery makes the charger return to the default status and the charger is ready for another cycle.

The charging in progress can be finished by pressing of the STOP pushbutton. It is forbidden to disconnect the battery during the process of charging.

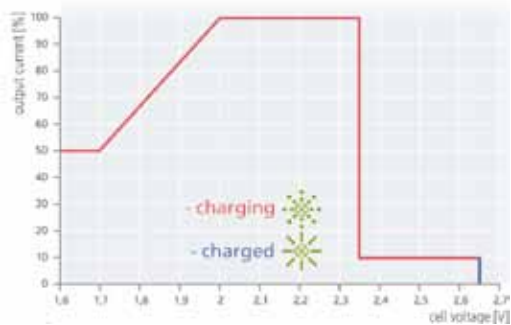
If power outage occurs during the charging process, it is not necessary to disconnect the battery. As soon as the voltage is restored, the charging process continues in the selected mode.

The shining red indicator lamp signals the failure during the charging process.

Characteristics IU1a



Characteristics IU1a - gel



Battery regeneration mode

The regeneration mode is used to improve the battery condition and to restore the parameters.

The regeneration mode shall be started manually by a long press of the STOP button (for ca 3 seconds) according to the selected purpose of the application (see below). Both the indicator lamps (green and red) start flashing and subsequently, as soon as the pushbutton has been released, the charging process begins. The

charging process in the regeneration mode runs with a constant current of 9 % of the set output current and it lasts 20 hrs. It will finish after the end of this period. The indicator lamps will stop flashing and the green one will be shining continuously.

Application for the equalization of the voltage on the cells (equalization)

The equalization is recommended to be carried out regularly on a two-week basis. The most suitable way is to perform the equalization after the standard charging of the battery. After the end of the main charging (the green indicator lamp is continuously shining), the regeneration mode can be launched (see above) in order to fulfil this purpose. In this case it is not necessary to disconnect the battery because of the setting of the battery default status.

Application for removal of lead (II) sulphate crystals from the cell boards (desulphation)

The desulphation is suitable to be carried out instead of common battery charging, best till the final signs of the charging process (min. 2.5 V/cell, 1.29 g/cm³). As the total charging of the battery in a regeneration mode is a time-consuming process (it may take even several days), it is necessary to launch the regeneration process repeatedly

(2x - 6x), with no need to disconnect the battery). Having the battery connected, we should launch the regeneration mode for the purpose of desulphation during the waiting period before the automatic start of the main charging process.

The desulphation is suitable to be performed regularly, at least every two months.

Charger maintenance

In order to secure reliable operation, a regular service inspection as well as cleaning are necessary to be carried out every six months of device operation. The inspection should focus on:

- test of indicator lamps by means of connection of the charger to the power mains (battery is not connected), for the type of AXIgo 24-30 (12-30), which is in the stand-by mode and the indicator lamps do not shine, connect a battery to the charger, both the indicator lamps will flash;
- a visual check of insulation of the supply cable as well as of the outgoing cables;
- blowing out of the dust inside the charger by means of compressed air;
- if the charger is operated in the environment with a high level of dust, it is necessary to pay great attention to cleaning of the charger and, as need may be, to shorten the interval between the service inspections; the layer of dust decreases the efficiency of cooling of power parts and there is a risk of power element overheating;
- the charger test of the insulation conditions by means of high voltage is forbidden; semiconductor devices may be damaged. The charger is necessary to be disconnected from power mains before this wiring test is carried out.

Alarm signalling

If a failure during the charging process occurs, a red control lamp will start shining and the charging process will be finished. The failure indication includes:

- unsatisfactory test at the beginning of the charging process (high internal source impedance of the battery, a too sharp increase in voltage),
- high charging current (>120% of the set value),
- low charging current (<50% of the set value),
- high voltage on the battery during the charging process (>3V/cell),
- disconnection of the battery during the process of charging (without stopping by means of the STOP pushbutton),
- high temperature of the charger (>90°C, only for the AXIgo 24-30, 12-30 type).

A red indicator lamp continuously shines. After the disconnection of the battery, it will switch off in 10 seconds.