HAWKER®

COST EFFECTIVE CHARGING SOLUTIONS

Hawker battery chargers

MotionLine
MasterLine puls/EU
MultiLine W0Wa
MultiLine IWUIa

EnerSys®
Power/Full Solutions

Industrial truck + battery + charger = 1 system

Optimised charging technology for all applications

Charging systems

Many motive power batteries are designed for specific requirements and constitute a system together with the matched charger. In this context the different technical configurations of the chargers have to meet the requirements. The charging technology must accommodate the characteristics of the battery and the application. This is a crucial factor for the economic operation of the batteries. All Hawker® chargers are equipped with microprocessors of the latest generation for charging control. Functional modern design with optimised ventilation for a long service life, a high quality powder coating and electrolyte resistant keypad go without saying as well as CE conformity. Optimised charging technology for all applications.

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MotionLine

Hawker® MotionLine

The Hawker MotionLine charger provides high value technical features. It is equipped with a Wsa-characteristics and is suitable for basic requirements and one-shift applications, i.e. where charging times of more than 10 hours are sufficient.

Range of applications

MotionLine:

- **Wsa-charging characteristics**
- **Charging times 10 - 14 hours**
- **Suitable for one-shift operations**
- **Wall mounted/floor mounted charger**
- **IP code 21**

Advantages

- **High quality chargers**
  For one-shift applications with low investment.
- **Fully automatic charging process**
  Charging starts automatically 8 seconds after connection of the battery with the self test of the charger. Switching-on cannot be overlooked, a charged battery is always available.
- **Automatic equalising charge**
  Equalisation of any imbalance bet ween the cells and optimisation of the battery service life.
- **Automatic refresh charge**
  Even after long rest periods, batteries are always ready for use.
- **Fault diagnosis and safety-cut-offs**
  Provide timely detection of faults and protect the battery from damage.
- **LED charging status indicators**
  The charging status is displayed with powerful and highly visible LEDs.
- **Automatic charger function test**
  By pressing the stop-key before the start of the charge an active function test can be initiated, which automatically will switch-over to battery charge.
- **MotionLine: proven Wsa-charging characteristics**
  For one-shift operations with 10 - 14 hours charging times.
- **Diffusion pulses after end-of-charging**
  Ensures optimum capacity is always available.

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MasterLine puls/EU

MasterLine puls/EU

The Hawker® chargers, MasterLine puls and MasterLine EU unify basic charging technology with the technical features of sophisticated chargers. The proven Hawker Ah-balancing with the special algorithm for the state of charge optimisation, warrants a safe full charge for all depth-of-discharges independent from mains voltage fluctuations. Additionally it safeguards a full charge if the electrolyte temperature deviates from 30°C. A LCD with clear text displays the state-of-charge, the charger settings and the end of charge data in real time. Integrated controllers for electrolyte circulation and automatic water topping up are standard features.

Range of applications

MasterLine puls:
- **Wsa-charging characteristics**
- **Charging times from 7.5 - 10 hours**
- **For one- and two shift-operations**

MasterLine EU:
- **Wsa-pulse charging characteristics**
- **Charging times from 6 - 10 hours**
- **For single and multiple-shift operations, as well as opportunity charge and short charging times**

Advantages

- **High quality battery charger**
  Serially equipped with controls for electrolyte circulation and water topping up.
- **New charger controller**
  Equipped with high quality components for reliability and precision.
- **Pre-selectable charging factor**
  For special applications the charging factor can be adapted.
- **Automatic equalising charge**
  Equalisation of any imbalance between the cells and optimisation of the battery service life.
- **Automatic refresh charges**
  Even after long rest periods, batteries are always ready for use.
- **Control for electrolyte circulation**
  For enhanced economy, ie. shorter charging times and linked with higher availability of the battery (pump can be retrofitted).
- **Control for automatic water topping up**
  Makes fully automatic water topping up of the battery possible (magnetic valve as option available).
- **Fault diagnosis and safety-cut-offs**
  Provides timely detection of faults and protects the battery from damage.
- **LCD with clear text messages**
  Provides a clear message about the state-of-charge progress, as well as assistance for focused service deployment.
- **Data memory**
  Download and analysis of the last 128 end-of-charge data recordings assists in the operation of the batteries.
  The data analysis allows fast and efficient after sales service on-site and warrants optimised operational safety.
- **MasterLine puls:**
  For one and two-shift operations. Current pulses during the gassing phase provide a fast and energy efficient battery charge.
- **MasterLine EU:**
  For single and multiple-shift operations, as well as opportunity charge and short charging times in conjunction with electrolyte circulation for enhanced economy.

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MultiLine W0Wa

Hawker® MultiLine W0Wa

The Hawker MultiLine W0Wa charger is a consequent development from the proven digital series. It is adjusted in an optimised way to the specific requirements of the user and is characterised by extensive features. Hawker MultiLine W0Wa is equipped with controlled W0Wa characteristics and is not influenced by mains voltage fluctuations. It is therefore not necessary to manually adapt the mains voltage. With a charging time of about 7.5 hours Hawker MultiLine W0Wa is ideally suited for multi-shift operations. The proven Hawker Ah-balancing feature with a special algorithm for the state-of-charge optimisation, warrants at all depths of discharge a full charge is achieved. Additionally it provides a safe and responsive full charge at electrolyte temperatures deviating from 30°C. Super bright Jumbo LEDs show the charging status which can be observed from a wide viewing angle. A LCD with clear text informs about the current state of charge and the residual charging time and by pressing the Info button, details of the charger settings and the end-of-charge data can be viewed. The Hawker MultiLine W0Wa is equipped with an IRComm-interface. Download and analysis of real-time data allows a fast and accurate statement of the status and provides maximum operational safety. Integrated controls for electrolyte circulation and automatic water topping up are standard features.

Range of applications

- **W0Wa-characteristics**
  Three capacity or charging time presets can be entered into the characteristics controller.
- **Proven charging characteristics, especially for short charging times in multi-shift operations**
- **Charging times of 7.5 - 12 hours**
- **Charging times of 5.5 - 10 hours with electrolyte circulation**
- **For single and multi-shift operations, as well as opportunity charges with electrolyte circulation**

Advantages

- **High quality chargers**
  With controlled W0Wa characteristics. When mains voltage fluctuates, the characteristic specifications are automatically adapted: No under or overcharging of the battery. It is therefore not necessary to manually adapt mains voltage at the charger. For multi-shift applications with high economy.
- **Electrolyte circulation**
  Suitable for multi-shift applications, electrolyte circulation provides optimised acid mixing with a fast and energy saving battery charging.
- **New charger controller**
  Equipped with high quality components for high reliability and precision. Use jumpers on the characteristics controller to preset the battery capacity range. All charging data is being documented with the integrated real-time clock.
- **Pre-selectable charging factor**
  For special applications the charging factor can be adapted.
- **Automatic equalising charge**
  Equalisation of any imbalance between the cells and optimisation of the battery service life.
- **Automatic refresh charges**
  Even after long rest periods, batteries are always ready for use.
- **Control for electrolyte circulation**
  For enhanced economy, ie. shorter charging times and linked with higher availability of the battery (pump can be retrofitted).
- **Control for automatic water topping up**
  Makes fully automatic water topping up of the battery possible (magnetic valve as option available).
- **Fault diagnosis and safety-cut-offs**
  Provides timely detection of faults and protects the battery from damage.
- **Filling state indicators**
  Super bright Jumbo LEDs show the charging status from a wide viewing angle.
- **LCD with clear text messages**
  The LCD provides messages in real time about the battery state of charge and residual charging time until the battery is fully charged. Info buttons and text display give a clear message about the charging progress, as well as assistance for a focused service deployment.
- **Data memory**
  Download and analysis of the last 128 end-of-charge data recordings assists in the operation of the batteries. The data analysis allows a fast and accurate on site after sales service and warrants optimised operational safety.

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MultiLine IWUIa

Hawker® MultiLine IWUIa

The Hawker MultiLine IWUIa charger provides high-level technology combined with performance and economy. Hawker MultiLine IWUIa chargers have a modular design consisting of microprocessor-controlled charging electronics, transformer control electronics and power thyristors. The transformer control electronics autonomously regulate all parameters of the charging regime providing independence from mains voltage fluctuations and loads. Settings, respectively charging regime parameters, can be adjusted according to the application and the battery type. The Hawker MultiLine IWUIa provides charging times between 5.5 and 14 hours depending on battery type and capacity and is suitable for any application. Depending on battery technology, depth of discharge is detected and the preset charging factor maintained by either, the well-proven Hawker Ah-balancing or adapted time controls. Super bright Jumbo LEDs show the charging status which can be observed from a wide viewing angle.

A LCD with clear text informs about the respective state of charge and the residual charge time and, by pressing the Info button, details of the charger settings and the end-of-charge data can be viewed.
The Hawker MultiLine IWUIa is equipped with an IRComm interface. Download and analysis of real-time data via infra-red allow a fast and accurate statement about the charge status and provides maximum operational safety. Integrated controls for electrolyte circulation and automatic water topping up are standard features.

Range of applications

- **IIWUIa-charging regimes**
  Proven charging characteristics, especially for short charging times in Multi-shift operations
- **Capacity ranges can be preset on the characteristics controller.**
- **Charging times of 7.5 - 12 hours**
- **Charging times of 5.5 - 10 hours with electrolyte circulation**
- **Charging times of 7.5 - 12 hours with Hawker Water Less® 20**
- **For single and multiple-shift operations, as well as opportunity charges with electrolyte circulation**

Advantages

- **High quality chargers**
  Regulated charging technology.
  For multi-shift operations with high economy and universal applications.
- **Regulated charging regimes**
  Fully regulated charging regimes especially for short charging times in multi-shift applications. Mains voltage fluctuations are fully compensated, i.e. the Hawker MultiLine IWUIa assures a responsive full charge with calculable charging times.
- **Control electronics of the transformer**
  Regulated technology with soft start, no in rush current peak, mains voltage fluctuations are compensated.
- **Change of charging regime possible if necessary**
  Currents and constant voltage values can be set according to the battery type and application.
- **Pre-selectable charging factor**
  For special applications the charging factor can be adjusted.
- **Automatic equalising charge**
  Equalisation of any imbalance between the cells and optimisation of the battery service life.
- **Automatic refresh charges**
  Even after long rest periods, batteries are always ready for use.
- **Fault diagnosis and safety-cut-offs**
  Provides timely detection of faults and protects the battery from damage.
- **Filling state indicators**
  Super bright Jumbo LEDs show the charging status from a wide viewing angle.
- **LCD with clear text messages**
  The LCD provides messages in real time about the battery state of charge and residual charging time until the battery is fully charged. Info buttons and text display give a clear message about the charging progress, as well as assistance for a focused service deployment.
- **Data memory**
  Download and analysis of the last 128 end-of-charge data recordings assists in the operation of the batteries. The data analysis allows a fast and accurate on site after sales service and warrants optimised operational safety.

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Selection table

	MotionLine	MasterLine puls	MasterLine EU	MultiLine W0Wa	MultiLine IWUIa
Applications					
• Battery nominal voltage 24 - 80 V	●	●	●	●	●
• Special - Battery nominal voltage (V)		❍	❍	❍	❍
• Battery capacities (Ah)	60-1700	176-1380	160-1380	105-1050	130-1550
• Vented batteries	●	●	●	●	●
• Vented batteries with electrolyte circulation (EC)			●	❍	❍
• Vented batteries Water Less® 20					❍
• One-shift operation	●	●	●	●	●
• Multishift operation		●	●	●	●
Charging time					
• 10 - 14 hours	●				
• 7.5 - 10 hours		●	●	●	●
• 6.0 - 10 hours with electrolyte circulation (EC)			●	●	●
• 5.5 - 10 hours with electrolyte circulation (EC)				●	●
• 7.5 - 12 hours with Water Less 20					●
Charger technology					
• Ah-balancing charging procedure	●	●	●	●	●
• Fully automatic charging	●	●	●	●	●
• 50 Hz non regulated Wsa-curve	●		●		
• 50 Hz non regulated Wsa-Puls curve		●			
• 50 Hz controlled W0Wa-curve				●	
• 50 Hz regulated IWUIa-curve					●
Charger functions					
• Automatic equalising charges	●	●	●	●	●
• Manual equalising charge	●	●	●	●	●
• Automatic refresh charge	●	●	●	●	●
• Fault diagnosis and safety cut-off-function	●	●	●	●	●
• Control battery voltage before connection	●	●	●	●	●
• Sulphation wait state	●	●	●	●	●
• Automatic charger function test	●	●	●	●	●
• Desulphation charge		●	●	●	●
• Pre-selectable charging factor		●	●	●	●
• Opportunity charges			●	●*	●*
• Temperatur adapted charge				❍	❍
Features					
• LED-charging status indication	●	●	●	●	●
• Jumbo LED status indicators				●	●
• LCD-Display		●	●	●**	●**
• Stop-key	●	●	●	●	●
• Menu-key				●	●
• Automatic water topping up		●	●	●	●
• IRComm-interface		●	●	●	●
• Data memory		●	●	●	●
• Real time data memory				●	●
• Battery identification with data storage				❍	❍
• Electrolyte circulation (EC)			●	❍	❍
Specific features					
• Cabinet IP 54		❍	❍	❍	❍
• Specific main voltage or mains frequency		❍	❍	❍	❍
• Specific paints		❍	❍	❍	❍
• Remote control		❍	❍	❍	❍
• AGV application					❍
• High rack lift operation					❍

● standard ❍ optional * use with electrolyte circulation (EC) **with clear text messages

Common features

Ah-balancing

- The special Hawker® balancing charging technology ensures a full charge without overcharge at all depth-of discharges and mains voltage fluctuations.
- The Hawker state-of-charge optimisation provides a stable charging factor even with deviation from the nominal temperature of 30°C.

Fully automatic charging

- The charge is automatically started 8 seconds after the connection of the battery with a self test of the charger.
- Switching-on the charger cannot be overlooked and a fully charged battery is always available.

Equalising charge

- Depending on the application of the battery one of three programmed equalising charges is automatically started.
- 20 hours after the start of the charge an equalising charge is initiated. 12% of the nominal capacity is charged. This feature ensures that any application related voltage imbalances are automatically compensated, always returning the battery to optimum capacity.
- In case of a fixed assignment of battery and charger, after every fifth opportunity charge or after 15 full cycles an equalising charge is started one hour after the end-of-charge (12% $C_{nominal}$).
- A manual equalizing charge, which can be activated anytime after a charge has been started, will begin one hour after the end-of-charge (12% $C_{nominal}$).

Refresh charge

- After end-of-charge the charger is periodically switched on to maintain the battery capacity.

Sulphation wait state

- Sulphated batteries are detected, the measurement for the calculation of the charged Ah is released after 15 minutes.

Pre-selectable charging factor

- Deviating from the basic setting the charging factor can be adjusted to suit the respective application.

Safety-cut-off function

- The maximum possible charging time is limited by a supervisory safety control.

Stop-key

- The stop-key allows disconnection of battery and charger at any time.

Automatic charger function test

- With the stop-key before start of charging an active functional check of the charger can be initiated, which automatically will switch over to charging.

Desulphation and commissioning charge

- Deeply discharged batteries (severe sulphation as a result of a discharge of more than 80% C_5) need additional charging in order to minimise the adverse consequences.
- This also applies for new batteries, with no commissioning charge or batteries which have been stored for a long time.
- With this charging program a defined Ah-capacity can be charged additionally.

LED charging status indications

- The status of the charge is displayed additionally by powerful LEDs.
  Charging active: LED “ON” lit
  Battery 80% charged: LED “80%” lit
  Battery 100% charged: LED “100%” lit
  Charging pulse active: LED “⎍” lit
  Mains black out, wrong battery nominal voltage LED “Fault” lit

... for enhanced economy

Extended features of the charger ranges: MasterLine, MultiLine W0Wa and MultiLine IWUla

Compensation of the ohmic drop over the charger cables

- By this the ohmic resistance of the charger cable can be compensated.
- Undercharging as a consequence of long charger cables or low cross section can be avoided.

Data memory

- The processor of the charger controller stores 128 end-of-charge data records, error data, as well as statistical data.
- These data records are available via the menu-key on the MultiLine W0Wa and MultiLine IWUla and displayed on the LCD.
- Real-time clock with data storage
  The infrared interface for download and analysis of real-time data allows a fast and accurate statement about the status and provides maximum operational safety.

Battery identification with data storage

- The optional battery identification device (mounted on the battery) helps assign the correct charging profile when a battery is connected to the charger.

IRComm-interface

- The data records can be downloaded to a PC.
- The data format is compatible with EXCEL® for processing and graphical display by this standard PC program.
- Battery charges can be traced online by a PC via IRComm-interface.

Control for electrolyte circulation standard

- Optionally the charger can be equipped with an airmix pump.
- Air pressure faults are detected and compensated by automatic switch over to a standard charging regime.

Control for automatic water topping up standard

- With an optional external magnetic valve the charger initiates the automatic water topping up of the battery.
- The electronic control ensures the battery is topped-up at the correct time

Jumbo LEDs

- The charging status which can be observed from a wide viewing angle

LCD with clear text messages

MasterLine chargers:
- Display with a bright dot matrix of sixteen characters on a luminous blue background.
- Provides messages in real time about battery recharge status and residual charging time until the battery is fully charged. Info buttons and text display give a clear message about the charging progress, as well as assistance for focused service deployment.

MultiLine W0Wa and MultiLine IWUla chargers:
- The LCD provides messages in real time about the respective battery charging status and residual charging time until the battery is fully charged
- In clear text messages the current status is displayed as well as assistance for focused service deployment.
- By the menu key, the current charging dates, end-of-charge dates and charger settings are displayed.
- Clear error messages help with fault diagnosis, respectively with after-sales service.
- The text language can be selected (German or English).

Controlled W0Wa- characteristic

Chargers MultilLine W0Wa
- Three capacities with respective charging time assignments can be pre-selected on the charging regime control PCB. The controlled charging currents are largely independent from mains current fluctuations. Mains voltage difficiencies can be compensated on the transformer of the charger.
- W0Wpa - pulse charging regime
  Controlled current pulses during gassing charge phase ensure fast and energy efficient battery charging with optimised acid mixing.

Regulated IWUla- characteristic

Chargers MultiLine IWUla
- IWUlpa - pulse characteristic
  Regulated current pulses in the gassing phase ensure a fast and energy efficient battery charge with optimised acid mixing.

Wherever you do business, EnerSys® can support you with motive power energy. The Hawker® branded battery range, matched chargers and systems provide trouble free performance under the most demanding service conditions. Our strategically located manufacturing plants are efficient and responsive with a culture of continuous improvement and added value for our business partners.

EnerSys has an enviable position in technology leadership and with significant investment in research and development we intend to stay at the leading edge in product innovation. The recently developed energy solutions: Hawker XFC™ and Water Less® 20 batteries, Lifetech and Lifespeed IQ™ HF chargers, have defined new benefits for our customers: faster recharge, more machine availability, lower operating and investment costs, reduced carbon footprint. Our team of development engineers is driven by the desire to build the best energy solutions and works closely with our customers and suppliers to identify development opportunities. Our bias for rapid innovation means we get new products to market fast.

EnerSys's integrated sales and service network is dedicated to providing our customers with the best solutions and after-sales support for their business. Whether you require 1 battery or a complete fleet of batteries, chargers, a battery handling system and a state of the art fleet management system, you can count on us. EnerSys is the world's largest industrial battery manufacturer and we are dedicated to being the best.

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