By this the ohmic resistance of the charging state 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.

The correct charging profile when a battery is connected to the charger.

Residual charging time until the battery is fully charged.

Battery charges can be traced online.

The LCD provides messages in real time about the respective battery charging state and residual charging time until the battery is fully charged.

Controlled W0Wa - characteristic

In clear text messages the current status is displayed as well as assistance for focused service deployment.

Where you do business, EnerSys can support you with motive power energy. The Hawker® lithium battery range, regulated W0Wa and optimized peak period performance under the most demanding conditions and MultiLine IWUIa, features a standard PWM (Pulse Width Modulation), and MultiLine IWUIa and display give a clear message about the charging progress, as well as assistance for focused service deployment.

MultiLine W0Wa and MultiLine IWUIa chargers:

- LCD provides messages in real time about the respective battery charging state.

- The battery charging state and residual charging time until the battery is fully charged.

- Assisted for focused service deployment.

- The controlled charging currents are largely independent from mains voltage fluctuations. Mains voltages can be compensated in the threshold of the charger's operational safety.

- The batter identification with data storage is securely protected.

- The LCD displays a wide range of information, including battery charge, state and residual charging time.

- The processor of the charger controller stores all of charge data, error data, as well as statistical data.

- These data records are available via the menus keys on the MultiLine W0Wa and MultiLine IWUIa and displayed on the LCD.

- Real-time clock with data storage.

- The infrared interface for downloading and analysis of machine data allows a fast and accurate alignment of the charger to the respective maintenance operational safety.

Battery identification with data storage

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

- 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 or a luminous blue background.

- Blue LED indicating a real-time status about battery recharge status and residual charging time until the battery is fully charged.

- Error messages and text display give a clear message about the charging progress, as well as assistance for focused service deployment.

- The electronic control ensures the charging status which can be observed from a wide viewing angle.

MasterLine IWUIa:

- The LCD displays a wide range of information, including battery charge, state and residual charging time.

- The processor of the charger controller stores all of charge data, error data, as well as statistical data.

- These data records are available via the menus keys on the MultiLine W0Wa and MultiLine IWUIa and displayed on the LCD.

- Real-time clock with data storage.

- The infrared interface for downloading and analysis of machine data allows a fast and accurate alignment of the charger to the respective maintenance operational safety.

Battery identification with data storage

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

- 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 or a luminous blue background.

- Blue LED indicating a real-time status about battery recharge status and residual charging time until the battery is fully charged.

- Error messages and text display give a clear message about the charging progress, as well as assistance for focused service deployment.

- The electronic control ensures the charging status which can be observed from a wide viewing angle.

- MasterLine IWUIa:

- The LCD displays a wide range of information, including battery charge, state and residual charging time.

- The processor of the charger controller stores all of charge data, error data, as well as statistical data.

- These data records are available via the menus keys on the MultiLine W0Wa and MultiLine IWUIa and displayed on the LCD.

- Real-time clock with data storage.

- The infrared interface for downloading and analysis of machine data allows a fast and accurate alignment of the charger to the respective maintenance operational safety.

Battery identification with data storage

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

- 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 or a luminous blue background.

- Blue LED indicating a real-time status about battery recharge status and residual charging time until the battery is fully charged.

- Error messages and text display give a clear message about the charging progress, as well as assistance for focused service deployment.

- The electronic control ensures the charging status which can be observed from a wide viewing angle.

MultiLine W0Wa:

- How you do business, EnerSys can support you with motive power energy. The Hawker® lithium battery range, regulated W0Wa and optimized peak period performance under the most demanding conditions and MultiLine IWUIa, features a standard PWM (Pulse Width Modulation), and MultiLine IWUIa and display give a clear message about the charging progress, as well as assistance for focused service deployment.

- The processor of the charger controller stores all of charge data, error data, as well as statistical data.

- These data records are available via the menus keys on the MultiLine W0Wa and MultiLine IWUIa and displayed on the LCD.

- Real-time clock with data storage.

- The infrared interface for downloading and analysis of machine data allows a fast and accurate alignment of the charger to the respective maintenance operational safety.

Battery identification with data storage

- The optional battery identification device connected to the battery helps assign the correct charging profile when a battery is connected to the charger.
## Optimised charging technology for all applications

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.

### HAWKER. Selection table

<table>
<thead>
<tr>
<th>Feature</th>
<th>MotionLine</th>
<th>MasterLine pro</th>
<th>MasterLine</th>
<th>MultiLine W0Wa</th>
<th>MultiLine IWUIa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery terminal voltage</td>
<td>24 - 80 V</td>
<td>24 - 80 V</td>
<td>24 - 80 V</td>
<td>24 - 80 V</td>
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<td>Battery configurations</td>
<td>1, 3</td>
<td>3</td>
<td>3</td>
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<td>Ventilation</td>
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<td>Emergency charger</td>
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<tr>
<td>Temperature adjustable charging</td>
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<td>yes</td>
<td>yes</td>
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<td>Current limit</td>
<td>yes</td>
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<td>Charge- / discharge-error</td>
<td>yes</td>
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<td>yes</td>
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<tr>
<td>Data memory</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Stop-key</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>LCD-Display</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<td>yes</td>
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<tr>
<td>Jumbo LED status indicators</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>LED-charging status indication</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Sulphation wait state</td>
<td>yes</td>
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<tr>
<td>Pre-selectable charging factor</td>
<td>yes</td>
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<td>yes</td>
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<td>yes</td>
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<tr>
<td>Automatic charger function test</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Automatic refresh charge</td>
<td>yes</td>
<td>yes</td>
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</tr>
<tr>
<td>Automatic equalising charges</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>50 Hz regulated IWUIa-curve</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>50 Hz controlled W0Wa-curve</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>50 Hz non regulated Wsa-Puls curve</td>
<td>yes</td>
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<tr>
<td>50 Hz non regulated Wsa-curve</td>
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<td>yes</td>
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<tr>
<td>Battery capacities (Ah)</td>
<td>60-1700</td>
<td>176-1380</td>
<td>160-1380</td>
<td>105-1050</td>
<td>130-1550</td>
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<td>Voltage monitoring</td>
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<td>yes</td>
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<tr>
<td>Automatic commissioning charge</td>
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<tr>
<td>Automatic equalising charging</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Fully automatic charging</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Pre-selectable charging factor</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Automatic charger function test</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Automatic refresh charge</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Temperature adaptive charge</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Sulphation wait state</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
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<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

- **Standard**
- **Optional**
- **Use with electrolyte circulation (EC)**
- **With clear text messages**

## Mature technology with new features

### Charger functions

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

- **Automatic charger function test**
  - With the display before start of charging an active functional check of the charger can be initiated, which automatically will switch over to charging.

- **Desulphation and equalising charging**
  - Deeply discharged batteries require desulphation as a result of a discharge of more than 80% C5 need additional charging in order to minimize the adverse consequences.

  - This also applies for new batteries, with no commissioning charge or batteries which have been stored for a long time.

- **Pre-selectable charging factor**
  - Depending on the battery 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.

- **Safety cut-off function**
  - The maximum possible charging time is limited by a supervisory safety control.

## MotionLine MasterLine MasterLine MasterLine MasterLine

- **MotionLine**
  - High rack lift operation
  - Remote control
  - Specific main voltage or mains frequency
  - Cabinet IP 54
  - Electrolyte circulation (EC)
  - Data memory
  - Automatic water topping up
  - Menu-key
  - Stop-key
  - LCD-Display
  - Jumbo LED status indicators
  - LED-charging status indication
  - Sulphation wait state
  - Pre-selectable charging factor
  - Automatic charger function test
  - Automatic refresh charge
  - Automatic equalising charges
  - 50 Hz regulated IWUIa-curve
  - 50 Hz controlled W0Wa-curve
  - 50 Hz non regulated Wsa-Puls curve
  - 50 Hz non regulated Wsa-curve
  - Fully automatic charging
  - Ah-balancing charging procedure
  - Optimised charging technology for all applications

- **MasterLine pro**
  - High rack lift operation
  - Remote control
  - Specific main voltage or mains frequency
  - Cabinet IP 54
  - Electrolyte circulation (EC)
  - Data memory
  - Automatic water topping up
  - Menu-key
  - Stop-key
  - LCD-Display
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  - 50 Hz non regulated Wsa-curve
  - Fully automatic charging
  - Ah-balancing charging procedure
  - Optimised charging technology for all applications

- **MasterLine**
  - High rack lift operation
  - Remote control
  - Specific main voltage or mains frequency
  - Cabinet IP 54
  - Electrolyte circulation (EC)
  - Data memory
  - Automatic water topping up
  - Menu-key
  - Stop-key
  - LCD-Display
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  - LED-charging status indication
  - Sulphation wait state
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  - Automatic refresh charge
  - Automatic equalising charges
  - 50 Hz regulated IWUIa-curve
  - 50 Hz controlled W0Wa-curve
  - 50 Hz non regulated Wsa-Puls curve
  - 50 Hz non regulated Wsa-curve
  - Fully automatic charging
  - Ah-balancing charging procedure
  - Optimised charging technology for all applications

- **MultiLine W0Wa**
  - High rack lift operation
  - Remote control
  - Specific main voltage or mains frequency
  - Cabinet IP 54
  - Electrolyte circulation (EC)
  - Data memory
  - Automatic water topping up
  - Menu-key
  - Stop-key
  - LCD-Display
  - Jumbo LED status indicators
  - LED-charging status indication
  - Sulphation wait state
  - Pre-selectable charging factor
  - Automatic charger function test
  - Automatic refresh charge
  - Automatic equalising charges
  - 50 Hz regulated IWUIa-curve
  - 50 Hz controlled W0Wa-curve
  - 50 Hz non regulated Wsa-Puls curve
  - 50 Hz non regulated Wsa-curve
  - Fully automatic charging
  - Ah-balancing charging procedure
  - Optimised charging technology for all applications

- **MultiLine IWUIa**
  - High rack lift operation
  - Remote control
  - Specific main voltage or mains frequency
  - Cabinet IP 54
  - Electrolyte circulation (EC)
  - Data memory
  - Automatic water topping up
  - Menu-key
  - Stop-key
  - LCD-Display
  - Jumbo LED status indicators
  - LED-charging status indication
  - Sulphation wait state
  - Pre-selectable charging factor
  - Automatic charger function test
  - Automatic refresh charge
  - Automatic equalising charges
  - 50 Hz regulated IWUIa-curve
  - 50 Hz controlled W0Wa-curve
  - 50 Hz non regulated Wsa-Puls curve
  - 50 Hz non regulated Wsa-curve
  - Fully automatic charging
  - Ah-balancing charging procedure
  - Optimised charging technology for all applications
Advanced charging technology for variable applications

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
- IWUIa 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.

Economic charging technology for basic applications

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 between 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.

Hawker® MultiLine IWUIa

Hawker® MotionLine

Hawker® MultiLine IWUIa

Hawker® MotionLine
Download and analysis of the last end-of-charge data recordings assists in the operation of the batteries. The data analysis allows fast and accurate on-site after-sales service and warrants optimised operational safety.

Data memory

For single and multiple-shift operations, as well as opportunity charge and short charging times in conjunction with electrolyte circulation for enhanced economy.

MasterLine EU:

For one- and two-shift operations. Current pulses during the gassing phase provide a fast and energy-efficient battery charge.

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, i.e. 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 accurate on-site after-sales service and warrants optimised operational safety. Integrated controllers for electrolyte circulation and automatic water topping up are standard features.

High quality battery charger

Serially equipped with controls for electrolyte circulation and water topping up.

Range of applications

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.

Advantages

- High quality battery charger
- 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, i.e. 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 accurate on-site after-sales service and warrants optimised operational safety.

MasterLine puls:

- Wsa-charging characteristics
- Charging times from 6 - 10 hours
- For single and multiple-shift operations, as well as opportunity charge and short charging times
- 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, i.e. 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 accurate on-site after-sales service and warrants optimised operational safety.

MasterLine EU:

- Wsa-pulse charging characteristics
- Charging times from 7.5 - 10 hours
- For one- and two-shift operations
- 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, i.e. 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 accurate on-site after-sales service and warrants optimised operational safety.

Control for automatic water topping up

Provides timely detection of faults and protects the battery from damage.

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, i.e. shorter charging times and linked with higher availability of the battery (pump can be retrofitted).

Control for automatic water topping up

Provides timely detection of faults and protects the battery from damage.

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 accurate on-site after-sales service and warrants optimised operational safety.
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**Data memory**
- For single and multiple-shift operations, as well as opportunity charge and short charging times in conjunction with electrolyte circulation for enhanced economy.

**Fault diagnosis**
- Even after long rest periods, batteries are always ready for use.

**Control for electrolyte circulation**
- Provides timely detection of faults and protects the battery from damage.

**Electrolyte circulation**
- Even after long rest periods, batteries are always ready for use.

**Automatic refresh charges**
- Makes fully automatic water topping up of the battery possible (magnetic valve as option available).

**Advanced features**
- High quality battery charger
- Specially 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, i.e. 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.

**Control with clear text messages**
- Provides a clear message about the state of charge progress, as well as assistance for focused service deployment.

**Data memory**
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**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 accurate on-site after sales service and warrants optimised operational safety.
The Hawker MultiLine IWUIa 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**
- Wsa-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 between 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-characteristics
- For one-shift operations with 10 - 14 hours charging times.
- Diffusion pulses after end-of-charging
- Ensures optimum capacity is always available.
Optimised charging technology for all applications

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.

## 3 Hawker MotionLine

### Standard features:
- Optimised ventilation technology
- High rack lift operation
- AGV application
- Specific main voltage or mains frequency
- Electrolyte circulation (EC)
- Battery identification with data storage
- Data memory
- IRComm-interface
- Automatic water topping up
- Menu-key
- Jumbo LED status indicators

### Special features:
- Opportunity charges
- Pre-selectable charging factor
- Automatic charger function test
- Fault diagnosis and safety cut-off-function
- Automatic refresh charge
- 50 Hz controlled W0Wa-curve
- 50 Hz non regulated Wsa-Puls curve
- 50 Hz non regulated Wsa-curve
- Fully automatic charging

### Charging time:
- 5.5 - 10 hours with electrolyte circulation (EC)
- 6.0 - 10 hours with electrolyte circulation (EC)
- 7.5 - 10 hours

### Battery capacities (Ah):
- 60-1700
- 176-1360
- 160-1300
- 105-1050
- 130-1550

### Battery nominal voltage:
- 24 - 80 V

### Battery capacities (Ah) + Battery nominal voltage:
- 5.5 - 12 hours with Water Less 20

### MotionLine MasterLine puls MasterLine EU MultiLine W0Wa MultiLine IWUIa

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**Common features**

- **Auto-balancing:** According to the state of charge, the battery capacity is automatically compensated. Related voltage imbalances are always automatically compensated, always ensuring full charge of the nominal capacity is charged. An equalising charge is automatically started. 12% of the nominal capacity is charged after the start of the charge, with a self-test of the charger. Switching on the charger cannot be overridden and a fully charged battery is always available.

- **Equalising charge:** Depending on the application of the battery and charger, the equalising charge is automatically started. 28 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. After initiating an equalising charge, the battery is released after 15 minutes.

- **Sulphation wait state:** Fully discharged batteries are detected, the measurement for the calculation of the charging Ah is removed after 16 hours.

- **Pre-ordinate charging factor:** Depending on the battery and charger, 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.

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**Optimised charging technology for all applications**

- **Optimised ventilation technology**
- **High rack lift operation**
- **AGV application**
- **Specific main voltage or mains frequency**
- **Electrolyte circulation (EC)**
- **Battery identification with data storage**
- **Data memory**
- **IRComm-interface**
- **Automatic water topping up**
- **Menu-key**
- **Jumbo LED status indicators**

- **Opportunity charges**
- **Pre-selectable charging factor**
- **Automatic charger function test**
- **Fault diagnosis and safety cut-off-function**
- **Automatic refresh charge**
- **50 Hz controlled W0Wa-curve**
- **50 Hz non regulated Wsa-Puls curve**
- **50 Hz non regulated Wsa-curve**
- **Fully automatic charging**

- **Charging time:**
  - 5.5 - 10 hours with electrolyte circulation (EC)
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- **Battery capacities (Ah):**
  - 60-1700
  - 176-1360
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- **Battery nominal voltage:**
  - 24 - 80 V

- **Battery capacities (Ah) + Battery nominal voltage:**
  - 5.5 - 12 hours with Water Less 20

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**Mature technology with new features...**

- **Stop-key:** The stop key allows disconnection of battery and charger at any time.
- **Automatic charge function test:** With the display before start of charging an active functional check of the charger can be initiated, which automatically will switch over to charging.
- **Desulphation and desulphating charge:** Deeply depleted batteries (limited sulphation as result of a discharge) of more than 60% Li need additional charging in order to minimise the adverse consequences.
- **Water Less:** This applies for new batteries, with no commissioning charge or batteries which have been stored for a long time.
- **Safety cut-off function:** The stop-key allows disconnection of battery and charger at any time.

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**LED charging status indications:**

- **The status of the charger is indicated additionally by powerful LEDs:** Charging active: LED “ON” lit
- **Battery 80% charged: LED “80%” lit
- **Battery 100% charged: LED “100%” lit
- **Charging takes action LED “24V”:** Metal black out, wrong battery nominal voltage LED “24V” lit
Battery nominal voltage 24 - 80 V
Depending on the application of the
After end-of-charge the charger is
This also applies for new batteries,
Deviating from the basic setting the
With the stop-key before start of
In case of a fixed assignment of
Real time data memory
The stop-key allows disconnection of
Sulphated batteries are detected, the
Switching-on the charger cannot be
The charge is automatically started
The special Hawker® balancing charging

Optimised charging technology for all applications

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.

Optimised charging technology for all applications

Charging applicable

Applications

Industrial truck + battery + charger = 1 system

Optimised charging technology for all applications

Charging systems

The economic operation of the battery and the application
The charging technology

Industrial truck

Battery

Charger

Optimised charging technology for all applications

Selection table

Industrial truck + battery + charger = 1 system

Mature technology with new features

Common features

- 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: related to the end-of-charge voltage and 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 overlapped and a fully charged battery is always available.

Equalising charge

- Depending on the application of the battery, an equalising charge is automatically started.
- 28 hours after the start of the charge as an equalising charge is initiated. 5% 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.

Sulphation wait state

- Sulphation as a result of a discharge of more than 80% C5 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 the charging program a defined Ah-capacity can be charged additionally.

LED charging status indications

- The status of the charge is displayed additionally by powerful LED "ON": Battery 80% charged, LED "ON": 100% Battery 100% charged. LED "ON": 0% Charged battery laden LED "OFF". Multi black out, wrong battery nominal voltage LED "Flash" 10

- In case of a fixed assignment of battery and charger, offer every fifth randomly charged battery charge after 10 full cycles of equalising charge is started one hour after the multi-charge (13%).
- A partial equalising charge, which can be activated anytime after a charge has been started, will begin one hour after the end of the charge (12%).

Safety cut-off function

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

- Deeply discharged batteries require desulphation as a result of a discharge of more than 80% C5 need additional charging in order to minimise the adverse consequences.

Redraw

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

Taking care of your battery

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- A partial equalising charge, which can be activated anytime after a charge has been started, will begin one hour after the end of the charge (12%).

Safety cut-off function

- The maximum possible charging time is limited by a supervisory safety control.
- The stop-key allows disconnection of battery and charger at any time.
By this the ohmic resistance of the charger cable can be compensated. Changing charging is a consequence of long charging cables or low cross section. Batteries can be topped up by this method. The correct charging regime when a battery is topped-up at the correct time is displayed on the LCD.

The charging status and residual charging time until the battery is fully charged is displayed. The electronic control ensures the operational safety.

Controlled MWa - characteristic

Chargers MultiLine W0Wa

Three capacitors with respective charging time assignments can be pre-selected on the charger. Charged current pulses during passing charge phase ensure fast and energy efficient battery charging with optimized acid mixing.

MultiLine MPS - characteristic

Chargers MultiLine MPS

All MPS - pulse characteristic regulated current pulses in the passing phase ensure a fast and energy efficient battery charge with optimized acid mixing.
...for enhanced economy

Extended features of the charger

Chargers: MotionLine, MultiLine W0Wa and MultiLine IWUIa

Compensation of the ohmic drop over the charger cables:

- By the ohmic resistance of the charger cable can be compensated.
- Charging as a consequence long charger cables in 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 mean keys on the MultiLine W0Wa and MultiLine IWUIa and displayed on the LCD.
- Real-time clock with data storage.

The infrared interface for download and analysis of machine data allows a fast and accurate statement about the maintenance operational safety.

Battery identification with data storage:

- The optional battery identification device connected to 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 NEXCOM for processing and graphical display by this standard PC.
- Battery chargers can be traced online by a PC via IRComm interface.

Control for electrolyte circulation standard

- Optionally the charger can be equipped with an air mix 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 remote 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 twenty characters or a luminous blue backlit LED for a real time about battery, recharge status and automatic charging time and 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 IWUIa 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 mean keys, the current charging states, end of charge dates and charger settings are displayed.
- The text language can be selected (German or English).

Controlled W0Wa-characteristic

Chargers MultiLine W0Wa
- Three capacitors with respective charging time assignments can be pre-selected on the charging regime control PCB. The controlled charging currents are largely independently from mains current fluctuations. Mains voltage differences can be compensated on the transformer of the charger controller. The controlled current pulses during passing charge phase ensure fast and energy efficient battery charging with optimised acid mixing.

Regulated IWUIa-characteristic

Chargers MultiLine IWUIa
- “W0”-pulse characteristic regulated current pulses in the passing phase ensure a fast and energy efficient battery charge with optimised acid mixing.

Where you do business, EnerSys can support you with motive power energy. The Hawker®-branded battery range, renowned chargers and bespoke predictable time performance under the most demanding service conditions, is a strategic business decision for our customers. The Hawker MasterLine, Hawker MasterLine Plus and Water Less® batteries, Lifetech® MotionLine and Water Less® 20 batteries, Lifetech® Xtreme Batteries, the Hawker XFCTM and water less® batteries, Lifetech® MotionLine and Water Less® 20 batteries, Lifetech® WPA and MultiLine IWUIa were developed to assist customers with a culture of continuous improvement and added value for our business partners. EnerSys has an enviable position in breakthrough innovation and with significant investment in research and development we intend to stay at the leading edge in product innovation. The recently introduced economic Hawker® MasterLine Plus and Water Less® 20 batteries, Lifetech® MotionLine and Water Less® 20 batteries, Lifetech® WPA and MultiLine IWUIa, MotionLine and Lifespeed IQTM HF chargers, have defined new benefits for our customers: 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, the time for rapid innovation means we get new products to market fast.

Hawker battery chargers

MultiLine MasterLine pulls/EU MultiLine W0Wa MultiLine IWUIa

Europese Headquarter
Hawker BSS GmbH, MotionLine – MultiLine – Lifetech
Kernstrasse 29, 89207 Ulm, Germany
Phone: +49 731 690 72 0
Fax: +49 731 690 72 69
Email: info@hawkerbss.com
Website: www.enersys-emea.com

Local contact
EnerSys Ltd
8001 Zürich
Löwenstrasse 32
8001 Zürich
Switzerland
Phone: +41 44 215 74 10
Fax: +41 44 215 74 11

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