Battery balancing

2 × 12 V

TRUCKS • BUSES • CONSTRUCTION VEHICLES

SELF-DISCHARGE PROPERTIES

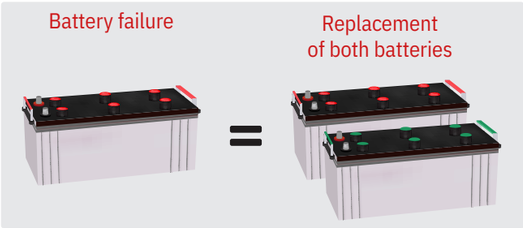
CREATE BATTERY IMBALANCE

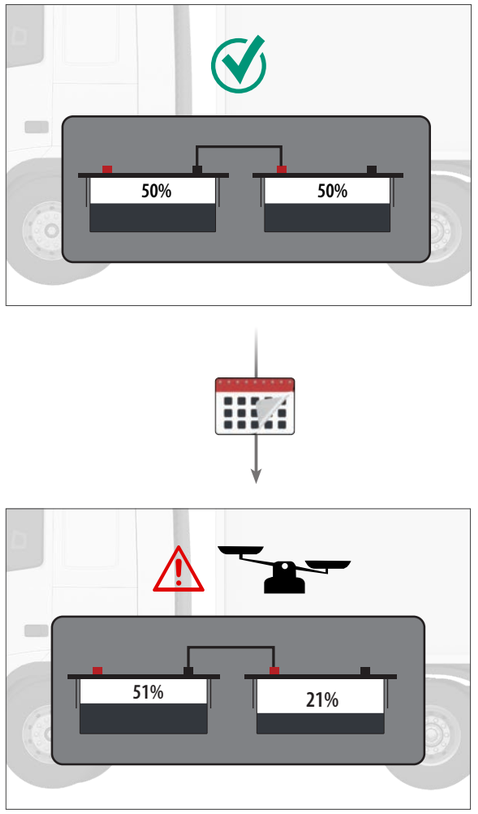
An unavoidable and natural occurrence

Over time, because of their self-discharge properties, and despite being regularly recharged by the alternator, the two 12 V batteries in a 24 V vehicle will become unbalanced, and their voltage and charge levels will increasingly differ from one another.

The cause of premature replacement of both batteries

As the two batteries are connected in series, the alternator recharges the whole system without taking into account the individual voltages of each battery, leaving the difference in their charge levels unchanged. The battery with the lowest charge level will be consistently under greater strain, and will rapidly lose performance. This failure affects the whole battery system, which will lead to costly and unplanned replacement of the batteries.





LOSS OF PROFIT
INEVITABLE

Breakdowns | Vehicle downtime

Replacing the battery pack:
Cost of batteries | Environmental impact

Workshop repair costs

GYS BALANCING SYSTEM

A SOLUTION UNIQUE TO THE MARKET.

- Balance the charge levels of the two 12 V batteries in the 24 V battery pack
- Extend the life of each battery.
- Warn you if a battery, and therefore the whole pack, has failed.

Optimise the health of the battery pack every time the vehicle is serviced

Rebalancing the two 12 V batteries in a 24 V pack helps prevent the failure of one of the batteries, which in turn would lead to the replacement of both. This is a recurring issue for commercial vehicle fleets, and can lead to breakdowns and vehicle downtime.

By equipping your workshops with a GYS battery balancing system, you can take advantage of the regular servicing of your vehicles to rebalance the batteries over the duration of the service, without disrupting the engineer while they are working. **Your vehicles will head back out on the road with better-balanced, better-charged batteries.**

WORK CARRIED OUT
WITHOUT SUPERVISION

The BSU is in place throughout maintenance

The batteries are rebalanced within 2-3 hours while maintenance is carried out on the vehicle. There will be no additional costs associated with longer maintenance periods.

While the mechanic is working

Balancing does not require human intervention. It is an automatic process that can be carried out during maintenance operations.

THE BENEFITS
ARE CLEAR

Financial benefits you can count on

Battery balancing significantly reduces battery replacement costs, breakdowns, and vehicle downtime, while optimising your fleet's productivity and profitability.

An eco-friendly solution

By extending the service life of your batteries, you can significantly reduce the number of new batteries you buy and the number of used batteries you send for disposal.

UNDERSTANDING THE GYS SOLUTION

Regular maintenance with the GYS balancing system ensures that your batteries last as long as possible.

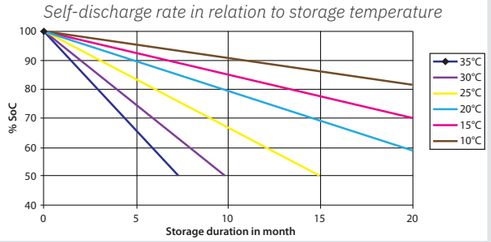
Service life of a lead-acid battery

A battery is like a living organism. Its lifespan can be affected by the number of cycles it goes through and the way it is used, stored and charged.

Factors that can negatively affect this lifespan include: deep discharges, storage while discharged, or poorly regulated charging that causes the battery to overheat or boil.

What is battery self-discharge?

Self-discharge rate in relation to storage temperature



*SoC: State of Charge

Self-discharge refers to the electrochemical processes that take place naturally and cause batteries (accumulators) to be discharged more or less quickly, even if no electrical consumer is connected.

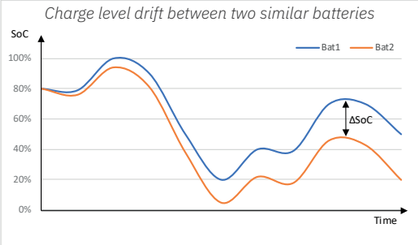
This process can be thought of as a low, but continuous, internal discharge current.

All lead-acid batteries self-discharge more or less quickly, depending on design, state of health, and the environment in which they are located.

This is an unavoidable phenomenon, inherent to every battery, and occurs when the battery is idle, charging, or in use.

It is important to note that two batteries of the same model will inevitably have different self-discharge values, even if they are used in the same way.

Charge level drift between two similar batteries



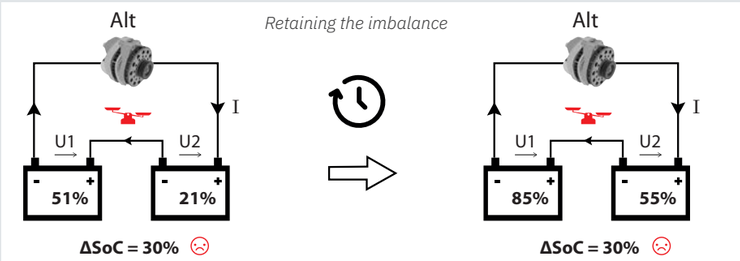
The challenge of balancing a 24 V battery pack made up of 2 x 12 V batteries

The 24 V battery pack in a commercial vehicle consists of two 12 V batteries connected in series. This means that the charge (or discharge) current from the pack must flow through both batteries at the same intensity, and that the pack voltage is the combined voltage of the two batteries.

However, the self-discharge current is specific to each of the two batteries individually. Over time, the self-discharge current differential will inevitably lead to a difference in charge levels between the two batteries.

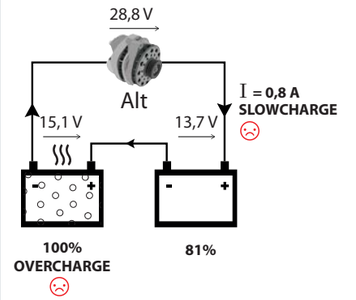
The series connection means that the alternator and consumers see the voltage of the pack as a whole, rather than that of each individual battery, which is a reflection of their respective levels of charge.

Recharging the pack via the alternator or discharging it via the consumers in the vehicle does nothing to compensate for the difference in charge level, as the two batteries will charge and discharge at the same rate, maintaining their charge level discrepancy.



FOR SUCCESSFUL BALANCING

Charging via the alternator of an unbalanced pack



When charging an unbalanced pack, one of the two batteries will reach 100% charge level before the other. At this point, the already-charged battery will be overcharged, which will cause it to heat up, leading to it boiling or venting. Only the current produced by the former will allow the latter to continue charging. Under these conditions, an overcharged battery will deteriorate prematurely. As the current is low, the second battery will take a long time to recharge, and will never achieve a full charge that will allow it to be rebalanced in relation to the other battery.

The limits of battery testing

A good battery tester will tell you the resting voltage of each of your two batteries, so you can measure any imbalance. Under load however, the voltage measured at the terminals of each battery does not provide this information, as the voltages of the two batteries do not reflect their actual charge levels.

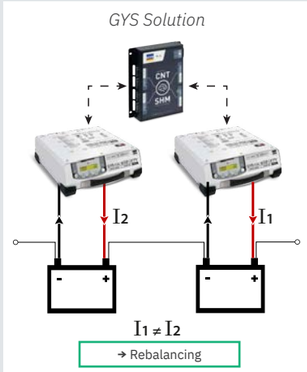
The principle behind the GYS system

The GYS battery balancing solution, developed by our expert technical engineers, is based on the combination of two connected chargers, one for each battery, and an innovative communication algorithm enabling them to communicate with each other.

This way, each battery can be charged at different speeds to ensure that both batteries arrive at the same level of charge quickly, and that the charging process regenerates each battery without overcharging them. This ensures that the service life of the battery pack is preserved as long as possible.

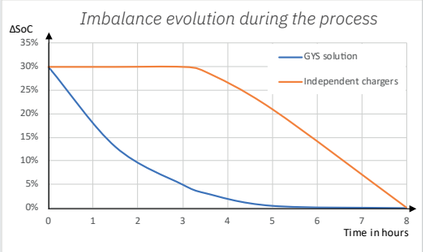
It is also worth noting that rebalancing and recharging take place simultaneously. This optimizes the use of your time, which is an invaluable tool in any professional environment.

GYS Solution



In line with vehicle maintenance constraints

Imbalance evolution during the process



When a commercial vehicle comes in for servicing, it's essential to act quickly, so that the vehicle can be returned as swiftly as possible, and the driver can leave with their vehicle with the minimum of downtime.

As a general rule, servicing and maintenance on this type of vehicle should be completed in less than 3 hours. It is therefore imperative to correct any battery imbalance within this timeframe.

The GYS balancing system achieves this objective.

According to tests carried out in our research department, on a pair of batteries with a 30% charge level imbalance, it was reduced to just 5% in less than 3 hours, and completely eliminated after 5 hours. This operation is carried out automatically and without human intervention.

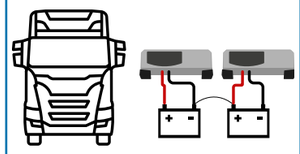
Tests show that the GYS system speeds up battery balancing considerably, compared with a solution using two independent chargers which do not have any communication with each other.

By repeating the GYS balancing process, the imbalance is naturally corrected and reduced towards zero, as the vehicle is serviced and repaired. Consequently, regular vehicle maintenance using the GYS method ensures perfect battery balance over the long term, and consequently optimum battery life.

THE ESSENTIALS
IN TWO PACKS

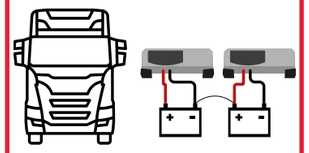
Pack 2 x 12 V

Balance the two 12 V batteries in the 24 V battery pack

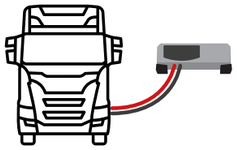


Pack 2 x 24 V

Balance the two 12 V batteries in the 24 V battery pack



Charge 24 V battery packs



TRUST US

GYS supplies all DAF dealers worldwide.

A SOLUTION
FOR ALL YOUR NEEDS

	BALANCING PACK				PACK BALANCING COMPLETE
	2 x 12 V		2 x 24 V		
	085534	*085541*	*085558*	*085565*	
BSU					
GYSFLASH 101.12 CNT *026998*	✓ x 2				✓ *ou*
GYSFLASH 101.24 CNT *025967*			✓ x 2		✓
ADDITIONAL MODULES					
Smart hub module (SHM) *025981*	✓		✓		✓
Smart Printer module (SPM) *026919* SLM / SPM Support *028906* 2 paper rolls *056633*					✓
Wireless barcode scanner *027725* SCANNER support *025745*					✓
AZERTY keyboard *027725* or QWERTY Keyboard *027770*					✓
Smart light module (SLM) *027978*					✓
SMC cable *056596*	✓		✓		✓
TROLLEY					
BSUFLASH PLUS Trolley		✓		✓	✓

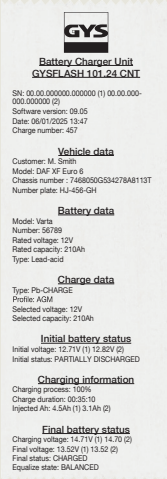
ADDITIONAL ADVANTAGES
OF THE GYS SOLUTION

A trolley designed for the workshop

The balancing system is offered on a trolley suitable for rough floors. It is designed for superior mobility in large, heavy machinery workshops.

Monitor balancing remotely

In large commercial vehicle workshops, the Smart Light Module lets you monitor charging and balancing progress at a distance, offering immediate overview of the situation without having to get close to the charger.



GYS

Battery Charger Unit
GYSFLASH 101.24 CNT

SN: 00.00.000000.000000 (1) 00.00.000-000.000000 (2)
Software version: 09.05
Date: 06/01/2025 13:47
Charge number: 457

Vehicle data
Customer: M. Smith
Model: DAF XF Euro 6
Chassis number : 7468050G534278A8113T
Number plate: HJ-456-GH

Battery data
Model: Varta
Number: 56789
Rated voltage: 12V
Rated capacity: 210Ah
Type: Lead-acid

Charge data
Type: Pb-CHARGE
Profile: AGM
Selected voltage: 12V
Selected capacity: 210Ah

Initial battery status
Initial voltage: 12.71V (1) 12.82V (2)
Initial status: PARTIALLY DISCHARGED

Charging information
Charging process: 100%
Charge duration: 00:35:10
Injected Ah: 4.5Ah (1) 3.1Ah (2)

Final battery status
Charging voltage: 14.71V (1) 14.70 (2)
Final voltage: 13.52V (1) 13.52 (2)
Final status: CHARGED
Equalize state: BALANCED

Traceability and monitoring of battery health

Produce a traceability record that provides visible confirmation that batteries are better charged and balanced. Offer the assurance that the vehicle leaves the workshop with batteries that are in better operational condition.

This ticket can be linked specifically to each vehicle or customer by easily entering information via the keyboard or a barcode scanner. Simplify maintenance management for every vehicle, and keep detailed records of battery condition at every service.

INVEST IN THE FUTURE

Made in France
since 1964

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