



Hiarom Rail-Road Electric Shunters

HRS 5E / HRS 8E / HRS 11E / HRS 14E

For maximum towing loads: 1000t / 1500t / 2000t / 2500t

- Specially designed for heavy shunting operation.
- Traction on all 4 rubber wheels. More than 2x higher coefficient of traction than a locomotive.
- All wheel steering. Crab steering.
- High capacity LiFePO4 battery.
- High voltage electric motors.

ELECTRIC TRACTION

BATTERY

Hiarom electric shunters are using Lithium battery (LiFePO4) from Flash Battery Italy. They are special battery for heavy industrial application with a high degree of safety against overloading and overheating. Integrated Battery management system with remote access.

TRADITIONAL LITHIUM BATTERIES VS FLASH BATTERY LITHIUM BATTERIES

TRADITIONAL LITHIUM BATTERIES

PASSIVE balancing only WITH LOW POWER	-
50% recharge in 60 MINUTES	-
LONG balancing time 4-8 HOURS	-
HIGH risk of sudden machine shutdowns	-
STANDARD batteries	-



FLASH BATTERY LITHIUM BATTERIES

ACTIVE and PASSIVE balancing WITH 20 TIMES HIGHER POWER	+
50% recharge in 25 MINUTES	+
SHORT balancing time LESS THAN 30 MINUTES	+
NO risk of machine shut-downs DAILY REMOTE CONTROL	+
CUSTOM batteries CUSTOM DESIGN	+



We chose Li-Fe-PO4 chemistry – the safest and most stable on the market. A lithium battery with li-fe-po4 chemistry has a much longer life: more than 4.000 recharge cycles.

It's available in the large-capacity formats (100 – 200 – 300 Ah) required in industrial applications, so there's no need to connect a great number of small cells in parallel, which lowers stability and can diminish the general safety of the battery pack.

Since these batteries are larger, maintenance is performed on-site, and the lithium cells can be replaced easily and quickly

The exclusive Flash Battery electronic balancing system is called the Flash Balancing System. Traditional balancing systems apply resistance to the cells with the greatest charge in an attempt to "lower" them to the level of the lowest cell. Although it's a simple and economical method, it's also extremely slow.

Flash balancing system acts both in active and passive with a much higher balancing power (20A) and not only at the end of the cycle, but also actively during discharge. This results in a 20 times faster balancing, maximum 30 minutes in cyclic applications, making it insignificant on the overall recharge time.

ABSOLUTELY NO BATTERY MAINTENANCE

The control electronics in a Flash Battery battery keeps it balanced and efficient from every standpoint.

This eliminates the need for regular maintenance, with great savings as compared with other batteries.

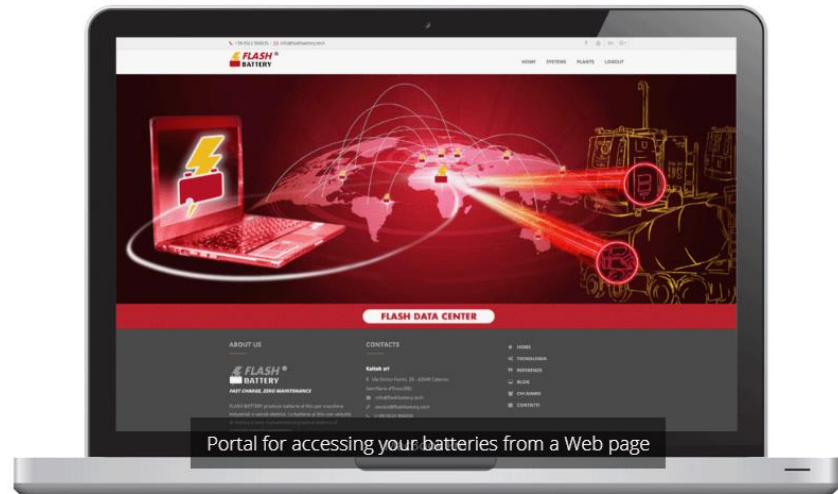
The battery's internal architecture and combined balancing allow repairs to be made by non-specialised personnel. the repairs can be made directly at the user's location, thus avoiding burdensome transport costs and long machine down time.

Flash battery technology features a remote monitoring system that reports malfunctions on a daily basis and enables the condition of each lithium battery to be determined at any time.



The Flash Alert System allows you to:

- ✓ monitor the parameters of each battery
- ✓ receive alerts if malfunctions occur
- ✓ implement continuous, automatic prevention
- ✓ organise special repair calls promptly
- ✓ eliminate maintenance costs
- ✓ increase the productivity of the customer's vehicle/machine
- ✓ collect data on actual use to effect improvements on the machine



ELECTRIC MOTOR

Permanent magnet synchronous motor made in Italy by Zapi

Liquid (WEG) cooled

Encapsulated, insulation class H

MOTOR CONTROLLER INVERTER

From Inmotion Italy (zapi Group)



Inmotion Technologies is a premier global supplier of AC drives and related products to the vehicle industry. With experience from a large installed base of high voltage inverters for hybrid vehicles currently in operation around the world.

ACH high voltage motor controllers are designed for use in large hybrid or fully electric vehicles. The ACH is designed for voltage levels from 100 V to 750 V, with continuous power levels of up to 300 kVA. With a rugged design and an expected life time of over 60 000 hours, the ACH is the ideal choice for both on-highway and off-highway applications.

- Rugged IP6K9K design suitable for the demanding environment of electric vehicles
- 4-quadrant, synchronous or asynchronous AC motor control, with speed, torque and DC-voltage control modes
- Liquid (WEG) cooled
- Extensive and powerful event handling and data logging simplifies troubleshooting and minimizes vehicle down time

SAFETY

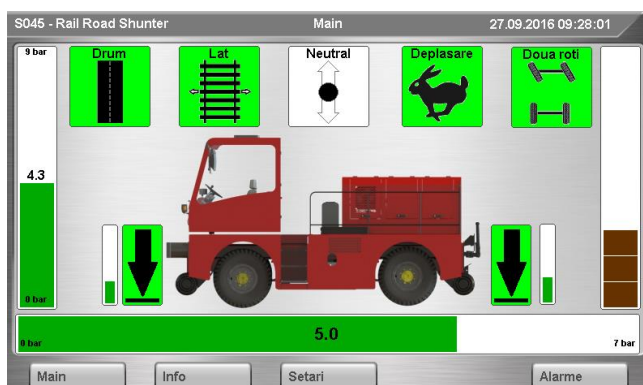
- Dead men pedal with acoustic and visual pre-warning.
- Red/White position lights for railway operation.
- Powerful working lights.
- Emergency stop buttons (2x in the cabin, one in each corner).
- Emergency brake normally closed with mechanical spring actuation. It can be actuated even in case of total loss of air, electrics, and power.
- Fire extinguishers.



CABIN / CONTROLS

The vehicle is equipped with a spacious cabin with good visibility in both directions and is furnished with two seats. The driver seat together with all the railway controls can rotate 180 degrees for reversing. The cabin is equipped with air conditioning, heater and defroster, radio-cd, suspension driver's seat, adjustable steering column.

Electronic displays are provided in the cabin for engine and transmission in addition to a video system with color display and two cameras (one for rear axle and coupler and one for driving backwards).



RAIL GUIDING SYSTEM

- Both rail axles can be lowered and raised hydraulically from the cabin.
- Automatic adjustment of the load on rail axles during railway travelling.
- Warnings if the pressure is out of range or if the axles are not in the correct road position.
- Lateral oscillating axles.
- Different track gauges available.

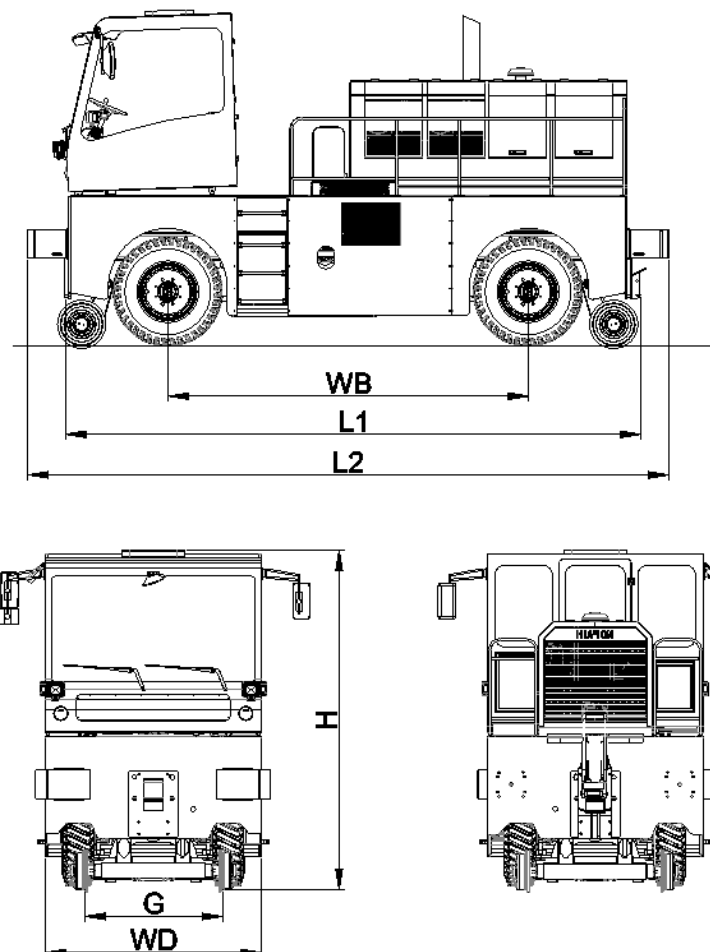


BRAKES

- Direct brake, hydraulically actuated by foot pedal for road travel or for stand-alone operation on railway.
- Indirect automatic brake according to UIC, pneumatically actuated, for shunting operation.
- Control of indirect braking from a lever in the cabin.
- Large capacity air tanks.
- Air drying system. Oil separator filter.
- Large capacity compressor mounted directly on the engine.
- Additional hydraulic compressor.
- Boost pressure function for fast filling of the railway cars.

EQUIPMENTS

UIC hook screw coupling and buffers	S	1435mm track gauge	S
SA3 or AAR coupling	O	1520, 1524, 1067 mm gauge	O
Various special couplings	O	UIC indirect brakes 5 bar	S
Four-wheel steering	S	Air supply 10 bar for railway cars	O
Air conditioner	O	Swiveling seat with panel for backward	S
Radio remote control for rail travel	O	Additional co-driver seat	S
Mirror heating	S	Additional air tanks	O
Auxiliary heater	S	Automatic fire extinguisher for engine	O
Various front attachments	O	On-board charger 400V/32A 22kW	S
Speed / distance recording device	O	External charger 400V/64A 44kW	O



Model	HRS 5E	HRS 8E	HRS 11E	HRS 14E
Tractive force max.	50 kN	80 kN	110 kN	140 kN
Towing capacity	1000 t	1700 t	2200 t	2700 t
Machine weight	13 t	16 t	22 t	28t
Engine power cont. operation	100 kW	100 kW	130 kW	150 kW
Engine power peak	150 kW	150 kW	180 kW	210 kW
Battery voltage CC	512V	512 V	512 V	512 V
Battery capacity	55 kWh	55 kWh	110 kWh	110kWh
Battery useful capacity (80%DoD)	44 kWh	44 kWh	88 kWh	88 kWh
Avg. consumption	11..15 kWh	12..16 kWh	14..18 kWh	16..20 kWh
On-board charger capacity	22 kWh	22 kWh	22 kWh	22 kWh
Wheelbase - WB	3600 mm	3600 mm	3900 mm	3900 mm
Machine length - L1	5500 mm	5500 mm	5900 mm	5900 mm
Length over UIC buffers - L2	7000 mm	7000 mm	7400 mm	7400 mm
Height - H	3500 mm	3500 mm	3650 mm	3650 mm
Width - WD	2400 mm	2400 mm	2400 mm	2400 mm
Track gauge standard G	1435 mm	1435 mm	1435 mm	1435 mm
Minimum horizontal track radius	90 m	90 m	100 m	100 m
Maximum lateral cant	130 mm	130 mm	130 mm	130 mm
Fuel tank capacity	200 l	200 l	400 l	400 l
Max. speed on road	25 km/h	20 km/h	20 km/h	20 km/h
Max. speed on rail	25 km/h	20 km/h	20 km/h	20 km/h
Max. speed at max tractive effort	8 km/h	6 km/h	6 km/h	5 km/h



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