

FFG tools / aids / devices

Current as of: December 2023

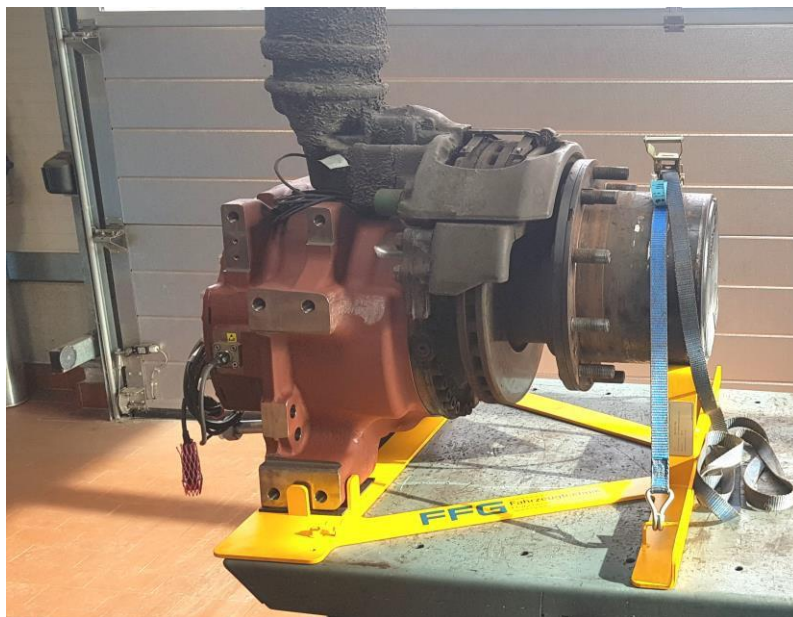
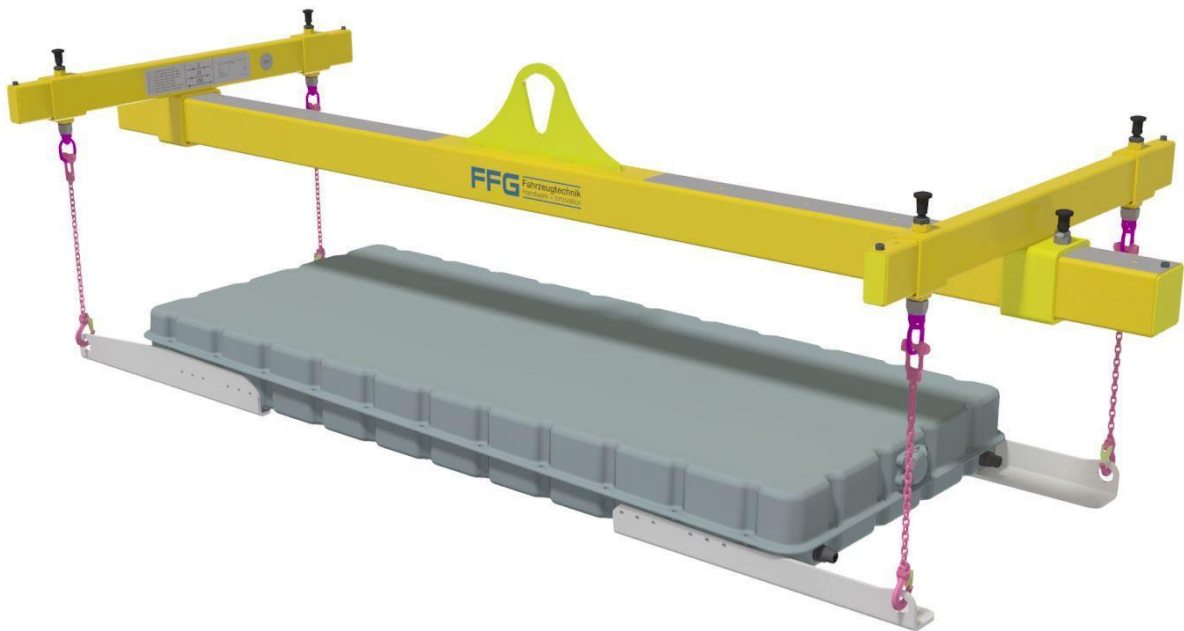
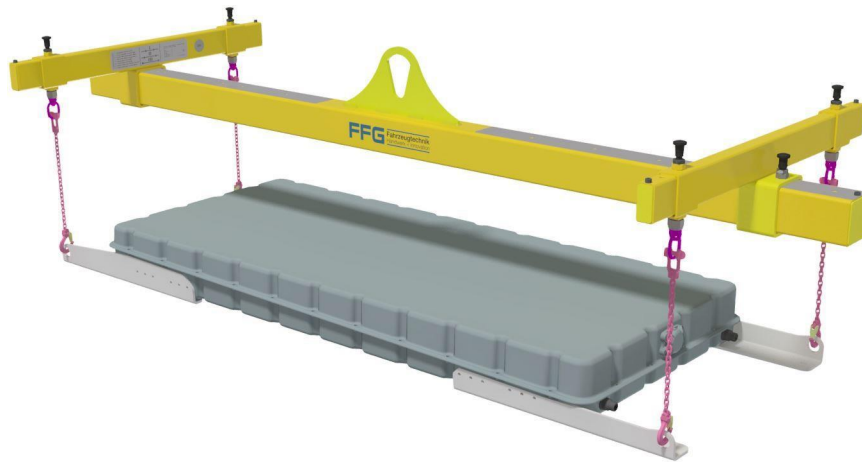


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1. Adjustable universal crane beam for HV batteries



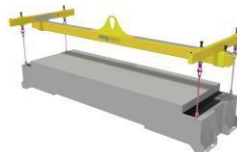
NMC-3:



LMP:



MAN:



SOLARIS Impact and BMZ:



Description:

The universal crane beam was developed to accommodate the different batteries from the various battery manufacturers. The universal crane beam is used to remove, install and lift the following battery types:

Bus type, bus manufacturer	Battery manufacturer	Battery designation
eCitaro, EvoBus GmbH	BorgWarner Akasol AG	NMC 1-3
eCitaro, EvoBus GmbH	Blue Solutions	LMP
MAN	Webasto	80kWh 36.266.15-6010
SOLARIS	Impact	LTO 25 kWh
SOLARIS	Impact	NMC 40 kWh A123 22s3p
SOLARIS	BMZ	NMC 79.2 kWh 180S1P

The four load chains of the universal crane beam can be adjusted to the different pick-up points of the batteries in order to be able to pick up the HV battery according to the centre of gravity. The support arms can be adjusted in the longitudinal direction and the load chain mounts in the transverse direction and fixed precisely in the corresponding positions with locking pins. The different combinations of support arm and load chain positions are shown in a legend on the beam. The crane beam is supplied with load chains, operating instructions and inspection booklet.

Technical data:

FFG part number	900 8102 005
Material	Steel S355
Load capacity	800 kg
Weight	approx. 65 kg
Length x width x height	2566 x 956 x 290 mm, height with chains: approx. 690 mm
Surface treatment	Powder coating signal yellow, RAL 1003

2. Crane beam for NMC-3 battery modules in the eCitaro



Beam with module

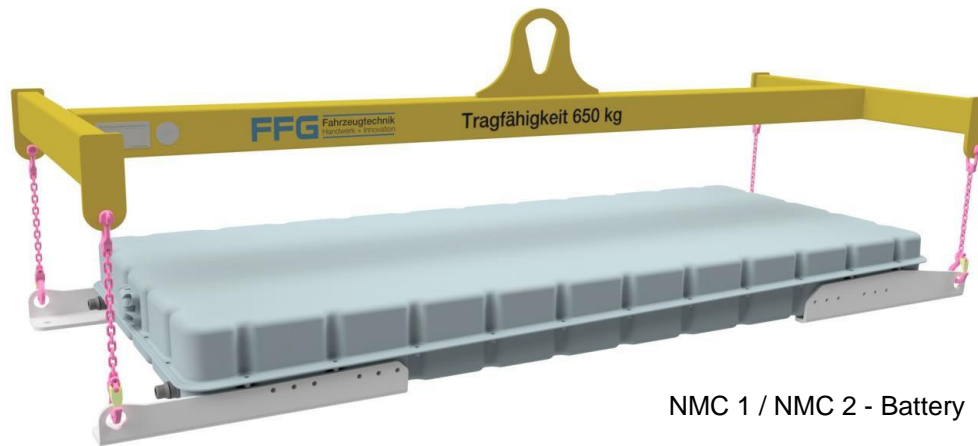
Description:

The crane beam is used to remove and install or lift the individual modules in the NMC-3-HV batteries from BorgWarner Akasol AG in the eCitaro from EvoBus GmbH. The module holder can be pushed out on one side so that the centring bolts can be hooked into the corresponding recesses in the module side surfaces. After hooking in, the module can be lifted out of the battery housing. The crane beam is supplied with operating instructions and inspection booklet.

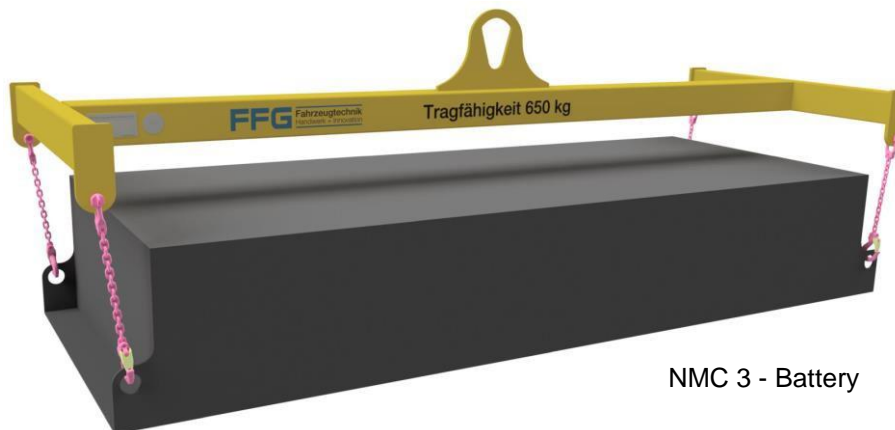
Technical data:

FFG part number	900 8102 006
Material	Steel S355
Load capacity	150 kg
Weight	approx. 6 kg
Length x width x height	625 x 91.5 x 315 mm
Surface treatment	Powder coating signal yellow, RAL 1003

3. Crane beam for NMC HV batteries in the eCitaro



NMC 1 / NMC 2 - Battery



NMC 3 - Battery

Description:

The crane beam is used to remove and install or lift the NMC batteries (NMC 1-3) from BorgWarner Akasol AG in the eCitaro from EvoBus GmbH. Compatibility with Akasol batteries from other bus manufacturers can be checked on a case-by-case basis.

The crane hook is located in the centre of gravity of the battery. The crane beam is supplied with load chains, manual and inspection booklet.

Technical data:

FFG part number	900 8102 003
Material	Steel S355
Load capacity	650 kg
Weight	approx. 34 kg
Length x width x height	1970 x 755 x 345 mm, height with chains: approx. 660 mm
Surface treatment	Powder coating signal yellow, RAL 1003

4. Crane beam for LMP HV batteries in the eCitaro



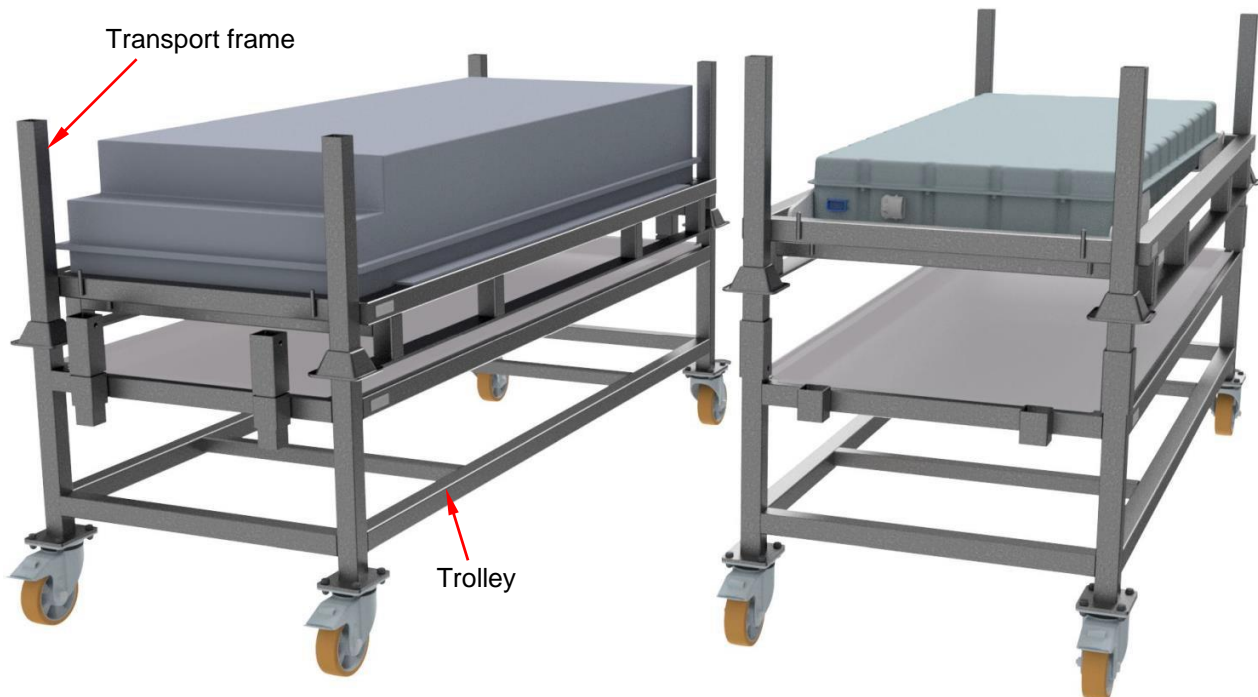
Description:

The crane beam is used to remove, install and lift the LMP HV batteries in the EvoBus GmbH eCitaro. The crane hook is located in the centre of gravity of the battery. The centre of gravity of the crane beam is balanced so that it hangs horizontally on the crane hook even without the LMP battery. The crane beam is supplied with load chains, manual and inspection booklet.

Technical data:

FFG part number	900 8102 004
Material	Steel S355
Load capacity	500 kg
Weight	approx. 32 kg
Length x width x height	1455 x 880 x 315 mm. Height with chains: approx. 720 mm
Surface treatment	Powder coating signal yellow, RAL 1003

5. Transport frame and trolley for HV batteries



Description:

Transport frames and trolleys for HV batteries can be used for processing, storing and transporting NMC batteries from BorgWarner Akasol AG and LMP batteries from Blue Solutions S.A.S., used in the eCitaro from Evobus GmbH. The heights of the trolley and transport frame are designed to provide a safe working height for employees when working under tension. The NMC batteries of the first two generations with a lower overall height can also be raised to a safe working height using pipe extensions. Two loaded transport frames can be stacked on top of each other. The trolley and transport frame can be transported together or individually, loaded or unloaded, by forklift truck. The trolley contains a stainless steel tray to collect any leaking liquids.

Technical data:

FFG part number	Transport frame: 900 8101 016 Trolley: 900 8101 018
Dimensions L x W x H	Transport frame: 2180 x 845x 509 mm Trolley: 2461 x 905 x 715 mm
Material	Steel S235 JR, stainless steel tray: 1.4301
Load capacity	1.5t
Weight	Transport frame: 60 kg Trolley: 100 kg
Surface treatment	hot-dip galvanised

6. Adapter frame for removing the HV battery from the rear of the eCitaro



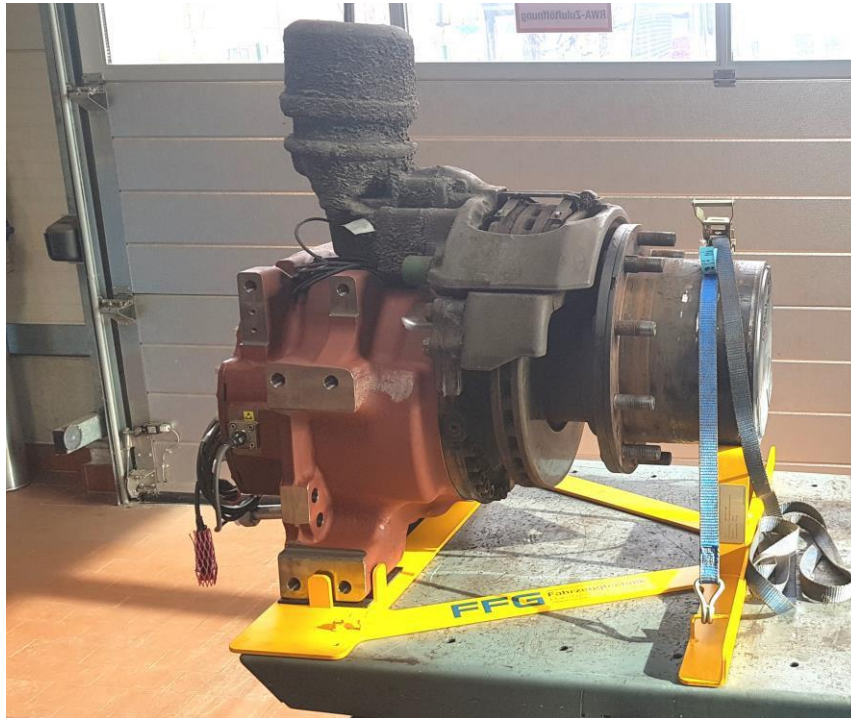
Description:

With the adapter frame and a suitable lifting table (e.g. from Fuchs or Blitz), the battery cluster in the rear of the EvoBus GmbH eCitaro can be removed.

Technical data:

FFG part number	900 8101 005
Material	Steel S235 JR
Weight	34 kg
Dimensions L x W x H	2000 x 870 x 228 mm
Surface treatment	Paint finish signal yellow, RAL 1003

7. Mount for removing the ZF AxTrax AVE 130 wheel end



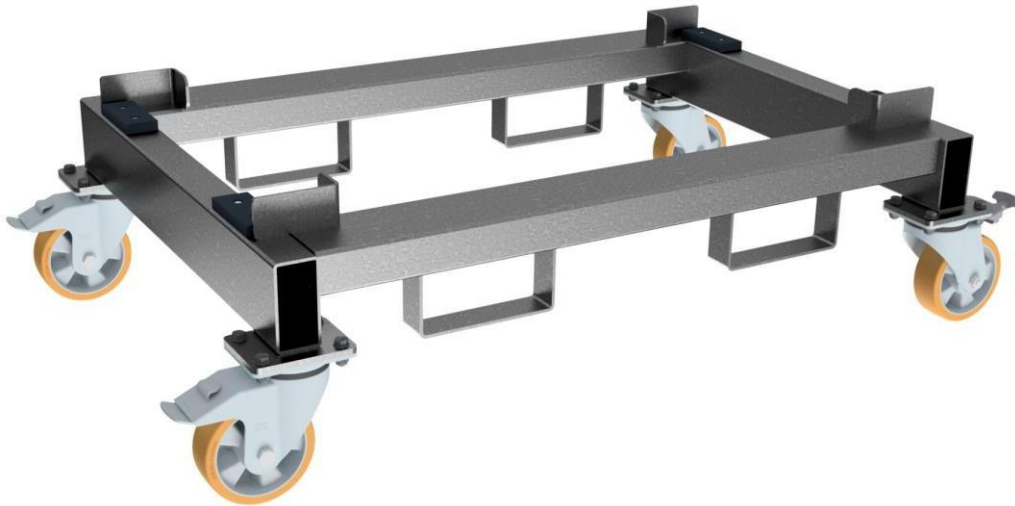
Description:

The holder can be mounted on a suitable lifting table in order to remove the wheel end from the AVE 130 electric portal axle from ZF Friedrichshafen AG. The mounts and rubber pads prevent the motor from slipping even if the lift table is slightly tilted.

Technical data:

FFG part number	900 8101 004
Material	Steel S235 JR
Weight	approx. 14.5 kg
Dimensions L x W H	640 x 790 x 190 mm
Surface treatment	Powder coating signal yellow, RAL 1003

8. Transport frame ZF rear axle



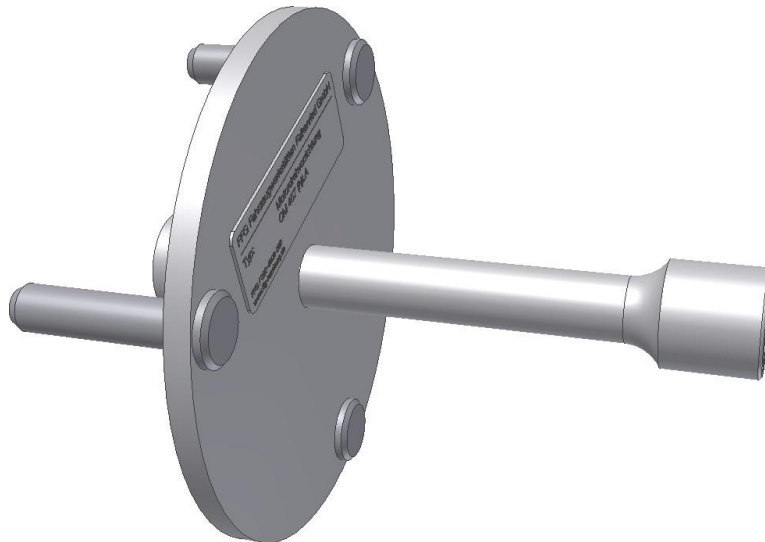
Description:

With the help of the transport rack, rear axles and electric portal axles from ZF Friedrichshafen AG can be stored, transported and positioned under the raised bus for removal and installation. The transport frame, including the rear axle, can be lifted with a forklift truck.

Technical data:

FFG part number	900 8101 003
Material	Steel S235 JR
Load capacity	1500 kg
Weight	approx. 57 kg
Dimensions L x W x H	1450 x 850 x 400 mm
Surface treatment	hot-dip galvanised

9. Engine turning device for OM 457(h)LA



Description:

Using the engine turning device, the crankshaft pulley of the OM 457 (h)LA engine from Evobus GmbH can be turned with a standard $\frac{3}{4}$ -inch ratchet.

Technical data:

FFG part number	000 4800 002
Material	Steel S235 JR
Weight	approx. 2.4 kg
Length	approx. 200 mm
Diameter	170 mm
Surface treatment	Paint finish signal yellow, RAL 1003

10. Puller for ZF wheel hub rear axle



Description:

The puller is used to remove or pull off wheel hubs on rear axles of type AV133 from ZF Friedrichshafen AG. To do this, the device is screwed onto the bolt circle of the wheel hub and the counter bearing is pushed into the wheel hub. The wheel hub is then pulled off the stub axle using the hydraulic press. The hydraulic ram is not included in the scope of delivery, but can be ordered separately.

Technical data:

	For MAN axles	For Citaro axles
FFG part number	000 4800 119	000 4800 116
Material	Steel S355	Steel S355
Weight	approx. 15 kg	approx. 14 kg
Diameter	max. 250 mm	max. 250 mm
Height	285 mm	280 mm
Surface treatment	Paint. signal yellow, RAL 1003	Paint. signal yellow, RAL 1003

Optional hydraulic set, consisting of: Enerpac RAC 304 hydraulic cylinder, hand pump and hose (see photo)

11. Cylinder trolley for 10 litre compressed air cylinders



Description:

Cylinder trolley for transporting a 10 litre compressed air cylinder. The cylinder trolley can be taken to a defective vehicle to fill the compressed air system of the suspension or brake system and make the vehicle manoeuvrable or towable. Furthermore, the compressed air can also be used for an impact wrench, e.g. when changing tyres.

Technical data:

FFG part number	000 4800 001
Material	Steel S235 JR
Weight (without bottle)	12 kg
Dimensions L x W x H	400 x 340 x 1120 mm
Surface treatment	Paint finish signal yellow, RAL 1003

12. Ring spanner for the cooling water expansion tank on the Citaro C1



Description:

Ring spanner for easy opening of the cap of the cooling water expansion tank of the Citaro C1 from Evobus GmbH.

Technical data:

FFG part number	120350
Material	Aluminium
Length	approx. 280 mm
Surface treatment	-

13. Pressure bolt parts kit for kingpin press



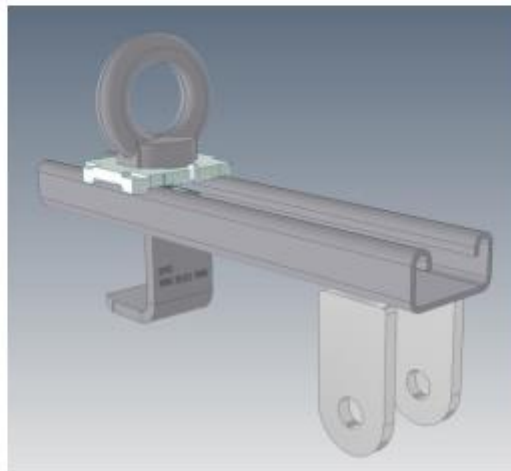
Description:

Optimised press-out bushing, mounting sleeve and pressure bolt in four lengths made of hardened steel. Can be used for the 75 tonne kingpin press from Werner Weitner GmbH for front axles of type RL from ZF Friedrichshafen AG for pressing out the kingpins.

Technical data:

FFG part number	Pressure bolt: L=70mm:	900 8103 301X
	L=120mm	900 8103 302X
	L=160mm	900 8103 303X
	L=190mm	900 8103 304X
	Mounting sleeve:	900 8103 310
	Squeeze-out bush:	900 8103 311
Material	CrMo steel	
Length of press-out bush	220 mm	
Surface treatment	galvanised	

14. Bracket for removing brake callipers



Description:

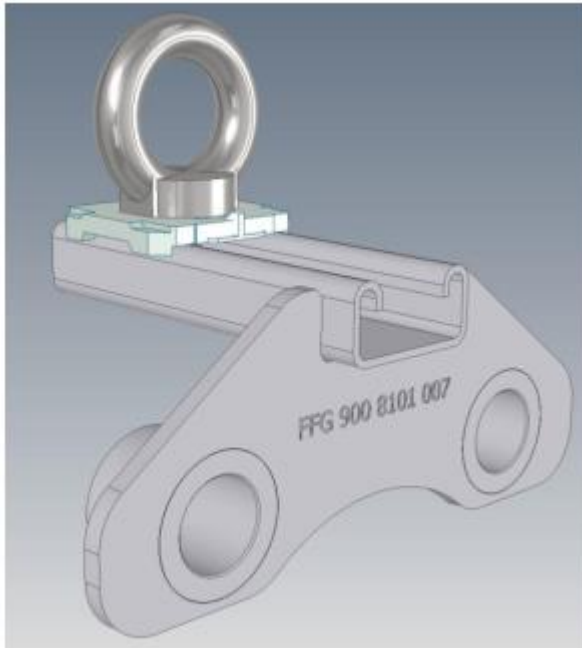
Bracket for removing brake callipers on wheel hubs of the RL front axle and AV rear axle systems from ZF Friedrichshafen AG.

The load centre can be individually adjusted by moving the eyebolt.

Technical data:

FFG part number	900 8101 006
Material	Steel S235 JR
Dimensions L x W x H	215 x 54 x 121 mm
Surface treatment	galvanised

15. Holder for removing wheel hubs



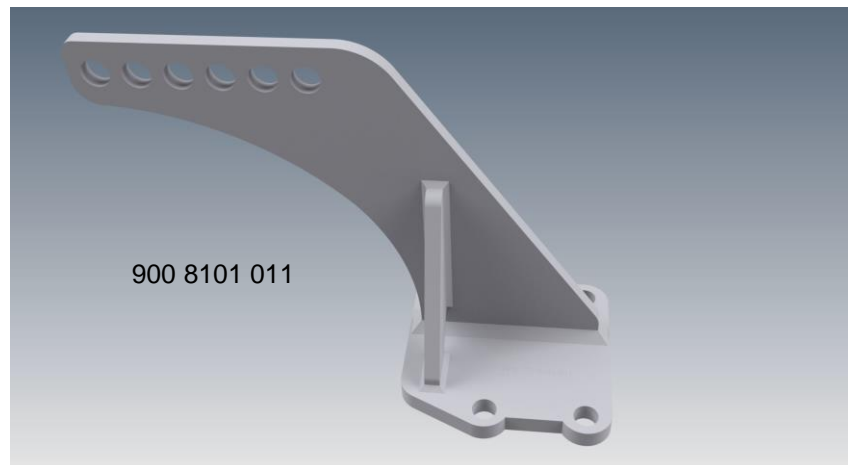
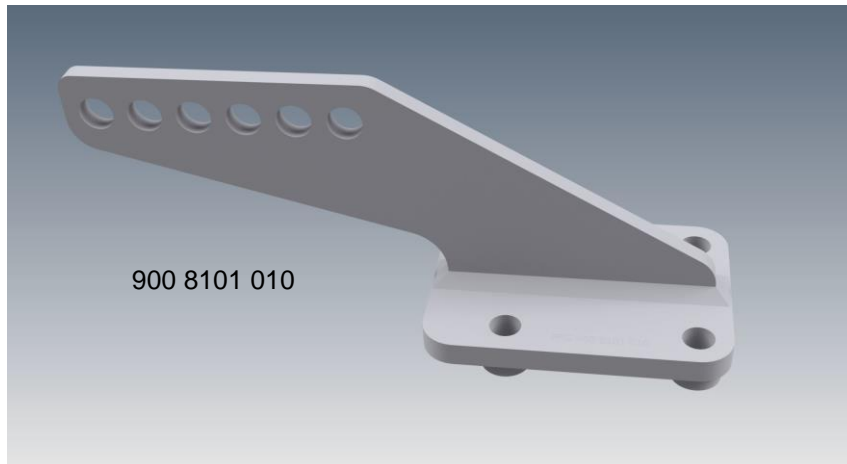
Description:

Holder for removing wheel hubs on AV rear axle systems from ZF Friedrichshafen AG. The load centre can be individually adjusted by moving the eyebolt.

Technical data:

FFG part number	900 8101 007
Material	Steel S235 JR
Dimensions L x W x H	115 x 170 x 138 mm
Surface treatment	galvanised

16. Pair of suspension brackets for lifting the OM936 engine



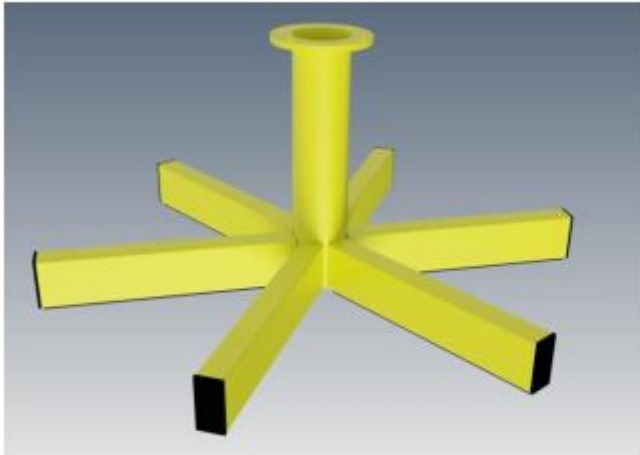
Description:

Pair of suspension brackets for the OM 936 engine from Evobus GmbH. The two brackets are bolted to the existing holes in the motor block using M16 bolts and lifting straps with shackles with sufficient load-bearing capacity (min. 1000 kg) are attached to one of the upper holes in the brackets. The motor can then be lifted with a forklift truck or a crane using a suitable lifting beam. Make sure that the slings hang vertically.

Technical data:

FFG part number	900 8101 010 and 900 8101 011
Material	Steel, S355J2+N
Weight	900 8101 010: 5.5 kg; 900 8101 011: 6.9 kg
Screws to be used:	M16 8.8 or 10.9
Minimum screw-in depth	13 mm
Surface treatment	galvanised

17. Assembly aid for ZF and Voith transmissions



Description:

The assembly aid makes it easier to work on gearboxes with SAE flanges from ZF Friedrichshafen AG and Voith GmbH & Co. KGaA, e.g. sealing the gearbox input side.

Technical data:

FFG part number	900 8101 008
Material	Steel S235 JR
Weight	13 kg
Dimensions H x DM Cross stand	405 x 884 mm
Surface treatment	Paint finish signal yellow, RAL 1003

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