V2.5 – FACTORY AND SITE ACCEPTANCE CHECKLIST

Introduction

The purpose of the EPM inspection and testing program at the fabrication site and on delivery location is to verify that the vehicle is designed and manufactured in accordance with the requirements specified in Volume 2 and its appendixes.

The following sections define the minimum inspection and test items. However, the Customer may request additional checks and tests; therefore, the Contractor shall provide all necessary tools, measuring devices and access required to perform such additional tests.

The acceptance checklist is structured in the following main sections:

- Documentation / Deliverables
- Dimensions
- Chassis & Structural Components
- Axles, Suspension & Wheels
- Pneumatic & Braking Systems
- Hydraulic & Steering System
- Electrical & Lighting Systems
- Operator Cabin
- Dashboard & Operator Environment
- Battery & Charging System
- Battery Safety / Resilience
- Drive System (Motors & Inverters)
- Safety
- Marking / Identification
- Performance
- Endurance Test

1 COMMISSIONING CHECK LIST

EPM Identification:		**Date:**	
Equipment Type:	Electric Prime Mover		
Contractor Witness:		**Customer Representative:**	
Signature:		**Signature:**	

Method Legend	
T	Tested
M	Measured
Ch	Checked
C	Calculated

Item	Description	Method	Ok / Fail	Error Code / Measurement / Comments
1. Documentation / Deliverables				
1.1	EU/EC Declaration of Conformity	**Ch**		
1.2	Certification of Structural Steel	**Ch**		
1.3	Layout Drawing	**Ch**		
1.4	Main components drawings	**Ch**		
1.5	Detailed dimension drawings with front, rear, left, right and top view of the EPM	**Ch**		
1.6	Electrical Drawing	**Ch**		
1.7	Pneumatic schematics	**Ch**		
1.8	Hydraulic schematics	**Ch**		
1.9	Technical data sheets and machine sheets of the main units and devices	**Ch**		
1.10	Warranty Certifications	**Ch**		
1.11	Instruction Manual for operator (EN & PL)	**Ch**		
1.12	Maintenance manuals including fault codes descriptions & troubleshooting	**Ch**		
1.13	PC software package provided with installation media & licenses (if needed)	**Ch**		
1.14	Online spare parts / service access: min. 4 user accounts	**Ch**		

1.15	Inspection Manuals with checklists for all periodical maintenance intervals	**Ch**		
1.16	Lubrication Maintenance Manuals	**Ch**		
1.17	Safe Work Procedures, including hazard risk assessment and technical requirements for maintenance and inspection of the battery, inverter and its power units	**Ch**		
1.18	Safe Work Procedures, including hazard risk assessment and technical requirements for maintenance and repair of EPM's driving motor, axles, brakes, hydraulic and pneumatic components	**Ch**		
1.19	Safe Work Procedures, including hazard risk assessment and technical requirements for troubleshooting and fault resolution for at least the following topics: - Battery Pack - BMS - Inverter - Driving Motor - Battery cooling and heating system - Charging system - PM Cabin interior system - PM Cabin diagnostic system	**Ch**		
1.20	Battery design calculations provided for duty / DoD / charging requirements	**Ch/C**		
1.21	Battery concept design and general arrangement provided	**Ch**		
1.22	Battery peak power / end-of-life C-rate calculations provided	**Ch/C**		
1.23	Battery technical dossier provided (electrical / mechanical / test / MSDS)	**Ch**		

1.24	Drive architecture / selection calculations provided	**Ch**		
1.25	Drive cable routing / layout drawings provided	**Ch**		
1.26	Drive, motor, CEP location and mounting drawings provided	**Ch**		
2. Dimensions				
2.1	Overall width (≤ 3000 mm)	**M**		
2.2	Overall length (≤ 6000 mm)	**M**		
2.3	Height of the top of cabin (≤ 4200 mm)	**M**		
2.4	Wheelbase	**M**		
2.5	5th wheel height – min / max	**M**		
2.6	5th wheel sweep clearance (kingpin → cabin) ≥ 1.8 m	**M**		
2.7	Outer turning radius	**M**		
2.8	Turning Radius with Trailer[1]	**M**		
3. Chassis & Structural Components				
3.1	Frame construction (welded / bolted)	**Ch**		
3.2	Structural component thickness ≥ 6 mm	**M**		
3.3	Anti-collision protection – battery compartment	**Ch**		

[1] Compliance to be verified during Site Acceptance Test unless fully demonstrated at Factory Acceptance Test

3.4	Anti-collision protection – air reservoirs	**Ch**		
3.5	Anti-collision protection – hydraulic oil tank	**Ch**		
3.6	Front bumper-to-cab standoff distance ≥ 100 mm	**M**		
3.7	Side bumper-to-cab standoff distance ≥ 50 mm (LH & RH)	**M**		
3.8	Towing pins front & rear (Ø 37–50 mm diameter)	**M**		
3.9	Emergency escape door with steps/platform and handrails	**Ch**		
3.10	Cab door hold-open latch (prevents self-closing)	**Ch**		
3.11	Walkways, platforms, stairs, ladders – anti-slip	**Ch**		
3.12	Walkways: protrusions minimised (flush/recessed)	**Ch**		
3.13	Handrails & access safety	**Ch**		
3.14	Bright coloured edge warning strips on the access steps	**Ch**		
3.15	Hot-dip galvanizing thickness for aux structure: ≥ 70 µm	**Ch**		
3.16	Guide slides for coupling at minimum 5th wheel height	**Ch**		
3.17	5th wheel auto-greasing system fitted; central grease tank mounted in a protected and accessible location	**Ch**		
3.18	Grease dose: manually adjustable	**T**		
3.19	Manual lubrication possible at each grease point	**Ch**		

4. Axles, Suspension & Wheels				
4.1	Front axle – steering function	**T**		
4.2	Front suspension – parabolic leaf springs & hydraulic shock absorber	**Ch**		
4.3	Rear air suspension with auto levelling	**Ch**		
4.4	Manual raise / lower suspension	**T**		
4.5	Differential lock – engagement / disengagement	**T**		
4.6	4 rear (driven) & 2 front wheels	**Ch**		
4.7	Tubeless pneumatic tires in size 310/80 R22.5	**Ch**		
4.8	The thickness of the rims at the point of attachment ≥ 15 mm	**M**		
4.9	Wheel nut protection for front wheels	**Ch**		
4.10	Plastic torque markers in all wheel nuts	**Ch**		
5. Pneumatic & Braking Systems				
5.1	An electrically powered air compressor	**Ch**		
5.2	Pneumatic operating brakes on the front axle (dry disc or drum)	**Ch**		
5.3	Pneumatic operating brakes on the rear axle (dry disc or drum)	**Ch**		
5.4	Dual-circuit braking system	**Ch**		
5.5	Service brake performance	**T**		

5.6	2 glad-hand connectors at the back of the cabin	**Ch**		
5.7	Pneumatic connectors: ABC type	**Ch**		
5.8	Fail-safe braking system with “spring-activated” parking brakes	**Ch**		
5.9	Parking brake engaged automatically when the motor is turned off	**T**		
5.10	Regenerative braking function	**T**		
6. Hydraulic & Steering System				
6.1	Fully hydrostatic steering system with orbitrol, priority valve and steering cylinder.	**Ch**		
6.2	Two heavy-duty double acting hydraulic cylinders for lifting/lowering 5th wheel	**Ch**		
6.3	Hydraulic oil tank capacity > 32 dm^3	**Ch**		
6.4	Working pressure of system 180-250 bar	**Ch**		
6.5	Steering lock-to-lock < 5 turns	**M**		
6.6	Lock-to-lock time < 3s by one hand (L→R & R→L)	**M**		
6.7	Hose abrasion protection (clamps & PE spiral)	**Ch**		
6.8	Visual leak inspection	**Ch**		
7. Electrical & Lighting Systems				
7.1	Battery main power cables: segregated from control wiring + additional harness protection	**Ch**		
7.2	Sealed harness connectors (water / salt / chemical resistant)	**Ch**		

7.3	Battery isolator (main switch): external, near battery compartment, accessible without opening covers	**Ch**		
7.4	LOTO-capable (lockable) battery isolator, complete HV battery system isolation for maintenance	**Ch**		
7.5	Rear 7-pin trailer socket ISO 1185 (near glad-hands)	**Ch**		
7.6	LED headlamps: dipped + high beam	**Ch**		
7.7	Front daytime running lights (DRL)	**Ch**		
7.8	Rear lights: LED tail & stop (behind cab)	**Ch**		
7.9	Front/rear turn indicators: visible from all sides of Prime Mover	**Ch**		
7.10	Mirror-bracket turn indicators: visible rear & side incl. with container trailer[1]	**Ch**		
7.11	Reverse light: auto ON in reverse	**T**		
7.12	Roof work lights (rear-facing): 5th wheel coupling visibility	**Ch**		
7.13	Beacon #1 (amber): ON with main switch; 360° visibility	**T**		
7.14	Beacon #2 (amber): seatbelt beacon; 360° visibility	**T**		
7.15	Cab interior light: LED	**Ch**		
7.16	TOS power: 12 VDC / 10 A dedicated fused supply	**Ch**		
7.17	Radio power: 12 VDC / 10 A dedicated fused supply	**Ch**		

[1] Compliance to be verified during Site Acceptance Test unless fully demonstrated at Factory Acceptance Test

8. Operator Cabin				
8.1	Cabin type: LHD (left hand drive)	**Ch**		
8.2	Cab ROPS/FOPS certificate	**Ch**		
8.3	Cab mounts: anti-vibration rubber isolators fitted	**Ch**		
8.4	Cab noise level ≤ 85 dB(A) (EN 12053 or equiv.)	**M**		
8.5	Fire-retardant insulation: fully bonded to firewall & cab side walls	**Ch**		
8.6	Front & rear laminated windows with full-width mesh sunshade (no view obstruction)	**Ch**		
8.7	Tinted rear window (absorbs sun rays)	**Ch**		
8.8	Rear window defrost: electric, dash switch ON/OFF	**T**		
8.9	Front window demisting function	**T**		
8.10	LH power window: up/down via dedicated dash switch	**T**		
8.11	Front/rear wiper & washer; independently controlled	**T**		
8.12	Tinted roof window with full-width rollable sunshade; rear-roof location for lowered-container view	**Ch/T**		
8.13	Full-coverage steel roof safety guard (bars ≥4 mm), RAL5005, not restricting lowered-container view	**Ch/M**		
8.14	Steering column and wheel: fully adjustable	**Ch/T**		
8.15	Air-suspended driver seat: weight, height, tilt, fore-aft & lumbar adj.	**T**		
8.16	Driver seat: foldable adj. armrests (L/R) & removable / adj. headrest	**Ch**		

8.17	Seat quick-drop to lowest position (easy entry/exit)	**T**		
8.18	Extra-long 3-point driver seat belt, auto-retract (ELR/BR-4), hi-vis, self-tensioning, shoulder height adj.	**T**		
8.19	External seatbelt fastening indicator: 2nd roof LED beacon ON when buckled	**T**		
8.20	Instructor seat: folding seat fitted	**Ch**		
8.21	Instructor seat belt: 2-point, auto-retract (ELR/BR-4)	**Ch/T**		
8.22	Mirrors (each side), vibration-resistant mounts: std ≥180×380 mm + pano ≥260×180 mm	**Ch/M**		
8.23	Mirror width coverage: 4.5 m @ cab end & 15 m @ 10 m behind cab (both sides)	**T**		
8.24	Exterior mirrors: electric heating, dash switch ON/OFF	**T**		
8.25	Interior mirror: panoramic reverse mirror fitted	**Ch**		
8.26	Front exterior spot mirror: panoramic, for confined manoeuvres	**Ch**		
8.27	Load-view mirror (interior): between dash and lower windscreen	**Ch**		
8.28	Manual A/C: cab temperature ≤ 20°C under ambient conditions specified in the Technical Specification	**T**		
8.29	Manual A/C control: thermostatic knob within operator reach	**Ch**		
8.30	Cab fan & heater: adjustable	**T**		
8.31	Two-way radio mount: 220×200 mm shelf or single-DIN pocket (50 mm unit height), within operator reach	**Ch**		

8.32	Speaker mount: plate/shelf ~100×100 mm near radio mount	**Ch**		
8.33	CB mic holder mount: ~50×50 mm fixing point near radio mount	**Ch**		
8.34	TOS PC/monitor mounting points provided	**Ch**		
8.35	Storage compartment in cab fitted	**Ch**		
9. Dashboard & Operator Environment				
9.1 Switches / operator controls				
9.1.1	Cab controls: within easy reach of driver	**T**		
9.1.2	Power switch: START/STOP button	**T**		
9.1.3	Road lights switch	**T**		
9.1.4	Operation lights switch	**T**		
9.1.5	Differential lock switch: spring-loaded, active only while pressed	**T**		
9.1.6	5th wheel lock/unlock: two separate ergonomic switches for two-finger operation	**T**		
9.1.7	Rear suspension lowering switch: 2-position, spring return to neutral	**T**		
9.2 Graphic symbols / indicators				
9.2.1	Indicator lights: LED type	**Ch**		
9.2.2	Turn indicator active	**T**		
9.2.3	Differential lock engaged (if fitted)	**T/Ch**		

9.2.4	Parking brake applied	**T/Ch**		
9.2.5	5th wheel locked status indicator	**T**		
9.2.6	Drive system fault / degraded mode indication	**T/Ch**		
9.3 Warnings / visual + audible alarms				
9.3.1	Turn indicator audible reminder while activated	**T/Ch**		
9.3.2	Seatbelt unbuckled warning before start of operation	**T/Ch**		
9.3.3	Hydraulic pressure low warning	**T/Ch**		
9.3.4	Traction motor temperature high warning	**T/Ch**		
9.3.5	Pneumatic pressure low warning	**T/Ch**		
9.3.6	Traction battery low warning	**T/Ch**		
9.3.7	24 V battery low warning	**T/Ch**		
9.3.8	Grease reservoir low/empty warning	**T/Ch**		
9.3.9	Low tire pressure warning (each tire separately)	**T/Ch**		
9.4 Dashboard information				
9.4.1	Power-on hour meter (key-on hours)	**T/Ch**		
9.4.2	Traction drive operating hours	**T/Ch**		
9.4.3	Total odometer (non-resettable)	**T/Ch**		

9.4.4	Speedometer	**T/Ch**		
9.4.5	Gear and travel direction indication	**T**		
9.4.6	TPMS display: individual tire pressures	**Ch**		
9.5 Energy data				
9.5.1	Battery power level [kWh], [%]	**Ch**		
9.5.2	Energy consumption: [kWh/km]	**T/Ch**		
9.5.3	Energy consumption: kWh per traction hour	**T/Ch**		
9.5.4	Energy consumption: kWh per power-on hour	**T/Ch**		
9.5.5	Regenerated energy	**T/Ch**		
9.6 Diagnostic access				
9.6.1	Diagnostic port(s) in cab/fuse box: full vehicle diagnostics without lifting cab or opening compartments	**Ch**		
10. Battery & Charging System				
10.1	Charging interface: single or double CCS2 connector.	**Ch**		
10.2	DC charging current capability: up to 400 A	**Ch/M**		
10.3	DC charging rate: ≥1C (based on battery nominal capacity)	**Ch/C**		
10.4	Charge performance: ≥70% DoD replenished in ≤1.5 h[1]	**T/M**		

[1] Compliance to be verified during Site Acceptance Test unless fully demonstrated at Factory Acceptance Test

10.5	Compatibility with the Customer's charging system throughout the charging process[1]	**T**		
10.6	Battery system energy capacity: ≥236 kWh	**Ch**		
10.7	Battery capacity supports max. one charging event per operating day[1]	**Ch/T**		
10.8	Battery modules housed in enclosed cabinets	**Ch**		
10.9	Charging inlet: steel enclosure with latching door	**Ch/T**		
10.10	Charging inlet identification decals fitted (weatherproof)	**Ch**		
10.11	Battery modules / replaceable electrical parts: front access	**Ch**		
10.12	Cooling system: maintenance access provided	**Ch**		
11. Battery Safety / Resilience				
11.1	Battery compartment: automatic fire suppression system or smoke detection fitted	**Ch**		
11.2	Battery system: degraded-mode operation available[1]	**T/Ch**		
11.3	Faulty battery string: automatic isolation without total power loss[1]	**T/Ch**		
12. Drive System (Motors & Inverters)				
12.1	High-efficiency, compact AC drive system	**Ch**		
12.2	Drive cooling: thermal control / water cooling provided	**Ch**		
12.3	Drive components: protection class min. IP65	**Ch**		

[1] Compliance to be verified during Site Acceptance Test unless fully demonstrated at Factory Acceptance Test

12.4	Drive components: operating range −30°C to +50°C	**Ch**		
12.5	Drive thermal management: adequate heating / cooling / ventilation provided	**Ch**		
12.6	Drive components: maintenance access provided	**Ch**		
12.7	Inverter protections: short-circuit and over-voltage	**T/Ch**		
12.8	Inverter earth-fault protection: output shut-off on excessive earth current	**T/Ch**		
12.9	Drive inverter system: fail-safe operation	**T/Ch**		
12.10	Drive system faults: no unintended motor motion / acceleration	**T/Ch**		
12.11	Motor protections: over-current, over-speed, over-temperature	**T/Ch**		
12.12	Drive system self-diagnostics available	**T/Ch**		
12.13	Drive fault logging retained after power OFF, incl. date/time and signal behaviour	**T/Ch**		
12.14	Drive diagnostics toolkit / controller access provided	**Ch**		
12.15	Drive parameter / firmware download capability provided	**T/Ch**		
12.16	Traction motors suitable for intensive / continuous duty	**T**		
12.17	Motor bearing housing: steel/cast construction (no aluminium/alloy)	**Ch**		
12.18	Motor-to-axle coupling: propeller shaft + universal joint (or approved equivalent)	**Ch**		

13. Safety				
13.1	5th wheel unlock interlock: enabled only at standstill	**T**		
13.2	Cab tilt mechanical safety latch (failsafe)	**Ch/T**		
13.3	Fire extinguisher: 6 kg in cab, or 2 kg in cab + 6 kg outside in latched PE case (no key/lock)	**Ch**		
13.4	Horn: ≥100 dB; cab control reachable & ergonomic	**T/M**		
13.5	Reverse buzzer: auto ON in reverse; ≥ 85 dB(A)	**T/M**		
13.6	Danger/ warning signs: compliant with applicable regulations and in Polish	**Ch**		
14. Marking / Identification				
14.1	Exterior paint colour: RAL 5005 (cab and main structure)	**Ch**		
14.2	RAL 1026 / RAL 9005 chevron marking on perimeter and protruding parts	**Ch**		
14.3	Customer logos fitted: cab front, LH cab side and RH cab side	**Ch**		
14.4	Fleet number / equipment ID fitted in specified locations (front cab, LH/RH chassis sides, both rear mudguards	**Ch**		
14.5	Rear window fleet number: transparent, applied from inside	**Ch**		
14.6	OCR ID fitted on roof and upper surfaces of battery-cover (both sides)	**Ch**		
14.7	Manufacturer nameplate fitted, incl. date of manufacture and basic technical parameters	**Ch**		

15. Performance				
15.1	Gross Combination Weight (GCW) ≥ 85 tones[1]	**Ch/T**		
15.2	Trailer coupling: 5th wheel auto lock/unlock from the cabin; no extra staff[1]	**T**		
15.3	Max travel speed FWD @ GCW 85 t = 30 km/h[1]	**T**		
15.4	Max travel speed FWD (unladen) = 30 km/h	**T**		
15.5	Travel speed REV (unladen) = 7 km/h	**T**		
15.6	Speed limiter: adjustable by maintenance staff	**T/Ch**		
15.7	Acceleration 0–25 km/h @ GCW 85 t = 35–42 s[1]	**T/M**		
16. Safety Aid Functions				
16.1	Operator smoking detection	**T**		
16.2	Operator fatigue detection	**T**		
16.3	Operator distraction detection	**T**		
16.4	Operator behaviour monitoring	**T**		
16.5	Tailgate warning system	**T**		
16.6	Side-collision warning system	**T**		
16.7	Trailer recognition / RFID	**T**		
16.8	Safety Aid event recording and data transmission	**T**		

[1] Compliance to be verified during Site Acceptance Test unless fully demonstrated at Factory Acceptance Test

2 ENDURANCE / DUTY TEST

Following successful completion of the Factory Acceptance Test (FAT), the endurance / duty test shall be carried out during the Site Acceptance Test (SAT) at the Customer's site.

A test scenario shall be prepared for at least 8 hours of continuous representative terminal operation of the Electric Prime Mover, including the tests that could not be performed during FAT.

The duty cycle shall include:

- coupling / uncoupling of container trailer,
- towing of loaded and unloaded trailer,
- forward / reverse travel,
- manoeuvring,
- braking and parking,
- operation of 5th wheel lifting / lowering and locking functions,
- use of lights, warnings and operator controls,
- charging events.

During the test, the Electric Prime Mover shall not exhibit any technical malfunction, unsafe behaviour, or fault resulting in interruption of normal operation.

During the endurance / duty test, the following data shall be recorded:

- power-on hours,
- traction drive operating hours,
- odometer / distance travelled,
- battery state of charge [%] / energy level [kWh],
- energy consumption [kWh/km, kWh/h],
- regenerated energy,
- traction motor and inverter temperatures,
- battery temperature(s),
- hydraulic oil temperature (if applicable),
- pneumatic pressure,
- active faults / alarms / warnings,
- number of charging events.