Technical Specification
M-04-573
Set of Screw Lifting Jacks –
operated above open side pits

Date	Comments	Signed	Approved / Issued by	Version
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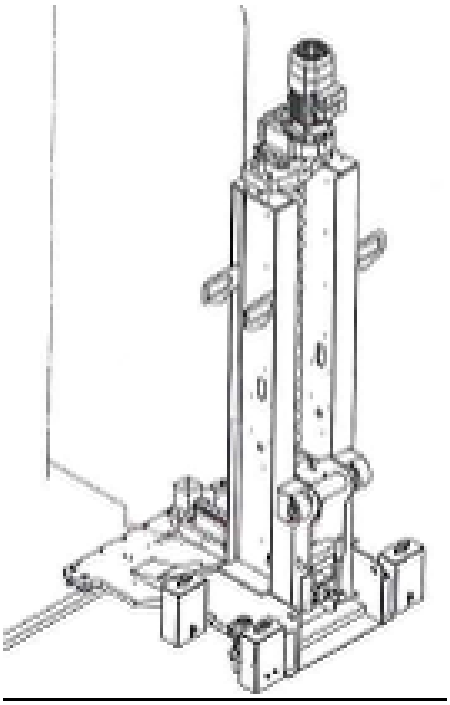

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1. General

Screw lifting jacks (the "Jacks") will be used to lift railway coaches.
Maintenance and repair work on railway vehicles will be carried out on bogies, wheelsets, and other components.
The Jacks will lift the vehicles to enable maintenance activities.
They will be connected to, operated from, and controlled via a central mobile control panel.
The Jacks will serve vehicles positioned at the service channel, as shown in:

Drawing GU251.00/01.4(Show section No:13: OPERATING ELEMENTS OF THE LIFTING JACKS(for example only for 25 ton).

1.1.1. The jacks will serve the vehicles at a Service channel.
1.1.2. The channel is a standard straight channel.

1.1.3 Specifications

1.2.		
1.2.1.	Carrying capacity of the lifting jack	**25 ton**
1.2.2.	Carrying capacity of the entire lifting jack installation (4 pieces)	100 ton
1.2.3.	Number of lifting jack installations	4 pieces
1.2.4.	Lowest position of the load anvil	400 mm
1.2.5.	Vertical stroke(min)	2500 mm min
1.2.6.	The Jacks will be moved:	The Jacks will be moved on auxiliary rails parallel to the main rails.
1.2.7.	Effective course	2100 mm
1.2.8.	Lifting / Lowering speed	~180 mm/min - Slow ~360 mm/min - Fast
1.2.9.	Floor clearance	~20 mm
1.2.10	Insulation ISO class	F
1.2.11	Duty cycle within one hour	30%
1.2.12	Lifetime (4 load cycle / day and 200 working days / year)	27,5 years
1.2.13	Power output of a single jack	4,0 kW
1.2.14	Voltage	400 V

1.2.15	Frequency	50 Hz
1.2.16	Protection class	IP 55
1.2.17	Temperature	0 °C – 40 °C
1.2.18	Max. sound level	< 70 dB (A)
1.2.19	Weight of each lifting jack	2-ton max
1.2.20	Connection to the local control box	fixed installed
1.2.21	Automatic synchronization range(max)	± 2 mm max
1.2.22	Synchronization monitoring tolerance	± 8 mm max
1.2.23	Electronic synchronization(**by encoder is a device)**	Yes

2. Structural description and requirements.

2.1. The wheels will be individually suspended so when unloaded, the Jacks will raise in approximately- 20 mm.

2.2. Each Jack will be marked in such a way so that it will be easy to identify each Jack and its control switches and the alarm signals on the control panel.

2.3. Jack's movement

2.3.1. The Jacks will be moved on auxiliary rails parallel to the main rails.(25 ton)

2.3.2. The Jacks will be equipped with electric drive units.

2.3.3. The loading brackets will be moved manually via a hand wheel when unloaded. This feature permits the precise alignment with the rail vehicle to be lifted.

2.4. Construction

2.4.1. The design should be based upon a - heavy-duty application with high safety factor for minimum deflection and low stress values.

2.4.2. A large base plate should make contact with the floor and lay the downward thrust of the load, spreading it over a wide area, ensuring stability when lifting and avoiding damage to the floor.

2.4.3. The carriage elevating unit should be freely supported by self-aligning system.

2.4.4. The pressure on the concrete floor should be limited to 200 kg/cm².

2.5. Lifting device

2.5.1. The spindle (pulling spindle) should be made from high grade steel with self-locking trapezoidal thread.
2.5.2. The spindle will be freely suspended from the self- aligning bearing in the trestle.
2.5.3. Quick changing of the spindle nut without dismounting the Jack and without additional hoists should be possible.
2.5.4. The spindle will be driven by a completely closed reduction gear (long duration lubrication) running in an oil bath with flanged brake motor.
2.5.5. The gear torque support would be equipped with rubber bumpers.
2.5.6. The screw shaft will be guarded and protected by neoprene flexible bellows or other equivalent protections, resistant to oil, grease and steam.
2.5.7. The spindle nut should be made of cast bronze.
2.5.8. The spindle nut should be reinforced and secured with a second safety nut.
2.5.9. The safety nut should be able to run behind the spindle nut without any load and should be **compliance with EN 1493 vehicle lift**. (Requires proof of compliance with the standard).
2.5.10. The spindle nut should be attached to the lifting carriage. In case of detaching of the nut from the lifting carriage during process, a safety device will prevent detaching and will stop the process.
2.5.11. In case of failure of the spindle nut due to the extreme wear while the jack is loaded, the safety nut should assure the function of the spindle nut and the load should be lowered by a manual function which allows lowering of the load safely.

2.6. Electrical control.

2.6.1. Central Control Panel: The jacks should be operated and controlled from a mobile central control panel.
2.6.2. Power and Control Signals: The central control unit should supply all necessary power and control signals.
2.6.3. Programmable Logic Control (PLC/PLS): The electrical control should include a PLC/PLS to monitor all connected hardware components (input/output modules, safety switches, contactors, etc.).
2.6.4. Individual Control Panels: Each lifting jack should have its own control panel (pendant).
2.6.5. Emergency Stop Button: The control panel should have an emergency stop button to stop all four jacks together or each jack separately.
2.6.6. The electric system shall be designed under CE rules, with sealed IP 55 metal protection, low voltage 24 volt controls.
2.6.7. The supplier shall supply the electrical system with a main switch on the control

panel.

2.6.8. Supply voltage with neutral conductor: 230 V; 3 x 400 VAC

2.6.9. Frequency: 50 Hz

2.6.10. Industrial PC (Siemens or equivalent) with a touchscreen shall be installed in the control cabinet.

2.7. Central Control Panel

The machine will be equipped with a Programmable Logic Controller with LCD Display.

The central control panel should comprise of:

2.7.1. Emergency – stop button.
2.7.2. Key switch for starting the system.
2.7.3. Light indicator for the operating and warning states.
2.7.4. Control key- manual operation for safety failure cases (for each and every jack).
2.7.5. Selector switch for operating states- The display of the control panel should present operating states, such as:
2.7.5.1. Group/individual.
2.7.5.2. Lifting/lowering mode.
2.7.5.3. Actual lifting height.
2.7.5.4. Fault analysis.
2.7.5.5. Power consumption.
2.7.5.6. Operating time counter.

2.8. Control lamps should comprise of:

2.8.1. Control voltage.
2.8.2. Synchronization.
2.8.3. Motor protection.
2.8.4. Safety limit switch;
2.8.5. Overload protection.
2.8.6. Wear on the load nut.
2.8.7. Phase-sequence.

2.9. Safety Functions and standard maintenance regulations:

2.9.1. The electrical control should contain the following safety functions:
2.9.1.1. Emergency stop.
2.9.1.2. Upper/ lower operating limit switch per Jack.
2.9.1.3. Key switch for manual safety operation -manual mode would be allowed only while failure is obtained.
2.9.1.4. Monitor the gap between main nut and safety nut.
2.9.1.5. The system will synchronize all jacks while operation with permissible tolerance. In case of failure system will shut off.
2.9.1.6. Motor protection through thermal motor protection relay.
2.9.1.7. DIN EN 1493 "Vehicle lifting platforms"
2.9.1.8. EN 60204 T1 / T32 " EN 60204 T1 / T32 Electrical equipment for machines".
2.9.1.9. VDE 0100 T1 / T726 "Jacking and hoisting equipment"

2.9.1.10. Design according to DIN EN ISO 13854(Safety of machinery-minimum gaps to avoid crushing of parts of the human body).
2.9.1.11. ISO 13732-1(ergonomics of the thermal environment)
2.9.1.12. Design according to DIN EN 12921, machinery directive 2006/42 EG, UVV and the generally valid technical rules

2.9.2. Limit Switches and Functions.

2.9.2.1. The lifting movement should be limited in its bottom and top final positions by a limit switch.
2.9.2.2. One additional emergency limit switch should be allocated to both switches, making sure switching off also in case of failure of the normal limit switch.
2.9.2.3. The screw nut should be electrically supervised by a limit switch at a distance of approximately - 2 mm to the safety nut. In case of a nut break this limit switch should come into action and switch off the drives.

2.9.3. Synchronization Control

2.9.3.1. The electric control should be equipped with an electronic synchronization control effecting equal speed of lifting and lowering the Jacks in group mode which will assure the uniform lifting and lowering of the vehicle
2.9.3.2. Synchronization control will be switched on automatically, as soon as the Jacks run in group operation.
2.9.3.3. In case of malfunction in the synchronization control, the Jack drives will be switched off.

2.9.4. Motor and Load Detector

2.9.4.1. Each drive will be equipped with a motor load detector.
2.9.4.2. In case of a 10 % or more overloading of the Jack drive, all drives will be switched off.

2.10. Operation Sequence

2.10.1. The complete installation will be switched on by means of a central control panel.
2.10.2. Actuate key switch "Control On".
2.10.3. Green indicator light "Ready for Service" will light.
2.10.4. Setting the selector switch "Individual Operation/Group Operation" to the individual operation. In the individual mode only, the "Lift / Lower" will be possible from the respective Jack.
2.10.5. Each Jacks will be brought to the lifting position of the vehicle
2.10.6. Switch the selector to group operation.
2.10.7. Synchronization control will be activated.

2.10.8. Activate button “Lift/Lower “
Group operation “Lift/ Lower “ will be only possible from the central control panel, by pushing an additional relevant “Lift/ Lower “ button at one of the jack located in the opposite side of the vehicle.

2.11. Malfunction

2.11.1. Indication of a malfunction will be by a red indicator light (e.g. by reaction of an emergency limit switch for the lifting movement).
2.11.2. The drives will be automatically switched off.
2.11.3. The system shall be safeguarded and the malfunction shall be indicated out.
2.11.4. Via a button in the control panel safety wiring cab be bridged over and lifting jack can be moved out of the dangerous situation.
2.11.5. The malfunction will be eliminated and afterwards has to be erased via a second button in the switch cabinet.
2.11.6. The workshop is designed for preventive and corrective maintenance work on 4-car and 6-car units.

2.12. Connecting Cable
2.12.1. For every lifting jack a connecting flexible cable (lift -control console) for the main and control current with connectors
mounted on both sides will be delivered. The length of each one of 4 cables should be divided to two pairs one 22 m. long each one
2.12.2. And second pair 32 m. long each one.
2.12.3. All the connectors will be equipped with protection covers.
2.12.4. The main current lead of the control console will be 20 m. long

2.13. Painting
2.13.1. All steel materials should be blasted to grade SA2 ½ and primed, before using.
2.13.2. Welded parts should be cleaned before painting.
2.13.3. Painting of the jacks will be according to:
standard UIC 842-2, 842-3 and 842-8.
2.13.4. Color of final painting will be RAL 2000.

2.14. Testing.
2.14.1. Static Test.
2.14.1.1. Testing shall be carried out in factory with static load of 150% at the middle height of the lifting course. There must be no permanent deformations as a result of the test.

2.14.2. Dynamic Test
2.14.2.1. The test will be carried out with a load of 125%. Two up and down strokes will be carried out.
2.14.2.2. All function and sensors will be tested.

3. Maintenance.

3.1. The set of jacks will be designed to minimize maintenance cost, using the following:
3.2. All mechanical and electrical components will be located in such a way that they will easy to check and replace.
3.3. Screw /nut lubrication will be done permanently by an automatic adjustable greasers. The grease tube goes directly inside the bronze nut, when empty the greaser must be replaced.

4. Spare parts

4.1. The delivery shall include spare parts for two years operation.
4.2. The supplier shall guarantee the availability of spare parts for 10 years.
4.3. If a spare part is no longer available on the market the supplier will offer an adequate substitute.

5. Installation and Acceptance Tests

5.1. Delivery and Accessories: The manufacturer is responsible for delivering components and systems according to the specifications, including all accessories, adapters, and recommended spare parts.
5.2. Installation and Operation: The manufacturer must handle system installation, ensure correct functioning, and oversee running-in and operation.
5.3. Installation Drawings: Equipment installation should follow the installation drawings provided by the manufacturer and approved by ISR.
5.4. Defect Correction: The manufacturer is responsible for correcting any defects detected by ISR after testing and running-in.
5.5. Training: The manufacturer must provide training for operators and maintenance personnel, lasting at least 3 working days at the ISR facility in Qishon depot, Haifa and Lod depot.
5.6. Acceptance: Final acceptance is subject to ISR's approval. Machine acceptance shall be subject to compliance with all requirements specified herein.

6. SLA

6.1. Service Call Response: The supplier must arrive on-site within 3 days of a service call.
6.2. Problem Resolution: Any issues must be fixed within 5 days from the time of the service call.
6.3. Spare Parts Delivery: Spare parts should be delivered within 14 days from the date of the order.

7. Scope of Supply

7.1. The complete Set of 4 Screw Lifting Jacks including:

- 7.1.1. Central control cabinet,
- 7.1.2. Cable Drag Chain System,
- 7.1.3. Guiding System,
- 7.1.4. Connecting Cables.
- 7.1.5. Supervising and responsibility of installation, correct functioning, operation and run-in 2 working days.
- 7.1.6. Training ISR personnel for 3 working day
- 7.1.7. Spare parts for two years maintenance during the warranty period.

7.2. Full set of documentation including three sets of printed and CD of installations and maintenance instructions comprising:

- 7.2.1. Technical specification including drawing with critical and external dimensions,
- 7.2.2. Working safety regulations
- 7.2.3. Electrical circular diagram
- 7.2.4. Description of the of each jack control unit and central cabinet including connections diagram
- 7.2.5. Instructions prior to installing the equipment and first time startup
- 7.2.6. Operation instructions and trouble- shooting
- 7.2.7. Spare parts catalog
- 7.2.8. Training and qualification programs

8. Documentation

8.1. Three (3) sets of printed and USB operating instructions will be included with the delivery of the machine.

8.2. The documentation language shall be Hebrew or English.

8.3. Technical description of the system components in Hebrew or English

8.4. The documentation delivered together with the machine comprises:

a) Instructions prior to installing the machine and first time startup
b) Technical description of the system components.
c) Description of the control panel
d) Description of accessories
e) Instructions for trouble-shooting.
f) Schematic drawing of the washing machine.
g) Maintenance instructions.
h) List of spare parts.
i) Instructions on electrical parts.
j) Instructions for equipment care and maintenance.
k) Instructions for trouble-shooting
l) Working safety regulations
m) EC conformity declaration including CE labeling.
n) Instructions on pneumatic parts.

o) Wiring diagram and schematic of flow.
p) Warranty conditions.

9. Training

9.1 Practical training; including:

- Equipment familiarization
- Performance of routine maintenance tasks
- Troubleshooting
- Replacement and adjustment tasks
- The training shall be performed at site by experienced instructors that hold appropriate skills and knowledge in the fields of operation of the System. minimum time for the training shall be 3(three) days devoted for training concerning the operation of the system and an additional 1 days per depot(Kishon-Haifa) devoted for training with respect to the maintenance of the System.

9.2 The Training Materials shall be provided in the following format:

- User Handbook / Operator's Manual, Calibration and Maintenance Manuals will be supplied as: files for theoretical lessons and practical lessons.
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10. Warranty and Availability of Spare Parts

The warranty period shall be 24 months, beginning after the completion of final acceptance tests as specified in the Agreement.
The supplier shall guarantee the availability of spare parts (electronics/ mechanical) for a period of 10 years.
If a spare part is no longer available on the market the supplier shall offer an adequate replacement.
Optional warranty upgrades shall be considered:
The supplier shall provide an ILS sheet, including a maintenance plan, spare parts availability and prices.
Commencing upon the completion of the Warranty Period (the "Optional Warranty" and "Optional Warranty Period", respectively). ISR may decide, at its sole discretion, to extend the Optional Warranty Period by an additional consecutive periods of 12 months each.
The optional warranty period shall not exceed 60 months.
During the Warranty Period Supplier shall perform an annual visit (1 visits in total- after 24 months) for preventive maintenance services including calibration, all in accordance with Technical Specifications.

11. Acceptance Test

Tests – all tests required either by the agreement, supplier or manufacturer instructions, and special requirements as approved by ISR in the T&C (Training and Certification) plan. Tests will include dry run, tests under normal and extreme conditions and quality tests. Tests shall be executed for units, equipment and subsystems. ISR reserves the right to attend any tests. Contractor shall inform ahead in the T&C plan and at least one week before the test.

FAT – Factory Acceptance Test: the FAT shall be performed at the site; minimum time for the FAT shall be four days, by two persons from ISR.

SAT – Site Acceptance Tests, as defined in the T&C plan.

Integration – all units, equipment and subsystems shall be working together as one system, fully interfaced with ISR and third parties systems required for operation. Integration shall be executed for a whole operational package.

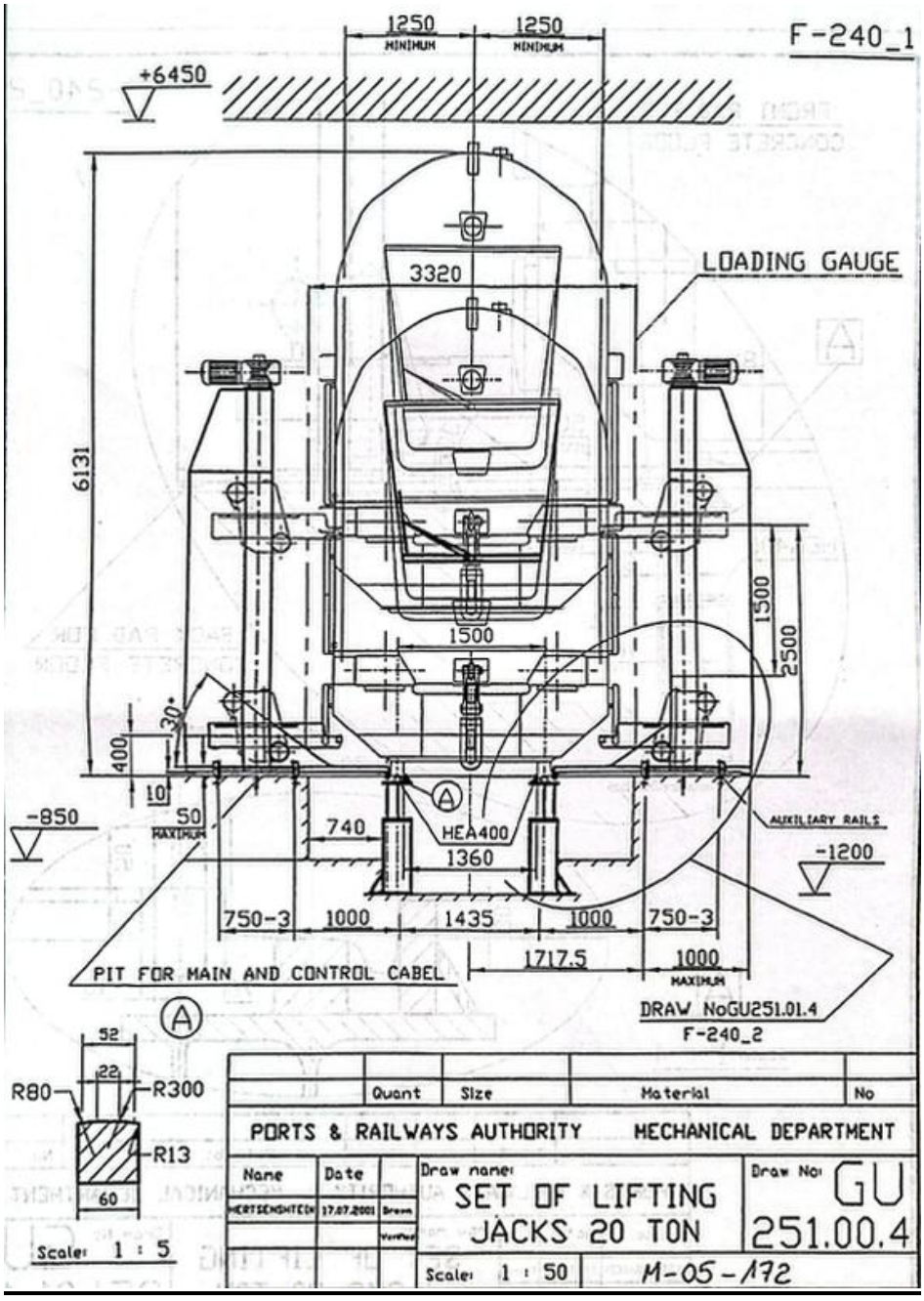
Commissioning – certification and documentation of all works executed by Contractor, following successful integration phase, including plant manuals, as built drawings, test documentation, and any other documentation defined in the T&C plan.

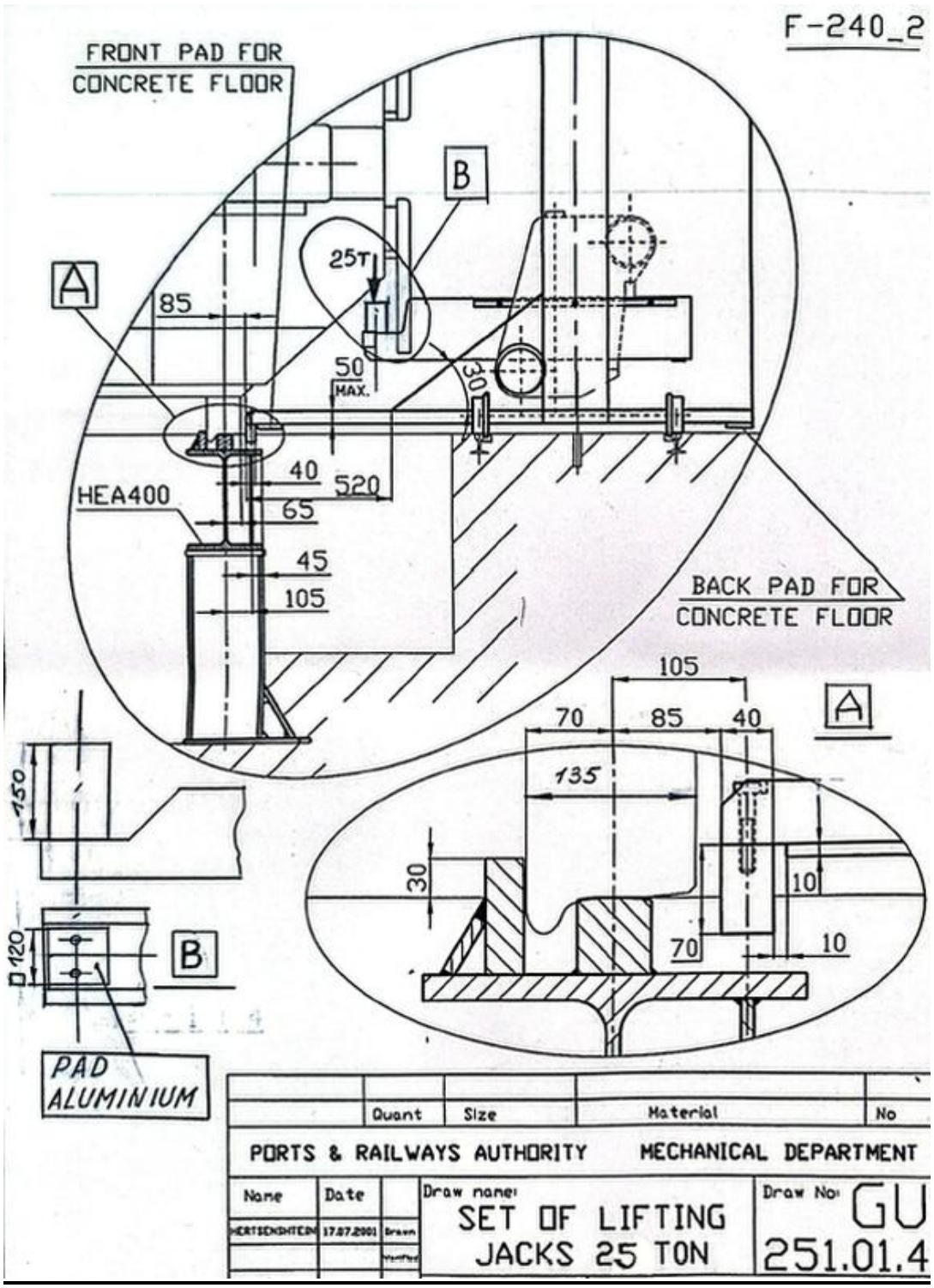
Provisional Handover – transfer operative, successfully commissioned operational installation, to ISR, including all training needed, for the start of the running tests with ISR rolling stock.

Final Handover – transfer operative, successfully commissioned operational installation, to ISR, including all training needed following successful end of running tests period with ISR rolling stock.

Final Acceptance – Where all works and the installation as an integrated system were successfully delivered to ISR and all operational tracks are under continuous operation. This phase will include verification and validation that all systems are working properly under ISR's requirements.

12. OPERATING ELEMENTS OF THE LIFTING JACKS(for example only for 25 ton)

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FRONT PAD FOR
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50
MAX.
30
40
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HEA400
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BACK PAD FOR
CONCRETE FLOOR
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