NEOMETRIX DEFENCE

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INTRODUCTION

Portable, Light Weight, Double Acting, Hydraulic Re-railing Equipment

M/s Neometrix's Re-railing equipment, in principle, designed such that, it is suitable for re-railing any type of rail vehicle, whether it is a tramway or underground railway cars, locomotives of heavy and heaviest construction as well as motor cars of latest design or vehicles of all kinds for use in steel works, especially torpedo ladle cars of heavy and heaviest design, are concerned. Furthermore, this re-railing equipment can also be used for lifting & displacing bridges and other heavy loads in heavy engineering companies.

By means of motorized pump set, all types of jacks are operated via a separate control desk. Therefore, pump-set can be placed enough distantly so that, neither the exhaust gases nor the noise disturbs the work force engaged at the site of restoration.

The connection between the pump set – the control desk – and the jacks is made by means high-pressure hoses & quick connect couplings.

The hoses are equipped with quick connect / disconnect couplings to connect and disconnect by hand.

Effortless, quick, reliable & safe connection is therefore possible always & every time.

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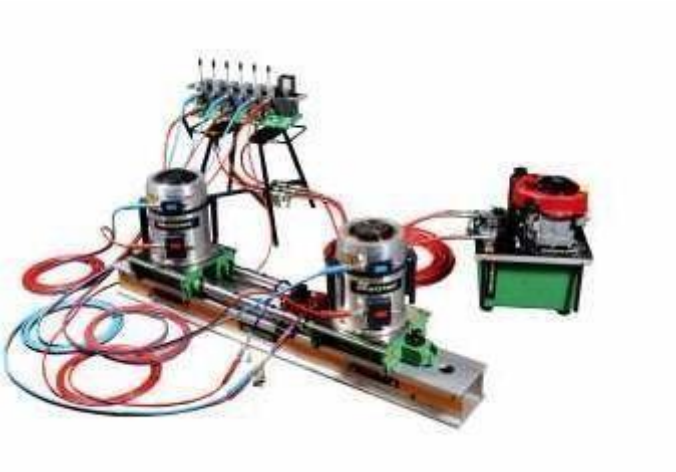
About equipment



- Double-acting hydraulic re-pressure system (490 bar)
- Quick set-up by virtue of light weight parts.
- Precisely controllable operations of lifting, lowering, pushing and pulling.
- High stability of the jacks under load due to integral & large bottom flange.
- Pilot operated check valves to secure load against accidental lowering in case of pressure loss (e.g. hose burst)
- Protection of the jacks against overload by means of two integral safety valves.
- Smooth & jerk free operation of the jacks even under full load & full stroke.
- Reduced wear due to mirror finished, roller-burnished and hard-anodized contact surfaces.
- Computer aided designs & use of high-strength light-metal alloy.
- Many choices to suit individual requirement. More options, means more precise selection & accurate solution.
- Reliable & safe operation even up to -40°C up to +70°C.
- Non-inter changeable. No oil leakage during coupling or uncoupling of the jacks.
- Disconnection and reconnection of hoses possible even under loaded condition.
- Hollow, single piece, extruded light metal alloy Re-railing bridges.
- Duo Traversing jack with hydraulic anchoring system.
- Rescue operator need not be under elevated load while restoration.
- Optimized strength the weight ratio.
- Highest portability.
- Safe, secured, swift operation at the site of incident.

About Content of This Manual

General

This technical manual contains description, drawings, parts lists & explanations regarding installation & working principle of M/s Neometrix's double acting, light weight hydraulic re-railing equipment.

Personnel required

According to the nature of the derailment occurred, site conditions & the type of the derailed rail vehicle, the re-railing operation can be carried out by 4 -6 trained operators. Therefore, everyone involved in re-railing / restoration operation should be familiar with the equipment, instructions of this manual.

Safety

When dealing with re-railing operations with this re-railing equipment, the following safety precautions have to be strictly observed.

- The jacks should be placed on a solid base in such a way that, at best the centre of the jack is in line with the centre of the lifting point (i.e., concentric loading) as far as possible. Eccentric loading should be avoided to prevent possible scores on the piston.

- Except in-case of the multi-stage spacer rings, hardwood packing should be placed between the saddles of the lifting jacks and the bottom edge of the lifting point in order to prevent the load from eventually sliding off the jack. As base for the jacks and as packing between the saddle of the jack and the bottom edge of the lifting point, hardwood of best quality and dimensions corresponding to the application should be used.

- During re-railing operation, all parts being in contact with liquids have to be monitored with regard to leakages possibly occurring, and the respective operating pressure shown on the pressure gauge has to be controlled. Defective devices should not be used in restoration work.

- Air which might get entrapped within the system has to be removed as fast as possible by repeatedly extending and retracting the pistons. Air lock issues are generally observed only during first run of the jacks or after replacing seals / any defective valves if any.

- The operating personnel are not allowed to stay under lifted loads, unless those loads are firmly secured by means of additional supports.

- Furthermore, the regulations for preventing accidents have to be observed.

Flow of information to workforce -

- Rescue team will have dress code.
- Upon rescue crew reaching the site of accident or derailment, a precise course of action / strategy will have to be drawn between the workforce & the commander.
- Everyone shall follow the instructions & only commander shall issue instructions to the workforce.
- Safety norms shall be strictly followed as a matter of rule.

1.	**SAFETY OF PRODUCT & OPERATING PERSONNEL –** M/s Neometrix's products guarantee the best performance when used properly. We focus our design mainly on the operator's safety, ease of operation & longevity. Operating instructions ensure that products are used safely. The equipment should be operated by persons with appropriate training on the safety aspects of such equipment to prevent injury to operator, equipment & the infrastructure. We emphasize on the fact that, users should read the operating instructions carefully before using the equipment. We further recommend that a qualified instructor train user. The equipment should be used exclusively for the intended purpose. Any form of use beyond stated in this manual is considered as improper use / misuse. The manufacturer / supplier will not be liable for any damages resulting from misuse.
2.	**GENERAL SAFETY ASPECTS ARE TO BE TAKEN SERIOUSLY.**  ➢ Before transporting the equipment to the site, ensure that the accessories are positioned in such a way that they cannot cause an accidental damage. Inspect the equipment before and after use for visible defects or damage. In the event of malfunctions, immediately shut down the equipment and secure lifted load. ➢ Safety devices sho ➢ uldn't be tampered. The maximum operating pressure set on the equipment must not be changed. ➢ Wear protective clothing, safety helmet with face visor, safety shoes and protective gloves. It is prohibited to work under load if this load is lifted exclusively by hydraulic equipment. If nature of work is inevitable, additional mechanical supports should be used. Inspect all pressure lines, hoses and connections for leaks and externally visible damage. If necessary, repair immediately. Squirting hydraulic liquids can result in injuries and fires when pumping unit is of combustion engine. ➢ Filling up of fuel or hydraulic oil during operation of the combustion engine is strictly prohibited. If the fuel of a combustion engine is spilled, this must be cleaned up before the engine is started. When working with combustion engine pumps, never touch the motor and exhaust system, since there is a risk of burning. ➢ Internal Combustion engines like petrol & diesel engines are not permitted to be operated in enclosed spaces as there is a risk of air poisoning and / or asphyxiation. ➢ When working close to live power, suitable measures must be taken to avoid high-voltage transferring to the equipment. Prior to equipment is switched on / started up, and during its operation, ensure that none is endangered by the operation of the equipment. Ensure that body parts or clothing don't get stuck between moving parts.

<table>
<tr><td></td><td>➢ Do not carry out any changes to the equipment. Instructions regarding safety are to be kept complete and in a legible condition.</td></tr>
<tr><td>3.</td><td>MAINTENANCE OF THE EQUIPMENT
Equipment is designed for Zero maintenance, however please note, hydraulic units are subjected to higher mechanical loads. Visual inspection and function tests must be carried out at regular time intervals. Inspection while operating the equipment detects signs of wear. Replacement of worn out or given up parts prevent potential damage to the equipment.</td></tr>
<tr><td>4.</td><td>SERVICING
Servicing is carried out by the manufacturer or personnel trained by the manufacturer only. OEM spare parts only to be used to replace worn-out or given up components. During installation work, pay particular attention to the cleanliness of all components as contaminants could cause damage to the hydraulic unit.</td></tr>
<tr><td>5.</td><td>PREVENTIVE SERVICE SCHEDULE
➢ The exterior surface of the equipment should be cleaned from time to time in order to protect from external corrosion. Oil is to be applied to the metallic surfaces.
➢ Jacks - Hydraulic seal kits should be replaced once in five years or whenever leakage is observed. Replacement of seals on damaged rams does not solve the leakage problem because seal gets cut there. Replace the dented / damaged ram.
➢ Observe all fasteners while working & tighten if loosened.
➢ Close observation prior to work, while working and after the work is must.
➢ Contact manufacturer if necessary or seek remedy from the manual.</td></tr>
<tr><td>6.</td><td>SCHEDULED MAINTENANCE & TROUBLESHOOTING</td></tr>
<tr><td></td><td>TILTING JACKS</td></tr>
<tr><td></td><td>MAINTENANCE –
In principle, there is no maintenance. Keep the jacks clean extremely. Replace all seals once in five to seven years or as & when leakage observed.</td></tr>
<tr><td></td><td><table>
<tr><td>Trouble</td><td>Cause</td><td>Solution</td></tr>
<tr><td>Leakage from seal box</td><td>Rod seal failed.</td><td>Check physical damage if any to the ram. Replace ram and then the seal.</td></tr>
</table></td></tr>
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Item listed as per contract

SL NO	DESCRIPTION AS PER DRAWINGS/P.O	QUANTITY	SERIAL NUMBER
1.	LIFTING JACK WITH HOOKED STOPPER (WITHOUT QUICK CONNECT COUPLERS)	02 NO'S	9750 & 9751

MAINTENANCE OF HRE

SL NO	DESCRIPTION	MAINTENANCE / USES
1	Petrol Engine Driven Power Pack	
2	Hydraulic oil - 68	Replace oil after 300 hrs of working, or when oil changes color or every three years as the case may be. The fluid should be replaced when it is warmed up. The old hydraulic fluid must be disposed of properly. Engine must be started once in a week for 2 – 3 minutes
3	Jacks	Hydraulic seal kits should be replaced once in 5/7 years or whenever leakage is observed. Replacement of seals on damaged rams does not solve the leakage problem because seal gets cut there. Replace the dented / damaged ram
4	Re-railing bridges, roller carriages, distance bars, mechanical stopper, Wire rope, multistage rings & other mechanical parts.	There is no maintenance schedule. Keep the unit clean extremely. Use wooden planks under the bridge.

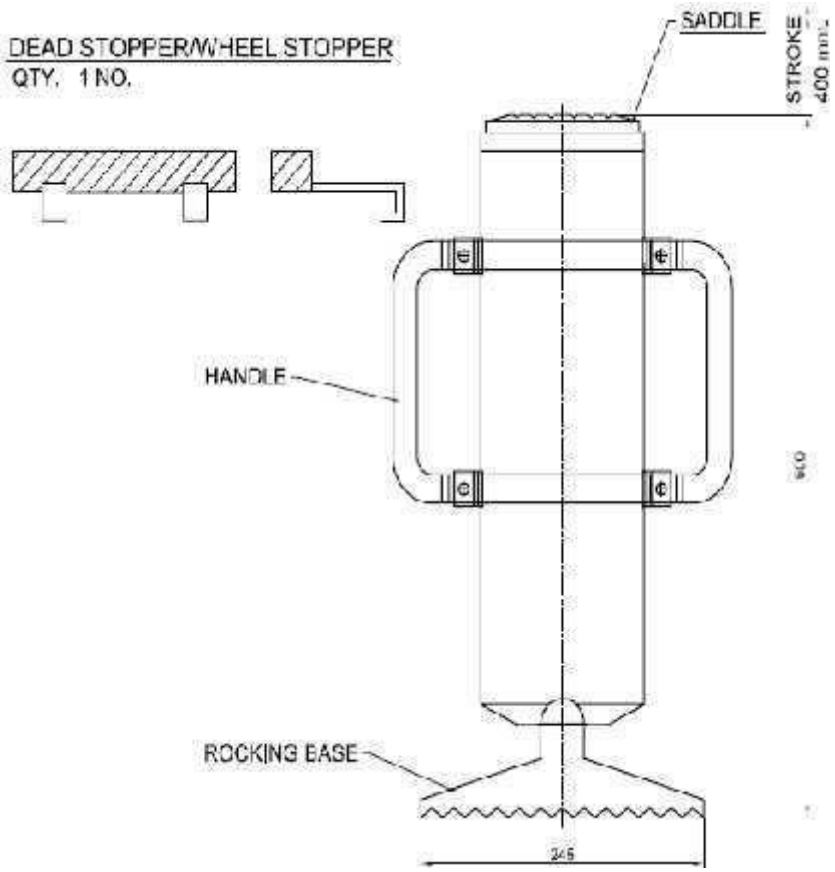
About tilting jack

TILTING JACK WITH HOOKED WHEEL STOP

Illustrative photos explain the process by itself.

- Tilting jack capacity - 212 kN, Construction height 600 mm,
- Stroke – 400 mm
- Used in combination with hooked wheel stop.
- This jack is mainly used for quick re-railing of two axle tanker.
- This jack is also useful in up-righting equipment.

Contrarily to the universal applicationof the jacks mentioned before, the tilting jack mainly serves for re-railing one derailed axle of a two-axle light or empty freight wagon in those cases where lifting and lateral displacement can be substituted by tilting the respective end of the vehicle towards the track either once or repeatedly.



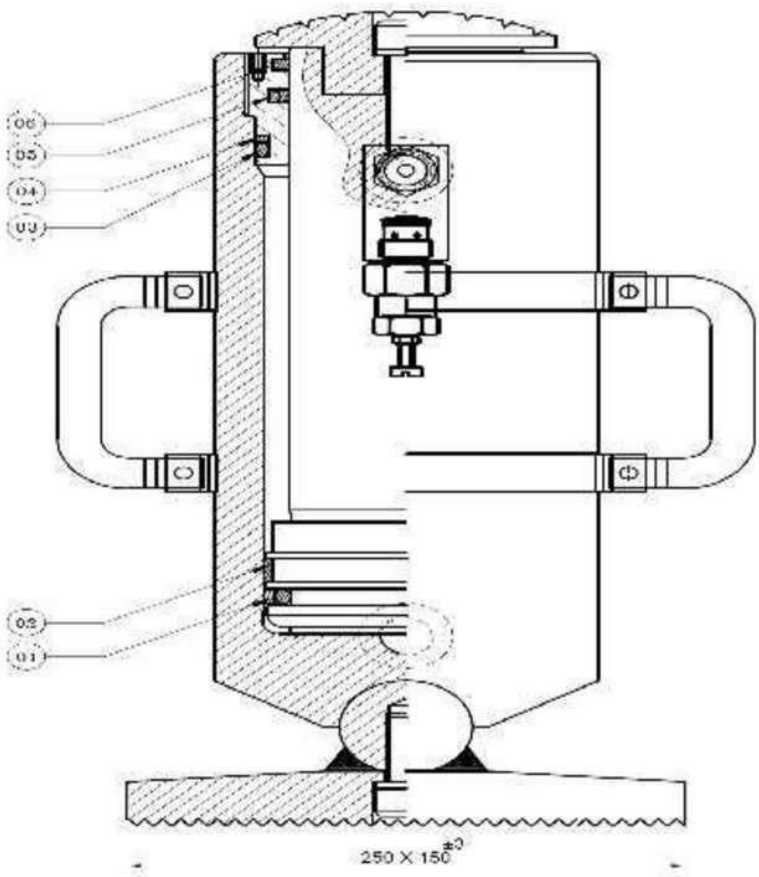
About fault finding

1. FAULTS OCCURING WITH THE JACKS

a) Piston cannot be extended, as :

- lack of oil within oil tank
- Air trapped within hydraulic system.
- piston seals defective
- oil too viscous

FOR SEAL KIT



SL.NO	PART NO.	DESCRIPTION	QTY
06	0305115510	WIPER RING	01
05	0326051820	ROD SEAL	01
04	0331010900	BACK UP RING	01
03	0307111070	O RING	01
02	0324010110	TURCITE STRIP	01
01	0325051800	PISTON SEAL (GLYDRING)	01

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Preserve This Manual for Future Reference & Records