Heavy duty camera winch.
Document name:

**VOR-HDCW-MAN:**

**VER 1.0**

Vortex Heavy Duty camera winch manual version 1.0

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1. INTRODUCTION

The Vortex heavy duty camera winch is designed to carry nominal 9mm diameter cable (cable size can be changed) to operate cameras or sensors.

1.1 Reference Documents
See Appendix and references section at the end of this document for certificates and manufacturers data.

1.2 Contacts
For Technical queries, Comments and Feedback contact Vortex Dredge: goodinjoe@gmail.com
2. SAFETY

2.1 Overview
All local HSE procedures must be followed. Use of PPE should follow guidelines outlined with handling of potential sample. For example hazardous gas samples should have PPE appropriate to mitigate dangers associated with that gas. Safety glasses should be considered minimum requirement irrespective of potential sample. Your safety is your responsibility. Think and plan ahead accordingly.

2.2 Risk Assessment
Consult with local HSE and installation operators to identify best practice steps needed for safe operations. Identify if the task been done and implement lessons learned. JHA, permitting and toolbox talks should preclude all operations.

2.3 Mechanical
Ensure all fittings and fasteners are secure. Check general condition of tool against images in manual for anything which may indicate potential operational issues.

•Remember, your safety is your responsibility. Think and plan ahead accordingly. If in doubt, please ask.
3. TECHNICAL SPECIFICATIONS

3.1 Description

Hydraulic driven winch with electrical 8 path slip rings.
3. TECHNICAL SPECIFICATIONS

3.2 Features include:

- ROV or topside hydraulics compatible.
- OMM32, 1.93 in3 / rev powerful and constant operating torque motor with 180kg capacity.
- Heavy duty worm gearbox with 50:1 gear ratio provides smooth line speed.
- Stainless steel and Acetal construction.
- Oil filled Gearbox for operation at depth.
- Load holding via worm gearbox provides controlled lowering and full load holding - no brake needed.
- Recommended for tooling packages and down hole cameras.
- Depth rating 3000mtr
- Roller fairlead

3.3 Specifications: The rated line pull shown is based on the first layer of cable on the drum.

- Rated Line Pull: 180 kg / 442 lb at 11th layer of cable with 1000psi at motor.
- Line Speed in: @ 16 LPM oil flow = 6.8 mtr/min at first layer of cable @ 180kg lift
- Minimum hydraulic flow = 16 LPM
- Maximum hydraulic flow = 20 lpm
- Minimum operation Pressure: 70 bar/ 1000 psi
- Maximum operation Pressure: 103 bar/ 1500 psi
- Hydraulic Motor: OMM32 31.6 or 1.93 in3 / rev
- Gear Train: Worm drive gearbox to stainless chains and sprockets
- Gear Ratio: 50:1 NMRV-P063 50 to1 WORM GEARBOX
- Winch Construction: Stainless steel and Acetal
- Brake: N/A. Winch uses worm drive gearbox for load holding
- Rotation of Winch: Over-wound orientation only
- Drum Barrel Diameter: 214 mm
- Drum Flange Diameter: 400 mm
- Distance Between Flanges: 166 mm
- Cable size Recommended: 9mm +/- 0.1mm
- Cable length potential with 9mm drum:
  - Level wind: Stainless diamond bar with integral fairlead
  - Slip rings: MOFLON MFS028-S08-IP68-VD OD 28mm, 8 signal, Max speed 200RPM, IP68, stainless steel housing, Industrial quality version(VD), Oil filled with comp tube
- Drum capacity using 9mm diameter cable:
  Theoretical wrapping of 18 wraps per lay to the maximum diameter would achieve approximately 146m. Actual wrapping of 17 wraps per lay gives approximately 137m. This gives a maximum of 9 lays on a full drum. Approximately 70 mtrs would need 5 lays.
- Weight in air: 59kg
- Weight in water: 39kg
- Dimensions: 650mm L x 550mm high x 528mm wide
# 3. TECHNICAL SPECIFICATIONS

## 3.4 Specifications: Drum pull and drum capacity.

<table>
<thead>
<tr>
<th>Layer of Wire Rope</th>
<th>Test pull weight kg / lb</th>
<th>Total cable on Drum Mtr</th>
<th>Line speed pulling in at 16 lpm Minimum (mtr/min)</th>
<th>Line speed Paying out at 16 lpm Minimum (mtr/min)</th>
<th>Hydraulic pressure required Bar / Psi</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>180 / 442</td>
<td>8.2</td>
<td>6.8</td>
<td>9.3</td>
<td>39.9 / 580</td>
</tr>
<tr>
<td>11th</td>
<td>180 / 442</td>
<td>70.1</td>
<td>10</td>
<td>12.1</td>
<td>55.1 / 800</td>
</tr>
</tbody>
</table>

Row 1 (6 Pre-Wraps) = 4.128m @ ID 219
Row 1 (12 Wraps) = 8.257m @ ID 219
Total Of 6 Pre-Wraps = 4.13m
Total After 6 Pre-Wraps = 66.38m
Total Including 6 Pre-Wraps = 70.5m
3. TECHNICAL SPECIFICATIONS

3.5 Specifications:
Base mounting holes.

Dimensions and specifications:
- Base mounting holes: 10.5 mm dia hole
- Overall dimensions: 700 x 520 x 260 x 260 x 90 x 60 x 60 x 280 x 60

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4. OPERATION PROCEDURES

4.1 Pre Dive Checks tool visual check

A: Ensure no damage to slip ring pins. Pin out from slip ring pins to cable end prior to and after deployment.
B: Ensure slip ring comp tube is near full of **dielectric oil**. A small air bubble is ok to allow for expansion.
C: Ensure gearbox comp tube is near full of **OMALA S4 WE 320** or **SHELL TIVELA S 320** oil. A small air bubble is ok to allow for expansion.
Set up drum with cable hole at top with spirit level on bolts as shown and level wind traveling away from sprockets. Rotate sprockets and jump the chains until measurements are as seen. Level wind pawl should be as shown.
4. OPERATION PROCEDURES

4.3 Level wind setting at start of cable lay. Cable installation

Rotate sprockets and jump the chains until measurements are as seen. Level wind pawl should be as shown.

Load cable into drum hole, connect to slip ring, secure slip ring with excess of cable inside drum.

Slowly rotate drum holding cable on drum as it rotates until at least 4 wraps are on drum. Keep tension on cable to ensure cable is tightly wrapped on drum.

Cable should be wrapped on drum under tension until full length of cable is installed.

ALWAYS KEEP AT LEAST 6 WRAPS ON DRUM AT ALL TIMES.
4. OPERATION PROCEDURES

4.4 Hydraulic connection

MOTOR DANFOSS 32CC/REV
SIDE PORTS
16MM
KEYED SHAFT
#6 BSP
OMM 32
OMM 2 BOLT FLANGE

10.57mm setting on both ends of cross port relief valve gives 1020psi.
4. OPERATION PROCEDURES

4.5 Hydraulic connection

- Minimum hydraulic flow = 16 LPM
- Maximum hydraulic flow = 20 lpm
- Minimum operation Pressure: 70 bar/1000 psi
- Maximum operation Pressure: 103 bar/1500 psi
- Rated Line Pull: 180 kg / 442 lb at 11th layer of cable with 1000 psi at motor.
- Port A = -4 jic
- Port B = -6 jic
4. OPERATION PROCEDURES

4.6 Servicing: Winch disassembly

Remove slip ring rotation retaining plate

Remove slip rings, carefully guiding comm tube from clearance gap
4. OPERATION PROCEDURES

4.7 Servicing: Winch dis assembly

Remove these bolts to remove gearbox from winch
4. OPERATION PROCEDURES

4.8 Servicing: Winch dis assembly

Remove these cap screws to unmount gearbox side cheek plate.
4. OPERATION PROCEDURES

4.9 Servicing: Winch dis assembly

Remove chains then remove gearbox side cheek plate to expose primary drive sprocket as shown.
4. OPERATION PROCEDURES

4.10 Servicing: Winch dis assembly

Remove drum from main bearing to expose slip ring side cheek plate as shown.

Re assembly of winch in reverse order.
4. OPERATION PROCEDURES

4.11 Servicing: Rust preventative and lubrication

After 3 to 5 dives, remove hydraulic motor, wash out with fresh water any debris, dry thoroughly and liberally spray a lot of rust preventative such as shown to protect carbon steel parts of gearbox. Spray the same on all areas of motor before bolting on gearbox. Spray gearbox with same product to prevent corrosion.
4. OPERATION PROCEDURES

4.12 Servicing: Rust preventative and lubrication

Before and after each deployment, pump grease in top to fill voids with grease and push water out. This is to protect carbon steel parts of drive system.

Pump grease in until it comes out these holes at the bottom here.

REMOVE ALL PRESSURE FROM TOOL BEFORE SERVICING:
5. MAINTENANCE & STORAGE

5.1 Standard Procedures

• Tool should be flushed with hot soapy water after each dive.
• Allow to dry fully.
• Spray rust preventative over aluminum and carbon steel parts.
• Check and replace anodes as required.
• Grease all points until full.
• Check operational condition of slip rings.
• Visual check of tool for anything which could prohibit future operation of the tool.

5.2 Replacement Procedures

• Contact Ashtead Technology representatives with reports of any damaged or unserviceable items
6. APPENDIX AND REFERENCES

6.1 Tool dimensions and weights
6. APPENDIX AND REFERENCES

Appendix 1
Gearbox oil  OMALA S4 WE 320  or  SHELL TIVELA S 320

Appendix 2
Rust preventative spray
6. APPENDIX AND REFERENCES

Appendix 3
Gearbox
NMRVP063/050
NMRV-P063 50:1 WORM GEARBOX

Motor to gearbox drive bush
NMRVP063BUSH14MM
NMRV-P063 INPUT BUSH 14mm

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<table>
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<tr>
<th>NMRV063 power</th>
<th>Motor size up to</th>
<th>Motor power up to</th>
<th>Nominal torque Nm</th>
<th>Ratios</th>
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<tbody>
<tr>
<td></td>
<td>090</td>
<td>2,2 kW</td>
<td>170</td>
<td>5,00 to 100,00</td>
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<table>
<thead>
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<th>PC+NMRV063 power</th>
<th>Motor size up to</th>
<th>Motor power up to</th>
<th>Nominal torque Nm</th>
<th>Ratios</th>
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<tbody>
<tr>
<td></td>
<td>080</td>
<td>0,92 kW</td>
<td>280</td>
<td>7,25 to 788,00</td>
</tr>
</tbody>
</table>
Appendix 4
Slip rings
MOFLON MFS028-S08-IP68-VD OD 28mm, 8Xsignal, Max speed 200RPM, IP68, stainless steel housing, Industrial quality version (VD), Oil filled with comp tube

FILL WITH DIALECTRIC OIL

Slip ring connectors: MCBH8MSS Subconn connector

Factory modified for M5 threaded hole and NETA plastic hose tail with taper cut off thread as shown.
6. APPENDIX AND REFERENCES

Appendix 5
Sprockets and drive chains

Sprockets: 1/2" BS SIMPLEX S

Chain:
08B-1-SS-KANA BS 1/2" SIMPLEX S/S CHAIN

Chain link:
08B-1-SS-CL-KANA BS 1/2" SIMPLEX S/S Conn L

Drum to idler chain: 505 mm
Idler to level wind chain: 445 mm
6. Contacts

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