The Phantom® FireFly remotely operated vehicle (ROV) is used for nuclear outage support and its portability and ease of deployment helps shorten facility down time. It is sized to penetrate through and below the top guide and core plate.

• Normally used for steam dryer visual exam during BWR scheduled outages. All materials are suitable for use in nuclear support.
• Torque balanced thrusters provide a high degree of control and maneuverability in the confined environments.
• Minimal electronics in the sub unit, ensuring reliability in areas of high radiation.
• All system fuses located in the surface control console for fast access.

The Phantom® FireFly ROV includes a one-year manufacturer’s warranty.

APPLICATIONS OF THE PHANTOM® FIREFLY

• Outage support for Nuclear Boiling Water Reactors (BWR)

THE DEEP OCEAN ENGINEERING ADVANTAGE

Deep Ocean Engineering is a USA based manufacturer of powerful, expandable, rugged underwater and surface drone vehicles, headquartered in the technology capital of the world, Silicon Valley, California. Its legendary Phantom® line of ROVs and USVs, many of which have been in use around the world for decades, are integrated with the latest digital technology and the highest quality components available in the market today, including thrusters, cables, sonar, cameras, lighting, navigation software and power.
### VEHICLE SPECIFICATIONS*

<table>
<thead>
<tr>
<th>Specification</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Working Depth</td>
<td>46m (150 ft)</td>
</tr>
<tr>
<td>Length</td>
<td>190mm (7.5 in)</td>
</tr>
<tr>
<td>Width</td>
<td>146mm (5.8 in)</td>
</tr>
<tr>
<td>Height</td>
<td>343mm (13.5 in)</td>
</tr>
<tr>
<td>Weight</td>
<td>6.35kg (14 lb)</td>
</tr>
</tbody>
</table>

### CAMER A TILT PLATFORM

- Operational arc: +30 Degrees / -150 Degrees
- Degrees from Horizontal: 9 Degrees per second

### LIGHTING

- 4 x 20 watt camera mounted lamps
- Variable light control, 2 light circuits

### THRUSTERS

- Brushed 48 VDC
- Shaft driven
- Individually controlled
- Mineral oil filled compensator on shaft seal

### OPTIONS

- Spares kits
- Technical training

### UMBILICAL

<table>
<thead>
<tr>
<th>Specification</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Bend</td>
<td>245mm (10in)</td>
</tr>
<tr>
<td>Weight in Air</td>
<td>8.5kg (18.5lb)/per 175 in</td>
</tr>
<tr>
<td>Weight in Water</td>
<td>3.2kg (7lb)/per 175 in</td>
</tr>
</tbody>
</table>

### CAMERA

- DOE 10:1 Color zoom
- Video Rating: 75 ohm coax, y/c
- Resolution: 470 lines of TV
- Sensitivity: 1.5 Lux
- Viewing Angle: 5 Degrees – 46 Degrees
- Length: 5.5 in
- Diameter: 2.8 in
- Weight in Water: 0.2 lb
- Air Weight: 1.4 lb

### CHASSIS

- Hard anodized black aluminum lower unit
- Houses camera/lights assembly
- Foam buoyancy houses 4 thrusters
- Protected by skid plates
- Safety wired stainless hardware
- Non-corroding

* Specifications subject to change 07112019