

Seaeye Falcon 12170 powerful portable versatile



The powerful, portable and versatile Seaeye Falcon designed for coastal and inshore operations to 300 metres water depth or for fly away operations offshore.

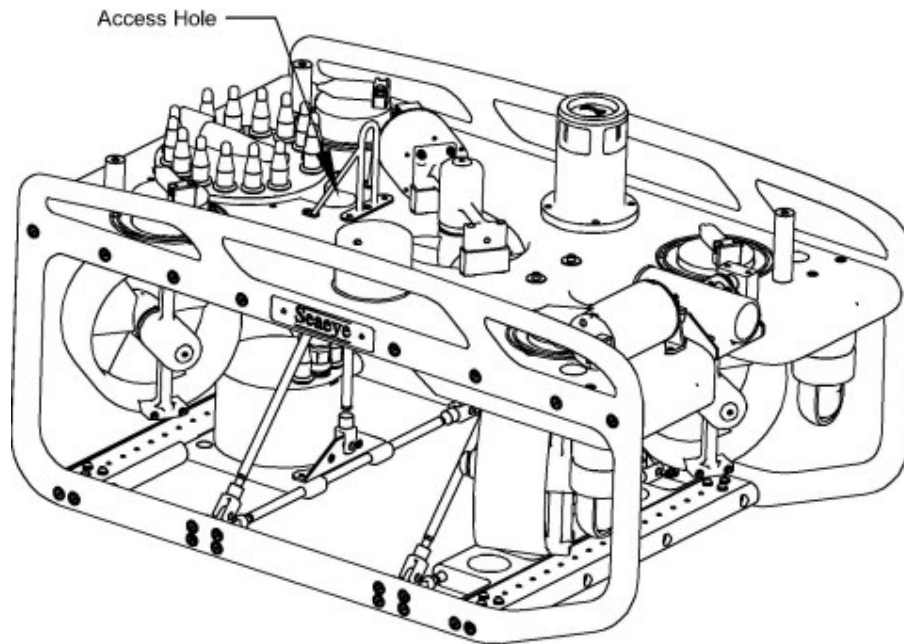
Seaeye Falcon Features:

- 300 metre depth rating, 16 kilo payload
- Max 450 metre umbilical
- Magnetically coupled brushless DC thrusters with velocity feedback loop
- 4 Vectored and 1 vertical thruster
- 50 kgf thrust with 1:1 power to weight ratio
- Distributed intelligence control system
- Integral system diagnostics
- High resolution colour camera on 180° Tilt Platform
- Variable intensity 150 watts of lighting
- Auto heading, depth, compass and rate gyro
- Portable surface control system with video overlay and daylight readable display
- Low drag umbilical
- Single phase A/C power input - auto selecting universal 100-270 VAC at 2.8 kW
- Sonar
- Single function Manipulator

THE VEHICLES Specifications

Vehicle Specifications	Seaeye Falcon
Maximum Working Depth	300 msw
Length	1000 mm
Height	500 mm
Width	600 mm
Launch Weight	50 kg (62 kg with additional buoyancy module installed)
Forward Speed	> 3 knots
Thrust Forward	50 kgf
Thrust Lateral	28 kgf
Thrust Vertical	13 kgf
Payload	4 kg (16 kg with additional buoyancy module installed)

Chassis Layout



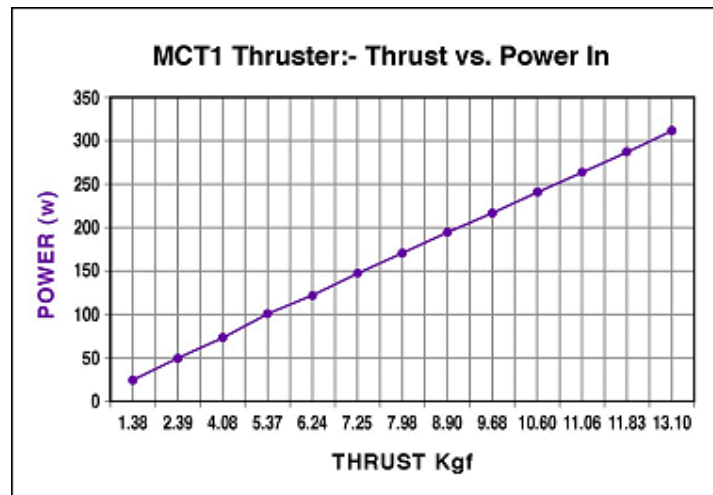
Saab Seaeve pioneered the use of polypropylene in the construction of ROV frames and continues this development with the Falcon. This material is robust, buoyant, easily drilled and machined and is corrosion free. Falcon's modern 'open frame' design allows the easy addition of standard bolt on accessories including cameras, sonars, tracking systems and a single function manipulator. Custom designed under-slung modules can also be added for task specific tooling. 316 stainless steel fittings are used throughout. The core frame is manufactured using modern composite materials.

Buoyancy & Payload

Buoyancy and payload is provided by securing buoyancy blocks of the appropriate depth rating to the chassis below an easily removable hydrodynamic faring. The faring cover also provides protection to electronics housings and cables routed along the top of the buoyancy to the junction box. Mounting points on the vehicle skids are provided for lead ballast to trim the vehicle's centre of gravity and buoyancy.

Propulsion

Brushless DC thrusters have been used on all Seaeve ROVs since 1987 when the company first introduced this technology to the offshore oil & gas industry. These thrusters have drive electronics with velocity feedback for precise and rapid thrust control. A fast PID control system and a solid-state rate gyro for enhanced azimuth stability prevent overshoot on a change of heading as well as helping stabilise the vehicle in forward flight making the vehicle so easy to fly.



The Falcon MCT01 thrusters are magnetically coupled and run cool without oil. Having no moving shaft seals they are extremely low maintenance, reliable and ideal for use in sensitive areas such as fisheries and on reefs.

The open frame and clutter free layout between decks in the Falcon provides the clearest water flow to 4 horizontal vectored thrusters positioned for optimum thrust and control in all directions and superior station keeping in strong cross currents.

Falcons are powered by 5 Seaeye Magnetically Coupled Thruster units (MCT1) each capable of achieving 13 kgf thrust at 320W or a combined forward thrust (bollard pull) of 50 kgf. For an ROV weighing only 50 kilos this represents an impressive 1:1 power to weight ratio.

MCT1 Thruster Performance

Thruster Configuration

4 Vectored Horizontal Thrusters

1 Vertical Thruster

Distributed Intelligence Control System & ROV Junction Box

The Falcon is the first ROV in its class to have a *distributed intelligence* control system. This is a multi-drop network that allows up to 128 devices to be connected together on a single RS485 serial network and to be individually controlled by a master processor.

Every controllable device on a Falcon, such as thrusters, lights, camera tilt motor, navigation pod and manipulator pod, contains its own microprocessor and interface and is called a 'node'. Each of these 'nodes' is separately addressed on the network and controlled by the master processor in the Surface Unit. Every node is fully isolated to maximise system reliability and each is connected into the vehicle junction box PCB using a common through bulkhead connector. The JB printed circuit board provides each node with its own

fused power supply and telemetry. This use of distributed intelligence does away with the traditional ROV electronics pod packed with interface circuit boards and frees up space while significantly reducing the weight of the vehicle.

Control System Diagnostics

Full system diagnostics are provided: A software routine automatically checks each node when the system is powered up and alerts are provided on the video overlay to warn the operator. The full characteristics of each node can also be interrogated individually from the surface unit. Local diagnostics are also provided for each node in the Junction Box with colour coded LEDs confirming fuse and telemetry status.

Camera System

A high resolution fixed focus colour camera is fitted to a camera platform that can be tilted + 90 degrees. An additional switched camera can be added to Falcon and is usually mounted on the underside of the camera tilt platform. The F2 Fibre Optic Pack in Falcon DR - (optional in standard Falcons) - provides 3 simultaneous video channels. Panning the camera is achieved by turning the vehicle which it can do within its own length.

Standard Seabeam Colour Camera Specification	
Camera Resolution	480 TVL
Min. Scene Illumination	0.2 LUX (F1.4)
Pick Up Device	1/2 Inch CCD Image Sensor
Lens	1/2" Aspherical 3.8mm lens, wide angle fixed focus
Horizontal Field of View	91°
Tilt	±90°

Navigation System & Auto Functions

Lighting



Two forward facing variable intensity 75 watt Tungsten Halogen flood lights are fitted. An optional additional light can be added. The lights are powered at low voltage, to improve reliability and longevity. In the Falcon *DR* the forward facing lights tilt with the camera for improved scene illumination. HID lights are offered as an option.

All navigation sensors and aids are housed in a single hardened aluminium pod. Auto depth and heading are standard fit with auto altitude offered as an option. A pitch and roll sensor is included and may be selected for display on the video overlay.

Specification	
Compass Accuracy	±0.5°
Depth Sensor Accuracy	±0.5% of FSD
Gyro	0.1 °/s
Surface Update Rate	<40 mS

SURFACE EQUIPMENT



Input Power Requirements

Single Phase universal auto sensing, self selecting input of 100-270 VAC at 2.8 kw.

Falcon Surface Control unit

The Falcon switch mode power supplies, control system, fold out 17 inch LCD monitor and keyboard are installed in a 19 inch rack mount transport case. All connections to the surface unit are on the front panel for easy access including the hand controller with its 5 metre flying lead. The power output from the surface unit to the umbilical is a galvanically isolated 500 VDC supply protected by a L.I.M.

Vehicle Controls on the Hand Control Unit (HCU)



The following vehicle controls are provided on the HCU:

- Single 3 axis joystick for horizontal vehicle control including forward, back, sideways and turn.
- Rotary trim controller for vertical thrust up or down.
- Push button dive and surface control
- Thruster enable / disable and power setting
- Camera selection
- Rotary control for lights intensity
- Auto pilot function for both heading & depth.
- Auxiliary vehicle controls (including manipulator open/close)

Video Overlay

A video overlay system is incorporated as standard providing the following information to the pilot:

- Compass heading
- Depth
- Camera tilt position
- Auto pilot function status
- Umbilical turns counter
- Vehicle pitch and roll
- CP reading

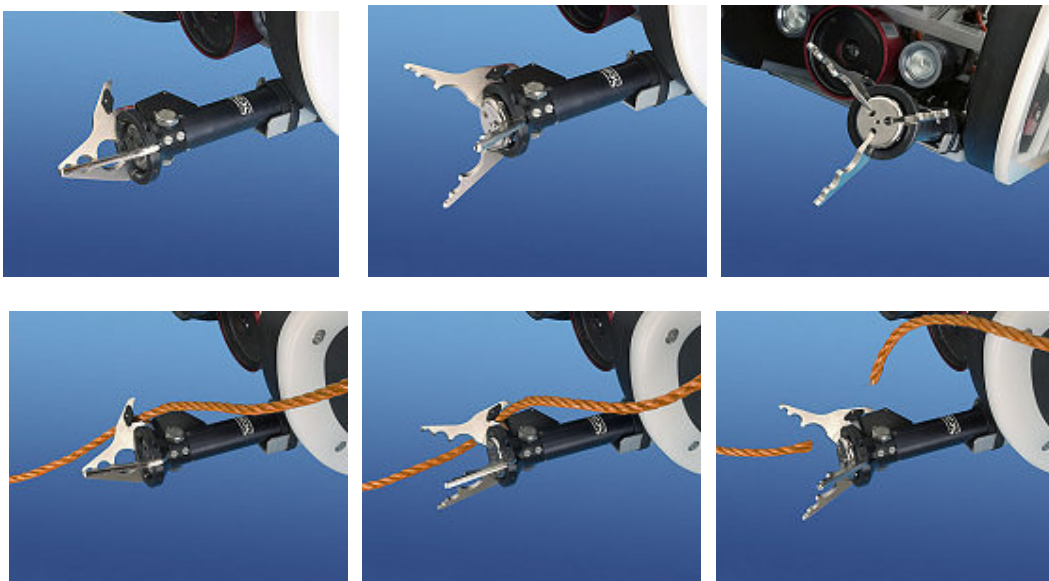
- Date and time
- Free Text using a QWERTY keyboard

UMBILICAL CABLES



For the standard Falcon a choice of neutrally buoyant or thinner, slightly heavy umbilical cable is offered. These light weight proprietary jacketed cables offer high abrasion resistance and incorporate a Vectran strength member. This cable features a tough abrasion resistant Polyethylene inner and outer jacket with a torque balanced vectran braided strength member. Internally this cable has two multi mode fibre optic passes providing 100% redundancy.

Single Function 3 Jaw Manipulator



The Manipulator (Type GRIPSTICK01) allows the operator to remotely hold objects and maneuver them as required. This clever single function manipulator has three, 100 mm stainless steel jaws enabling vertical or horizontal objects to be grasped without the need of the rotate function required with traditional two jaw manipulators. Particularly useful

for freeing trapped umbilicals, light recovery tasks or attaching a line, we recommend this device as the first choice of accessory to add to the vehicle. This tool can also be used to cut 9 mm diameter rope with the simple installation of a craft or 'Stanley Knife' blade that remains fully protected while the jaws are closed. Open and close of the jaws is controlled on the Falcon hand controller.

Sonar



Sonar is the underwater equivalent of radar and is used to increase the detection range of subsea objects far beyond the visual range of the ROV's camera. This significantly adds to the operational capability of any ROV particularly in search and survey operations as well as for obstacle avoidance. It can also be a great help to the ROV pilot in orientating himself and the ROV to its surroundings, particularly in poor visibility. In extreme conditions it may be impossible to usefully operate an ROV without sonar. The detection range of sonar depends on ambient water conditions, the type of seabed, the size of the object and the frequency of the sonar head. Lower frequency sonars provide greater detection range but at the expense of image resolution. Higher frequency sonars have lower detection ranges but greater resolution. Some sonars have a fixed frequency while others are tuneable or have dual, selectable frequencies. The sonar head is installed on the vehicle with the transducer protected by a polypropylene guard. The sonar data is transmitted to the surface processor through a spare screened twisted pair in the ROV umbilical and the sonar image is displayed on a monitor housed in a 19 inch racked transit case with the sonar processor. Some manufacturers offer sonar processing software that can be installed on the clients own PC as an alternative to using their surface sonar processor