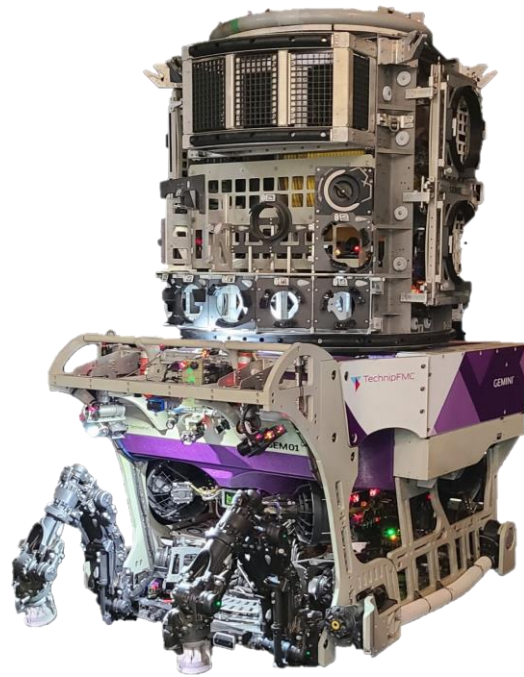


Schilling Robotics GEMINI™ ROV System

The GEMINI™ ROV System is the next generation of advanced Work Class ROV providing unprecedented productivity and reliability for the most complex deep-water intervention tasks in oil and gas developments worldwide. The ROV is designed as a highly stable, powerful work platform, specifically optimized for all typical tasks associated with drill support and completion activities.

The GEMINI™ ROV is equipped with dual next-generation manipulators enabling the ROV to exchange tools subsea without the requirement to recover to the surface. The system is designed to remain at the subsea worksite for extended periods, performing numerous subsea tasks utilizing the tooling and services stored on the ROV and TMS. At 250 horsepower and a depth rating of 9,843 fsw (3,000 m) or 13,123 fsw (4,000 m), the GEMINI™ ROV's overall performance is unequaled.

- Integrated next-generation dual manipulator systems with force compliance (mitigates all forces being applied during intervention tasks)
- Manipulator tooling interface with integrated electric power, communications, and hydraulics for tooling
- One-touch automated tool exchange on either port or starboard manipulator
- Integrated tooling suite (over 30 standard tools)
- 2-minute automated tool exchange
- 5-minute pilot assisted tool engagement
- Two (2) 55 gal (208 liter) or one (1) 110 gal (416 liter) auxiliary fluid reservoir(s) and 25 gal (95 liter) waste fluid reservoir
- Integrated 250 hp HPU (motor, pumps, reservoirs, and filters)
- Integrated 150 hp auxiliary system (ISOL-8 pump) capable of pumping multiple fluids simultaneously with combined 50 gpm at 5,000 psi (189 lpm at 345 Bar)
- Integrated API 53 compliance for BOP intervention (less than 45 seconds to shear and seal BOP)
- Integrated Schilling advanced tooling valve packs providing fluid intervention flexibility
- Seven (7) thruster propulsion system, featuring Schilling thrusters that enable long duration dives
- 60-minute repair/replacement time on all subsystems including the GEMINI™ manipulators
- 28-day dive duration with all tooling and fluids available for work 24/7



ISOL-8 Auxiliary Tooling System

To meet the most demanding intervention requirements, the ISOL-8 pump is capable of producing a maximum output of 50 gpm at 5,000 psi (189 lpm at 345 Bar), sufficient to actuate BOP shear rams, shear and seal, in 45 seconds or less as specified by API 53. This level of performance is attained through an 8-cylinder reciprocating pump that can operate with hydraulic fluid, water glycol or seawater. The pump can deliver multiple fluids, simultaneously offering fully independent pressure and flow control of each hydraulic circuit through the onboard Schilling Robotics multi-function valve packs.

StationKeep™ V2

The newest version of StationKeep™ V2 incorporates additional ROV sensor inputs and a state estimator, enhancing the overall accuracy and performance by a minimum factor of four in extreme environmental conditions and up to a factor of ten in normal operating conditions. These performance enhancements provide an extremely stable platform from which high-precision intervention tasks can be performed by the GEMINI™ ROV without the need to anchor and stabilize the ROV to a subsea asset. The accuracy of Schilling Robotics' StationKeep™ V2 mode is unmatched in its ability to maintain vehicle position within a 1 in (25 mm) watch circle in currents exceeding 2 knots.

GEMINI™ Manipulators

The GEMINI™ ROV features a fully integrated dual manipulator system. Each manipulator is a six-degree-of-freedom, roll-pitch-roll hydraulic manipulator with a force sensing, tool exchanging wrist that can transfer power, communications, and hydraulic fluid to attached tools.

The manipulator meets Schilling's 60-minute repair philosophy, incorporating a modular design that simplifies maintenance, troubleshooting, and repair by concentrating functions in modules and simplifying the interconnections between modules. The manipulator tooling interface allows zero-leak subsea tool exchange with positive tool engagement, ensuring tools are correctly oriented and can never be accidentally dropped.

Tools are automatically exchanged from the ROV tool carousel or TMS tool holders with the touch of a button.

Assist and automated modes aid operators to quickly and consistently perform tasks regardless of operator skill.

- Reach: 89 in (2.26 m)
- High-accuracy performance payload: 140 lbs (63.5 kg)
- Heavy-lift manipulation payload: 375 lbs (170 kg)
- FLOT 1-DOF orientation payload: 600 lbs (272 kg)
- Wrist torque and rotation, nominal: 450 ft-lbs (62 kg-m); 360° continuous up to 100 rpm
- Through-arm tool hydraulics: 8 gpm @ 5,000 psi (30.3 lpm @ 345 Bar)
- Through-arm tool power: 120 W
- Through-arm tool communications: 100 Mb Ethernet
- Integrated machine vision camera (MVC) and lights



GEMINI™ ROV Tooling Carousel with Capacity for 15 Tools and Automatic Acquisition by Port or Starboard Manipulators

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Specifications

Working Depth:	9,843 fsw (3,000 m) or 13,123 fsw (4,000 m)
Docking Interface SWL:	20,062 lbs (9,100 kg)
Through-Frame Lift (w/ All Tools and Fluids Installed):	2,200 lbs (1,000 kg)
Weight in Air:	12,980 lbs (5,900 kg)
Weight in Air (w/ 110 gal fluid):	13,948 lbs (6,340 kg)
Dimensions:	13 ft x 8 ft x 8 ft (3.9 m x 2.5 m x 2.5 m)
Payload (Tools Installed):	66 lbs (30 kg)

Peak Thrust Performance

- Forward/ Aft/ Lateral: 8,680 ft-lb (1,200 kgf)
- Vertical - Up/ Down: 7,233 ft-lb (1,000 kgf)
- StationKeep™: 1 in (25 mm)

Equipment Fit

- Manipulators: (2) GEMINI™
- Depth Sensor: Valeport miniIPS
- MRU: iXblue Octans Nano
- DVL: Teledyne RDI Pioneer 600 kHz
- Lights: (11) 120 VAC and (3) 24 VDC
- Cameras: SD and HD Options
- Pan and Tilt: (2) Schilling Electric
- Available Valves: (6) 2 gpm (8 lpm)

Hydraulic System

- Thrusters: (7) Schilling
- HPU: 250 hp
- Auxiliary: 150 hp
- Operating Pressure: 3,000 psi – 5,000 psi
(207 – 345 Bar)

Digital Video Suite

The digital video-over-Ethernet system can transport both HD and SD video, through H.264 compression, that can be annotated and recorded via the video PC on the surface. The system can record up to 4x HD streams simultaneously and redundant HD video recording, annotation, and editing suites are provided as standard.

- High-definition, low-latency streaming video at 1920 x 1080 resolution, 60 frames per second
- Video streaming using H.264 compression over RTSP
- SD low-latency streaming video at NTSC/PAL resolution
- Topside video output: HDMI, NTSC/PAL analog video