The combined strengths of heritage, innovation and training will ensure TMT’s continued success.
COMPANY PROFILE

Total Marine Technology is an Australian based company situated in Bibra Lake, Western Australia. It is owned by SapuraKencana Petroleum Berhad, one of the world's largest integrated oil and gas service and solution providers.

It was formed in 1999 to provide locally built Work Class Remotely Operated Vehicles (ROV) and intervention tooling designed specifically for the offshore drilling and production industry. The founders of TMT believed building equipment locally and maximizing the use of standard components from established industries, would deliver the intrinsic reliability missing from many ROV systems available at that time.

TMT has continually built ROVs over the past 13 years, and in the process, attracted people who passionately contribute to the ongoing success of TMT’s products and services. The team currently exceeds 250 personnel involved with the design, engineering, building and delivering of great products and services worldwide.

TMT has a strong focus on training and developing young people within our industry. We are the largest worldwide employer of apprentices engaged in ROV manufacture and currently operate the only Australian government approved apprenticeship scheme, which combines industry trade qualifications with offshore experience.

We have a number of patents and industry awards that recognize TMT’s competence and excellence. Innovation driven by client need and the challenge to exceed expectations within the underwater intervention environment, defines TMT as a clear leader in ROV and intervention technology. The combined strengths of heritage, innovation and training will ensure TMT’s continued success as we commence deep water operations in Brazil and introduce Light Well Intervention into our portfolio of services.
DEEPEST DIVE

On the 5th March 2013, TMT completed the deepest known dive by a non-military ROV system in Australia, reaching 3105msw. TMT set this new bench mark depth with our new Typhoon work class ROV, designed, engineered and built in Western Australia.

The tests were carried out to qualify the ROV system for pipelay operations in the deep-water Brazilian market and were conducted from the 72 metre DP2 vessel Seahorse Standard. The Perth Canyon test site is located 100 nautical miles west of Perth. One shallow dive was carried out prior to departure followed by five dives offshore over a period of three days.

Despite some early technical challenges in preceding dives, predominantly relating to the test-specific deployment setup, the dive to 3105msw and subsequent recovery was conducted without issue.

The success of this dive has delivered a number of new contracts to TMT for operations in Brazil. Over the next 2 years we will build and deploy 12 new Typhoon ROV systems on Petrobras deep water projects.
The TMT crew did an outstanding job integrating and operating the system. Thanks for the extra effort put into design and deliver.

- Craig, Subsea Field Engineer.
OPERATIONS

ROV Operations are the lifeblood of TMT. It drives our product development through experience and recognition of the diverse dynamic factors our crews and clients confront everyday in the offshore environment. The TMT Operations strategy integrates the right people with the right equipment to deliver world class ROV system performance, safely and reliably, all the time.

Successful outcomes require a seamless partnership between robust technology and confident operators. The strength of these two factors will determine the ability of any ROV service provider to maximise project success, independent of adversity and unplanned events.

As an ROV manufacturer, we can offer a unique training environment to ensure our people are technically competent and offshore ready. Our international workforce know our equipment from the ground up and our ongoing training develops strong personal competence within the offshore team. This actively managed approach maintains a safe and efficient ROV operation throughout the project.

Our ROV and tooling manufacturing facility can integrate customised hardware configurations to optimise client requirements before mobilisation. This flexibility and depth of engineering within TMT ensures that the equipment is always right for the scope of work.

The TMT onshore operations department has the experience to integrate and manage our services on a global level to provide our clients and crews with the support required to deliver exceptional ROV and tooling performance.

TMT Offshore ROV track record includes:
- Drilling Support
- Subsea Completions
- Field Intervention
- Pipelay Barge Support
- Field Construction
- Field Abandonment
- Environmental Surveys
- IMR - Inspection Maintenance Repair
HEAVY WORK CLASS ROVS

TMT TYPHOON MK2

TMT TYPHOON MK1

TRITON XLX

MEDIUM WORK CLASS AND IMR ROVS

TMT NOMAD

TRITON XLR

TRITON XL

SURVEY AND INSPECTION ROVS

TMT NAVIGATOR

SEAHEY

LBV150/300

TMT TYPHOON SYSTEM INTEGRATION TEST (SIT) ROV

SIT ROV (MOCK ROV)
Since 1999 TMT has successfully built a locally based, world class ROV manufacturing and operations facility. We believe the combination of great design, engineering excellence and offshore intervention experience, allows TMT to partner with clients and develop innovative systems and products.

TMT has over 30 design engineers actively engaged in underwater intervention design. Our team consists of a mix of both senior engineers of different industry backgrounds, ranging from aeronautical to motorsport, and young apprentices taking their first steps into the oil and gas industry. Here at TMT, only industry accepted guidelines and processes are used during the design phase, which includes both Australian and international standards.

Being in the industry for over 13 years, TMT has valuable experience in constructing robust and tough work class ROVs. Our proven designs have stood the test of time delivering numerous patents and design awards.

As a manufacturer and operator, TMT has the unique ability to seamlessly flow people from the design and build process into the offshore operating environment. Our ability to combine technical competence developed in the workshop with experienced offshore ROV professionals delivers an integrated team of personnel, equipment and safe processes dedicated to exceptional offshore performance worldwide.

The information published in this book was accurate at the time of publication. However, due to changes in technology, suppliers, our continual process of improvement, or factors not under our control, some images, data or specifications may change at any time and without notice, and TMT can not guarantee their accuracy. Before relying on the information in any important matter, confirm the details by contacting us at sales@tmtrov.com.au or call +61 8 9411 6500.
TYPHOON MK2

The Typhoon is a 150HP heavy work class ROV with a proven 3000msw depth rating. It is designed and built in Australia to be a cost effective and client focused answer to your ROV needs. The Typhoon is a flexible platform ROV suited to a wide range of applications.

FEATURES

Electronic Architecture
  Distributed node control including automated heading and station hold, expandable RS485 network with a range of quick-change PCBs for different applications. Dual redundant control and modern interface.

ROV Instrumentation
  - Altimeter
  - Compass
  - Depth sensor
  - Sonar system
  - X & Y accelerometer, Pitch and Roll
  - DVL Seabed Positioning

Manipulators
  Two manipulators on extendable TMT Z-extensions are provided. The Z-extension provides 300mm of controlled movement in the Z axis (fwd-aft) for manipulators. A third central Z-extension is available for tooling. Manipulator options include:
    - Schilling T4, 7-function – Master/Slave
    - Schilling RigMaster
    - 5 function - Rate Schilling Atlas, 7-function - Rate
    - TMT Guidepost Grabber, 2 function - Rate

Tooling Interface
  8x 0-20LPM, 3000psi for Tooling
  8x 0-20LPM, 3000psi for Manipulators
  2x Hi Flow 0-100LPM, 0-3000psi
  5x Ultra High Flow direct to main 200LPM HPU
  5x Med Flow direct to secondary 50LPM HPU
  1x Ancillary HPU interface

Through Frame Lift
  Tooling or third party equipment payload capacity 3,500kg

TMS
  The Typhoon ROV is designed to suit Perry Type 5A TMS. Other TMS models are available as an option.
## SPECIFICATIONS

### ROV
- **Depth Rating**: 3000msw
- **Length**: 3.5m
- **Width**: 1.8m
- **Height**: 2.2m
- **Weight**: 5,300kgs
- **Frame Proof Load**: 30,000kgs
- **Through Frame Lift**: 3,500kg

### ROV THRUST
- **Four Vertical and Four Horizontal Thrusters**
  - **Forward / Astern**: 1,000kg
  - **Lateral PORT / STBD**: 800kg
  - **Vertical Up / Down**: 800kg

### ROV HPU
- **150HP (Max)**
- **240lpm (Primary) @ 207bar (3000psi)**
- **50lpm (Auxiliary) @ 207bar (3000psi)**
- **Variable Axial Piston Pumps**

### ROV ELECTRICAL SYSTEMS
- **Frequency**: 60Hz ±5%
- **Voltage**: 440VAC ±5%
- **ROV HPU**: 200kVA, 3250VAC
- **ROV Instruments**: 8kVA, 2400VAC
- **Pan & Tilt**: 1x Front 1x Rear
- **Lights**: 6x 24VDC LED
- **Cameras**:
  - Colour Zoom: 1x Kongsberg OE14-367A
  - High Definition: 1x Kongsberg OE15-101C
  - Black & White: 4x Kongsberg OE15-109
  - Colour: 1x Kongsberg OE14-111
- **Data Channels**: 8 Aux Data Channels
- **Sonar**: Kongsberg 1171 Sonar Head
- **Navigation System**: Doppler Velocity Log

### MANIPULATORS
- **Standard**:
  - Schilling T4, 7-function - Master/Slave
  - Schilling Atlas, 7-function - Rate
- **TMT Guidepost Grabber, 2 function - Rate**
- **Option**:
  - Schilling Atlas, 7-function - Rate
  - Schilling RigMaster - Rate

### EMERGENCY RECOVERY DEVICES
- **Strobe**: Novatech ST400A
- **Acoustic Beacon**: 2x ULB-362PL

### 20' WORKSHOP - OPTION
- **Décor**: 2x 7kW
- **Integrated Workshop**
  - Separate wet and dry working areas
  - Lifting Rail: 1,000kg
  - HVAC: 7kW
  - Workbench, Storage, Spares

### DECK HPU - OPTION
- **Hydraulic Power**: 22kW
- **Operating Pressure**: 0 to 250bar
- **Maximum Pressure**: 250bar
- **Maximum Output Flow**: 52 L/min

### A-FRAME - OPTION
- **Safe working load**: 15 Te
- **Design factor**: 3.0 global
- **Outreach**: 4.0 m
- **Dimensions**: 4.0 wide x 6.0 long (m)
- **Gross weight**: 27,000kgs
- **Boom extension**: 2.0m
- **Sheave wheel diameter**: 1200mm
- **Hydraulic damping**: +/- 10º
- **Latch rotation**: 355º

### AVAILABLE ROV TOOLS
- Gasket Ring Tool
- Gasket Installer
- Guide Wire Cutter
- Hot stabs
- Guide Post Cutter
- Water blasters
- Mini Dredge
- PH Meter
- Rig Floor Monitor
- Fluid Transfer Skid
- Smart Torque Tool
- Guidewire Latch
- Plate Handling Tool
- Systems
- Smart Level
- Current Meter
- CP Probe
- Mega Digger
- Densitometer

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Unwrapping a new Typhoon MK2.

Total Marine Technology | www.tmtrov.com.au
The Typhoon MK1 is a 150HP heavy work class ROV with a 3000m depth rating. It is designed and built in Australia to be a cost-effective and client focused answer to your ROV needs. The Typhoon has significant advantages in deck footprint, deck loading, performance, reliability and has a patented seabed positioning system.

FEATURES

Hydraulic Accumulator
HPU fail-safe that allows the ROV to finalise tooling functions and stow arms in the event of hydraulic power loss.

Seabed Reference Positioning System (SRPS)
Increases visibility by eliminating the need for vertical thrust near the ocean floor. The ROV can use the SRPS for precise vertical positioning and for heavy lift assistance.

Electronic Architecture
Automated heading and station hold, expandable RS485 control network with a range of quick-change PCBs for different applications. PC independent fail safe master controller.

20’ Control Van/Workshop
Most compact deck footprint for heavy work class ROV with integrated workshop, control cabin and electrical compartment.

Electric Winch
45m/min mid-drum dual VSD drive electric winch with full redundant drive and transmission system.

Manipulators
Permanent 2 function grabber with up to 3 manipulators on z-function mounts. Manipulator options with backup units and onshore full service workshop:

- Schilling T4 8-function
- Rigmaster 5-function
- TMT 7-function rate manipulator

Tooling Interface
8x Standard 20L/min, 3000psi
4x Hi Flow 0-75L/min, 0-3000psi
2x Ultra High Flow Direct to main 200L/min HPU
1x Ancillary HPU interface

Instrumentation
Smart level, metrology scanner, pH meter, densitometer, soil sampler, x-ray NDT, ultrasonic NDT and hydrophone.
# Specifications

## ROV

- **Depth Rating**: 3000 metres
- **Length**: 2.5 metres
- **Width**: 1.7 metres
- **Height**: 2.2 metres
- **Weight**: 3480 kg
- **Frame Lift**: 500 kg
- **10 Auxiliary Tooling Ports**
- **Dual HPU**: 150 HP, 3000psi, 200L/min (primary), 80L/min (secondary)
- **Hydraulic Accumulator**: 20L
- **Forward**: 1000 kg
- **Aster**: 1000 kg
- **Port / Starboard**: 800 kg
- **Vertical Up / Down**: 800 kg
- **Lights**: Hi Power LED & Halogen
- **Cameras**: 16x Multidrop HD Colour, Var. Zoom + Focus, 8 Auxiliary Data Channels, Sonar System, Imaginex Video Recorder, Hard disk & DVD
- **Longitudinal Deployment Platters**: x 3
- **Grabber**: 2 Function (TMT)
- **SRPS Winch (Drum Capacity)**: 50 metres
- **SRPS Weight**: 500 kg

## Control Van / Workshop

- **Length**: 6.1 metres
- **Width**: 2.4 metres
- **Height**: 2.75 metres
- **MGM (Offshore Lift Rated)**: 15000 kg
- **Zone 1 (NEC 500-503)**: Standard Workshop
- **Integrated Workshop**

## Umbilical Winch

- **Umbilical Diameter**: 31 mm
- **Drum Capacity**: 3000 metres
- **Length**: 3.5 metres
- **Width**: 2.5 metres
- **Height**: 3.1 metres
- **Weight (Offshore Lift Rated)**: 24.5t
- **Fully Redundant Dual VSD Electric Drive**: 74 kw
- **Line Speed**: 45m/min

## Launch & Recovery Systems (Options)

- **Over the Side Hydraulic A-Frame (Dynacon 6010)**
- **Tether Management System (Perry Type 2)**
- **Fixed Rig Sliding Door**

## Tools to Assist Drilling

- **Gasket Ring Tool**
- **Gasket Installer**
- **Guide Wire Cutter**
- **Hot stabs**
- **Guide Post Cutter**
- **Water blasters**
- **Mini Dredge**
- **PH Meter**
- **Rig Floor Monitor**
- **Fluid Transfer Skid**
- **Smart Torque Tool**
- **Guidewire Latch Systems**
- **Plate Handling Tool**
- **Current Meter**
- **Smart Level**
- **Mega digger**
- **CP Probe**
- **Densitometer**
The XLX ROV system is a hydraulic heavy duty ROV system. Designed and built to perform the most exacting operations in the harshest of environments for long periods of time, the XLX provides the necessary attributes to get the job done.

With an impressive 1,100kgf thrust performance, the XLX is in a class of its own.

The XLX is particularly suited for heavy duty construction support, where remote intervention tasks are required, such as positioning of subsea structures, pipeline/umbilical connection, pipeline repair, component change-out, valve operation, fluid injection, debris removal plus many more.

The vehicle may be fitted with a range of acoustic sensors to perform precision surveys and conduct salvage operations.

Deep-water operations are aided by the use of a complimentary top hat Tether Management System (TMS), designed to maximise the performance of the vehicle by eliminating the effects of umbilical drag and vessel motion.

SPECIFICATIONS

Length: 3226mm
Width: 1803mm
Height: 2000 - 2148mm
Depth rating: 3000/4000msw
Power: 150-250hp
Payload: 250-550kg

The XLR is a hydraulic, medium duty ROV system which is typically used for many subsea applications such as submarine rescue “first response”, equipment salvage, and survey. It is designed and built to perform in the harshest of environments for long periods and is similar in control functions to the XLX ROV system. The vehicle may be fitted with a range of acoustic sensors to perform precision surveys and conduct salvage operations.

Deep-water operations are aided by the use of a complimentary top hat Tether Management System (TMS), designed to maximise the performance of the vehicle by eliminating the effects of umbilical drag and vessel motion.

SPECIFICATIONS

Length: 2500mm
Width: 1700mm
Height: 1700-2184mm
Depth rating: 4500msw
Power: 125hp
Payload: 150-250kg

The Triton 1 and Triton XL11 are 125 hp work class ROV systems. The Triton XLS system’s 3000kg of through-frame lift provides a platform for a wide variety of tooling modules and custom intervention work skills. The Triton and XL are highly dependable work class vehicles designed for extreme water depths and demanding subsea construction tasks.

The system effectively supports offshore projects and construction tasks, including:

- Deepwater and ultra-deepwater installation and construction support
- Subsea cable burial and maintenance
- Deepwater salvage and recovery
- Remote tool deployment
- Subsea pipeline construction, completion and survey activities
- Platform inspection, repair and maintenance
- Suction pile installation
- Drill support and completion activities

SPECIFICATIONS

Length: 3226mm
Width: 1803mm
Height: 2000 - 2148mm
Manipulator function: Titan T4 7-Function/Rigmaster 5-Function
Depth rating: 2000msw
HP: 100hp
Payload: 200kg
NOMAD

The Nomad (work class) ROV is a 50HP work class ROV with a proven 1200msw depth rating. It is designed and built in Australia to be a cost effective and client-focused answer to your ROV needs.

The Nomad can be installed in an ROV hanger, or supplied with Control and Workshop container for installation on deck. The system is field proven since 2002 and has evolved to include TMS options and greater depth capability.

FEATURES

The following information defines the current system configuration. Many other tooling options are available upon request.

Manipulators

Two manipulators on extendable TMT Z Extensions are provided. The Z Extension provides 300mm of controlled movement in the Z axis (fwd-aft) for manipulators. A third centrally mounted TMT Guide Post Grabber 2-function is permanently mounted. Manipulator options include:

- Schilling T4, 7-function, Master / Slave
- Schilling RigMaster, 5-function, rate
- Schilling Atlas, 7-function, rate

Tooling Interface

Two 0-28L/min, 2500psi for Tooling
One Hi Flow 0-110L/min
See overleaf for standard tooling options

Hydraulic Accumulator

The hydraulic accumulator provides an HPU failsafe that allows the ROV to finalise tooling functions and stow arms in the event of hydraulic power loss.

Seabed Reference Positioning System

The Seabed Reference Positioning System (SRPS) increases visibility by eliminating the need for vertical thrust near the ocean floor. The ROV can use the SRPS for precise vertical positioning and for heavy lift assistance.

ROV Instrumentation

- Depth sensor
- Fluxgate compass
- Sonar

SPECIFICATIONS

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<tr>
<td>Length</td>
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The Nomad Navigator is a high end observation electric/hydraulic compact ROV system. It was built for rapid deployment situations on vessels of opportunity. The low overall footprint and deck load increases the vessel of deployment versatility, without compromising functionality. The system offers a comprehensive manipulator package from a small operating platform, including the ability to operate a Schilling T3 manipulator. (Offered standard with Schilling/Orion type). In addition, a 2 function grabber is included which will accommodate a greater than standard guide-post diameter attachment.

The main propulsion system incorporates 4 vectored and 2 vertical electric thrusters. The use of electric thruster minimises maintenance and improves overall reliability. The ROV has a large number of hydraulic tooling options, due to the versatility of the 8 function smart valve pack and 28 Lpm @ 200 bar auxiliary hydraulic pack and 400kg payload capability.

The system has been field proven since 2002 and has evolved to include TMS options and greater depth capability.

**SEAEYE SURVEYOR**

The Seaeye ROV is a survey and inspection vehicle with a large payload and an enviable international track record. Seaeye is a versatile ROV system with a four function manipulator capability, light hydraulic tooling functions and a broad interfacing capacity. This system can be operated as a free swimming vehicle or alternatively, in conjunction with its optional TMS working in a 150m operational radius.

Ideally suited to inshore or civil applications where a rapid setup is required. The integrated control console, tether and ROV take only minutes to have ready for operation.

**FEATURES**
- Light weight
- Compact
- Intuitive integrated control console
- Easily transportable
- High-quality video and lighting
- Small diameter, low drag tether
- Balanced sensor platform
- Manipulator system
- Inspection suits

**SPECIFICATIONS**

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**NAVIGATOR**

**SPECIFICATIONS**

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</table>
The SeaBotix LBV150-4 is an affordable streamlined MiniROV system. Added tether length and the integrated control console provide a well rounded system that is simple to setup and operate.

**FEATURES**
- Light weight
- Compact
- Intuitive integrated control console
- Easily transportable
- High quality video and lighting
- Small diameter, low drag tether
- Balanced sensor platform

**SPECIFICATIONS**
- Length: 530mm
- Width: 245mm
- Height: 254mm
- Weight in air: 11kg
- Tether: 150/200msw
- Thrusters: 4 Brushless DC
- Bollard thrust: 4.9kgf each
- Maximum operating current: 2 knots

The LBV300-6 is a well-rounded ROV system for all inshore applications. The ROV system offers all the proven features of the LBV systems.

Ideally suited to inshore or civil applications where a rapid setup is required. The integrated control console, tether and ROV take only minutes to have ready for operation.

**FEATURES**
- Light weight
- Compact
- Intuitive integrated control console
- Easily transportable
- High quality video and lighting
- Small diameter, low drag tether
- Balanced sensor platform

**SPECIFICATIONS**
- Length: 530mm
- Width: 484mm
- Height: 254mm
- Weight in air: 13kg
- Tether: 300msw
- Thrusters: 4 Brushless DC
- Bollard thrust: 4.9kgf each
- Maximum operating current: 2.5 knots

The LBV 150.

The LBV 300.
The TMT System Integration Test (SIT) Typhoon ROV, often referred to as a Mock ROV, provides an economical method of testing ROV access and functionality around subsea equipment. The on-board hydraulic and electrical systems allow ROV tools to be fully tested onshore, prior to being deployed to the offshore and subsea environment.

The SIT ROV comes equipped with identical Z function mounts as the Typhoon 150 MK2 ROV, allowing for a variety of manipulators to be used. The Hydraulic Power Unit (HPU) is mounted internally.

The SIT ROV is mounted on castors to provide an easier means of relocation.

The whole system can be packed into airfreight containers for fast transport to site. TMT can modify the entire system to suit your requirements.

FEATURES

- Variety of manipulator options to suit client needs
- 3 x Z Functions for mounting of manipulators
- Grabber manipulator
- Pan & Tilt cameras and lights
- Hydraulic Manifold for client tooling
- Adjustable lift point for balancing load
- Ballast option for heavy tooling
- Control Desk included – Typhoon MK2 footprint
- 21 x 16L/min hydraulic functions
- 3 x 8L/min hydraulic proportional functions
- 3 x 40L/min hydraulic functions
- Integrated air blaster cooler and on demand marine grade water oil heat exchanger

SPECIFICATIONS

- Length: 3.5m
- Width: 1.9m
- Height: 2.4m
- Weight in air (approx.): 1700kg
- Through frame lift: 3.5T

HPU SPECIFICATIONS

- Pressure: 210bar (3946bar)
- Flow: 40L/min
- Air cooled
- Tank capacity: 180L
- Power: 18.5kW
The TMT Seabed Reference Positioning System (SRPS) increases potential visibility by eliminating the need for vertical thrust near the ocean floor. The ROV can use the SRPS for precise vertical positioning and for heavy lift assistance. The pack is fitted with a hydraulic winch, that is used to lower and raise the clump weight. Then, the lift umbilical is slacked off from the surface. Ultimately, by operating the clump winch, the vehicle can control its height in reference to the seabed. An animated presentation demonstrating its operation is available on request. The system is designed for TMT ROVs but add-on SRPS skid is available for other ROVs on request.

**FEATURES**
- Easily fitted to ROV Hydraulic system
- Proven rugged design
- Corrosion resistant material
- Hydraulically operated

**SPECIFICATIONS**
- Dimensions (Winch)
  - Length: 260 mm
  - Width: 440 mm
  - Height: 425 mm
- Clump weight: 500 kg
- Winch pull: 3000 kg
- Winch capacity: 50 m
- Depth rating: Unlimited

The TMT Seabed Reference Positioning System (SRPS) installed in a Typhoon ROV.
Maintaining expensive, and job critical ROV tooling is neglected by many subsea field operators with the end result being tooling arriving at the job site in a non-operational condition. A missing hose, handle, fitting or test certificate can be the cause of very costly operational down time.

Many companies who own subsea ROV tooling assets lack the facilities and in house systems to properly deal with these items, with the end result being neglected tools left to corrode and deteriorate to the point where they are no longer able to be used.

TMT’s Asset Management Department offers a full “life of asset” service which takes care of the storage, insurance, maintenance, mobilisation and de-mobilisation of your tooling assets in a cost effective and open reporting system. Rather than just offer a simple storage facility, Total Marine Technology will track, mobilise and maintain your assets in order to achieve the best return on investment of your subsea ROV tooling.

On receipt of a new tool to the TMT Asset Management Department, a full inspection and maintenance report is completed to highlight any operational deficiencies and establish a service and repair plan. Our aim is to ensure that the tool is “offshore ready” at all times. Our process includes the replacement of any missing or damaged items with OEM Components. From then on, the TMT Asset Management team log and report all stages of your equipment’s life cycle using specialised, in-house developed software. All assets start their life tagged, labelled, coded into the system and properly stored for use.

Upon receipt of a mobilisation request, tooling is operationally checked by people who know ROV tooling and can identify shortfalls in inventory, such as missing hoses and connection cables. Our process assures that critical job-related tooling arrives at the job site ready to do the operation for which it is intended. All certification, service records, operation and maintenance manuals and inventory are supplied with the tool so that nothing is left to chance.

When the de-mobilised tool is received at our Bibra Lake facility, an inventory check takes place and any missing or damaged items are notified to the owner for possible financial recovery from the previous user. Post operation maintenance is then carried out and, on completion, tool status, location, maintenance records and test certificates are uploaded onto our asset data base ready for the next campaign.

TMT also offers a secure web-based client login so that tool status and location can be checked and current certificates and records can be accessed and downloaded.

The TMT facility in Bibra Lake offers a full lifetime service for your subsea equipment and the TMT Asset Management team take care of every aspect of the equipment’s operational life. We can even supply offshore tooling technicians for your offshore service needs.

Customer service is paramount to the TMT asset team and our satisfied clients will confirm that they made the right decision when they handed their ROV tooling assets to TMT to manage.
Total Marine Technology has built a solid reputation over the past 12 years for the design, manufacture, servicing and offshore operation of specialised subsea intervention tooling. As an example of our ongoing commitment to tooling innovation and technology development, we hold a number of patents for ROV design, pipeline inspection and underwater density measurement.

We have the people and the equipment to make sure your custom tooling project is delivered on time and, most importantly, works when deployed offshore. It makes sense to trust your next tooling project to a company that can integrate experience with technology and meet your needs first time, every time.

"We believe it’s all about building strength through partnerships. TMT’s abilities are designed around delivering world class support and driven by client expectations."

- Paul Colley, CEO Total Marine Technology.
10 SIT ROV
- Typhoon SIT ROV

11 PIPELINE INSPECTION
- TMT X-Ray Pipe Inspection Tool
- TMT Pipeline Inspection Tool

12 ROV COMPONENTS AND MANIPULATORS
- 3-Way Hydraulic Ball Valve
- 2-Way Hydraulic Ball Valve
- ROV Valve Handle Assembly
- ROV Valve
- Effer Crane
- Docking Probe
- TMT Manipulator Arm Hire
- IMENCO Manipulator Jaws
- TMT Manipulator Arm Hire
- Passive Cursor System
- TMT Grabber Arm
- General Electrical Enclosures
- Flexible Fluid Tanks

13 SUBSEA SMART TECHNOLOGY
- TMT Gauge Tester
- Colour Zoom and Focus Camera
- Low Light Camera
- TMT LED Light
- IMENCO Guide Wire Anchor
- IMENCO Guide Wire
- IMENCO Slim Line Guide Wire Anchor
- TMS 8.5T & 12T ROV Shackles
- TMS 5.4T Long Shank Hook
- TMS 12 T Plate Clamp
- TMS Subsea Winch

14 ROV FRIENDLY RIGGING
- CDL MicroGyro
- PMAC DP Probe
- Leak Detection System
- TMT Densitometer
- Tritech Bathy Suite
- Valeport Current Meter
- Imagery 881 Sonar
- Tritech Microm Sonar
- Vortex Gas Sampling Tool
- Tritech Sealing Sonar and SCU
- TSS 350 Cable Tracker
- TSS 440 Pipe Tracker
- RJE Underwater Beacon/Locator
- Digiquartz Depth Sensor

15 COMPLETION TOOLING
- IMENCO Guide Wire Anchor
- IMENCO Slim Line Guide Wire Anchor

SKWS - LIGHT WELL INTERVENTION TOOLING
- Diverless Range Connector
- Subsea Intervention Device
- AXE Cutting System
- Cement Injection Tool

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27
The TMT Torque Tool Mk2 is lighter and even more powerful than the previous model.

The TMT Smart Torque Tool MK2 is the latest in ROV friendly subsea intervention tooling.

The MK2 is intuitive to use. In automatic mode, the torque limit, number of turns and speed limit parameters are set via a topside laptop and the tool will function autonomously to achieve and control these outcomes safely. In alternative manual mode, the same limits are entered, but the operator selects the operating parameters.

Torque feedback from the tool is viewed in real time on the laptop as an instantaneous value and graph, which can be saved for future reference. Advanced control algorithms eliminate the risk of damage to subsea infrastructure.

The innovative design of the Smart Torque Tool MK2, allows the operation of Class 1 to 4 fittings without changing the tool or surfacing the ROV.

The small size of the Smart Torque Tool MK2 allows it to be easily packaged into two carry-on sized cases allowing speedy and economical delivery to site.

TMT can customise the tool to suit your requirements.

**FEATURES**

- Corrosion resistant material
- Easily accessed by ROV
- Easily operated by ROV
- Accurate down to 50Nm
- Field proven
- Rated for offshore deployment
- Self-error checking
- Accurate speed from 0.1 to 10rpm
- Subsea removable from support
- Fail safe electronics design
- Temperature and pressure compensated

**SPECIFICATIONS**

- **Length** .......................... 510mm
- **Width** ........................... 225mm
- **Height** ............................ 165mm
- **Weight in air** .......................... 24kg
- **Weight in seawater** ......................... 20kg
- **Torque** .......................... ISO 13628-8 Class 1-4
- **Resolution on output** ............. 1º
- **Maximum operating pressure** .... 2072bar (3000psi)
- **Depth rating** ........................ unlimited
- **Interfaces** .......................... rotary low torque
- ........................................... types A, B and C
- ........................................... Rotary high torque
- ........................................... Petrobras, Customised

**QUOTES**

“We consider this tool to be the most versatile Torque Tool and FLOT system available anywhere.”
The Electric Torque Tool is TMT’s latest in ROV friendly subsea intervention tooling.

The TMT Electric Torque Tool has an intuitive and comprehensive user interface. In automatic mode the torque limit, number of turns and speed limit parameters are set via a custom software application topside. This allows the tool to function autonomously to achieve the specified outcomes safely. In the alternative manual mode, the same outcomes are entered but the operator selects the valve operating parameters.

The tools electric servo motor drive unit offers superior controllability of torque and speed versus its hydraulic counterparts. The electric drive also provides the full rated torque at near linearity from zero to maximum RPM.

The servo motor’s integrated resolver feedback provides high resolution positioning detail. When this is coupled with the accurate strain gauge torque feedback on the output stage of the gearbox, it provides superior measurement information compared to other available tools.

The TMT Electric Torque Tool’s innovative design allows for the operation of Class 1 to 4 fittings without changing the tool or bringing the ROV to the surface.

The small size of the TMT Electric Torque Tool allows it to be easily packaged into two carry-on sized cases allowing speedy and economical delivery to site. TMT can customise the tool to suit your requirements.

**FEATURES**
- Corrosion resistant material
- Easily accessed by ROV
- Easily operated by ROV
- Accurate down to 50Nm
- Rated for offshore deployment
- Self-error checking
- Accurate speed from 0.1 to 10rpm
- Subsea removable from support
- Fail safe electronics design
- Temperature and pressure compensated

**SPECIFICATIONS**
- **Length**: 510 mm
- **Width**: 225 mm
- **Height**: 165 mm
- **Weight in air**: 24 kg
- **Weight in seawater**: 20 kg
- **Torque**: ISO 13628-8 Class 1-4
- **Resolution on output**: 1°
- **Peak torque**: 3000Nm
- **Voltage**: 240VAC
- **Peak current**: 8.25A
- **Depth rating**: Unlimited
- **Interface**: Rotary low torque types A, B and C, Petrobras, Customised
The Smart Torque Plate Handling Tool System.

The Smart Torque Plate Handling Tool is an ROV friendly subsea intervention tool. The tool offers precise break out, running and make-up torques for classes 1-4 and 17 ISO standard interfaces. The ROV operator can change torque settings at any time during the operation from the tool’s control console, in a range from 54 to 2711 Nm. Torque feedback from the tool can be viewed in real time on the user interface as an instantaneous value or graph, which can be saved on the interface for future reference.

The Smart Torque Tool latches into the base cradle hydraulically and can be disconnected by the ROV in order to use as a standalone torque tool. The hydraulic latches for the reaction buckets are hydraulically driven forward and spring retracted, so that in case of loss of hydraulic power the latches will release.

FEATURES
- Corrosion resistant materials
- Easily accessed and operated by ROV
- Removable underwater
- Field proven

SPECIFICATIONS
- Length ........................................ 980mm
- Width ........................................ 250mm
- Height ....................................... 835mm
- Weight in air ................................. 90kg
- Weight in seawater ......................... 60kg
- Depth rating ................................... Unlimited
- Torque ISO13628-8 Class1-4, 30-2711Nm
- Torque resolution ............................ 3Nm
- Maximum operating pressure ............. 207 bar (3002 psi)
- Forward tilt ................................. 5 degrees
- Aft tilt ....................................... 30 degrees
TMT STANDARD TORQUE TOOL

The TMT Standard Torque Tool is a hydraulic rotary tool that can be fitted with socket drives to suit Class 1 and 2, Class 3 and Class 4 valve stem dimensions.

The tool is fitted with 4 metre hydraulic hose set and an ROV handle set is supplied.

Surface calibration is performed by inserting the tool into the supplied reaction bucket, which is fitted with either a 1,000 Nm or 3,000 Nm transducer. Hydraulic pressure applied to the tool is limited to obtain the maximum allowable torque for the operation readout on the torque analyser unit.

After calibration, the tool is ready to be deployed with the operational parameters set in place.

SPECIFICATIONS

- Weight: (approx.) 36kg
- Maximum hydraulic input pressure: 203 bar
- Output torque ranges: Class 1 to Class 4 (67Nm to 2,711Nm)

Reaction bucket for calibration.

TMT Standard Torque tool.
The TMT Manual Torque tool is designed to operate various functions on subsea infrastructure through the use of an ROV. Torque feedback is generated through the use of a visible dial, showing the angular deflection of the tool in degrees, and a pre-calibrated torque table that relates angular deflection to torque.

The TMT Manual Torque tool is available in two models:

- Type A and Class 4 ROV interfaces
- For valves on the BOP Well Kill Panel

FEATURES

- Easily transportable
- Easy to install and remove
- Corrosion resistant materials
- ROV deployable

SPECIFICATIONS

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<tr>
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</table>
The TMT Heavy Duty Flying Lead Orientation Tool (HD-FLOT) provides a robust platform to support ROV stab-plate installation and valve override operations.

The HD-FLOT frame is combined with a TMT Smart Torque Tool MK2 and is controlled by the ROV hydraulic supply. The HD-FLOT can support a payload of up to 500kg. A pair of hydraulic cylinders actuates a mechanism to provide a tilt up of 90 degrees, which keeps the tool within the frame of the ROV during launch and recovery, and a tilt down of 90 degrees which facilitates use with vertical receptacles. Another cylinder provides ±20° roll.

An optional and load-tunable flexible mounting provides visual feedback of the loads being exerted upon the tool. All external components are made from corrosion-resistant materials for long life.

The TMT Smart Torque Tool can be removed subsea for use with a manipulator.

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**FEATURES**

- Subsea Removable Torque Tool
- High capacity
- Low weight
- Low maintenance
- Optional flexible mounting of torque tool for visual indication of load
- Torque tool interface provides digital pitch and roll feedback to assist in leveling the tool

**SPECIFICATIONS**

- **Length**: 1050mm
- **Width**: 402mm
- **Height**: 525mm
- **Weight in air**: 65kg
- **Weight in seawater**: 45kg
- **Supply pressure**: 207bar (3000psi)
- **Required hydraulic flow**: 2L/min
- **Tilt rotation**: ±20°
- **Tilt up/down**: ±90°
- **Depth rating**: unlimited
The Extension Shaft was originally designed to replace the existing drive shaft on subsea trees. The existing shafts have a triangular drive torque tool interface, but are limited in the amount of torque that can be applied to the valve stem. This tool allows higher torque to be applied to the valve.

The Extension Shaft is created from stainless steel, in order to achieve a maximum torque transmission capacity of 1750Nm. This maximum torque capacity is only achieved when the replacement valve insert is used. Without this insert, the maximum torque that can be applied to the valve is limited by the existing valve insert to 1400Nm.

TMT can modify the tool to suit your requirements.

- Valve interface: 54.5mm x 15mm Rectangular Spade
- Torque tool interface: Ø89.6mm Inscribed Circle Triangle

### FEATURES
- Easy to install and remove
- Corrosion resistant materials
- ROV deployable

### SPECIFICATIONS
- Length: 1200mm
- Width: 160mm
- Height: 350mm
- Weight in air: 42kg
- Maximum torque (valve insert): 1400Nm
- Maximum torque (no valve insert): 1250Nm
The Topside Norbar Torque verification kit, as configured by TMT, is a NATA tested and certified device. The tools are used to accurately confirm the torque output from a hydraulic or electric torque tool. The kit comes with a 1000Nm transducer block for measuring torque from 67Nm (Class 1) to 271Nm (Class 2) and a 3000Nm transducer block for measuring torque to 1355Nm (Class 3) and 2711Nm (Class 4).

The appropriate transducer block is bolted to the back of the supplied API17D reaction bucket. Once secured, the correct drive adaptor bit is inserted to receive drive force from the tool being tested. Torque is read on the torque tool display unit.

**FEATURES**
- Accurately confirm torque ranges; Class 1 to 4
- Proven rugged design
- Long battery life from single charge
- Easy to set up and use
- Safe to use

**SPECIFICATIONS**
- Transducer Block 1: 1000Nm
- Transducer Block 2: 3000Nm
- Class 1 & 2: 11/16" socket
- Class 3: 11/8" socket
- Class 4: 11/2" socket

The AM1 Valve Insert Gripper was originally designed to remove the valve insert from needle valves on subsea trees. In order to apply a higher torque than the insert will allow or to use the Valve Hole Cutting tool, the insert needs to be removed using the Gripper tool. The Valve Insert Gripper consists of a threaded actuator attached to the ROV handle, which is driven underneath a wedge that expands to grip the valve insert. As the actuator and the wedge are linked together, when the handle is wound out, the grip will release, allowing the valve insert to be reinstalled if required. TMT can modify the tool to suit your requirements.

**FEATURES**
- Installed and operated using an ROV handle
- Guidance funnel to ease installation
- Powerful internal gripping mechanism
- Can be used to remove or install valve insert
- ROV deployable
- Can replace a diver deployed tool

**SPECIFICATIONS**
- Length: 455mm
- Width: 155mm
- Height: 155mm
- Weight in air: 4kg
- ROV interface: Ø19.05mm T-bar Handle
- Depth rating: unlimited

The AM1 Valve Insert Gripper.

NORBAR TORQUE VERIFICATION UNIT

The Topside Norbar Torque verification kit, as configured by TMT, is a NATA tested and certified device. The tools are used to accurately confirm the torque output from a hydraulic or electric torque tool. The kit comes with a 1000Nm transducer block for measuring torque from 67Nm (Class 1) to 271Nm (Class 2) and a 3000Nm transducer block for measuring torque to 1355Nm (Class 3) and 2711Nm (Class 4).

The appropriate transducer block is bolted to the back of the supplied API17D reaction bucket. Once secured, the correct drive adaptor bit is inserted to receive drive force from the tool being tested. Torque is read on the torque tool display unit.

**FEATURES**
- Accurately confirm torque ranges; Class 1 to 4
- Proven rugged design
- Long battery life from single charge
- Easy to set up and use
- Safe to use

**SPECIFICATIONS**
- Transducer Block 1: 1000Nm
- Transducer Block 2: 3000Nm
- Class 1 & 2: 11/16" socket
- Class 3: 11/8" socket
- Class 4: 11/2" socket

The AM1 Valve Insert Gripper.
The Stanley IW12 hydraulic impact wrench features adjustable impact intensity. The IW12 can handle a wide variety of applications. The rugged Stanley impact wrench mechanism is simple to maintain and has many features to give it proven reliability. The swing hammer design results in minimal torque transmission to the operator/manipulator.

**FEATURES**
- Light Weight
- Compact
- Corrosion resistant material
- Easily transportable
- Hydraulically operated
- ROV deployable
- Field proven

**SPECIFICATIONS**

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Length</td>
<td>241mm</td>
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<td>Width</td>
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<tr>
<td>Weight in air</td>
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<td>Hydraulic pressure</td>
<td>70 - 140bar</td>
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<td>Torque</td>
<td>340 - 1632Nm</td>
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<tr>
<td>Flow rate</td>
<td>15 - 45L/min</td>
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<tr>
<td>Depth rating</td>
<td>Consult TMT</td>
</tr>
</tbody>
</table>

The IW12 Impact Wrench.

The IW12 IMPACT WRENCH

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02 WELLHEAD ALIGNMENT
The Acoustic Smart Level assists in keeping the drill string vertical by measuring the inclination of the drill string in two perpendicular planes. The transmitter bottle is clamped to the string with a customisable clamp.

The drill string angles are displayed digitally on the front of the transmitter bottle where it can be read using cameras on an ROV.

Inclination information can also be sent acoustically to a listening bottle on the ROV or over the side of the vessel or rig. Data is then transferred to the ROV operator using custom software to provide a visual representation.

**FEATURES**
- Corrosion resistant material
- Easily transportable
- Reduces deployment of ROV
- Real time data collection and recording
- Field proven

**SPECIFICATIONS**

**TRANSMITTER BOTTLE**
- Length: 1156mm
- Width: 285mm
- Weight in air: 40.7kg

**LISTENING BOTTLE**
- Length: 432mm
- Width: 521mm
- Weight in air: 23.5kg
The TMT Riser Alignment Tool (RAT) is a flexible and versatile solution for checking the inclination of a riser or similar subsea structure. The RAT can be installed on deck, on a riser with a diameter of between 150mm (6”) and 350mm (14”), with proper inserts. It can be removed easily and quickly subsea by an ROV.

The RAT is electrically isolated so it will not lead to any corrosion of the host structure. Depending on operational needs, it can employ the default light strap or if tighter, stronger fastening is required, an insulated wire rope.

FEATURES

- Easily removed by ROV
- Easily read from ROV
- Corrosion resistant material
- Proven rugged design

SPECIFICATIONS

Dimensions (Winch)

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<table>
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<tr>
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<tr>
<td>Length</td>
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<td>Width</td>
<td>540mm</td>
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<tr>
<td>Height</td>
<td>200mm</td>
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<tr>
<td>Weight in air</td>
<td>26kg</td>
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<tr>
<td>Weight in seawater</td>
<td>11.5kg</td>
</tr>
</tbody>
</table>

Accuracy: ±0.25°

Maximum subsea deployment: 20 days

Maximum working depth: 6000msw*

Range: ±3°

*Depending on the bullseye used
The Wellhead Alignment Frame (WHAF) is designed to be attached to subsea infrastructure on a rig and then lowered through the moonpool.

Once subsea, an ROV is able to fly up and press against the bumper unit and give a heading to determine the orientation of structure. Once the structure has been landed, the ROV uses the bullseye to check that the angle of the structure is within acceptable limits.

An optional ROV docking probe interface, compliant with ISO 13628-8:2002(E), is also available. TMT can modify the tool to suit your requirements.

**FEATURES**
- Bullseye type and resolution flexibility
- Full galvanic isolation from wellhead
- Guide base not required
- Rugged design
- ROV retrievable
- Optional transponder buckets

**SPECIFICATIONS**

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<thead>
<tr>
<th>Feature</th>
<th>Value</th>
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<td>Weight</td>
<td>90kg (approx.)</td>
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<tr>
<td>Required torque</td>
<td>65Nm</td>
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</table>
The TMT Smart Level is an alternative to the commonly used bullseye. However, reading the measurement is much easier due to the bright red digital display, thus reducing errors. It is attached to a specially modified 8 inch drill collar and measures the inclination of two perpendicular vertical planes of the PGB.

**FEATURES**
- Anodized aluminium housing
- Rechargeable battery powered
- Proven rugged design
- Calibrated straight from the factory
- Supplied with hose lengths from 1 to 15 metres
- Easy to read, bright red digital display

**SPECIFICATIONS**
- Length: 370mm
- Width: 380mm
- Height: 500mm
- Weight in air: 28kg
- Weight in seawater: 18kg
- Depth rating: 1500msw
- Accuracy: +/-0.1º
- Battery capacity: 100hrs fully charged
The AM1 Valve Hole Cutting tool is used to open subsea tree needle valves that are too deteriorated to operate, as sometimes occurs during well abandonment.

The tool cuts through the valve actuator, allowing the valve stem to move freely, enabling the valve to be opened by applying hydraulic pressure underneath the stem of the valve.

After the tool has been used, it would be impossible to close the valve again.

FEATURES
- Installs on valve body using ROV manipulator
- Powered using the ROV’s hydraulic power supply
- Highly efficient broaching bit minimizes cutting time
- Incorporates a clamping mechanism that grips the valve holding the tool in place during the cutting operation
- An indicator rod is used to show when the end of the cut is reached

SPECIFICATIONS
- Length: 757mm
- Width: 226mm
- Height: 226mm
- Weight in air: 50kg
- Cutting head diameter: 50mm
- Feed depth (total): 56mm
- System pressure: 207bar (3002psi)
- Clamp pressure: 70bar (1015psi)
- Cylinder feed pressure: 16bar (232psi)
- Motor flow: 6.5L/min
The TMT Soft Line Cutter is used to cut soft material such as hemp fibre ropes and slings. It is a guillotine style cutter, hydraulically actuated and ROV manipulator deployed.

A steel blade travels between two stationary side plates and into a shear point receiver area. The object being cut is sheared between the blade and the side plates.

The Soft Line Cutter can be used to cut lines up to 70mm thick.

An assortment of blades is provided with the tool.

FEATURES
- Compact design
- Easy to install and remove
- Corrosion resistant material
- ROV deployable

SPECIFICATIONS
- Length: 610mm
- Width: 230mm
- Height: 70mm
- Weight in air: 15kg
- Maximum operating pressure: 206bar (3000psi)
The Tree Cap Drill tool was originally designed to suit subsea trees. The Tree Cap Drill is used to drill 50mm diameter holes underneath the actuating ring of the tree cap. It provides a means to access the ring with lifting hooks, to release the tree cap in the event that the hydraulic release mechanism fails.

When deployed, the Tree Cap Drill is used to drill three holes in the underside of the tree cap, spaced at approximately 120º apart. Once the three holes are drilled, then the Tree Cap Drill is recovered to the surface so that the ROV can handle the large tree cap hooks. The hooks are then used to remove the tree cap using the top drive. The tool can be modified to suit customer requirements.

FEATURES
- Easy to install and remove
- Corrosion resistant materials
- ROV deliverable
- ROV handle suits T4 Parallel Jaw

SPECIFICATIONS
- Length: 1185mm
- Width: 1135mm
- Height: 1050mm
- Weight in air: 193kg
- Weight in seawater: 38kg
- Drill diameter: 50mm
- Drill stroke: 94mm
- Hydro pressure: 206bar (3000psi)
- Hydro flow (total): 20L/min
The Wire Rope Cutter is a heavy-duty, guillotine type cutter. It is a hydraulically driven unit, which is capable of cutting steel wire up to 75mm, 1060N/mm² grade.

The body of the cutter is of aluminium construction. The tool has an in built hydraulic intensifier so it can operate with normal ROV pressure of 210bar (3045psi) input. The tool is configured with a purpose built protection frame and manipulator handle that allows for the cutter to be deployed for both horizontal and vertical cuts. An integrated interlock ensures the blade cannot activate until the anvil is fully deployed.

**FEATURES**
- Cost-effective
- Low maintenance
- ROV handles
- Field proven
- Internal relief valve
- Integrated hydraulic intensifier

**SPECIFICATIONS**

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The Wire Rope Cutter is capable of cutting through steel wire up to 75mm thick.
The TMT 900mm Diamond Chop Saw is suitable for cutting large steel piles of up to 330mm in diameter. The tool can attach and locate itself on the work piece using hydraulic arms which support the tool in the cutting process. A hydraulic motor powers the blade and cut indicators allow operators to track cutting progress.

TMT can configure the tool to the customer requirements.

**FEATURES**
- ROV manipulator held
- Powerful motor
- Removable guards
- Simple controls
- Non-blocking/jamming design
- Self-locates and clamps to work piece

**SPECIFICATIONS**
- Length: 1685mm
- Width: 900mm
- Height: 650mm
- Weight in seawater: 20kg
- Maximum pressure: 210bar
- Maximum flow rate: 65L/min
- Grinding disc: *900mm
- Maximum pressure: 210bar
- Power: 15.5kw
- Speed: 810rpm
- Depth: Unlimited

*Optional larger units are available*
The 4 Inch Colet Connector Mechanical Override tool was originally designed to suit subsea trees. The override tool interfaces with the two 1 inch mechanical override rods that protrude from the top of the flowline connector and uses two hydraulic cylinders to raise the locking ring inside the flowline connector to release the connector.

The tool was designed to replace an existing diver operated tool and allow a larger force to be applied to the mechanical override rods than was previously possible. TMT can modify the tool to suit your requirements.

**FEATURES**
- Requires only one movement to operate
- Powerful
- Field proven

**SPECIFICATIONS**
- Length: 940mm
- Width: 445mm
- Height: 402mm
- Weight in air: 60kg
- Weight in seawater: 49kg
- Maximum depth: Unlimited
- Maximum pressure: 689bar (10,000psi)
- Cylinder stroke: 152mm (6")
- Connector stroke: 89mm (3.5")

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<td>15.7</td>
<td>10000</td>
<td>28.5</td>
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</table>
The 45 Litre Compensator Tank is a sealed and pressure compensated variable displacement oil tank suitable for use on an ROV to unlimited dive depths. The tanks are capable of handling a wide range of oils and grades.

These tanks can be customised to suit your needs and a range of sizes are available.

**FEATURES:**
- Large 45 litre capacity
- Burst disc
- Level sensor
- Wet sensor
- Temperature sensor
- Handles a wide range of oils and grades
- Not depth limited
- Simple and effective electronic leak detection
- Positive leak design

**SPECIFICATIONS**

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<th>Specification</th>
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<tr>
<td>Height</td>
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<tr>
<td>Weight</td>
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<tr>
<td>Maximum oil capacity</td>
<td>45 Litres</td>
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<td>Maximum flow limit</td>
<td>limited by pump and 3&quot; pump inlet only</td>
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<td>Bladder material</td>
<td>reinforced rubber</td>
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<tr>
<td>Depth rating</td>
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</tr>
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</table>
The 5½ inch AX Ring Grip Gasket tool is used to install or remove an internal AX gasket from the wellhead. The tool is designed to grip AX ring gaskets in subsea environments with an internal diameter of 5½ inch.

Any other rings can be gripped by changing out the wedging plate, which can be supplied separately. The tool is deployed axially into the gasket.

TMT can modify the tool to suit your requirements.

FEATURES
• Cost-effective
• Low maintenance
• ROV handles
• Field proven

SPECIFICATIONS
Length ........................................... 220mm
Width ............................................. 90mm
Height ........................................... 400mm
Weight in air .................................... 3.2kg
Weight in seawater .............................. 2kg
Retracted width .................. 132mm (5.2 inches)
Extended width .................. 142mm (5.6 inches)
Input fitting spec. .................. JIC 9/16
Maximum operating pressure .......... 206bar (3000psi)
The 5½ inch Hub Cleaning Tool provides a means to remove foreign matter present on a 5½ inch tubing hub. To maximise the effectiveness of the metal to metal and elastomeric seals used on the 5½ inch hub, seal surfaces need to be clean and free from any foreign matter. The tool lands out onto the 5½ inch hub on the manifold using a plastic shaped hub corresponding to a 5½ inch tubing head hub.

A hydraulic motor is used to rotate a cleaning head. The cleaning head has three separate pads with coarse Scotch Brite material fitted to the surface. There are no steel surfaces in direct contact with the hub.

TMT can configure the tool to your requirements.

FEATURES
- Cost-effective
- Low maintenance
- ROV deployed and powered
- Field proven

SPECIFICATIONS
- Length: 480mm
- Diameter: 230mm
- Weight in air: 29kg
- Weight in seawater: 22kg
- Maximum operating pressure: 138bar (2000psi)
- Maximum flow rate: 80L/min
- Input hydraulic fittings: 2 x JIC-6 & JIC-4
The AX/VX Subsea Ring tool provides the means to install or remove the 18\(\frac{3}{4}\) inch gasket. The tool is deployed into the gasket to grip the inner diameter. Once a grip is achieved, the ROV can remove the gasket from the wellhead.

TMT can modify the tool to suit your requirements.

**FEATURES**
- Easily fitted to an ROV
- Rugged aluminium radial ring
- Simple and highly serviceable
- Common industrial parts easily available
- Proven design

**SPECIFICATIONS**
- Length: 600mm
- Width: 468mm
- Weight: 16kg
- Pressure Rating: 206bar (3000psi)
- Ring Size: 18\(\frac{3}{4}\)" AX / VX Gasket
BACK SEAL TEST UNIT

The TMT Back Seal Test Unit is a compact tool that allows the ROV to conduct pressure verification tests on subsea equipment, typically back seal test ports. Hydraulic fluid is supplied from the ROV through an ROV isolation valve and pressure gauge on the Back Seal Test Unit and then out to a hot stab and the subsea equipment. When the required test pressure is reached, the ROV closes the isolation valve, locking in the pressure between the valve and the subsea equipment. The supply pressure can then be vented and the pressure monitored for the required duration, as per clients requirements.

The TMT Back Seal Test Unit is designed to be easily mounted into an ROV or a manipulator for ease of use and access.

FEATURES
- 2 Port ISO hot stab receptacle for storage
- Easily readable subsea pressure gauge dial
- ROV operated 1/4 turn isolation valve
- Compact, lightweight frame

SPECIFICATIONS
- Length: 490mm
- Width: 210mm
- Height: 300mm
- Weight in air: 19kg
- Weight in seawater: 14.5kg
- Pressure rating: 5000psi
- Depth rating: 3000msw
- Hydraulic fittings: 7/16" JIC Male
TMT VALVE HOLD OPEN TOOL

The TMT Valve Hold Open Tool was originally designed to replace the existing diver installable tool for subsea trees with 2½ inch and 4½ inch valves. The tool is used to hold a valve open after the valve has been hydraulically opened.

The TMT Valve Hold Open Tool can reliably hold open both of the spring loaded valves. The larger 4½ inch valve has the greater spring force of 9000psi when fully open.

TMT can modify the tool to suit your requirements.

FEATURES
- Easy to install and remove
- Corrosion resistant materials
- ROV deployable

SPECIFICATIONS
Length: 503 mm
Width: 220 mm
Height: 180 mm
Weight in air: 17.5 kg
Weight in seawater: 15.5 kg
ROV handle: T4 Parallel Jaw Manipulator

The TMT Valve Hold Open Tool.

LINEAR OVERRIDE TOOL

The Linear Override Tool is a flexible and versatile solution for operating various interfaces on Linear Actuator Override Tools. LOTs are available in a range of loads up to 50 tons.

The Linear Override Tool is comprised of two parts, the Lock Off Tool and the Actuator. The Actuator contains a hydraulically operated piston. The Lock Off Tool is a mechanical device and is left behind on the interface when the valve is required to be left overridden. TMT can configure the Linear Override Tool to the customer requirements.

FEATURES
- Easily removed by ROV
- Easily operated from ROV
- Corrosion resistant material
- Proven rugged design

SPECIFICATIONS
Weight in air: 76.2 kg
Weight in seawater: 60 kg
Interface: ±0.25º
Maximum load: 50 tons
The Cement Top Up Stab is an ROV operated hot stab with a 2” bore that can be used to pump cement into the conductor annulus of a wellhead to correct a poor cementing job. The cement is pumped down to the seabed through a drill string, which is connected to the hot stab using a 15m cementing hose. Prior to the deployment of the wellhead, matching receptacles are installed onto the cementing tubes of the wellhead for the ROV to interface with. The receptacle can be easily modified to suit the client’s specifications as required.

FEATURES

- Corrosion resistant
- Compact
- Easy to operate
- Supplied with:
  - cementing hose
  - drill string adaptor
- Large, straight through bore to minimise pressure losses.

SPECIFICATIONS

- Length: 427mm
- Width: 155mm
- Height: 400mm
- Weight in air: 31kg
- Weight in seawater: 27kg
- Pressure rating: 500psi
- Depth rating: unlimited
The Underwater Breaker/Driver tool is in the 90 pound class of breakers. With its long piston stroke, it is our hardest hitting ROV held breaker. It is used for heavy concrete and rock breaking, coral removal and rod and anchor driving. Standard 1¼ inch by 6 inch hex chuck and latch retainer.

The breaker is painted in a highly visible yellow.

Included are a vibration shock absorber mount with 4 metres of ¾ inch hydraulic hose and a Dirty Oil Pack. The Dirty Oil Pack prevents the ROV oil from being contaminated.

**BREAKER**

**FEATURES**
- Operated in any position
- Corrosion resistant materials
- Operated using 7-function arm
- Hydraulically controlled by ROV tooling manifold
- Uses standard 1 inch x 4 ¼ inch hex shank tool bits:
  - Moil
  - Chisel
  - Spade

**SPECIFICATIONS**
- Length: 736mm
- Width: 410mm
- Weight: 85kg
- Depth rating: unlimited
- Performance: 1080bpm@8gpm
- Flow range: 26-34L/min
- Working pressure: 105-140bar (1523-2031psi)

**IHPU (DIRTY OIL PACK)**

The TMT Dirty Oil Pack is an Isolated Hydraulic Power Unit (IHPU) that can be easily incorporated into an ROV hydraulic system. It provides an isolated hydraulic supply to drive tooling and equipment that might potentially cause contamination to the main ROV hydraulic supply.

The pack is a fully self-contained circuit incorporating hydraulic motor, pressure compensated pump, compensated reservoir, pressure and return line filters and multiple inlet/outlet connection points. Hook-up to the ROV is quick and simple by connecting a supply, return and drain line to an ROV valve pack function. TMT can customise the IHPU to your requirements.

**FEATURES**
- Simple design
- Self-contained
- Variable pressure and flow
- Quick fit to ROV
- Integral filters
- Compensator
- Pressure relief valve

**SPECIFICATIONS**
- Weight in air (empty): ~40kg
- Weight in seawater (empty): ~25kg
- Maximum oil capacity: 6L
- Maximum output pressure: 203bar
- Maximum output flow: @200bar: variable
- Motor operating pressure requirement: 203bar
- Motor operating flow requirement: variable
- Depth rating: unlimited
In the exploitation of offshore oilfields, a subsea tubing head might not be used for production immediately after installation at the wellhead. In such circumstances, there is a need to protect the tubing head sealing surfaces against corrosion. Protection against damage or obstruction by falling debris, silt and biological accretions is also required.

The TMT Tubing Head L-loop Debris Cap is specifically designed for the tubing head L-loop vertical hub.

The cap has a rubber face seal on the contact area with the hub to minimise loss of preservation fluid from within the L-loop.

**FEATURES**

- Compact design
- Easy to install and remove
- Corrosion resistant material
- ROV deployable

**SPECIFICATIONS**

- **Length**: 265mm
- **Height**: 330mm
- **Weight in air**: 19.7kg
- **Weight in seawater**: 12.3kg
- **Depth rating**: 125msw*

*Consult with TMT for a higher depth rating.
The Slimline Guide Wire Anchor suits Regan style post tops with 19mm cables. The anchor has few moving parts and a robust stainless steel chassis construction. A sliding collar on the top of the anchor allows an ROV operator to release an anchor with ease. The anchor can be re-inserted whilst underwater and without having to reset the mechanism.

An extra removal feature is included in the design and should the release mechanism fail, a specially designed shear pin allows the anchor to be removed.

FEATURES
- Self-arming on insertion into post top
- Slimline design
- Easily maintained
- Easily recovered
- A simple subsea attach and release operation means that no special tools are required

SPECIFICATIONS
- Length: 650mm
- Diameter: 90mm
- Weight in seawater: 12kg
- Depth rating: unlimited
- Guide post: suits Regan post tops
- Guide wire: 19mm
- Shear pin capacity (default): 7.5T*
- Depth rating: unlimited
*(Higher and lower rating (8.5, 9.5 and 6 Tonnes) available on request.)
GUIDEPOST RELEASE TOOL

The TMT Guidepost Release Tool provides the means for removing guidepost extensions. This could be at the end of the field life or as part of a standard operational procedure during installation.

An internal pressure reducing valve is set at 1000psi to limit the load that is applied to the guidepost latch. Springs will automatically retract the cylinders if hydraulic power is lost, preventing the tool from becoming stuck onto the guidepost.

The tool is typically operated using an ROV manipulator, however, it can also be rigidly mounted onto the ROV for projects that require an extended use of the tool.

TMT can customise the tool to suit the client’s requirements.

FEATUERS
• Light weight
• Compact
• Painted to reduce corrosion
• Automatic retraction
• Hydraulically operated
• ROV operated and deployable
• Regan Type GL-4 Latch Profile

SPECIFICATIONS
Length .......................... 540mm
Width ............................ 489mm
Height ........................... 567mm
Weight in air .................... 54kg
Weight in seawater ............. 46kg
Maximum hydraulic pressure .......................... 3000psi
Depth rating ...................... unlimited
The TMT Beacon Transponder Stand is a subsea positioning tripod used to support a range of different transponders. It elevates the transponder unit above the sea floor, clear of potential obstacles and makes the unit easier to find.

The TMT Beacon Transponder Stand has been designed with a broad and sturdy footprint to inhibit movement and sinking into unstable surfaces.

The TMT Beacon Transponder Stand also incorporates a clever folding system. It will pack flat and take up much less space for transport and storage.

**FEATURES**

- Can hold a range of different transponder units
- Large and sturdy base for extra stability
- Keeps the transponder clear of obstacles
- Makes transponders easier to find
- Clever fold flat system for transport and storage

TMT Beacon Transponder Stand.
The Drill Collar Transducer Buckets allow a subsea transducer to be mounted directly onto a section of drill string, so that the exact depth of the drill string can be measured using a subsea transponder array.

The Drill Collar Transducer Buckets mount onto a drill pipe sub that has grooves machined in it to secure the buckets. A transponder is mounted on the surface, which then communicates with the pre-installed subsea array, in order to determine the depth of the drill string and equipment that is being deployed. If necessary, the transponder can be removed by ROV whilst subsea. TMT can customise to the clients requirements.

FEATURES

- Lightweight aluminium construction
- Compatible with various subsea transponders (not included)

SPECIFICATIONS

- Length: 680mm
- Width: 360mm
- Height: 720mm
- Weight in air: 25kg
- Weight in seawater: 16kg
- Depth rating: Unlimited

TMT Drill Collar Transponder Bucket
The Tubing Hanger Emergency Release Tool (TH ERT) is normally supplied with a dummy hot stab. The TH ERT is an ROV interface panel with brackets, so that it may be mounted to a 5 inch (127mm) outside diameter tube. It is a means of supplying hydraulic pressure to the tubing hanger release cylinder, via a 2 port ISO hot stab to the ROV.

The hydraulic fluid is supplied via a pair of 4 metre hydraulic hoses connected to the tooling port on one end and to the ROV interface panel, via the 2 port hot stab on the other end.

**FEATURES**
- Easy to install and remove
- Corrosion resistant materials
- ROV deployable

**SPECIFICATIONS**
- Length: 475mm
- Width: 468mm
- Height: 750mm
- Weight in air: 55kg
- ROV valve: 1½ inch NPT
- Maximum supply pressure: 206bar (3000psi)
The SST/FSB 18¾ inch Override Tool was originally designed to open 18¾ inch subsea trees at the connection between subsea tree and flow base, and the connection between flow base and wellhead. This is achieved by placing the tool underneath the override rods found at the connectors and energising the tool hydraulics.

The tool is lightweight and has high tensile aluminium alloy structural elements. Two tools are used at the same time. Each tool has two telescopic cylinders and is capable of exerting 125 tonnes of pressure. An interface plate is provided to allow the tool to be used on both Sub Sea Tree (SST) and Flow Support Base (FSB) override rods.

TMT can modify the tool to suit your requirements.

**FEATURES**
- Easy to install and remove
- Corrosion resistant materials
- Compact design
- Light weight
- ROV deployed

**SPECIFICATIONS**
- Length: 570mm
- Width: 260mm
- Height: 300mm
- Weight in air: 60kg
- Weight in seawater: 40kg
- Maximum pressure: 500bar (7252psi)

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<th>Stage Tonnage</th>
<th>BAR</th>
<th>PSI</th>
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The Video Inspection Module consists of a circular array of 12 high quality colour cameras. The output from the cameras is displayed on a screen for real time viewing. Video from the selected camera can be recorded to DVD and used for later reporting.

Each of the cameras has 10x optical, 4x digital zoom and auto focus. Zoom and focus can be adjusted manually if required. There are 12 high intensity LED lights which provide lighting for even the darkest situations.

This camera system is typically used for internal pile inspections. TMT can configure the Video Inspection Module to your requirements.

FEATURES
- Compact design
- Digital video output
- Rugged stainless steel casing
- High quality images
- 40x optical and digital zoom
- Focus control
- Automatic or manual controls
- Complete 360° imagery

SPECIFICATIONS
- Length: 800mm
- Diameter: 170mm
- Weight in seawater: 30kg
- Minimum illumination: 1.5lx (typical)
- Resolution: 720p
- Depth rating: 350msw
The Wellhead Acid Plug is a cap designed for a H4 wellhead. The cap seals around the top surface of the wellhead as well as sealing the internal flowline. The internal seal depends on the length of the mandrel/stinger, at the base of the stinger there is a rubber flange.

A biological inhibitor, generally acid, is then injected through a hot stab in the top of the cap. This fills the cavity in between the two seals and ensures the wellhead internals remain clean.

TMT can modify the tool to suit your requirements.

**FEATURES**
- Cost-effective
- Field proven
- ROV operated
- Low maintenance

**SPECIFICATIONS**
- **Materials**: PE, SS316, POM and Aluminium
- **Weight in air**: Short . . . . 163kg  
  Long . . . . 196kg
- **Weight in seawater**: 75kg (approx.)
- **Proof load**: 1T
All involvement I have had with TMT ROV hands has been very positive. They can come back anytime.

- Darrell, Drilling Supervisor.
10K INTENSIFIER

A hydraulic intensifier increases hydraulic pressure by reducing flow. The TMT 10K Intensifier provides a means to raise the ROV hydraulic system pressure to 10,000psi (690bar).

Adjustment of the outlet pressure is carried out by adjusting the inlet pressure of the tool. The 10K tool is also available in a High Return Flow version which has a much faster retracting speed.

TMT can modify the tool to suit your requirements.

FEATURES
- Easy to install and remove
- Light weight
- Pressure gauge
- Anodic protection
- Constructed of Acetal, Stainless Steel and Aluminium
- Can be used with seawater, oils or glycols

SPECIFICATIONS
Size – Standard
- Length: 339mm
- Width: 152mm
- Height: 168mm

Size – with High Return Flow
- Length: 410mm
- Width: 232mm
- Height: 170mm

Weight in air – Standard: 6.3kg
Weight in air – with High Return Flow: 11.1kg
Ratio: 4:1
Maximum flow input: 14L/min
Maximum flow output: 2L/min
Maximum pressure input: 3000psi
Maximum pressure output: 10,000psi
The BOP Intervention Skid is designed to enable an ROV to close rams and safety valves on client equipment quickly. The skid houses a 200L bladder and two separate pumps, enabling the skid to produce a maximum flow rate of 180L/min and a maximum pressure of 10,000psi (689bar).

The output of the fluid skid is accurately measured using electronic flow meters and pressure transducers, allowing the output of the skid to be graphed vs time. In addition to these functions, the skid can also pump through a dual port hot stab to 10,000psi (689bar), with the ability to remotely select which port the high pressure fluid is directed to.

**FEATURES**
- Easy to install and remove
- Corrosion resistant materials
- Flow meter

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Length</th>
<th>3400mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
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<tr>
<td>Height</td>
<td>500mm</td>
</tr>
<tr>
<td>Weight in air</td>
<td>750kg</td>
</tr>
<tr>
<td>Weight in seawater</td>
<td>200kg</td>
</tr>
<tr>
<td>Max. supply pressure</td>
<td>97 - 207bar (1400 - 3000psi)</td>
</tr>
<tr>
<td>Max. supply flow</td>
<td>200L/min</td>
</tr>
<tr>
<td>Volume of hydraulic fluid</td>
<td>220L</td>
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<tr>
<td>Output pressure</td>
<td>179 - 689bar (2600 - 10,000psi)</td>
</tr>
<tr>
<td>Max. output flow</td>
<td>180L/min</td>
</tr>
</tbody>
</table>

---

The TMT Hydraulic Skid is designed to be a structural interface between an ROV and a range of tooling, as well as a remotely controlled hydraulically isolated hydraulic power pack. The main hydraulic supply from an ROV is the input that drives a completely isolated hydraulic circuit.

This platform provides a range of hydraulic functions to tooling which can be quick-docked to the skid without any risk of contamination to the ROV oil supply.

The skid has its own Smart Tooling Interface which provides instrumentation and controls for High-flow/Low-flow manifolds, lights and cameras. TMT can configure the Hydraulic Skid to customer requirements.

**STANDARD OUTPUTS**

- 2 x proportional control Low-flow 4 port 3-way directional valves, open centre – 8L/min @ 3045 psi
- 6 x Lo-flow 4 port 3-way directional valves, open centre – 15L/min @ 3045 psi
- 2 x proportional control High-flow 4 port 3-way directional valves, open centre 85L/min @ 3045 psi

**FEATURES**
- Smart tool interface
- Easy to install and remove
- Corrosion resistant materials
- Lights and Cameras
- Flow meter

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Length</th>
<th>3400mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>1840mm</td>
</tr>
<tr>
<td>Height</td>
<td>1000mm</td>
</tr>
<tr>
<td>Weight in air</td>
<td>1000kg</td>
</tr>
<tr>
<td>Weight in seawater</td>
<td>30kg</td>
</tr>
<tr>
<td>Max. supply pressure</td>
<td>2000msw</td>
</tr>
<tr>
<td>Max. supply flow</td>
<td>224bar (3250psi)</td>
</tr>
<tr>
<td>Volume of hydraulic oil</td>
<td>45L</td>
</tr>
</tbody>
</table>
The High Flow Tooling Manifold is a compensated hydraulic manifold that incorporates proportional solenoid operated cartridge valves to create a high flow tooling manifold. The manifold has five functions, four with proportional flow and one with proportional pressure and flow.

FEATURES
- Lightweight aluminium construction
- Independent proportional flow of all functions
- Proportional pressure and flow on one function
- Pressure transducer function 1-4
- Independent pressure transducer function 5
- Transparent acrylic cover - LED function lights
- Retained bolts on cover assembly
- Water ingress sensor
- Field proven to 3100msw

SPECIFICATIONS
- Length: 734mm
- Width: 255mm
- Height: 386mm
- Weight in air (without oil): 64.4kg
- Weight in seawater: 45kg
- Depth rating: unlimited
- Number of functions: 5
- Maximum inlet flow: 280L/min
- Maximum flow function 1-4: 64L/min
- Maximum flow function 5: 100L/min
- Maximum operating pressure: 207bar (3002psi)
- Maximum relief setting: 230bar (3336psi)
The HC6D2W is a self priming, dual media miniBOOSTER which is capable of up to 28L/min flow on the high pressure end. Like other miniBOOSTER models, it raises supplied pressure to a higher outlet pressure and automatically compensates for consumption of oil to maintain the high pressure. Adjustment of the outlet pressure is carried out by varying the supplied pressure. Relative to its flow capability, the HC6D2W is a compact unit, weighing only 24 kilograms.

FEATURES
- Easy to install and remove
- Corrosion resistant materials

SPECIFICATIONS
- Length: 453mm
- Diameter: 100mm
- Weight in air: 24kg
- Mounting: inline tube
- Maximum flow rate: 28L/min

A miniBOOSTER unit used in a TMT hydraulic skid.
06 GRINDING AND BRUSHING
The 9 inch Grinder/Brush is a multipurpose rotary hydraulic tool for subsea applications. The tool is ideally suited to ROV use and can be fitted with a range of handles to allow your manipulator arm to handle the device comfortably.

The tool can be fitted with a wide range of accessories for applications such as:

- Grinding
- Cutting
- Polishing

FEATURES

- Low profile
- Easily transportable
- Corrosion resistant material
- ROV deployable
- Powerful motor
- Multiple accessories
- Removable guard for larger discs and accessories

SPECIFICATIONS

- Length without ROV handle: 302mm (approx.)
- Width: 310mm
- Height: 260mm
- Weight in seawater: 8kg
- Depth rating: Unlimited
- Grinding disc: 230mm x 2.2mm
- Maximum operating pressure: 140 bar (2031 psi)
- Maximum flow: 16L/min
- Power: 1.8kW
- Speed: 1950 rpm

Some of the numerous accessories available for the TMT 9 Inch Grinder.
The Annulus Bore Grinder was originally designed to facilitate proper sealing on a re-entry spool annulus bore. It does this by removing material from the shoulder of the pocket and leaving a surface finish suitable for sealing.

The feed cylinders are fitted with flow and pressure regulation, which is pre-set during workshop testing.

FEATURES
- Feed cylinders fitted with flow and pressure regulation
- Corrosion resistant materials
- Installed and operated using 7-function arm
- Hydraulically controlled by ROV tooling manifold

SPECIFICATIONS
- Length: 800mm
- Width: 300mm
- Height: 300mm
- Weight in air: 30kg
- Material removal rate: 1mm/min (approx.)
- Maximum motor speed: 10,000rpm
- Motor flow: 50L/min
HOT STAB
RECEPTACLE CLEANER

The Hot Stab Receptacle Cleaner was originally designed to remove marine growth from the hot stab receptacle on tree pod interface panels. The tool is created from stainless steel and Acetal in order to achieve maximum tool life.

The consumable cleaning brushes are made from carbon steel and abrasive impregnated plastic.

The drive motor is fitted with a check valve to prevent the tool from running in the wrong direction. The tool can be modified by TMT to suit customer requirements.

FEATURES

• Easy to install and remove
• Corrosion resistant materials
• ROV deployable

SPECIFICATIONS

Length ........................................ 447mm
Diameter ...................................... 124mm
Weight in air .................................. 4kg
Cleaning brush diameter ....................... 58mm
Maximum motor speed ......................... 1250rpm
Maximum pressure ......................... 140bar (2031psi)
Maximum flow ............................... 20L/min
Fitting specification ..................... JIC 3/4 inch male
The AX/VX Profile Cleaning Tool is designed to clean scale and growth from the wellhead sealing surface. An outer ring is hydraulically actuated to clamp onto the wellhead and centralise the cleaning head. A powerful hydraulic motor and cleaning pads then conform to the surface of the well pipe to create an ultra-clean surface ready for other processes. Variable cleaning pressure can be controlled from the surface.

**FEATURES**
- Three cleaning pads
- Hydraulic motor
- Proven rugged design
- Lightweight construction
- Range of cleaning pads available

**SPECIFICATIONS**
- Length: 910mm
- Width: 980mm
- Height: 390mm
- Weight in seawater: 30kg
- Depth rating: unlimited
- Maximum operating pressure: 210bar (3046psi)
- Maximum flow: 65L/min
- Power: 1.5kW
- Speed: 810rpm

AX/VX Profile Cleaning Tool being used on a test wellhead.
Hot stabs provide a means of transferring fluid subsea with almost no leaks to the environment. They are mainly used for installation, intervention and completion purposes on subsea wellhead components. A variety of different fluids can be used.

TMT designs and builds hot stabs to conform to ISO 13628-8 or the ISO equivalent API 17H. TMT can also customise a hot stab to suit your requirements ranging from a blank or dummy hot stab to one with multiple ports. The hot stab can be customised to suit most applications.

FEATURES
- Compatible with most 2 port receptacles
- Different handle options
- 316 or 2205 stainless steel
- Multiple accessories
- 5000 and 10,000psi options
- Pressure balanced

SPECIFICATIONS
- Length: 208mm
- Width: 208mm
- Height: 800mm
- Weight: 3kg
- Depth rating: Unlimited

TMT HOT STABS

TMT Hot Stab Receptacle
The Six Port Hot Stab is unique to TMT. Hot stabs provide a means of transferring fluid subsea with almost no leaks to the environment. Hot stabs are mainly used for installation, intervention and completion purposes on subsea wellhead components. A variety of different fluids can be used with these stabs.

**FEATURES:**
- Male, Female & Dummy
- Different ROV handle options
- 316 or 2205 stainless steel
- Multiple accessories
- 5000 & 10,000psi options

**SPECIFICATIONS:**
- Pressure ratings: 5000 & 10,000psi
- Depth rating: Unlimited

**Male Hot Stab**
- Length: 530mm
- Width: 100mm
- Height: 80mm
- Weight in air: 4.0Kg
- Weight in seawater: 3.5Kg

**Female Hot Stab**
- Length: 190mm
- Width: 100mm
- Height: 100mm
- Weight in air: 5.8Kg
- Weight in seawater: 5.0Kg

**PETROBRAS**
TMT can provide the Petrobras standard hot stab. TMT can also customise a hot stab to suit your needs ranging in size from a blank or dummy hot stab to one with multiple ports. The hot stab can be customised to suit most applications.

**FEATURES:**
- Male, Female & Dummy
- Different ROV handle options
- 316 or 2205 stainless steel
- Multiple accessories
- 5000 & 10,000psi options

**SPECIFICATIONS:**
- Male weight in air: 4.2kg
- Male weight in seawater: 4.0kg
- Female weight in air: 4.7Kg
- Female weight in seawater: 4.1Kg
- Dummy weight in air: 0.4Kg
- Dummy weight in seawater: 1.3Kg
- Pressure ratings: 5000 & 10,000psi
- Depth rating: Unlimited
HOT STAB MANIFOLDS

These hot stab tools were developed for a pipeline with 30 inch Sub Sea Isolation Valves (SSIV) fitted with a hydraulically operated actuator at each end.

Each valve and actuator is fitted with three hot stabs that allow transfer of fluids by an ROV or diver for maintenance and control purposes.

Actuators have a three element hot stab oriented for vertical makeup and each valve has two separate single element hot stabs, one oriented for vertical and one for horizontal makeup.

The hot stabs are upgraded to industry standard components suitable for use by divers or ROV.

Hot stab designs are based on ISO 13628-8:2002 10,000 psi type A, dual and single port specifications. Dummy plugs can be fitted to all females when not in use.

FEATURES

- 1 x 2 Port ISO hot stab receptacle
- 1 x 1 Port ISO hot stab receptacle
- Acetal parking receptacle

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>208mm</td>
</tr>
<tr>
<td>Width</td>
<td>208mm</td>
</tr>
<tr>
<td>Height</td>
<td>800mm</td>
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<tr>
<td>Weight - 1 port</td>
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<td>Weight - 2 port</td>
<td>25kg</td>
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<tr>
<td>Depth rating</td>
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<tr>
<td>Pressure rating</td>
<td>345/689bar (5000 / 10,000psi)</td>
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<td>Hot stab receptacle material</td>
<td>Nitronic 50</td>
</tr>
<tr>
<td>End ports</td>
<td>1/8” Swagelok</td>
</tr>
</tbody>
</table>
TMT JET PUMP

The TMT Jet Pump supplies a high pressure jet of seawater that can be used to clean subsea equipment. The ROV supplies hydraulic fluid to the unit, which drives the reciprocating pump to deliver seawater at an intensified pressure. A cleaning lance is provided with the pump that the ROV uses with its 7 function arm to clean as required.

TMT can configure the Jet Pump to your requirements.

FEATURES
- Easily fitted to any ROV
- Uses filtered seawater as a supply
- High pressure – high flow output
- Supplied with cleaning lance and 3 metre hose

SPECIFICATIONS
- Length: 287mm
- Width: 200mm
- Height: 170mm
- Output pressure: 345bar (5000psi)
- Output flow: 32L/min
- Input pressure: 214bar (3100psi)
- Input flow: 85L/min

WATER BLASTER

The Water Blaster supplies a high pressure jet of seawater that can be used to clean subsea equipment. The ROV supplies hydraulic fluid to the unit, which drives the reciprocating pump to deliver seawater at an intensified pressure. A cleaning lance is provided with the pump that the ROV uses with its 7 function arm.

TMT can modify the Water Blaster to suit your requirements.

FEATURES
- Easily fitted onto an ROV
- Uses filtered seawater as a supply
- High pressure – high flow output
- Supplied with cleaning lance and 3 metre hose
- Field proven

SPECIFICATIONS
- Length: 287mm
- Width: 300mm
- Height: 170mm
- Output pressure: 345bar (5000psi)
- Output flow: 32L/min
- Input pressure: 214bar (3100psi)
- Input flow: 85L/min
The TMT Mega Digger moves high volumes of material around subsea structures in the fastest most effective way possible. The unit is mounted to the front of the ROV using a multi-position mounting frame fitted with a front bumper.

The ROV then positions itself up-current of the material to be removed and secures itself to the structure by use of the TMT ROV Grabber unit or manipulator. If no structure is available, the ROV can hold it’s position by using the TMT Seabed Referencing Position System (SRPS) system.

TMT can configure the Mega Digger to your requirements.

FEATURES
- Mounts to ROV front
- Light weight
- Low maintenance
- High volume excavation
- Non-blocking / jamming design
- Operating on ROV hydraulic circuit

SPECIFICATIONS
- Drive propeller: 585mm x 4 Blades
- Cowling: 700 x 280mm
- Weight in Air: 45kg
- Weight in Seawater: 35kg
- Power Unit: OMS 80 Motor
- Maximum pressure: 175bar
- Flow Rate Required: 65L/min
- Depth Rating: Unlimited
TMT SUBSEA TOOLING BASKET

The TMT Subsea Tooling Basket is a multipurpose basket for subsea use. The Tooling Baskets can come in various shapes, sizes and weights. Generally of a large size, the multipurpose basket is used to transport tooling and equipment to and from subsea for use by divers or ROVs. TMT can build tooling baskets to your requirements.

FEATURES

- Easily transportable
- Four lifting points
- All stainless steel construction
- Custom inner frames are available

SPECIFICATIONS

The TMT Subsea Tooling Baskets are a secure and convenient transit solution.

TMT ROV TOOLING BASKET

The TMT ROV Tooling Basket comes in various shapes, sizes and weights. Generally of a large size, the multipurpose basket is used to allow the ROV to transport tooling and equipment to and from subsea. TMT can build tooling baskets to your requirements.

FEATURES

- Easily transportable
- Four lifting points
- Corrosion resistant materials
- Custom inner frames are available

SPECIFICATIONS

Customised to requirements
The TMT System Integration Test (SIT) Typhoon ROV, often referred to as a Mock ROV, provides an economical method of testing ROV access and functionality around subsea equipment. The on-board hydraulic and electrical systems allow ROV tools to be fully tested onshore, prior to being deployed to the offshore and subsea environment.

The SIT ROV comes equipped with identical Z function mounts as the Typhoon 150 MK2 ROV, allowing for a variety of manipulators to be used. The Hydraulic Power Unit (HPU) is mounted internally.

The SIT ROV is mounted on castors to provide an easier means of relocation.

The whole system can be packed into airfreight containers for fast transport to site. TMT can modify the entire system to suit your requirements.

FEATURES
- Variety of manipulator options to suit client needs
- 3 x Z Functions for mounting of manipulators
- Grabber manipulator
- Pan & Tilt cameras and lights
- Hydraulic Manifold for client tooling
- Adjustable lift point for balancing load
- Ballast option for heavy tooling
- Control Desk included – Typhoon MK2 footprint
- 21x 16L/min hydraulic functions
- 3x 8L/min hydraulic proportional functions
- 3x 40L/min hydraulic functions
- Integrated air blaster cooler and on demand marine grade water oil heat exchanger

SPECIFICATIONS
- Length: 3.5m
- Width: 1.9m
- Height: 2.4m
- Weight in air (approx.): 1700kg
- Through frame lift: 3.5T

HPU SPECIFICATIONS
- Pressure: 210bar (3046bar)
- Flow: 40L/min
- Air cooled
- Tank capacity: 180L
- Power: 18.5kW
TMT X-RAY PIPE INSPECTION TOOL

The TMT X-Ray Pipe Inspection Tool was designed to perform X-ray and Ultrasonic inspections on pipeline field joints with ROVs. The tool is deployed in a custom basket which also houses eight (8) X-ray films.

Once located on the pipe the tool can rotate around the pipe to the area of interest and take an X-Ray image. It can also cut a hole in the urethane coating to expose the pipe for ultrasonic measurement which is also performed by the tool.

Note: The urethane cutter is a scraping tool so it is not capable of cutting through the pipe itself.

The tool has hydraulically operated clamp and rotate with speed control. Hydraulic supply is from the ROV

The X-Ray Tool control and data monitoring is done through an intuitive and comprehensive graphical user interface system displayed on a laptop.

TMT can customise the Tool to suit your requirements.

FEATURES

- Corrosion resistant materials
- Easily installed by ROV
- Easily accessed by ROV
- Easily operated by ROV
- Field proven
- Film is reloadable subsea

SPECIFICATIONS

Dimensions - Tool
- Length: 1600mm
- Width: 1250mm
- Height: 1050mm
- Weight in air: 230kg
- Weight in seawater: 30kg

Dimensions - Basket
- Length: 1280mm
- Width: 1500mm
- Height: 2450mm
- Weight basket only: 525kg
- Weight with tool: 815kg

Electrical supply: 24VDC @6A, 2 x Video lines

Hydraulic supply: 2200psi@15L/min

Video cameras: 4

Pipeline minimum diameter: 390mm

Depth rating: 150msw
TMT PIPELINE INSPECTION TOOL

The TMT Pipeline Inspection Tool is a remotely operated pipeline inspection tool for use with ROVs. The inspection tool cleans, removes the pipeline FJ coating by jet cutting and performs ultrasonic testing (both Time-Of-Flight Diffraction (TOFD) & Phased Array) of the weld.

The tool has a hydraulically operated clamp and rotate with speed control. The on-board hydraulics can additionally supply hydraulic power to third party equipment. Once the tool is installed, operation is independent of the ROV.

In operational use, the inspection tool collects twice the information, in half the time, as compared to inspections performed by divers.

The inspection tool control and data monitoring is done through an intuitive and comprehensive graphical user interface system displayed on a laptop.

TMT can customise the tool to suit your requirements.

FEATURES
• Corrosion resistant material
• Easily installed by ROV
• Easily accessed by ROV
• Easily operated by ROV
• Once installed, independent of ROV
• Field Proven

SPECIFICATIONS

Dimensions - Tool
Length: 1000mm
Width: 1000mm
Height: 1300mm
Weight in air: 350kg
Weight in seawater: 30kg

Dimensions - Basket
Length: 4100mm
Width: 2088mm
Height: 1850mm
MGM: 3400kg

Hydraulic supply: 3000psi @35L/min
Lights: 4 LED
Cameras: 4
Data: RS422/485
Depth rating: 150msw
3-WAY HYDRAULIC BALL VALVE

The TMT 3-way Hydraulic Ball Valve Assembly is a low pressure 3-way ball valve with a double acting hydraulic cylinder, that is able to open and close the valve using hydraulic power alone. The hydraulic cylinder is mounted such that it cannot overload the stem of the ball valve, and hence can reliably and safely actuate the valve 90º, allowing the valve input to switch between the two sources.

The actuator is compact and lightweight, meaning that it can be mounted in line with hydraulic tubing if required, but it also includes mounting holes so that it can be secured separately.

FEATURES
- Corrosion resistant Stainless Steel components
- Compact and easily operated by an ROV
- 90º operation
- Various mounting options available

SPECIFICATIONS
- Length: 315mm
- Width: 105mm
- Height: 127mm
- Weight in air: 4.2kg
- Weight in seawater: 3.7kg
- Cylinder operating pressure: 3000psi
- Pressure rating: 3000psi
- Depth rating: Unlimited

2-WAY HYDRAULIC BALL VALVE

The TMT 2-Way Hydraulic Ball Valve Assembly is a high pressure 2-way ball valve and a double acting hydraulic cylinder, that is able to open and close the valve using hydraulic power alone. The hydraulic cylinder is mounted such that it cannot overload the stem of the ball valve, and hence can reliably and safely actuate the valve 90º.

The actuator is compact and lightweight, meaning that it can be mounted in line with hydraulic tubing if required, but it also includes mounting slots so that it can be secured separately.

FEATURES
- Corrosion resistant SS components
- Compact and easily operated by an ROV
- 90º operation
- Various mounting options available

SPECIFICATIONS
- Length: 330mm
- Width: 140mm
- Height: 85mm
- Weight in air: 2.8kg
- Weight in seawater: 2.4kg
- Cylinder operating pressure: 3000psi
- Pressure rating: 10,000psi
- Depth rating: Unlimited
ROV VALVE

HANDLE ASSEMBLY

The TMT ROV Valve Handle Assembly is a high pressure hydraulic ball valve with an ROV handle installed on it, allowing an ROV to easily and safely operate the ball valve. The stem of the ball valve is protected against overloading and the assembly has integrated stops to ensure that the valve is operated exactly 90°.

The Valve Handle Assembly is available in two different sizes, depending on the size of the assembly that the valve is being installed on, and a wide variety of ball valves can be used with the handle.

FEATURES

• Made from corrosion resistant stainless steel
• Various sized valves are available
• Rugged and robust design

SPECIFICATIONS

Dimensions standard: 140L x 170W x 170Hmm
Dimensions compact: 135L x 105W x 105Hmm
Weight in air standard: 6.6kg
Weight in air compact: 3.4kg
Weight in seawater standard: 5.5kg
Weight in seawater compact: 2.9kg
Pressure rating: 10,000psi
Depth rating: Unlimited

ROV VALVE

The TMT ROV Valve is a robust adapter between delicate valve stems and the ROV hydraulic arms. It decouples the forces from the stem that might otherwise be damaging to the valve.

The design can incorporate valves with various sizes. TMT can modify the tool to suit your requirements. Note: specifications may change depending on the valve size selected.

FEATURES

• Made from corrosion resistant stainless steel
• Various sized valves are available

SPECIFICATIONS

Length: 170mm
Width: 175mm
Height: 220mm
Weight in air: 9kg
Weight in seawater: 6kg
Valve size: ¼" - 2"
Operating torque: 8-15Nm (1/4" – 1/4" ball valve)
Break torque: >2000Nm
Depth rating: Unlimited
Pressure rating*: 3000-10000psi
*Depending on valve required

Valve being operated by an ROV manipulator.

TMT ROV Valve.

ROV Valve Handle Assembly.
EFFER 1355 8s Picker Crane is capable of lifting 4T@ 19.6m. The Crane can be folded up into a compact parked position within the skid envelope. The base is certified for offshore lifting DNV 2.7-3 Class R30. The crane is supplied with a dedicated four leg sling set. Flexible deck fixing options with six bolted flanges located around skid. The skid base accommodates an on-board 7 tonne winch for skidding, tagline or equipment deployment.

TMT can modify the crane to suit your requirements.

FEATURES
- On board 24VDC power
- Dedicated four leg sling set
- Wireless belly pack remote control
- Loaded percentage and lifting cylinder pressure displayed in real time on remote control

SPECIFICATIONS
- Length: 5.5m
- Width: 2.55m
- Weight in Air: 17,000kg
- Outreach: 19.69m
- SWL: Load chart is available on request.
- DNV: Portable offshore unit for base Type B Class R30
A Docking Probe is an intervention system for station keeping. It firmly attaches an ROV to an underwater structure, to prevent the ROV from moving during the execution of tasks. It also provides a positive location for the repeatability of tasks, as per ISO 13628-8.

Docking Probes are used where the loading of subsea equipment interface is not desirable, as in the case of the operation of needle valves or hot stabs, where heavier loads like jumper slabs are being handled or where many interfaces are close together such as in a panel.

**FEATURES**
- Compact design
- Hydraulically operated
- Corrosion resistant material
- Positive pull-in action
- Spring return

**SPECIFICATIONS**
- Dimensions: Standard ISO 13628-8
- Weight in air: 10kg
- Weight in seawater: 7kg
- Axial load: 3000kg
- Interface: ISO 13628-8
Flexible Fluid Tanks are reservoirs for the storage and transport of fluids to be used in a subsea environment. The outer tank fabric is 1100 dtex base polyester 900gsm PVC coated on both sides. The inner tank fabric is 940 dtex polyamide base 805gsm polyurethane polyether on both sides. The fittings are all brass machined 83 mm diameter with a 3/4 inch BSP thread centre. All seams are 20 mm electrofusion welded with stitched outer tank seams. Fluids used may be petroleum based, water-glycol based, hydraulic fluid or seawater.

**FEATURES**
- Compact design
- Electrofusion welded seams
- Corrosion resistant materials

**SPECIFICATIONS**
- Length: 1600mm
- Width: 750mm
- Volume: 210L

The TMT Flexible Fluid Tank can be used as part of an ROV fluid transfer skid.

The TMT Flexible Fluid Tank.
TMT produces Electronics Enclosures to contain the majority of the Typhoon ROV’s subsea, low voltage electrical components and electronics. This includes instrument, lighting and video power supplies, fibre optic multiplexer/modem, video switching circuits and serial communication nodes.

TMT will customise electrical enclosures to your requirements and so the details below are dependant on your specifications.

Standard electrical penetrations include:

- 11 x IE55-15
- 5 x IE55-20
- 8 x IE55-24

**FEATURES**

- Accessible at both ends
- Air or nitrogen environment
- Air transportable
- Corrosion resistant material
- Extender board available
- External fibre plug
- Field proven to 3100 msw

**SPECIFICATIONS**

- Cylinder outer diameter: 304mm
- Cylinder inner diameter: 256mm
- Internal usable volume
  - Length: 838mm
  - Diameter: 255mm
- Total length: 1379mm
- Weight when empty: 112Kg
- Weight with electronics: 125Kg
- Depth rating: 3000msw
- Tested to depth: 3750msw
The Passive Cursor System has been developed as a cost-effective solution to safely deploy heavy work class ROVs through the splash zone in rough seas, and when the launch has to take place near a vessel.

The system consists of an aluminium cage resting on a Tether Management System (TMS), hydraulically tensioned guide wires and a support structure for the wire terminations.

TMT can modify the Passive Cursor System to suit your requirements.

**FEATURES**

- Low maintenance
- Cost-effective
- Hydraulic guide wire tensioning
- Corrosion resistant cage
- Field proven
- Marine specific protective coating

**SPECIFICATIONS**

- Diameter of cage: As required
- Cage weight in air: 650kgs
- Cage weight in seawater: 400kgs
- Guide wire tension: 12T
- DNV certification: 2.7 - 3
The TMT Grabber Arm is a 2-function manipulator with a single jaw that is suitable for attaching to a greater than standard guidepost. The arm is used to attach to a structure to allow the vehicle to hold position.

The Grabber Arm can also be used as a platform to deploy various TMT tools. The use of the arm can free up other manipulators for performing other work.

FEATURES
- Easily transportable
- Easy to install and remove
- Corrosion resistant materials

SPECIFICATIONS
- Length: 2010mm
- Width: 281mm
- Height: 519mm
- Weight in air: 65kg
- Depth rating: 3000msw
- Mechanical range, extended: 900mm
- Mechanical range, grabber: 340mm

The TMT Grabber Arm.

The TMT Grabber Arm.
Very proactive and professional team. Always endeavouring to be ahead of the game.

- Kevin, Drilling Supervisor.
The Imenco 3 and 4 finger front adapter for manipulators are made from high strength stainless steel and are an exact fit to Schilling’s Titan II, III, IV and Orion manipulators.

The 4 finger is perfect to use on T-bar grips and for other applications that require a steady grip. The front adapter assembly comes complete with an actuation plate and piston and all necessary gaskets, and will replace the standard parallel grip by simply loosening the 6 bolts. The changeover is done in less than half an hour.

A majority of the ROV operators prefer and have installed Imenco’s finger jaws on their manipulators with hundreds of Imenco jaws in use.

**FEATURES**
- Quick change
- Corrosion resistant
- Low cost
- Field proven

**SPECIFICATIONS**
- Maximum opening between tips: 165mm
- Maximum Length mounted: 200mm
- Diameter of Adapter: 115mm
- Finger Width: 37mm
TMT has a wide range of manipulator arms available for hire. We can advise on the best choice for your project and supply a manipulator arm specifically customised for your requirements.

We offer full backup support including installation, customisation and maintenance. For more information visit www.tmtrov.com.au or contact us on sales@tmtrov.com.au
SCHILLING MANIPULATORS

ORION

The Schilling Orion is a seven function dexterous arm, available as either a rate or position controlled manipulator. The Orion is the choice when compact size, light weight and excellent payload capacity is the requirement. The arm’s structural segments are fabricated from hard-anodized extruded aluminium for strength and corrosion resistance.

Both the position-controlled and rate-controlled models have a standard depth rating of 6,500msw, allowing them to be mounted on a wide range of ROVs. Ideally suited for light to medium class ROVs.

TMT can configure the tool to suit your requirements.

FEATURES

- Corrosion resistant material
- Large operating envelope
- Dexterous grabber
- Long service life
- Field proven
- High lift to weight ratio

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Weight in air</th>
<th>54kg</th>
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</thead>
<tbody>
<tr>
<td>Weight in seawater</td>
<td>38kg</td>
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<tr>
<td>Lift at full extension</td>
<td>68kg</td>
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<tr>
<td>Maximum lift, nominal</td>
<td>250kg</td>
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<tr>
<td>Maximum gripper opening</td>
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<td>Grip force, nominal</td>
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<td>Wrist torque</td>
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<td>Wrist rotate continuous</td>
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<tr>
<td>Maximum reach</td>
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<tr>
<td>Depth rating</td>
<td>6,500msw</td>
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</table>

RIGMASTER

The Schilling RigMaster is a five-function, rate-controlled, heavy-lift grabber arm. The grabber arm can be used to grasp and lift heavy objects or to anchor the ROV by clamping the gripper around a structural member at the work site. Constructed primarily of aluminium and titanium, the RigMaster provides the power, performance and reliability required for demanding subsea work.

The RigMaster is used for tasks such as connecting ROV to assets to provide a stable platform for grabbing hold of a structure to allow the vehicle to hold position.

TMT can configure the tool to suit your requirements.

FEATURES

- Corrosion resistant material
- Large Operating Envelope
- Easily operated by ROV
- Long service life
- Field proven
- High lift to weight ratio
- Boom function extends arm by 305mm

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Weight in air</th>
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<td>Weight in seawater</td>
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<td>Maximum gripper opening</td>
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</tr>
<tr>
<td>Wrist rotate</td>
<td>360º</td>
</tr>
<tr>
<td>Maximum reach, boom retracted</td>
<td>1,067mm</td>
</tr>
<tr>
<td>Maximum reach, boom extended</td>
<td>1,372mm</td>
</tr>
<tr>
<td>Depth rating</td>
<td>6,500msw</td>
</tr>
</tbody>
</table>

TITAN 4

The Schilling Titan 4 is a seven function, rate-controlled, heavy-lift manipulator arm. The manipulator’s high dexterity and accuracy can be used to perform fine movements required for complex and delicate tasks.

Constructed primarily of titanium, the Titan 4 provides the power, performance, and reliability required and are widely used on heavy work ROVs.

The Titan 4 can be used for a wide variety of tasks that require precision and strength. The Titan is considered the premium option of seven function manipulators.

TMT can configure the tool to suit your requirements.

FEATURES

- Titanium construction
- Large operating envelope
- Acute precision control
- Long service life
- Field proven
- High lift to weight ratio

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Weight in air</th>
<th>100kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight in seawater</td>
<td>78kg</td>
</tr>
<tr>
<td>Lift at full extension</td>
<td>122kg</td>
</tr>
<tr>
<td>Maximum lift, nominal</td>
<td>454kg</td>
</tr>
<tr>
<td>Maximum gripper opening</td>
<td>99mm</td>
</tr>
<tr>
<td>Grip force, nominal</td>
<td>4,092N</td>
</tr>
<tr>
<td>Wrist torque</td>
<td>170Nm</td>
</tr>
<tr>
<td>Wrist rotate continuous</td>
<td>6-35rpm</td>
</tr>
<tr>
<td>Maximum reach</td>
<td>1,922mm</td>
</tr>
<tr>
<td>Depth rating standard</td>
<td>4,000msw</td>
</tr>
<tr>
<td>Depth rating extended</td>
<td>7,000msw</td>
</tr>
</tbody>
</table>

Controller

- Length | 470mm |
- Width | 177mm |
- Height | 65mm |
- Weight | 3.7kg |

Schilling Rigmaster manipulator.
As part of the development of the Macedon Gas Field, a requirement for interfacing and monitoring pressure and temperature sensors within the subsea X Tree existed. TMT developed an interface allowing portable testing and verification of the sensors. Additionally, it is possible to interface via a serial connection in the ROV umbilical, providing redundancy should the X Tree control cable fail.

The software can be modified to suit your requirements.

FEATURES
- Easily fitted
- Data logging capability
- Field proven
- High pressure output
- Configurable interface options:
  - X Tree standalone
  - Reeler cable and X Tree
  - X Tree through an ROV interface (without reeler)
  - Simulation node for testing and verification

INTERFACE OPTIONS
- RS232
- RS485
- Ethernet

PROTOCOLS AVAILABLE
- Modbus
- TCP/IP
- Customised

TMT GAUGE TESTER

A TMT Gauge Tester as viewed subsea.

The interface for monitoring the TMT Gauge Tester.
The TMT Zoom and Focus Colour Subsea Camera incorporates the latest Sony ultra-compact colour camera with a ¼ inch CCD and featuring a 40x zoom ratio (10x optical, 4x digital). The variable magnification ability is an assist when stand-off inspections are required.

The camera is easily clamped into location or can be combined with a Pan and Tilt module to allow ROV operators to look around underwater.

FEATURES

- Easy to install and remove
- Rugged aluminium casing
- Field tested and proven
- Sony EXview™ HAD CCD image sensor

SPECIFICATIONS

- Length: 200mm
- Diameter: 60mm
- Weight in air: 3.0kg (approx.)
- Depth rating: 3000msw
- Minimum illumination: 1.5lux
- Number of pixels: 440K pixels
- Shutter speed: 1/5s to 1/10,000s (22 steps)
- Power consumption: 6 to 12VDC/2.1W (motors active)
LOW LIGHT CAMERA

The Low Light Camera allows operators to clearly see in poorly lit situations where other cameras will only display a black screen. The camera is easily clamped into location or can be combined with a Pan and Tilt module to allow operators to look around whilst subsea.

FEATURES
- Works in ultra-low light conditions
- Easy to install and remove
- Corrosion resistant materials
- Field proven to 3100msw

SPECIFICATIONS
- Diameter: 78mm
- Length: 217mm
- Weight in seawater: 3.8kg
- Depth rating: 3000msw
- Minimum illumination: 0.0004lux
- Number of pixels: 440K Pixels
- Shutter speed: 1s to 1/10,000s (22 Steps)

A TMT Low Light Camera combined with a TMT LED Light and installed on a Pan and Tilt module.
The LED Light is a small and compact low energy consumption light source which is useful for providing a white light for most applications. The LED light will provide thousands of hours of service without the need to change globes.

The lights are easily clamped into location or can be mounted on a Pan and Tilt module to provide additional camera lighting.

**FEATURES**

- LED technology
- Easy to install and remove
- Corrosion resistant materials
- High light density
- Field proven to 3100msw

**SPECIFICATIONS**

- Length: 120mm
- Diameter: 50mm
- Weight in seawater: 0.5kg
- Voltage: 26VDC
- Power consumption: <5Watts
- Depth rating: 3000msw

*Total Marine Technology | www.tmtrov.com.au*
The TMT ROV Deployable Cement Detector utilizes pH level changes to give an indication of the presence of cement slurry in the displaced returns during a wellhead casing cement run.

Using the active pH detector, an accurate indication of cement returns is provided during the cementing process.

**FEATURES**
- Compact design
- No radioactive material or energy
- Easy to install and remove
- ROV deployable

**SPECIFICATIONS**
- Weight: 0.8kg
- Depth rating: 1200msw
- Input voltage: 10 to 24VDC @ 199mA
- Signal output: RS-485 2 Wire
- Response time: 1 second (approx.)
The TMT 250m Drop Camera System is an easy to mobilise and use camera system. Ideal for subsea seabed surveys, subsea structure surveys and inspection of any item underwater within its depth range.

Standard fitout is a downward looking camera angle but can be configured to a horizontal view camera and light set up.

FEATURES
• Cost-effective
• Low maintenance
• Field proven

SPECIFICATIONS
Depth rating - camera ............... 1000msw
Depth rating - lights ................ 3000msw
Surface power requirement .......... 240VAC
Power supply to camera ............... 24VDC
Umbilical length ..................... 240m
Umbilical maximum load rating .... 900kg breaking strain
Umbilical working load limit ......... 100kg
Camera image sensor .............. Sony Super HAD II CCD
Sensitivity ......................... 0.3lx
Wide angle lens ................... 3.6mm
The Compact Tooling Manifold (CTM) is a compact hydraulic manifold that incorporates either switching or proportional Wandfluh NG3 valves.

The variety of possible configurations is huge, thus providing an extremely flexible solution to a multitude of different subsea tooling applications. It is easy to use and the small size saves valuable space and weight. The CTM supports up to eight functions.

TMT can customise the manifold to suit specific requirements and the number of functions can be increased or decreased.

 FEATURES

- Small and lightweight aluminium manifold
- Electrical proportional pressure control of main galley
- Externally adjustable flow control for each function
- Variable configuration of meter-in or meter-out checks
- Externally adjustable relief valve for each function
- Removable cross checks for each function
- Switching or proportional function valves
- Transparent acrylic cover - LED function lights
- Captive cover screws
- Water ingress sensor
- Field proven to 3100msw

 SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>395mm</td>
</tr>
<tr>
<td>Width</td>
<td>200mm</td>
</tr>
<tr>
<td>Height</td>
<td>170mm</td>
</tr>
<tr>
<td>Weight in air</td>
<td>19kg</td>
</tr>
<tr>
<td>Weight in seawater</td>
<td>12kg</td>
</tr>
<tr>
<td>Depth rating</td>
<td>unlimited</td>
</tr>
<tr>
<td>Number of functions</td>
<td>8</td>
</tr>
<tr>
<td>Maximum inlet flow</td>
<td>60L/min</td>
</tr>
<tr>
<td>Maximum flow per function</td>
<td>15L/min</td>
</tr>
<tr>
<td>Maximum operating pressure</td>
<td>207bar (3002psi)</td>
</tr>
<tr>
<td>Maximum relief setting</td>
<td>414bar (6005psi)</td>
</tr>
</tbody>
</table>
The TMT Densitometer uses ultrasonic technology to determine the specific density of cement or cement-like materials underwater. It is useful for piling applications to confirm the level of the cement during pumping and confirm a consistent density to prevent failure.

The slim-line design and rugged stainless steel housing ensures the sensitive electronics are protected in the harshest of conditions.

The TMT Densitometer can be calibrated on specific concrete mixtures to ensure optimal results.

FEATURES
• Software driven density readings
• No radioactive material or energy
• Fits inside most drill strings
• ROV deployable

SPECIFICATIONS
Length ........................................ 405mm
Width ........................................... 60mm
Height .......................................... 60mm
Weight in seawater ............................ 5kg
Depth rating ................................... 1650msw
Density detection range ..................... 1SG to 2SG
Connections ................................. subsea sealed 8 pin plug

Denstometer readings are displayed on the operators screen.

The TMT Densitometer.
The Kongsberg Maritime OE14-408, available in either PAL or NTSC, is a new generation digital stills colour camera. It features a smaller diameter and a higher resolution than the previous model with a 10 megapixel resolution and 5x optical zoom.

Each image is framed using real time video and is temporarily stored in the on-board memory, standard 16Gb. The image can then be uploaded on the surface using a USB link. Images are selectable at resolutions of 640 x 480 up to 3648 x 2736 in JPEG or RAW format.

The Graphical User Interface (GUI) gives full control of the camera over RS232 / RS485 and also allows the camera to be controlled through a dedicated connector.

If hardwired control is preferred, then zoom, focus and shutter functions can be controlled in this way.

Remote or sequential photo trigger options are also available.

**FEATURES**
- Low power consumption
- High stability and reliability
- Fully calibrated
- Frequency outputs or dual
- RS-232 and RS-485 interfaces

**SPECIFICATIONS**
- Length: 239mm
- Diameter: 98mm
- Weight in air: 3.0kg
- Weight in seawater: 1.1kg
- Image resolution: 3648 x 2736 to 640 x 480 pixels
- Scene illumination: 1 Lux
- Signal to noise ratio: >41dB
- Power input: Constant Voltage 16V - 24VAC
- Power input: 0.5A or 1.5A with flashgun (max)
- Input voltage: +6 (Min) to +16 VDC
- Output signal: RS-232 or RS-485
- Depth rating: 1500 & 4500msw

Good cameras like the TMT Pencil Camera make it easier to operate in difficult conditions.
**DIGITAL VIDEO RECORDER**

The EdgeDVR is a complete solution for recording digital video inspections. It has been developed to be used by personnel with all levels of experience when completing visual inspections on subsea structures with real-time event logging. It is simple to operate and full of very useful features.

**FEATURES**
- User-configurable digital overlay
- Unique inspection data browser for easy review of data
- Built-in 4-way video switcher (SD)
- Hot-Key and manual event entry instantaneous video stills and video clips
- Automatic "blackbox" recording in SD or HD/SD combined
- Programmable
- Customiseable
- Add text to the overlay live
- Real-time current profiling
- Offsite work-pack generation
- Sequential dive numbering
- Automatically generates event, dive, video stills and anomaly logs in Excel format

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>4U Rack Mounted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ports</td>
<td>4x USB 2.0</td>
</tr>
<tr>
<td></td>
<td>2x USB 3.0</td>
</tr>
<tr>
<td></td>
<td>4x Composite 75 Ohm BNC</td>
</tr>
<tr>
<td></td>
<td>4x 9pin Serial Ports</td>
</tr>
<tr>
<td>Keyboard and Mouse Inputs</td>
<td>3 removable hard drive slots</td>
</tr>
<tr>
<td></td>
<td>2x 1TB hard drives</td>
</tr>
</tbody>
</table>

**Edgetech DVR rack mount unit.**

**TIGER SHARK DIGITAL CAMERA**

The Imenco Tiger Shark is a digital stills camera perfect for ROV use or as a high resolution stand-alone camera for research purposes. It has a 14 megapixel image resolution, integrated flash, ethernet control and download capabilities.

Options include a timer function, red dot laser for reference scaling, and a battery pack for advanced image capturing.

**FEATURES**
- User friendly
- Integrated flash
- High resolution
- RS-232 and RS-485 Interfaces

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Length</th>
<th>169mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>83mm</td>
</tr>
<tr>
<td>Weight in air</td>
<td>3.1kg</td>
</tr>
<tr>
<td>Weight in seawater</td>
<td>2.2kg</td>
</tr>
<tr>
<td>Resolution</td>
<td>14mpx</td>
</tr>
<tr>
<td>Focal length</td>
<td>4x Zoom</td>
</tr>
<tr>
<td>Focus</td>
<td>Auto</td>
</tr>
<tr>
<td>Voltage input</td>
<td>12 / 24VDC</td>
</tr>
<tr>
<td>Power input</td>
<td>37W</td>
</tr>
<tr>
<td>Input voltage</td>
<td>+6 (Min) to +16 VDC</td>
</tr>
<tr>
<td>Output signal</td>
<td>RS-232 or RS-485</td>
</tr>
<tr>
<td>Depth rating</td>
<td>6000msw</td>
</tr>
</tbody>
</table>

**Imenco Tiger Shark Digital Camera.**

**Edgetech interface.**

**Imenco Tiger Shark Digital Camera.**
LBV150 AND LBV300 MINI ROV SYSTEMS

The SeaBotix LBV150-4 is an affordable streamlined mini ROV system. Added tether length and the integrated control console provide a well-rounded system that is simple to setup and operate.

FEATURES
- Light weight
- Compact
- Intuitive integrated control console
- Easily transportable
- High quality video and lighting
- Small diameter, low drag tether
- Balanced sensor platform

SPECIFICATIONS
Length .......................... 530mm
Width .......................... 245mm
Height .......................... 254mm
Weight in air .................... 11kg
Depth rating ................. 150/200msw
Tether ......................... 150m
Thrusters ...................... 4 Brushless DC
Bollard thrust ................. 4.9kgf each
Maximum operating current .. 2 knots

The LBV300-6 is a well-rounded ROV system for all inshore applications. The ROV system offers all the proven features of the LBV systems. Ideally suited to inshore or civil applications where a rapid setup is required. The integrated control console, tether and ROV take only minutes to have ready for operation.

FEATURES
- Light weight
- Compact
- Intuitive integrated control console
- Easily transportable
- High quality video and lighting
- Small diameter, low drag tether
- Balanced sensor platform

SPECIFICATIONS
Length .......................... 530mm
Width .......................... 484mm
Height .......................... 254mm
Weight in air ................... 13kg
Depth ............................ 300msw
Tether ......................... 300m
Thrusters ...................... 4 Brushless DC
Bollard thrust ................. 4.9kgf each
Maximum operating current .. 2.5 knots
RJE UNDERWATER BEACON/LOCATOR

The RJE ULB-362 is a compact, cost-effective, full ocean depth, underwater location beacon designed for applications where size is critical. Typical applications include use on ROVs, AUVs, ordinance and equipment recoveries.

The ULB-362 can withstand very high levels of vibration, pressure and temperature. It is powered by a battery with a 6 year shelf life, which provides a minimum operating life of 30 days when activated. The ULB series beacons can be ordered in aluminium or stainless steel bodies and configured to activate with a time delay or power-loss option.

FEATURES
- Water activated
- Long battery shelf life
- Compact
- Rugged

SPECIFICATIONS
- Length: 101.6mm
- Diameter: 33mm
- Weight in air: 227.0g
- Operating frequency: 27, 37.5, 45 kHz (+/- 1kHz)
- Acoustic output: 160.5db ef 1<Pa @ 1m
- Activation: water switch or other options
- Power source: lithium battery
- Battery shelf life: 6 Year
- Battery life: 30 Days
- Housing material: aluminium or stainless steel
- Depth rating: 6000msw
DIGIQUARTZ DEPTH SENSOR

Digiquartz Depth Sensors provide the ultimate precision in water level measurements. Typical application accuracy of 0.01 % is achieved even under difficult environmental conditions. Desirable characteristics include excellent long-term stability, 1 x 10⁻⁸ resolution, low power consumption and high reliability.

The remarkable performance of these depth sensors is achieved through the use of a precision quartz crystal resonator whose frequency of oscillation varies with pressure-induced stress. A quartz crystal temperature signal is provided to thermally compensate the calculated pressure and achieve high accuracy over a broad range of temperatures. The depth sensors include waterproof housings with integral shock protection. Dual RS-232 and RS-485 interfaces allow complete remote configuration and control of all operating parameters including resolution, sample rate, and choice of engineering units, integration time, and sampling requests.

FEATURES

- Low power consumption
- High stability and reliability
- Fully calibrated
- Frequency outputs or dual RS-232 and RS-485 interfaces

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Pod</th>
<th>Weight</th>
<th>1.33kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>Stainless Steel</td>
<td></td>
</tr>
<tr>
<td>Calibrated temperature range</td>
<td>-2 to 4°C</td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>±0.01 Full Scale</td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.01 Full Scale</td>
<td></td>
</tr>
<tr>
<td>Over pressure</td>
<td>±1.2x Full Scale</td>
<td></td>
</tr>
<tr>
<td>Thermal sensitivity</td>
<td>&lt;0.0008% Full Scale °C</td>
<td></td>
</tr>
<tr>
<td>Input voltage</td>
<td>+6 (Min) to +16 VDC</td>
<td></td>
</tr>
<tr>
<td>Output signal</td>
<td>RS-232 or RS-485</td>
<td></td>
</tr>
<tr>
<td>Depth rating</td>
<td>7000msw</td>
<td></td>
</tr>
</tbody>
</table>

CDL MICROGYRO

The CDL MicroGyro has been designed to meet the requirement for high quality deep-water recovery of attitude information within the survey industry. Based around the industry standard Robertson SKR82 gyrocompass, the unit provides sensor information at a high update rate either through its own lightweight umbilical or through customer ROV umbilicals.

The CDL MicroGyro is extremely small, measuring only 9” diameter by 19” long and achieves a 3,000m depth rating with a total pod weight of less than 27kg. Installation is an easy one-man operation.

The MicroGyro is controlled by the new CDL Data Display Unit (DDU). The DDU is a general use display unit which contains a high contrast colour display powered by the Windows CE™ operating system.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Pod</th>
<th>Length</th>
<th>487mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>228mm</td>
<td></td>
</tr>
<tr>
<td>Weight in air</td>
<td>27kg</td>
<td></td>
</tr>
<tr>
<td>Weight in water</td>
<td>8kg</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Display Unit</th>
<th>Length</th>
<th>180mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>120mm</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>240mm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>4.5kg</td>
<td></td>
</tr>
</tbody>
</table>

Digiquartz Depth Sensor.

CDL MicroGyro.

Data Display Unit.
LEAK DETECTION SYSTEM

The Acoustic Pipeline Leak Detection (APLD) allows rapid detection and the locating of leaks by scanning over the suspect area. The system can be deployed using an ROV, AUV, towed vehicle or can be diver held. Software rejection of sounds of frequencies below 30kHz enables automatic filtering of most of the acoustic noise generated by the ROV or attendant vessel.

The two channel system allows one or more sensor types (fluorometer and acoustic) to be operated simultaneously for more efficient detection.

The sensors are connected to a processor board that is mounted within a pressure housing mounted on the ROV. The processor produces data in RS232 and RS485 (operator selectable) format for transmission to the surface via the ROV umbilical. Power is supplied by the ROV (12 to 30VDC). For diver operations, the sensor connects to the surface PC via a diver to a surface cable and a pressure housed RS485 signal converter.

FEATURES
- Diver, ROV, AUV or towed
- Direction hydrophones
- Variable pressure and flow
- Quick fit to ROV
- Easily mobilised
- Real time processing
- Field proven

SPECIFICATIONS
- Diameter: 55mm
- Length: 250mm
- Subsea connector: 6-Way
- Electrical inputs: 6 to 15VDC
- Electrical outputs: 0 to 2.5VDC
- Frequency response: 30kHz to 140kHz
- 40kHz to 150kHz
- Gain options: 49, 52, 60 & 72dB
- Depth rating: 1500msw, 3000msw option

PMAC CP Probe.

PMAC CP PROBE

The PMAC CPacq is a user operated simplified Cathodic Protection (CP) inspection system that does not require the presence of a CP engineer and can be used by data recorders, ROV pilots or any other survey and inspection personnel. Based on the use of the Silver/Silver Chloride Half Cells, the system provides real time data measurement for both subsea pipelines and structures. Continuous CP and Field Gradient (FG) readings can be read simultaneously coupled with contact measurement when required.

FEATURES
- Direct contact CP readings
- Proximity CP readings
- Field Gradient readings
- Simple to use
- Compact

SPECIFICATIONS
- PROBE
  - Diameter: 60mm
  - Height: 300mm
  - Weight in Air: 0.9kg
  - Weight in Seawater: 0.25kg
  - Probe Type: Single half-cell Contact / Proximity CP
  - Probe with 1m whip Cell Type: Silver / Silver-Chloride half cells
- ELECTRONICS POD
  - Diameter: 139mm
  - Length: 230mm
  - Weight in Seawater: ~1kg
  - Type: Subsea digitiser
  - Outputs: Multiple RS232 and RS485
  - Power: 24VDC or 110VAC
  - Depth Rating: 1500msw, 3000msw option

The PMAC CP PROBE.

Leak Detection System output screens.
The Tritech SeaKing 700 Series integrated bathymetric and oceanographic sensor suites comprise of up to four high resolution sensors:

- Tritech PA500 Precision Altimeter
- Paroscientific Digiquartz Precision Depth Sensor
- Falmouth Scientific Conductivity Probe
- Falmouth Scientific Temperature Probe

There are two standard configurations available:

- SeaKing 701 Bathymetric system, comprising depth and altitude sensors
- SeaKing 704 Oceanographic system - as 701, but with temperature and conductivity sensors

Other configurations can be supplied on request. The units are available in four standard depth ratings: 700, 1400, 2000, 4000 metres.

Although the sensors form an integrated package, the altimeter may be mounted separately on the ROV. This allows positioning of the individual sensors away from areas of masking or disturbance, such as vehicle structure or thruster wash. Specifications on sensors are available on request.

FEATURES
- Configurable design
- Real time monitoring
- Corrected temperature
- Corrected salinity
- Field proven
- Compact

SPECIFICATIONS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>262mm</td>
</tr>
<tr>
<td>Diameter</td>
<td>110mm</td>
</tr>
<tr>
<td>Weight in air</td>
<td>4.2kg</td>
</tr>
<tr>
<td>Weight in seawater</td>
<td>2.1kg</td>
</tr>
<tr>
<td>Communication</td>
<td>ARCNET, RS232</td>
</tr>
<tr>
<td>Power Input</td>
<td>24-28VDC @ 8VA</td>
</tr>
<tr>
<td>Material</td>
<td>Anodised Aluminium Alloy</td>
</tr>
<tr>
<td>Depth Rating</td>
<td>700 to 4000msw</td>
</tr>
</tbody>
</table>

The Valeport Model 803 ROV Current Meter is a unique instrument, providing ROV pilots with relative water velocity data in real time. It can be fitted to an ROV to provide actual through the water speeds or fitted to Tether Management Systems to give a measurement of local flow conditions. The selection of output options make interfacing easy, and data may be displayed using the software supplied.

Available in both 500msw acetal and 3000msw titanium depth rating versions, the Model 803 is an extremely durable, reliable method of measuring current speeds in a wide variety of underwater vehicle applications.

FEATURES
- High accuracy
- Proven rugged design
- Easy to set up and use

SPECIFICATIONS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>350mm</td>
</tr>
<tr>
<td>Diameter</td>
<td>92mm</td>
</tr>
<tr>
<td>Weight in seawater</td>
<td>Acetal: 0.5kg</td>
</tr>
<tr>
<td></td>
<td>Titanium: 3.5kg</td>
</tr>
<tr>
<td>Class</td>
<td>1 1/8 inch socket</td>
</tr>
<tr>
<td>Units</td>
<td>m/s</td>
</tr>
<tr>
<td>Range</td>
<td>±5m/s</td>
</tr>
<tr>
<td>Accuracy</td>
<td>0.01m/s +1%</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.001m/s</td>
</tr>
</tbody>
</table>

Tritech SeaKing Integrated Sensor Suite.

Valeport Current Meter.
**TRITECH MICRON SONAR**

The Tritech Micron Sonar is the smallest digital Compressed High-Intensity Radiated Pulse (CHIRP) sonar in the world and is ideal for use by small ROVs, as a first-rate obstacle avoidance sonar in miniature form.

CHIRP technology dramatically improves the range resolution compared with conventional scanning sonars - it is a feature normally associated with much larger and more expensive systems.

As part of Tritech’s SeaKing range of mechanical imaging sonars, in addition to boasting CHIRP technology, the Micron also utilises Digital Sonar Technology (DST) to offer exceptional clarity and resolution - a feature again normally associated with much larger, more expensive systems.

The Micron DST Sonar can be controlled by a customer supplied PC equipped with Tritech AIF card or laptop equipped with the Tritech Seahub, configured for either RS232 or RS485 protocols. The sonar has a standard auxiliary port to allow it to interface with other Tritech sensors.

**FEATURES**

- Programmable
- Multi-frequency
- High performance
- Low cost
- Simple to use
- Compact size

**SPECIFICATIONS**

- Diameter: 79.4mm
- Length: 182mm
- Weight in air: 1.5kg
- Weight in seawater: 0.6kg
- Frequency: 310kHz, 675kHz or 1MHz
- Range resolution: 1m - 4m: 2mm, 5m & up: 10mm
- Minimum detectable range: 150mm
- Maximum cable length: 1000m
- Material: Aluminum
- Material (3000msw): Titanium
- Depth rating: 1000msw and 3000msw

---

**IMAGENEX 881 SONAR**

The Imagenex 881A Digital Multi-Frequency Imaging Sonar is a programmable imaging sonar that you can operate using default frequency settings or you can customise the configurations for your own situation.

High performance, lower cost, low power and simple set-up and installation make this sonar perfect for any ROV from the largest work class models to the smallest inspection ROVs, ALVs or UUV applications.

**FEATURES**

- Programmable
- Multi-Frequency
- High performance
- Low cost
- Compact size

**SPECIFICATIONS**

- Length: 182mm
- Diameter: 79.4mm
- Weight in air: 1.5kg
- Weight in seawater: 0.6kg
- Frequency: 310kHz, 675kHz or 1MHz
- Range resolution: 1m - 4m: 2mm, 5m & up: 10mm
- Minimum detectable range: 150mm
- Maximum cable length: 1000m
- Material: Aluminum
- Material (3000msw): Titanium
- Depth rating: 1000msw and 3000msw

---

Imagenex 881A Digital Multi-Frequency Imaging Sonar module and interface screen.
**VORTEX GAS SAMPLING TOOL**

The Vortex Liquid and Gas sampling tool is designed to capture gas or liquids escaping underwater for the purpose of recovery to the surface for analysis. The tool is designed to be deployed from the surface with zero pressure in the containment bottles. Sample filling relies on pressure differential between the isolated sea level pressure inside the bottles and the surrounding ambient seawater pressure.

All the components are housed in one anti-impact stainless steel housing, allowing this tool to be rough handled and transited in work baskets.

During product recovery via the bleed off valve, personnel do not have to be directly exposed to pressurized components. Very high burst pressure bottles allow higher containment pressure in smaller bottles to reduce the footprint of the tool.

**FEATURES**
- Large capacity
- Field proven
- Corrosion resistant materials
- Primary and secondary isolation valves

**SPECIFICATIONS**
- Length: 890mm
- Width: 180mm
- Funnled diameter: 150mm
- Weight in air: 22kg
- Weight in seawater: 16kg
- Containment bottle volume: 1.8L
- Gas sample volume @69bar: 146L
- Depth rating: 2054msw

**CONTAINMENT BOTTLE**
- Internal volume (each bottle): 445mL (min.)
- Burst (minimum): 8700psi
- Puncture force: 260Nf

*Limited by ratings of valves and gauges*

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**TRITECH SUPER SEAKING SONAR AND SCU**

The Super SeaKing DST is a digital CHIRP dual frequency sonar capable of operating at 325kHz or 675kHz. When operating at 325kHz the sonar has a true operational range of 300m. Switching to 675kHz, the same sensor is capable of providing a high definition image at shorter range.

The Super SeaKing DST shares many of the features of the earlier SeaKing, which has been chosen as the standard obstacle avoidance sonar in many of the professional ROV fleets around the world.

**FEATURES**
- Reliable, robust, proven design
- Two operating frequencies
- Easy integration
- Tuneable frequency ranges

**SPECIFICATIONS**
- Length: 757mm
- Width: 180mm
- Funnel diameter: 150mm
- Weight in air: 22kg (aluminium)
- Weight in seawater: 16kg (aluminium)
- Containment bottle volume: 1.8L
- Gas sample volume @69bar: 146L
- Depth rating: 4000m standard
- *2054msw* optional
- Temeratures: Operating: -10 to 35°C
- Storage: -20 to 50°C

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Vortex Gas Sampling Tool.

Tritech SCU.

Tritech Super Seaking Sonar.
TSS 350 CABLE TRACKER

The TSS 350 system is designed specifically for the detection and survey of tone-carrying cables. Featuring a comprehensive software display and menu structure, real-time information is presented in a clear graphical format and provided as a digital output for storage and subsequent processing.

The fully integrated system provides accurate survey data, verifying location and burial status of a cable as well as providing operators with fault location, vehicle skew angle and “Look Ahead” information.

Maximum cable detection range at a vertical range is up to 10m and within a performance based on 25Hz total horizontal swath width of 20m centred on the coil array. The system includes 19” rack mountings equipment and monitor.

FEATURES
- Good detection range
- Accurate and reliable
- Tone frequency discrimination
- Variable Pressure and flow
- Quick fit to ROV
- Look ahead information
- Cable fault location
- Cable location data
- Depth of burial data
- Field proven

SPECIFICATIONS
SUBSEA ELECTRICAL POD
Diameter ........................................ 140mm
Height ........................................... 450mm
Weight in air ................................... 6-Way
Weight in seawater ......................... 6 to 15VDC
ROV connection ......................... 8-way impulse connector
Input frequency ......................... 57-63Hz @ 100/132V
.......................... 47-53Hz @ 180/264V

ALTIMETER
Length ........................................ 140mm
Height ....................................... 2290mm
Frequency ................................ 250kHz
Range .................. Min 30cm - Max 30m
Depth Rating .................. *3000msw
*All subsea components are depth rated to 3000msw.

TSS 440 PIPE TRACKER

The TSS 440 Pipe Tracker detection system can be fitted to Work Class ROVs and, when interfaced with suitable navigation packages, provide the precise location and depth of burial for pipes and cables, or pipeline out of straightness information.

FEATURES
- Pulse induction technology for accurate survey regardless of vehicle heading
- Windows-based display and control software
- DSP techniques give quality control information
- Long range detection of buried subsea targets
- Fully integrated system with altimeter, mounting frame, field spares and documentation
- Pipe out of straightness measurement option
- Easy to operate
- Simple to install and service

SPECIFICATIONS
Length ........................................ 366mm
Width ......................................... 140mm
Weight in air ................................ 10kg
Weight in water ......................... 2kg
Depth rating .................. 3000msw

TSS 440 Pipe Tracker
ROV FRIENDLY RIGGING

5.4T LONG SHANK HOOK

The Crosby L562A ROV Shank Hook has been designed for efficient handling and attachment by ROVs to subsea and other hard to reach loads. The tool has been developed in conjunction with major North Sea subsea operators.

The Shank Hook has a 250mm long hexagonal body for easy handling by ROV manipulators. They are available in 11 different sizes from 5.4 to 175T. The hook is opened remotely by cables and guided by the pad eyes on either side of the hook. Special padeye positioning is available upon request.

FEATURES
- ID code stamped on every hook
- Easy to install and remove
- Heavy duty
- High cycle, long life spring
- Meets world class standard for lifting

SPECIFICATIONS
- Length: 123mm
- Width: 65mm
- Height: 421mm
- Weight in air: 9.5kg
- Rating: 5.4T
- Minimum ultimate load: 4WLL
- Depth rating: Unlimited

12T PLATE CLAMP

The ROV Plate Clamp facilitates the recovery of flat plate. The tool is deployed and operated by an ROV with industry standard manipulators. The ROV positions and locks the clamp in place, while a suitable crane is still required to actually lift or lower the plate.

FEATURES
- Easy to install and remove
- Corrosion resistant materials
- No additional hydraulic lines required
- ROV deployable

SPECIFICATIONS
- Length: 700mm
- Width: 380mm
- Height: 696mm
- Weight in air: 78kg
- Weight in seawater: 68kg
- Plate thickness: 0-54mm
- SWL: 12,000kg

12T ROV SHACKLE

The TMT 8.5 and 12 tonne ROV friendly shackles are the ideal ROV rigging item. The shackles use standard off the shelf Bow Shackle bodies with TMT machined spring loaded pin attached. The modified shackles are individually load tested and certified.

Each shackle comes complete with a Monkey Fist Lanyard system. The ROV simply locates the Monkey Fist and pulls to release the clip pin. This allows the kinetic force in the loaded spring to pull the shackle pin out and open up the shackle for release. TMT can configure the tool to the customer requirements.

FEATURES
- Easily fitted to any ROV
- Cost effective
- Based on standard Bow Shackle
- All items connected with wire rope

SPECIFICATIONS
- Load Rating: 8.5 and 12T
- Weight in Air: (approx.) 8.5 and 12T

Total Marine Technology | www.tmtrov.com.au
This hydraulic subsea winch is capable of moving loads of up to 3.6 tonnes and using varying lengths and sizes of wire ropes. The winch is of heavy duty construction and various sizes are available. This winch is also used on TMT ROV’s for clump weight management.

FEATURES
- Light weight
- Compact
- Corrosion resistant material
- Easily transportable
- Hydraulically operated
- Removable guards
- ROV deployable

SPECIFICATIONS
- Length: 260mm
- Width: 440mm
- Height: 425mm
- Weight in air: 30kg
- Depth rating: 3000msw
- Ratio: 50:1
- Capacity: 35.6kN
- Wire rope length: 30m x 10mm
- Hydraulic pressure: 120bar (1740psi)
- Oil flow: 0-75L/min

Subsea winch.

The subsea winch can be used for clump weight management in a TMT Typhoon MK2 ROV.
IMENCO GUIDE WIRE ANCHOR

The Imenco 22,000lbs Guide Wire Anchor is compatible with an 8 5/8 inch OD Guidepost with matching receptacle bore and retaining shoulder. The anchor is equipped with two locking dogs which transfer the load onto the retaining shoulder of the guidepost. The tool is designed according to DNV 2.22 Lifting Appliances, with a safety factor of 1.5.

TMT can configure to the customer requirements.

FEATURES
- Simple and reliable
- Double self-locking dogs
- Anchor stabbed by own weight
- Field proven

SPECIFICATIONS
- O/A length: 710mm
- Stabbing length: 495mm
- Anchor entering diameter: 74mm
- Maximum diameter: 127mm
- Weight in air: 26kg
- Weight in seawater: 19kg
- Maximum shear pin: 10T
- Normal operating tension: 7.5T

IMENCO SLIM LINE GUIDE WIRE ANCHOR

The Imenco Slim Line Guide Wire Anchor only differs from the standard anchor in that the termination head has the same dimensions as the body allowing the entire anchor to enter the guidepost if necessary.

TMT can configure to the customer requirements.

FEATURES
- Slimline design fits entire anchor into the guidepost
- Simple and reliable
- Double self-locking dogs
- Anchor stabbed by own weight
- Field proven

SPECIFICATIONS
- O/A length: 710mm
- Stabbing length: 491mm
- Anchor entering diameter: 74mm
- Maximum diameter: 127mm
- Weight in air: 18kg
- Maximum shear pin: 10T
- Normal operating tension: 7.5T
SapuraKencana Well Services (SKWS) provides cost-effective Riserless Light Well Intervention (RLWI) services for the subsea oil and gas industry. These cover the full life cycle of the field, from FEED study to installation, maintenance, abandonment and full decommissioning of subsea production facilities. Our equipment and people have a proven track record spanning decades, making us the leading RLWI service provider in the Asia Pacific region. We have the tools, the experience and the passion to deliver.

Formed as a joint venture between SapuraKencana Australia and TMT Australia, SKWS leverages on the complimentary experience and expertise of these companies. Both companies are Australian subsidiaries of the Malaysian Based petroleum giant, SapuraKencana Petroleum Berhad.

The SKWS team has extensive experience in subsea project delivery and vessel operations. Our resources, including project management, project planning, detailed engineering and logistics, combined with an extensive fleet of marine vessels offer a complete solution for your project needs. Our subsea well abandonment and field decommissioning capabilities include removal of subsea infrastructure, down-hole plugging of the well and environmentally safe removal of wellheads to the highest regulatory standards. Our suite of tools has a proven track record for performing Riserless Light Well Intervention (RLWI) and subsea well abandonment and can be utilised from a conventional drill rig with marine riser or a mono hull vessel of opportunity which offers significant cost savings when compared to a rig-based solution. The higher availability and faster mobilisation/transit times of mono hull vessels adds to operator benefit.
The SKWS Subsea Hydraulic Diverless Flange Connector is a purpose designed tool for connecting surface or other subsea jumpers to API flanges with up to a 12 inch interface, without the need for divers. The connector is deployed and operated with the use of a deck winch and ROV. The connector has simple hydraulic control which can be driven from a surface or ROV supply.

The Diverless Flange Connector is run onto the seabed using a deck crane or deck winch with a clump weight and buoyancy and an optional hydraulic umbilical. The tool is then flown to the flange connection by ROV and engaged.

The connector is then clamped and locked to the flange with the surface controls or ROV hydraulic hot stab. The connection can also be pressure tested from the surface or by an ROV. The buoyancy is then released and returned to the surface with the clump weight.

The connector also enables connection to API or ANSI flanges subsea without the use of divers and can be designed to suit a range of connections and pressure requirements.*

FEATURES

- Simple hydraulic controls
- Cost-effective
- Deployed by crane or winch on wire
- ROV operated
- 2 inch double block and bleed
- Field proven

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Flange size</th>
<th>up to 12 inch API</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure rating - flange connection WP</td>
<td>5000psi</td>
</tr>
<tr>
<td>&quot;Maximum operating pressure rating&quot;</td>
<td>3000psi</td>
</tr>
<tr>
<td>Weight in air</td>
<td>400-2500kg (5-12&quot;)</td>
</tr>
</tbody>
</table>

*Maximum operating pressure rating.
The key to our subsea Riserless Light Well Intervention (RLWI) services is the Subsea Intervention Device (SID). It is a self-contained modular subsea lubricator package, complete with electro-hydraulic control system. It can operate on both horizontal and vertical trees, with the ability to control the tree, if required.

The SID allows slick line or electric line tools to be run into live wells to carry out a number of operations throughout its life cycle, including:

- Plug installation and removal
- Stroking/cycling mechanical valves
- PLT/MPLT logging
- Perforating, punching and cutting
- Milling out obstructions and debris removal
- Changing out down-hole gauges and valves

The SID enables faster, more convenient access to the well bore for easy data acquisition, safety valve remedial work, well intervention, maintenance and repair; making scheduled and emergency subsea well intervention immediately practical and cost effective.

Together with SKWS’ proprietary Vessel Deployment System (VDS) or Intervention Compensation System (ICS), SID can be deployed from any suitable vessel of opportunity. This reduces the dependency on specialist rigs or vessels, allowing the system to be in the field quicker at a reduced cost.

Utilising the SID system can significantly reduce the risk of production deferment and improve reserves recovery through planned data acquisition or emergency well maintenance.

**FEATURES**

- Significantly lower costs
- Deployable from a vessel of opportunity
- No hydrocarbons brought back to the vessel
- Faster task completion with less downtime
- Rapid mobilisation and deployment using a vessel of opportunity
- Diverless operation
- Bore selector provides quick access to annulus and production bore

**SPECIFICATIONS**

- 7/8 inch clear bore
- Water depth: 800 m
- Maximum working pressure: 5,000 psi (upgradable)
- Maximum wire diameter: 3.175 mm (1/8") slick line, 7.938 mm (5/16") electric line
- H2S service
- Accommodates 39’ tool strings (upgradeable)
- Full subsea well control capability
- Safety pressure lock engages at 150 psi internal pressure
- Transport weight (approx.): 35 Te
The AXE severance system is a high pressure water jet cutting system designed for environmentally friendly removal of subsea wellheads, piles and platform conductors. AXE can cut multi-string casings including 30", in a single pass; removing the need for explosives or rig-based mechanical cutting tools.

The system is independently powered by a 450 bhp diesel power pack and can be deployed from a rig on drill pipe, or a vessel of opportunity on wire. A key benefit of the AXE is its ability to cut below the mud line and when deployed with a wellhead connector, the cut and recovery can be completed in a single run. The AXE has an extensive track record of successful cuts in the Asia Pacific region.

FEATURES
- Multi-casing wellhead removal
- Platform conductor cutting
- Jacket pile cutting
- Single pass cut of multi-layer casing
- Environmentally inert consumables
- Eliminates use of explosives
- Single trip tool
- Cut and wellhead pull in single run
- Proven technology
- Skid based system
- Integrated power pack
- Suitable for non-centric or loose casing

SPECIFICATIONS
- Engine: Cummins NTA855 450 bhp
- Fuel consumption: 95 L/hr (25 USG/hr)
- Nominal flow rate: 12,000 L/hr (3,175 USG/hr)
- Maximum working pressure: 14,500 psi (1,000 bar)
- Grit consumption: 1.7 T/hr
- AXE housing lift capacity: 120 T

Results of using the AXE Cutting system.
Cement Injection Tool

SapuraKencana Well Services’ Cement Injection Tool (CIT) is a combination, disposable, isolation, squeeze packer and casing perforating system. It enables the perforation of production casing, monitoring and control of annular pressure and, if required, recementation of the production casing annulus and placement of an abandonment plug in the casing itself.

The tool has two main components including an upper and lower subassembly. Each subassembly is similar and comprises dual packers and perforating units. The subassemblies are interconnected by a lifting wire and a hydraulic umbilical. A hydraulic umbilical connects the tool to surface controls, the length of which is determined by the plug requirement depth.

Any 15,000 psi hydraulic power unit or test pump can be utilized to function the tools.

The CIT is run into the well to the required depth using a standard deck winch, hang-off tool and lifting wires (depth adjustment). The upper perforating subassembly is set then activated, and annular pressure monitored. The lower perforating subassembly (±100m below the packer) is then set and activated and circulation established down the annulus and up a flow path through the lower and upper subassemblies, enabling a cement plug of ±100m to be placed in the annulus. The CIT units can then be removed from the well or left in hole as packers for placement of further cement plugs in the casing. Tools are designed for use in 9 5/8” casing.

Features
- 24 mm perforations
- Opposing packer seals
- Two (2) perforators per subassembly
- Hydraulic controls
- Pressure monitoring umbilical
- Eliminates requirement for explosives or wireline perforating systems
- Disposable tool, reducing W.O.C time and total abandonment time
- Cost effective, rigless operations
- Establishes circulation path in un-cemented annulus

Specifications
- Upper tool length: 4.5 m
- Lower tool length: 4.25 m
- Tool mass: 550 kg (each subassembly)
- Maximum tool diameter: 208 mm (8 3/16 inch)
- Maximum working pressure: 15,000 psi (1034 bar)
- Perforation diameter: 24 mm (0.945 inch)
- Perforators: 2 per sub
- Transport skid dimensions: L5.1 m x W1.1 m x H1.2 m
- Transport skid capacity: 12 tools
SapuraKencana Petroleum Berhad is one of the world’s largest integrated oil and gas service and solution providers. The Group’s principal business revolves around the provision of end-to-end services and solutions to the upstream petroleum industry covering activities such as engineering, construction, installation and commissioning of offshore pipelines and structures, provision of accommodation and support vessels, drilling services, topside maintenance services, underwater and diving services, geotechnical and geophysical services and project management through to development and production.

With a workforce of over 9,000 people, the Group’s global presence can be seen in over 20 countries covering Malaysia, China, Australia, Middle East, America, Brazil and many more.
SAPURAKENCANA AUSTRALIA

SapuraKencana Australia is a fully owned subsidiary of the SapuraKencana Petroleum group and is the result of the acquisition of the Marine Construction division of Clough.

SapuraKencana Australia combines world class project management systems, track record, people and Australian relevance and presence with SapuraKencana Petroleum’s extensive fleet of leading edge construction vessels to deliver EPIC and T&I offshore services to clients throughout Australia and South East Asia.

SapuraKencana Australia is ISO 4801, 9001 and 14001 certified. By using proven quality and project management systems, combined with three decades of successful offshore project delivery experience, SapuraKencana Australia delivers safe, innovative and cost effective solutions.

TL GEOHYDROGRAPHICS

TLGH has positioned itself to be the leading contractor in the oil and gas industry specialising in hydrographic survey, geophysical survey, offshore construction support and underwater inspection services.

In addition, TLGH is also actively involved in providing survey services to other areas such as submarine power cable laying, submarine telecommunication cable laying, utility gas pipeline installation, port construction, bridge construction, pier construction, navigation/admiralty charts development, verification and correction.
A Remotely Operated Underwater Vehicle, commonly referred to as an ROV, is an unmanned underwater vehicle. It is usually controlled from the surface through attached cables which supply power and transfer video and data between the ROV and the controller.

HISTORY

ROVs were first developed in the 1950s for use by the military to retrieve practice torpedoes and mines from the sea bed. The first very public use of ROVs was by the US Navy in 1966 when, after a mid-air collision between a B-52 bomber and a refuelling plane off the coast of Spain, an ROV was used to retrieve a nuclear bomb from the wreckage on the bottom of Mediterranean Sea.

Up until 1974 it was estimated that a few hundred work class ROVs had been built world wide. During the 1980s their use expanded significantly in the offshore oil and gas industry because of their ability to work at depths where it was difficult and unsafe for human divers. By 2011 it has been estimated that over 1500 commercial ROVs were in service. Most of these in the offshore oil and gas industry.

CONSTRUCTION

ROVs are made with a chassis or frame to mount and protect the electronics and power units and to which the robotic arms are attached. Flotation tanks, ballast, thrusters and clump weights (a heavy ballast attached by wire) are used to control movement, buoyancy and stability. Polymers (plastics), stainless steel and aluminium are the most common materials used in ROVs because of their resistance to corrosion.

ROVs are connected to the surface and to their controls by a tether which has multiple purposes. It supplies the ROV with electricity, sends signals from the operator to the ROV to control movement, tools and cameras, and returns video and data back to the operator. The tether must also be strong enough to carry the weight of the ROV when it is deployed and recovered from the water.
TYPES OF ROVS

Inspection Class ROVs are small, sometimes down to a few kilograms, and often small enough to be launched and operated by a single person. They are outfitted with cameras and lights and may also have a small arm or manipulator. They are used for visual inspections of pipelines, search and rescue operations, ship hull inspections, treasure recovery and port inspections.

Light Work Class ROVs have lights, cameras and robotic arms and are able to use various tools and sensors. They are more powerful and capable than the simple inspection vehicles and so can be used for some maintenance roles as well as inspection and surveying duties.

Heavy Work Class ROVs such as the TMT built Typhoon, carry multiple robotic arms with the ability to use powerful tools for cutting, grinding and manipulating objects under water. Additionally they carry a range of cameras, lights and sensors such as GPS, sonar, density and acidity to measure their surroundings. They are sometimes used with a Tether Management System that helps reduce drag on the ROVs tether when rough seas or strong currents might make it difficult for the ROV to manoeuvre. These vehicles are capable of the most complex and difficult activities and can operate in depths up to 3000m. They are most often used in the oil and gas industry for rig and pipeline work.

ROVs are also used extensively by the scientific community to study the ocean by taking samples and making observations at depths that previously were too difficult or costly for study. Many ROVs are also used by the military for mine clearing and surveillance operations.