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> "The combined strengths of heritage, innovation and training will ensure TMT's continued success."

COMPANY PROFILE

Total Marine Technology is an award winning engineering and manufacturing company based in Western Australia. It was formed in 1999 to provide locally built Work Class Remotely Operated Vehicles (ROV's) 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 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, from 25 different cultural groups and countries, all involved with the design, engineering, building and delivering of great products and services worldwide.

TMT is committed to developing people within our industry. We have an apprenticeship scheme and a staff training and competency program for building the quality of our personnel and in turn the quality of the company, products and services.

TMT is a unique company in Australia. It is the only manufacturer of work class ROVs in Australia. To back this up we have a number of patents and industry awards that recognize TMT's excellence in engineering design and manufacturing.

Innovation driven by client need, and the challenges within the drilling support and production environment, that 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.

DEEP WATER HEAVY WORK CLASS ROVS

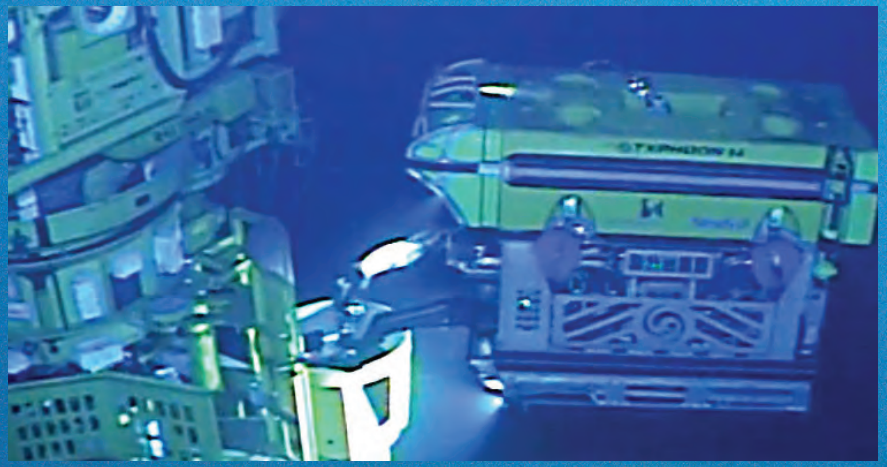
Right from the start, TMT Typhoon MK2 ROVs have been exceeding performance targets and setting records. In 2013 TMT completed the deepest known dive by a non-military ROV system in Australia. This was conducted in the Perth Canyon at a depth of 3105 MSW to technically qualify the Typhoon ROV systems for use in Brazil.

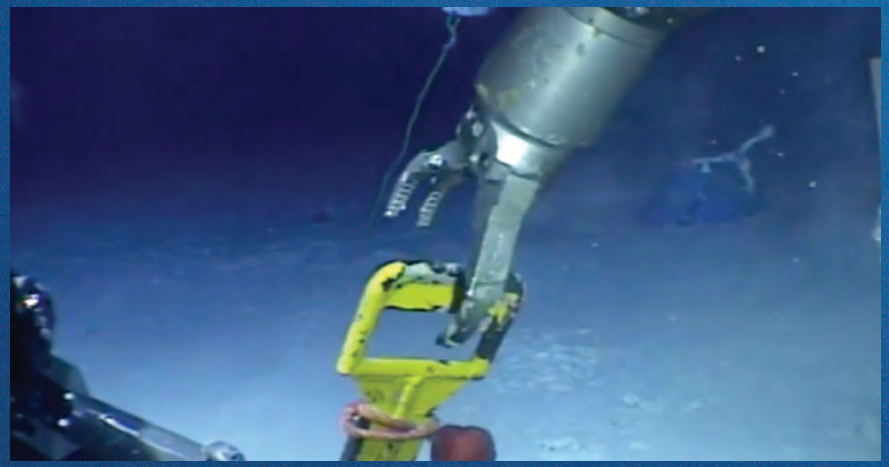
More records have been set by TMT ROVs in Brazil, with one ROV recently being operated continuously at a depth of over 2000m for eight days (192 hours) without needing to be recovered to the surface.

In September 2015 a Typhoon MK2 working in the North West Shelf of Australia, achieved the fastest BOP closure time of 35 seconds, operating at 245 Lpm. The operation in the NW Shelf had been operating at 100% uptime.

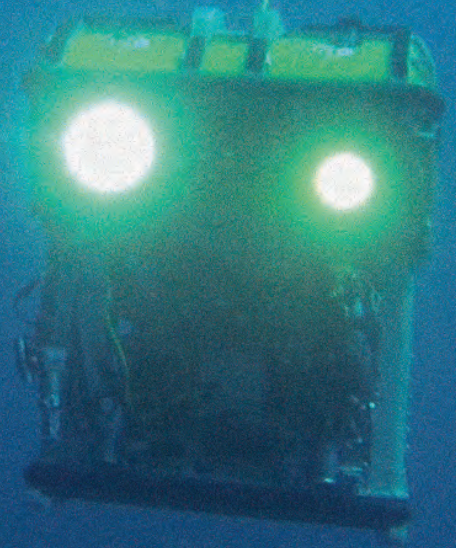
TMT Operations Manager Craig Roberts said the reason for the perfect results was “a team effort and having the ROV fully Quality Assured and Checked before it left here. Tooling was also Quality Assured and Checked by the client, after our own internal checks, and before going into the field.”

The Sapura Diamante with two TMT Typhoon MK2 ROVs on board, is anchored near Rio de Janiero, Brazil.





> **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.**



ROV 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 experience includes:

- Drilling Support
- Subsea Completions
- Field Intervention
- Pipelay Barge Support
- Field Construction and Installation
- Field Abandonment
- Environmental Surveys
- Debris Clearance
- IMR - Inspection Maintenance Repair

The TMT Offshore Survey Floating Acoustic Telemetry Transceiver Buoy (FATT Buoy) being deployed from a rig in Australia's North West Shelf.

TMT OFFSHORE SURVEY

The Total Marine Technology Survey Department is an innovative, experienced and highly skilled group of professionals. TMT Survey conducts offshore positioning services, geophysical surveys, construction support and drilling support. All our services are executed with tailored technology to collect quality useable information and provide rapid data delivery to our clients.

Together with our award winning engineers and experienced ROV operations crews, TMT Survey creates unique and cost effective solutions for offshore surveying, such as our new Floating Acoustic Telemetry Transceiver Buoy - the TMT FATT Buoy. See more information about our survey products on page 142.

3D laser scanning using the 2G Robotics ULS-200.

The TMT FATT Buoy (Floating Acoustic Telemetry Transceiver) is an acoustic positioning system developed by TMT in conjunction with iXBlue.

THE C.Y. O'CONNOR AWARD FOR EXCELLENCE IN ENGINEERING AND TECHNOLOGY

At the 2014 Western Australian Industry and Exports Awards, Total Marine Technology won the C.Y. O'Connor Award for Excellence in Engineering and Technology, and also received a Special Commendation in the Manufacturing Export Award.

TMT CEO Paul Colley said "It's great to see our talented engineers working together in innovative ways. It's great for the company, but we are also gaining recognition of our success from our peers and the public."

The awards were presented at a special function attended by the Governor of Western Australia, Her Excellency The Honourable Mrs Kerry Sanderson, AO and the Attorney General and Minister for Commerce, Hon Michael Mischin, MLC.

The Minister said "The awards honour the success of Western Australian businesses and acknowledge their contribution to our State's economic and social development, prosperity and growth."

The C.Y. O'Connor Award for Excellence in Engineering and Technology is awarded by the WA Department of Commerce for excellence in engineering, technology, medical technology, information technology and/or technical research and development.

TMT ENGINEERING TEAM
AWARD WINNING INNOVATION

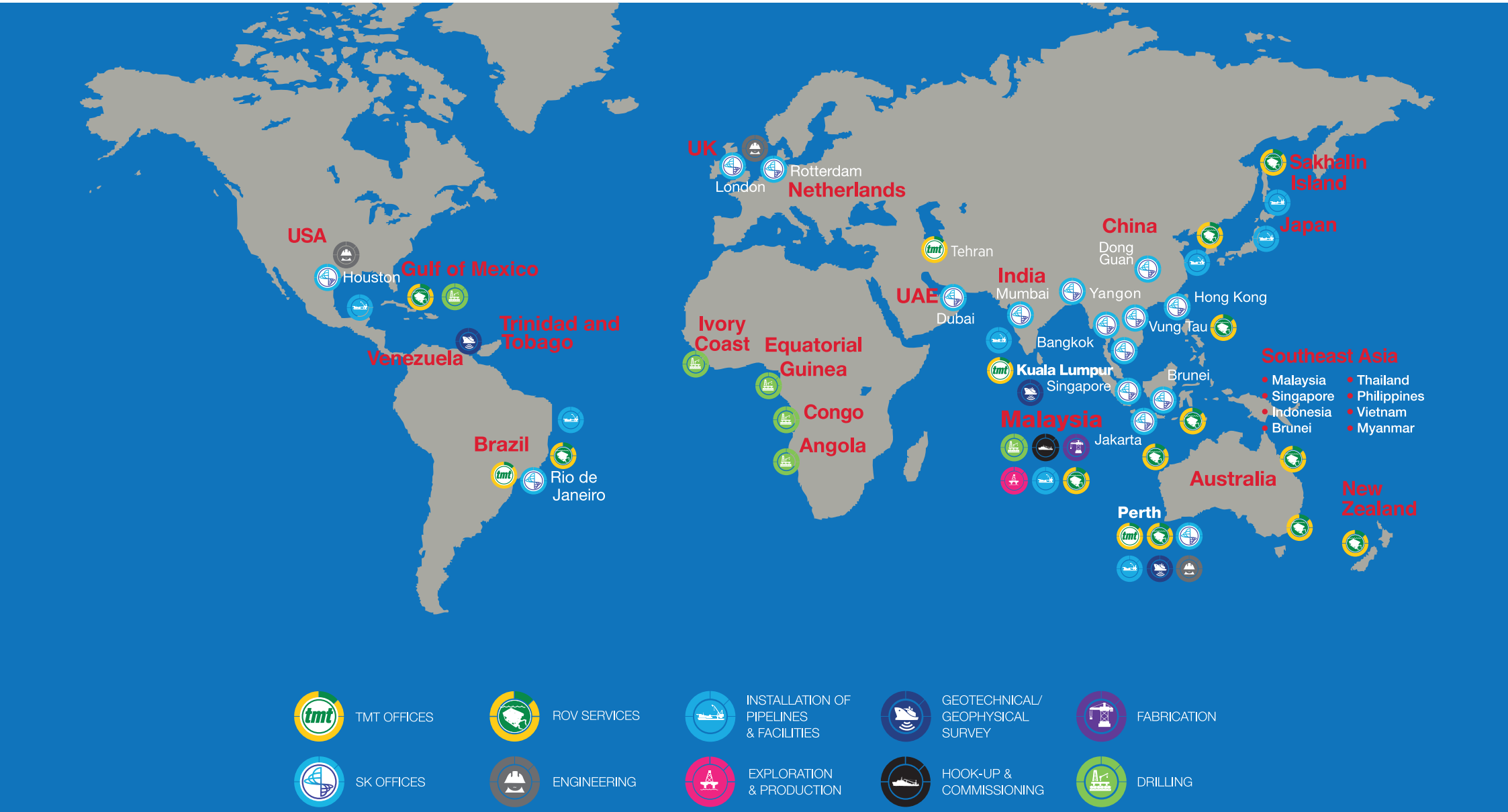
TMT has successfully built a locally based, world class ROV manufacturing and operations facility. We believe the combination of great design, engineering excellence and offshore intervention experience allows TMT to partner with clients and develop innovative systems and products.

TMT has over 50 engineers working on all our various projects. Our team consists of a mix of both senior engineers of different industry backgrounds ranging from aeronautical to motorsport engineering to 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 workclass ROVs. Our tested and proven designs have stood the test of time with numerous patents applied for our innovations. All our workclass ROVs have a payload of at least 150HP and a depth rating of up to 3000M.

As a manufacturer operator, TMT has the unique ability to seemlessly 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.

TOTAL MARINE TECHNOLOGY AND SAPURA ENERGY GLOBALLY INTEGRATED SERVICES & SOLUTIONS



TOTAL MARINE TECHNOLOGY MALAYSIA OPERATIONS AND TRAINING SUPPORT FACILITY

A WORLD CLASS FACILITY FOR ROV MANUFACTURING, OPERATIONS SUPPORT AND TRAINING.

Since 2011, TMT has been building its Malaysian branch to better support ROV operations in the region. TMT Malaysia currently manages the operations of nine ROVs which will grow to 13 in the next year. A direct result of the increased presence in the region is improved communication with clients and better support for ROV crews.

Puchong has excellent access to industrial services and suppliers, and is centrally located between Klang Port, Kuala Lumpur International Airport and the Kuala Lumpur City Centre.

Within Puchong, the new facility is located in a new dedicated industrial estate located on a major transport route between the sea port and the airport.

Operations
- Operations support with project managers, crew managers, maintenance, and storage.

Warehousing
- Provide controlled warehousing and stores for production and regional operations.
- High quality spares, tools and consumables stocked on the shelf for immediate use by operations in the region.

Training
- Onsite training facility with courses and a simulator for training local ROV crews.
- Skilled and effective workshop technicians trained to support ROV systems and tooling.

Manufacturing
- Onsite production of ROV systems, tooling and spare parts.
- Supplier network throughout Malaysia and the region.

TMT ROV support facility in Puchong, Malaysia.

The Sapura Energy fabrication yard in Lumut, Malaysia.

SAPURA ENERGY

Sapura Energy is a leading global integrated oil and gas services and solutions provider operating across the entire upstream value chain. As a fully-fledged upstream player, the Group's spectrum of capabilities cover the exploration, development, production, rejuvenation, as well as decommissioning and abandonment stages of the value chain.

With a highly skilled and technically capable multinational workforce comprising over 13,000 people, strategic world-class assets, and strong project management capabilities, the Group today has a global presence in over 20 countries.

Sapura Energy made the prestigious Forbes Asia's Fabulous 50 listing for the second successive year, demonstrating its commitment to excellence in all aspects of its business. Sapura Energy was also voted Asia's Overall best managed company in Natural Resources for 2014 in a poll conducted by the international financial publication, Finance Asia.

The newly built Sapura Diamante in Brazilian waters. It has two TMT Typhoon MK2 ROVs on board.

SAPURA ENERGY AUSTRALIA

Sapura Energy Australia is a leading offshore oil and gas subsea contractor in the region with more than 3 decades of track record in the offshore construction market. Based in Perth, Australia, Sapura Energy Australia is a wholly owned subsidiary of the Malaysian based petroleum giant, Sapura Energy.

Through the Sapura Energy group, we have access to technologically advanced and highly-versatile fleet which includes a comprehensive mix of heavy lift, derrick pipelay barge and subsea support vessels.

We are ISO 4801, 9001 and 14001 certified and by using proven quality and project management systems, Sapura Energy Australia delivers safe, innovative and cost effective solutions.

Sapura Energy Australia offers clients an array of offshore services with a particular focus on the most challenging projects.

Combining world class project management systems, track record and experienced people with Sapura Energy's extensive fleet of leading edge construction vessels, Sapura Energy Australia delivers EPIC and T&I offshore services to clients in the Asia Pacific region, Australia, China , Russia and beyond.

Our people have successfully delivered numerous offshore and EPIC projects in the marketplace, We have a strong focus on the execution of SURF projects.

The Sapura Energy 1200 ABS DP3 self-propelled heavy lift pipe laying vessel.

SAPURA ENERGY WELL SERVICES

Sapura Energy Well Services 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 Sapura Energy Australia and TMT Australia, Sapura Energy Well Services leverages on the complimentary experience and expertise of these companies. Both companies are Australian subsidiaries of the Malaysian based petroleum giant, Sapura Energy.

The Sapura Energy Well Services 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.

You can see some of the available Well Services equipment from page 131.

The Sapura Energy Well Services Subsea Intervention Device.

TMT IN THE COMMUNITY
STUDENT RESOURCES

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 operator on the surface.

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 used 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 operators 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

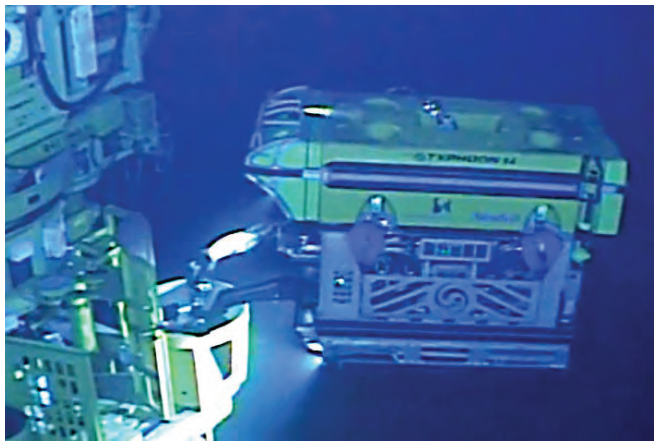
Inspection Class ROVs are small, sometimes down to a few kilograms, and often small enough to be launched and operated by a single person. They are outfitted with cameras and lights and may also have a small arm or manipulator. They are used for visual inspections of pipelines, search and rescue operations,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



ROV FACTORY TOURS

To help educate and inform about Remotely Operated Underwater Vehicles (ROVs), TMT runs regular ROV Familiarisation Sessions for interested industry groups, universities and high school groups. Sessions are tailored to the group and take the form of a guided tour and talk that covers ROV technology, related engineering disciplines, manufacturing processes and offshore energy production.

TMT's Bibra Lake facility is an ideal location to be introduced to ROVs, engineering and manufacturing, as there is no other facility producing these heavy duty work class ROVs in Australia.

An ROV Familiarisation Session includes a tour of the engineering departments and access to some of the dozens of engineers involved in building ROVs. A tour of the workshops is also included to see where the ROVs and subsea tooling take shape, and where, after final assembly, they are tested, certified, documented and packaged to be sent to work. TMT also has a large operations division with over 120 people working offshore, keeping TMTs fleet of over 24 ROVs hard at work.

The ROV Familiarisation Sessions suit organisations and educational institutions with interests in any of the fields of engineering, applied technology, manufacturing or offshore energy production. TMT welcomes visits from university and high school students, and organisations wanting to be better informed about ROVs.

Sessions are usually tailored to suit the attendees. Areas covered may include:

- engineering disciplines such as hydraulic, mechanical, electronic, software, production, and project management
- workshop and factory floor/assembly line facilities
- manufacturing processes
- managing and operating ROVs

KIDS DAY

A HANDS-ON HIGH TECH OPEN DAY IN A SUBSEA ROBOTICS FACILITY WITH ACTIVITIES FOR KIDS OF ALL AGES.

What an incredibly successful day! In 2015 over 250 kids and even more big kids came to play with the toys at the Total Marine Technology ROV factory in Bibra Lake.

The Build Your Own Robot Arm Kit, Rocket Building and Launching and range of remote control vehicles were all very popular, but its amazing to see how something as simple as a pool full of oobleck slime (a non-newtonian fluid - look it up) can keep kids enthralled for hours.

There was entertainment for everyone thanks to the range of activities that included electronic kits, the ROV Simulator (with extra fish!), fishing for ducks with the Titan manipulator, 3D computer modelling and Laz's rusty chocolate prizes. We also had specialty catering vans to feed everyone and very talented face painter.

There was lots of great feedback from big and small kids saying the TMT Kids Day was well worth the visit.

THINGS TO DO AT THE KIDS DAY

- Control a real robotic arm
- Fly an ROV
- The Ooze Pool - Play in a pool full of icky oobleck (it's a liquid that you can walk on - until you stop!)
- Build your own hydraulic robot arm and take it home
- Try a mission on the ROV simulator
- Remote control vehicle displays
- Rocket building and launching
- Lego building
- Computer aided design demo
- Historical ROV Display
- Shrinky Cups (subsea pressure demonstration)
- Show bags
- Make stuff
- Break stuff
- Learn stuff

AUSTRALIAN MADE ROVS

DESIGN
ENGINEERING
MANUFACTURE
OPERATE
MAINTAIN
EVOLVE

THE TMT ROV FLEET

TMT TYPHOON HEAVY WORK CLASS ROVS

TMT TYPHOON MK2 150/200

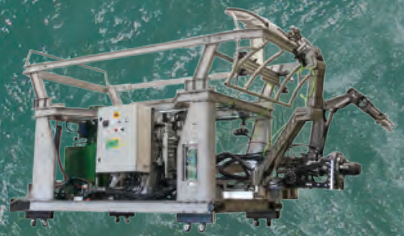
TMT TYPHOON MK1

LIGHT WORK CLASS AND IMR ROVS

TMT NOMAD

TMT NAVIGATOR

TMT TYPHOON SIT ROV (MOCK ROV)

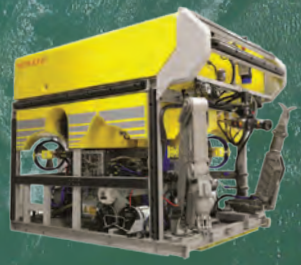


SYSTEM INTEGRATION TEST (SIT) ROV

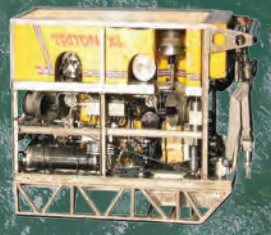
WORK CLASS, IMR, SURVEY AND INSPECTION ROVS

SEAEYE TIGER

TRITON XLX



TRITON XLR



TRITON XL

LBV150/300 (Observation Class)

TMT TYPHOON MK2

The TMT Typhoon Mk2 150.

The TMT Typhoon MK2 is a Heavy Work Class ROV with a proven 3000msw depth rating and a power rating up to 200hp. It is designed and built in Australia to be cost effective and client focused.

The TMT Typhoon MK2 is a flexible platform ROV suited to a wide range of applications. The Typhoon can be installed in an ROV hanger, or supplied with a Control and Workshop container for installation on deck.

The specification described here includes many optional features as the Typhoon MK2 ROV can be customised to suit your specific needs.

FEATURES

Electronic Architecture

Distributed node control including automated heading and station hold. Expandable RS485 network with a range of quick-change PCB's for different applications. Dual redundant control and modem interface.

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 Conan, 7-function, Master / Slave
- Schilling T4, 7-function, Master / Slave
- Schilling RigMaster, 5-function, rate
- Schilling Atlas, 7-function, rate
- TMT Guidepost Grabber, 2-function, rate

Tooling Interface

5x 0-15L/min, 3000psi for Tooling

8x 0-15L/min, 3000psi for Manipulators

3x 0-8L/min, 3000psi proportional for Tooling

2x High Flow 0-76L/min, 0-3000psi

1x Ultra High Flow direct to main 0-238L/min HPU

10x Medium Flow direct to secondary 0-78L/min HPU

Tether Management System

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

ROV Instrumentation

- Sonar system
- CDL TOGSNAV with:
  - Depth sensor
  - DVL
  - North seeking gyro compass
  - Temperature sensor

SPECIFICATIONS

Unwrapping a new Typhoon MK2.

ROV
Depth Rating 3000msw
Length 3.5m
Width 1.8m
Height. 2.2m
Weight 5,300kg
Frame Proof Load. 30,000kg
Through Frame Lift . . . . . 2,700kg (upgrade to 4,500kg)

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

ROV HPU
200HP (optional maximum)
238L/m (Primary) @ 207bar (3000psi)
76L/m (Auxiliary) @ 207bar (3000psi)
Variable Axial Piston Pumps

ROV ELECTRICAL SYSTEMS
Frequency . . . . . .60Hz ±5%
Voltage . . . . . .440VAC ±5%
ROV HPU 200kVA, 3250VAC
ROV Instruments. 6kVA, 2400VAC
Pan & Tilt. . . . . 2x Front 1x Rear
Lights . . . . . 6x 24VDC LED
. . . . . .2x 120VDC SeaLite LEDs
Cameras:
Colour Zoom . . . . . 2x Kongsberg OE14-367A
High Definition . . . . . 1x Kongsberg OE15-101C
Black & White . . . . . 3x Kongsberg OE15-109
Colour. . . . . 1x Kongsberg OE14-111
Data Channels . . . . . 4 Aux. Data Channels
Sonar . . . . . Kongsberg 1171 Sonar Head
Navigation System . . . . . CDL TOGSNAV

MANIPULATORS
Standard:
Schilling Conan . . . . . 7-function - Master/Slave
Schilling Atlas. . . . . 7-function - Rate
TMT Guidepost Grabber . . . . . 2 function - Rate
Option:
Schilling T4 . . . . . 7-function - Master/Slave
Schilling Atlas. . . . . 7-function - Rate
Schilling RigMaster . . . . . 5-function - Rate

EMERGENCY RECOVERY DEVICES
Strobe . . . . . Novatech ST400A
Acoustic Beacon 2x ULB-362PL

20' CONTROL VAN - OPTION
Length 6.1m
Width 2.4m
Height. 2.75m
MGM 16,000kg
Non-Hazardous Area. . . . . .Standard
HVAC 2x 7kW
Integrated Workshop

20' WORKSHOP - OPTION
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. . . . . 50 L/min

A-FRAME - OPTION
Safe working load. . . . . .15 T
Design factor . . . . . 3.0 global
Outreach . . . . . .4.0 m
Dimensions . . . . . 6m x 4m
Gross weight 27,000kg
Boom extension 2.0m
Sheave wheel diameter 1200mm
Hydraulic damping . . . . . +/- 10º
Latch rotation. 355º

WINCH - OPTION
Pull (1st layer) . . . . . 18T @ 0-50m/min
Pull (top layer) . . . . . 12T @ 0-70m/min
Pull Brake Holding Load . . . . . 180% FLT (min.)
Drum capacity . . . . . 3000m of 32.6mm dia. cable
Drum dimensions . . . . . 2100mm O/D x 1300mm
. . . . . .PCD x 2000mm approx.
Power Required . . . . . 175 kW duty approx.

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

The TMT Typhoon Mk1.

TMT TYPHOON MK1

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 PCB's 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

Inside the TMT Typhoon ROV Workshop.

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
Astern . . . . . .1000 kg
Port / Starboard . . . . . .800 kg
Vertical Up / Down . . . . . .800 kg
Lights . . . . . .Hi Power LED & Halogen
Cameras . . . . . .16x Multidrop HD Colour
. . . . . .Var. Zoom + Focus
Data Channels . . . . . 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

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

A TMT designed and built Nomad ROV ready for duty.

TMT 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

Length	3m
Width	1.7m
Height	23.7m
Weight in air	5200kg
Depth rating	1200m
Payload	1000kg
Frame lift	3500kg

TMT NAVIGATOR

The Nomad Navigator is a high end observation electric/ hydraulic compact ROV system. It was built for rapid deployment uations 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.

SPECIFICATIONS

Depth Rating	600/3000m
Length	1.2m
Width	0.95m
Height (Free Swimmer)	1.2m
Weight (Free Swimmer)	400kg
Height (Extra Thruster)	1.35m
Weight (Extra Thruster)	600kg
Payload	200/400kg
Frame construction	Aluminium
System power	Electrical 440V

TMT SYSTEM INTEGRATION TEST (SIT) TYPHOON ROV

The TMT System Integration Test (SIT) Typhoon ROV, sometimes 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 into 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.

HYDRAULIC CONNECTIONS

- 21 x 16L/min hydraulic functions
- 3 x 8L/min hydraulic proportional functions
- 3 x 40L/min hydraulic functions

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 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 and 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
- 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
Tank capacity	180L
Power	18.5kW

Typhoon System Integration Test ROV.

SEAEYE TIGER

The Seaeye Tiger is widely regarded as the leading observation and inspection vehicle within the oil and gas industry. Increasingly, they are also being taken up as the ROV of choice by military and scientific customers seeking increased capability in deep water.

With a depth rating of 700msw, the Tiger is a very stable platform and is able to perform well in strong currents and under the harshest conditions, providing excellent handling and manoeuvrability. Its open frame construction and generous payload offer the possibility of adding a widerange of tools and sensors as well as interchangeable tool skids.

ELECTRONIC ARCHITECTURE

All vehicle electronics are enclosed in a watertight and anodised electronics pod machined from 6082 marine grade aluminium and fitted with a leak alarm.

PROPULSION

The Seaeye Tiger has one (1) vertical and four (4) horizontal vectored brushless SM4 250 Volt DV thrusters. These thrusters provide superior control and response and give the Seaeye Tiger excellent stable handling characteristics.

EQUIPMENT INTERFACE

The Seaeye Tiger also benefits from the following options:

- TMS Type 2 or free-swimming operation
- Up to three video cameras (two live)
- Sonar systems, altimeter
- Scientific measurement systems (bathy, CTD, etc.)
- CP probe (contact or proximity)
- Tracking systems
- Ultrasonic thickness gauge
- Tooling skids: 4-function manipulator, cutting tool, cleaning brush. can be provided

FEATURES

- Vectored thrusters
- 700msw depth rating
- Compatible with TMS Type 2
- Free swimming option
- Up to three video cameras
- Multiple instrument systems available
- Responsive control and stable handling

SPECIFICATIONS

Length	1030mm
Width	700mm
Height	590mm
Weight in air (approx.)	150kg
Payload	32kg
Depth Rating	700msw

TRITON XLX

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

TRITON XLR

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

TRITON XL

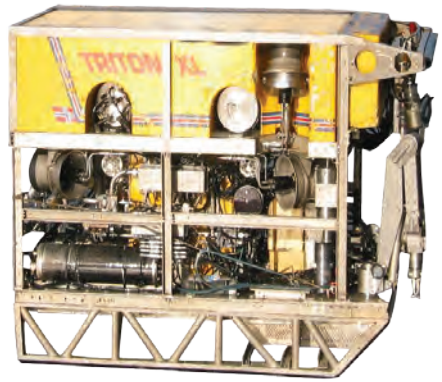
The Triton 1 and Triton XL11 are 125 hp work class ROV systems. The Triton XLS system’s 3000kg of through-frame lift provides a platform for a wide variety of tooling modules and custom intervention work skids. The Triton and XL are highly dependable work class vehicles designed for extreme water depths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



MINI ROV SYSTEMS
LBV150

The SeaBotix LBV150-4 is an affordable streamlined MiniROV system. This class of ROV is sometimes called a suitcase ROV because of its portability.

It can be transported, launched and controlled by a single person. 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 LBV 150.

LBV300

The SeaBotixLBV300-6 is a well-rounded ROV system for all inshore applications. This 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. Like the LBV150 it can be operated by one person.

FEATURES

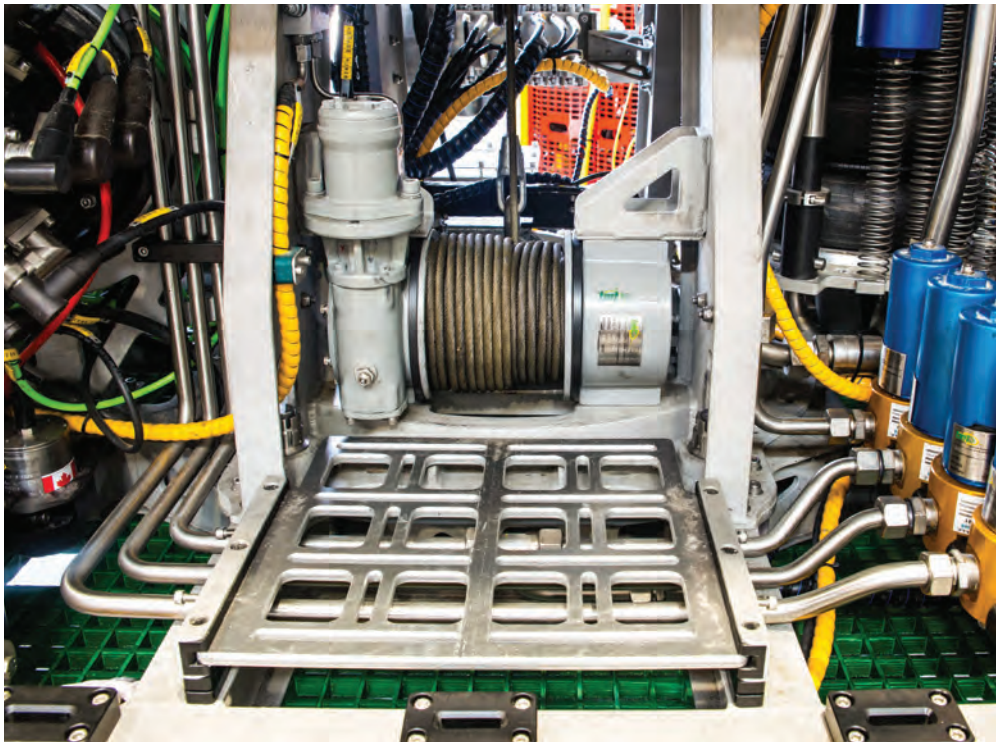
- Light weight
- Compact
- Intuitive integrated control console
- Easily transportable
- High-quality video and lighting
- Small diameter, low drag tether
- Balanced sensor platform

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

The LBV 300.

TMT SEABED REFERENCE POSITIONING SYSTEM (SRPS)



The TMT Seabed Refernce Positioning System (SRPS) installed in a Typhoon ROV.

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.

FEATURES

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

SPECIFICATIONS

Dimensions (Winch)

Length	260mm
Width	440mm
Height	425mm
Clump weight	500kg
Winch pull	3000kg
Winch capacity	.50m
Depth rating	.Unlimited

ROV TOOLING

DESIGN
ENGINEERING
MANUFACTURE
OPERATE
MAINTAIN
EVOLVE

TOOL STORAGE AND MAINTENANCE SERVICES

Engineering Design
Sophisticated Manufacturing Facility
Tested and Qualified
Fully Packaged
Full Documentation
Configured to Client Requirements
Sales and Rental

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.

ROV TOOLING

Total Marine Technology has built a solid reputation 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.

01 TORQUE TOOL AND CONTROL SYSTEMS


TMT HD FLOT


Gate Valve Linear Override Tool


TMT LRP Lift Cap Manual Torque Tool


AM1 Valve Insert Gripper


Norbar Torque Verification Unit


Extension Shaft

02 WELLHEAD ALIGNMENT


IW12 Impact Wrench


Acoustic Smart Level


Riser Alignment Tool


Wellhead Alignment Frame


TMT Smart Level

03 CUTTING AND BORING


AM1 Valve Hole Cutting Tool


ROV Knife


TMT Soft Line Cutter


Tree Cap Drill


Wire Rope Cutter


115mm Wire Rope Cutter Assembly


900mm Chop Saw

04 DRILLING AND ABANDONMENT


4 Inch Collet Connector Mechanical Overide


45 Litre Compensator Tank


5.5 Inch AX Ring Grip Gasket Tool


5.5 Inch Hub Cleaning Tool


Valve Hold Open Tool


Linear Overide Tool


AX/VX Gasket Install & Removal Tool


AX / VX Ring Tool


Tubing Head L-Loop Debris Cap


Back Seal Test Unit


Breaker


Isolated HPU (Dirty Oil Pack)


Wellhead Preservation

04 DRILLING AND ABANDONMENT


Slimline Anchor


TMT Bubble Catcher


Guidepost Tool


CP Clamp System


TMT Beacon Transponder Stand


Drill Collar Transducer Bucket


Tubing Hanger Emergency Release


Video Inspection Module


SST/FSB 18¾ Inch Override Tool

05 FLUID INJECTION/TOOLING SKIDS


10K Intensifier


BOP Intervention Skid


TMT Hydraulic Skid


TMT MK2 200 Fluid Transfer Skid

05 FLUID INJECTION/TOOLING SKIDS


High Flow Tooling Manifold


TMT Tooling Skid


TMT Pipe Inspection Skid


Compact High Pressure Glycol Injection Skid


TMT FLX Skid


TMT Marinised miniBooster

06 GRINDING AND BRUSHING


Hot Stab Receptacle Cleaner


Multi-Purpose Rotary Tool


AX/VX Profile Cleaning Tool


Annulus Bore Grinder

07 HOT STABS


TMT Hot Stabs


TMT 6 Port Hot Stab


TMT Hot Stab Dummy

07 HOT STABS


Cement Top Up Stab


TMT Petrobras Hot Stab


Hot Stab Manifolds

08 JETTING AND DREDGING


Mini Dredger

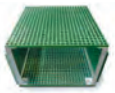

Mega Digger


TMT Hydraulic Low Pressure Jet Pump


TMT Water Blaster

09 SUBSEA BASKETS


TMT Subsea Tooling Basket

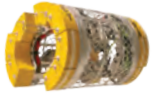

ROV Tooling Basket

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


2.4L Compensator Bottle


15L Compensator Bottle


Casing Hanger Gauge


Effer Crane


Docking Probe


TMT ISO Docking Probe Frame


Flexible Fluid Tanks


TMT Flexi Joint


General Electrical Enclosures

12 ROV COMPONENTS AND MANIPULATORS


TMT ROV Control Console


Passive Cursor System


TMT Grabber Arm


Imenco Manipulator Jaws


TMT Manipulator Arm Hire

13 SUBSEA SMART TECHNOLOGY


TMT Gauge Tester


Colour Zoom and Focus Camera


Low Light Camera


TMT LED Light


Cement Detector


250m Drop Camera System


Compact Tooling Manifold


RJE Underwater Beacon/Locator

13 SUBSEA SMART TECHNOLOGY


TMT Densitometer


Kongsberg Digital Camera and Flash


Pencil Camera


Digital Video Recorder

Digital Still Camera


LBV150 Mini Observation ROV


LBV300 Mini Observation ROV


Digiquartz Depth Sensor


CDL MicroGyro


PMAC CP Probe


Leak Detection System


Tritech Bathy Suite


Valeport Current Meter

13 SUBSEA SMART TECHNOLOGY


Imagenex 881 Sonar


Tritech Micron Scanning Sonar


Vortex Gas Sampling Tool


Tritech SeaKing Sonar and SCU


TSS 350 cable Tracker


TSS 440 Pipe Tracker

14 COMPLETION


IMENCO Guide Wire Anchor


IMENCO Slim Line Guide Wire Anchor

15 ROV FRIENDLY RIGGING


5.4T Long Shank Hook


12 T Plate Clamp


TMT 12T ROV Shackle


TMT 85 & 125Te ROV Shackles


Subsea Winch

16 SEWS - LIGHT WELL INTERVENTION


Diverless Flange Connector


Subsea Intervention Device


AXE Cutting System


Cement Injection Tool

17 TMT CONTAINERS


TMT Control Container


TMT Workshop Container


TMT Stores Van


Diesel Generator Set and Lift Frame

18 MARINE GROWTH CAPS


MGC - ISO Linear Type B, Class 5


MGC - XT, Tubing Head Spool


MGC - ISO Type B Hot Stab


MGC - Tronic Electronic Flying Lead


MGC - Vetco

19 OFFSHORE SURVEY


TMT FATT Buoy


TMT Air Lync Wi-Fi System


Dimensional Control


COMPATT Stab and Receptacle


Subsea 3D Laser Scanner


Sensor Holder


Saddle Bracket


Subsea Positioning


Surface Navigation and Construction

TMT SMART TORQUE TOOL MK2

The TMT Smart Torque Tool Mk 2 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 valve operating parameters.

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

The Smart Torque Tool Mk2 innovative design allows the operation of Class 1 to 4 fittings with out changing the tool or surfacing the ROV.

The small size of the Smart Torque Tool Mk2 allows it to be easly packaged into two carry-on sized cases allowing speedy and economical delivery to site.

Either a TMT-NSS-182, Two Function Manifold for Torque Tool only operation or a TMT-NSS-181, Five Function Manifold for Torque Tool and FLOT operations can be provided.

TMT can customise the tool to suit your requirements.

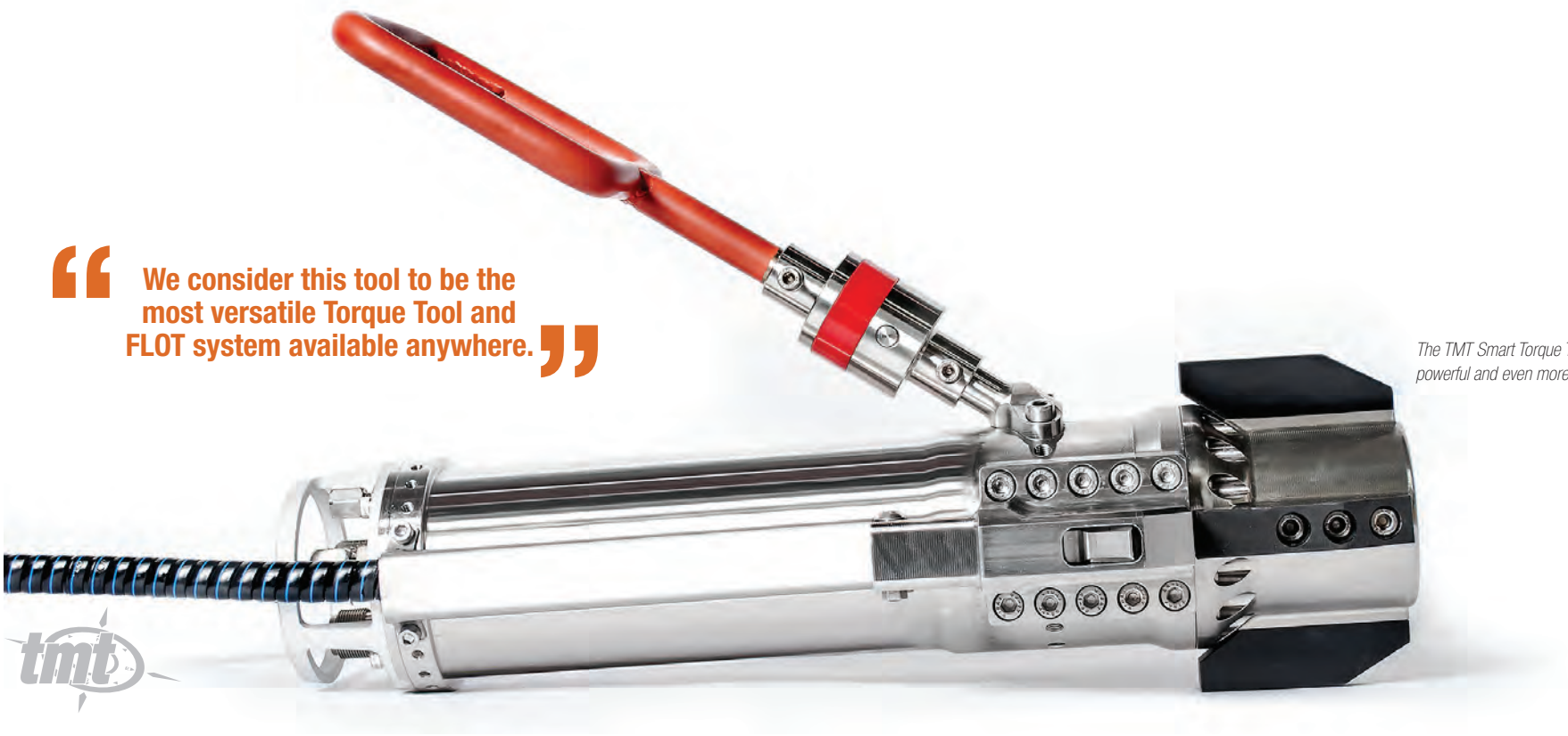
FEATURES

- 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	Class 1 - 4, 50 - 3000Nm
Resolution on output	1°
Maximum operating pressure	207bar (3000psi)
Depth rating	unlimited
Interfaces	rotary low torque types A, B and C, rotary high torque, Petrobras, Customised

“We consider this tool to be the most versatile Torque Tool and FLOT system available anywhere.”



The TMT Smart Torque Tool Mk2 is lighter, more powerful and even more finely controllable.

TMT ELECTRIC SMART TORQUE TOOL

Torque tool operations can now be delivered from any electric inspection class ROV.

The patent pending, TMT Electric Smart 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. This allows the tool to function autonomously to achieve the specified outcomes safely. The tool's electric servo motor drive unit offers superior controllability of torque and speed as opposed it's hydraulic counterparts. The electric drive also provides the full rated torque at near linearity, from zero to its maximum speed.

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

The TMT Electric Smart Torque Tool's innovative end effector 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 Smart Torque Tool allows it to be easily packaged into two carry-on sized helicopter compliant cases, allowing rapid delivery to site. TMT can customise the tool to suit your requirements.

FEATURES

- Accurate down to low torque values
- Intuitive operating interface
- Accurate speed control
- Vertical and horizontal configuration
- Optional Hydraulic latching
- Adaptive power consumption
- Temperature sensor
- Level (pitch & roll) sensor
- Wet sensor
- Adopter plates for industry standard
- FLOTs including TMT

SPECIFICATIONS

Length	510 mm
Width	225mm
Height	165mm
Weight in air	24kg
Weight in seawater	20kg
Torque	Class1-4, 25 - 3711Nm
Maximum Speed	5 rpm
Resolution on output	1°
Peak torque	2711Nm
Voltage	110VAC
Power and Current @ 1000Nm	150W, 1.4A
Power and Current @ 2711Nm	400W, 3.7A
Depth rating	3000msw
Interface	Rotary low torque types A, B and C, Rotary high torque,

The TMT Electric Smart Torque Tool

TMT SMART TORQUE PLATE HANDLING TOOL

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.

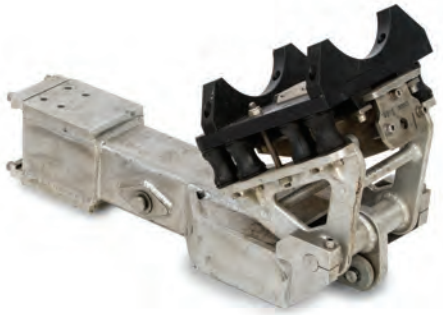
The Smart Torque Tool latches into the base cradle hydraulically and can be disconnected by the ROV in order to use as a standalone torque tool. The hydraulic latches for the reaction buckets are hydraulically driven forward and spring retracted, so that in case of loss of hydraulic power the latches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

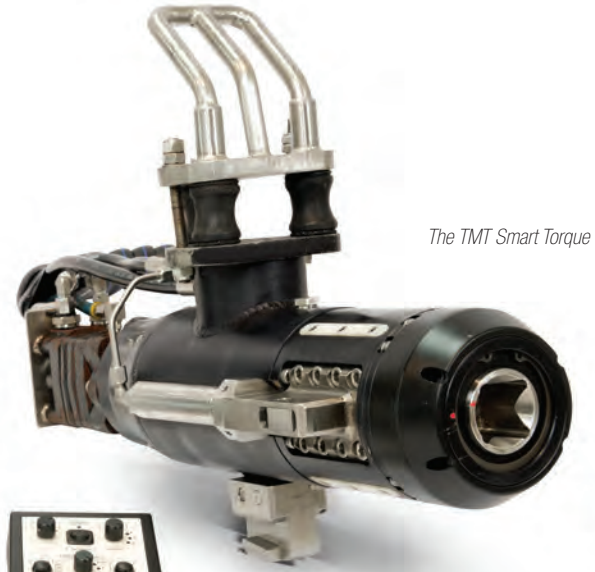
FEATURES

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

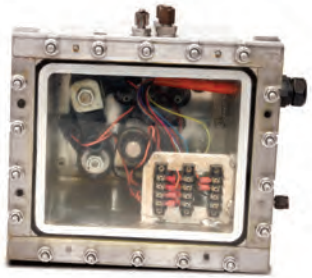
SPECIFICATIONS

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 (3002psi)
Forward tilt	5 degrees
Aft tilt	30 degrees





The TMT Smart Torque Plate Handling Tool System.



TMT LAOT & LOT

The TMT Linear Actuator Override Tool (LAOT) and Lock-Out Tool (LOT) is flexible and versatile solution for operating various linear override tool interfaces. The TMT LAOT is hydraulically powered to provide up to 86.2Te (846kN) of linear force at 10,000psi (68.9MPa) in the forward (extend) direction.

The LAOT can be coupled with a LOT in order to provide a mechanical means of locking the valve in stroked position for a prolonged time.

The LAOT can be engaged and disengaged from the LOT at any time by rotating the LAOT equipped with a ISO 13628-8 Type A linear interface (1/8 turn lock). The LOT can also interchange between Type A and Type B interfaces to suit the valve head. The LOT is a mechanical device that can be left behind if required on the interface. TMT can configure the LAOT and LOT to the customer requirements.

FEATURES

- Can be held by manipulator or mounted on the TMT HD-FLOT
- Easily operated from a ROV
- High Strength AISI 630 Stainless Steel
- Configurable stroke up to 8.625" (219 mm)
- ISO 13628-8 Type A or B Interface available
- Optional 2-port hot stab interface

SPECIFICATIONS

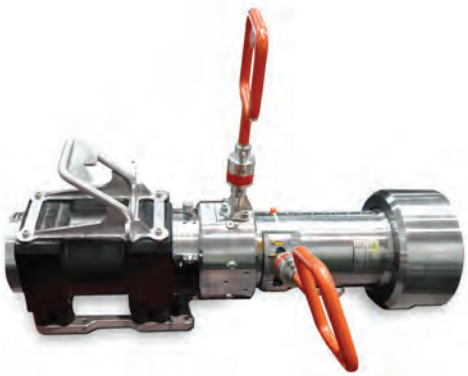
TMT LINEAR ACTUATOR OVERRIDE TOOL (LAOT)

Length	482mm
Width	232mm
Height	597mm
Weight in Air	64.8kg
Weight in Seawater	53.8kg
Pressure	10,000psi

Flow L/min 14 Extend / 8 Retract

TMT LOCK-OUT TOOL (LOT)

Length	385mm
Width	537mm
Height	613mm
Weight in Air	58kg
Weight in Seawater	49.9kg
Depth Rating	Unlimited



TMT HYDRAULIC MANUAL TORQUE TOOL

The TMT Hydraulic Manual Torque Tool is a simple and cost effective tool to operate subsea valving via host ROV hydraulic System. The Manual Torque Tool places minimal additional weight to the ROV and is easy to install and operate.

The Manual Torque Tool requires no data or electrical input. Surface calibration is required via pressure regulation and a Surface Torque Verification unit (optional extra).

Latch configuration is available. Can be fitted with the following drive sockets:

- Class 1 & 2 (11/16")
- Class 3 (1 1/8")
- Class 4 (1 ½").

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

The Torque Tool comes standard with a four (4) metre length of hydraulic hose and a Pressure Regulating Valve (PRV) to adjust pressure to the hydraulic motor for final toque adjustment.

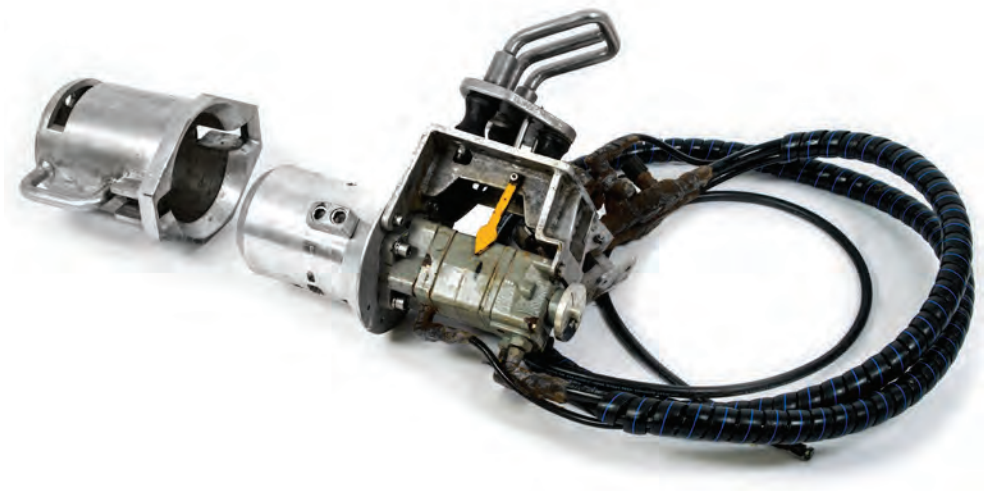
TMT can customise the tool to suit your requirements.

FEATURES

- Simple tilt indicator
- Visual Turns Counter
- Fitted with 17D (ISO13628-8) nose cone
- Field proven
- Latch option
- 4 metre hydraulic hose set included
- ROV manipulator 3 finger jaw friendly handle

SPECIFICATIONS

Transit Case Dimensions	750L x540W x540Hmm
Weight in Air	~40kg
Torque	Class1-4, 67-2711Nm
Max. Op. Press.	207bar (3000psi)
Depth Rating	Unlimited



TMT MANUAL 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 Manual Torque tool is available in two torque capacities and multiple end fittings:

- ISO 13628-8; Type A, Type B and Class 1, 2, 3 and 4 ROV interfaces, Annex D type 1-5 for end effectors
- Paddle valves on a BOP
- 1.25" FMC Needle Valve Adopter
- Petrobras interface available

FEATURES

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

SPECIFICATIONS

TMT-0005-3845

Maximum Torque	162Nm
Length	402mm
Diameter	153mm
Weight in air	4.2kg
Weight in seawater	3.0kg

TMT-0004-8531

Maximum Torque	216Nm
Length	402mm
Diameter	153mm
Weight in air	5.0kg
Weight in seawater	3.6kg

TMT Manual Torque Tools are available for many different applications.

TMT CLASS 4 TO CLASS 5 MULTIPLIER

The TMT Class 4 to 5 Multiplier enables the use of a Class 4 torque tool in a Class 5 receptacle. It incorporates a gearbox to provide a torque multiplication at the output.

A class 5 multiplier is simpler, lighter and a more cost effective solution than a hydraulically actuated Class 5 torque tool, when coupled with a Smart Torque Tool Mk2, it provides greater accuracy, control and safety than hydraulic tools that utilise relief valves for over-torque protection.

The Class 4 receptacle retains the latching flange which provides the ability to engage and disengage the class 4 torque tool at will, this also means the class 5 tool can be mounted to the class 4 heavy duty FLOT.

The Class 4 to 5 Multiplier has a design limit of 8500Nm, which exceeds the Class 5 limit of 6779Nm.

FEATURES

- Easy to install & remove
- Corrosion resistant materials
- Compensation system
- Compensation relief
- Field proven
- Quick disconnects

SPECIFICATIONS

Length	893mm
Width	343mm
Height	413mm
Weight in Air	55kg
Weight in Seawater	41kg
Nominal Torque	1:3.6
Turns Ratio	1: 3.72
Female Interface	Class 4
Male Interface	Class 5
Max Torque Input	2360Nm
Max Torque Output	8500Nm
Depth Rating	Unlimited

TMT HEAVY DUTY FLOT

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 provide ± 20º roll.

A load tuneable compliant mounting provides the operator visual feedback of the loads being exerted upon the tool. All external components are made from corrosion resistant materials for long life. The Torque Tool can be removed subsea and used with a manipulator.

FEATURES

- Subsea Removable Torque Tool
- High capacity
- Low weight
- Low maintenance
- Compliant mounting of torque tool
- for visual indication of load
- Torque tool interface provides digital pitch and roll feedback to assist in levelling 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	±20º
Tilt up/down	±90º
Payload	500kg
Depth rating	unlimited

A TMT HD FLOT with a Smart Torque Tool operating from a Typhoon ROV.

GATE VALVE LINEAR OVERRIDE TOOL

The Gate Valve Linear Override Tool (GVLOT) is designed to override large gate valves. The tool uses a high capacity interface to transfer up to 139 metric tonnes (306,000 lbf) of force onto the gate valve actuator and has a stroke of 381mm (15"). This interface is different to those specified in ISO 13628-8 as they are not capable of transferring this force.

The tool can be installed and operated using an ROV and can be hydraulically locked open. The main hydraulic cylinder is manufactured from a titanium alloy to minimise the weight and enable it to be rated to a higher operating load. The tool can be provided with a hydraulic intensifier that is used to provide the operating pressure of 10,000psi (690bar) from the ROV hydraulics. If required, the tool can be customised for shorter strokes and mechanical locking mechanisms.

FEATURES

- Titanium alloy construction
- 381mm (15") actuation stroke
- 139mT (306,000lbf) maximum actuation force
- Hydraulic lock to maintain gate valve override
- Customised high capacity LOT interface
- Deployable by ROV or tool deployment unit

SPECIFICATIONS

Length	865mm
Width	415mm
Height	500mm
Weight in Air	120kg
Weight in Seawater	95kg
Pressure Rating	10,000psi (690bar)
Depth Rating	only limited by ROV depth

Gate Valve Linear Override Tool.

TMT LRP LIFT CAP MANUAL TORQUE TOOL

The TMT LRP Lift Cap Manual Torque Tool (MTT) is a manual torque tool designed specifically for the Lower Riser Package (LRP) of the Funnel and Lift Cap Assembly.

The MTT is intended to be installed on cap using an ROV manipulator with the top handle, featureing the TMT Flexi Joint. The manipulator then grips second (lower) handle and applies a counter-clockwise torque to unscrew the Lower Riser Package (LRP) Locking Screws, four (4) located on the LRP Cap.

The torque required for the LRP Locking Screws is 150Nm, and all Schilling Robotic manipulators are capable of 170Nm minimum.

TMT can customise the tool to suit your requirements.

FEATURES

- Cathodic protection
- TMT Flexi joint
- Integrated D-handle for ROV control
- Field proven
- Easy to install & remove
- ROV operated and deployed

SPECIFICATIONS

Length	565mm
Width	429mm
Height	543mm
Weight in Air	10.4 / 23kg/lbs
Weight in Seawater	7.7 / 17kg/lbs
Depth Rating	Unlimited

AM1 VALVE INSERT GRIPPER

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	155mm
Width	155mm
Height	436mm
Weight in air	4kg
ROV interface	Ø19.05mm T-bar Handle
Depth rating	unlimited

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

Norbar Torque Verification Unit.

TMT EXTENSION SHAFT

The TMT 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 TMT Extension Shaft.

IW12 IMPACT WRENCH

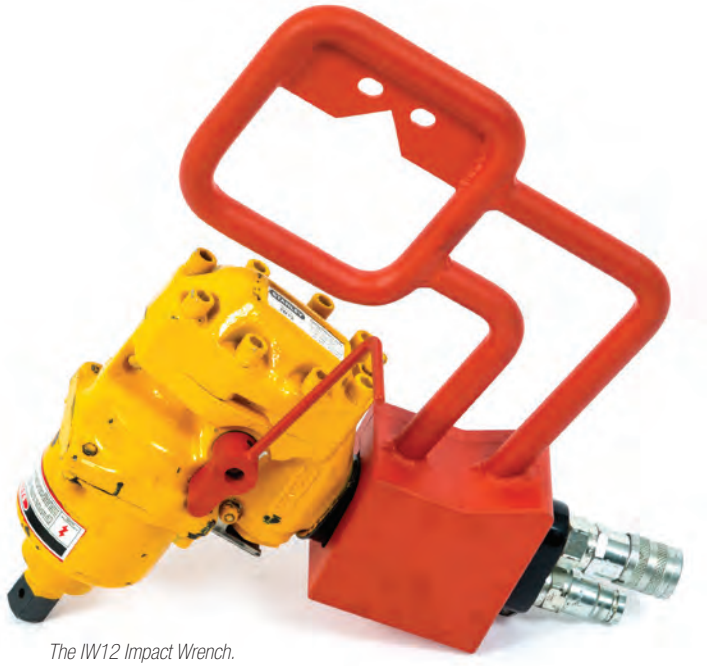
The Stanley IW12 hydraulic impact wrench features adjustable impact intensity. The IW12 can handle a wide variety of applications. The rugged Stanley impact wrench mechanism is simple to maintain and has many features to give it proven reliability. The swing hammer design results in minimal torque transmission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

FEATURES

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

SPECIFICATIONS

Length	241mm
Width	103mm
Weight in air	6.4kg
Hydraulic pressure	70 - 140bar
Torque	340 - 1632Nm
Flow rate	15 - 45L/min
Depth rating	Consult TMT



The IW12 Impact Wrench.

ACOUSTIC SMART LEVEL

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 deployments 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

Acoustic Smart Level.

RISER ALIGNMENT TOOL

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)

Length	660mm
Width	540mm
Height	200mm
Weight in air	26kg
Weight in seawater	11.5kg
Accuracy	±0.25°
Maximum subsea deployment	20 days
Maximum working depth	6000msw*
Range	±3°

*Depending on the bullseye used

Riser Alignment Tool.

WELLHEAD ALIGNMENT FRAME

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

Length	1920mm
Width	1762mm
Height	719mm
Weight	90kg (approx.)
Required tightening torque	65Nm

Wellhead Alignment Frame.

TMT SMART LEVEL

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	+/-0.1°
Battery capacity	100hrs fully charged

The TMT Smart Level.

Typical installation of a TMT Smart Level.

A TMT Smart Level mounted to a customised frame for use by an ROV.

AM1 VALVE HOLE CUTTING TOOL

Front view showing the highly efficient cutting bit.

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.

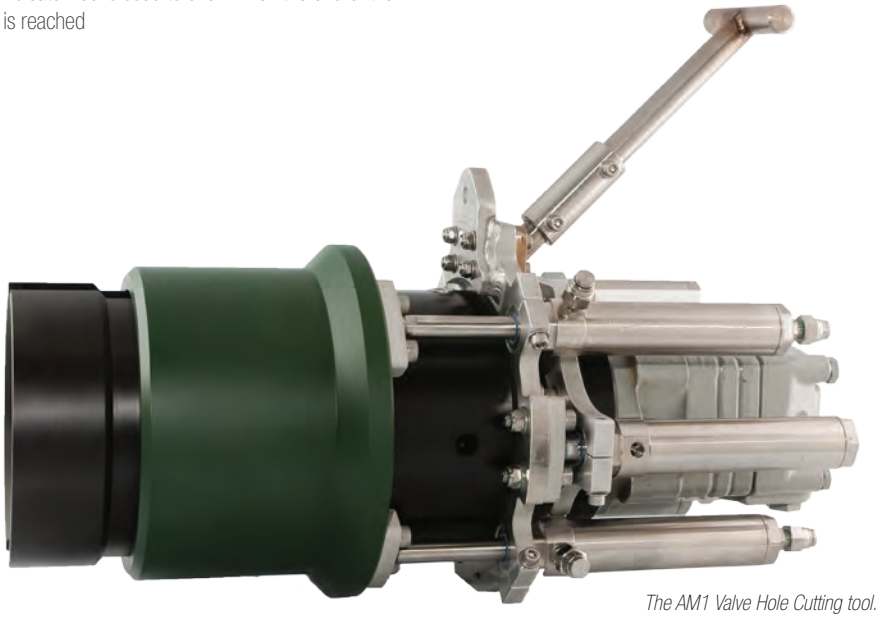
After the tool has been used, it is impossible to close the valve again.

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 AM1 Valve Hole Cutting tool.

TMT ROV KNIFE

The TMT ROV Knife is designed specifically for the subsea environment. The ROV knife is made for the cutting of hoses, rope and thin wire in a wide variety of situations; for example, in the event that a hydraulic cutter is not readily available.

The TMT ROV Knife can be paired with an assortment of ROV handles to allow easy use by a variety of ROV manipulators.

The TMT ROV Knife is made of Stainless Steel in two different lengths and comes with a safety holster.

TMT can configure the tool to the customer requirements.

FEATURES

- Cost-effective
- Low maintenance
- ROV operated
- Field proven
- Safety holster included

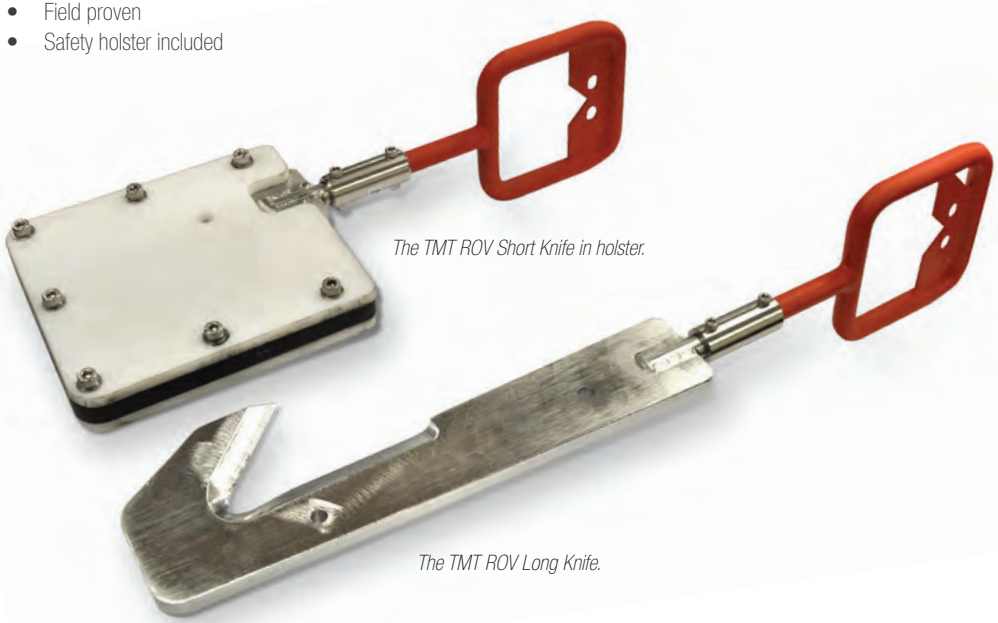
SPECIFICATIONS

LONG KNIFE

Length	704mm
Width	16mm
Height	139mm

SHORT KNIFE

Length	504mm
Width	16mm
Height	139mm
Weight in Air	8.56kg
Weight in Seawater	6.63kg
Angle	50°
Handle	Assorted
Depth Rating	Unlimited



The TMT ROV Short Knife in holster.

The TMT ROV Long Knife.

TMT SOFT LINE CUTTER

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

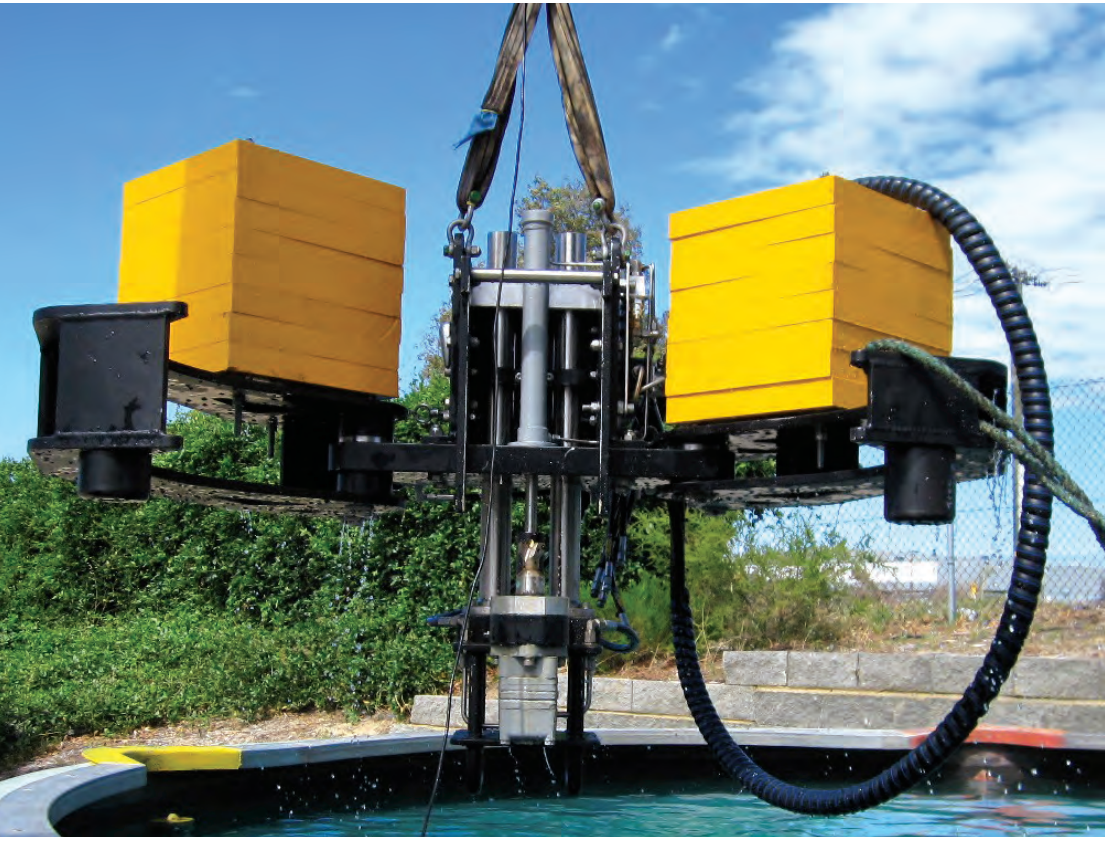
- Compact design
- Easy to install and remove
- Corrosion resistant material
- ROV deployable

SPECIFICATIONS

Length	610mm
Width	230mm
Height	70mm
Weight in air	15kg
Maximum operating pressure	206bar (3000psi)

The TMT Soft Line Cutter.

TREE CAP DRILL



The Tree Cap Drill being lifted out of the test pool.

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

75MM WIRE ROPE CUTTER

The TMT 75mm Cutter Assembly allows the cutter orientation to be easily handled by the ROV manipulator. 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 cutter tool has an inbuilt hydraulic intensifier so it can operate with the normal ROV pressure of 210bar (3045psi) input. The tool is configured with a TMT purpose built protective 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 engaged.

TMT can configure to the customer requirements.

FEATURES

- Cost-effective
- Low maintenance
- ROV delivered & operated
- Field proven
- Internal relief valve
- Long blade life
- Aluminium construction
- Integrated hydraulic intensifier

SPECIFICATIONS

Dimensions

Length	517mm
Width	175mm
Height	1390mm
Weight in air	60kg (approx.)
Weight in seawater	40kg (approx.)
Depth rating	unlimited
Maximum input pressure rating	690bar

The Wire Rope Cutter is capable of cutting through steel wire up to 75mm thick.

TMT 115MM WIRE ROPE CUTTER

The TMT 115mm Wire Rope Cutter Assembly is a heavy-duty guillotine type cutter. It is a hydraulically driven unit, which is capable of cutting steel wire up to a maximum tensile strength of 1770N/mm and 115mm in diameter.

The TMT Cutter Assembly allows the cutter orientation to be easily adjusted in 45° increments to cut wires at different angles. The Cutter Assembly has been designed primarily to mount the 115mm but can also be adopted to fit the 75mm Webtool cutter. The frame is designed to suit Typhoon Mk2 series ROV's. The bracket also allows the cutter height to be lowered by approximately 600mm to allow the cutters to be used when the Typhoon MK2 Tooling Skid is attached to the ROV. This tool requires 10,000psi to cut and can be used with the TMT 10k Intensifier.

FEATURES

- Cost-effective
- Low maintenance
- Field proven
- Skid modification option available

SPECIFICATIONS

115MM INLINE

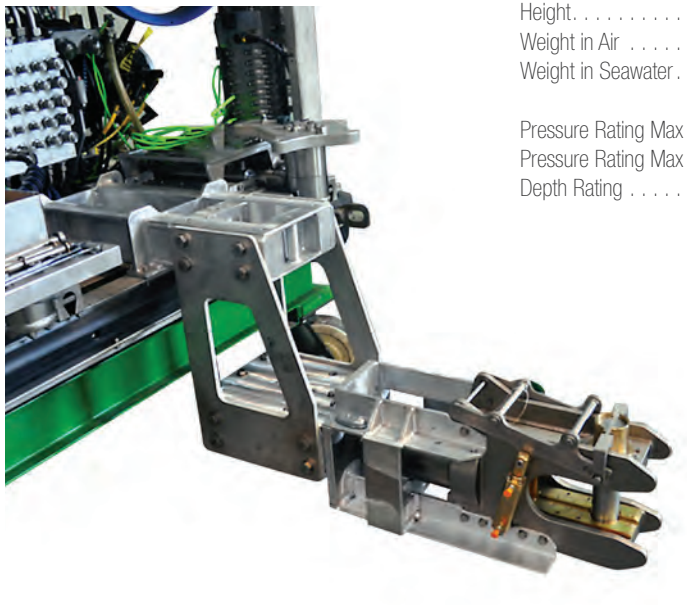
Dimensions

Length	1781mm
Width	396mm
Height	523mm
Weight in Air	197kg
Weight in Seawater	155kg

115MM OFFSET

Length	1781mm
Width	396mm
Height	763mm
Weight in Air	220kg
Weight in Seawater	170kg

Pressure Rating Max - Cutter	690bar
Pressure Rating Max - Anvil	210bar
Depth Rating	unlimited



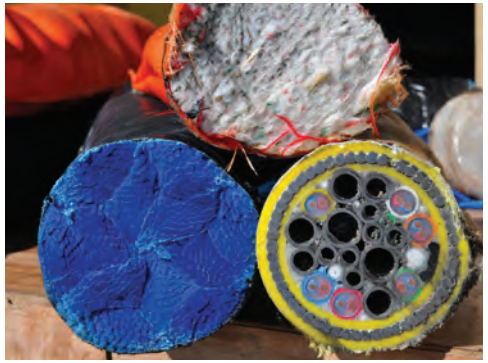
The TMT 115mm Wire Rope Cutter and Cutter Assembly mounted on an ROV..

TMT 900MM CHOP SAW

TMT 900mm Chop Saw.

The TMT 900mm Diamond Chop Saw is suitable for cutting large steel piles 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.



End view of cuts through ropes and an umbilical.

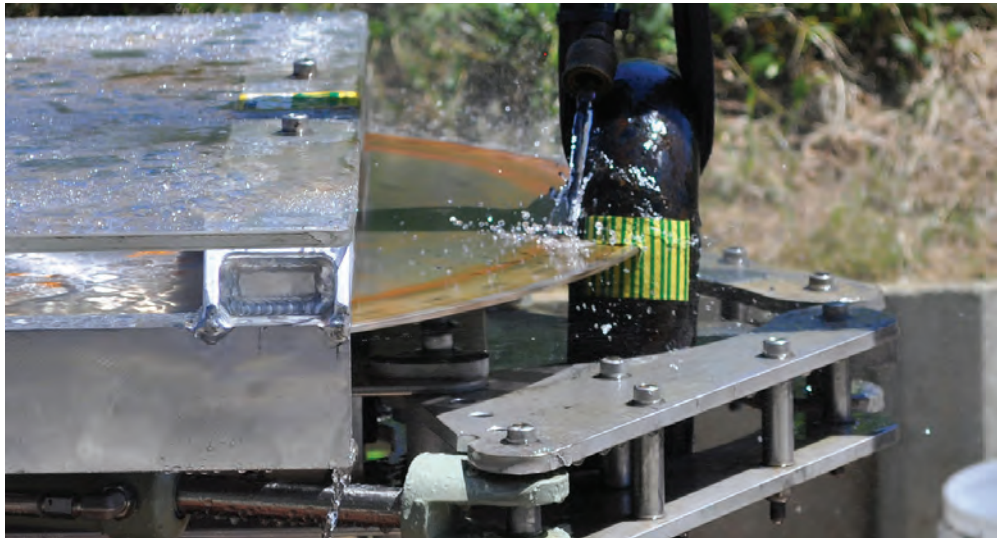
FEATURES

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

SPECIFICATIONS

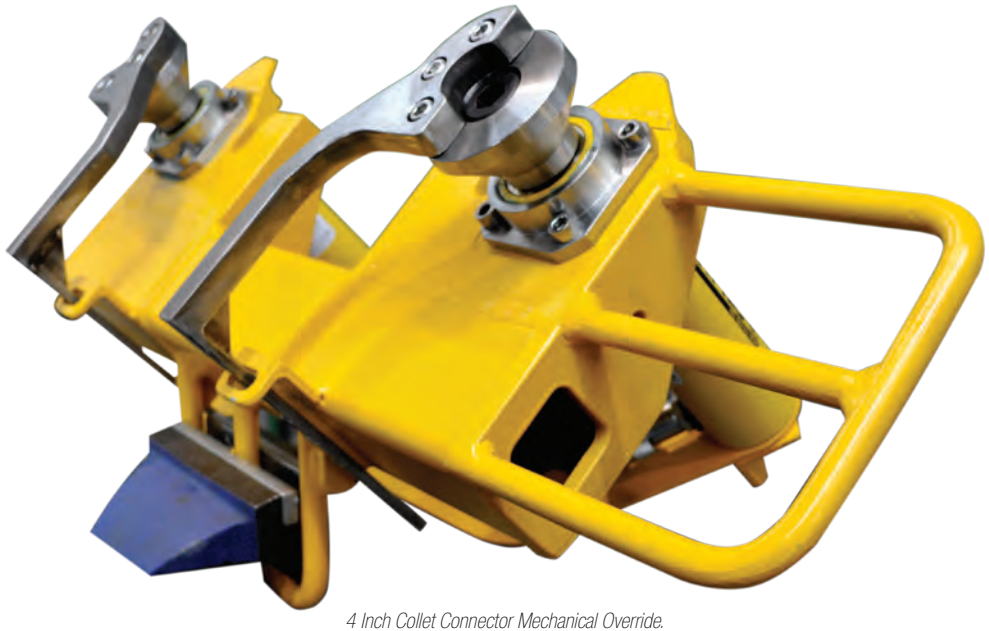
Length	1685mm
Width	900mm
Height	650mm
Weight in seawater	20kg
Maximum pressure	210bar
Maximum flow rate	65L/min
Grinding disc	*900mm
Maximum pressure	210bar
Power	15.5kw
Speed	810rpm
Depth	unlimited

*Optional larger discs are available



The TMT 900mm Chop Saw in action cutting through anchor chain.

4 INCH COLLET CONNECTOR MECHANICAL OVERRIDE



4 Inch Collet Connector Mechanical Override.

The TMT 4 Inch Collet 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 and release the connector.

The tool was designed to replace an existing diver operated tool, to allow a larger force to be applied to the mechanical override rods than was previously possible.

The tool can be modified to suit customer requirements.

FEATURES

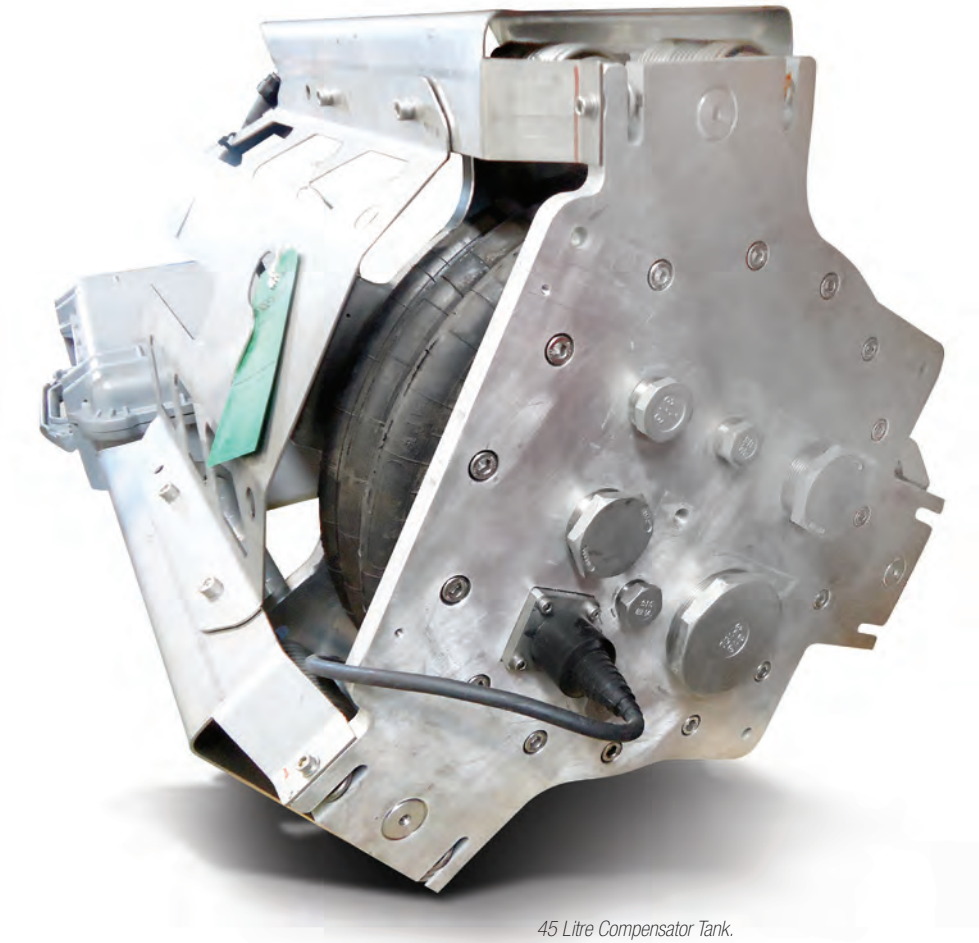
- Requires only one movement to operate
- Powerful
- Field proven

SPECIFICATIONS

Length 940mm
Width 402mm
Height. 445mm
Weight in air. 60kg
Weight in seawater 49kg
Maximum pressure . . . . . 700 bar (10,000psi)
Cylinder stroke . . . . . 152mm (6")
Connector stroke . . . . . .89mm (3.5")
Maximum depth . . . . . .unlimited

INPUT PRESS. PSI	TOTAL TONNAGE	INPUT PRESS. PSI	TOTAL TONNAGE
500	1.4	5500	15.7
1000	2.9	6000	17.1
1500	4.3	6500	18.5
2000	5.7	7000	20.0
2500	7.1	7500	21.4
3000	8.6	8000	22.8
3500	10.0	8500	24.3
4000	11.4	9000	25.7
4500	12.8	9500	27.1
5000	14.3	9550	27.3
5500	15.7	10000	28.5

45 LITRE COMPENSATOR TANK



45 Litre Compensator Tank.

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

Length	560mm
Width	540mm
Height	540mm
Weight	20kg (empty)
Maximum oil capacity	45Litres
Max. flow	limited by pump and 3" pump inlet only
Bladder material	reinforced rubber
Depth rating	unlimited

A Compensator Tank on an ROV.

5.5 INCH AX RING GRIP GASKET TOOL

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.

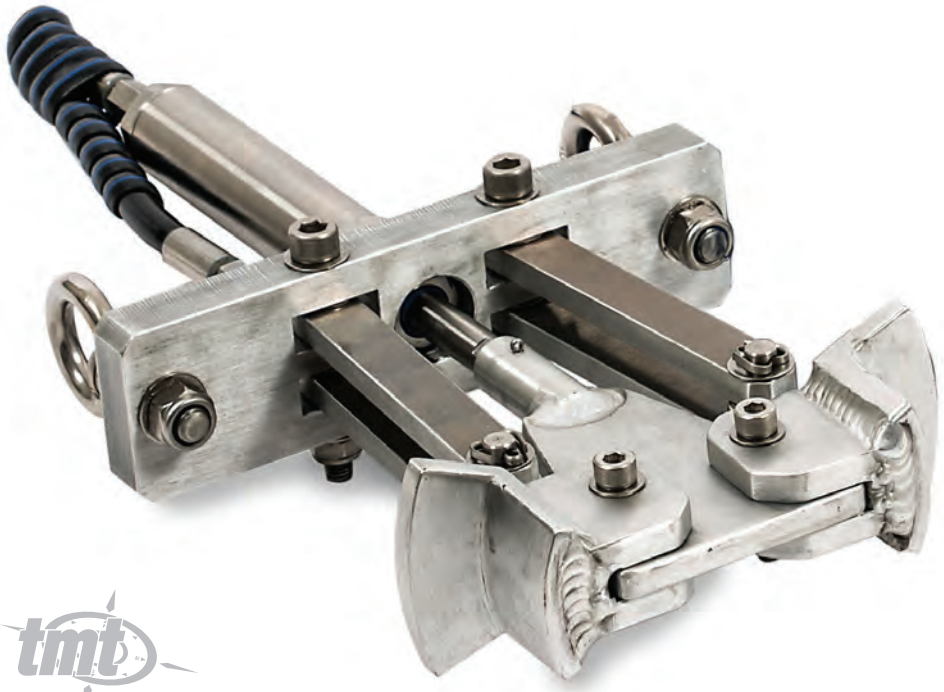
TMT can modify the tool to suit your requirements.

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)



5½ inch AX Ring Grip Gasket tool.

5.5 INCH HUB CLEANING TOOL

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

5½ inch Hub Cleaning tool.

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 2 1/16 inch and 4 1/8 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 4 1/8 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
- Proven rugged design

SPECIFICATIONS

Length	503mm
Width	220mm
Height	180mm
Weight in air	17.5kg
Weight in seawater	15.5kg
ROV handle	T4 Parallel Jaw Manipulator
Maximum spring force	621bar (9000psi)

The TMT Valve Hold Open tool.

LINEAR OVERRIDE TOOL

The Linear Override Tool (LOT) 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.

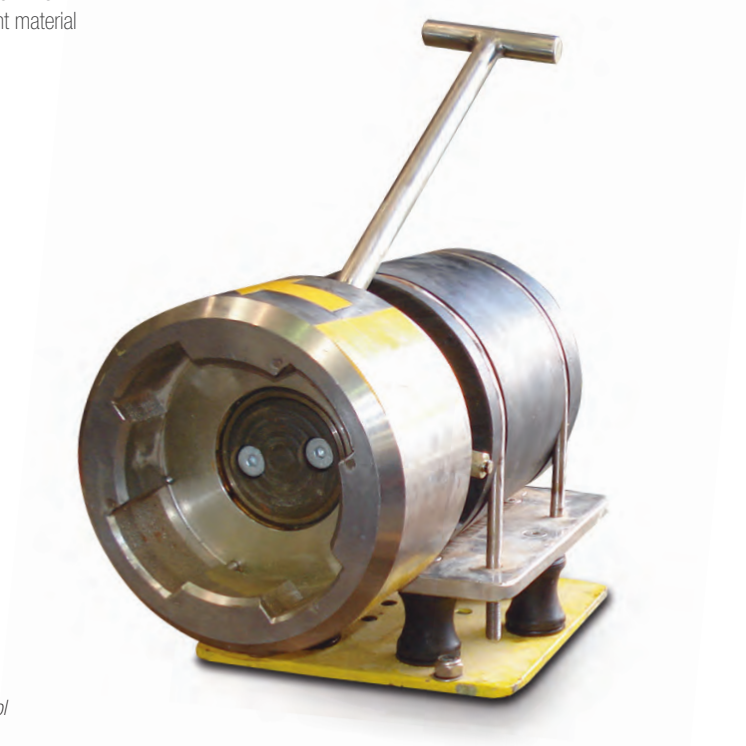
The Linear Override Tool is comprised of two parts, the Lock Off Tool and the Actuator. The Actuator contains a hydraulically operated piston. The Lock Off Tool is a mechanical device and is left behind on the interface when the valve is required to be left overridden. TMT can configure the Linear Override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

FEATURES

- Easily removed by ROV
- Easily operated from ROV
- Corrosion resistant material

SPECIFICATIONS

Weight in air	76.2kg
Weight in seawater	60kg
Interface	±0.25°
Maximum load	50tons



Linear Overide Tool

AX/VX GASKET INSTALL & REMOVAL TOOL

The AX/VX Gasket Installation and Removal Tool enables an ROV to install or remove a subsea tree or BOP gasket in the case that the subsea Tree or BOP connector is not equipped with a captive gasket system.

The tool can also be used to change out a damaged or leaking gasket.

In order to preserve the sealing surfaces of the gasket, the tool expands and grips against the inner surface of the gasket with brake shoes. As friction varies significantly especially with the presence of liquids, the tool exerts a significant load against the gasket in order to ensure it will not separate. As a redundancy, in case of hydraulic failure during installation or retrieval, there are two sprung guides which provide enough force to maintain grip on the gasket.

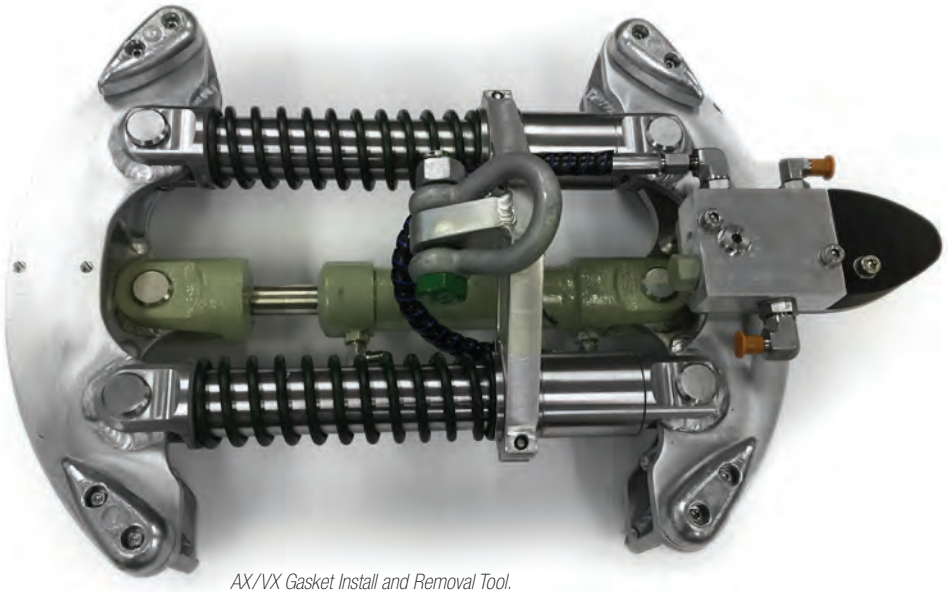
TMT can configure the tool to the customer requirements.

FEATURES

- Cost-effective
- Low maintenance required
- ROV handled
- Field proven

SPECIFICATIONS

Length	582mm
Width	385mm
Height	269mm
Weight in Air	20.8kg
Weight in Seawater	16.2kg
Pressure	3000psi
Flow	8 extend / 8 retract L/min
Depth Rating	Unlimited



AX/VX Gasket Install and Removal Tool.

AX/VX RING TOOL

The AX/VX Subsea Ring tool provides the means to install or remove the 18¾ 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 any ROV
- Rugged aluminium radial ring
- Simple and highly serviceable
- Common industrial parts easily available
- Proven design

SPECIFICATIONS

Diameter	600mm
Height	468mm
Weight	16kg
Pressure Rating	206bar (3000psi)
Ring Size	18¾" AX/VX Gasket

AX/VX Ring Tool.

TUBING HEAD L-LOOP DEBRIS CAP

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.

Tubing Head L-Loop Debris Cap.

TMT 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 ¼ 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

Back Seal Test Unit.

BREAKER

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 1⅛ 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 ⅜ inch hydraulic hose and a Dirty Oil Pack. The Dirty Oil Pack prevents the ROV oil from being contaminated.

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)

Underwater Breaker.

ISOLATED HPU (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.

Attachment to the ROV is quick and simple by connecting the supply, return and drain lines 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
- Integrated 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

TMT Isolated Hydraulic Power Unit.

Wellhead Acid Plug.

WELLHEAD ACID PLUG

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

View showing internal seals and flange.

Wellhead Preservation Cap.

TMT SLIMLINE ANCHOR

The TMT Slimline Guide Wire Anchor suits the Regan style post tops with 19mm guide wires. The anchor has few moving parts and a robust stainless steel chassis construction.

A sliding collar at the top of the anchor allows an ROV operator to release the anchor with ease. The anchor can be re-inserted whilst underwater 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 air	12kg
Weight in seawater	10.8kg
Depth rating	unlimited
Guide post	suits Regan post tops
Guide wire	19mm
Shear pin capacity (default)	7.5T*
Recommended Working Limit	50% of Shear Pin Capacity
Depth rating	unlimited

*Higher and lower rating (8.5, 9.5 and 6 Tonnes) available on request.

TMT BUBBLE CATCHER

The TMT Bubble Catcher is used as a simple tool to estimate the gaseous leakage from a well or any subsea structure.

The catcher is fully flooded on deployment and on arrival at leak site is manoeuvred into position by the ROV manipulator.The escaping gas is the captured in the clear plastic void and depending on time and leak rate will displace the seawater in the catcher vessel. A graduated ruler is fitted to the side on the vessel and markings note fluid displaced in litres.

The operator commences a time mark, i.e. with a stop watch, and notes the amount of fluid displaced at depth and can then roughly calculate the volume of gas leakage at depth. To then understand surface leakage the operator would multiply the subsea volume by the number of atmospheres of depth. i.e. 100MSW would be ten (10) atmospheres. So one (1) litre of leakage at 100MSW would equate to ten (10) litres of gas at the surface.

The unit comes with an offset ROV D handle that allows unobstructed viewing of the vessel. The Linear Gauge can be customised to suit clients requirements.

TMT Part Number: TMT-0013-3212.

FEATURES

- Field tested
- Corrosion resistant material
- ROV delivered
- D-Handle Standard
- Customised Packing

SPECIFICATIONS

Diameter	160mm
Height	300mm
Weight in Air	3kg
Weight in Seawater	81kg
Measurement Range	0-100mm*
Working Depth	Unlimited

*Range can be customised to suit the client

TMT Guidepost Release Tool.

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 then applied to the guidepost latch. Springs will automatically retract the cylinders if hydraulic power is lost, preventing the tool from become 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 your requirements.

FEATURES

- 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

Integrated extension guide.

TMT CP CLAMP TIE IN SYSTEM

The TMT Corrosion Protection (CP) Clamp Tie In is designed to electrically connect subsea components to the existing CP System via an ROV.

The tooling is offered in different configurations, dependent on the client's specific requirements. Functionally, the use of the tool is similar in every configuration. The system consists of multiple clamps, joining subsea structures both electrically and physically by an electrical cable.

TMT can modify the CP Clamp Tie In System to suite the client's requirements.

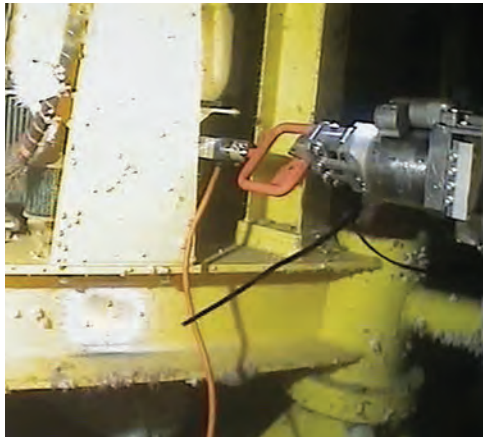
FEATURES

- Compact design
- ROV installed and removed
- ROV handle
- Corrosion resistant material

SPECIFICATIONS

Clamp Weight in Air 19.8kg
Clamp Weight in Seawater 17.2kg
Electrical Resistance (end to end) . . . . . <0.1mΩ
ROV Installable . . . . . Yes
Diver Installable, with Torque Multiplier . . . . . Yes

TMT CP Clamp System.



An ROV arm applying the TMT CP Clamp System subsea.

TMT BEACON TRANSPONDER STAND

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.

TMT can modify the stand to suit your requirements.

FEATURES

- Cost-effective
- Low maintenance
- ROV delivered & operated
- Field proven
- Internal relief valve
- Long blade life
- Aluminium construction

SPECIFICATIONS:

Dimensions Deployed . . . . . 1780 x2020H(mm)
Dimensions Folded . . . . . 610 x2020H(mm)
Weight in Air 76kg
Weight in Seawater 66kg
Transponders supported . . . . . Varies
Depth Rating . . . . . Unlimited

TMT Beacon Transponder Stand.

DRILL COLLAR TRANSDUCER BUCKET

The Drill Collar Transducer Bucket will 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 Bucket mounts onto a drill pipe sub that has grooves machined 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.

SPECIFICATIONS

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

FEATURES

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

TMT Drill Collar Transponder Bucket

TH ERT (TUBING HANGER EMERGENCY RELEASE TOOL)

The Tubing Hanger Emergency Release Tool (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.

SPECIFICATIONS

Length	475mm
Width	468mm
Height	750mm
Weight in air	55kg
ROV valve	½ inch NPT
Maximum supply pressure	206bar (3000psi)

FEATURES

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

The Tubing Hanger Emergency Release Tool (TH ERT) is normally supplied with a dummy hot stab.

VIDEO INSPECTION MODULE

The module in its rugged casing.

Operator controls and displays.

TMT Video Inspection Module internals.

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 360º imagery

SPECIFICATIONS

Length	800mm
Diameter	170mm
Weight in seawater	30kg
Minimum illumination	1.5lx (typical)
Resolution	720p
Depth rating	350msw

SST/FSB 18.75 INCH OVERRIDE TOOL

SST/FSB 18¾ Inch Override Tool.

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)

Tonnage vs. Pressure				
Stage Tonnage			BAR	PSI
1st	2nd	3rd		
8.6	4.0	1.4	34	500
17.2	8.0	2.8	69	1000
25.9	12.0	4.1	103	1500
34.5	16.0	5.5	138	2000
43.1	20.0	6.9	172	2500
51.7	24.0	8.3	207	3000
60.3	28.0	9.7	241	3500
69.0	32.0	11.0	276	4000
77.6	36.0	12.4	310	4500
86.2	40.0	13.8	345	5000
94.8	44.0	15.2	379	5500
103.4	48.0	16.6	414	6000
112.1	52.0	17.9	448	6500
120.7	56.0	19.3	483	7000
125.0	58.0	20.0	500	7250

> **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 increase tool pressure up to10,000psi (690bar) by multiplying the ROV hydraulic system pressure.

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 will provide faster retracting speed for large cylinders etc.

TMT can modify the tool to the customer requirements.

FEATURES

- Easy to install and remove
- Light weight
- Pressure gauge
- Anodic protection
- Made of corrosion resistant materials
- Can be used with water, oils or glycols

SPECIFICATIONS

Size - Standard	339mm x 152mm x 168mm
Size - with High Return Flow	410mm x 232mm x 170mm
Weight in Air - Standard	6.3kg
Weight in Air - with High Return Flow	11.1kg
Pressure Multiplication Ratio	4:1
Max Flow Input	14L/min
Max Flow Output	2L/min
Max Pressure Input	2500psi
Max Pressure Output	10,000psi

10K Intensifier.

Total Marine Technology ROV skids are designed and built to meet the needs of demanding subsea projects nad your specific needs. ROV skids are usually attached to the base of an ROV and can provide additional sensors, tooling, or power to the ROV, or the tools that the ROV is controlling.

TMT has designed and built a wide range of ROV skids including skids for customised tooling, fluid transfer, supplying additional hydraulic power, BOP intervention, pipe-lay support and mattress positioning, and increasing buoyancy.

BOP INTERVENTION SKID

The TMT 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 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.

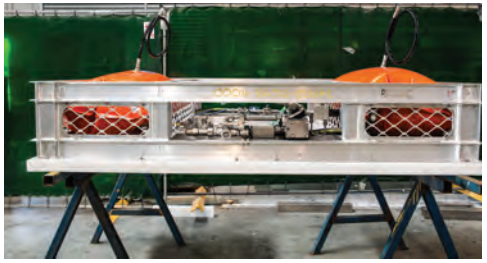
BOP Intervention Skid.

FEATURES

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

SPECIFICATIONS

Length 3400mm
Width 1840mm
Height. 500mm
Weight in air. 750kg
Weight in seawater 200kg
Depth rating. . . . . .unlimited
Max. supply pressure . . . . . 97 - 207bar (1400 - 3000psi)
Maximum supply flow 200L/min
Volume of hydraulic fluid 220L
Output pressure . . . . . 179 - 689bar (2600 - 10,000psi)
Maximum output flow 180L/min



TMT HYDRAULIC SKID

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

Length 3400mm
Width 1840mm
Height. 1000mm
Weight in air. 1000kg
Weight in seawater 30kg
Depth rating. 2000msw
Maximum supply pressure 224bar (3250psi)
Maximum supply flow 200L/min
Volume of hydraulic oil. 45L

The TMT Hydraulic Skid mounted to an ROV.

TMT MK2 200 FLUID TRANSFER SKID

The TMT Fluid Skid Mk2 - 200 is designed to enable the ROV to quickly close the Blow Out Preventer (BOP) rams and safety valves on the client equipment. The skid houses a fluid bladder with 180-200L useable volume and two (2) separate pumps, enabling the skid to produce a maximum flow rate of 260L/min and a maximum pressure of 10,000psi (689bar). The skid is designed to be mounted on the Typhoon MK2 150 ROV and compatible with the Typhoon MK2 SRPS clump weight system.

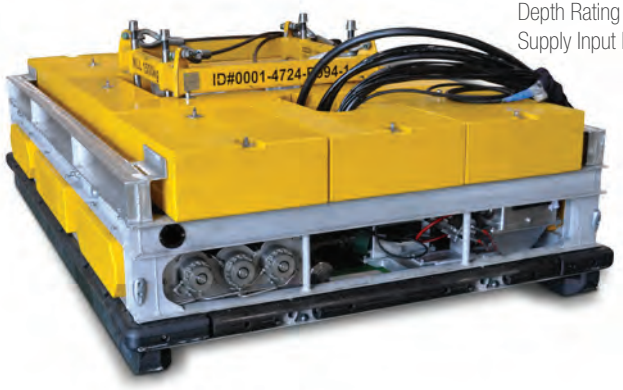
The Fluid Transfer Skid system components are mounted in an aluminium alloy skid, which can be adapted to be compatible with multiple types of ROVs. The output of the fluid skid is accurately measured using electronic flow meters and pressure transducers, allowing the output of the skid to be graphed 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 & remove
- Corrosion resistant materials
- Two pressure settings on high pressure
- pump, remotely switched.
- Pressure and flow measurement
- Emergency seawater pickup
- Easy to use GUI
- Data Logging
- Field proven
- Hot stabs supported include
- ISO 13628-8, API 17H type A or type C
- and Petrobras.

SPECIFICATIONS

Length	2830mm
Width	1860mm
Height	630mm
Weight in Air	1265kg
Weight in Seawater	55kg
Max weight of the ROV	6000kg
Usable Volume of Control Fluid	180-200L
Max Output Pressure	10,000psi (689bar)
Max Output Flow	260L/min
Nominal High Flow Output	200L/min@3000psi
Supply Flow	220L/min & 80L/min
Fluid Filters	5 micron
Depth Rating	3000msw
Supply Input Pressure	3000psi



HIGH FLOW TOOLING MANIFOLD

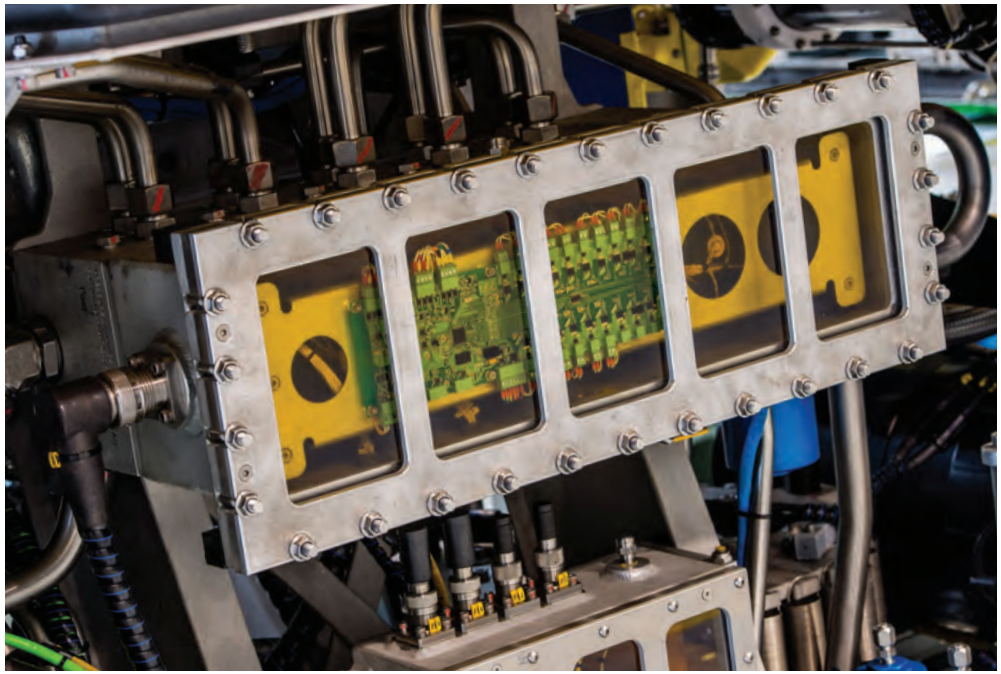
The High Flow Tooling Manifold is a compensated hydraulic manifold that incorporates proportional solenoid operated cartridge valves to create a high flow tooling manifold. The manifold has five functions, four with proportional flow and one with proportional pressure and flow.

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)

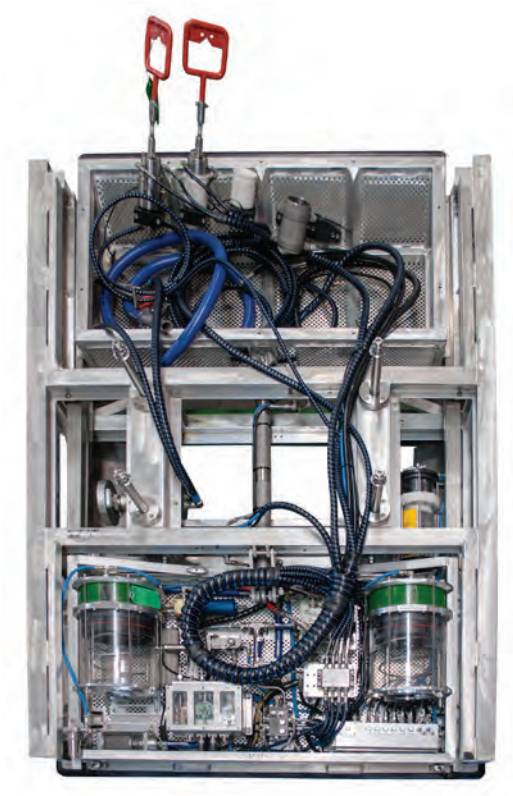


High Flow Tooling Manifold.

TMT TOOLING SKID

The TMT Tooling Skid is installed underneath the ROV and provides dual hot stab functionality and a hydraulically actuated drawer for tool storage. The two dual-port hot stabs provide up to 5000psi each at 20L/min, with a 27L storage capacity. The hot stabs' pressure and flow is controlled, monitored and logged on a custom graphical user interface.

The tooling drawer can provide a mounting point for various tools to be accessed by the ROV's manipulators when the drawer is extended. The TMT Tooling Skid can be fitted with dredging, jetting or other additional tooling systems to suit your needs.



Top view of a TMT Tooling Skid.

FEATURES

- Graphical user interface
- Hydraulically actuated tooling drawer
- 2 x dual port 5000psi hot stabs
- Digital logging
- RS485 comms system
- Water jetting tooling available
- Dredging tooling available
- Easy to install & remove
- Emergency sea water pickup
- Dedicated compensation for electric
- enclosures
- Corrosion resistant materials

SPECIFICATIONS

Length	2790mm
Width	1860mm
Height	490mm
Weight in Air	620kg
Weight in Seawater	350kg
Drawer Payload	250kg
Water Jetting	3000psi, 15L/min
Dredging	810L/min
Max Hot Stab Pressure	0-5000psi (350bar)
Volume of Glycol	27L
Depth Rating	3000msw

The TMT Tooling Skid being attached to a Typhoon MK2 ROV.

TMT PIPE INSPECTION SKID

The TMT Pipe Inspection Skid is a frame that mounts underneath an ROV. The frame is used to assist in subsea pipeline inspections. Rubber rollers, located underneath the skid allow the skid, to travel along the top of the subsea pipeline, allowing for camera inspection.

The skid can be used on a 250-900mm OD pipes and incorporates, by default, the following features:

- Two (2) Manipulators
- Two (2) Pencil Camera, with optional lights available

The Pipe Inspection Skid system components are mounted in a 6082 aluminium skid, which is designed to be compatible with specific ROVs. Various additional sensor packages are available upon request.

TMT can configure the Pipe Inspection Skid to the client's requirements.

SPECIFICATIONS

Length	3171mm
Width	2672mm
Height	1940mm
Weight in Air	367kg
Weight in Seawater	13.6kg
Max weight of ROV & TMS	9500kg
Depth Rating*	Unlimited

*Depending on optional accessories.

FEATURES

- Easy to install & remove
- Corrosion resistant materials
- Field proven
- Flotation
- Two Manipulators
- Two Cameras

BACKPACK FLUID TRANSFER SKID

The TMT Backpack Fluid Transfer Skid allows an ROV to perform fluid injection. The backpack is suitable for wellhead preservation injection of MEG/glycol, acid (HW740R), seawater and other fluids.

The system components are mounted in a lightweight aluminium backpack frame which is designed to be compatible with a range of ROVs. The fluid skid attaches to the aft of the ROV. ROV controlled valving is used to control flow. The standard ROV Aft camera can monitor and the output flow and pressure.

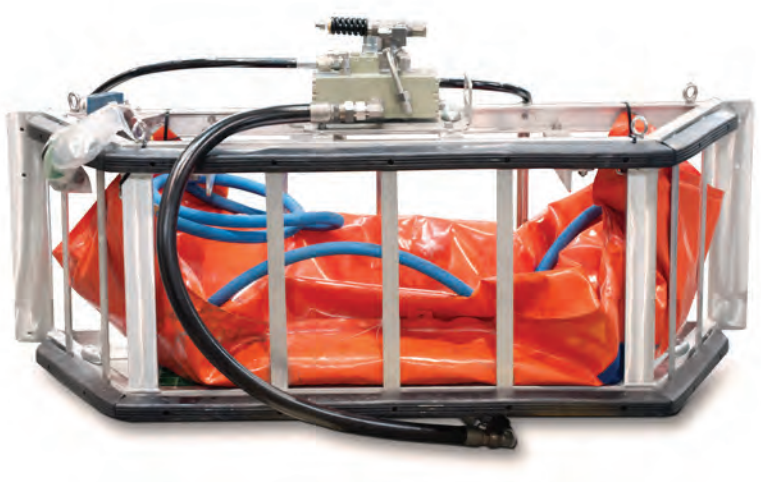
TMT can configure the tool to suit the customer requirements, such a sea water injection switch, additional injection volume and flow metering capability.

FEATURES

- Easy to install & remove
- Easy to transport
- Flow & pressure gauges
- Compact high volume
- Field proven
- In-line fluid filter
- Water, MEG, acid compatible

SPECIFICATIONS

Length	520mm
Width	1550mm
Height	840mm
Shipping Weight	112kg
Weight in Seawater	58kg
Volume of Hydraulic Fluid	160L
Maximum injection flow rate	25L/min
Maximum injection pressure	4500psi (310bar)



TMT FLX SKID

Total Marine Technology has designed and manufactured a new skid for FLX operations. The skid is mounted to the bottom of an ROV by four (4) connection pins. The standard frame is able to be mounted to two different ROV's, Forum XLX-Evo and TMT Typhoon Mk2 150.

The FLX Skid includes a RigMaster manipulator, mounted on the port side of the FLX Core tool on a Z-function mount that can provide a 400mm extension in addition to the approximate 300mm extension of the arm by itself.

The basic features of the FLX skid include:

- FLX Core Tool is able to extend 400mm, roll ±15°, tilt +30/-60°
- Rated to 300msw
- Neutrally buoyant when subsea

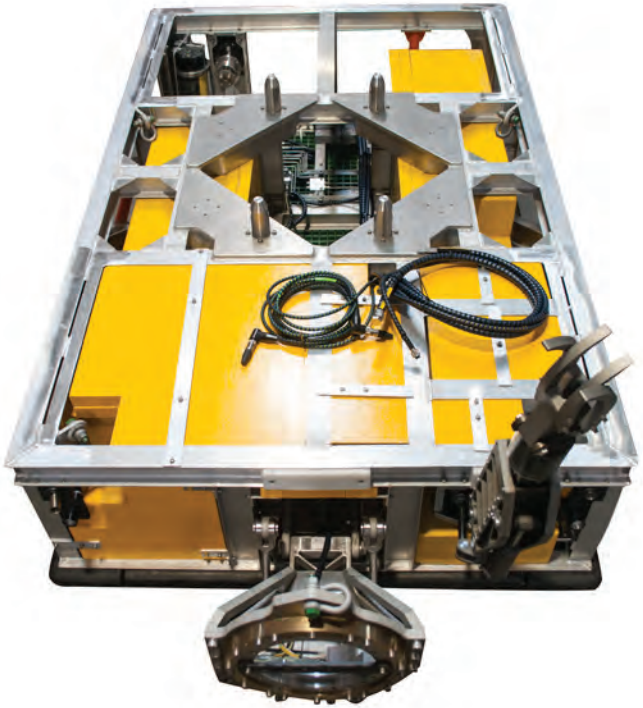
TMT can customise this tool to your requirements, including a higher depth rating if required.

FEATURES

- TMT MK2 ROV or XLX-Evo ROV
- compatible
- Cathodic protection
- Nine (9) hydraulic functions
- Neutrally buoyant in seawater
- Three (3) emergency disconnect
- contingency systems in place
- Retractable FLOT
- DNV certification

SPECIFICATIONS

Length	2830mm
Width	1856mm
Height	1129mm
Weight in Air	1341kg
Weight in Seawater	±20kg
Hydraulic Pressure	3000psi
Depth Rating	300msw



TMT MARINISED miniBOOSTER

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.

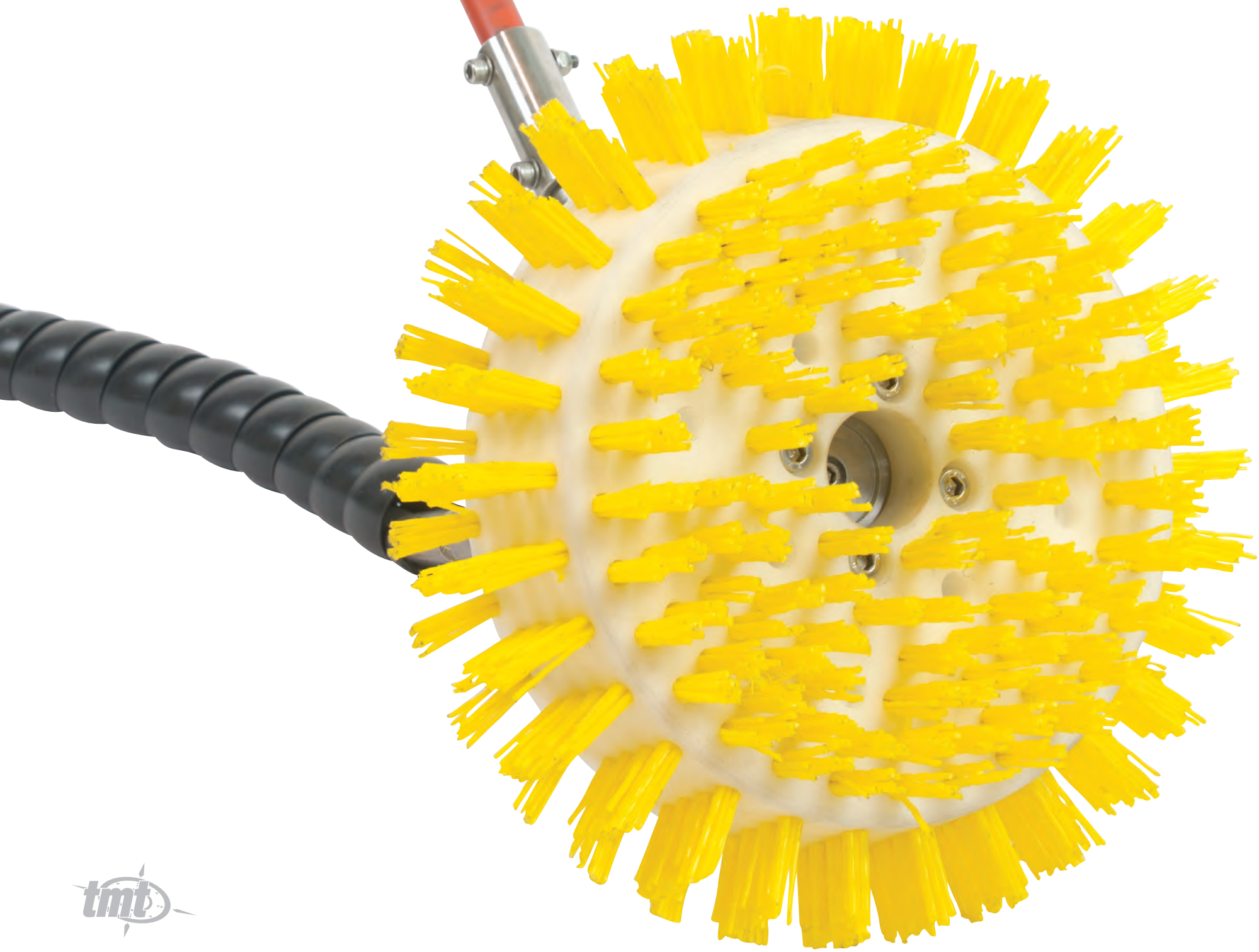
FEATURES

- 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.



TMT HOT STAB RECEPTACLE CLEANER

The TMT 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.

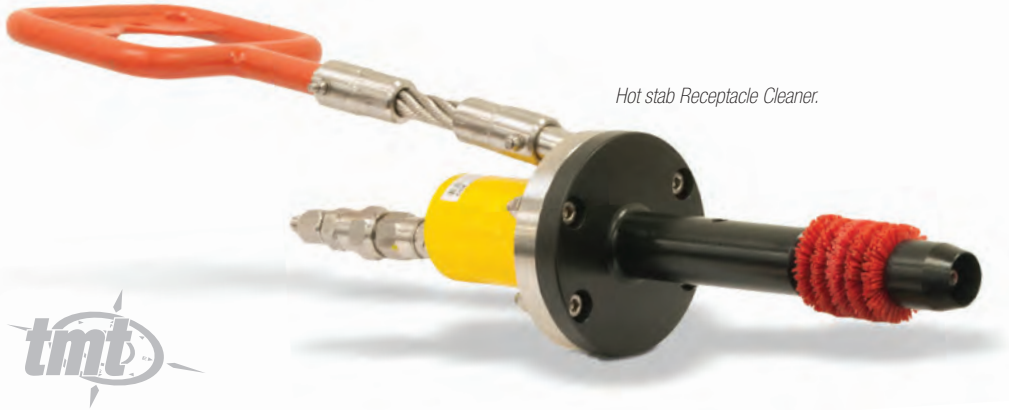
The drive motor is fitted with a check valve to prevent the tool from running in the wrong direction. The tool can be modified by TMT to suit customer requirements.

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 9/16 inch male



Hot stab Receptacle Cleaner.

MULTI-PURPOSE ROTARY TOOL

The TMT Multi-Purpose Rotary Tool is a versatile hydraulic rotary tool for subsea applications. The tool is ideally suited to ROV applications 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
- Cleaning
- Cutting
- Polishing

TMT can customise the Multi-Purpose Rotary Tool to suit the customer requirements.

FEATURES

- Low profile
- Easily transportable
- Corrosion resistant material
- ROV deployable
- Powerful motor
- Multiple accessories
- Removable guards

SPECIFICATIONS

Length	302mm
Width	310mm
Height	260mm
Weight in seawater	8kg
Grinding disc	230mm x 2.2mm
Maximum operating pressure	140bar (2030psi)
Maximum flow	16L/min
Power	1.8kW
Speed	1950rpm
Depth rating	unlimited

Some of the numerous accessories available for the TMT 9 Inch Grinder.

TMT 9 Inch Grinder with brush cleaning attachment and an ROV handle.

AX/VX PROFILE CLEANING TOOL

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.

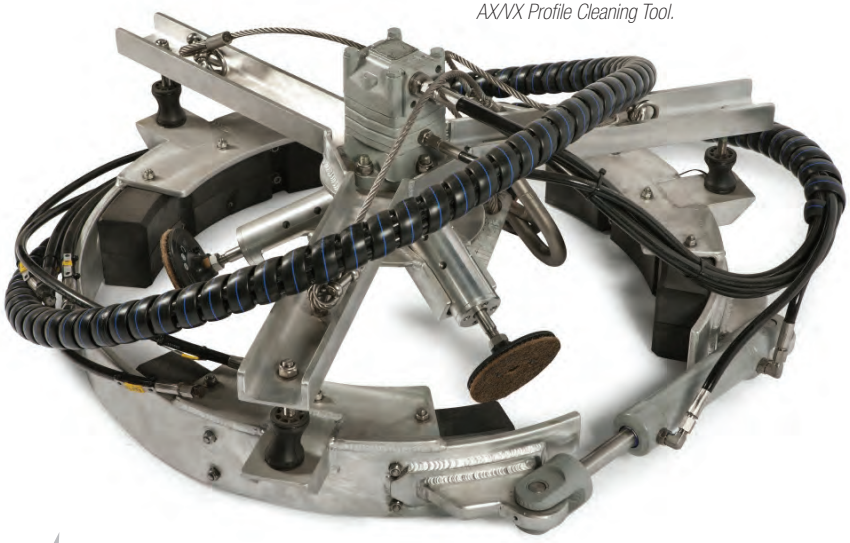
A powerful hydraulic motor and cleaning pads then conform to the surface of the well pipe to create an ultra-clean surface ready for other processes. Variable cleaning pressure can be controlled from the surface.

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.

ANNULUS BORE 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

Annulus Bore Grinder.

TMT HOT STABS AND ACCESSORIES

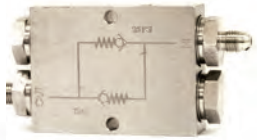















TMT HOT STABS

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 fluids can be used.

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

FEATURES

- ISO and API standards compliant
- Compatible with most receptacles
- Multiple handle options
- 316 or 2205 stainless steel
- Multiple accessories
- 5000 and 10,000psi options
- Pressure balanced
- Custom design and build options available

TMT 6 PORT HOT STAB

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 and 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

TMT 6 Port Hot Stab.

TMT HOT STAB DUMMY

The TMT Dummy Hot Stab is used to plug the female hot stab receptacles when they are not in use.

The Dummy Hot Stab provides hydraulic integrity by blocking contaminants from entering the system. In addition, long term it protects the seals from marine growth, build up.

The TMT Dummy Hot Stab is typically tailored to suit the client specifications.

FEATURES:

- Easy to install and remove
- Corrosion resistant materials
- Plastic or Stainless Steel
- Single to 6 Ports
- Field proven
- One piece dummy or combination of metallic handle and plastic body

SPECIFICATIONS:

Length	401mm
Diameter	97mm
Weight in Air	2.22kg
Weight in Seawater	1.45kg
Handle	ROV D, Xylan Coat
Depth Rating	Unlimited
Standard	API 17H, ISO 13628-8

CEMENT TOP UP STAB

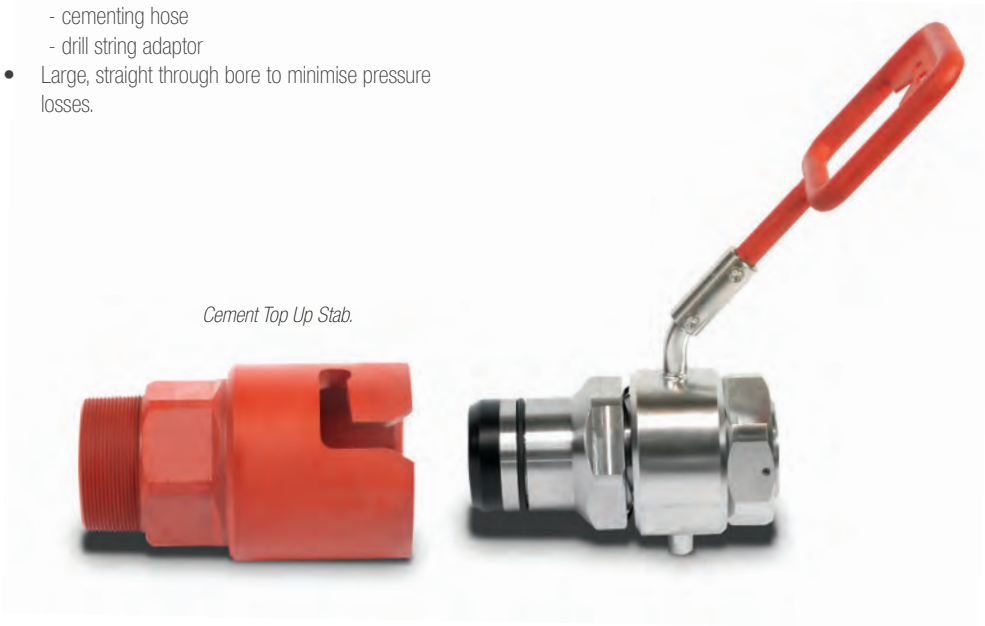
The Cement Top Up Stab is an ROV operated hot stab with a 2" bore that can be used to pump cement into the conductor annulus of a wellhead to correct a poor cementing job. The cement is pumped down to the seabed through a drill string, which is connected to the hot stab using a 15m cementing hose. Prior 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



Cement Top Up Stab.

TMT PETROBRAS HOT STAB

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 and dummy
- Different ROV handle options
- 316 or 2205 stainless steel
- Multiple accessories
- 5000 and 10,000 psi options

SPECIFICATIONS:

Pressure ratings . . . . . 5000 & 10,000psi
Depth rating. . . . . .Unlimited

Male Hot Stab
Length 620mm
Width 125mm
Height. 153mm
Weight in air. 5.1Kg
Weight in seawater 4.4kg

Female Hot Stab
Length 190mm
Width 102mm
Height. 120mm
Weight in air. 6.2Kg
Weight in seawater 5.4kg

Dummy Hot Stab
Weight in air. 2.9Kg
Weight in seawater 2.3kg

Petrobras Hot Stab.

TMT HYDRAULIC ACTUATOR OVERRIDE HOT STAB

The TMT Hydraulic Actuator Override Hot Stab two port tool was developed for a pipeline with 30" Sub Sea Isolation Valve (SSIV) fitted with a hydraulically diver operated actuator at each end. Each valve and actuator is fitted with three hot stabs that allow transfer of fluids by a ROV or diver for maintenance and control purposes.

Actuators have a three element hot stab orientated for vertical makeup and each valve has two separate single element hot stabs, one orientated for vertical and one for horizontal makeup. The hot stabs are upgraded to industry standard components suitable for use by divers or ROV.

The hot stab designs are based on ISO 13628-8:2002 10k 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 Hotstab Receptacle
- 1 x 1 Port ISO hot stab receptacle
- Acetal parking receptacle

SPECIFICATIONS

Length 208mm
Width 208mm
Height. 800mm
Weight - 1 port 18kg
Weight - 2 port 25kg
Depth rating. 3000msw
Pressure rating. . . . . .5000 / 10,000psi (345/689 bar)
End ports . . . . . .½" Swagelok

Dual Port TMT Hydraulic Actuator Override Hot Stab equipped with dummy hot stabs.

TMT MINI DREDGER

The TMT Mini Dredger is the ideal tool for jetting (blowing) small amounts of material from external wellhead equipment such as wellhead sealing profiles, or clearing cement dust from bullseyes and other external equipment. Reverse the motor and you are then able to dredge (suck) material from internal sealing areas such as the wellhead top seal and around the tubing hangar.

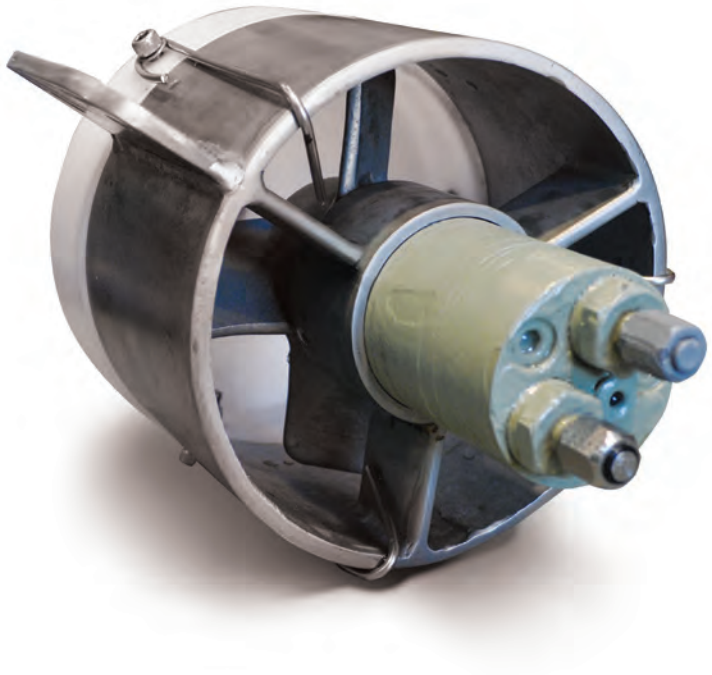
The TMT Mini Dredger is extremely rugged and designed to last, with a simplistic design that is easy to service, operate and maintain.

FEATURES

- Hydraulically driven
- Variable speed jetting and dredging
- ROV D handle for manipulator operation for hose and dredger
- 316 stainless steel body and propeller drive
- Non corroding Acetal nose cone
- Nose cone adaptors to suit hose sizes 1" to 3"
- Non-metallic suction end for wellhead contact areas

SPECIFICATIONS

Diameter 230mm
Length 300mm
Weight in air. 6kg
Weight in seawater 4kg
Maximum input hydraulic pressure 207bar
Hydraulic hose set . . . . . .7/16JIC – 3/8 hose
. . . . . 7/16JIC x 4,000mm
Suction hose set. . . . . 1", 2" and 3" x 2000mm



TMT MEGA DIGGER

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 HYDRAULIC LOW PRESSURE JET PUMP

The TMT Hydraulic Low Pressure Jet Pump uses a hypro hydraulically driven centrifugal pump, which is connected to a custom designed nozzle by a flexible two (2) inch hose. This jetting pump is typically fitted to the TMT Tooling Skid (TMT-NSS-200 Typhoon MK2 Fluid Transfer Skid) and forms part of the TMT dredging and jetting suite of subsea tools. It is easily handled by ROV manipulators using the integrated D-handle.

The TMT Hydraulic LP Jet Pump is excellent for cleaning drill cuttings from around sensitive completion areas.

TMT can customise this tool to your requirements.

FEATURES

- Fast and efficient jetting
- Smooth and reliable hydraulic pump
- Corrosion resistant materials
- Easy to install & remove
- Stainless steel filter grill
- Integrated D-handle for ROV control

SPECIFICATIONS

Length	410mm
Width	235mm
Height	253mm
Max Flow Rate	214gpm
Max Pressure	150psi
Ports	2" NPT inlet
	1" NPT outlet
Hydraulic Ports	½" NPT inlet
	¾" NPT tank
Hose	2" (51mm)

TMT 420 WATER BLASTER

The TMT 420 Water Blaster Tool supplies a high pressure jet of sea water that can be used to clean subsea equipment. The ROV supplies hydraulic fluid power to the unit, which drive the reciprocating pump to deliver seawater at an intensified pressure.

A cleaning lance is provided with the pump that the ROV uses with its seven (7) function arm to clean as required. Different nozzles, including a turbo nozzle and flat fan nozzle in different jet angles are provided together with the tool to be able to meet different cleaning requirements.

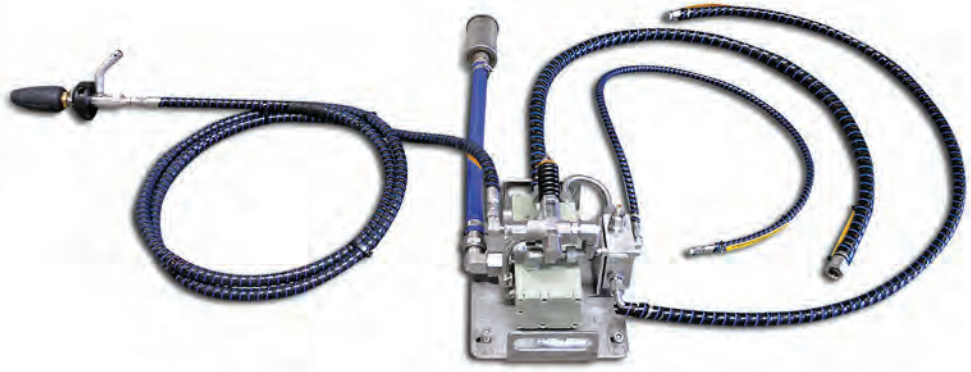
TMT can configure the Water Blaster to suit your requirements.

FEATURES

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

SPECIFICATIONS

Length	250mm
Width	150mm
Height	100mm
Weight in Air	40kg
Weight in water	35kg
Pumping Power	14kW
Output pressure	6000psi
Output flow	20L/min
Input pressure	3100psi
Input flow	20L/min
Depth Rating	3000msw




There is only one company designing
and building Work Class ROVs in
Australia - Total Marine Technology.

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

Length	2450mm
Width	1590mm
Height	1449mm
Weight in air	664.4kg
Weight in water	575kg
Depth rating	unlimited

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.

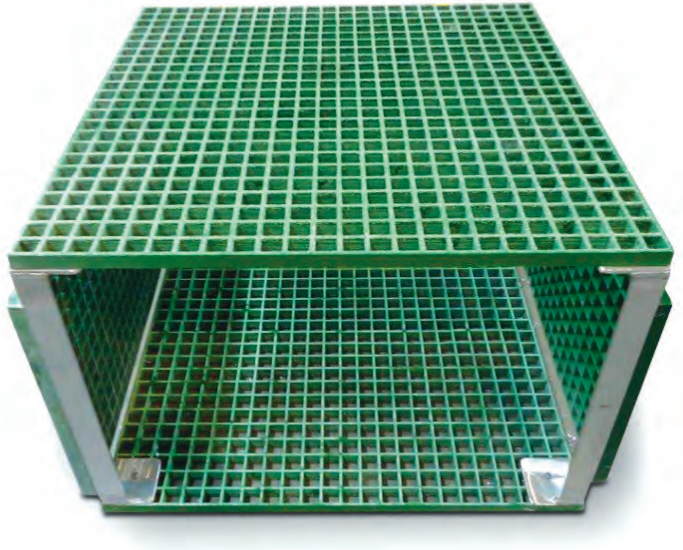
TMT can build tooling baskets to your requirements.

FEATURES

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

SPECIFICATIONS

Customised to requirements



The TMT Typhoon MK2 System Integration Test ROV.

TMT SYSTEM INTEGRATION TEST (SIT) TYPHOON ROV

The TMT System Integration Test (SIT) Typhoon ROV, sometimes 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 into 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.

HYDRAULIC CONNECTIONS

- 21 x 16L/min hydraulic functions
- 3 x 8L/min hydraulic proportional functions
- 3 x 40L/min hydraulic functions

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 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 and 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
- Integrated air blaster cooler and on demand marine grade water oil heat exchanger

SPECIFICATIONS

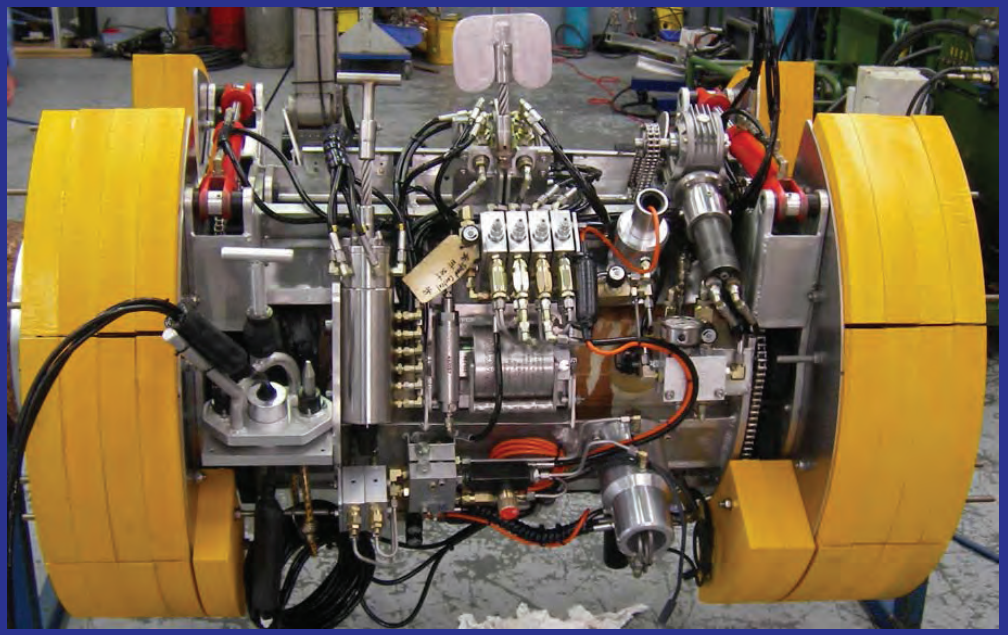
Length	3.5m
Width	1.9m
Height	2.4m
Weight in air (approx.)	1700kg
Through frame lift	3.5T

HPU SPECIFICATIONS

Pressure	210bar (3946bar)
Flow	40L/min
Tank capacity	180L
Power	18.5kW

Controlling the System Integration Test ROV.

TMT X-RAY PIPE INSPECTION TOOL



The TMT X-Ray Pipe Inspection Tool is capable of both X-ray and ultrasonic imaging of pipe.

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 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 a hydraulicly operated clamp and rotates 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 of the weld, both Time-Of-Flight Diffraction (TOFD) and Phased Array.

The tool has a hydraulically operated clamp and rotates 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.

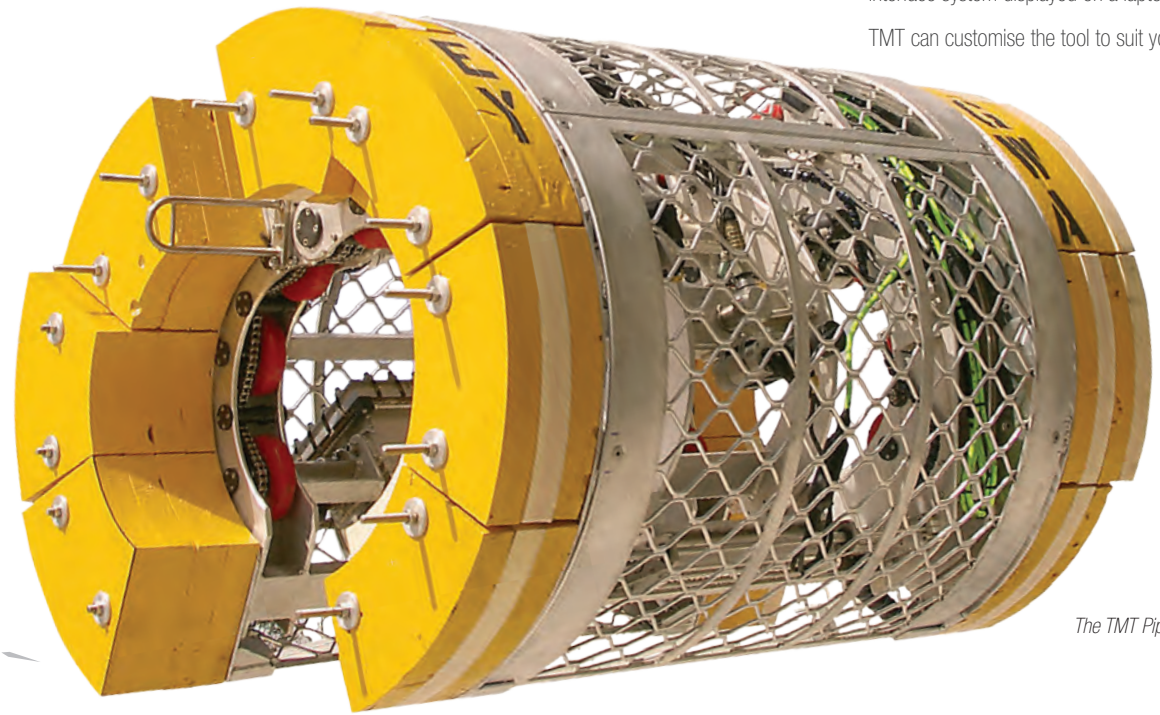
TMT can customise the tool to suit your requirements.

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



The TMT Pipeline Inspection Tool.

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

3-Way Hydraulic Ball Valve.

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 stainless steel 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

2-Way Hydraulic Ball Valve.

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 90º.

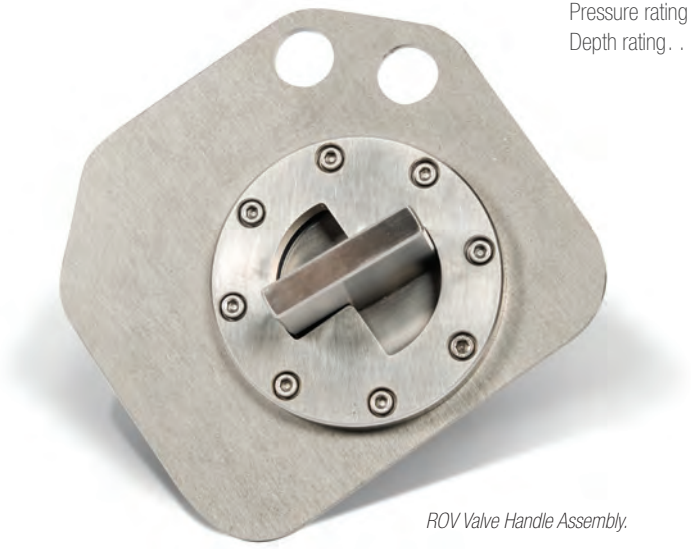
The Valve Handle Assembly is available in two different sizes, depending on the size of the assembly that the valve is being installed on, and a wide variety of ball valves can be used with the handle.

FEATURES

- Corrosion resistant stainless steel components
- Compact and easily operated by an ROV
- 90º operation
- Protection against stem overloading
- Variety of ball valves, from ¼" to ½" bore
- Standard and compact size available
- Easily mounted onto an ROV tool or panel

SPECIFICATIONS

Dimensions - standard	140L x170W x170Hmm
Dimensions - compact	135L x105W x105Hmm
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 Handle Assembly.

ROV VALVE

The TMT ROV Valve is a robust adapter between delicate valve stems and the ROV hydraulic arms. It de-couples 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 are based on the valve size selected.

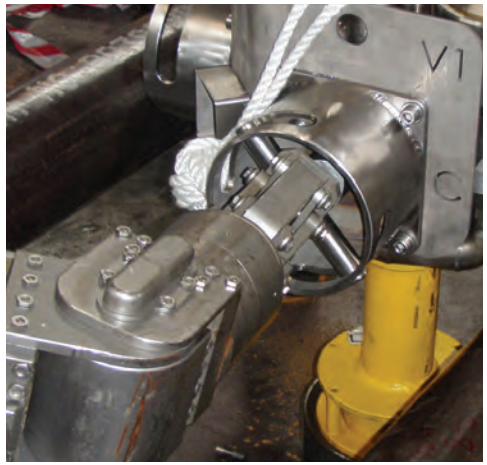
FEATURES

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

SPECIFICATIONS

Length	170mm
Width	175mm
Height	220mm
Weight in air	9kg
Weight in seawater	6kg
Valve size	¼" - 2"
Operating torque	8-15Nm (½" – 1¼" ball valve)
Break torque	>2000Nm
Depth rating	unlimited

TMT ROV Valve.



Valve being operated by an ROV manipulator.

TMT 2.4L COMPENSATOR BOTTLE

The TMT 2.4 Litre Compensator Bottle is used to maintain compensation oil pressure. The Compensator Bottle acts as a spring-loaded accumulator to maintain an approximate compensated oil pressure of 3.5psi (0.25bar) when empty to 13.5 psi (0.95bar) when full, using the standard four (4) spring configuration. These pressures can be halved by using two (2) springs in the Compensator Bottle.

The compensator allows for volumetric expansion and contraction of fluids in compensated housings due to changes in temperature and pressure.

The Compensator Bottle can be configured, so it is easy to fill or empty, using quick connect / disconnect fittings. No special tooling or jigs are required for reassembly or disassembly of the Compensator Bottle. This makes the compensator very safe, as normal disassembly removes all of the tools stored spring energy.

A 15 or 20psi pressure relief valve is fitted to prevent over-pressure.

The Compensator Bottle shown includes the optional Linear Level Sensor.

The TMT 2.4 litre Compensator Bottle can be customised to suit most applications.

FEATURES

- Safe disassembly
- Corrosion resistant materials
- Spring loaded
- Pressure relief valve (20psi)
- Optional linear sensor
- Anodic protection
- Field proven
- Easy to install and remove
- Mounted horizontally or vertically

SPECIFICATIONS

Dimensions
Diameter 187mm
Height 375mm
Weight in Air, empty* 7.6kg
Weight in Seawater, empty* 4.6kg
Spring combination pressures
Full 2 springs / 4 springs . . . . . .~6.75 / 13.5 psi
Volume 2.4L
Fluid connector . . . . . .7/16 JIC
Electric Cable . . . . . Impulse 3 Pin 1/2-24"
Depth Rating . . . . . .Unlimited

*Including the fittings and the level sensor.

TMT 15L COMPENSATOR BOTTLE

The TMT 15 litre Compensator Bottle is used to maintain compensation oil pressure. The Compensator Bottle acts as a spring-loaded accumulator to maintain compensated oil in the pressure range of 3psi (0.2bar) when empty, to 6.5 psi (0.45bar) when full and using the standard spring configuration, above ambient depth pressure and will also allow for any temperature changes.

The TMT 15L Compensator Bottle can be supplied configured with three (3) different spring combinations, resulting in the following fluid pressures of 1psi (0.07bar), 3psi (0.21bar) and 6.5psi (0.45bar) when full.

The Compensator Bottle is easy to fill or empty, through the quick connect/disconnect fittings.

A pressure relief valve is fitted, preventing over-pressure. The Compensator Bottle can be fitted with an optional level sensor.

The TMT 15 litre Compensator Bottle can be customised to suit most applications.

FEATURES

- Easy to install and remove
- Corrosion resistant materials
- Spring loaded
- Pressure relief valve (10psi)
- Optional linear sensor
- Anodes attached
- Field proven

SPECIFICATIONS

Diameter 328mm
Height 472.5mm
Weight in Air (oil filled) 20.75kg
Weight in Seawater (oil filled) 9.8kg
Spring combination pressures
when full . . . . . .1/3/6.5 psi
Volume 15L
Depth Rating . . . . . .Unlimited

TMT CASING HANGER GAUGE

Within subsea oil and gas wells, the casing hangers and various sleeves are locked into place using locking rings. These locking rings are actuated when the casing hanger is installed; however it is sometime necessary to verify that these locking rings are still in the correct place, in case they have been inadvertently unlocked.

The Casing Hanger Gauge Tool is an ROV tool that allows the depth of the Casing Hanger below the subsea tree housing to be checked. The ROV lowers the tool into the subsea well and the gauge lands out in the casing hanger. The ROV then measures this distance between the casing hanger and the subsea tree datum to determine whether the casing hanger is still in the locked position.

TMT can modify the tool to suit your requirements.

FEATURES

- Low maintenance
- Field proven
- ROV delivered
- Corrosion resistant materials

SPECIFICATIONS

Diameter 664mm
Length 4203mm
Weight in Air 110kg
Weight in seawater 67kg
Maximum Gauging Depth. 3892mm
Depth Rating . . . . . .unlimited

The TMT Casing Hanger Gauge.

EFFER CRANE

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 seven 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 17,000kg
Outreach 19.69m
SWL. . . . . .Load chart is available on request
DNV 2.7-3
Portable offshore unit for base Type B Class R30.

The Effer 1355 8s Picker Crane.

DOCKING PROBE

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

Docking Probes.

TMT ISO DOCKING PROBE FRAME

The TMT Docking Probe Frame is an intervention system for station keeping and firmly attaches a ROV to an underwater structure preventing the ROV from moving during the execution of tasks and provides a positive location for the repeatability of tasks, as per ISO 13628-8.

The Docking Frame is 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 are being handled i.e. jumper slabs or where many interfaces are close together i.e. in a panel. The TMT Docking Frame is easily installed or removed.

TMT can modify the Docking Frame to suite the client's requirements.

FEATURES

- Compact design
- Probe hydraulically operated
- Corrosion resistant material
- Positive pull-in action
- Spring return – fail safe
- Easy to installed or removed

SPECIFICATIONS

Length	1702mm
Width	350mm
Height	180mm
Probe Axial Load	3000kg
Probe Interface	ISO 13628-8
Weight in Air	59kg
Weight in Seawater	38kg

TMT ISO Docking Probe Frame.

FLEXIBLE FLUID TANKS

The TMT Flexible Fluid Tank.

TMT 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 ¾ 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 Tanks can be used as part of an ROV fluid transfer skid.

TMT FLEXI JOINT

The new TMT Flexi Joint for ROV handles can transfer torque that unlike the standard wire rope used for joints, has a higher stiffness in bend so it can be used for handling heavy tools like large hot stabs and torque tools.

The Flexi Joint can also use different types of flexi element and achieve different stiffness's as required.

The Flexi Joint doesn't get damaged with extreme side loads (dissimilar to wire rope ones), as angular bend is limited to 10º in all planes and metal to metal stop will prevent it from too much deformation and potential damage.

The Flexi Joint body is made of SS316, the pin is 2205 and the Flexi Element is polyurethane, Duro 70 or 90.

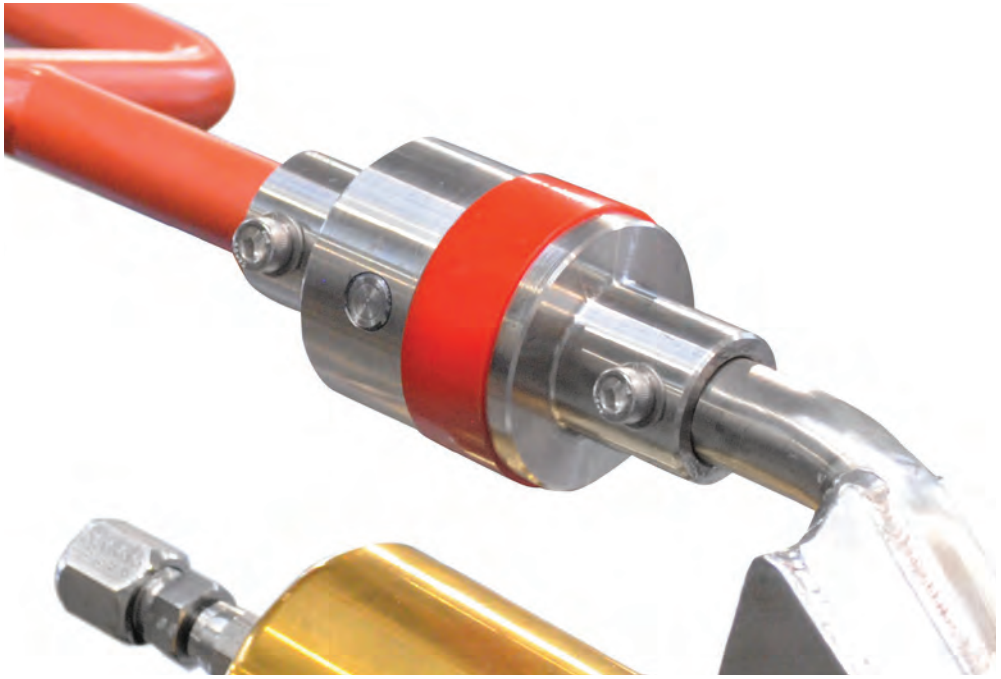
TMT can configure the tool to the customer requirements.

FEATURES

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

SPECIFICATIONS

Length	78mm
Diameter	72mm
Weight in Air, excluding handle	~0.78kg
Weight in Seawater	~0.66kg
Max Rotation in any direction	10º
Max Pull & Push Force	5000N
Depth Rating	3000msw
Max Torque	60Nm
Stiffness Factor- Shore 90PU	4.4Nm/Degree



GENERAL ELECTRICAL ENCLOSURES

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

TMT CONTROL CONSOLE

An example of the TMT ROV Training Simulator software for use with the pilot console for training or mission simulation.

The Pilot Control Console provides the operator control of the ROV. The console is a carbon fibre shell with movable control panel modules that can be customised to suit the type of job that the particular vehicle is doing, or to the operator's preference.

The Pilot Control Console consists of two (2) operator positions. Normally, the right side is used for piloting the Typhoon ROV and the left side for operating the TMS, manipulator, winch remote panel on the Co-pilot side and other subsystems or tools.

TMT can modify the Pilot Console to suite the client's requirements.

FEATURES

- Corrosion resistant material
- Multiple screen display
- Total of 13 monitors available
- Adjustable height of console & displays
- Ease of installation and servicing
- Cup holders are standard

SPECIFICATIONS

Length	2422mm
Width	1395mm
Height	2107mm
Weight	291.3kg
Control spaces	18
42" Monitors	2
17 " Monitors	5
Touch Screens	2
4" Monitors	4

Controllers can be changed for different applications


TOTAL MARINE TECHNOLOGY

PASSIVE CURSOR SYSTEM

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

TMT GRABBER ARM

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 Grabber Arm is used to attach to a structure to allow the vehicle to hold position.

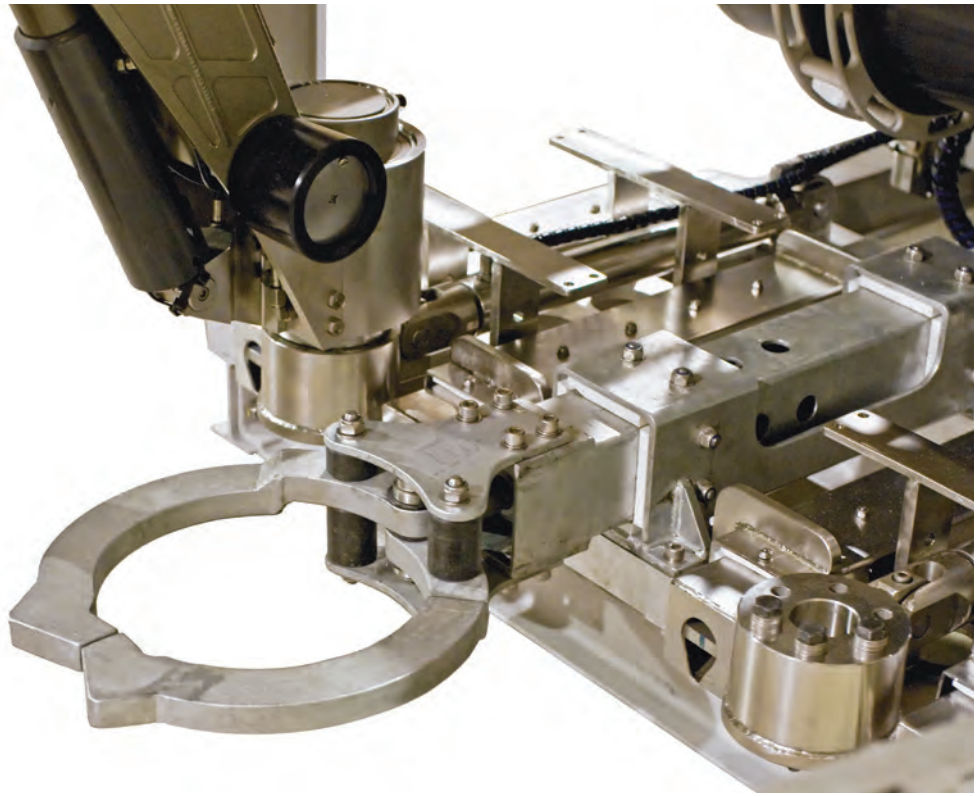
The Grabber Arm can also be used as a platform to deploy various TMT tools. The use of the arm can free up other manipulators for performing other work.

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



TOTAL MARINE TECHNOLOGY MANIPULATOR HIRE

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

IMENCO MANIPULATOR JAWS

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

Imenco 3 and 4 finger manipulator jaws.

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

Weight in air	54kg
Weight in seawater	38kg
Lift at full extension	68kg
Maximum lift, nominal	250kg
Maximum gripper opening	97mm
Grip force, nominal	4,448N
Wrist torque	205Nm
Wrist rotate continuous	6-35rpm
Maximum reach	1,532mm
Depth rating	6,500msw

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

Weight in air	64kg
Weight in seawater	48kg
Lift at full extension, boom retracted	270kg
Lift at full extension, boom extended	181kg
Maximum lift, nominal	273kg
Maximum gripper opening	284mm
Wrist torque	205Nm
Wrist rotate	360º
Maximum reach, boom retracted	1,067mm
Maximum reach, boom extended	1,372mm
Depth rating	6,500msw

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 preform 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

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

Controller

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

TMT GAUGE TESTER

TMT Gauge Tester.

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

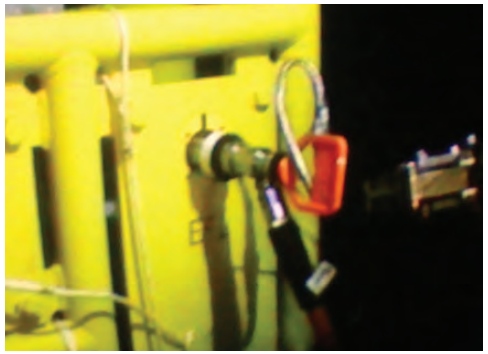
- Easily fitted
- Data logging capability
- Field proven
- High pressure output
- Configurable interface options:
- X Tree standalone
- Reeler cable and X Tree
- X Tree through an ROV interface (without reeler)
- Simulation node for testing and verification

INTERFACE OPTIONS

- RS232
- RS485
- Ethernet

PROTOCOLS AVAILABLE

- Modbus
- TCP/IP
- Customised



A TMT Gauge Tester subsea.

The interface for monitoring the TMT Gauge Tester.

COLOUR ZOOM AND FOCUS CAMERA

A TMT Colour Camera alongside an LED light mounted on a pan and tilt module.

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 TMT 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 FCB-IX11A/FCB-IX11AP Block

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	½s to $\frac{1}{10,000}$s (22steps)
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	3.6kg
Depth rating	3000msw
Minimum illumination	0.0004lux
Number of pixels	440K Pixels
Shutter speed	⅛s to $\frac{1}{10,000}$s (22 Steps)

A TMT Low Light Camera combined with a TMT LED Light and installed on a Pan and Tilt module.

TMT LED LIGHT

A TMT LED Light.

The TMT 24Vdc 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 combined with a TMT Pan and Tilt modules to allow operators to look around whilst subsurface.

FEATURES

- Uses LED technology
- Easy to install & remove
- Corrosion resistant materials
- High light density
- Over temperature protection
- Wide angle lens
- Field proven to 3100msw
- Anode attached

SPECIFICATIONS

Length	120mm
Diameter	50mm
Weight in seawater	0.45kg
Voltage	20-30VDC
Power consumption	<15Watts
Quad CRE XPG LEDs	700lumens
Connector	LPMBH-4-MP
Depth rating	3000msw
Light Dimmer Controlled	RS485 Serial

A TMT LED Light and camera in a fixed ROV mount.

CEMENT DETECTOR

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.

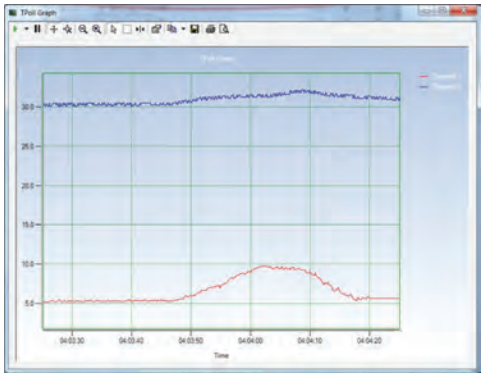
FEATURES

- 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.)

Cement Detector with ROV handle.



Cement Detector data graph.

TMT COMPACT TOOLING MANIFOLD

The TMT Compact Tooling Manifold (CTM) is a compact hydraulic manifold that incorporates Wandfluh NG3 valves either switching or proportional. The variety of possible configurations is huge, thus providing an extremely flexible solution to a multitude of different subsea tooling applications.

Its ease of use makes it user friendly and the small size saves valuable space and weight. The CTM supports up to eight (8) functions.

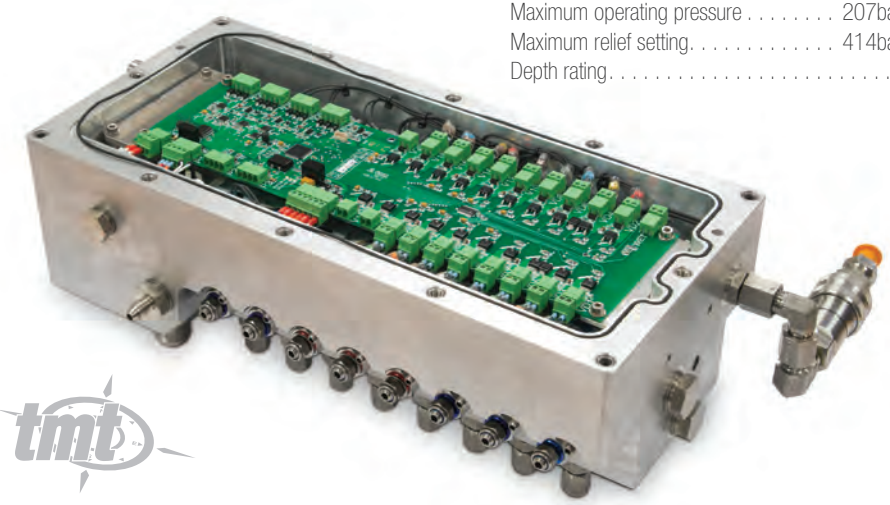
TMT can customise the manifold to suit specific customer requirements, the number of functions can be increased or decreased.

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

Length	395mm
Width	200mm
Height	170mm
Weight in air	19kg
Weight in seawater	12kg
Number of functions	8
Maximum inlet flow	60L/min
Maximum flow per function	15L/min
Maximum operating pressure	207bar (3002psi)
Maximum relief setting	414bar (6005psi)
Depth rating	unlimited



250M DROP CAMERA SYSTEM

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

250m Drop Camera system.

KONGSBERG DIGITAL CAMERA AND FLASH

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 an 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 cameras framing video to be displayed on the PC.

The USB2 or Ethernet link for "On the Fly" communication and rapid image upload over 10 kilometres of fibre optic cable is incorporated 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 x2736 to 640 x480 pixels
Scene illumination	1 Lux
Signal to noise ratio	>41dB
Power input	Constant Voltage 16V - 24VDC
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

The Kongsberg Digital Camera and Flash.

PENCIL VIDEO CAMERA

The TMT Pencil Camera is a low power, high resolution colour pencil camera allowing operators to maintain observation of fixed areas cheaply and effectively. This type of camera is perfect to provide fixed position views.

Features include automatic white balance, automatic electronic shutter and automatic gain control to ensure best exposure and image quality as illumination levels change.

The small size is ideally suited for ROV manipulators and various tooling applications. The camera is easily clamped into location or can be combined with a Pan and Tilt module to allow operators to look around whilst underwater.

FEATURES

- Easy to install and remove
- Rugged aluminium casing
- SONY Super HAD II CCD Image Sensor

SPECIFICATIONS

Length	80.5mm
Diameter	21.5mm
Weight in air	0.65kg
Depth rating	1000msw
Minimum illumination	0.3lx (approx.)
Wide angle lens	3.6mm

TMT Pencil Camera.

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

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

TMT DENSITOMETER

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 slimline 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

Densitometer readings are displayed on the operators screen.

MINI ROV SYSTEMS
LBV150

The SeaBotix LBV150-4 is an affordable streamlined MiniROV system. This class of ROV is sometimes called a suitcase ROV because of its portability.

It can be transported, launched and controlled by a single person. 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 LBV 150.

LBV300

The SeaBotixLBV300-6 is a well-rounded ROV system for all inshore applications. This 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. Like the LBV150 it can be operated by one person.

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

The LBV 300.

DIGITAL VIDEO RECORDER

The EdgeDVR is a complete solution for digital video inspections. Developed to be used by personnel with all levels of experience when completing visual inspections on subsea structures which require real-time event logging. Simple to use and full of very useful features. It has a proven history of reliability.

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 instant 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

Dimensions	4U Rack Mounted
Ports	4x USB 2.0
	2x USB 3.0
	Gigabit LAN
	4x Composite 75 Ohm BNC
	4x 9pin Serial Inputs
	Keyboard and Mouse Inputs
Storage	3 removable hard drive slots
	2x 1TB hard drives

Edgetech DVR rack mount unit.

Edgtech interface.

DIGITAL STILL 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

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

Imenco Tiger Shark Digital Camera.

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

Weight	1.33kg
Housing material	stainless steel
Accuracy	0.01%
Calibrated temperature range	-2 to 4ºC
Hysteresis	≤±0.01 Full Scale
Repeatability	≤±0.01 Full Scale
Over pressure	1.2x Full Scale
Thermal sensitivity	<0.0008% Full Scale ºC
Input voltage	+6 (Min) to +16 VDC
Output signal	RS-232 or RS-485
Depth rating	7000msw

Digiquartz Depth Sensor.

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 17" long. This allows easy helicopter transportation for last minute projects and achieves a 3,000msw depth rating with a total pod weight of less than 27kg. Installation is an easy one-man operation.

FEATURES

- Easy to install and remove
- Robertson SKR82 gyro
- Small size
- Topside control system
- High accuracy

SPECIFICATIONS

POD

Length	487mm
Diameter	228mm
Weight in air	27kg

DISPLAY UNIT

Length	240mm
Width	180mm
Height	90mm

Settling Time	45 minutes
Settling Point Error	±0.5ºx sec. latitude
Repeatability	±0.25ºx sec. latitude
Dynamic	±0.7º rms
Pitch & Roll accuracy	0.05º
Temperature Accuracy	0.5ºC
Depth Accuracy	0.25%FSD
Gimballing System - Range	95
Depth Rating	3000msw

CDL MicroGyro.

Data Display Unit.

CATHODIC PROTECTION: 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

PMAC CP Probe.

ACOUSTIC PIPELINE 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.

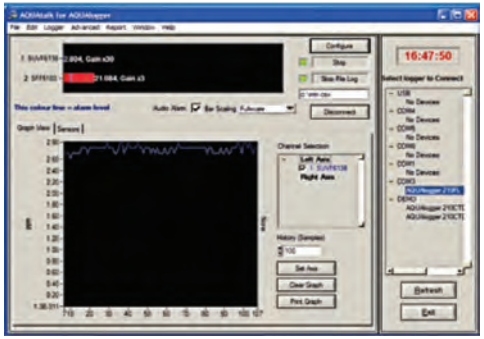
The sensors are connected to a processor board that is mounted within a pressure housing mounted on the ROV. The processor produces data in RS232 and RS485 (operator selectable) format for transmission to the surface via the ROV umbilical. Power is supplied by the ROV (12 to 30VDC). For diver operations, 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	2000msw



Leak Detection System output screens.

TRITECH BATHY SUITE

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

Length	262mm
Diameter	110mm
Weight in air	4.2kg
Weight in seawater	2.1kg
Communication	ARCNET, RS232
Power Input	24-28VDC @ 8VA
Material	Anodised Aluminium Alloy
Depth Rating	700 to 4000msw

Tritech SeaKing 700 Integrated Sensor Suite.

VALEPORT CURRENT METER

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

Length	350mm
Diameter	92mm
Weight in seawater	
Acetal	0.5kg
Titanium	3.5kg
Class 4	1½ inch socket
Units	m/s
Range	±5m/s
Accuracy	0.01m/s +1%
Resolution	0.001m/s

Valeport Current Meter.

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.

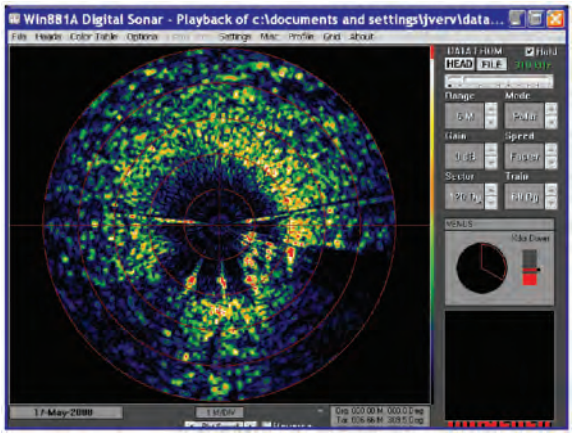
High performance, lower cost, low power and simple set-up and installation make this sonar perfect for any ROV from the largest work class models to the smallest inspection ROVs, AUVs or UUV applications.

FEATURES

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

SPECIFICATIONS

Length	182mm
Diameter	79.4mm
Weight in air - 1000msw	1.5kg
Weight in air - 3000msw	2.0kg
Weight in seawater - 1000msw	0.6kg
Weight in seawater - 3000msw	1.1kg
Frequency	310kHz, 675kHz or 1MHz
Range resolution	1m - 4m: 2mm
	5m & up: 10mm
Minimum detectable range	150mm
Maximum cable length	1000m
Material (1000msw)	Aluminum
Material (3000msw)	Titanium
Depth rating	1000msw and 3000msw



Imagenex 881 Sonar module and interface screen.

TRITECH MICRON SCANNING 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	324g
Weight in seawater	180g
Frequency	CHIRP centred on 700kHz
Range resolution	~7.5mm
Mechanical resolution	0.45°, 0.9°, 1.8°
Scanned sector	Variable up to 360°
Maximum cable length	1000m
Power	12 - 48VDC at 4VA
Communication	RS485 (twisted pair), RS232
Depth rating	750/3000msw

Tritech Micron Sonar.

VORTEX LIQUID AND 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
Funnel 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)	8700ps
Puncture force	260N

*Limited by ratings of valves and gauges

Vortex Gas Sampling Tool.

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.

Tritech Super SeaKing Sonar.

FEATURES

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

SPECIFICATIONS

Length	757mm
Weight in air	3kg (aluminium)
Weight in water	1.4kg (aluminium)
Materials	Anodised aluminium alloy
Depth rating	4000m standard
	6800m optional
Temperatures	Operating: -10 to 35°C
	Storage: -20 to 50°C

Tritech SCU.

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 350 Cable Tracker

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


tmt
Marine Techno
TYPHOO

IMENCO GUIDE WIRE ANCHOR

The Imenco 22,000lbs Guide Wire Anchor is compatible with an 8⅝ 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 Guide Wire Anchor

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

Imenco Slim Line Guide Wire Anchor

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	4xWLL
Depth rating	Unlimited

5.4T Long Shank Hook.

12T PLATE CLAMP

The TMT 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

12 Tonne Plate Clamp with ROV handles.

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 pins. 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.) 6kg

TMT 12 Tonne ROV Shackle.

TMT ROV SHACKLES, 125 AND 85TE

The TMT ROV friendly shackle modifications are a cost effective engineered solution to install and remove standard Green pin and sling saver shackles subsea.

The modification has a positive shackle pin guide that provides ease of operation by an ROV manipulator to engage or disengage the shackle pin. The engage pin is held in place by manipulator installation of a keeper pin with gravity operate dog to assure that the accidental disengagement of the shackle pin does not occur.

The shackle bow is not modified in our design and a simple load test is all that is required to re-certify the modified shackle assembly.

TMT modification as shown here is 85te Green Pin Safety Shackles and 125te sling saver safety shackles however our design can be modified quickly to suit shackles of higher or lower ratings.

TMT product number is:

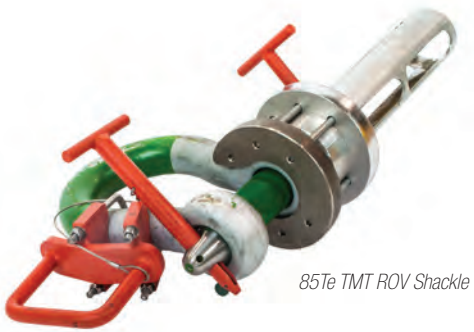
- 125Te ROV Shackle: TMT-0013-2115
- 85Te ROV Shackle: TMT-0013-2336

FEATURES

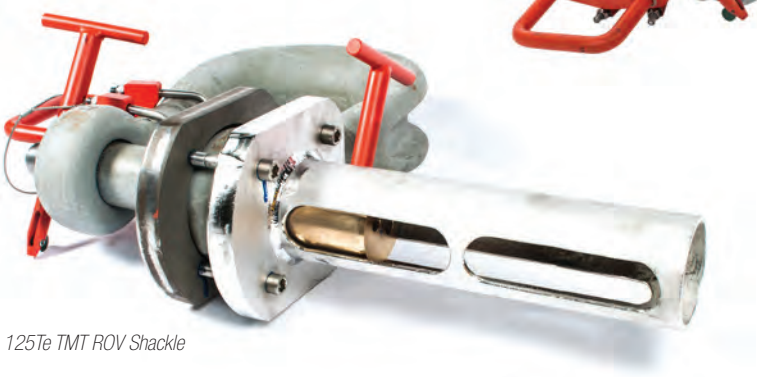
- ROV positioned and operated
- Adoptive and cost effective

SPECIFICATIONS

Dimensions – 125Te	627H x 1006L x 310Wmm
Dimensions – 85Te	475H x 1023L x 314Wmm
Weight in Air– 125Te	125kg
Weight in Water– 12Te	109kg
Weight in Air – 85Te	78.4kg
Weight in Water – 85Te	69kg
Depth Rating	Unlimited



85Te TMT ROV Shackle



125Te TMT ROV Shackle

SUBSEA WINCH

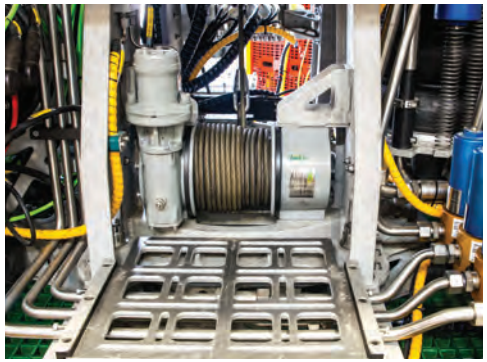
This hydraulic subsea winch is capable of moving loads of up to 3.6 tonnes and using varying lengths and sizes of wire ropes. The winch is of heavy duty construction and various sizes are available. This winch is also used on TMT ROV's for clump weight management.

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



Clump weight management on a Typhoon ROV using the TMT Seabed Refernce Positioning System (SRPS).

Subsea winch.


NORMAND CLOUGH

SAPURA ENERGY WELL SERVICES

Sapura Energy Well Services 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.

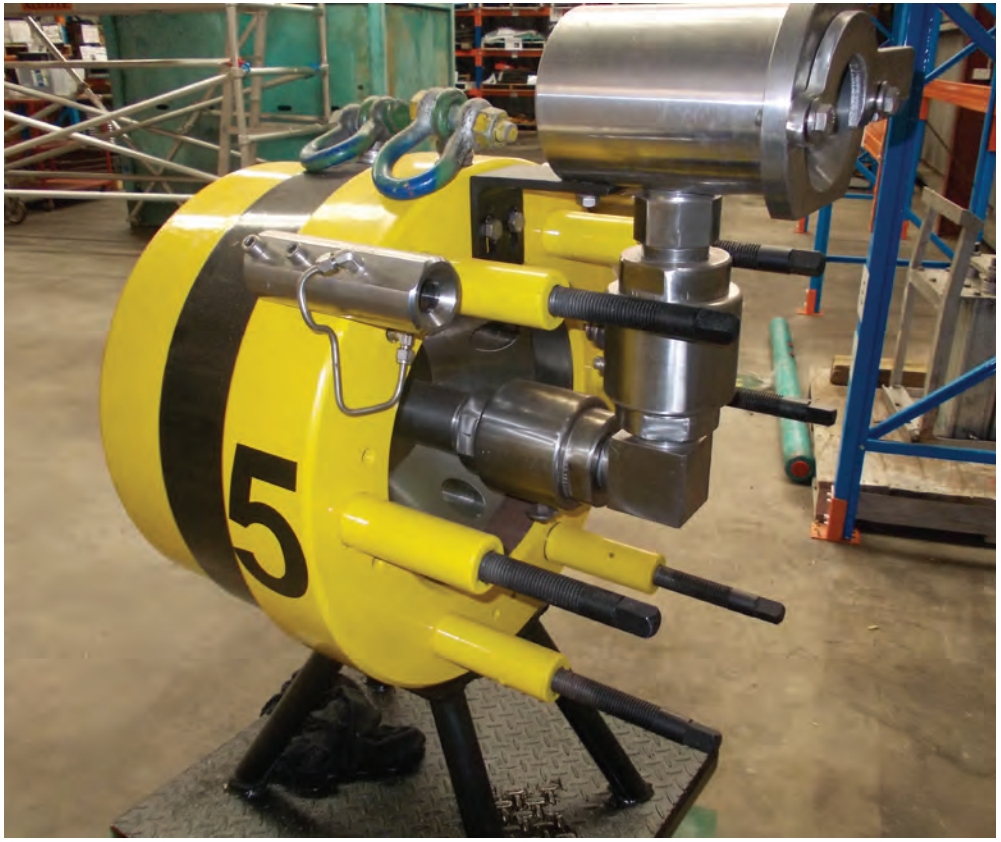
Formed as a joint venture between Sapura Energy Australia and TMT Australia, Sapura Energy Well Services leverages on the complimentary experience and expertise of these companies. Both companies are Australian subsidiaries of the Malaysian based petroleum giant, Sapura Energy.

The Sapura Energy Well Services 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.

DIVERLESS FLANGE CONNECTOR



Diverless Flange Connector.

The TMT Diverless Flange Connector is a purpose designed tool for connecting surface or other subsea jumpers to API flanges up to a 12" 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 controls which can be driven from a surface or ROV supply.

The 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 surface or by ROV. The buoyancy is then released and returned to 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

Flange size . . . . . up to 12 inch API
Pressure rating - flange connection WP 5000psi
*Maximum operating pressure rating 3000psi
Weight in air. . . . . .400-2500kg (5-12")

SUBSEA INTERVENTION DEVICE

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 Sapura Energy Well Services' 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

7⅜ inch clear bore
Water depth. . . . . 800 m
Maximum working pressure . . . . . 5,000 psi (upgradable)
Maximum wire diameter. . . . . 3.175 mm (⅛") 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

AXE CUTTING SYSTEM

Results of using the AXE Cutting system.

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

CEMENT INJECTION TOOL

Sapura Energy 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 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 utilised 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 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 9⅝" 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 (8³/16 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

TMT CONTROL CONTAINER

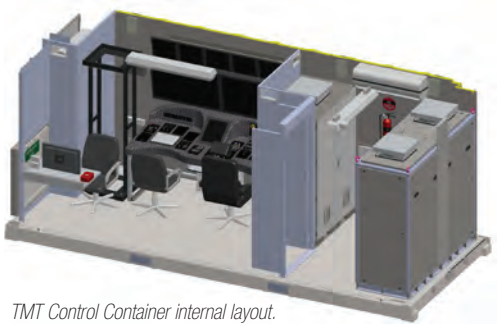
The TMT ROV Control Van has an ergonomic design with easy access for crew to all operating stations. Crew change out events will not inhibit or hinder ongoing operations at any other station. Crew comfort and maintenance access has been a primary consideration in the design and installation of the equipment. Office setup includes desk, printer and computer. Power distribution equipment is located in an isolated area of the Control Van to reduce ambient heat and noise. TMT can modify the Control Van to suit the customer requirements.

FEATURES

- Air conditioned, with backup
- Protected against corrosion
- All exits clearly marked
- Grounding straps
- Load test certificates
- UPS, if zoning permits
- Suitable maritime coating system applied

SPECIFICATIONS

Length 6.1m
Width 2.4m
Height. 2.75m
Weight 16,000kg
Domestic Power . . . . . 440VAC @60Hz
Lifting Arrangement . . . . . 4 point
Classifications . . . Zone 1 (NEC 500-503), Safe Zone, Zone 2
DNV Certification 2.7-1
Fire Rating . . . . . A60 SOLAS Compliant



TMT Control Container internal layout.

TMT Control Container.

TMT WORKSHOP CONTAINER

The TMT ROV Workshop container is a practical design that allows easy access to both stores and the maintenance area of the ROV equipment. Typically, the container is installed on the lower deck.

Heavy equipment can be easily lifted into the container through the use of an overhead traveling gantry. This typically extends 1.2m past the container's double doors. The workshop contains shelving and storage for tools, spares and consumables. The container, additionally, can be used as a mobile electrical & hydraulic workshop with dedicated areas for each.

FEATURES

- Split system air conditioned
- Non-slip flooring
- Exits and escape hatches clearly marked
- Grounding external bosses on all diagonals
- Load test certificates
- Suitable maritime coating system
- Shelving and storage compartments
- Multi-cable transits
- ISO locks and lifting points
- Independent Electrical and Workshop Benches

SPECIFICATIONS

Length 6.1m
Width 2.4m
Height. 2.75m
Weight (approx.) 15,000kg
Domestic Power . . . . . 440VAC @60Hz
Lifting Arrangement 4 . . . . . point
Classification Zone . . . . . 1, 2 & safe area
DNV Certification 2.7-1
Insulation . . . . . A60 (on request)

TMT Workshop Container.

TMT STORES VAN

The TMT ROV Stores Van is of a practical design with easy access to all heavy equipment on lower levels.

Heavy equipment change-out is easily achievable with the use of the overhead gantry from its storage location through the van to approximately three feet external to the cargo doors.

TMT can modify the Stores Van to suit customer requirements.

FEATURES

- Air conditioned
- Protected against corrosion
- All exits clearly marked
- Grounding straps
- Load test certificates
- Hydraulic work bench
- Electrical work bench
- Slaving and drawers of storage
- Suitable maritime coating system applied

SPECIFICATIONS

Length	6.1m
Width	2.4m
Height	2.75m
Weight	16,000kg
Domestic Power	440VAC @60Hz
Lifting Arrangement	4 point
Classifications	Zone 1 (NEC 500-503)
	Safe Zone
	Zone 2
DNV Certification	2.7-1
Fire Rating	A60 SOLAS Compliant

TMT Stores Van.

DIESEL GENERATOR SET AND LIFT FRAME

The Diesel Generator Set and Lift Frame is a fully containerised power supply rated to 500kVA. The Diesel generator set is designed and built for offshore deployment in a marine environment. The container is a practical design that allows easy access to both the diesel engine and power generator for maintenance or repair.

The generator set is a Cummins QSX15* engine with a Stamford Automatic Voltage Regulated (AVR) MX341*, generator.

The Diesel Generator Set comes fully configured with a modern control and alarm, regulation and monitoring panels. Access to all controls and monitoring equipment can be from the external panels.

The generator is a Safe Zone generator which has over speed shut down and is capable of being shut down on ESD.

TMT can configure the Diesel Generator Set and Lift Frame to suit customer requirements.

FEATURES

- Easy to install and remove
- Easy to transport
- Acoustic shielding
- DNV certified lifting frame
- Fully corrosion treated
- Marine certified controller
- Field proven
- Insulation monitor

SPECIFICATIONS

Length	5540mm
Width	2300mm
Height	2900mm
Shipping Weight	8600kg
Generator rated	500kVA
Generator	Stamford AVR MX 341*
Diesel Motor	Cummins QSX15*
Power	675hp (503kW)
Cylinders	6

*Or equivalent.

TMT DESIGNED AND MADE MARINE GROWTH COVERS

MGC - ISO LINEAR TYPE B

The TMT ISO Linear Type B Marine Growth Cover (MGC) is an economical way of protecting subsea Linear Type B receptacles from excessive marine growth build up.

The MGC fits over the ISO 13628-8 Linear Type B interface to protect both the front and rear faces of which subsea tools interface with. Polyurethane is used to retain the cover in position and stop it from rotating. The TMT MGC isolates the receptacle from the marine environment. The physical presence of the plug inhibits the buildup of marine growth and helps to eliminate time consuming cleaning processes that could be required before using the receptacle.

The TMT MGC can be customised to suit most applications. All TMT MGCs are designed to last over 40 years in the subsea environment.

FEATURES:

- Easy to install and remove
- Corrosion resistant materials
- Non Metallic
- Field proven
- Standard Receptacles include ISO 13628-8

SPECIFICATIONS:

0011-9566

Diameter	246mm
Height	262mm
Weight in Air	6.05kg
Weight in Seawater	1.64kg

MGC - CLASS 5

The TMT Class 5 Marine Growth Cover (MGC) is an economical way of protecting subsea XT rotary intervention valve buckets to standard and ISO 13628-8 high torque receptacles, from excessive marine growth build up.

The non-metallic plug is fitted with a nitrile ring to retain the MGC in the receptacle. The TMT MGC isolates the valve bucket from the marine environment. The physical presence of the plug inhibits the buildup of marine growth and helps to eliminate time consuming cleaning processes that could be required before a torque tool can re-enter the valve bucket.

The TMT MGC can be customised to suit most applications. All TMT MGCs are designed to last over 40 years in the subsea environment.

FEATURES:

- Easy to install and remove
- Corrosion resistant materials
- Titanium Bolts
- Field proven
- Standard Receptacles include ISO 13628-8

SPECIFICATIONS:

0011-9496

Diameter	186mm
Height	258mm
Weight in Air	6.9kg
Weight in Seawater	1.9kg

MGC - XT

The TMT XT Marine Growth Cover (MGC) is an economical way of protecting the XT subsea receptacles from excessive marine growth build up.

This MGC is a prime example of TMT's ability to custom design a cover to suit any receptacle. The XT MGC suits 2x ISO Class 4 receptacles that are positioned close to each other. This particular MGC uses its weight as a retention mechanism in a vertical bucket. The TMT Marine Growth Cover isolates the receptacle from the marine environment. The physical presence of the plug inhibits the buildup of marine growth and helps to eliminate time consuming cleaning processes that could be required before using the receptacle.

The TMT MGC can be customised to suit most applications. All TMT MGCs are designed to last over 40 years in the subsea environment.

FEATURES:

- Easy to install and remove
- Corrosion resistant materials
- Titanium Bolts
- Field proven
- Standard Receptacles include ISO 13628-8

SPECIFICATIONS:

0011-8837

Length	350mm
Width	260mm
Height	399mm
Weight in Air	10.2kg
Weight in Seawater	2.9kg

MGC - TUBING HEAD SPOOL

The TMT Tubing Head Spool (THS) Marine Growth Cover (MGC) is an economical way of protecting the subsea THS receptacle from excessive marine growth build up.

The non-metallic plug is fitted with an O-ring as a retention mechanism. The TMT MGC isolates the receptacle from the marine environment. The physical presence of the plug inhibits the buildup of marine growth and helps to eliminate time consuming cleaning processes that could be required before receptacle can be used.

The TMT MGC can be customised to suit most applications. All TMT MGCs are designed to last over 40 years in the subsea environment.

FEATURES

- Easy to install and remove
- Corrosion resistant materials
- Non-metallic
- Field proven
- Standard Receptacles include ISO 13628-8

SPECIFICATIONS

0011-8562

Diameter	102mm
Height	165mm
Weight in Air	0.57kg
Weight in Seawater	0.15kg

MGC - ISO TYPE B HOT STAB

The TMT Male ISO Type B Hot Stab Marine Growth Cover (MGC) are an economical way of protecting subsea female ISO 13628-8 hot stab receptacles, from excessive marine growth build up.

The non-metallic plug is fitted with O-rings for retention. The use of polyurethane provides compliance for the handle to allow for easy subsea installation. The TMT MGC isolates the receptacle from the marine environment. The physical presence of the plug inhibits the buildup of marine growth and helps to eliminate time consuming cleaning processes that could be required before a hot stab can re-enter the valve receptacle.

The TMT MGC can be customised to suit most applications. All TMT MGCs are designed to last over 40 years in the subsea environment.

FEATURES:

- Easy to install and remove
- Corrosion resistant materials
- Titanium Rod
- Field proven
- Standard Receptacles include ISO 13628-8

SPECIFICATIONS:

0011-8880

Diameter	42.7mm
Length	441mm
Weight in Air	3.7kg
Weight in Seawater	0.33kg

MGC - TRONIC ELECTRONIC FLYING LEAD

The TMT Tronic Electronic Flying Lead (EFL) Marine Growth Cover (MGC) is an economical way of protecting subsea EFL receptacles from excessive marine growth build up.

The non-metallic plug is fitted with an O-ring seal to retain the MGC in the receptacle. The use of polyurethane gives compliance to the handle, allowing the MGC to be easily installed subsea. The TMT MGC isolates the receptacle from the marine environment. The physical presence of the plug inhibits the buildup of marine growth and helps to eliminate time consuming cleaning processes that could be required before re-entering the valve receptacle.

The TMT MGC can be customised to suit most applications. All TMT MGCs are designed to last over 40 years in the subsea environment.

FEATURES

- Easy to install and remove
- Corrosion resistant materials
- Titanium Pins
- Field proven
- Standard Receptacles include ISO 13628-8

SPECIFICATIONS

0012-0159

Diameter	49mm
Height	325mm
Weight in Air	1.2kg
Weight in Seawater	0.3kg

MGC - VETCO

The TMT Vetco Marine Growth Cover (MGC) is an economical way of protecting subsea receptacles from excessive marine growth build up.

The MGC uses its weight in sea water as a retention mechanism in a vertical bucket. The TMT MGC isolates the valve bucket from the marine environment. The physical presence of the plug inhibits the buildup of marine growth and helps to eliminate time consuming cleaning processes that could be required before using the valve bucket.

The TMT MGC can be customised to suit most applications. All MGCs are designed to last subsea over 40 years.

FEATURES:

- Easy to install and remove
- Corrosion resistant materials
- Titanium fasteners
- Field proven
- Standard Receptacles include ISO 13628-8

SPECIFICATIONS:

0012-0790

Diameter	534mm
Height	600mm
Weight in Air	66.26kg
Weight in Seawater	10.19kg

MGC - VETCO GRAY TYPE 72A MK2

The TMT Marine Growth Cover (MGC) Vetco Gray (VG) Type 72A covers are an economical way of protecting the subsea VG Type 72A receptacle from excessive marine growth build up.

The non-metallic plug is fitted with a nitrile ring for retention, similar to an O-ring. The TMT MGC isolates the valve bucket from the marine environment. The physical presence of the plug inhibits the buildup of marine growth and helps to eliminate time consuming cleaning processes that could be required before a torque tool can re-enter the valve bucket.

The TMT MGC can be customised to suit most applications. All TMT MGCs are designed to last over 40 years in the subsea environment.

FEATURES

- Easy to install and remove
- Corrosion resistant materials
- Titanium Bolts
- Field proven
- Standard Receptacles include ISO 13628-8

SPECIFICATIONS

0011-9530

Diameter	304mm
Height	395mm
Weight in Air	6.1kg
Weight in Seawater	1.72kg

TMT FATT BUOY

The TMT FATT Buoy (Floating Acoustic Telemetry Transceiver) is an acoustic positioning system that brings simplicity and cost savings to subsea tracking operations. It is easier to deploy and more accurate than other costlier systems.

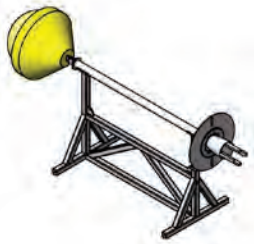
TMT worked closely with iXBlue, the makers of the industry leading GAPS positioning system, to create a unique design. Traditional seabed acoustic transponder arrays can often be expensive and over engineered for the required accuracy or task at hand. The TMT FATT Buoy replaces these traditional seabed acoustic transponder arrays on rigs that do not have an on-board USBL system for tasks such as spudding or workovers.

The combination of an inertial aided USBL system and a high-precision DGNSS allows tracking of compatible beacons in depths of up to 4000m. Once deployed, the TMT FATT Buoy can be held in place by a crane wire, winch or simply tethered to a vessel or platform.

The TMT FATT Buoy can be used on operations that require USBL even when a through hull moon pool is not available, or if an over the side USBL fixture is not feasible.

FEATURES

- Deployed via crane or winch
- No calibrations required
- High precision DGNSS position
- Full integration of USBL
- Inertial Navigation System (INS)
- Real-time positioning
- Seabed position accuracy of 0.2% x slant range



SPECIFICATIONS

Diameter	3.85m
Height	1.2m
Weight in Air	157Kg
Data Output	RS422, RS232, Ethernet
Power Supply	28-36V DC
	110/240V AC
Power Consumption	50W
Cable Length	100m
Connector 1	6-pin SUBCONN
Depth Rating	25m

TMT AIR LYNC WI-FI SYSTEM

The TMT Air Lync is a high-speed Wi-Fi system. This new and innovative product offers many features not currently available.

Operating in a Point-to-Multipoint topology, the system is very well placed to provide a quick response in most situations, and is very suitable to offshore multi-vessel environments.

Vessel-to-vessel communications form a critical part of any project, and are usually limited to radio communications between vessels (UHF/VHF), or through an expensive satellite link for providing internet access to each vessel.

This presents many challenges, and does not allow for bandwidth intensive applications, such as transferring large files, video/voice-conferencing (Skype or similar), sharing of video files, or streaming of footage in real time (such as ROV/Dive video or CCTV).

The TMT Air Lync system is capable of maintaining a stable, high-speed data link between vessels, operating up to three kilometres with clear line-of-site. The system acts as a "wireless ethernet cable" and has a tested real world throughput of up to 150 Mbps.

ADDITIONAL OPTIONS INCLUDE:

- Long-range capable with 900MHz add-on
- Multi-channel video capture/distribution
- Low-latency video transcoding
- Redundant switching/antennae.

BELOW ARE JUST A FEW EXAMPLES OF THE POSSIBLE USES OF TMT AIR LYNC:

- HD video conferencing (virtual meetings)
- High-clarity voice calls
- Simultaneous streaming of multiple HD video feeds
- Transferring large 3D seismic data files
- Real-time remote monitoring of ROV video
- Tracking vessels through survey system
- Distribution of internet throughout field
- Remote viewing/assistance over network
- Transmission of sensors remotely
- Real-time monitoring of pipeline inspections
- Complete access to IRM systems

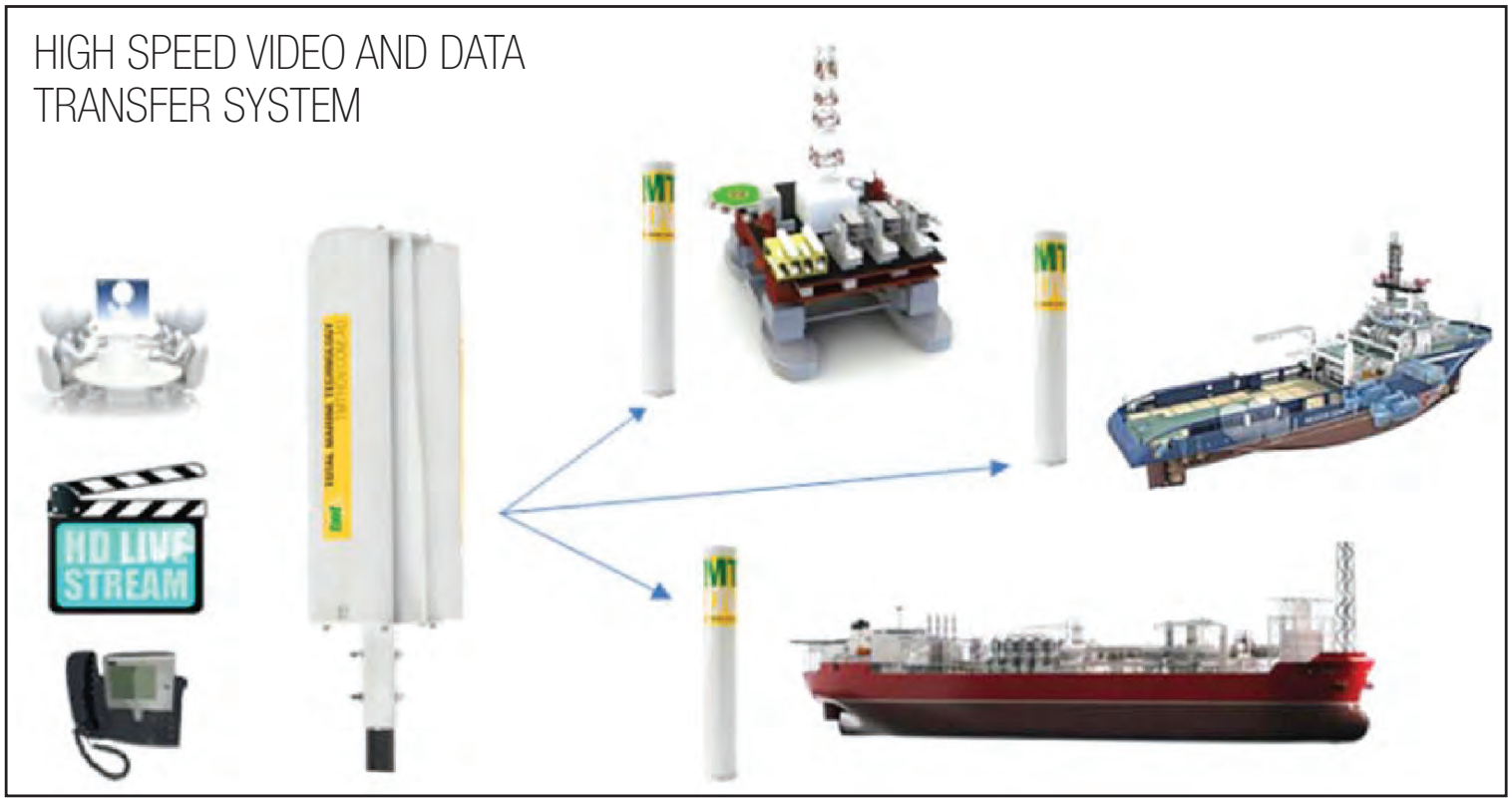
Installation of the system is designed to be a simple and cost efficient process (plug & play), requiring only one ethernet cable to be installed between the antenna unit and interface box. A second cable can be run for redundancy.

For more information, or to organise a demonstration of the system in action, please contact Total Marine Technology.

FEATURES

- Very high-bandwidth, high-speed wireless link
- Video teleconferencing between in-field vessels
- No ongoing costs (no monthly fees)
- Distribution of internet connection (if available)
- Simultaneous streaming of HD/SD Video
- Sharing of very large files between vessels
- Clear, private voice calling between vessels
- Option to add long-range tracking for survey

HIGH SPEED VIDEO AND DATA TRANSFER SYSTEM



DIMENSIONAL CONTROL

Three-dimensional control surveys of offshore installations and vessels underpins the survey systems and positioning of objects in real world scenarios.

The placement of a comprehensive number of control points throughout an offshore installation or vessel allows for other points of reference to be reliably determined to meet project requirements. Knowing the relationship between various points on a structure or vessel assists with the mathematical analysis of object positioning.

Equipment such as GNSS antennas, motion reference units, USBL transducers, and multibeam echo sounders rely on accurate three-dimensional control so that real world positioning on the surface and subsurface can be achieved.

COMPATT STAB AND RECEPTACLE

In the offshore surveying profession, accuracy is synonymous with precision. TMT's machinists allow for in house production and fabrication of hardware such as stabs to be positioned on the bottom of a high accuracy inclinometer positioning COMPATT or a GyroCOMPATT and mate with a receptacle attached to a structure.

Our machining capabilities allow for precision fits of the stab into the receptacle to a tolerance of 0.02mm – 0.05mm. Uses for the stabs and receptacles with the COMPATTS are for instances such as subsea metrology utilizing Long Base Line (LBL) or sparse LBL operations. Operations include spool piece metrology, structure installation for high accuracy positioning, orientation, inclination and heighting.

SUBSEA 3D LASER SCANNER

The ULS-200 Subsea Laser Scanner is a mid-range measurement system that is ideal for capturing high-detail measurements in subsea areas spanning from 0.3m to 2.5m, depending on environmental conditions. The system is designed for inspection of offshore jackets, inland dams and bridges, pipeline surveys, flanges and ovality measurements.

The laser scanner produces very high-detail measurements, capable of resolving measurements of less than 1mm and can be easily deployed by ROV, AUV or diver.

The ULS-200 can be easily operated, using the 2G Robotics ULScanSoft CAD package, to collect and process the underwater point cloud data. Measurements can be taken directly from the point clouds, and the point clouds can be saved to .xyz files, which are commonly used file formats for point cloud data.

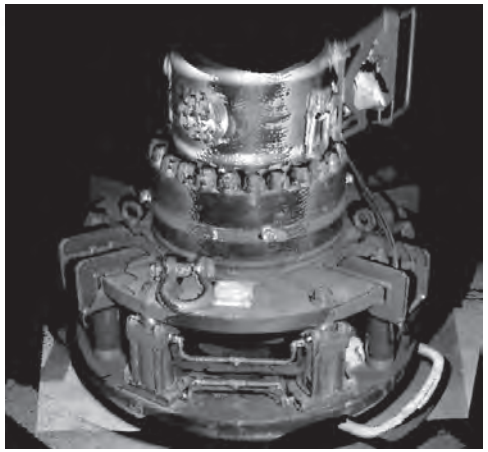
The point clouds can be imported into almost any CAD program for advanced data analysis and overlay comparison. An API is also available for command and data collection through your own software program. The unit can be mounted on a rotary actuated tripod and placed on the seabed or mounted on an ROV and integrated to the ROV system.

FEATURES

- Ambient light filtration
- Hundreds of times higher resolution than sonar
- Modular design
- Algorithms to deal with silt in the water
- ROV, AUV & diver deployable
- .xyz, LAS & CSV formats

SPECIFICATIONS

Length	334mm
Height	368mm
Weight in seawater	1.6kg
Scan Range	<0.3m to 25m
Vertical Laser Coverage	50º
Vertical Resolution	0.1042°
Rotational Range	360º
Laser Foot Print	1mm
Power	12-24Vdc 50mW
Data Interface	RS485, USB
Depth Rating	350m



SENSOR HOLDER

The sensor holder / holster is a simple form design for the purpose of protecting portable survey instruments. The holder is capable of housing instruments such as a mini depth sensor or a mini sound velocity sensor.

The ROV can then place the holder at designated positions such as the top of a structure or specific point of interest. Having a closed bottom and open front to the holder allows water to encompass the sensor and protect it from knocks and seabed soil.

The unit comes with an ROV D-handle for the manipulator and slots to attach hose clamps for securing the instrument.

SPECIFICATIONS

Width	80mm
Height	200mm
Weight in air	0.5kg

SADDLE BRACKETS

Saddle brackets are used for the purpose of positioning a particular position of a pipe (usually the end flange) either in absolute position or relative to another pipeline end flange or structure.

The design of a particular saddle bracket will vary depending on the pipe diameter and flange size. A survey sensor, such as an inclinometer COPATT or GyroCOMPATT is attached to the top of the saddle bracket and held in place by use of a TMT stab and receptacle.

TMT design engineers and fabricators can produce saddle brackets to suit all pipe types and the instruments that are placed on top of them. Recent saddle brackets have been designed to accommodate a piggyback pipeline and marine riser.

SUBSEA POSITIONING

TMT use a variety of subsea positioning systems & methods to safely & accurately position subsea equipment & assets. Methods employed are project specific and aim to provide the highest possible results. Subsea beacons are used in conjunction with USBL/SSBL or LBL configurations, which allows for position to a high degree of confidence.

KONGSBERG HIPAP 500

A common SSBL (Super Short Base Line) used on TMT projects is the Kongsberg HiPAP 500. The system will dynamically control the beam so it is always pointing towards the transponder. This form of beam listening allows for suppression of noise from other directions in the water column. This assists with processing of the received signal.

SPECIFICATIONS

Gate valve size	500mm
Transducer Diameter	400mm
Acoustic operating area	±100°
Number of elements	241
Range detection accuracy	<20cm
Typical operating range	1-4000m
Narrow pointing receiver beam	±5°
Connector	SEA CON

ROVNAV 6 TRANSCEIVER

Long Base Line acoustic positioning systems are used to provide an accurate means for installing subsea structures, tracking TMT ROV's and conducting acoustic metrology. The system uses an array of subsea transceivers to measure acoustic ranges. These ranges are then passed through a "Least Squares" computation to precisely trilaterate a position of an object. The seabed array is fixed for the duration of a project and therefore precision remains the same regardless of the water depth.

TMT employ the Sonardyne Fusion 6G system for LBL purposes. It generally consists of a Navigation PC, the Fusion 6G LBL Software, a ROVNav 6 LBL Transceiver (ROV mounted or vessel deployed dunker). The ROVNAV6 is a 6G Wideband2 LBL and telemetry transceiver

SPECIFICATIONS

Dimensions	Ø194 x692mm
Weight in Air	24kg
Weight in Water	16kg
Depth Rating	1000msw
Range Precision	<15mm
Battery Life	3 days
Connector	AGP (8-Way Female)
Power Input	24 or 48Vdc ±10%
Outputs	
Serial	RS485 / RS232

SONARDYNE 6G

Sonardyne offer a variety of other solutions for subsea positioning. The 6G subsea transponder provides integrated navigation, telemetry and modem capabilities. All models use Sonardyne Wideband & 2 advanced signal processing for navigation & acoustic communication.

SPECIFICATIONS

Dimensions	Dependent on configuration
Weight in Air	Dependent on configuration
Pressure Sensors	High-Accuracy/Strain Gauge
Optional Sensors	DigiQuartz, Temperature, Inclinometer, Pres-Sens
Depth Rating	3000, 5000, or 7000msw
Communications	Wideband 2
Available Channels	Over 500

SONARDYNE 6G GYRO COMPATT

The Iodestar GyroCompatt integrates Sonardyne's Wideband & acoustic positioning & Lodestar Attitude & Hearing Reference Technology. This provides high update rate wireless attitude, heading, heave, surge, sway, pressure, sound velocity & acoustic positioning of any subsea object.

SPECIFICATIONS

Dimensions	247.8 x 917.2Hmm
Weight in Air	45kg
Weight in Water	17kg
Depth Rating	3000msw
Battery Life (Powered/Standby	3 months/28 hours
Power Supply	24Vdc
Follow-up Speed	~200°/second

SONARDYNE iWAND 6

The iWand is a hand held acoustic transponder test and configuration device which enables all 6G (excluding WSM6, which can only be acoustically tested) transponders to be easily configured.

SPECIFICATIONS

Dimensions	40 x276H x 84Wmm
Weight in Air	0.8kg
Display	Sunlight Readable LCD
Battery Life	12 Hours
Time Stamping	Internal GPS-UTC

SURFACE NAVIGATION AND CONSTRUCTION

A variety of equipment is employed when conducting construction work in a variety of scenarios. It is important to have accurate position and heading sources at all times and TMT use commercially available equipment in the field to give reliable and accurate results.

Hemisphere Atlas Link smart antenna can achieve excellent real time horizontal accuracy. It was designed to excel in challenging environments and is ideal in the marine environment. Its smart antenna technology uses multiple GNS systems and frequencies to achieve optimal results.

SPECIFICATIONS

Receiver Type: . . . . . Dual Frequency, multi GNSS RTK
Signals received: . . . . . GPS, GLONASS and BeiDou
Channels: 372
Dimensions . . . . . 15.8L x 15.8W x 7.9H (cm)
Weight . . . . . <1.5kg
Positioning Accuracy . . . . . RTK 10mm +1ppm

The Spatial FOG (Fibre Optic Gyro) Dual is a ruggedized GNS aided inertial navigation system and AHRS (Attitude, Heading and Reference System) that provides accurate position, velocity, acceleration and orientation under the most demanding conditions. It combines ultra-high accuracy fibre optic gyroscopes, accelerometers, magnetometers and a pressure sensor with a dual antenna RTK GNSS receiver. These are coupled together in a sophisticated fusion algorithm to deliver accurate and reliable navigation and orientation.

Spatial FOG Dual features dual antenna moving baseline RTK. This allows it to provide highly accurate heading while both stationary and moving. The unit also contains a dual frequency Trimble RTK GNSS receiver and supports all of the current and future satellite navigation systems, including the Omnistar service.

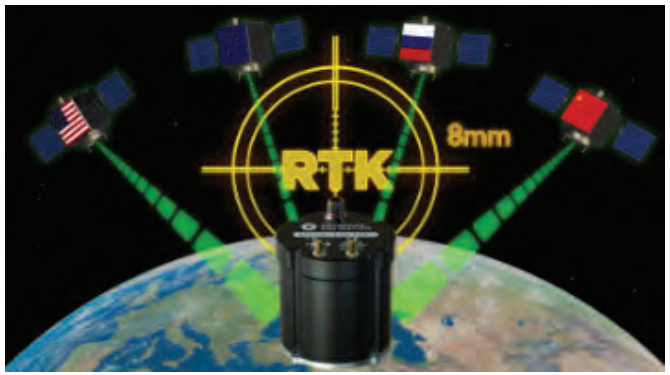
SPECIFICATIONS

Horizontal Position Accuracy (with RTK) . . . . . .0.008 m
Vertical Position Accuracy (with RTK). . . . . .0.015 m
Velocity Accuracy . . . . . 0.005 m/s
Roll & Pitch Accuracy . . . . . 0.01 °
Heading Accuracy. . . . . 0.01 °
Heave Accuracy . . . . 2 % or 0.02 m (whichever is greater)
Supported Nav. Systems GPS, GLONASS, GALILEO, BeiDou
Dimensions . . . . . 94x94x95 mm
Weight . . . . . 740 grams

The Meridian Gyrocompass Surveyor is designed for the requirements of a modern integrated bridge system. Due to the Meridian's small size and fast settle time of less than 45 minutes, there are no limits to the type of vessel for which it is suitable. The Meridian Surveyor has a wide range of interfaces to enable use on any marine vessel. The unit utilises a DTG gyro element which provides exceptional performance with an exceptional accuracy.

SPECIFICATIONS

Dimensions 334H x267W x440Dmm
Weight in Air 15.5kg
Display . . . . . 360°
Settle Point Error . . . . . .0.10°
Static Accuracy . . . . . .0.05°
Dynamic Accuracy . . . . . .0.20°
Follow-up Speed . . . . . .~200° /second
Settling time. . . . . .<45 minutes



Sensors such as the TSS Meridian, Hemisphere Atlas Link and Spatial FOG Dual, along with ROV sensors and subsea positioning systems are all integrated into the online navigation suite QINSY (Quality Integrated and Navigation System). This allows the surveyor to view all sensors simultaneously to deliver project requirements expeditiously.


tmt
AUSTRALIA
1 AMBITIOUS LINK
RECEPTION