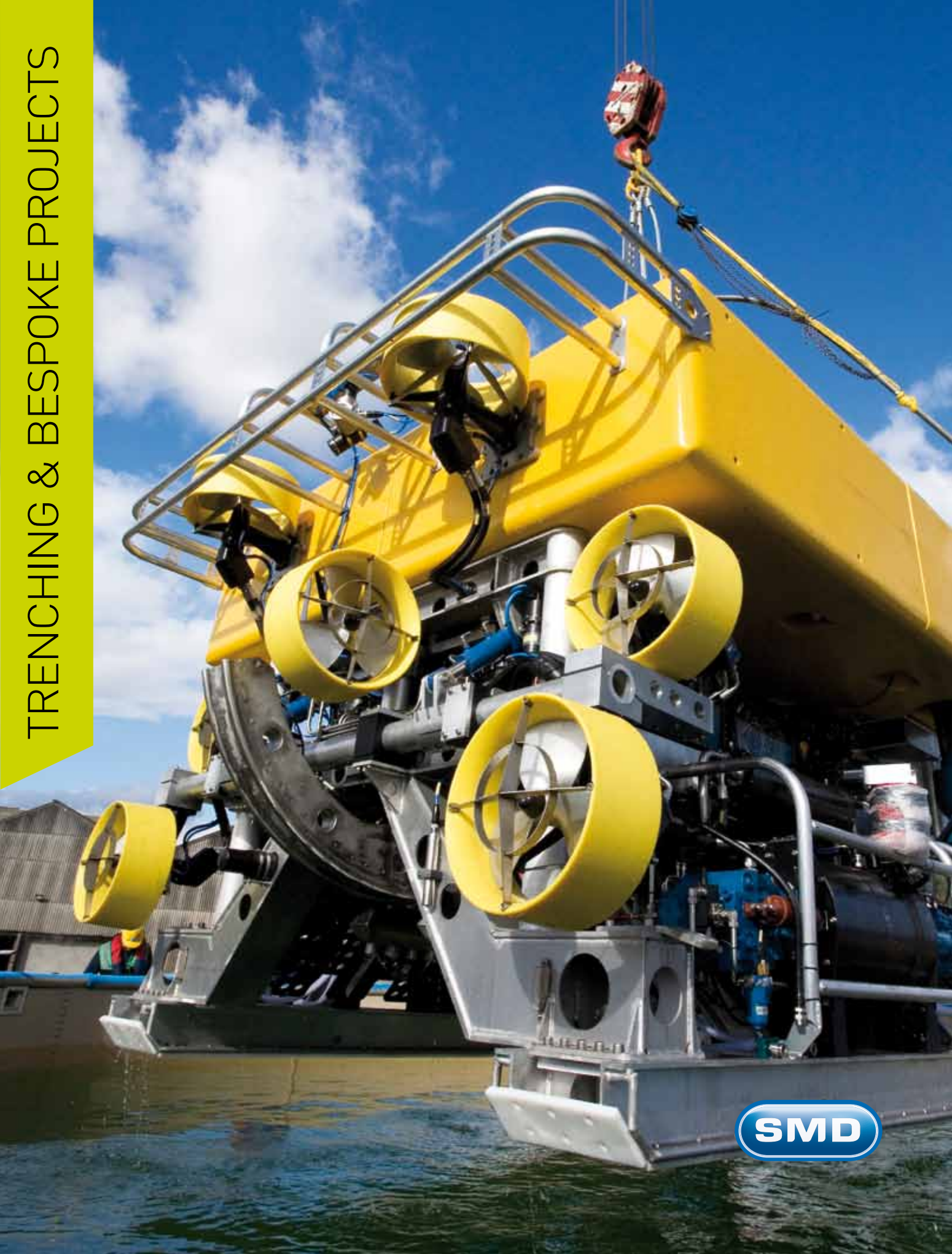
TRENCHING & BESPOKE PROJECTS



TRENCHING & BESPOKE PROJECTS

SMD is the world's leading subsea trenching equipment supplier, committed to high quality and performance, founded on thorough engineering and solid support. SMD offer the world's largest range of subsea trenching products. The trenching business stream supplies towed and self-propelled vehicles, with a comprehensive range of in-house engineered launch and recovery systems (LARS) and state-of-the-art control systems.

SMD has delivered over one hundred subsea trenching systems spanning a thirty year period, developing a unique and comprehensive, world class product range with cutting edge technology. The success of these systems is reflected in repeat business from a valued, worldwide customer base. SMD seek to continuously improve and develop new products and new technologies to satisfy the ever evolving technical challenges.

SELF PROPELLED SYSTEMS

The self propelled systems include the Q-Trencher (QT) and heavy tracked trencher ranges. Q-Trenchers are SMD's fourth generation trenching ROV. Subsea power available ranges from 400 through to 2800hp all able to free fly with track upgrades. Heavy tracked trenchers are available in a range of chassis sizes and power ratings to suit trenching in hard ground up to 50MPa. Trenchers can be configured to carry multiple tools, simultaneously or in interchangeable cartridges, including rock and clay chains, jetters, dredges, eductors and backfill tools to suit every soil combination.

Bespoke, self propelled systems developed for customers include RT-1, the world's most powerful subsea tractor . and UT-1, the world's largest trenching remotely operated vehicle (ROV). RT-1 (180Te) was designed to trench 1.5m diameter pipelines to 2m deep in 100MPa rock. UT-1 (60Te) was designed to trench 1m diameter pipelines at water depths of 1500MSW.

Q TRENCHER (QT) RANGE	QT400	QT600	QT800	QT1000	QT1400	QT2800
WEIGHT IN AIR (TE)	9.5	17	19	21	30	60
INSTALLED POWER (HP)	400	600	800	1000	1400	2800
JETTING POWER (HP)	200-350	440-540	640-740	840-940	1000-1200	2000
MAX TRENCH DEPTH (M)	1.5-2.0	2.5-3.0	2.5-3.0	2.5-3.5	2.8-3.5	2.0-2.5
PRODUCT SIZE (MM)	200	400	500	600	800	1000
LENGTH Excl. SWORDS	3.8	5	5	5	7.8	7.8
WIDTH	3.2-4.6	4.2-5.0	4.2-5.0	4.2-5.0	6.5	7.8
HEIGHT	2.5	3-3.3	3.3	3.3	5.0	5.6

TRACTOR RANGE	BT800	BT1100	BT2100	BT2400	LBT800
WEIGHT IN AIR (TE)	35	50	60	180	60-75
INSTALLED POWER (KW)	600	800	1600	2400	800
TRENCH DEPTH (M)	1.0-2.3	1.0-3.0	1.0-3.5	2.0-6.0	1.0-2.0
MAX DIAMETER (M)	300	300	800	1500	250
LENGTH	13	13.5	14.5	22.5	13.5
WIDTH	6	6.0-7.5	7.5	13	10-12
HEIGHT	5.4	5.5	5.5	9.6	9-10.7
TOOL POWER (KW)					
MECHANICAL	300	400	800	1600	400
JETTER	2x200	2x300	2x300	2x400	2x200
DREDGE (KW)	1x50kw 400m³/hr	1x75kw 600m³/hr	2x75kw 1200m³/hr	3x75kw 1800m³/hr	1x50kw 400m³/hr

TOWED SYSTEMS

SMD's towed systems are designed to bury subsea telecommunication and power cables up to 350mm diameter and pipelines up to 1500mm diameter. Available systems include the Multi-Depth Plough (MD3) Heavy Duty Plough (HD3), Ultra Duty Plough (UD3) and Multipass Plough (MP) systems, supplied with tow load capability of 80, 120, 150, 250 and 350Te.

SMD Smart Ploughs (MD3, HD3 and UD3) all have powered steering and variable depth control to maximise cable protection. All Smart Ploughs have optional jetting to transform progress rates in dense sands.

THE TRENCHING BUSINESS STREAM IS DEDICATED TO THE SAFE AND EFFICIENT PROTECTION OF SUBMARINE CABLES AND PIPES.

	TELECOM	POWER & UMBILICAL CABLES			PIPELINES	
PLOUGH RANGE	MD3	HD3-200	HD3-300	UD3	MP	BP
WEIGHT IN AIR (TE)	22	35	45	120	140-180	100-120
TRENCH DEPTH (M)	0.0-3.0	0.0-3.0	0.0-3.0	3.0-4.0	2.0-2.5	N/A
MAX TOW LOAD (TE)	80	150	150	250	350	200
PRODUCT SIZE (M)						
LENGTH	9.1	13	15	20	18.5-21.4	17.8-19.7
WIDTH	5.1	6.3	6.5	8	9.8-11.75	9.4-11.3
HEIGHT	4.4	6.6	6.6	9.5	8.5-9.65	8.0-9.3
MINIMUM BEND RADIUS	1.5-2.0	2.0-3.5	2.5-5.0	5.0-6.0	N/A	N/A

BESPOKE SYSTEMS

SMD can apply expertise and experience to a wide range of problems which require a subsea remotely operated solution or specialist handling equipment. SMD has a long track record of developing innovative solutions, which mitigate risk by using, wherever possible, a standard range of components. Examples include Rock Dumping Fall Pipe ROV, Pipe Riding Jet Sled and Excavation vehicles.

CABLE LAY EQUIPMENT

SMD has extensive experience of marine cable handling, having supplied numerous systems over the last twenty years. Systems supplied utilise both hydraulic and electric drive systems across the complete range of handling equipment, including both linear and drum engine systems. The SMD self fleeting drum is particularly suited to sensitive cables.

QT 400/600/800/1000

INSTALLATION AND MAINTENANCE ROV

The Q-Trencher (QT) 400, 600, 800 and 1000 remotely operated vehicles (ROVs) are based on two aluminium chassis designs which provide high power trenching capability for the burial of cables, umbilicals and small diameter pipes up to 3m deep in various water depths. The ROVs use variable high flow or high pressure jetting to optimise the trenching to suit the anticipated conditions. Vehicles can be fitted with tracks and/or a rear eductor to enhance burial of large diameter products, as well as a suite of tools for maintenance operations. With their high thrust, the vehicles are capable of rapid post lay survey.

FEATURES

- **400/600/800/1000hp of installed power**
- **Up to 3m max trench depth capability**
- **Up to 4 knot swimming for survey**
- **500, 1000, 2000 or 3000m maximum water depth available**
- **Optional rear eductor for large product burial**
- **Optional track modules for hard ground trenching**
- **Variable high flow or high pressure jetting for optimized trenching**
- **Optional cable maintenance tools package incl. manipulators, cable cutter and clamp**
- **Comprehensive instrumentation and surveillance**
- **Proven Curvetech™ components throughout**
- **DVECS robust distributed control platform provides reliable, ergonomic operations and good diagnostics**
- **Range of SMD designed A-frame based LARS for standard and high sea states**
- **Containerised control and power system**

	QT400	QT600	QT800	QT1000
GENERAL				
Depth rating	2000-3000msw	2000-2500msw	500-200msw	500-2000msw
Dimensions				
Length (Excl. Swords)	3.8m	5.0m	5.0m	5.0m
Width	3.2m-4.6m	4.2-5.0m	4.2-5.0m	4.2-5.0m
Height	2.5m	3.3m	3.3m	3.3m
Weight in air (skids)	9.5 Te	17.0 Te	19.0 Te	21 Te
Submerged Weight	Buoyant	Buoyant	Buoyant	Buoyant
Max Tow Load	1500kg	2100kg	2100kg	2100kg

	QT400	QT600	QT800	QT1000
PERFORMANCE				
Vertical	1.5 knots	1.5knots	1.5knots	1.5knots
Fore / Aft	3.5 knots	4.0 knots	4.0 knots	4.0 knots
Lateral	3.0 knots	2.0 knots	2.0 knots	2.0 knots
ROV power	400hp (300kW) total: 1 x 400hp (300kW) 4-pole Curvetech™ HPUs	600hp (450kW) total: 2 x 300hp (225kW) 4-pole Curvetech™ HPUs	800hp (600kW) total: 2 x 400hp (300kW) 4-pole Curvetech™ HPUs	1000hp (750kW) total: 2 x 500hp (375kW) 4-pole Curvetech™ HPUs
JETTING SYSTEM				
Main jet tooling configuration				
Twin leg jet tool with fwd/downward facing jets (sub seabed) and cable depressor	✓	✓	✓	✓
Trench depth	up to 2.0m legs	0-2.0m standard, 0-3m with extended swords	0-2.0m standard, 0-3m with extended swords	0-2.0m standard, 0-3m with extended swords
Width control - leg spanning (between inside of legs) 50mm to 400 mm - remotely variable	✓	✓	✓	✓
Water supply	up to 250kW (with tracks)	twin hydraulically driven water pumps absorbing up to 300kW free fly and 400kW tracked mode	twin hydraulically driven water pumps	twin hydraulically driven water pumps
Forward jet tool				
Configuration - twin jet device (above seabed) which jets down either side of product	✓	✓	✓	✓
Trench depth - up to 1.0m (soil dependent)	✓	✓	✓	✓
OPTIONAL TRACK MODULES				
Bolt on modules with hydraulically driven Plastic track plates on standard running gear	✓	✓	✓	✓
Speed	0 to 2km/hr	0 to 2km/hr	0 to 2km/hr	0 to 2km/hr
OPTIONAL DREDGE SYSTEM				
Twin leg aft mounted eductor with Hydraulically driven dredge pump	✓	✓	✓	✓
0 to 2.0m standard dredge depth	✓	✓	✓	✓
CABLE TRACKING PACKAGE				
Cable detection and survey				
Tone detection TSS350	✓	✓	✓	✓
Pulse induction TSS440	✓	✓	✓	✓
O/A Sonar and cameras	✓	✓	✓	✓
TSS440 Deployment hyd. actuated frame	✓	✓	✓	✓
OPTIONAL CABLE TOOLS PACKAGE				
2 x 7 function manipulators	✓	✓	✓	✓
Cable cutter - up to 100mm	✓	✓	✓	✓
Cable clamp - up to 100mm	✓	✓	✓	✓
SUBSEA ELECTRONICS				
Electronics pod - one atmosphere pressure vessel	✓	✓	✓	✓
Depth rating	up to 3000m	up to 3000m	2000m*	2000m*
Fibre optic MUX communication	✓	✓	✓	✓
Connection point for vacuum checking of seals	✓	✓	✓	✓
Built in spare channels RS232, RS485, Ethernet 110V, 24V	✓	✓	✓	✓

* STANDARD ARRANGEMENT - BESPOKE SOLUTIONS AVAILABLE

QT 1400/2800

The Q-Trencher (QT) 1400 and 2800 remotely operated vehicles (ROVs) are based on two high strength steel chassis designs which provide high power trenching capability for the burial of cables, umbilicals and large diameter pipes up to 3m deep in various water depths. The ROVs use variable high flow or high pressure jetting to optimise the trenching to suit the anticipated conditions. The QT 1400 can be fitted with tracks and/or a rear eductor to enhance burial of large diameter products, it can also be supplied with independent track bases for chain cutting trenching, core drilling or cutter dredge applications.

The QT 2800 is the world's most powerful free-swimming jet trencher. With more than 2 megawatts of total power, the trencher delivers 1.5 megawatts of jetting power.

SMD offer a turnkey, integrated solution including SMD designed high sea state launch and recovery systems (LARS) and umbilical systems.

FEATURES

- **1400/2800hp of installed power**
- **Up to 3m max trench depth capability**
- **Up to 3 knot swimming for survey**
- **1500, 2000 or 3000m maximum water depth available**
- **Optional rear eductor for large product burial**
- **Optional track modules for hard ground trenching**
- **Variable high flow or high pressure jetting for optimized trenching**
- **Proven Curvetech™ components throughout**
- **DVECS robust distributed control platform provides reliable,ergonomic operations and good diagnostics**
- **Range of SMD designed A-frame based LARS for standard and high sea states**
- **Containerised control and power system**

	QT1400	QT2800
GENERAL		
Depth rating	1000, 2000 & 3000msw options	1500msw
Dimensions		
Length	7.8m	7.8m
Width	6.5m	7.8m
Height	5.0m	5.6m
Weight in air (skids)	30 Te	60 Te
Submerged Weight	Neutral	Neutral
Max tow load	1000kg	5800kg
PERFORMANCE		
Vertical	2.0 knots	2.0 knots
Fore / Aft	3.0 knots	3.0 knots
Lateral	2.0 knots	2.0 knots
ROV power	1400hp (1050kW) total: 1 x 300kW, 4160V 2 x 375kW, 4160V	2800hp (2100kW) total: 2 x300kW, 3300V 4 x400kW, 3300V
JETTING SYSTEM		
Configuration—twin legged jet tool mounted on double scissor linkage. jet orientation constant .	from 0.5m to 3.0m	from 0.75 to 2.5m
Max trench depth	Variable 2.5-3.5m	Variable 0-2.5m
Jetting pressure	Variable 4-15bar	
Width control	Leg spanning (between inside of legs) Min 150mm Max 900mm Variable, remote controlled	Leg spanning (between inside of legs) Min 250mm Max 1200mm Variable, remote controlled
Water pumps	up to 2 x 375kW	Up to 4 x 375kW
Water supply (approx.)	2400m3/hr@7bar or 1200m3/hr @ 15bar (2 pumps)	2400m3/hr@7bar or 1200m3/hr @ 15bar (2 pumps)
DREDGE SYSTEM		
Configuration	Twin legged venture type eductor mounted on constant angle linkage system	Twin legged dredge mounted on 180° pivoting system
Trench depth	Variable from 0.25m	Variable from 0.25m
Trench width	0.5-1.2m remotely controlled	0.5-1.2m remotely controlled
SUBSEA ELECTRONICS		
Electronics pod	One atmosphere pressure vessel	One atmosphere pressure vessel
Depth rating	3000m	1500m
Test pressure - 1.25 x working pressure	✓	✓
Connection point for vacuum checking of seals	✓	✓

QT 1400 BASE MODULES

MULTI TASK BASE MODULES

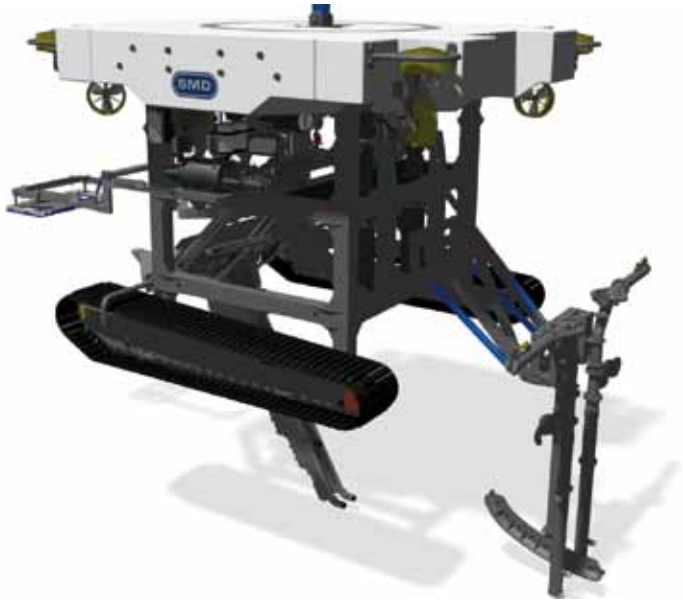
The Q Trencher (QT) 1400 system utilises a core buoyancy module with integral HPUs, thruster pack, water pumps, cameras, central control pod, etc. This can be attached quickly and easily to various functional base modules which include, but are not restricted to, jet trenching module, chain trenching module, core drilling module, crane dredge cutter module.

The base modules are connected to the core buoyancy module with mechanical linkage pins, wet connectors, water hosing and hydraulic piping where necessary for minimal change-over time.

SMD offer a turnkey, integrated solution including SMD designed high sea state launch and recovery systems (LARS) and umbilical systems. The LARS can be supplied with deck transfer system for module change-out in sea state 3.

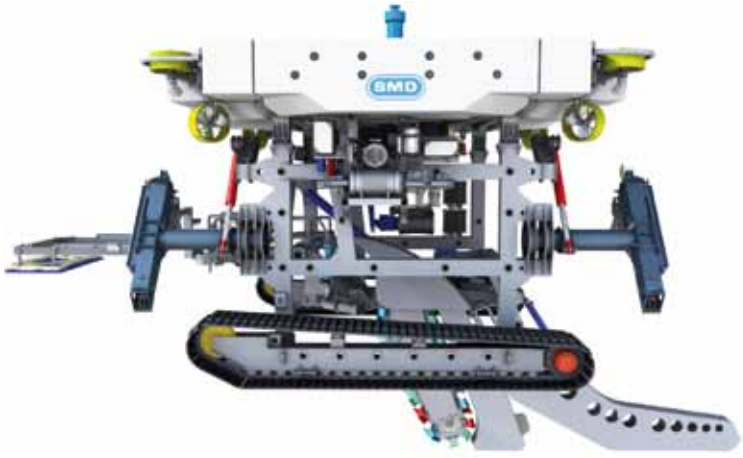
JETTING

- **Track based jetting module for jetting in sand and clay up to 100Kpa**
- **Burial depth from 1m to 3m for cables and pipelines up to 800mm diameter.**
- **Rear eductor system for trench clearing.**
- **Depth of operations to 1500m and 3000m.**



CHAIN CUTTING

- **Track based chain cutting module for trenching in clays up to 250KPa**
- **Burial depth from 1m to 2m with integral depressor and cable handling equipment**
- **Suitable for cables up to 200mm diameter and 3m MBR.**
- **Depth of operations to 500m and 1000m.**



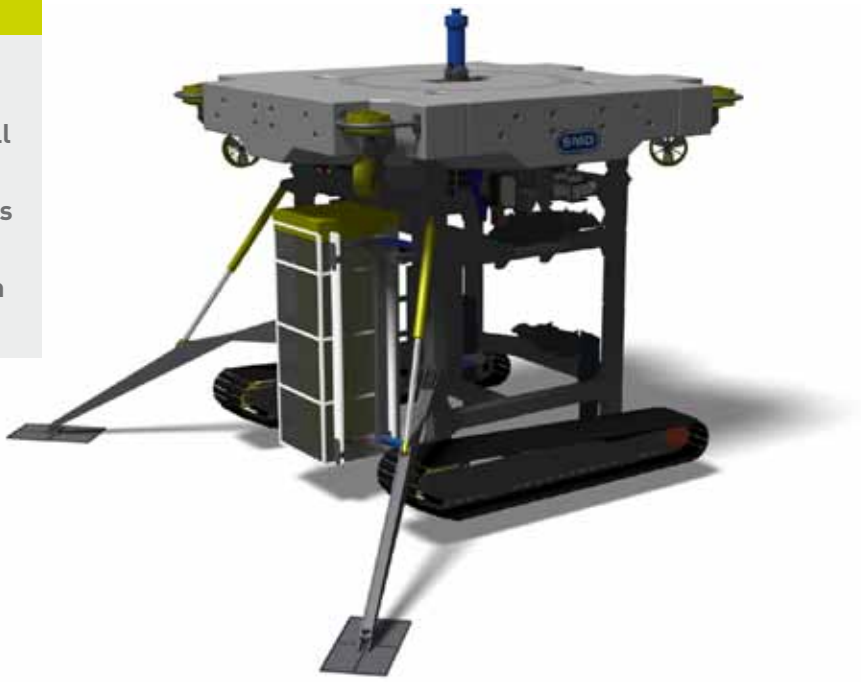
Q-T 1400 BASE MODULES

CUTTING DREDGE

- Track based free fly crane mounted cutting head or jet cutter with integral dredging for site clearance operations.
- Dredge pump capable of transporting up to 200m³/hr solids.
- Depth of operations to 3000m.

CORE DRILLING

- Track based wire line core drilling module for soil investigations with 75mm drill rods and up to 10te push force, together with drill casings and CPT capability.
- Supplied with subsea loaded drill magazines for drilling depth beyond 90m.
- Depth of operations to 500m, 1000m, 2000m and 3000m.

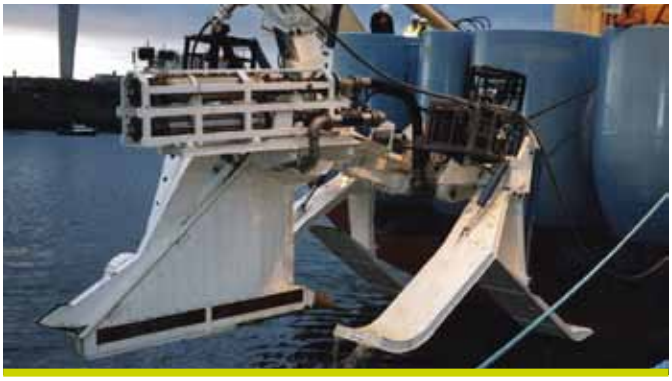


MD3/HD3/UD3

FLEXIBLE SLOT PLOUGHS

The Smart Plough range including the Multi-Depth Plough (MD3), Heavy Duty Plough (HD3) and Ultra Duty Plough (UD3), is recognised globally as setting the standard in cable ploughing, reliably trenching in most soils including sands, clays and soft rock. The range is designed to handle cables up to 150, 200, 300 and 400mm diameter electrical cables and repeaters for telecommunication systems. The ploughs come with a further range of cable MBR capability from 1.5m to 6.0m.

Using patented technology, the ploughs are designed to minimise pull force requirements and provide effective trenching capability from zero to 4m depth. Their performance can be enhanced with jetting and rock ripping upgrades. Coupled with a tow winches, umbilical winches and wide angle A frames, SMD are able to supply a turnkey flexibles burial solution for a wide range of cable sizes and vessel tow load together with cabel and handling systems such as drum cable engines (DCEs) and linear cable engines (LCEs).



FEATURES

- **80 –250te max pull capability**
- **2-4m max trench depth capability**
- **Product burial from 150 to 400mm dia., 1.5 to 6.0m MBR**
- **Diverless subsea unloading**
- **Diverless subsea loading**
- **Emergency cable unload**
- **Multi depth burial capability**
- **Steering bridle +/- 12 degrees**
- **Jetting system for enhanced burial in sand**
- **Jetting thruster for positional accuracy when landing on seabed**
- **Comprehensive instrumentation and surveillance**
- **Optional kit for beach operations**
- **Proven Curvetech™ components throughout**
- **DVECS robust distributed control platorm provides reliable, ergonomic operaÐons and good diagnostics**
- **Range of SMD designed A-frame based LARS for standard and high sea states**
- **Containerised control and power system**

	MD3	HD3-200	HD3-300	UD3
GENERAL				
Depth rating	2000msw	1500msw	1500msw	500msw
Dimensions				
Length	9.1m	13.5m	15.0m	20.0m
Width	5.1m	6.3m	6.5m	8.0m
Height	4.4m	6.6m	6.6m	9.5m
Weight in air (std)	22 Te	35 Te	45 Te	120 Te
Submerged weight	19 Te	30 Te	39 Te	106 Te
Max tow load	80 Te	150 Te	150 Te	250 Te
PERFORMANCE				
Trench depth	Variable 0 to 3.0m	Variable 0 to 3.0m	Variable 0 to 3.3m	3.0m to 4.0m
Max. cable dia.	20mm to 160mm	30mm to 200mm	30mm to 300mm	200mm to 400mm
Min. cable bend radius	1.5-2.0m	2.0-3.5m	2.5-5.0m	5-6.0m
Steering.	+/- 15 deg.	+/- 12 deg.	+/- 12 deg.	+/-12deg
Max repeater diameter	380m	×	×	×
MECHANICAL				
High strength steel chassis	✓	✓	✓	✓
Replaceable wear-resistant steel wear parts	✓	✓	✓	✓
Stainless steel fittings and housings	✓	✓	✓	✓
TRENCHING SYSTEM				
Configuration - passive parallel sided share	✓	✓	✓	✓
Jetting - 250-500kW	✓	✓	✓	✓
Water supply (approx) - 800m^3/1600m^3 @ 6bar (approx)	✓	✓	✓	✓
Plough share tip, knife jetting & forward jetting arm	✓	✓	✓	✓
DIVERLESS SUBSEA UNLOADING	×	✓	✓	✓
Crane - knuckle boom	×	✓	✓	✓
Slewing depressor - to assist cable into share	×	✓	✓	✓
Front bellmouth tines - load cable into front bellmouth	×	✓	✓	✓
Jetting thruster - to assist landing over cable	×	✓	✓	✓
Tipping trough - to assist with unloading	×	✓	✓	✓
ROV intervention panel - emergency unload	×	✓	✓	✓
HYDRAULIC SYSTEM				
Installed power	15kW	15kW	15kW	25kW
Smart heavy duty marine cylinders	361pm@250bar	36lpm @ 250bar	36lpm @ 250bar	45lpm @ 250bar
Directional and counterbalance valves	✓	✓	✓	✓
Stainless steel, oil compensated valve packs	✓	✓	✓	✓
Stainless steel manifolds, pipes & fittings	✓	✓	✓	✓
Multi-spiral flexible hoses	✓	✓	✓	✓

MP

PIPELINE V PLOUGH

The Multipass Plough (MP) builds on SMD's reputation for the continuous development of products. The MP sets the standard globally for multipass pipeline ploughing offering remotely variable multipass capability. This allows the operator to remotely adjust the depth during trenching. The plough system also includes SMD advancements such as Hi-Tow points and the active share track, making the MP the most advanced pipe trenching technology in the world. Towing capability ranging 250te, 300te and 350te vessel pull, combined with the track drive and jetting ensures maximum burial capability. The ploughs are also available with air tank buoyancy for minimum ground pressure.

FEATURES

- **250 Te, 300 Te and 350 Te max tow load**
- **2.0-2.5m max. trench depth capability with multi-pass**
- **2x25 Te to 2x75 Te pipe handling capacity**
- **Large pitch capability**
- **Hi-Tow points reduce tow force requirements**
- **Optional active share track reduces tow force requirements**
- **Optional jetting on share reduces tow forces in sands**
- **SMD powered steering**
- **1000m maximum water depth depth as standard**
- **Comprehensive instrumentation and surveillance**
- **Proven Curvetech™ components throughout**
- **DVECS robust distributed control platform provides reliable, ergonomic operations and good diagnostics**
- **Range of SMD designed A-frame based LARS for standard and high sea states**
- **Containerised control and power system**

GENERAL

Depth rating	1000msw
Dimensions	
Length	18.5-21.4m
Width	9.8-11.75m
Height	8.5-9.65m
Weight in air (std)	140-180 Te
Submerged weight	125-155 Te
Max tow load	250/300/350 Te

PERFORMANCE

Trench depth	1st pass - 1.5-2.0m 2nd pass – 2.0-2.5m
Max. product diameter	700-1460mm dia.
Steering	+/- 8 deg.
Soft ground capability	5kPa at full trench depth

MECHANICAL

Construction	High strength steel chassis
Wear parts	Replaceable wear-resistant steel
Other	Stainless steel fittings and housings

TRENCHING SYSTEM

Main share	Passive blades 35 deg. vee trench
Fixed mouldboards	25 deg. slope spoil heaps either side of trench
Share track	reduces tow forces up to 80 Te down force up to 1400m/hr track speed
Optional jetting	150kW Plough share jetting Upgrade to Umbilical and Winch Upgrade to Power and Control System

BP

PIPELINE BACKFILL PLOUGH

The Backfill Plough (BP) builds on SMD's reputation for the continuous development of products. The BP sets the standard globally for pipeline backfill ploughs, offering front end loading, remotely variable mouldboard depth control, and rear driven compacting rollers. These features simplify operational requirements and allow the operator to remotely adjust the tow forces during backfill operations. The ploughs are also available with air tank buoyancy for minimum ground pressure.

FEATURES

- **120 Te, 160 Te and 200 Te max tow load**
- **Rear driven compacting roller**
- **Remotely driven mouldboard depth control**
- **Optional front end loading**
- **Detachable lift point**
- **A frame stabilising frame**
- **Hi-tow points reduce tow force requirements**
- **SMD powered steering**
- **1000m maximum water depth**
- **Comprehensive instrumentation and surveillance**
- **Proven CurvetechTM components throughout**
- **DVECS robust distributed control platform provides reliable, ergonomic operations and good diagnostics**
- **Range of SMD designed A-frame based LARS for standard and high sea states**
- **Containerised control and power system**

GENERAL

GENERAL	
Depth rating	1000msw
Dimensions	
Length	17.8 –19.7m
Width (launch)	9.4-11.3m
Height	8.0-9.3m
Weight in air (std)	100-120 Te
Submerged weight	90-102 Te
Max tow load	120/160/200 Te

PERFORMANCE

Steering	+/- 8 deg.
Soft ground capability	5kPa at full trench depth

MECHANICAL

Construction	High strength steel chassis
Wear parts	Replaceable wear-resistant steel
Other	Stainless steel fittings and housings

BACKFILL SYSTEM

Mouldboards	Variable blades

BT 800/1100/2100/2400

INNOVATIVE TRENCHING TRACTOR SOLUTION

The Burial Tractor (BT) range draws on SMD's experience of track driven vehicles, trenching and product handling subsea to provide a soft to hard ground burial solution in one neat package. The BT is a fully amphibious vehicle and comes equipped with a selection powerful chain cutter trenching tools, dredge pumps and jet legs. Well proven chain cutter deployment systems allow pre or post-lay burial of cables up to 300mm diameter and 5.0m MBR, and pipelines up to 1.5m diameter.

SMD offer a turnkey, integrated solution including SMD designed high sea state launch and recovery systems (LARS) and umbilical systems.

FEATURES

- **800/1100/2100/3200hp of installed power**
- **From 30Te to 180Te air weight**
- **Pre and post lay cable and pipeline burial**
- **3.0m Variable jetting capability with depressor**
- **2.0m to 3.0m chain cutter for hard ground up to 40MPa and 80MPa**
- **Optional fore, mid and aft dredge pumps each capable of transporting up to 600m³/hr solids**
- **300mm max. cable/umbilical diameter with rear swords with 3.0-5.0m min. bend radius depending on burial depth**
- **1500mm max pipe diameters with pipe handling up to 75te each**
- **Optional 3Tem crane manipulator with grab/jet/dredge tools for intervention tasks**
- **1000m max. water depth as standard**
- **Comprehensive instrumentation and surveillance**
- **Proven CurvetechTM components throughout**
- **DVECS robust distributed control platform provides reliable, ergonomic operations and good diagnostics**
- **Range of SMD designed A-frame based LARS for standard and high sea states**
- **Containerised control and power system**

	BT800	BT1100	BT2100	BT2400
GENERAL				
Depth rating	1000msw	1000msw	1000msw	1000msw
Dimensions				
Length (with tools)	13.0m	13.5m	14.5m	22.5m
Width	6.0m	6-7.5m	7.5m	13.0m
Height	5.4m	5.5m	5.5m	9.6m
Weight in air	35 Te	50 Te	60 Te	180 Te
PERFORMANCE				
Trench depth (jetting)	1.0-2.0m	1.0-3.0m	1.0-3.5m	2.5m
Max. product diameter	300mm	300mm	800mm	1500mm
Speed 0-250m/hr	✓	✓	✓	✓
Soil types Sands	All sands	All sands	All sands	All sands
Clays	10 to 1000kPa	10 to 1000kPa	10 to 1000kPa	10 to 1000kPa
Rock	1 to 40 MPa	1 to 40 MPa	1 to 80 MPa	1 to 80 MPa
Soft ground capability (with buoyancy)	12-20 Pa	12-20 Pa	14-25 Pa	20-40 Pa
Installed power	600kW total 2 x 300kW HPU	800kW total 2 x 400kW HPU	1600kW 4.400kW HPU	2400kW total 6 x 400kW HPU
MECHANICAL				
High strength steel chassis	✓	✓	✓	✓
Replaceable wear-resistant steel wear parts	✓	✓	✓	✓
Stainless steel fittings and housings	✓	✓	✓	✓
TRENCHING SYSTEM				
Configuration – single vertical hyd. drive chain cutter with separate rear jet tool.	✓	✓	✓	✓
Trench Profile Depth	2.0m	2.0 & 3.0m vert.	3.0m	2.0 & 2.5m 'V'
Width	0.5m	0.6m	0.6m	4.0m (90 deg.)
Chain power	300Kw	400kW	800kW	3 x 400kW
Chain width	600mm	600mm	600mm	900mm
Chain speed 0 to 4m/s	✓	✓	✓	✓
Heavy duty chain with point attack picks	✓	✓	✓	✓
Forward dredge pump (spoil removal)	50kW 400m^3	1 x 75kW 600m^3	2 x 75 kW 1200m^3	3 x 75kW 1800m^3
Dredge spoil backfill	✓	✓	✓	✓
spoil fed to cover cable	✓	✓	✓	✓
Jetting configuration – Water pumps supply hyd. deployable twin-legged device either side of cable with in-built depressor.				
Jetting power	2 x 200kW	2 x 300kW	2 x 300kW	2 x 400kW
Jet leg depth	2.0m	3.0m	3.0m	2.0m

LBT

INNOVATIVE CABLE INSTALLATION SOLUTION

The Lay and Burial Tractor (LBT) is based on the BT800 tractor specification and draws on SMD's experience of track driven vehicles, trenching and cable handling subsea to provide lay and burial solution in one neat package. LBT is a fully amphibious vehicle and comes equipped with a powerful chain cutter, spoil dredge pump and jet legs to simultaneous lay and bury cable or post lay cable burial. LBT has a driven cable reel mounted on the vehicle itself and this means it can operate independently of the vessel with only the umbilical attached. This has benefits in sectors such as offshore wind farm installation, significantly reducing installation time.

FEATURES

- **800kW of installed power**
- **1.0-2.0m depth jetting capability**
- **2.0m chain cutter**
- **250mm max. product diameter**
- **1.8-2.0m min. bend radius**
- **High current stability (8 Knots)**
- **Simultaneous and post lay burial**
- **Fore Dredge pump with rear trench backfill function**
- **3Te m crane manipulator with jet/dredge tools**
- **Comprehensive instrumentation and surveillance**
- **Proven CurvetechTM components throughout**
- **DVECS robust distributed control platform provides reliable, ergonomic operations and good diagnostics**
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GENERAL

Depth rating	1000msw
Dimensions	
Length (with tools)	13.5m
Width	10.0-12.0m
Height	9.0-10.7m
Weight in air (no cable)	60-75 Te

CABLE REEL

Core dia.	3.0-4.0m
Drum width	2.3m
Cable capacity	1000m (150mm dia. max.)
Weight	4te empty
	30 Te loaded, options for 40 Te and 50 Te
Hyd. drive	1.5 Te @ 30m/min.
Emergency brake	3 Te on bottom wrap

BESPOKE PROJECTS

BESPOKE SUBSEA SOLUTIONS AND SPECIALIST HANDLING EQUIPMENT

SMD can apply expertise and experience to a wide range of problems which require a subsea remotely operated solution or specialist handling equipment. SMD has a long track record of developing innovative solutions, which mitigate risk by using, wherever possible, a standard range of components and drawing on the experience of over 350 subsea projects.

Typical projects undertaken such as the fall pipe remotely operated vehicle (ROV) designed to control the positioning of an 800mm diameter, 2km long rock dump fall pipe with 600Kw of on board power. The system included dynamic positioning, pipe following and survey equipment.

FEATURES

- **Feed studies**
- **Special purpose design**
- **Consultancy**
- **Process design**
- **Tooling design**
- **Control system design**
- **Simulation**
- **Deck layouts**
- **Machine selection**

LAUNCH AND RECOVERY SYSTEMS (LARS)

SMD bring years of knowledge and experience to the design and manufacture of launch and recovery systems for some of the world's largest subsea machines to offer a range of A-frames specifically designed for handling subsea trenching equipment. All have attained Lloyds Design Approval and are tested according to Lloyds Rules.

WIDE ANGLE A FRAMES

SMD supply a large range of wide angle A frames which are utilised with a range of subsea systems including cable ploughs and trenching remotely operated vehicles (ROVs). Load ranges, from 20Te sea state 6 to 75Te sea state 5 are available. Wide angle A frames are particularly useful for cable plough systems allowing the tow wire/lift wire to run over the central sheave, when the A frame is in board and towing.

Wide angle A frames are also useful for trenching ROV deployment maximising the free board height and the vessel clearance.

NARROW ANGLE A FRAMES

SMD offer a very large range of narrow angle A frames which are used for launching work class ROVS, trenching ROVS, tractors and pipeline plough systems. Load ranges from 8 tonnes sea state 6, to 300Te sea state 5 are available. Narrow angle A frames are simple and robust systems minimising maintenance and weight.

UMBILICAL WINCHES

SMD manufacture a range of umbilical winches capable of handling single wire armoured or buoyant umbilical cable, for operating depth ranges up to 4000m. Non lifting umbilical winches are used to power a wide range of trenching equipment including tractors, large cable ploughs and pipeline ploughs.

LARS

LIFTING UMBILICAL WINCHES

SMD manufacture a range of lifting umbilical winches capable of handling loads up to 25Te in sea state 7. The umbilical cables are double armoured and operate at voltages up to from 3300 to 4500volts. Lifting umbilical winches are used to power Q Trencher ROVs (600 to 1400) and lightweight tractor systems.

TOW WINCH

SMD have a long history of supplying lifting tow winches in conjunction with cable plough systems, with tow capacities from 35te to 200te tow load. The tow winches incorporate fleeting systems in conjuction with render functions for various towing speeds.

PASSIVE HEAVE COMPENSATOR

SMD supply passive heave compensators for lifting operations where subsea machines from 100Te to 350Te need to be landed on the sea bed in a controlled manor, in sea states up to and including sea state 6. The passive heave compensators have a number of operating modes for the various stages of operation including manual, automatic, slack wire and taut wire modes.

HYDRAULIC POWER UNITS

SMD deck equipment is powered from various hydraulic power units ranging in size from 220Kw to 460Kw with double or triple motor drives for redundancy. HPUs can be supplied containerised or open-frame depending on customer preference.

HEAD OFFICE & HEAVY PRODUCTION

SOIL MACHINE DYNAMICS LTD
TURBINIA WORKS, DAVY BANK, WALLSEND,
TYNE AND WEAR, NE28 6UZ, UK

T +44 191 234 2222 E INFO@SMD.CO.UK

WWW.SMD.CO.UK

TRENCHING BUSINESS STREAM MANAGER

PAUL DAVISON

T +44 191 234 8530 M +44 7813606331
E PAUL.DAVISON@SMD.CO.UK

WWW.SMD.CO.UK

SALES MANAGER – TRENCHING & BESPOKE PROJECTS

GRAEME WALKER

T +44 191 234 8690 M +44 7897260324
E GRAEME.WALKER@SMD.CO.UK

WWW.SMD.CO.UK