

MacArtney
UNDERWATER TECHNOLOGY

TrustLink™
Connectivity

Connecting oceans of knowledge

Worldwide Sales and Service Support



- **Group headquarters**
Esbjerg, Denmark
- **Operations and sales offices**
21 locations in Europe, the Americas and Asia Pacific
- **Distribution network**
20 locations around the world

Founded in 1978 by Martin and Winnie MacArtney
~ 540 employees in group companies

MacArtney operations



MacArtney Denmark



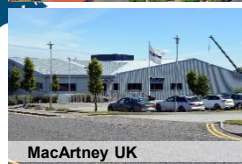
MacArtney Manufacturing



MacArtney Hydraulics



MacArtney Norge



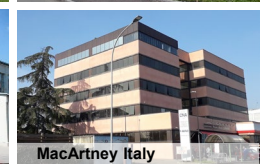
MacArtney UK



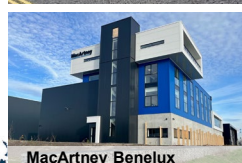
MacArtney France



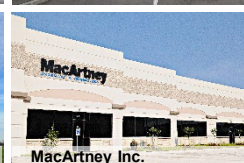
MacArtney Germany



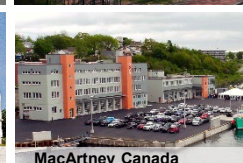
MacArtney Italy



MacArtney Benelux



MacArtney Inc.



MacArtney Canada



SubConn



MacArtney Singapore



MacArtney China



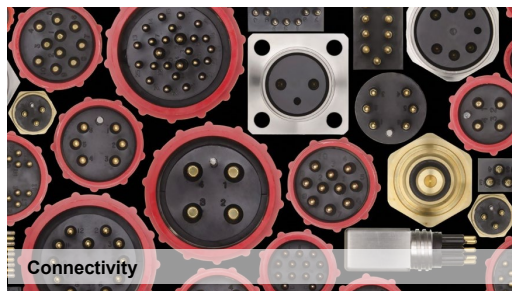
MacArtney Australia

Operations and distributors

Denmark | Norway | Sweden | Finland | United Kingdom | Netherlands | Germany | Poland | France
Spain | Portugal | Italy | UAE | Saudi Arabia | Israel | Turkey | South Africa | Nigeria | USA | Canada | Mexico
Colombia | Chile | Brazil | Singapore | China | India | Pakistan | South Korea | Japan | Taiwan | Australia

MacArtney is a system solution provider

We | design
| manufacture
| sell
| service



Connectivity
Underwater connectivity solutions
- connectors, cables and terminations



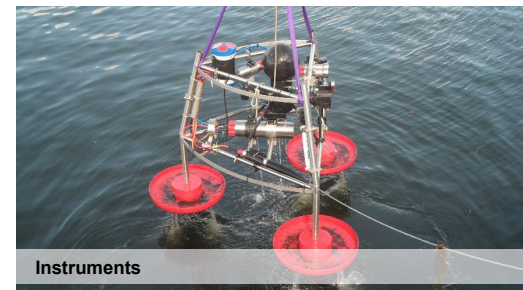
Winch and handling solutions
Winch and handling solutions
- winches, A-frames and rotary products



Remote technology
Remote technology systems
- ROTVs and ROVs



Telemetry
Underwater telemetry systems
- multiplexers and electronics



Instruments
Underwater instrumentation systems and products
- sonars, sensors and cameras



Marine and offshore

Green Ocean

- Marine renewables (waves, tidal, generators)
- De-pollution
- Subsea Data centers
- Floating Offshore Wind

EPC contractors

- Engineering, Procurement and construction companies

Operators with vessels for

- FPSO
- Rock Dumping
- Pipe and cable laying
- Land reclamation
- Subsea mining
- Subsea exploration (seismic and drilling)
- Dredging
- ROV
- Decommissioning
- Diving service

Survey & Inspection:

- Commercial survey companies; hydrographic, UXO, SSS etc.



Ocean Science

Research

Climate change/Global warming studies, seabed observatories for:

- Physical Oceanography
- Coastal research
- Freshwater research
- Fisheries research
- Marine biology
- Marine geology
- Environmental monitoring

Hydrography

Hydrographic charting/mapping of the seabed, rivers, channels and ports carried out on behalf of the public:

- National and Regional charting/mapping services
- National and Regional waterways authorities
- Port authorities

Vessels:

- Ship yards building research vessels, survey vessels (public) and monitoring workboats.
- Companies operating the RV and environmental monitoring fleets
- Operators and fleet/vessel owners



Naval

Facilities and yards

- Test ranges
- Naval Ship yards
- Navies

Subsea Detection

- Integrators
- Tier contractors
- MCM and ASW
- Unmanned vehicles/applications (AUV's and USV's)

Research and Development:

- Institutes and laboratories predominantly funded by defence funds.

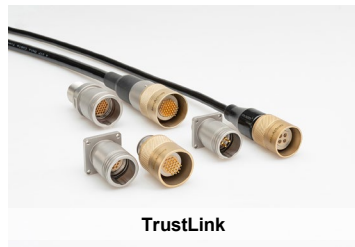
MacArtney brands



SubConn



OptoLink



TrustLink



TrustLink API



GreenLink



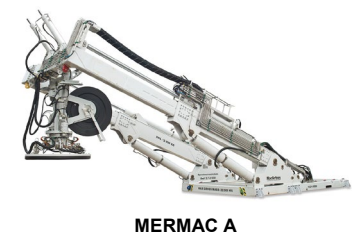
CORMAC



MERMAC



MERMAC eA



MERMAC A



MERMAC D



LUXUS



EMO



NEXUS



FOCUS



TRIAXUS



TrustLink Metal Shell

TrustLink Metal Shell - Specifications



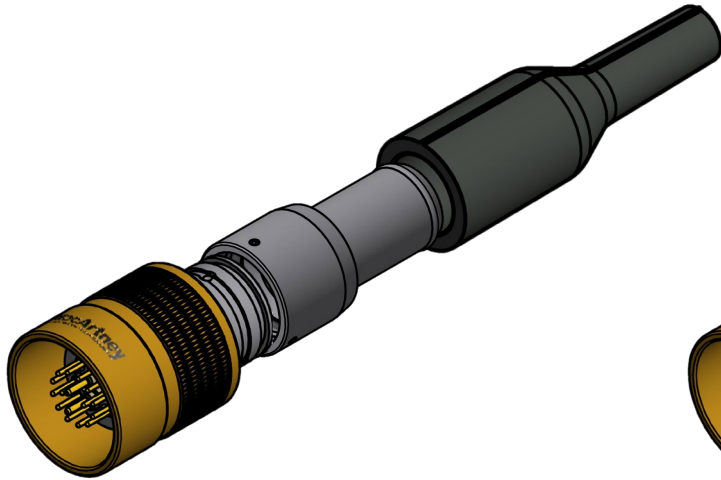
Size A							
Pins	Cable	Rated voltage	Rated current (all pins equally loaded)	Impulse test*	Ac withstand*	Ac withstand immersed*	IR
	AWG	VAC	A	2.5/4 kV**	2.5/4 kV**	2.5/4 kV**	>50 MΩ*
4	14	600	25	Yes	Yes	Yes	Yes
8	18	600	8	Yes	Yes	Yes	Yes
12	20	250	7	Yes	Yes	Yes	Yes
Size B							
16	2	16	600	9	Yes	Yes	Yes
	14	20	250	6	Yes	Yes	Yes
19	20	250	6	Yes	Yes	Yes	Yes
Size C							
26	20	250	5	Yes	Yes	Yes	Yes
37	20	250	5	Yes	Yes	Yes	Yes

*Test requirements according to EN50393 table 5

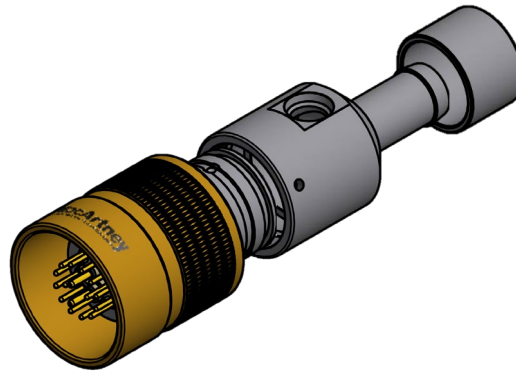
** 2,5 kV for pins rated 250 V and 4 kV for pins rated 600 V

Configurations - Electrical

- Easy to fit to customer needs due to the add-ons on the connector body
- The different CCP configurations:



CCP 16 pin male with boot stud and boot



CCP 16 pin male with PBOF



CCP 16 pin male with overmould

Configurations - Electrical

- Easy to fit to customer needs due to the add-ons on the connector body
- The different FCR and BCR configurations:



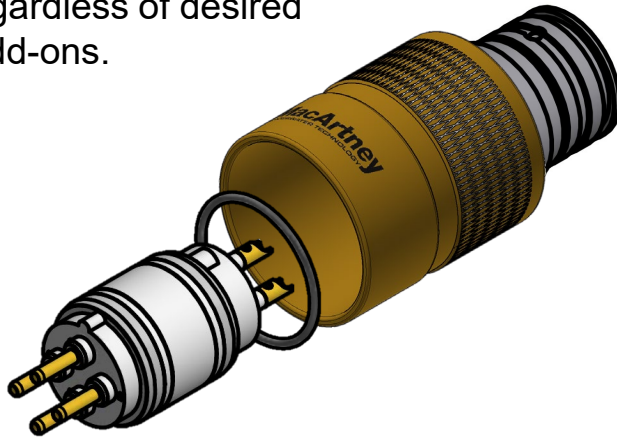
BCR 37 pin male with washer and hex nut



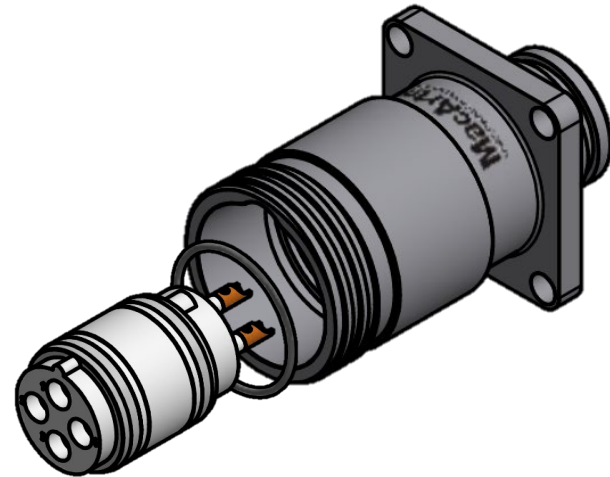
FCR 4 pin male

Interchangeable and reversible insert configurations

- The customisation in the TrustLink connector is unique to the series.
- In the case of a rental company, the more inexpensive male part can be mounted on equipment, regardless of desired housing and/or add-ons.



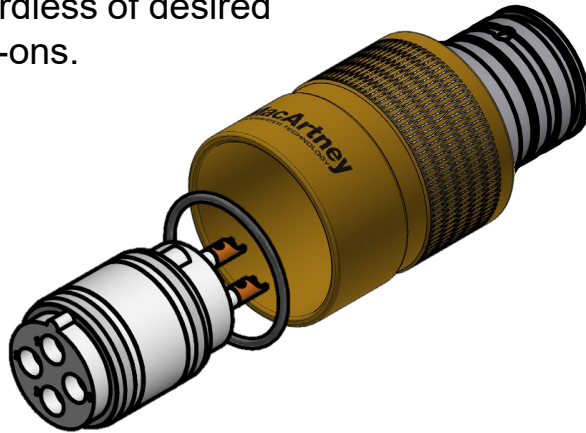
CCP 4 pin male



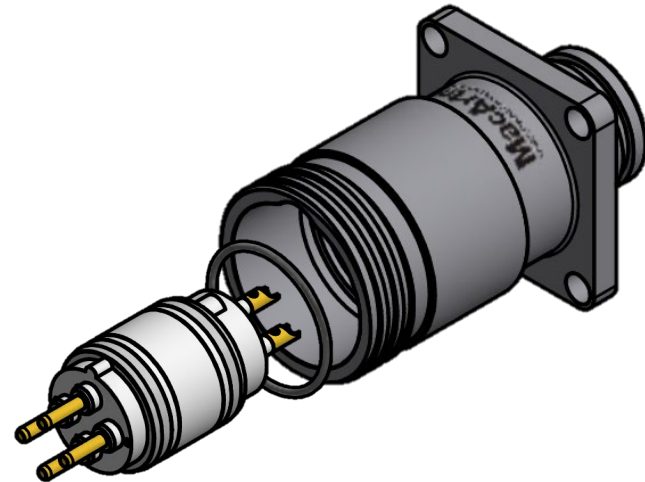
FCR 4 pin female

Interchangeable and reversible insert configurations

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- In the case of a rental company, the more inexpensive male part can be mounted on equipment, regardless of desired housing and/or add-ons.



CCP 4 pin female



FCR 4 pin male

Mechanical properties

Materials

Metal shell housing:	Diamond polished AISI 316*
Locking sleeves:	Diamond polished Nickel Aluminium Bronze C63000*
Pressure cap:	Diamond polished AISI 316*
Dust cap:	POM
Electrical insert:	Glass reinforced high performance thermoplastic
O-ring:	FPM-75

Environmental

Qualified pressure tested:	Mated 720 bar/10,400 psi
Depth rating:	Mated 600 bar/8,700 psi

Temperature rating

Water	-4 to 70°C/25 to 158°F
Air:	-25 to 70°C/13 to 158°F
Storage:	-25 to 70°C/13 to 158°F

Standards

Creepage distances and clearances:	EN 60664-1, table F2 and F4
Electrical low voltage tests:	EN 50292, table 5

TrustLink PDF files on the webpage

Electrical



Design and testing requirements

Test type	Standard	Test requirement to pass
Impulse test	EN 50393	2.5/4 kV
AC dielectric withstand	EN 50393	2.5/4 kV
AC dielectric withstand immersed	EN 50393	2.5/4 kV
IR	EN 50393	Min. 50 MΩ
Pollution degree	EN 60664-1	2
Creepage distance	EN 60664-1	Depend of connector size
Clearance in air	EN 60664-1	Min. 1.5/3 mm depending on the voltage rating of the connector
Short circuit test	Necessary to avoid damage to soldering if short circuited (max temp for soldering).	Max sc. current for 1 sec without exceeding 150°C (max temp for soldering)

• • • •

Designed and tested to the EN 60664-1 and EN 50393-Table 5 standard

• • • •

TrustLink public domain information

Material is free to access on our webpage:

- Assembly instructions
- Maintenance and usage instructions
- 3D files
- 4-37 electrical contacts... ▶▶

The image displays a collection of product covers for TrustLink Metal Shell Connectors, arranged in a 3D perspective. The covers are dark blue with white and gold text and images of the connectors. The covers shown are:

- FCR - assembly instruction
- BCR - assembly instruction
- CCP - assembly instruction
- Pressure Cap M/F - assembly instruction

Overlaid on the right side is a 'Related files' list:

Related files

- [TrustLink Metal Shell Connectors.pdf](#)
- [TrustLink MS assembly instruction Pressure Cap MF.pdf](#)
- [TrustLink MS assembly instruction BCR.pdf](#)
- [TrustLink MS assembly instruction CCP.pdf](#)
- [TrustLink MS assembly instruction FCR.pdf](#)
- [TrustLink MS assembly instructions.pdf](#)

Overlaid on the bottom left is a '3D Files' section:

3D Files

Step files

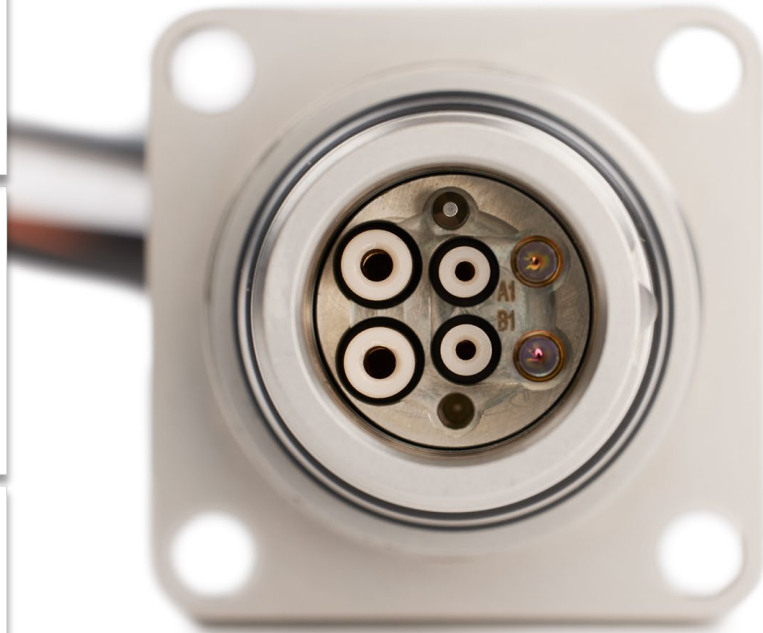
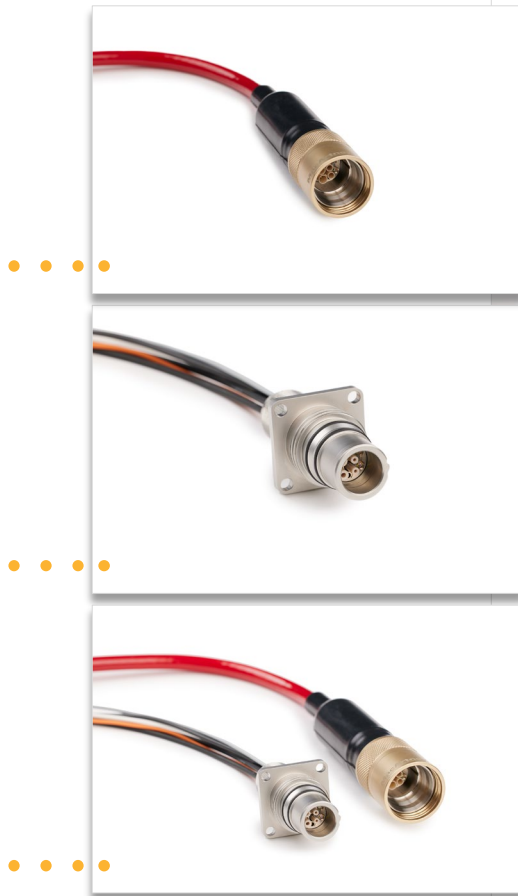
- Size A
- Size B
- Size C

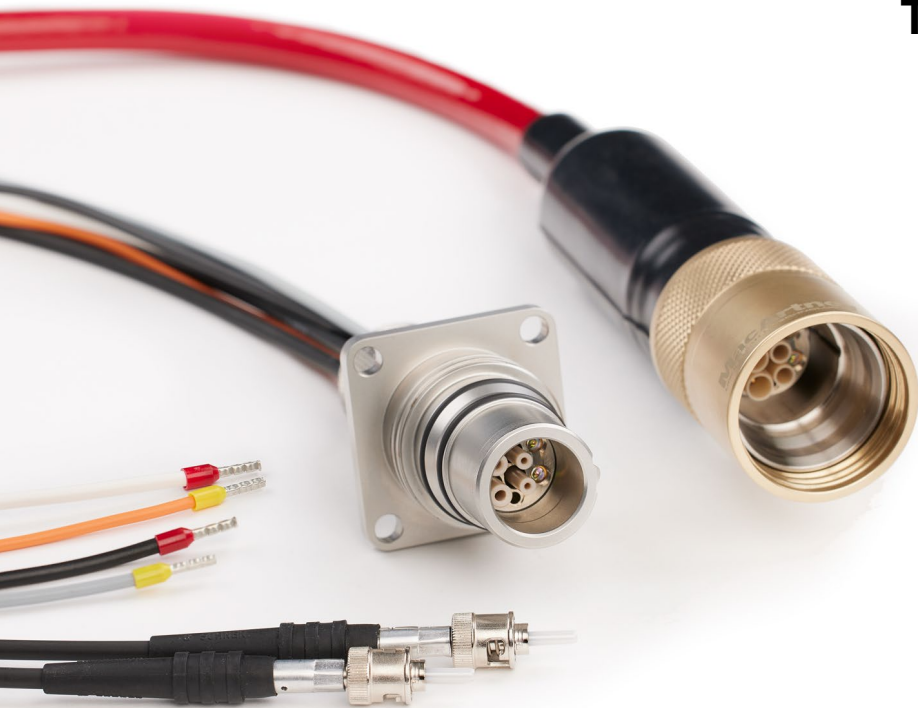
X_B files

- Size A
- [Size B](#)
- Size C

Hybrid

TrustLink Hybrid





TrustLink Hybrid – Next Generation

- TrustLink Metal Shell Hybrid
- Compact design minimising footprint
- Single connector with power, data and communication
- 6-way
 - 2-power 16 AWG
 - 2-signal 20 AWG
 - 2-optical
- Optical expanded beam technology
(*same as MacArtney OptoLink*)
- Easy-to-clean connector design

TrustLink Metal Shell - specifications

Hybrid FCR & CCP ● ● ● ●



Electrical			
Pins		Cable	Rated voltage
No.	AWG	VAC	A
4	16	600	5
	20	250	5

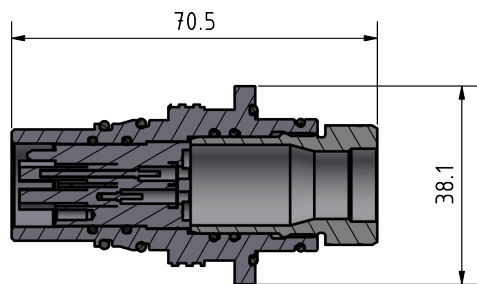
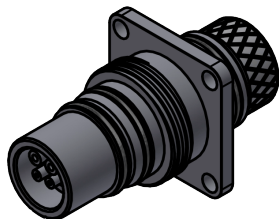
Hybrid CCP ● ● ● ●



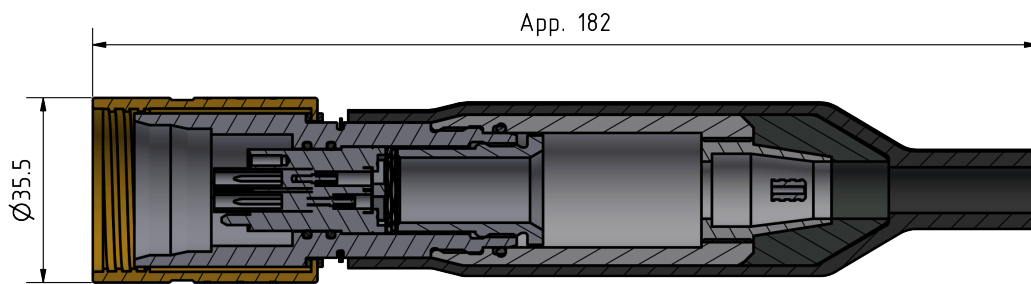
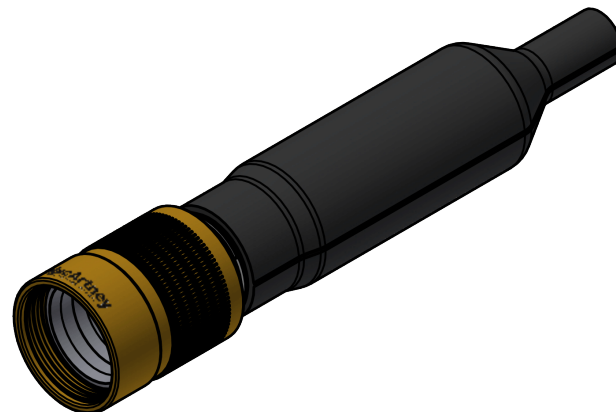
Optical					
Optical	Optical passes	Wavelength	Attenuation (max)	Attenuation (typical when mated)	Fibre types
	No.	Nm	dB	dB	µm
Single mode	2	1,310 - 1,550	2,5	1.0 - 1.5	9/125
<i>or</i>					
Multi mode	2	850 - 1,300	2,5	1.0 - 1.5	50/125

Hybrid

TrustLink Hybrid



Hybrid FCR cross section ● ● ● ●



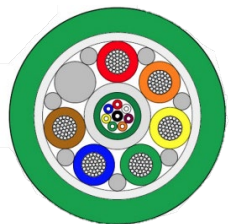
Hybrid CCP cross section ● ● ● ●

Cable of choice - Recommended



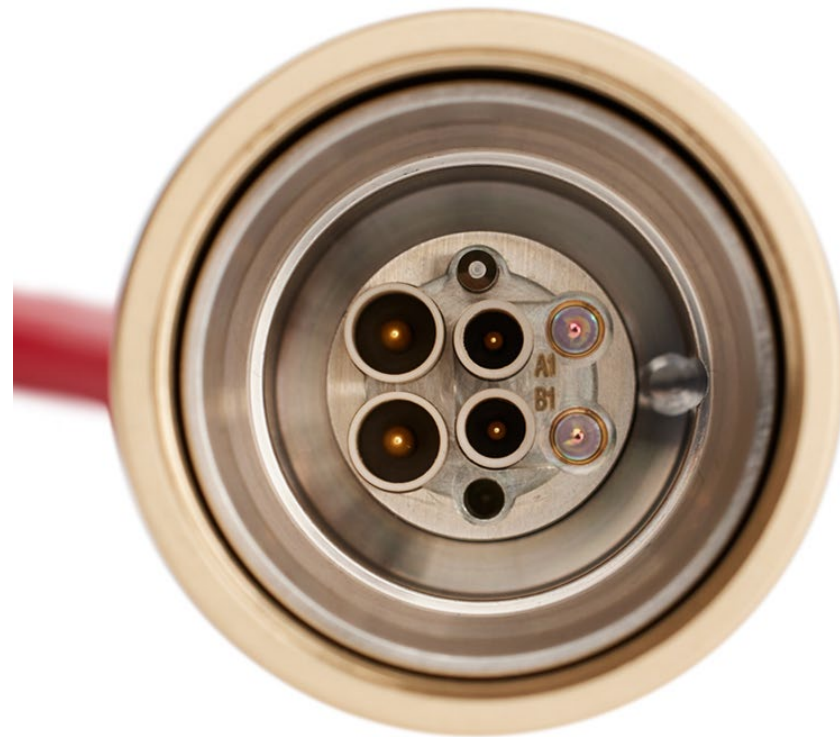
Fibre hybrid cable 3780cc

- 8 x 9/125µm OS2 Single mode fibres



Fibre hybrid cable 3644cc

- 4 x 9/125µm OS2 Single mode fibres
- 4 x 50/125µm OS2 Multi mode fibres





TrustLinkTM

CASES

Application - Energy customer



MacArtney has worked with a client to introduce our TrustLink range as a replacement for their current supplier.



A energy company operating in the oil and gas segment.



The Remotely Operated Controls System (ROCS), eliminates the umbilical during well completions.



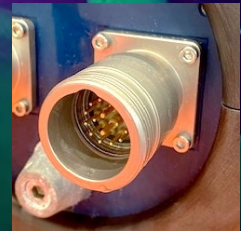
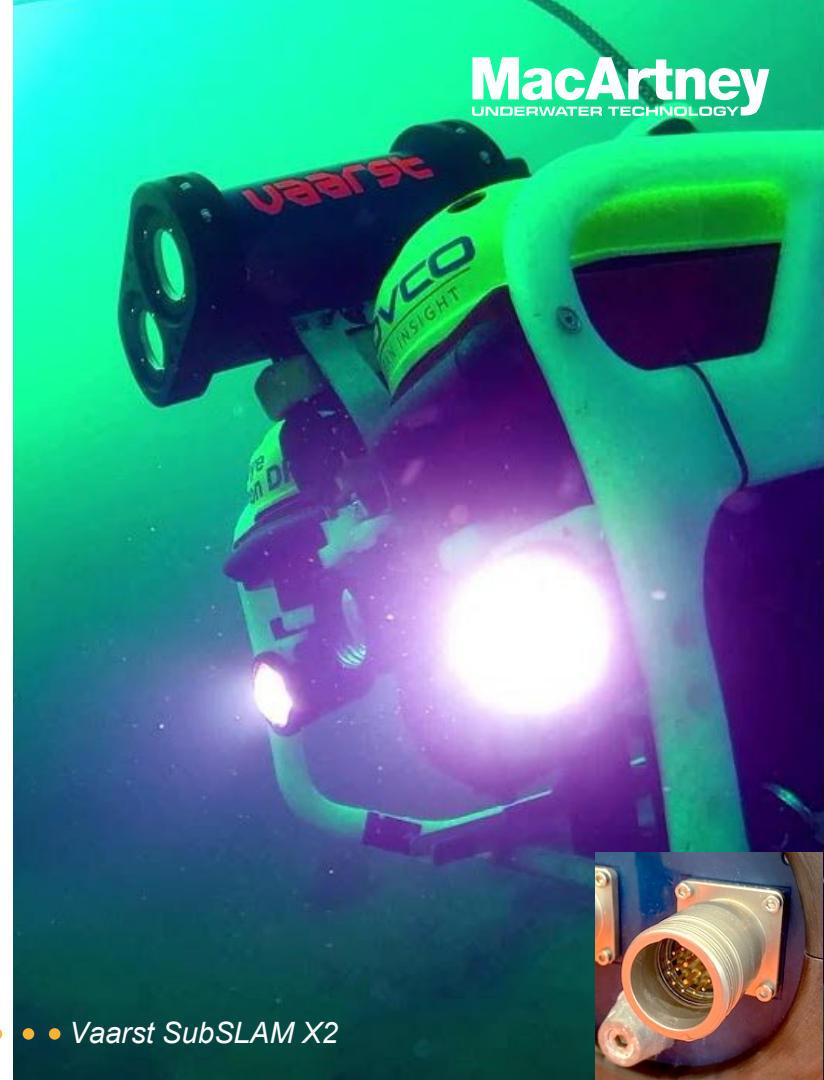
The application utilises both SubConn® and TrustLink Metal Shell connectors.



This is now standard with this client to fulfil the application needs.

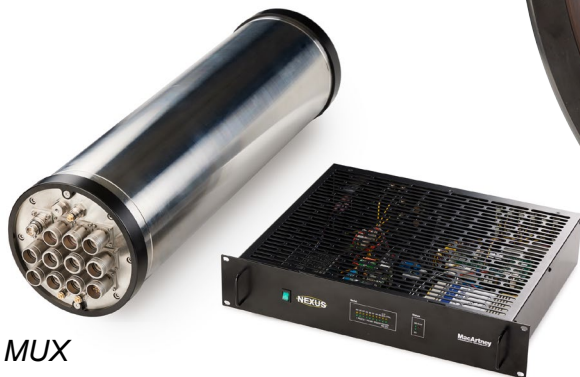
Application - Vaarst

- Vaarst (a Rovco company) has replaced competitor connectors with TrustLink Metal Shell.
- MacArtney won the order due to do the TrustLink product performance and workshop capabilities.
- This is a complete terminated solution, with direct input from the clients engineering department.
- The TrustLink connector fulfills the customer total needs.
- The SubSLAM X2 is a 3D scanner that incorporates the most recent advances in computer vision and AI.
- 4 times the data quality of competitors with 1" sensors.

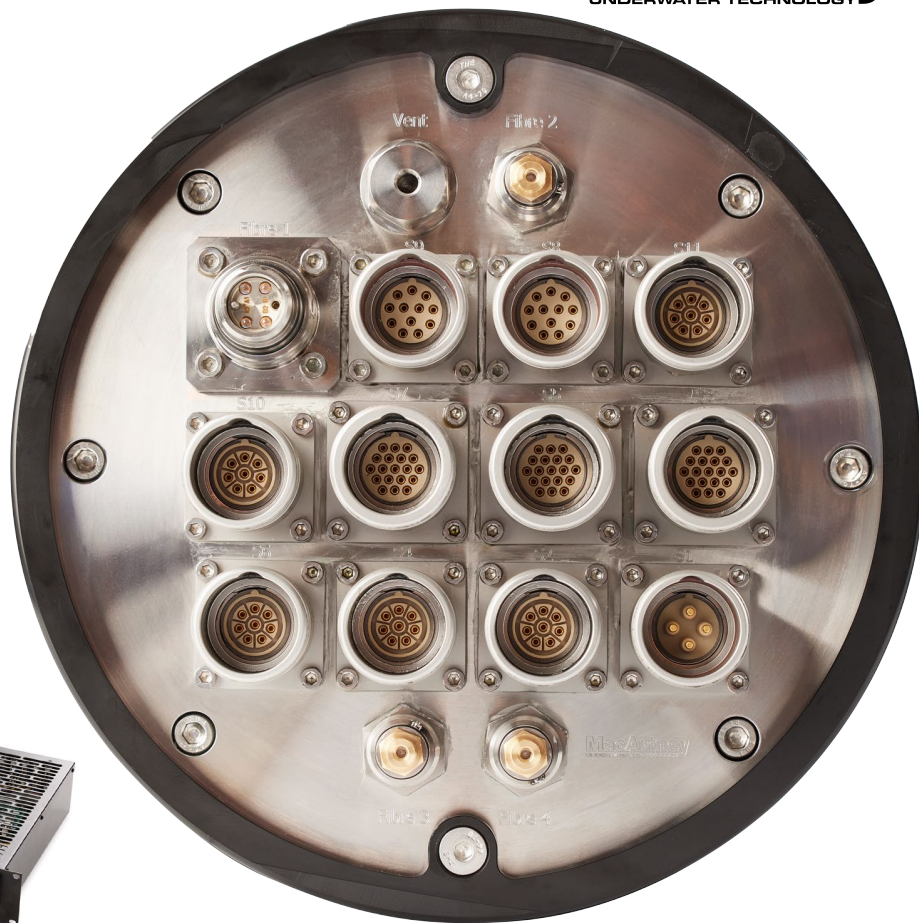


Application - Tooling Mux for Brazilian project

- Order of 5 Tooling MUXes for use on ROV systems.
- The MUX systems have an increased power budget and control options for individual sensor channels.
- The MUX also includes fibre optic pass-through channels for high bandwidth FO sensors.
- Stainless bottle design



NEXUS Tooling MUX



MacArtney connectivity product portfolio

Performance

Own products and 3rd party partnership products enable MacArtney to cover our customers' connectivity needs "100%" and provide custom solutions

Rubber Moulded



Metal Shelled



Burton™

TrustLink™



Wet Mateable



Cost

Features and benefits

TrustLink Metal Shell

- Long lifetime, up to 25 years
- Modular design (only 3 shell sizes)
- Insert rated up to 10.000 matings
- High performance thermoplastic reinforced elastomer insert
- Can be supplied in moulded, booted and PBOFs
- Backpressure rated up to 600 bar Water-blocked CCP in case of cable damage up to 600 bar
- Hybrid data, power and communication in a single connector
- Additional materials available

MacArtney

- No Minimum Order Quantity on standards
- Global workshop capabilities
- Global technical support
- Extensive internal pressure testing capabilities
- 45 years of underwater technology experience
- Proven solutions provider
- Great customer service

MacArtney

UNDERWATER TECHNOLOGY

PRESENTS

•••• See the video online



World-wide sales and service support



Thank you for your attention

For further information

please visit:

www.macartney.com

or contact us at:

info@macartney.com