

2018 SOLAR CHALLENGE CATALOGUE

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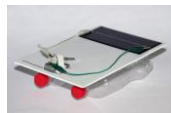
Scorpio Technology has many components for participation in the various **SOLAR CHALLENGES**, including **specialised solar panels**. Other solar panels and components for experimenting with solar power generation are listed in our *Technology* and *Electronics & Tech Components* Catalogues.

KITS FOR INTRODUCING SOLAR (NON COMPETITIVE)



INTRO SOLAR CAR KIT (SCRINT)

This is a basic four-wheeled vehicle which is powered by 2 no. 4 solar panels. Suitable for introducing the concept of solar power and low friction to students. **Price: \$37.13**



INTRO SOLAR BOAT KIT (SBTINT)

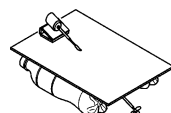
This kit introduces the concept of solar powered boats, by building a simple solar powered boat. It contains a no. 4 solar panel and the required electrical and mechanical parts. **Price: \$26.52**

STARTER KITS FOR SOLAR CHALLENGE PROJECTS



JUNIOR SOLAR BOAT KIT (SBTJUN)

This kit contains the required motor, electrical and mechanical parts to use as the basis for building a competitive Junior level solar powered boat (a solar panel is NOT included in this kit). **Price: \$27.35**



ADVANCED SOLAR BOAT KIT (SBTADV)

This kit contains the hull material, electrical and mechanical parts to use as the basis for building a competitive Advanced level solar powered boat (motor and solar panel are NOT included in this kit). **Price: \$27.35**



CHALLENGER SOLAR CAR (CHALLENGER)

Provides the mechanical and electronic parts to build the chassis for a Student designed Car (Advanced). Includes carbon fibre tubes, axle bracket and Faulhaber mounting kits, wheels, brass pinion gears and SPPCL (motor and solar panel are NOT included in this kit). **Price: \$135.00**



SHERIDAN KIT CAR (SHERIDAN)

This kit contains all of the parts needed to construct one Sheridan Car Challenge competition vehicle EXCEPT for the Solar Panels and wiring. **Price: \$64.35**

The illustrations and charts in the **TECHNICAL GUIDE** list options and the product codes for those options:

TECHNICAL GUIDE - REQUIREMENTS TO DESIGN AND BUILD A ...

MODEL SOLAR BOAT *

1x Solar panel
1x Electric motor
1x Propeller and Propeller shaft, etc.
1x Hull materials
1x Solar Panel Power Controller (Low Volt)**
Various components and sundry items

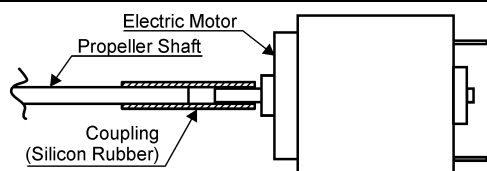
MODEL SOLAR CAR *

1x Solar panel
1x Electric motor, mounting and gearing
1x Wheels, bearings and axles
1x Frame / body materials
1x Solar Panel Power Controller (Low Volt /AutoMax)
Various components and sundry items

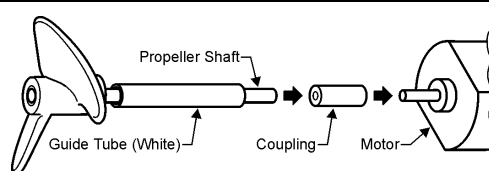
* Always check your State's current Solar Challenge Regulations to ensure you comply. ** Advanced Division only.

MODEL SOLAR BOAT - PROPELLERS & SHAFTS

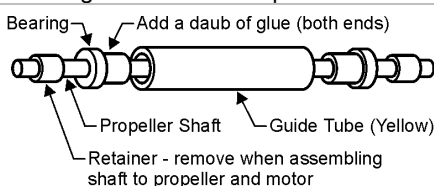
HOW DOES IT GO TOGETHER? WHAT CHOICES ARE THERE? Our range of components starts with a basic economical set up when starting out, and extends to carbon fibre propeller shafts and Driveline bearings.



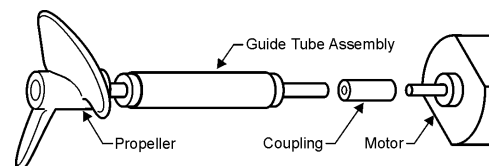
Assembling a motor to a Propeller shaft



The Propeller shaft and guide tube (using GUIDW)



Assembling the Low-friction Guide tube assembly (using GUIDY)
(using short pieces of coupling as retainers)



Assembling the Propeller shaft to the motor



2.5mm Propeller shaft	Motor	Coupling	Shaft		GUIDE TUBE		Driveline bearing BEARBT	Propeller #2
		1.8 ID	STR2.5	CFR	GUIDW	GUIDY #1		
Steel	✓	✓	✓		✓			✓
Carbon Fibre	✓	✓		✓	✓			✓
Steel	✓	✓	✓			✓	✓	✓
Carbon Fibre	✓	✓		✓		✓	✓	✓

The coupling provides a flexible connection between motor and propeller shafts

#1 This tube has a larger inner diameter, so that Driveline bearings are used to reduce friction and reduce power consumption, and is for use with the 2.5mm carbon fibre or steel rod

#2 The 2 and 3 blade boat propellers are a press-fit onto a 2.5mm shaft.

MODEL SOLAR CAR and BOAT - TECHNICAL INFORMATION SHEETS

INTRODUCTION TO SOLAR POWER: A brief introduction to solar power relating to small solar panels.

HOW DO I WIRE UP THE SOLAR PANEL ? IN SERIES? IN PARALLEL ??

Please e-mail a request for either sheet to sales@scorpiotechnolgy.com.au and we will e-mail that info to you.

MODEL SOLAR CAR - AXLES AND WHEELS

WHAT CHOICES DO I HAVE for AXLES AND WHEELS? HOW DO I ASSEMBLE THEM?

Our broad range allows for a lot of choices, from basic (wheel & axle) up to carbon fibre with bearings and collars.

<p>Using a 2.5 or 3.0mm shaft</p> <p>Insert shaft into wheel.</p>	<p>Using a 3.0mm shaft and bearings</p> <p>Step 1 Insert bearings Step 2 Insert shaft</p>	<p>Using a 6.0mm shaft and bearings and collars</p> <p>Step 1: Insert bearings Step 2: Insert shaft Step 3: Add and fasten collars</p>
<p>USING TYRE MATERIAL: The Loctite 406 Retaining compound is used to glue the tyre material ends together to form a tyre</p> <p>Cut Joint here</p>		<p>USING O-RINGS AS TYRES: The O-Ring is stretched to fit over the wheel. It sits in the groove around the wheel</p>

Axle Diameter and Options	Wheels #1 & #2 & #6						Bearings #3			Tyre #2		Axle #5					Guide Tube			#4
	SW70A	SW70AGR	SW70B	SW70D	SW70E	SW70EGR	BEAR7	BEAR10	BEAR10F	TYRE	ORING55	STR2.5	CFR	STR3.0	CFR3.0	CFT	GUIDW	GUIDY	BEARBT #5	COLLAR
2.5mm Axle																				
Steel				✓						✓		✓					✓			
Carbon Fibre				✓						✓			✓				✓			
Steel				✓						✓		✓						✓	✓	
Carbon Fibre				✓						✓			✓					✓	✓	
3.0mm Axle																				
No bearings			✓							✓				✓	✓			✓		
7mm Bearings	✓	✓					✓				✓			✓	✓			✓		
10mm Bearings					✓	✓		✓			✓			✓	✓			✓		
6.0mm Axle					✓	✓			✓		✓					✓				✓

NOTE: Refer to the Price List - some axles and tubes are available separately or in mixed packs.

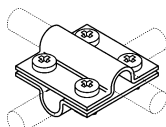
- #1: Three wheels are usually used without friction material to keep friction on the track to a minimum.
- #2: One driving wheel should have a "tyre" to increase friction on the track. If tyre material is chosen, then 4 of the same type of wheels (non-grooved) will be required. Otherwise an O-ring is used with a grooved wheel.
- #3: The wheel hub accepts two bearings side by side, and they are press-fitted in the hub. It is suggested that the bearings are glued in using Loctite 609 Adhesive.
- #4: The collars are used to retain wheels onto 6.0mm diameter axle. 2 collars are required per wheel, one on either side. A space of the thickness of a sheet of paper should be left, to allow the wheel / bearings to rotate freely. Collar ID = 6.2mm and is fixed to the axle by a small grub screw.
- #5: To provide lower friction between the axle and the guide tube, driveline bearings can be used with the larger diameter axle tube (GUIDY) – refer to the section on propeller shafts for the assembly drawing (2 per shaft).

MODEL SOLAR CAR - FRAMES / CHASSIS (using 6mm Carbon Fibre tube)

HOW CAN I CONSTRUCT A FRAME / CHASSIS FOR MY CAR using 6.0mm CARBON FIBRE TUBES?:

AXLE BRACKET KIT (AXBKTK) consists of 8 axle brackets, nuts and bolts to assemble 6mm carbon fibre tubes into a rectangle.

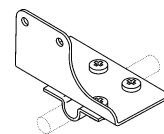
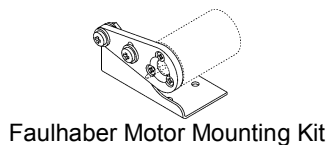
AXLE & FRAME KIT (AXFRK) consists of the Axle Bracket Kit and two 650mm long 6mm diameter carbon fibre tubes.



ELBOWS can be used to create a 3 dimensional frame – the Elbows are glued into the end of the tubes to create right angle joints.

MODEL SOLAR CAR - FAULHABER MOTOR MOUNTING



The Faulhaber motor can be mounted onto a solar Car in one of 2 ways – using a *Faulhaber Motor Mounting Kit* (FAUMMK – motor not included) to mount the motor onto a body or onto carbon fibre tube.



Faulhaber Motor Mounting Kit includes one Axle Bracket to mount onto 6mm tube

PRICE LIST

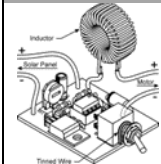
ESSENTIALS for both CAR & BOAT ...

ELECTRIC MOTORS				AutoMax SOLAR MPPT	
	MODEL	ST-403 T1	FAULHABER 2232		
	CODE	SM403	SMFAU		AUTOMAX
	Efficiency	67%	87%	AutoMax is a computerized Maximum Power Point Tracker.	
	Operating range (Volts)	6.0V	Nom. 6.0 V		
	No load	RPM	9,000	This unit holds the solar panel's output voltage at its Maximum Power Point voltage regardless of the load conditions. Assembled and tested. Includes Deans Micro plugs.	
		Amps	0.17		
	Under load at Max efficiency	RPM	7,790	Price	
		Amps	1.1		
	Torque		51 g-cm	\$95.00	
	Testing voltage	6.0 V	6.0 V	Deans Micro Plugs (if you need additional ones for the AUTOMAX)	
	Body O.D. / length (mm)	32.0 / 29.0	22.0 / 32.2		
	Shaft dia. & length (mm)	2.0 / 8.5	2.0 / 6.0	Price (per pair)	
	Weight (grams)	76.5g	62 g		
	Price	\$6.70	\$99.75	\$2.85	

FAULHABER MOTOR MOUNTING KITS

Faulhaber & Mounting Kit	Code:	FAUMOTK	Price:	\$102.90
Faulhaber Mounting Kit	Code:	FAUMMK	Price:	\$5.15



SOLAR PANEL POWER CONTROLLER (SPPC)




Multiplies starting current. The SPPC kit is useful, as powering an electric motor directly from a solar panel can be inefficient. The SPPC circuit holds the output of the solar panel at a preset power voltage point and substantially boosts the starting current available to the motor. The kit consists of the PCB & electronic components. *Weight approx. 45 grams.* The SPPC is available in 2 variants. **Specify the Code of the version required (SPPCL or SPPCS) Price: \$11.07**



SPPCL: This version is the Low voltage unit (VOC 6.5-12V), and is useful in the Solar Boat challenge.


SPPCS: This version is the Standard voltage unit (VOC 13-23v), and is designed for use in the Solar Model car challenge

SOLAR PANEL			CALIBRATED SOLAR PANEL	
		SOLAR26		#10 Calibrated (with wires)
	Area	350 cm ²	Code:	SOLAR10
	Dimensions mm	160x252	Price:	\$10.00
	VoltsAmps	7.0V–1.0A	This panel is used to determine how intense / powerful the sun is at the time of testing.	
	Watts (nominal)	5.0 – 5.2		
	Weight (approx.)	50 grams		
	Price	\$88.05		

	SOLAR PANEL WIRING HARNESS		Provides all the parts required to make up a wiring harness for wiring for the Solar Panel No. 26 in series & parallel
	Code:	HARNESS26	
	Price:	\$6.96	

SWITCHES

	TOGGLE SWITCHES		Sold in Packs of 5	1-4 packs	5-9 packs	10-19 packs	20+ packs
	Code:	SW1W One way Switch	SPDT (Single Pole Double Throw). "ON-OFF" switch. 4 terminals: 2 "in" and 2 "out".	\$5.80	\$5.68	\$5.56	\$5.45
	Code:	SW2W Two way Switch	DPDT (Double Pole Double Throw). "ON-OFF-ON" switch. 6 terminals: 2 "in" & 4 "out". Can be used as a forward/reverse switch.	\$9.36	\$9.15	\$8.96	\$8.80
	SLIDE SWITCHES		Sold in Packs of 5	1-4 packs	5-9 packs	10-19 packs	20+ packs
	Code:	SSWS Slide Switch (small)	This switch is DPDT.	\$4.51	\$4.40	\$4.24	\$4.01
	Code:	SSWL Slide Switch (large)	This switch is DPDT with centre off position. Can be used as a forward/off/reverse or series/off/parallel switch for solar panels.	\$5.57	\$5.50	\$5.23	\$5.02

PROPELLER SHAFTS, AXLES AND GUIDE TUBES							
Item	Steel Rod	Steel Rod	Carbon Fibre Rod	Carbon Fibre Rod	Guide Tube	Guide Tube #3	Guide Tube #4
Code	STR2.5	STR3.0	CFR	CFR3	GUIDW	GUIDY	GUIDG
Use	Axle / Propeller Shaft				Propeller Shaft Tube		
Rod OD	2.5mm	3.0mm	2.5mm	3.0mm	---	---	---
Rod Length	500mm	500mm	650mm	650mm	---	---	---
Tube ID	---	---	---	---	2.7mm	4.5mm	3.2mm
Tube Length	---	---	---	---	500mm	500mm	500mm
Pack of 5	\$3.01	\$5.20	\$16.12	\$19.00	\$5.41	\$7.60	\$6.50
Pack of 20	\$10.76	\$17.51	---	---	\$19.94	\$29.12	\$24.53

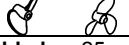
Item	Steel rod & Guide tube	Steel rod & Guide tube	Steel rod & Guide tube	Carbon fibre rod & Guide tube #3	Carbon fibre rod & Guide tube
Code	SRGTW	SRGTY	SR3GTG	CFGTY	CF3GTG
Use	Propeller Shaft & Tube				
Rod OD	2.5mm	2.5mm	3.0mm	2.5mm	3.0mm
Rod Length	500mm	500mm	500mm	650mm	650mm
Tube ID	2.7mm	4.5mm	3.2mm	4.5mm	3.2mm
Tube Length	500mm	500mm	500mm	500mm	500mm
Pack of 5 (of each)	\$7.68	\$9.60	\$11.52	\$22.16	\$23.72

#3 The 4.5mm ID guide tube has a larger inner diameter, so that driveline bearings can be used with the 2.5mm rod.

#4 Suits 3.0mm steel rods.

PLATFORM & HULL MATERIAL (for either a car or boat)			
CODE: CORF200/300/5	CORFLUTE SHEET	Dimensions: 300mm x 200mm x 5mm	Price (each): \$1.70
CODE: STYRO300/200/25	STYROFOAM (for Monohull)	Dimensions: 300mm x 200mm x 25mm	Price (each): \$5.50
CODE: STYRO300/50/25	STYROFOAM (2 pieces required to make a catamaran)	Dimensions: 300mm x 50mm x 25mm	Price (each): \$1.50

ESSENTIALS for SOLAR BOATS ...

COUPLING: Motor to Prop. Shaft		BOAT PROPELLERS		 DRIVELINE BEARING	
Material	Silicon rubber tube	Type / dia.	2 blade - 28 mm	3 blade - 25mm	CODE:
CODE	COUP1.8 #1	COUP2 #2	CODE	PROP2	BEARBT
I.D. / O.D.	1.8/3.8mm	2.0/4.0 mm	Hole size	2.4 mm	Hole: 2.5mm
Price (per m)	\$5.20	\$5.79	Pack of 10	\$12.26	Pack of 10 \$5.97

#1: For use with 2.0mm motor shafts - to join the (2.0mm) motor shaft to the (2.5mm) propeller shaft



#2: For use with shafts 2.2mm and larger - to join two shafts together (e.g. 2.5mm & 3.0mm shafts)

ESSENTIALS for SOLAR CARS ...

MODEL SOLAR CAR - FRAMES / CHASSIS (using 6mm Carbon Fibre tube)

HOW CAN I CONSTRUCT A FRAME / CHASSIS FOR MY CAR using 6.0mm CARBON FIBRE TUBES?:

The following framing kits have been developed to be used in conjunction with some of the listed framing components such as elbows for the model solar car frame or chassis construction.




FRAMING KITS							
	Item	Code	Price		Item	Code	Price
	Axle Bracket Kit	AXBKTK	\$6.10		Axle & Frame Kit	AXFRK	\$17.50

MODEL SOLAR CAR - AXLE AND WHEELS









WHAT CHOICES DO I HAVE for AXLES AND WHEELS? HOW DO I ASSEMBLE THEM?

Our broad range allows for a lot of choices, from basic (wheel & axle) up to carbon fibre with bearings and collars.


WHEELS (Nylon Low Rolling Resistance, 70mm dia.)								
Wheel Code		SW70D	SW70B	SW70A	SW70E		SW70AGR	SW70EGR
Hole Diameter		2.5mm	3.0mm	7.0mm	10.0mm		7.0mm	10.0mm
Thickness		2.0mm	2.0mm	2.0mm	2.0mm		4.0mm	4.0mm
Colour		Blue	Yellow	Yellow	Yellow		Yellow	Yellow
							To be used with OR/ING55	
Price per Pack of 10		\$33.98					\$36.23	

FRAMING & SOLAR WHEEL COMPONENTS					
	Item	Code	Description/Notes	Qty/Pkt	Price
	Carbon Fibre Tube	CFT	Dimensions: OD 6.0 / ID 3.0-3.5mm Length: 650mm long	5	\$28.95
	Elbow	ELBOW	Join Carbon Fibre Tubes.	10	\$5.23
	Collar (Axle retainer)	COLLAR	Used to retain wheels on the 6.0 diameter axle shaft (CFT). It uses a small grub screw. I.D. is 6.2mm.	10	\$4.45

FRAMING & SOLAR WHEEL COMPONENTS...continued

	Spur Gear to Wheel Adapter	GEARADAPT	To suit 70E & modified 80T solar wheels.	1	\$7.50
	Allen Key	HEX1.5	Allen Key for the <i>COLLAR's Grub screw</i> .	1 5	\$2.00 \$7.50
	Grub Screw	SCRGR	M3x3mm Grub screw. Spares for COLLARS and the Brass pinion gears.	10	\$2.00
	Tyre Material	TYRE	Rubber TYRE material is designed to suit the normal 70mm wheels, and has to be glued to form the tyre.	Per metre	\$5.20
	Tyres (O-Rings)	ORING55	This O-Ring is approximately 1.0mm diameter, to suit the groove in the wheels <i>SW70AGR</i> & <i>SW70EGR</i> , to increase traction.	10	\$4.03
	7.0mm Plain Bearing	BEAR7	Single row, unsealed ball races. Outer/flange diameter: 7.0mm Bore diameter/Width: 3.0mm diameter/3.0mm.	10	\$29.32
	10.0mm Plain Bearing	BEAR10	Single row, unsealed ball races. Outer/flange diameter: 10.0mm Bore diameter/Width: 3.0mm diameter/4.0mm.	10	\$30.31
	10.0mm Flanged Bearing	BEAR10F	Single row, unsealed ball races. Outer/flange diameter: 10.0mm/11.2mm. Bore diameter/Width: 3.0mm dia./3.0mm.	10	\$31.42

PINION GEARS – Suit Faulhaber Motors

	Brass pinion gears, 0.5 Module, 2.0mm bore with grub screws. Code: BRGPXX (XX denotes no. of teeth)	No. of teeth	11	13	16	18	20
		Price (each)	\$12.54	\$12.87	\$13.48	\$13.59	\$14.08

LOCTITE

Code	Type	Usage	Bottle Size	Price
LOC406	Retaining compound	Tyre material	25ml bottle	\$27.32
LOC609	Instant adhesive	Ball bearings	10ml bottle	\$21.81

The Loctite 406 Retaining compound is used to glue the ends of the tyre material, to form a tyre

The Loctite 609 Instant adhesive is used to retain Ball bearing races inside the wheels' hubs.

GEARS AND OTHER COMPONENTS

Scorpio Technology offers a much wide range of components for SOLAR experimentation, including a range of gears. **Note:** The brass pinion gears listed in this catalogue are to be used with the Faulhaber motors. Plastic Pinion gears are a press-fit, and are **not** recommended to use with Faulhaber motors due to the risk of damage to the motor.

We also have general items suitable for use in schools, by hobbyists, or at home. These include: SWITCHES, FASTENERS (nuts, bolts, washers), ALLIGATOR CLIPS, ELECTRONICS kits and parts, smaller SOLAR PANELS, ELECTRIC MOTORS, GEARBOXES, and much more. Refer to our website or our **"TECHNOLOGY"** and **"ELECTRONICS & TECHNOLOGY COMPONENTS"** CATALOGUES for a comprehensive listing.

OUR WEBSITE & CATALOGUES

We have updated our website, and will be progressively adding more items to our online catalogues and information. Please have a look - we would appreciate feedback on what else you would like to see. Thank you for your continuing support.

E-MAIL SUPPORT & SOLAR CONSULTANT

Need some advice? For **PRICING** and **STOCK AVAILABILITY** e-mail us at sales@scorpiotechnology.com.au

For Solar Technical assistance **ONLY**, e-mail our Solar Consultant at: ian@scorpiotechnology.com.au

HOW AND WHERE DO I GET WHAT I NEED ?

- ✓ E-mail, post or fax your official school order form to us, including the teacher's name to speed delivery.
- ✓ An invoice will be included with the goods. Note: you do not need to open an account with us.
- ✓ Orders are dispatched quickly and are sent using Australia Post.
- If you need quicker delivery please ask for a quote for Express shipping
- ✓ Prices and stock availability are subject to change without notice.
- ✓ Payment is by cheque, EFT or credit card. Please note there will be a 1.5% surcharge on all credit card payments over \$250

✓ ALL PRICES
INCLUDE GST

Weight	Under 0.5 kg	0.5 - 2.0 kg	2 - 5 kg	5 - 10 kg	Over 10 kg
Victoria	\$9.02	\$11.67	\$13.26	\$15.91	\$21.22
NSW. SA. TAS	\$9.02	\$15.12	\$16.97	\$19.09	\$26.52
Brisbane, Perth	\$9.02	\$16.97	\$19.09	\$23.87	\$31.82
QLD, WA, NT (Rural)	\$9.02	\$18.56	\$21.22	\$26.52	\$37.13



SCORPIO TECHNOLOGY VICTORIA PTY. LTD.

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9 October 2017 Scorpio Technology office hours are: **8.45 am to 4:00 pm, Monday to Friday (EST)**