

2017 SOLAR CHALLENGE CATALOGUE

CONTENTS:

STARTER KITS – SOLAR BOATS & CAR P1

TECHNICAL GUIDE: P1

AN OVERVIEW of components for Boats & Cars

SOLAR BOAT – Propellers & Shafts P1

Technical Information sheets (Wiring & Theory)

SOLAR CAR – Axles & Wheels P2

- Faulhaber Motor Mounting P2

- Making a Frame / Chassis (options) P2

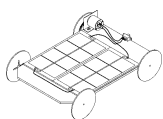
PRICE LIST: Essentials for both CAR & BOAT P3

How & where do I get what I need? P4

Postage costs P4

Scorpio Technology has many components for participation in the various **SOLAR CHALLENGES**, including **specialty designed solar panels**. Other solar panels and components for experimenting with solar power generation, are listed in Scorpio's Technology Catalogue.

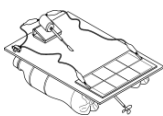
KITS FOR SOLAR CHALLENGE PROJECTS



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: \$36.05



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: \$62.50



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: \$25.75



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: \$26.55

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

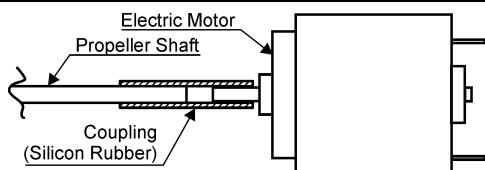
MODEL SOLAR CAR *

- 2x Solar panels
- 1x Electric motor, mounting and gearing
- 1x Wheels, bearings and axles
- 1x Frame / body materials
- 1x Solar Panel Power Controller (Standard/AutoMax)
- Various components and sundry items

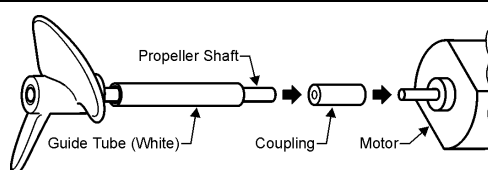
* Always check your State's current Solar Challenge Regulations to ensure you comply. ** Advanced Division only.

MODEL SOLAR BOAT - PROPELLERS & SHAFTS

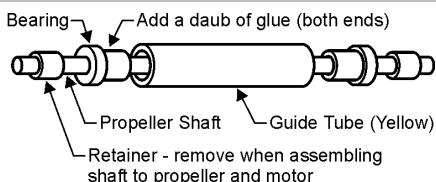
HOW DOES IT GO TOGETHER? WHAT CHOICES ARE THERE? Our range of components starts with a basic economical set up when starting out, and extends to carbon fibre propeller shafts and Driveline bearings.



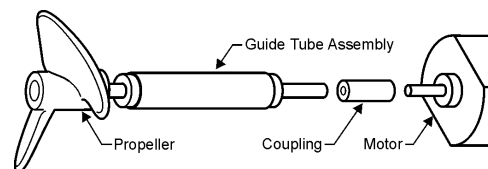
Assembling a motor to a Propeller shaft



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	Propeller #2
		1.8 ID	STR2.5	CFR	GUIDW	GUIDY #1			
Steel	✓	✓	✓		✓		BEARBT	✓	
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.



SCORPIO TECHNOLOGY VICTORIA PTY. LTD.

www.scorpiontechnology.com.au

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@scorpiotechnology.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.

Using a 2.5 or 3.0mm shaft

Insert shaft into wheel.

Using a 3.0mm shaft and bearings

Step 1 Insert bearings
Step 2 Insert shaft

Using a 6.0mm shaft and bearings and collars

Step 1: Insert bearings
Step 2: Insert shaft
Step 3: Add and fasten collars

USING TYRE MATERIAL:
The Loctite 406 Retaining compound is used to glue the tyre material ends together to form a tyre

Cut
Joint here

USING O-RINGS AS TYRES: The O-Ring is stretched to fit over the wheel. It sits in the groove around the wheel

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	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).
- #6: If a smaller diameter wheel is required the 70mm wheels can be turned down on a lathe.

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

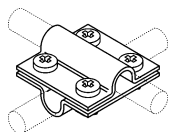
HOW CAN I CONSTRUCT A FRAME / CHASSIS FOR MY CAR using 6.0mm CARBON FIBRE TUBES?:

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.



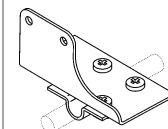
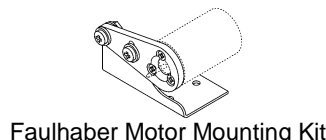
AXLE BRACKET KIT (AXBKTK) consists of 8 axle brackets, nuts and bolts to assemble 6mm carbon fibre tubes into a rectangle.

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



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.

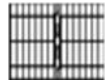
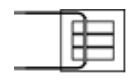



Faulhaber Motor Mounting Kit includes one Axle Bracket to mount onto 6mm tube

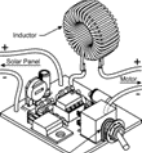
PRICE LIST

ESSENTIALS for both CAR & BOAT ...

ELECTRIC MOTORS			
	MODEL	ST-403 T1	FAULHABER 2232
	Code / PERFORMANCE	SM403	SMFAU
Efficiency		67%	87%
Operating range (Volts)		6.0V	Nom. 6.0 V
No load	RPM	9,000	7,100
	Amps	0.17	1.83
Under load at Max efficiency	RPM	7,790	6,600
	Amps	1.1	
Torque		51 g-cm	
Testing voltage		6.0 V	6.0 V
DIMENSIONS			
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
Weight (grams)		76.5g	62 g
MOTOR Price		\$6.70	\$99.75
Faulhaber & Mounting Kit Code: FAUMOTK		\$102.90	
Faulhaber Mounting Kit Code: FAUMMK		\$5.15	



SOLAR PANEL		CALIBRATED SOLAR PANEL	
	SOLAR26		#10 Calibrated (with wires)
Area	350 cm ²	Price: \$10.00	
Dimensions mm	160x252	Code: SOLAR10	
Volts/Amps	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		
Note: The Solar Challenge Model Car requires 2 Panels			
AutoMax SOLAR MPPT			
	Code: AutoMax		
	Price \$95.00		
	AutoMax is a computerised Maximum Power Point Tracker.		
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.			

SOLAR PANEL POWER CONTROLLER (SPPC)

	<p><i>Multiplies starting current.</i> 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. <i>Weight approx. 45 grams.</i> The SPPC is available in 2 variants. Specify the Code of the version required (SPPCL or SPPCS) Price: \$11.07</p>		
<p>SPPCL: This version is the Low voltage unit (VOC 6.5-12V), and is useful in the Solar Boat challenge.</p>		<p>SPPCS: This version is the Standard voltage unit (VOC 13-23v), and is designed for use in the Solar Model car challenge</p>	

DEANS MICRO PLUGS (if you need additional ones for the AUTOMAX) Code: **DEANSMP** Price: **\$2.58**

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		Supplied with 2 screws per switch		Sold in Packs of 5			
	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	Guide Tube	Guide Tube #3	Steel rod & Guide tube	Steel rod & Guide tube	Carbon fibre rod & Guide tube
Code	STR2.5	STR3.0	CFR	GUIDW	GUIDY	SRGTW	SRGTY	CFGTY
Use	Axle / Propeller Shaft			Propeller Shaft Tube		Propeller Shaft & Tube		
Rod OD	2.5mm	3.0mm	2.5mm	---	---	2.5mm	2.5mm	2.5mm
Rod Length	500mm	500mm	650mm	---	---	500mm	500mm	650mm
Tube ID	---	---	---	2.7mm	4.5mm	2.7mm	4.5mm	4.5mm
Tube Length	---	---	---	500mm	500mm	500mm	500mm	500mm
Pack of 5	\$3.01	\$5.20	\$16.12	\$5.41	\$7.60	\$7.68	\$9.60	\$22.16
Pack of 20	\$10.76	\$17.51	---	\$19.94	\$29.12	---	---	---

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

PLATFORM (for either a car or boat)

CODE: CORF200/300/5	CORFLUTE SHEET	Dimensions: 300mm x200mm x 5mm	Price (each) : \$1.65
----------------------------	----------------	--------------------------------	------------------------------

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	COUP1.8 #1 COUP2 #2	CODE	PROP2	PROP3	
I.D. / O.D.	1.8/3.8mm 2.0/4.0 mm	Hole size	2.4 mm		
Price (per m)	\$5.20 \$5.79	Pack of 10	\$12.26		
			Pack of 10		CODE: BEARBT Hole: 2.5mm \$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 ...

FRAMING KITS AND COMPONENTS

							
Item	CARBON FIBRE TUBE	Item	ELBOW #	Item:	AXLE BRACKET KIT	Item	AXLE & FRAME KIT
Code	CFT	Code	ELBOW	Code	AXBKTK	Code	AXFRK
Dimensions	OD 6.0 / ID 3.0-3.5mm	Use	Join CFT	Price	\$6.10	Price	\$17.50
Length	650mm long	Pack of 10	\$5.23	# Needs to be glued into the Carbon fibre tube			
Pack of 5	\$28.95						


WHEELS (Nylon Low Rolling Resistance, 70mm dia.)

Wheel Code	SW70D	SW70B	SW70A	SW70E		SW70AGR	SW70EGR
Hole Dia.	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
Pack of 10	\$33.98					\$36.23	
						# to be used with ORING55	

TYRES (O-RING)

TYRE O-RING	
ORING55	
This O-Ring is approx. 1.0mm diameter, to suit the groove in WHEELS SW70AGR and SW70EGR, to increase traction.	
Pack of 10	\$4.03


TYRE MATERIAL (CODE: TYRE)

	Rubber TYRE material is designed to suit the normal 70mm wheels, and has to be glued to form the tyre.	Price \$5.20 per metre
---	--	----------------------------------




LOCTITE

CODE	LOC406	LOC609
Type	Retaining compound	Instant adhesive
Usage	Tyre material	Ball Bearings
Bottle size	25 ml bottle	10 ml bottle
Price	\$27.32	\$21.81

COLLAR (AXLE RETAINER) (CODE: COLLAR)

	Used to retain wheels on the 6.0 diameter axle shaft (CFT). It uses a small grub screw. I.D. is 6.2mm.	Pack of 10: \$4.45
HEX1.5 - ALLEN KEY for the COLLAR's Grub screw		\$2-ea/ \$7.50 pack of 5

BEARINGS

Code :	BEAR7	BEAR10	BEAR10F
Type: single row, unsealed ball races	Plain 	Plain 	Flanged 
Outer / flange dia	7.0	10.0	10.0 / 11.2
Bore dia / Width	3.0dia / 3.0	3.0dia / 4.0	6.0dia / 3.0
Pack of 10	\$29.32	\$30.31	\$31.42

BUT WAIT

.... THERE'S MORE !
- MORE COMING, AS WE CONTINUE TO EXPAND OUR PRODUCT RANGE (AND WE WELCOME SUGGESTIONS)

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

GEARS AND OTHER COMPONENTS

Scorpio Technology offer a much wider range of components for SOLAR experimentation, including a range of gears. **Note:** the 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 CATALOGUE** for a comprehensive listing.

HOW AND WHERE DO I GET WHAT I NEED ?

- ✓ E-mail, post or fax your official school order 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	\$8.84	\$11.44	\$13.00	\$15.60	\$20.80
NSW. SA. TAS	\$8.84	\$14.82	\$16.64	\$18.72	\$26.00
Brisbane, Perth	\$8.84	\$16.64	\$18.72	\$23.40	\$31.20
QLD, WA, NT (Rural)	\$8.84	\$18.20	\$20.80	\$26.00	\$36.40



SCORPIO TECHNOLOGY VICTORIA PTY. LTD. ABN 34 056 661 422

17 Inverell Ave., Mt. Waverley, Vic. 3149 Tel: (03) 9802 9913 Fax: (03) 9887 8158

www.scorpiotechnology.com.au E-mail: sales@scorpiotechnology.com.au

17 October 2016 Scorpio Technology office hours are: 8.45 am to 4:00 pm, Monday to Friday (EST)