

Scorpio Technology has many kits and components for participation in the various **SOLAR CHALLENGES**, including specially designed solar panels.

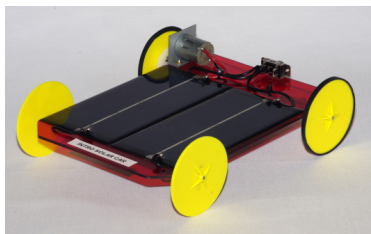
Other kits, solar projects, solar panels and components for experimenting with solar power generation are also shown in this catalogue.

We hope you enjoy our selection.

Prices include GST and subject to change without notice.

SOLAR KITS

KITS FOR INTRODUCING SOLAR (NON COMPETITIVE)



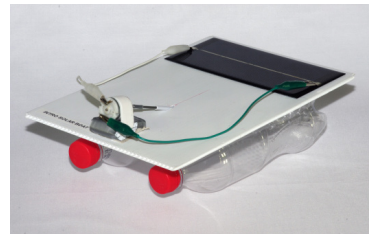
INTRO SOLAR CAR KIT

Code: 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.

Legend: A, C, D, H

\$49.77 (1 - 19); \$48.76 (20+)



INTRO SOLAR BOAT KIT

Code: 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.

Legend: A, C, D, H

\$36.37 (1 - 19); \$35.63 (20+)



SOLAR CAR BASIC

Code: SOLARB

The **SOLAR CAR - BASIC** is a simple four-wheeled vehicle, driven by an electric motor, powered by a solar panel. Power to the wheels is transferred from the motor by gears. This car will run on a smooth level surface from 25% sunlight upwards.

The solar panel consists of one large section producing 2.0 Volts and 0.9 Amps of electricity, under a 100% sunlight condition.

Suitable for introducing the concept of solar power to students.

Legend: A, C, D, H

Price: \$26.72 (1 - 49); \$25.79 (50+)

SOLAR CAR BASIC - NO SOLDER

Code: SOLARB-NS

The No-solder version has a motor and switch with wires pre-soldered to them, with twist-on connectors to join the wires. Uses a 3.0V 0.8A solar panel.

Legend: B, C, D, H

\$27.70 (1 - 49); \$26.92 (50+)



SOLAR CAR V2

Code: SOLARV2

The **SOLAR CAR V2** is a basic four-wheeled vehicle, driven by an electric motor, powered by a purpose-designed solar panel. Power to the wheels is transferred from the motor by gears. This car will run on a smooth level surface from 25% sunlight upwards.

The Solar panel consists of two sections, each of 1.5 Volts and 0.35 Amps, which can be connected in series or parallel, to suit changing light conditions.

Legend: A, C, D, H

\$20.80 (1 - 49); \$20.22 (50+)



SOLAR CAR ADVANCED

Code: SOLDV

The **ADVANCED SOLAR CAR** is a four-wheeled basic vehicle, driven by an electric motor and powered by a purpose designed solar panel.

This vehicle has a 4 piece solar panel, and also has a **SOLAR PANEL POWER CONTROLLER - LOW VOLTAGE (SPPC-LV)**, which helps your vehicle to achieve maximum performance, by the use of an electronic circuit (device).

The 4 piece panel allows for a lot experimentation with series and parallel wiring and differing power outputs.

Motion from the motor to the wheels is transferred by the use of gears.

***Legend: A, C, D, E, F, H**

\$33.49 (1 - 19); \$32.49 (20+)

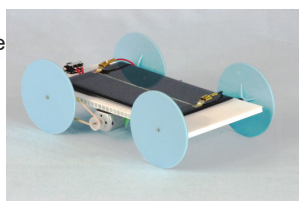
Prices per kit.

**BLUE SKY
Code: BLUESKY**

This boy's the environmentalist in the family!

(From our Blue Brothers' series)

Suitable for both senior primary and junior secondary students.



A four-wheeled solar powered vehicle at its simplest. This vehicle illustrates a basic electric circuit where electricity is generated from a solar panel to power motor.

These cars can be used to perform basic experiments relating to solar energy.

Legend: B, C, D, H

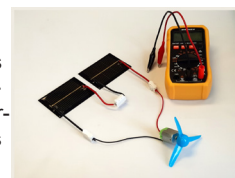
\$23.38 (1 - 19); \$22.69 (20+)

INTRODUCING SOLAR ENERGY

Code: SOLARINTRO

The **INTRODUCING SOLAR ENERGY** kit allows students to investigate the operation and properties of solar cells, and see how electricity is generated by them. By using the supplied components together with a multimeter, students can experiment with Series and Parallel circuits, and carry out simple experiments with sound and motion.

\$22.25



Class pack of 10 supplied in handy storage container.

Code: SOLARINTRO10

\$210.00

NOTE: Multimeter not included – but is required for carrying out experiments with this kit. Propeller colour supplied may differ from illustration.

LEGEND: * A=Solder B=No Solder C=Mechanical D=Electrical E=Electronic F=PCB G=Programmable H=Alternative Energy

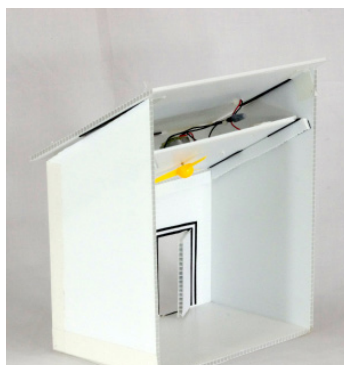
INTRODUCING SOLAR PROJECTS

Scorpio Technology has put together a selection of kits that are suitable for both primary school and secondary school level. Each kit order includes comprehensive instructions /Teaching Unit.

SOLAR PROJECT KITS

A Solar House Project that provides a useful introduction to solar energy and simple electric circuits in everyday life. This project allows students to construct a Solar House and observe electricity collected from the sun's ray light up the LED downlights and ceiling fan.

NAME	CODE	PRICE
Solar House Kit	SOLHOUSEK	\$55.97



The *SOLAR HOUSE* kit is designed to introduce students to the concept of solar power and how solar power can be used to run electrical appliances and fittings in a house. The house is open on one side for easy viewing.

This kit provides the:

corflute panels, cloth tape and plan for making the house solar and electrical components to simulate a solar panel running a ceiling fan and 2 downlights, and includes the wiring.

NAME	CODE	PRICE
Solar House Project - Components	SOLCOMP	\$29.93



The *SOLAR HOUSE PROJECT - COMPONENTS* kit is designed to introduce students to the concept of solar power and how solar power can be used to run electrical appliances and fittings in a house.

This kit provides the solar and electrical components to simulate a solar panel running a ceiling fan and 2 downlights:

- Solar panel with wires
- Electric motor and propeller
- 2 LEDs, a switch and wiring

These can be fitted to a model solar house of your own design.

NAME	CODE	PRICE
Solar House Project - Corflute	SOLCORHOUSE	\$29.93



This kit allows you to make a model solar house (open on one side for easy viewing) to use together with the *SOLAR HOUSE*

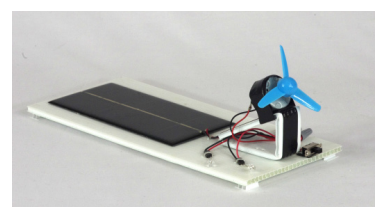
PROJECT - COMPONENTS kit (which is used to simulate a solar panel running a ceiling fan and 2 downlights).

Includes the corflute panels, cloth tape and plan for making the house.

Solar panel sold as part of *SOLAR HOUSE PROJECT - COMPONENTS* (SOLCOMP) or *SOLAR HOUSE* Kit (SOLHOUSEK).

The above is an illustration of a completed house using the corflute.

NAME	CODE	PRICE
Project Board Kit	SOLPROJBRD	\$3.90



A corflute project board that allows students to observe electricity produced by a solar panel. For use with the components supplied in the *SOLAR HOUSE PROJECT - COMPONENTS* kit (SOLCOMP). This kit can be used as an alternative to the complete Solar House.

SOLAR PROJECTS

A variety of Project Sheets will be made available progressively for projects in the classroom relating to solar energy. Students can undertake these projects either as an individual project / task or in small groups.

These project sheets are available to download from our website: www.scorpiotechnology.com.au. Most of the components required to complete these projects are available from Scorpio Technology.

Project sheets currently available include:

- Creating 2V or 4V Solar Chargers
- Cooking with Solar Energy (Creating a Solar Pizza Oven)



2024 SOLAR & SOLAR CHALLENGE CATALOGUE

STARTER KITS FOR SOLAR CHALLENGE PROJECTS



JUNIOR SOLAR BOAT KIT

Code: 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).

\$35.60 (1 - 19); \$34.83 (20+)

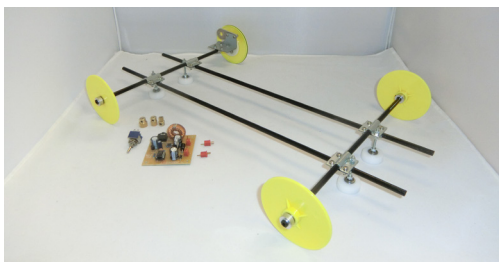


ADVANCED SOLAR BOAT KIT

Code: 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 the this kit).

\$34.56 (1 - 19); \$33.54 (20+)



CHALLENGER SOLAR CARV2

Code: CHALLENGERV2

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, guide rollers, brass pinion gears and PICAXE 08M2 SOLAR PANEL POWER CONTROLLER (PICSPPC08M2)..

PLEASE NOTE: The PICSPPC08M2 is supplied with a blank PICAXE chip, that requires programming (see Note 2). Pre-programmed chips are also available upon request when ordering..

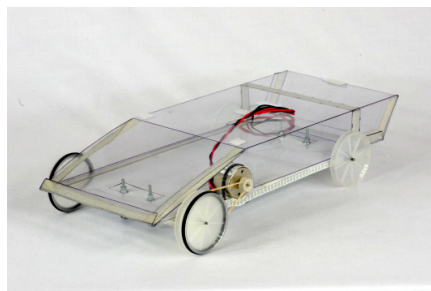
It can be used to compete in the Model Solar Car Challenges held in various states around Australia.

(Motor and solar panel are NOT included in this kit.

Note: 1. This kit assumes use of the FAULHABER 2232 electric motor which is seen as "the" motor to use for this competition..

2. A Picaxe download cable (PICUCAB) is required to download the program to the PICSPPC08M2

\$202.19



SHERIDAN KIT CAR

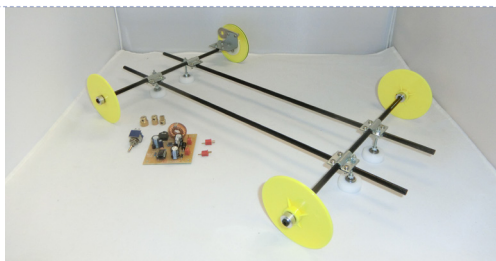
Code: SHERIDAN

This kit contains all of the parts needed to construct one Sheridan Car Challenge competition vehicle EXCEPT for the Solar Panels and wiring.

\$83.75

CHALLENGER SOLAR CAR V2, CHALLENGER SOLAR CAR KIT SM403, SHERIDAN KIT CAR and ADVANCED SOLAR BOAT:

PLEASE NOTE: One DVD with instructions is supplied with each order. The DVD contains pdf instructions – Adobe Acrobat is required. Alternately a USB stick can be supplied or the files uploaded to the cloud.



CHALLENGER SOLAR CAR KIT SM403

Code: CHALLENGERSM403

This kit is the same as the CHALLENGERV2, except that this kit has the SM403 MOTOR MOUNTING KIT, to allow the competitors to use the SM403 motor. This provides a more economical way to enter the designed cars section and can later be upgraded to the higher performing Faulhaber motor, by swapping the motor mounting kit.

Provides the mechanical and electronic parts to build the chassis for a Student Designed Car (Advanced). Includes carbon fibre tubes, axle bracket and SM403 mounting kits, wheels, guide rollers, brass pinion gears and PICAXE 08M2 SOLAR PANEL POWER CONTROLLER (PICSPPC08M2)..

PLEASE NOTE: The PICSPPC08M2 is supplied with a blank PICAXE chip, that requires programming (see Note 2). Pre-programmed chips are also available upon request when ordering.

It can be used to compete in the Model Solar Car Challenges held in various states around Australia.

(Motor and solar panel are NOT included in this kit.

Note: 1. This kit assumes use of the ST-403 T1 (SM403) electric motor.

2. A Picaxe download cable (PICUCAB) is required to download the program to the PICSPPC08M2

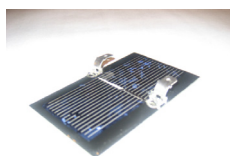
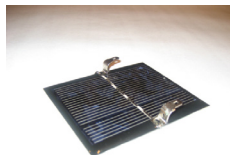
\$202.19

ALL PRICES
INCLUDE GST

SCORPIO TECHNOLOGY VIC PTY. LTD.

January 2024 • www.scorpiotechnology.com.au • sales@scorpiotechnology.com.au • ABN 34 056 661 422 2022

SOLAR PANELS - SMALL HOBBY PANELS



CODE	SIZE	NO. OF PIECES	WATTS	VOLTS/AMPS (NOM)	WIRES (LENGTH)	PRICE
SOLAR1	86 x 57 mm	1	0.485	0.5V / 0.97A	---	\$6.62
SOLAR2	86 x 133 mm	1	1.2	1.5V/0.8A	---	\$14.49
SOLAR2L	71 x 161 mm	1	1.2	1.5V/0.8A	---	\$14.49
SOLAR 3	105 x 72 mm	1	0.68	2.0V / 0.34A	---	\$10.58
SOLAR4	86 X 170 mm	1	1.6	2.0V / 0.92A	---	\$18.14
SOLAR5	22 x 84 mm	1	0.18	0.5V / 0.37A	100 mm	\$4.17
SOLAR7	78 x 179mm	1	2.4	3.0V/0.8A	120 mm	\$18.14
SOLAR8	86 x 147 mm	1	1.44	2.0V/0.72A	---	\$13.05
SOLAR9.5	51 x 58mm	1	0.10	1.5V/0.07A	100 mm	\$4.43
SOLAR11	91 x 104 mm	2	2 x 0.525	2x 1.5V/0.35A	---	\$10.58
SOLAR13	91 x 216 mm	3	4 x 0.57	4 x1.5V/0.38A	---	\$19.15
SOLAR14	60 x 78 mm	1	0.45	1.5V/0.3A	100 mm	\$6.62
SOLAR17	85 x 65 mm	1	0.48	4.0V / 0.12A	---	\$6.62
SOLAR23	86 x 188 mm	2	2 x 0.85	2 x 1.0V/0.85A	---	\$17.27

NOTE: When selecting a solar panel to drive an electric motor, please ensure that you select a panel with the appropriate voltage & current for the selected motor – or vice versa.

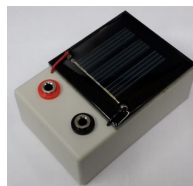
CALIBRATED SUN METER

Code: **SUNMETER10**

This sunlight meter has a calibrated solar panel. It allows easy determination of Sun intensity. This is a valuable tool when testing solar powered vehicles or boats, or considering the effect that different positions of the sun have on solar power generation. This enables students to take into account the prevailing Sun level during testing of any sort.

Additional item required to use this: Digital Multimeter with banana plugs on leads.

\$21.00



THE FOLLOWING PAGES LIST KITS AND COMPONENTS THAT ARE USED IN MODEL SOLAR CARS AND BOATS, AS WELL AS SOME PRODUCTS FOR EXPERIMENTING WITH SOLAR.

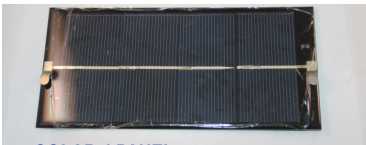
A TECHNICAL GUIDE CAN BE FOUND AT THE END OF THIS CATALOGUE, PROVIDING INFORMATION ON:

- WHAT PARTS ARE REQUIRED TO BUILD A BOAT OR CAR
- WHAT ITEMS GO TOGETHER
- HOW TO USE SOME OF THE KITS / COMPONENTS

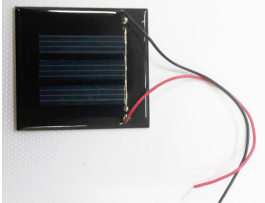
GOOD LUCK WITH YOUR CHALLENGE!"

2024 SOLAR & SOLAR CHALLENGE CATALOGUE

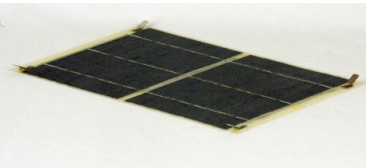
SOLAR PANELS - SOLAR CHALLENGE



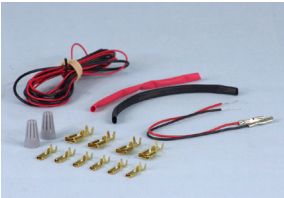
SOLAR 4 PANEL



SOLAR 10 CALIBRATED PANEL



SOLAR 26 PANEL



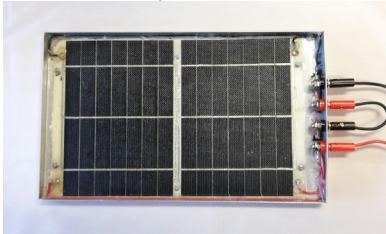
CODE	AREA	DIMENSIONS	WATTS	VOLTS/AMPS (NOM)	WEIGHT	PRICE
SOLAR4		86 x 170 mm	1.6	2.0V / 0.92A	70 grams	\$18.14
4 of these panels can be connected in series or parallel to power the Sheridan car or other Solar challenge projects.						
SOLAR10		52 x 56 mm	100% sun=100mA	1.5V / 0.1A		\$13.85
The No. 10 calibrated panel is used to determine how intense / powerful the sun is at the time of testing. When connected to a digital multi-meter, this panel measures the sunlight intensity as a percentage. This panel has 100mm long wires. NOTE: 100% sun = 100mA						
SOLAR26	350 cm ²	160 x 252 mm	5.0 to 6.0	7.0V / 1.0A	50 grams	\$111.50
High performance competition grade solar panel.						

SOLAR PANEL WIRING HARNESS Code: HARNESS26

This kit provides all the parts required to assemble a wiring harness for wiring the No. 26 Solar Panel (SOLAR26) in series and parallel.
This is wired up to either a Toggle switch or a large Slide switch – which have centre-off position. Thus, the switch is used to switch between S (Series)-Off-P (Parallel).
\$9.07

ALUMINIUM TRAY KIT FOR SOLAR 26 Code: TRAY26

Aluminium tray with banana plugs, banana panel mounts, hook-up wire and other components to mount the Solar Panel No. 26 (SOLAR26). Suitable for use when racing model solar cars in competition.
\$22.43
Aluminium Tray also available to purchase separately.
**Code: TRAYAL
\$12.85**



ESSENTIALS FOR BOTH CAR & BOAT

Essential for both Model Solar Car & Model Solar Boat challenges.**			
MODEL		ST-403-T1	FAULHABER 2232
CODE		SM403	SMFAU
DIMENSIONS & PERFORMANCE			
Efficiency		67%	87%
Operating range (Volts)		6.0V	Nominal 6.0V
No load	RPM	9,000	7,100
	Amps	0.17	1.83
Under load at Maximum efficiency	RPM	7,790	6,600
	Amps	1.1	
	Torque	51 g-cm	
Testing voltage		6.0V	6.0V
Body O.D. / length (mm)		32.0 / 29.0	22.0 / 32.2
Shaft diameter & length (mm)		2.0 / 8.5	2.0 / 6.0
Weight (grams)		76.5	62
Price		\$9.50	\$127.28

ALL PRICES
INCLUDE GST

FAULHABER MOTOR MOUNTING KITS



FAULHABER MOTOR MOUNTING KIT

Code: FAUMMK

The *FAULHABER MOUNTING KIT* is used to attach the motor mounting bracket and the motor to one Carbon fibre tube. This kit provides the parts (brackets, screws, nuts and bolts) to assemble an adjustable mount for a Faulhaber 2232 motor.

This mounting system provides adjustment to allow a number of different pinion gears to be used for best performance, as sun levels change during the competition.

\$6.71



FAULHABER & MOUNTING KIT

Code: FAUMOTK

The *FAULHABER MOTOR AND MOUNTING KIT* consists of:

-1x *FAULHABER MOUNTING KIT* (FAUMMK)

-1x Faulhaber 2232 Electric motor (SMFAU)

\$130.00

SM403 MOTOR MOUNTING KITS

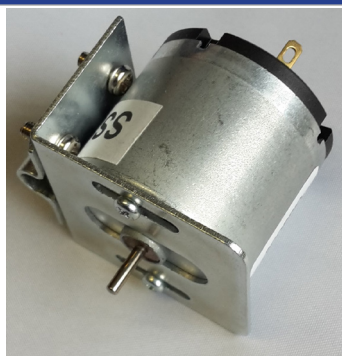


SM403 MOTOR MOUNTING KIT

Code: SM403MMK

The *SM403 MOUNTING KIT* is used to attach the motor mounting bracket and the motor to one Carbon fibre tube. This kit provides the parts (brackets, screws, nuts and bolts) to assemble a SM403 motor to a chassis. Adjustment is by moving the motor up or down, allowing different gears to be used.

\$6.98



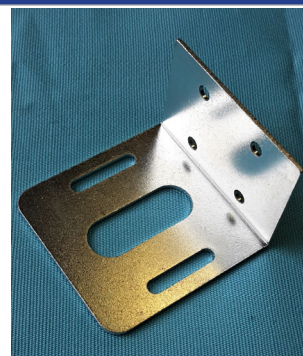
SM403 MOTOR AND MOUNTING KIT

Code: SM403MOTK

The *SM403 MOTOR AND MOUNTING KIT* consists of:

- 1 X *SM403 MOTOR MOUNTING KIT*
- 1 X ST-403 T1 Electric Motor

\$15.70



MOTOR MOUNT - ADJUSTABLE - SM403

Code: MMPL403

Adjustable motor mount plate for solar motor SM403.

\$1.70

AUTOMAX SOLAR MPPT

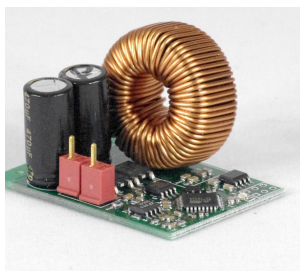
Code: AUTOMAX

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.

\$127.36



DEANS MICRO PLUGS

Code: DEANSMP

If you need additional ones for the *AUTOMAX*.

Pair.

\$3.30 per pair



2023 SOLAR & SOLAR CHALLENGE CATALOGUE

SOLAR PANEL POWER CONTROLLER (SPPC)

Code: **PICSPPC08M**

The **PICAXE08M2 SOLAR PANEL POWER CONTROLLER** controls a solar panel's output voltage to its maximum power point voltage irrespective of load. This results in the transfer of all the available solar panel power to the load. Depending on the load characteristics this circuit can provide a significant multiplication of the current available from the solar panel into the load.

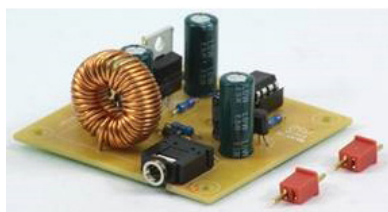
For a motor this means increasing its torque, especially useful when a car is accelerating from a standing start. This feature also allows a motor to start and operate at a much lower light intensity than is possible with the motor directly connected to the solar panel.

The unit automatically sets the appropriate control voltage on start up.

While it was specifically designed to operate with a Scorpio No. 26 Solar panel it will operate with any solar panel that has an open circuit voltage between 7.0 volts and 10.0 volts and a short circuit current between 0.1 amp and 1.0 amp.

PLEASE NOTE: The **PICSPPC08M2** is supplied with a blank **PICAXE** chip, that requires programming. A **PICAXE** download cable (**PICUCAB**) is required. Pre-programmed chips are also available on request when ordering.

\$29.15 (1-19); \$27.11 (20+)



Code: **SPPCL / SPPCS**

The **SOLAR PANEL POWER CONTROLLER** multiplies the solar panel's starting current for motors. Normally, powering an electric motor directly from a solar panel can be quite inefficient, especially during start up and at low motor speeds.

The **SPPCS / SPPCL** allows the motor to start and operate at a much lower light intensity than is possible with the motor directly connected to the solar panel.

This **SPPCS / SPPCL** circuit holds the output of the solar panel at its maximum power voltage point. Thus it is able to substantially boost the starting current available to the motor.

NOTE: This circuit regulates the input voltage rather than the output voltage.

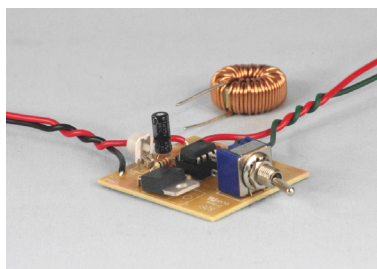
Energy consumption by the circuits is 0.04 W (approximately). The **SPPCS's / SPPCL's** weight is approximately 45 grams (including the inductor).

The two **SPPC's** will work with any solar panel or combination of solar panels whose Voltage Open Circuit (VOC) voltage is:


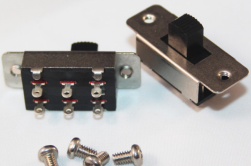
- For the **SPPCS**: between 13 and 23 volts
- For the **SPPCL**: between 6.5 and 12 volts

NOTE: A rated 12V panel at VOC will be higher than 12V.

SPPCS: \$14.84 (1 - 19); \$14.54 (20+) // SPPCL: \$14.84 (1 - 19); \$14.54 (20+)




SWITCHES

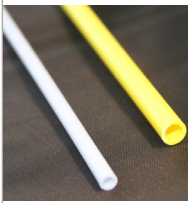
	TOGGLE SWITCHES		PACK SIZE	1 - 4 PKS	5 - 9 PKS	10 - 19 PKS	20+ PKS
	One way switch - Code: SW1W . SPDT (Single Pole Double Throw). "ON-OFF" switch. 4 terminals" 2 "in" and 2 "out".		5	\$8.10	\$7.85	\$7.70	\$7.55
	Two way switch - Code: SW2W . DPDT (Double Pole Double Throw). "ON-OFF-ON" switch. 6 terminals: 2 "in" and 4 "out". Can be used as a forward/off/reverse or series/off/parallel switch for solar panels.		5	\$12.95	\$12.65	\$12.40	\$12.15
	SLIDE SWITCHES - Supplied with 2 screws per switch						
	Small slide switch - Code: SSWS . DPDT.. ON-OFF.		5	\$6.25	\$6.10	\$5.90	\$5.55
	Large slide switch - Code: SSWL . DPDT. ON-OFF-ON. With centre "OFF" position. Can be used as a forward/off/reverse switch for solar panels.		5	\$7.85	\$7.65	\$7.25	\$6.95

PLATFORM (for both cars & boats)

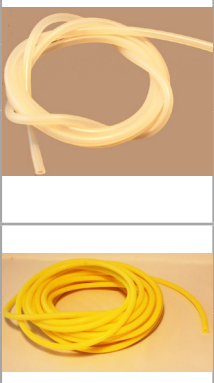
ITEM NAME	CODE	NOTES	QTY.	PRICE
CORFLUTE SHEET - DIMENSIONS: 100MM X 200MM X 5MM	CORF100/200/5		1	\$1.10
CORFLUTE SHEET - DIMENSIONS: 300MM X 120MM X 5MM	CORF300/120/5		1	\$1.80
CORFLUTE SHEET - DIMENSIONS: 200MM X 300MM X 5MM	CORF200/300/5		1	\$2.25
FOAM TRAY - 11 X 9 INCH- SHALLOW	FOAMTR11X9	Light weight foam tray suitable for boats	1	\$0.66
FOAM TRAY - 11 X 5 INCH - SHALLOW	FOAMTR11X5	Light weight foam tray suitable for boats	1	\$0.43
FOAM TRAY - 14 X 11 INCH - DEEP	FOAMTR14X11	Light weight foam tray suitable for boats. 35mm deep.	1	\$1.50

PROPELLER SHAFTS, AXLES, GUIDE TUBES & COUPLING

	AXLES / PROPELLER SHAFTS							
	ITEM	CODE	ROD O.D.	ROD LENGTH	QTY. PER PACK	PRICE	QTY. PER PACK	PRICE
	STEEL ROD 2.5MM X 500MM	STR2.5	2.5 mm	500 mm	5	\$4.05	20	\$14.50
	CARBON FIBRE ROD 2.5MM X 650MM	CFR	2.5 mm	650 mm	5	\$21.70	---	N/A
	FIBREGLASS ROD 500MM	FIBGRD500	3.0 mm	500 mm	5	\$7.30	20	\$24.45
	CARBON FIBRE ROD 3.0MM X 650MM	CFR3	3.0 mm	650 mm	5	\$25.50	---	N/A
	CARBON FIBRE TUBE (3.0 -3.5MM ID)	CFT	6.0 mm	650 mm	5	\$40.95	---	N/A

	GUIDE TUBES FOR AXLES / PROPELLER SHAFTS						
	ITEM	CODE	NOTES.	TUBE I.D.	TUBE LENGTH	QTY. PER PACK	PRICE
	GUIDE TUBE 500MM WHITE	GUIDW	Suit 2.5mm rods	2.7 mm	500 mm	5	\$7.30
	GUIDE TUBE 500MM WHITE	GUIDW20		2.7 mm	500 mm	20	\$26.80
	GUIDE TUBE 500MM GREY	GUIDG	Suit 3.0mm rods.	3.2 mm	500 mm	5	\$8.80
	GUIDE TUBE 500MM GREY	GUIDG20		3.2 mm	500 mm	20	\$31.95
	GUIDE TUBE 500MM YELLOW	GUIDY	Larger inner diameter so that drive line bearings can be used for the 2.5mm steel rods.	4.5 mm	500 mm	5	\$10.20
	GUIDE TUBE 500MM YELLOW	GUIDY20		4.5 mm	500 mm	20	\$39.00

ITEM	CODE	NOTES.	ROD O.D.	ROD LENGTH	TUBE I.D.	TUBE LENGTH	PRICE
STEEL ROD & GUIDE TUBE WHITE	SRGTW	Pack consists of 5 Steel Rods & 5 White Guide Tubes.	2.5 mm	500 mm	2.7 mm	500 mm	\$10.35
STEEL ROD & GUIDE TUBE YELLOW	SRGTY	Pack consists of 5 Steel Rods & 5 Yellow Guide Tubes. Larger inner diameter so that drive line bearings can be used for the steel rod.	2.5 mm	500 mm	4.5 mm	500 mm	\$13.10
CARBON FIBRE ROD & GUIDE TUBE YELLOW	CFGTY	Pack consists of 5 Carbon Fibre Rods & 5 Yellow Guide Tubes. Larger inner diameter so that drive line bearings can be used for the steel rod.	2.5 mm	650 mm	4.5 mm	500 mm	\$29.90
FIBREGLASS ROD & GUIDE TUBE GREY	FGRGTG	Pack consists of 5 3.0mm Fibreglass Rods & 5 Grey Guide Tubes.	3.0 mm	500 mm	3.0 mm	500 mm	\$15.00
CARBON FIBRE ROD & GUIDE TUBE GREY	CF3GTG	Pack consists of 5 3.0mm Carbon Fibre Rods & 5 Grey Guide Tubes.	3.0 mm	650 mm	3.2 mm	500 mm	\$32.40

	COUPLING							
	ITEM NAME	CODE	COLOUR	MATERIAL	I.D.	O.D.	NOTES	PRICE
	COUPLING 1.3/3.3	COUP1.3	Trans parent	Silicon Rubber Tube	1.3 mm	3.3 mm	Will fit on a 2.0mm motor shaft (as used in ROBOBUG).	\$7.00 / mtr
	COUPLING 1.8/3.8	COUP1.8	Grey	Silicon Rubber Tube	1.8 mm	3.8 mm	1mm wall thickness. For use with 2.0mm motor shafts – to join the 2.0mm motor shaft to the 2.5mm propeller shaft.	\$7.00 / mtr
	COUPLING 1.8/2.8	COUP1.8/0.5	Grey	Silicon Rubber Tube	1.8 mm	2.8 mm	0.5mm wall thickness. For use as per COUP1.8 (this has a thinner wall thickness).	\$5.70 / mtr
	COUPLING 2.0/4.0	COUP2Y	Yellow	Silicon Rubber Tube	2.0 mm	4.0 mm	For use with shafts 2.2mm and larger – to join two shafts together (e.g. 2.5mm & 3.0mm shafts).	\$7.85 / mtr

2024 SOLAR & SOLAR CHALLENGE CATALOGUE

HOOK UP WIRE & BANANA PLUGS

HOOK UP WIRE



HOOK-UP WIRE

Code: **WIREHU10**

Choice of black / red / blue / green / yellow / white / brown / orange
Size (approx.) 21 / 0.08.

Please specify colour & length when ordering. If no colour is specified, black (**WIREHUBK10**) will be delivered.

Price per 10 metres: **\$3.50**

Code: **WIREHUT5**

Thicker wire suitable for making up Banana Plug leads and Alligator Clips. Size (approx.) 24 / 0.2.

Choice of black / blue / green / red
Please specify colour & length when ordering. If no colour is specified, black (**WIREHUTBK5**) will be delivered.

Price per 5 metres: **\$5.84**

BANANA PLUGS – 4MM

Code: **BAPLBK4A (Black)**

Code: **BAPLG4 (Green)**

Code: **BAPLR4A (Red)**

Code: **BAPLY4 (Yellow)**

Side stacking – 4mm stem

(Banana Lead Connectors – Stackable)

Available in black / green / red / yellow (specify colour & code when ordering).

Pack of 10.

\$10.05



BANANA PLUGS WITH WIRES (PAIR)

Code: **BAPLW2**

Set of red & black banana plugs with matching 40cm leads.

\$6.82



BANANA PLUG PANEL MOUNT SOCKET – 4MM

RED - Code: **BANSOCMTR**

BLACK - Code: **BANSOCMBK**

4mm Panel Mount Sockets to suit Banana plugs.

4.0mm (I.D.)

11.3mm (O.D.)

16.5mm (length)

\$1.20 each



BANANA PLUGS - PIGGY BACK - 4MM

Code: **BAPLPBBK4 (Black)**

Code: **BAPLPBR4 (Red)**

Piggy Back Style - Another banana plug can be inserted into the back of the plug. 4mm terminals (dia).

Red or Black (please specify).



\$2.75 (each)




FOR A VARIETY OF ALLIGATOR CLIPS - See "ALLIGATOR CLIPS"

ESSENTIALS FOR SOLAR BOATS

COUPLING USED FOR MOTOR TO PROPELLER SHAFT - See "COUPLING": COUP1.8/3.8 & COUP2.0

	BOAT PROPELLERS				
	TYPE / DIAMETER	CODE	HOLE SIZE	QTY / PKT	PRICE
	2 Blade - 28 mm	PROP2	2.4 mm	10	\$16.45
	3 Blade - 25 mm	PROP3	2.4 mm	10	\$16.45

	DRIVELINE BEARING			
	CODE	HOLE SIZE	QTY / PKT	PRICE
	BEARBT	2.6 mm	10	\$7.80

Used with yellow guide tube (**GUIDY**) to reduce friction & reduce power consumption.
4.3 mm (O.D.) x 6.0 mm (Flange diameter) x 7.0 mm (width)
(See Technical Information section).

ESSENTIALS FOR SOLAR CARS

FRAMING KITS

AXLE BRACKET KIT

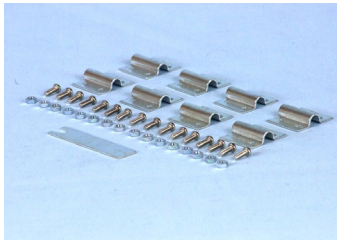
Code: **AXBKTK**

The **AXLE BRACKET KIT** is used to clamp together 6.0mm diameter carbon fibre tubes. Using these allows a frame to be created – this kit provides enough parts for 4 pieces of carbon fibre to be clamped into a rectangle. This then forms the base of a Solar car.

Hours to construct: 1 - 2

*Legend: B, C

\$8.16



AXLE FRAME KIT

Code: **AXFRK**

The **AXLE FRAME KIT** is used to make a simple rectangular frame, and consists of an **AXLE BRACKET KIT** and 2x 6.0mm diameter carbon fibre tubes

Hours to construct: 1 - 2

*Legend: B, C

\$24.59



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MODEL SOLAR CAR - AXLE AND WHEELS

WHAT CHOICES DO I HAVE FOR AXLES & WHEELS? HOW DO I ASSEMBLE THESE?


Our broad range allows for a lot of choices, from basic (wheel & axle) up to carbon fibre with bearings and collars. See our "Technical Information" section for more detailed advice.

		WHEELS (Nylon Low Rolling Resistance)					
		WHEEL DIMENSIONS (MM)				COLOUR	QTY PER PACK
WHEEL CODE		WHEEL DIAMETER	HOLE DIAMETER	THICKNESS			
		SW70B	70 mm	3.0 mm	2.0 mm	Yellow	10
		SW70A	70 mm	7.0 mm	2.0 mm	Yellow	10
		SW70/E	70 mm	10.0 mm	2.0 mm	Yellow	10
		Solar Wheels below to be used with ORING55					
		SW70AGR	70 mm	7.0 mm	4.0 mm	Yellow	10
		SW70EGR	70 mm	10.0 mm	4.0 mm	Yellow	10

FRAMING & SOLAR WHEEL COMPONENTS



CARBON FIBRE TUBE
Code: CFT
Dimensions: O.D. 6.0mm / I.D. 3.0 - 3.5mm
Pack of 5.
\$40.95




ALLEN KEY
Code: HEX1.5
For the COLLAR'S and brass PINION GEARS grub screws.
Pack of 1
\$2.60

Code: HEX1.5-5
Pack of 5
\$9.80



TYRE MATERIAL
Code: TYRE
Rubber TYRE material is designed to suit the normal 70mm wheels, and has to be glued to form the tyre.
Per metre.
\$3.34



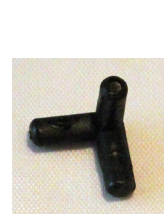
COLLAR (AXLE RETAINER)
Code: COLLAR
I.D. 6.2mm.
Used to retain wheels on the 6.0mm diameter axle shaft (CFT). It uses a small grub screw.
Pack of 10.
\$6.15




SPUR GEAR TO WHEEL ADAPTER
Code: GEARADAPT
The GEAR ADAPTOR is designed to mount a (modified) 80T gear onto a solar wheel, where the wheel is installed on a 6mm carbon fibre axle using 10mm flanged bearings.
For details on using the gear adaptor for the driven wheel, see the "Solar Challenge: Technical Guide" section.
\$9.39




TYRE (O-RINGS)
Code: ORING55
This O-Ring is approximately 1.0mm diameter, to suit the groove in the wheels SW70AGR & SW70EGR, to increase traction.
Pack of 10.
\$5.39



ELBOW
Code: ELBOW
Used to join CARBON FIBRE TUBES (CFT). 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
Pack of 10.
\$2.57



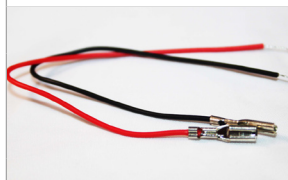

GRUB SCREW
Code: SCRGR
Pack of spare grub screws for use with collars & brass pinion gears (BRGRP11-20).
Pack of 10.
\$2.45






TYRE 71MM RUBBER EXTRUSION
Code: TY71
To suit 70mm solar wheels 4mm wide.

Install the tyres over the wheels, much the same as you would a bike tyre, starting at the bottom, and working up. As the wheels are very narrow, it can be fiddly to get the tyres to seat properly.

WARNING: Be careful when installing the tyres, as they are NOT rubber bands and have very little stretch in them – they can easily be broken at the join.
Pack of 5.
\$6.86

TERMINATED WIRES	CODE	SIZE	TYPE	QTY / PKT	PRICE
	WIRETB150	150mm	Terminated wire 150mm black (B150) or red (R150) with female spade at one end. Terminal at one end. Fits the terminals on SM403.	10	\$3.60
	WIREFR150	150mm		10	\$3.60
	WIRETB75	75mm	Terminated wire 75mm black (B75) or red (R75) with female spade at one end.	10	\$3.60
	WIREFR75	75mm		10	\$3.60
	WIRET180PR	180mm	Pair of 180mm terminated wires (1 x black + 1 x red) with 6.3mm terminal at one end. Fit solar panel terminals. 24 strands / 0.2mm dia.	2	\$0.95

2024 SOLAR & SOLAR CHALLENGE CATALOGUE

BEARINGS									
	ITEM	CODE	DESCRIPTION	OUTER DIAMETER	FLANGE DIAMETER	BORE DIAMETER	WIDTH	QTY. / PKT	PRICE
	7.0MM PLAIN BEARING	BEAR7	Single row, unsealed ball races.	7.0 mm	---	3.0 mm	2.0 mm	10	\$39.30
	10.0MM PLAIN BEARING	BEAR10	Single row, unsealed ball races.	10.0 mm	---	3.0 mm	4.0 mm	10	\$39.45
	10.0MM FLANGED BEARING	BEAR10F	Single row, unsealed ball races.	10.0 mm	11.2 mm	6.0 mm	3.0 mm	10	\$41.30
	10.0 x 3.0MM FLANGED BEARING	BEAR10/3F	Suitable for use with the 3mm fibreglass (FIBGRD500) or 3mm Carbon fibre (CFR3) rods OR with BOLT3X40MM and the Guide Roller (GUIDEROLLER).	10.0 mm	11mm	3.0 mm	3.0 mm	10	\$38.60
	DRIVELINE BOAT BEARING	BEARBT	Driveline bearing. Used with yellow guide tube (GUIDY) to reduce friction & reduce power consumption. (See Appendix C: Solar Challenge for details).	4.3 mm	6.0 mm	2.6 mm	7.0 mm	10	\$7.80



GUIDE ROLLERS 25MM X8.9

Code: GUIDEROLLER

25mm diameter x 9mm high.

Hole that will take 2 x 10mm flanged bearings with a 0.5mm thick washer between the bearings

Pack of 4.

\$9.63



2.9MM SOLAR WHEEL SPACER

Code: SPACERSW2.9


2.9mm spacer for mounting gear onto solar wheel SW70B using 3.0mm fibreglass or carbon fibre rods.

28mm O.D x 4mm thick with a 2.9mm hole.

Pack of 12.

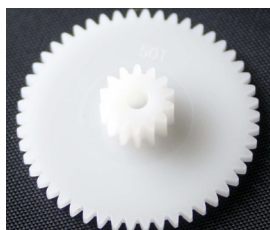
\$5.75

(NOTE: If the bearings in the guide rollers will be bolted, a half millimetre spacer may be required to avoid the bearings being crushed).

	PINION GEARS – to suit Faulhaber Motors						
	Brass <i>PINION GEARS</i> suitable for use with <i>FAULHABER and ST-403 T1 (SM403) MOTORS</i> . 0.5 Module, 2.0mm bore with grub screws. The grub screw mounting allows gears to be changed quickly during competitions.	NO. OF TEETH	11	13	16	18	20
		CODE	BRGP11	BRGP13	BRGP16	BRGP18	BRGP20
		PRICE	\$23.20	\$24.15	\$25.20	\$25.80	\$26.70

GEARS AND OTHER COMPONENTS

Scorpio Technology offers a 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.



If using the Gear Adaptor (Code: GEARADAPT), the spur gear that is used with that is:

GEAR SPUR 80T X 0.5MM X 2.9MM

Code: GEAR80/0.5/2.9

\$10.22 (Pack of 10)

\$24.50 (Pack of 50)

NOTE: To use with the Gear Adaptor, the gear needs to be modified with the centre machined out with a 12mm end mill, so that it fits over the Gear Adaptor.

NOTE: Photo illustrates a gear that has NOT been modified.

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SHERIDAN CAR KIT

DEDICATION

"The Sheridan Car Challenge is named for long standing member of the Victorian Model Solar Vehicle Challenge, Don Sheridan, who passed away in December 2015.

Don was the stalwart behind the Kit Cars.

From the beginning, he was responsible for their design, ongoing development and distribution. Don was always happy to be a mentor, or provide assistance whenever he was asked. His passion and commitment to the cause were of great value and his efforts and enthusiasm will be missed. We thank you for your participation in this event and in helping to honour the memory of our friend and colleague.

Following Don's dedicated efforts to design and craft some of the specialised elements that were integral to the original design, the car kit has been modified to incorporate more commercially available components.

Unfortunately, this means that, with the exception of the solar panel array, kits and components from previous years no longer meet the regulations for this event.

To ensure the continuation of the event that bears Don Sheridan's name, the VMSVC have organised for Scorpio Technology to stock and sell the new Sheridan car kits as a standard item. The kit required is the "Sheridan Kit Car", code SHERIDAN (Not the Intro Solar Car)".

Excerpt from the Victorian Model Solar Vehicle Challenge
Regulations for Sheridan Car Challenge (Kit Cars)

CAR KIT - SHERIDAN CAR CHALLENGE

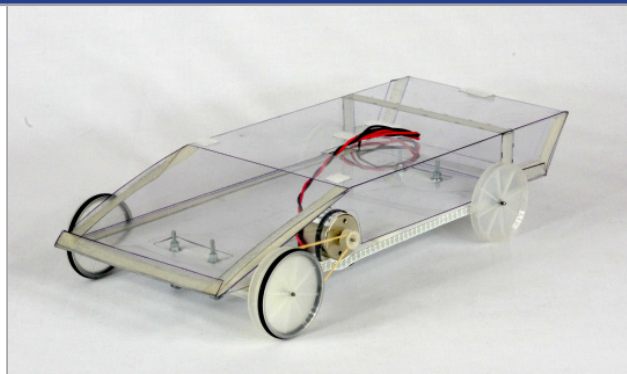
Code: SHERIDAN

This kit contains all of the parts needed to construct one competition vehicle EXCEPT for the Solar Panels and wiring. It includes:

- drawings and instructions
- chassis and body materials, including double sided tape
- all the electrical and mechanical parts needed

NOTE: as the solar panels are not specified in the Regulations you need to determine what panels you plan to use and purchase those separately.

\$83.75



Below is the part of our range of SOLAR PANELS that are most suitable for use in the Sheridan Challenge

NUMBER	SOLAR26	SOLAR4	SOLAR10
AREA	350 cm ²		
DIMENSIONS (MM)	160mm x 252mm	86mm x 170mm	52mm x 56mm
WATTS	5.0 to 6.0	1.5	100% sun=100mA
VOLTS / AMPS (NOM)	7.0V – 1.0A	2.0V / 0.92A	1.5V / 0.1A
WEIGHT	50 grams	70 grams	---
PRICE	\$111.50	\$18.14	\$13.85
			

* The No. 10 panel is used to determine how intense / powerful the sun is at the time of testing. When connected to a digital multi-meter, this panel measures the sunlight intensity as a percentage. This panel has 100mm long wires. NOTE: 100% sun = 100mA

2024 SOLAR & SOLAR CHALLENGE CATALOGUE


ACCESSORIES

WIRING HARNESS KIT FOR SOLAR 26 PANEL Code: HARNESS26 This kit provides all the parts required to assemble a wiring harness for wiring the No. 26 Solar Panel (SOLAR26) in series and parallel. This is wired up to either a Toggle switch or a large Sliding switch – which have centre off position. Thus, the switch is used to switch between S(Series)-Off-P (Parallel). \$9.07		ALUMINIUM TRAY KIT FOR SOLAR 26 Code: TRAY26 Aluminium tray with banana plugs, banana panel mounts, hook-up wire and other components to mount the Solar Panel No. 26 (SOLAR26). Suitable for use when racing model solar cars in competition. \$22.43 ALUMINIUM TRAY (sold separately) Code: TRAYAL \$12.85	
---	---	---	---

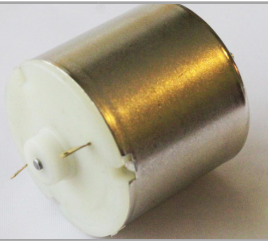
SPARE PARTS AND COMPONENTS suitable for use with Sheridan Kit Car

PLEASE NOTE: THE REQUIRED QUANTITY OF THESE PARTS ARE INCLUDED IN THE SHERIDAN CAR KIT – SPARES ARE AVAILABLE IN CASE ANYTHING FAILS DURING TESTING OR USE.

PULLEYS

	CODE	HOLE DIAMETER	GROOVE DIAMETER	NOTES	QTY. PER PACK	PRICE
	PU5.5	1.9 mm	5.5 mm	Press fits onto 2mm motor shaft. Hole can be drilled to 2.4mm diameter to suit the 2.5mm rod	10	\$14.65
	PU10x1	1.9 mm	10 mm	Press fits onto 2mm motor shaft. Hole can be drilled to 2.4mm diameter to suit the 2.5mm rod	10	\$15.80
	PU30W	2.4 mm	30 mm	Press fits onto 2.5mm steel rod. Hole can be drilled to 2.9mm diameter to suit the 3.0mm rod	10	\$17.95
	PU50	2.4 mm	50 mm	Press fits onto 2.5mm steel rod. Hole can be drilled to 2.9mm diameter to suit the 3.0mm rod	10	\$21.80

ELECTRIC MOTOR



MODEL		ST-403-T1
CODE		SM403
DIMENSIONS & PERFORMANCE		
Efficiency		67%
Operating range (Volts)		6.0V
No load	RPM	9,000
	Amps	0.17
Under load at Maximum efficiency	RPM	7,790
	Amps	1.1
	Torque	51 g-cm
Testing voltage		6.0V
Body O.D. / length (mm)		32.0 / 29.0
Shaft diameter & length (mm)		2.0 / 8.5
Weight (grams)		76.5
Price		\$9.50

O-RING



Code: ORING50X4
Inner Diameter: 50mm
Cross Section: 4.0mm
O-Rings are used as a tyre on the 50mm pulleys (PU50).
Pack of 10.
\$7.14

SWITCH



TOGGLE SWITCHES	PACK SIZE	1 - 4 PKS	5 - 9 PKS	10 - 19 PKS	20+ PKS
Two way switch Code: SW2W DPDT (Double Pole Double Throw). "ON-OFF-ON" switch. 6 terminals: 2 "in" and 4 "out". Can be used as a forward/ off/reverse or series/ off/parallel switch for solar panels.	5	\$12.95	\$12.65	\$12.40	\$21.15

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FASTENERS, WASHERS & ADHESIVES

	BOLT40	M3 x 40MM Phillips Head	10	\$4.30		WASHER	M3 WASHER 8.0mm OD, 0.5mm thick. 3.0mm hole.	100	\$1.90
	NUTM3	M3 HEXAGONAL NUT is 5.0 mm across the flat	100	\$3.10		WASH3.9/15	WASHER 3.9 X 15MM Large washer 3.9mm hole x 15mm (outer diameter).	10	\$3.70
	TAPESS	ADHESIVE SINGLE SIDED TAPE 12mm x 66m Suitable for use to retain motors & guide tubes.	66 mtr roll	\$7.79		TAPEDS	CLOTH DOUBLE SIDED TAPE. Approx. 12 or 18mm wide (depending on availability) Suitable for use to retain motors & guide tubes.	25 mtr roll	\$13.23
	VELHO	VELCRO HOOK 19MM WIDE White self-adhesive 19mm Hook tape.	Per mtr	\$4.02		VELLO	VELCRO LOOP 19MM WIDE White self-adhesive 19mm Loop tape	Per mtr	\$4.02
	CABTIE200	CABLE TIE 200MM X 3.65MM Cable ties 200mm long x 3.65 mm wide. Suitable for attaching the motor to the chassis.	10	\$1.87		TWIST ON CONNECTORS Code: CONN-SC 3.8mm Twist on connector for joining 2-3 wires together without soldering (Grey). Pack of 10. \$6.95			

LARGE TERMINALS

Code: TERML

Fits the terminals of SOLAR26
panels
Pack of 10
\$4.40



SMALL TERMINALS

Code: TERMS

Push onto the terminals of the
toggle or large sliding switch.
Pack of 10.
\$2.45



RUBBER BANDS

(As supplied in the Sheridan Kit Car)

RUBBER BANDS #16

Code: RUBBAND16

Pack of 10
\$0.41



RUBBER BANDS #18

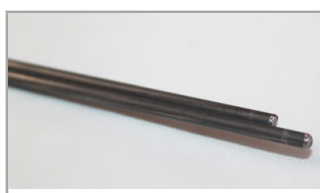
Code: RUBBANDS18

Pack of 10.
\$0.41

WIRES & TERMINATED WIRES

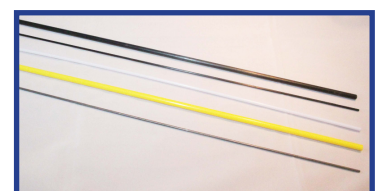
	CODE	SIZE	COLOUR	QTY	PRICE
	WIREHUR	21 / 0.08	Red	Per 10 mtr	\$3.50
	WIREHUBK	21 / 0.08	Black	Per 10 mtr	\$3.50
	WIREHUG	21 / 0.08	Green	Per 10 mtr	\$3.50
	WIREHUBL	21 / 0.08	Blue	Per 10 mtr	\$3.50
	WIREHUY	21 / 0.08	Yellow	Per 10 mtr	\$3.50
	WIREHUW	21 / 0.08	White	Per 10 mtr	\$3.50
	WIREHUBR	21 / 0.08	Brown	Per 10 mtr	\$3.50
	WIREHUO	21 / 0.08	Orange	Per 10 mtr	\$3.50
	CODE	SIZE	TYPE	QTY / PKT	PRICE
	WIRETB150	150mm	Terminal at one end. Fits the terminals on SM403	10	\$3.60
	WIRETR150	150mm		10	\$3.60

STEEL ROD

	STEEL ROD 2.5MM X 500MM Rod Outer diamter: 2.5mm Rod Length: 500mm	
	Code: STR2.5 Pack of 5 \$4.05	Code: STR2.5-20 Pack of 20 \$14.50

SHRINK WRAP

CODE	DESCRIPTON	QTY / PKT	PRICE
SHRINK3RED	Shrink Wrap Red, 3mm diameter	1 mtr	\$2.35
SHRINK3BLK	Shrink Wrap Red, 3mm diameter	1 mtr	\$2.35



2024 SOLAR & SOLAR CHALLENGE CATALOGUE

ALLIGATOR CLIPS

	ITEM NAME & DESCRIPTION	CODE	QTY / PKT	PRICE
	ALLIGATOR CLIPS - INSULATED SHANK - BLACK	ALLICLIPIB	10	\$10.50
	ALLIGATOR CLIPS - INSULATED SHANK - RED Alligator clips with screw. Overall length approx. 75mm. Black or red (please specify colour).	ALLICLIPIR	10	\$10.50
	ALLIGATOR CLIP - PLAIN SHANK	ALLICLIPPS	10	\$8.00
	ALLIGATOR CLIP TO PIN - JUMDER LEAD SET Jumper Cable Set – Arduino & RaspberryPi compatible • Each cable consists of a Pin to insulated Alligator Clip • Ideal use with Prototyping Breadboards • Multi-coloured for easy identification • 20cm Length	ALLIWIRESCLIP10	10	\$10.95




BATTERY HOLDER FOR 4 X AA BATTERIES Code: BH4AAF

Battery Holder for 4 x AA batteries with cover, on-off switch.
Wires approx. 150mm long.
Pack of 5.

Price:
\$17.84 (1 - 4 pkt)
\$16.37 (5 - 9 pkt)
\$14.99 (10 - 20 pkt)
\$13.74 (20+ pkt)

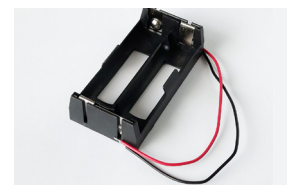
FOR A VARIETY OF BANANA PLUGS - See "BANANA PLUGS & WIRES"

BATTERIES



	CODE	SIZE	TYPE	QTY / PKT	PRICE
	BATTAA	AA	Heavy Duty	4	\$3.90
	BATTALK	AA	Alkaline	4	\$4.90
	BATTALK40	AA	Alkaline	40	\$29.64

BATTERY HOLDER FOR 2 X 18650 RECHARGEABLE BATTERIES Code: BH2R18650

Fits 2 x 18950 batteries.
150mm leads.
Ideal for Arduino® projects or any on-board power storage applications.
Suitable for case mounting too.
Constructed of ABS Plastic.
\$5.95



BEARINGS

	ITEM	CODE	DESCRIPTION	OUTER DIAMETER	FLANGE DIAMETER	BORE DIAMETER	WIDTH	QTY. / PKT	PRICE
	10.0MM PLAIN BEARING	BEAR10	Single row, unsealed ball races.	10.0 mm	---	3.0 mm	4.0 mm	10	\$39.45
	DRIVELINE BOAT BEARING	BEARBT	Driveline bearing. Used with yellow guide tube (GUIDY) to reduce friction & reduce power consumption	4.3 mm	6.0 mm	2.6 mm	7.0 mm	10	\$7.80

PVC SHEET – 610 X 420 X 0.25MM
Code: PVC610X420

Clear PVC sheet 610mm wide x 420mm long x 0.25mm thick size, as used in the **SHERIDAN KIT CAR.**

\$2.14

**ALL PRICES
INCLUDE GST**

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TOOLS & AIDS FOR CONSTRUCTION



WIRE STRIPPER
Code: WIRESTR

TRex design – Automatically adjusts to insulation diameter, and is one handed operation
\$22.95



MINI CRIMPING TOOL
Code: CRIMPT

Crimping tool for non-insulated lugs.
Suits large terminals (*TERML*) & small terminals (*TERMS*).
\$23.00



DIGITAL MULTIMETER
Code: MULTIM

To measure the intensity of the sunlight a Scorpio Calibrated Solar panel (*SOLAR10*) can be used together with a multi-meter.

- This shows the sun's intensity in % sunlight. And aids your testing by providing comparison data.

3.5 digits LCD display,
8 functions,
19 ranges

Dimensions: 132mm x 70mm x 25mm.
DC Voltage Range: 200mV/2V/20V/200V/500V
AC Voltage Range: 200V/500V
DC Current Range: 2mA/20mA/200mA
Resistance: 200Ω/2kΩ/20kΩ/200kΩ/2MΩ
Battery Test: 1.5V/9V
\$16.95



MULTI-USE TOOL / SPANNER
Code: MULTITOO

Can be used as a Gear pusher or as a Spanner for M3 nuts. Pack of 10.
5.6mm opening.
\$5.00



SIDE CUTTERS - INSULATED
Code: SIDECUT

150mm long side cutter
\$25.96 ea (1 - 25)
\$24.50 ea (26+)

DIGITAL MULTIMETER WITH NON-CONTACT VOLTAGE SENSOR

Code: MULTIM1527

Black & red banana plug test leads included.

\$24.95

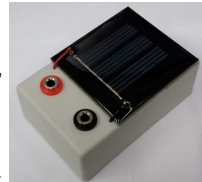


CALIBRATED SUN METER

Code: SUNMETER10

This sunlight meter has a calibrated solar panel. It allows easy determination of Sun intensity. This is a valuable tool when testing solar powered vehicles or boats, or considering the effect that different positions of the sun have on solar power generation. This enables students to take into account the prevailing Sun level during testing of any sort.

Additional item required to use this: Digital Multimeter with banana plugs on leads.
\$20.22



SOLDERING IRON 6W - BATTERY OPERATED
Code: SOLDIRNBT

6W, 4.5V battery operated soldering iron useful for on-site repairs and PCB work and heats to soldering temperature in about 10 seconds. It also has a safety cover that prevents damage to the tip and prevents the power being turned when it's in the drawer of a toolbox.

175mm long.

Requires 3 x AA batteries (*not included*).

\$25.95 ea (1-24 units)

\$23.95 ea (25+ units)

DIGITAL MULTIMETER 1527 SET
Code: MULTIM1527SET

MULTIM1527SET consists of the Multimeter 1527, a soft, foam lined zip up case, a pair of leads with banana plugs at both ends, and both insulated and plain shank alligator clips to add onto the banana plugs for greater versatility.

\$44.50



2024 SOLAR & SOLAR CHALLENGE CATALOGUE

EXPERIMENTING WITH SOLAR ENERGY

MOUNTED SOLAR CELL

Code: PH0467L

This apparatus comprises a selenium photo-voltaic cell.

For use with the **MINI MOTOR UNIT** (Code: PH1319) to demonstrate the production of electrical energy directly from light energy.

\$51.35



SOLAR FURNACE

Code: PH0467SF

Demonstrate the extraordinary power of the Sun.

Did you know temperatures can reach more than 150 degrees C in bright sunlight?

Demonstrate this with our 31cm diameter parabolic reflector. It concentrates sunlight in a black colored copper cup.

\$91.65



ENERGY CONVERSION KIT

AR1100050

There are three instruments fitted on a plastic moulded base to run electrical equipment. Battery, solar cell and hand driven dynamo selectable via a knob fitted on the base.

Different components also provided with kit to observe the effect of these three electrical energy conversion systems on the components.

\$89.50



CROOKE'S RADIOMETER

Code: PH0418A

An instrument that dates back to 1876, with a 70mm (approx.) glass bulb mounted on a sturdy plastic moulded base.

The partly evacuated bulb contains black and white veins. Each vein is blackened on one side, while the reverse side is bright.

Stands over 17cm tall.

\$23.65



SOLAR POWERED ROVERS

Code: SN550030

Get ready to explore the amazing capabilities of solar energy by building your own solar-powered vehicles and devices with this Thames & Kosmos kit.

Using a system of ultralight bamboo rods, plastic gears, and a powerful solar panel, you'll build five different motorized models that move using electricity generated directly from sunlight. Construct three types of solar cars, a solar fan, and a solar robot. Perform science experiments with each model to learn about gear ratios, solar cells, and more. The ultralight materials make your models speedy and durable while the modular gearing system lets you test out three different gear ratios.

\$35.00



SOLAR ENERGY KIT

Code: PH1321

Apply knowledge of solar energy in a practical experiment.

This **SOLAR ENERGY KIT** comprises of a solar panel housed in a plastic box, a low consumption motor with fan, a buzzer and an LED for conducting a series of solar powered activities.

\$78.00



TRANSPARENT SOLAR CELL DOLLY

Code: 100013C

Discover how sunlight can be converted to energy

Experiment with changing the angle of the solar panel, adding weight, running it uphill, and running it on rough & smooth surfaces

Good for standard motion labs as well as lessons on energy and alternative energy

Runs on solar power or batteries; switch to solar drive, battery drive, or battery charge!

Adjustable panel

Includes Teacher's Guide & reproducible Student Handout

12cm long. Battery not included.

\$55.00



SOLAR ENERGY - MOTOR, CELL, FAN & REVERSE SWITCH

Code: EM3732-001

The IEC Solar Energy Fan is an excellent unit for demonstrating solar. It consists of a small base with a solar generator, connected to a motor and fan. Switches permit on/off and reversal of the motor direction. A cowl is fitted around the fan to avoid damage during use or storage.

Designed strong for student use.

The fan runs well under direct sunlight and

also by bright incandescent light. See IECs new 12V. 20W Microscope lamp using a reflector lamp LB2162-001.

\$69.00



14-IN-1 EDUCATIONAL SOLAR ROBOT

Code: FS615

An amazing solar powered robot that can be transformed into 14 different robot models.

Provides hours of creative fun!

A great educational kit for ages 10 years+.

• Solar powered panel makes these robots environmentally friendly!

• Detailed instruction (2 levels) makes DIY robot building a breeze.

\$43.95



SOLAR MECHANICS

Code: SN665068

Build more than 20 solar-powered models to learn about how solar cells convert energy from sunlight into mechanical energy with this Thames & Kosmos educational kit. Learn about solar power in a fun, hands-on way.

Conduct experiments with the solar cell to see how different placement angles, different light levels, different sources of light, and different loads affect its operation. Recommended ages: 8+.

\$59.95



LIMITED STOCK

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SOLAR CHALLENGE - TECHNICAL GUIDE

MODEL SOLAR BOAT CHALLENGES

KITS FOR INTRODUCING SOLAR (NON COMPETITIVE)	STARTER KITS FOR SOLAR CHALLENGE PROJECTS
INTRO SOLAR BOAT (SBTINT)	JUNIOR SOLAR BOAT KIT (SBTJUN)
	ADVANCED SOLAR BOAT KIT (SBTADV)

TECHNICAL GUIDE - REQUIREMENTS TO DESIGN & BUILD A MODEL SOLAR BOAT

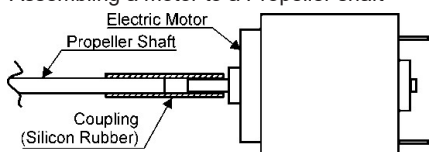
WHAT PARTS ARE REQUIRED? <ul style="list-style-type: none"> 1 x Solar panel and wiring 1 x Electric motor 1 x Propeller & propeller shaft, etc. 1 x Hull material(s) 1 x Switch (3 position) 1 x Solar Panel Power Controller (Low Volt)** 2 x Guide wire follower Various other components & sundry items. e.g. adhesives, cable ties, velcro (hook & loop)... 	WHAT TOOLS ARE NEEDED?* <p>The basic tools needed to make a boat include:</p> <ul style="list-style-type: none"> Side cutters and wire strippers Small hammer. Soldering iron and stand, solder Craft knife and scissorsRuler and pen / marker Cutting tools (e.g. Hacksaw, mini bolt cutters) Shaping tools for the hull (e.g. Hot wire cutter, rasp, flat file, sandpaper)).
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*Always check your State's current Solar Challenge Regulations to ensure that you comply.

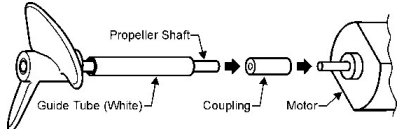
**Advanced Division only.

MODEL SOLAR BOAT - PROPELLERS & SHAFTS

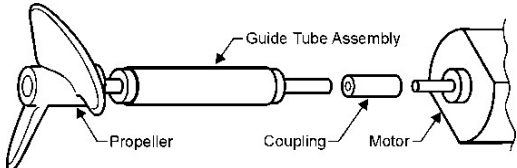
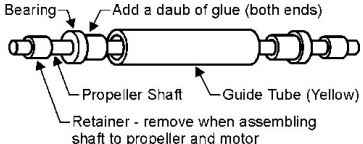
HOW DOES IT GO TOGETHER? WHAT CHOICES ARE THERE? Our range of components starts with a basic economical set up when starting out, and extends to carbon fibre propeller shafts and Driveline bearings.

<p>Assembling a motor to a Propeller shaft</p> 	<p>The coupling provides a flexible connection between motor and propeller shafts.</p> <p>The silicon-rubber coupling (COUP1.8) has an inner diameter of 1.8mm and will stretch over both the 2.0mm motor shaft and the 2.5mm propeller shaft.</p>
--	--

There are a number of options for making the propeller shaft and tube, and are shown below:

 <p>The Propeller shaft and guide tube (using GUIDW)</p>	<p>There are 2 choices in propeller shaft material:</p> <ul style="list-style-type: none"> - 2.5mm steel rod (STR2.5) - 2.5mm carbon fibre rod (CFR). <p>The drawing on the left shows the more economical set up, using 2.7mm ID guide tube (GUIDW).</p>
---	---

THIS IS THE RECOMMENDED SET UP FOR COMPETITION:

 <p>Propeller shaft and guide tube (using GUIDY & Boat bearings (BEARBT))</p>	<p>There are 2 choices in propeller shaft material:</p> <ul style="list-style-type: none"> - 2.5mm steel rod (STR2.5) - 2.5mm carbon fibre rod (CFR). <p>The drawing on the left shows the recommended set up, using 4.5mm ID guide tube (GUIDY) and a Bearing (BEARBT) at each end. This reduces friction to a minimum, as the shaft only has 2 contact points.</p>
 <p>Assembling the Low-friction Guide tube assembly (using GUIDY) (using short pieces of coupling as retainers)</p>	<p>The drawing on the left shows the assembly procedure for the Guide tube and bearings.</p>

The chart below summarises the pictorial information above. Each line (Option) spells out which parts go together for that option.

		COUPLING	SHAFT		GUIDE TUBE		BEARING	
2.5MM PROPELLER SHAFT	MOTOR	COUP1.8 (1.8mm ID)	STR2.5	CFR	GUIDEW	GUIDY #1	DRIVELINE BEARING BEARBT	PROPELLER #2
Option 1: Steel	✓	✓	✓		✓			✓
Option 2: Carbon Fibre	✓	✓		✓	✓			✓
Option 3: Steel	✓	✓	✓			✓	✓	✓
Option 4: Carbon Fibre	✓	✓		✓		✓	✓	✓

#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 an interference-fit onto a 2.5mm shaft.

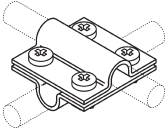


MODEL SOLAR CAR CHALLENGES

KITS FOR INTRODUCING SOLAR (NON COMPETITIVE)	STARTER KITS FOR SOLAR CHALLENGE PROJECTS
INTRO SOLAR CAR (SCRINT)	CHALLENGER SOLAR CAR V2(CHALLENGERV2)
	SHERIDAN KIT CAR (SHERIDAN)

TECHNICAL GUIDE - REQUIREMENTS TO DESIGN & BUILD A MODEL SOLAR CAR

WHAT PARTS ARE REQUIRED?* 1 x Solar panel and wiring or tray 1 x Electric motor, mounting and gearing 1 x Wheels, bearings and axles Frame / body materials 1 x Switch (2 or 3 position) 1 x Solar Panel Power Controller (Picaxe / Low volt / AutoMax**) 4 x Guide rail followers Various other components & sundy items, e.g. adhesives (such as silicon roof and gutter sealant), ...cable ties, velcro (hook & loop)...	WHAT TOOLS ARE NEEDED?* The basic tools needed to make a car include: Side cutters and wire strippers Small hammer. Soldering iron and stand, solder Craft knife and scissors, Ruler and pen / markerDrill and drill bits, Hot glue gun Cutting tools (e.g. Fine blade hacksaw, mini bolt cutters) Shaping tools for the body (e.g. Hot wire cutter, rasp, flat file, sandpaper)). Screw drivers, Allen Keys
---	--

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

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?:	
<p><i>AXLE BRACKET KIT (AXBKTK)</i> consists of 8 axle brackets, nuts and bolts to assemble 6mm carbon fibre tubes into a rectangle.</p>  <p><i>AXLE & FRAME KIT (AXFRK)</i> consists of the Axle Bracket Kit and two 650mm long 6mm diameter carbon fibre tubes</p> <p><i>ELBOWS</i> can be used to create a 3 dimensional frame – the Elbows are glued into the end of the tubes to create right angle joints.</p>	 

MODEL SOLAR CAR - FAULHABER MOTOR MOUNTING

The Faulhaber 2232 motor can be mounted onto a solar Car using a *FAULHABER MOTOR MOUNTING KIT* – either by bolting the motor mounting kit to a car body, or by using the included Axle bracket to attach it to 6mm carbon fibre tube.

FAULHABER & MOUNTING KIT (FAUMOTK). This consists of:

- 1 x *FAULHABER MOTOR MOUNTING KIT*
- 1 x Faulhaber 2232 motor



FAULHABER MOTOR MOUNTING KIT (FAUMMK). This consists of an adjustable mounting bracket and plate and includes one Axle Bracket (to mount this onto 6mm tube)



MODEL SOLAR CAR - AXLES AND WHEELS

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

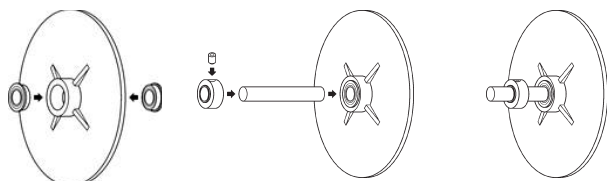
Our broad range allows for a lot of choices, from basic (wheel & axle) up to carbon fibre tubes with bearings and collars. The first listed option is the recommended set-up for competing, and other options are listed below that.

THIS IS THE RECOMMENDED SET UP FOR COMPETITION:

This is based around the use of 6mm Carbon fibre tube, which is light and strong and is integrated into the chassis.

- The wheel hub accepts two flanged 10mm 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.
- The wheels are held onto the tube by the use of collars on either side.
- SW70E are plain wheels (2mm thick – 10mm ID). For providing friction to the surface, wheel SW70E-GR has a wider outside surface and is grooved, to allow an O-ring (ORING55) to be used to provide traction to the track.
- Three wheels are usually used without friction material to keep friction on the track to a minimum.
- One driving wheel should have a "tyre" to increase friction on the track.

USING A 6.0MM SHAFT (CFT) AND BEARINGS AND COLLARS



Step 1 Insert the bearings from both sides

Step 2 Insert the shaft

Step 3: Add and fasten collars from both sides

THE WHEELS AND TYRE:



SW70E



SW70E-GR

USING O-RINGS AS TYRES: The 55mm O-Ring is stretched to fit over the wheel. It sits in the groove around the wheel

	Wheels		Bearings	Tyre	Axle	Collar
Axle & wheel setup	SW70E	SW70E-GR	BEAR10F	ORING55	CFT	COLLAR
6.0 mm Axle	✓	✓	✓	✓	✓	✓

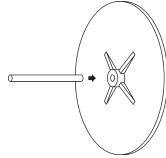
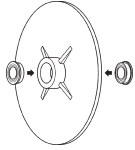
THESE SET UPS USE 3.0mm SHAFTS AND BEARINGS TO PROVIDE A LOW FRICTION DRIVELINE:

There are choices in wheels, for the options listed below:

- SW70A are plain wheels (2mm thick – 7.0mm ID). For providing friction to the surface, wheel SW70A-GR has a wider outside surface and is grooved, to allow an O-ring (ORING55) to be used to provide traction to the track.
- SW70E are plain wheels (2mm thick – 10mm ID). For providing friction to the surface, wheel SW70E-GR has a wider outside surface and is grooved, to allow an O-ring (ORING55) to be used to provide traction to the track.
- If TYRE material is chosen, then 4 of the same type of wheels (non-grooved) will be required.
 - #a: Three wheels are usually used without friction material to keep friction on the track to a minimum.
 - #b: One driving wheel should have a "tyre" to increase friction on the track.
 - #c: 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*.

The use of these 3.0mm shafts requires the user to mount the axle and its axle tube to the body.

USING A 3.0MM SHAFT AND BEARINGS



Step 1 Insert the bearings from both sides

Step 2 Insert the shaft (gently tapping with a hammer)

The drawing on the left shows the a low friction set up using the 3.0mm shaft, using Ball Bearings. There are a variety of options using bearings.



BEAR7 BEAR10/3F
BEAR10



(Flanged)

THE WHEELS:



SW70A
SW70E



SW70A-GR
SW70E-GR

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



The chart below summarises the options available for 3.0mm shafts using bearings. Each line spells out which parts go together.

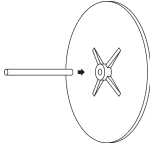
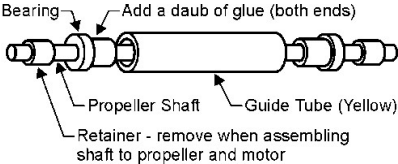
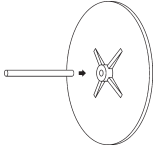
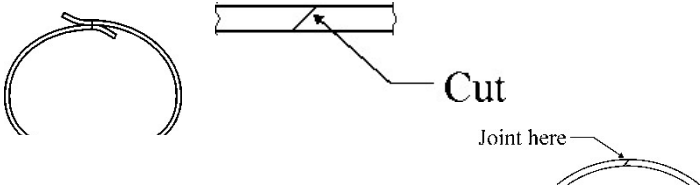
	Wheels #a & #b				Bearing #c			Tyre	Axle		Guide Tube
	SW70A	SW70AGR	SW70E	SW70EGR	BEAR7	BEAR10	BEAR10 /3F	ORING55	FIBGRD500	CFR3	GUIDG
Axle and Wheel set up Options											
3.0mm Axle using <u>Grooved wheels and O rings</u>											
... and 7.0mm Bearings											
Option 1: 3.0mm Fibreglass rod	✓	✓			✓			✓	✓		✓
Option 2: 3.0mm Carbon fibre rod	✓	✓			✓			✓		✓	✓
... and 10.0mm Bearings											
Option 3: 3.0mm Fibreglass rod			✓	✓		✓		✓	✓		✓
Option 4: 3.0mm Carbon fibre rod			✓	✓		✓		✓		✓	✓
... and Flanged 10.0mm Bearings											
Option 5: 3.0mm Fibreglass rod			✓	✓			✓	✓	✓		✓
Option 6: 3.0mm Carbon fibre rod			✓	✓			✓	✓		✓	✓

	Wheels		Bearings #c			Tyre	Axle		Guide Tube
	SW70A	SW70E	BEAR7	BEAR10	BEAR10/3F	TYRE / TY71	FIBGRD500	CFR3.0	GUIDG
Axle and Wheel set up Options									
3.0mm Axle using <u>plain wheels and Tyre material</u>									
... and 7.0mm Bearings									
Option 7: 3.0mm Fibreglass rod	✓		✓			✓	✓		✓
Option 8: 3.0mm Carbon fibre rod	✓		✓			✓		✓	✓
... and 10.0mm Bearings									
Option 9: 3.0mm Fibreglass rod		✓		✓		✓	✓		✓
Option 10: 3.0mm Carbon fibre rod		✓		✓		✓		✓	✓
... and Flanged 10.0mm Bearings									
Option 11: 3.0mm Fibreglass rod		✓			✓	✓	✓		✓
Option 12: 3.0mm Carbon fibre rod		✓			✓	✓		✓	✓

THESE SET UPS ARE AN ECONOMICAL WAY TO START OUT, BUT ARE NOT RECOMMENDED FOR SERIOUS COMPETITONS:

The simplest set up is the use of 2.5mm or 3.0mm shafts with the 70mm wheels. The wheels are an interference fit onto the shaft and need to be have the shaft hammered into the them.

- The use of any of these shafts requires the user to mount the axle and it's axle tube to the body.

<p>USING A 2.5MM SHAFT</p>  <p>Insert the shaft into the wheel</p>	<p>The simplest set up is the use of 2.5mm shafts with the 70mm wheels (SW70D)</p>
<p>Using a 2.5mm shaft (Low friction option)</p>  <p>Bearing → Add a daub of glue (both ends) Propeller Shaft → Guide Tube (Yellow) Retainer - remove when assembling shaft to propeller and motor</p>	<p>The drawing on the left shows how to assemble the low friction set up using the 2.5mm shaft, using 4.5mm ID guide tube (GUIDY) and a Bearing (BEARBT) at each end. This reduces friction to a minimum, as the shaft only has 2 contact points.</p>
<p>USING A 3.0MM SHAFT</p>  <p>Insert the shaft into the wheel</p>	<p>The 3.0mm shafts provides a stronger axle that the 2.5mm shaft, and is paired with the 70mm wheels (SW70B).</p>
<p>WHAT ABOUT THE WHEELS? USING TYRE MATERIAL</p>  <p>Cut Joint here</p>	<p>Three wheels are usually used without friction material to keep friction on the track to a minimum.</p> <p>One driving wheel should have a "tyre" to increase friction on the track.</p> <p>An adhesive like the Loctite 406 Retaining compound is used to glue the tyre material ends together to form a tyre.</p>
<p>WHAT ABOUT THE WHEELS ? USING THE TYRE 71MM RUBBER EXTRUSION?</p>	<p>Install the tyres over the rear wheels, much the same as you would a bike tyre, starting at the bottom, and working up. As the wheels are very narrow, it can be fiddly to get the tyres to seat properly.</p> <p>WARNING: Be careful when installing the tyres, as they are NOT rubber bands and have very little stretch in them – they can easily be broken at the join.</p>

The chart below summarises the options available for 2.5mm and 3.0mm shafts – without the use of bearings. Each line (Option) spells out which parts go together for that option.

	Wheels #1 & #2		Tyre #2	Axle				Guide			Bearing
	SW70B	SW70D	TYRE / TY71	STR2.5	CFR	FIB-GRD500	CFR3.0	GUIDW	GUIDG	GUIDY	BEARBT
Axle Diameter and Option											
2.5mm Axle											
Option 1: Steel		✓	✓	✓							
Option 2: Carbon Fibre Rod		✓	✓		✓			✓			
Option 3: Steel		✓	✓	✓				✓		✓	✓
Option 4: Carbon Fibre Rod		✓	✓		✓					✓	✓
3.0mm Axle (NO bearings)											
Option 5: Fibreglass Rod / Steel	✓		✓			✓			✓		
Option 6: Carbon Fibre Rod	✓		✓				✓		✓		

ESSENTIALS FOR BOTH CAR & BOAT...		
ELECTRIC MOTORS	Solar Motor SM403	SM403
	Faulhaber 2232	SMFAU
AUTOMAX SOLAR MPPT	Automax	AUTOMAX
PROGRAMMABLE SOLAR PANEL POWER CONTROLLER	Picaxe Programmabel Solar Power Panel Controller	PICSPPC08M2
SOLAR PANEL POWER CONTROLLER	Solar Power Panel Controller – Low Voltage (Useful In The Solar Challenges)	SPPCL
SOLAR PANELS	Solar Panel No. 26	SOLAR26
	Solar Panel No. 10 Calibrated	SOLAR10
SOLAR PANEL WIRING HARNESS FOR SOLAR26	Wiring Harness For Solar26	HARNESS26
SWITCHES	One Way Toggle Switch (SPDT “On-Off”)	SW1W
	Two Way Toggle Switch (DPDT “On-Off-On”)	SW2W
	Small Sliding Switch (On-Off)	SSWS
	Large Sliding Switch (Series-Off-Parallel)	SSWL
PLATFORM & HULL MATERIAL (FOR EITHER CAR OR BOAT)	Corflute Sheet 300mm X 200mm X 5mm	CORF200/300/5
PROPELLER SHAFTS, AXLES & GUIDE TUBES	Various	

ESSENTIALS FOR SOLAR BOATS...		
PLATFORM & HULL MATERIAL	Styrofoam (For Monohull) 300mm X 200mm X 25mm	STYRO300/200/25
	Styrofoam (For Catamaran) 300mm X 50mm X 25mm	STYRO300/50/25
COUPLING	Coupling 1.8/3.8mm	COUP1.8
	Coupling 2.0/4.0mm	COUP2.0Y
BOAT PROPELLERS	Propeller – 2 Blade	PROP2
	Propeller – 3 Blade	PROP3
DRIVELINE BEARINGS	Boat Driveline Bearings	BEARBT

ESSENTIAL FOR SOLAR CARS		
FAULHABER MOTOR MOUNTING	Faulhaber & Motor Mounting Kit	FAUMOTK
	Faulhaber Mounting Kit	FAUMMK
SM403 MOTOR MOUNTING	SM403 Motor & Mounting Kit	SM403MOTK
	SM403 Motor Mounting Kit	SM403MMK
ALUMINIUM TRAY FOR SOLAR26	Aluminium Tray Kit & Components	TRAY26
	Aluminium Tray (no components)	TRAYAL
FRAMING KITS	Axle Bracket Kit	AXBKTK
	Axle & Frame Kit	AXFRK
WHEELS	See <i>Solar Wheels – Nylon Low Rolling Resistance, 70mm Diameter</i>	
	Solar Wheel 70mm Diameter (2mm thick)	SW70A / SW70E
	Solar Wheel 70mm Diameter (with groove for O-Ring)	SW70A-GR / SW70E-GR
FRAMING & SOLAR WHEEL COMPONENTS	Carbon Fibre Tube	CFT
	Elbow	ELBOW
	Collar (Axle Retainer)	COLLAR
	Guide Rollers	GUIDEROLLER
	Spur Gear to Wheel Adapter	GEARADAPT
	Allen Key	HEX1.5
	Grub Screw (spares for collars & brass gears)	SCRGR
	Tyre Material	TYRE
	Tyre 71mm Rubber Extrusion	TY71

	Tyres (O-Rings - for use with solar wheels with grooves)	ORING55
	7.0mm Plain Bearing	BEAR7
	10.0mm Plain Bearing	BEAR10
	10.0mm Flanged Bearing	BEAR10F
	10.0mm x 3mm Flanged Bearing	BEAR10/3F
AXLES	Choices of Steel or Carbon Fibre or Fibreglass	
PINION GEARS	Pinion Gears to suit Faulhaber Motor	BRGPXX

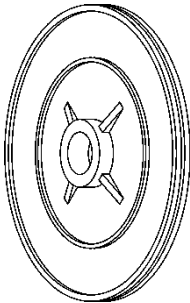
NOTE: Refer to "Propeller Shafts, Axles, Guide Tubes and Coupling" tables in the main part of the catalogue for a comprehensive listing of Guide Tubes and Steel Shafts (Rods) available.

USING THE GEAR ADAPTOR FOR THE DRIVEN WHEEL

Below is a guide to the set up and production steps used. Tick off each box as you complete a task and document it.

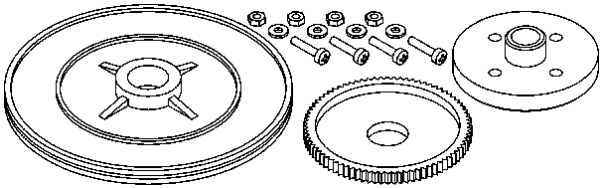
THE DRIVEN (GROOVED) WHEEL

There is one x 70mm grooved low rolling resistance solar wheel required (the other 3 can be the normal un-grooved type), and before installing onto the axle, it needs to be assembled with the adaptor and a modified 80 tooth gear.



To make up the assembly above you need the following - part ordering codes are in brackets:

- 1 x 70mm grooved wheel (SW70EGR)
- 1 x Gear Adaptor (GEARADAPT)
- 1 x modified 80 Tooth spur gear (GEAR80/2.9) ###
- 4 x M3 Bolt x 12mm (BOLT12)
- 4 x M3 Nut (NUTM3)
- 4 x M3 Washer (WASHER)
- 2 x 10mm Flanged bearings (BEAR10F)
- 2 x Collars (COLLAR)

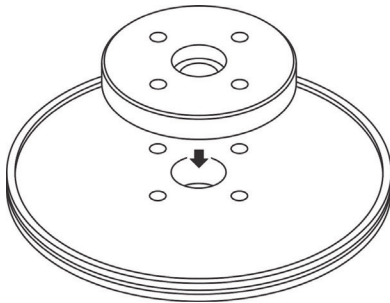


This 80 Tooth gear starts as a GEAR80/2.9, with the centre machined out with a 12mm end mill, so that it fits over the gear adaptor.

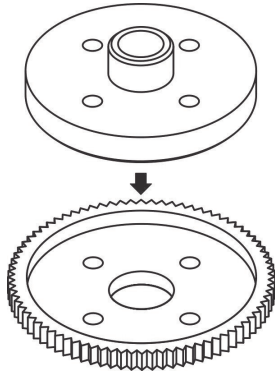
TOOLS REQUIRED:

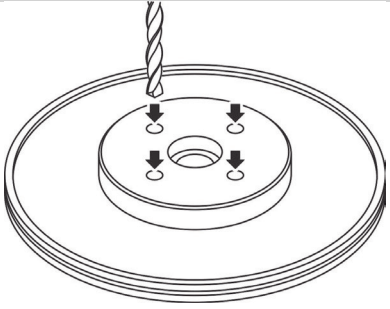
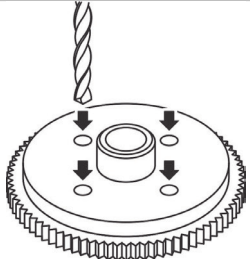
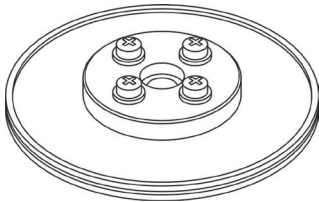
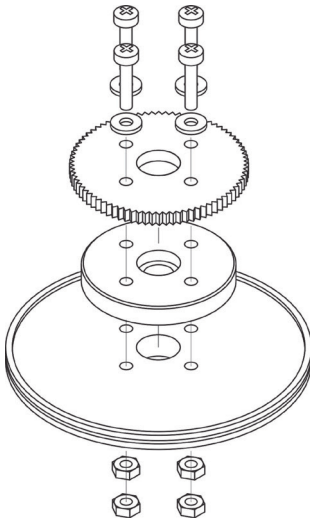
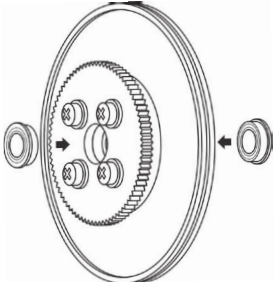
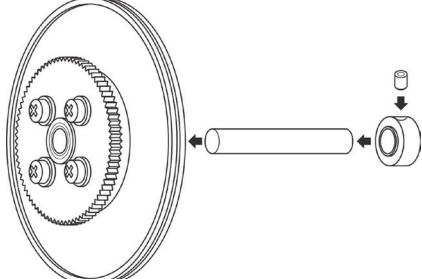
- ☐ Phillips (cross) screwdriver: #1 Point (SCREWDRPH1/80)
- ☐ A small spanner / Multitool (for the M3 nuts)
- ☐ 3mm drill bit and drill
- ☐ 12mm end mill
- ☐ Allen key (HEX1.5)

- ☐ Place the solar wheel onto a scrap piece of wood, with the flat side up.
- ☐ Gently tap the adaptor with a small hammer until it is fully installed into the wheel's centre boss, on the flat side of the wheel.



- ☐ Assemble the 80 Tooth gear onto the metal adaptor, so that it sits flat on the adaptor (the gear's inside lip will fit snugly over the adaptor)



<p><input type="checkbox"/> Using the holes in the adaptor as guides, drill 3 mm holes through the wheels.</p>	
<p><input type="checkbox"/> Turn the adaptor over so that the gear sits flat: Rest it on a scrap piece of timber and using the holes in the wheel and adaptor as guides, drill 3 mm holes through the gear.</p>	
<p><input type="checkbox"/> Assemble the Gear, adaptor and wheel assembly using the Bolts, nuts and washers.</p> 	
<p><input type="checkbox"/> Insert 2 off the 10mm flanged bearings into this gear / wheel / adaptor assembly, one from each side</p>	
<p><input type="checkbox"/> Slide one collar onto the axle at the end where the motor will be mounted and tighten the grub screw (work out how far in from the end the collar will be attached?).</p> <p><input type="checkbox"/> Slide the Wheel, adaptor and gear assembly onto the axle.</p> <p><input type="checkbox"/> Add the second (outside) collar on and slide the collar against the wheel, making certain the wheel is against the inside collar and tighten the grub screw.</p> <p>NOTE: Check that the wheel spins freely.</p>	

SETTING UP THE GUIDE ROLLERS

GUIDE ROLLERS KIT:

- ☐ 4 X Guide Rollers (GUIDEROLLER)
- ☐ 8 x Bearings ID3/OD 10mm (BEAR3/10F)
- ☐ 4 x Bolt - M3 x 40 (BOLT40)
- ☐ 24 x Nut M3 (NUTM3)
- ☐ 4 x Washer M3 (WASHER)



Below is a guide to the set up and production steps used. Tick off each box as you complete a task and document it.

The guides consist of a POM Guide roller, fitted with flanged bearings and mounted on an M3 screw, with the required clearance.

1.1 ASSEMBLE THE FOUR GUIDE ASSEMBLIES:

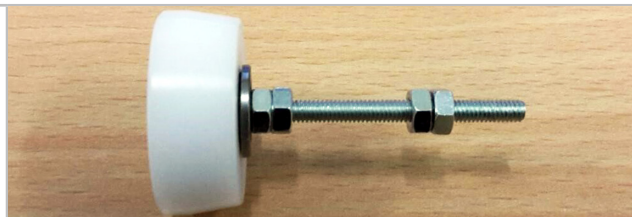
Before fitting the Guide assembly to the axle bracket, assemble the Guides as detailed:

NOTE: There are 4 Guide assemblies in total. The instructions detail how to make one Guide assembly that needs to be repeated for the other 3 guide assemblies.



- ☐ Push one of the flanged bearings into the recessed hole in the guide roller
- ☐ Slide the guide roller down the M3x40 bolt
- ☐ Slide a washer down the bolt (this will prevent the bearings crushing together)
- ☐ Slide and push in the other flanged bearing
- ☐ Spin an M3 nut down till it touches the bearing
- ☐ Tighten the nut with the spanner (Multitool) provided in the kit
- ☐ Spin a second nut and tighten it onto the first nut
 - hold the first nut (the one next to the bearing) with the Multitool and do not let this nut rotate
 - with the other spanner firmly tighten the second (outside) nut against the first
- ☐ Spin on two more nuts to the height required for the guide rail. Leave these finger tight - they will be tightened after fitting the guide through the axle bracket

- ☐ When you finishg you should have made 4 of these assemblies, and ready to install.



1.2 ASSEMBLE THE FOUR GUIDE ASSEMBLIES TO THE AXLE BRACKET:

Put the chassis on a flat surface, with the tyre fitted to the drive wheel, and with all four wheels on a flat surface.

- ☐ Fit the guide bolt through the hole in the axle bracket
- ☐ Measure the guide screw head to track clearance at the front and the rear (that is - how above the track is the screw head)
- ☐ For each guide assembly adjust the nut underneath and closest to the axle bracket until a clearance of between 3 and 4 mm is achieved between the screw head and the track surface
- ☐ Put one 3mm nut on the bolt where it protrudes through the axle bracket, and tighten it onto the axle bracket
- ☐ Recheck the clearance between the screw head and track, and adjust the nuts on either side of the axle bracket if required
- ☐ Put the second 3mm nut on the bolt and spin it down to the first nut
- ☐ Next you need to tighten the lock nuts - the lock nuts are the second nuts shown in the photo (above and below the axle bracket) using the two spanners (the Multitool provided in the kit and the second spanner):
 - hold the first nut (the one next to the axle bracket) with the Multitool and do not let this nut rotate
 - with the other spanner firmly tighten the second (outside) nut against the first.

NOTE: Both of these lock nuts must be tightened up against the inside nuts - this provides a locking action of the nuts against each other. The lock nuts help to prevent the bumps on the track and guide rollers from loosening the clamping nuts.

WARNINGS:

- If this lock nut comes loose the guide rollers will move out of place to the detriment of car performance - by creating more rolling resistance, or in an extreme case, allowing the car to leave the track.

When testing and racing, do keep checking that they remain tight and in position.

This is what it will look like when assembled to the axle bracket.



GENERAL INFORMATION & TECHNICAL INFORMATION SHEETS

SOLAR CHALLENGE KITS

Kits designed to help your students to make competitive boats and cars for participating in the Model Car and Boat Challenges.

Before starting to build:

Download the current Regulations for the MODEL SOLAR CAR appropriate to your state:

Victoria: STUDENT DESIGNED CAR

<https://www.modelsolar.org.au/the-challenge/regulations>

NSW SUNSPRINT

<https://www.sunsprint.com.au/>

Tasmania SOLAR CAR

<http://www.tassolarchallenge.org/>

You can also find a lot of **technical information and ideas** on the Victorian and Tasmanian websites.

If you require **help or advice**, feel free to contact your state's Solar Committee or Scorpio Technology.

YOUR SUCCESS STORIES!!

On our website we have a page called "KITS IN ACTION". This is YOUR chance to share your success stories and ideas with other teachers. We would appreciate photos and stories of what you have done, how you have adapted our kits or even how you have used the project afterwards – to test them and have fun with them.

EMAIL 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

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.

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QLD / WA / NT (Rural)	\$11.40	\$23.48	\$26.85	\$33.56	\$46.96	

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