ROBOT WARS 2002

Technical Sheet No. 1

Failsafes

A failsafe is an electronic device which detects radio interference, or lack of a signal from the transmitter, it is then able to set a servo to a predetermined position. The servo must be able to then switch off power supply to drive and weapon systems – this can be achieved via micro switches, relays, etc.

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Technical Sheet No. 2

Aerial Installation

There are many cases of radio interference or lack of control of robots, many of these are due to poor aerial installations. The following is one method which we use and it gives very good results.

The length of your receiving aerial needs to be long enough to work and short enough to be practical 30cm to 40cm is about the best length, for you technos there is no science in the length it's just practical. This must be made from something like piano wire and fitted to the outside cover of your robot through a plastic insulator so that the aerial does not come in contact with the cover. Make sure you put something on top so you don't poke it in your eye. You should then unsolder the flexible wire from your receiver and replace this with a lapped or braided screened lead approximately 7/.2mm. The centre wire goes onto the aerial position on your receiver then the braid or screen should be insulated and attached to the zero volts or negative supply on your receiver. The other end centre wire should be attached to your aerial with a push-on terminal and the braid or screen should be earthed to the cover of your robot. Try to keep this wire as short as practically possible.

If you wish, also shield your receiver by covering it with either an aluminium mesh box or tin box, this is not normally necessary, but you may do this if you wish. When you have completed your installation, you should then do a range check. This should be done with your robot sitting on its cradle with the drive wheels off the ground and your transmitter aerial fully retracted. You should then operate your robot gradually moving away from it with your transmitter, and providing your TX and RX batteries are fully charged and in good condition, you should get a range of about 150 feet without any interference problems. (This is assuming that you have suppressed the motors etc.)

Note: Some information supplied by Ripmax/Futaba

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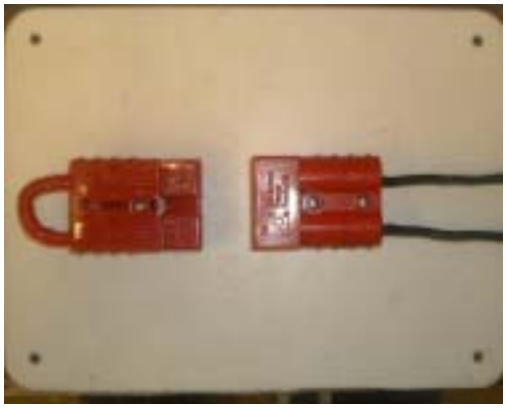
Technical Sheet No. 4

Removable Link

The removable link should be a device fitted between the battery and the electronics of your robot, there should not be any electrical components included in this circuit i.e. relays etc. The purpose of this device is that once removed it makes the robot completely inoperable.

There are various ways of doing this, the easiest being to fit something like a household fuse with a copper or brass strip brazed across the terminals, or a large lorry type plug and socket with a 6 or 10mm^2 cable loop. This can then be easily removed and would therefore make your robot totally safe. You can in fact use any method you wish as long as it is visible when held in your hand and is easy to connect and disconnect.

No robot will be allowed on site without this device fitted and working correctly.



N.B. All house robots are fitted with this device. So it can be done!

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Technical Sheet No. 5

Compressed Gas Cylinders/Pressure Systems

CO2 cylinders used **MUST** conform to Health & Safety Executive requirements as described in **Carriage of Dangerous Goods (Classification, Packaging and Labelling) and Use of Transportable Pressure Receptacles Regulations 1996 (CDGCPL2 Regulations as amended): Approved Design Standards & Specification**

This document contains current cylinder design standards and specifications for the manufacture of new cylinders. It also contains obsolete design standards and specifications to which cylinders may no longer be manufactured but may still be used if they are safe and have been examined at appropriate intervals by a competent person in accordance with CDGPL2.

As these cylinders are used as gas cylinders and not as fire extinguishers the hydraulic test frequency will be 5 years from the date of manufacture and every five years thereafter.

The cylinders permitted for use are as follows; -

1.1 kg capacity steel nominal diameter of 90mm and nominal overall length of 480mm
1.1 kg capacity aluminium nominal diameter of 104mm and nominal overall length of 410mm
2.0 kg capacity aluminium nominal diameter of 118mm and nominal overall length of 480mm

Please note the cylinder sizes are meant as guidance only as they do vary slightly from different manufacturers. All cylinders **MUST** be fitted with standard CO2 male thread valves incorporating a bursting disc set to burst at 190 bar and ideally be of the screw down type. Photo is of 1.1kg capacity steel cylinder (round bottom) and 1.1kg capacity aluminium cylinder (flat bottom).

All CO2 cylinder valves **MUST** be fitted with a safety-bursting disc, **WHICH MUST NOT BE TAMPERED WITH UNDER ANY CIRCUMSTANCES.**

Ref: Derek Foxwell/Technical
Last updated 8th March 2002

Cylinders and valves must not be tampered with but if cylinder valves have been removed they must be replaced at the correct torque setting.

Moisture must not be allowed to enter any cylinder that is to contain CO2. Whenever moisture is suspected the cylinder must be returned to the competent person for thorough examination.

If a receiver tank or pressure system is used it will fall under the **Pressure Systems Safety Regulations 2000** and as such will require a written scheme of examination and periodic examinations by a competent person. He/she can select the periodicity as he/she sees fit. The scope of the examination must include the gas cylinder and the receiver/buffer tank, which becomes a pressure vessel during use. (This would only apply if the largest vessel in the system is above 250 bar.litres. Below this level a WSE is not required although the system must be properly designed and properly maintained to ensure it remains safe.

OTHER GASES

Should you wish to use any other gas you should discuss your requirements with the Robot Wars technical department. However the requirements of CDGPL2 must still be observed.

Helpful information on gas cylinders may be found on the HSE website www.HSE.gov.uk and from the British Compressed Gases Association on Tel No. 023 8064 1488 and www.bcga.co.uk.

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Technical Sheet No. 6

Batteries

There have been lots and lots of questions on my e-mail about batteries. I will try to answer as simply as possible most of the questions I have been asked.

In Robot Wars we cannot allow any battery to leak acid onto our set or leak whilst on the benches in the pits. We have tested many batteries and we have recommended that sealed lead acid batteries with AGM (absorbent glass matt) are acceptable for Robot Wars. The batteries we have tested and approved are as follows:

1. Hawker
2. Yuassa
3. Dryfit
4. Cyclone
5. Steatite
6. Kiel

These batteries have all come up to the standard we expect for Robot Wars.

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Technical Sheet No. 7

Carrying Cradle

This is an example of a cradle built by a competitor on Series 4. It enables the Robot to run with wheels off the bench or floor and also allows the Robot to be moved easily and safely.

The cradle is an important part of the loading and off loading of your Robot to and from the stage. **So no bricks or lumps of wood please.**

ROBOT WARS 2002

USEFUL SUPPLIERS LIST

PLEASE ENSURE THAT YOU E-MAIL OR FAX THE SUPPLIERS ON THIS LIST AND DO NOT TIE UP THEIR TELEPHONE WITH TECHNICAL ENQUIRIES

Company	Contact	Materials Available
4QD 30 Reach Road Burwell Cambs CB5 OAH	Web site: http://www.4qd.co.uk E-mail:: support@4QD.co.uk Fax: 01638 744080 Tel: 01638 741930	Speed Controllers (mechanical interface)
Bosch Motors c/o Ellis Components Derbyshire	Web site: www.ellis-componants.co.uk E-mail: sales@ellis-componants.co.uk Fax: 01773 874645 Tel: 01773 873151	Bosch Motors
Brusa Elektronik Erlen 116 CH – 9473 Gams Switzerland	E-mail: brusa@brusa.rol.ch Fax: +41 (0)81 750 3539 Tel: +41 (0)81 750 3530	Electronic Speed Controller, Electric Motors
Delbots 6 Clarice Way Wallington Surrey SM6 9LD	E-mail sales@delbotsfoxy.demon.co.uk Fax: 020 8286 0413 Tel: 020 8647 1033	Digital Interface Boards Bosch Motor Brackets
Festo Limited Automation House Harvest Crescent Ancells Business Park Fleet, Hampshire GU13 8XP	Web site: www.festo.com E-mail: enquiry_gb@festo.com Fax: 01252 775012 Tel: 0800 626422	Pneumatics and pneumatic control systems
Hawker Energy Products Ltd Stephenson Street Newport Gwent, NP9 OXJ	Web-site: www.hawker.co.uk E-mail: sales@hawker.invensis.com Fax: 0161 727 3805 Tel: 0161 794 4611	Hawker Batteries
Hobby Stores (Nationwide)	Web site: www.hobbystores.co.uk E-Mail: hobbystores@hobbystores.co.uk	Radios, Failsafes Servos, etc.

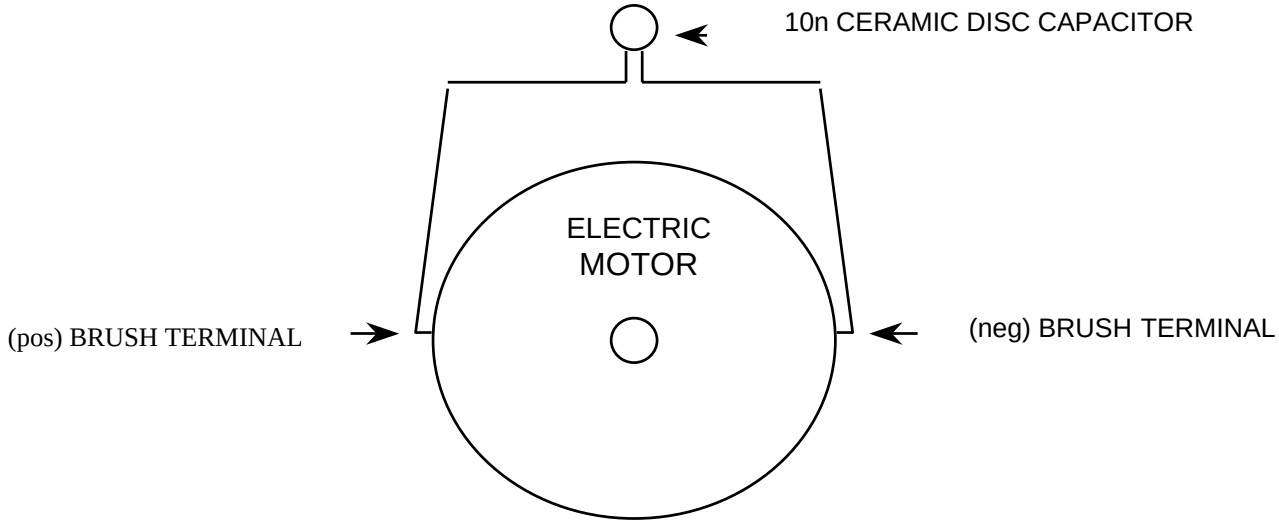
Hydropower	Web site: E-mail: Fax: Tel:	www.hydropower.co.uk sales@hydrapower.co.uk 01462 420901 01462 438303	Hydraulic fittings, pumps, etc.
Life Support Services Unit G Chantry Lance Trading Estate Storrington Sussex, RH20 4AD	E-Mail: Fax: Tel:	info@lifesupportservices.co.uk 01903 745923 01903 742322	High Pressure Cylinders (all sizes) and Regulator Valves
M D S Marketing UK Limited Unit H5 Hastingwood Trading Estate Harbet Road Edmonton London N18 3RR	Web site: E-Mail: Fax: Tel:	www.mdsbattery.co.uk sales@mdsbattery.co.uk 020 8884 0750 020 8884 4904	Batteries (all types)
RCS Electro Pneumatics Ltd West End Business Park Blackburn Road Oswaldtwistle Lancs, BB5 4W7	Web site: Tel:	www.rcs-w-p.co.uk 01254 872277	Cylinders and Valves
Roadcare Lower Early Reading Berks	Fax: Tel:	01189 665393 01189 665393	Second-hand, reconditioned Power Tools i.e. Chainsaws Angle grinders
Steatite	Web site: Tel:	www.steatite.co.uk 0121 678 6888	Batteries
Wessex Resins Cupernhan House Cupernhan Lane Romsey Hants SO5 174	Web site: E-mail: Fax: Tel:	www.wessex-resins.com information@wessex-resins.com 01794 517779 01794 521111	Fibreglass resins and glass cloth
Vantec 460 Casa Real Pl. Nipomo California CA93444 U.S.A.	Fax: Tel:	001 805 929 5056 001 805 929 5055	Speed Controllers (electronic interface)

ROBOT WARS 2002

Technical Sheet No. 3

Electric Motor Suppression

One of the most common problems with electric motor drive is radio interference due to lack of suppression or noise from the brush armature contact. When using secondhand motors be sure that the brushes are in good order and no segments are missing or damaged on the armature. This can cause serious radio interference. The other most serious problem is competitors working on their robots with the motors installed, as you can imagine any iron filings or metal swarf will eventually find their way into the motor (it's got two big magnets) this also will cause serious radio interference. So if you are working on your robots with motors installed, cover all of the air vents on your motors with masking tape to prevent any ingestion of iron filings or swarf. The diagram below is a simple and efficient way of suppressing your motor/s, although this is only advisory not compulsory.



FOR BOSH MOTORS
WITH 4 BRUSHES
THIS MUST BE DONE TWICE

Ref: Derek Foxwell/Technical
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