



Team 1403
Cougar Robotics
a FIRST® Robotics Team

Safety Manual



ELECTRICAL PROCEDURES - 1

MECHANICAL PROCEDURES -

TESTING PROCEDURES -

GENERAL SAFETY -



ELECTRICAL SAFETY

Soldering

Wiring

Wire Insulation

Battery Handling Procedures

Heat Gun

Grounding



SOLDERING

Make sure that the solder is RoHS compliant
lead-free solder

Use the stand whenever iron is not being used

Use 600 degrees Fahrenheit

Use the buddy system to minimize errors in
soldering or safety



WIRING

There should be no exposed wires

Ensure that there are no sharp bends in the wire

Use the proper gauge for the voltage and current



WIRE INSULATION

Use heat shrink tubing whenever possible to insulate exposed wire

Only use electrical tape when absolutely necessary



BATTERY HANDLING

Always connect the circuit breaker first to make sure that there is an emergency stop, and to stop short circuits from being dangerous

Carry one battery at a time

Refer to the battery leakage visual in the event that a battery leaks also refer to the Safety Data Sheet



HEAT GUN

Never point the heat gun at anyone

Let the heat gun cool down before unplugging

Use the low setting on the heat gun to limit extreme heat and prevent burns



GROUNDING

When testing for grounding errors, use a continuity testing probe on the metal frame of the robot and the negative side of the robot clip to see if there is a short circuit

If there is a short circuit, review the robot's wiring



MECHANICAL SAFETY

Holes

Drilling

Pneumatics

Sharp Tool Handling Procedures

Hand Tool Procedures



HOLES

Check all holes to make sure there are no sharp edges – those could cut someone!

If there are any sharp edges, deburr them to remain safe



TESTING PROCEDURES

Respect of Stored Energy

Personal Protection

Transport

Lifting Procedure



LIFTING PROCEDURE

Relieve all stored energy and open the main circuit breaker on the robot

Ensure that the robot is made safe prior to lifting it off the playing field, no dangling parts, etc

Remove debris from the playing field

Go through the following checklist to ensure that the lift is safe

Make sure all parts are firmly secured to the robot

Make sure that the robot is powered off

Appoint enough lifters to lift the robot

Make sure that all appointed lifters keep their feet planted firmly on the ground



LIFTING PROCEDURE (CONT.)

Begin to lift and always remember to lift with the legs instead of your back

Slide the cart under the robot; do walk with the robot to avoid injuries

Keep the robot close to your body to ensure control of its movements

Place the robot on the cart and make sure that the cart is stable and will not roll

Use the gate to enter and exit the field

Use the gate opening to exit the playing field

Climbing over the railing is prohibited



GENERAL SAFETY

Fire Extinguishers

Fire Extinguisher Procedure

Personal Protection Equipment

Safety Data Sheets

COUGAR Safety Rules

Competition

Pit Safety

Safety Education

FIRST Aid Kit



FIRE EXTINGUISHERS

Class A



This class of
fire
extinguishers
is for solid fuel
fires

Class B



This class of
fire
extinguishers
is for chemical
fires

Class C



This class of
fire
extinguishers
is for electrical
fires

ABC is a combination of the three

FIRE EXTINGUISHER PROCEDURE

Remember the acronym PASS

Pull out the safety pin

Aim at the fire

Squeeze the trigger

Sweep the nozzle back and forth



PERSONAL PROTECTION EQUIPMENT

Safety glasses are always worn when handling materials and/or are in the pit at all times

Work gloves are always worn when handling heavy, hot, sharp, or rough materials, as well as when using high powered equipment

Closed-toed shoes are always worn when in the pit or near robots and equipment





SAFETY DATA SHEETS

We have a safety data sheet for the chemicals we use (e.g: the sulfuric acid in the lead-acid batteries)

A proper SDS lists all materials used by your team with safety information on these products; they tell ingredients, allergy information, how to treat if a reaction occurs, what to do if ingested, splashed in eyes, etc



SAFETY DATA SHEETS (CONT.)

Our team keeps brand specific sheets because different brands use different materials in their products



COUGAR SAFETY

Clean workspaces

Only work under adult supervision

Use the correct tools for the job

Get help when needed

Always wear PPE

Report an incident to a responsible adult



COMPETITION SAFETY

Use the buddy system when traveling at
and around the event

Release stored energy



PIT SAFETY



SAFETY EDUCATION



FIRST AID KIT

