

BRUSHLESS 3 PHASE AC MOTOR & SPEED CONTROL SYSTEM

MODEL: ACI 24-3 (3 HORSE POWER TRACTION DRIVE SYSTEM)

Thank you for choosing Mtroniks to control your model.

Overview

For over 20 years Mtroniks have been at the forefront of electronic speed control design and manufacture for the hobby industry.

Our products are designed and manufactured entirely in house in the UK. The ACI range of motors and controllers has been developed over the last 9 years. The extensive research and design program looked at every aspect of the problems associated with the speed control of large scale models.

The ACI range is an exciting departure from the more usual DC motors and standard speed controllers which are commonly available.

ACI systems achieve huge power outputs in very small, highly efficient packages by using the very latest brushless motor technology. Of particular interest is the exceptional torque offered by these motors, this gives large models truly massive pulling power.

As with all our products the ACI range is not designed down to a price. Rigorous testing has proved the systems to be well on top of the job.

These systems can be used singularly or in multiples and can therefore find applications in large machines and locomotives up to 15" gauge and beyond.

The 12 pole brushless motor at the heart of the system uses rare earth, ultra high strength magnets. The resistance of the motor is less than 0.035ohms, this very low winding resistance in combination with the magnets and general design are the key to the incredible small size, efficiency and high power offered by these systems.



Using your controller

General

Your new controller is relatively simple to use and configure for use in your model, but there are a few important aspects which you should understand, BEFORE you wire it into your model.

- 1) ALWAYS fit a fuse. A 100Amp fuse in line with the positive (+ve) 24V supply feed from your battery.
- 2) Make sure that you use thick enough wires, thin wires may heat up and melt, possibly causing short circuits or fires. The currents seen in ride on type locomotives can easily exceed 100Amps.
- 3) **BE VERY SURE NOT** to accidentally reverse connect to the battery, even a momentary touch on the wrong battery terminal can cause fatal damage to your controller.
- 4) Do not adjust the sealed pot, this is for factory use only, breaking of the seal will void your warranty.
- 5) DO NOT lengthen the motor wires by more than an extra 200mm.

Installation notes

Install the controller power module into your model close to the motor, then install the battery as close as possible to the ACI controller.

The power module gets warm during use, fastening the module to a metal chassis is ideal.

The power module has 8 connections in total, 2 for the 24V battery supply, 3 for the motor connections and 3 multi-way connectors which allow connection to the controller handset, motor sensor harness and the auxiliary harness.

The motor should be fixed to a suitable plate chassis using 4 x M5 high tensile bolts. As supplied, the motor has two transport bolts (M5 x 30) to steady the timing ring, these should be removed and replaced by the 4 x M5 bolts to secure the motor to the chassis plate. Once you have removed the transport bolts be very careful not to jar the end cap of the motor before fitting to your chassis.

Connect the motor sensor harness to the controller power module by pushing the motor sensor harness onto the 6 way plastic connector. Fasten the 3 thick motor wires (Yellow, Red & Black) to the controller power module using 6mm nuts.

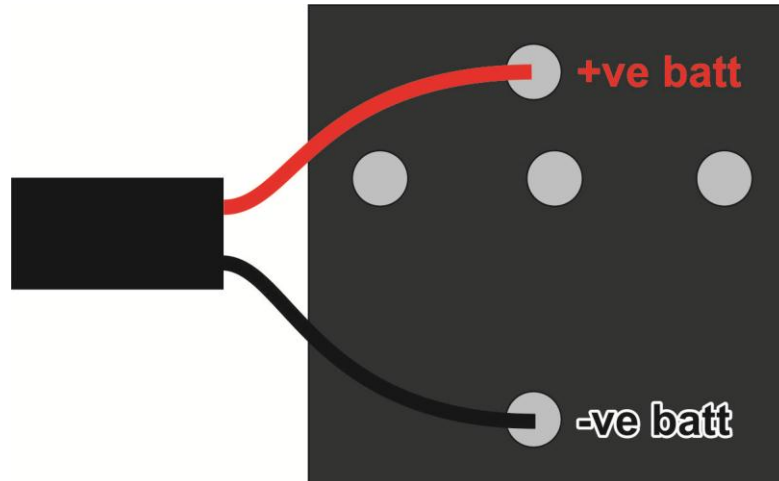
Connect the controller handset to the controller power module by pushing the multi way connector onto the circular socket.

Finally, with the power switched off on the control handset connect the positive and negative wires from your battery to the controller power module using 6mm nuts.

NOTE 1: The small pin connectors are for factory use only. These are used for firmware/software updates. Depending on the model of the controller there may be fibre optic interface connections for master/slave operation. The adjustable pot is also for factory use only.

NOTE 2: Master/Slave multi system controllers also have communication ports for the fibre optic cables.

The high peak currents present in these control systems require the fitting of a capacitor bank across the battery connections on the speed controller. Be sure to observe the correct polarity.



Using your model

The throttle control is disabled at switch on unless it is in the neutral band or is returned to neutral position after switch on.

Always apply power gently and progressively, rapid acceleration can easily induce damaging wheel slip and places much greater stress on the drive train components and can excessively load batteries.

If you are travelling in one direction and switch to the opposite direction using the direction toggle switch, the controller will apply maximum brakes and stop. It will not apply power in the other direction until the throttle control is first returned to the neutral position for 2 seconds or longer.

If you come to a stand-still on an incline and begin to roll back, always stop using the mechanical brake (handbrake) before attempting to set off again.

The emergency stop button will, when pressed momentarily, apply maximum brakes and when close to stopping, the controller will short the motor to apply absolute maximum brakes. The power to the unit **MUST** be switched off then back on again to reset an emergency stop.

The 'dead man' jack plug is located on the front edge of the controller handset, when removed, full brakes are applied as in an emergency stop condition.

Features

- Fully regenerating, digital, high frequency operation, 3 phase inverter
- Anti-lock brakes
- Peak and Average current limits
- Master/Slave configuration – Fibre optic link
- Intelligent control bus – Failsafe & ‘Dead man’ safety plug
- Waterproof power module
- 24v DC operation /115Amps input maximum
- Over temperature protection
- Ultra smooth power control
- Firmware/Software upgradeable
- 6.0mm studs for heavy duty power connections

Optional Accessories

Description	Part No.
○ Supply fuse and holder	DC/AC120SF
○ 2m red/black 6.0mm ² cable w/connectors	DC/AC 120W2M
○ 1m red/black 6.0mm ² cable w/connectors	DC/AC 120W1M
○ Spare/Replacement handset	DC/AC I Handset
○ Handset cable assembly	DC/AC I Cont Cable
○ Fibre optic cable (3.0m)	DC/AC I Fibre Cable(3m)
○ Fibre optic cable (10.0m)	DC/AC I Fibre Cable (10m)
○ Relay board for auxiliary outputs	DC/AC RL424V

Master/Slave operation (Controller specific)

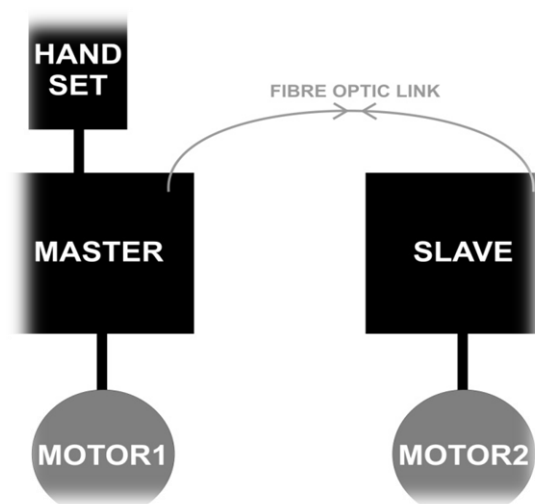
The ACI range of controllers come with the factory specified option of being able to link more than one controller via a fibre optic cable.

This allows 2 or more controllers to be operated together from one single handset. The maximum length of fibre optic cable which can be used is 20.0m, this denotes the maximum distance you can have between 2 controllers. Applications include 'topping and tailing' train configurations and also very high power, multi motor, locomotives.

When the second controller is set to slave, it is controlled, via the optical link, by the first 'master' controller which is controlled by the handset.

The fibre optic cable is the ideal way to connect the controllers, there is no electrical connection between the 2 controllers and no wires to damage or short out.

If the optical cable is broken, the slave controller will revert to neutral and freewheel until you can stop and repair/replace the cable.

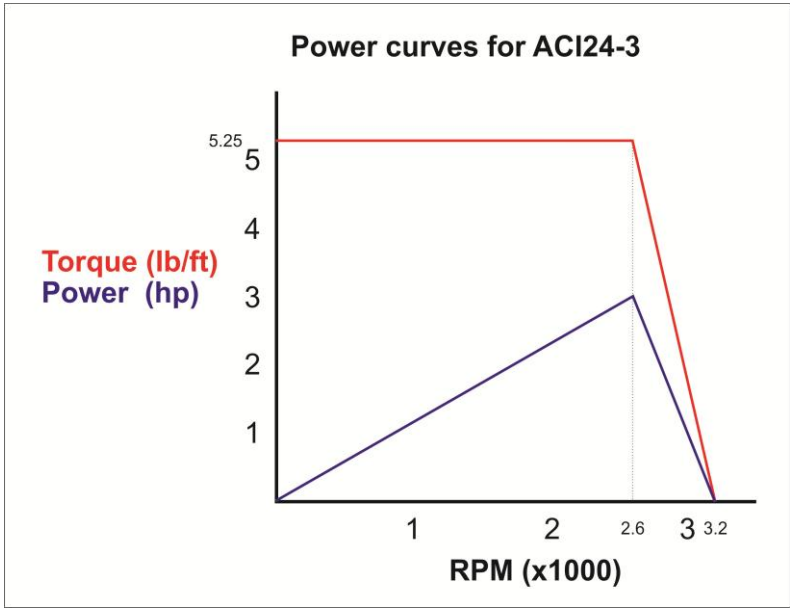


Auxiliary switched outputs

The ACI controller has up to 4 auxiliary switched outputs. These connections are controlled by the 4 switches on the handset. The auxiliary relay connections are via the 8-pin socket situated in the corner of the speed controller.

Relay board (#DC/AC RL424V) is available separately.

Power curves for ACI24-3



Dimensions of the ACI24-3

AC Traction system

