AMC3000

ACCESSORY MOTOR CONTROLER
REFERENCE MANUAL
**VERSION 1.1**

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INTRODUCTION

The AMC3000 Accessory Motor Controller is designed to be used with and is completely compatible with the Lionel Trainmaster Command Control system. The controller operates DC Can motors and any Lionel AC Universal accessory motors requiring 2 Amps or less to operate. This is done through any Lionel Trainmaster compatible hand held such as the Lionel CAB-1. It allows you to operate 2 motors and 2 lights. The AMC3000 can follow the back and forth movement of your hand giving you the versatility of realistic control to run your layout directly from your finger tips. This manual is designed to take you through the basic operation and wiring details of the AMC3000. Please take the time to read this information before attempting to connect it to your layout.

AMC3000

ACCESSORY MOTOR CONTROLLER
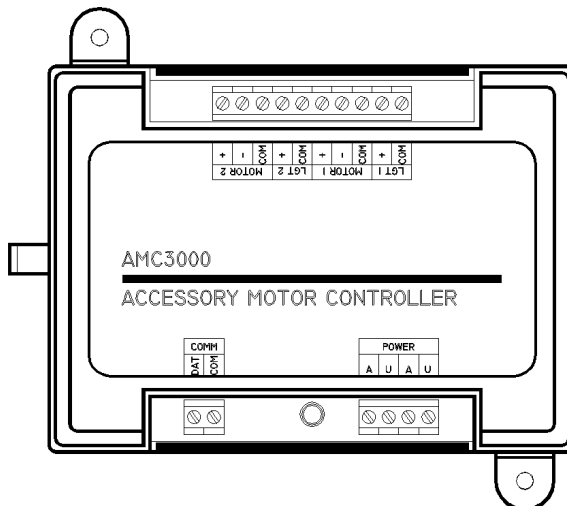
SPECIFICATIONS

Physical

Size 3.7" x 2.7" x 1.2"
Mounting with two #4 pan head sheet metal screws
Operates two motors and two lights

Electrical Ratings

Maximum Input Voltage 9Volts to 18 Volts AC
  (12 Volts AC recommended)
Input Supply Current 50 ma plus motor currents
COMM input signal +/- 12 Volts
Maximum Output Current 2 Amps Peak per motor

GENERAL INFORMATION

Terms

Following are specific terms, words, letters and how they are used in the manual:

- DAT: The RED wire connected to the COMM connector
- COMM: Communication terminals
- COM: Common electrical connection
- POWER A: Lionel terminology for power or hot connection to accessory transformer
- POWER U: Lionel terminology for ground or neutral connection to accessory transformer
- LED: Indicator to let you know the controller is working
- TERMINAL: Connector strip where you connect the wires
- DAISY CHAIN: Linking multiple controllers together to add additional switch and accessory modules

Common Points

This is a list of all the common points and terms that will be used with the AMC3000.

- All motors and lights are controlled as engines (ENG)
- Odd numbers are assigned to motor outputs
- Even numbers are assigned to light outputs. Light outputs are always assigned to the even number following the motors. Example If ENG 1 were assigned to motor 1, than the lights will be assigned to ENG 2.
- Two engines and two lights can be operated with one AMC3000
- There are two types of operation styles:
    - Constant: Run the motor constantly at the speed that you set
    - Interactive: Operate the motor simultaneously with the back and forth movements of your hands
- The AMC3000 will supply up to 2 Amps peak power output per motor or lights output. Exceeding the maximum power will cause the AMC3000 to shut down. To reset the module turn the power off for one minute.

Important Keys

The following is a list of all the keys that will be used from the Lionel CAB-1.

- **(Set)** : Sets the engine address with the run/program jumper removed.   Sets favorite settings when run/program jumper is installed
- **(AUX1)** : Turns the key pad on for number entry or toggles motor 1 on/off
- **(AUX2)** : Toggles motor 2 on/off
- **(ENG)** : Selects the motor light accessory
- **(RED KNOB)** : In constant mode controls the speed of motor 2;   Interactive mode controls the speed and direction of motor 2
- **(DIR < >)** : In constant mode toggles the direction of motor 2
- **(BOOST)** : In constant mode increases speed of motor 1; Interactive   mode it sets the direction to forward and increases the speed of   motor 1
- **(BRAKE)** : In constant mode it decreases the speed of motor 1;   Interactive mode it sets the direction to reverse and increases the   motor speed
- **(F KEY)** : In constant mode sets motor 1 direction to move up/forward
- **(R KEY)** : In constant mode sets motor 1 direction to move down/reverse
- **(L,M & H)** : Use to set the power setting of the motors. Three settings of   intensity control are Low (slow), Medium (medium) or High (fast)

WIRING CONNECTIONS

OUTPUTS

RUN/PROGRAM
JUMPER

AMC3000

ACCESSORY MOTOR CONTROLLER

COMM

LED
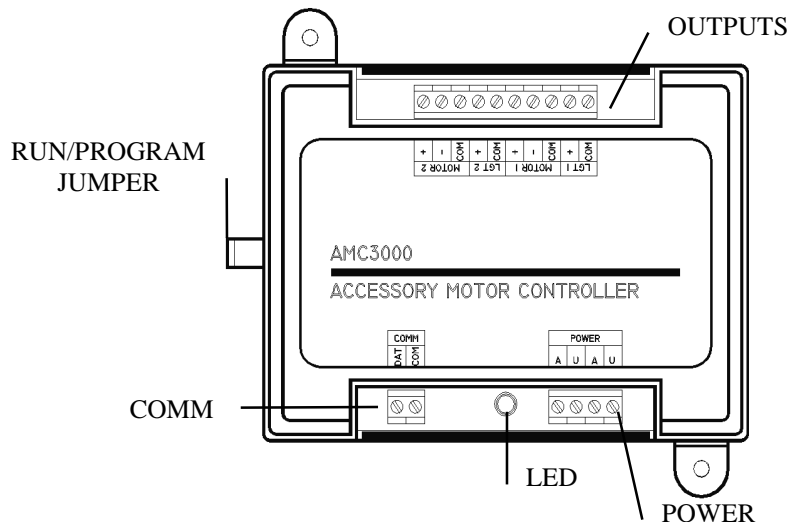
POWER

Power

The Power connections on the AMC3000 are located in the lower right hand corner and are marked as POWER. This is the power to run the module including the motors and lights.

Two connections are required between the AMC3000 and a accessory transformer:

- The first connection to the AMC3000 is the POWER A terminal. It is connected to the accessory A terminal or power side of the transformer.

- The second connection is the POWER U terminal. It is connected to the U terminal or common side of the accessory transformer.

It is recommended that you use a separate accessory transformer with the output of 12 Volts AC. This will allow the AMC3000 to function regardless of whether the track voltage is ON. The input voltage supplied is directly applied to the motors.

Operating at higher voltages only shortens the life of the motors and lights and does not make the accessories operate better. Most Lionel accessories are designed to operate at 12 Volts. For example, running a 12 Volt motor at 18 Volts increases the current by 1.5 times. This may

exceed the maximum 2 Amp rating of the output. To correct this problem simply reduce the input voltage.

Additional terminals are supplied to easily daisy chain the accessory power to other ALC3000 family members. To do this simply repeat the connection of both the A and U terminals to the other ALC3000 family members. It is recommended to color code both the A and U wires and maintain this color coding throughout the layout.

COMM

The COMM connections on the AMC3000 are located in the lower left hand corner and are marked as connector terminal COMM. These connections supply the communication or COMM to each ALC3000 family member. It tells the ALC3000 family controller what you want to do.

Two connections are needed between the AMC3000 and the Lionel Command Base. To make these connections, you will need a cable with a DB9 connector on one end. The interface cable plugs into the Lionel Command Base connector marked computer. IC Controls can provide ready to use cables for connecting the entire ALC3000 Family together. You may purchase these cables by ordering part #ICC3001-6 or -20 depending on length.

- The first connection is the DAT (DATA) connection. This would be the red wire of the IC controls ICC3001 cable.

- The second connection is the COM (Common wire of the communication port) connection. This would be the green wire of the IC controls ICC3001 cable.

Making your own cable is explained in detail under CONNECTING THE CABLE FROM THE AMC3000 CONTROLLER TO THE COMMAND BASE. The completed connections to the AMC3000 is shown on the next page.

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DB9
CONNECTOR

CONNECTIONS TO NEXT
ALC3000 FAMILY
MEMBER

ACCESSORY
TRANSFORMER
12 VOLTS AC
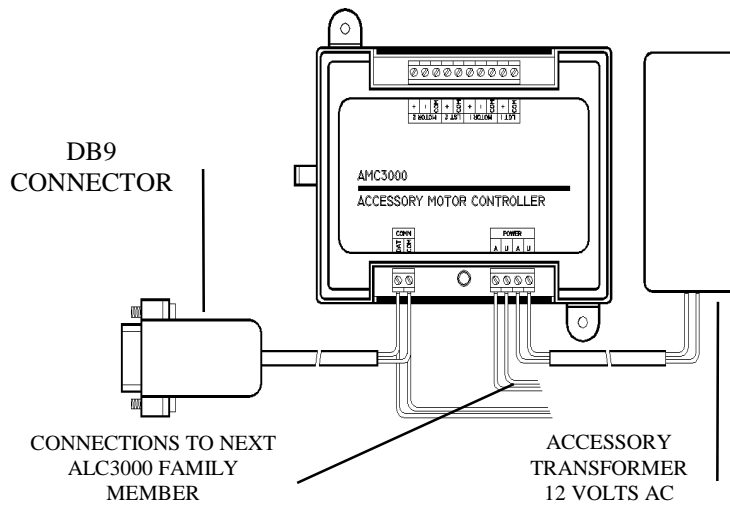
MOTOR ACCESSORY AND LIGHT OUTPUTS

The accessory and light connections on the AMC3000 are located on the top side of the AMC3000. These connections can be thought of as a variable transformer to run motor movement and lights with intensity. At least two connections are required per accessory motor or light, a positive or power connection and a negative or COM (common) connection. The AMC3000 controller may be connected to any DC Can motor or AC Universal accessory motor requiring less than 2 Amps to operate.

OUTPUTS
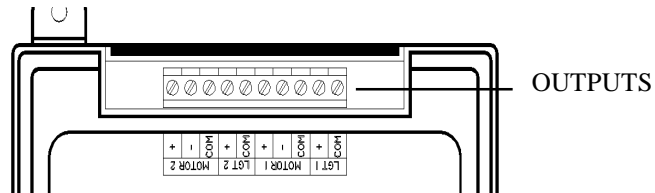
There are two types of motor connection. These types are based on whether the motor can run in one direction or both direction. If the motor only runs in one direction then connect

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one side of the motor to the terminal marked + and the other to the one marked COM.

Note: That if you try and select a direction of a motor that can operate only in one direction the motor will simply not operate in reverse. To correct this problem just change the direction of the motor and it should start operating again.

If your motor runs in both directions then connect one side of the motor to the terminal marked + and the other side of the motor to the terminal marked -. This will allow the motor to operate in both directions.

Note: Any common connection between two motors must be removed to allow both motors to operate at the same time in different directions.

Deciding which motor connection to hook up to is determined by which controls you what to run that motor with. The motor that is to be controlled by the **(RED KNOB)** should be connected to motor 2. The motor that is controlled by the **(BOOST)** and **(BRAKE)** keys is connected to motor 1. The same holds true for the lights. The light 2 output is controlled by the **(RED KNOB)** and light 1 is controlled by the **(BOOST)** and **(BRAKE)** keys. Remember motors have ODD ENG numbers and lights have EVEN ENG numbers.
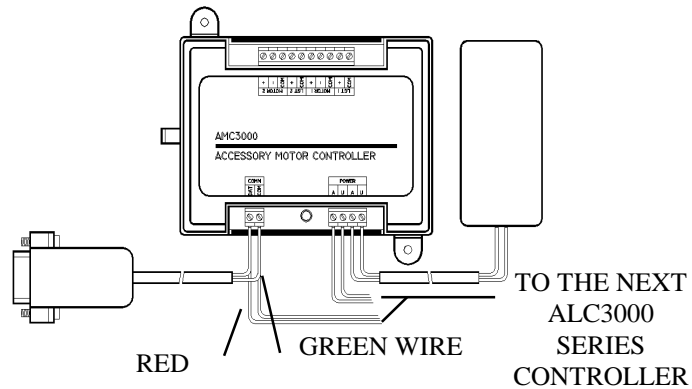
CONNECTING THE AMC3000 TO THE COMMAND BASE

The ALC3000 controller family requires a cable to be connected from the Command Base to the ALC3000 controller family. This is done by using a simple two wire cable. The cable should be made of #22 gauge stranded wire containing a RED and GREEN wire. This cable may be purchased ready made from IC Controls as #ICC3001-6' or -20'. You may choose to build your own cable. The details of how to do this are as follows. The connector required to hook to the command base is called a Male DB-9 (Radio Shack Part #276-1537). Connect the RED (DAT) wire to pin 2 of the DB9 connector. Connect the GREEN (COM) wire to pin 5 of the DB9.

Connecting the ALC3000 controller family to the Command base.

PIN 2 RED   PIN 5 GREEN

GREEN

RED

DB9 CONNECTOR
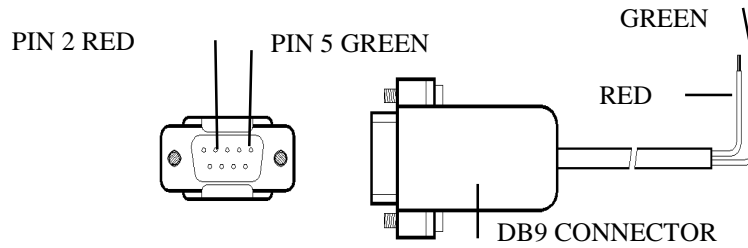
Refer below for the complete diagram on connecting the ALC3000 controller family to the command base.

AMC3000
ACCESSORY MOTOR CONTROLLER

TO THE NEXT
ALC3000
SERIES
CONTROLLER

RED   GREEN WIRE

- Start by connecting the DB9 end of the cable to the Command Base marked Computer

- Connect the RED wire to the DAT terminal of the COMM connector located on the AMC3000

- Connect the GREEN wire to the COM of the COMM connector located on the AMC3000. Additional ALC3000 family members can be added by simply daisy chaining the RED (DAT) and GREEN (COM) wires from this AMC3000 to the next

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Run/Program Jumper

The Run/Program jumper is located on the left side of the AMC3000. The jumper is a small black connector that is easily removed and replaced. It controls whether the AMC3000 should perform a command or **(SET)** it's accessory and light numbers. The jumper should only be removed when you are setting the address of the AMC3000. Pressing **(SET)** with the jumper installed will set the accessory's favorite setting. See *Setting Your Favorite Accessory Motor Settings* for more details.

RUN/PROGRAM
JUMPER
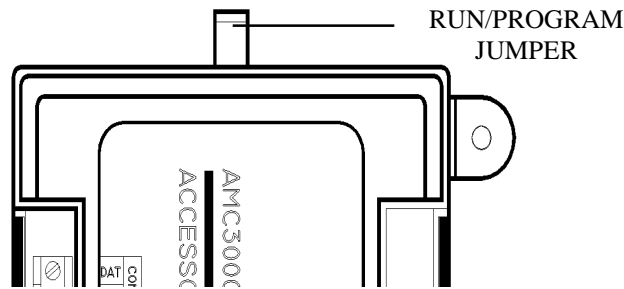
Use of LED light

The LED light located at the bottom center of the AMC3000, indicates the proper operation of the controller. There are three different types of flashes, the quick flash, short blink, and long blink to indicate the different functions of the controller.

Quick Flash This flash is a 10th of a second in duration. (It flashes so fast you can hardly see it, like if you were to say one thousand and one, you would only be able to say one thou). A quick flash indicates the AMC3000 is receiving information from the command base. It's indicating that the information it's getting is **NOT** for this motor controller. An example of what would cause the Quick Flash would be during the operation of controlling a turnout switch on the layout. Information is being sent to the ASC3000 Accessory Switch Controller and not to the AMC3000 Accessory Motor Controller.

<u>Short Blink</u> A 1/2 second short blink indicates the AMC3000 has received a command telling it to do something. It indicates normal operation when motor or light is selected the hand held. For example, when the Short Blink would flash when you select motor **(ENG) (#5)** and engine 5 is the number of this AMC3000.

<u>Long Blink</u> A one (1) second Long Blink indicates the AMC3000 has a **(SET)** command that should be stored into the AMC3000 for later use.   An example of the Long Blink is when the Run/Program jumper is removed and a **(SET)** accessory or light number is done. (Setting a accessory or light number is covered further in the manual.) An other example of the Long Blink is when the **(SET)** function is pressed with the run/program jumper installed setting the characteristics or favorite setting of the motor controller.

Halt Button

Pushing the halt button on the hand held will immediately turn off all outputs on the AMC3000. Each output can be turn back on after the halt button has been released.

USING THE AMC AS AN ACCESSORY AND LIGHT CONTROLLER

General Overview

The AMC3000 has the power capability of running two motors and two lights requiring 2 Amps or less. It will operate DC Can motors and AC universal accessory motors with high precision from the hand held. The AMC3000 will also control the intensity of two lights allowing you to set the mood of the accessory scene. Now at the end of the day you can place your favorite setting in memory to be called back the next with a simple push of the **(BELL)** key.

Setting the Accessory and Light Address

Setting the address of the AMC3000 is easy. First decide which accessory number you would like to use. Remember AMC3000 controllers are addressed as engines (ENG). Motors are assigned as ODD numbers, lights are EVEN numbers. An example would be if you wanted the AMC3000 to run the log loader which has two motors and one light. You wanted to address the motors as (#3) this would automatically make the light operate as (#4). Make the necessary POWER and COMM connections.

NOTE: It is not necessary at this time for the outputs to be connected to (SET) the accessory and light number, only the COMM and POWER are required.

First set the address of the AMC3000:

- Remove the **Run/Program jumper** from the side of the AMC3000 that you wish to SET

- Select **(ENG)** button on the hand held

- Next select **(# 3)** for (ENG) (# 3)

- Then press **(SET)**

- Reinstall the Run/Program jumper

This set the AMC3000 Motor 1 and Motor 2 outputs to ENG 3 and Light 1 and Light 2 outputs to ENG4. It is not necessary to set the Light 1 and light 2 addresses because this is done when you set the motor address.

The AMC3000's LED should Long Blink for one (1) second indicating that you have set the motor number. If it does not, make sure the Run/Program jumper is removed and repeat until you see a long blink. After you have seen the Long Blink replace the Run/Program jumper and test the operation of the AMC3000.

Note: Always remember to replace the Run/Program jumper after you have programmed the address.

To test the function:

- Select **(ENG)**

- Select the **(# 3)**

- Then operate the **(RED KNOB)** back and forth

The LED should Short Blink (not Quick Flash) if you have set it correctly when you move the **(RED KNOB)** back and forth.

Settings Operation Styles

There is two different ways you can operate your accessories with the hand held controller by setting the operation to either Constant or Interactive. The Constant setting will run the motor constantly at the speed that you set. The Interactive setting will operate the motor interactively along with the back and forth movement of you hand. In both settings you can also determine what type of reaction time or power setting you would like. This is done by first selecting the operational style, then selecting the L-Low, slow reaction time, M-Medium reaction, and H for High, fast, very sensitive reaction.

The operations style should be set before operating the accessory. First decide which style you like. For example, the Gantry Crane boom position is best operated in interactive mode. When you move your hand to the left it follows by moving to the left. When you stop it stops. The Log Loader chain drive is a good example of constant mode

once you set the speed of the chain you can leave it to continually lift logs at that speed.

You can test each style and power setting with your own accessories customizing it to your style. Don't be afraid the play with it, just write down what works for you.

Each motor can be independently set to Constant or Interactive. First decide which one you would like to use. Next you must decide on a power setting for that motor. You should always start on high then move down if you like. Starting at the low setting may cause you to believe the accessory is not operating correctly.

Each motor and style is selected by first pressing the AUX1 button followed by a single number to select a style for that motor

- **(AUX1) (#1)**   Motor 1 Constant

- **(AUX1) (#2)**   Motor 2 Constant

- **(AUX1) (#4)**   Motor 1 Interactive

- **(AUX1) (#5)**   Motor 2 Interactive

After the style has been entered a power setting must be selected. This is done by the use of the L, M and H keys located at the bottom of the Hand held.

For example, lets set the AMC3000 Motor 1 output of ENG #7 to constant output with a High power setting

- First select to the AMC3000 press the **(ENG)** button then the number **(#7)**

- Next select the style of operation of Motor 1 as constant press **(AUX1)** then **(#1)**

- Finally select the power setting of Motor 1, press **(H)**. A Long Blink will follow indicating the mode has been selected.

Continuing the example, lets set the AMC3000 Motor 2 output of ENG #7 to Interactive output with a High power setting

- Begin by again selecting the AMC3000 press the **(ENG)** button then the number **(#7)**

- Next select the style of operation of Motor 2 as interactive press **(AUX1)** then **(#5)**

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- Finally select the power setting of Motor 2, press **(H)**. A Long Blink will follow indicating the mode has been selected.

The accessory will then be controlled by the following keys

Motor 1

- **(BOOST)** will speed the motor up

- **(BRAKE)** will slow the motor down

- **(F)** Key will set the direction forward or up

- **(R)** Key will set the direction reverse or down

Motor 2

- **(RED KNOB)** will control both speed and direction. A clockwise move to the right will move the accessory to the right. A counter clockwise move to the left will move the accessory to the left. The quicker you move the faster the accessory follows. You stop it stops.

- **Note:** The direction key has no function. The direction is determined by which way the knob is turned.

To summarize the setting for constant style key strokes:

- **(ENG) (#7) (AUX1) (#1) (L,M or H) =** AMC #7, Motor 1 constant, Low, Medium or High

- **(ENG) (#7) (AUX1) (#2) (L,M or H) =** AMC #7, Motor 2 constant, Low, Medium or High

To summarize the setting for interactive style key strokes:

- **(ENG) (#7) (AUX1) (#4) (L,M or H) =** AMC #7, Motor 1 interactive, Low, Medium or High

- **(ENG) (#7) (AUX1) (#5) (L,M or H) =** AMC #7, Motor 2 interactive, Low, Medium or High

Setting the lights address

The AMC3000 has the power to be able to run two accessory lights with varying intensity. Giving you the ultimate control setting the mood of your layout. Both lights are addressed from the same engine number. Remember that number is addressed as an even number. For example, if the AMC3000 motor is set to **(ENG) (#3)** then the ENG number for the lights would be 4 or pressing **(ENG) (#4)** would select the light of that AMC3000.

The light address is always set to the next even number of the AMC3000. This address is automatically set by setting the odd motor address first.

To operate the lights in this example you would:

- Press **(ENG)** followed by **(#4)** selecting the lights

- Now you may operate light 1 with the **(BOOST)** to raise the intensity of the light and **(BRAKE)** to lower the intensity

- To operate light 2 use the **(RED KNOB)**

Saving your favorite accessory motor setting

Once you have your motor style and light intensity set to your favorite position you can save it by pressing the **(SET)** button on the hand held with the run/program jumper installed. The next time you wish to turn that accessory on, select it by pressing the **(ENG)** the address **(#)** and the **(BELL)** key. Your accessory will run just as you left it.

This action will also save the styles that you have selected for each motor. These styles will then be restored automatically when the power has been turn back on.

Search Lamp

Wiring and operating simple light as ENG number 2. To connect the simple light accessory refer to the wiring diagram below. **Note:** The motors that are connected to the AMC3000 and would ENG 1.
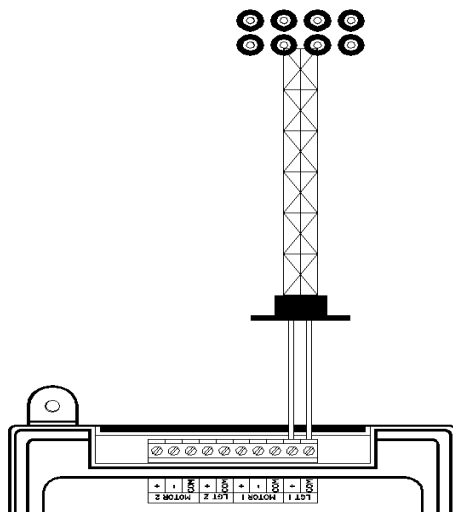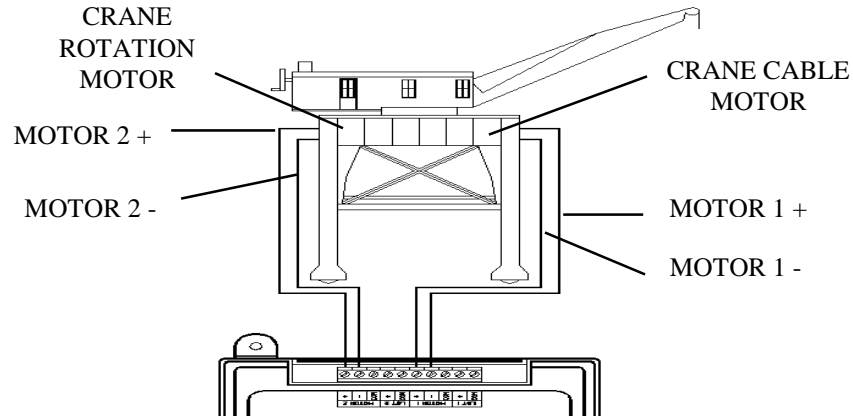

To set the address for the search lamp

- Remove the **Run/Program jumper** from the side of the AMC3000 that you wish to SET

- Select **(ENG)** button on the hand held

- Next select **(# 1)** for **(ENG 1)** remember the light will be set to ENG 2

- Then press **(SET)**

- Reinstall the Run/Program jumper

To operate the light:

- Select **(ENG) (#2)**

- Press and hold **(BOOST)** to increase the intensity of the light.

- Press and hold **(BRAKE)** to decrease the intensity of the light.

- Pressing **(AUX1)** will toggle the light on and off.

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Gantry Crane

Wiring and operating gantry crane as **(ENG) (#3)**. To connect the gantry crane accessory refer to the wiring diagram below. Remove the mechanical switch level and cut the common that connects the two motors together. This can be done by either cutting or unsoldering the wires from the motors. Each motor has a + marking on it. Connect it to the + terminal on the AMC3000. Connect the other motor terminal to the - terminal of the AMC3000. If the Crane moves in the opposite direction of the controls simply reverse the + and - connection at the AMC3000.

To set the address for the gantry crane

- Remove the **Run/Program jumper** from the side of the AMC3000 that you wish to SET

- Select **(ENG)** button on the hand held

- Next select **(# 3)** for **(ENG 3)**

- Then press **(SET)**

- Reinstall the Run/Program jumper

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Select style of operation. Set both Motor 1 and Motor 2 to interactive high power.

- **(ENG) (#3) (AUX1) (4) (H) =** AMC #3, Motor 1 interactive High

- **(ENG) (#3) (AUX1) (5) (H) =** AMC #3, Motor 2 interactive High

- Press **(SET)** to store the style of the motor setting in the AMC3000

To operate the gantry crane:

- Select **(ENG) (#3)** on the hand held

- Press **(BOOST)** or **(BRAKE)** to operate motor 1 and will run the cable up and down respectively.

- Rotate the **(RED KNOB)** left and right to operate motor two. Rotate left and the crane moves left. Rotate right and the crane goes right. The movement should follow the motion of your hand.

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Log Loader

Wiring and operating log loader as ENG # 7. ENG # 8 will be used to control the lights.   To connect the log loader accessory refer to the wiring diagram below
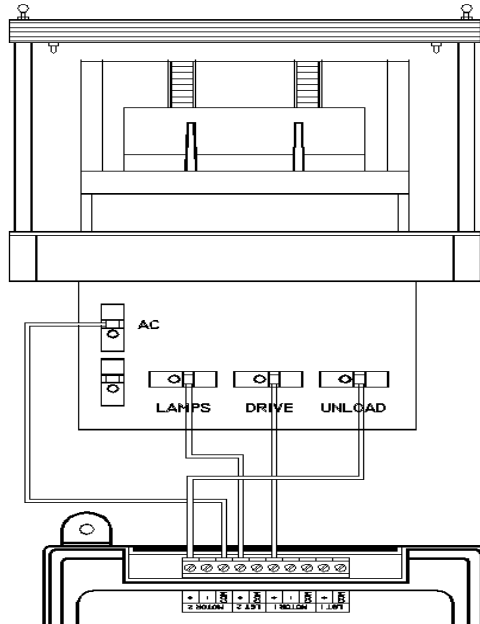
To set the address for the Log Loader

Remove the **Run/Program jumper** from the side of the AMC3000 that you wish to SET

- Select **(ENG)** button on the hand held

- Next select **(# 7)** for **(ENG 7)** Number 7 controls the motor and 8 controls the lights

- Then press **(SET)**

- Reinstall the Run/Program jumper

To select the style of operation. Set both Motor 1 and Motor 2 to constant at medium power.

- **(ENG) (#7) (AUX1) (1) (M) =** AMC #7, Motor 1 constant Medium

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- **(ENG) (#7) (AUX1) (2) (M) =** AMC #7, Motor 2 constant Medium

- Press **(SET)** to store the style of the motor setting in the AMC3000

To operate the Log Loader:

- Select **(ENG) (#7)** on the hand held

- Press and hold the **(BOOST)** or **(BRAKE)** to operate motor 1 and will run the chain loader. If the chain fails to operate when boost is pressed try changing direction with the **(R)**and **(F)** keys.

- Rotate the **(RED KNOB)** to the right and the dumping level should start down. Turn the knob back to the left and the levers will go back up. Remember the motor must be on constant for the levers to stay down. Again if the levels fail to operate try pressing the **(DIR)** key then the **(RED KNOB)** again**.**

Additional Information and Technical Support

IC Control is continually trying to make it's products the best in the market place. Your input on our products is very important to us. It allows us to shape our products to your needs. If you have any comments or questions on any of our products please feel free to contact us. We can be reached at:

> IC Controls
> P.O. Box 296
> New Boston, MI 48164
> ATT: Marketing Dept.

Warranty Information

IC Controls stands behind their products with a one year parts and labor warranty. If the product fails to operate because of manufacture defect, IC Controls will repair or replace it at their discretion free of charge for a period of one year from the date of purchase.   To return defective product please include the following:

- Defective unit
- Dated sales receipt
- Reason for return
- A check for $5.00 to cover postage and handling

Send the above information to:
IC Controls
P.O. Box 296
New Boston, MI 48164
ATT: Returns Dept.
Please allow 2 to 3 weeks for processing.

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