

## Installing the *Revolution* Motor on the Arri II

### **Installation**

The *Revolution* for the Arri II drives the 1:1 shaft on the right side of the camera. There is a two-part breakaway rubber coupler that attaches the motor to the 1:1 shaft.



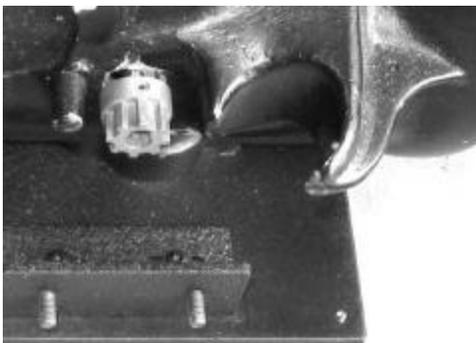
Remove the inching knob from the 1:1 shaft using a small screwdriver. Push the coupler onto the shaft. There is a 5mm brass insert inside the ¼" coupler which will adapt it to the Arri shaft size. Tighten the setscrew on the coupler (1/16" hex wrench). Don't make it too tight or you might raise a burr on the shaft that will make it difficult to remove the coupler.

The base plate mounts under the camera. It is held on with the included 3/8" bolt (3/16" hex wrench) and two of the motor screws.



Remove the Arri motor from the camera (four screws) and remove the gear pieces that come out.

On early Arri models, the idler gear underneath will pull off its shaft. On later models, you have to remove two screws and take a small assembly off.



If there is a stud in the bottom of your camera (towards the front, just behind the lens mount) unscrew that as well.

Put two of the screws in a bag with the other parts you removed (and the inching knob). Don't lose them! If you don't have an Arri motor attached under your camera, there are two 4mm screws included for attaching the camera to the base plate.

You can see how the camera fits on the base plate. To attach, first use the 3/8" bolt. Don't make it tight, keep it loose so you can wiggle the base around. Then, put in the two screws near the front. Snug up the two screws and the 3/8" bolt. You should be able to turn the 1:1 shaft freely.

The motor pod attaches to the two studs on the right side of the base plate. Remove the thumbscrews, plug it in, and screw on the two thumbscrews.

The coupler on the motor shaft will plug into the coupler you put on the 1:1 shaft via the splined rubber piece. You have to mesh the splines together as you push on the motor pod.

The rubber will compensate for some misalignment. If necessary, the right-angle on the base plate can be loosened and shifted around for best alignment (5/64" hex wrench). The motor-mounting nuts can be loosened to slide the motor up and down.

Also, the coupler can be moved on the motor shaft by loosening the setscrew (1/16" hex wrench).

## Operation

Refer to the *Revolution* instruction manual for operating instructions.

Before using the intervalometer, check to make sure the shutter is in the closed position. Look through the viewfinder and turn the 1:1 shaft until you can see an image in the viewfinder.

The mirror should be fully covering the shutter. Most Arri's have a black bar centered on the shutter. If you pull off the lens, you should see this black bar centered in the lens port.

After you have the mirror centered, it is a good idea to put a piece of colored tape on the top of the rubber coupling. This will help you to see that the motor is turning the shaft a full rotation with each exposure.

When filming, make sure the viewfinder is closed, to prevent light leaking in. Note that the mirror shutter will leak light above a certain interval. Below 10 seconds is generally safe.

## Torque Adjustment

The electrical current used to turn the motor and the current used to hold the motor between exposures can be adjusted. This should not be necessary.

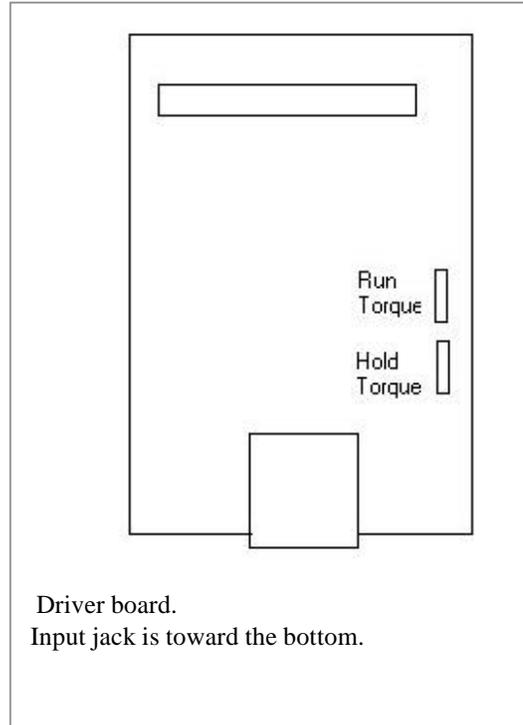
The motor torque is proportional to the current, so increasing the current will increase torque. When the motor turns, the current is set by the *Run Torque* adjustment. When the motor is stationary, the current is set by the *Hold Torque* adjustment.

For cameras with a 1:1 drive shaft, very little run torque is needed. You shouldn't have to increase the torque, however, you can try decreasing the torque if you need to conserve battery power.

The hold torque is used to hold the shutter in place between exposures. Most cameras do not need any hold torque whatsoever, and the hold torque can be kept at zero, prolonging battery life and eliminating the "squealing" noise that can occur when the motor is stationary.

To adjust the run and hold torque, you have to remove the driver box, unscrew the bottom (2mm hex, or phillips), then you can turn the trim pots with a small screwdriver. Clockwise will increase.

On some models there are holes in the case so you can adjust the trim pots without removing the case.



# *Revolution*<sup>™</sup> Motor

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## Operating Instructions



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*Revolution* is a trademark of NCS Products

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## Introduction

Congratulations on your purchase of a *Revolution Motor (RM)*. The *Revolution* uses advanced motor driving techniques to minimize vibration for single-frame, time-lapse and sync filming.

When shooting single-frames, the motor is accelerated from the stopped position for least stress on the cameras.

Sync capable models ramp the motor speed to the target sync speed, then decelerate to a stop.

## Overview

The RM consists of the motor unit, which mounts on the camera, and the control box. Power is supplied to the motor unit via a standard 4-pin XLR connector. Pin 1 is ground, pin 4 is positive.

Please refer to the installation instructions provided for your specific motor.

The control box will not be damaged if you plug (or unplug) it from the motor unit while power is applied. However, sometimes the control box will not be properly initialized. Turn the motor power off then on again to reset it, or just hook up the control box before applying power.

## The Controls

The control box has a pushbutton, three thumbwheels, and two indicator LEDs.

The three thumbwheels are used to set the filming parameters. The first digit is used to specify what parameter to set, and the second two digits are used to set the value of that parameter.

## Time-Lapse Operation

The RM will be in *idle mode* when power is applied. The red light will flash at a 1-second rate. This indicates that the RM is ready to be programmed with your desired filming parameters.

The RM allows three time-lapse parameters to be set. *Exposures*, *shutter speed*, and *interval*.

When first powered on, *exposures* is set to 10 seconds of film (240 frames), *shutter speed* is set to 1/4 second and *interval* is set to 1 second.

*Exposures* controls how many frames are exposed. *Shutter speed* controls the duration of

each exposure. And *interval* is the delay between exposures. Longer intervals compress time more.

If you want to shoot 240 frames of film with a 1/4 second shutter speed at a 1 second interval, you can just turn the first thumbwheel to “4” and press the pushbutton. However, you’ll probably want to pick your own settings.

You *do not* have to enter the three parameters in any specific order. Nor do you have to re-enter them every time you start filming (unless you disconnect power).

## Exposures [1:nn]

The RM allows you to set the maximum number of frames to expose (*exposures*). This value is entered in seconds, with each second representing 24 frames of film.

To set 10 seconds of film (240 frames), turn the thumbwheels to 1:10. For one minute of film, turn the thumbwheels to 1:60.

If you set the thumbwheels to 1:01, *exposures* will be set to one frame. This is useful for animation.

To set a value greater than 99 seconds, turn the thumbwheels to 1:00 and press the pushbutton. Both lights will start flashing. Then, turn the thumbwheels to the number of minutes and seconds you wish to film, and press the pushbutton.

For example, setting the thumbwheels to 3:20 will set *exposures* to three minutes and twenty seconds of film (140 seconds total, or 2880 frames).

## Shutter Speed [2:nn]

*Shutter speed* can be set to 1/8<sup>th</sup>, 1/4<sup>th</sup>, 3/8<sup>th</sup>, or 1/2 second (all crystal-controlled). Or, you can set a long duration exposure from 1-89 seconds.

Refer to the shutter speed chart. To set a speed of 1/4 second, turn the thumbwheels to 2:02. To set a shutter speed of two seconds, turn the thumbwheels to 2:12. Of course, you must press the pushbutton to enter the speed.

Value	Shutter Speed
2:01	1/8 <sup>th</sup> sec
2:02	1/4 <sup>th</sup> sec
2:03	3/8 <sup>th</sup> sec
2:04	1/2 sec
2:11-99	1-89 secs

## Interval [3:nn]

*Interval* can be set from 1 second to 9 hours. You can set values from 1 to 99 seconds by entering the desired interval directly. For example, 3:05 will set *interval* to 5 seconds.

For longer intervals, set the thumbwheels to 3:00 and press the pushbutton. Both lights will start flashing. Then, set *interval* in minutes:seconds on the thumbwheels (minutes on the first thumbwheel, seconds on the second and third thumbwheels) and press the pushbutton again.

For example, turning the thumbwheels to 2:30 will set *interval* to two-and-one-half minutes.

To set *interval* in hours and minutes, turn the thumbwheels to 3:00, then press and release the pushbutton. Don't change the thumbwheels. Press and release the pushbutton again, then set the interval in hours:minutes on the thumbwheels (hours on the first thumbwheel, minutes on the second and third thumbwheels). Press and release the pushbutton one final time.

## Filming [4:xx]

Turn the first thumbwheel to 4 and press the pushbutton. Filming will start. Once the programmed number of *exposures* has been filmed, the unit will return to idle mode.

The second two thumbwheels can be at any number less than 80 (except for 44 and 50, which have special functions).

To stop filming at any time, press and hold the pushbutton until both lights come on. Release, and the RM will return to idle mode.

The motor will always stop with the shutter closed.

## Delay-before-Filming [4:50]

To program a delay before filming, turn the thumbwheels to 4:50 and press the pushbutton.

The next value you enter in will be the number of ¼ hour increments to delay. For example, 4:50 → 4:04 will cause filming to be delayed by one hour. 4:50 → 4:10 will cause filming to be delayed by 2½ hours. During this delay period, the light will flash quickly. Press the pushbutton to abort and return to idle mode.

## Changing Interval/Shutter Speed while filming

It is possible to change *shutter speed* and *interval* without stopping and re-starting.

To change *shutter speed*, turn the thumbwheels to 2:nn and press the pushbutton.

To change *interval*, turn the thumbwheels to 3:nn and press the pushbutton. *Interval* will now be *nn* seconds.

To stop filming, turn the first thumbwheel back to 4 and press the pushbutton.

## Presets

The RM has 10 memory locations. These locations store combinations of *exposures*, *shutter speed*, and *interval*. These memory locations are referred to as Presets.

You can program nine of these Presets, accessed by thumbwheel settings of 4:91 to 4:99. Preset 4:90 is special—it stores the values used the last time the RM was run.

To program a Preset with the current settings of *exposures*, *shutter speed*, and *interval*, first turn the thumbwheels to the desired Preset number minus 10 (between 4:81 and 4:89). Then, press and release the pushbutton. The Preset will be programmed, and will hold those values until reprogrammed.

For example, to program Preset 99, first set *exposures*, *shutter speed*, and *interval* as described earlier. Then, turn the thumbwheels to 4:89 and press the pushbutton. Now Preset 99 is programmed. Turn the thumbwheels to 4:99, press the pushbutton, and filming will commence.

## Automatic Filming with Preset 99

If you apply power to the RM with the thumbwheels set to 4:99, it will automatically start running with the contents of that preset.

This is useful if you have the power source to the RM controlled by a timer or hooked up to a switch.

## Automatic Filming of Multiple Presets [8:90-8:99]

The RM has a useful feature that allows you to tell it to film using the contents of multiple Presets, one after the other. This is called *chaining*.

For example, let us say Preset 91 contains an *interval* setting of 1 second and an *exposures*

setting of 240 frames (10 seconds of film). Preset 92 contains an *interval* setting of 5 seconds and a *exposures* setting of 120 frames (5 seconds of film). To chain from Preset 91 to Preset 92, so that first 10 seconds of film are exposed with an interval of 1 second, and then 5 seconds of film are exposed with an interval of 5 seconds, do the following.

Turn the thumbwheels to 8:91 and press and release the pushbutton. Both lights will start flashing. Turn the thumbwheels to 8:92 and press the pushbutton.

You can chain from any Preset to any higher Preset, for example, 91 to 99, or 93 to 96, but not from a higher Preset to a lower Preset.

To finish with the current exposure sequence but cancel pending exposure sequences, turn the thumbwheels to 8:00. To cancel all exposure sequences and stop filming immediately turn the thumbwheels to 8:00 and press the pushbutton

## Sync Filming [6:nn]

Sync-enabled units can turn the camera at sync speeds. The highest sync speed is different in the different *Revolution* models.

For the Bolex and Eyemo models, turn the thumbwheels to 6:24 for a 24 fps filming speed. Press and release the pushbutton to start filming. Press again to stop.

Bolex and Eyemo sync motors shipped after October of 2004 have the 0.1% slower video speeds built-in. Use 6:23 for 23.976 and 6:29 for 29.970.

For 1:1 shaft models, the motor will run at ½ the speed entered on the thumbwheels. For example, 6:08 will give a 4fps frame rate.

The motor is accelerated to the target speed. When accelerating, the red light will be on. When sync speed is reached, the green light will turn on.

Generally, you won't know in advance how long the shot will be. But if you do know how long the shot will be, or would like to limit the maximum length of a shot, you can preset the maximum number of *sync exposures*.

## Sync Exposures [7:nn]

The Eyemo and Bolex models allow you to preprogram the number of seconds of film you want to expose when using mode 6. *Sync exposures* is set the same way as time-lapse exposures are set (mode 1). When powered on, *sync exposures* is set to 2 minutes.

For example, if you'd like a 30-second take, turn the thumbwheels to 7:30 and press the pushbutton. When you film at sync, the camera will stop after 30 seconds of film have been exposed.

**Revolution Operating Summary**

The first digit on thumbwheels is the control digit.

0 - Manual Advance

**1 - Exposures (in seconds)**

**2 - Shutter Speed**

**3 - Interval**

**4 - Run**

5 - Special Function

6 - Sync Running

7 - Sync exposures

8 - "Chaining"

**0 - Manual Advance**

The motor will rotate while the pushbutton is held down. Set the speed (from 10-90) on the thumbwheels (lower is faster). Or use 0:01-08 to advance the shutter in 1/8<sup>th</sup> frame increments.

**1 - Exposures**

Enter the number of seconds of film you wish to expose on the thumbwheels (1 second equals 24 frames).

**2 - Shutter speed**

Value	Shutter Speed
<b>2:01</b>	1/8 <sup>th</sup> sec
<b>2:02</b>	1/4 <sup>th</sup> sec
<b>2:03</b>	3/8 <sup>th</sup> sec
<b>2:04</b>	1/2 sec
<b>2:11-1:99</b>	1-89 secs

**3 - Interval**

Enter the interval in seconds on the thumbwheels.

**4 - Start Time Lapse**

4:50 → 4:nn delay nn ¼ hours.  
4:44 bulb mode

**6 - Sync Running**

Run at the speed on the thumbwheels (Bolex, Eyemo model) or Run at ½ the speed on the thumbwheels (other models). Use 6:23 for 23.976 and 6:29 for 29.970 (Bolex, Eyemo models only).

**7 - Sync exposures**

Seconds of film to expose when sync running (Bolex, Eyemo models only).

## Revolution Addendum

### **Long-Duration Exposures**

Entering shutter speeds longer than 89 seconds is a two-step procedure.

First enter 2:00 and press the pushbutton. Both lights will flash. Then turn the thumbwheels to the desired shutter speed in *minutes:seconds*. The longest exposure that can be programmed is 4 minutes.

For example, 2:00 → 1:00 will give a 1 minute exposure time. 2:00 → 3:30 will give a 3 ½ minute exposure.

If you need a shutter speed longer than 4 minutes, you can turn the shutter 180-degrees so it stops 'open' (0:04 will do this). Then use a long *interval* to expose the frame.

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### **Default Frames/Second**

When setting *exposures*, the *Revolution* control box assumes 24 frames equals 1 second of film. For example, when you set *exposures* using 1:10, 240 frames of film will be exposed.

If you use the 25-fps system, you can change the frames/sec value to 25. Then, setting *exposures* using 1:10 will expose 250 frames of film.

Do this carefully, because if you enter the second number wrong, you can overwrite the wrong configuration variable. That might be bad.

It's a three step procedure. First, enter 5:00. Press the pushbutton and both lights should start flashing. Next, enter 5:24. Again press the pushbutton and both lights should still be flashing. Finally, enter 5:25. Lights stop flashing. Enter 1:02 to preset 50 frames and run it to see if stops after 50 exposures.

If for some reason you are transferring at 30 frames per second enter  
5:00→5:24→5:30.

To return to the original USA setting enter  
5:00→5:24→5:24.

Note that this has nothing to do with sync-speed running (on sync-capable models). For 24-fps sync-speed, use 6:24. For 25-fps sync-speed, use 6:25

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January 23, 2005