

# Installing & Using the TCS TXM10-S Crystal Drive on your Arri 16-S or 16-M Camera

## 1. Installation

A. The TXM10-S base top has three tapped holes, for mounting either an S or an M, for screws to prevent the camera body from swiveling on the base. Insert one #4-40 x 1/4" cap screw in each of one or two holes as shown below. These will engage the bottom front of the body casting.

B. Pass the 3/8"-16 x 2" screw up through the bottom hole of the base and into the corresponding tripod thread of the camera. Tighten securely with a screwdriver or coin. Note: the base does not have to be attached in order to operate, in case you want to mount it outside a sound blimp.

C. Connect the camera body cable by plugging the banana plug into the base. Connect the other end to the usual battery jack on the camera body. This may be a bullet connector for the original S (the **left** one of the two pins), or a 3-pin or 4-pin XLR connector for the M, or for modified S's. This cable is to provide power to the camera body, for the usual run switch, buckle trip, and take-up motor. Slip a piece of insulating tubing over the **right** hand pin if an original S, to prevent accidental insertion of the bullet connector and blowing of the fuse.

D. Install the TXM10-S motor in the usual way. First, inspect the motor front drive coupling, and the camera's rubber coupling. They should be clean and free of oil or fingerprints which could cause slippage. Clean if necessary with detergent and water, or a mild solvent such as alcohol, without getting cleaner on other camera or motor parts. Tighten the clamp. Connect the 7-pin Tuchel plug to the socket on the base.

E. To verify that the drive coupling is not slipping, a television receiver can be used as a poor man's strobe. If you have European television, run the camera at 25 FPS and point it at the screen, while looking through the finder and preferably while tuning in a broadcast channel. A shutter bar should appear in the picture and be nearly stationary. If you have U.S. television, set the camera to 30 FPS and do the same thing. Because U.S. video is 29.970 FPS the shutter bar will drift up through the picture in about 16 seconds. If you have access to a Milliframe Controller or Videoframe Controller, connect it and set it to 29.970 FPS and you should get a stationary shutter bar. Do not use a computer monitor as their scan rates are not standardized.

If the coupling fit is loose and slipping slowly, it can be remedied by: loosening the motor coupling setscrew and moving it forward a bit; or applying and heating a 1/2" long piece of 3/8" shrinkable tubing; or by applying a non-slip compound.

F. If you are using an original 8.4 V Arri S take-up torque motor you must have it converted for 12 V operation, and to minimize electrical interference with the TXM10-S's electronics which can cause loss of sync. Some torque motors are unsuitable for use even after the usual noise suppression technique is applied.

G. The base provides tripod sockets and "studio rig" capability for some accessories intended for the Arri 35; however as the base increases the camera height by 1.95" instead of the optimum 1.85" only adjustable or flexible studio rigs will fit.

## 2. Operation

Power is supplied to the camera and crystal drive by the 4-pin XLR connector on the base. 12 volts DC minimum is required for proper operation. Pin 1 is — and pin 4 is +. Do not apply reversed polarity as this will damage the base unit. If you are not sure your battery and all cables are correctly wired, do not use them until proper polarity is verified with a voltmeter. Under adverse conditions, increased voltage may be required to reliably run at the highest speed, say 14 V. Do not apply more than 16 V. Do not operate with a weak low voltage battery (see note\* below.)

Running speed is selected by the rotary 16-position switch on the right side of the base. The speeds are organized according to the AC power line (mains) frequency powering the HMI or fluorescent lights, or metal vapor street lights, used for filming the scene. Because discharge lights actually flash 120 or 100 times a second (on 60 and 50 Hz respectively) only speeds of 120 or 100 divided by a whole number will give film that does not flicker or pulsate.

□ The eight speeds on the right, in **Bold Face** are for 60 Hz HMI's and include 6, 12, 15, 20, 24, 30, 40 and 60 FPS (frames per second.)

□ The eight speeds on the left in *Italic Face* are for 50 Hz HMI's and include 5, 10, 12-1/2, 16-2/3, 20, 25, 33-1/3 and 50 FPS.

□ The two lowest 50 Hz speeds (5 and 10) can also be used for filming under 60 Hz HMI's. These two speeds, plus 20 FPS, can be used if you have mixed 50 Hz and 60 Hz power as could conceivably occur in foreign location filming.

□ If you are filming under daylight or high-amperage incandescent light any of the speeds can be used at will.

No harm should be done by changing speeds while running; the new speed should lock in almost instantly except between 50, 6 and 12; or 60, 5 and 10 FPS.

The running direction is controlled by the Forward-Reverse switch on the front of the base. Push the top of the rocker switch for Forward; push the bottom of the switch for Reverse. A red mark will show as a warning in the Reverse position. On the Arri S be sure to **also** change the direction knob on the magazine take-up motor. Do not change direction while running as this will cause undue strain electrically and mechanically.

Normal running should be controlled with the camera's run switch. For this, the "Normal-Test Run" switch is kept in the Normal position. This is not only convenient, but also gives the protection of the internal buckle trip that will stop the camera in case of problems. It is also possible to run using the Test Run position, in case the buckle trip or run switch in the camera, or the camera power pigtail, is defective. Note however that this gives no protection from film buckle and requires extra alertness by the camera operator. It is also possible to run

also possible to run using the Test Run position, in case the buckle trip or run switch in the camera, or the camera power pigtail, is defective. Note however that this gives no protection from film buckle and requires extra alertness by the camera operator. It is also possible to run the camera remotely by suitable connection to the front Accessory socket.

Two sync alarm lights are provided, one on each side. They will light up whenever the chosen speed (internal or external) is not being maintained.

The fuse, a 3 A GMA (5 x 20mm) type should never blow in normal operation. It protects all circuits from gross faults that could melt or burn the wiring.

An Accessory socket is provided to supply power to a power zoom control or other device. It can also be used for supplying power to problem torque motors. The mating plug is a locking 240° 5-pin or 6-pin DIN, or corresponding conventional DIN. Pin 3 is —, pin 1 is unswitched 12 V, and pin 5 is switched 12 V. A switch between pins 1 and 5 will remotely run the camera, but bypassing the internal buckle trip.

When the camera stops with the shutter out of the viewing position, manually turn the knob on the motor rear clockwise to again see through the lens.

Note that the Arriflex is not a quiet, self-blinded camera. For sound filming a blimp is required, or else film outdoors at a distance or through a closed window.

### 3. Using External Speed Control

The TXM10-S has a 9-pin WPI (formerly Amphenol) “Tiny Tim” connector for external speed control, as used with the Aaton cameras. This permits running at some 55,000 speeds between about 5 and 60 FPS. This will fit the TCS TMC-55Aa Milliframe Controller, the TCS TVC Videoframe Controller, and most other brands of precision speed control. The socket provides 12 V (or other voltage depending on applied power) as long as the battery cable is connected, giving the required standby power to the controller. The socket accepts 100 pulses per frame from the controller, changing over automatically when the signal is received, and outputs 1 pulse per frame (5 V CMOS logic) as required for a redundant footage counter, or for proper operation of some brands of external controller. Note that the frame signal is electronically synthesized and does not correspond to any particular shutter position, and so it cannot be used for automatic shutter re-phasing, and strobe sync.

External control permits “odd” speeds to be used, such as for filming when a video or computer monitor is in the scene, controlling shutter bar. It also permits the use of unusual HMI speeds, or traditional speeds, that are not provided on the speed dial. In addition, it permits keeping much closer sync when filming, say, a music video with DAT (digital audio tape) playback. This is because the filming rate can be set to equal the Rank or Bosch NTSC video transfer rate of 23.976 or 29.970 FPS and eliminate sync drift.

The TXM10-S’s speed switch is still partially active when using external speed control, to enable reaching the externally chosen speed more rapidly. To take advantage of this, **also** set the TXM10-S speed switch to approximately the external speed.

The TCS accessories draw such little power that they would take one week (TMC-55Aa) or three weeks (TVC) to discharge the average battery, connected 24 hours per day. Therefore, to simplify operation no standby switch is provided. If the camera will not be used for an extended period, disconnect the battery or accessory cable.

The male Tiny Tim connector is susceptible to dirt, bent pins, and short circuits so careful handling is called for.

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### \*Note on Weak Batteries

Do not use the TXM10-S with weak, low voltage batteries. This will cause part of the circuitry to overheat and fail.

This is because the power to the motor is controlled by an MOS power transistor operating as a pulse width modulator. Normally this device is very efficient, runs stone cold and does not need any heat sinking, so none is provided.

However, with a weak battery, say under 9 volts, the device will not fully turn on when it is supposed to, generating considerable heat from the voltage drop, and overheating.

### Insertion of Screws to Prevent Camera from Swiveling on Base:



