

Using the TCS TMC-55 Tobin Milliframe Controller

1. Introduction. The TMC-55 permits speed control of a compatible movie camera in .001 FPS (frame per second), or milliframe, steps. This is done to enable filming at various rates under HMI discharge lamps, fluorescents, or metal-arc street lights without having a flicker in the film. It also enables filming with a video or computer monitor in the shot, eliminating the flickering or shutter bar that would otherwise result. It may just be used to provide traditional speeds that are not provided on the camera's speed dial.

2. Connection. The unit plugs directly into compatible cameras that have the Fischer 11-pin accessory socket. Included are variations of the Arri 16-SR and 35-BL cameras, as well as TCS crystal drives and conversions. With most cameras, inserting the Fischer plug automatically gives speed control to the TMC-55. With most cameras, the accessory is provided DC power as long as the camera is in the Standby mode. The illuminated decimal point pilot light shows that power is being received. If no filming will be done for a while, save power by turning the camera off Standby. When the unit will not be used, unplug it by pulling on the release sleeve.

3. Operation. Turn the camera to Standby. Dial in the desired running speed with the pushwheel switches; each digit is separately controlled, increased with the top button and decreased with the bottom button. The decimal point will flash red until the selected speed output is stable, at which time it becomes a steady green. This only takes a second or two at normal speeds, a bit longer above 80 FPS. Speeds up to 99.999 are obtained with the pushwheel switches alone, with the +80 switch at "Normal." For speeds above 99.999, but not above 159.999, subtract 80 from the desired speed and set this on the pushwheel switches, and turn on the "+80" switch. To get the desired correct speed in this mode the pushwheel switches must be set to 79.999 or less. After the decimal point is a steady green the camera may be started at will. Note that the TMC-55's decimal point being green means that the camera is correctly being told what speed to run; it is still necessary to check the camera's sync alarm to make sure that speed is actually being achieved. For most cameras the speed is accurate as dialed; for the Arri 16-SR High Speed, however, use a calculator to divide the desired speed by 2, or multiply the desired speed by 0.5, to determine the setting to be entered in the pushwheel switches.

4. Filming under HMI lights. For shooting with discontinuous illumination there are only certain speeds that will give flicker-free footage. Discharge type lights operating on 60 Hz current actually flash 120 times per second, so a sub-multiple of 120 frames per second must be exposed to get a whole number of shorter-than-1/120th of a second flashes and therefore even exposure from one frame to the next. Speeds that accomplish this are 120 divided by 1, 2, 3, 4, etc. giving the series of 120, 60, 40, 30, 24, 20, 17-1/7, 15, 13-1/3, 12, and so on. Operation on 50 Hz is similar, giving corresponding speeds of 100, 50, 33-1/3, 25, 20, 16-2/3, 14-2/7, 12-1/2, 11-1/9, 10, and so on. A chart of the HMI speeds is printed on the back of the unit, including all speeds down to 4 FPS. Divide 120 (for 60 Hz) or 100 (for 50 Hz) by any whole number greater than 30 (25) to derive slower HMI speeds.

5. Filming from video monitors. For shooting with an NTSC (U.S. system) video monitor in the shot, the shutter bar can be immobilized by filming at 29.97 or 14.985 FPS. If the video originates on a VCR that is running a bit off speed, the filming rate may have to be altered slightly. When you start filming, push the "Phase" button to move the shutter bar to a point of minimum visibility (say just below the bottom of the frame) before informing the director to command "Action!" If the monitor is large in the film frame, 14.985 FPS may be preferable in order to record all the scanning lines in the video; 29.97 FPS will only get the odd or the even scan lines owing to interlaced scan. Use of a scan doubler and a non-interlaced VGA type monitor will enable getting all the lines at 29.97 FPS. For PAL monitors use 25 or 12.5 FPS. For sync sound filming the pilot frequency should be proportional to running speed. Sync sound filming may not be feasible.

6. Filming from computer monitors. This is a real no-man's land as each monitor seems to be driven at a speed different from every other. Ideally use a photoelectric frequency meter to determine the ideal filming speed, or run the camera (without film!) while playing with the pushwheel switches to establish it by trial and error. If the monitor is interlaced you may have to run at half speed to get all the scanning lines. For non-interlaced monitors try 25 to 46 FPS; for interlaced monitors try 12.5 to 23 FPS. As with filming from a video monitor, start filming and push the "Phase" button to move the shutter bar to the desired position before informing the director to command "Action!" Sync sound filming may not be feasible in most cases.

7. Setting the speed limit jumpers. To avoid over-revving and damaging your camera, you may elect to set the three internal jumpers that limit the maximum speed of the TMC-55. Ground yourself to a metal water pipe, or to a metal appliance with a grounded 3-wire power cord, to drain off static charge that could damage the unit. Remove the four case screws and lift off the front panel. Notice that at the top of the circuit board there are three jumpers; they are changed by pulling straight out and re-installing one space to the left or right as directed below, bridging two of the three metal pins. Select a speed that is below the camera's speed limit. An abbreviated chart is glued inside the case. Expanded instructions are as follows:

For no limit (159.999 FPS) all three jumpers should be to the right, as viewed facing the circuit board.

For 99.999 FPS ("+80" switch inactive), move the top jumper to the left but keep the other two on the right.

For 79.999 FPS, move the top two jumpers to the left but keep the bottom one on the right.

For 39.999 FPS, all three jumpers should be on the left.

Speeds now set in excess of the jumper limit will be truncated and incorrect. For example, with a 39.999 FPS limit, if someone selects 49.999 the camera will run at 9.999 instead, without any decimal point color change or other warning other than observing the camera's tachometer.

When the limit is set where you want it, reassemble the case. There are, incidentally, two adjustments

color change or other warning other than observing the camera's tachometer.

When the limit is set where you want it, reassemble the case. There are, incidentally, two adjustments inside that are critical to the proper calibration and operation of the unit; do not touch these unless you have the proper instruments, instructions and ability.

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