Some Rare Problems in TVT Machines

In no particular order:

1. Early TVT models had a 3 amp 1N5822 Schottky diode across the drive motor (but before the relay direction switching) which has been known to fail, causing stalling, and overheating and failure of the Mosfet motor drive transistor. Later models have a 10 amp MBR1060 Schottky diode instead before the relay, plus a 30 volt TVP transient voltage protector directly across the motor. This latter protects against the operator switching very rapidly from forward to reverse when the relay contacts might be between positions and the Schottky diode thus momentarily not in the circuit.

2. Early TVT models had a 24 volt 2.5 amp power supply for the motor circuit. Some of these objected to the starting current of the motor, and would self-protect by "flashing" on and off, expecially if receiving 240 volts AC power, so the 24 volts was supplanted by a 6 amp silicon diode from the 12 volt supply so the 12 volt supply would aid in starting the motor if the draw exceeded 2.5 amps. Currently we are using a 24 volt 5 amp power supply for the motor circuit on TVT-16, and also TVT-8 models that are likely to be powered with 240 volts. The running current is only 1 to 2 amps but the much higher starting current is the problem with lighter duty supplies.

3. Very early TVT-8 models had a 24 volt Johnson takeup motor, while later TVT-8s have both motors as Igarashi 12 volt ones. The Johnson motors had a built-in bridge rectifier so they would only power in one direction. Some Johnson motors have developed excessive static friction and may stall. You can try oiling both bearings. They can be replaced by the Igarashi ones, however the power must be changed to 12 volts from 24, and the series resistor changed also to the new 10Ω 15W value. The mounting holes need to be re-drilled or filed to the new spacing, and a reel spindle with a smaller hole installed.

4. In the TVT-8 J, K and P models a Luxeon 3 watt white emitter is installed with a maximum current of 1000 mA. We have run into a rare malfunction where at near maximum current the emitter will "flash" from bright to dim at random intervals. You might first suspect the Luxeon emitter itself. This has thus far however been traced to a defective forward biased 1N4001-1N4004 silicon diode in the linear to logarithmic coupling network from the Mosfet voltage follower. There are three in series; the defective one is located by measuring the voltage across them and seeing which has 3 volts across it when the emitter flashes to dim, instead of the normal 0.9 volts. As they are all from the same manufacturing batch and thus equally suspect, it might be worthwhile to replace all three.

5. In early units the torque motors had a 1N4001-1N4004 silicon diode in parallel, but before the relay direction switching. In case the operator switched very rapidly from forward to reverse, the flyback pulse from the motor could occur while the relay is between positions, apparently causing relay arcing and thus causing overvoltage failure of the Mosfet that switches power to the torque motor. This can cause leakage in the Mosfet so a torque motor runs while the TVT-8 is in the Stop or Still position. This is remedied by replacing the Mosfet. This failure mode has hopefully been eliminated in current units by also putting a 15 volt TVP device directly across each torque motor.

6. The most frequent difficulty with the TVT-8 models is the behavior of the pulldown claw. A variety of problems can cause jitter or losing film loops such as tilt, wear, protrusion, centering or throw of the teeth which in turn is related to end play, roughness or lack of lubrication in the up-down cam and wear or excessive tightness or looseness of the plastic strips in the shuttle that bear on the up-down cam. The claw pivot needs lubrication or it will cause problems. Tightness of the plastic wear strips is critical but is not addressed by the B&H service instructions. There should be slight tightness or drag on the cam towards the end of the downwards stroke, but be loose again at the very end. If it is too loose the picture will be unsteady especially at the higher speeds, or lose the loops owing to the up-down travel being insufficient. If it is too tight the claw will not be able to retract fast enough after the end of the stroke owing to excess friction, causing loss of loops and noisy running. The wear strips come in three thicknesses: black for normal, white for thicker, and red for thickest. The steps in thickness are too coarse so often the black strip will be too loose but the white too tight. Here it is necessary to swage the shuttle arm to make it a bit tighter, then file it to make it looser as the swaging is often too much and .001" can make a difference. The strips are no longer available as spares and can only be had by sacrificing a spare mechanism. Any

adjustments that must be made by bending the claw arm can be an exercise in futility as they tend to not stay adjusted. Difficult cases may require that the serviceman replace the entire mechanism. They come in various styles, with various emitter diameters and various styles of Framer lever, and different thicknesses of the main part of the casting, and this should be specified to get one with a good fit. Also according to model, video standard and film format, various types of shutter and timing pulley are factory fitted.

7. The film sprockets can be a problem if they are stuck or if the ratcheting mechanism is misadjusted. At the factory the sprocket shafts are inspected for free turning, and if resistant at all to turning they are disassembled, cleaned and re-oiled. They can be stiff because of old grease, or dirt, getting into the bearing. If the shaft sticks, this can result in the ratchet slipping causing a “rat-tat-tat” noise and loop gain or loss. The ratcheting mechanism should be adjusted so it is rather difficult for the operator to turn the sprocket against the gear. If it is too loose, the ratchet can slip causing loss or gain of film loops. The ratchet tension is adjusted by bending the flat spring so the center is raised about 1/16" or 1/8" relative to the nubs on the ends, prior to installing. The amount depends on the stiffness of the particular spring and the thickness of the two washers. The order of assembly is the actual gear that engages the worm gear first, the gear with ratchet teeth second, the flat spring third with nubs down, then two 7/32" washers, then the E-clip. Be sure that the two washers are free to move up and down on the shaft; if they stick on the step in the shaft diameter they will cause excessive tension initially, causing the serviceman to think the spring is too tight, but then will slip down later with use, causing excessive looseness.