

Check your presses: Are you geared up?

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By Frank Bourlon

The top speed of your press is controlled by several factors that include base speed, field weakening speed (if your controller is equipped with this feature), the MOP (motor operated potentiometer) and the max speed, or top speed potentiometer. Modifying the pulleys or gearbox that drive the press can also control speed.

The DC motor's base speed is normally 1,750 rpm, with a field weakening speed of 2,250 rpm.

The maximum speed of a press can be calculated by knowing the machine's gear ratio or pulley size and the press' base speed.

The RPM of the drive shaft is determined by the pulley ratio of 7:16, which is equal to approximately 2:29 revolutions to 1. This means that the motor would have to move 2.29 times to drive the pressline shaft one revolution.

Another way to look at this is to take the base speed of 1,750, apply the 2.29:1 ratio, and arrive at a drive shaft rpm total of 764.

As a result, the press' units plates and blanket cylinders would rotate at 254.7 ipm, or impressions per minute, because the pressline drive shaft has to rotate three times to move the plate and blanket cylinders once.

The net result: 15,284 impressions per hour.

Top speed?

Typically, I see Goss Community presses run as much as 17,000 iph, which means the press' motors are running above base speed.

Base speed is achieved by applying the full motor nameplate voltage to the motor armature. At this speed, the motor achieves maximum torque and thus runs the most efficiently.

To increase the motor above base speed, you have to weaken the motor field by reducing the motor nameplate rated field amps to the motor. In this case, by reducing the field current by 10 percent, the motor's speed increases to about 1,925 rpm. But be careful: Increasing your press too far above base speed can damage the motor and the press equipment.

Instead, if more speed is needed, consider changing the pulley sizes or gear ratios. That will accomplish the same goal as weakening the field current. But check the motor's amps at full lead

and speed any time you consider changing pulleys or gear ratios. Otherwise, you risk damaging the motor.

Check other options

If you are unable to attain full press speed, the culprit may not be gearing or the pressline. Instead, solving the problem could be as simple as changing the limit setting on the drive controller.

The load on the motor determines the press current, which reflects the number of units running and the units' associated web tension.

The current limit adjustment is used to make sure the motor never exceeds the maximum rated armature amperage stamped on the motor nameplate. For example, if the motor nameplate-stated maximum amperage is 100 amps and the current limit was set so that the motor could only use 50 amps, the result would be that the press might attain full speed with a few units connected but, with all the units in operation, the press would run more slowly.

Additionally, the motor controller's maximum speed, also known as the top speed pot, might be set too low. This would keep the motor controller from delivering the full armature voltage to the motor. This would also reduce the top speed of the press.

Finally, check the MOP. The MOP has cam-operated switches that will keep the total reference voltage from being applied to the motor drive. Adjusting the top limit cam can increase the speed of the motor as long as the full nameplate voltage hasn't been reached.

An important note: This article is intended for those folks that can't achieve the maximum speed of their press as specified by the manufacturer. Increasing speeds above a manufacturer's recommendation can cause premature equipment failure or paper jams.

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