

By David MacFarland

Smooth Operators

ZF AS-Tronic transmissions require operator education

Think that crane you are operating is shifting smoothly on an automatic transmission? Maybe it is, but chances are it is not an automatic, it is a manual transmission, or as we say “a fully automated manual transmission.” You may ask, “What’s the difference?” The increasingly popular ZF AS-Tronic transmission has crept its way with force into crane manufacturers’ factories and markets around the world – especially in the United States. It combines the benefits of a manual transmission – fuel economy and low maintenance – and the ease of an automatic transmission (shift operation). Surprisingly, the transmission is fully operated without a clutch pedal. This article offers new information about

AS-Tronic transmissions, as well as where to go should any issues arise.

If you were to dissect the AS-Tronic transmission you would find it is built almost exactly like a manual gear box. The input has a dry clutch and a pressure plate. Further back you would find main shaft and lay-shaft with synchronizers and helical gears attached to shift forks and shift rails. Located on top you would find the GS3, or the brain of the transmission’s operation. Due to the workload of the application, most AS-Tronics in cranes also have a cooler, an “In-Tarder,” and power take-offs. Some models also have a torque converter, however, these cranes are just starting to surface in the U.S. crane market.



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Understanding operation

Most warranty or non-warranty failures we have seen were due to operating error and therefore preventable. As applied to cranes, the AS-Tronic transmission has only been found in the United States for about five or six years. Yet some of these cranes have already been re-sold. Training on operation may have been given at the time the crane was originally purchased as new, but chances are that after the crane was re-sold no training took place.

It’s important to realize that although there is no clutch pedal, you are essentially operating a manual transmission. The AS-Tronic transmission can be operated in automatic mode and manual mode depending on the driver or circumstances, and the transmission operates no differently than with a car. The important function of the transmission for jobsite operation is maneuvering mode, which is not to be confused with manual mode.

Each application is different when selecting maneuvering mode, so it is necessary to refer to the operator’s manual for how to do this. Maneuvering mode operates by shifting the transmission into first (forward) gear or reverse and applying clutch pressure as needed by the computer. In maneuvering mode the accelerator in operation with the GS3 acts as a clutch pedal for the first 80 percent of the throttle. Some cranes limit engine speed to 800 rpm when in maneuvering mode. Operators should be wary of exceeding 800 rpm because in maneuvering



A rebuilt 12AS-2302 ZF AS-Tronic transmission from a Link-Belt crane undergoes standard testing procedures at the ZF factory.

mode the clutch is slipping. Excess rpm will cause clutch wear.

Maneuvering mode is critical when the crane is operating in soft soil. While in maneuvering mode you should not slam the accelerator thinking the engine needs to be at full power to get out of the mud. This will burn out the clutch and the crane will shut down. In maneuvering mode, 800 rpm is sufficient to move the largest cranes with the AS-Tronic out of the mud – provided you are not so severely stuck that you need to be towed. We know because we have tried it ourselves! Any instruction in this article about operation and maneuvering mode can be found in your operator's manual or by simply calling an authorized on-highway ZF distributor.

Fault codes and oil changes

On occasion you might see some fault codes flashing, but don't panic. All AS-Tronic transmissions run on the "Controlled Area Network" or CANbus. CANbus is the communication link between the engine, transmission, ABS system

and sometimes other components of the vehicle that are electronically integrated to communicate with each other. With a CANbus failure the engine will automatically de-rate and ABS function shuts down to minimize damage, sometimes without warning the operator. Often the loss of power can be confused with transmission problems yet the transmission is usually fine. Be sure to record fault codes and contact your local distributor to start the trouble-shooting process. Many of these failures are electrical and can be corrected easily.

Lastly, the oil change intervals are longer with a manual gearbox than they are with an automatic transmission. This does not mean a manual gearbox should be ne-

glected. Checking for leaks and maintaining proper oil levels will always prolong the life of your transmission. Lubricants and change intervals can be found in the operator's manual or on our website.

These cranes work hard for you, and you want them to continually work hard. Often a transmission goes down and the failure could have been prevented. ■



Left to right: The transmission output to the clutch and pressure plate along with air lines and diagnostic cables.