38 ETR type stop solenoid

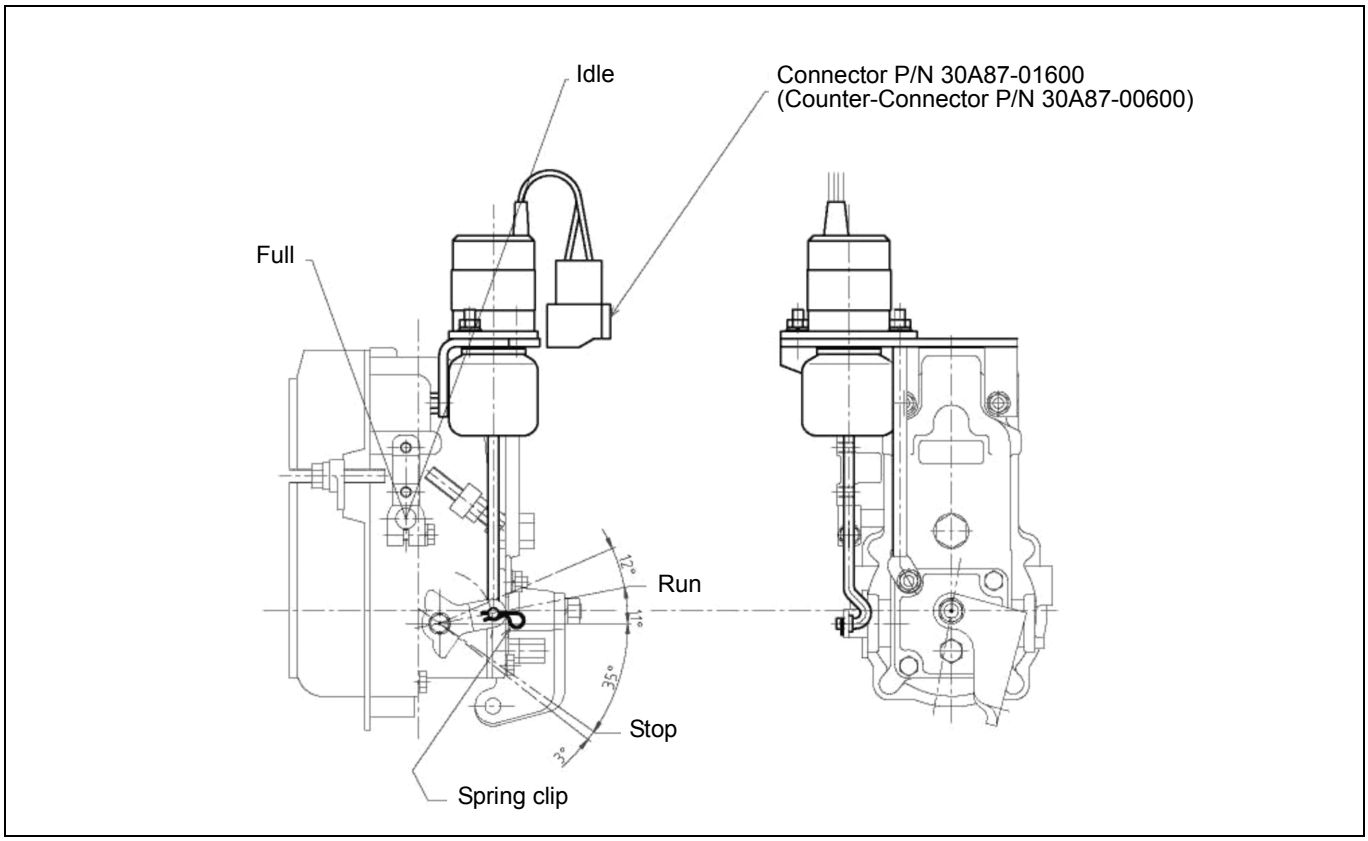


Figure 222

38.1 General

The energize-to-run (ETR) solenoid controlled engine shutdown system operates as follows:

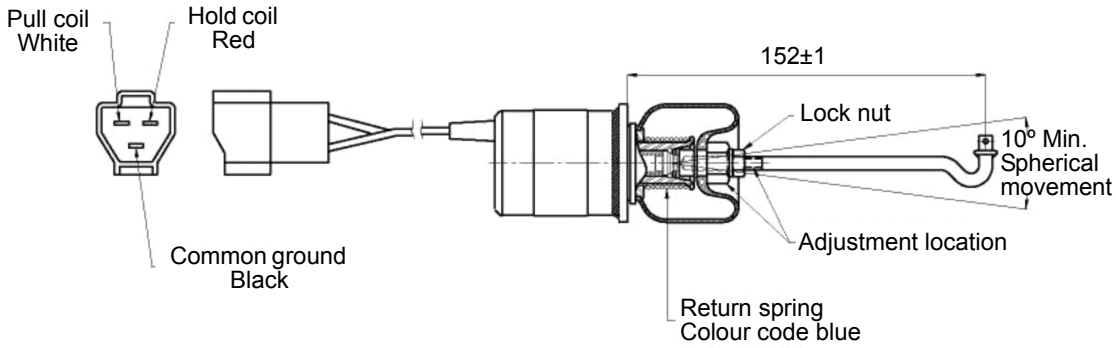
When the starter switch is turned to the "ON" position, the hold coil and the pull coil are energized simultaneously, pulling the stop lever to the "RUN" position. However, the pull coils is energized only for about 1 second (maximum 3 seconds) by a special controller.

The hold coil of the solenoid remains energized in both the "ON" and "START" position of the starter switch, keeping the stop lever in the "RUN" position. When the current to the hold coil is interrupted, the hold coil is no longer energized causing that the stop lever immediately will be pushed to the no-injection position by the internal return spring force of the solenoid. The engine then stops.

This system is a safety device designed to stop the engine whenever the wiring is open or when the starter switch is turned "OFF".

NOTE

If the electrical system includes a control timer to stop the engine, the starter switch should be turned in the "OFF" position for at least 10 seconds before making another start attempt in order to reset the control timer automatically.



Note: Plunger shown in energized position

Figure 223

38.2 Solenoid specification

		current		resistance (+/-10%) at 20 ºC	
connection	wire color	rated 12V	rated 24V	rated 12V	rated 24V
hold coil	red	55 A	29 A	11.15 Ω	41.35 Ω
pull coil	white	1.1 A	0.6 A	0.217 Ω	0.817 Ω
common ground	black				

Notice that the housing is ungrounded.

Replace the complete solenoid if not within the above mentioned specification.

> **⚠ CAUTION**
>
> To avoid damage to the stop solenoid, do not energize the pull coil for more than 10 seconds. Allow the solenoid to cool down before energizing again.

38.3 Inspection

1. Check the spring: the coil ends should be squared and ground.
2. Check the connecting rod spherical movement freely.
3. Check the rubber boot for any cracks or leaks.

Replace the complete solenoid assy if any failure at 1, 2 or 3.

4. The plunger and hub should be free of any wear, dirt or grease: clean if necessary. Install a tie rap to install the rubber boot.
5. Check the spring clip to secure well.

38.4 Connecting rod adjustment

1. Check the connecting rod length and adjust to 152 +/- 1 mm if necessary (see Figure 223 on page 164).
2. Install the connecting rod from inside out to the stop lever and lock it by the spring clip (see Figure 222 on page 163).
3. Start and stop the engine to check proper operation of the shutdown system.

> **⚠ WARNING**
>
> Wrong adjustment will cause that the engine can not run or can not be stopped. It is also possible that the engine can not reach its maximum output.

WORKSHOP TIPS

39 BASIC RECOMMENDED ASSEMBLY PROCEDURES

Proper installation of parts is important to the reliable operation of an engine. This section outlines basic recommended procedures, some of which require special tools, devices or work methods. Improper parts installation can result in parts or engine damages.

39.1 Oil Seals

When installing an oil seal (metal-encased type), observe the following points:

39.1.1 Driving an oil seal into housing

1. Before installing the oil seal, make sure the lip is not damaged and apply a thin coat of grease to the press-fitted surface of the outer case of the seal.
2. When installing the oil seal, position the lip in the correct direction.
3. Using a special tool (oil seal installer) to guide the lip, install the oil seal squarely in the housing. Do not tap the oil seal with a hammer.

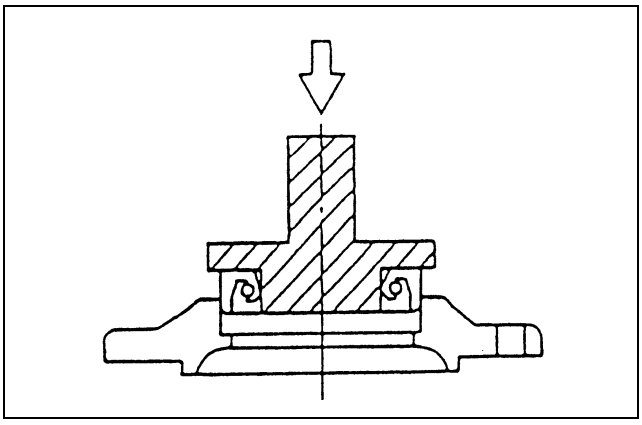


Figure 224 Oil seal installer

39.1.2 Driving oil seal onto shaft

1. Apply a thin coat of grease to the lip of the oil seal.
2. When installing the oil seal on a shaft having splines, threads or keyway, use a special tool (oil seal guide) in order not to cause damage to the lip of the oil seal.

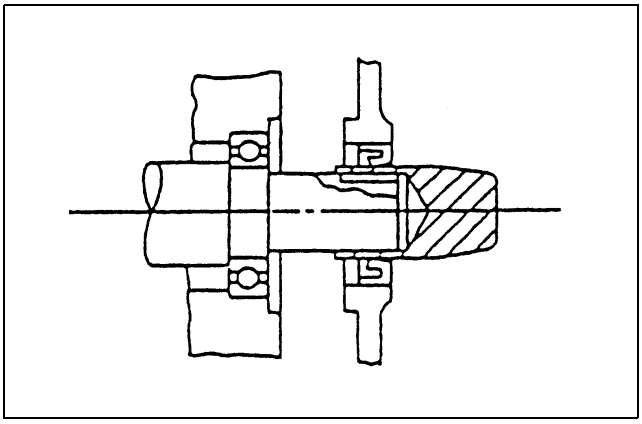


Figure 225 Oil seal guide

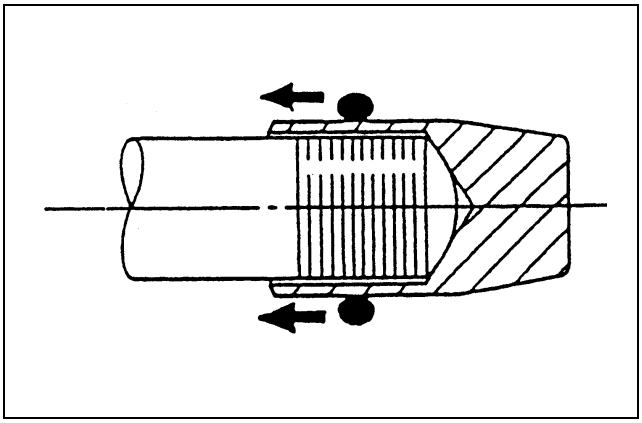


Figure 226 O-ring guide

39.2 O-rings

Use an O-ring guide to install an O-ring over stepped parts, splindes, threads, or key way to prevent damage to ring. Apply a smear of grease to the O-ring before installation.

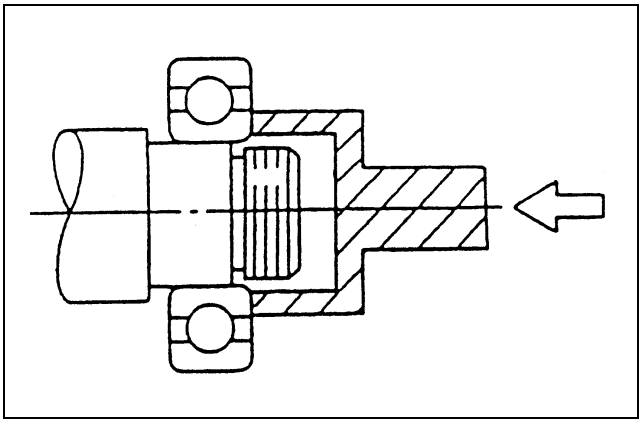


Figure 227 Bearing driver

39.3 Bearings

1. When installing a rolling bearing, be sure to push the inner or outer race by which the bearing is fitted. Be sure to use a bearing driver like the one shown.

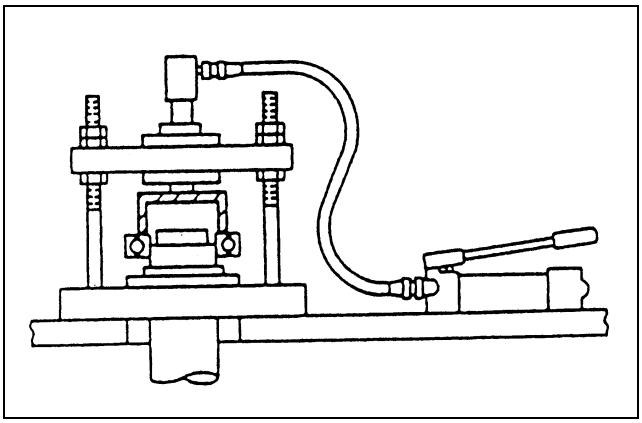


Figure 228 Bearing installation with a press

2. Whenever possible, use a press to minimize shock to the bearing and to assure proper installation.

39.4 Split Pins and Spring Pins

Generally, split pins are to be replaced once disturbed. Instert the pin fully and spread it properly. Drive each spring pin into position to hold it in place after later installation of parts has been completed.

BLANK PAGE