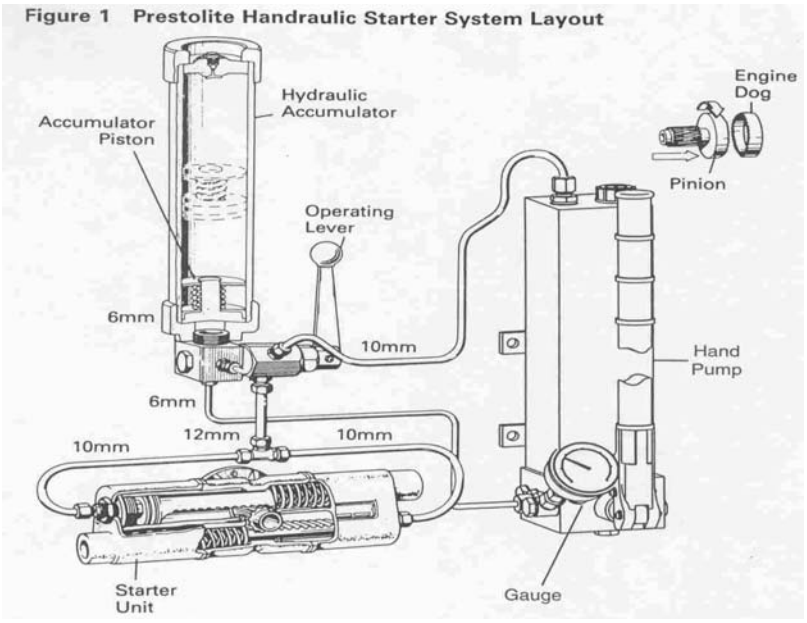
HYDRAULIC STARTING INSTRUCTION

1. TURNING OF THE OPERATION SWITCH TO "MANUAL START" POSITION
2. PRESSURIZE AT THE HYDRAULIC STARTER (325 TO 350 BAR)

Figure 1 Prestolite Handraulic Starter System Layout



SAFETY
Detailed notes are included in the operation and service instruction where appropriate, and are summarised below.

SAFETY PRECAUTIONS
1. Do not disconnect pipe joints with the system under pressure. Discharge the accumulator first by operating the relay valve.
2. Do not operate the starter unless the starter unit is secured to its mounting bracket on the engine. During starting the starter pinion is fed forward and rotated at high speed, and the engagement teeth can inflict serve injury.
3. Do not remove spring retaining nuts, circlips or other retainers without first ensuring that the spring is prevented from releasing suddenly.
4. Do not attempt to dismantle nor flame cut the accumulator. It is permanently charged with nitrogen gas at high pressure.
5. If the accumulator is to be scrapped, follow the guidelines as described on page 19.
6. Do not use lubricating oil or vegetable based oil (such as automobile brake fluid).Use only the hydraulic fluids recommended on page 1.

First ensure that the engine is in a ready-to-start condition, primed with fuel and at full compression. If the engine has not been started since leaving the manufacturers works check the starter and engine for freedom as described on page 13.
Check that the Feed Tank is filled to the correct level with approved hydraulic fluid and vented as described on page 10 “Filling and Venting the System”. Raise pressure to between 276 and 345 bar (4000-5000 lbf/in^2) using the hand pump. Pull the relay valve operating lever until resistance is felt (about 45°), then continue until the lever has reached its stop.
The relay valve lever operates a two-stage vale and should not be snatched or jerked.
The first stage allows a slow bleed of pressurised fluid to the starter racks, causing slow rotation of the starter pinion accompanied by its forward axial movement until it is engaged with the engine dog.
The second stage releases the full flow of fluid at high pressure to the racks, this provides the starting impulse.
When the engine starts, the lever is released to return to its normal position. Springs return the racks to their original position and the pinion retracts. Fluid from the starter unit is returned to the feed tank, via ports in the relay valve, ready for the next charging of the accumulator.
The engine can be inched over for making adjustment or checking freedom with the accumulator discharged, by holding the relay valve open and operating the hand pump.

FILLING AND VENTING THE SYSTEM
After mounting and connecting the various units, fill the feed tank with approved hydraulic fluid to the indicated level.
Pull the relay valve operating lever to the fully open position and operate the hand pump gently until the starter racks have engaged the pinion and then completed their travel – about ¾ turns of the engine crankshaft.
Release the relay valve lever, thus allowing the fluids to be returned to the feed tank by the spring loaded starter racks.
Allow air to vent from the returning fluid, repeat as necessary until returning fluid is free from air. Check the feed tank level ant top up as necessary.
If the hand pump fails to deliver fluid, it will be necessary to vent it by slackening the gauge union a couple of turns and operating the lever until fluids emerges free from air bubbles. Retighten the union and resume venting.
Do not attempt to vent the system by removing or disturbing the relief valve.
The system is self-venting in service if laid out as we recommended and further venting should only be necessary if pipe runs have been disconnected or the starter is operated with insufficient fluid.
The starter fails to engage properly or disengages during operation, this may be due to air in the system and it should be vented as described.
When checking the fluid level in the feed tank make sure that there is no pressure in the system by operation the relay lever valve.