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Introduction

Water injection, as a separate liquid or emulsion with liquid fuels, or as a vapour, has been thoroughly researched [1-5]. Present research for reducing harmful emissions and increasing thermal e ciency

rottle valve was also adjusted for each speed using another step motor and by means of same parallel port. Two computers collected all the data from experiments as indicated in gure 1.

For each run, the engine was started on pure LPG and then switched to the test water to arrange fuel mass ratio. All tests were performed at constant load and variable engine speed and MBT (Maximum brake torque) ignition timing. At each operating condition, the dynamometer load, speed, exhaust gas temperature, fuel and water ow rates were uncertainties, calculated by the method proposed by Kline and McClintock [6], are summarized in table 2.

Results and Discussion

e e ect of water addition on engine horsepower, brake speci c fuel consumption, brake thermal e ciency and the exhaust gas temperature were studied. e e ect of water addition on the engine output torque and brake power for various speeds are shown in gure 2 and 3. Both of the torque and the brake power intensities strongly depend on the engine speed. At low speed, torque increases to reach a maximum as the engine speed increases, and then, as engine speed increases further, torque decreases for all cases as shown in gure 2. e torque decreases because the engine is unable to ingest a full charge of air at the higher speeds. It is clear from gure 2 that as the mass ratio of water to fuel increases, the engine torque increases. Water injection signi cantly a ects the burn rate. Harrington [2] found that the water-gasoline mixture with respect to gasoline for a single cylinder engine have slower burn rates. Peak pressure position (PPP) occurs too late due to the lowered combustion rate as a result of water injection. e spark advanced the peak pressure position back to its optimal value during the tests. is helps to increase the output torque with water injection. e e ect of the water injection on the engine power is shown in gure 3. e brake power increases to a maximum and then decreases at higher speeds. is is mainly because friction losses increase with engine speed and become the dominant factor at very high speeds. Figure 3 shows that the power increases slightly as the water to fuel mass ratio

Citation: