4.0 SYSTEM OPERATION

4.1 BASIC SYSTEM OPERATION

4.1.01 The system is arranged to be operated automatically on receipt of two signals from the fire detection system panel. This will open the relevant zone section valve, and the first nitrogen cylinder actuator thus starting the Gas Pump and filling the pipework with water up to the sprinklers.

4.1.02 Upon actuation of one or more sprinklers, the system will discharge on a continuous basis for the duration of the discharge through the tubing distribution system and the open HI-FOG sprinklers.

4.1.03 The discharge may be interrupted at any time by closing the main isolation valve at the GPU. This should only be done at the direction of the fire brigade or the authority having jurisdiction after a review of the fire area.

Note: Never close the water supply line when the system is on standby or in operation. The supply line can be closed for maintenance ONLY.

4.2 NORMAL STANDBY CONDITION

4.2.01 The water storage tank will be full to capacity. There will be no fault signal from the water low level monitoring switch.

4.2.02 The water supply valve from the storage tank to the GPU will be open.

4.2.03 The water storage cylinders mounted in the cylinder rack will be full.

4.2.04 All nitrogen cylinders mounted in the cylinder rack will be full and the cylinder valves will be open. There will be no fault signal from the low pressure nitrogen switches and each actuator valve pressure switch will be reading approximately 200 bar.

4.2.05 The system isolation valve situated between the Gas Pump and the section valves will be in the open position. There will be no fault from the valve closed monitoring switch at the GPU system control panel.

4.2.06 System standby pressure will be approximately 25 bar. This can be verified from the GPU outlet pressure gauge. There will be no fault signal at the GPU system control panel.

4.2.07 The standby pump is stable (not operating).

4.2.08 Mains power is available on the GPU system control panel.

4.3 NORMAL SYSTEM OPERATION

Note: Numbers in brackets (XX), Refer to Drawing P990296-P-001 (App 04).

4.3.01 In normal standby mode the GPU(1) and standby pump (05) are at rest and the pressure within the pipework up to the section valves is held at 25 bar by the standby pump.

4.3.02 Nitrogen is supplied to the standby pump by the dedicated Pilot nitrogen cylinder.

4.3.04 Any small leakage within the sprinkler pipework is automatically made up from the standby pump which operates on a pressure drop within the distribution pipework.

4.3.05 Should a section valve be activated, water will flow through the valve into the dry pipework up to the closed sprinkler heads.

4.3.06 On receipt of an electrical signal, the solenoid actuator valve (11) mounted on the first nitrogen cylinder opens, releasing the nitrogen and opening the pneumatic valve actuators (12) on the remaining cylinders.

4.3.07 The GPU piston starts to move raising the pressure in the distribution pipework to around 90 bar pushing water through the system up to closed sprinklers. The GPU will continue to operate maintaining a pressure of 90 bar until the pressure stabilizes. If no sprinklers have been activated the pump will stop. On activation of one or more sprinklers the Gas Pump will start to pump continuously.

4.3.08 When the pressure in the front row of nitrogen cylinders drops to below 80 bar, the pneumatic Delta P valve actuator (13b) mounted on the first nitrogen cylinder of the back row opens, releasing the nitrogen and opening the pneumatic valve actuators (13a) on the remaining cylinders of the back row.

4.3.09 The GPU will continue to pump until the nitrogen from all the cylinders is exhausted or the discharge is interrupted by closing the system isolation valve.

4.3.10 The quantities of nitrogen cylinders and water have been calculated to give a system duration of 30 minutes protection for a complete suite.

4.4 SPRINKLER ALARMS

4.4.01 Each MER is provided with a section valve. In total there are 2 section valves installed within the building.

4.4.02 The purpose of the section valves is to provide a means of zoning, and to give indication of where a sprinkler has been activated.

4.4.03 Each section valve is fitted with an isolation valve for maintenance purposes. Each isolation valve is fitted with locking plates. It is highly recommended that each valve is padlocked in the open position and a procedure put in place for the control and recording of isolations.

4.4.04 Each section valve has a pressure switch mounted upstream which is used to signal system activation of the relevant zone.

4.5 SPRINKLER ACTIVATION

In the event of a sprinkler being activated, proceed as follows:-

4.5.01 Verify the MER of the activated sprinkler, this will be indicated on the Main Fire Panel. **WARNING:** do not reset the system until the cause of the activated sprinkler has been evaluated.

4.5.02 Proceed to the relevant section/zone and check that the fire has been extinguished, or the cause of accidental activation has been established.

4.5.03 Close the system isolation valve and all nitrogen cylinder valves.

4.5.04 Replace the activated/damaged HI-FOG sprinkler after draining the system. **WARNING:** only replace an activated sprinkler with the same type.

4.5.05 Check the relevant section valve has reset.

4.5.06 Replace nitrogen cylinders with fully charged cylinders

4.5.07 Return system to its normal standby condition as described in Section 4.2.

4.5.08 **It is recommended that in the event of a fire or accidental discharge a Marioff engineer carries out these procedures.**