



P6232

HYDRAULIC RAM

INTRODUCTION

The hydraulic ram is a simple hydraulic machine which utilises the kinetic energy of a moving column of water to pump a part of this water flow to a height which is greater than the original supply head.

A machine of this type, which was first described by Montgolfier at the end of the eighteenth century, utilises the inertia of the supply water. It is now widely used for obtaining water supplies from natural water courses where no external power supply is available.

DESCRIPTION

Cussons P6232 Hydraulic Ram has been designed to provide a clear indication of the principles of operation.

The main component of the Ram Unit is a cast iron base which contains the waste or pulse valve and the discharge or non-return valve. A supply reservoir, which is mounted on an adjustable stand to give it the necessary elevation, is connected to one end of the base by a fall pipe.

The outlet from the base is controlled by the pulse valve which is loaded so that with no flow in the fall pipe the load on the waste valve can overcome the static head to open the valve. This allows water to flow down the fall pipe and as the velocity in the fall pipe increases so the dynamic pressure under the waste valve increases until it overcomes the external load and closes the valve.

The sudden retardation imposed on the water in the fall pipe causes a rapid increase in pressure in the base which becomes sufficient to open the discharge valve, delivering a quantity of water through the valve.

When the momentum of the water in the fall pipe has been destroyed, the pressure returns to its original value, causing the non-return valve to close and enabling the pulse valve to re-open. The flow of water re-commences and the cycle is repeated.

A cast iron air vessel is mounted above the discharge valve, the enclosed air in this vessel, which is subjected to the delivery pressure, acts as a cushion for the pressure fluctuations produced by the discharge valve, thus giving a smoother rate of delivery. The pulse valve may be loaded with additional masses placed on a small platform attached to the valve. This additional mass causes the valve to close at a higher flow velocity, which causes a greater pressure surge.

The delivery from the hydraulic ram is taken by a flexible pipe, supported on an adjustable height stand, to a flow measuring cylinder (not supplied) via a 'syphon breaker' located at the top most part of the delivery pipe.

EXPERIMENTAL CAPABILITIES

- ◆ Establishment of flow/pressure characteristics and determination of efficiency of the given Hydraulic Ram.

DIMENSIONS AND WEIGHTS

Nett:- 500 x 115 x 800 mm, 11.0 Kg.

Gross:- 0.06m³, 13.0 Kg.