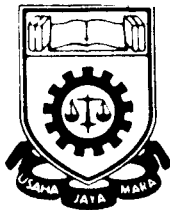


**DIPLOMA IN ELECTRONICS ENGINEERING**  
**SCHOOL OF ENGINEERING**  
**MARA INSTITUTE OF TECHNOLOGY**



**AUTOMATIC WATERING**  
**SYSTEM**

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Thank you

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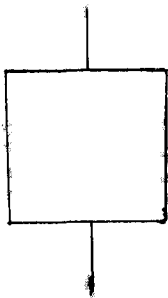
## 1.1 DIRECTIONAL CONTROL VALVES

Directional control valves manage the flow path of the fluid in the system. They function to stop, start, check, divert, shuttle, divide proportionally, and by other means direct the flow of fluid in one, two, three, four, or more flow paths or ways. Pressure and flow compensation, in addition to the major control function, are frequently built into these valves. Directional control valves are also common as an integral part of such components as mobile hydraulic pumps to add flexibility through internal directional control. Other modern applications include electrohydraulic servo-valves that control the flow of fluid in response to programmed and feedback signals from electronic and other logic master control systems.

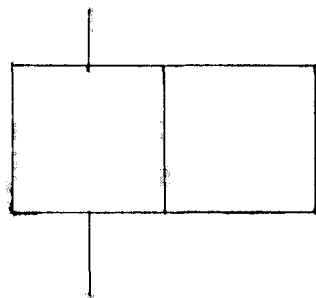
Directional control valves may be direct acting or pilot operated from an adjacent or remote location. They may be manually actuated physically by an operator, hydraulically by pilot pressure, pneumatically by air pressure, and electrically by solenoids or servo-drivers receiving control signals from control panels, servo systems, and programmed signals. Valving action round shear plates, and rotating and sliding spool elements. The majority of directional control valves use sliding spool elements.

Three terms receive widespread use in the description of any control valves - position, way and port. Standard symbols are used to represent their meaning.

Position refers to the number of positions within the valve body that the valve shifting mechanism or element, such as the sliding spool in a spool valve, can assume in directing the flow of fluid through the valve.



One-position  
(or infinite position  
single envelope)



Two-position