

# CHAPTER 5

## Ladder diagram

KJE555 - PLC

## Ladder diagram

- Ladder diagram consists of one vertical line found on the left hand side, and lines which branch off to the right
- Line on the left is called a “bus bar”, and lines that branch off to the right are “instruction lines”

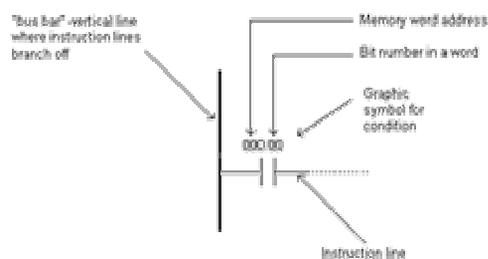
## Ladder diagram (2)

- Ladder diagram consists of one vertical line found on the left hand side, and lines which branch off to the right
- Line on the left is called a “bus bar”, and lines that branch off to the right are “instruction lines”

## Ladder diagram (4)

- Basic elements of a relay diagram can be seen in the following picture

Basic elements of a relay diagram

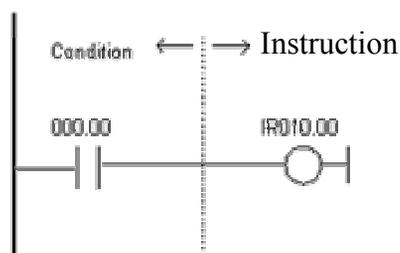


## Ladder diagram (5)

- In the example above, operand is bit 0 of memory location IR000
- Based on the picture above, one should note that a ladder diagram consists of two basic parts: left section also called conditional, and a right section which has instructions
- When a condition is fulfilled, instruction is executed

## Ladder diagram (6)

Condition and  
instruction in  
relay diagram



- Picture above represents an example of a ladder diagram where relay is activated in PLC controller when signal appears at input line 00

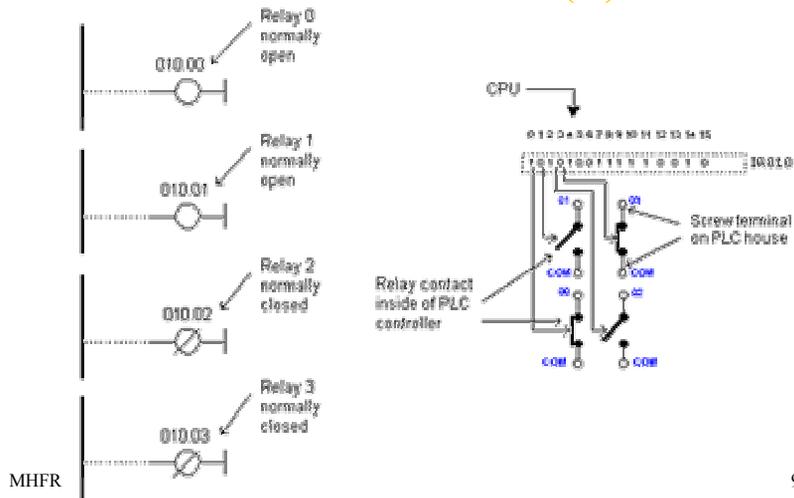
## Ladder diagram (7)

- When a CPU activates one of the leading four bits in a word IR010, relay contact moves and connect line attached to it
- In this case, these are the lines connected to a screw terminal marked as 00 and to one of COM screw terminals

## Normally open and normally closed contacts

- Normally open (NO) switch won't conduct electricity until it is pressed down
- Normally closed (NC) switch will conduct electricity until it is pressed
- Good examples for both situations are the doorbell (NO) and a house alarm (NC)

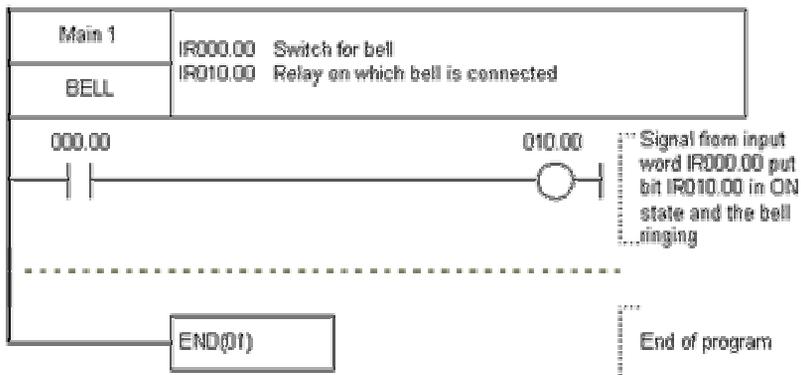
## Normally open and normally closed contacts (2)



## Brief example

- Example below represents a basic program
- Example consists of one input device and one output device linked to the PLC controller output
- Key is the input device, and bell is the output supplied through a relay 00 contact at the PLC controller output

## Brief example (2)



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## Brief example (3)

- Input 000.00 represents a condition in executing an instruction over 010.00 bit
- Pushing the key sets off a 000.00 bit and satisfies a condition for activation of a 010.00 bit which in turn activates the bell

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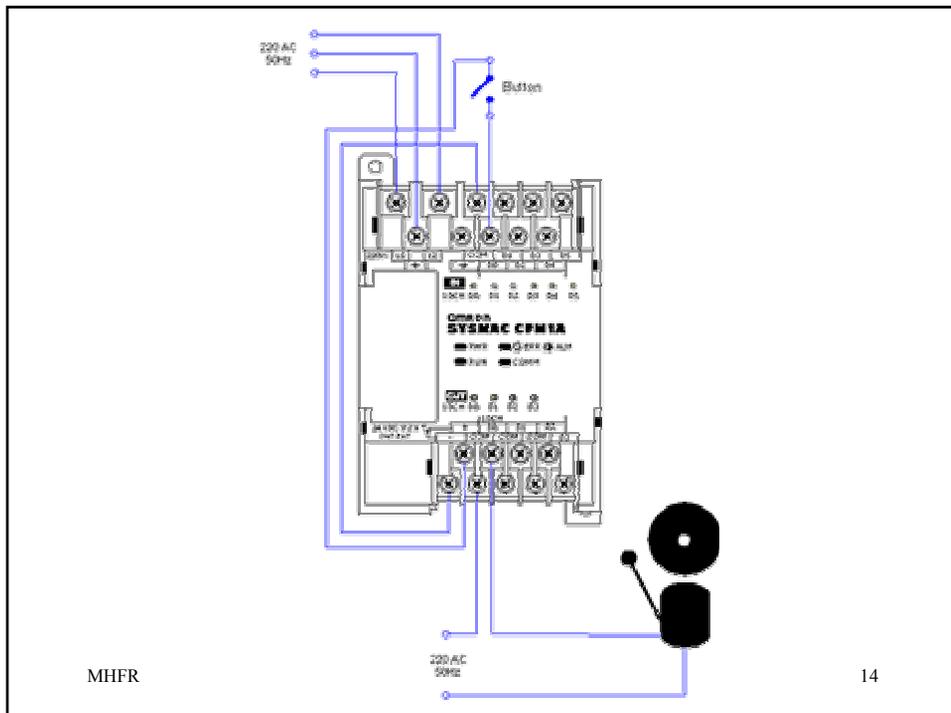
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## Brief example (4)

- For correct program function another line of program is needed with END instruction, and this ends the program
- The following picture depicts the connection scheme for this example

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# END OF CHAPTER 5