(1) Programming Counter:-

Counter instruction:-

A Programmed Counter can the same function as Mechanical Counter. A Counter are similar to timers except it do not operate on an external clock but dependent on external input Program Sources for Counting.

* It included as Part of the Counter itself is the Counter Preset value & the Current accumulated Count for the Counter.
* PLC Counter Can be designed to Count up to a Preset value (or) to Count down to a Preset value.
* The up-Counter is incremented by 1 each time the rung Containing the Counter is energized.
* The down-Counter decremented by 1 each time, this the rung containing the Counter is energized.
* The value indicated by the Counter is termed as the accumulated value.

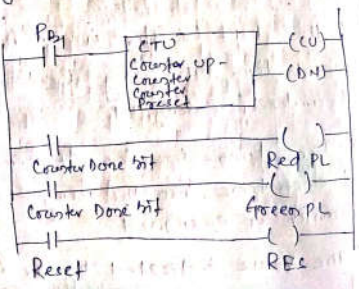
Types of PLC Counter (2)

In general a PLC Counter can classified into 3 types. These are:

(a) UP - Counter
(b) down - Counter.
(c) up - down Counter.

UP - Counter:-

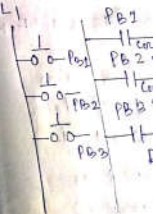
The Count - up Counter is an o/p instⁿ whose function is to increment it's accumulated value on false - to - True transition of it's instⁿ. The cup - Counter o/p instⁿ will increment by 1 each time, the counted event is occured. Fig shows the Program and timing diagram for a simple up - Counter.



Down - Counter:-

The ... instⁿ will Count ... by 1 each time ... it occures.

* Each time ... value occures, ... is decremented.
* Normally ... in Conjuction ... form an Up/d...
* Fig shows ... for a Up/down ...



... - Broadly ... Cnt - ...

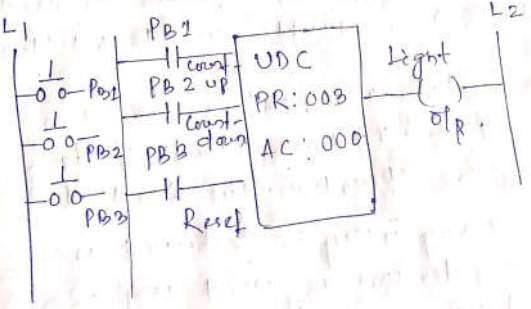
Down - counter: (3)

The down - counter o/p. instⁿ will count down by decrement by 1 each time the counted event is occurs.

* Each time the down count event value occurs, the accumulated value is decremented.

* Normally the down - counter is used in conjuction with the up - counter to form an up/down counter.

* Fig shows the program & timing diagram for a up/down counter.



Data Manipulation instruction of PLC

Data Manipulation:-

Data Manipulation instⁿ enable the Programmable Controller to take some of the qualities of a computer system.

* A Data Manipulation can involves to transfer of data & operation on data with math functions, data conversion, data comparision & logical operation.

* There are two basic instⁿ, this instruction that can operate on word data & those operate on file (or) block

* Each data manipulation instruction required two (or) more words of data memory for operation. The word of data memory is may be referred as either register (or) as word that can depend upon Manufacturer.

* The data Manipulation (or) also the movement, manipulation (or) storage of data in either single (or) multiple - word groups from one data memory area to another.

* A Data Manipulation can be placed in two categories
  (a) Data transfer.
  (b) Data Comparison.

Data transfer operations:-

A Data transfer (or) can introduced the transfer of the contents from one word (or) register to another.

* A Data transfer (or) can address any location in the memory. Prestored values can be retrieved & that can placed in any new location. That location may be, Preset register for a timer (or) Counter (or) even an o/p register.

* In Basically there are two types of (or) set that are used to acquire & move data.

The ALLen-Bradley PLC-2 Controller can used out-formatted

for data transfer instn. These are GET & PUT.

* GET instruction tell the Processor to go get a value stored in some word. The GET instruction is programmed in the Condn portion of a logic Rung.

* Similarly PUT instruction tell the Processor where the PUT information is obtained from the GET instn. The PUT instn is programmed in the otp portion of the Logic Rung. A PUT instn receives all 16-bit of data from Processing the GET instn.

Data Compare instn.

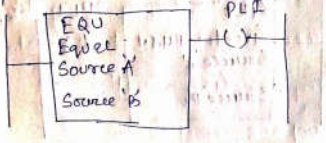
As we know that a data transfer operations are all otp instn where as the data compare instn are inputs instn.

* A data compare instn can compare the data stored in two or more word or register & also make a decision

based on the Programming instruction.

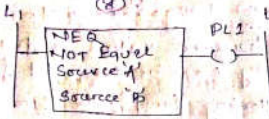
* The Numeric values in two words of memory can be compared for each of the following cmd's. Which can depend on the PLC. These are:

(a) Equal instruction (EQU) :- The equal instn is an input instn which can compare source A to source B. Where source A is equal to source B. then this instn is logically true. otherwise it is false.

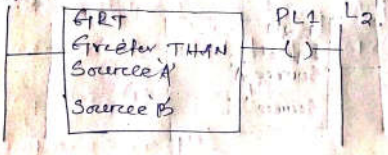


(b). NOT Equal (NEQ) instruction:- The not equal (NEQ) instn is an o/p instn which can compare source A to source B. Where source A is not equal to source B. then the instn is logically true. otherwise it is logically false. Fig shows an example of the NEQ instn.

(2)

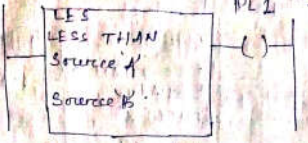


(3) Greater than (GRT) instn :- The Greater than instn is an input instn that can compare Source 'A' to Source 'B' where Source 'A' is greater than Source 'B', then the instn is logically true other wise it is logically false. Fig shows an example of GRT instn.



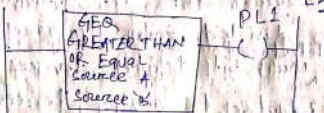
(4). Less than (LES) instn :- The less than instn is an input instn that can compare Source 'A' to Source 'B', where Source 'A' is less than Source 'B', then the instn is logically true otherwise it is logically false. Fig shows an example of less than instn.

(9).



E) Greater than or equal (GEQ) instr:-

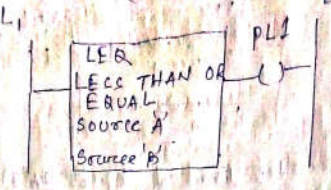
This instr is an input instruction that can compare source 'A' to source 'B'. Where source 'A' is greater than (or) equal to source 'B' then this instruction is logically true otherwise it is logically false. Fig shows an example of Greater than or equal (GEQ) instr.



(6) LESS than (or) equal (LEQ) instr:-

This instruction is an input instruction that can compare source 'A' to source 'B' when source 'A' is Less than (or) equal to source 'B', this instruction is logically true otherwise it is logically false. Fig shows an example of the LEQ input instruction.

(10)



Numerical data I/O interfaces.

The capabilities of data Manipulation. Processing of PLC which can Led to a I/O interfaces is known as numerical data I/O interfaces.

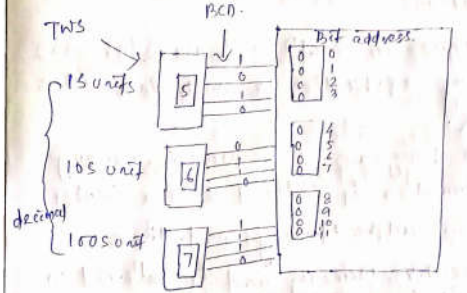
* Numerical data I/O interfaces can divided into two groups.
  (a) Interface to Multi bit digital devices.
  (b) Interface to analog devices.

* The multi bit digital devices are take discrete I/O devices. because Processed signal are discrete (ON/off).

* In discrete I/O a single bit is required to read an input/o Control an o/p.

* The word bit (W) interfaces allow a group of bits to the i/p (or) o/p as a unit.

* Eg stores a BCD input interface module connected to thumbwheel switch (TWS).



The BCD input module can be allows the Processor to accept 4-bit digital codes. This interface input data into specific register (or) word location in memory to be used by the Control Program. Register input modules accept generally a voltage in the range of 5V d.c to 24V. d.c. Data Manipulation instruction are used to access the data

from the module the CPU can provide data for register used in the control program.

SEQUENCER INSTRUCTION:

Sequencer instr^n are used to control automatic assembly M/c that have a consistent & repeatable operation.

* Sequencer instr^n can make program many application a much easier task.
* To program, a sequencer, binary information is entered into a series of consecutive memory word. These consecutive memory word is referred as a word file. first of all a data can entered into a word file for each sequencer step. Through the steps, binary information is transferred from the word file to the output word.
* The sequencer o/p (SQO) instr^n can be used to control o/p devices sequentially. The sequence of operation is stored in a data file & the information is transferred sequentially to the o/p.