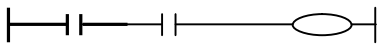
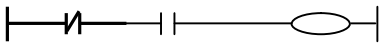
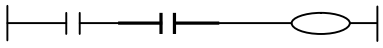
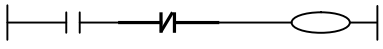
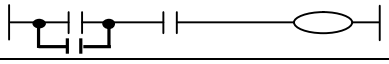
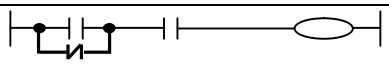
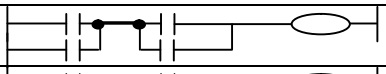
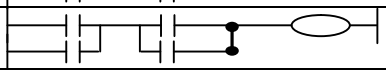
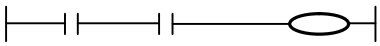
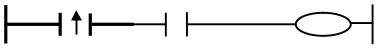
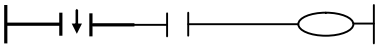
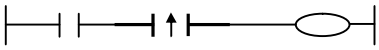
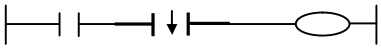
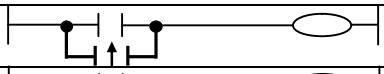
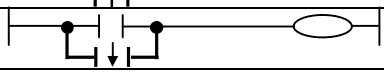
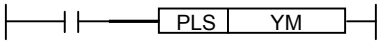
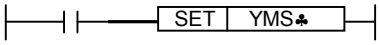
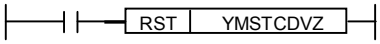
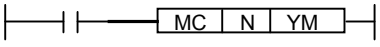
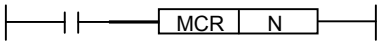
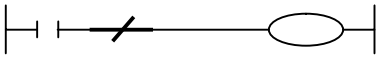
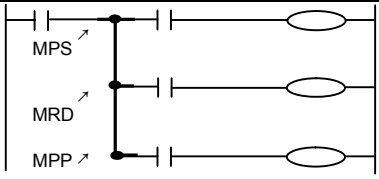
Index

◎ List of Basic Instruction

Symbol	Function	Circuit & Devices
LD LoaD	Each logic start A contact	 X,Y,M,S,T,C
LDI LoaD Inverse	Each logic start B contact	 X,Y,M,S,T,C
AND AND	Serial connection A contact	 X,Y,M,S,T,C
ANI ANd Inverse	Serial connection B contact	 X,Y,M,S,T,C
OR OR	Parallel connection A contact	 X,Y,M,S,T,C
ORI OR Inverse	Parallel connection B contact	 X,Y,M,S,T,C
ANB ANd Block	Serial connection of Parallel circuit	
ORB OR Block	Parallel connection of serial circuit	
OUT OUT	Final operation coil drive	 Y,M,S,T,C
LDP LoaD rising Pulse	Initial logical operation Rising edge pulse	 X,Y,M,S,T,C
LDF LoaD Falling pulse	Initial logical operation Falling edge pulse	 X,Y,M,S,T,C
ANDP AND Pulse	Serial connection of Rising edge pulse	 X,Y,M,S,T,C
ANDF AND Falling	Serial connection of Falling edge pulse	 X,Y,M,S,T,C
ORP OR Pulse	Parallel connection of Rising edge pulse	 X,Y,M,S,T,C
ORF OR Falling	Parallel connection of Falling edge pulse	 X,Y,M,S,T,C
NOP NOP	No operation	N/A
PLS PULSE	Rising edge pulse	 PLS YM
PLF PLF	Falling edge pulse	 PLF YM♣
SET SET	Set a bit device Permanently ON	 SET YMS♣
RST ReSeT	Reset a bit device Permanently OFF	 RST YMSTCDVZ
MC Master Control	Denote the start of Master control block	 MC N YM
MCR Master Control Reset	Denote the end of Master control block	 MCR N
INV INVerse	Invert the current result of the internal PLC operations	
MPS PuSh	Push the result of operation to stack	 MPS ↗ MRD ↗ MPP ↗
MRD ReaD	Read the result of operation from stack	
MPP PoP	Pop & remove the Result from stack	
END END	Main program end	Forced the current program scan to step 0

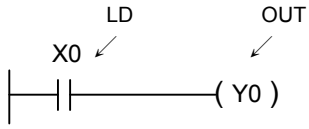
♣ : Special Auxiliary Relay

◎ Load & Load Inverse & Out Instruction

		J1n	J2n--

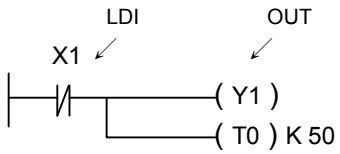
Mnemonic	Instruction	Symbol & Device	Step number
LD	LoaD	X,Y,M,S,T,C	1
LDI	LoaD Inverse	X,Y,M,S,T,C	1
OUT	OUT	Y,M,S,T,C	1

♦ If each logic line start an NO contact, use the LD instruction.



LD	X	0
OUT	Y	0

♦ If each logic line start an NC contact, use the LDI instruction.



LDI	X	1
OUT	Y	1
OUT	T	0
(SP)	K	50

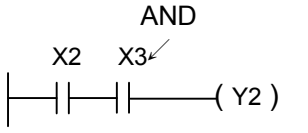
♦ When use hand held programmer, the space key needs to be pressed to enable the constant to be entered.

◎ AND & AND Inverse Instruction

		J1n	J2n--

Mnemonic	Instruction	Symbol & Device	Step number
AND	AND	X,Y,M,S,T,C	1
ANI	ANd Inverse	X,Y,M,S,T,C	1

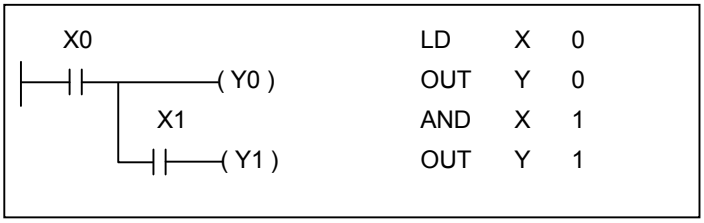
♦ If an NO contact is connected in series, use the AND instruction.



LD	X	2
AND	X	3
OUT	Y	2

♦ If an NC contact is contacted in series, use the ANI Instruction.

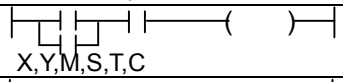
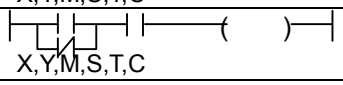
LD	X	2
ANI	X	3
OUT	Y	3



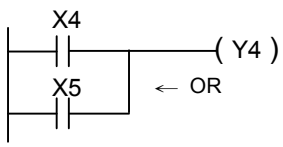
LD	X	0
OUT	Y	0
AND	X	1
OUT	Y	1

◎ OR & OR Inverse Instruction

		J1n	J2n--

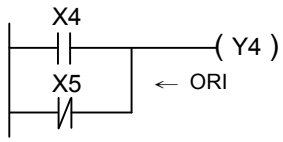
Mnemonic	Instruction	Symbol & Device	Step number
OR	OR		1
ORI	OR Inverse		1

♦ If an NO contact is connected in parallel, use the OR instruction.




```
LD    X  4
OR    X  5
OUT   Y  4
```

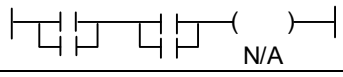
♦ If an NC contact is connected in parallel, use the ORI instruction.



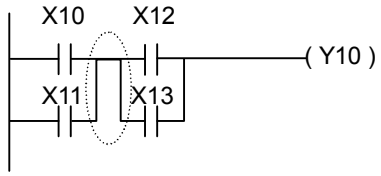

```
LD    X  4
ORI   X  5
OUT   Y  4
```

◎ ANB Instruction

		J1n	J2n--

Mnemonic	Instruction	Symbol & Device	Step number
ANB	ANd Block		1

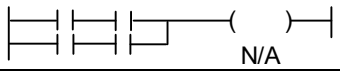
♦ Serial connection of parallel circuit, use the ANB



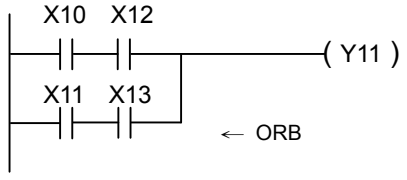

```
LD    X  10
OR    X  11
LD    X  12
OR    X  13
ANB
OUT   Y  10
```

◎ ORB Instruction

		EX_{1N}	J2n--

Mnemonic	Instruction	Symbol & Device	Step number
ORB	OR Block		1

♦ Serial connection of parallel circuit, use the ORB

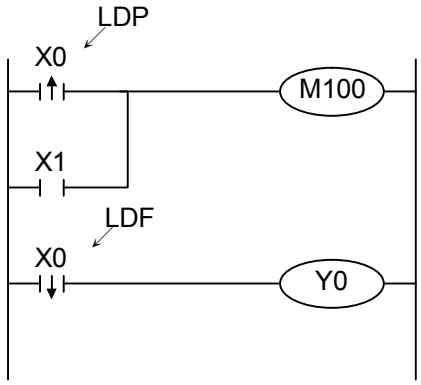



```
LD    X  10
AND   X  12
LD    X  11
AND   X  13
ORB
OUT   Y  11
```

◎ Load Pulse & Load Falling Pulse Instruction

		J1n	J2n--

Mnemonic	Instruction	Symbol & Device	Step number
LDP	LoaD rising Pulse	X,Y,M,S,T,C	2
LDF	LoaD Falling pulse	X,Y,M,S,T,C	2




```
☞ 0   LDP  X  0
  2   OR   X  1
  3   OUT  M  100
☞ 4   LDF  X  0
  6   OUT  Y  0
```

Basic points to remember:

- ♦ Connect LDP and LDF instructions directly to the left hand bus bar.
- ♦ Or use LDP and LDF instructions to define a new block of program when use ORB and ANB instructions (see later sections).
- ♦ LDP is active for one program scan after the associated device switches from OFF to ON.
- ♦ LDF is active for one program scan after the associated device switches from ON to OFF.

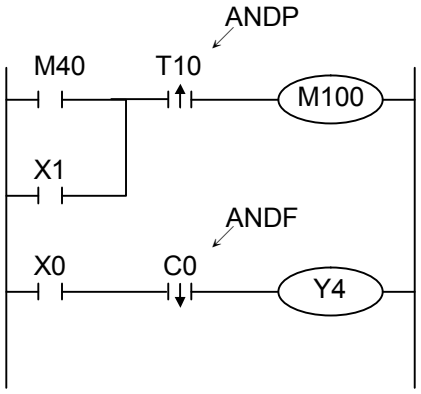
Single Operation flags M2800 to M3071

- ♦ When the pulse operation instructions used with auxiliary relays M2800 to M3071, only activate the first instruction encountered in the program scan, after the point in the program where the device changes. Any other pulse operation instructions will remain inactive.
- ♦ This is useful for use in STL programs (see chapter 3) to perform single step operation using a single device.
- ♦ Any other instructions (LD, AND, OR, etc.) will operate as expected.

◎ AND Pulse & AND Falling Pulse Instruction

		J1n	J2n--

Mnemonic	Instruction	Symbol & Device	Step number
ANDP	AND Pulse	X,Y,M,S,T,C	2
ANDF	AND Falling pulse	X,Y,M,S,T,C	2




```
0   LD    M  40
1   OR    X  1
2   ANDP  T  10
4   OUT   M  100
5   LDF   X  0
6   ANDF  C  0
8   OUT   Y  4
```

Basic points to remember:

- ♦ Use the ANDP and ANDF instructions for the serial connection of pulse contacts.
- ♦ Usage is the same as for AND and ANI; see earlier.
- ♦ ANDP is active for one program scan after the associated device switches from OFF to ON.
- ♦ ANDF is active for one program scan after the associated device switches from ON to OFF.

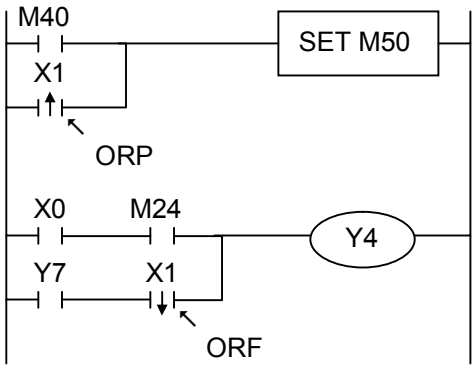
Single operation flags M2800 to M3071:

- ♦ When used with flags M2800 to M3071, only the first instruction will activate.

◎ OR Pulse & OR Falling Pulse Instruction

		J1n	J2n--

Mnemonic	Instruction	Symbol & Device	Step number
ORP	OR Pulse	X,Y,M,S,T,C	2
ORF	OR Falling pulse	X,Y,M,S,T,C	2




```
0   LD   M 40
1   ORP  X 1
3   SET  M 50
4   LD   X 0
5   AND  M 24
6   LD   Y 7
7   ORF  X 1
9   ORB
10  OUT  Y 4
```

Basic points to remember:

- ♦ Use the ORP and ORF instructions for the parallel connection of pulse contacts.
- ♦ Usage is the same as for OR and ORI; see earlier.
- ♦ ORP is active for one program scan after the associated device switches from OFF to ON.
- ♦ ORF is active for one program scan after the associated device switches from ON to OFF.

Single operation flags M2800 to M3071

- ♦ When used with flags M2800 to M3071, only the first instruction will activate.

◎ NOP & END Instruction

		J1n	J2n--

Mnemonic	Instruction	Symbol & Device	Step number
NOP	NOP	N/A	1
END	END	END	1

NOP Instruction

♦ After the program “all clear operation” is executed, all instructions in the program are over written with NOP’s.

END INSTRUCTION

♦ Insert this instruction at the end of a program and program return to step 0.

♦ If missing this instruction, then program can’t be executed.

NOTE :

1:Program a circuit from its up to down and left to right.

2:Output relay can’t be connected directly from the bus bar.

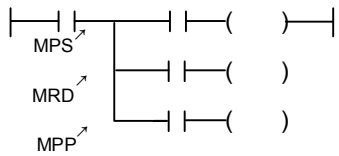
If necessary, connect it through the N/C contact of special auxiliary relay M8000.

3:I/O relay, inside auxiliary relay, TIM/OUT the number of contact that can be used per output relay is not limited.

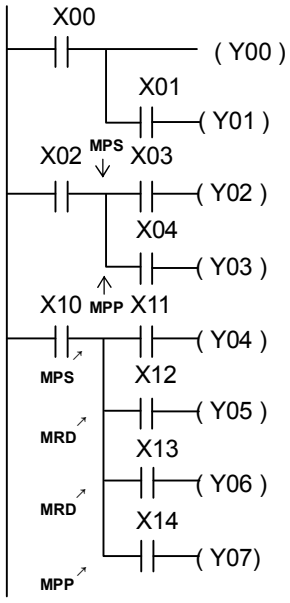
4:Behind the output coil can not in addition contact; Two or more output coils can be connected in parallel.

◎ Multiplex output circuit

		J1n	J2n--

Mnemonic	Instruction	Symbol & Device	Step number
MPS	Memory PuSh		1
MRD	Memory ReaD		1
MPP	Memory PoP		1

- In LYPLC EX series, there are (11) stack memory space can store operation result, so MPS instruction may be used up to (11) times continuously.
- MPS: Push the operation result into stack and the stack pointer increment by 1.
- MRD: Read the operation result from stack and the stack pointer unchanged.
- MPP: Pop the operation result from stack. First the stack pointer decrement by 1.
- MPS,MRD,MPP are all no operand.

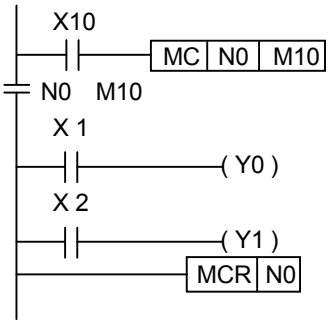


LD	X	00
OUT	Y	00
AND	X	01
OUT	Y	01
LD	X	02
MPS		
AND	X	03
OUT	Y	02
MPP		
AND	X	04
OUT	Y	03
LD	X	10
MPS		
AND	X	11
OUT	Y	04
MRD		
AND	X	12
OUT	Y	05
MRD		
AND	X	13
OUT	Y	06
MPP		
AND	X	14
OUT	Y	07

◎ Master Control (MC/MCR)

		J1n	J2n--

Mnemonic	Instruction	Symbol & Device	Step number
MC	Master control	MC N Y,M	2
MCR	Master Control Reset	MCR N	1



LD	X	10
MC	N	0
SP	M	10
LD	X	1
OUT	Y	0
LD	X	2
OUT	Y	1
MCR	N	0

- N is the nesting level number.
- The MC/MCR instructions are used in pairs when branch a circuit to plural OUT instruction.
- When the MC condition is ON, the state of each relay is the same as in an ordinary circuit with out MC/MCR instruction.
- When the MC condition is OFF, the state of each relay between the MC and MCR instruction is as following:

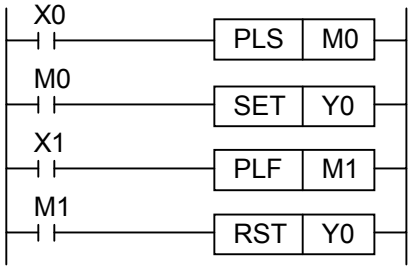
Time, Device for OUT	Reset & OFF
Counter, Device for SET	Hold present state

- Be sure that an LD/LDI instruction will be always following MC/MCR instruction.

◎ Inverse (INV)

		J1n	J2n--

Mnemonic	Instruction	Symbol & Device	Step number
INV	INVerse	N/A	1




```
0   LD   X 0
1   PLS  M 0
3   LD   M 0
4   SET  Y 0
5   LD   X 1
6   PLF  M 1
8   LD   M 1
9   RST  Y 0
```

Basic points to remember:

- The INV instruction is used to change (invert) the logical state of the current ladder network at the inserted position.
- Usage is the same as for AND and ANI; see earlier.

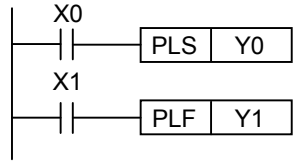
Usages for INV

- Use the invert instruction to quickly change the logic of a complex circuit.
  It is also useful as an inverse operation for the pulse contact instruction LDP, LDF, ANP, etc.

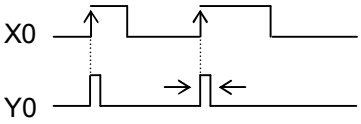
◎ PLS / PLF (Pulse Output)

		J1n	J2n--

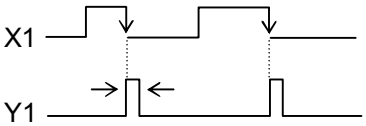
Mnemonic	Instruction	Symbol & Device	Step number
PLS	PuLSe	PLS Y.M.	2
PLF	PuLse Falling	PLF Y.M.	2




```
LD   X  0
PLS  Y  0
LD   X  1
PLF  Y  1
```



♦ When X0 pulse OFF→ON, the specified devices of PLS is enabled “1” scan cycle.



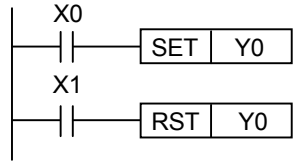
♦ When X1 pulse ON→OFF, the specified devices of PLF is enabled “1” scan cycle.

♦ The special auxiliary relay can’t be for PLS/PLF used.

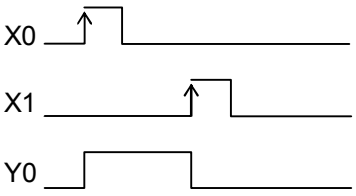
◎ SET/RST

		J1n	J2n--

Mnemonic	Instruction	Symbol & Device	Step number
SET	SET	SET Y,M,S	Y.M. :1 Special M,S Coils :2
RST	ReSeT	RST Y,M,S,D	D, special D, registers, V and Z :3




```
LD   X  0
SET  Y  0
LD   X  1
RST  Y  0
```



♦ SET : While operation result is on the specified device is enabled. Once enabled, the specified device remains enabled even if the operation result is disabled.

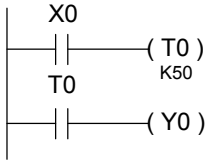
♦ RST : While operation result is on the specified device is reset, word device cleared to “0”.

◎ TIMER & COUNTER

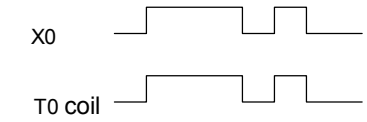
		J1n	J2n--

Mnemonic	Instruction	Symbol & Device	Step number
OUT	OUT	(T.C) K..	32 bit counter : 5 Others :3
RST	RST	RST T,C	T.C : 2

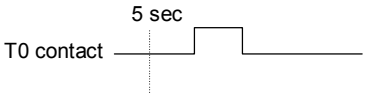
<< Timer >>




```
LD    X  0
OUT   T  0
      K  50
LD    T  0
OUT   Y  0
```

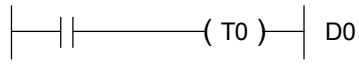


♦ When X0 on, T0 active after 5 seconds T0 contact ON, and keep current data even through X0 keep ON.



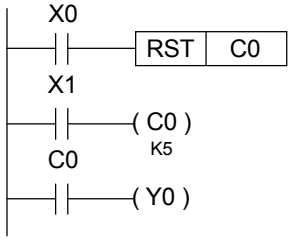
♦ When X0 off, then clear T0 to “0” and contact off,

♦ Timer can be set directly by using constant K or indirectly by using data register (D).

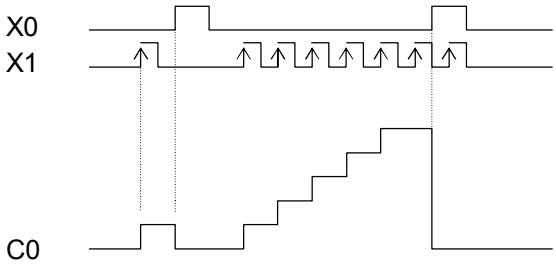


♦ All of the timers (T000~T255) are unlatched.

<< Counter >>



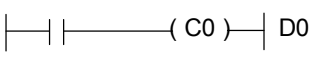

```
LD    X  0
RST   C  0
LD    X  1
OUT   C  0
      K  5
LD    C  0
OUT   Y  0
```



♦ When X0 ON, clear C0 current data to“0” and contact off.

♦ C0 count up the signal of X1 (OFF→ON), after 5 counts then keep current value and the contact ON.

♦ Counters can be set directly using constant K or indirectly by using data register (D).



♦ All of the counters (C0 ~ C255) are latched.

♦ The high speed counters refer to chapter 4.