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Programming Manual

Software

atLogic

V2.2.48

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Preface

Thank you for purchasing Autonics product.

This programming manual contains information about the product and its proper use, and should be kept in a place where it will be easy to access.

atLogic Programming Manual Guide

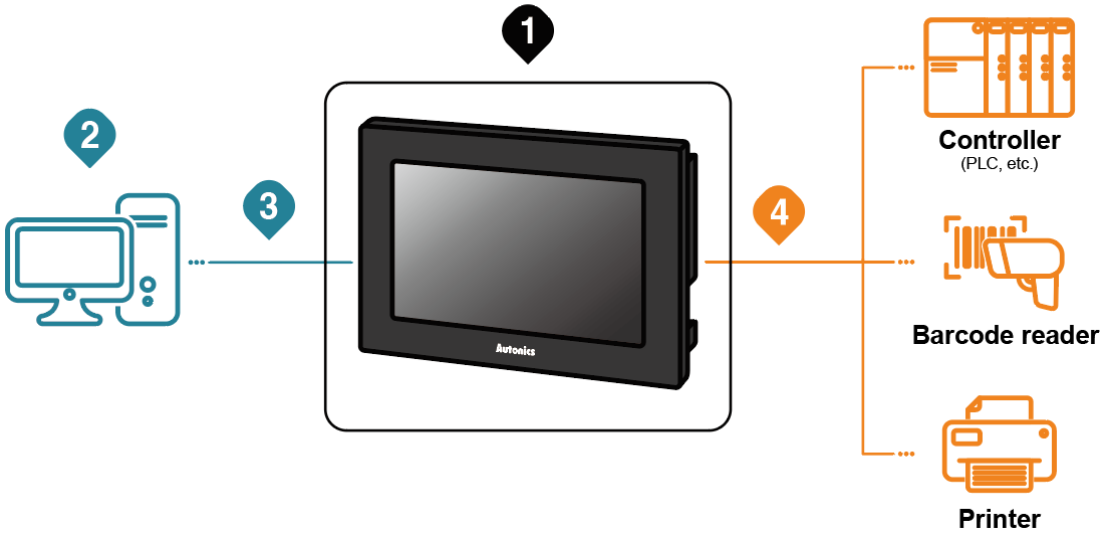
- Please familiarize yourself with the information in this manual before using the product.
- This manual provides detailed information on the product's features. It does not offer any guarantee concerning matters beyond the scope of this manual.
- This manual may not be edited or reproduced in either part or whole without permission.
- This programming manual is not provided as part of the product package.
  Please visit our website (www.autonics.com) to download a copy.
- The manual's content may vary depending on changes to the product's software and other unforeseen developments within Autonics, and is subject to change without prior notice. Upgrade notice is provided through our website.
- We contrived to describe this manual more easily and correctly. However, if there are any corrections or questions, please notify us these on our website.

atLogic Programming Manual Symbols

Symbol	Description
Note	Supplementary information for a particular feature.
Warning	Failure to follow instructions can result in serious injury or death.
Caution	Failure to follow instructions can lead to a minor injury or product damage.
Ex.	An example of the concerned feature's use.
※1	Annotation mark.

※ The specifications and dimensions of this manual are subject to change without any notice.

Reference Manual for Each Configuration



1 Logic panel device specification, installation, maintenance, management, firmware update and system configuration

Hardware Manual	LP-A Series User Manual

2 Project drawing, programming

Software Manual	Drawing	atDesigner User Manual
	Programming	atLogic User Manual, atLogic Programming Manual

3 Project Upload/Download

Hardware Manual	LP-A Series User Manual

4 Connected device setting, communication setting

Software Manual	Drawing	atDesigner User Manual
	Programming	atLogic User Manual, atLogic Programming Manual
Hardware Manual		LP-A Series User Manual

4 Check connectable device, connection cable model name and protocol

Communication Manual	GP/LP Communication Manual

Table of Contents

1 Overview

1.1 Feature of atLogic

atLogic is the exculsive software to write program and debug for LP series. Features and advantages of atLogic are as below.

- Support multi project
  Able to open up to 5 projects at the same time and write or edit programs.
- Convenient program edit
  - Able to edit by cell unit
  - Able to edit with multi window
  - Support several view functions such as viewing device name, variable name, or device name & comment, etc. to edit program easily.
  - Able to edit ladder program and mnemonic program at the same time.
- Several monitor function
  Support several monitor function such as monitoring variable, device, system, or time chart, etc.
- Convenient user interface
  Easy adaptation for atLogic by same basic function of Microsoft window.
- Various message window
  Supports various message window for edit or check program easily.
- Real time switching ladder and mnemonic program
  Switching ladder or mnemonic program in real time and it is available to write or edit at two editors simultaneously.

1.2 Program Structure and Operation

1.2.1 Program Structure

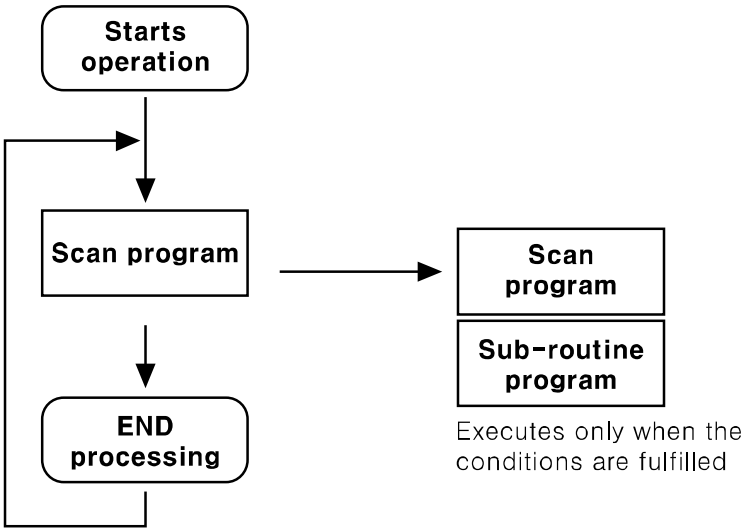
The program consists of all functions required to execute a specific control, and it is saved embedded RAM of CPU module or flash memory.

These functions are generally classified as below.

Function	Description
Scan Program	Processes a sign repeating regularly in every scan.
Time-driven Interrupt Program	Executes the program according to the set time interval when required to process time conditions as follows. · When it is required to faster processing than an average process time for a scan · When it is required a longer time interval than an average processing time for a scan · When it is required to process a program in the designated time interval
Subroutine Program	Executes only when certain condition is fulfilled. (When input condition of CALL instruction is ON)

1.2.2 Program Operation

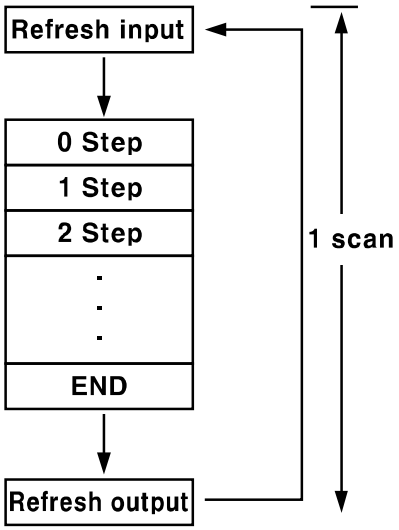
This program processes the operation according to the following procedures.



2 Create Program

2.1 Operation Processing Procedures

2.1.1 Basic Processing Procedures

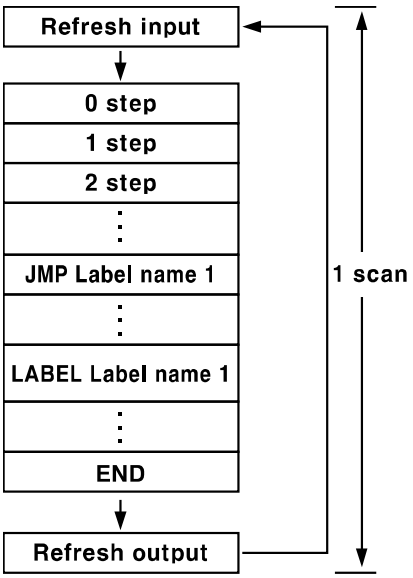


LP program performs input refresh before starting its operation, and begins operation work from the step 0 one by one. Then it executes output refresh after performing the END instruction. Through all these procedures, finally one scan is completed.

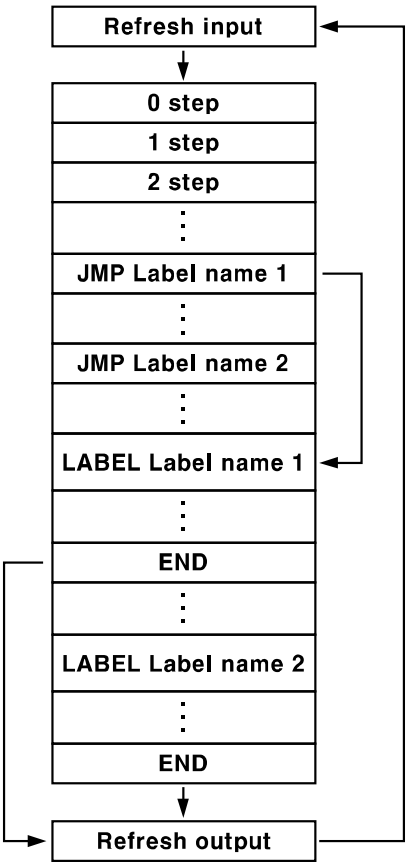
- Refresh input: Before executing the program operation, it reads the data from the input contact or module and saves it in designated device area(X Device).
- Refresh output: After completing the program operation, it outputs the data from designated area(Y Device) to the output contact or output module.
- Refresh input and output: Refresh input and output is executed by force at the time to perform the instruction.

2.1.2 Processing Procedures when Branching

(1) When using JMP to CALL

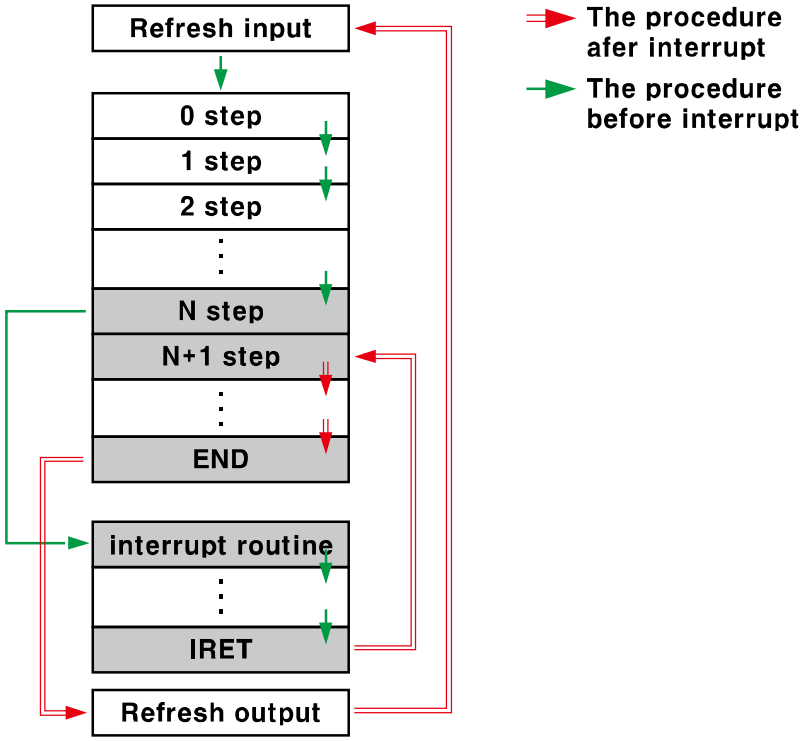


(2) When END instruction is duplicated



If the END instruction executes while the program is being processed, it exits the operation without performing the below program.

(3) Interrupt, Subroutine, User defined functions



As above example for interrupt program, programs containing interrupt, subroutine and user defined functions, firstly jump to the subroutine and perform it completely, and then go to the main program again, finally keep continuing to execute the program from the next step of the stopped step.

2.2 Display the numerical values

(1) Decimal number

Setting values of timer and counter, addresses of word device and S device, for designate the numeral values in instruction operands, for designate the number of operation times in instruction operands
Ex) 1, 3, 10, 19...

(2) Hexadecimal number

Setting values of timer and counter, addresses of bit devices such as X, Y and M, for designate the numeral values in instruction operands, for designate the number of operation times in instruction operands
Ex) h0001, h0003, h000a, h0013...

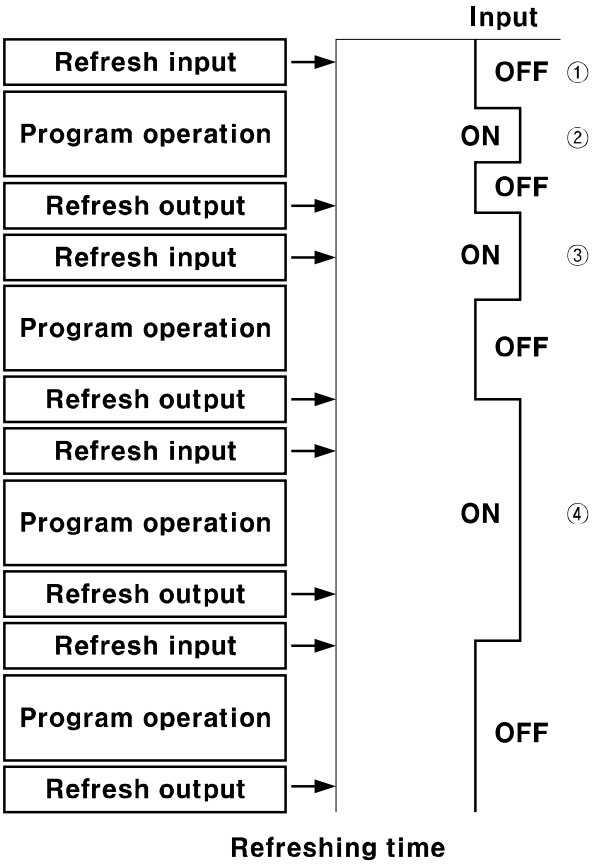
(3) Binary number

Setting values of timer and counter, for designate the numeral values and the number of operation times is displayed with decimal or hexadecimal number, these kinds of numeric values are usually converted into binary numbers in LP.
Ex) 0001, 0011, 1010, 00010011...

(4) BCD

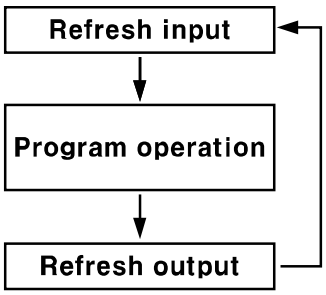
BCD is a numeric system that represents the decimal digits consisted of 0 to 9 as the binary numeric system of 4 bits.
Ex) 0001, 0011, 0001 0000, 0001 1001...

2.3 Input/Output Processing



No.	Description
①	Input is OFF.
②	It is not time to refresh input, input is OFF.
③	It is ON at the time to refresh input, input is ON. But the length of input signal is shorter than scan cycle, it may not recognize as ON depending on the time to refresh input.
④	Because the input retains ON during a cycle of scan regardless of refreshing input time. ※The minimum input retaining time of LP series is 1ms. Even though the input is entered at the time of refreshing input, the input is invalid if it is not able to maintain for 1ms.

2.4 Response Delay



The program is processed as above, therefore in case of input/output the response delay may be occurred due to operation time. If you need to perform input/output processing while program is being operated, it is available with using REF instructions(Refresh input/output).

2.5 Dual Coil

2.5.1 Definition and Diagnosis of Dual Coil

(1) Definition of dual coil

Dual coil indicates that the same output coil is used in duplicate in a program.

(2) Diagnosis of dual coil

1) When the same device is used as operand of OUT instruction more than twice in a program.

- Not dual coil

Step	Instruction	OP1	OP2
0	LOAD	M00000	
1	OUT	M00001	
2	LOAD	M00002	
3	RST	M00001	
4	END		

- Dual coil

Step	Instruction	OP1	OP2
0	LOAD	M00000	
1	OUT	M00001	
2	LOAD	M00002	
3	OUT	M00001	
4	END		

2) When the same device of counter or timer is used as timer/counter instruction more than twice in a program.

- Not dual coil

	Step	Instruction	OP1	OP2
	0	LOAD	M00000	
	1	LOAD	M00001	
	2	CTU	C000	100
	7	LOAD	M00002	
	8	MOV	100	C000
	13	END		

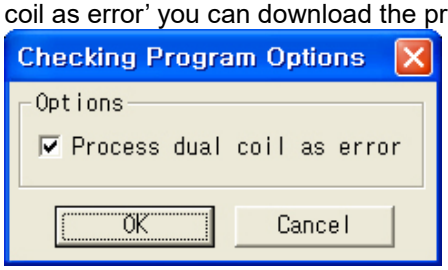
- Dual coil

	Step	Instruction	OP1	OP2
	0	LOAD	M00000	
	1	LOAD	M00001	
	2	CTU	C000	100
	7	LOAD	M00002	
	8	LOAD	M00003	
	9	CTU	C000	10
	14	END		

It is not regard as dual coil when the same device is used in other instructions.

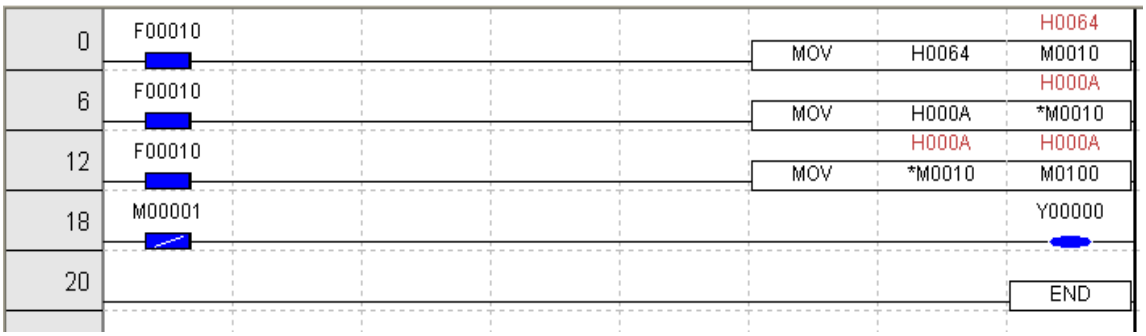
(3) Process dual coil as error

Select [Tool]-[Program Checking]-[Program Checking Options] of atLogic menu, ‘Checking Program Options’ dialog box appears. Check ‘Process dual coil as error’ and it processes dual coil as an error and you cannot download the program. If not checking ‘Process dual coil as error’ you can download the program.



2.6 Pointer Use

Pointer usually refers to the same kind of device having a corresponding device value as an address. Using a pointer indicates that the asterisk mark('*') attaches in front of device in order to use it as a pointer. (ex : *M0010)



Ex.

When as following mnemonic codes exist,

MOV *M0010 D0050

If the value 100 is stored in M0010, the above mnemonic code can be interpreted as follows.

MOV M0100 D0050

If the value 30 is stored in D0050, the above mnemonic code can be interpreted as follows.

MOV 30 D0050

2.7 Operation Error

If it is a numerical operation error caused by the problems, which are occurred during performing the user program, it is displayed in error flag and the system continues to operate. When the operation time is longer than the setting time for scan delay monitoring during performing the operation, the system is not operated any more.

- Time-driven operation error (F35 bit)
  When the scan time is longer than the time-driven setting time, it is SET. When the scan time is shorter than the time-driven setting time, its corresponding bit turns OFF from ON.
- Operation error flag (At present) (F68 bit)
  When an error occurs in numerical operation during performing the user program, its corresponding bit is SET. When changing to all modes excluded STOP mode and no operation error after a scan and program download and power reset, its corresponding bit turns OFF from ON.
- Operation error flag (Retaining) (F69 bit)
  It is used to figure out the history of operation error occurrences. If the first operation error occurs while scanning, the corresponding bit is SET and turns OFF when the power is reset.

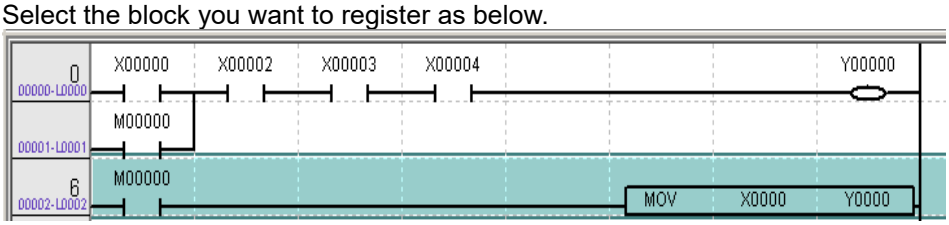
2.8 Usage of User Defined Functions

This function is to reuse a block, possibly to be used in other project, by making it library while you are creating a program. The program made in library is saved as a file so that it is available to use in other projects or PC again.

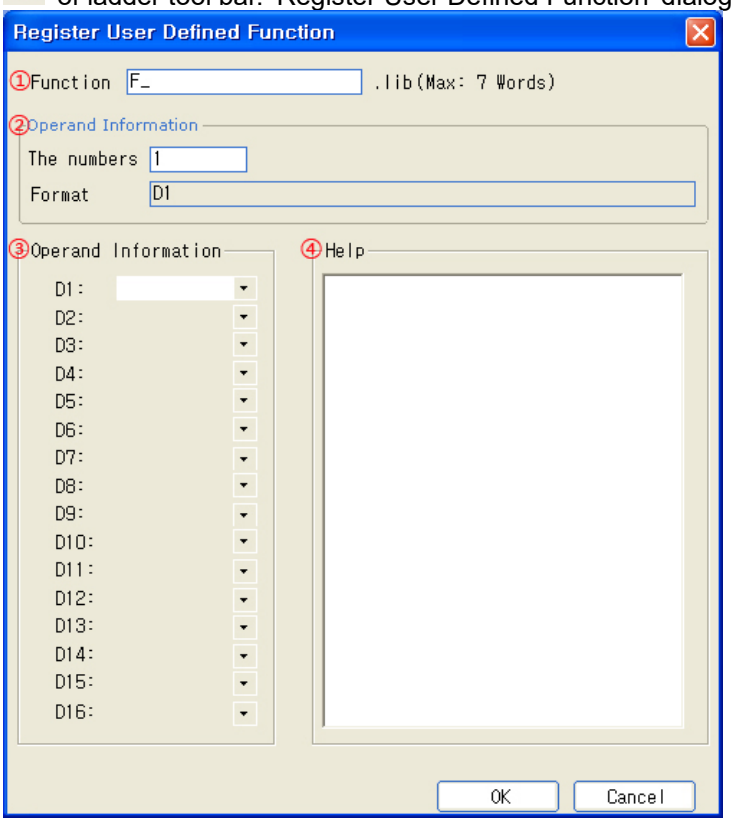
User calls “user defined functions” as forms of FCALL cmd op1 op2... and uses it as forms of FUNC cmd.

(1) How to register user defined functions

1st Select the block you want to register as below.



2nd Select [Tool]-[Register User Defined Function] of menu, press Shift + F10, or click of ladder tool bar. ‘Register User Defined Function’ dialog box appears.

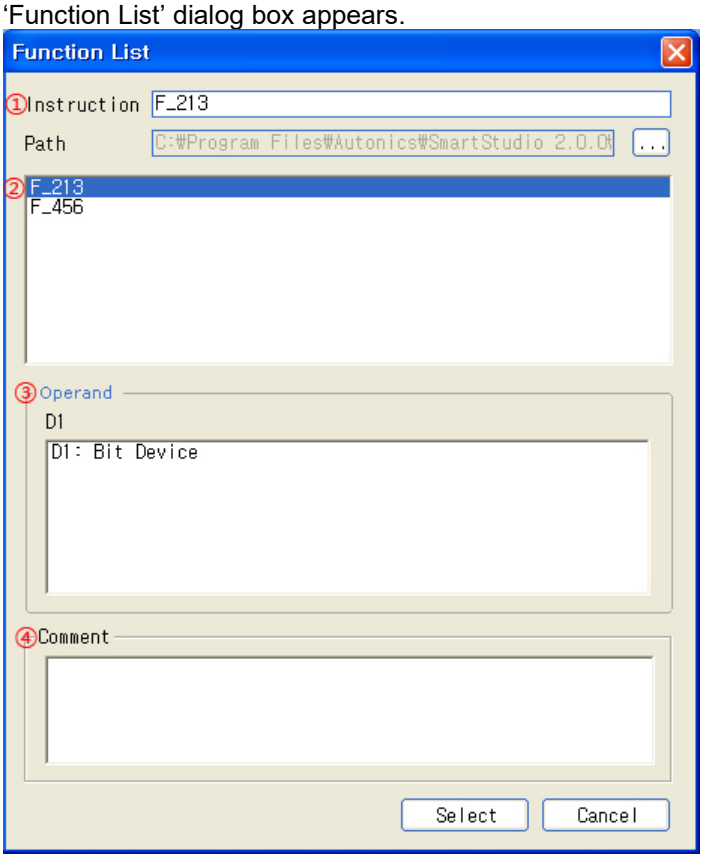


No.	Description
①	Input a user defined function name.
②	Set the number of operands to use.
③	Set the number of each operand’s device as much as the designated number of operands.
④	Describe for the user defined functions you want to register.

3rd If click “OK” button after completing above process, the user defined function is registered. The registered user defined function is stored with the function name.lib file in \LIB folder.

(2) How to use user defined function

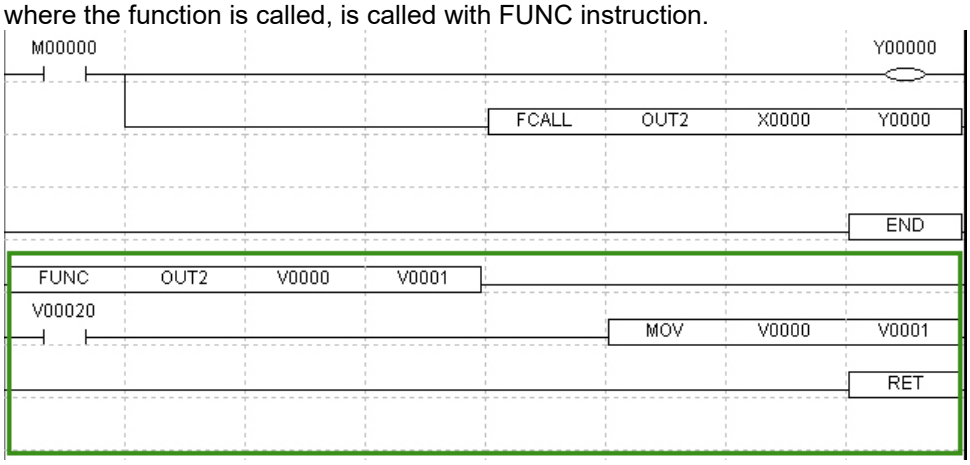
1st Select [Tool]-[User Defined Function], press Ctrl + F11, or click of ladder tool bar. 'Function List' dialog box appears.



No.	Description
①	Displays the selected user defined function name.
②	Displays user defined functions stored in the designated folders.
③	Displays used device in the selected user defined function.
④	Displays registered description for the selected user defined function.

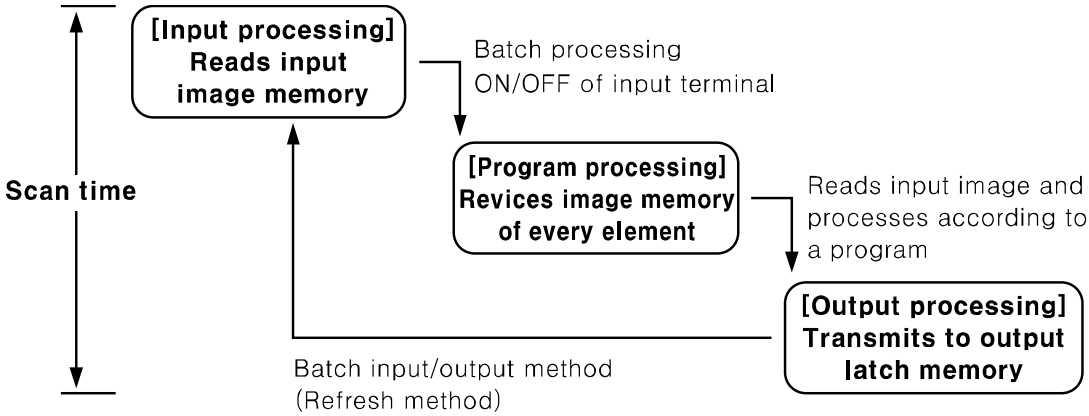
2nd User defined functions are applied when click 'Select'. If user defined function or operand is not entered correctly, and when you click 'Select', 'Function List' dialog box is not closed and user defined function is not applied to ladder program.
Click 'Cancel' and the user defined functions list is closed automatically regardless of whatever you input.

3rd In the place where call the function, call with FCALL instruction, and in the place where the function is called, is called with FUNC instruction.



2.9 Notice

(1) Input/Output processing and response delay



It is processing input/output through executing the above processing repeatedly. Therefore, please be aware that there is a response delay by operation cycle except by the operation time of input filter or output elements in sequence control.

(2) Dual coil

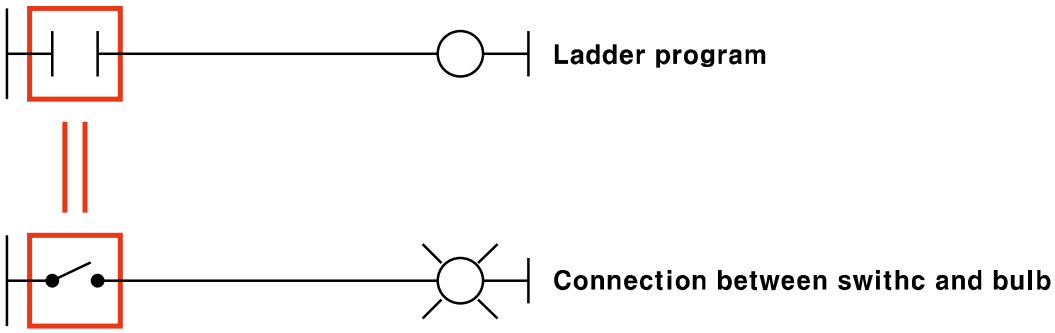
When the output coil is used in multi places, usually the last programmed coil is activated first.
For example,
LOAD X0
OUT Y0 (First Y0)
LOAD Y0
OUT Y1
LOAD X1
OUT Y0 (Second Y0)
In above, **X0** = ON, **X1**= OFF.
For first **Y0** is **X0** = ON, virtual memory is ON and output **Y1** is ON. However, second **Y0** is **X1** = OFF, virtual memory turns OFF.
Therefore, actual external output is **Y0** = ON, **Y1** = ON. If using dual output as explained above, the latter one is activated first. Therefore, pay attention when using dual coil. For whether to using dual coil or not, refer to ‘2.5 Dual Coil’.

3 Device

3.1 X Device

X input device is a device that transfers the signal inputted from an external switch or a button to CPU.

It is able to use A(Normally Open) or B(Normally Closed)Contacts in the program, and also available to with pulse inputs for the contact.

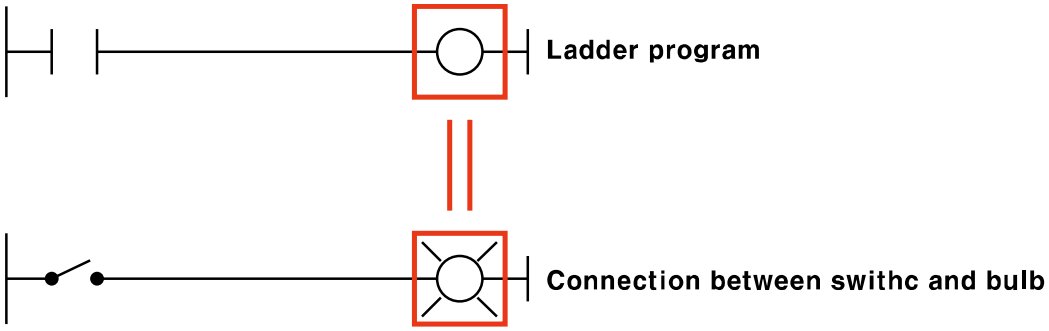


X input device, which is not connected with input terminal, is able to be used as the same function as an inner auxiliary device(M Device).

Because input contact is only retained by external input, be sure that if you want to use it as an external output.

3.2 Y Device

Y output device is a device that transfers the inner processing result to externally connected output devices.



Y device, which is not connected with output terminal, is able to be used as the same function as an inner auxiliary device(M Device).

In case the output device is allocated to an actual external contact and the same output contact is used more than twice to the operand of out instruction in a program, the last used output is output to outside. For further details, refer to ‘2.5 Dual Coil’.

3.3 M Device

It is an inner auxiliary device of LP.

It is only able to perform in the program, not able to directly output to outside of LP. It is available to be used as a memory protection device by setting ‘Device Latch Range Settings’ in [Parameter]-[COMMON].

3.4 S Device

It is a step device.

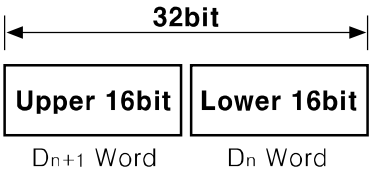
It is a device to control step and used with OUT, SET and RESET instructions. When it is used with SET or RESET instruction, the previous step must be performed first to execute the current step. When it is used with OUT instruction, it executes the last step turned “On” regardless of the order of step.

It is unavailable to be used as a word device, only can be used as a bit device. It is available to be used as a memory protection device by setting ‘Device Latch Range Settings’ in [Parameter]-[COMMON]. The clear condition, SET XXX.00, is able to execute anytime regardless of the processing steps.

3.5 D Device

It is a data device of LP.

It is only able to be used as a word bit, not able to be used as a bit device. When it is used as the 32 bit instruction, D word is operated as lower 16 bit and D+1 word is operated as upper 16 bit as following picture.



It is available to be used as a memory protection device by setting ‘Device Latch Range Settings’ in [Parameter]-[COMMON].

3.6 T Device

It is a device used with instructions related to Timer.

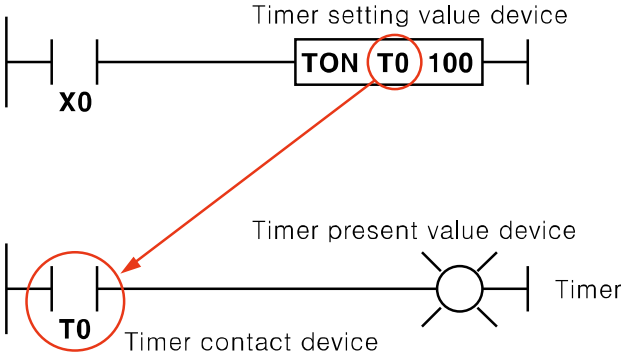
It consists of three parts; timer contact, timer setting value, timer present value.

Timer contact performs ON/OFF functions according to the result of timer instruction and also available to be used as timer and input instructions.

Timer setting value is a place where a boundary value for the result of timer is saved, and is available to be used with timer and application instructions.

Timer present value is a place where a present value is stored while timer is operating, and user can not set it up directly.

When as following picture, if inputting 100 to “T0” setting value device, “T0” timer contact device turns ON when “T0” present value device becomes 100.



Timer instructions, related to LP Series are TON, TOFF, TMON, TRTG and TMR, and even the same timer device is operated differently depending on each instruction.

The basic cycle of timer device is 10ms, but it is available to be operated in 10ms or 100ms by setting up the device range in parameters.

It is available to be used as a memory protection device by setting ‘Device Latch Range Settings’ in [Parameter]-[COMMON].

For furter details of timer device, refer to ‘5.3.2 Timer ’.

3.7 C Device

It is a device used with the instructions related to Counter.

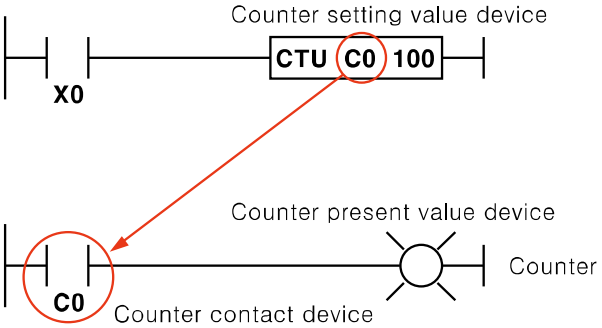
It consists of three parts; counter contact, counter setting value, and counter present value.

Counter contact performs ON/OFF functions according to the result of counter instructions, and also available to be used as counter and input instructions.

Counter setting value is a place where a boundary value for the result of count is stored, and is available to be used with counter and application instructions.

Counter present value is a place where a present value is stored while counter is operating, and user can not set it up directly.

When as following picture, if inputting 100 to “C0” setting value device, “C0” contact device turns ON when “C0” present value device becomes 100.

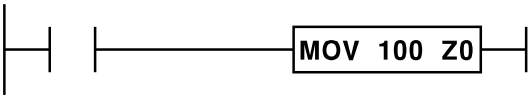


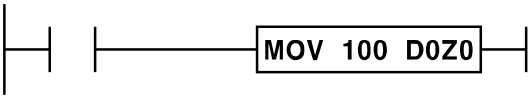
Counter instructions, related to LP Series are CTD, CTU, CTUD and CTR, and even the same counter device is operated differently depending on each instruction.

3.8 Z Device

It is a device that is able to designate indirectly a device with using other word device.

When as following picture, if “D0” device value is 10, the value 10 stored in “D0” is transferred to D(0+Z0) device, namely D100 device.





In other words, MOV D0 D0Z0 is interpreted as below.

- MOV D0 D (value of 0 + Z0)
- MOV D0 D (0+100)
- MOV D0 D100

For another example, if MOV D0 D40Z0 it could be interpreted as below.

- MOV D0 D (value of 40 + Z0)
- MOV D0 D (40+100)
- MOV D0 D 140

It is possible to designate a device address indirectly according to the change of Z device.

3.9 F Device

It is a device that sets up the status and operation of LP.

It designates a device that is able to be used separately in input and output instructions, and not able to be used as a memory protection area.

For further details of F device, refer to ‘4 Special ’.

3.10 V Device

It is the used area for matched automatically device area by system when using user defined function. User can not use this device area.

3.11 L Device

It is a link device. It is a device sharing link data each other when communicating with other module.

It is available to be used as a memory protection device by setting ‘Device Latch Range Settings’ in [Parameter]-[COMMON].

3.12 R Device

It is a device used when using the recipe function of graphic panel in LP series.

It is available to be used as a memory protection device by setting ‘Device Latch Range Settings’ in [Parameter]-[COMMON].

3.13 Device List

3.13.1 LP-S044/LP-S070

	Description	Bit range	Word range	GP device(UB)	GP device (UW)
X	Input device	X0 to X255F	X0 to X255	UB70000 to UB7255F	UW7000 to UW7255
Y	Output device	Y0 to Y255F	Y0 to Y255	UB80000 to UB8255F	UW8000 to UW8255
M	Auxiliary device	M0 to M9999F	M0 to M9999	UB200000 to UB29999F	UW20000 to UW29999
S	Step device	S0.0 to S255.99			
D	Data device	D0 to D9999F	D0 to D9999	UB400000 to UB49999F	UW40000 to UW49999
T	Timer contact	T0 to T255		UB100000 to UB10015F	UW10000 to UW10015
T	Timer present value		T0 to T255	UB110000 to UB11255F	UW11000 to UW11255
T	Timer set value		T0 to T255	UB130000 to UB13255F	UW13000 to UW13255
C	Counter contact	C0 to C255		UB150000 to UB15015F	UW15000 to UW15015
C	Counter present value		C0 to C255	UB160000 to UB16255F	UW16000 to UW16255
C	Counter set value		C0 to C255	UB180000 to UB18255F	UW18000 to UW18255
Z	Index device	Z0 to Z255F	Z0 to Z255	UB067000 to UB06955F	UW06700 to UW06955
F	Special device	F0 to F255F	F0 to F255	UB064000 to UB066550F	UW06400 to UW06655
V	Virtual device	V0 to V255F	V0 to V255	UB061000 to UB06355F	UW06100 to UW06355
L	Link device	L0 to L999F	L0 to L999		UW38000 to UW38999
R	File device	R0 to R3999F	R0 to R3999	UB020000 to UB05999F	UW02000 to UW05999
UW /UB	Read area			UB000000 to UB00014F	UW00000 to UW00014
UW /UB	Write area			UB000015 to UB00029F	UW00015 to UW00029
UW /UB	User area			UB000030 to UB01999F	UW00030 to UW01999

3.13.2 LP-A070/LP-A104

	Description	Bit range	Word range	GP device (UB)	GP device (UW)
X	Input device	X0 to X255F	X0 to X255	UB70000 to UB7255F	UW7000 to UW7255
Y	Output device	Y0 to Y255F	Y0 to Y255	UB80000 to UB8255F	UW8000 to UW8255
M	Auxiliary device	M0 to M9999F	M0 to M9999	UB200000 to UB29999F	UW20000 to UW29999
S	Step device	S0.0 to S255.99			
D	Data device	D0 to D9999F	D0 to D9999	UB400000 to UB49999F	UW40000 to UW49999
T	Timer contact	T0 to T255		UB100000 to UB10015F	UW10000 to UW10015
T	Timer present value		T0 to T255	UB110000 to UB11255F	UW11000 to UW11255
T	Timer set value		T0 to T255	UB130000 to UB13255F	UW13000 to UW13255
C	Counter contact	C0 to C255		UB150000 to UB15015F	UW15000 to UW15015
C	Counter present value		C0 to C255	UB160000 to UB16255F	UW16000 to UW16255
C	Counter set value		C0 to C255	UB180000 to UB18255F	UW18000 to UW18255
Z	Index device	Z0 to Z255F	Z0 to Z255	UB067000 to UB06955F	UW06700 to UW06955
F	Special device	F0 to F255F	F0 to F255	UB064000 to UB066550F	UW06400 to UW06655
V	Virtual device	V0 to V255F	V0 to V255	UB061000 to UB06355F	UW06100 to UW06355
L	Link device	L0 to L999F	L0 to L999		UW38000 to UW38999
R	File device	R0 to R3999F	R0 to R3999	UB020000 to UB05999F	UW02000 to UW05999
UW /UB	Read area			UB000000 to UB00014F	UW00000 to UW00014
UW /UB	Write area			UB000015 to UB00029F	UW00015 to UW00029
UW /UB	User area			UB000030 to UB01999F	UW00030 to UW01999

4 Special Device

4.1 LP-S044/LP-S070

4.1.1 Bit Special Device List

4.1.1.1 System Mode

Name	Function	Initial value	R/W	GP device	LP device
Run mode	· Turns ON, when system mode is run · Turns OFF, when system mode changes from run to other mode	OFF	R	UB64000	F00000
Stop mode	· Turns ON, when system mode is stop · Turns OFF, when system mode changes from stop to other mode	OFF	R	UB64001	F00001
Pause mode	· Turns ON, when system mode is pause · Turns OFF, when system mode changes from pause to other mode	OFF	R	UB64002	F00002
Debug mode	· Turns ON, when system mode is debug · Turns OFF, when system mode changes from debug to other mode	OFF	R	UB64003	F00003

4.1.1.2 System Signal

Name	Function	Initial value	R/W	GP device	LP device
Always ON	· Always ON, when PLC mode is run, debug mode · Always OFF, when PLC mode is not run, debug mode	OFF	R	UB64010	F00010
Always OFF	· Always OFF, when PLC mode is run, debug mode · Always ON, when PLC mode is not run, debug mode	OFF	R	UB64011	F00011
1 scan ON	· Turns ON only first scan, when PLC mode is run · Turns OFF after second scan, when PLC mode is run	OFF	R	UB64012	F00012
1 scan OFF	· Turns OFF only first one scan, when PLC mode is run · Turns ON after second scan, when PLC mode is run,	OFF	R	UB64013	F00013
Scan pulse	Reverse every scan, when PLC is in run mode	OFF	R	UB64014	F00014
Time synchronous pulse	One synchronous pulse during the RTC time.	OFF	R	UB64015	F00015

4.1.1.3 System Status

Name	Function	Initial value	R/W	GP device	LP device
While operating forced input	· Turns ON, when registering forced input device · Turns OFF, when releasing forced input device	OFF	R	UB64020	F00020
While operating forced output	· Turns ON, when registering forced output device · Turns OFF, when releasing forced output device	OFF	R	UB64021	F00021
While running time-driven	· Turns ON, when running time-driven · Turns OFF, when stopping time-driven	OFF	R	UB64024	F00024
Back-up battery errors (At present)	· Turns ON, when the backup battery voltage is below the standard level · Turns OFF, when the backup battery voltage is over the standard level	OFF	R	UB6402C	F0002C
Back-up battery errors (Retaining)	· Retains ON, when the backup battery voltage is below the standard level · Turns OFF, when changing program or mode	OFF	R	UB6402D	F0002D

4.1.1.4 System Error

Name	Function	Initial value	R/W	GP device	LP device
Error occurrence	· Turns ON, when any of errors occurs among the all defined errors · Turns OFF, when clearing error	OFF	R	UB64030	F00030
Errors related to PLC program	· Turns ON, when errors related to program occur · Turns OFF, when clearing program error · Turns OFF, when it stops operation · Turns OFF, when changing program · Turns OFF, when changing mode	OFF	R	UB64034	F00034
Time-driven operation error	· Turns ON, when scan time is longer than time-driven setting time · Turns OFF, when scan time is shorter than time-driven setting time	OFF	R	UB64035	F00035
Time setting error flag	· Turns ON, when the time data is not properly written · Turns OFF, when the time data is properly written by using RTC	OFF	R	UB64036	F00036
Communication errors (will be supported)	· Turns ON, when the communication error occurs · Turns OFF, when the communication is properly completed	OFF	R	UB64038	F00038
I/O setting value errors	· Internal device range includes actual unavailable range, this bit turns ON when checking 'Using Internal Device' of 'I/O Contact Setting' dialog box in	OFF	R	UB64039	F00039

Name	Function	Initial value	R/W	GP device	LP device
	'EXTENSION' tab from atLogic's Parameter. · When user does not turn OFF, this bit maintains.				

4.1.1.5 Module Status

Name	Function	Initial value	R/W	GP device	LP device
Using inner device of SLOT 0	· Turns ON, when SLOT0 parameter uses more than one inner device · Turns OFF, when SLOT0 parameter does not use inner device	OFF	R	UB64040	F00040
Using inner device of SLOT 1	· Turns ON, when SLOT1 parameter uses more than one inner device · Turns OFF, when SLOT1 parameter does not use inner device	OFF	R	UB64041	F00041
Using inner device of SLOT 2	· Turns ON, when SLOT2 parameter uses more than one inner device · Turns OFF, when SLOT2 parameter does not use inner device	OFF	R	UB64042	F00042
Using inner device of SLOT 3	· Turns ON, when SLOT3 parameter uses more than one inner device · Turns OFF, when SLOT3 parameter does not use inner device	OFF	R	UB64043	F00043
Using inner device of SLOT 4	· Turns ON, when SLOT4 parameter uses more than one inner device · Turns OFF, when SLOT4 parameter does not use inner device	OFF	R	UB64044	F00044
Using inner device of SLOT 5	· Turns ON, when SLOT5 parameter uses more than one inner device · Turns OFF, when SLOT5 parameter does not use inner device	OFF	R	UB64045	F00045
Using inner device of SLOT 6	· Turns ON, when SLOT6 parameter uses more than one inner device · Turns OFF, when SLOT6 parameter does not use inner device	OFF	R	UB64046	F00046
Using inner device of SLOT 7	· Turns ON, when SLOT7 parameter uses more than one inner device · Turns OFF, when SLOT7 parameter does not use inner device	OFF	R	UB64047	F00047
Using inner device of SLOT 8	· Turns ON, when SLOT8 parameter uses more than one inner device · Turns OFF, when SLOT8 parameter does not use inner device	OFF	R	UB64048	F00048
Using inner device of SLOT 9	· Turns ON, when SLOT9 parameter uses more than one inner device · Turns OFF, when SLOT9 parameter does not use inner device	OFF	R	UB64049	F00049
Using inner device of	· Turns ON, when SLOT10 parameter uses more than one inner device	OFF	R	UB6404A	F0004A

Name	Function	Initial value	R/W	GP device	LP device
SLOT 10	· Turns OFF, when SLOT10 parameter does not use inner device				
Using inner device of SLOT 11	· Turns ON, when SLOT11 parameter uses more than one inner device · Turns OFF, when SLOT11 parameter does not use inner device	OFF	R	UB6404B	F0004B
Using inner device of SLOT 12	· Turns ON, when SLOT12 parameter uses more than one inner device · Turns OFF, when SLOT12 parameter does not use inner device	OFF	R	UB6404C	F0004C
Using inner device of SLOT 13	· Turns ON, when SLOT13 parameter uses more than one inner device · Turns OFF, when SLOT13 parameter does not use inner device	OFF	R	UB6404D	F0004D
Using inner device of SLOT 14	· Turns ON, when SLOT14 parameter uses more than one inner device · Turns OFF, when SLOT14 parameter does not use inner device	OFF	R	UB6404E	F0004E
Using inner device of SLOT 15	· Turns ON, when SLOT15 parameter uses more than one inner device · Turns OFF, when SLOT15 parameter does not use inner device	OFF	R	UB6404F	F0004F

4.1.1.6 System Clock

Name	Function	Initial value	R/W	GP device	LP device
10ms clock	10ms cycle of system clock occurs		R	UB64054	F00054
20ms clock	20ms cycle of system clock occurs		R	UB64055	F00055
50ms clock	50ms cycle of system clock occurs		R	UB64056	F00056
100ms clock	100ms cycle of system clock occurs		R	UB64057	F00057
200ms clock	200ms cycle of system clock occurs		R	UB64058	F00058
500ms clock	500ms cycle of system clock occurs		R	UB64059	F00059
1s clock	1s cycle of system clock occurs		R	UB6405A	F0005A
2s clock	2s cycle of system clock occurs		R	UB6405B	F0005B
5s clock	5s cycle of system clock occurs		R	UB6405C	F0005C
10s clock	10s cycle of system clock occurs		R	UB6405D	F0005D
60s clock	60s cycle of system clock occurs		R	UB6405E	F0005E

4.1.1.7 Operation

Name	Function	Initial value	R/W	GP device	LP device
Zero flag	· Turns ON, when operation result is 0 · Turns OFF, when operation result is not 0	OFF	R	UB64060	F00060
Carry flag	· Turns ON, when carry occurs as operation result · Turns OFF, when carry does not occur as operation result	OFF	R	UB64061	F00061
Borrow flag	· Turns ON, when borrow occurs as operation result · Turns OFF, when borrow does not occur as operation result · Turns OFF, when changing program or mode	OFF	R	UB64062	F00062
Operation error flag (At present)	· Turns ON, when operation error occurs during scan operation · Turns OFF, when changing the other mode except stop mode · Turns OFF, when there is no operation error after one scan operation · Turns OFF, when downloading program or re-setting power	OFF	R	UB64068	F00068
Operation error flag (Retaining)	· Retains ON, when operation error occurs during scan operation · Turns OFF, when resetting power	OFF	R	UB64069	F00069

4.1.1.8 System Setting

Name	Function	Initial value	R/W	GP device	LP device
Settings for full output restriction	· When it turns ON, it is restricted port output and all ports becomes OFF.	OFF	W	UB64070	F00070
Start-up time-driven activity	· When it turns ON, it starts time-driven activity depending on a word setting value of time-driven run-time. · When it turns OFF, it operates minimum speed of scan as possible as it can.	OFF	W	UB64074	F00074
Operating conditions for extended module function	· After checking 'Operating only in run mode' in 'COMMON' tab from atLogic's Parameter and downloading these, it turns RESET. · After checking 'Operating in stop mode' in 'COMMON' tab from atLogic's Parameter and downloading these, it turns SET. · In case of uploading from LP, it does not read data from parameter file, it is uploaded with the set contents from the special register.	OFF	W	UB64078	F00078
Default filter setting flag	· When it is set, operate all undefined filters of module in parameters as default values. · When it is reset, all undefined filters of module are operated without a filter.	OFF	W	UB64079	F00079

4.1.1.9 Time Setting

Name	Function	Initial value	R/W	GP device	LP device
Time setting	· Set it as a special register after it is ON. At this time, the time is not changed. · When it turns OFF after completing settings, it is writing in RTC and the time set in the special register keeps going on.	OFF	W	UB64080	F00080
+/- 30 sec correction of time setting	· When it changes from OFF to ON within the range of 0 to 29sec, the time (second) is shifted to 00. · When it changes from OFF to ON within the range of 30 to 59sec, the time(second) is shifted to 00 and increased one minute	OFF	W	UB64081	F00081

4.1.1.10 Module Setting

Name	Function	Initial value	R/W	GP device	LP device
Settings for using inner device of SLOT0 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB64090	F00090
Settings for using inner device of SLOT1 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB64091	F00091
Settings for using inner device of SLOT2 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB64092	F00092
Settings for using inner device of SLOT3 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB64093	F00093
Settings for using inner device of SLOT4 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB64094	F00094
Settings for using inner device of SLOT5 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB64095	F00095
Settings for using inner device of SLOT6 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB64096	F00096
Settings for using inner device of SLOT7 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB64097	F00097
Settings for using inner device of SLOT8 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB64098	F00098
Settings for using inner device of SLOT9 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB64099	F00099
Settings for using inner device of SLOT10 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB6409A	F0009A
Settings for using inner device of SLOT11 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB6409B	F0009B
Settings for using inner device of SLOT12 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB6409C	F0009C
Settings for using inner device of SLOT13 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB6409D	F0009D
Settings for using inner device of SLOT14 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB6409E	F0009E
Settings for using inner device of	When bit turns ON, inner device value is written to	OFF	W	UB6409F	F0009F

Name	Function	Initial value	R/W	GP device	LP device
SLOT15 module function	module register				

4.1.1.11 Motion Control

(1) CH1 special device

Name	Function	R/W	GP device	LP device
Using Motion CH1	· 1: Use · 0: No use	R	UB64100	F100
Moving of Motion CH1 (Accel, decel, constant)	· 1: Moving · 0: Not moving	R	UB64101	F101
Using acceleration of Motion CH1	· 1: Accelerating · 0: Not accelerating	R	UB64102	F102
Driving with set speed of Motion CH1	· 1: Operating with set speed · 0: Not operating with set speed	R	UB64103	F103
Decelerating of Motion CH1	· 1: Decelerating · 0: Not decelerating	R	UB64104	F104
Dwelling of Motion CH1	· 1: Dwelling · 0: Not dwelling	R	UB64105	F105
Finish driving of CH1	· 1: Finishing drive · 0: Not finishing drive	R	UB64106	F106
Detecting S/W lower limit of Motion CH1	· 1: Detecting S/W lower limit · 0: Not detecting S/W lower limit	R	UB64107	F107
Detecting S/W upper limit of Motion CH1	· 1: Detecting S/W upper limit · 0: Not detecting S/W upper limit	R	UB64108	F108
Detecting H/W lower limit of Motion CH1	· 1: Detecting H/W upper limit · 0: Not detecting H/W upper limit	R	UB64109	F109
Detecting H/W upper limit of Motion CH1	· 1: Detecting H/W lower limit · 0: Not detecting H/W lower limit	R	UB6410A	F10A

(2) CH2 special device

Name	Function	R/W	GP device	LP device
Using Motion CH2	· 1: Use · 0: No use	R	UB64120	F120
Moving of Motion CH2 (Accel, decel, constant)	· 1: Moving · 0: Not moving	R	UB64121	F121
Using acceleration of Motion CH2	· 1: Accelerating · 0: Not accelerating	R	UB64122	F122
Driving with set speed of Motion CH2	· 1: Operating with set speed · 0: Not operating with set speed	R	UB64123	F123
Decelerating of Motion CH2	· 1: Decelerating · 0: Not decelerating	R	UB64124	F124
Dwelling of Motion CH2	· 1: Dwelling · 0: Not dwelling	R	UB64125	F125

Name	Function	R/W	GP device	LP device
Finish driving of CH2	· 1: Finishing drive · 0: Not finishing drive	R	UB64126	F126
Detecting S/W lower limit of Motion CH2	· 1: Detecting S/W lower limit · 0: Not detecting S/W lower limit	R	UB64127	F127
Detecting S/W upper limit of Motion CH2	· 1: Detecting S/W upper limit · 0: Not detecting S/W upper limit	R	UB64128	F128
Detecting H/W lower limit of Motion CH2	· 1: Detecting H/W upper limit · 0: Not detecting H/W upper limit	R	UB64129	F129
Detecting H/W upper limit of Motion CH2	· 1: Detecting H/W lower limit · 0: Not detecting H/W lower limit	R	UB6412A	F12A

(3) Jog special device

Name	Function	R/W	GP device	LP device
Jog starting forward of Motion CH1	· ON rising: Moving forward jog in accelerating and constant speed · OFF falling: Moving forward jog in decelerating and stop	R/W	UB64501	F501
Jog starting backward of Motion CH1	· ON rising: Moving backward jog in accelerating and constant speed · OFF falling: Moving backward jog in decelerating and stop	R/W	UB64502	F502
Jog starting forward of Motion CH2	· ON rising: Moving forward jog in accelerating and constant speed · OFF falling: Moving forward jog in decelerating and stop	R/W	UB64503	F503
Jog starting backward of Motion CH2	· ON rising: Moving backward jog in accelerating and constant speed · OFF falling: Moving backward jog in decelerating and stop	R/W	UB64504	F504

4.1.2 Word Special Device

4.1.2.1 PLC Model

Name	Function	R/W	GP Device	LP device
PLC series and model code	▪ High 2 digits = Series code ▪ Low 2 digits = Model code	R	UW6500	F0100
System version	Displays the version of firmware by the range of 5 word	R	UW6501 to UW6505	F0101 to F0105
Released date of the version(Year)	Released year of the version	R	UW6506	F0106
Released date of the version(Month, date)	Released month and date of the version. Displays 4 digits, high 2 digits denotes month and low 2 digits denotes date.	R	UW6507	F0107

4.1.2.2 Scan Time

Name	Function	R/W	GP device	LP device
Present scan time	Executing time for present scan (Revised in every scan)	R	UW6510	F0110
Min. scan time	Min. scan time during the operation (It clears when changing PLC mode or program)	R	UW6511	F0111
Max. scan time	Max. scan time during the operation (It clears when changing PLC mode or program)	R	UW6512	F0112
Average scan time	Displays average scan time	R	UW6513	F0113

4.1.2.3 Operation

Name	Function	R/W	GP device	LP device
Step operation generated error (At present)	Present step which has operation error (It clears when changing PLC mode or program)	R	UW6520	F0120
Step operation generated error (Retaining)	First operation error step, (It clears when changing PLC mode or program)	R	UW6521	F0121

4.1.2.4 Step

Name	Function	R/W	GP Device	LP device
Error step	Stopped step by error at present	R	UW6530	F0130
Break step	Braked step during debug mode operation (It clears when changing PLC mode or program)	R	UW6531	F0131

4.1.2.5 Diagnosis

Name	Function	R/W	GP device	LP device
Self-diagnosis error code	Displays self-diagnosis error code	R	UW6540	F0140

UW6540 (F0140)	Type	Cause of error
0X0010	Watchdog error	Scan time excesses watchdog timer setting value
0X0020	Memory error	When a certain area of memory is the un-approached state.
0x0021	Battery error	When battery value is below the standard level
0x0022	RTC setting error	Disable to set RTC and RTC operation error
0X0030	Program instruction error	When the program contains instructions that are not able to read and inappropriate forms.
0X0031	Program sequence error	When there is not the instructions required to process the program, such as user defined functions, label name, END, RET and IRET, etc.
0X0040	Parameter setting error	When there are some problems in settings for common and expansion parameters.
0X0041	Time-driven error	When it operates longer than the given time-driven run-time.
0X0050	Extended module setting error	In case, the hardware constructions are different from previous parameter settings when applying power again and changing the mode.
0X0051	Extended module attaching and removing error	When the extended module is attached or removed in run mode.
0x0060	Communication fail error	When it is received NAK and data format not able to read.
0x0061	Communication format error	When there are some problems occurred in formats (excess of limited range etc.) and CHECK SUM while download and upload.

4.1.2.6 Time

Name	Function	R/W	GP device	LP device
Time setting (Year)	Save the setting value of year as BCD Data	W	UW6550	F0150
Time setting (Month)	Save the setting value of month as BCD Data	W	UW6551	F0151
Time setting (Date)	Save the setting value of date as BCD Data	W	UW6552	F0152
Time setting (Hour)	Save the setting value of hour as BCD Data	W	UW6553	F0153
Time setting (Min)	Save the setting value of minute as BCD Data	W	UW6554	F0154
Time setting (Sec)	Save the setting value of second as BCD Data	W	UW6555	F0155
Time setting (Day)	Save the setting value of the day of week as BCD Data 0: Sunday, 1: Monday, 2: Tuesday, 3: Wednesday, 4: Thursday, 5: Friday, 6: Saturday	W	UW6556	F0156

4.1.2.7 Input Filter Setting

Name	Function	R/W	GP device	LP device
Input filter settings	Designates default input filter value by ms unit When this is 0, it does not set filter value. It applies to all of non-filter setting modules.	R/W	UW6560	F0160

4.1.2.8 Time-driven Run-time Settings

Name	Function	R/W	GP device	LP device
Time-driven run-time settings	When time-driven setting flag is ON, time-driven running operates with the setting time of this register.	R/W	UW6561	F0161
Watchdog timer settings	0 to 65535 (Unit: ms)	R/W	UW6562	F0162

4.1.2.9 Time-driven Interrupt

Name	Function	R/W	GP device	LP device
Time-driven interrupt cycle settings 1	Time-driven interrupt cycle settings 1	R/W	UW6570	F0170
Time-driven interrupt cycle settings 2	Time-driven interrupt cycle settings 2	R/W	UW6571	F0171
Time-driven interrupt cycle settings 3	Time-driven interrupt cycle settings 3	R/W	UW6572	F0172
Time-driven interrupt cycle settings 4	Time-driven interrupt cycle settings 4	R/W	UW6573	F0173
Time-driven interrupt cycle settings 5	Time-driven interrupt cycle settings 5	R/W	UW6574	F0174
Time-driven interrupt cycle settings 6	Time-driven interrupt cycle settings 6	R/W	UW6575	F0175
Time-driven interrupt cycle settings 7	Time-driven interrupt cycle settings 7	R/W	UW6576	F0176
Time-driven interrupt cycle settings 8	Time-driven interrupt cycle settings 8	R/W	UW6577	F0177

4.1.2.10 Motion Control

(1) CH1 Special device

Name	Function	R/W	GP device	LP device
Current position	Current position of Motion CH1	R	UW6460	F60
Current speed	Current speed of Motion CH1	R	UW6462	F62
Action No.	Current action No. of Motion CH1	R	UW6464	F64
Pattern No.	Current pattern No. of Motion CH1	R	UW6465	F65
Home position	Current home position of Motion CH1	R	UW6466	F66
Set speed	Setting speed of Motion CH1	R	UW6468	F68
Error check	Error code check of Motion CH1	R	UW6420	F20

(2) CH2 Special device

Name	Function	R/W	GP device	LP device
Current position	Current position of Motion CH2	R	UW6470	F70
Current speed	Current speed of Motion CH2	R	UW6472	F72
Action No.	Current action No. of Motion CH2	R	UW6474	F74
Pattern No.	Current pattern No. of Motion CH2	R	UW6475	F75
Home position	Current home position of Motion CH2	R	UW6476	F76
Set speed	Setting speed of Motion CH2	R	UW6478	F78
Error check	Error code check of Motion CH2	R	UW6421	F21

4.2 LP-A070/LP-A104

4.2.1 Bit Special Device

4.2.1.1 System Mode

Name	Function	Initial value	R/W	GP device	LP device
Run mode	· Turns ON, when system mode is run · Turns OFF, when system mode changes from run to other mode	OFF	R	UB744000	F00000
Stop mode	· Turns ON, when system mode is stop · Turns OFF, when system mode changes from stop to other mode	OFF	R	UB744001	F00001
Pause mode	· Turns ON, when system mode is pause · Turns OFF, when system mode changes from pause to other mode	OFF	R	UB744002	F00002
Debug mode	· Turns ON, when system mode is debug · Turns OFF, when system mode changes from debug to other mode	OFF	R	UB744003	F00003

4.2.1.2 System Signal

Name	Function	Initial value	R/W	GP device	LP device
Always ON	· Always ON, when PLC mode is run, debug mode · Always OFF, when PLC mode is not run, debug mode	OFF	R	UB744010	F00010
Always OFF	· Always OFF, when PLC mode is run, debug mode · Always ON, when PLC mode is not run, debug mode	OFF	R	UB744011	F00011
1 scan ON	· Turns ON only first scan, when PLC mode is run · Turns OFF after second scan, when PLC mode is run	OFF	R	UB744012	F00012
1 scan OFF	· Turns OFF only first one scan, when PLC mode is run · Turns ON after second scan, when PLC mode is run,	OFF	R	UB744013	F00013
Scan pulse	Reverse every scan, when PLC is in run mode	OFF	R	UB744014	F00014
Time synchronous pulse	One synchronous pulse during the RTC time.	OFF	R	UB744015	F00015

4.2.1.3 System Status

Name	Function	Initial value	R/W	GP device	LP device
While operating forced input	▪ Turns ON, when registering forced input device ▪ Turns OFF, when releasing forced input device	OFF	R	UB744020	F00020
While operating forced output	▪ Turns ON, when registering forced output device ▪ Turns OFF, when releasing forced output device	OFF	R	UB744021	F00021
While running time-driven	▪ Turns ON, when running time-driven ▪ Turns OFF, when stopping time-driven	OFF	R	UB744024	F00024
Back-up battery errors (At present)	▪ Turns ON, when the backup battery voltage is below the standard level ▪ Turns OFF, when the backup battery voltage is over the standard level	OFF	R	UB744025	F00025
Back-up battery errors (Retaining)	▪ Retains ON, when the backup battery voltage is below the standard level ▪ Turns OFF, when changing program or mode	OFF	R	UB74402C	F0002C

4.2.1.4 System Error

Name	Function	Initial value	R/W	GP device	LP device
Error occurrence	▪ Turns ON, when any of errors occurs among the all defined errors ▪ Turns OFF, when clearing error	OFF	R	UB744030	F00030
Errors related to PLC program	▪ Turns ON, when errors related to program occur ▪ Turns OFF, when clearing program error ▪ Turns OFF, when it stops operation ▪ Turns OFF, when changing program ▪ Turns OFF, when changing mode	OFF	R	UB744034	F00034
Time-driven operation error	▪ Turns ON, when scan time is longer than time-driven setting time ▪ Turns OFF, when scan time is shorter than time-driven setting time	OFF	R	UB744035	F00035
Time setting error flag	▪ Turns ON, when the time data is not properly written ▪ Turns OFF, when the time data is properly written by using RTC	OFF	R	UB744036	F00036
Communication errors (will be supported)	▪ Turns ON, when the communication error occurs ▪ Turns OFF, when the communication is properly completed	OFF	R	UB744038	F00038

Name	Function	Initial value	R/W	GP device	LP device
I/O setting value errors	· Internal device range includes actual unavailable range, this bit turns ON when checking 'Using Internal Device' of 'I/O Contact Setting' dialog box in 'EXTENSION' tab from atLogic's Parameter. · When user does not turn OFF, this bit maintains.	OFF	R	UB744039	F00039
Watch dog timer error	· Turns ON, when watch dog timer occurs · Turns OFF, when watch dog timer error clear	OFF	R	UB74403A	F0003A

4.2.1.5 Module Status

Name	Function	Initial value	R/W	GP device	LP device
Using inner device of SLOT 0	· Turns ON, when SLOT0 parameter uses more than one inner device · Turns OFF, when SLOT0 parameter does not use inner device	OFF	R	UB744040	F00040
Using inner device of SLOT 1	· Turns ON, when SLOT1 parameter uses more than one inner device · Turns OFF, when SLOT1 parameter does not use inner device	OFF	R	UB744041	F00041
Using inner device of SLOT 2	· Turns ON, when SLOT2 parameter uses more than one inner device · Turns OFF, when SLOT2 parameter does not use inner device	OFF	R	UB744042	F00042
Using inner device of SLOT 3	· Turns ON, when SLOT3 parameter uses more than one inner device · Turns OFF, when SLOT3 parameter does not use inner device	OFF	R	UB744043	F00043
Using inner device of SLOT 4	· Turns ON, when SLOT4 parameter uses more than one inner device · Turns OFF, when SLOT4 parameter does not use inner device	OFF	R	UB744044	F00044
Using inner device of SLOT 5	· Turns ON, when SLOT5 parameter uses more than one inner device · Turns OFF, when SLOT5 parameter does not use inner device	OFF	R	UB744045	F00045
Using inner device of SLOT 6	· Turns ON, when SLOT6 parameter uses more than one inner device · Turns OFF, when SLOT6 parameter does not use inner device	OFF	R	UB744046	F00046
Using inner device of SLOT 7	· Turns ON, when SLOT7 parameter uses more than one inner device · Turns OFF, when SLOT7 parameter does not use inner device	OFF	R	UB744047	F00047
Using inner device of	· Turns ON, when SLOT8 parameter uses more than one inner device · Turns OFF, when SLOT8 parameter	OFF	R	UB744048	F00048

Name	Function	Initial value	R/W	GP device	LP device
SLOT 8	does not use inner device				
Using inner device of SLOT 9	· Turns ON, when SLOT9 parameter uses more than one inner device · Turns OFF, when SLOT9 parameter does not use inner device	OFF	R	UB744049	F00049
Using inner device of SLOT 10	· Turns ON, when SLOT10 parameter uses more than one inner device · Turns OFF, when SLOT10 parameter does not use inner device	OFF	R	UB74404A	F0004A
Using inner device of SLOT 11	· Turns ON, when SLOT11 parameter uses more than one inner device · Turns OFF, when SLOT11 parameter does not use inner device	OFF	R	UB74404B	F0004B
Using inner device of SLOT 12	· Turns ON, when SLOT12 parameter uses more than one inner device · Turns OFF, when SLOT12 parameter does not use inner device	OFF	R	UB74404C	F0004C
Using inner device of SLOT 13	· Turns ON, when SLOT13 parameter uses more than one inner device · Turns OFF, when SLOT13 parameter does not use inner device	OFF	R	UB74404D	F0004D
Using inner device of SLOT 14	· Turns ON, when SLOT14 parameter uses more than one inner device · Turns OFF, when SLOT14 parameter does not use inner device	OFF	R	UB74404E	F0004E
Using inner device of SLOT 15	· Turns ON, when SLOT15 parameter uses more than one inner device · Turns OFF, when SLOT15 parameter does not use inner device	OFF	R	UB74404F	F0004F

4.2.1.6 System Clock

Name	Function	Initial value	R/W	GP device	LP device
10ms clock	10ms cycle of system clock occurs		R	UB744050	F00050
20ms clock	20ms cycle of system clock occurs		R	UB744051	F00051
50ms clock	50ms cycle of system clock occurs		R	UB744052	F00052
100ms clock	100ms cycle of system clock occurs		R	UB744053	F00053
200ms clock	200ms cycle of system clock occurs		R	UB744054	F00054
500ms clock	500ms cycle of system clock occurs		R	UB744055	F00055
1s clock	1s cycle of system clock occurs		R	UB744056	F00056
2s clock	2s cycle of system clock occurs		R	UB744057	F00057
5s clock	5s cycle of system clock occurs		R	UB744058	F00058
10s clock	10s cycle of system clock occurs		R	UB744059	F00059
60s clock	60s cycle of system clock occurs		R	UB74405A	F0005A

4.2.1.7 Operation

Name	Function	Initial value	R/W	GP device	LP device
Zero flag	· Turns ON, when operation result is 0 · Turns OFF, when operation result is not 0	OFF	R	UB744060	F00060
Carry flag	· Turns ON, when carry occurs as operation result · Turns OFF, when carry does not occur as operation result	OFF	R	UB744061	F00061
Borrow flag	· Turns ON, when borrow occurs as operation result · Turns OFF, when borrow does not occur as operation result · Turns OFF, when changing program or mode	OFF	R	UB744062	F00062
Operation error flag (At present)	· Turns ON, when operation error occurs during scan operation · Turns OFF, when changing the other mode except stop mode · Turns OFF, when there is no operation error after one scan operation · Turns OFF, when downloading program or re-setting power	OFF	R	UB744068	F00068
Operation error flag (Retaining)	· Retains ON, when operation error occurs during scan operation · Turns OFF, when resetting power	OFF	R	UB744069	F00069

4.2.1.8 System Setting

Name	Function	Initial value	R/W	GP device	LP device
Settings for full output restriction	· When it turns ON, it is restricted port output and all ports becomes OFF.	OFF	W	UB744070	F00070
Settings for output reset restriction	· When it turns ON, it is restricted output reset	OFF	W	UB744071	F00071
Start-up time-driven activity	· When it turns ON, it starts time-driven activity depending on a word setting value of time-driven run-time. · When it turns OFF, it operates minimum speed of scan as possible as it can.	OFF	W	UB744074	F00074
Change time-driven activity operating time	· When it turns ON, it changes the time of time-driven activity operation	OFF	W	UB744075	F00075
Change time-driven activity interrupt time	· When it turns ON, it changes the time of time-driven activity interrupt	OFF	W	UB744076	F00076
Remain output status while stop	· Turns ON, when output status remains · Turns OFF, when output status does not remain	OFF	W	UB744077	F00077
Operating conditions for extended module function	· After checking 'Operating only in run mode' in 'COMMON' tab from atLogic's Parameter and downloading these, it turns RESET. · After checking 'Operating in stop mode' in 'COMMON' tab from atLogic's Parameter and downloading these, it turns SET. · In case of uploading from LP, it does not read data from parameter file, it is uploaded with the set contents from the special register.	OFF	W	UB744078	F00078
Default filter setting flag	· When it is set, operate all undefined filters of module in parameters as default values. · When it is reset, all undefined filters of module are operated without a filter.	OFF	W	UB744079	F00079

4.2.1.9 Time Setting

Name	Function	Initial value	R/W	GP device	LP device
Time setting	· Set it as a special register after it is ON. At this time, the time is not changed. · When it turns OFF after completing settings, it is writing in RTC and the time set in the special register keeps going on.	OFF	W	UB64080	F00080
+/- 30 sec correction of time setting	· When it changes from OFF to ON within the range of 0 to 29sec, the time (second) is shifted to 00. · When it changes from OFF to ON within the range of 30 to 59sec, the time(second) is shifted to 00 and increased one minute	OFF	W	UB64081	F00081

4.2.1.10 Module Setting

Name	Function	Initial value	R/W	GP device	LP device
Settings for using inner device of SLOT0 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB744090	F00090
Settings for using inner device of SLOT1 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB744091	F00091
Settings for using inner device of SLOT2 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB744092	F00092
Settings for using inner device of SLOT3 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB744093	F00093
Settings for using inner device of SLOT4 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB744094	F00094
Settings for using inner device of SLOT5 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB744095	F00095
Settings for using inner device of SLOT6 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB744096	F00096
Settings for using inner device of SLOT7 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB744097	F00097

Name	Function	Initial value	R/W	GP device	LP device
Settings for using inner device of SLOT8 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB744098	F00098
Settings for using inner device of SLOT9 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB744099	F00099
Settings for using inner device of SLOT10 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB74409A	F0009A
Settings for using inner device of SLOT11 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB74409B	F0009B
Settings for using inner device of SLOT12 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB74409C	F0009C
Settings for using inner device of SLOT13 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB74409D	F0009D
Settings for using inner device of SLOT14 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB74409E	F0009E
Settings for using inner device of SLOT15 module function	When bit turns ON, inner device value is written to module register	OFF	W	UB74409F	F0009F

4.2.1.11 Motion control

(1) CH1 special device

Name	Function	R/W	GP device	LP device
Using Motion CH1	· 1: Use · 0: No use	R	UB744100	F00100
Moving of Motion CH1 (Accel, decel, constant)	· 1: Moving · 0: Not moving	R	UB744101	F00101
Using acceleration of Motion CH1	· 1: Accelerating · 0: Not accelerating	R	UB744102	F00102
Driving with set speed of Motion CH1	· 1: Operating with set speed · 0: Not operating with set speed	R	UB744103	F00103
Decelerating of Motion CH1	· 1: Decelerating · 0: Not decelerating	R	UB744104	F00104
Dwelling of Motion CH1	· 1: Dwelling · 0: Not dwelling	R	UB744105	F00105
Finish driving of CH1	· 1: Finishing drive · 0: Not finishing drive	R	UB744106	F00106
Detecting S/W lower limit of Motion CH1	· 1: Detecting S/W lower limit · 0: Not detecting S/W lower limit	R	UB744107	F00107
Detecting S/W upper limit of Motion CH1	· 1: Detecting S/W upper limit · 0: Not detecting S/W upper limit	R	UB744108	F00108
Detecting H/W lower limit of Motion CH1	· 1: Detecting H/W upper limit · 0: Not detecting H/W upper limit	R	UB744109	F00109
Detecting H/W upper limit of Motion CH1	· 1: Detecting H/W lower limit · 0: Not detecting H/W lower limit	R	UB74410A	F0010A
Motion CH 1 usage error	· 1: Error occurs · 0: Not error occurs	R	UB744110	F00110
Motion CH 1 emergency stop error	· 1: Error occurs · 0: No error	R	UB74411F	F0011F
MTSRS action designated flag (Action list exit)	· 1: Exit action list · 0: Not exit action list	R	UB744400	F00400
MTSRS action designated flag (group exit)	· 1: Group exit · 0: Not group exit	R	UB744401	F00401

(2) CH2 special device

Name	Function	R/W	GP device	LP device
Using Motion CH2	· 1: Use · 0: No use	R	UB744120	F00120
Moving of Motion CH2 (Accel, decel, constant)	· 1: Moving · 0: Not moving	R	UB744121	F00121
Using acceleration of Motion CH2	· 1: Accelerating · 0: Not accelerating	R	UB744122	F00122
Driving with set speed of Motion CH2	· 1: Operating with set speed · 0: Not operating with set speed	R	UB744123	F00123
Decelerating of Motion CH2	· 1: Decelerating · 0: Not decelerating	R	UB744124	F00124
Dwelling of Motion CH2	· 1: Dwelling · 0: Not dwelling	R	UB744125	F00125
Finish driving of CH2	· 1: Finishing drive · 0: Not finishing drive	R	UB744126	F00126
Detecting S/W lower limit of Motion CH2	· 1: Detecting S/W lower limit · 0: Not detecting S/W lower limit	R	UB744127	F00127
Detecting S/W upper limit of Motion CH2	· 1: Detecting S/W upper limit · 0: Not detecting S/W upper limit	R	UB744128	F00128
Detecting H/W lower limit of Motion CH2	· 1: Detecting H/W upper limit · 0: Not detecting H/W upper limit	R	UB744129	F00129
Detecting H/W upper limit of Motion CH2	· 1: Detecting H/W lower limit · 0: Not detecting H/W lower limit	R	UB74412A	F0012A
Motion CH 2 usage error	· 1: Error occurs · 0: Not error occurs	R	UB744130	F00130
Motion CH 2 emergency stop error	· 1: Error occurs · 0: No error	R	UB74413F	F0013F
MTSRS action designated flag (Action list exit)	· 1: Exit action list · 0: Not exit action list	R	UB744402	F00402
MTSRS action designated flag (group exit)	· 1: Group exit · 0: Not group exit	R	UB744403	F00403

(3) Jog special device

Name	Function	R/W	GP device	LP device
Jog starting forward of Motion CH1	· ON rising: Moving forward jog in accelerating and constant speed · OFF falling: Moving forward jog in decelerating and stop	R/W	UB744501	F00500
Jog starting backward of Motion CH1	· ON rising: Moving backward jog in accelerating and constant speed · OFF falling: Moving backward jog in decelerating and stop	R/W	UB744502	F00501
Jog starting forward of Motion CH2	· ON rising: Moving forward jog in accelerating and constant speed · OFF falling: Moving forward jog in decelerating and stop	R/W	UB744503	F00502
Jog starting backward of Motion CH2	· ON rising: Moving backward jog in accelerating and constant speed · OFF falling: Moving backward jog in decelerating and stop	R/W	UB744504	F00503

4.2.1.12 High-speed Counter

(1) CH1 special device

Name	Function	R/W	GP device	LP device
Using high-speed counter CH1	· 1: Use · 0: No use	R	UB744300	F00300
High-speed counter CH1 up counting or down counting status	· 1: Use · 0: No use	R	UB744301	F00301
Matching high-speed counter CH1 with match value 1	· 1: Match · 0: Not match	R	UB744303	F00303
Matching high-speed counter CH1 with match value 2	· 1: Match · 0: Not match	R	UB744304	F00304
Matching high-speed counter CH1 with match value 3	· 1: Match · 0: Not match	R	UB744305	F00305
Overflow status of high-speed counter CH 1 present value	· 1: Overflow · 0: Not overflow	R	UB744308	F00308

(2) CH2 special device

Name	Function	R/W	GP device	LP device
Using high-speed counter CH2	・ 1: Use ・ 0: No use	R	UB744310	F00310
High-speed counter CH2 up counting or down counting status	・ 1: Use ・ 0: No use	R	UB744311	F00311
Matching high-speed counter CH2 with match value 1	・ 1: Match ・ 0: Not match	R	UB744313	F00313
Matching high-speed counter CH2 with match value 2	・ 1: Match ・ 0: Not match	R	UB744314	F00314
Matching high-speed counter CH2 with match value 3	・ 1: Match ・ 0: Not match	R	UB744315	F00315
Overflow status of high-speed counter CH2 present value	・ 1: Overflow ・ 0: Not overflow	R	UB744318	F00318

4.2.2 Word Special Device

4.2.2.1 PLC Model

Name	Function	R/W	GP device	LP device
PLC series and model code	▪ High 2 digits = Series code ▪ Low 2 digits = Model code	R	UW74500	F100
System version	Displays the version of firmware by the range of 5 word	R	UW74501	F101
Released date of the version (Year)	Released year of the version	R	UW74506	F106
Released date of the version (Month, date)	Released month and date of the version. Displays 4 digits, high 2 digits denotes month and low 2 digits denotes date.	R	UW74507	F107

4.2.2.2 Scan Time

Name	Function	R/W	GP device	LP device
Present scan time	Executing time for present scan (Revised in every scan)	R	UW74510	F110
Min. scan time	Min. scan time during the operation (It clears when changing PLC mode or program)	R	UW74511	F111
Max. scan time	Max. scan time during the operation (It clears when changing PLC mode or program)	R	UW74512	F112
Average scan time	Displays average scan time	R	UW74513	F113
Scan time count	Counts and displays every scan time	R	UW74514	F114

4.2.2.3 Operation

Name	Function	R/W	GP device	LP device
Step operation generated error (At present)	Present step which has operation error (It clears when changing PLC mode or program)	R	UW74520	F120
Step operation generated error (Retaining)	First operation error step, (It clears when changing PLC mode or program)	R	UW74521	F121

4.2.2.4 Step

Name	Function	R/W	GP device	LP device
Error step	Stopped step by error at present	R	UW74530	F130
Break step	Braked step during debug mode operation (It clears when changing PLC mode or program)	R	UW74531	F131

4.2.2.5 Diagnosis

Name	Function	R/W	GP device	LP device
Self-diagnosis error code	Displays self-diagnosis error code	R	UW74540	F140

UW74540 (F140)	Type	Cause of error
0X0010	Watchdog error	Scan time excesses watchdog timer setting value
0X0020	Memory error	When a certain area of memory is the un-approached state.
0x0021	Battery error	When battery value is below the standard level
0x0022	RTC setting error	Disable to set RTC and RTC operation error
0X0030	Program instruction error	When the program contains instructions that are not able to read and inappropriate forms.
0X0031	Program sequence error	When there is not the instructions required to process the program, such as user defined functions, label name, END, RET and IRET, etc.
0X0040	Parameter setting error	When there are some problems in settings for common and expansion parameters.
0X0041	Time-driven error	When it operates longer than the given time-driven run-time.
0X0050	Extended module setting error	In case, the hardware constructions are different from previous parameter settings when applying power again and changing the mode.
0X0051	Extended module attaching and removing error	When the extended module is attached or removed in run mode.
0x0060	Communication fail error	When it is received NAK and data format not able to read.
0x0061	Communication format error	When there are some problems occurred in formats (excess of limited range etc.) and CHECK SUM while download and upload.

4.2.2.6 Time

Name	Function	R/W	GP device	LP device
Time setting (Year)	Save the setting value of year as BCD Data	W	UW6550	F0150
Time setting (Month)	Save the setting value of month as BCD Data	W	UW6551	F0151
Time setting (Date)	Save the setting value of date as BCD Data	W	UW6552	F0152
Time setting (Hour)	Save the setting value of hour as BCD Data	W	UW6553	F0153

Name	Function	R/W	GP device	LP device
Time setting (Min)	Save the setting value of minute as BCD Data	W	UW6554	F0154
Time setting (Sec)	Save the setting value of second as BCD Data	W	UW6555	F0155
Time setting (Day)	Save the setting value of the day of week as BCD Data 0: Sunday, 1: Monday, 2: Tuesday, 3: Wednesday, 4: Thursday, 5: Friday, 6: Saturday	W	UW6556	F0156

4.2.2.7 Input Filter Setting

Name	Function	R/W	GP device	LP device
Input filter settings	Designates default input filter value by ms unit When this is 0, it does not set filter value. It applies to all of non-filter setting modules.	R/W	UW74560	F160

4.2.2.8 Time-driven Run-time Setting

Name	Function	R/W	GP device	LP device
Time-driven run-time settings	When time-driven setting flag is ON, time-driven running operates with the setting time of this register.	R/W	UW74561	F161
Watchdog timer settings	0 to 65535 (Unit: ms)	R/W	UW74562	F162

4.2.2.9 Time-driven Interrupt

Name	Function	R/W	GP device	LP device
Time-driven interrupt cycle settings 1	Time-driven interrupt cycle settings 1	R/W	UW74570	F170
Time-driven interrupt cycle settings 2	Time-driven interrupt cycle settings 2	R/W	UW74571	F171
Time-driven interrupt cycle settings 3	Time-driven interrupt cycle settings 3	R/W	UW74572	F172
Time-driven interrupt cycle settings 4	Time-driven interrupt cycle settings 4	R/W	UW74574	F174
Time-driven interrupt cycle settings 5	Time-driven interrupt cycle settings 5	R/W	UW74575	F175
Time-driven interrupt cycle settings 6	Time-driven interrupt cycle settings 6	R/W	UW74576	F176
Time-driven interrupt cycle settings 7	Time-driven interrupt cycle settings 7	R/W	UW74577	F177
Time-driven interrupt cycle	Time-driven interrupt cycle	R/W	UW74578	F178

Name	Function	R/W	GP device	LP device
settings 8	settings 8			

4.2.2.10 Motion Control

(1) CH1 special device

Name	Function	R/W	GP device	LP device
Current position	Current position of Motion CH1	R	UW74460	F60
Current speed	Current speed of Motion CH1	R	UW74462	F62
Action No.	Current action No. of Motion CH1	R	UW74464	F64
Pattern No.	Current pattern No. of Motion CH1	R	UW74465	F65
Home position	Current home position of Motion CH1	R	UW74466	F66
Set speed	Setting speed of Motion CH1	R	UW74468	F68
Error check	Error code check of Motion CH1	R	UW74420	F20

(2) CH2 special device

Name	Function	R/W	GP device	LP device
Current position	Current position of Motion CH2	R	UW74470	F70
Current speed	Current speed of Motion CH2	R	UW74472	F72
Action No.	Current action No. of Motion CH2	R	UW74474	F74
Pattern No.	Current pattern No. of Motion CH2	R	UW74475	F75
Home position	Current home position of Motion CH2	R	UW74476	F76
Set speed	Setting speed of Motion CH2	R	UW74478	F78
Error check	Error code check of Motion CH2	R	UW74421	F21

4.2.2.11 High-speed Counter

(1) CH1 special device

Name	Function	R/W	GP device	LP device
Current position counting mode	1 phase: 1, 2 2 phase: 1,2,3,4 No use: -1	R	UW74590	F190
Current counting value	High-speed counter CH1 current counting value	R	UW74592	F192
Match value 1	High-speed counter CH1 match value 1	R	UW74596	F196
Match value 2	High-speed counter CH1 match value 2	R	UW74598	F198
Current phase type	0: NO USE (Normal input), 1: CH1 - phase1, 2: CH2 - phase1, 3: CH1,CH2 - phase1, 4: phase2	R	UW74612	F212
CH1 current total counting value	The number of total pulse input after counting starts (64 bit) Current total counting value = Total counting value + Current HSCNT counting value Initializes when using HSRST instruction or replacing PLC program	R	UW74620	F220

(2) CH2 special device

Name	Function	R/W	GP device	LP device
Current position counting mode	1 phase: 1, 2 2 phase: 1,2,3,4 No use: -1	R	UW74591	F191
Current counting value	High-speed counter CH2 current counting value	R	UW74602	F202
Match value 1	High-speed counter CH2 match value 1	R	UW74606	F206
Match value 2	High-speed counter CH2 match value 2	R	UW74608	F208
CH2 current total counting value	The number of total pulse input after counting starts (64 bit) Current total counting value = Total counting value + Current HSCNT counting value Initializes when using HSRST instruction or replacing PLC program	R	UW74628	F228

5 Instruction

5.1 Structures of Instruction Name

The structure of instruction name is divided into three parts and each part represents data type, instruction name, and data processing method respectively. The data type is usually located in front of instruction name, and the data processing method is located after the instruction name(Limited to a few of them).

5.1.1 Structure by Data Type

(1) By data size

1) Bit data type instruction
   It has an instruction structure of Bxxxx after Bit's B.
   Ex) **B**MOV, **B**MO**VL, B**MOVG …. etc.
2) Nibble data type instruction (4bit)
   It has an instruction structure of Nxxxx after Nibble's N.
3) Half word data type instruction (8bit)
   It has an instruction structure of Hxxxx after Half Word's H.
4) Word data type instruction (1word)
   It has an instruction structure of xxxx without Word name.
   Ex) MOV, MOVL, MOVG …. etc.
5) Double word data instruction (2word)
   It has an instruction structure of Dxxx after Double word's D.
   Ex) **D**MOV, **D**MOVL, **D**MOVG …. etc.
6) User-defined data type instruction
   It has an instruction structure of Axxxx, after Any bit's A.
   Ex) **A**OR, **A**AND, **A**XOR, …. etc.

(2) By data sign

There are signed and unsigned data types, and the former is typically used with omitting its name. On the other hand, the latter is used with "U" and "U" is positioned in the far last part of the instruction name.
If there is name according to data processing, in case of (xxxL, xxxG) it is placed to the back.
For further details, refer to '5.1.1.1 Structure by Data Processing'.

- If there is no data processing method part: MUL**U**, ADD**U**, SUB**U**, ….. etc.
- If there is a data processing method part: MULL**U**, ADDL**U**, SUBL**U** ….. etc.

(3) By BCD data

BCD data has an instruction structure of xxxB after BCD's B.
Be sure that the data processing method part (List, Group) is always positioned after the BCD part.

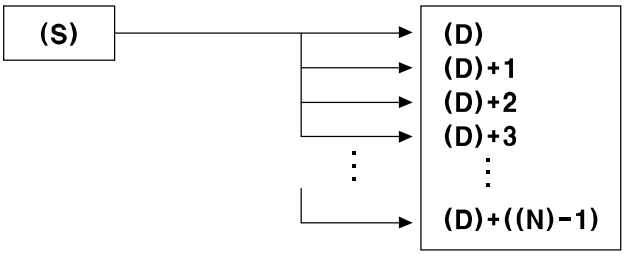
- If there is no data processing method name. (1: 1 process): ADD**B**, MUL**B**, SUB**B**, ….. etc.
- If the data processing method name is 'List': ADD**B**L, MUL**B**L, SUB**B**L, …. etc.

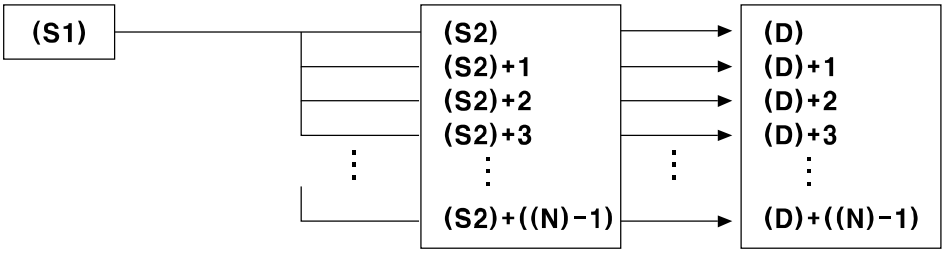
5.1.1.1 Structure by Data Processing

(1) 1:1 processing instruction

It has an instruction structure of xxx with omitting the name.
Ex) MOV, …

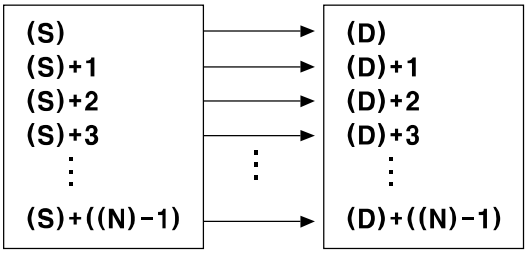
(2) 1:N processing instruction





It has an instruction structure of xxxL after List's "L".
Ex) MOV**L**, ….

(3) N:N processing instruction



It has an instruction structure of xxxG after Group's "G",
Ex) MOV**G**, …

Note

Operand

- S: Represents source device
- D: Represents destination device
- N: Represents the number of device

5.2 Basic Instruction List

5.2.1 Non Processing Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
NOP		1	2	10.25	2.5	85

5.2.2 Contact Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
LOAD		1	1	10.625	2.5	86
LOADN		1	1	10.25	2.5	87
LOADP		2	1	19.8	5	88
LOADF		2	1	19.8	5	89
AND		1	1	10.3	2.5	90
ANDN		1	1	10.5	2.5	91
ANDP		2	1	20.28	5	92
ANDF		2	1	20.28	5	93
ANDL		1	0	20.2	5	94
OR		1	1	10	2.5	95

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
ORN		1	1	10	2.5	96
ORP		2	1	19	5	97
ORF		2	1	19	5	98
ORL		1	4	19	5	99

5.2.3 Output Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
OUT		1	1	10.625	2.5	100
OUT Syyy.xx		1	1	10.8	2.5	101
OUTP		2	1	18.4	5	102
OUTF		2	1	18.4	5	103
SET	(S)	1	1	10	2.5	104
SET Syyy.xx	(S)	1	1	10	2.5	105
RST	(R)	1	1	10	2.5	106

5.2.4 Reversal Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
ALT	ALT D	3	1	28.12 / 25.0	4.125	107
NOT		1	0	10.25	2.5	108

5.2.5 Stack Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
MPUSH		1	0	10.25	2.5	109
MLOAD		1	0	10.25	2.5	110
MPOP		1	0	10.25	2.5	111

5.2.6 Exit Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
MPUSH		1	0	10.25	2.5	109

5.3 Application Instruction list

5.3.1 Count Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
CTU	U CTU S R<S> N	5	2	29.5	8.75	113
CTD	D CTU S R<S> N	5	2	29.5	8.75	114
CTUD	D CTUD S D R<S> N	5	2	32.0	9.375	115
CTR	U CTR S R<S> N	5	2	29.5	8.75	116

5.3.2 Timer Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
TON	TON S N	5	2	28.5	8.75	117
TOFF	TOFF S N	5	2	27.5	8.125	118
TMR	TMR S N	5	2	27.5	7.5	119
TMON	TMON S N	5	2	27.5	8.125	120
TRTG	TRTG S N	5	2	739.0	8.75	121

5.3.3 Control Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
JMP	JMP LABEL	3	1	28.5	8.75	122
LABEL	LABEL Label name	3	1	10.25	2.5	123
FCALL	FCALL LABEL	3	1	28.5	8.75	124
FUNC	FUNC LABEL	3	1	28.5	8.75	125

5.3.4 Branch Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
CALL	CALL LABEL	3	1	28.5	8.75	126
SUBRT	SUBRT LABEL	3	1	28.5	8.75	127
RET	RET	1	0	10.25	2.5	128

5.3.5 Loop Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
FOR	FOR N	3	1	28.5	8.75	129
NEXT	NEXT	1	0	10.25	2.5	130

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
BREAK	BREAK	1	0	10.25	2.5	131

5.3.6 Master Control Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
MCS	MCS N	2	1	28.5	8.75	132
MCR	MCR N	2	1	28.5	8.75	133

5.3.7 Interrupt Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
EI	EI	1	0	10.25	2.5	134
DI	DI	1	0	10.25	2.5	135
ETI	ETI N	1	1	10.25	2.5	136
EEI	EEI N	1	1	10.25	2.5	137
DTI	DTI N	1	1	10.25	2.5	138
DEI	DEI N	1	1	10.25	2.5	139
TINT	TINT N	1	1	10.25	2.5	140

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
EINT	EINT N	1	1	10.25	2.5	141
IRET	IRET	1	0	10.25	2.5	142

5.3.8 Watchdog Timer

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
WDT	WDT	1	0	10.25	2.5	143

5.3.9 Input Comparison Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
LOAD=	┤ = S1 S2 ├	5	2	26.87	8.125	144
LOAD>	┤ > S1 S2 ├	5	2	26.87	8.75	145
LOAD<	┤ < S1 S2 ├	5	2	26.87	8.75	146
LOAD<>	┤ <> S1 S2 ├	5	2	26.87	8.75	147
LOAD>=	┤ >= S1 S2 ├	5	2	26.87	8.75	148
LOAD<=	┤ <= S1 S2 ├	5	2	26.87	8.75	149
DLOAD=	┤ = S1 S2 ├	5	2	29.0	8.125	150
DLOAD>	┤ > S1 S2 ├	5	2	29.0	8.75	151
DLOAD<	┤ < S1 S2 ├	5	2	29.0	8.75	152
DLOAD<>	┤ <> S1 S2 ├	5	2	29.0	8.75	153
DLOAD>=	┤ >= S1 S2 ├	5	2	29.0	9.375	154
DLOAD<=	┤ <= S1 S2 ├	5	2	29.0	9.375	155
AND=	─┤ = S1 S2 ├	5	2	28.5	10	156
AND>	─┤ > S1 S2 ├	5	2	28.5	10	157

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
AND<	┤ < S1 S2 ├	5	2	28.5	10	158
AND<>	┤ <> S1 S2 ├	5	2	28.5	10.625	159
AND>=	┤ >= S1 S2 ├	5	2	28.5	10.625	160
AND<=	┤ <= S1 S2 ├	5	2	28.5	10.625	161
DAND=	┤ = S1 S2 ├	5	2	29.5	10.625	162
DAND>	┤ > S1 S2 ├	5	2	29.5	10.625	163
DAND<	┤ < S1 S2 ├	5	2	29.5	10.625	164
DAND<>	┤ <> S1 S2 ├	5	2	29.5	10.625	165
DAND>=	┤ >= S1 S2 ├	5	2	29.5	10.635	166
DAND<=	┤ <= S1 S2 ├	5	2	29.5	10.625	167
OR=	┘ = S1 S2 ├	5	2	28.0	10.625	168
OR>	┘ > S1 S2 ├	5	2	28.0	10.625	169
OR<	┘ < S1 S2 ├	5	2	28.0	10.625	170
OR<>	┘ <> S1 S2 ├	5	2	28.0	10.625	171

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
OR>=	>= S1 S2	5	2	28.0	10.625	172
OR<=	<= S1 S2	5	2	28.0	10.625	173
DOR=	= S1 S2	5	2	29.0	10.625	174
DOR>	> S1 S2	5	2	29.0	10.625	175
DOR<	< S1 S2	5	2	29.0	10.625	176
DOR<>	<> S1 S2	5	2	29.0	10.625	177
DOR>=	>= S1 S2	5	2	29.0	10.625	178
DOR<=	<= S1 S2	5	2	29.0	10.625	179

5.3.10 Comparison Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
CMP	CMP S1 S2 D	7	3	49.35 / 34.3	11.375	180
DCMP	DCMP S1 S2 D	7	3	51.1 / 35.35	12.25	181
ACMP	ACMP S1 S2 D N	7	4	when H: 3, 54.6 when H: 15, 74.2 when H: 30, 94.5 when not running, 39.2	when H: 3, 16.625 when H: 15, 17.5 when H: 30, 21 when not running, 16.625	182
CMPL	CMPL S1 S2 D N	9	4	when N: 2, 62.1 when N: 4, 85.5 when N: 8, 124.2 when N: 16, 211.5 when not running, 41.85	when N: 2, 18 when N: 4, 21.375 when N: 8, 29.25 when N: 16, 45 when not running, 13.5	183
DCMPL	DCMPL S1 S2 D N	9	4	when N: 2, 66.6 when N: 4, 88.2 when N: 8, 129.6 when N: 16, 214.2 when not running, 43.2	when N: 2, 22.5 when N: 4, 25.875 when N: 8, 32.625 when N: 16, 39.375 when not running, 15.75	184
BWCMP	BWCMP S1 S2 D N	9	4	49.35	11.375	185
DBWCMP	DBWCMP S1 S2 D N	9	4	51.1	12.25	187

5.3.11 Transmission Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
BMOV	BMOV S D	5	2	19.5 / 19.5	6.875	189
MOV	MOV S D	5	2	19.5 / 19.5	7.5	190
DMOV	DMOV S D	5	2	22.35 / 22.35	8.75	191
BMOVL	BMOVL S D N	7	3	when N: 2, 35 when N: 4, 37.8 when N: 8, 44.1 when N: 16, 56 when not running, 32.9	when N: 2, 13.125 when N: 4, 16.625 when N: 8, 20.125 when N: 16, 16.625 when not running, 9.625	192
MOVL	MOVL S D N	7	3	when N: 2, 29.4 when N: 4, 31.5 when N: 8, 33.6 when N: 16, 37.8 when not running, 27.3	when N: 2, 9.625 when N: 4, 12.25 when N: 8, 13.125 when N: 16, 15.75 when not running, 9.625	193
DMOVL	DMOVL S D N	7	3	when N: 2, 33.32 when N: 4, 35.35 when N: 8, 38.5 when N: 16, 45.5 when not running, 31.5	when N: 2, 10.5 when N: 4, 12.25 when N: 8, 14 when N: 16, 18.375 when not running, 9.625	194
BMOVG	BMOVG S D N	7	3	when N: 2, 37.1 when N: 4, 41.6 when N: 8, 449.7	when N: 2, 12.25 when N: 4, 13.125 when N: 8, 16.625	195

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
				when N: 16, 65.8 when not running, 32.9	when N: 16, 18.375 when not running, 11.375	
MOVG	MOVG S D N	7	3	when N: 2, 27.3 when N: 4, 28.35 when N: 8, 30.1 when N: 16, 37.1 when not running, 26.6	when N: 2, 10.5 when N: 4, 11.375 when N: 8, 13.125 when N: 16, 15.75 when not running, 9.625	196
DMOVG	DMOVG S D N	7	3	when N: 2, 28.35 when N: 4, 30.38 when N: 8, 33.32 when N: 16, 39.2 when not running, 26.6	when N: 2, 10.5 when N: 4, 11.375 when N: 8, 13.125 when N: 16, 14 when not running, 8.75	197
BCMOV	BCMOV S D	5	2	19.5 / 19.5	6.875	198
CMOV	CMOV S D	5	2	19.5 / 19.5	7.5	199
DCMOV	DCMOV S D	5	2	22.35 / 22.35	8.75	200

5.3.12 Exchange Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
XCH	XCH S D	5	2	19.5 / 18.0	6.875	201
DXCH	DXCH S1 S2	5	2	20.1 / 18.0	7.5	202
AXCH	AXCH S1 S2 N	7	3	25.45	9.2	203
SWAP	SWAP D	3	1	12.9 / 11.9	4.5	204
DSWAP	DSWAP D	3	1	13.35 / 12.3	4.875	205

5.3.13 Rotation Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
ROR	ROR S C	5	2	25.5 / 21.5	8.125	206
DROR	DROR S C	5	2	25.5 / 21.5	8.125	207
AROR	AROR S N C	7	3	30.24	9.57	208
RORC	RORC S C	5	2	27 / 21.5	8.75	209
DRORC	DRORC S C	5	2	27 / 21.5	8.75	210
ARORC	AROSC S N C	7	3	30.24	9.57	211
ROL	ROL S C	5	2	25.5 / 21.5	8.125	212

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
DROL	DROL S C	5	2	25.5 / 21.5	8.125	213
AROL	AROL S N C	7	3	25.45	9.2	214
ROLC	ROLC S C	5	2	27 / 21.5	8.75	215
DROLC	DROLC S C	5	2	27 / 21.5	8.75	216
AROLC	AROLC S N C	7	3	30.24	9.57	217

5.3.14 Movement Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
SFTR	SFTR S N	9	2	38.75	10.55	218
ASFTR	ASFTR S N1 N2	9	3	43.2 / 35.55	12.375	219
SFTL	SFTL S N1 N2	9	2	38.75	10.55	220
ASFTL	ASFTL S N1 N2	9	3	43.2 / 35.55	12.375	221
WSFTR	WSFTR S N1 N2	9	3	when N1: 8, 40.5 when N1: 16, 45.5 when N1: 24, 50.4 when N1: 32, 54 when not running, 33.3	when N1: 8, 12.375 when N1: 16, 13.5 when N1: 24, 14.625 when N1: 32, 15.75 when not running, 11.25	222
WSFTL	WSFTL S N1 N2	9	3	when N1: 8, 40.5 when N1: 16, 45.5 when N1: 24, 50.4 when N1: 32, 54 when not running, 33.3	when N1: 8, 12.375 when N1: 16, 13.5 when N1: 24, 14.625 when N1: 32, 15.75 when not running, 11.25	223

5.3.15 Arithmetic Operation Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
ADD	ADD S1 S2 D	7	3	37.1 / 32.2	11.375	224
DADD	DADD S1 S2 D	7	3	52.36 / 38.36	13.125	225
ADDU	ADDU S1 S2 D	7	3	37.1 / 32.2	12.25	226
DADDU	DADDU S1 S2 D	7	3	52.36 / 38.36	14	227
ADDL	ADDL S1 S2 D N	9	4	37.1	12.25	228
DADDL	DADDL S1 S2 D N	9	4	52.36	14	229
ADDLU	ADDLU S1 S2 D N	9	4	52.36	14	230
DADDLU	DADDLU S1 S2 D N	9	4	62.38	16	231
SUB	SUB S1 S2 D	7	3	37.1 / 32.2	11.375	232
DSUB	DSUB S1 S2 D	7	3	40.32 / 36.33	12.25	233
SUBU	SUBU S1 S2 D	7	3	37.1 / 32.2	11.375	234
DSUBU	DSUBU S1 S2 D	7	3	40.32 / 36.33	12.25	235
SUBL	SUBL S1 S2 D N	9	4	37.1	11.375	236
DSUBL	DSUBL S1 S2 D N	9	4	40.32	12.25	237

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
SUBLU	SUBLU S1 S2 D N	9	4	40.32	12.25	238
DSUBLU	DSUBLU S1 S2 D N	9	4	52.36	16	239
MUL	MUL S1 S2 D	7	3	37.1 / 32.2	12.25	240
DMUL	DMUL S1 S2 D	7	3	53.34 / 38.36	14	241
MULU	MULU S1 S2 D	7	3	37.1 / 32.2	12.25	242
DMULU	DMULU S1 S2 D	7	3	53.34 / 38.36	14.875	243
MULL	MULL S1 S2 D N	9	4	37.1	12.25	244
DMULL	DMULL S1 S2 D N	9	4	53.34	14.875	245
MULLU	MULLU S1 S2 D N	9	4	53.34	14.875	246
DMULLU	DMULLU S1 S2 D N	9	4	62.28	16	247
DIV	DIV S1 S2 D	7	3	46.2 / 34.3	13.125	248
DDIV	DDIV S1 S2 D	7	3	52.36 / 38.36	14	249
DIVU	DIVU S1 S2 D	7	3	46.2 / 34.3	13.125	250
DDIVU	DDIVU S1 S2 D	7	3	52.36 / 38.36	13.125	251

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
DIVL	DIVL S1 S2 D	9	4	52.36	14	252
DDIVL	DDIVL S1 S2 D N	9	4	62.28	16	253
DIVLU	DIVLU S1 S2 D N	9	4	62.28	16	254
DDIVLU	DDIVLU S1 S2 D N	9	4	73.22	18.46	255
INC	INC D	3	1	13.8 / 12.3	4.875	256
DINC	DINC D	3	1	14.37 / 12.87	4.875	257
DEC	DEC D	3	1	13.8 / 12.3	4.875	258
DDEC	DDEC D	3	1	14.37 / 12.87	4.875	259
ADDB	ADDB S1 S2 D	7	3	67.2 / 32.2	13.125	260
DADDB	DADDB S1 S2 D	7	3	110.32 / 35.35	14	261
ADDBL	ADDBL S1 S2 D N	9	4	110.32	14	262
DADDBL	DADDBL S1 S2 D N	9	4	132.21	18	263
SUBB	SUBB S1 S2 D N	7	3	41.3 / 32.2	13.125	264
DSUBB	DSUBB S1 S2 D	7	3		14	265

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
SUBBL	SUBBL S1 S2 D	9	4	44.28	14	266
DSUBBL	SUBBL S1 S2 D	9	4	53.28	16.55	267
MULB	MULB S1 S2 D	7	3	95.2 / 32.2	13.125	268
DMULB	DMULB S1 S2 D	7	3		21	269
MULBL	MULBL S1 S2 D N	9	4	110.5	25.3	270
DMULBL	DMULBL S1 S2 D N	9	4	132	28.5	271
DIVB	DIVB S1 S2 D	7	3	82.6 / 32.2	14	272
DDIVB	DDIVB S1 S2 D	7	3		14	273
DIVBL	DIVBL S1 S2 D N	9	4	95.3	36.2	274
DDIVBL	DDIVBL S1 S2 D N	9	4	110	55.3	275
INCB	INCB D	3	1	39.9 / 12.9	6	276
DINCB	DINCB D	3	1		7.5	277
DECB	DECB D	3	1	39.9 / 12.9	6	278
DDECB	DDECB D	3	1		6.375	279

5.3.16 Logical Operation Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
WAND	WAND S1 S2 D	7	3	23.25	8.4	280
DAND	DAND S1 S2 D	7	3	23.25	8.4	281
AAND	AAND S1 S2 D N	9	4	38.44	10.5	282
WANDL	WANDL S1 S2 D N	9	4	28.1	9.3	283
DANDL	DANDL S1 S2 D N	9	4	35.2	10.2	284
WOR	WOR S1 S2 D	7	3	23.25	8.4	285
DOR	DOR S1 S2 D	7	3	23.25	8.4	286
AOR	AOR S1 S2 D	9	4	35.2	10.2	287
WORL	WORL S1 S2 D	9	4	28.1	9.3	288
DORL	DORL S1 S2 D N	9	4	28.1	9.3	289
XOR	XOR S1 S2 D	7	3	23.25	8.4	290
DXOR	DXOR S1 S2 D	7	3	28.1	9.3	291
AXOR	AXOR S1 S2 D N	9	4	35.2	10.2	292
XORL	XORL S1 S2 D N	9	4	35.2	10.2	293

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
DXORL	DXORL S1 S2 D N	9	4	38.44	10.5	294
XNR	XNR S1 S2 D	7	3	23.25	8.4	295
DXNR	DXNR S1 S2 D	7	3	28.1	9.3	296
AXNR	AXNR S1 S2 D N	9	4	38.44	10.5	297
XNRL	XNRL S1 S2 D N	9	4	23.25	8.4	298
DXNRL	DXNRL S1 S2 D N	9	4	28.1	9.3	299

5.3.17 BIN/BCD Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
BIN2BCD	BIN2BCD S D	5	2	22.38	8.4	300
DBIN2BCD	DBIN2BCD S D	5	2	22.38	8.4	301
BCD2BIN	BCD2BIN S D	5	2	22.38	8.4	302
DBCD2BIN	DECD2BIN S D	5	2	22.38	8.4	303

5.3.18 String Conversion Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
BIN2HASC	BIN2HASC S D	5	2	22.38	8.4	304
DBIN2HASC	DBIN2HASC S D	5	2	25.38	8.8	305
HASC2BIN	HASC2BIN S D	5	2	22.38	8.4	306
DHASC2BIN	DHASC2BIN S D	5	2	25.38	8.8	307
BCD2DASC	BCD2DASC S D	5	2	22.38	8.4	308
DBCD2DASC	DBCD2DASC S D	5	2	25.38	8.8	309
DASC2BIN	DASC2BIN S D	5	2	25.38	8.8	310
DDASC2BIN	DDASC2BIN S D	5	2	35.24	9.6	311

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
STR2ASC	STR2ASC S D	7	2	38.5	10	312
DASC2BCD	DASC2BCD S D	5	2	35.24	9.6	313
DDASC2BCD	DDASC2BCD S D	5	2	25.38	8.8	314
BIN2DASC	BIN2DASC S D	5	2	22.38	8.4	315
DBIN2DASC	DBIN2DASC S D	5	2	25.38	8.8	316

5.3.19 Code Conversion Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
GRY2BIN	GRY2BIN S D	5	2	22.38	8.4	317
DGRY2BIN	DGRY2BIN S D	5	2	25.38	8.8	318
BIN2GRY	BIN2GRY S D	5	2	22.38	8.4	319
DBIN2GRY	DBIN2GRY S D	5	2	25.38	8.8	320

5.3.20 Sign Reversal Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
NEG	NEG D	3	1	23.4	8.2	321
DNEG	DNEG D	3	1	23.4	8.2	322

5.3.21 Data Conversion Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
DECO	DECO S D N	7	3	28.8	9.2	323
ENCO	ENCO S D N	7	3	28.8	9.2	324
EXT	EXT D	3	1	23.4	8.2	325

5.3.22 Refresh Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
REF	REF D N	5	2	23.4	8.2	326

5.3.23 Display Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
SEG	SEG S D N	7	3	23.4	8.2	327

5.3.24 Clock Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us)		Page
				LP-S044	LP-S070, LP-A070, LP-A104	
TCMP	TCMP S1 S2 S3 S4 D	7	5	38.5	10	329
TADD	TADD S1 S2 D	7	3	38.5	10	330
TSUB	TSUB S1 S2 D	7	3	38.5	10	331
TRD	TRD D	3	1	52.5	12	332
TWR	TWR D	3	1	52.5	12	333
HOUR	HOUR S D1 D2	7	3	25.24	10.5	334
TZCP	TZCP S1 S2 S3 D	9	4	52.5	12	335

5.3.25 Motion Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us) LP-S070, LP-A070, LP-A104	Page
MTVDM	MTVDM S0 S1 S2 S3 S4 S5	9	6	15.75	337
MTPDM	MTPDM S0 S1 S2 S3 S4 S5	9	6	18	338
MTIDM	MTIDM S0 S1	5	2	9	339
MTMEC	MTMEC S0	5	1	6.75	340
MTEMS	MTEMS S0	5	1	9	341
MTCPP	MTCPP S0 S1	5	2	9	342
MTFOS	MTFOS S0	5	1	6.75	343
MTSRS	MTSRS S0	5	1	6.75	344
MTOBC	MTOBC S0	5	1	6.75	345
MTOVV	MTOVV S0 S1	5	2	9	346
MTOVP	MTOVP S0 S1	5	2	10.125	347
MTIPT	MTIPT S0 S1 S2 S3	7	4	13.5	348
MTUAI	MTUAI S0 S1	5	2	11.25	349

5.3.26 High-speed Counter Instruction

Instruction	Ladder symbol	Step	Operand	Run time (ON/OFF) (unit: us) LP-A070, LP-A104	Page
HSCNT	HSCNT S0 S1 S2 D S3	7	5	14	350
HSSET	HSSET S0 S1 S2	6	3	13.5	352
HSRST	HSRST S0 S1	7	2	13.5	353

5.4 Basic Instruction

5.4.1 Non Processing Instruction (NOP)

Non processing instruction	NOP	Applicable model LP-S044, LP-S070, LP-A070, LP-A104

1. It is non processing instruction.
2. It is available only for mnemonic program.

5.4.2 Contact Instruction (LOAD)

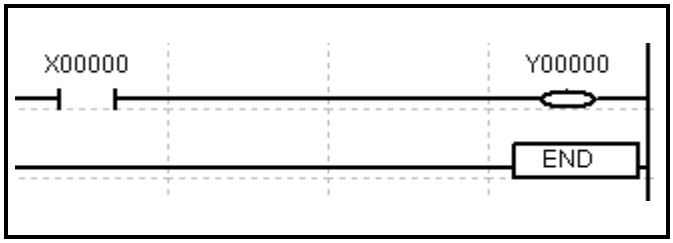
Contact instruction **LOAD** **S**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

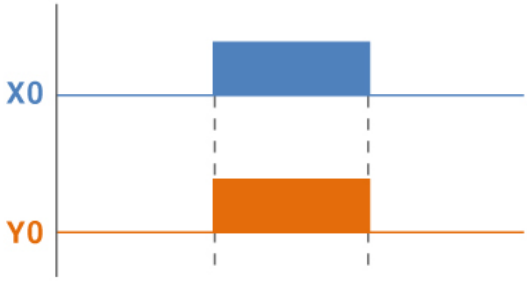
OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	BIT	X, Y, M, S, T, C, F, UB					
		Contact of bit device					
		Not applicable					1

<Ladder>



When the contact(S) is ON, the corresponding output bit becomes 1.

<Time chart>



5.4.3 Contact Instruction (LOADN)

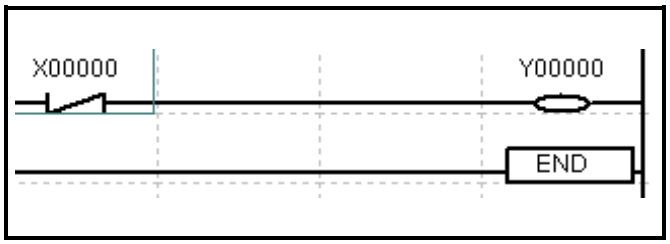
Contact instruction **LOADN** **S**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

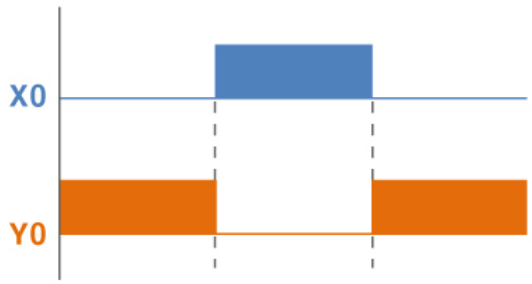
OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	BIT	X, Y, M, S, T, C, F, UB					
		Contact of bit device					
		Not applicable					1

<Ladder>



When the (S) bit turns OFF from ON, the operation result becomes ON from OFF.

<Time chart>



5.4.4 Contact Instruction (LOADP)

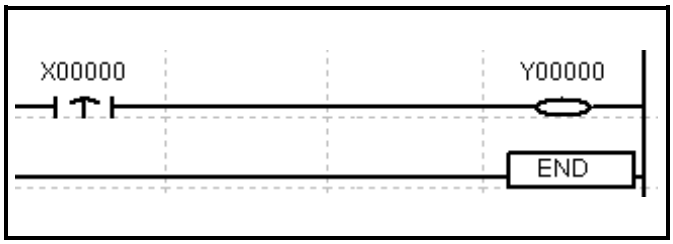
Contact instruction **LOADP** **S**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

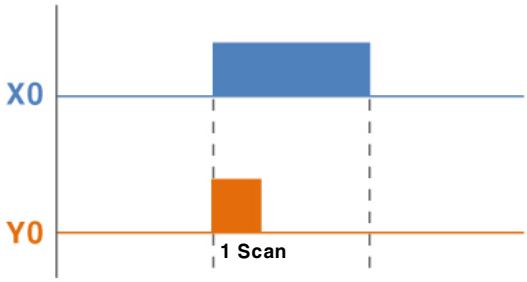
OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	BIT	X, Y, M, S, T, C, F, UB					
		Contact of bit device					
		Not applicable					2

<Ladder>



As soon as the (S) contact turns ON from OFF, the operation result becomes ON.

<Time chart>



5.4.5 Contact Instruction (LOADF)

Contact instruction **LOADF** **S**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

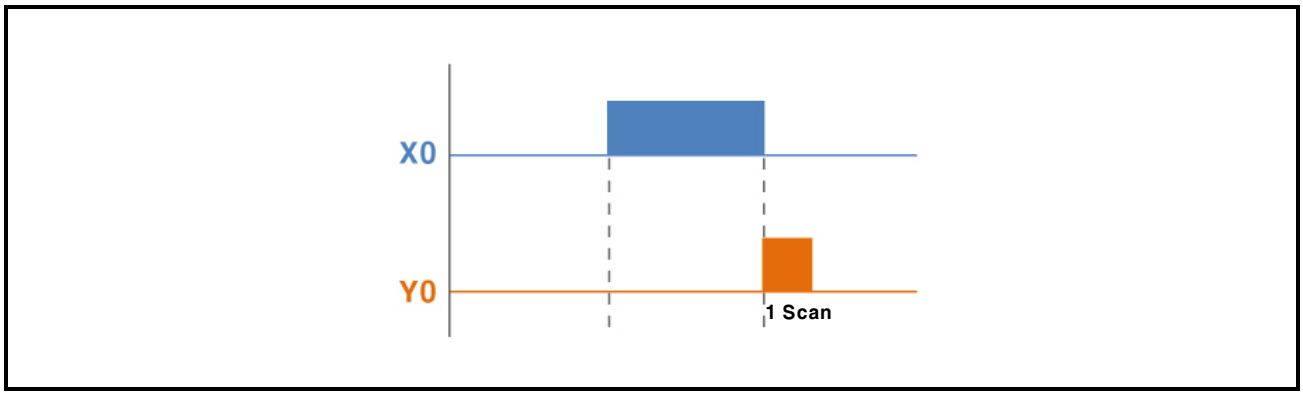
OP	DATA type	Available device / Description / Range
S	BIT	X, Y, M, S, T, C, F, UB
		Contact of bit device
		Not applicable

Error	Zero	Carry	Borrow	Step
				2

<Ladder>

As soon as the (S) contact turns OFF from ON, the operation result becomes ON.

<Time chart>



5.4.6 Contact Instruction (AND)

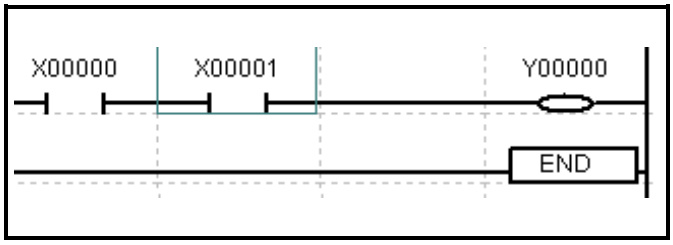
Contact instruction **AND** **S**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

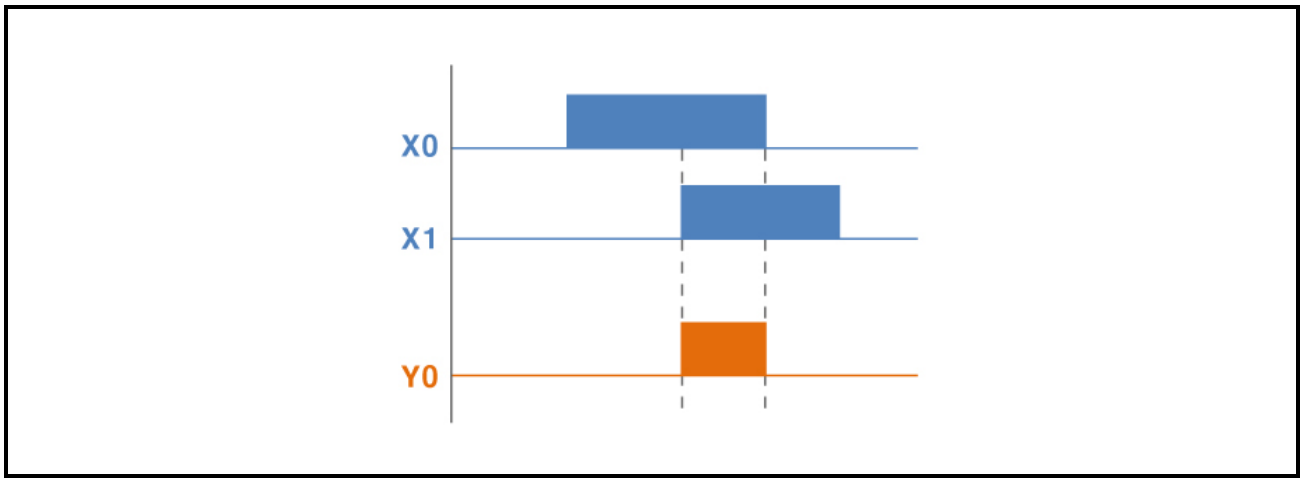
OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	BIT	X, Y, M, S, T, C, F, UB					
		Contact of bit device					
		Not applicable					1

<Ladder>



Executes AND operation between the previous operation result and the designated contact(S), and considers it as the operation result.

<Time chart>



5.4.7 Contact Instruction (ANDN)

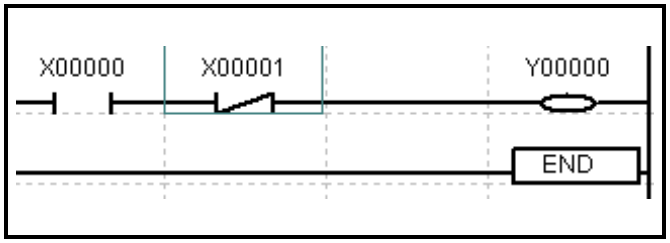
Contact instruction **ANDN** **S**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

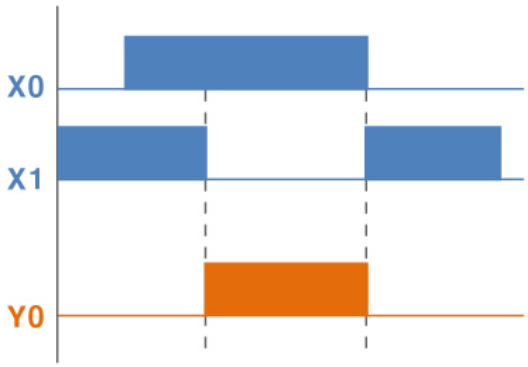
OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	BIT	X, Y, M, S, T, C, F, UB					
		Contact of bit device					
		Not applicable					1

<Ladder>



Executes AND NOT operation between the previous operation result and the designated contact(S), and considers it as the operation result.

<Time chart>



5.4.8 Contact Instruction (ANDP)

Contact instruction **ANDP** **S**

Applicable model

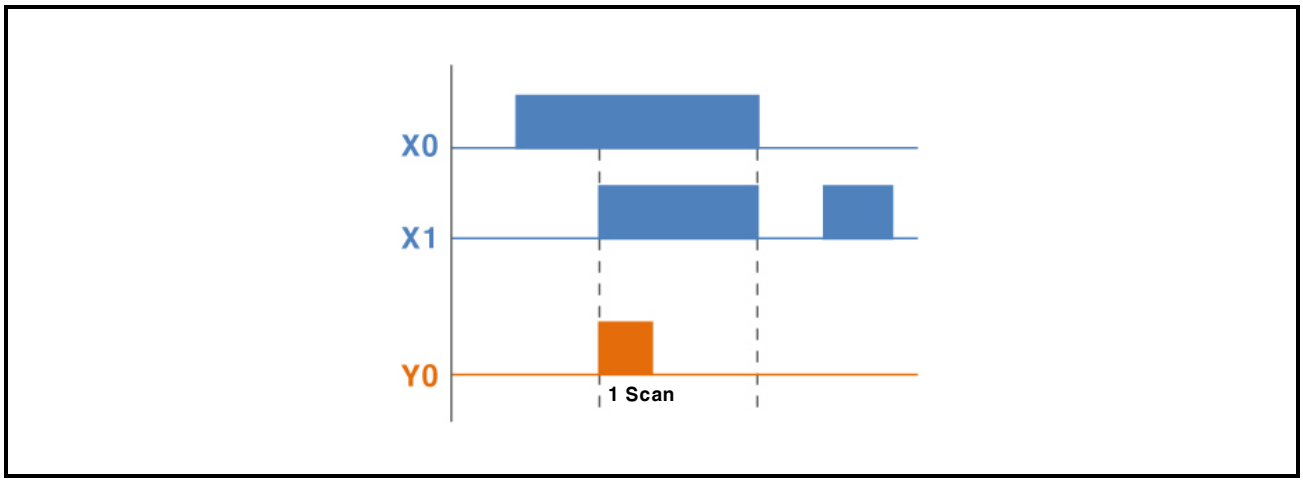
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	BIT	X, Y, M, S, T, C, F, UB					
		Contact of bit device					
		Not applicable					2

<Ladder>

On the rising edge of a pulse, it executes AND operation between the previous operation result and the designated contact(S), and considers it as the operation result.

<Time chart>



5.4.9 Contact Instruction (ANDF)

Contact instruction **ANDF** **S**

Applicable model

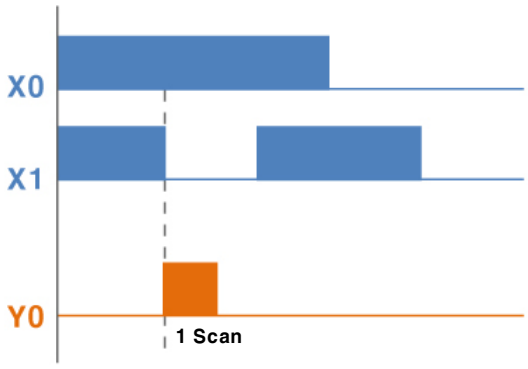
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	BIT	X, Y, M, S, T, C, F, UB					
		Contact of bit device					
		Not applicable					2

<Ladder>

On the falling edge of a pulse, it executes AND operation between the previous operation result and the designated contact(S), and considers it as the operation result.

<Time chart>



5.4.10 Contact Instruction (ANDL)

Contact instruction **ANDL**

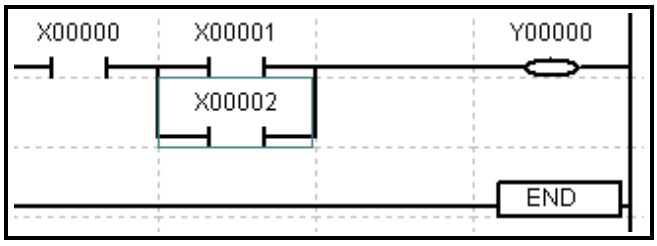
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

<Mnemonic & Ladder>

Step	Instruction	OP1	OP2
0	LOAD	X00000	
1	LOAD	X00001	
2	OR	X00002	
3	ANDL		
4	OUT	Y00000	
5	END		

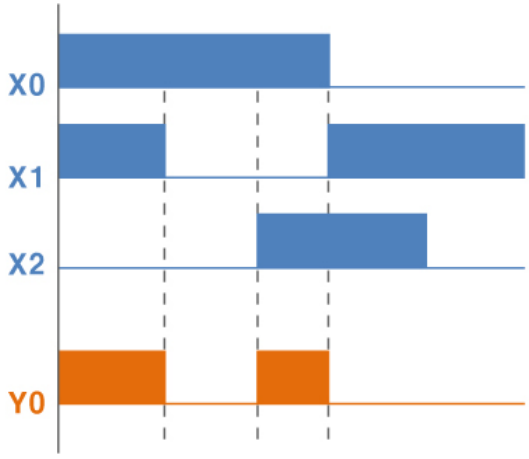
Executes the AND operation between the block and the block.



[Note]

- You cannot add as device input in ladder.
- Input for instruction is available only for mnemonic.

<Time chart>



5.4.11 Contact Instruction (OR)

Contact instruction **OR** **S**

Applicable model

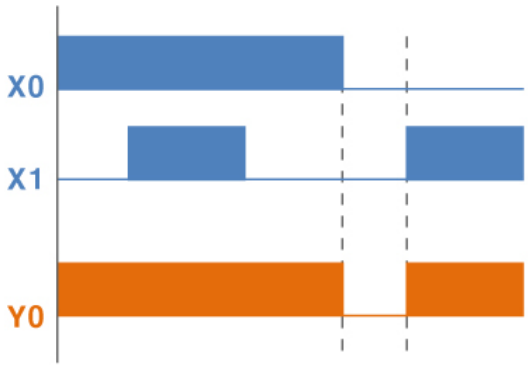
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	BIT	X, Y, M, S, T, C, F, UB					
		Contact of bit device					
		Not applicable					1

<Ladder>

Executes the OR operation between the previous operation result and the designated contact(S), and considers it as the operation result.

<Time chart>



5.4.12 Contact Instruction (ORN)

Contact instruction **ORN** **S**

Applicable model

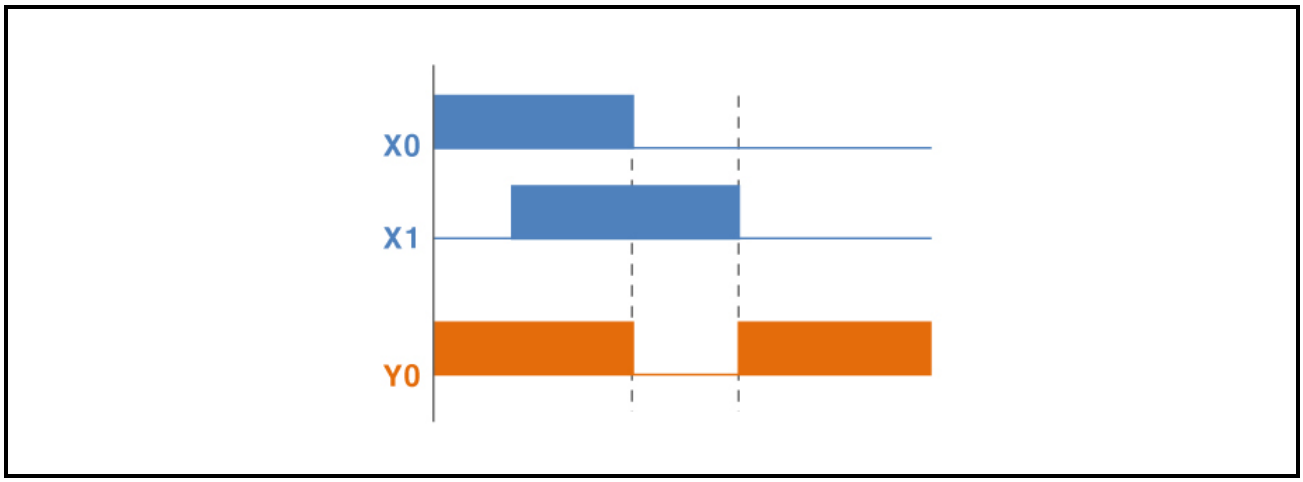
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	BIT	X, Y, M, S, T, C, F, UB					
		Contact of bit device					
		Not applicable					1

<Ladder>

Executes the ORN operation between the previous operation result and the designated contact(S), and considers it as the operation result.

<Time chart>



5.4.13 Contact Instruction (ORP)

Contact instruction **ORP** **S**

Applicable model

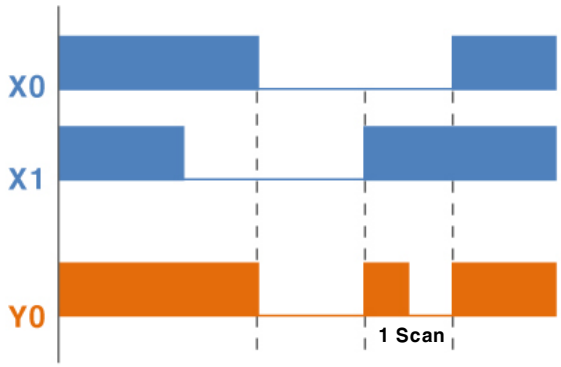
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	BIT	X, Y, M, S, T, C, F, UB					
		Contact of bit device					
		Not applicable					2

<Ladder>

On the rising edge of a pulse, executes OR or ORN operation between the previous operation result and designated contact(S), and considers it as the operation result.

<Time chart>



5.4.14 Contact Instruction (ORF)

Contact instruction **ORF** **S**

Applicable model

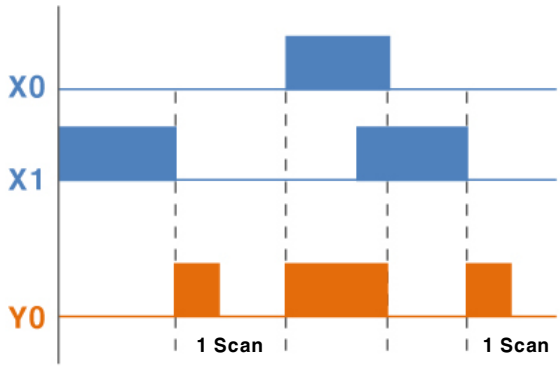
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	BIT	X, Y, M, S, T, C, F, UB					
		Contact of bit device					
		Not applicable					2

<Ladder>

On the falling edge of a pulse, executes OR or ORN operation between the previous operation result and the designated contact(S), and considers it as the operation result.

<Time chart>



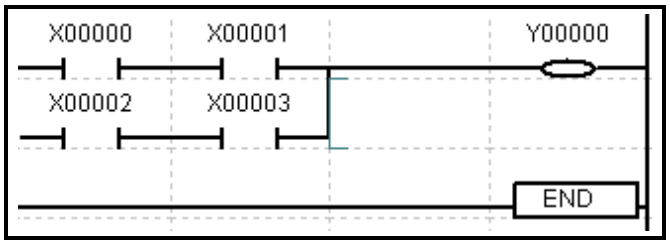
5.4.15 Contact Instruction (ORL)

Contact instruction	ORL	Applicable model LP-S044, LP-S070, LP-A070, LP-A104

<Mnemonic & Ladder>

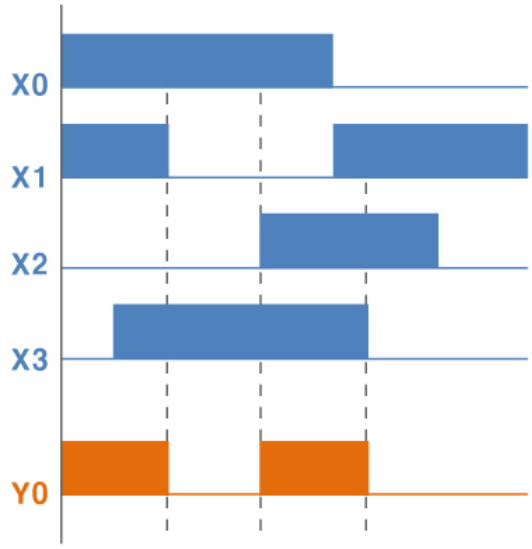
Step	Instruction	OP1	OP2
0	LOAD	X00000	
1	AND	X00001	
2	LOAD	X00002	
3	AND	X00003	
4	ORL		
5	OUT	Y00000	
6	END		

Executes the OR operation between the block and the block.



[Note]
- You cannot add as device input in ladder.
- Input for instruction is available only for mnemonic.

<Time chart>



5.4.16 Output Instruction (OUT)

Output instruction **OUT** **D**

Applicable model

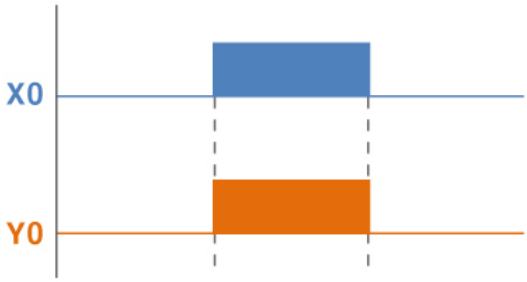
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	BIT	Y, F, S, M, UB					
		ON/OFF contact of device					
		Not applicable					1

<Ladder>

Outputs the operation result executed to the OUT instruction to the (S) device.

<Time chart>



5.4.17 Output Instruction (OUT Syyy.xx)

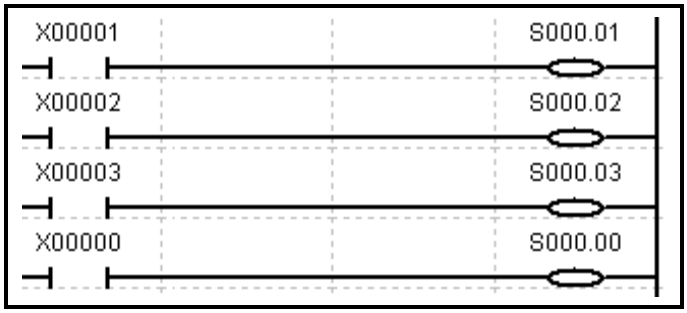
Output instruction OUT Syyy.xx D

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	BIT	S					
		yyy is group number(0 to 255), xx is step number (0 to 99)					
		Not applicable					1

<Ladder>



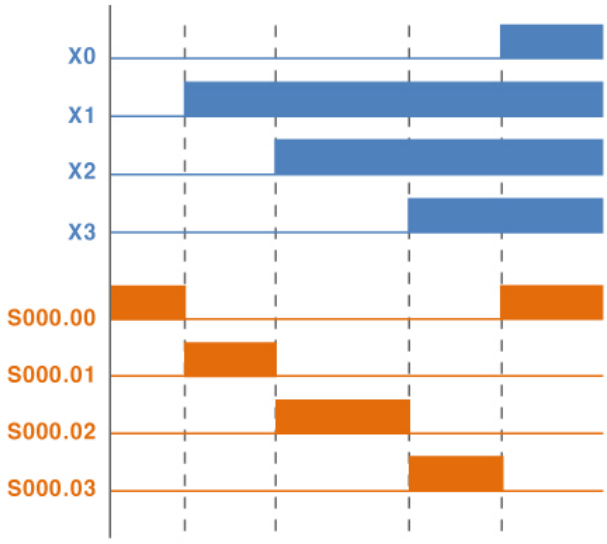
Step device

yyy: Group number(0 to 255)

xx: Step number(0 to 99)

1. Unlikely the Sequential Control (Set Syyy.xx) Instructions, if input condition turns ON, the corresponding step becomes ON regardless of the step order.
2. Although a number of input condition contacts become ON in the same group, the last programmed contact is output firstly.
3. Even if the input condition turns OFF, the step number retains ON.
4. In order to clear the OUT Syyy.xx instruction, the input contact of Syyy.00 should become ON.

<Time chart>



5.4.18 Output Instruction (OUTP)

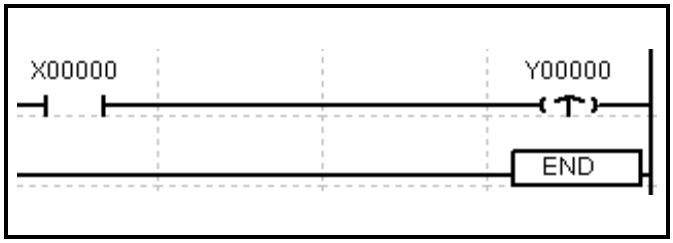
Output instruction **OUTP** **D**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

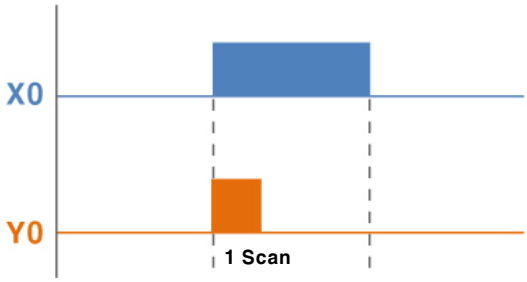
OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	BIT	Y, F, S, M, UB					
		Contact to be ON for one scan on the rising edge of a pulse					
		Not applicable					2

<Ladder>



When the operation result executed to the OUTP turns OFF from ON, the output contact becomes ON for only one scan and then becomes OFF for any other cases.

<Time chart>



5.4.19 Output Instruction (OUTF)

Output instruction **OUTF** **D**

Applicable model

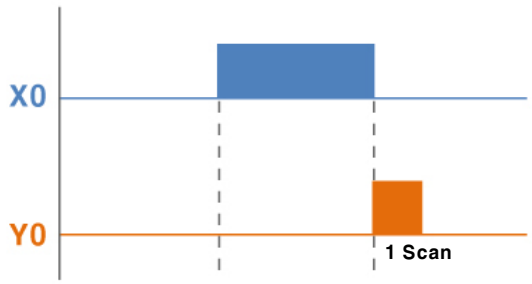
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	BIT	Y, F, S, M, UB					
		Contact to be ON for one scan on the falling edge of a pulse					
		Not applicable					2

<Ladder>

When the operation result executed to the OUTF turns OFF from ON, the output contact becomes ON for only one scan and then becomes OFF for any other cases.

<Time chart>



5.4.20 Output Instruction (SET)

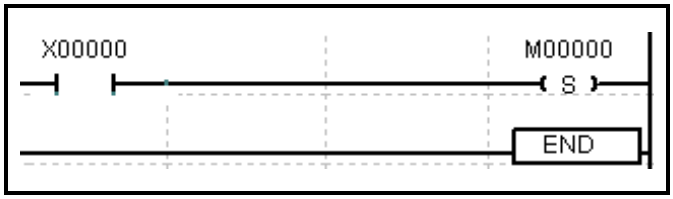
Output instruction **SET** **D**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

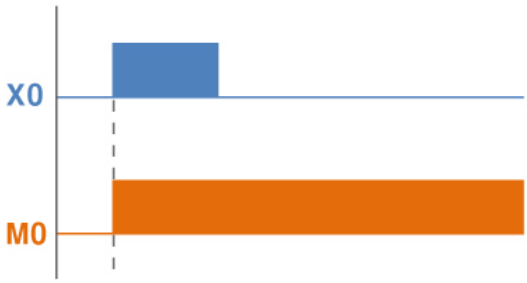
OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	BIT	Y, F, S, T, C, M, UB					
		Contact to be maintained ON status					
		Not applicable					1

<Ladder>



1. Once the contact is SET, even if the input condition turns OFF, it retains SET status.
2. In order to turn OFF the contact, you should execute
The RST instruction.

<Time chart>



5.4.21 Output Instruction (SET Syyy.xx)

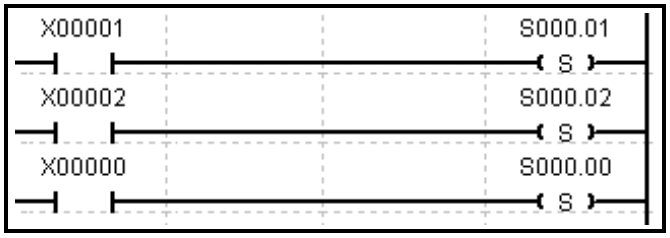
Output instruction **SET Syyy.xx** **D**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	BIT	S					
		yyy is group number(0 to 255), xx is step number (0 to 99)					
		Not applicable					1

<Ladder>



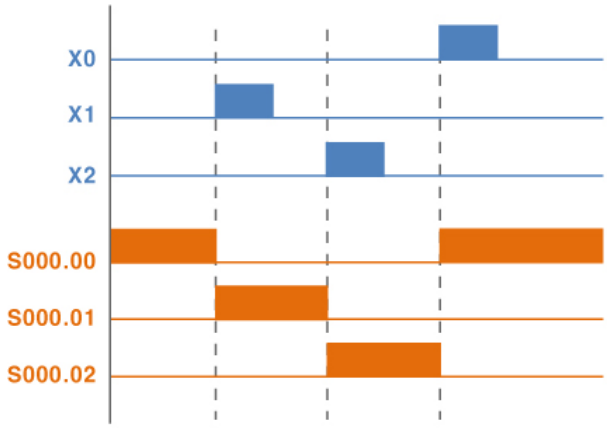
Step device

yyy: Group number(0 to 255)

xx: Step number(0 to 99)

1. If the input contact of current step number is ON while the previous step number is retaining ON status, the current step number turns ON and the previous step number turns OFF.
2. Even if the input contact turns OFF, S device at ON status retains ON.
3. Syyy.00 is always ON status when starting the program.
4. In order to reset the Syyy.xx instruction, the input contact of Syyy.00 should become ON.

<Time chart>



5.4.22 Output Instruction (RST)

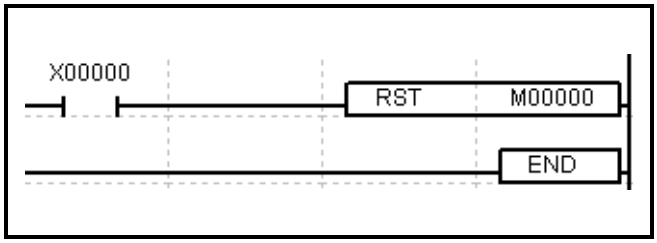
Output instruction **RST** **D**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

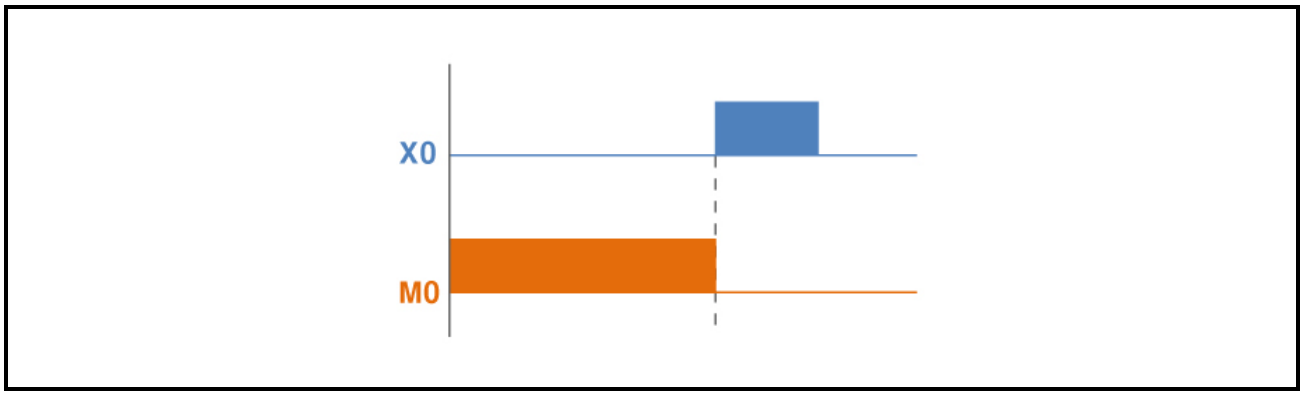
OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	BIT	Y, F, S, T, C, M, UB					
		Contact to be maintained OFF status					
		Not applicable					1

<Ladder>



1. If the input condition turns ON, the corresponding contact becomes OFF.
2. Even if the input condition turns OFF, the corresponding contact retains OFF.

<Time chart>



5.4.23 Reversal Instruction (ALT)

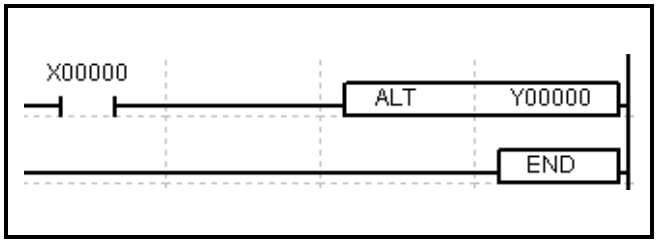
Reversal instruction **ALT** **D**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

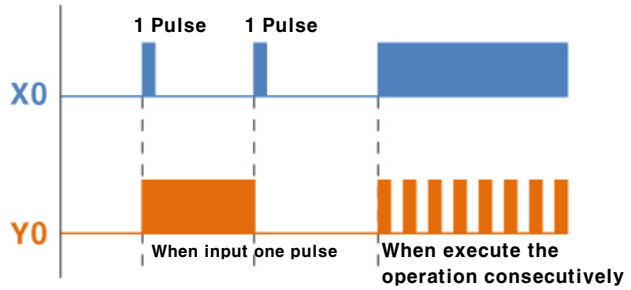
OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	BIT	Y, F, M ,UB					
		Data address to execute the operation					
		Not applicable					3

<Ladder>



Whenever the input condition turns ON from OFF, the output is reversed according to this, and this event is consecutively executed every operation cycle.

<Time chart>



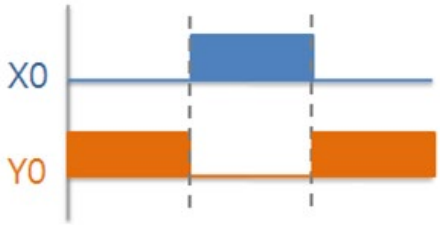
5.4.24 Reversal Instruction (NOT)

Reversal instruction	NOT	Applicable model LP-S044, LP-S070, LP-A070, LP-A104

<Ladder>

1. Transfers input by reversing.
2. A contact circuit is reversed as B contact circuit, B contact circuit is reversed as A contact circuit.

<Time chart>



5.4.25 Stack Instruction (MPUSH)

Stack instruction	MPUSH	Applicable model
		LP-S044, LP-S070, LP-A070, LP-A104

The operation results executed to current are stored in the stack.

5.4.26 Stack Instruction (MLOAD)

Stack instruction	MLOAD	Applicable model LP-S044, LP-S070, LP-A070, LP-A104

Loads the value stored in the stack.

5.4.27 Stack Instruction (MPOP)

Stack instruction	MPOP	Applicable model LP-S044, LP-S070, LP-A070, LP-A104

Removes the data in the stack after reading it.

5.4.28 Exit Instruction (END)

Exit instruction	END	Applicable model LP-S044, LP-S070, LP-A070, LP-A104

Exits the program.

5.5 Application Instruction

5.5.1 Counter Instruction (CTU)

Counter instruction CTU S N

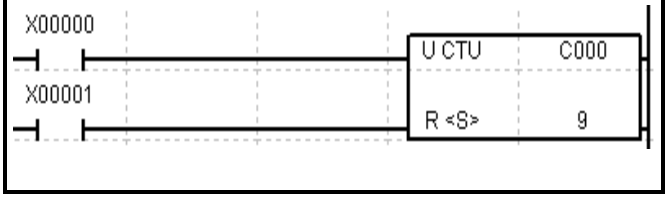
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	C, UW
		Counter contact you want to use
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Setting value of counter
		0(h0000) to 65535(hFFFF)

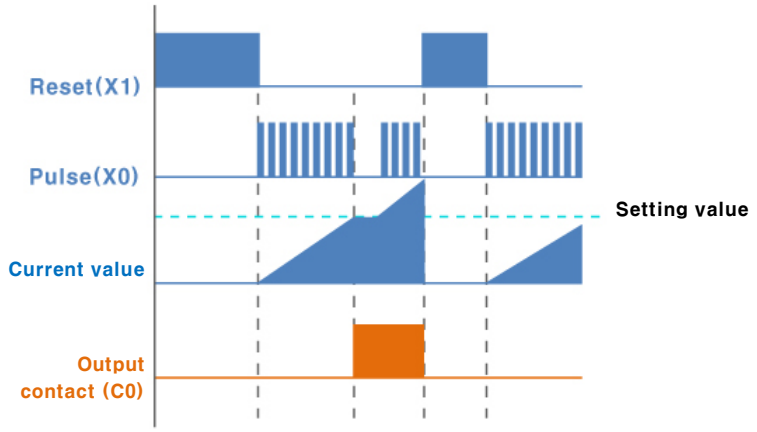
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the pulse signal is applied to the input rung when the reset signal is OFF, the word value of S device is increased one by one, and then when it reaches the setting value N, the corresponding counter contact turns ON.
2. If the reset signal turns ON, the word value of S device becomes 0.

<Time chart>



5.5.2 Counter Instruction (CTD)

Counter instruction **CTD** **S** **N**

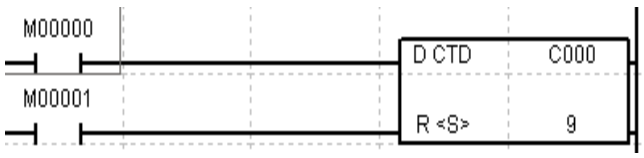
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	C, UW
		Counter contact you want to use
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, M , S, T, C, D, Z, F, UW, integer
		Setting value of counter
		0(h0000) to 65535(hFFFF)

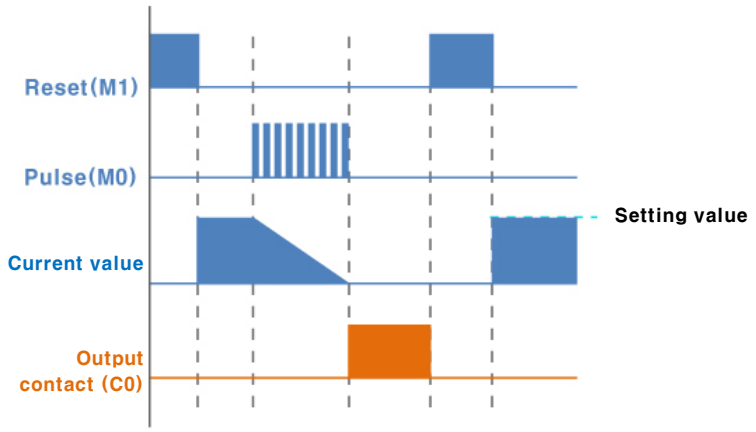
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the pulse signal is applied to the input rung when the reset signal is OFF, the word value of S device is decreased one by one, and then when it reaches 0, the corresponding counter contact turns ON.
2. If the reset signal is ON, the word value of S device becomes the setting value “N” .

<Time chart>



5.5.3 Counter Instruction (CTUD)

Counter instruction **CTUD** **S** **N**

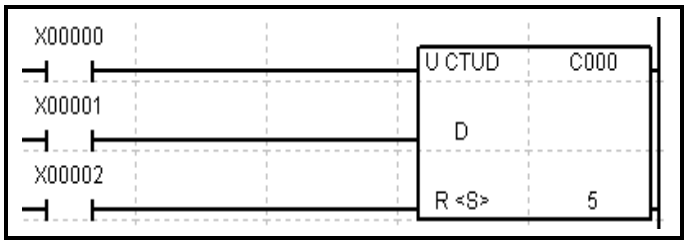
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	C, UW
		Counter contact you want to use
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, M , S, T, C, D, Z, F, UW, integer
		Setting value of counter
		0(h0000) to 65535(hFFFF)

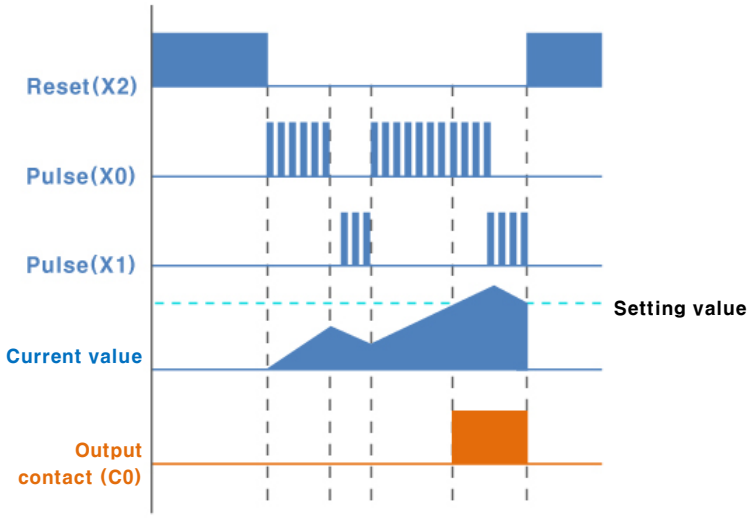
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the count-up pulse is applied to the input rung when the reset signal is OFF, the word value of S device is increased one by one. Likewise, if the countdown pulse is applied to the input rung, the word value of S device is decreased one by one.
2. If the word value of S device is greater than the setting value “N”, the corresponding counter contact turns ON, and if the word value of S device is less than the setting value “N”, the corresponding counter contact turns OFF.
3. If the reset signal is ON, the word value of S device becomes 0.

<Time chart>



5.5.4 Counter Instruction (CTR)

Counter instruction CTR S N

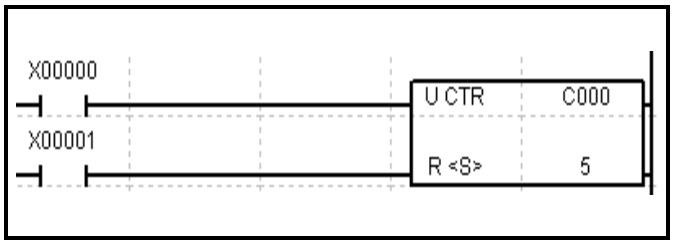
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	C, UW
		Counter contact you want to use
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, M , S, T, C, D, Z, F, UW, integer
		Setting value of counter
		0(h0000) to 65535(hFFFF)

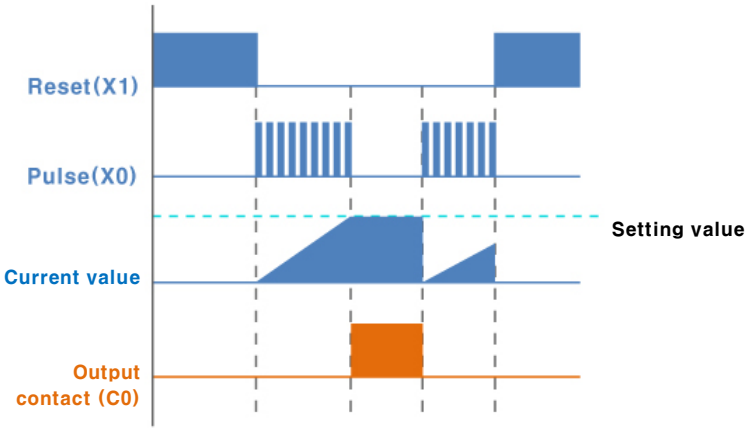
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the pulse signal is applied to the input rung when the reset signal is OFF, the word value of S device is increased one by one, and then when it reaches 0, the corresponding counter contact turns ON.
2. If the pulse is continuously being input even after the reset signal is ON, the word value of S device is restarted at 0 again and the corresponding counter contact becomes OFF.
3. Even if the reset signal turns ON, the word value of S device becomes 0.

<Time chart>



5.5.5 Timer Instruction (TON)

Timer instruction TON S N

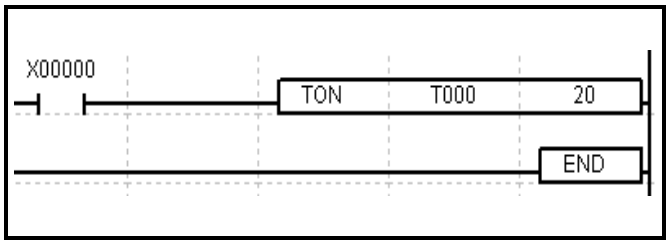
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	T, UW
		Timer contact you want to use
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, M , S, T, C, D, Z, F, UW, integer
		Setting value of timer
		0(h0000) to 65535(hFFFF)

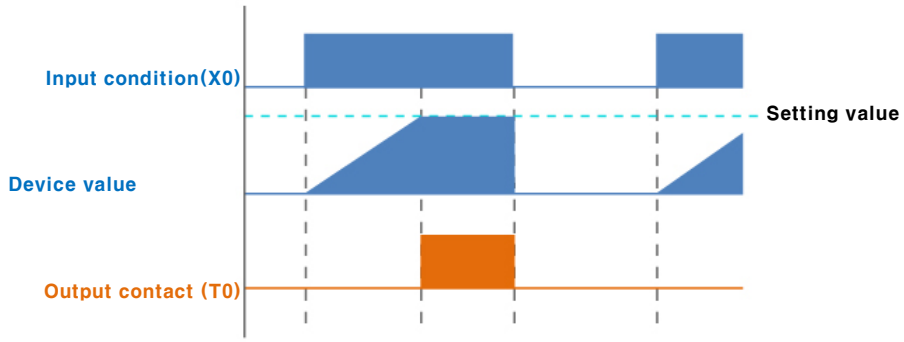
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. As soon as the input condition is ON, S device value of the timer is increased one by one and then when it reaches the setting value “N”, the corresponding timer contact turns ON.
2. If the input condition becomes OFF or encounters RSTxxx instruction, the corresponding timer contact turns OFF and the current value becomes 0.

<Time chart>



5.5.6 Timer Instruction (TOFF)

Timer instruction TOFF S N

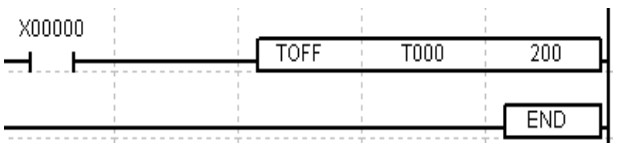
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	T, UW
		Timer contact you want to use
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, M , S, T, C, D, Z, F, UW, integer
		Setting value of timer
		0(h0000) to 65535(hFFFF)

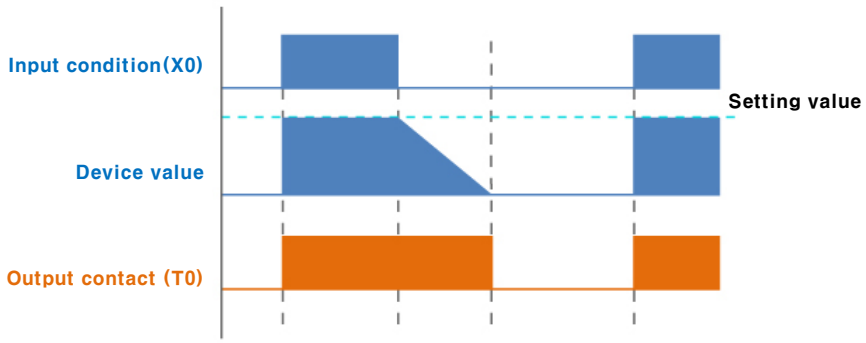
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. As soon as the input condition is ON, S device value of the timer is changed into the setting value “N” and the corresponding timer contact becomes ON.
2. If the input condition becomes OFF, the current value of the timer is decreased one by one and when it reaches “0”, the corresponding timer contact becomes OFF.
3. If it encounters RST Txxxx instruction, the corresponding timer contact turns OFF and the setting value becomes “0”.

<Time chart>



5.5.7 Timer Instruction (TMR)

Timer instruction **TMR** **S** **N**

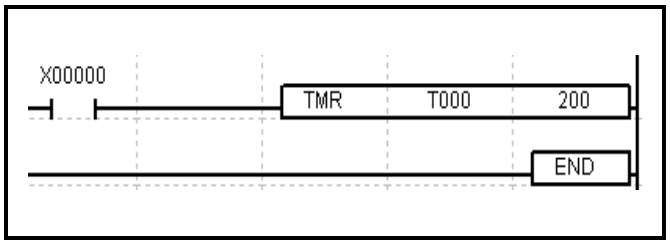
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	T, UW
		Timer contact you want to use
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, M , S, T, C, D, Z, F, UW, integer
		Setting value of timer
		0(h0000) to 65535(hFFFF)

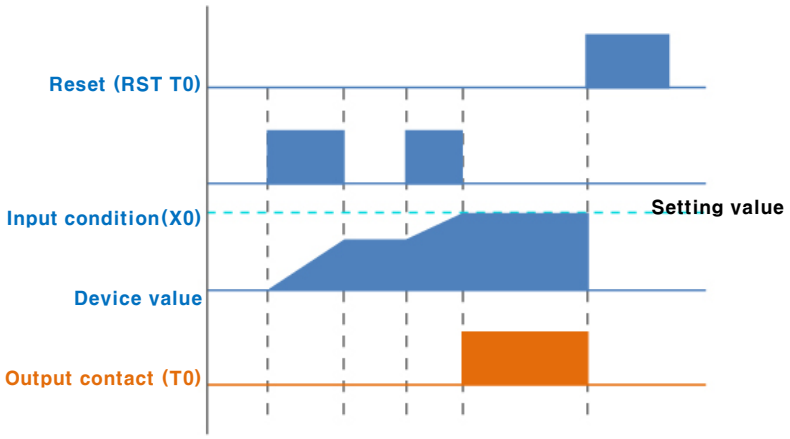
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. When the input signal is ON, the S device value of the timer is increased. And when the input signal is OFF, even if its value does not reach the setting value “N”, it retains the current status of its value, and when the input signal is ON again it is increased from that value.
2. When the S device value reaches the setting value “N”, the corresponding timer contact turns ON. If it encounters RST Txxxx instruction, the corresponding timer contact turns OFF and the S device value becomes “0”.

<Time chart>



5.5.8 Timer Instruction (TMON)

Timer instruction **TMON** **S** **N**

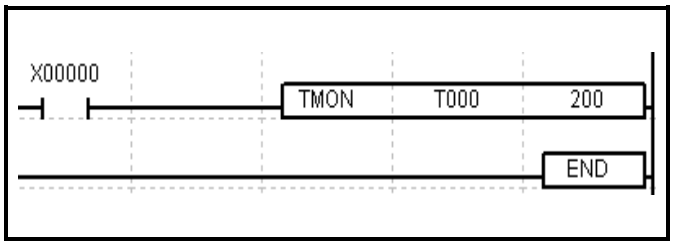
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	T, UW
		Timer contact you want to use
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, M , S, T, C, D, Z, F, UW, integer
		Setting value of timer
		0(h0000) to 65535(hFFFF)

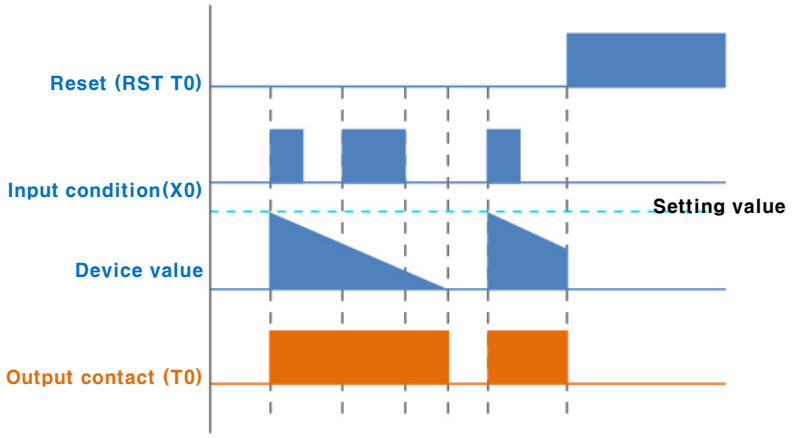
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. As soon as the input condition is ON, the corresponding timer contact turns ON, and the S device value of the timer is changed into the setting value “N” then it is decreasing.
2. Although the input condition is changed into ON/OFF in the middle of the execution, the timer is continuously operating, and when S device value of the timer reaches “0”, the timer contact is to be OFF.
3. When it encounters RSTxxx instruction, the corresponding timer contact will be OFF and the S device value of the timer will be “0”. .

<Time chart>



5.5.9 Timer Instruction (TRTG)

Timer instruction **TRTG** **S** **N**

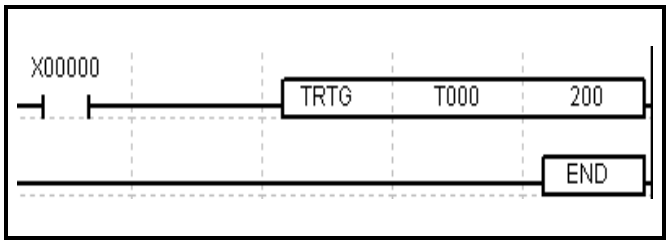
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	T, UW
		Timer contact you want to use
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, M , S, T, C, D, Z, F, UW, integer
		Setting value of timer
		0(h0000) to 65535(hFFFF)

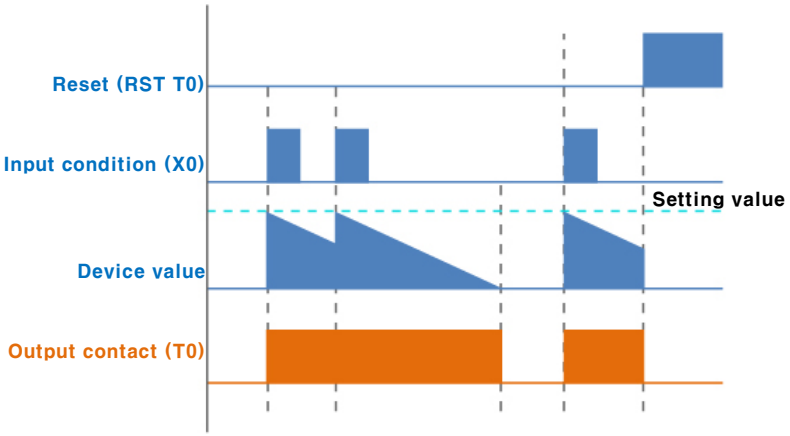
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. As soon as the input condition is ON, the corresponding timer contact turns ON and the S device value is changed into the setting value “N” then it is decreasing.
2. If the input condition turns OFF in the middle of the execution and then becomes ON, the S device value is changed into the setting value “N” again then it will be decreasing.
3. If it encounters the RST instruction, the corresponding timer contact turns OFF and the S device value is changed into “0”.

<Time chart>



5.5.10 Control Instruction (JMP)

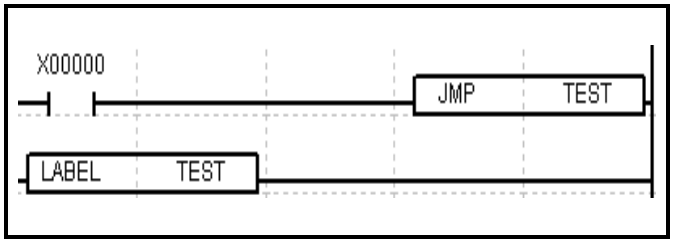
Control instruction **JMP** **LABEL**

Applicable model

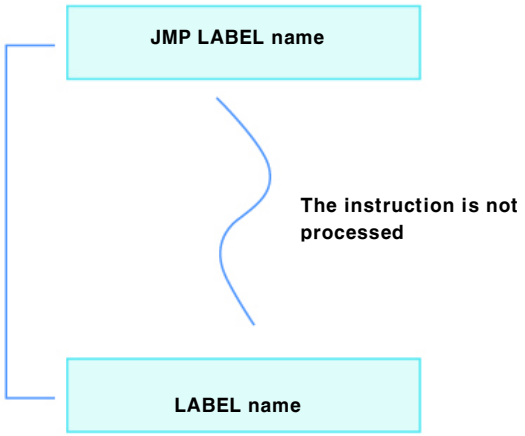
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
LABEL	STRING	LABEL name					
		Label for the place to jump					
		STRING	◎				3

<Ladder>



1. Jump to the place where the LABEL is matched.
2. When executing the JMP instruction, it does not process the instructions between JMP to LABEL.
3. If the LABEL does not exist, error flag occurs.

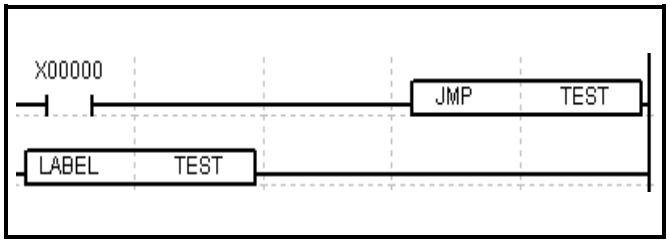


5.5.11 Control Instruction (LABEL)

Control instruction	LABEL	Label name	Applicable model
			LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
Label name	STRING	LABEL name					
		Label for the place to be jumped					
		STRING					3

<Ladder>



It is a destination for the JMP instruction.

5.5.12 Control Instruction (FCALL)

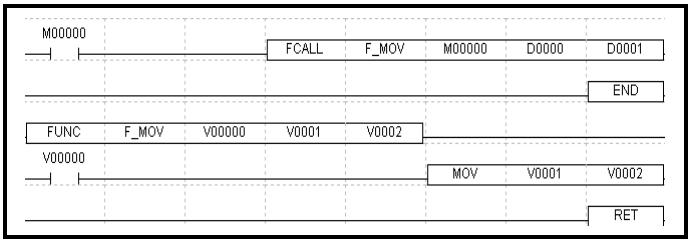
Control instruction **FCALL** **LABEL**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
LABEL	STRING	LABEL name					
		Label for the function to call					
		STRING	◎				3

<Ladder>



1. Calls the registered user defined function.
2. If you call an unused function, error flag occurs.
3. When you input the instruction statement, the number of operands should be matched.

5.5.13 Control Instruction (FUNC)

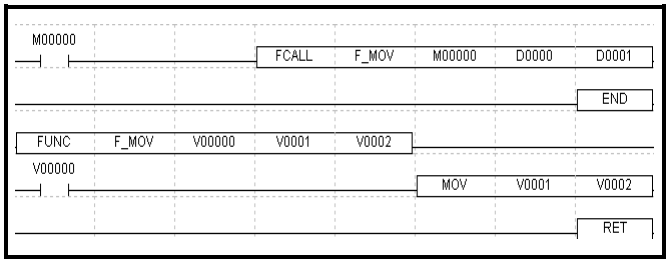
Control instruction **FUNC** **LABEL**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
LABEL	STRING	LABEL name					
		Label for the starting position of the function					
		STRING					3

<Ladder>



1. Represents the starting position of the user defined function.
2. It should be located behind the END sentence.
3. The virtual function device “V” is being used.
4. The RET sentence should be located in the last part of the FUNC statement.

5.5.14 Branch Instruction (CALL)

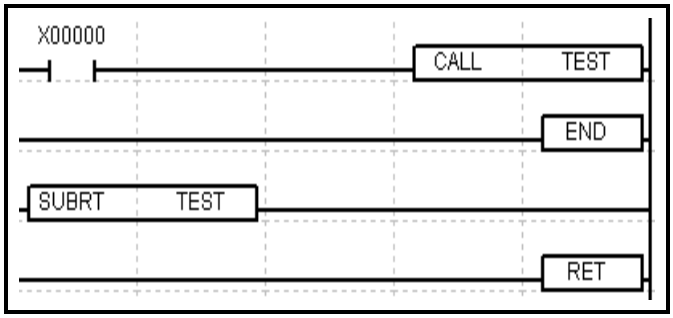
Branch instruction **CALL** **LABEL**

Applicable model

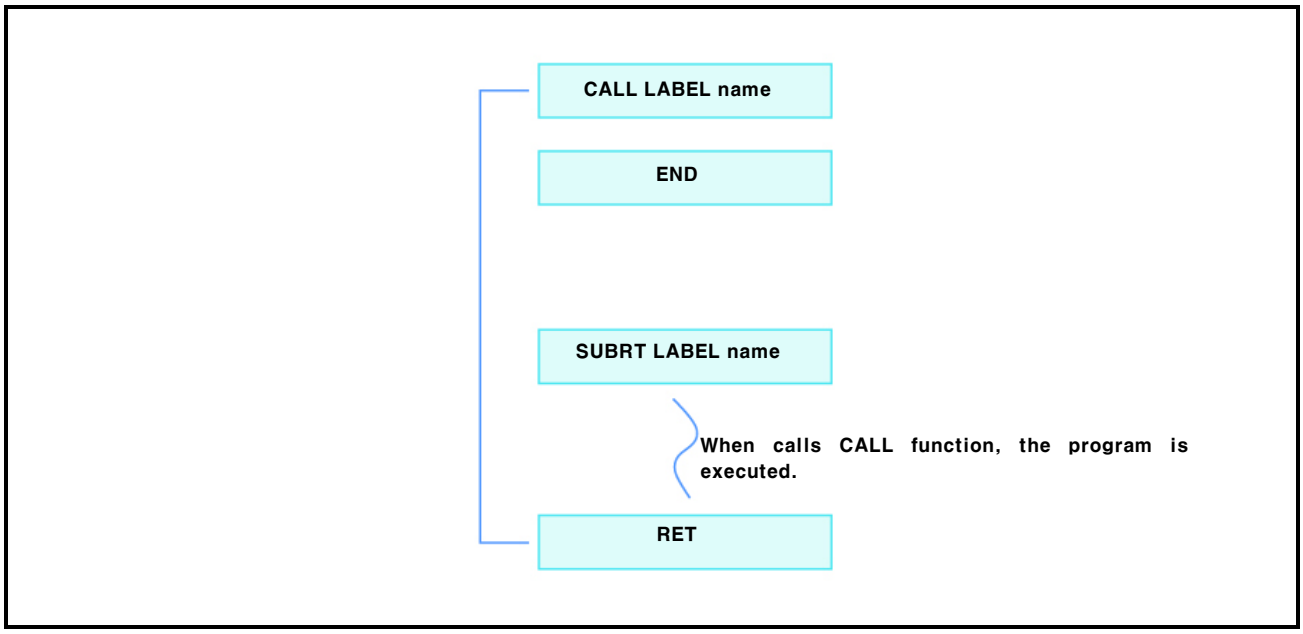
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
LABEL	STRING	LABEL name Label for the function to call					
		STRING					3

<Ladder>



1. Calls the subroutine, such as “LABLE” name. (Executing the program between the SUBRT LABEL to RET instructions)
2. CALL LABEL can be used in duplicating, and the program between SUBRT LABEL to RET instructions should be located behind the END instruction.



5.5.15 Branch Instruction (SUBRT)

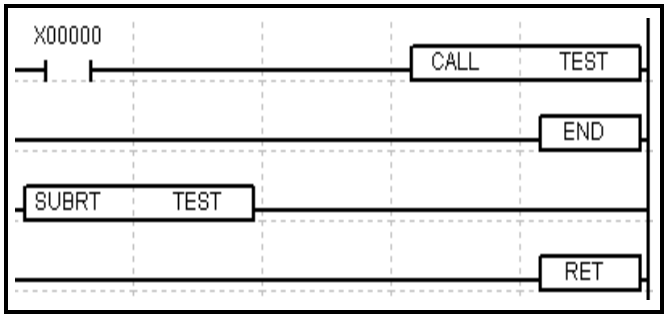
Branch instruction **SUBRT** **LABEL**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
LABEL	STRING	LABEL name					
		A label for the called function					
		STRING					3

<Ladder>



1. Displays the starting point of the CALL subroutine.
2. It should be located behind END and cannot be used in duplicate.(For CALL statement, it is able to be used in duplicate)

5.5.16 Branch Instruction (RET)

Branch instruction	RET	Applicable model LP-S044, LP-S070, LP-A070, LP-A104

Exits the subroutine

5.5.17 Loop Instruction (FOR)

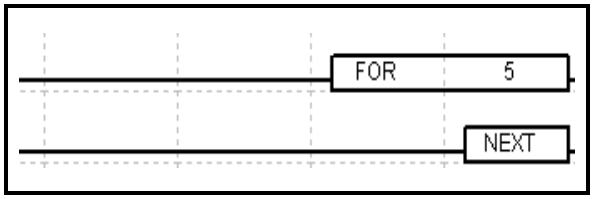
Loop instruction **FOR** **N**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
N	WORD	Integer					
		0(h0000) to 65535(hFFFF)					3

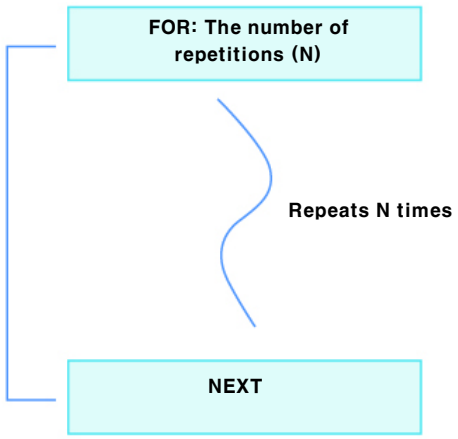
<Ladder>



1. Sets the number of repetitions for the program with the NEXT instruction.
2. The program is repeated N times until encountering the NEXT.
3. The range for the number of repetitions is from 0 to 65535.

[Note]

The scan time can be longer than you expected therefore please use the WDT instruction in order not to exceed the setting value.



5.5.18 Loop Instruction (NEXT)

Loop instruction	NEXT	Applicable model LP-S044, LP-S070, LP-A070, LP-A104

The program is repeated from the FOR instruction to the NEXT instruction.

5.5.19 Loop Instruction (BREAK)

Loop instruction	BREAK	Applicable model LP-S044, LP-S070, LP-A070, LP-A104

Repeat operation is executed with FOR, NEXT instruction. With BREAK instruction, the repeated operation stops even though repeated execution is not complete.

5.5.20 Master control Instruction (MCS)

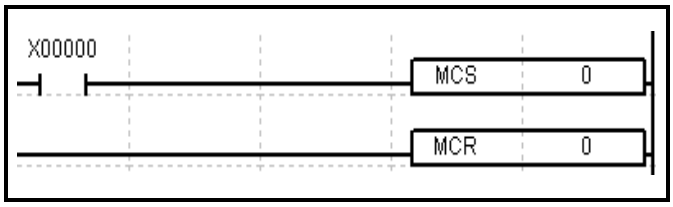
Master control instruction **MCS** **N**

Applicable model

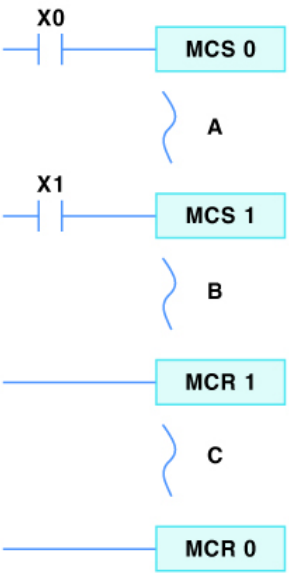
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
N	Invariable number	Integer					
		MCS number (0 to 7)					
		0 to 7	◎				2

<Ladder>



1. If the input condition of MCS is ON, the program is executed to the MCR instruction, which has the same number of MCS. And if the input condition turns OFF, the program does not execute the instruction.
2. MCS number “0” has the highest priority and MCS number “15” has the lowest priority, therefore you should use them in order of priority, and should clear them in reverse order.
3. When you execute the MCR instruction, if you clear the higher priority the MCS block, which has the lower priority, is cleared too.
4. MCS or MCR instruction should be used in order of its priority.



Example) **1. When X0 is ON and X1 is OFF, A and C program are cleared**

2. When XO is ON and X1 is ON, A, B, C program are cleared

3. When XO is OFF and X1 is ON, A, B, C program are not cleared.

4. When XO is OFF and X1 is OFF, A, B, C programs are not cleared.

5.5.21 Master control Instruction (MCR)

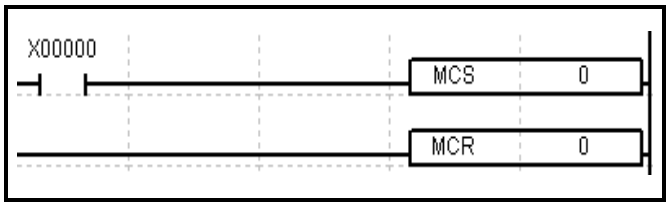
Master control instruction **MCR** **N**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
N	Invariable number	Integer					
		MCR number (0 to 7)					
		0 to 7					2

<Ladder>



Master control reset

Clears the registered master control by using the MCS instruction.

5.5.22 Interrupt Instruction (EI)

Interrupt instruction **EI**

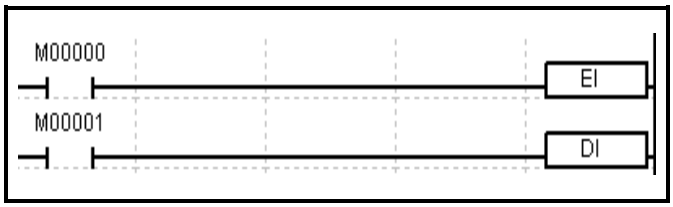
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
		Not applicable

Error	Zero	Carry	Borrow	Step
				1

<Ladder>



Enable Interrupt

1. Enables all interrupts.
2. Enables the entire time interrupts and external interrupts.
3. In order to use the individual interrupt, you should use ETI and EEI instructions.

5.5.23 Interrupt Instruction (DI)

Interrupt instruction **DI**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
							1

<Ladder>

Disable Interrupt

1. Disables all interrupts.
2. Disables the entire time interrupts and external interrupts.
3. In order to disable the individual interrupt, you should use the DTI and DEI instructions.

5.5.24 Interrupt Instruction (ETI)

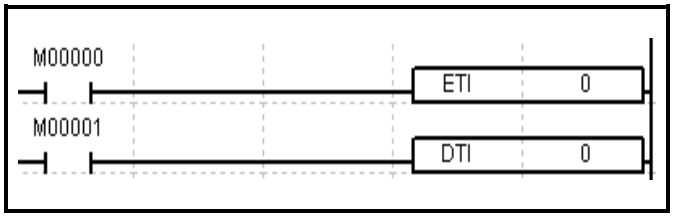
Interrupt instruction **ETI**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
	Invariable number	Integer					
		0 to 7					1

<Ladder>



Enable Time Interrupt

1. Enables the individual time interrupt.
2. In order to use ETI, you should activate all interrupts by using EI instruction first.
3. Structure of the instructions

ETI Time Interrupt Number(0 to 7)

5.5.25 Interrupt Instruction (EEI)

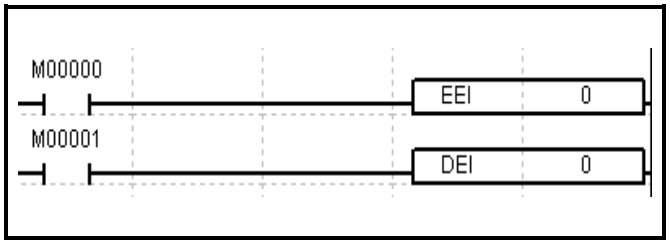
Interrupt instruction **EEI**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
	Invariable number	Integer					
		0 to 15					1

<Ladder>



1. Enables the individual external interrupt.
2. In order to use the EEI, you should activate all interrupts by using EI instruction first.
3. Structure of the instructions

EEI External Interrupt Number(0 to 15)

5.5.26 Interrupt Instruction (DTI)

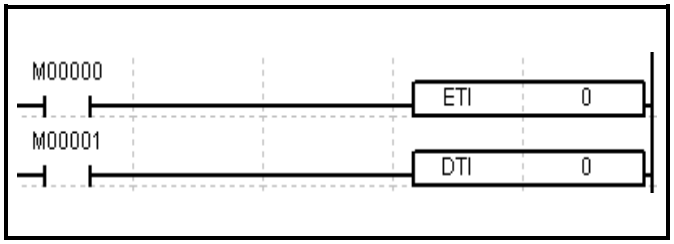
Interrupt instruction **DTI**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
	Invariable number	Integer					
		0 to 7					1

<Ladder>



Disable Time Interrupt
1. Disables the individual time interrupt.
2. Structure of the instructions
DTI Time Interrupt Number(0 to 7)

5.5.27 Interrupt Instruction (DEI)

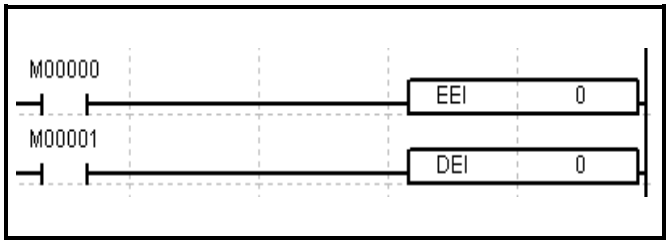
Interrupt instruction **DEI**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
	Invariable number	Integer					
		0 to 15					1

<Ladder>



Disable External Interrupt
1. Disables the individual external interrupt.
2. Structure of the instructions
DEI External Interrupt Number(0 to 15)

5.5.28 Interrupt Instruction (TINT)

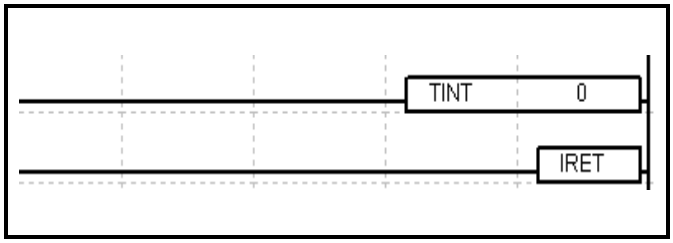
Interrupt instruction **TINT**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
	Invariable number	Integer					
		0 to 7					1

<Ladder>

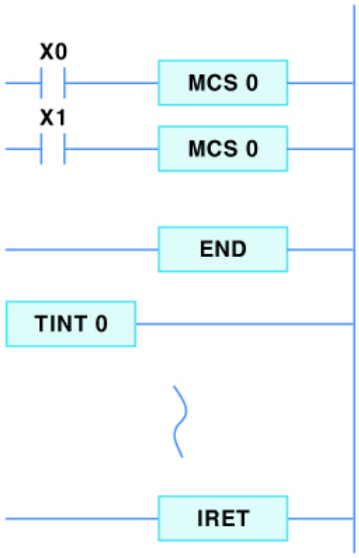


Time Interrupt

1. Represents the starting point of the time interrupt block.
2. In order to indicate the end of block, you should use the IRET instruction at the end of TINT block.
3. Structure of the instructions

TINT Time Interrupt Number(0 to 7)

Example)



As soon as the input contact of ETI 0 is ON, TINT0 to IRET loop runs.

When the input contact of DTI 0 is ON, TINT0 to IRET loop stops.

5.5.29 Interrupt Instruction (EINT)

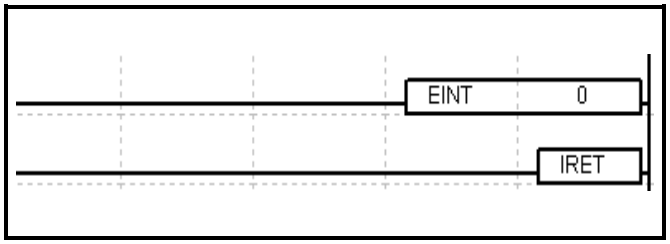
Interrupt instruction **EINT**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
	Invariable number	Integer					
		0 to 15					1

<Ladder>



External Interrupt

1. Represent the starting point of the external interrupt block.
2. In order to indicate the end of block, you should use the IRET instruction at the end of EINT block.
3. Structure of the instructions

EINT External Interrupt Number(0 to 15)

5.5.30 Interrupt Instruction (IRET)

Interrupt instruction **IRET**

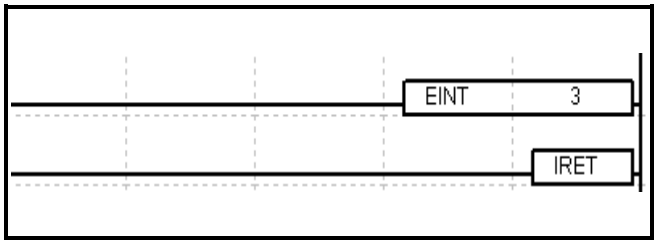
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range

Error	Zero	Carry	Borrow	Step
				1

<Ladder>



Interrupt Return

1. Represents the end of time interrupt and external interrupt blocks.
2. As below, it is generally being used with TINT or EINT instruction as a pair.

TINT to IRET

EINT to IRET

5.5.31 Watchdog timer(WDT)

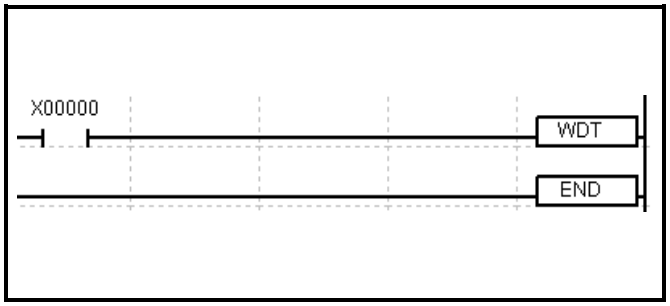
Watchdog timer **WDT**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
							1

<Ladder>



1. Resets watch dog timer during the program operation.
2. When the operation time from 0 step to END is over than max. watchdog setting time, program operation stops and WDT instruction should be used.
3. Watch dog setting value is able to change by special device.
4. When resupply power, watchdog setting value is reset as 200ms.

5.5.32 Input comparison Instruction (LOAD=)

Input comparison instruction **LOAD=** **S1** **S2**

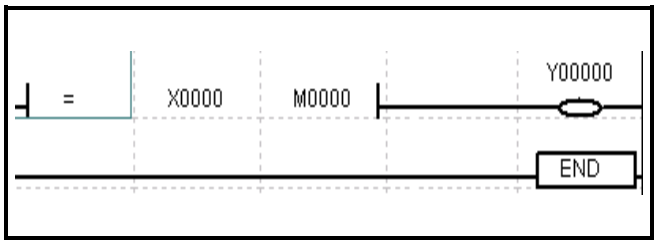
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

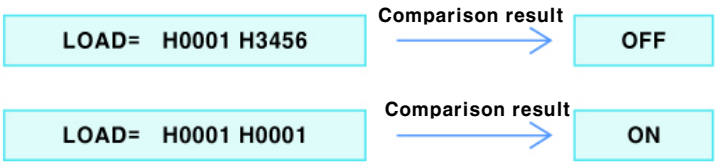
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. Compares the word value of S1 with that of S2, and if they are equal, it turns ON.
2. If the word values of S1 and S2 are not equal, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Ex)



5.5.33 Input comparison Instruction (LOAD>)

Input comparison instruction **LOAD>** **S1** **S2**

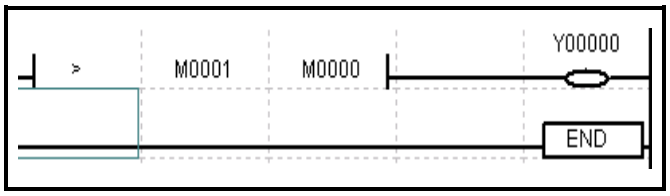
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

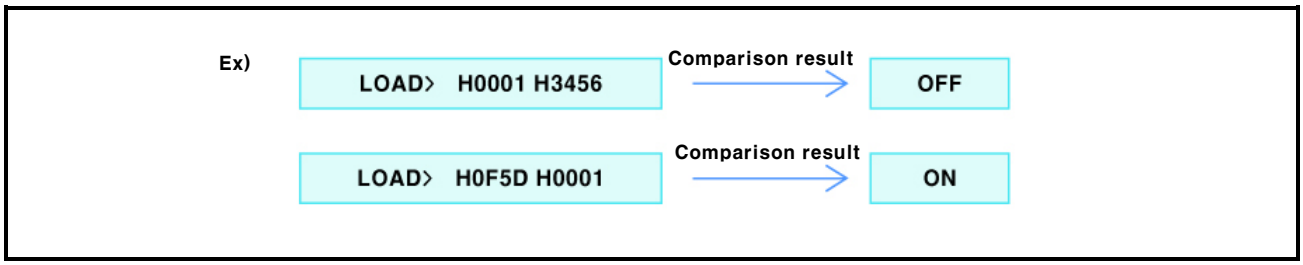
OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is greater than that of S2, it turns ON.
2. If the word value of S1 is less than or equal to that of S2, it turns OFF.
3. Execute the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))



5.5.34 Input comparison Instruction (LOAD<)

Input comparison instruction **LOAD<** **S1** **S2**

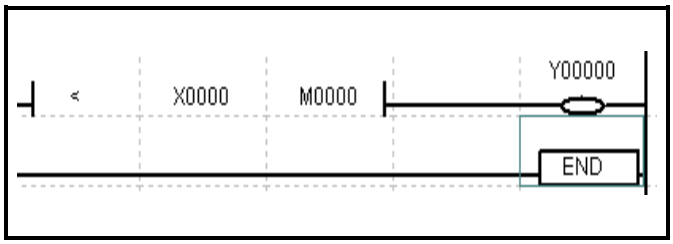
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

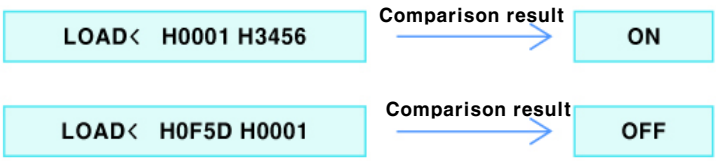
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the world value of S1 is less than that of S2, it turns ON.
2. If the word value of S1 is greater than or equal to that of S2, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to hFFFF(32767))

Ex)



]

5.5.35 Input comparison Instruction (LOAD<>)

Input comparison instruction **LOAD< >** **S1** **S2**

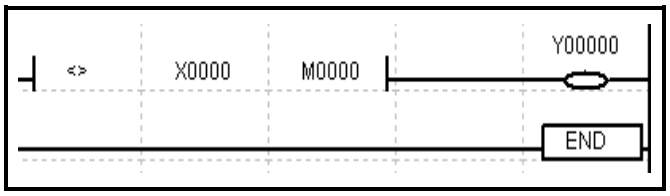
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

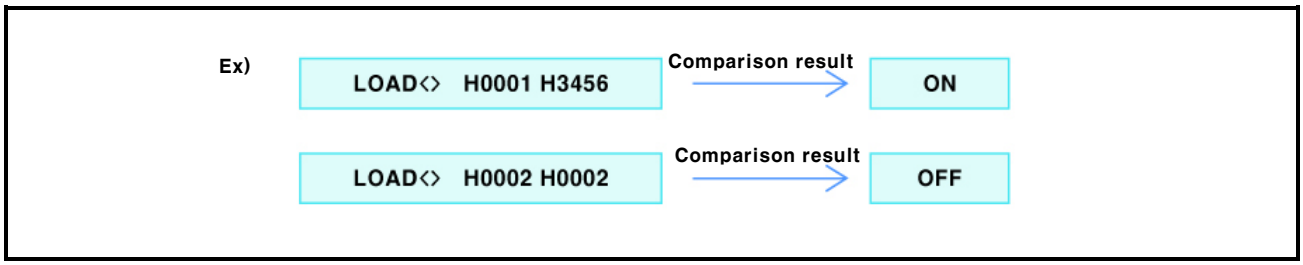
OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word values of S1 and S2 are not equal, it turns ON.
2. If the word values of S1 and S2 are equal, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))



5.5.36 Input comparison Instruction (LOAD>=)

Input comparison instruction **LOAD>=** **S1** **S2**

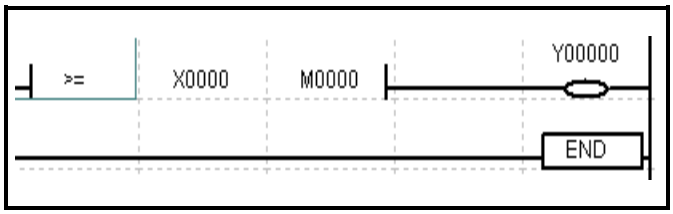
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

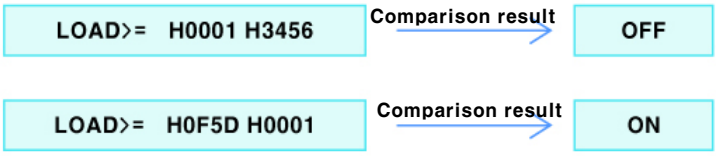
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is less than or equal to that of
S2, it turns ON.
2. If the word value of S1 is greater than that of S2, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Ex)



5.5.37 Input comparison Instruction (LOAD<=)

Input comparison instruction **LOAD<=** **S1** **S2**

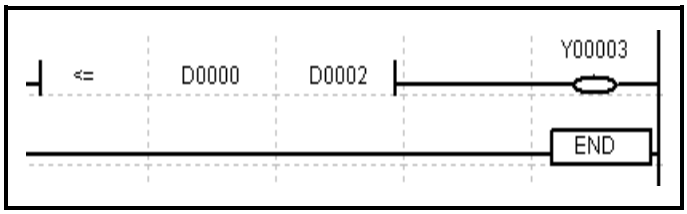
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

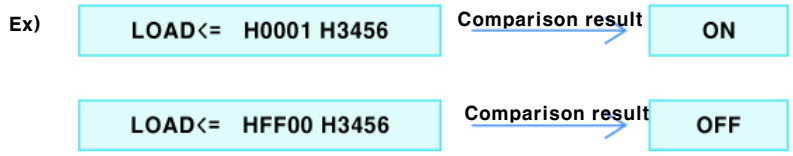
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is less than or equal to that of S2, it turns ON.
2. If the word value of S1 is greater than that of S2, it turns OFF.
3. Executes the Signed comparison. (h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Ex)



5.5.38 Input comparison Instruction (DLOAD=)

Input comparison instruction **DLOAD=** **S1** **S2**

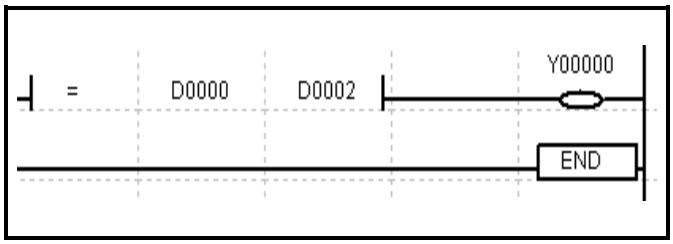
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word values of S1 and S2 are equal, it turns ON.
2. If the double word values of S1 and S2 are not equal, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Ex)

DLOAD=	H000100FF	H34561000	Comparison result →	OFF
DLOAD=	H00014000	H00014000	Comparison result →	ON

5.5.39 Input comparison Instruction (DLOAD>)

Input comparison instruction **DLOAD>** **S1** **S2**

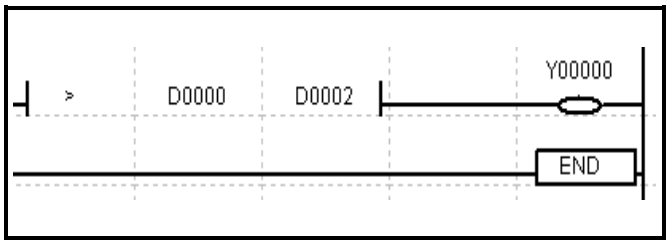
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

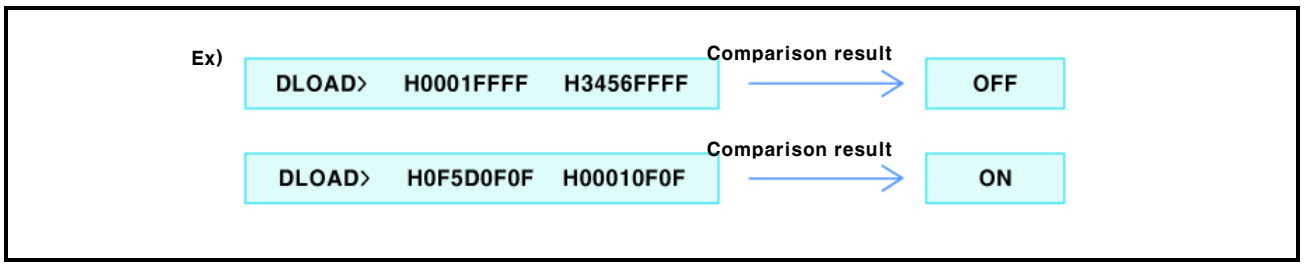
OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is greater than that of S2, it turns ON.
2. If the double word value of S1 is less than or equal to that of S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))



5.5.40 Input comparison Instruction (DLOAD<)

Input comparison instruction **DLOAD<** **S1** **S2**

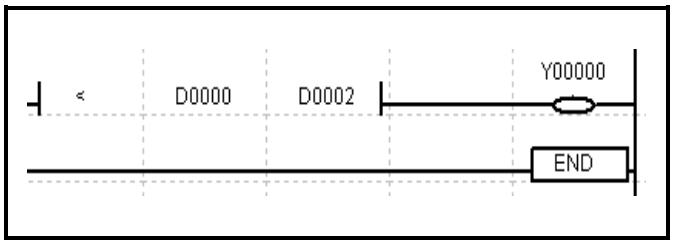
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

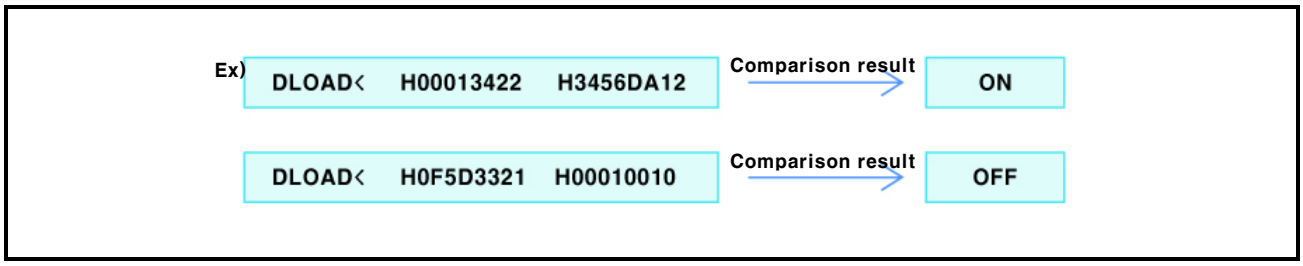
OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is less than that of S2, it turns ON.
2. If the double word value of S1 is greater than that of
S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))



5.5.41 Input comparison Instruction (DLOAD<>)

Input comparison instruction **DLOAD<>** **S1** **S2**

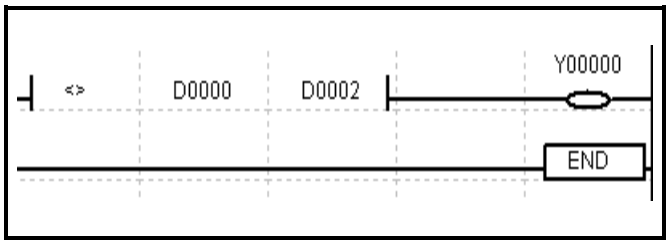
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

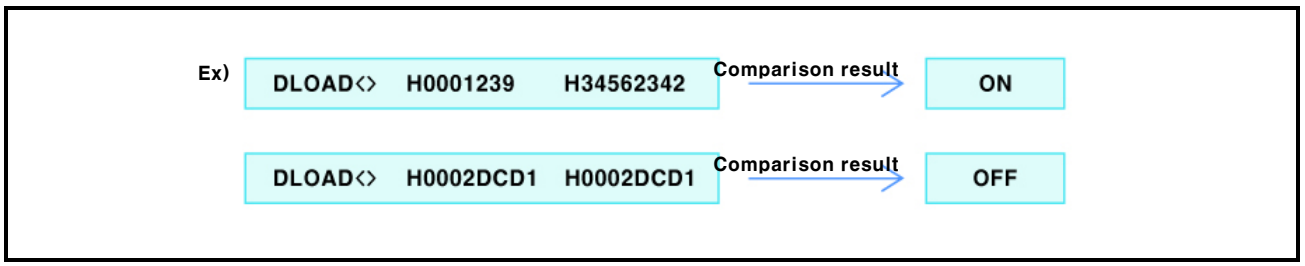
OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word values of S1 and S2 are not equal, it turns ON.
2. If the double word value of S1 and S2 are equal, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))



5.5.42 Input comparison Instruction (DLOAD>=)

Input comparison instruction **DLOAD>=** **S1** **S2**

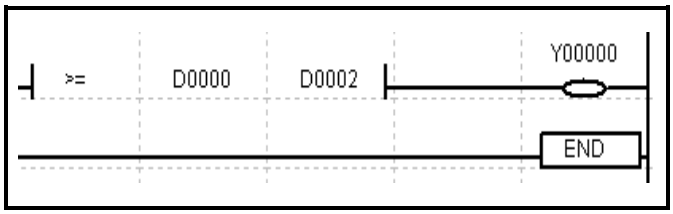
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	integer, *, Z, X, Y, M, D, L, F, T, C, UW
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is greater than or equal to that of S2, it turns ON.
2. If the double word value of S1 is less than that of S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Ex)

DLOAD>= H00010000 H345632DD → Comparison result → OFF

DLOAD>= H0F5DD123 H00010000 → Comparison result → ON

5.5.43 Input comparison Instruction (DLOAD<=)

Input comparison instruction **DLOAD<=** **S1** **S2**

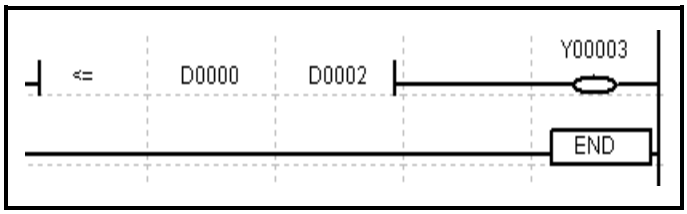
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

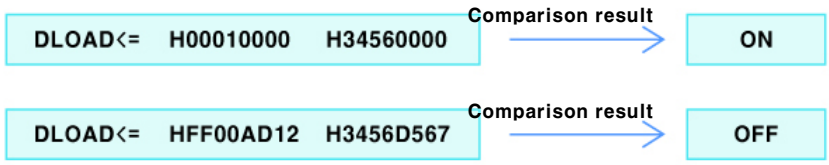
Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is less than or equal to that of S2, it turns ON.
2. If the double word value of S1 is greater than that of S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Ex)



5.5.44 Input comparison Instruction (AND=)

Input comparison instruction **AND=** **S1** **S2**

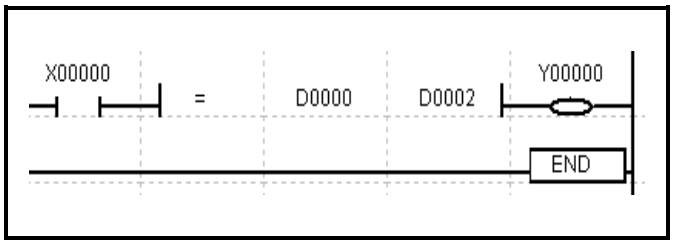
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word values of S1 and S2 are equal, it turns ON.
2. If the word values of S1 and S2 are not equal, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Instruction	Condition	Comparison result
AND =	S1 = S2	ON

5.5.45 Input comparison Instruction (AND>)

Input comparison instruction **AND>** **S1** **S2**

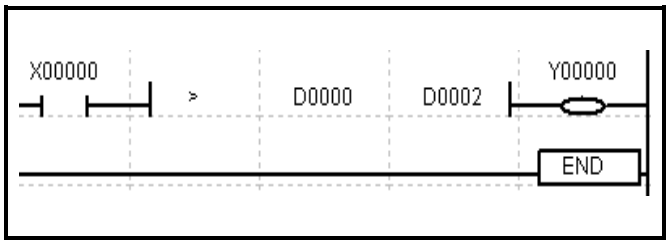
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is greater than that of S2, it turns ON.
2. If the word value of S1 is less than or equal to that of
S2, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Instruction	Condition	Comparison result
AND >	S1 > S2	ON

5.5.46 Input comparison Instruction (AND<)

Input comparison instruction **AND<** **S1** **S2**

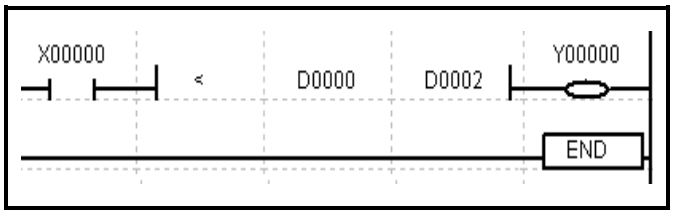
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is less than that of S2, it turns ON.
2. If the word value of S1 is greater than or equal to that of S2, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Instruction	Condition	Comparison result
AND <	S1 < S2	ON

5.5.47 Input comparison Instruction (AND<>)

Input comparison instruction **AND< >** **S1** **S2**

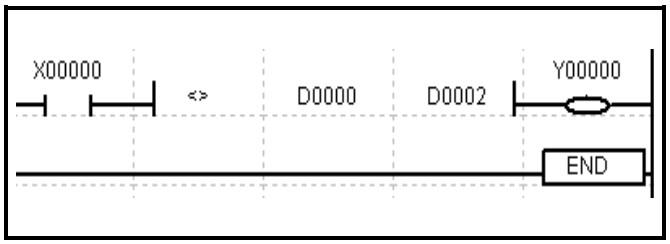
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word values of S1 and S2 are not equal, it turns ON.
2. If the word values of S1 and S2 are equal, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Instruction	Condition	Comparison result
AND < >	S1 < > S2	ON

5.5.48 Input comparison Instruction (AND>=)

Input comparison instruction **AND>=** **S1** **S2**

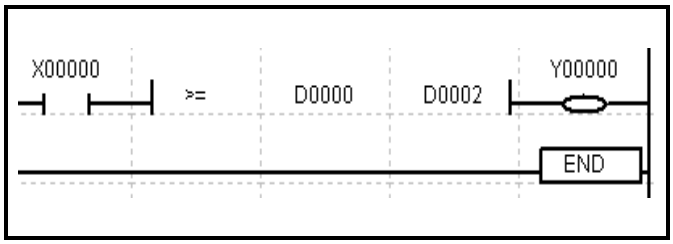
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is greater than or equal to that of S2, it turns ON.
2. If the word value of S1 is less than that of S2, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Instruction	Condition	Comparison result
AND > =	S1 > = S2	ON

5.5.49 Input comparison Instruction (AND<=)

Input comparison instruction AND<= S1 S2

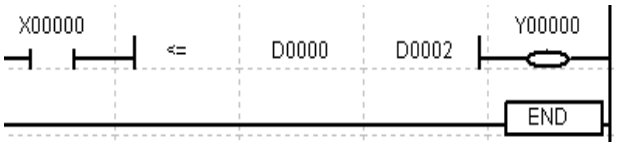
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is less than or equal to that of
S2, it turns ON.
2. If the word value of S1 is greater than that of S2, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Instruction	Condition	Comparison result
AND < =	S1 < = S2	ON

5.5.50 Input comparison Instruction (DAND=)

Input comparison instruction **DAND=** **S1** **S2**

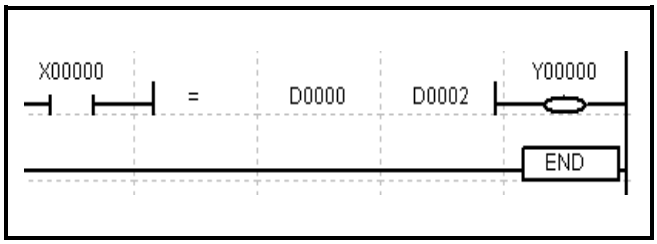
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word values of S1 and S2 are equal, it turns ON.
2. If the double word values of S1 and S2 are not equal, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Instruction	Condition	Comparison result
DAND =	S1 = S2	ON

5.5.51 Input comparison Instruction (DAND>)

Input comparison instruction **DAND>** **S1** **S2**

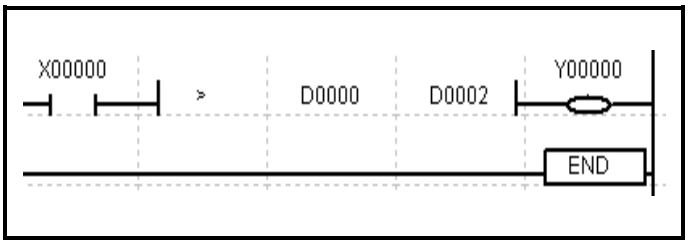
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is greater than that of S2, it turns ON.
2. If the double word value of S1 is less than or equal to that of S2, it turns OFF. .
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Instruction	Condition	Comparison result
DAND >	S1 > S2	ON

5.5.52 Input comparison Instruction (DAND<)

Input comparison instruction **DAND<** **S1** **S2**

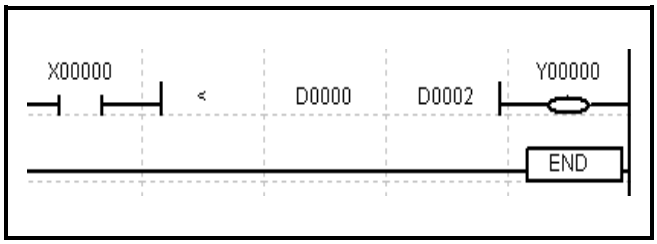
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is less than that of S2, it turns ON.
2. If the double word value of S1 is greater than or equal to that of S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Instruction	Condition	Comparison result
DAND <	S1 < S2	ON

5.5.53 Input comparison Instruction (DAND<>)

Input comparison instruction **DAND< >** **S1** **S2**

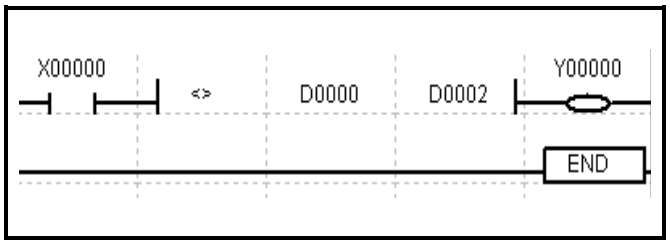
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word values of S1 and S2 are not equal, it turns ON.
2. If the double word values of S1 and S2 are equal, it turns OFF.
3. Executes the Signed comparison. (h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Instruction	Condition	Comparison result
DAND < >	S1 < > S2	ON

5.5.54 Input comparison Instruction (DAND>=)

Input comparison instruction **DAND>=** **S1** **S2**

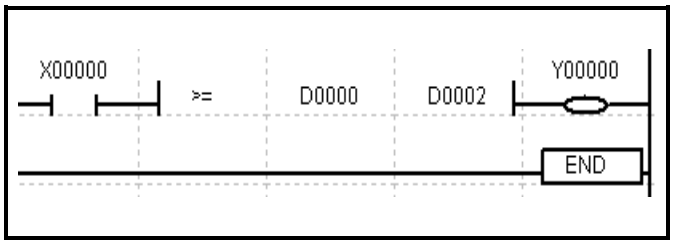
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is greater than or equal to that of S2, it turns ON.
2. If the double word value of S1 is less than that of S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Instruction	Condition	Comparison result
DAND > =	S1 > = S2	ON

5.5.55 Input comparison Instruction (DAND<=)

Input comparison instruction DAND<= S1 S2

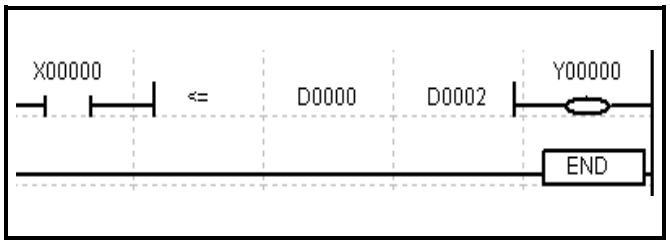
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is less than or equal to that of S2, it turns ON.
2. If the double word value of S1 is greater than that of
S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Instruction	Condition	Comparison
DAND < =	S1 < = S2	ON

5.5.56 Input comparison Instruction (OR=)

Input comparison instruction **OR=** **S1** **S2**

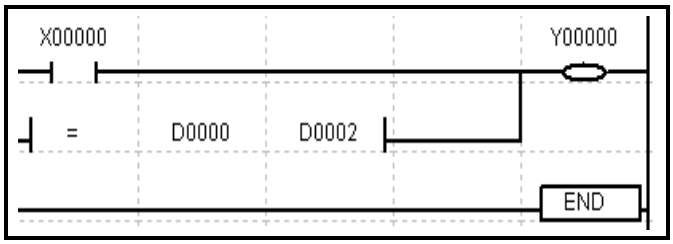
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is equal to that of S2, it turns ON.
2. If the word value of S1 is not equal to that of S2, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Instruction	Condition	Comparison
OR =	S1 = S2	ON

5.5.57 Input comparison Instruction (OR>)

Input comparison instruction **OR>** **S1** **S2**

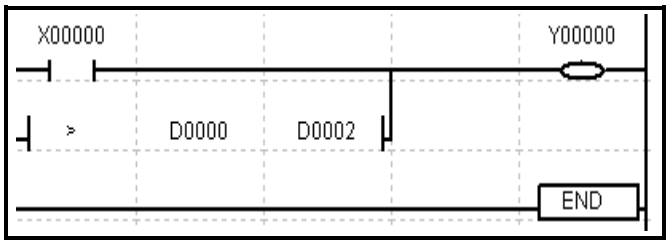
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is greater than that of S2, it turns ON.
2. If the word value of S1 is less than or equal to that of S2, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Instruction	Condition	Comparison
OR >	S1 > S2	ON

5.5.58 Input comparison Instruction (OR<)

Input comparison instruction **OR<** **S1** **S2**

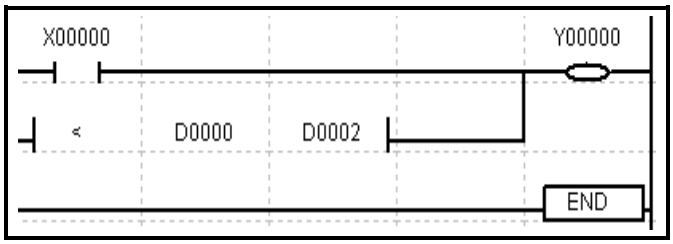
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is less than that of S2, it turns ON.
2. If the word value of S1 is greater than or equal to that of S2, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Instruction	Condition	Comparison
OR <	S1 < S2	ON

5.5.59 Input comparison Instruction (OR<>)

Input comparison instruction **OR< >** **S1** **S2**

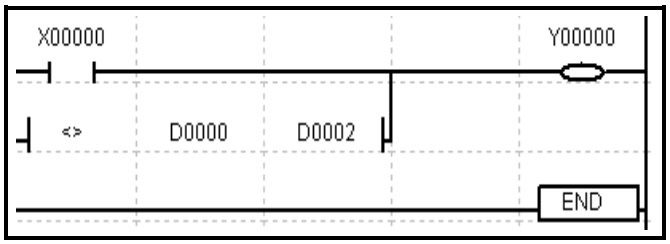
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is not equal to that of S2, it turns ON.
2. If the word value of S1 is equal to that of S2, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Instruction	Condition	Comparison
OR < >	S1 < > S2	ON

5.5.60 Input comparison Instruction (OR>=)

Input comparison instruction OR>= S1 S2

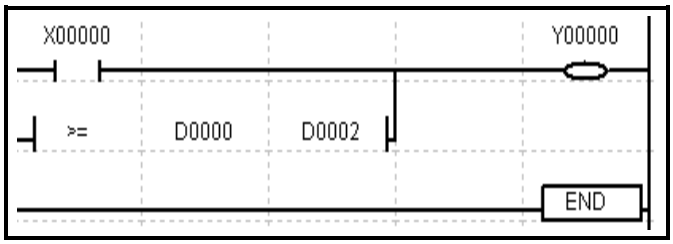
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is greater than or equal to that of S2, it turns ON.
2. If the word value of S1 is less than that of S2, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Instruction	Condition	Comparison
OR > =	S1 > = S2	ON

5.5.61 Input comparison Instruction (OR<=)

Input comparison instruction OR< = S1 S2

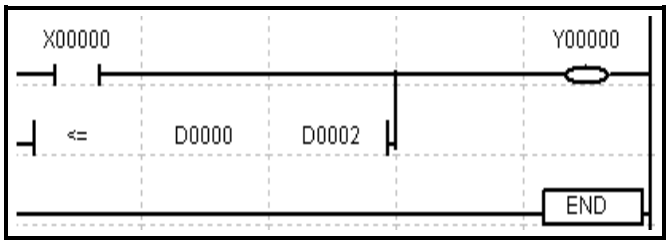
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the word value of S1 is less than or equal to that of S2, it turns ON.
2. If the word value of S1 is greater than that of S2, it turns OFF.
3. Executes the Signed comparison.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

Instruction	Condition	Comparison
OR < =	S1 < = S2	ON

5.5.62 Input comparison Instruction (DOR=)

Input comparison instruction **DOR=** **S1** **S2**

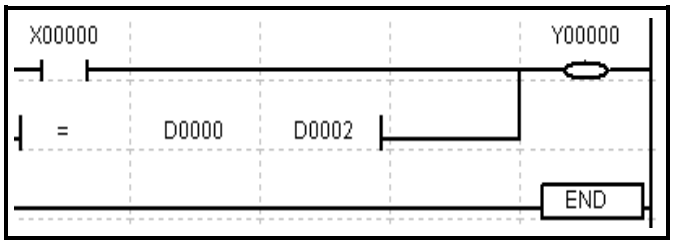
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is equal to that of S2, it turns ON.
2. If the double word value of S1 is not equal to that of S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Instruction	Condition	Comparison
DOR =	S1 = S2	ON

5.5.63 Input comparison Instruction (DOR>)

Input comparison instruction **DOR>** **S1** **S2**

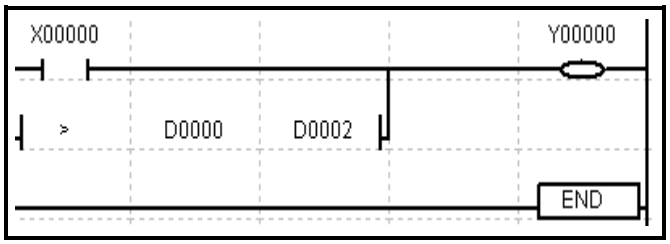
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is greater than that of
S2, it turns ON.
2. If the double word value of S1 is less than or equal to that of S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) <
0 to h7FFFFFFF(2147483647))

Instruction	Condition	Comparison
DOR >	S1 > S2	ON

5.5.64 Input comparison Instruction (DOR<)

Input comparison instruction **DOR<** **S1** **S2**

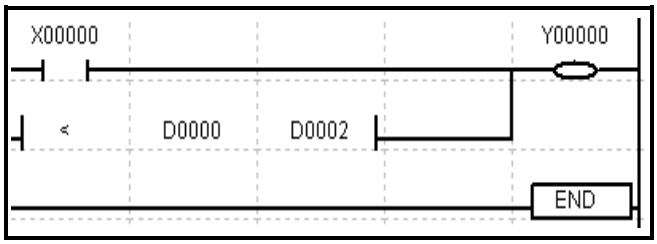
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is less than that of S2, it turns ON.
2. If the double word value of S1 is greater than or equal to that of S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Instruction	Condition	Comparison
DOR <	S1 < S2	ON

5.5.65 Input comparison Instruction (DOR<>)

Input comparison instruction **DOR< >** **S1** **S2**

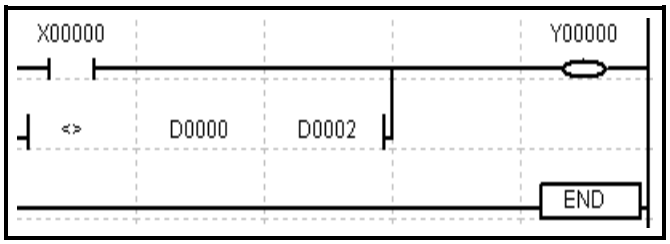
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is not equal to that of S2, it turns ON.
2. If the double word value of S1 is equal to that of S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Instruction	Condition	Comparison
DOR < >	S1 < > S2	ON

5.5.66 Input comparison Instruction (DOR>=)

Input comparison instruction DOR>= S1 S2

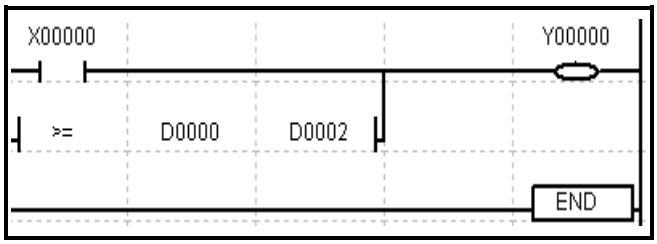
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is greater than or equal to that of S2, it turns ON.
2. If the double word value of S1 is less than that of S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Instruction	Condition	Comparison
DOR > =	S1 > = S2	ON

5.5.67 Input comparison Instruction (DOR<=)

Input comparison instruction **DOR<=** **S1** **S2**

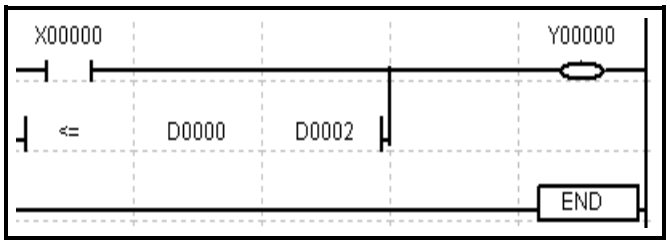
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. If the double word value of S1 is less than or equal to that of S2, it turns ON.
2. If the double word value of S1 is greater than that of
S2, it turns OFF.
3. Executes the Signed comparison.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

Instruction	Condition	Comparison
DOR < =	S1 < = S2	ON

5.5.68 Comparison Instruction (CMP)

Comparison instruction **CMP** **S1** **S2** **D**

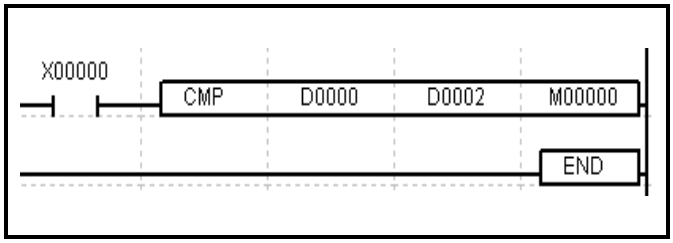
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-32768(h8000) to 32767(h7FFF)
D	BIT	Y, M, UB
		Lead address of bit device to save the comparison result
		Not applicable

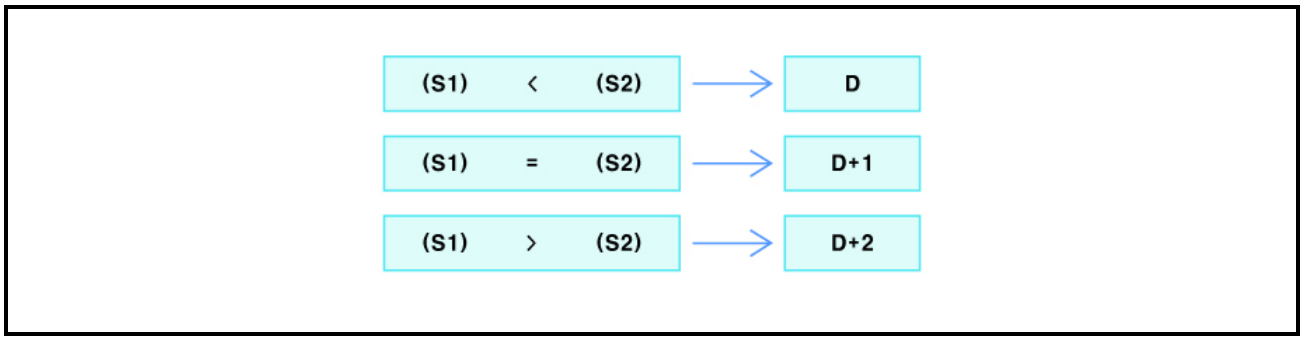
Error	Zero	Carry	Borrow	Step
				7

<Ladder>



Compares the word value of S1 with that of S2. The result is as below :

1. If S1 < S2, D bit turns ON.
2. If S1 = S2, D+1 bit turns ON.
3. If S1> S2, D+2 bit turns ON.
4. Comparison executes the Signed operation. (h8000(-32768) to h7FFF(-1) < 0 to h7FFF(32767))



5.5.69 Comparison Instruction (DCMP)

Comparison instruction **DCMP** **S1** **S2** **D**

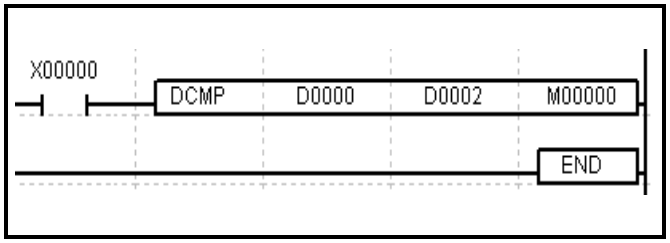
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or address to compare with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
D	BIT	Y, M, UB
		Lead address of bit device to save the comparison result
		Not applicable

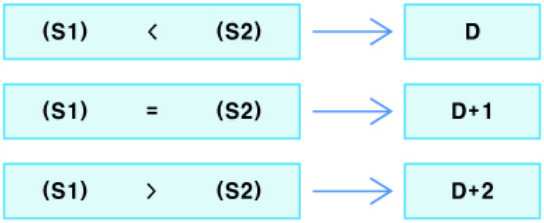
Error	Zero	Carry	Borrow	Step
				7

<Ladder>



Compares the double word value of S1 with that of S2. The result is as below :

1. If S1 < S2, D bit turns ON.
2. If S1 = S2, D+1 bit turns ON.
3. If S1 > S2, D+2 bit turns ON.
4. Comparison executes the Signed operation. (h8000(-32768) to h7FFF(-1) < 0 to h7FFF(32767))



5.5.70 Comparison Instruction (ACMP)

Comparison instruction **ACMP** **S1** **S2** **D** **N**

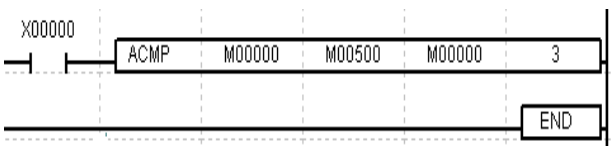
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	BIT	X, Y, F, T, C, M, UB
		Lead address of data or bit device to compare with S2
		Not applicable
S2	BIT	X, Y, F, T, C, M, UB
		Lead address of data or bit device to compare with S1
		Not applicable
D	BIT	Y, M, UB
		Lead address of bit device to save the comparison result
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of devices to compare
		1 to 32

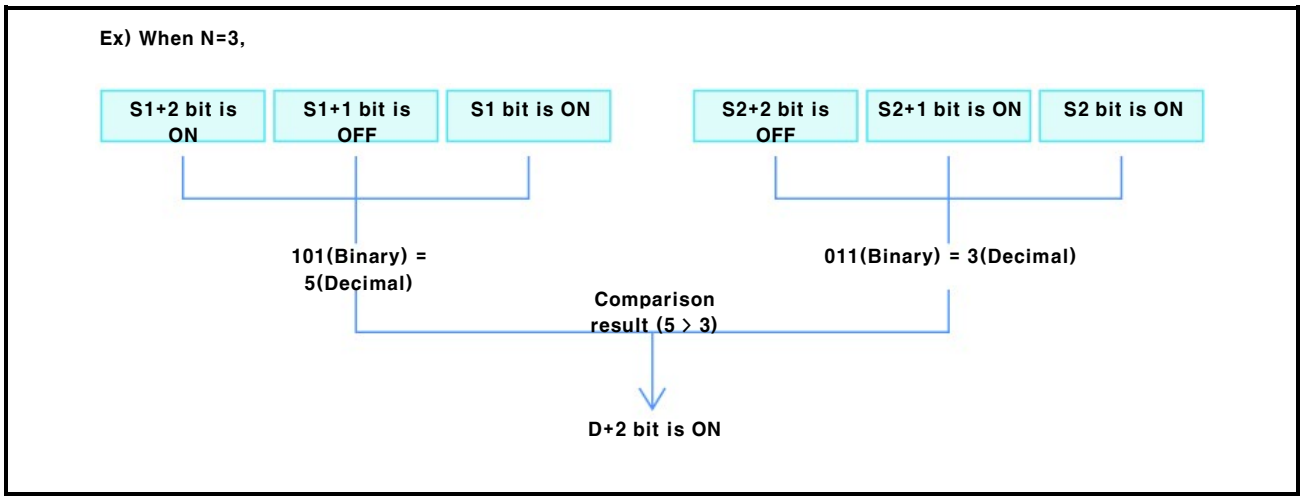
Error	Zero	Carry	Borrow	Step
				7

<Ladder>



Compares the number of N bit values beginning with S1 bit with the number of N bit values beginning with S2 bit. As a result :

1. If S1 < S2, D bit turns ON.
2. If S1==S2, D+1 bit turns ON.
3. If S1>S2, D+2 bit turns ON.



5.5.71 Comparison Instruction (CMPL)

Comparison instruction CMPL S1 S2 D N

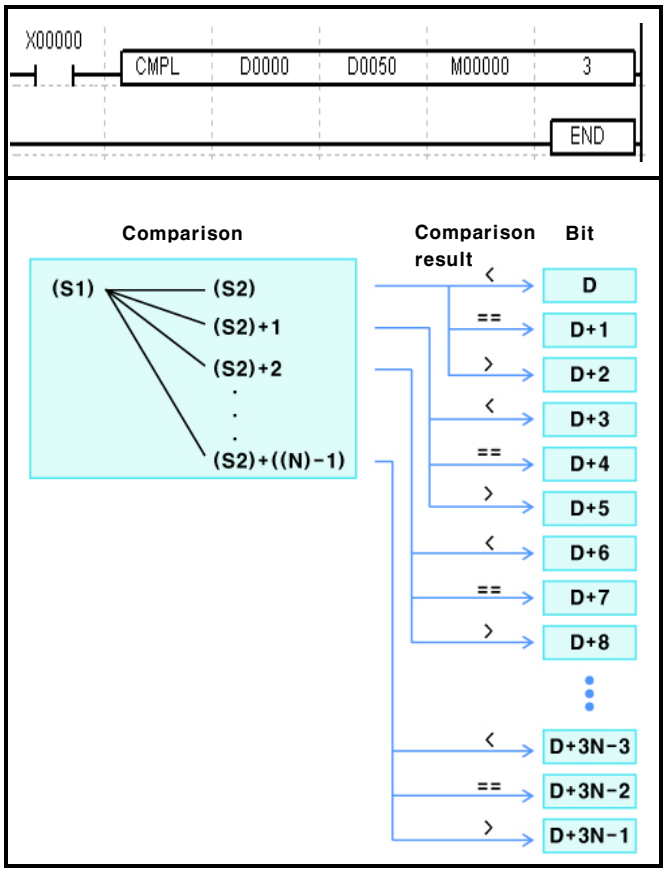
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or data address to compare with S2
		-32768(h8000) to 32767(hFFFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or data address to compare with S1
		-32768(h8000) to 32767(hFFFF)
D	BIT	Y, M, UB
		Lead address of bit device to save comparison result
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data to compare with S1 data
		As many as the number of devices remained in S1, S2 and D area

Error	Zero	Carry	Borrow	Step
				9

<Ladder>



Compares the word value of S1 with the number of N word values beginning with S2 word. As a result :

1. If S1 < S2, D bit turns ON.
2. If S1 == S2, D+1 bit turns ON.
3. If S1 > S2, D+2 bit turns ON.

The comparison result of S2+1 is stored in bits from D+3 to D+5, like this way, the operation results are sequentially stored in D bits.

4. Comparison executes the Signed operation. (h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))

5.5.72 Comparison Instruction (DCMPL)

Comparison instruction **DCMPL** **S1** **S2** **D** **N**

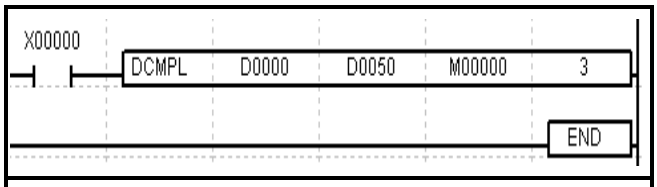
Applicable model

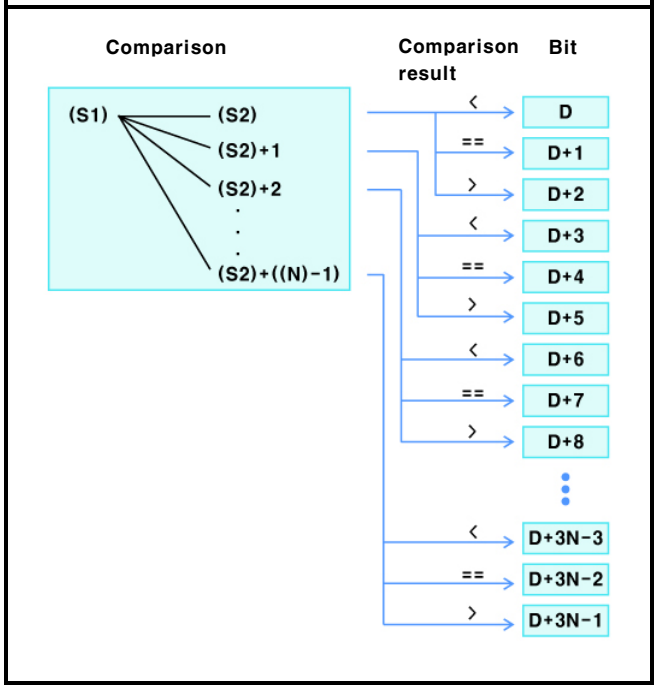
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or data address to compare with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data or data address to compare with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
D	BIT	Y, M, UB
		Lead address of bit device to save comparison result
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data to compare with S1 data
		As many as the number of devices remained in S1, S2 and D area

Error	Zero	Carry	Borrow	Step
				9

<Ladder>





Compares the double word S1 with the number of N double words beginning with double word S2. As a result :

1. If S1 < S2, D bit turns ON.
2. If S1 == S2, D+1 bit turns ON.
3. If S1 > S2, D+2 bit turns ON.

The comparison result of S2+1 is stored in bits from D+3 to D+5, like this way, the operation results are sequentially stored in D bits.

4. Comparison executes the Signed operation. (h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))

5.5.73 Comparison Instruction (BWCMP)

Comparison instruction **BWCMP** **S1** **S2** **S3** **D**

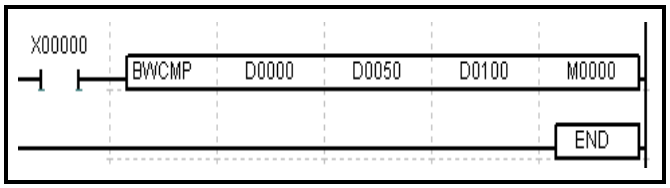
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	INT	X, Y, M, S, T, C, D, Z, F, UW, integer
		Data to compare with S2 and S3
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, M, S, T, C, D, Z, F, UW, integer
		Data to compare with S1 and S3
		-32768(h8000) to 32767(h7FFF)
S3	INT	X, Y, M, S, T, C, D, Z, F, UW, integer
		Data to compare with S1 and S2
		-32768(h8000) to 32767(h7FFF)
D	BIT	Y, M, UB
		Bit device address to save comparison result
		Not applicable

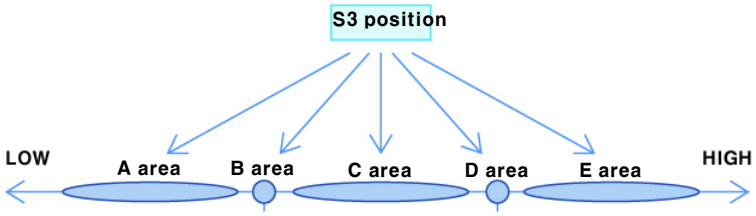
Error	Zero	Carry	Borrow	Step
				9

<Ladder>



Compare word value of S3 with the limited area between S1 and S2 word values. As a result :

1. If the value of S3 is less than the smaller value of the two (S1, S2), D bit turns ON.
2. If the value of S3 is equal to the smaller value of the two, D+1 bit turns ON.
3. If the value of S3 is located between the two values, D+2 bit turns ON.
4. If the value of S3 is equal to the larger value of the two, D+3 bit turns ON.
5. If the value of S3 is greater than the larger value of the two, D+4 bit turns ON.
6. Comparison executes the Signed operation.



Smaller number between S1 and S2,

Larger number between S1 and S2

If S3 position is

- A area, D bit is ON
- B area, D+1 bit is ON
- C area, D+2 bit is ON
- D area, D+3 bit is ON
- E area, D+4 bit is ON

Ex) In case of S3=h3300, S1=h1011, S2=h2020,

0	0	0	0	0
D+4	D+3	D+2	D+1	D

→ S3 is placed at E area. Therefore, D+4 bit is ON

1	0	0	0	0
D+4	D+3	D+2	D+1	D

5.5.74 Comparison Instruction (DBWCMP)

Comparison instruction **DBWCMP** **S1** **S2** **S3** **D**

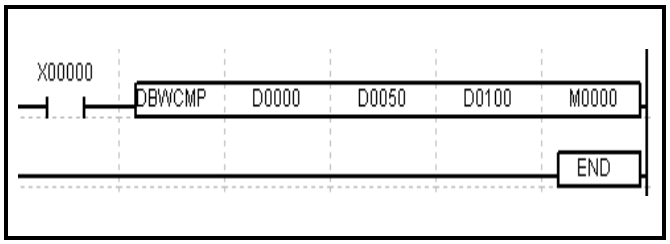
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, M, S, T, C, D, Z, F, UW, integer
		Data to compare with S2 and S3
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
S2	DINT	X, Y, M, S, T, C, D, Z, F, UW, integer
		Data to compare with S1 and S3
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
S3	DINT	X, Y, M, S, T, C, D, Z, F, UW, integer
		Data to compare with S1 and S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
D	BIT	Y, M, UB
		Bit device address to save comparison result
		Not applicable

Error	Zero	Carry	Borrow	Step
				9

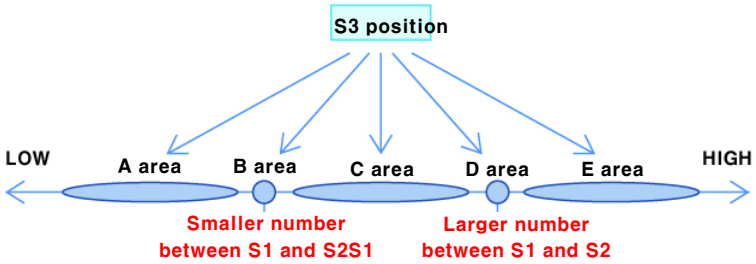
<Ladder>



Compares the double word value of S3 with the limited area between S1 and S2 word values.

As a result :

1. If the value of S3 is less than the smaller value of the two (S1, S2), D bit turns ON.
2. If the value of S3 is equal to the smaller value of the two, D+1 bit turns ON.
3. If the value of S3 is located between the two values, D+2 bit turns ON.
4. If the value of S3 is equal to the larger value of the two, D+3 bit turns ON.
5. If the value of S3 is greater than the larger value of the two, D+4 bit turns ON.
6. Comparison executes the Signed operation.



If S3 position is

- A area, D bit is ON
- B area, D+1 bit is ON
- C area, D+2 bit is ON
- D area, D+3 bit is ON
- E area, D+4 bit is ON

Ex) In case of S3=h33003300, S1=h10000111, S2=h2020FF00,

0	0	0	0	0
D+4	D+3	D+2	D+1	D

→ S3 is placed at E area. Therefore, D+4 bit is ON

1	0	0	0	0
D+4	D+3	D+2	D+1	D

5.5.75 Transmission Instruction (BMOV)

Transmission instruction **BMOV** **S** **D**

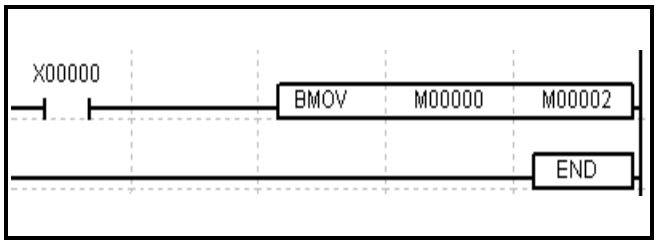
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	BIT	X, Y, F, T, C, M, UB
		Bit device number you want to transmit
		Not applicable
D	BIT	Y, F, T, C, M, UB
		Bit device address to save the transmitted data
		Not applicable

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Transmits the source bit to the destination bit.

5.5.76 Transmission Instruction (MOV)

Transmission instruction **MOV** **S** **D**

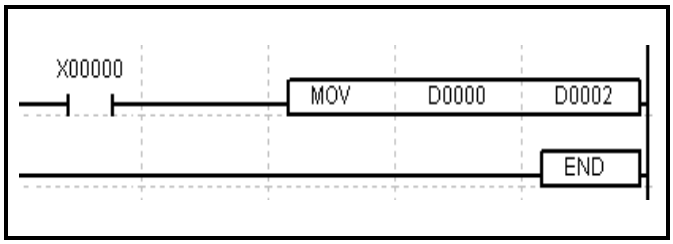
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

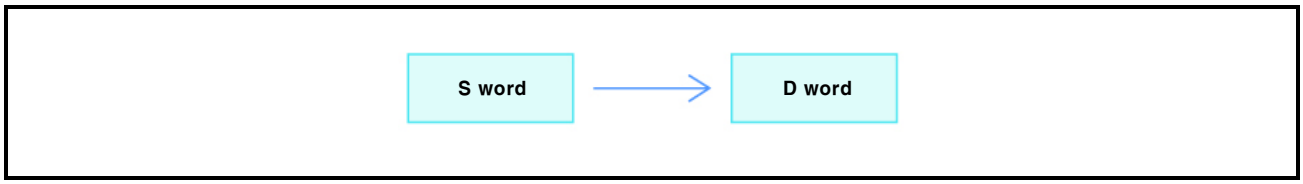
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data to transmit or device number which have the data
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Device number to save transmitted data
		0(h0000) to 65535(hFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Transmits the source word to the destination word.



5.5.77 Transmission Instruction (DMOV)

Transmission instruction **DMOV** **S** **D**

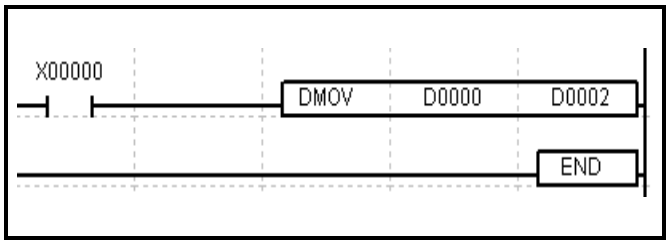
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data to transmit or device number which have the data
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Device number to save transmitted data
		0(h0000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Transmits the source double word to the destination double word.

5.5.78 Transmission Instruction (BMOVL)

Transmission instruction **BMOVL** **S** **D** **N**

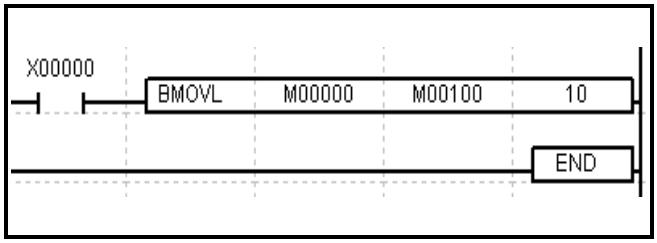
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

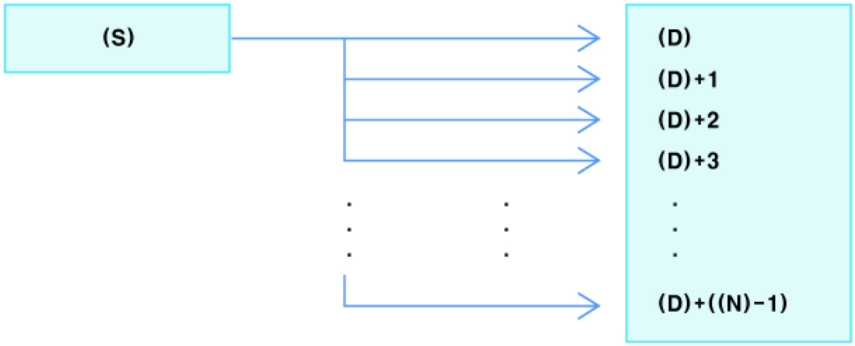
OP	DATA type	Available device / Description / Range
S	BIT	X, Y, F, T, C, M, UB
		Bit device number you want to transmit
		Not applicable
D	BIT	Y, F, T, C, M, UB
		Bit device address to save the transmitted data
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of destination bit devices to save the transmitted data
		To the remained devices in corresponding D area

Error	Zero	Carry	Borrow	Step
				7

<Ladder>



Transmits the source bit to the number of N bits beginning with D, one by one.



5.5.79 Transmission Instruction (MOVL)

Transmission instruction **MOVL** **S** **D** **N**

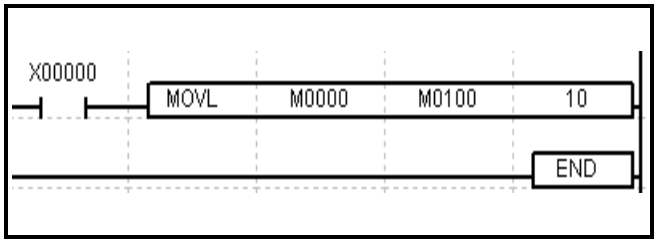
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

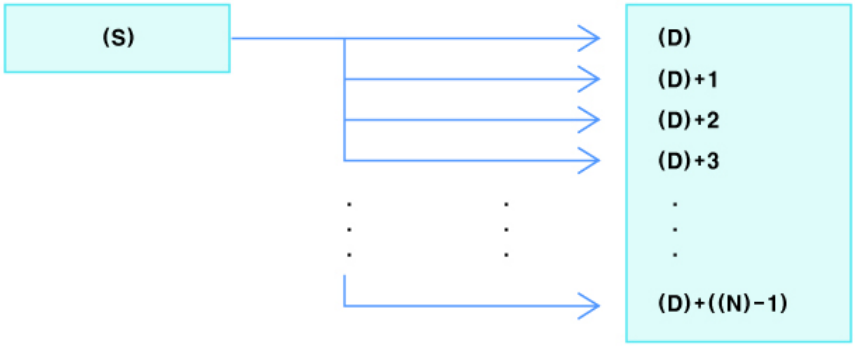
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data to transmit or device number which have the data
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Device number to save transmitted data
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of destination bit devices to save the transmitted data
		To the remained devices in corresponding D area

Error	Zero	Carry	Borrow	Step
				7

<Ladder>



Transmits the source word to the number of N words beginning with D, one by one.



5.5.80 Transmission Instruction (DMOVL)

Transmission instruction **DMOVL** **S** **D** **N**

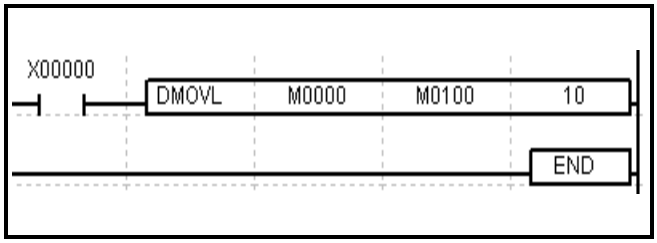
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

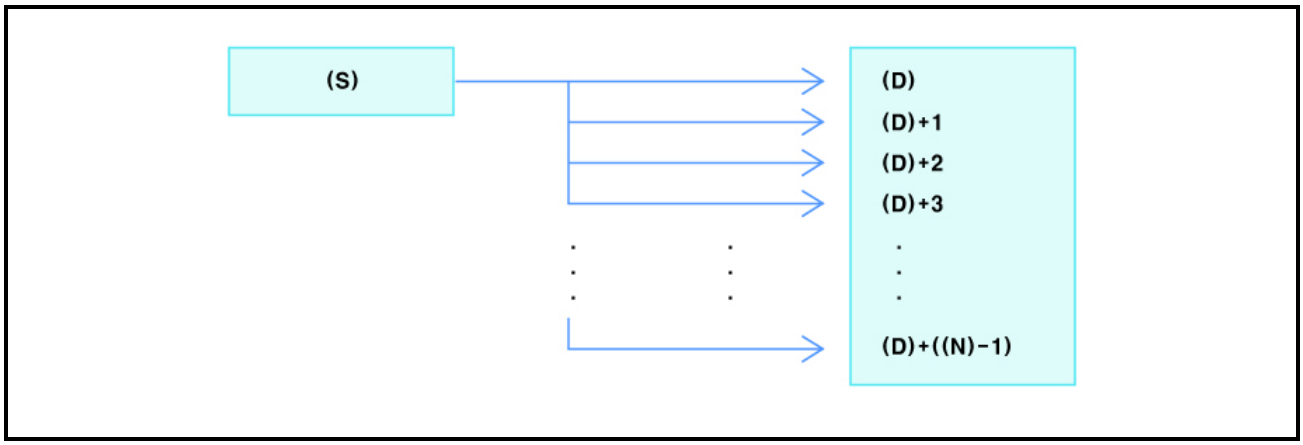
OP	DATA type	Available device / Description / Range
S	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data to transmit or device number which have the data
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Device number to save transmitted data
		0(h0000) to 4294967295(hFFFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of destination bit devices to save the transmitted data
		To the remained devices in corresponding D area

Error	Zero	Carry	Borrow	Step
				7

<Ladder>



Transmit the source double word to the number of N double words beginning with D, one by one.



5.5.81 Transmission Instruction (BMOVG)

Transmission instruction **BMOVG** **S** **D** **N**

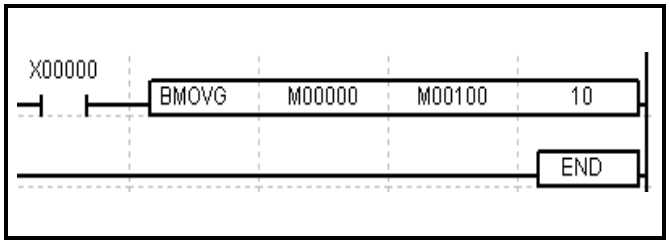
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

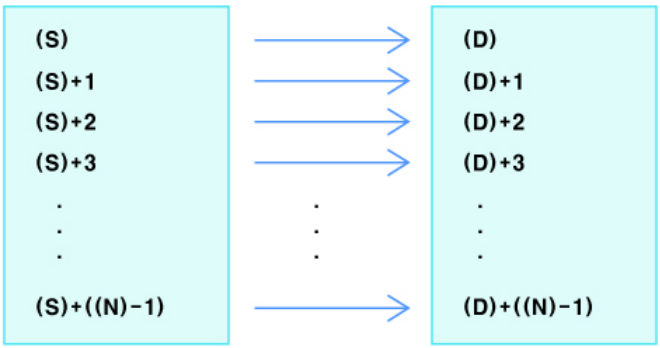
OP	DATA type	Available device / Description / Range
S	BIT	X, Y, F, T, C, M, UB
		Bit device number you want to transmit
		Not applicable
D	BIT	Y, F, T, C, M, UB
		Bit device address to save the transmitted data
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bit devices to save to be transmitted data and the transmitted data
		To the remained devices in corresponding S, D areas

Error	Zero	Carry	Borrow	Step
				7

<Ladder>



Transmits the number of N bit groups beginning with (S) to the number of N bit groups beginning with (D), in batches.



5.5.82 Transmission Instruction (MOVG)

Transmission instruction **MOVG** **S** **D** **N**

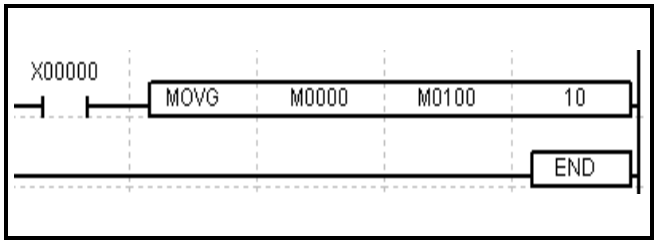
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

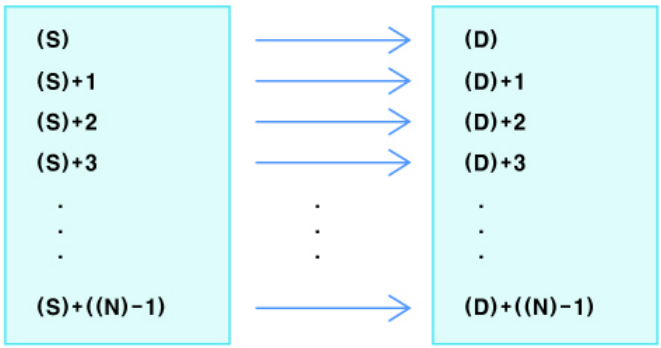
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data to transmit or device number which have the data
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L ,D, UW
		Device number to save transmitted data
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bit devices to save to be transmitted data and the transmitted data
		To the remained devices in corresponding S, D areas

Error	Zero	Carry	Borrow	Step
				7

<Ladder>



Transmit the number of N word groups beginning with (S), to the number of N word groups beginning with (D), in batches.



5.5.83 Transmission Instruction (DMOVG)

Transmission instruction **DMOVG** **S** **D** **N**

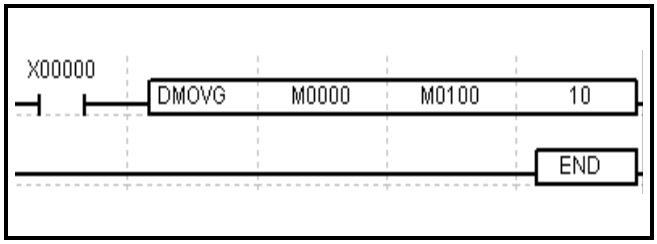
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

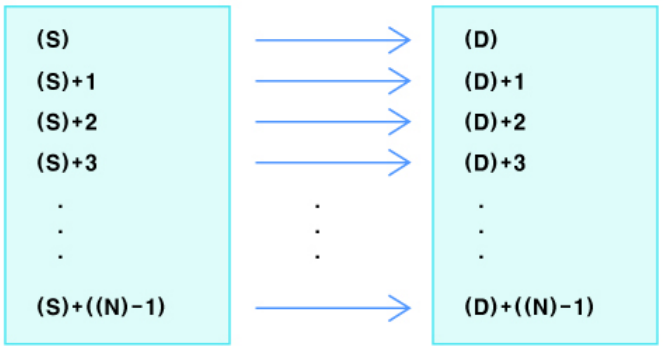
OP	DATA type	Available device / Description / Range
S	DWORD	X, Y, F, Z, T, C, M, S, L, D ,UW
		Data to transmit or device number which have the data
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D ,UW
		Device number to save transmitted data
		0(h0000) to 4294967295(hFFFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D ,UW, integer
		The number of bit devices to save to be transmitted data and the transmitted data
		To the remained devices in corresponding S, D areas

Error	Zero	Carry	Borrow	Step
				7

<Ladder>



Transmit the number of N double word groups beginning with (S) to the number of N double word groups beginning with (D), in batches.



5.5.84 Transmission Instruction (BCMOV)

Transmission instruction **BCMOV** **S** **D**

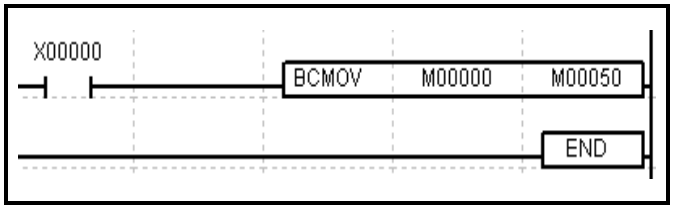
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

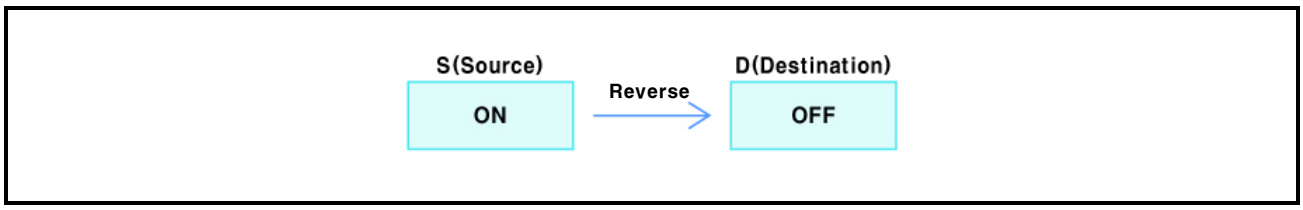
OP	DATA type	Available device / Description / Range
S	BIT	X, Y, F, T, C, M, UB
		Bit device number you want to transmit
		Not applicable
D	BIT	Y, F, T, C, M, UB
		Bit device address to save the transmitted data
		Not applicable

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Reverses the source device and then transmits it to the destination bit.



5.5.85 Transmission Instruction (CMOV)

Transmission instruction CMOV S D

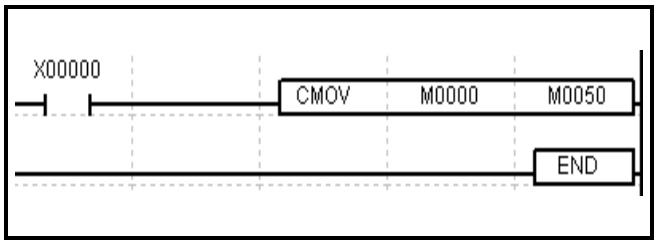
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

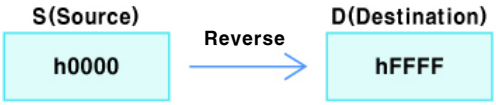
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data to transmit or device number which have the data
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Device number to save transmitted data
		0(h0000) to 65535(hFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Reverses the source word and then transmits it to the destination word.



5.5.86 Transmission Instruction (DCMOV)

Transmission instruction **DCMOV** **S** **D**

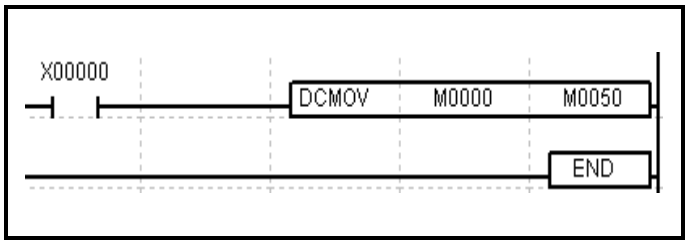
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

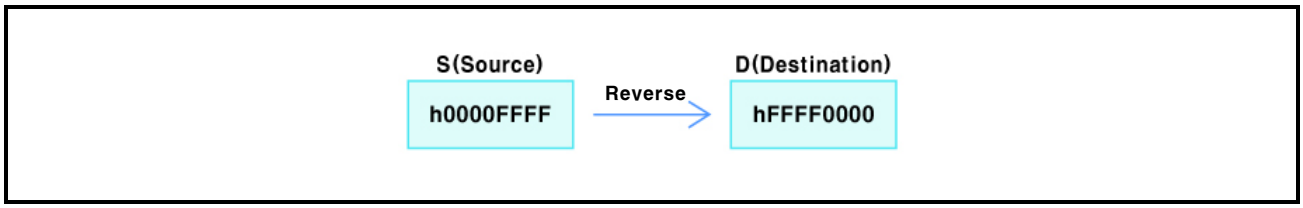
OP	DATA type	Available device / Description / Range
S	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data to transmit or device number which have the data
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Device number to save transmitted data
		0(h0000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Reverses the source double word and then transmits it to the destination double word.



5.5.87 Exchange Instruction (XCH)

Exchange instruction **XCH** **S1** **S2**

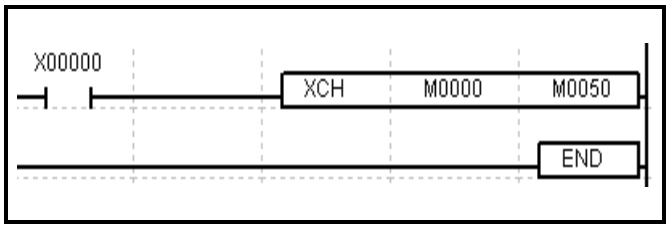
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Data device number to be exchanged
		0(h0000) to 65535(hFFFF)
S2	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Data device number to be exchanged
		0(h0000) to 65535(hFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Exchanges a data in S1 word and a data in S2 word each other.

5.5.88 Exchange Instruction (DXCH)

Exchange instruction **DXCH** **S1** **S2**

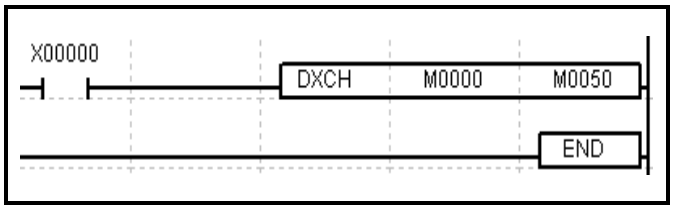
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Data device number to be exchanged
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Data device number to be exchanged
		0(h0000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Exchanges a data in the double word S1 and a data in the double word S2 each other.

5.5.89 Exchange Instruction (AXCH)

Exchange instruction **AXCH** **S1** **S2** **N**

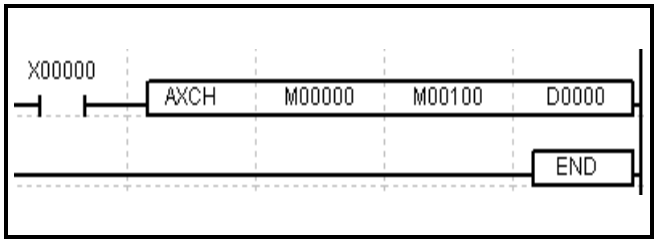
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

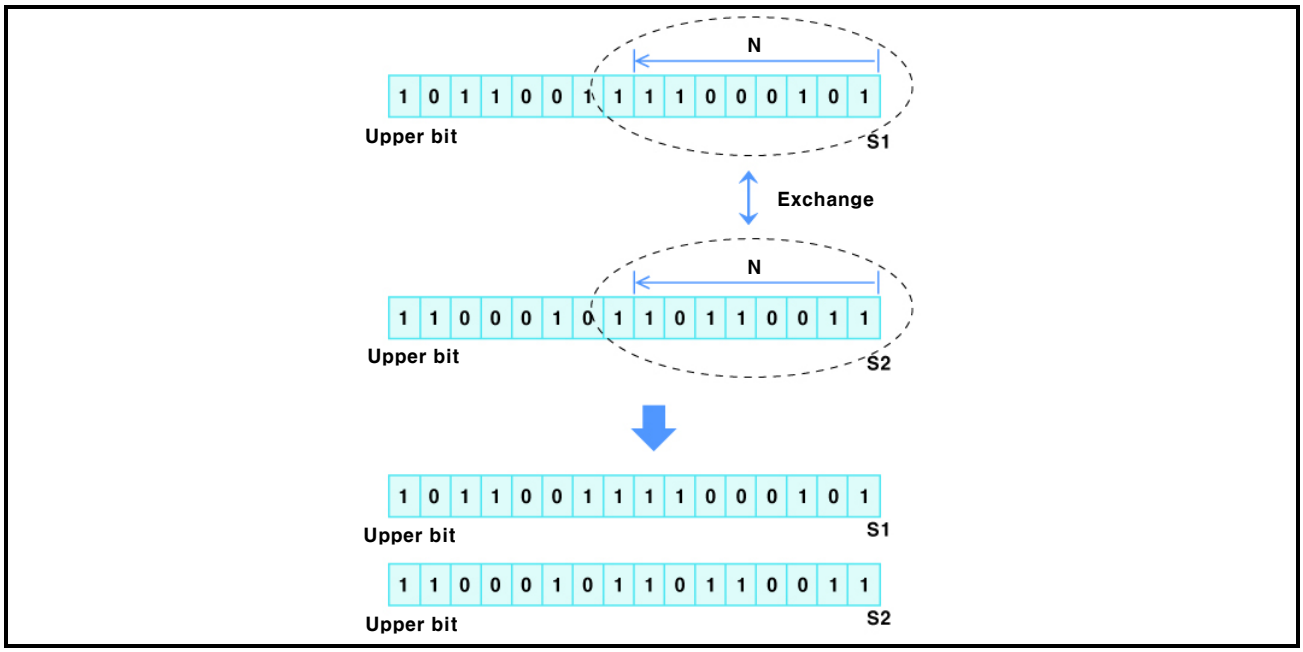
OP	DATA type	Available device / Description / Range
S1	BIT	Y, F, T, C, M, UB
		Bit device address of the data to be exchanged
		Not applicable
S2	BIT	Y, F, T, C, M, UB
		Bit device address of the data to be exchanged
		Not applicable
N	WORD	Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of the data bits to be exchanged
		To the device range remained in corresponding S1 and S2 areas.

Error	Zero	Carry	Borrow	Step
				7

<Ladder>



Exchanges the number of N bits beginning with S1 with the number of N bits beginning from S2 each other.



5.5.90 Exchange Instruction (SWAP)

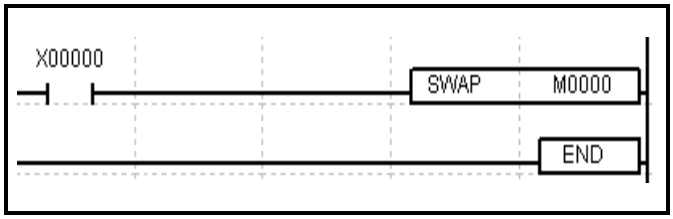
Exchange instruction **SWAP** **D**

Applicable model

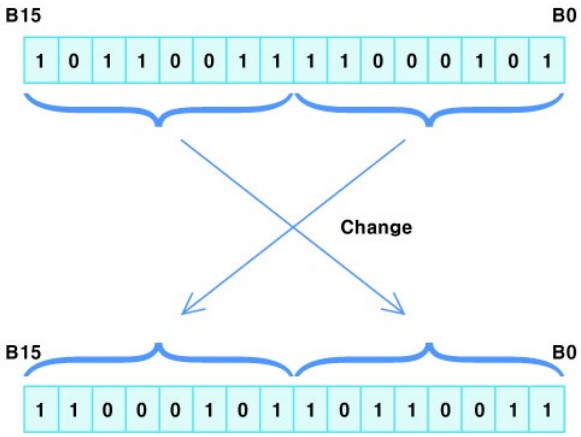
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	WORD	Y, F, Z, T, C, M, S, L, D, UW					
		Data address to exchange upper and lower bit					
		0(h0000) to 65535(hFFFF)					3

<Ladder>



Exchanges the high order bytes of the designated word with its low order bytes each other.



5.5.91 Exchange Instruction (DSWAP)

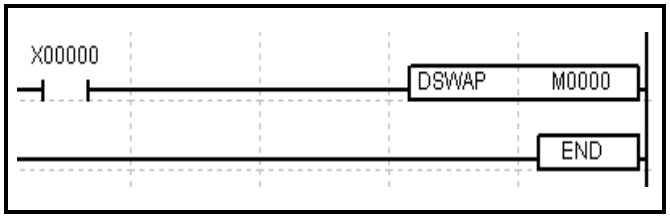
Exchange instruction **DSWAP** **D**

Applicable model

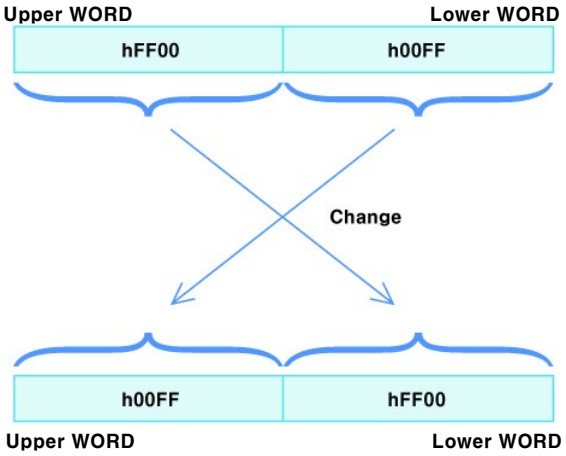
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW					
		Data address to exchange upper and lower bit					
		0(h0000) to 4294967295(hFFFFFFFF)					3

<Ladder>



Exchanges the high order word of the designated double word with its low order word.



5.5.92 Rotation Instruction (ROR)

Rotation instruction **ROR** **S** **C**

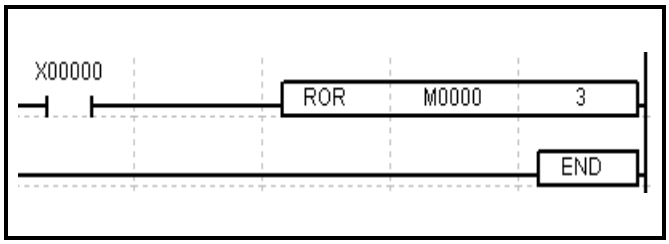
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

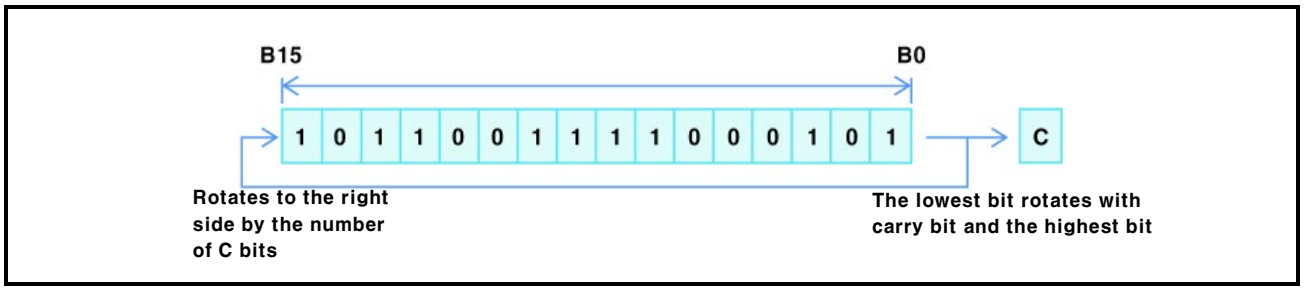
OP	DATA type	Available device / Description / Range
S	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the operation
		0(h0000) to 65535(hFFFF)
C	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate right side
		0 to 255

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Rotates the source word to the right side by the number of C bits.



5.5.93 Rotation Instruction (DROR)

Rotation instruction **DROR** **S** **C**

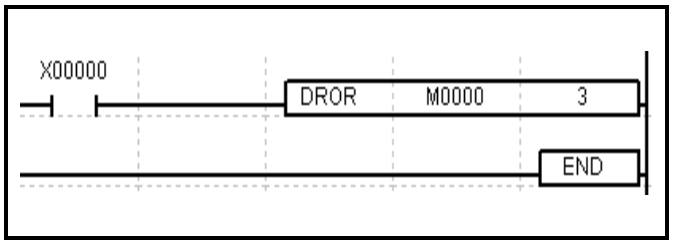
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

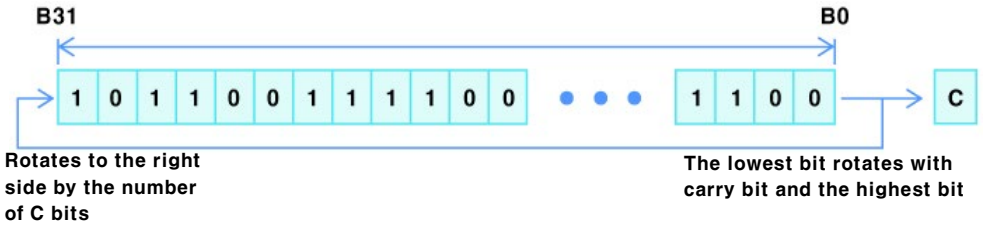
OP	DATA type	Available device / Description / Range
S	DWORD	X, F, Z, T, C, M, S, L, D, UW
		Data address to execute the operation
		0(h0000) to 4294967295(hFFFFFFFF)
C	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate right side
		0 to 255

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Rotates the source double word to the right side by the number of C bits.



5.5.94 Rotation Instruction (AROR)

Rotation instruction **AROR** **S** **N** **C**

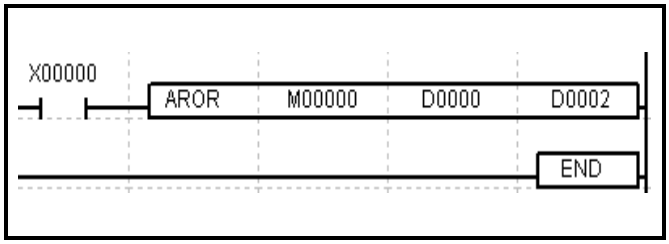
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

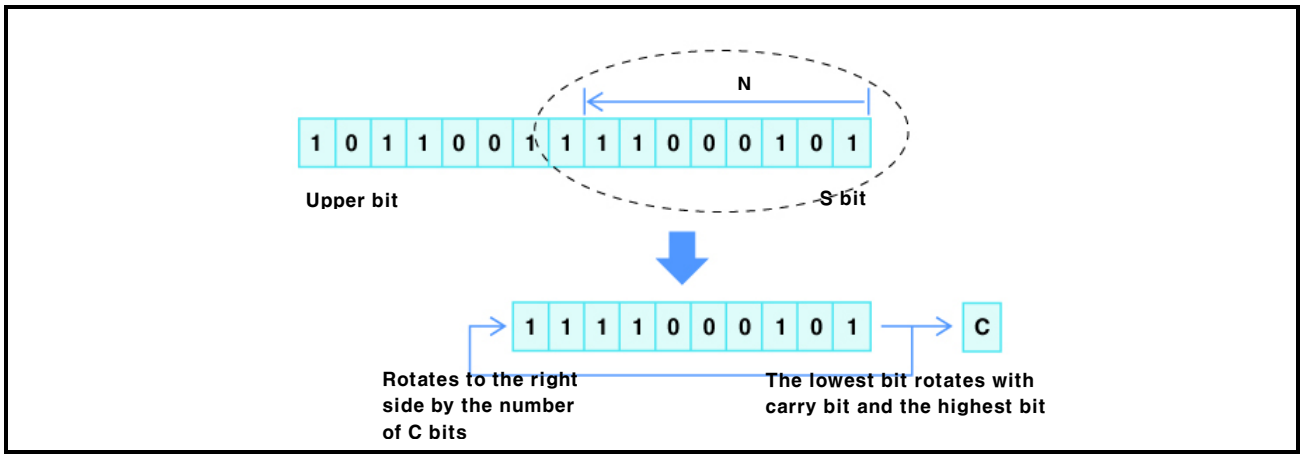
OP	DATA type	Available device / Description / Range
S	BIT	Y, F, T, C, M, UB
		Start address for bit device of the data to execute the operation
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bit device to execute the operation from start address
		To the remained device range in corresponding S area
C	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate right side
		0 to 255

Error	Zero	Carry	Borrow	Step
		◎		7

<Ladder>



Within the number of N bits, bits rotate to the right side by the number of C bits beginning with S bit.



5.5.95 Rotation Instruction (RORC)

Rotation instruction **RORC** **S** **C**

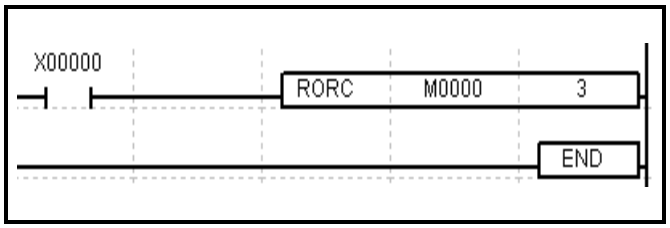
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

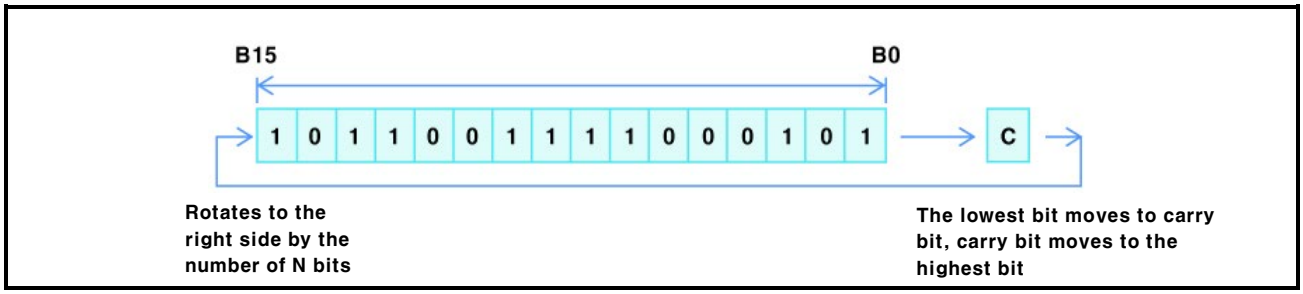
OP	DATA type	Available device / Description / Range
S	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the operation
		0(h0000) to 65535(hFFFF)
C	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate right side
		0 to 255

Error	Zero	Carry	Borrow	Step
		◎		5

<Ladder>



Rotates the source word including carry bit, to the right side by the number of C bits.



5.5.96 Rotation Instruction (DRORC)

Rotation instruction **DRORC** **S** **C**

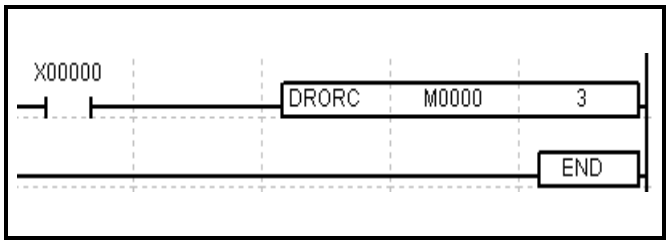
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

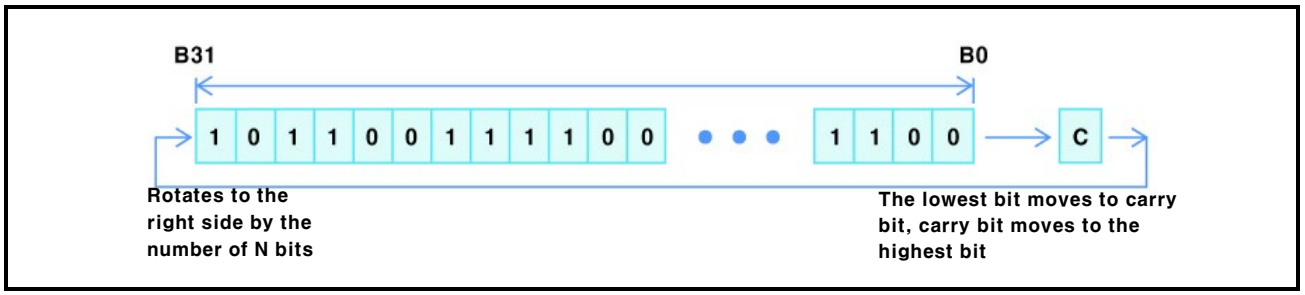
OP	DATA type	Available device / Description / Range
S	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the operation
		0(h0000) to 4294967295(hFFFFFFFF)
C	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate right side
		0 to 255

Error	Zero	Carry	Borrow	Step
		◎		5

<Ladder>



Rotates the source double word including carry bit, to the right side by the number of C bits.



5.5.97 Rotation Instruction (ARORC)

Rotation instruction ARORC S N C

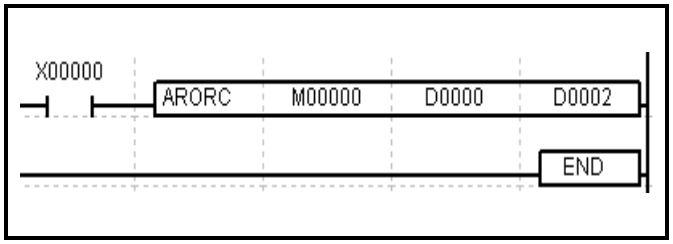
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

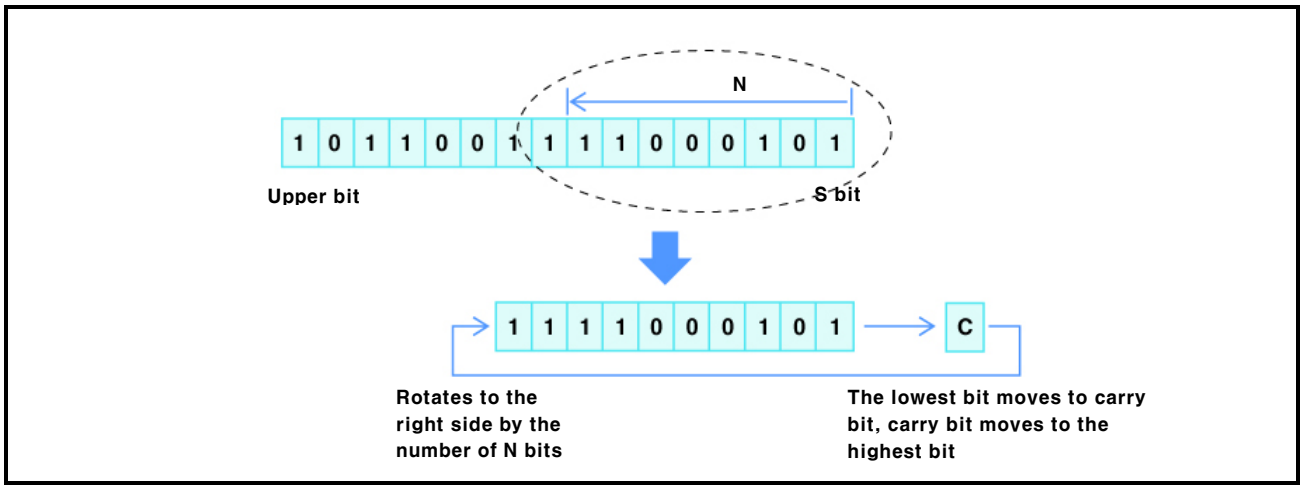
OP	DATA type	Available device / Description / Range
S	BIT	Y, F, T, C, M, UB
		Start address for bit device of the data to execute the operation
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bit device to execute the operation from start address
		To the remained device range in corresponding S area
C	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate right side
		0 to 255

Error	Zero	Carry	Borrow	Step
		◎		7

<Ladder>



Within the number of N bits, rotates the designated bits including carry bit to the right side by the number of C bits.



5.5.98 Rotation Instruction (ROL)

Rotation instruction **ROL** **S** **C**

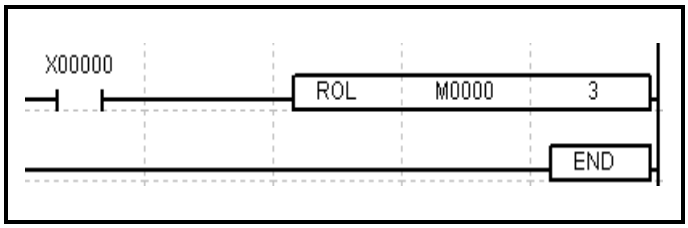
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

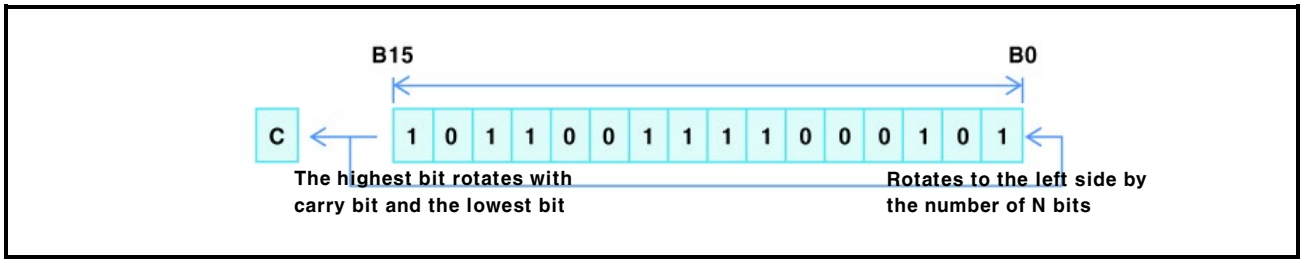
OP	DATA type	Available device / Description / Range
S	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the operation
		0(h0000) to 65535(hFFFF)
C	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate left side
		0 to 255

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Rotates the source word to the left side by the number of C bits.



5.5.99 Rotation Instruction (DROL)

Rotation instruction **DROL** **S** **C**

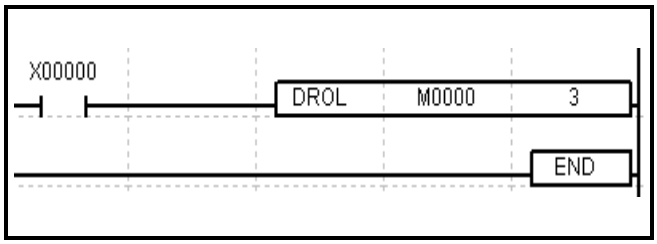
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

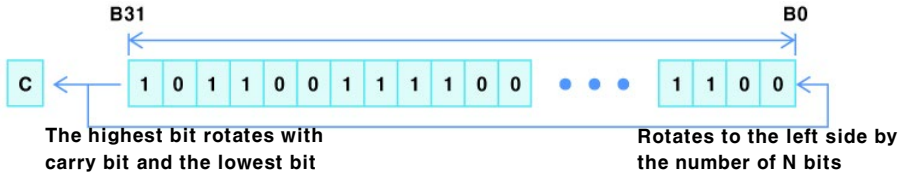
OP	DATA type	Available device / Description / Range
S	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the operation
		0(h0000) to 4294967295(hFFFFFFFF)
C	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate left side
		0 to 255

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Rotates the source double word to the left side by the number of C bits.



5.5.100 Rotation Instruction (AROL)

Rotation instruction **AROL** **S** **N** **C**

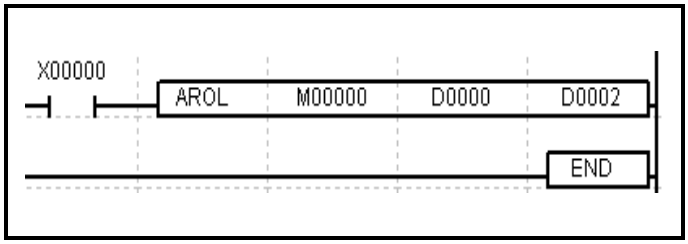
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

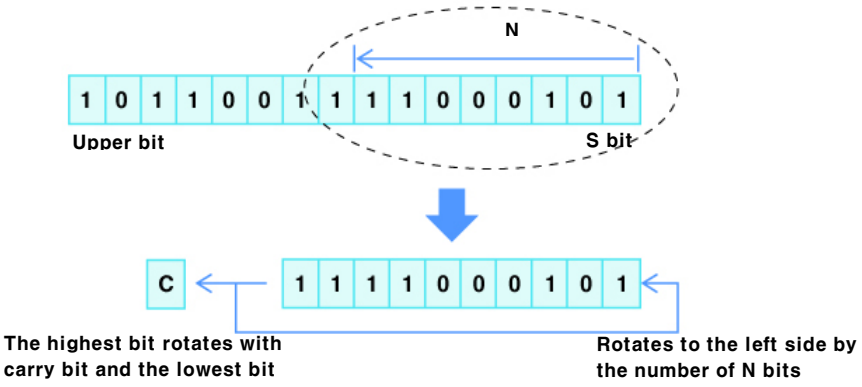
OP	DATA type	Available device / Description / Range
S	BIT	Y, F, T, C, M, UB
		Start address for bit device of the data to execute the operation
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bit device to execute the operation from start address
		To the remained device range in corresponding S area
C	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate left side
		0 to 255

Error	Zero	Carry	Borrow	Step
		◎		7

<Ladder>



Within the number of N bits, rotates the designated bits beginning with the S bit to the left side by the number of C bits.



5.5.101 Rotation Instruction (ROLC)

Rotation instruction ROLC S C

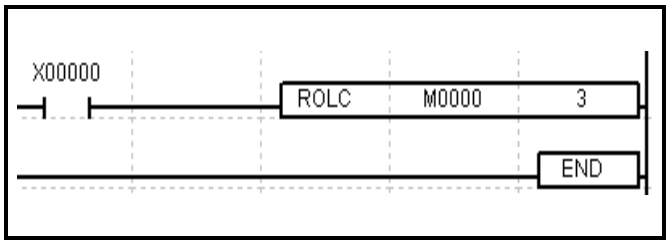
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

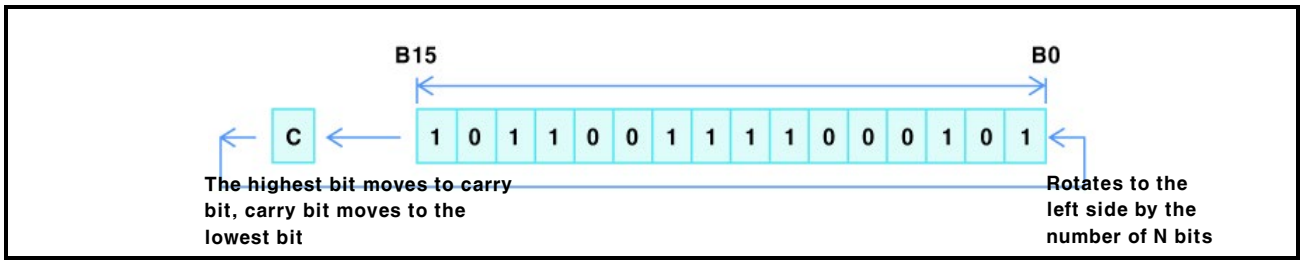
OP	DATA type	Available device / Description / Range
S	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the operation
		0(h0000) to 65535(hFFFF)
C	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate right side
		0 to 255

Error	Zero	Carry	Borrow	Step
		◎		5

<Ladder>



Rotates the source word including carry bit to the left side by the number of C bits.



5.5.102 Rotation Instruction (DROLC)

Rotation instruction **DROLC** **S** **C**

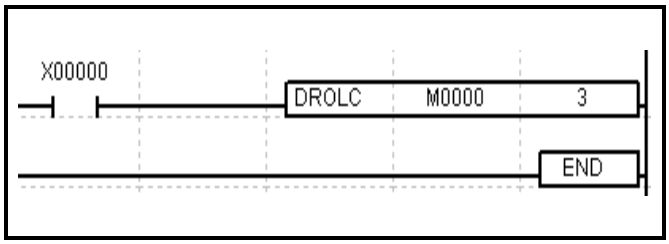
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

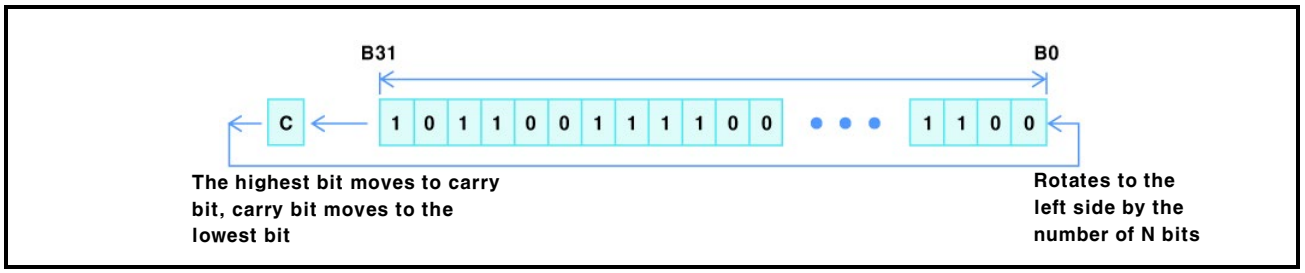
OP	DATA type	Available device / Description / Range
S	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the operation
		0(h0000) to 4294967295(hFFFFFFFF)
C	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate left side
		0 to 255

Error	Zero	Carry	Borrow	Step
		◎		5

<Ladder>



Rotates the source double word including the carry bit to the left side by the number of C bits.



5.5.103 Rotation Instruction (AROLC)

Rotation instruction AROLC S N C

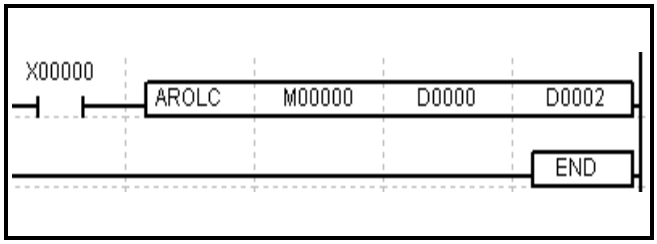
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

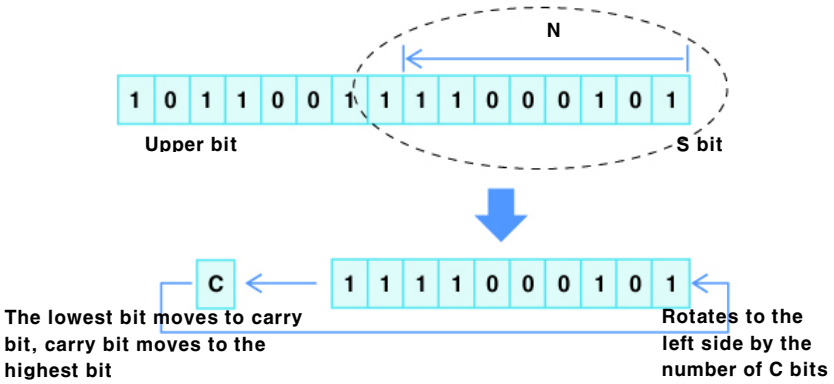
OP	DATA type	Available device / Description / Range
S	BIT	Y, F, T, C, M, UB
		Start address for bit device of the data to execute the operation
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bit device to execute the operation from start address
		To the remained device range in corresponding S area
C	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate left side
		0 to 255

Error	Zero	Carry	Borrow	Step
		◎		7

<Ladder>



Within the range from the source bit to the N bit, rotates the designated bits including the carry bit to the left side by the number of C bits beginning with the S bit.



5.5.104 Movement Instruction (SFTR)

Movement instruction **SFTR** **S** **N**

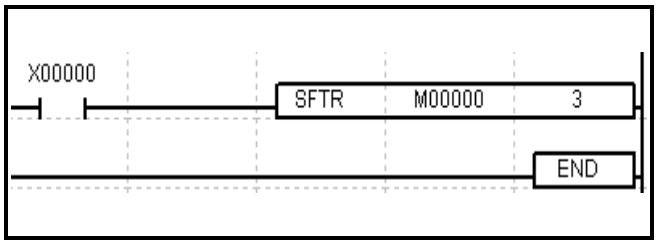
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

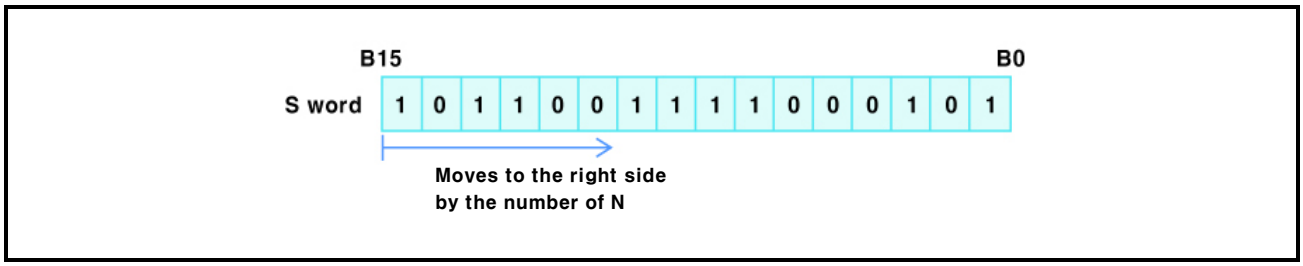
OP	DATA type	Available device / Description / Range
S	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the operation
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate right side
		0 to 16

Error	Zero	Carry	Borrow	Step
		◎		9

<Ladder>



1. Within the S word, moves the 16-bit of S word to the right side by the number of N bits.
2. If the N_{th} bit from the low order bit is 1, carry bit is SET.



5.5.105 Movement Instruction (ASFTR)

Movement instruction ASFTR S N1 N2

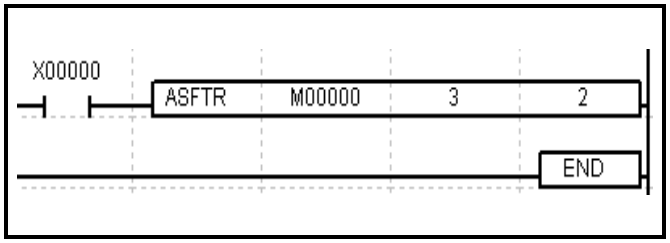
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

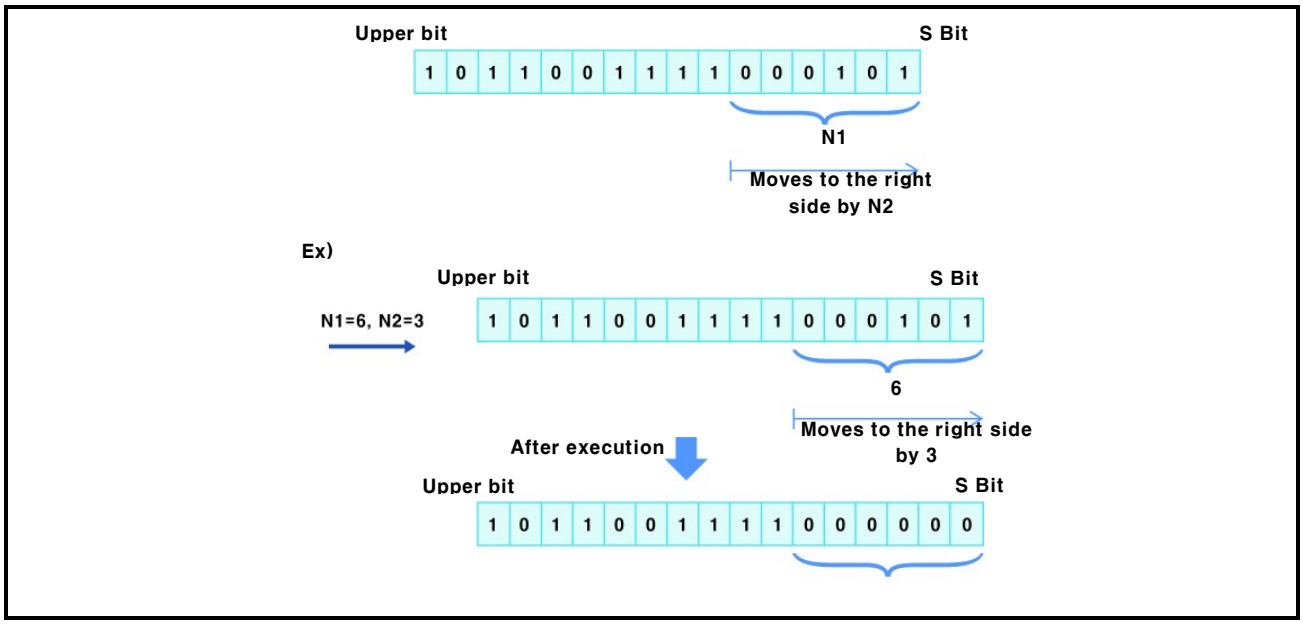
OP	DATA type	Available device / Description / Range
S	BIT	Y, F, T, C, M, UB
		Start bit position of the data to execute the operation
		Not applicable
N1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits from the designated position as S
		0 to 32
N2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate right side
		0 to 32

Error	Zero	Carry	Borrow	Step
				9

<Ladder>



1. From the source bit, N1 bits moves to the right side as N2 in the range.
2. The high order bits, which are the number of movement, have “0” as their value.
3. If the value of N2 is greater than N1, the values from source bit to N bit are shifted to “0”.



5.5.106 Movement Instruction (SFTL)

Movement instruction **SFTL** **S** **N**

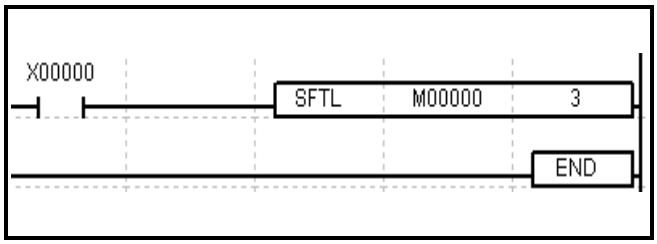
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

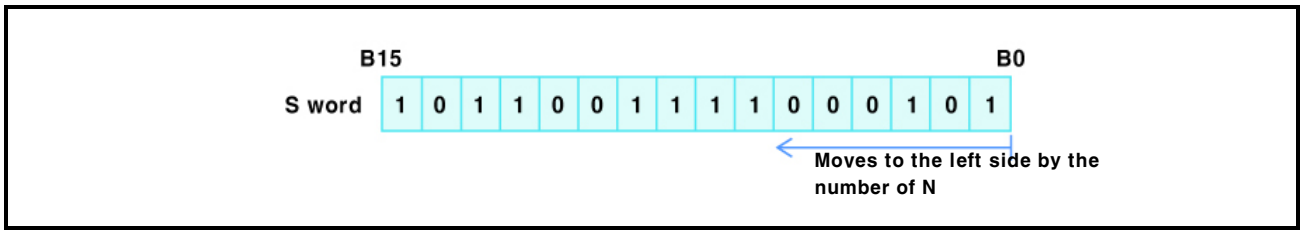
OP	DATA type	Available device / Description / Range
S	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the operation
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate left side
		0 to 16

Error	Zero	Carry	Borrow	Step
		◎		9

<Ladder>



1. Within the source word, move the 16 bits of source word to the left by the number of N bits.
2. If the N_{th} bit from the high order bit is 1, carry bit is SET.



5.5.107 Movement Instruction (ASFTL)

Movement instruction ASFTL S N1 N2

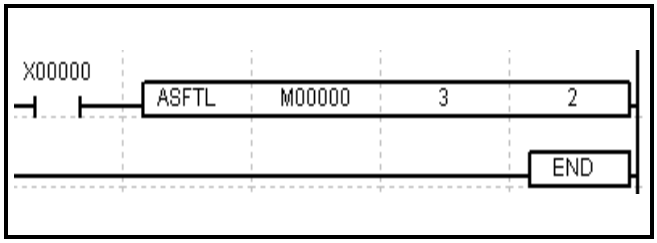
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

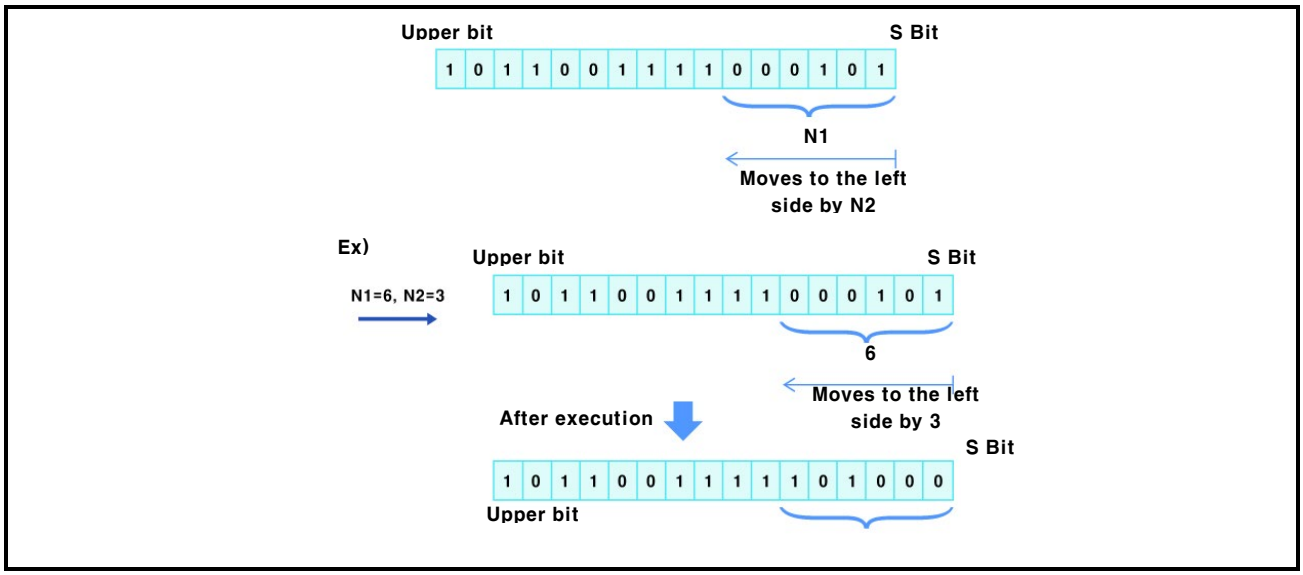
OP	DATA type	Available device / Description / Range
S	BIT	Y, F, T, C, M, UB
		Start bit position of the data to execute the operation
		Not applicable
N1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits from the designated position as S
		0 to 32
N2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bits to rotate left side
		0 to 32

Error	Zero	Carry	Borrow	Step
				9

<Ladder>



1. From the source bit, N1 bits moves to the left side as N2 in the range.
2. The low order bits, which are the number of movement, have “0” as their value.
3. If the value of N2 is greater than N1, the values of designated bits, from source bit to the N1, are shifted to “0”.



5.5.108 Movement Instruction (WSFTR)

Movement instruction **WSFTR** **S** **N1** **N2**

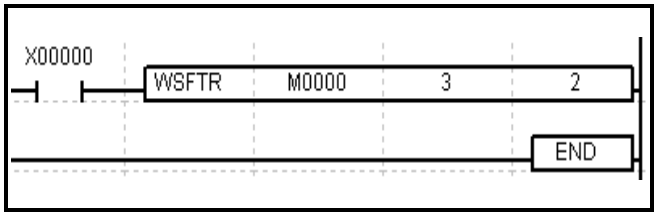
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

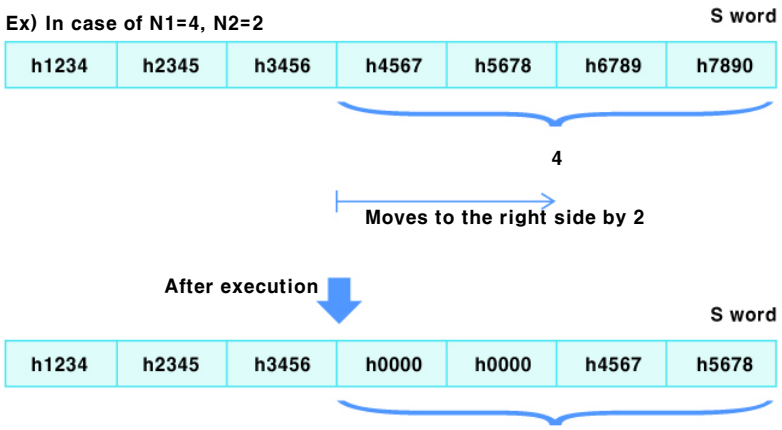
OP	DATA type	Available device / Description / Range
S	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the operation
		0(h0000) to 65535(hFFFF)
N1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of words from the designated position as S
		To the remained device range in corresponding S area
N2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of words to move to the right
		To the range not greater than the N1 value

Error	Zero	Carry	Borrow	Step
				9

<Ladder>



1. From the source word, N1 words moves to the right side as N2 in the range by word unit.
2. The high order words, which are the number of movement, have “0” as their value.



5.5.109 Movement Instruction (WSFTL)

Movement instruction **WSFTL** **S** **N1** **N2**

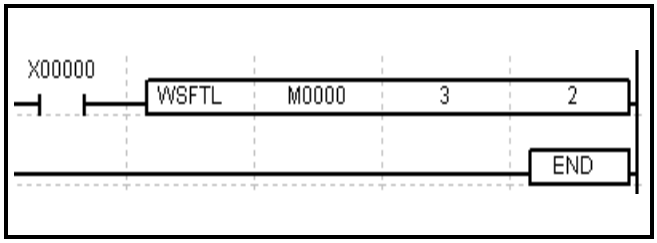
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

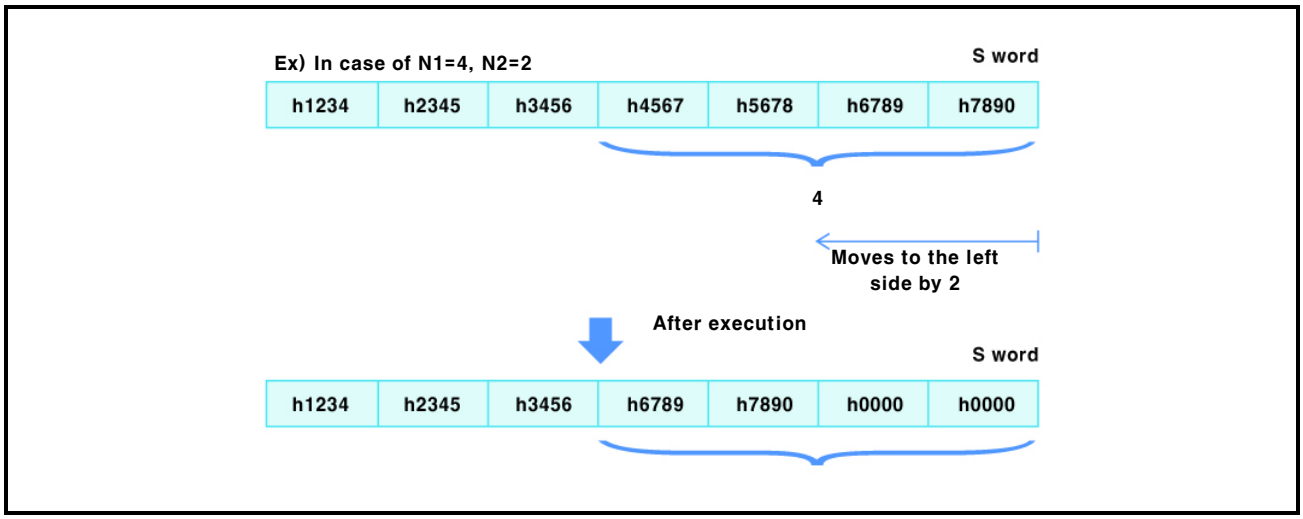
OP	DATA type	Available device / Description / Range
S	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the operation
		0(h0000) to 65535(hFFFF)
N1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of words from the designated position as S
		To the remained device range in corresponding S area
N2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of words to move to the left
		To the range not greater than the N1 value

Error	Zero	Carry	Borrow	Step
				9

<Ladder>



1. From the source word, N1 words moves to the left side as N2 in the range by word unit.
2. The lower order words, which are the number of movement, have “0” as their value.



5.5.110 Arithmetic Operation Instruction (ADD)

Arithmetic operation instruction **ADD** **S1** **S2** **D**

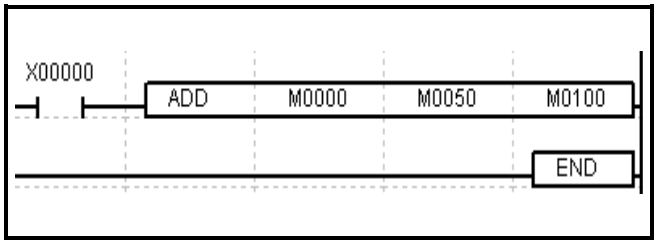
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

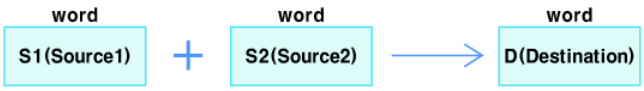
OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the addition operation with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the addition operation with S1
		-32768(h8000) to 32767(h7FFF)
D	INT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
	◎	◎		7

<Ladder>



1. Adds the word values of S1 and S2, and then stores the result into the destination word D
2. Executes the Signed operation.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))
3. If the result value exceeds 'h7FFF(32767)', carry flag is SET.
4. If the result value is h0000, zero flag is SET.



5.5.111 Arithmetic Operation Instruction (DADD)

Arithmetic operation instruction **DADD** **S1** **S2** **D**

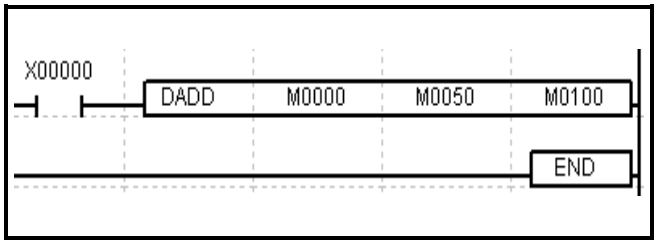
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

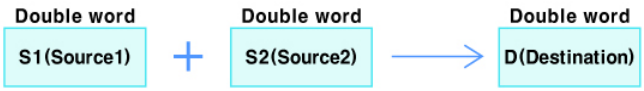
OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the addition operation with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the addition operation with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
D	DINT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)

Error	Zero	Carry	Borrow	Step
	◎	◎		7

<Ladder>



1. Adds the double word values of S1 and S2, and then stores the result into the destination double word D.
2. Executes the Signed operation.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))
3. If the result value exceeds ‘h7FFFFFFF (2147483647)’, carry flag is SET.
4. If the result value is ‘h00000000’, zero flag is SET.



5.5.112 Arithmetic Operation Instruction (ADDU)

Arithmetic operation instruction **ADDU** **S1** **S2** **D**

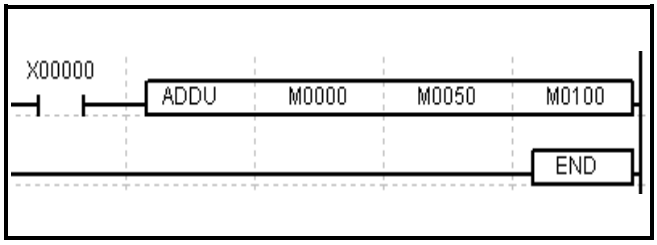
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

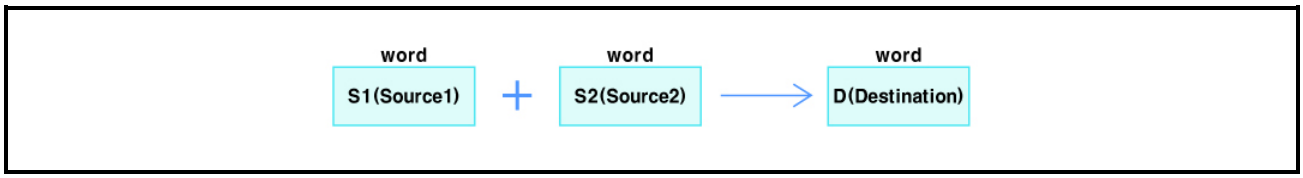
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the addition operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the addition operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)

Error	Zero	Carry	Borrow	Step
	◎	◎		7

<Ladder>



1. Adds the word values of S1 and S2 and then stores the result into the destination word D.
2. Executes the Unsigned operation.
3. If the result value exceeds ‘hFFFF (65535)’, carry flag is SET.
4. If the result value is ‘h0000’, zero flag is SET.



5.5.113 Arithmetic Operation Instruction (DADDU)

Arithmetic operation instruction **DADDU S1 S2 D**

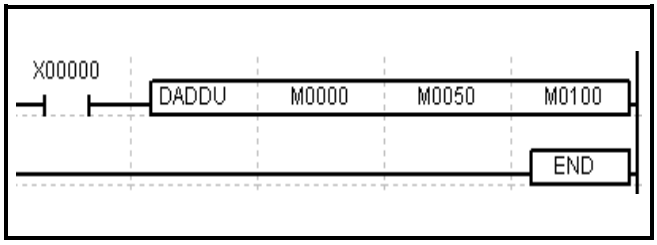
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

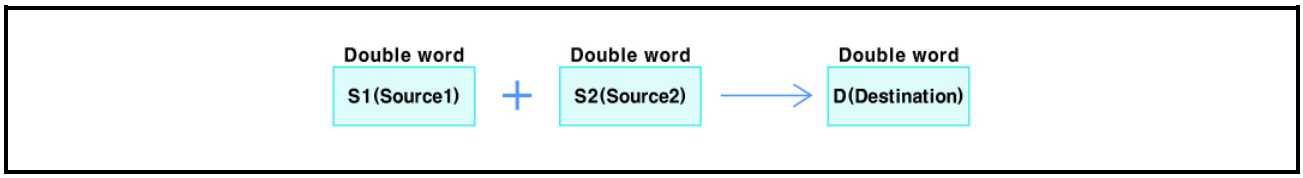
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the addition operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the addition operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
	◎	◎		7

<Ladder>



1. Adds the double word values of S1 and S2, and then stores the result into the destination double word D.
2. Executes the Unsigned operation.
3. If the result value exceeds ‘hFFFFFFFF (4294967295)’, carry flag is SET.
4. If the result value is ‘h0000’, zero flag is SET.



5.5.114 Arithmetic Operation Instruction (ADDL)

Arithmetic operation instruction **ADDL** **S1** **S2** **D** **N**

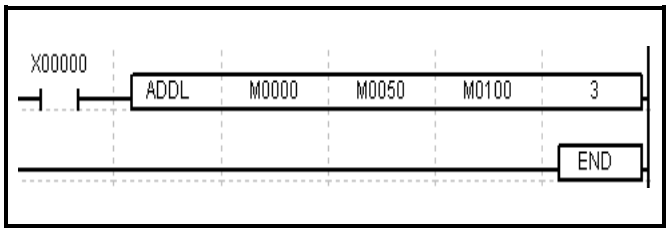
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

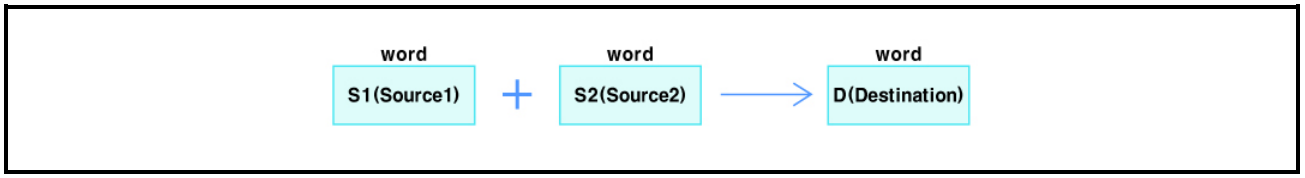
OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the addition operation with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the addition operation with S1
		-32768(h8000) to 32767(h7FFF)
D	INT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-32768(h8000) to 32767(h7FFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

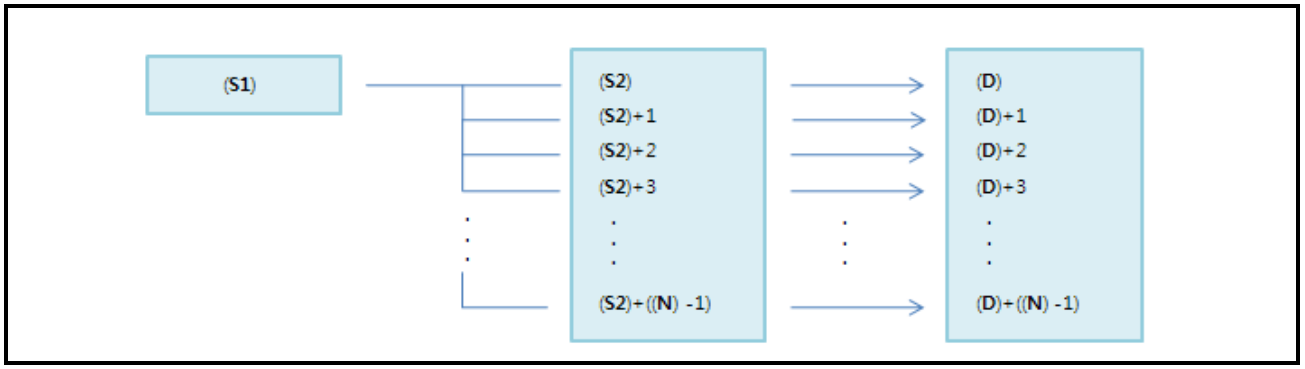
Error	Zero	Carry	Borrow	Step
	◎	◎		9

<Ladder>



1. Adds the word value of S1 and the number of N word values beginning with S2 one by one, and then stores the number of N results into the number of N corresponding destination words beginning with word D.
2. Executes the Signed operation.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))
3. If the result value is 'h0000', zero flag is SET.





5.5.115 Arithmetic Operation Instruction (DADDL)

Arithmetic operation instruction **DADDL S1 S2 D N**

Applicable model

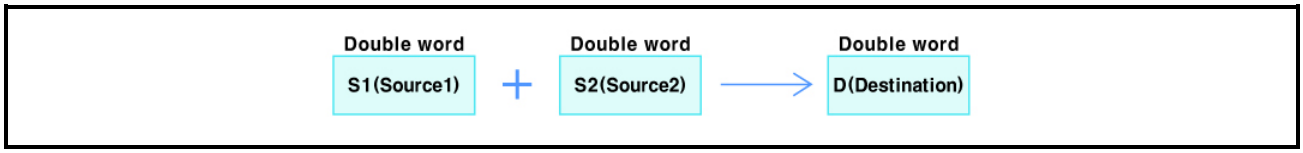
LP-S044, LP-S070, LP-A070, LP-A104

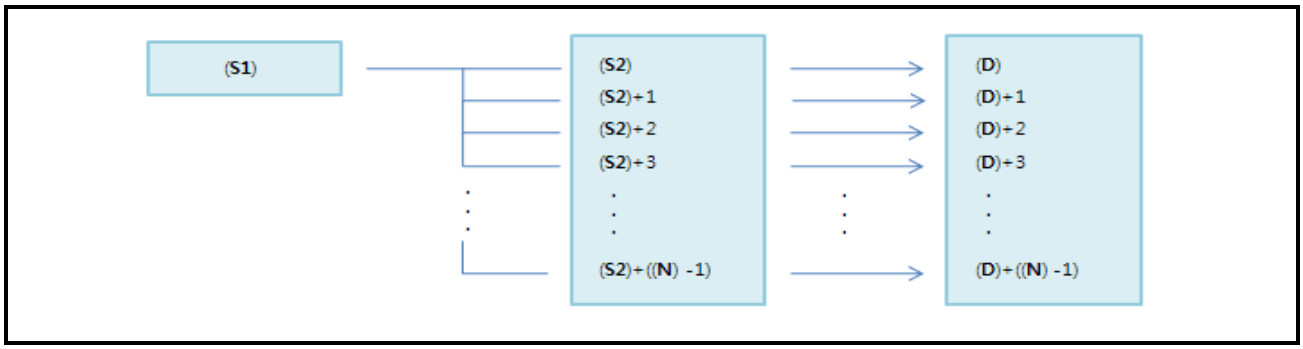
OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the addition operation with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the addition operation with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
D	DINT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

Error	Zero	Carry	Borrow	Step
	◎	◎		9

<Ladder>

1. Adds the double word value of S1 and the number of N double word values beginning with S2 one by one, and then stores their results into the number of N corresponding destination double words beginning with double word D respectively.
2. Executes the Signed operation.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))
3. If the result value is 'h00000000', zero flag is SET.





5.5.116 Arithmetic Operation Instruction (ADDLU)

Arithmetic operation instruction **ADDLU** **S1** **S2** **D** **N**

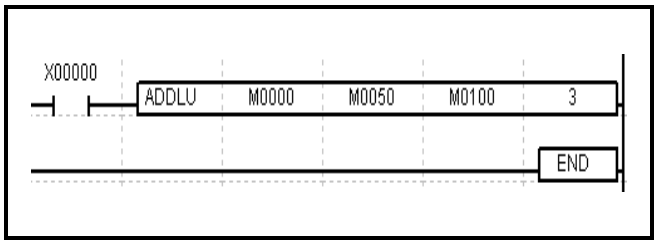
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

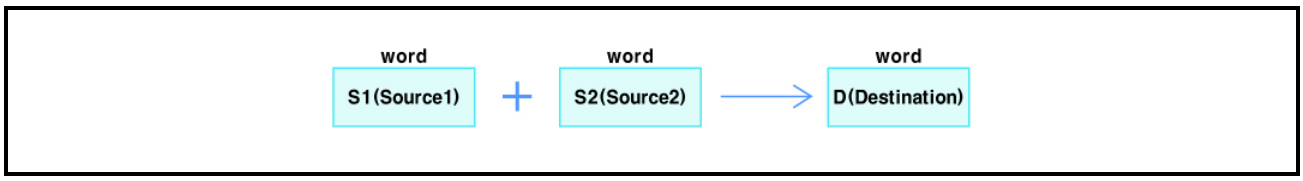
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the addition operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the addition operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

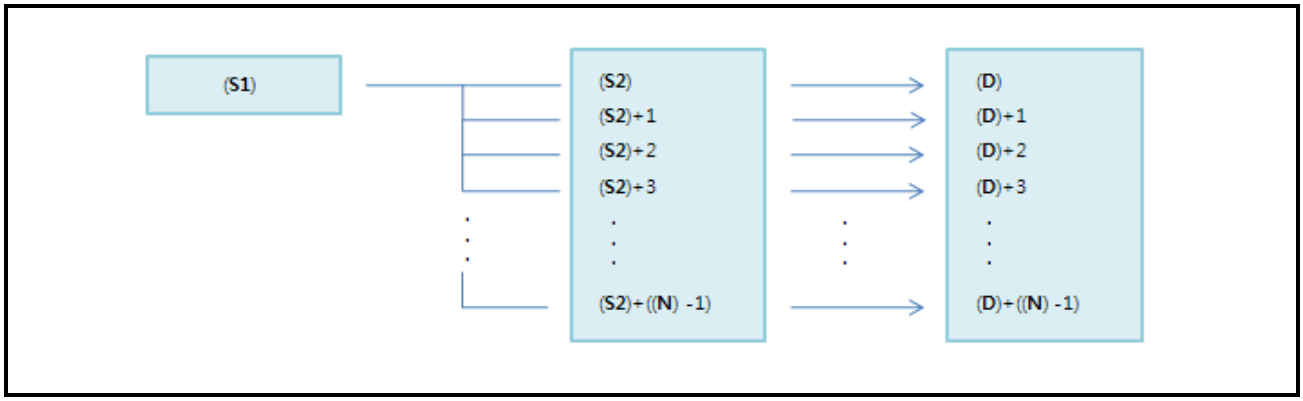
Error	Zero	Carry	Borrow	Step
	◎	◎		9

<Ladder>



1. Adds the word value of S1 and the number of N word values beginning with S2 one by one, and then stores their results into the number of N corresponding destination words beginning with word D respectively.
2. Executes the Unsigned operation.
3. If the result value exceeds 'hFFFF (65535)' carry flag is SET.
4. If the result value is 'h0000', zero flag is SET.





5.5.117 Arithmetic Operation Instruction (DADDLU)

Arithmetic operation instruction **DADDLU S1 S2 D N**

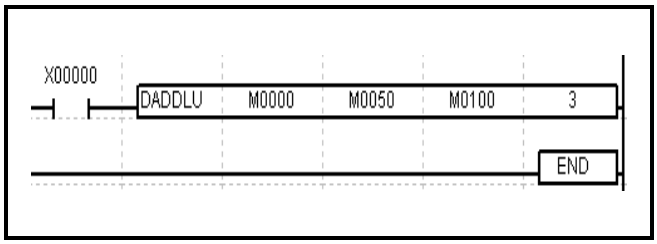
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

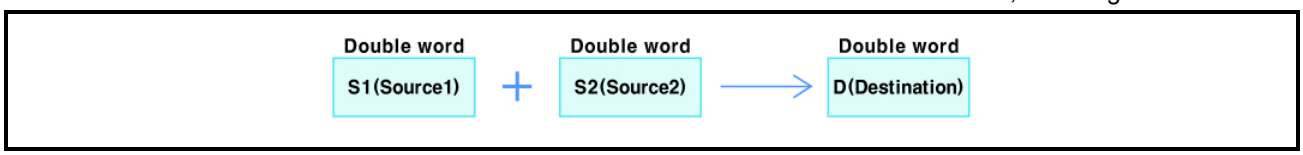
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the addition operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the addition operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

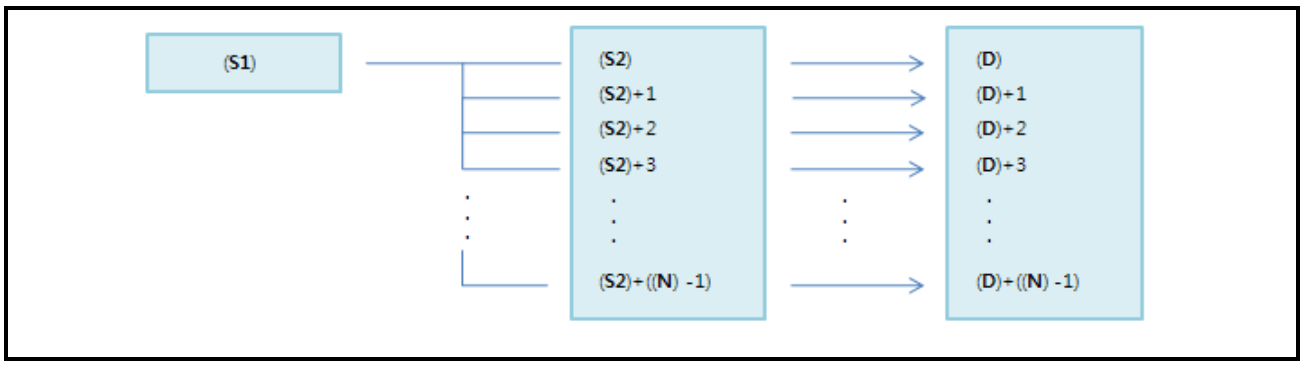
Error	Zero	Carry	Borrow	Step
	◎	◎		9

<Ladder>



1. Adds the double word value of S1 and the number of N double word values beginning with S2 one by one, and then stores their results into the number of N corresponding destination double words beginning with double word D respectively.
2. Executes the Unsigned operation.
3. If the result value exceeds 'hFFFFFFFF (4294967295)', carry flag is SET.
4. If the result value is 'h0000', zero flag is SET.





5.5.118 Arithmetic Operation Instruction (SUB)

Arithmetic operation instruction **SUB** **S1** **S2** **D**

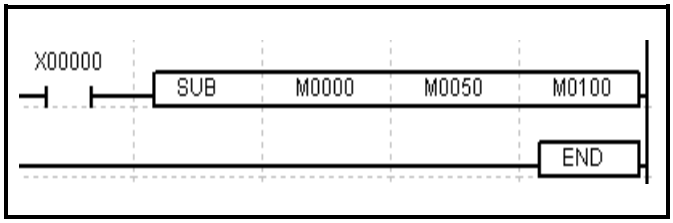
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

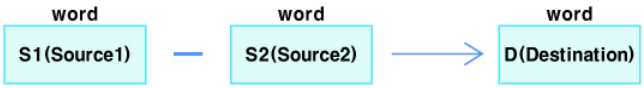
OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the subtraction operation with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the subtraction operation with S1
		-32768(h8000) to 32767(h7FFF)
D	INT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
	◎		◎	7

<Ladder>



1. Subtracts the word value of S2 from the word value of S1 and then stores the result into the destination word D.
2. Executes the Signed operation.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))
3. If the result value is ‘h0000’, zero flag occurs.



5.5.119 Arithmetic Operation Instruction (DSUB)

Arithmetic operation instruction **DSUB** **S1** **S2** **D**

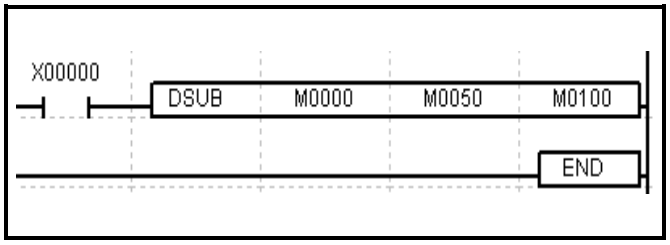
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

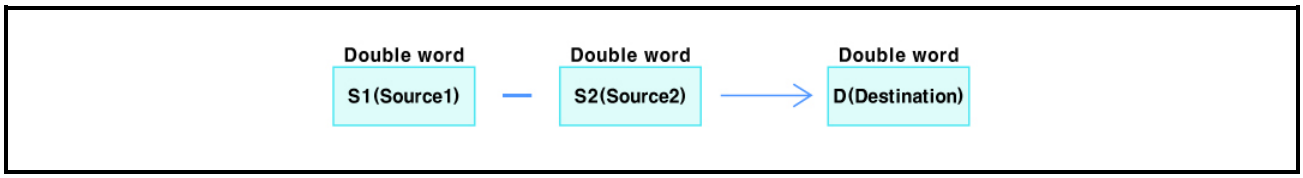
OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the subtraction operation with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the subtraction operation with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
D	DINT	Y, F, Z, T, C, M, S, L ,D, UW
		Address to save the operation result
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
	◎		◎	7

<Ladder>



1. Subtracts double word value of S2 from the double word value of S1 and then stores the result into the destination double word D.
2. Executes the Signed operation.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))
3. If the result value is ‘h00000000’, zero flag occurs.



5.5.120 Arithmetic Operation Instruction (SUBU)

Arithmetic operation instruction **SUBU** **S1** **S2** **D**

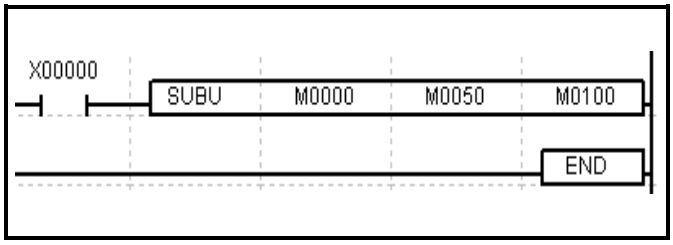
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

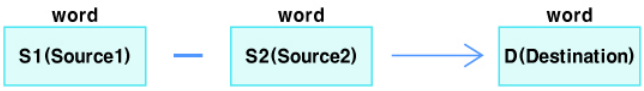
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the subtraction operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the subtraction operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)

Error	Zero	Carry	Borrow	Step
	◎		◎	7

<Ladder>



1. Subtracts the word value of S2 from the word value of S1 and then stores the result into the destination word D.
2. Executes the Unsigned operation.
3. If the result value is ‘h0000’ or out of this, borrow flag occurs.
4. If the result value is ‘h0000’, zero flag occurs.



5.5.121 Arithmetic Operation Instruction (DSUBU)

Arithmetic operation instruction **DSUBU** **S1** **S2** **D**

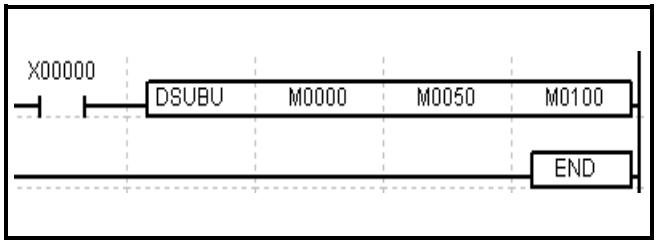
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

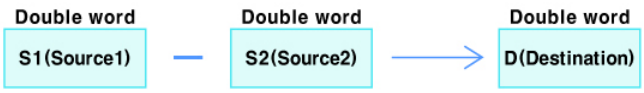
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the subtraction operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the subtraction operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
	◎		◎	7

<Ladder>



1. Subtract the double word value of S2 from the double word value of S1 and then store the result into the destination double word D.
2. Executes the Unsigned operation.
3. If the result value is ‘h00000000’ or out of this, borrow flag occurs.
4. If the result value ‘h00000000’, zero flag occurs.



5.5.122 Arithmetic Operation Instruction (SUBL)

Arithmetic operation instruction **SUBL** **S1** **S2** **D** **N** **N**

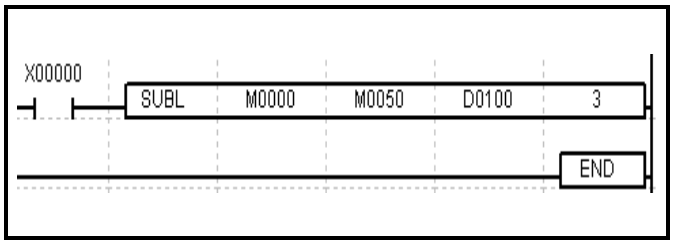
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

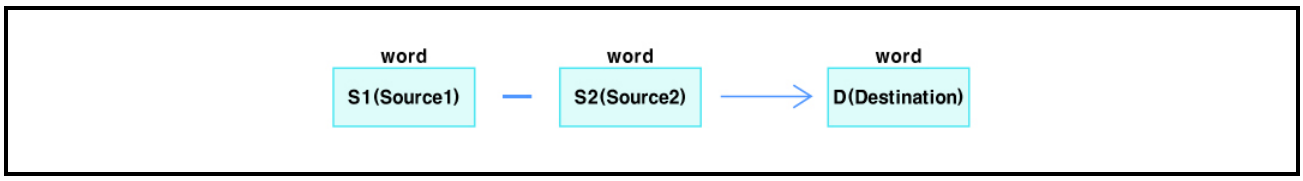
OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the subtraction operation with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the subtraction operation with S1
		-32768(h8000) to 32767(h7FFF)
D	INT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-32768(h8000) to 32767(h7FFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

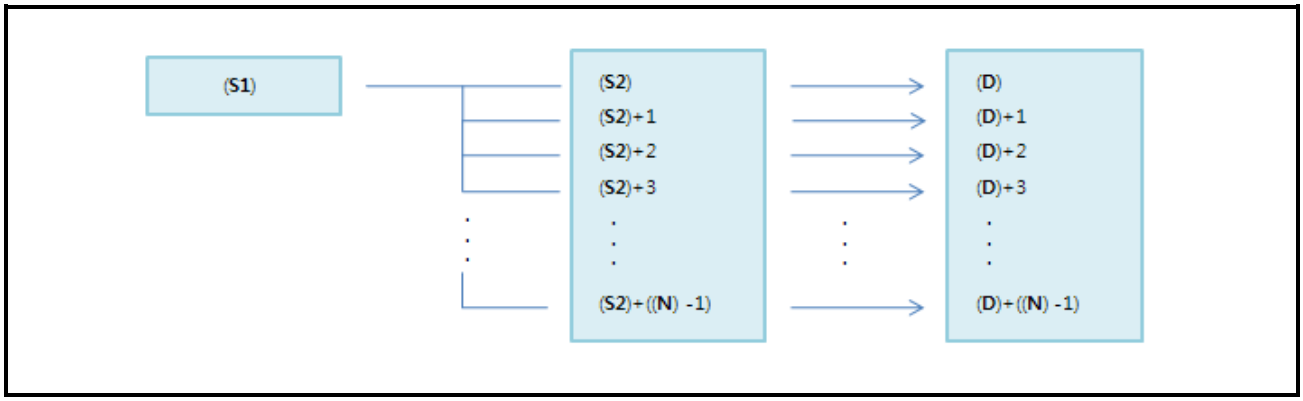
Error	Zero	Carry	Borrow	Step
	◎		◎	9

<Ladder>



1. Subtracts the number of N word values, which are from S2 to S2(N-1), from the double word value of S1 respectively, and then stores the result into the number of N corresponding destination double words beginning with the word D.
2. Executes the Signed operation.
(h8000(-32768) to hFFFF(-1) < 0 to h7FFF(32767))
3. If the result value is 'h0000', zero flag occurs.





5.5.123 Arithmetic Operation Instruction (DSUBL)

Arithmetic operation instruction **DSUBL** **S2** **D** **N**

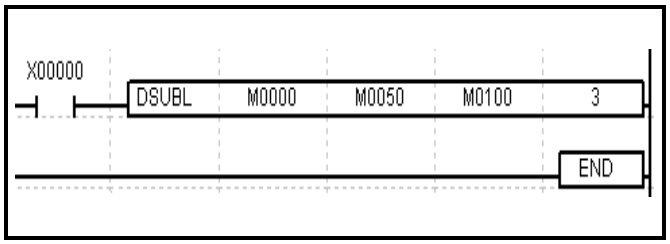
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

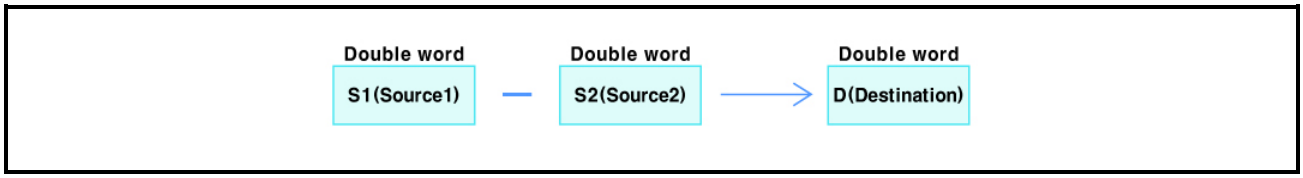
OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the subtraction operation with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the subtraction operation with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
D	DINT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

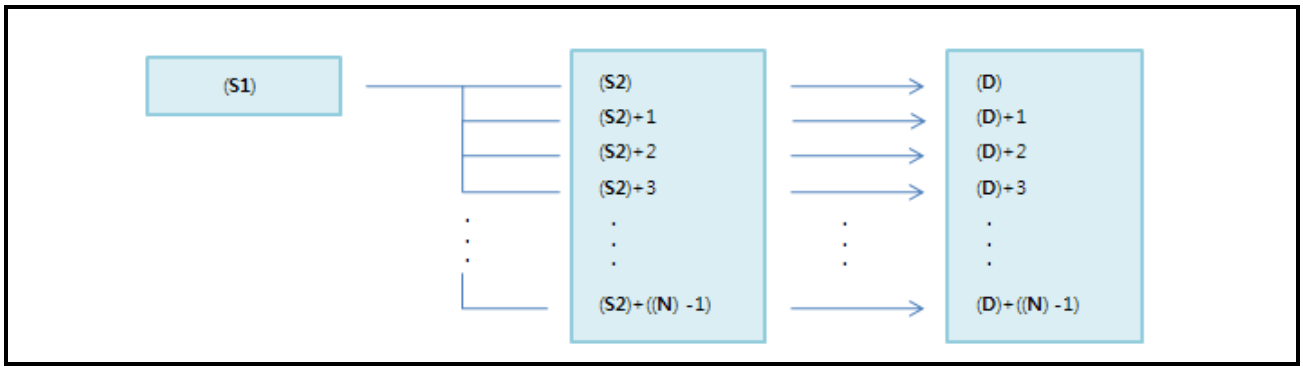
Error	Zero	Carry	Borrow	Step
	◎		◎	9

<Ladder>



1. Subtracts the number of N double word values, which are from S2 to S2(N-1), from double word value of S1 respectively, and then stores the result into the number of N corresponding destination double words beginning with the double word D.
2. Executes the Signed operation.
(h80000000(-2147483648) to hFFFFFFFF(-1) < 0 to h7FFFFFFF(2147483647))
3. If the result value is 'h00000000', zero flag occurs.





5.5.124 Arithmetic Operation Instruction (SUBLU)

Arithmetic operation instruction **SUBLU** **S1** **S2** **D** **N**

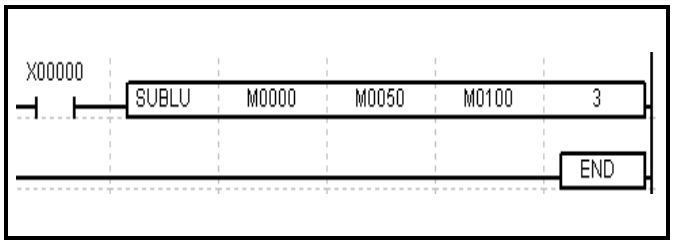
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

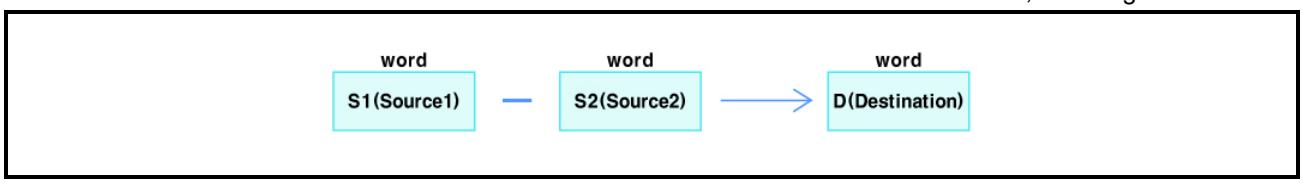
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the subtraction operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the subtraction operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

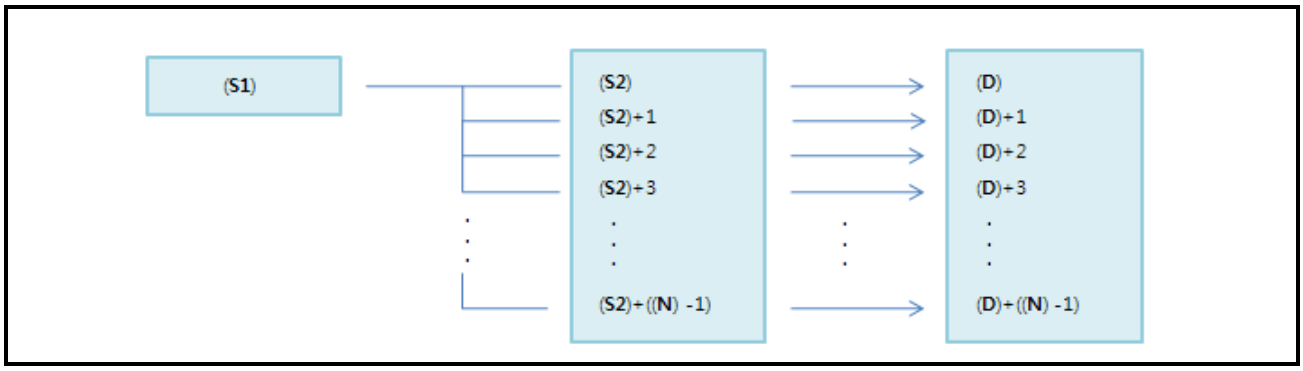
Error	Zero	Carry	Borrow	Step
	◎		◎	9

<Ladder>



1. Subtracts the number of N word values, which are from S2 to S2(N-1), from word value of S1 respectively, and then stores the result into the number of N corresponding destination words beginning with the word D.
2. Executes the Unsigned operation.
3. If the result value is ‘h0000’ or out of this, borrow flag occurs.
4. If the result value is ‘h0000’, zero flag occurs.





5.5.125 Arithmetic Operation Instruction (DSUBLU)

Arithmetic operation instruction **DSUBLU S1 S2 D N**

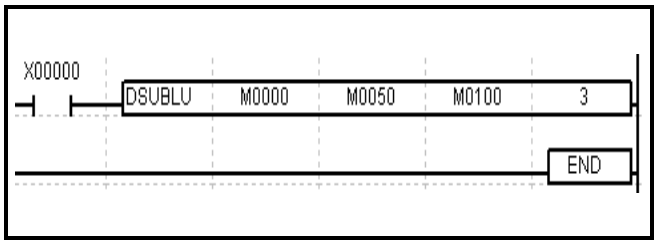
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

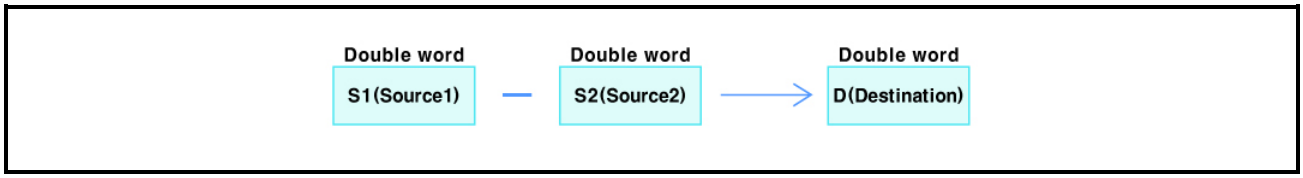
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the subtraction operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the subtraction operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

Error	Zero	Carry	Borrow	Step
	◎		◎	9

<Ladder>



1. Subtracts the number of N double word values, which are from S2 to S2(N-1), from double word value of S1 respectively, and then stores the result into the number of N corresponding destination beginning with the double word D.
2. Executes the Unsigned operation.
3. If the result value is ‘h00000000’ or out of this, borrow flag occurs.
4. If the result value ‘h00000000’, zero flag occurs.



5.5.126 Arithmetic Operation Instruction (MUL)

Arithmetic operation instruction **MUL** **S1** **S2** **D**

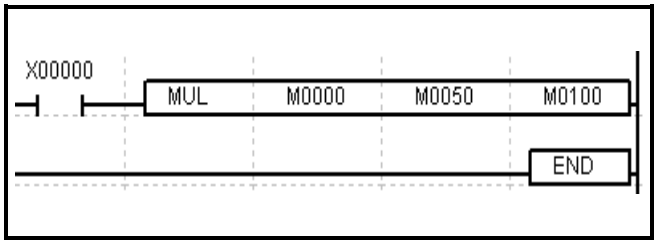
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

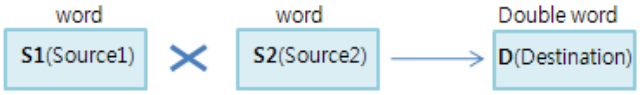
OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the multiplication with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the multiplication with S1
		-32768(h8000) to 32767(h7FFF)
D	DINT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
	◎	◎		7

<Ladder>



1. Multiplies the word value of S1 and that of S2, and then stores the result into the destination double word “D”.
2. Executes the Signed operation.
3. If the result value is ‘0’, zero flag occurs.



5.5.127 Arithmetic Operation Instruction (DMUL)

Arithmetic operation instruction **DMUL** **S1** **S2** **D**

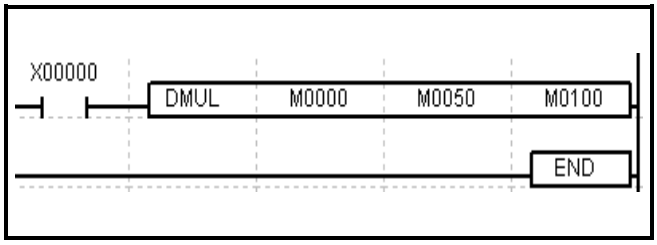
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

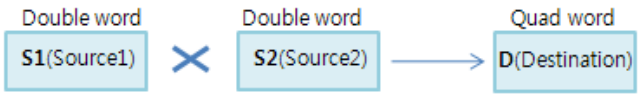
OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the multiplication with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the multiplication with S1
		-2147483648(h80000000 to 2147483647(hFFFFFFFF)
D	QWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result

Error	Zero	Carry	Borrow	Step
	◎	◎		7

<Ladder>



1. Multiplies the double word value of S1 and that of S2, and then stores the result into the destination “Quad Word D”.
2. Executes the Signed operation.
3. If the result value is ‘0’, zero flag is SET.



5.5.128 Arithmetic Operation Instruction (MULU)

Arithmetic operation instruction **MULU** **S1** **S2** **D**

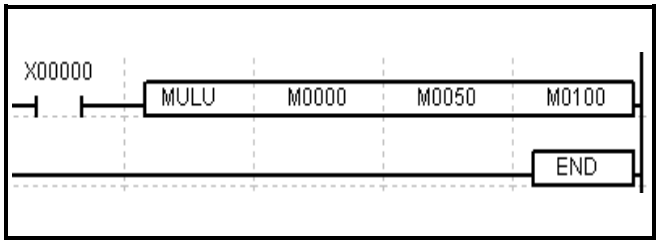
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

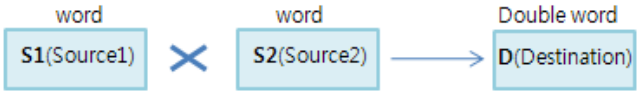
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the multiplication with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the multiplication with S1
		0(h0000) to 65535(hFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
	◎	◎		7

<Ladder>



1. Multiplies the word value of S1 and that of S2, and then stores the result into the destination “Double Word DW”.
2. Executes the Unsigned operation.
3. If the result value is ‘0’, zero flag occurs.



5.5.129 Arithmetic Operation Instruction (DMULU)

Arithmetic operation instruction **DMULU S1 S2 D**

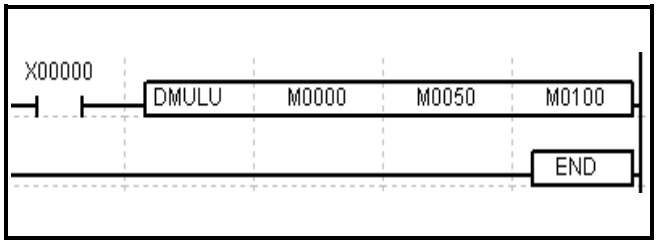
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

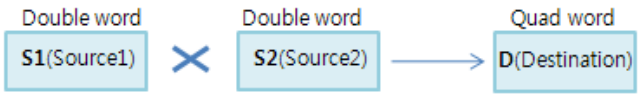
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the multiplication with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the multiplication with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	QWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result

Error	Zero	Carry	Borrow	Step
	◎	◎		7

<Ladder>



1. Multiplies the double word value of S1 and that of S2, and then stores the result into the destination "Quad Word D".
2. Executes the Unsigned operation.
3. If the result value is '0', zero flag occurs.



5.5.130 Arithmetic Operation Instruction (MULL)

Arithmetic operation instruction **MULL** **S1** **S2** **D** **N**

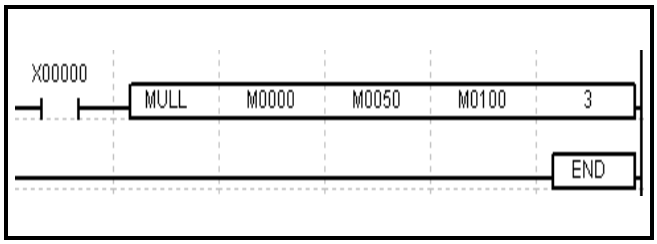
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

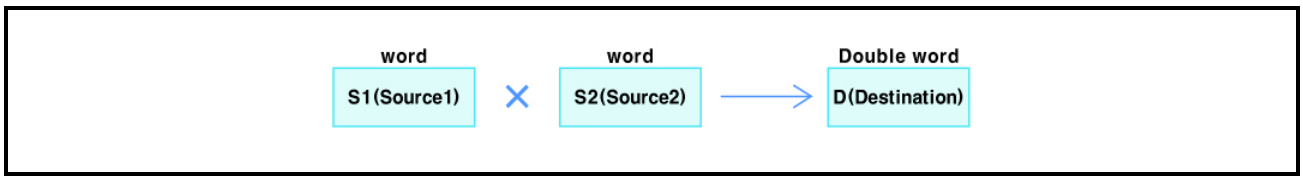
OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the multiplication with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the multiplication with S1
		-32768(h8000) to 32767(h7FFF)
D	DINT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

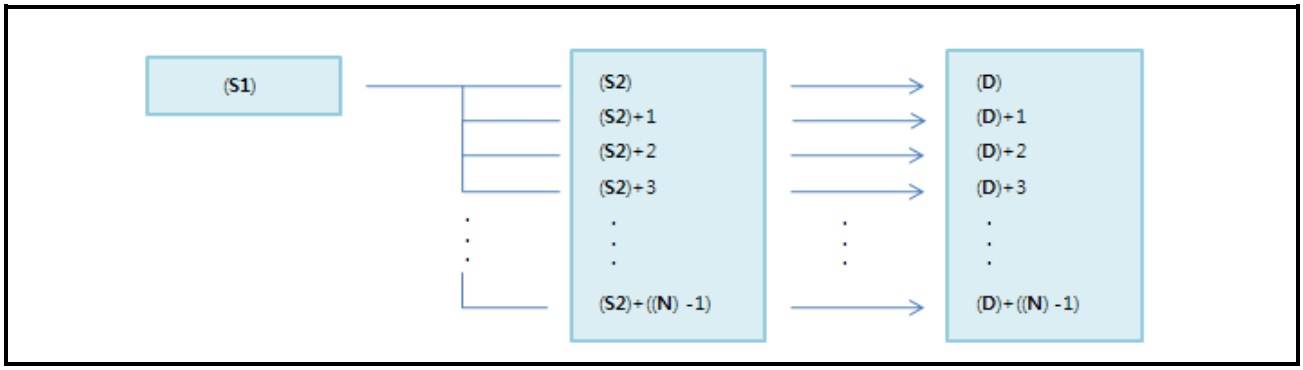
Error	Zero	Carry	Borrow	Step
	◎	◎		9

<Ladder>



1. Multiplies the word value of S1 and the number of N word values, which are from S2 to S2(N-1), respectively, and then stores the result into the number of corresponding destination double words beginning with double word D.
2. Executes the Signed operation.
3. Any one of the results is '0', zero flag occurs.





5.5.131 Arithmetic Operation Instruction (DMULL)

Arithmetic operation instruction **DMULL S1 S2 D N**

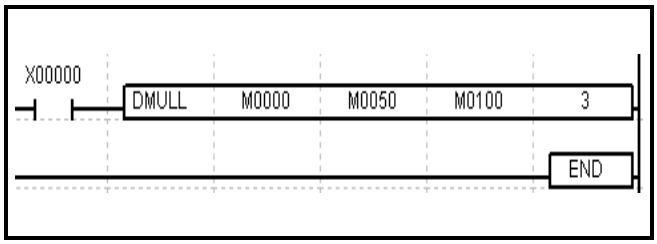
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

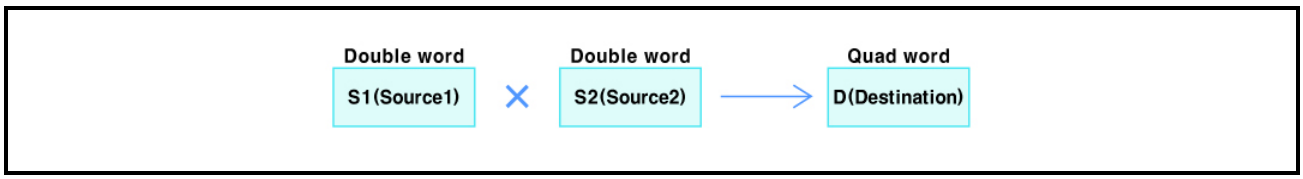
OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the multiplication with S2
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the multiplication with S1
		-2147483648(h80000000) to 2147483647(h7FFFFFFF)
D	QINT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

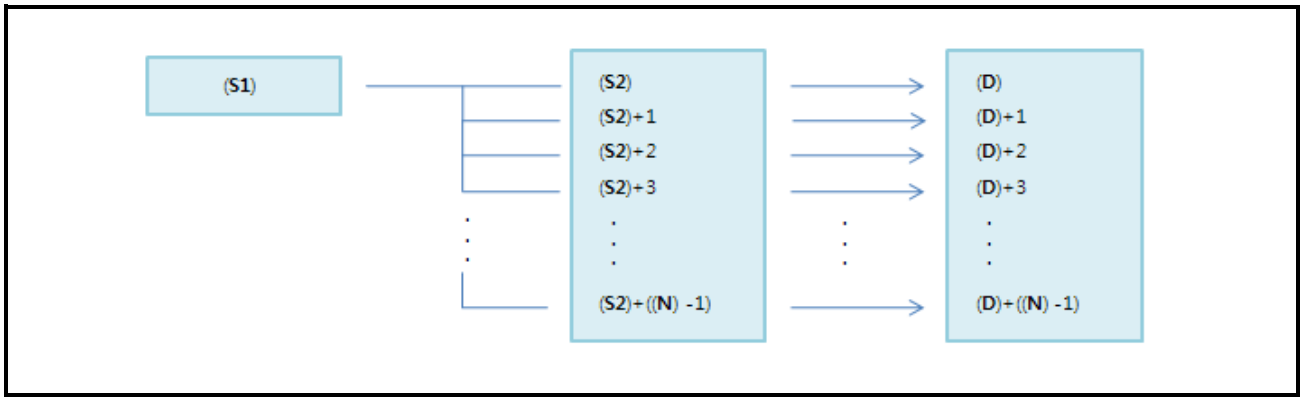
Error	Zero	Carry	Borrow	Step
	◎	◎		9

<Ladder>



1. Multiplies the double word value of S1 and the number of N double word values, which are from S2 to S2(N-1), respectively, and then stores the result into the number of corresponding destination quad words beginning with D.
2. Executes the Signed operation.
3. Any one of the results is ‘0’, zero flag occurs.





5.5.132 Arithmetic Operation Instruction (MULLU)

Arithmetic operation instruction **MULLU S1 S2 D N**

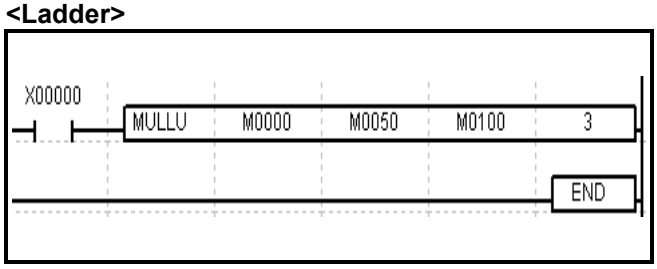
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

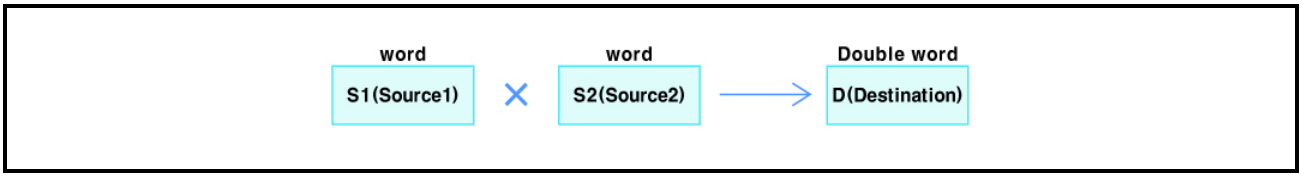
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the multiplication with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the multiplication with S1
		0(h0000) to 65535(hFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

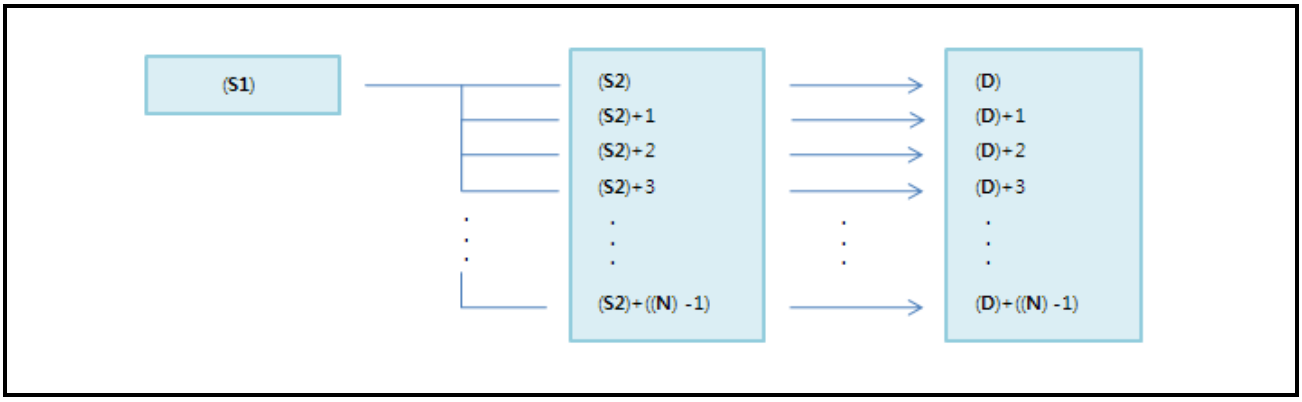
Error	Zero	Carry	Borrow	Step
	◎	◎		9

<Ladder>



1. Multiplies the word value of S1 and the number of N word values, which are from S2 to S2(N-1) respectively, and then stores the result into the number of corresponding destination double words beginning with double word D one by one.
2. Executes the Unsigned operation.
3. Any one of the results is '0', zero flag occurs.





5.5.133 Arithmetic Operation Instruction (DMULLU)

Arithmetic operation instruction **DMULLU S1 S2 D N**

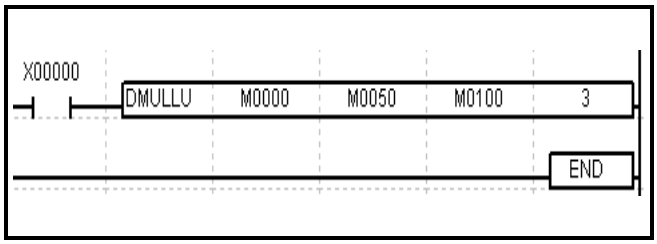
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

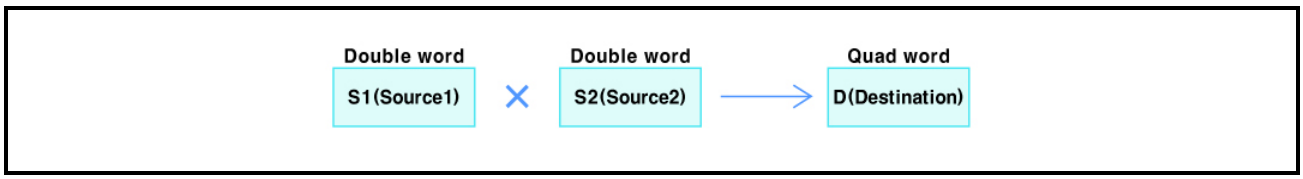
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the multiplication with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the multiplication with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	QWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

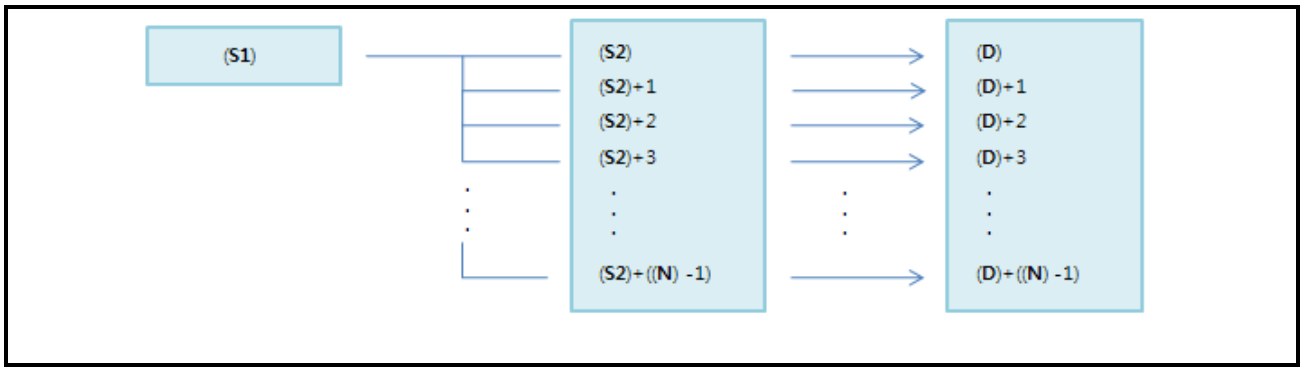
Error	Zero	Carry	Borrow	Step
	◎	◎		9

<Ladder>



1. Multiplies the double word value of S1 and the number of N double word values, which are from S2 to S2(N-1), and then stores the result into the number of N corresponding destination quad words beginning with quad word D one by one.
2. Executes the Unsigned operation.
3. Any one of the results is ‘0’, zero flag occurs.





5.5.134 Arithmetic Operation Instruction (DIV)

Arithmetic operation instruction **DIV** **S1** **S2** **D**

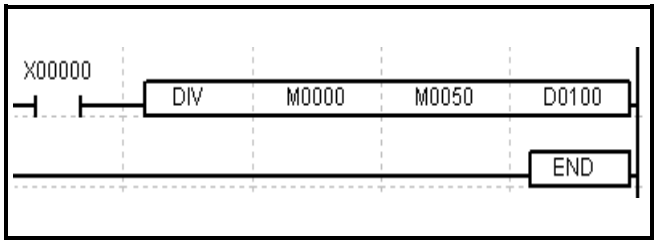
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

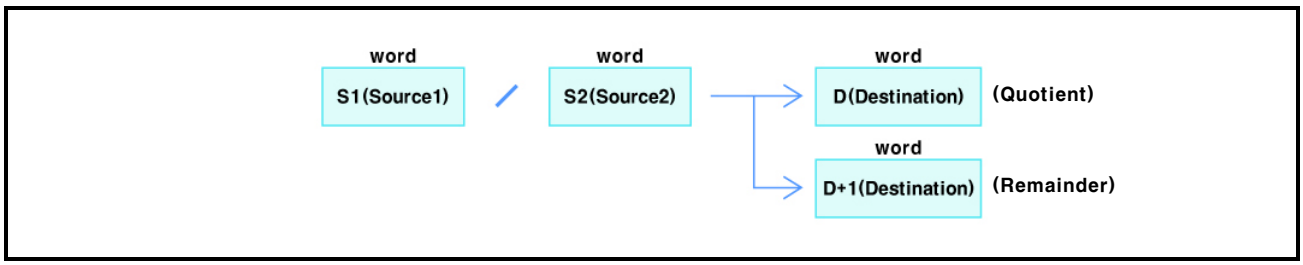
OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the division operation with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the division operation with S1
		-32768(h8000) to 32767(h7FFF)
D	INT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
◎	◎			7

<Ladder>



1. Divides the word value of S1 by that of S2 and then stores the quotient and the remainder into the destination “Word D” and “Word D+1” respectively.
2. Executes the Signed operation.
3. If the divisor is 0, error flag is SET.
4. If the dividend is 0, zero flag is SET.



5.5.135 Arithmetic Operation Instruction (DDIV)

Arithmetic operation instruction **DDIV** **S1** **S2** **D**

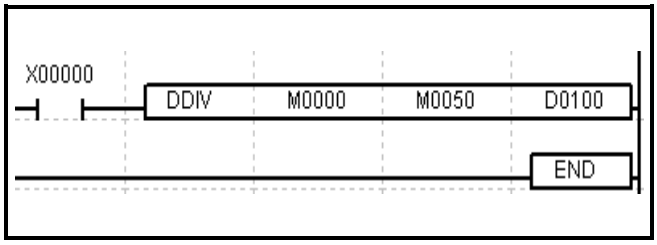
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

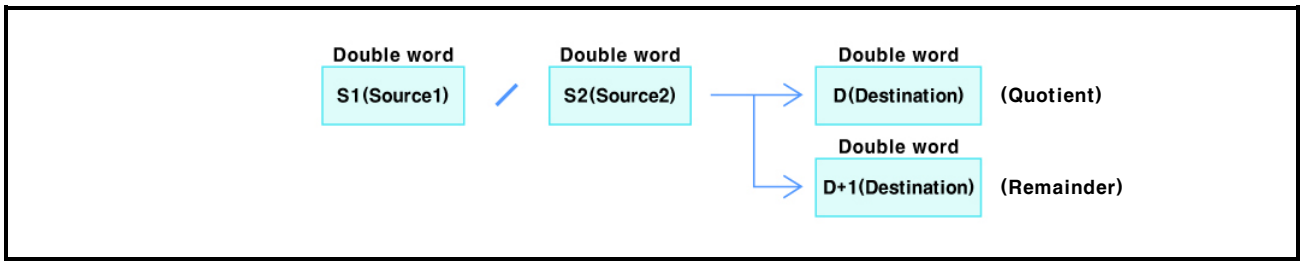
OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the division operation with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the division operation with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
D	DINT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
◎	◎			7

<Ladder>



1. Divides the double word value of S1 by that of S2 and then stores the quotient and the remainder into the destination “Double Word D” and “Double Word D+1” respectively.
2. Executes the Signed operation.
3. If the divisor is 0, error flag is SET.
4. If the dividend is 0, zero flag is SET.



5.5.136 Arithmetic Operation Instruction (DIVU)

Arithmetic operation instruction **DIVU** **S1** **S2** **D**

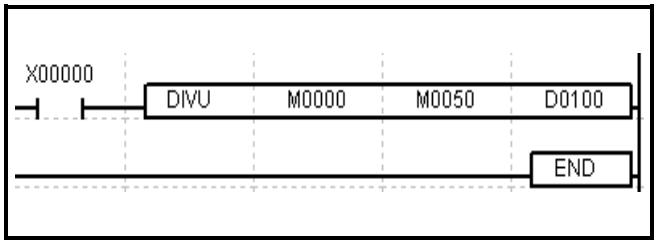
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

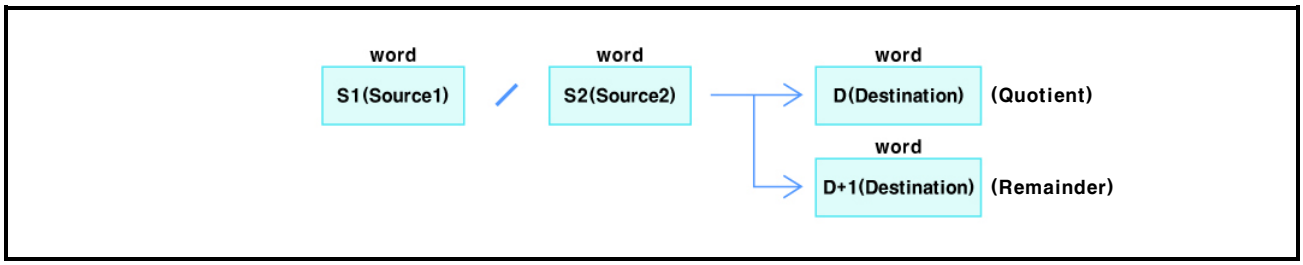
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the division operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the division operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)

Error	Zero	Carry	Borrow	Step
◎	◎			7

<Ladder>



1. Divides the word value of S1 by that of S2 and then stores the quotient and the remainder into the destination “Word D” and “Word D+1” respectively.
2. Executes the Unsigned operation.
3. If the divisor is 0, error flag is SET.
4. If the dividend is 0, zero flag is SET.



5.5.137 Arithmetic Operation Instruction (DDIVU)

Arithmetic operation instruction **DDIVU** **S1** **S2** **D**

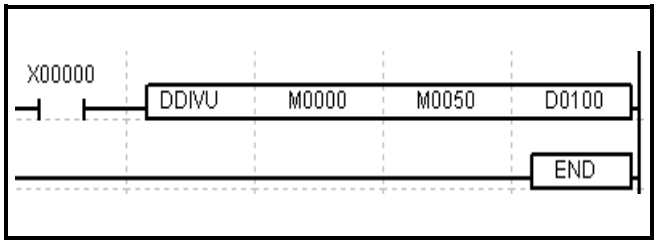
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

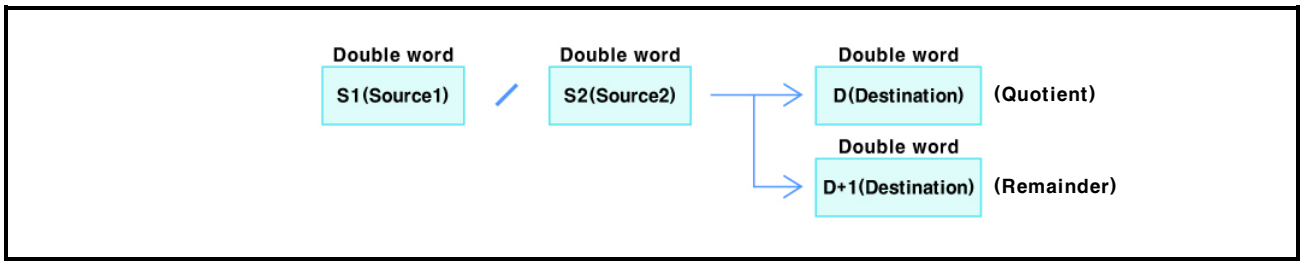
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the division operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the division operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
◎	◎			7

<Ladder>



1. Divides the double word value of S1 by that of S2 and then stores the quotient and the remainder into the destination “Double Word D” and “Double Word D+1” respectively.
2. Executes the Unsigned operation.
3. If the divisor is 0, error flag is SET.
4. If the dividend is 0, zero flag is SET.



5.5.138 Arithmetic Operation Instruction (DIVL)

Arithmetic operation instruction **DIVL** **S1** **S2** **D** **N**

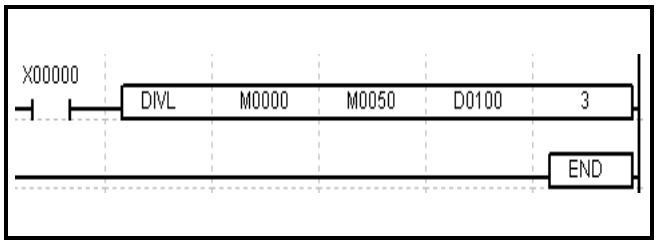
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

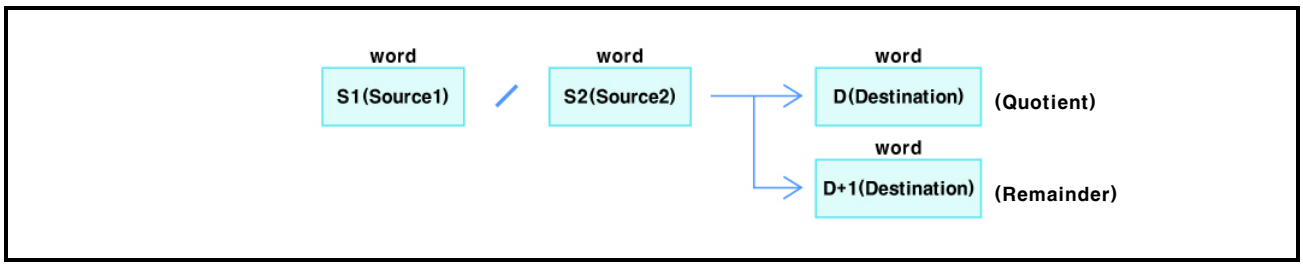
OP	DATA type	Available device / Description / Range
S1	INT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the division operation with S2
		-32768(h8000) to 32767(h7FFF)
S2	INT	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the division operation with S1
		-32768(h8000) to 32767(h7FFF)
D	INT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-32768(h8000) to 32767(h7FFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

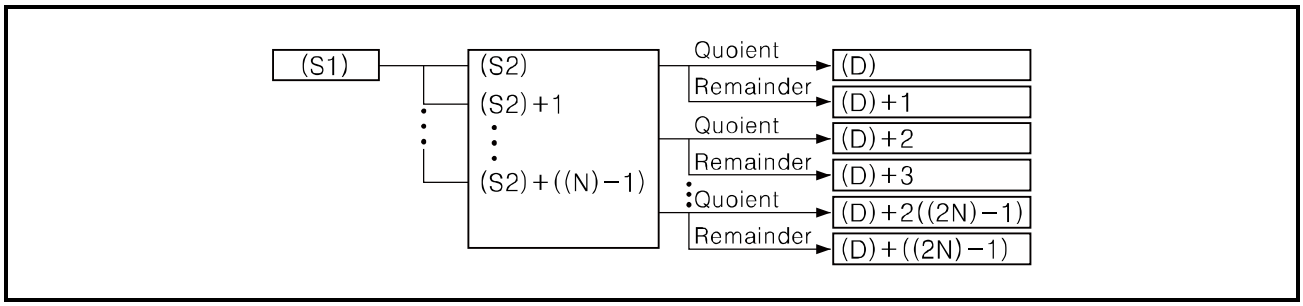
Error	Zero	Carry	Borrow	Step
◎	◎			9

<Ladder>



1. Divides the word value of S1 by the number of N word values beginning with S2 and then stores the quotient and the remainder into the destination “Word D” and “Word D+1” respectively.
2. Executes the Signed operation.
3. If the divisor is 0, error flag is SET.
4. If the dividend is 0, zero flag is SET.





5.5.139 Arithmetic Operation Instruction (DDIVL)

Arithmetic operation instruction **DDIVL** **S1** **S2** **D** **N**

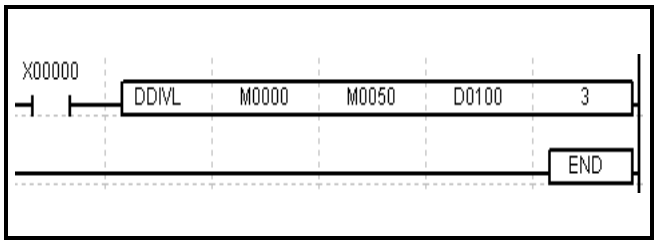
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

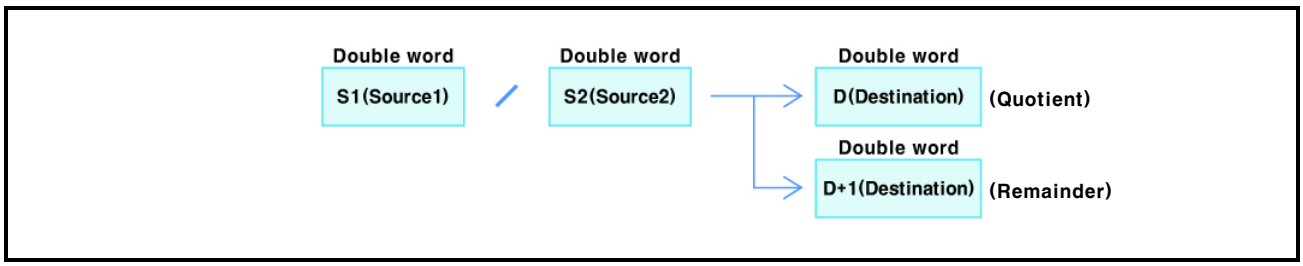
OP	DATA type	Available device / Description / Range
S1	DINT	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the division operation with S2
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
S2	DINT	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the division operation with S1
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
D	DINT	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

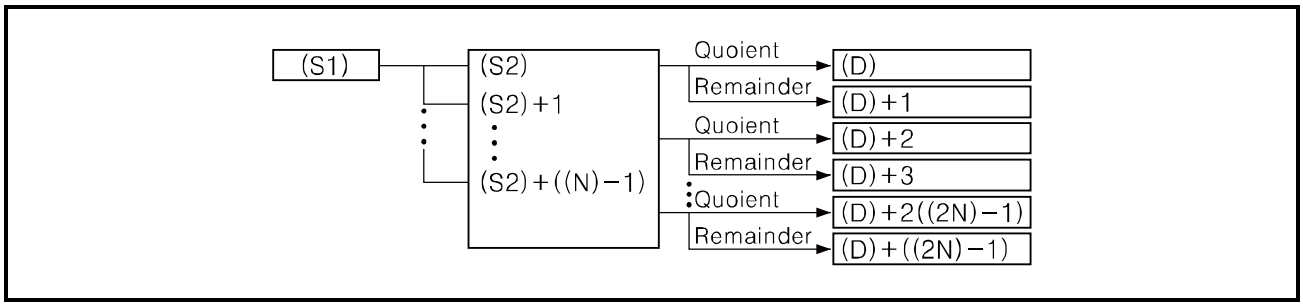
Error	Zero	Carry	Borrow	Step
◎	◎			9

<Ladder>



1. Divides the double word value of S1 by the number of N double word values beginning with S2 and then stores the quotient and the remainder into the destination “Double Word D” and “Double Word D+1” respectively.
2. Executes the Signed operation.
3. If the divisor is 0, error flag is SET.
4. If the dividend is 0, zero flag is SET.





5.5.140 Arithmetic Operation Instruction (DIVLU)

Arithmetic operation instruction **DIVLU** **S1** **S2** **D** **N**

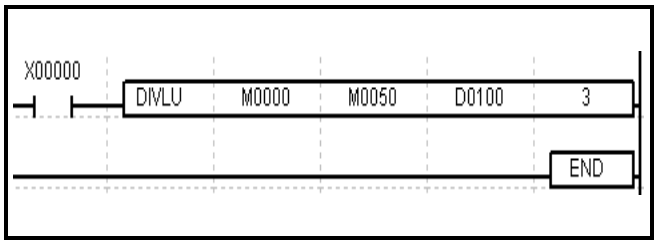
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

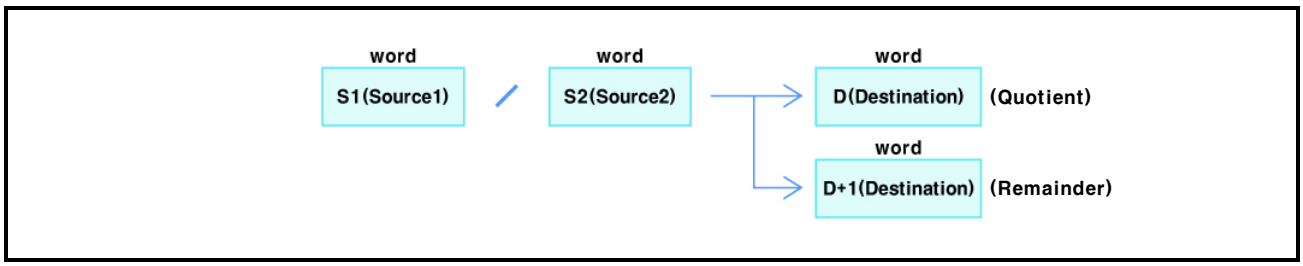
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the division operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the division operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

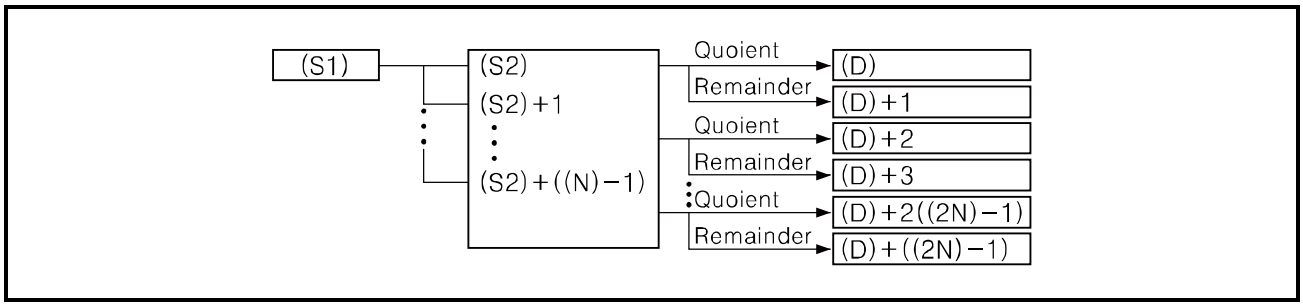
Error	Zero	Carry	Borrow	Step
◎	◎			9

<Ladder>



1. Divides the word value of S1 by the number of N word values beginning with S2 and then stores the quotient and the remainder into the destination “Word D” and “Word D+1” respectively.
2. Executes the Unsigned operation.
3. If the divisor is 0, error flag is SET.
4. If the dividend is 0, zero flag is SET.





5.5.141 Arithmetic Operation Instruction (DDIVLU)

Arithmetic operation instruction **DDIVLU S1 S2 D N**

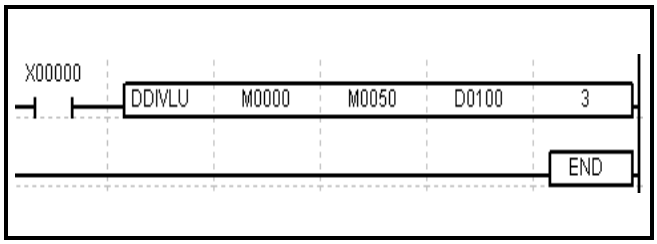
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

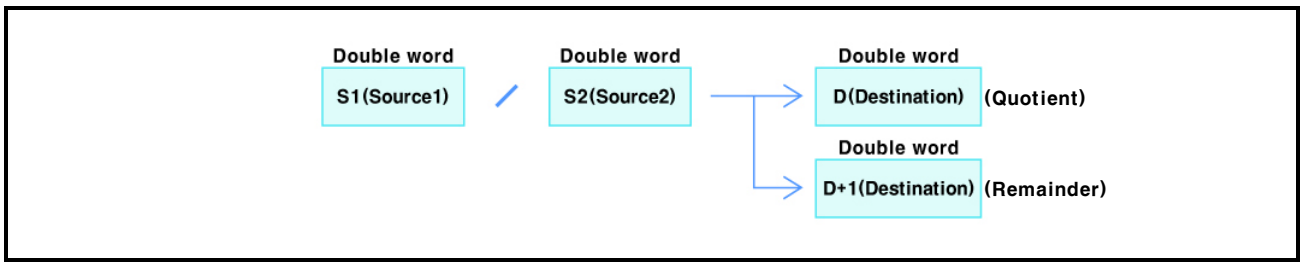
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the division operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the division operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

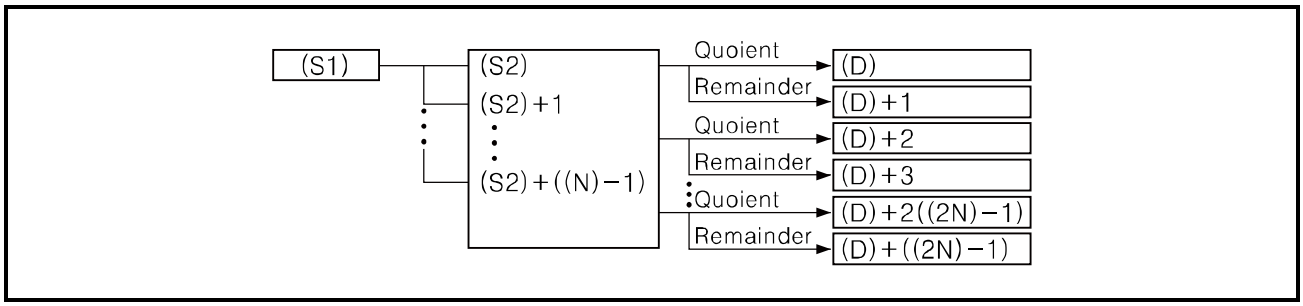
Error	Zero	Carry	Borrow	Step
◎	◎			9

<Ladder>



1. Divides the double word value of S1 by the number of N double word values beginning with S2 and then stores the quotient and the remainder into the destination “Double Word D” and “Double Word D+1” respectively.
2. Executes the Unsigned operation.
3. If the divisor is 0, error flag is SET.
4. If the dividend is 0, zero flag is SET.





5.5.142 Arithmetic Operation Instruction (INC)

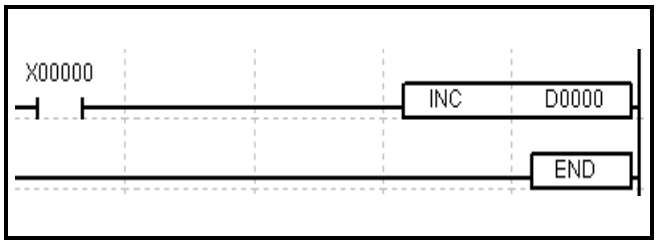
Arithmetic operation instruction **INC** **D**

Applicable model

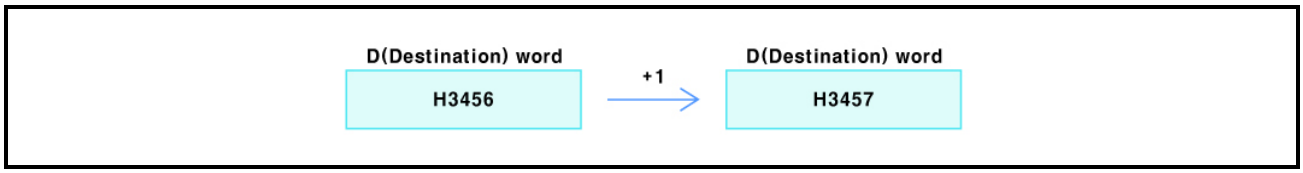
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	WORD	Y, F, Z, T, C, M, S, L, D, UW					
		Data address to execute the operation					
		0(h0000) to 65535(hFFFF)		◎	◎		3

<Ladder>



1. Increases the value of destination word D by '1'.
2. If the value is increased from the maximum value by 1 and then becomes 0, zero flag and carry flag are SET.



5.5.143 Arithmetic Operation Instruction (DINC)

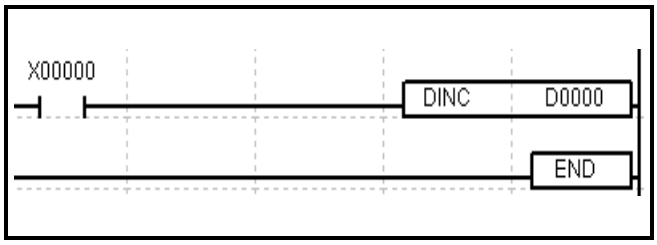
Arithmetic operation instruction **DINC** **D**

Applicable model

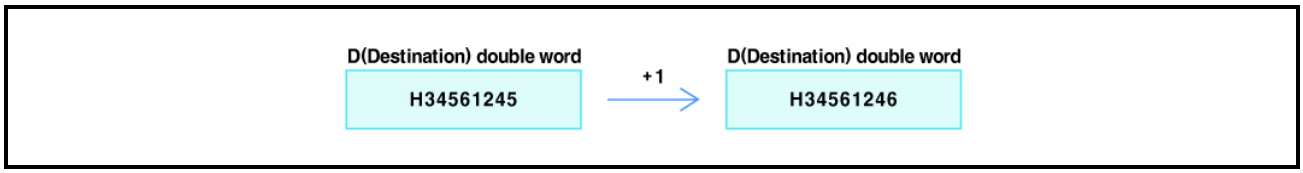
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW					
		Data address to execute the operation					
		0(h0000) to 4294967295(hFFFFFFFF)		◎	◎		3

<Ladder>



1. Increases the value of destination double word D by '1'.
2. If the value is increased from the maximum value by 1 and then D value becomes 0, zero flag and carry flag are SET.



5.5.144 Arithmetic Operation Instruction (DEC)

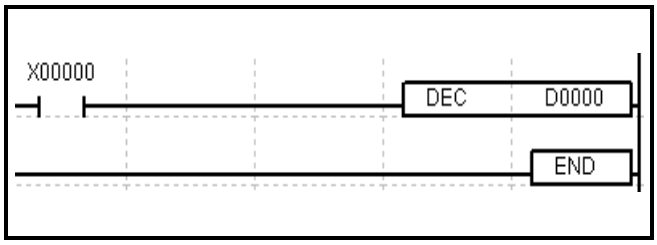
Arithmetic operation instruction **DEC** **D**

Applicable model

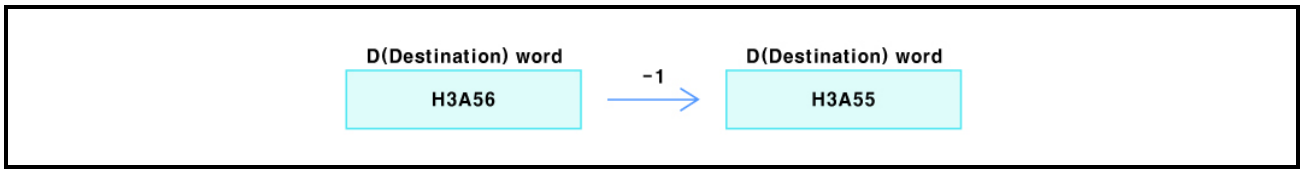
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	WORD	Y, F, Z, T, C, M, S, L, D, UW					
		Data address to execute the operation					
		0(h0000) to 65535(hFFFF)		◎		◎	3

<Ladder>



1. Decreases the value of destination word D by ‘1’.
2. If D value is ‘0’, zero flag is SET.
3. If D value is decreased again from ‘0’, borrow flag is SET.



5.5.145 Arithmetic Operation Instruction (DDEC)

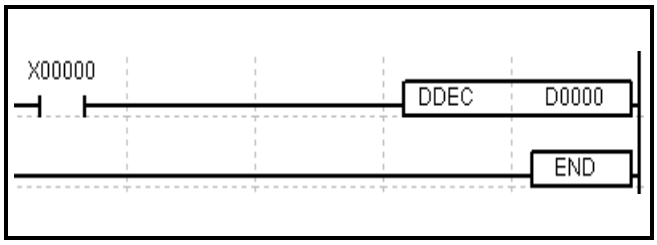
Arithmetic operation Instruction **DDEC** **D**

Applicable model

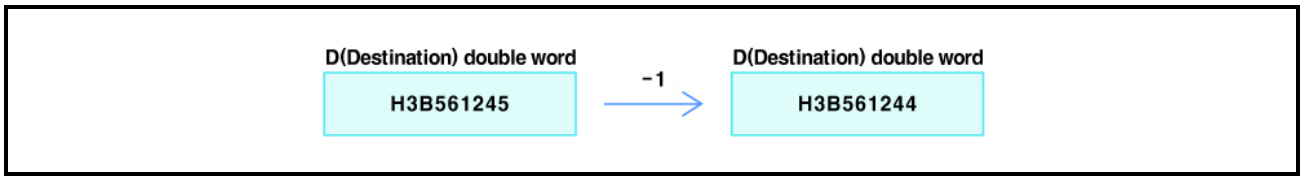
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW					
		Data address to execute the operation					
		0(h0000) to 4294967295(hFFFFFFFF)		◎		◎	3

<Ladder>



1. Decreases the value of destination double word D by ‘1’.
2. If D value is ‘0’, zero flag is SET.
3. If D value is decreased again from ‘0’, carry flag is SET.



5.5.146 Arithmetic Operation Instruction (ADDB)

Arithmetic operation instruction **ADDB** **S1** **S2** **D**

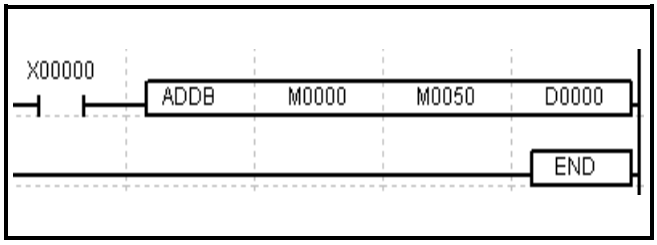
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

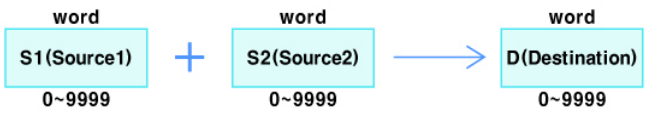
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD addition operation with S2
		h0000 to h9999
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD addition operation with S1
		h0000 to h9999
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h0000 to h9999

Error	Zero	Carry	Borrow	Step
◎	◎	◎		7

<Ladder>



1. Adds the word value of S1 and that of S2, both are composed of BCD codes, and then stores the result into the destination word D as BCD code.
2. If any of the value not composed of the BCD code is detected in S1 and S2, error flag is SET. (Except 0 to 9999)
3. If the result value is out of the range of D, carry flag is SET.
4. If the result value is ‘0’, zero flag is SET.



5.5.147 Arithmetic Operation Instruction (DADDB)

Arithmetic operation instruction **DADDB S1 S2 D**

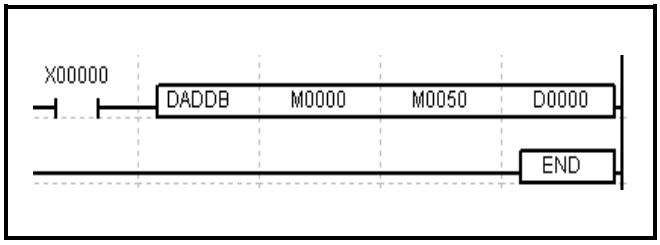
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

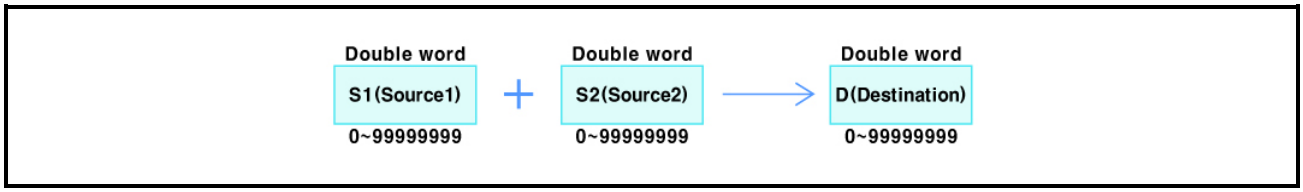
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD addition operation with S2
		h00000000 to h99999999
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD addition operation with S1
		h00000000 to h99999999
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h00000000 to h99999999

Error	Zero	Carry	Borrow	Step
◎	◎	◎		7

<Ladder>



1. Adds the double word values of S1 and S2, both are composed of BCD codes, and then stores the result into the destination double word D as BCD codes.
2. If any of the value not composed of the BCD code is detected in S1 and S2, error flag is SET. (Except 0 to 99999999)
3. If the result value is out of the range of D, carry flag is SET.
4. If the result value is ‘0’, zero flag is SET.



5.5.148 Arithmetic Operation Instruction (ADDBL)

Arithmetic operation instruction **ADDBL** **S1** **S2** **D** **N**

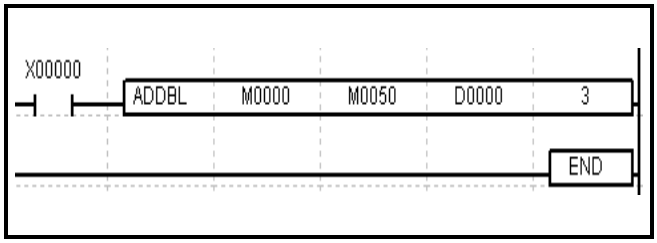
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

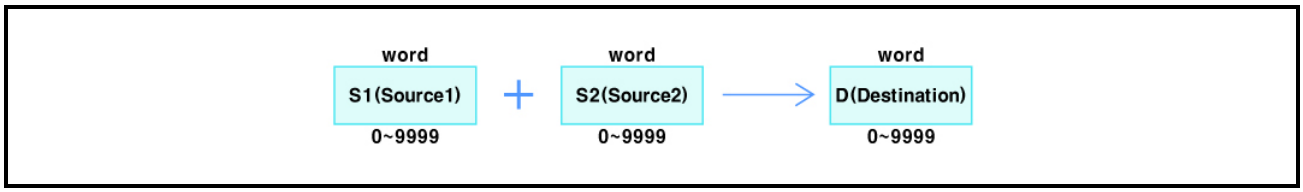
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD addition operation with S2
		h0000 to h9999
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the BCD addition operation with S1
		h0000 to h9999
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h0000 to h9999
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

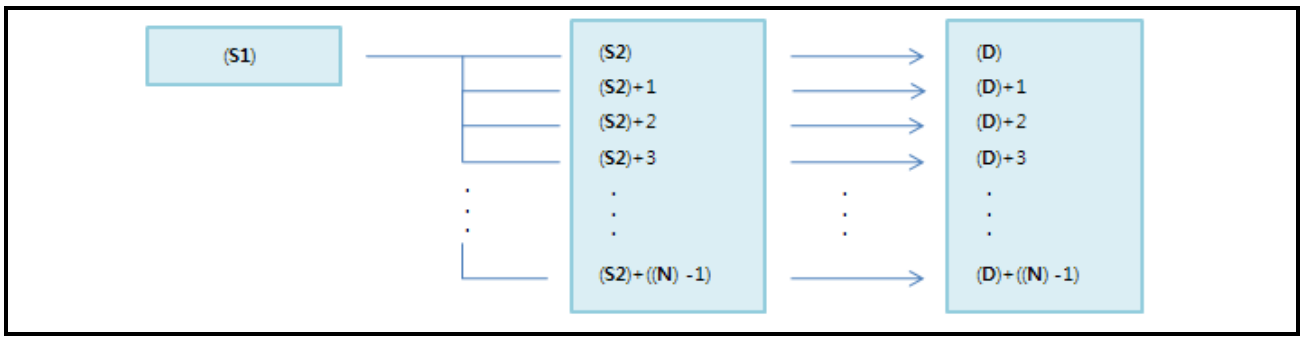
Error	Zero	Carry	Borrow	Step
◎	◎	◎		9

<Ladder>



1. Adds the word value of S1 composed of BCD code and the number of N word values beginning with S2 also composed of BCD code, respectively, and then stores the result into the number of N destination words beginning with D as BCD code.
2. If any of the value not composed of the BCD code is detected in S1 and S2, error flag is SET.
3. If any of the result value from D to D+N is out of the D range, carry flag is SET.
4. If any of the result value from D to D+N is 0, zero flag is SET.





5.5.149 Arithmetic Operation Instruction (DADDBL)

Arithmetic operation instruction **DADDBL S1 S2 D N**

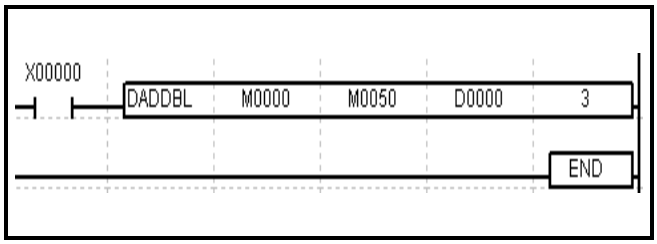
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

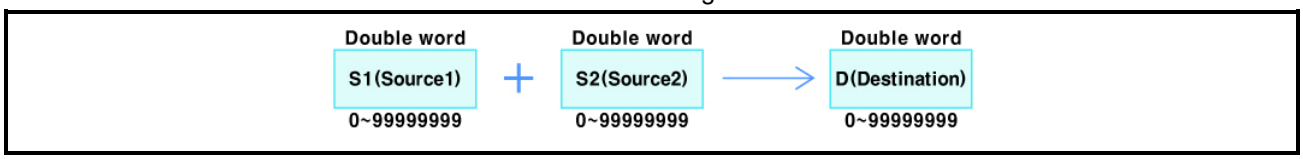
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD addition operation with S2
		h00000000 to h99999999
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the BCD addition operation with S1
		h00000000 to h99999999
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h00000000 to h99999999
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

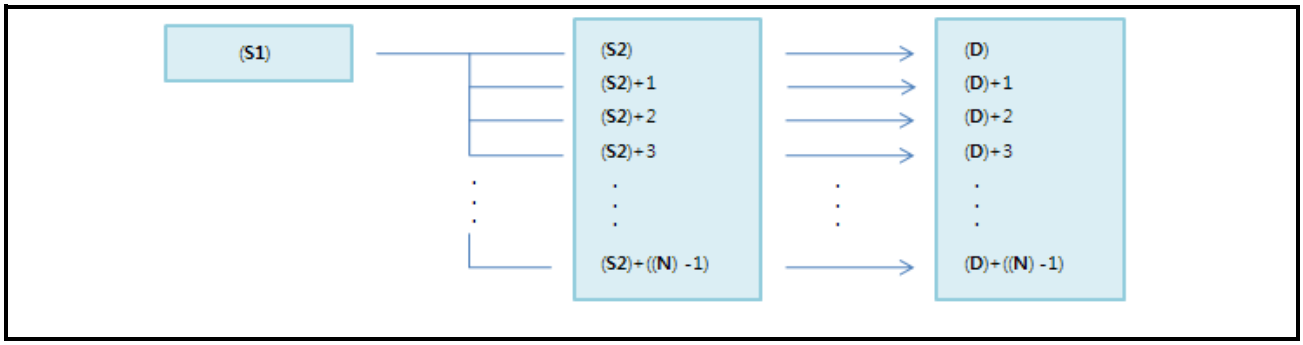
Error	Zero	Carry	Borrow	Step
◎	◎	◎		9

<Ladder>



1. Adds the double word values S1 composed of BCD code and the number of N double word values beginning with S2 also composed of BCD code, respectively, and then stores the result into the number of N destination double words beginning with D double word as BCD code.
2. If any of the value not composed of the BCD code is detected in S1 and S2 error flag is SET.
3. If any of the result value from D and D+N is out of the D range, carry flag is SET.
4. If any of the result value from D and D+N is 0, zero flag is SET.





5.5.150 Arithmetic Operation Instruction (SUBB)

Arithmetic operation instruction **SUBB** **S1** **S2** **D**

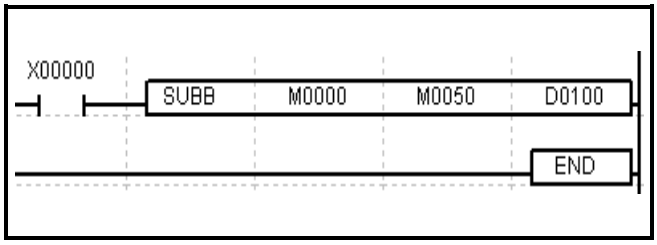
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

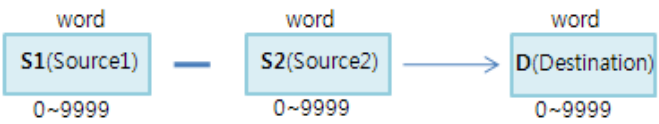
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD subtraction operation with S2
		h0000 to h9999
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD subtraction operation with S1
		h0000 to h9999
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h0000 to h9999

Error	Zero	Carry	Borrow	Step
◎	◎		◎	7

<Ladder>



1. Subtracts the word value of S2 composed of BCD code from the word value of S1 composed of BCD code, and then stores the result into the destination word D as BCD code.
2. If any of the value not composed of the BCD code is detected in S1 and S2, error flag is SET. (Except 0 to 9999)
3. If the result value is negative number, it is stored as ‘h9999’.
4. If the result value is ‘0’, zero flag is SET.



5.5.151 Arithmetic Operation Instruction (DSUBB)

Arithmetic operation instruction **DSUBB** **S1** **S2** **D**

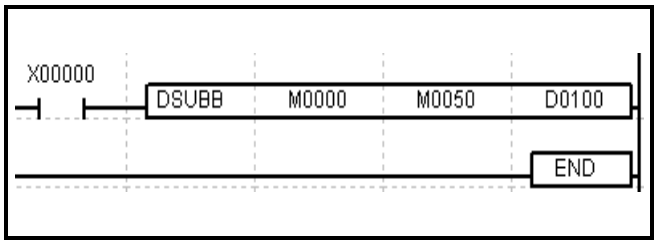
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

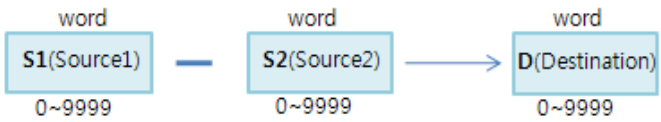
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD subtraction operation with S2
		h00000000 to h99999999
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD subtraction operation with S1
		h00000000 to h99999999
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h00000000 to h99999999

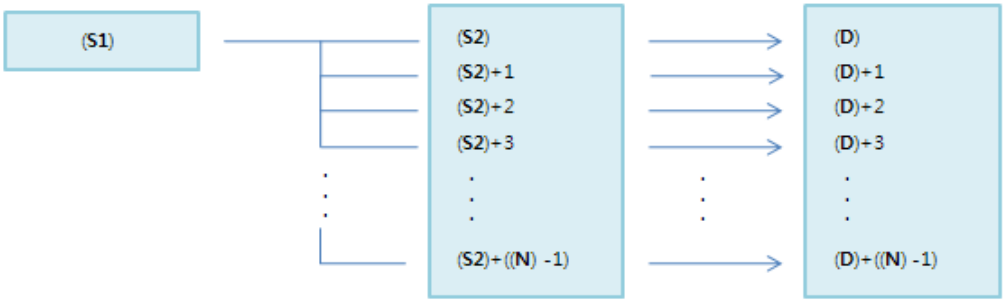
Error	Zero	Carry	Borrow	Step
◎	◎		◎	7

<Ladder>



1. Subtracts the double word value of S2 from double word value of S1, both are composed of BCD code, and then stores the result into the destination double word D as BCD code.
2. If any of the value not composed of the BCD code is detected in S1 and S2, error flag is SET. (Except 0 to 99999999)
3. If the result value is negative number, it is stored as 'h9999'.
4. If the result value is '0', zero flag is SET.





5.5.152 Arithmetic Operation Instruction (SUBBL)

Arithmetic operation instruction **SUBBL** **S1** **S2** **D** **N**

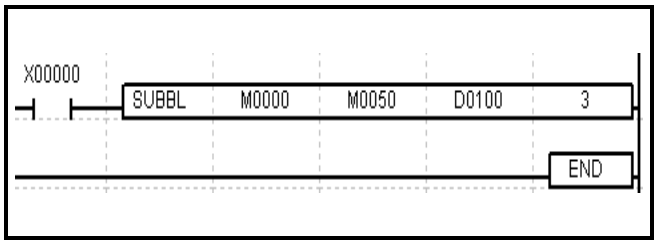
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

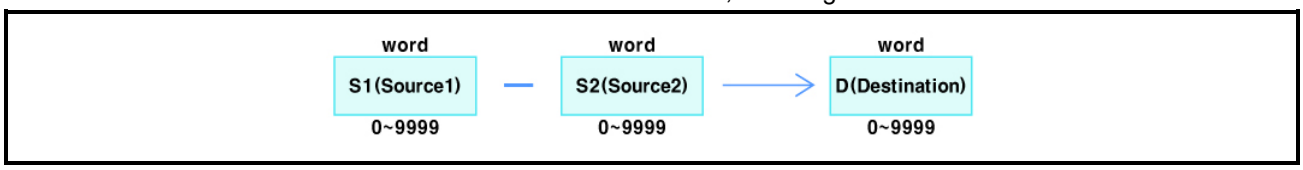
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD subtraction operation with S2
		h0000 to h9999
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the BCD subtraction operation with S1
		h0000 to h9999
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h0000 to h9999
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

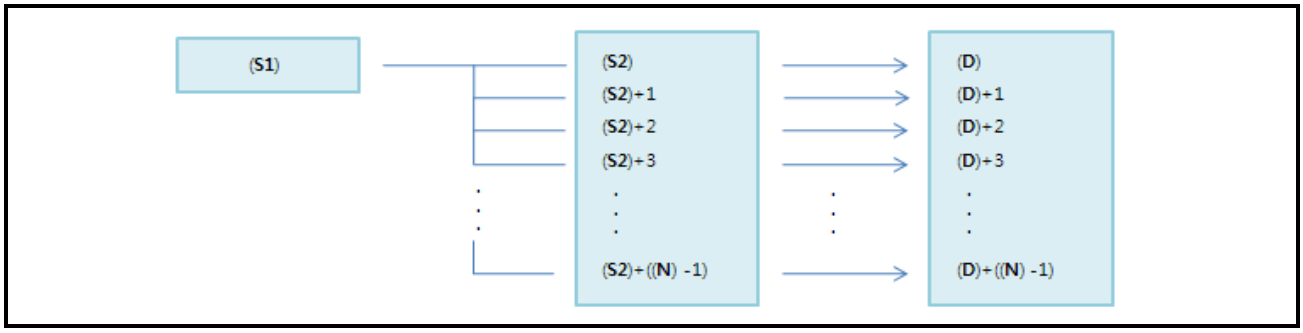
Error	Zero	Carry	Borrow	Step
◎	◎		◎	9

<Ladder>



1. Subtracts the number of N words values composed of BCD code beginning with S2 from word value of S1 composed of BCD code and then stores the result into the number of N destination words beginning with D as BCD code.
2. If any of the value not composed of the BCD code is detected in S1 and S2, error flag is SET.
3. If any of the result value in the range from D to D+N is negative number in word area, it is stored as 'h9999'.
4. If any of the result value in the range from D to D+N is '0', zero flag is SET.





5.5.153 Arithmetic Operation Instruction (DSUBBL)

Arithmetic operation instruction **DSUBBL S1 S2 D N**

Applicable model

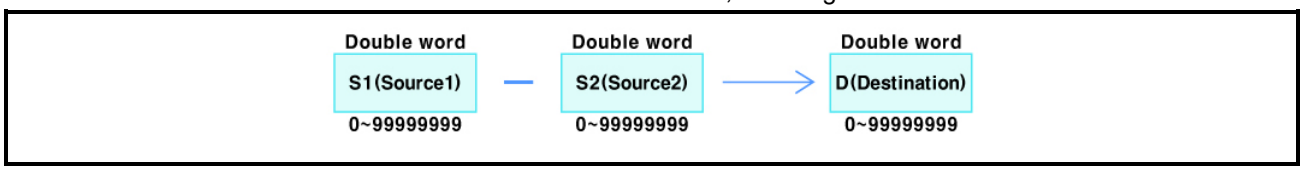
LP-S044, LP-S070, LP-A070, LP-A104

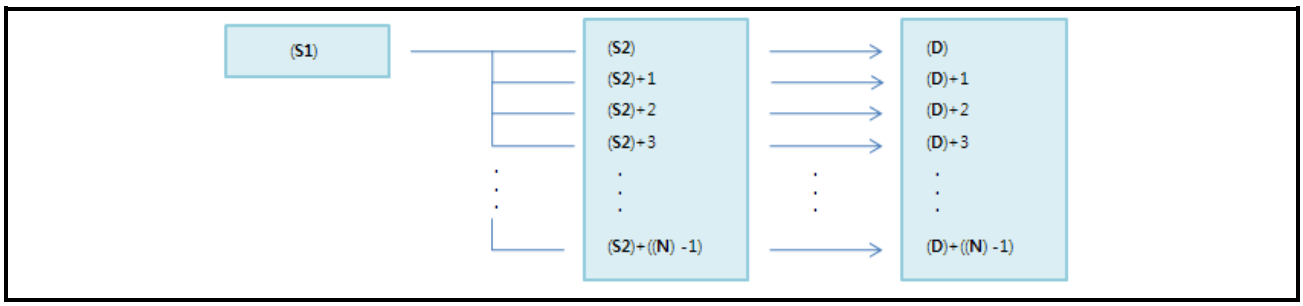
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD subtraction operation with S2
		h00000000 to h99999999
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the BCD subtraction operation with S1
		h00000000 to h99999999
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h00000000 to h99999999
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

Error	Zero	Carry	Borrow	Step
◎	◎		◎	9

<Ladder>

1. Subtracts the number of N double word values from S2 to S2(N-1), composed of BCD code, from the double word value of S1 composed of BCD code respectively, and then stores the result into the number of N destination double words beginning with D as BCD code.
2. If any of the value not composed of the BCD code is detected in S1 and S2, error flag is SET.
3. If any of the result value in the range from D to D+N is out of the D range, carry flag is SET.
4. If any of the result value in the range from D to D+N is '0', zero flag is SET.





5.5.154 Arithmetic Operation Instruction (MULB)

Arithmetic operation instruction **MULB** **S1** **S2** **D**

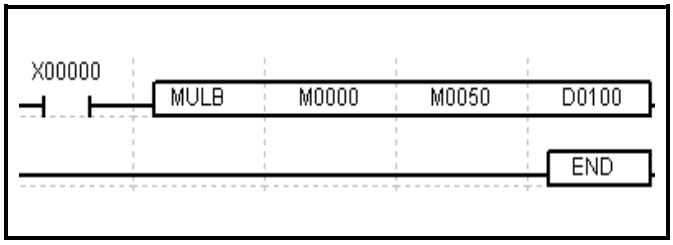
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

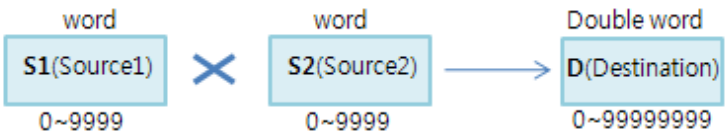
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD multiplication with S2
		h0000 to h9999
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD multiplication with S1
		h0000 to h9999
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h00000000 to h99999999

Error	Zero	Carry	Borrow	Step
◎	◎	◎		7

<Ladder>



1. Multiplies the word value of S1 and that of S2, both are composed of BCD code and then stores the result into the destination double word D as BCD code.
2. If any of the value not composed of the BCD code is detected in S1 and S2, error flag is SET. (Except 0 to 9999)
3. If the result value is out of the D range, carry flag is SET.
4. If the result value is ‘0’, zero flag is SET.



5.5.155 Arithmetic Operation Instruction (DMULB)

Arithmetic operation instruction **DMULB S1 S2 D**

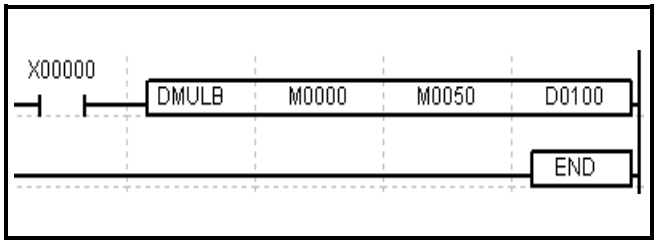
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

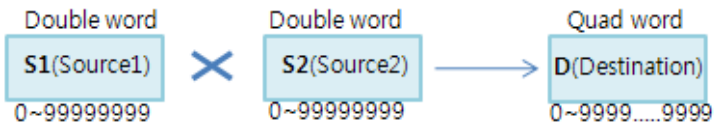
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD multiplication with S2
		h00000000 to h99999999
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD multiplication with S1
		h00000000 to h99999999
D	QWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result

Error	Zero	Carry	Borrow	Step
◎	◎	◎		7

<Ladder>



1. Multiplies the double word value of S1 and that of S2, both are composed of BCD code, and then stores the result into the destination quad word D as BCD code.
2. If any of the value not composed of the BCD code is detected in S1 and S2, error flag is SET. (Except 0 to 99999999)
3. If the result value is out of the D range, carry flag is SET.
4. If the result value is ‘0’, zero flag is SET.



5.5.156 Arithmetic Operation Instruction (MULBL)

Arithmetic operation instruction **MULBL** **S1** **S2** **D** **N**

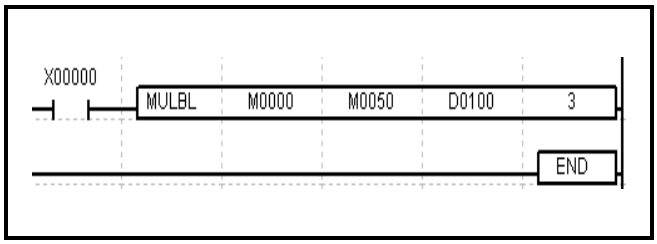
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

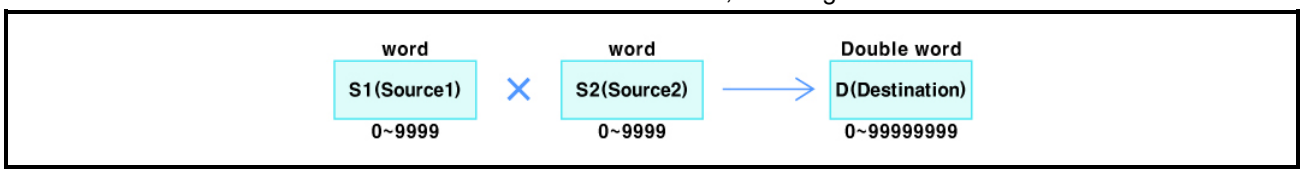
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD multiplication with S2
		h0000 to h9999
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the BCD multiplication with S1
		h0000 to h9999
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h00000000 to h99999999
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

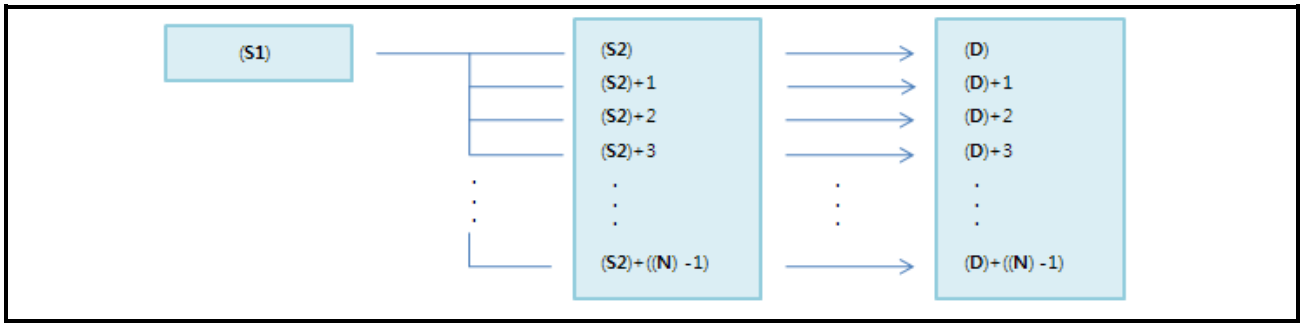
Error	Zero	Carry	Borrow	Step
◎	◎	◎		9

<Ladder>



1. Multiplies the word value of S1 and the number of N word values from S2 to S2(N-1), both are composed of BCD code, one by one, and then stores the result into the number of N destination double words beginning with D as BCD code.
2. If any of the value not composed of the BCD code is detected in S1 and S2, error flag is SET.
3. If any of the result value in the range from D to D+N is out of the D range, carry flag is SET.
4. If any of the result value in the range from D to D+N is '0', zero flag is SET.





5.5.157 Arithmetic Operation Instruction (DMULBL)

Arithmetic operation instruction **DMULBL S1 S2 D N**

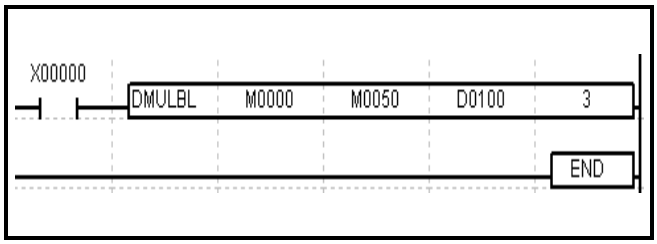
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

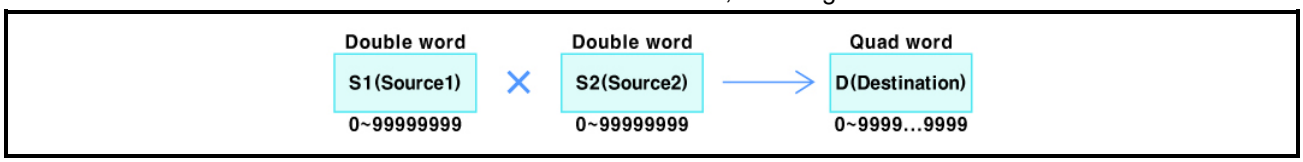
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD multiplication with S2
		h00000000 to h99999999
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the BCD multiplication with S1
		h00000000 to h99999999
D	QWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

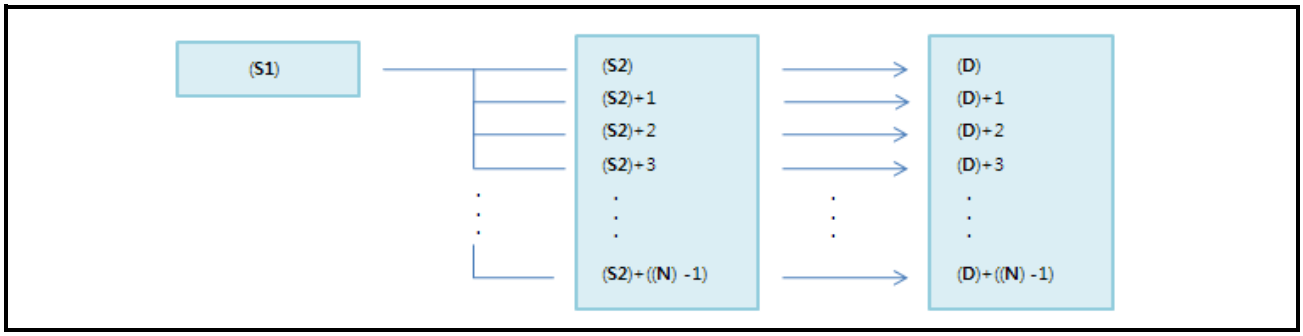
Error	Zero	Carry	Borrow	Step
◎	◎	◎		9

<Ladder>



1. Multiplies the double word value of S1 composed of BCD code and the number of N double words from S2 to S2(N-1) composed of BCD code, one by one, and then stores the result into the number of N destination quad words beginning with D as BCD code.
2. If any of the value not composed of the BCD code is detected in S1 and S2, error flag is SET.
3. If any of the result value in the range from D to D+N is out of the D range, carry flag is SET.
4. If any of the result value in the range from D to D+N is '0', zero flag is SET.





5.5.158 Arithmetic Operation Instruction (DIVB)

Arithmetic operation instruction **DIVB** **S1** **S2** **D**

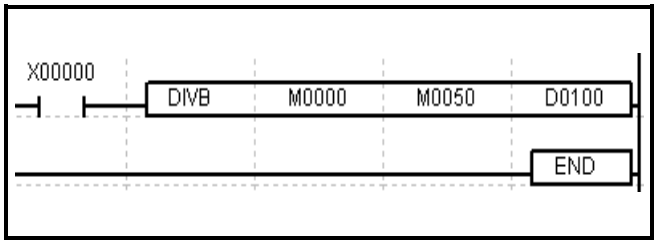
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

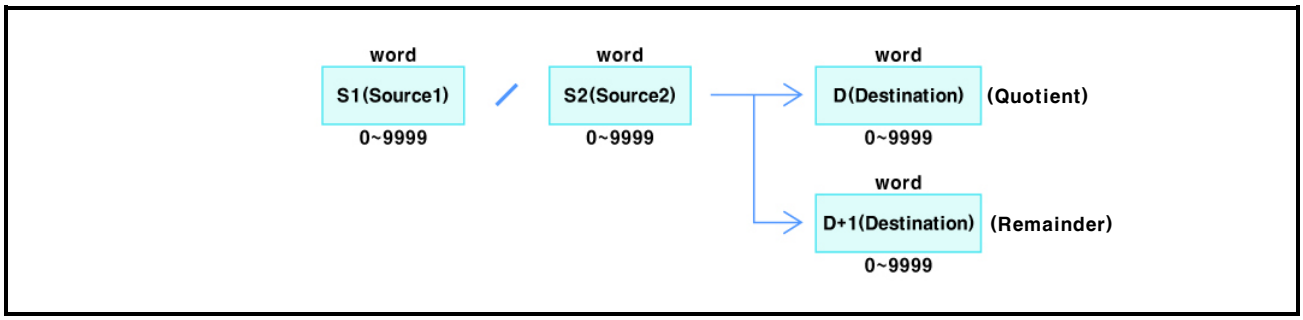
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD division operation with S2
		h0000 to h9999
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD division operation with S1
		h0000 to h9999
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h0000 to h9999

Error	Zero	Carry	Borrow	Step
◎	◎			7

<Ladder>



1. Divides the word value of S1 composed of BCD code by the word value of S2 composed of BCD code, and then stores the quotient and the remainder into the D and D+1 words respectively.
2. If S2 is 0, or either S1 or S2 is not the BCD code, error flag is SET.
3. If the quotient is ‘0’, zero flag is SET.



5.5.159 Arithmetic Operation Instruction (DDIVB)

Arithmetic operation instruction **DDIVB** **S1** **S2** **D**

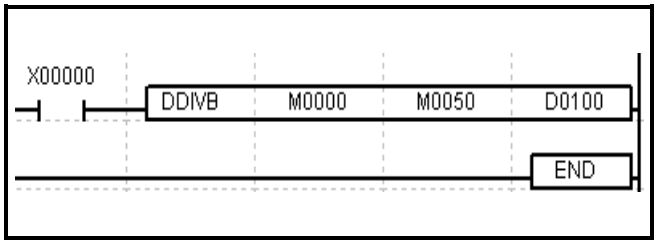
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

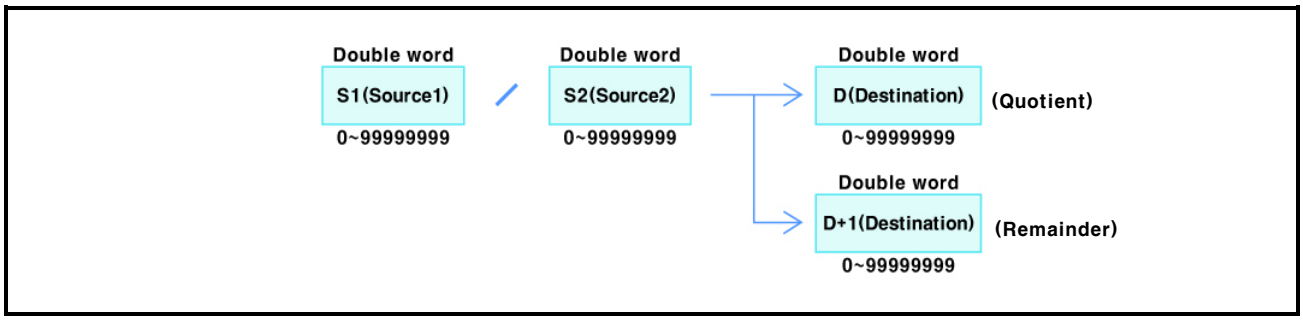
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD division operation with S2
		h00000000 to h99999999
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD division operation with S1
		h00000000 to h99999999
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h00000000 to h99999999

Error	Zero	Carry	Borrow	Step
◎	◎			7

<Ladder>



1. Divides the double word value of S1 composed of BCD code by the double word value of S2 composed of BCD code, and then stores the quotient and the remainder into the D and D+1 double words respectively.
2. If S2 is 0, or either S1 or S2 is not the BCD code, error flag is SET.
3. If the quotient is ‘0’, zero flag is SET.



5.5.160 Arithmetic Operation Instruction (DIVBL)

Arithmetic operation instruction **DIVBL** **S1** **S2** **D** **N**

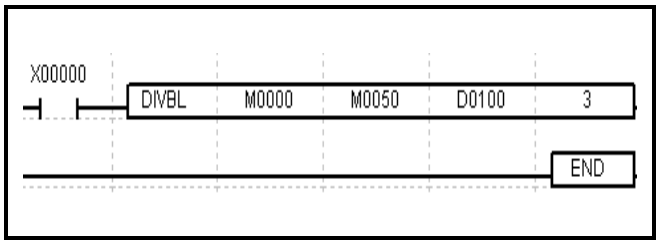
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

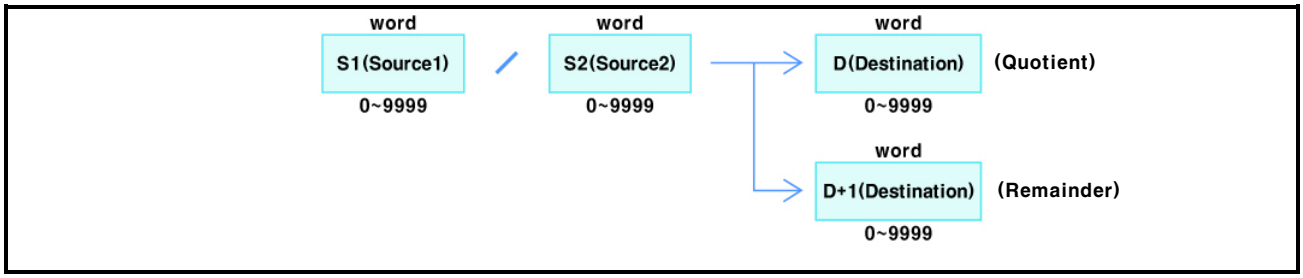
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD division operation with S2
		h0000 to h9999
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the BCD division operation with S1
		h0000 to h9999
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h0000 to h9999
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

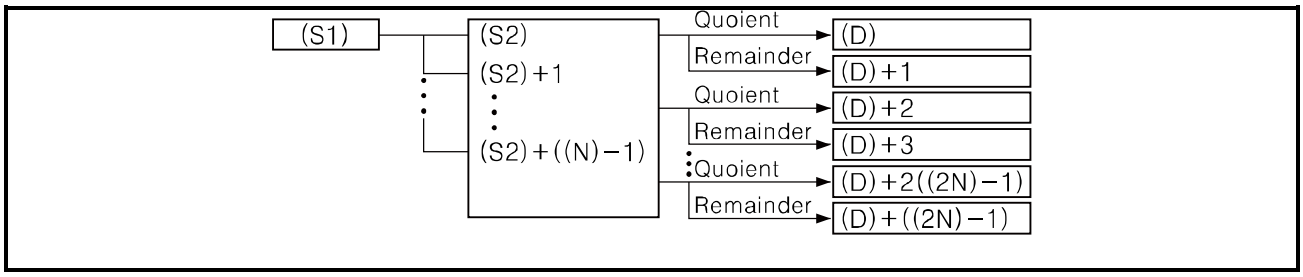
Error	Zero	Carry	Borrow	Step
◎	◎			9

<Ladder>



1. Divides the word value of S1 composed of BCD code by the number of N word values from S2 to S2(N-1) composed of BCD code, and then stores the quotient and the remainder into the D and D+1 double words respectively.
2. If S2 is 0, or either S1 or S2 is not the BCD code, error flag is SET.
3. If the quotient is ‘0’, zero flag is SET.





5.5.161 Arithmetic Operation Instruction (DDIVBL)

Arithmetic operation instruction **DDIVBL** **S1** **S2** **D** **N**

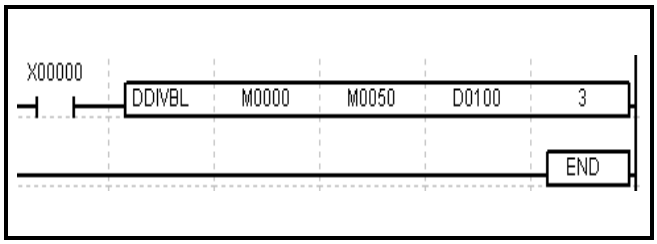
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

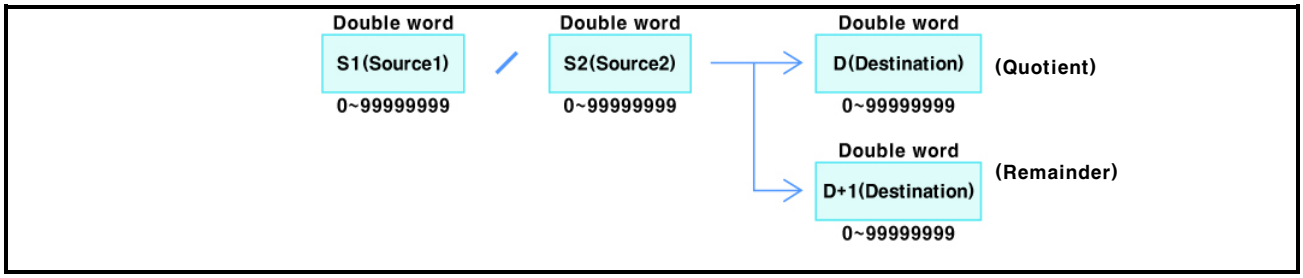
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the BCD division operation with S2
		h00000000 to h99999999
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the BCD division operation with S1
		h00000000 to h99999999
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		h00000000 to h99999999
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

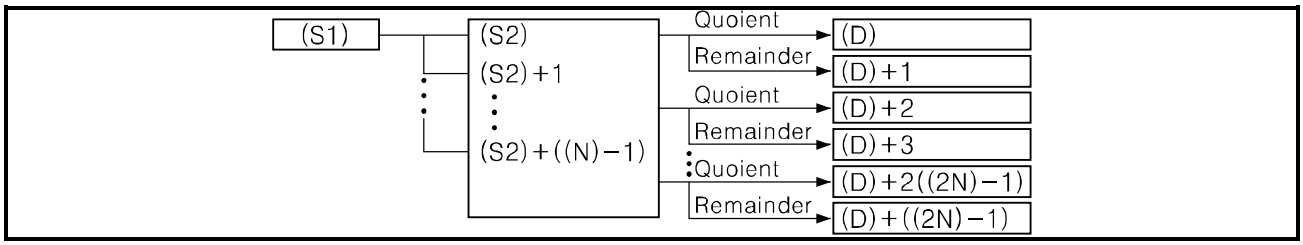
Error	Zero	Carry	Borrow	Step
◎	◎			9

<Ladder>



1. Divides the double word value of S1 composed of BCD code by the number of N double word values from S2 to S2(N-1), composed of BCD code, and then stores the quotient and the remainder into the D and D+1 double words respectively.
2. If S2 is 0, or either S1 or S2 is not the BCD code, error flag is SET.
3. If the quotient is '0', zero flag is SET.





5.5.162 Arithmetic Operation Instruction (INCB)

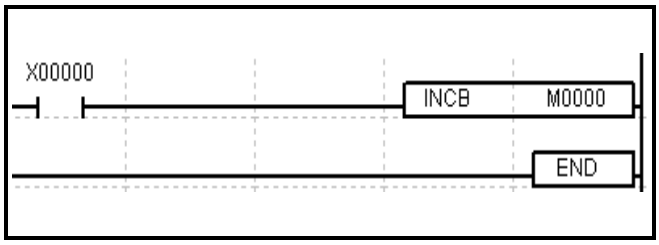
Arithmetic operation instruction **INCB** **D**

Applicable model

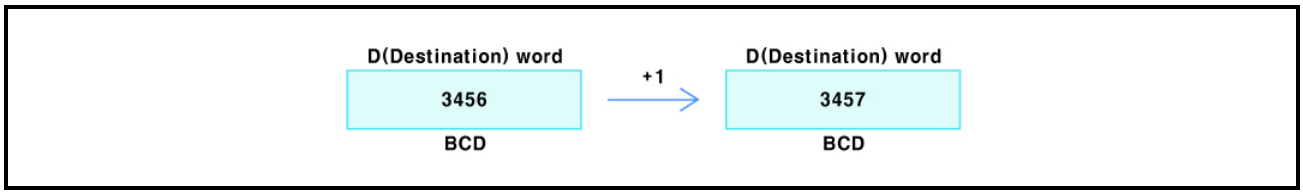
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	WORD	Y, F, Z, T, C, M, S, L, D, UW					
		BCD data address to execute the operation					
		h0000 to h9999	◎	◎	◎		3

<Ladder>



1. Increases the word value of D composed of BCD code by 1 as BCD code.
2. If the word value of D is not the BCD code, error flag is SET.
3. If the increased result is 0(BCD), zero flag is SET.
4. If the increased result is out of the D word range, carry flag is SET.



5.5.163 Arithmetic Operation Instruction (DINCB)

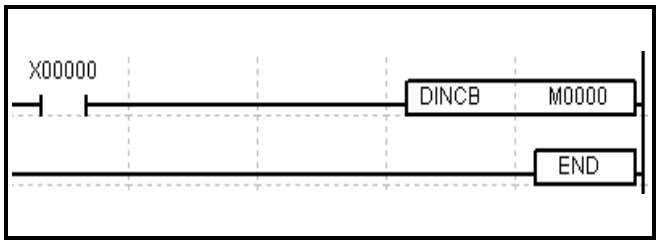
Arithmetic operation instruction **DINCB** **D**

Applicable model

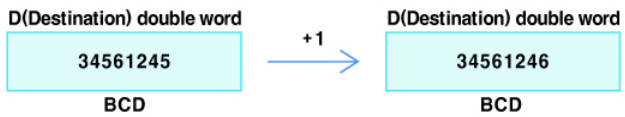
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW					
		BCD data address to execute the operation					
		h00000000 to h99999999	◎	◎	◎		3

<Ladder>



1. Increases the double word value of D composed of BCD code by 1 as BCD code.
2. If the double word value of D is not the BCD code, error flag is SET.
3. If the increased result is 0(BCD), zero flag is SET.
4. If the result value is out of the D double word range, carry flag is SET.



5.5.164 Arithmetic Operation Instruction (DECB)

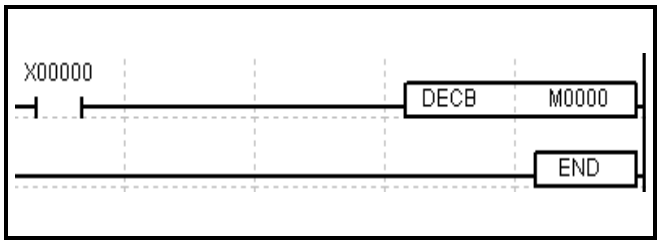
Arithmetic operation instruction **DECB** **D**

Applicable model

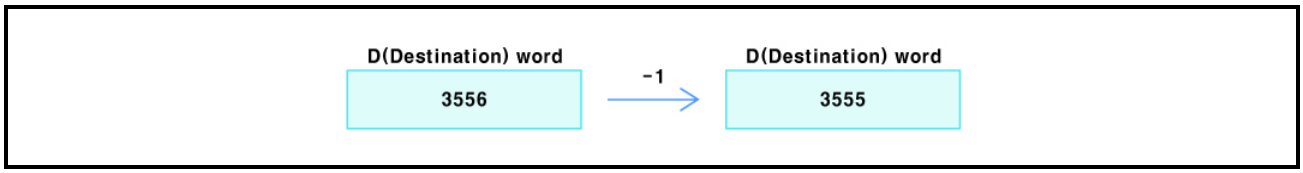
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	WORD	Y, F, Z, T, C, M, S, L, D, UW					
		BCD data address to execute the operation					
		h0000 to h9999	◎	◎		◎	3

<Ladder>



1. Decreases the word value of D composed of BCD code by 1 as BCD code.
2. If the word value of D is not the BCD code, error flag is SET.
3. If the decreased result is 0(BCD), zero flag is SET.
4. If the result value is out of D word range, borrow flag is SET.



5.5.165 Arithmetic Operation Instruction (DDECB)

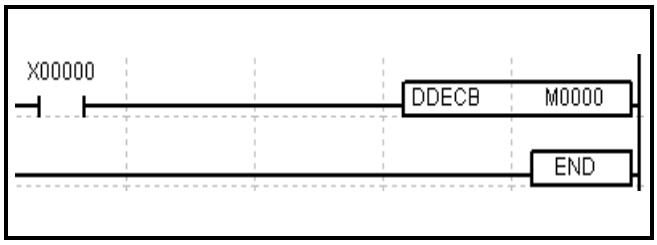
Arithmetic operation instruction **DDECB** **D**

Applicable model

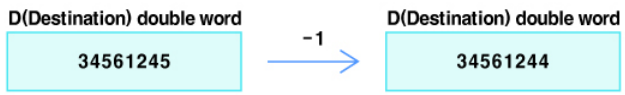
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW					
		BCD data address to execute the operation					
		h00000000 to h99999999	◎	◎		◎	3

<Ladder>



1. Decreases the double word of D composed of BCD code by 1 as BCD code.
2. If the double word value of D is not BCD code, error flag is SET.
3. If the decreased result is 0(BCD), zero flag is SET.
4. If the result value is out of the D double word range, borrow flag is SET.



5.5.166 Logical Operation Instruction (WAND)

Logical operation instruction **WAND** **S1** **S2** **D**

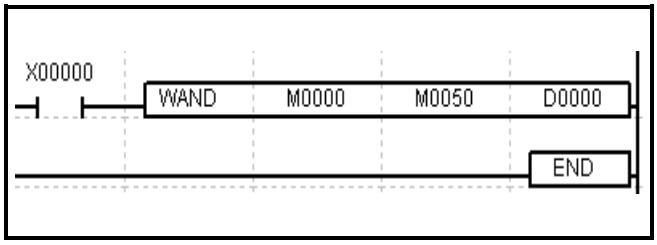
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

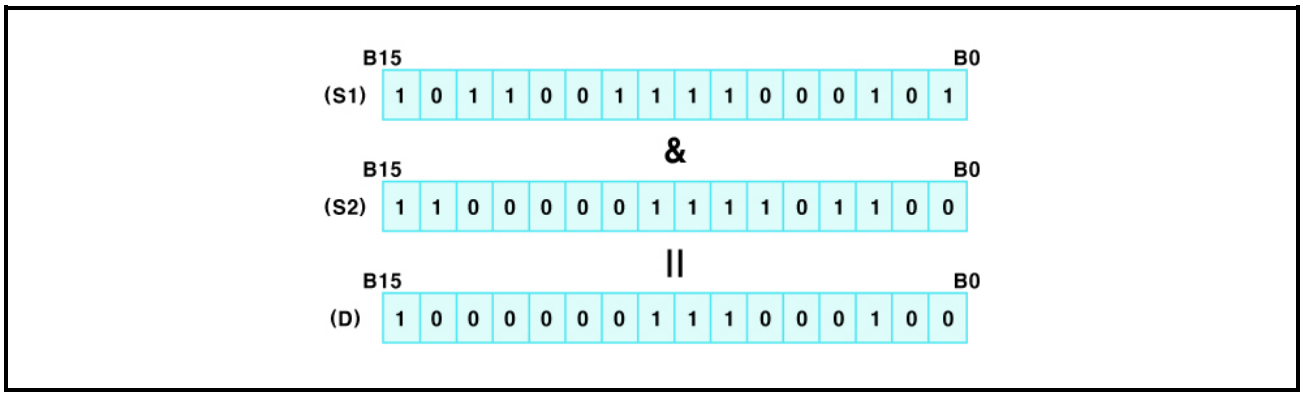
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the '&' operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the '&' operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)

Error	Zero	Carry	Borrow	Step
	◎			7

<Ladder>



1. Executes the '&' operation for every bit of S1 word and the corresponding bit of S2 word and then stores the result into the D word.
2. If the result value is '0', zero flag is SET.



5.5.167 Logical Operation Instruction (DAND)

Logical operation instruction **DAND** **S1** **S2** **D**

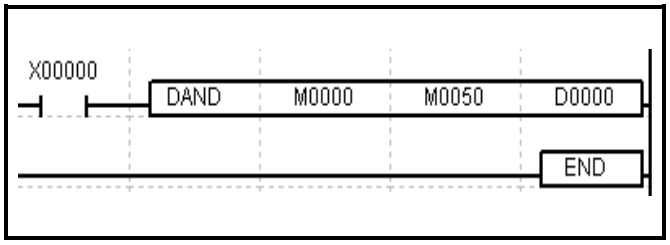
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

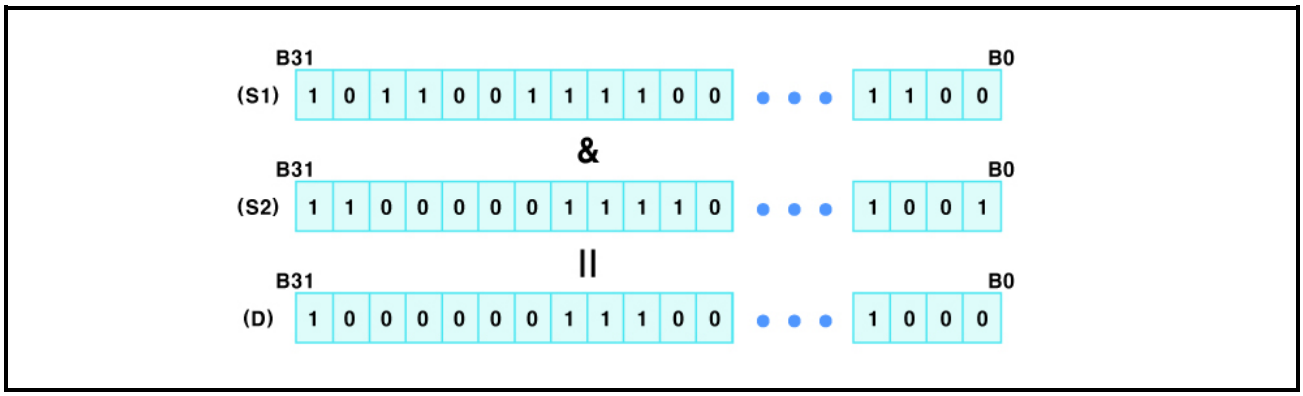
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the '&' operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the '&' operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
	◎			7

<Ladder>



1. Executes the '&' operation for every bit of S1 double word and the corresponding bit of S2 double word and then stores the result into the D double word.
2. If the result value is '0', zero flag is SET.



5.5.168 Logical Operation Instruction (AAND)

Logical operation instruction **AAND** **S1** **S2** **D** **N**

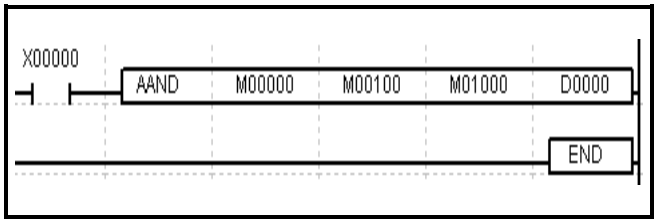
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

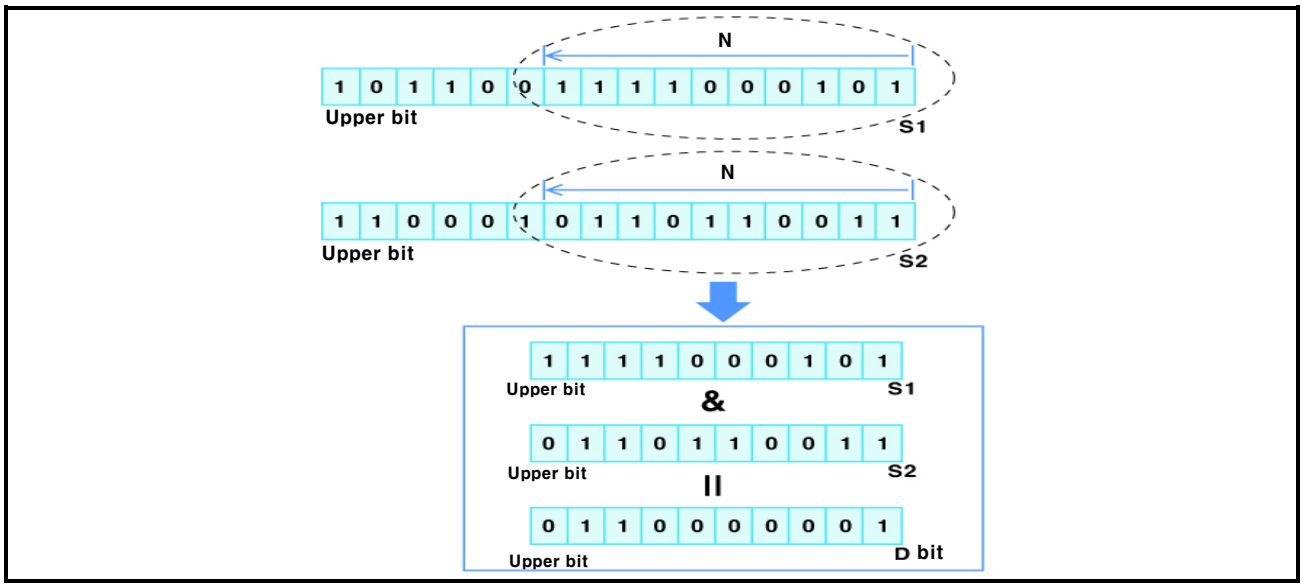
OP	DATA type	Available device / Description / Range
S1	BIT	X, Y, F, T, C, M, UB
		Start address of the bit device to execute the '&' operation with S2
		Not applicable
S2	BIT	X, Y, F, T, C, M, UB
		Start address of the bit device to execute the '&' operation with S1
		Not applicable
D	BIT	Y, F, T, C, M, UB
		Start address of the bit device to store the operation result
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bit device to execute the operation including the start address
		As many as the number of devices remained in the corresponding S1, S2, and D area

Error	Zero	Carry	Borrow	Step
	◎			9

<Ladder>



Executes the '&' operation for the number of N bits, from S1 to SN, and the number of N bits, from S2 to S2(N-1), and then stores the result into the number of N bits beginning with D.



5.5.169 Logical Operation Instruction (WANDL)

Logical operation instruction **WANDL** **S1** **S2** **D** **N**

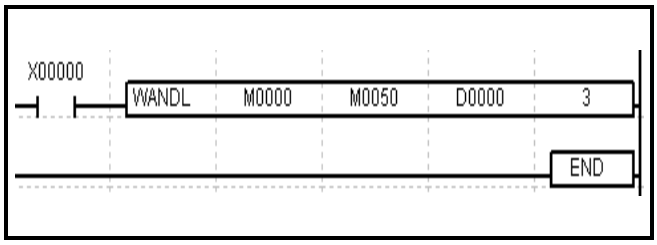
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

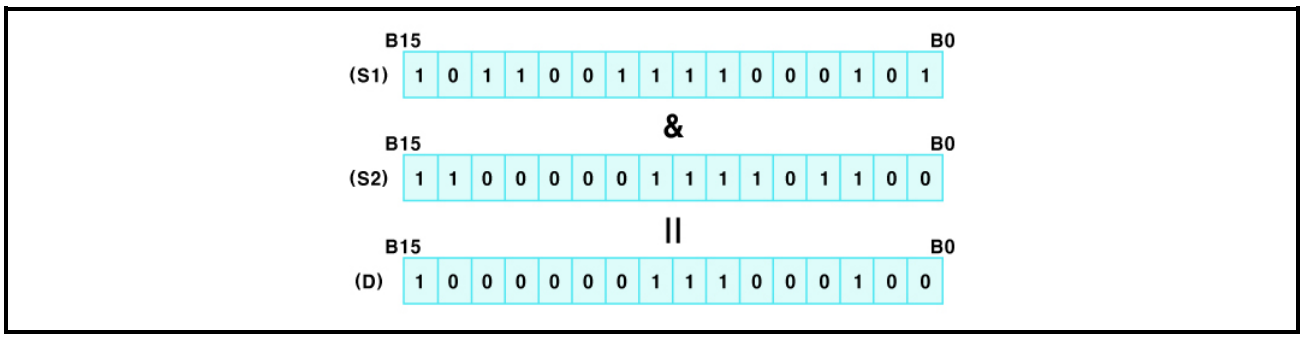
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the '&' operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the '&' operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

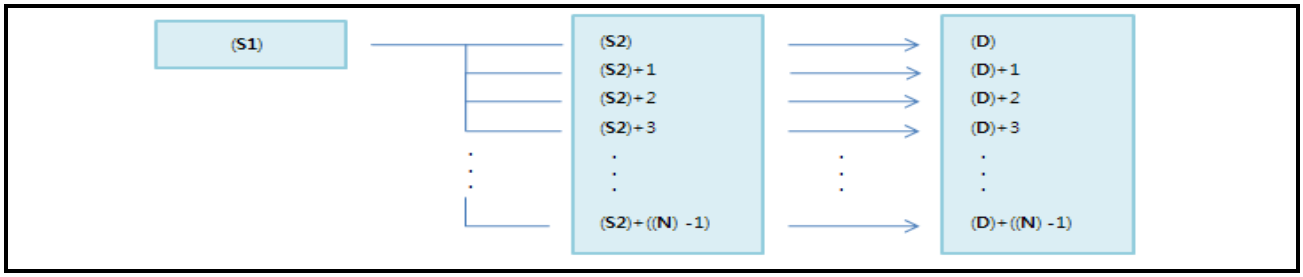
Error	Zero	Carry	Borrow	Step
	◎			9

<Ladder>



1. Executes the bitwise '&' operation for every bit of S1 word and the number of N words from S2 to S2 (N-1) and then stores the result into the number of N words beginning with D.
2. If the result value is '0' word, zero flag is SET.





5.5.170 Logical Operation Instruction (DANDL)

Logical operation instruction **DANDL** **S1** **S2** **D** **N**

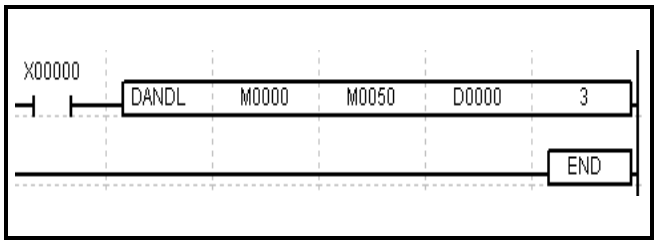
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

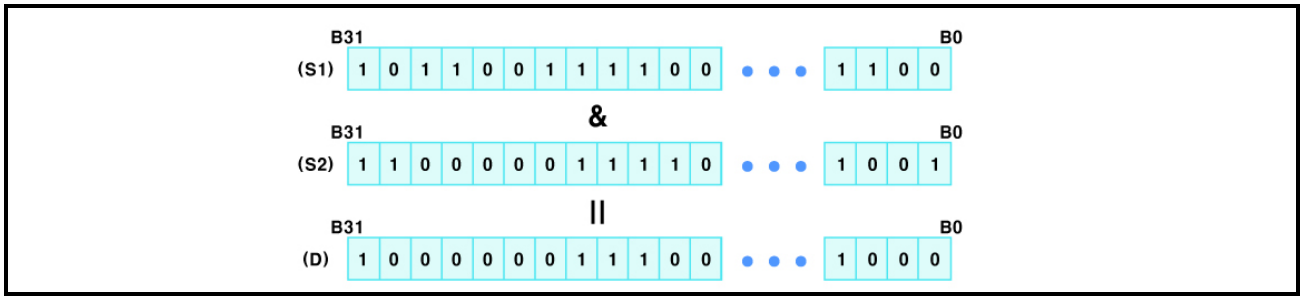
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the '&' operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the '&' operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

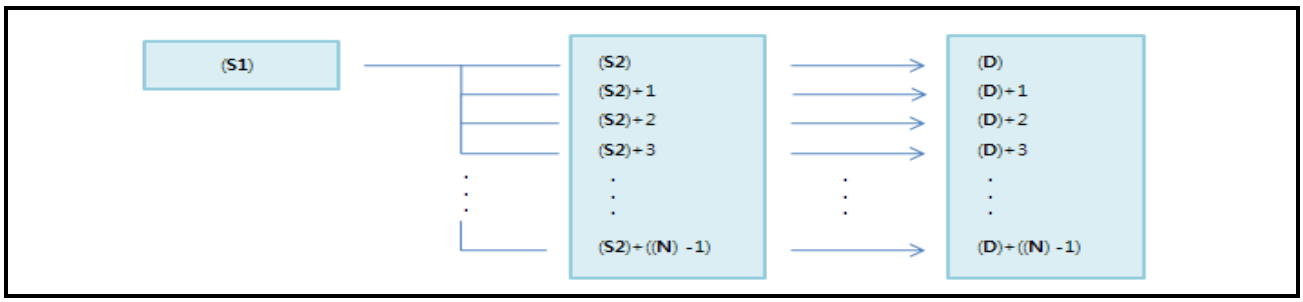
Error	Zero	Carry	Borrow	Step
	◎			9

<Ladder>



1. Executes the bitwise '&' operation for every bit of S1 double words and the number of N words from S2 to S2 (N-1) and then stores the result into the number of N words beginning with D.
2. If the result value is '0' double word, zero flag is SET.





5.5.171 Logical Operation Instruction (WOR)

Logical operation instruction **WOR** **S1** **S2** **D**

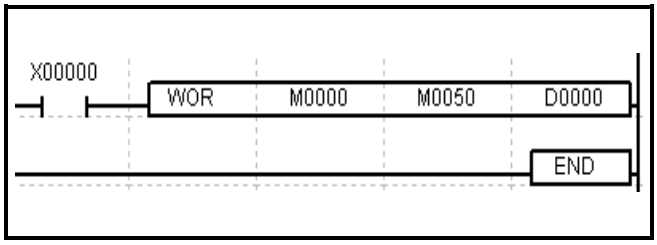
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

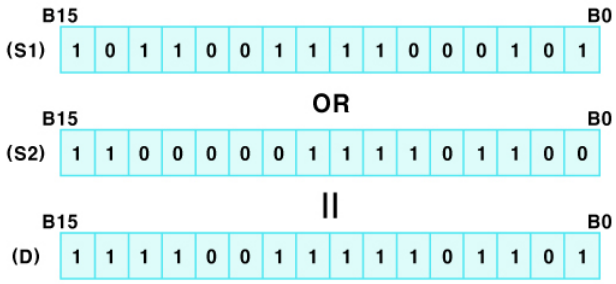
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'OR' operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'OR' operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)

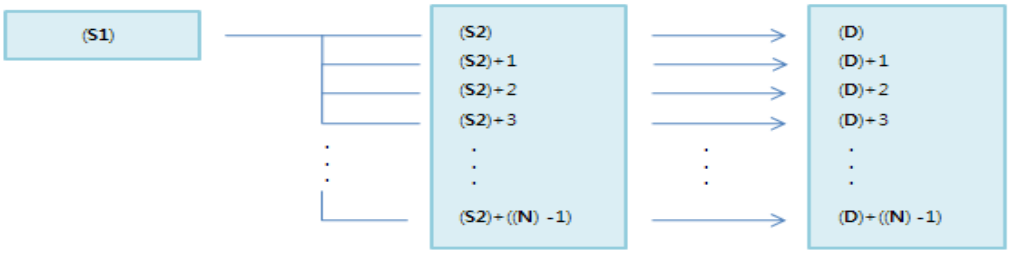
Error	Zero	Carry	Borrow	Step
	◎			7

<Ladder>



1. Executes the logical 'OR' operation for every bit in S1 words and the corresponding bit of S2 words and then stores the result into the D word.
2. If the result value is '0', zero flag is SET.





5.5.172 Logical Operation Instruction (DOR)

Logical operation instruction **DOR** **S1** **S2** **D**

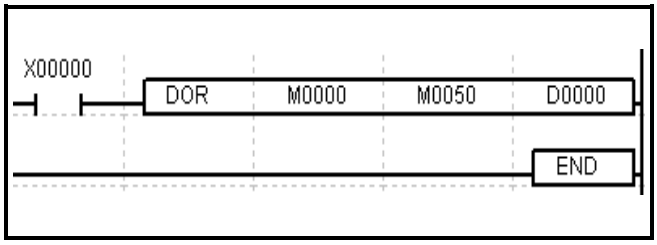
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

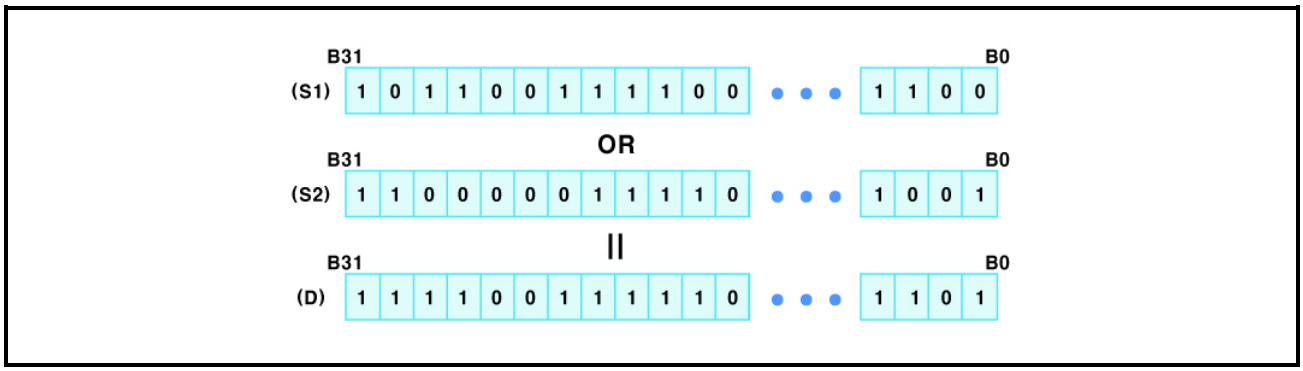
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'OR' operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'OR' operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
	◎			5

<Ladder>



1. Executes the logical 'OR' operation for every bit of S1 double words and the corresponding bit of S2 double words, and then stores the result into the D double word.
2. If the result value is '0', zero flag is SET.



5.5.173 Logical Operation Instruction (AOR)

Logical operation instruction	AOR	S1	S2	D	N

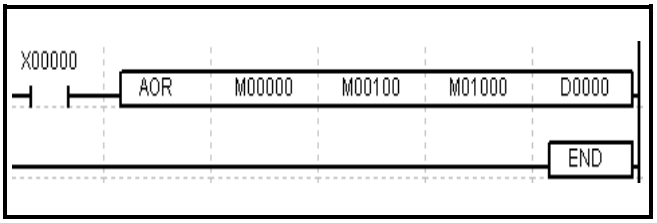
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

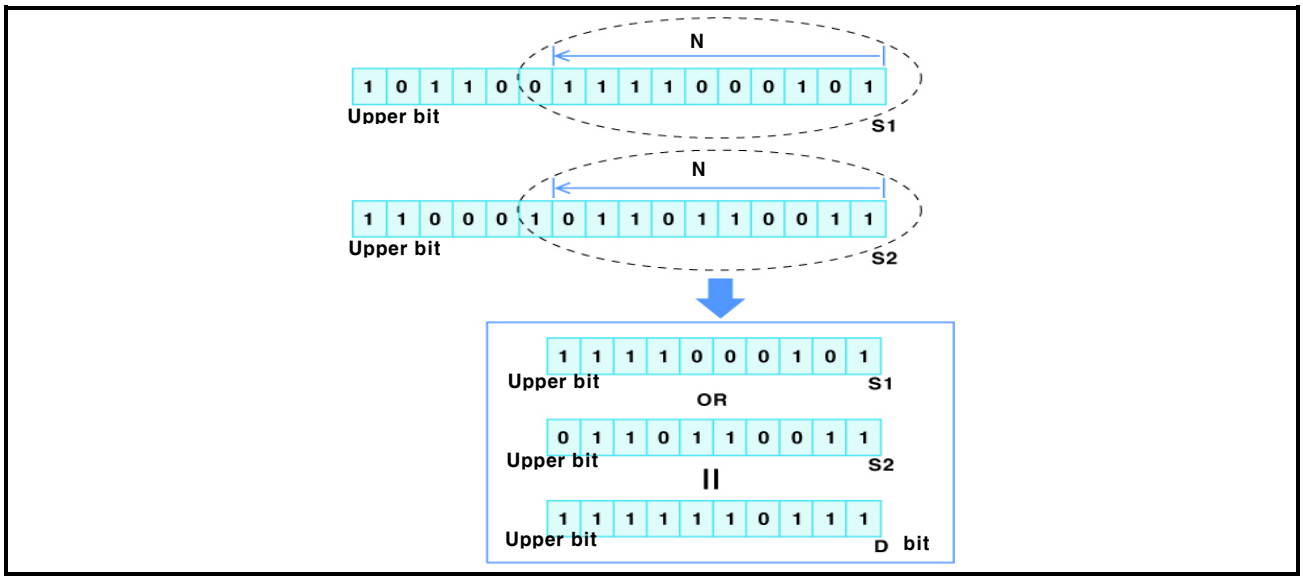
OP	DATA type	Available device / Description / Range
S1	BIT	X, Y, F, T, C, M, UB
		Data address to execute the 'OR' operation with S2
		Not applicable
S2	BIT	X, Y, F, T, C, M, UB
		Data address to execute the 'OR' operation with S1
		Not applicable
D	BIT	Y, F, T, C, M, UB
		Start address of the bit device to save the operation result
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bit devices to execute the operation including the start address
		As many as the number of devices remained in the corresponding S1, S2, and D area

Error	Zero	Carry	Borrow	Step
	◎			9

<Ladder>



Executes the logical 'OR' operation for the number of N bits from S1 to SN and the number of N bits from S2 to S2(N- 1), and then stores the result into the number of N bits beginning with D.



5.5.174 Logical Operation Instruction (WORL)

Logical operation instruction WORL S1 S2 D N

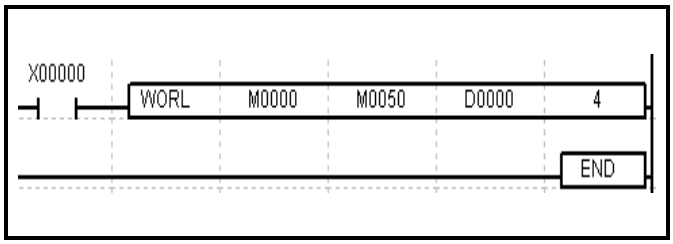
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

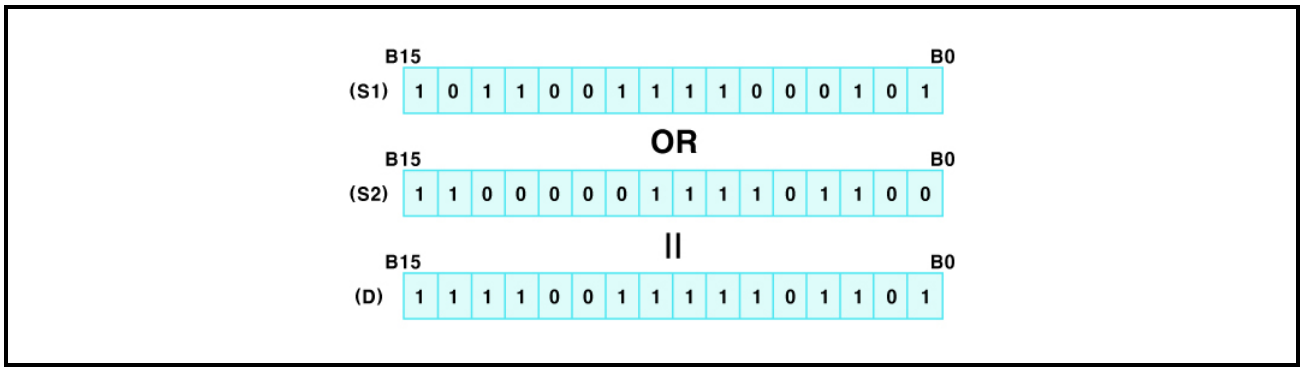
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'OR' operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the 'OR' operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

Error	Zero	Carry	Borrow	Step
	◎			9

<Ladder>



1. Executes the bitwise logical 'OR' operation for every bit of S1 words and the number of N words from S2 to S2 (N-1), and then stores the result into the D word.
2. If the result value is '0' word, zero flag is SET.



5.5.175 Logical Operation Instruction (DORL)

Logical operation instruction	DORL	S1	S2	D	N

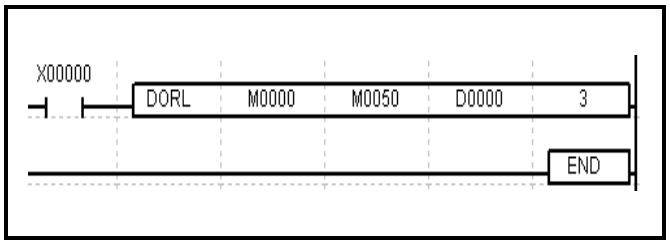
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

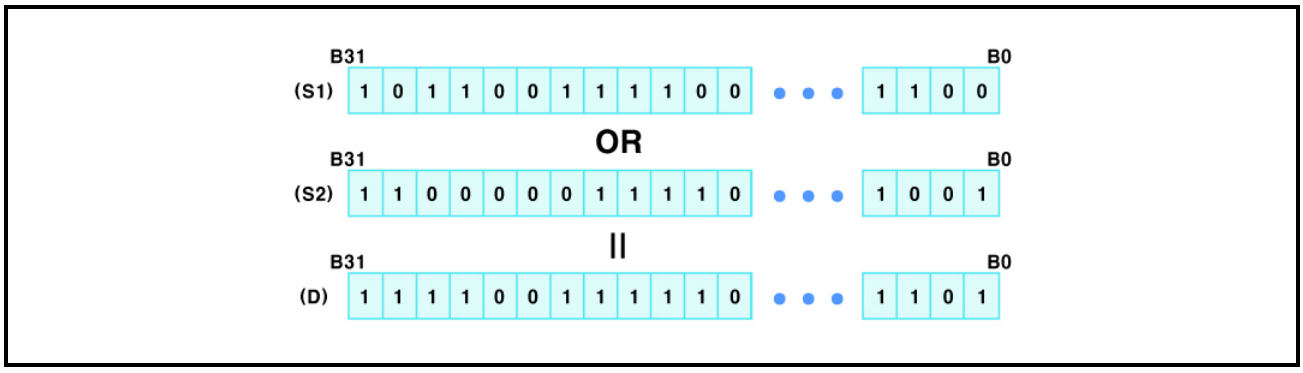
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'OR' operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the 'OR' operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

Error	Zero	Carry	Borrow	Step
	◎			9

<Ladder>



1. Executes the bitwise logical 'OR' operation for every bit of S1 double word and the number of N double words from S2 to S2(N-1) respectively and then stores the result into the number of N double words beginning with D double word.
2. If the result value is '0' double word, zero flag is SET.



5.5.176 Logical Operation Instruction (XOR)

Logical operation instruction **XOR** **S1** **S2** **D**

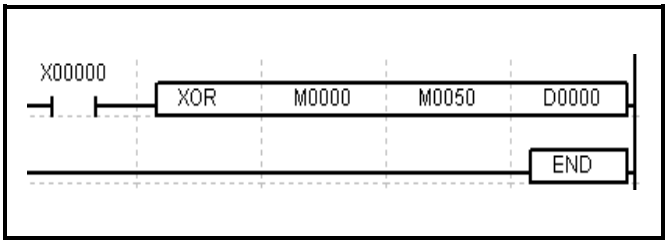
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

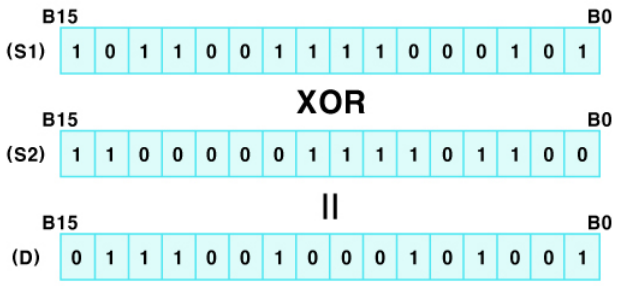
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'XOR' operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'XOR' operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)

Error	Zero	Carry	Borrow	Step
	◎			7

<Ladder>



1. Executes the logical 'XOR' operation for every bit of S1 word and the corresponding bit of S2 word and then stores the result into the D word.
2. If the result value is '0', zero flag is SET.



5.5.177 Logical Operation Instruction (DXOR)

Logical operation instruction **DXOR** **S1** **S2** **D**

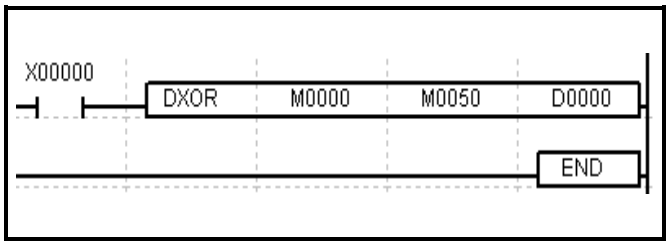
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

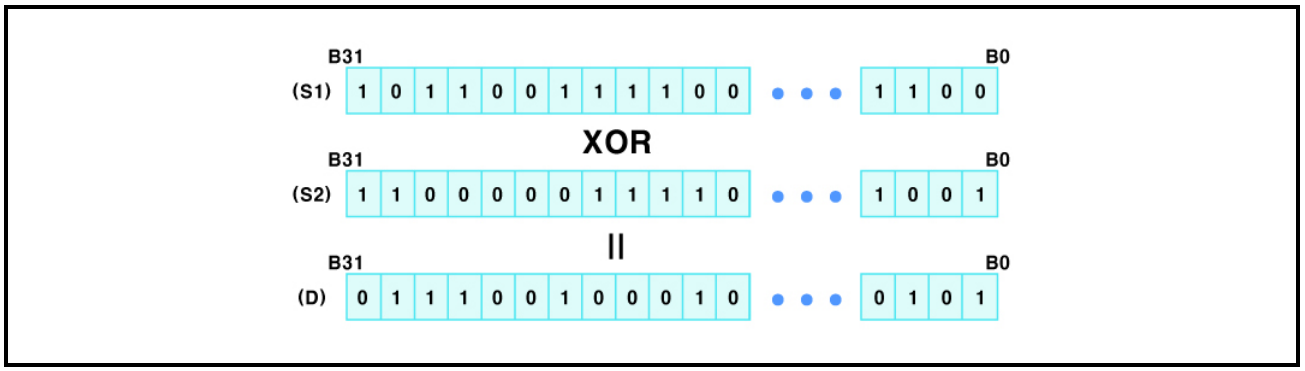
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'XOR' operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'XOR' operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
	◎			7

<Ladder>



1. Executes the logical 'XOR' operation for every bit of S1 double word and the corresponding bit of S2 double word and then stores the result into the D double word.
2. If the result value is '0', zero flag is SET.



5.5.178 Logical Operation Instruction (AXOR)

Logical operation instruction AXOR S1 S2 D N

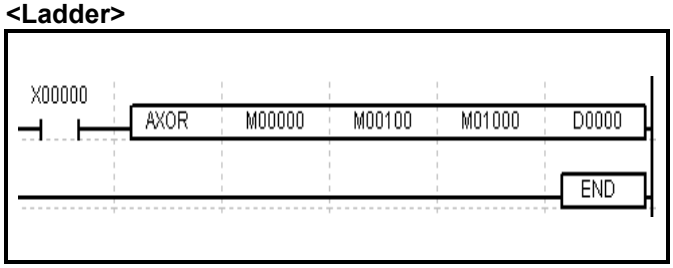
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

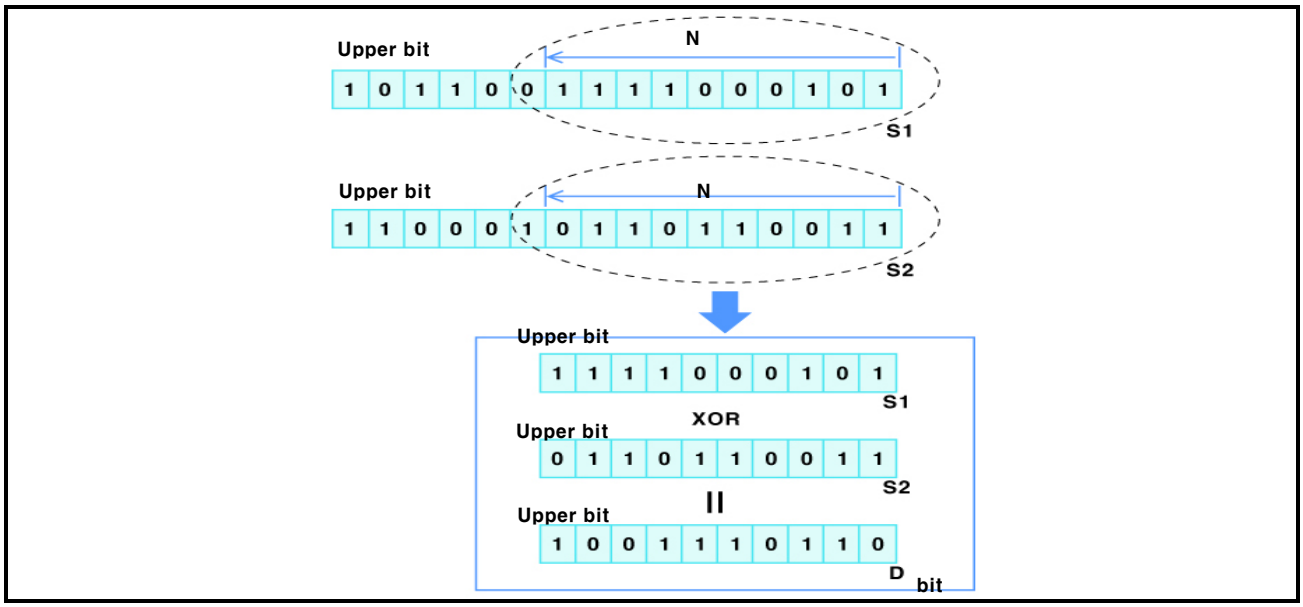
OP	DATA type	Available device / Description / Range
S1	BIT	X, Y, F, T, C, M, UB
		Start address of the bit device to execute the 'XOR' operation with S2
		Not applicable
S2	BIT	X, Y, F, T, C, M, UB
		Start address of the bit device to execute the 'XOR' operation with S1
		Not applicable
D	BIT	Y, F, T, C, M, UB
		Address to save the operation result
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bit devices including the start address to execute the operation
		As many as the number of devices remained in S1, S2 and D area

Error	Zero	Carry	Borrow	Step
	◎			9

<Ladder>



Executes the logical 'XOR' operation for the number of N bits from S1 to SN and the number of N bits from S2 to S2 (N-1), bit by bit, and then stores the result into the number of N bits beginning with D destination bit.



5.5.179 Logical Operation Instruction (XORL)

Logical operation instruction XORL S1 S2 D N

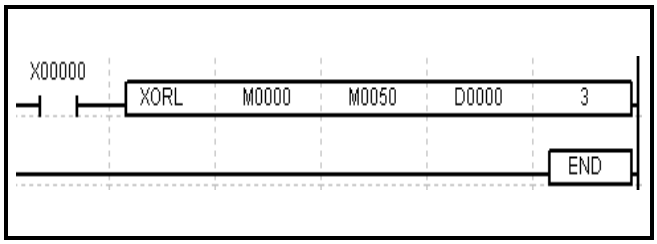
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

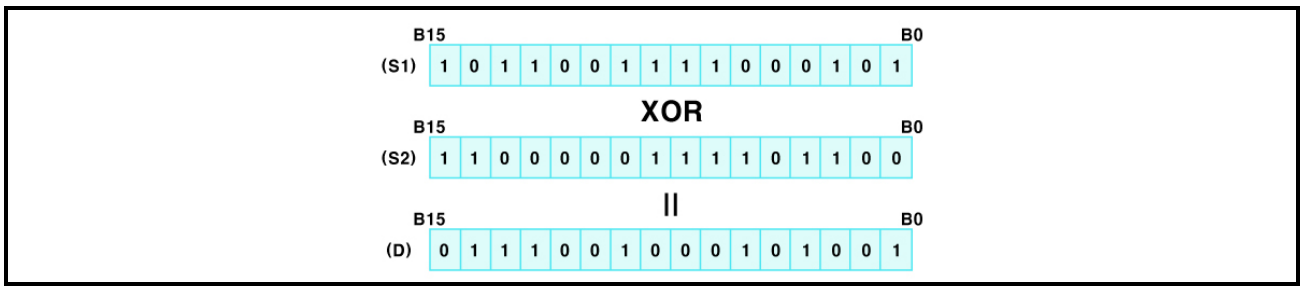
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'XOR' operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the 'XOR' operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

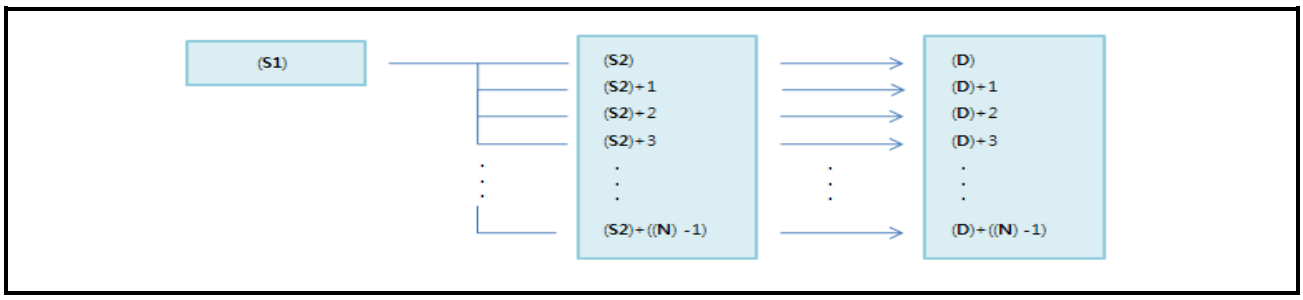
Error	Zero	Carry	Borrow	Step
	◎			9

<Ladder>



1. Executes the bitwise logical 'XOR' operation for every bit of S1 word and the number of N words, from S2 to S2 (N-1), then stores the result into the number of N words beginning with D.
2. If the result value is '0' word, zero flag is SET.





5.5.180 Logical Operation Instruction (DXORL)

Logical operation instruction DXORL S1 S2 D N

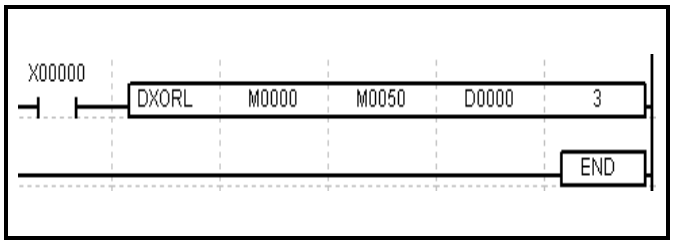
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

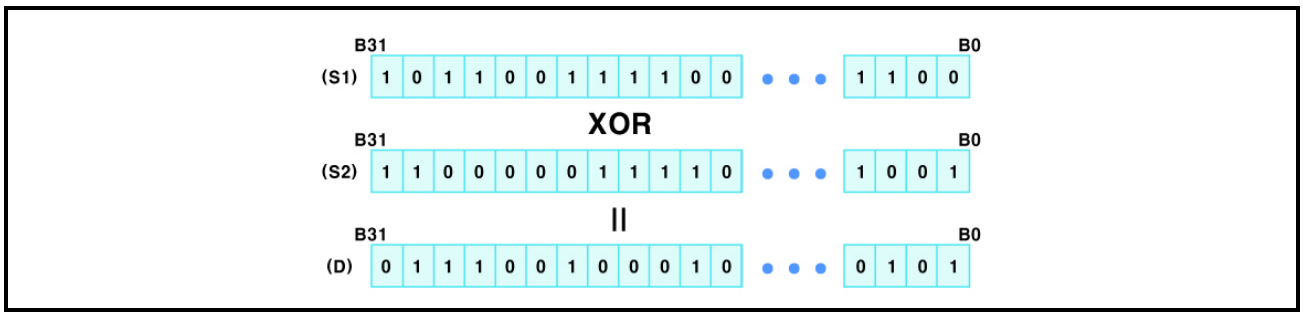
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'XOR' operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the 'XOR' operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

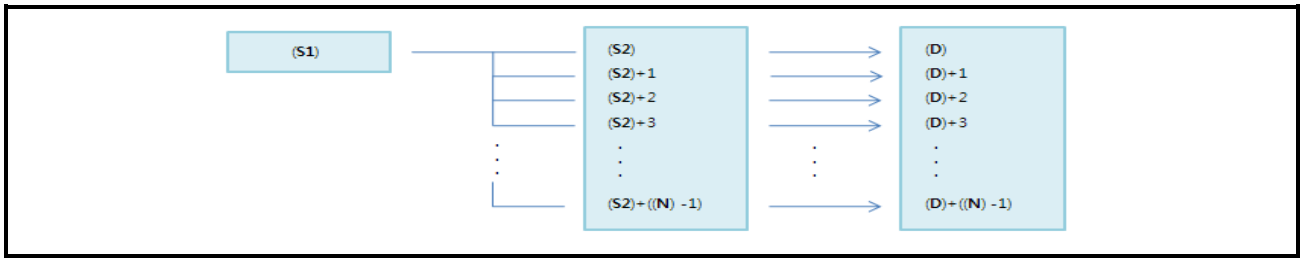
Error	Zero	Carry	Borrow	Step
	◎			9

<Ladder>



1. Executes the bitwise logical 'XOR' operation for every bit of S1 double word and the number of N double words from S2 to S2 (N-1), and then stores the result into the number of N double words beginning with D.
2. If the result value is '0' double word, zero flag is SET.





5.5.181 Logical Operation Instruction (XNR)

Logical operation instruction **XNR** **S1** **S2** **D**

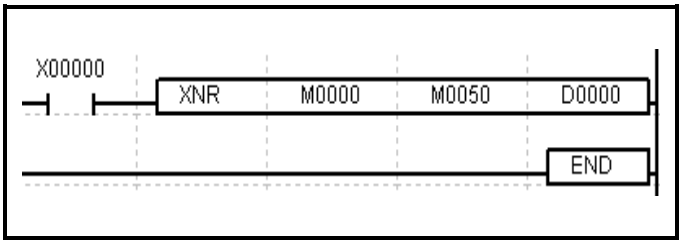
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

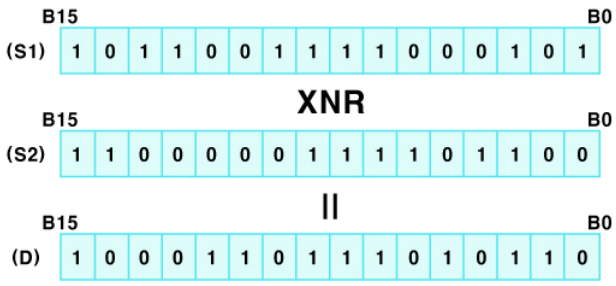
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'XNR' operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'XNR' operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)

Error	Zero	Carry	Borrow	Step
	◎			7

<Ladder>



1. Executes the logical 'XNR' operation for every bit of S1 word and the corresponding bit of S2 word, bit by bit, and then stores the result into the D word.
2. If the result value is '0', zero flag is SET.



5.5.182 Logical Operation Instruction (DXNR)

Logical operation instruction **DXNR** **S1** **S2** **D**

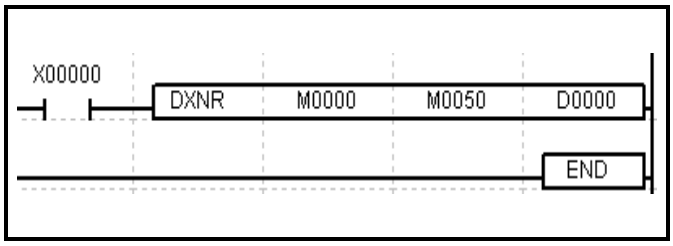
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

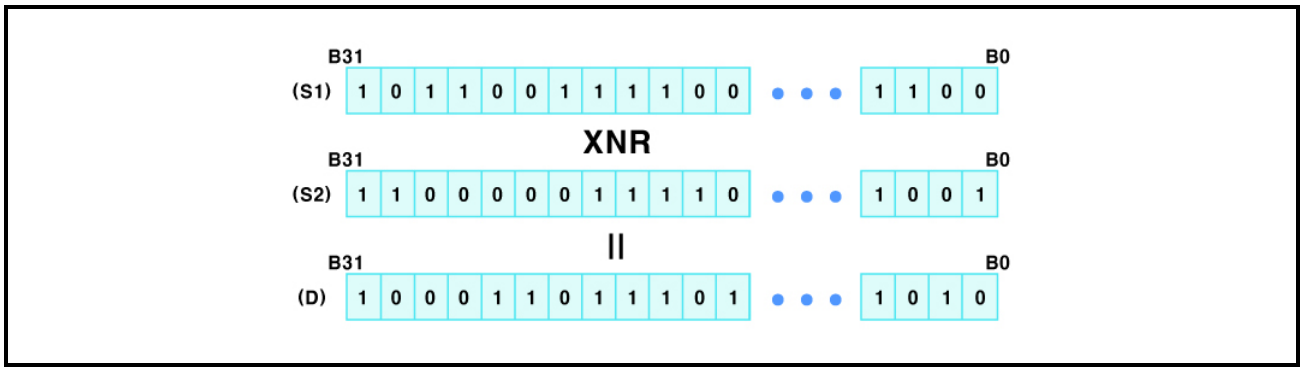
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'XNR' operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'XNR' operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
	◎			7

<Ladder>



1. Executes the logical 'XNR' operation for every bit of S1 double word and the corresponding bit of S2 double word, and then stores the result into the D double word.
2. If the result value is '0', zero flag is SET.



5.5.183 Logical Operation Instruction (AXNR)

Logical operation instruction AXNR S1 S2 D N

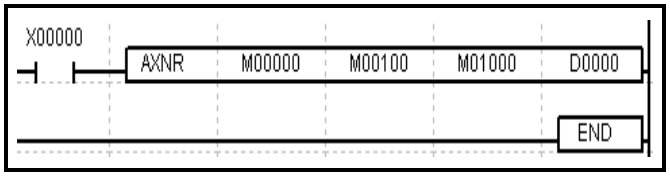
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

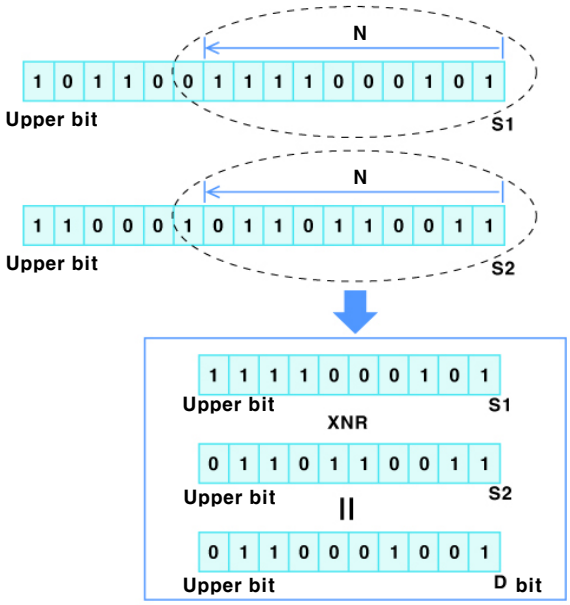
OP	DATA type	Available device / Description / Range
S1	BIT	X, Y, F, T, C, M, UB
		Start address of the bit device to execute the 'XNR' operation with S2
		Not applicable
S2	BIT	X, Y, F, T, C, M, UB
		Start address of the bit device to execute the 'XNR' operation with S1
		Not applicable
D	BIT	Y, F, T, C, M, UB
		Start address of the bit device to save the operation result
		Not applicable
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of bit devices to execute the operation including the start address
		As many as the number of devices remained in the corresponding S1, S2, and D area

Error	Zero	Carry	Borrow	Step
	◎			9

<Ladder>



Executes the logical 'XNR' operation for the number of N bits from S1 to SN and the number of N bits from S2 to S2 (N-1), and then stores the result into the number of N bits beginning with D destination bit.



5.5.184 Logical Operation Instruction (XNRL)

Logical operation instruction XNRL S1 S2 D N

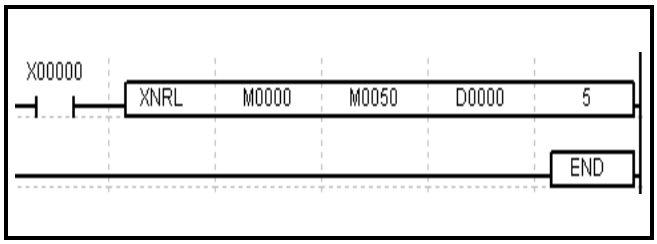
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

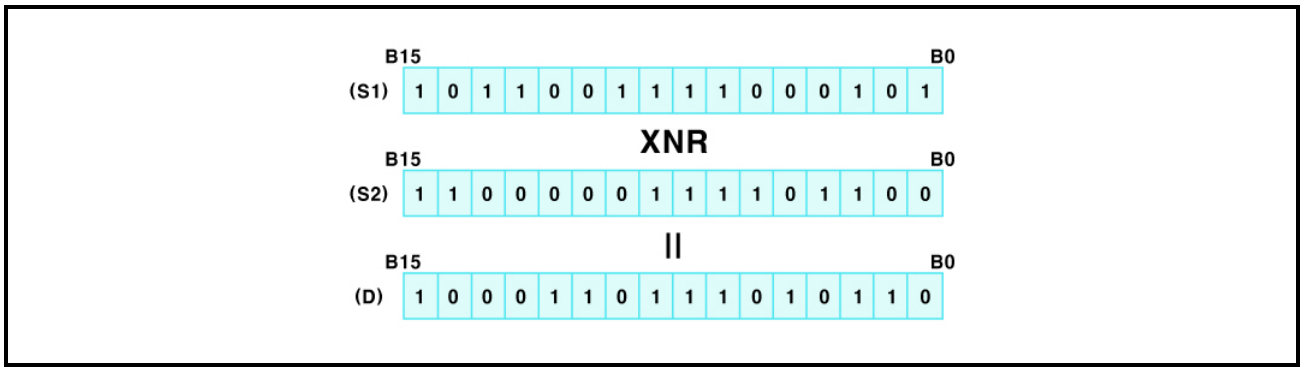
OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'XNR' operation with S2
		0(h0000) to 65535(hFFFF)
S2	WORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the 'XNR' operation with S1
		0(h0000) to 65535(hFFFF)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

Error	Zero	Carry	Borrow	Step
	◎			9

<Ladder>



1. Executes the bitwise logical 'XNR' operation for every bit of S1 word and the number of N words from S2 to S2 (N-1) bit by bit, and then stores the result into the number of N words from D word.
2. If the result value is '0' word, zero flag is SET.



5.5.185 Logical Operation Instruction (DXNRL)

Logical operation instruction DXNRL S1 S2 D N

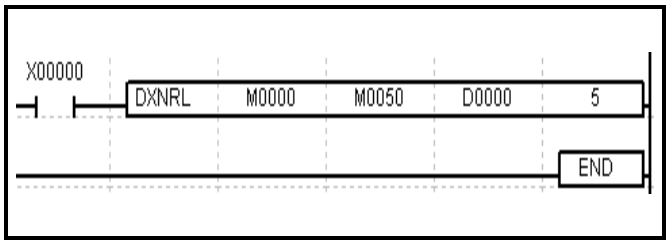
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

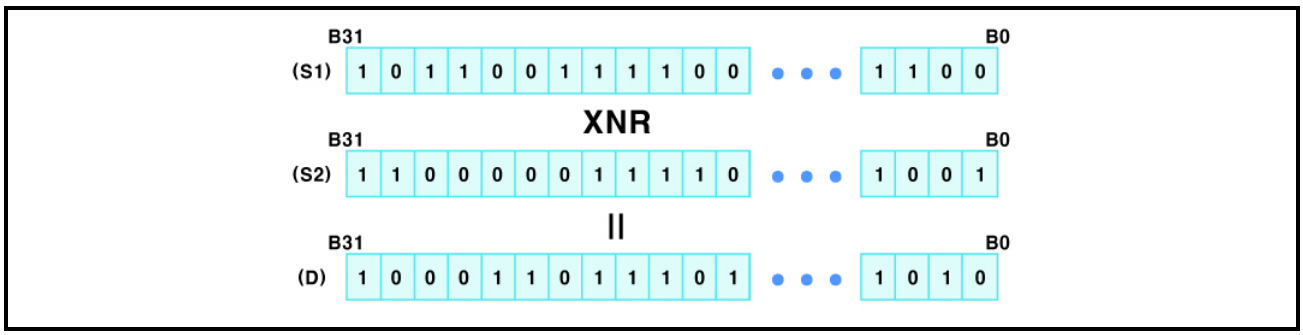
OP	DATA type	Available device / Description / Range
S1	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Data address to execute the 'XNR' operation with S2
		0(h0000) to 4294967295(hFFFFFFFF)
S2	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW
		Data address to execute the 'XNR' operation with S1
		0(h0000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Address to save the operation result
		0(h0000) to 4294967295(hFFFFFFFF)
N	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		The number of S2 data address and saved address to execute the operation with S1
		In the range within the corresponding device area of S2 and D

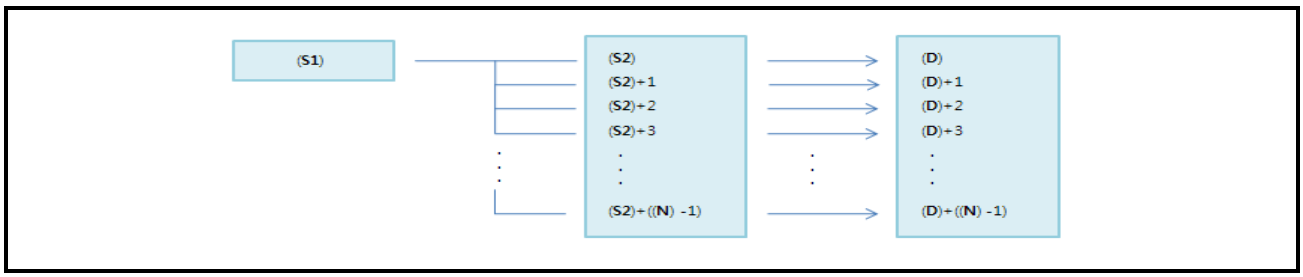
Error	Zero	Carry	Borrow	Step
	◎			9

<Ladder>



1. Executes the logical 'XNR' operation for every bit of S1 double word and the number of N double words from S2 to S2 (N-1), bit by bit, and then stores the result into the number of N double words beginning with D.
2. If the result value is '0' double word, zero flag is SET.





5.5.186 BIN/BCD conversion Instruction (BIN2BCD)

BIN/BCD conversion instruction **BIN2BCD** **S** **D**

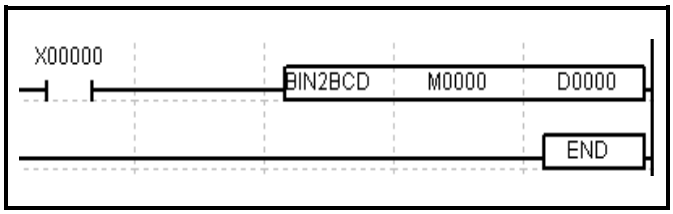
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

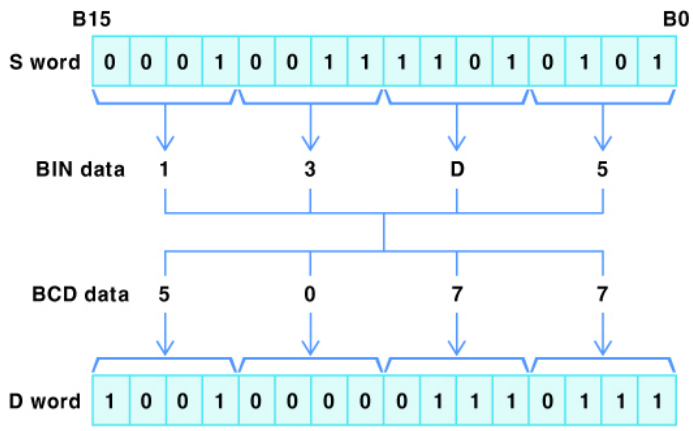
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Device number which has to be transmitted data or data
		0 to 9999(h0000 to h270F)
D	WORD	Y, F, Z, T, C, M, S, L, D, UW
		Device address to save converted data
		h0000 to h9999

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Converts the BINARY data (0 to h270F) stored in S device into the BCD data and then stores the result into the D word.
2. If the converted value is out of the range between 0 to 9999 (BIN data 0 to h270F), error flag is SET.



5.5.187 BIN/BCD conversion Instruction (DBIN2BCD)

BIN/BCD conversion instruction **DBIN2BCD** **S** **D**

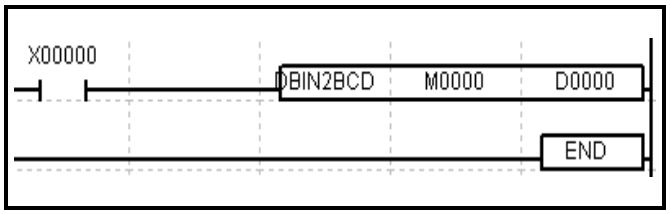
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

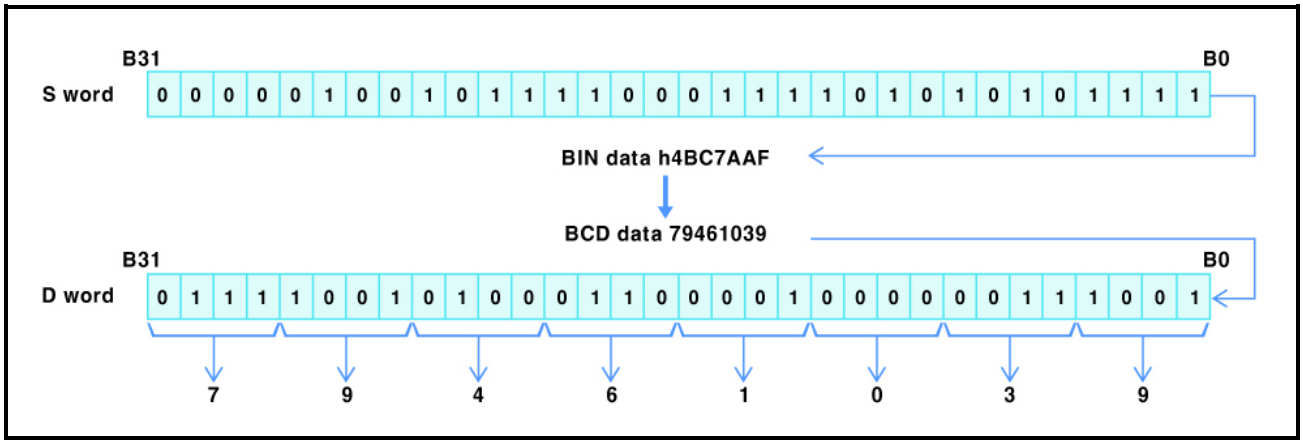
OP	DATA type	Available device / Description / Range
S	DWORD	X, Y, F, Z, T, C, M, S, L, D, UW, integer
		Device number which has to be transmitted data or data
		0 to 99999999(h00000000 to h05F5E0FF)
D	DWORD	Y, F, Z, T, C, M, S, L, D, UW
		Device address to save converted data
		h00000000 to h99999999

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Converts the BINARY data (0 to h05F5E0FF) stored in S double word into the BCD data, and then stores the result into the D double word.
2. If the converted value is out of the range from 0 to 99999999 (BIN data 0 to h05F5E0FF), error flag is SET.



5.5.188 BIN/BCD conversion Instruction (BCD2BIN)

BIN/BCD conversion instruction **BCD2BIN** **S** **D**

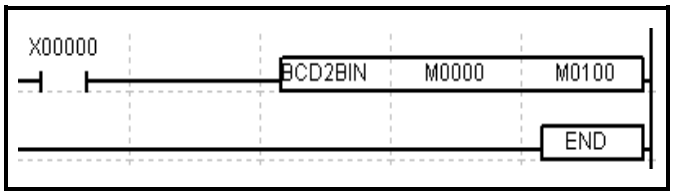
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

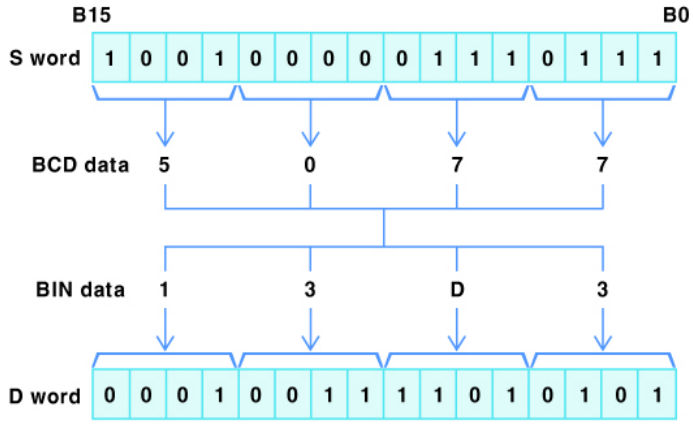
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves BCD data to be converted as BIN value
		h0000 to h9999
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		0 to 9999(h0000 to h270F)

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Converts the BCD code (0 to 9999) stored in S word into the BINARY data and then stores the result into the D word.
2. If the S word is not the BCD code, error flag is SET.



5.5.189 BIN/BCD conversion Instruction (DBCD2BIN)

BIN/BCD conversion instruction **DBCD2BIN** **S** **D**

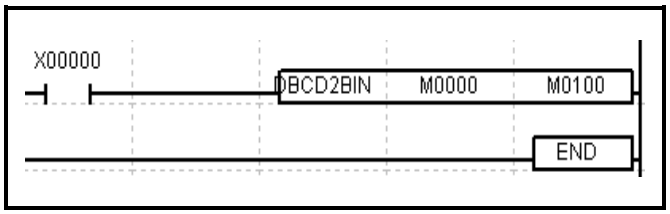
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

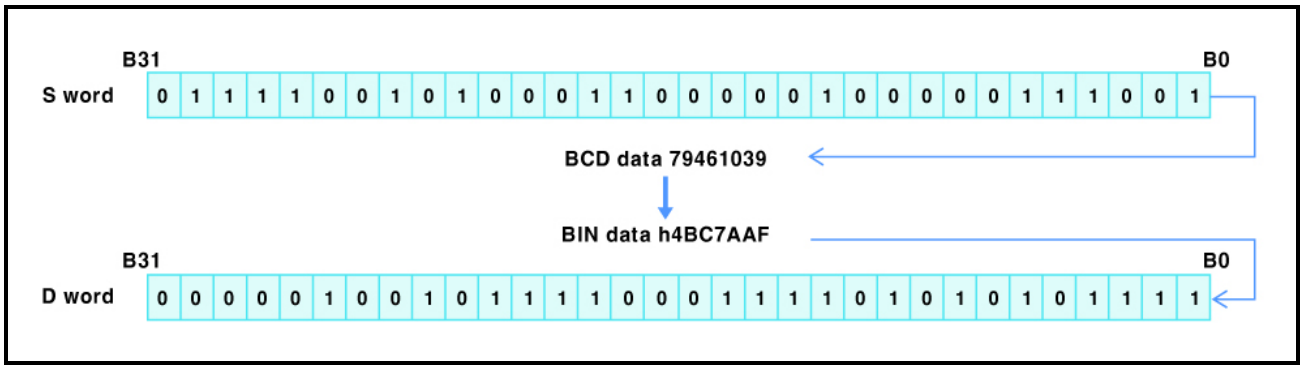
OP	DATA type	Available device / Description / Range
S	DWORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves BCD data to be converted as BIN value
		h00000000 to h99999999
D	DWORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		0 to 99999999(h00000000 to h05F5E0FF)

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Converts the BCD data stored in S double word into the BINARY data, and then stores the result into the D double word.
2. If the S double word is not the BCD code, error flag is SET.



5.5.190 String conversion Instruction (BIN2HASC)

String conversion instruction **BIN2HASC** **S** **D**

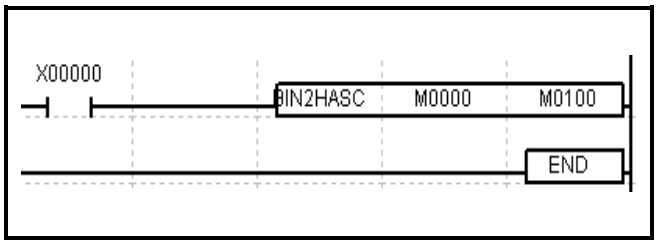
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

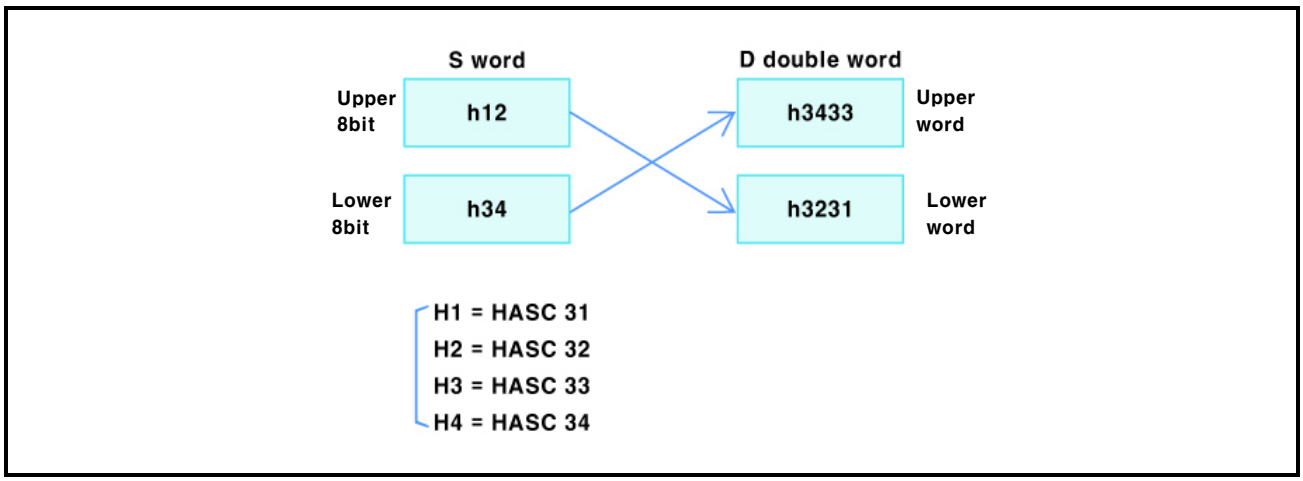
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves to be converted data as ASCII value
		h0000 to hFFFF
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		Allowable range per byte(h30 to h39, h41 to h46)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. Converts the BINARY data stored in S word into the HEX ASCII one by one in order from the upper order value.
2. The converted value is sequentially stored in D double word beginning with D, by 2 digits per word.
3. The operation range is ‘h0000 to hFFFF’.



5.5.191 String conversion Instruction (DBIN2HASC)

String conversion instruction **DBIN2HASC S D**

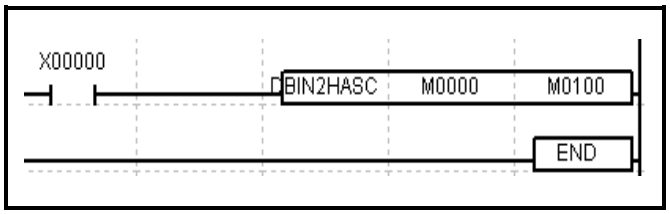
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

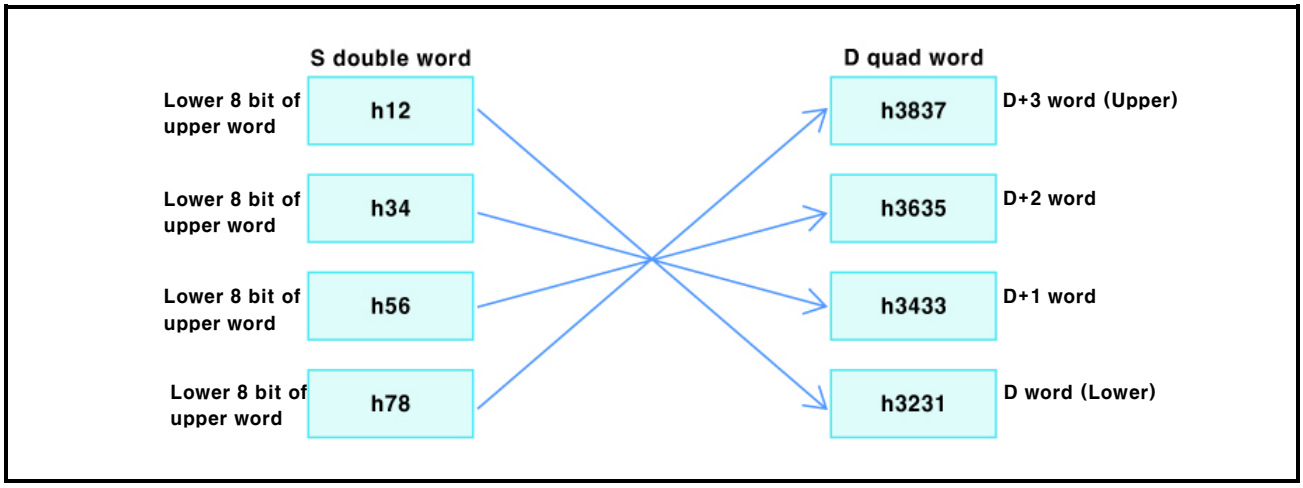
OP	DATA type	Available device / Description / Range
S	DWORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves to be converted data as ASCII value
		h00000000 to hFFFFFFFF
D	QWORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		Allowable range per byte (h30 to h39, h41 to h46)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. Converts the BINARY data stored in S double word into the HEX ASCII one by one in order from the upper order value.
2. The converted value is sequentially stored in D quad word beginning with D, by 2 digits per word.
3. The operation range is h00000000 to HFFFFFFFF.



5.5.192 String conversion Instruction (HASC2BIN)

String conversion instruction **HASC2BIN** **S** **D**

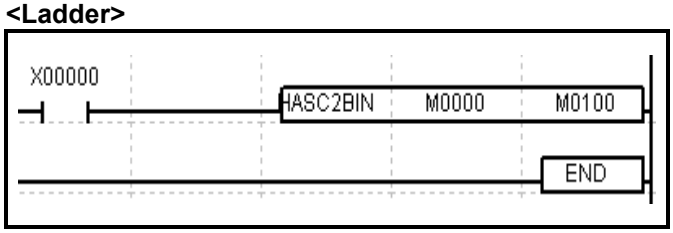
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

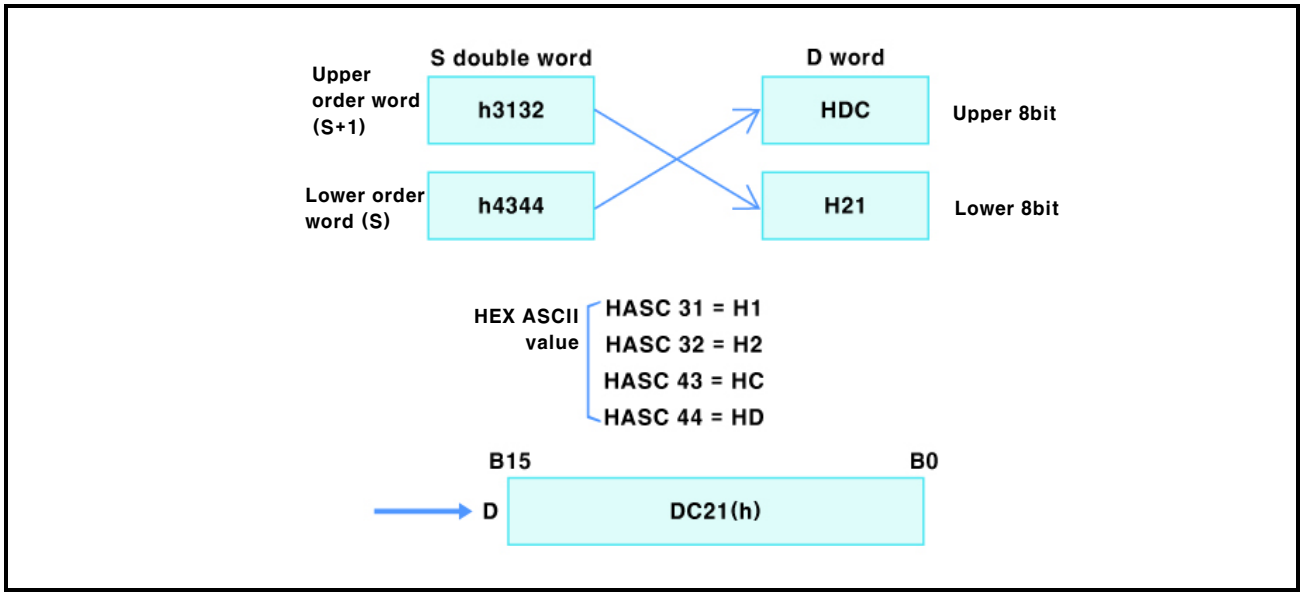
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW
		Device address which saves HEX ASCII value to be converted data as BIN value
		Allowable range per byte (h30 to h39, h41 to h46)
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		h0000 to hFFFF

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Recognizes the double word value of S as ASCII and stores the corresponding value into the D word.
2. If the converted value is not the HEX ASCII, error bit (F34) is SET. (h30 to h39, h41 to h46)



5.5.193 String conversion Instruction (DHASC2BIN)

String conversion instruction **DHASC2BIN S D**

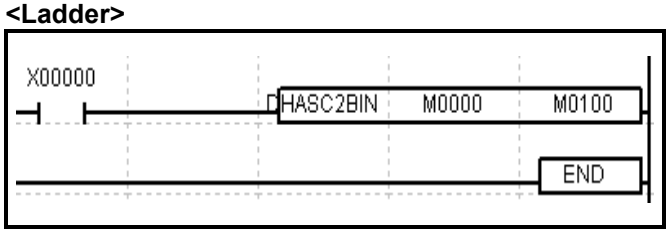
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

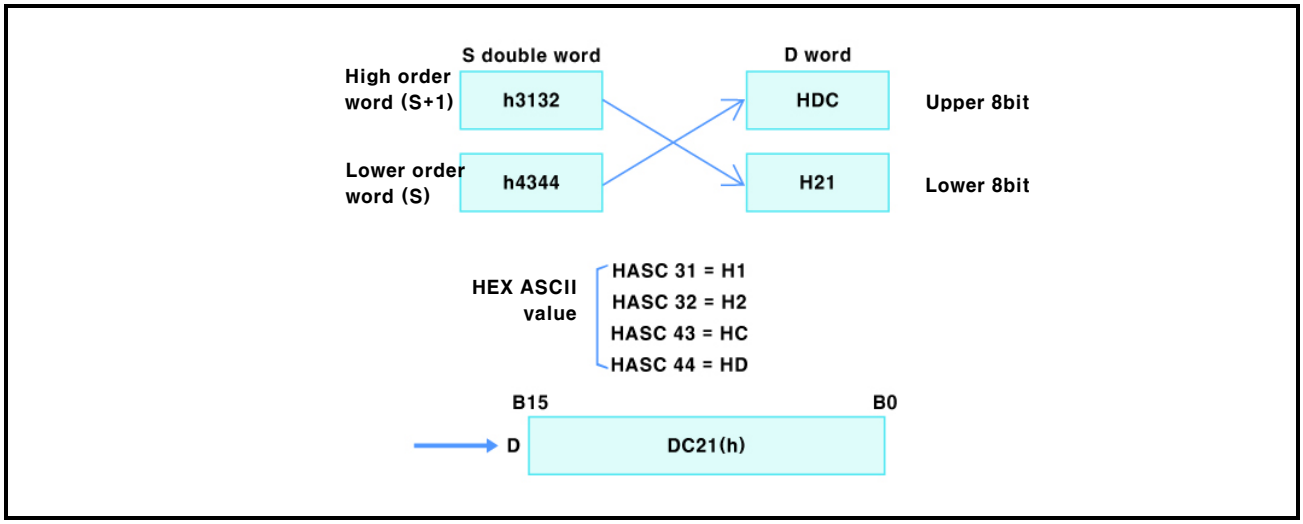
OP	DATA type	Available device / Description / Range
S	DWORD	X, Y, M, S, T, C, D, Z, F, UW
		Device address which saves HEX ASCII value to be converted data as BIN value
		Allowable range per byte (h30 to h39, h41 to h46)
D	DWORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		h00000000 to hFFFFFFFF

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Recognizes the quad word value of S as ASCII and stores the corresponding value into the D double word.
2. If the converted value is not the HEX ASCII, error bit (F34) is SET. (h30 to h39, h41 to h46)



5.5.194 String conversion Instruction (BCD2DASC)

String conversion instruction **BCD2DASC** **S** **D**

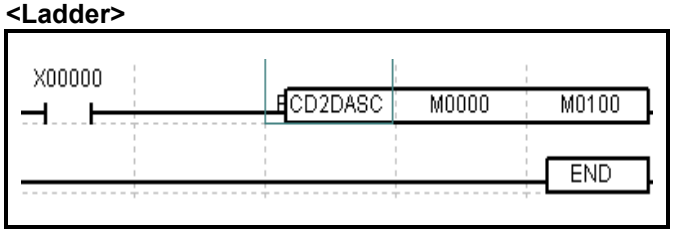
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

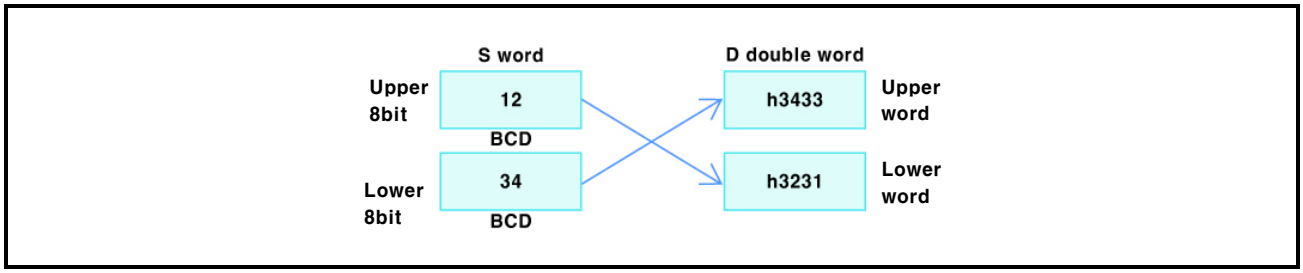
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the data to be converted data as ASCII value
		h0000 to hFFFF
D	DWORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		Allowable range per byte (h30 to h39, h41 to h46)

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Recognizes BCD data stored in S word as decimal number, converts each digit into the ASCII value and then stores them sequentially into the D double word.
2. The operation range is ‘h0000 to h9999’.
3. If the S word is not the BCD code, error flag is SET.



5.5.195 String conversion Instruction (DBCD2DASC)

String conversion instruction **DBCD2DASC S D**

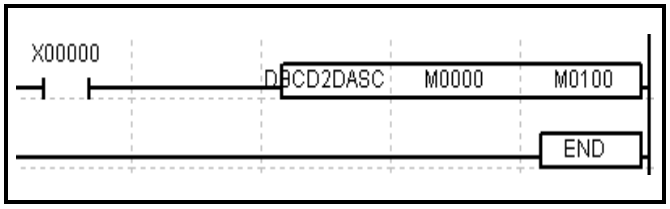
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

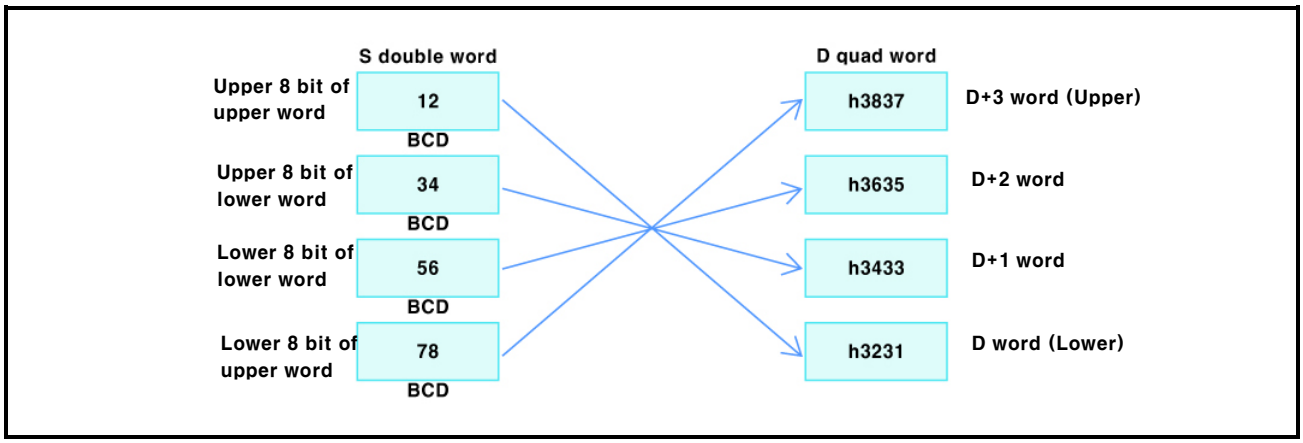
OP	DATA type	Available device / Description / Range
S	DWORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the BCD data to be converted data as ASCII value
		h00000000 to h999999999
D	QWORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		Allowable range per byte (h30 to h39, h41 to h46)

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Recognizes BCD data stored in S double word as decimal number, converts each digit into the ASCII value and then stores them sequentially into the D word.
2. The operation range is h00000000 to h99999999.
3. If the S word is not the BCD code, error flag is SET.



5.5.196 String conversion Instruction (DASC2BIN)

String conversion instruction **DASC2BIN** **S** **D**

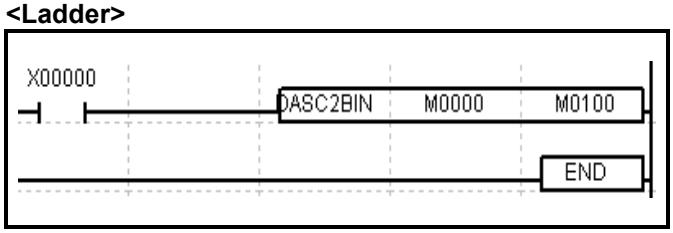
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

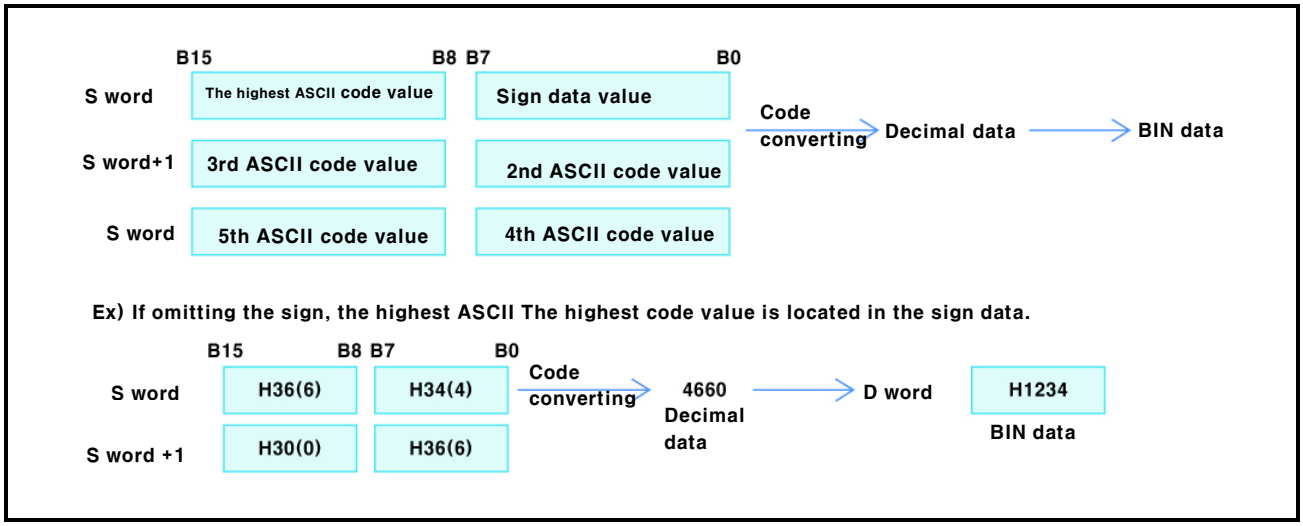
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW
		Device address which saves the Dec ASCII data to be converted as BIN value
		h30 to h39 per byte except sign bit (h2D, h28)
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		-32768(h8000) to 32767(h7FFF)

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Recognizes the ASCII data stored in S word as decimal number, convert each digit into the BINARY value, and then stores them into the D word.
2. The lower order byte of the first source word determines the sign of the BINARY value.
3. The sign value is +(H2B), -(H2D).
4. If the sign value is positive, it can be omitted.
5. The D word is stored as Signed.
6. The operation range is -32768(h8000) to 32767 (h7FFF).
7. If the S word is not in the valid ASCII (h30 to h39) range, corresponding to 0 to 9, error bit (F34) is SET.



5.5.197 String conversion Instruction (DDASC2BIN)

String conversion instruction **DDASC2BIN S D**

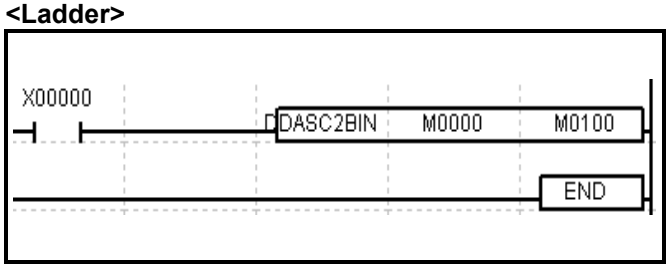
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

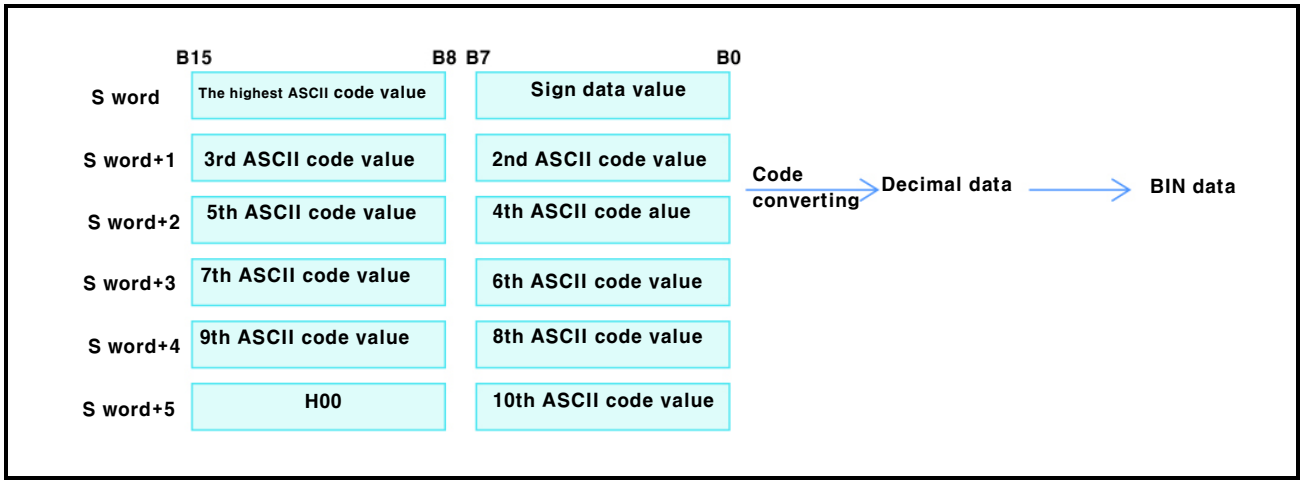
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the Dec ASCII data to be converted as BIN value
		h30 to h39 per byte except sign bit (h2D, h28)
D	DINT	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Recognizes the ASCII data stored in S word as decimal number and convert each digit into the BINARY value then stores them into the D word.
2. The lower order byte of the first source word determines the sign of the BINARY value.
3. The sign value is +(H2B), -(H2D).
4. If the sign value is positive, it can be omitted.
5. The D word is stored as Signed.
6. The operation range is -2147483648 (h80000000) to 2147483647 (h7FFFFFFF).
7. If the S word is not in the valid ASCII (h30 to h39) range, corresponding to 0 to 9, error bit (F34) is SET.



5.5.198 String conversion Instruction (STR2ASC)

String conversion instruction **STR2ASC** **S** **D**

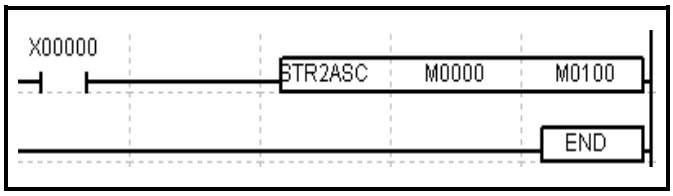
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

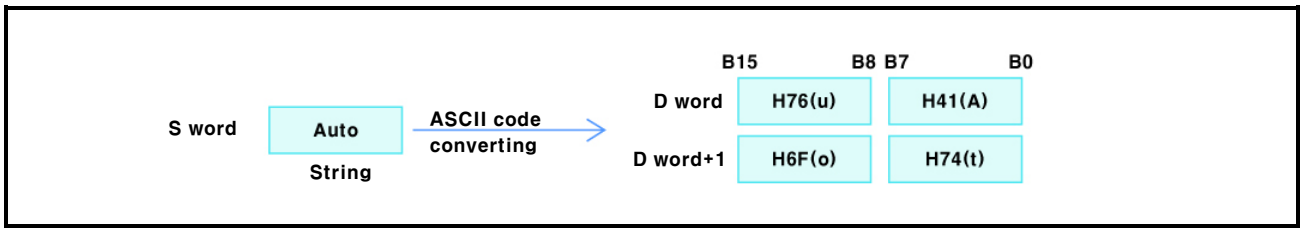
OP	DATA type	Available device / Description / Range
S	STRING	STRING
		STRING data to convert as ASCII value
		String
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		ASCII value

Error	Zero	Carry	Borrow	Step
				7

<Ladder>



1. Converts STRING into the ASCII and then stores it sequentially into the D.
2. It is available to input up to 128 characters.



5.5.199 String conversion Instruction (DASC2BCD)

String conversion instruction **DASC2BCD** **S** **D**

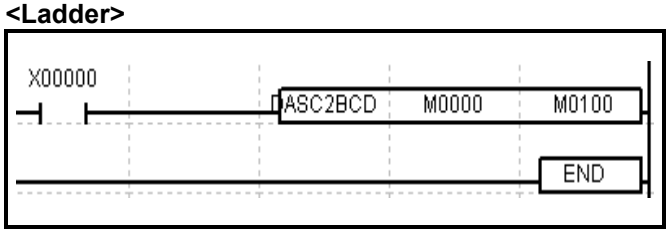
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

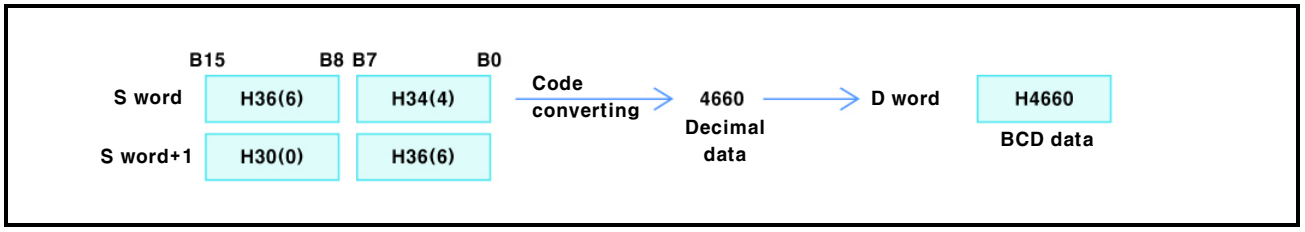
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the Dec ASCII data to be converted as BCD value
		h30 to h39 per byte except sign bit (h2D, h28)
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		h0000 to h9999

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Recognizes the ASCII data stored in S word as decimal number and convert it into the BCD code then stores it into the D word.
2. The converted value is stored as Unsigned and the operation range is h0000 to h9999.
3. If the converted result is not in the valid ASCII range (h30 to h39), error flag is SET.



5.5.200 String conversion Instruction (DDASC2BCD)

String conversion instruction **DDASC2BCD** **S** **D**

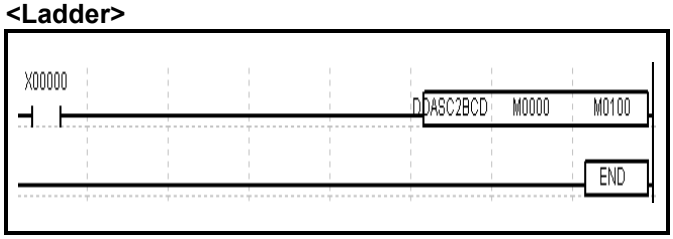
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

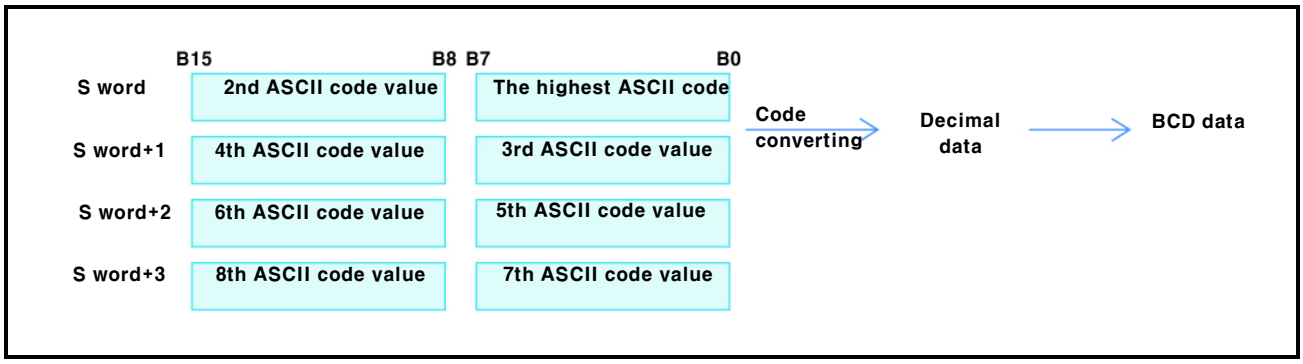
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the Dec ASCII data to be converted as BCD value
		Allowable range per byte (h30 to h39)
D	DWORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		h00000000 to h99999999

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Recognizes the ASCII data stored in S word as decimal number and convert it into the BCD code, then stores it into the D word one by one.
2. The converted value is stored as Unsigned, and the operation range is ‘h00000000 to h99999999’.
3. If the converted result is not in the valid ASCII range (h30 to h39), error flag is SET. (BCD range: 0 to 9)



5.5.201 String conversion Instruction (BIN2DASC)

String conversion instruction **BIN2DASC** **S** **D**

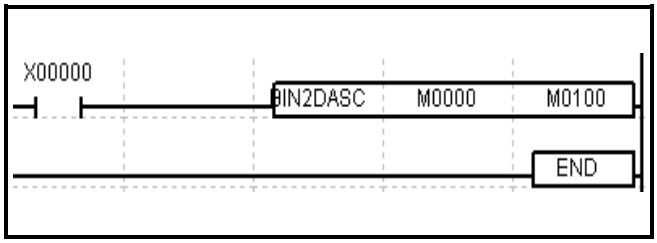
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

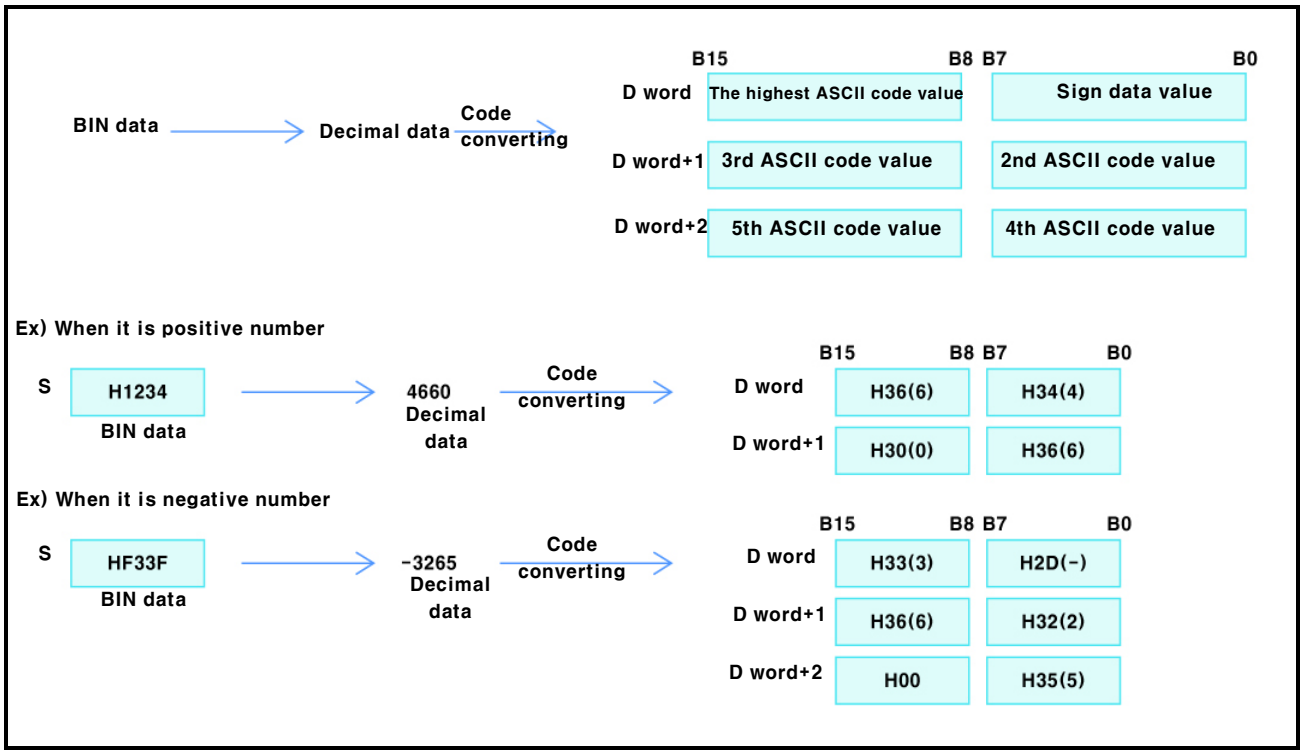
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the data to be converted as ASCII value
		-32768(h8000) to 32767(h7FFF)
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		h30 to h39 per byte except sign bit (h2D, h28)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



1. Recognizes the BIN data stored in S word as decimal number and converts it into the ASCII code, then stores it sequentially into the D, beginning with D word, by 2 digits per word.
2. If the word value of S is negative, the sign value '–(H2D)' will firstly be output on the first byte of D word.
3. Executes the Signed operation, and the operation range is -32768 (h8000) to 32767 (h7FFF).



5.5.202 String conversion Instruction (DBIN2DASC)

String conversion instruction **DBIN2DASC** **S** **D**

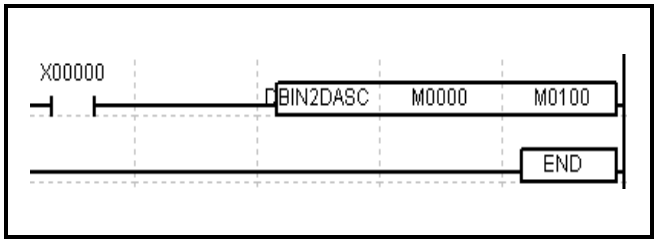
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

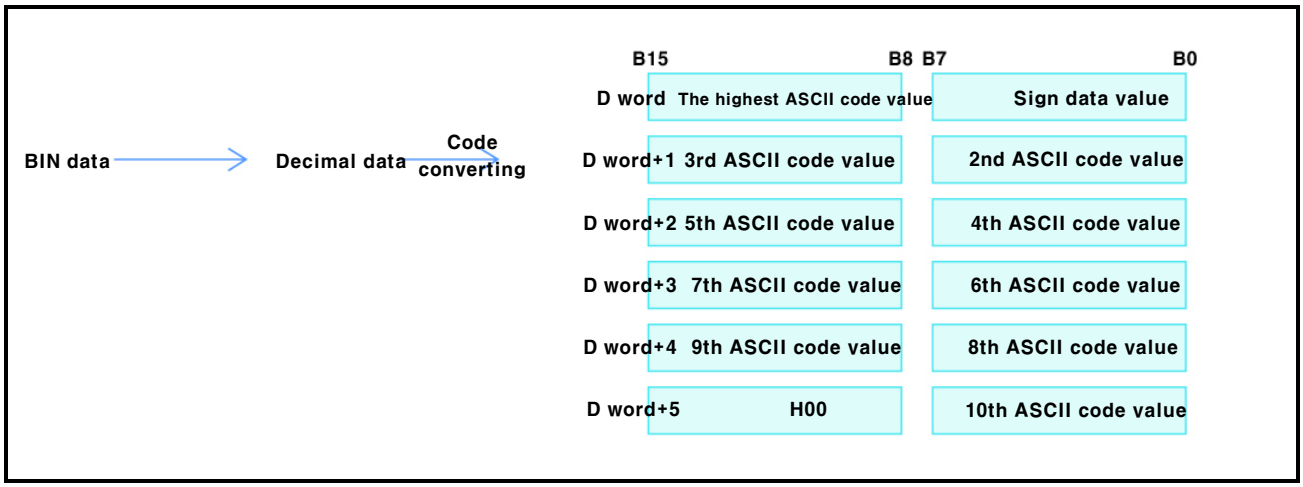
OP	DATA type	Available device / Description / Range
S	DINT	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the data to be converted as ASCII value
		-2147483648(h80000000) to 2147483647(hFFFFFFFF)
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		h30 to h39 per byte except sign bit (h2D, h28)

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



1. Recognizes the BIN data stored in S double word as decimal number and converts it into the ASC II, then stores it into the D word beginning with D, by 2 digits per word.
2. If the word value of S is negative, the sign value '–(H2D)' will firstly be output on the first byte of D word.
3. Executes the Signed operation, and the operation range is -2147483648 (h80000000) to 2147483647 (h7FFFFFFF).



5.5.203 Code conversion Instruction (GRY2BIN)

Code conversion instruction **GRY2BIN** **S** **D**

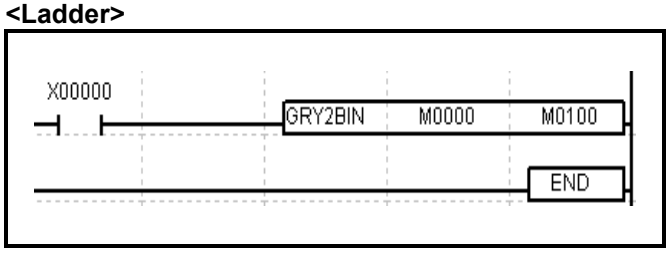
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

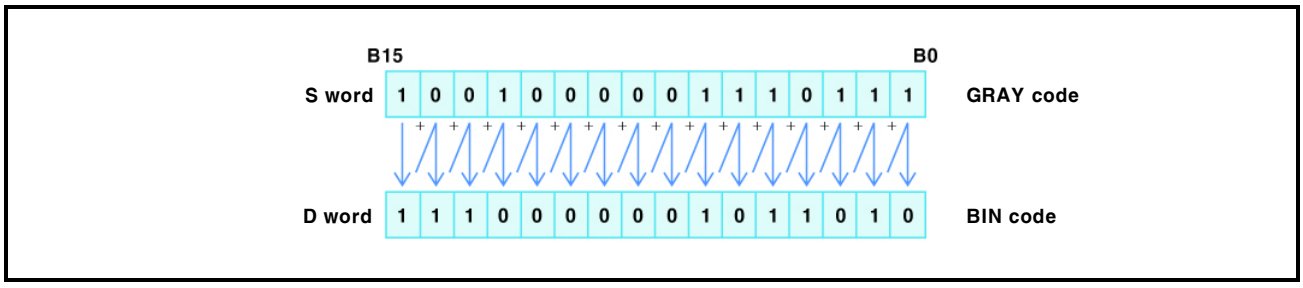
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the GRAY code data to be converted as BIN value
		0(h0000) to 65535(hFFFF)
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		0(h0000) to 65535(hFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Converts the GRAY code data stored in S word into the BINARY data and stores it into the D.



5.5.204 Code conversion Instruction (DGRY2BIN)

Code conversion instruction **DGRY2BIN S D**

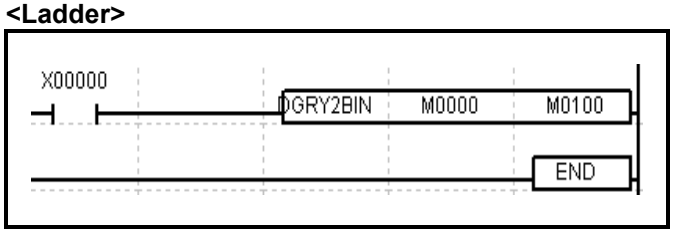
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

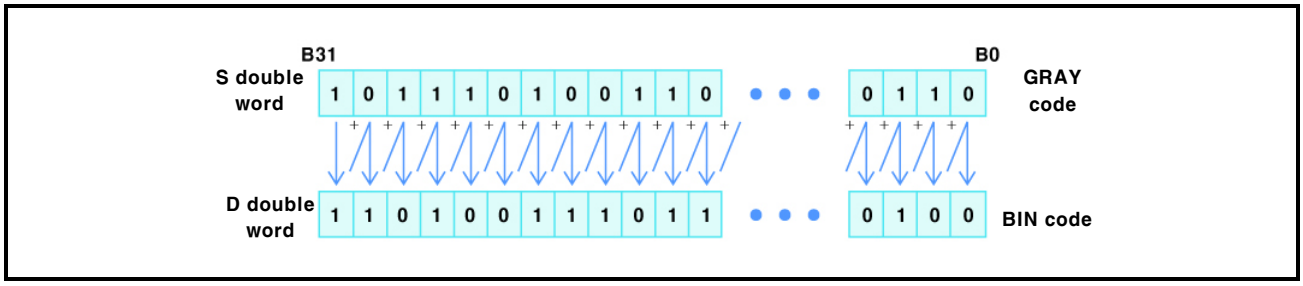
OP	DATA type	Available device / Description / Range
S	DWORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the GRAY code data to be converted as BIN value
		0(h00000000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		0(h00000000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Converts the GRAY code data stored in S double word into the BINARY data and stores it into the D double word.



5.5.205 Code conversion Instruction (BIN2GRY)

Code conversion instruction **BIN2GRY** **S** **D**

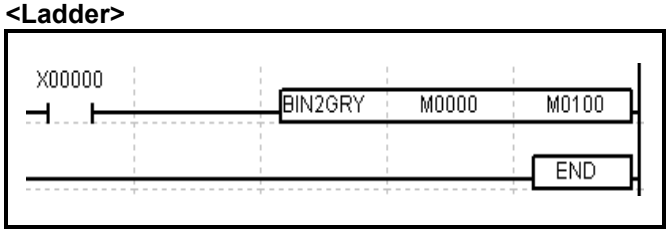
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

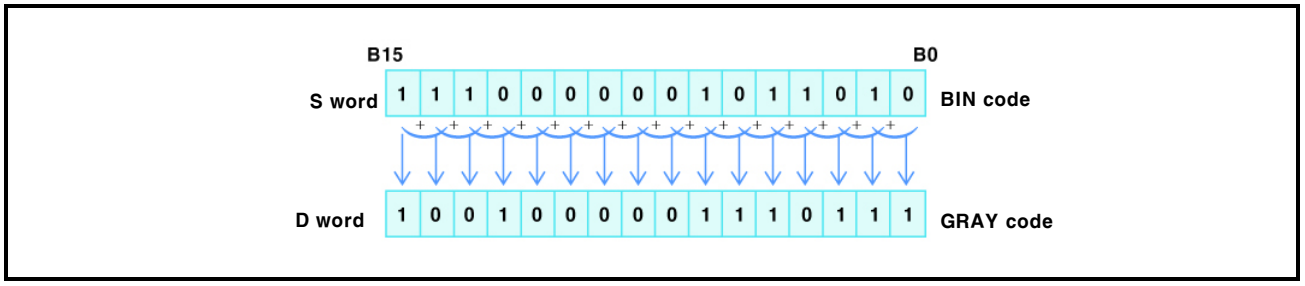
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the data to be converted as GRAY code value
		0(h0000) to 65535(hFFFF)
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		0(h0000) to 65535(hFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Converts the BINARY code data stored in S word into the GRAY code data and then stores it into the D word.



5.5.206 Code conversion Instruction (DBIN2GRY)

Code conversion instruction **DBIN2GRY S D**

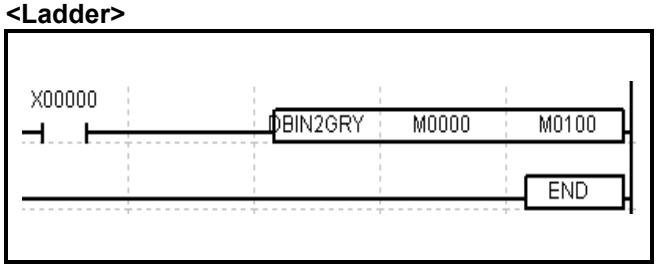
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

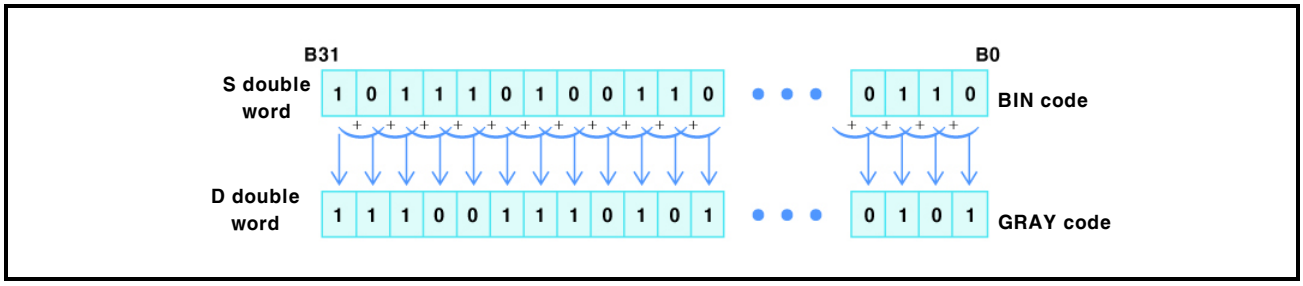
OP	DATA type	Available device / Description / Range
S	DWORD	X, Y, M, S, T, C, D, Z, F, UM, integer
		Device address which saves the data to be converted as GRAY code value
		0(h00000000) to 4294967295(hFFFFFFFF)
D	DWORD	Y, M, S, T, C, D, Z, F, UW
		Device address to save converted data
		0(h00000000) to 4294967295(hFFFFFFFF)

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Converts the BINARY code data stored in S double word into the GRAY code data and then stores it into the D double word.



5.5.207 Sign reversal Instruction (NEG)

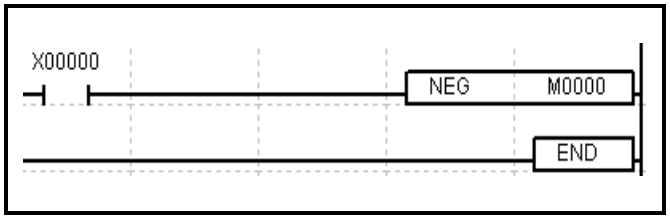
Sign reversal instruction **NEG** **D**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	WORD	Y, M, S, T, C, D, Z, F, UW					
		Device address to convert sign					
		0(h0000) to 65535(hFFFF)					3

<Ladder>



Reverses the sign of D word.

5.5.208 Sign reversal Instruction (DNEG)

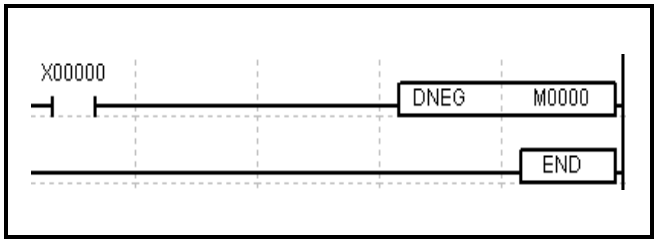
Sign reversal instruction **DNEG** **D**

Applicable model

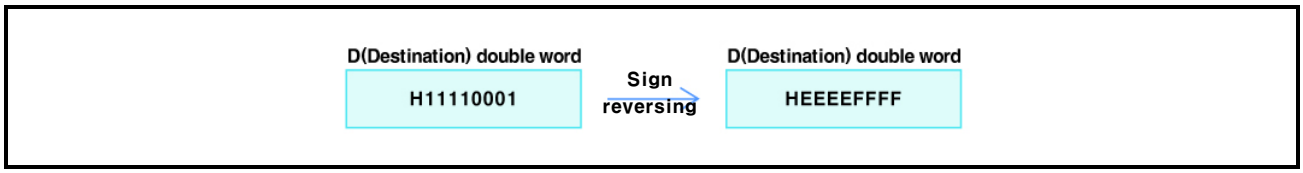
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	DWORD	Y, M, S, T, C, D, Z, F, UW					
		Device address to convert sign					
		0(h00000000) to 4294967295(hFFFFFFFF)					3

<Ladder>



Reverses the sign of D double word.



5.5.209 Data conversion Instruction (DECO)

Data conversion Instruction **DECO** **S** **D** **N**

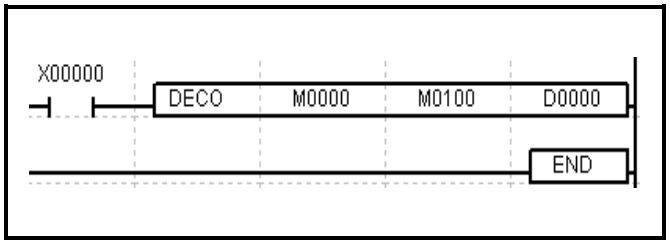
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

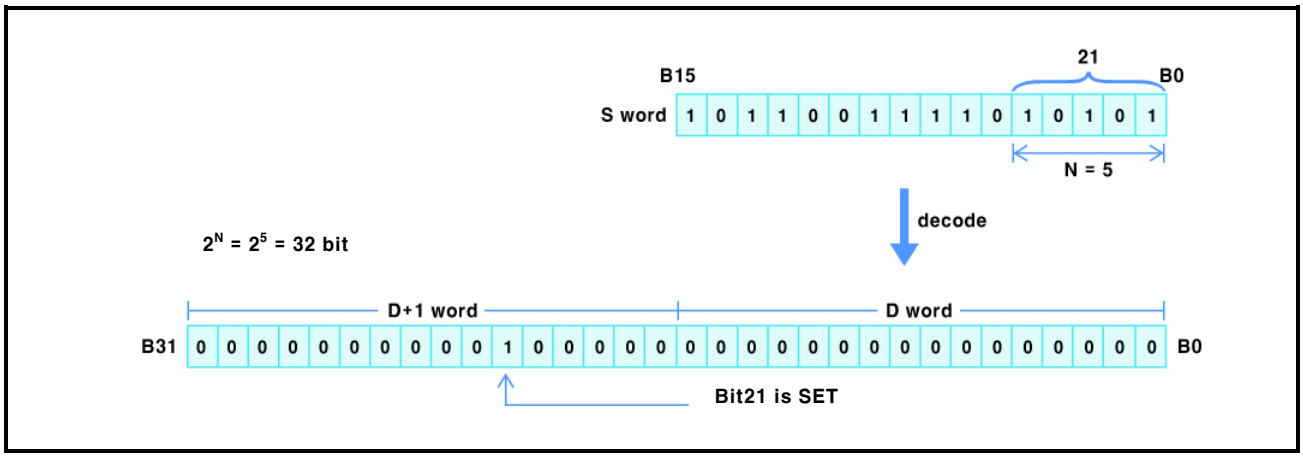
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW
		Data address to execute the decoder operation
		0(h0000) to 65535(hFFFF)
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		The number of bits to be decoded
		0 to 8

Error	Zero	Carry	Borrow	Step
◎				7

<Ladder>



1. Decodes the number of B bits stored in S word from 0 to N and stores the result into the D word.
2. If the N is 0, it does not execute the instruction.
3. If the decoded value is not in the range from 0 to 8, error flag is SET.



5.5.210 Data conversion Instruction (ENCO)

Data conversion instruction **ENCO** **S** **D** **N**

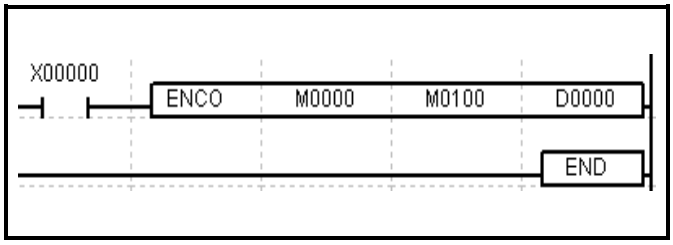
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

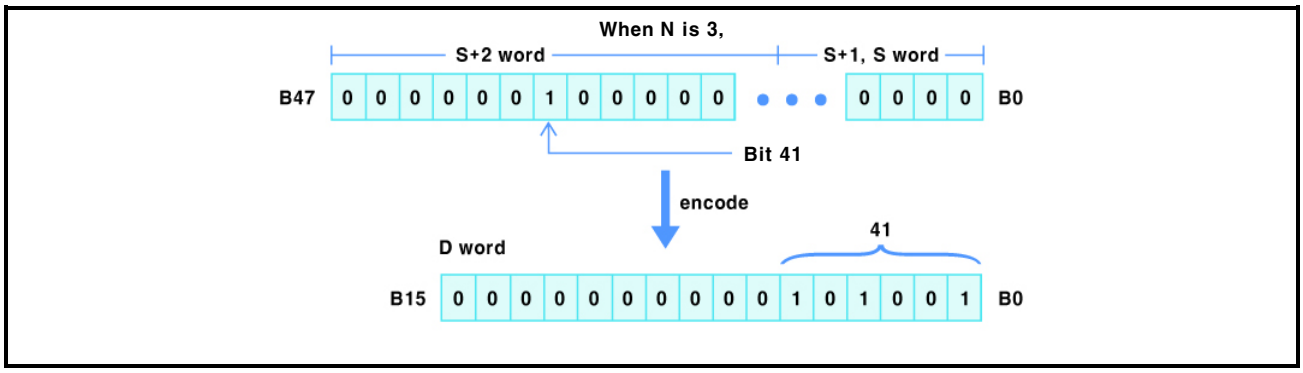
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW
		Data address to execute the encoder operation
		0(h0000) to 65535(hFFFF)
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Address to save the operation result
		0(h0000) to 65535(hFFFF)
N	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		The number of words to be encoded
		0 to 8

Error	Zero	Carry	Borrow	Step
◎	◎			7

<Ladder>



1. Encodes the number of N words from S to N and stores them into the D.
2. If the N is not in the range from 0 to 8, error flag is SET.
3. If the encoded value is 0, zero flag is SET.
4. If N is 0, it does not execute the instruction.



5.5.211 Data conversion Instruction (EXT)

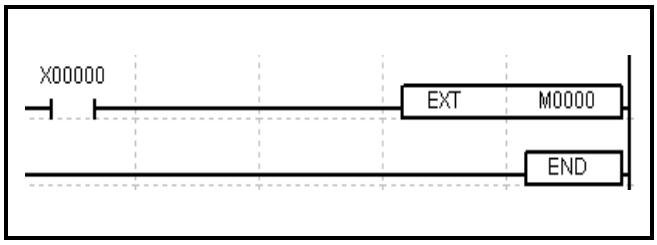
Data conversion instruction **EXT** **D**

Applicable model

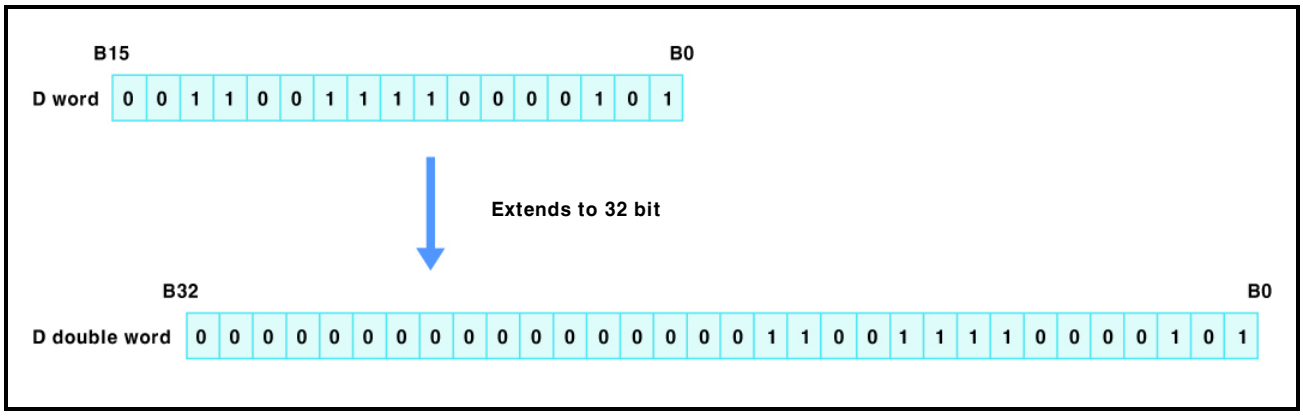
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	INT	Y, M, S, D, UW					
		Data address to execute the operation					
		-32768(h8000) to 32767(h7FFF)					3

<Ladder>



1. Extends the value of D word to 32bit.
2. Executes the Signed operation.



5.5.212 Refresh Instruction (REF)

Refresh instruction **REF** **D** **N**

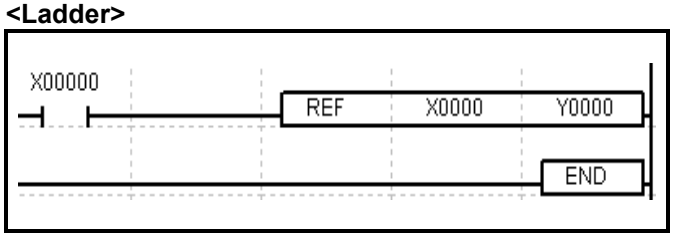
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
D	BIT	X, Y
		Input/Output bit device
		Not applicable
N	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		The number of bit devices to refresh from D bit
		0 to 65535

Error	Zero	Carry	Borrow	Step
				5

<Ladder>



Refreshes the number of N bit devices beginning with I/O D bit device.

5.5.213 Display Instruction (SEG)

Display instruction SEG S D N

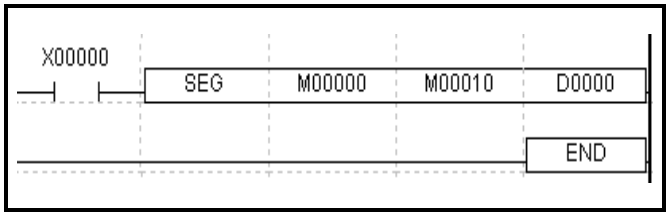
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	BIT	X, Y, M, UB
		Address which saves the data to be decoded as 7 segment
		Not applicable
D	BIT	Y, M, UB
		Address to save the decoded data
		Not applicable
N	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer\
		The number of data to be decoded

Error	Zero	Carry	Borrow	Step
				7

<Ladder>

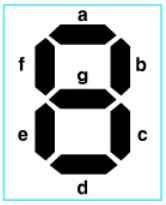


Decodes the number of N data composed of 4 bit per each to the 7 segment data, one by one, and stores it as the number of N data composed of 8 bit per each.

[Segment structure]

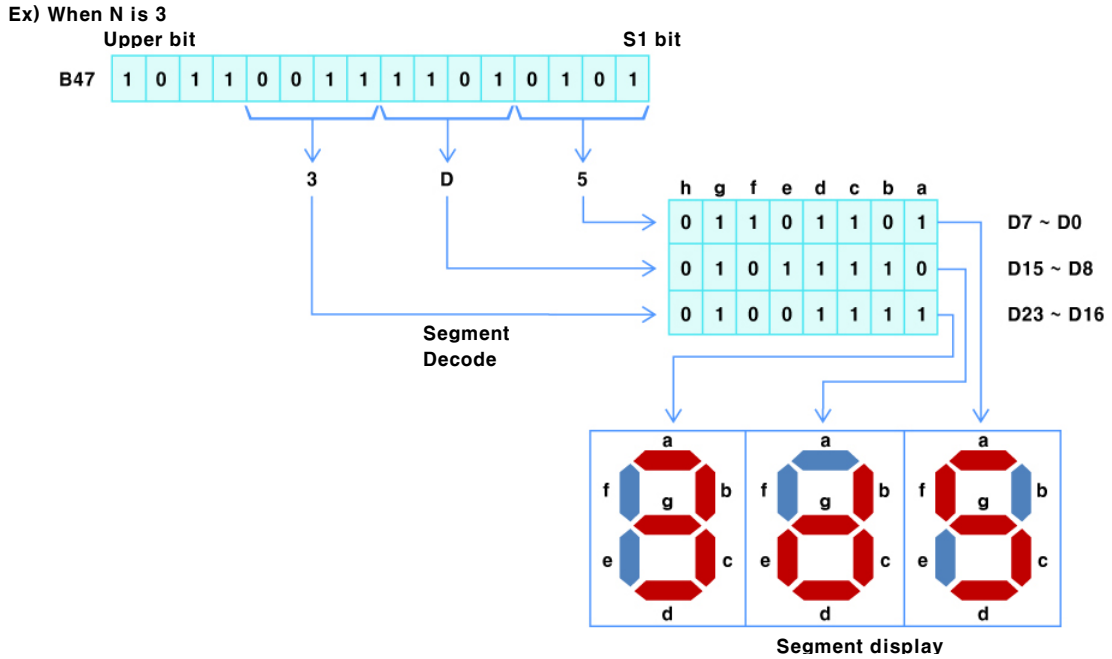
4 input bit	
Hex.	Bit
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000
9	1001
A	1010
B	1011
C	1100
D	1101
E	1110
F	1111

Segment structure



Segment data decode

DECODE								Segment display
h	g	f	e	d	c	b	a	
0	0	1	1	1	1	1	1	0
0	0	0	0	0	1	1	0	1
0	1	0	1	1	0	1	1	2
0	1	0	0	1	1	1	1	3
0	1	1	0	0	1	1	0	4
0	1	1	0	1	1	0	1	5
0	1	1	1	1	1	0	1	6
0	0	1	0	0	1	1	1	7
0	1	1	1	1	1	1	1	8
0	1	1	0	0	1	1	1	9
0	1	1	1	0	1	1	1	A
0	1	1	1	1	1	0	0	B
0	0	1	1	1	0	0	1	C
0	1	0	1	1	1	1	0	D
0	1	1	1	1	0	0	1	E
0	1	1	1	0	0	0	1	F



[The structure when connecting AUTONICS display unit]

Display		Negative logic input						Positive logic input					
Hex.	Dec.	S+3BIT	S+2BIT	S+1BIT	S BIT	BI	LATCH	S+3BIT	S+2BIT	S+1BIT	S BIT	BI	LATCH
Zero Blank	Zero Blank	1	1	1	1	1	1	0	0	0	0	1	0
0	0	1	1	1	1	0	1	0	0	0	0	0	0
1	1	1	1	1	0	×	1	0	0	0	1	×	0
2	2	1	1	0	1	×	1	0	0	1	0	×	0
3	3	1	1	0	0	×	1	0	0	1	1	×	0
4	4	1	0	1	1	×	1	0	1	0	0	×	0
5	5	1	0	1	0	×	1	0	1	0	1	×	0
6	6	1	0	0	1	×	1	0	1	1	0	×	0
7	7	1	0	0	0	×	1	0	1	1	1	×	0
8	8	0	1	1	1	×	1	1	0	0	0	×	0
9	9	0	1	1	0	×	1	1	0	0	1	×	0
A	Blank	0	1	0	1	×	1	1	0	1	0	×	0
B	Blank	0	1	0	0	×	1	1	0	1	1	×	0
C	Blank	0	0	1	1	×	1	1	1	0	0	×	0
D	Blank	0	0	1	0	×	1	1	1	0	1	×	0
E	Blank	0	0	0	1	×	1	1	1	1	0	×	0
F	Blank	0	0	0	0	×	1	1	1	1	1	×	0
HOLD		×	×	×	×	×	0	×	×	×	×	×	H

"X": It does not matter whether you input HIGH or LOW level signal.
Blank: It does not display anything even if you input the signal by using input data.
If you connect BI terminal to the VCC (HIGH level) D, it executes the Zero blanking, and if you connect BI terminal to the GND (LOW level) terminal, it displays 0.
*AUTONICS display unit has embedded DECODER DRIVER, therefore you can use S bit without D (Destination) bit.

5.5.214 Clock Instruction (TCMP)

Clock instruction	TCMP	S1	S2	S3	S4	D

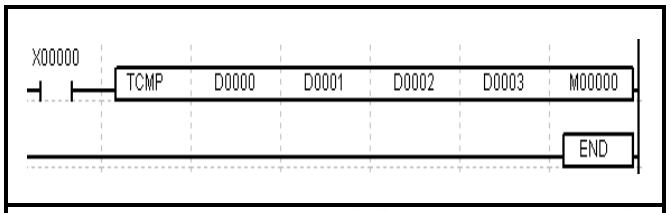
Applicable model

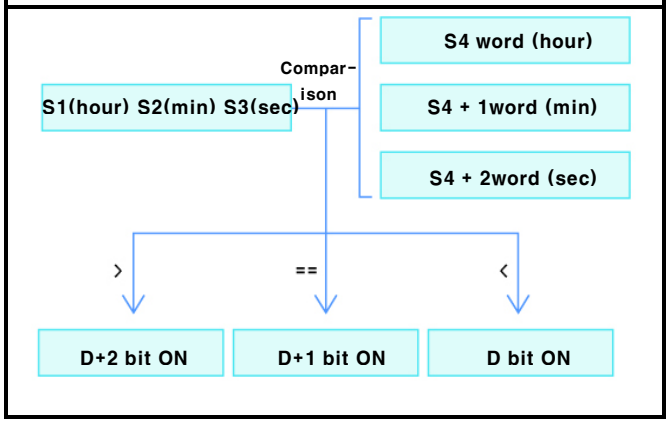
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the data to be compared with 'hour' data of S4
		0(h0000) to 23(h0017)
S2	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the data to be compared with 'minute' data of S4
		0(h0000) to 59(h0038)
S3	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Device address which saves the data to be compared with 'second' data of S4
		0(h0000) to 59(h0038)
S4	WORD	X, Y, M, S, T, C, D, Z, F, UW
		Device address, which saves the data to be compared with the data of S1, S2 and S3.
		Time data range
D	BIT	Y, M, S, T, C, Z, F, UB
		Bit device address to save the comparison result
		Not applicable

Error	Zero	Carry	Borrow	Step
◎				7

<Ladder>





Compares a data composed of S1(hour), S2(minute), and S3(second) with a data composed of S4 to S4+2 word, and as a result;

1. If the two values are equal, D bit turns ON.
2. If S4 is less than the former, D+1 bit turns ON.
3. If S4 is larger than the former, D+2 bit turns ON.
4. If S4 value is read as TRD instruction and available.
5. If the input value is not time data (hour: 0 to 23, minute: 0 to 59, second: 0 to 59) error flag is SET.

5.5.215 Clock Instruction (TADD)

Clock instruction **TADD** **S1** **S2** **D**

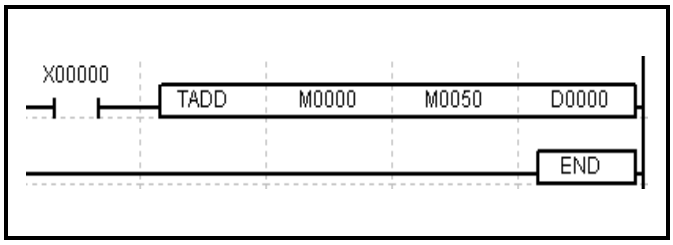
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, M, S, T, C, D, Z, F, UW
		Device address which saves the data to execute the time addition operation with S2
		Time data range
S2	WORD	X, Y, M, S, T, C, D, Z, F, UW
		Device address which saves the data to execute the time addition operation with S1
		Time data range
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Address to save the operation result
		Time data range

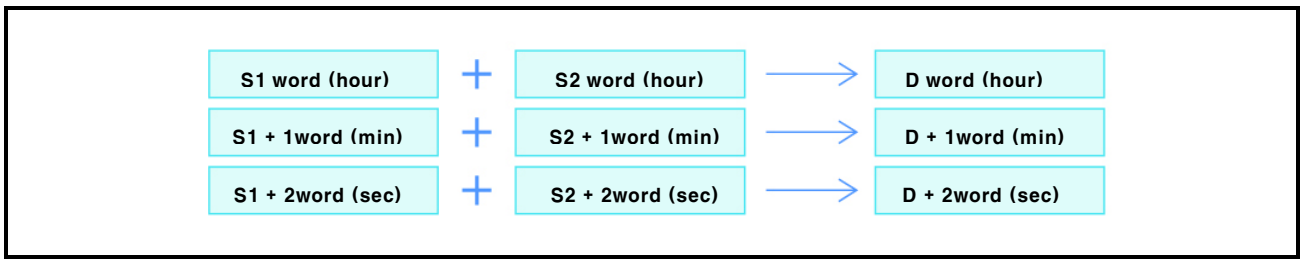
Error	Zero	Carry	Borrow	Step
◎		◎		7

<Ladder>



1. Executes the addition operation for each word of S1 device, in which S1(hour), S1+1(minute), or S1+2(second), is stored, and the corresponding word of S2 device, in which S2(hour), S2+1(minute), or S2+2(second) is stored, and store the result into the designated word of D device respectively.
2. If the time exceeds 24 o'clock, carry flag occurs and the data is stored from 0 again.
3. If the input value is not time data (hour: 0 to 23, minute: 0 to 59, second: 0 to 59) error flag is SET.

(Note) Recognizes and displays the data as binary value.



5.5.216 Clock Instruction (TSUB)

Clock instruction **TSUB** **S1** **S2** **D**

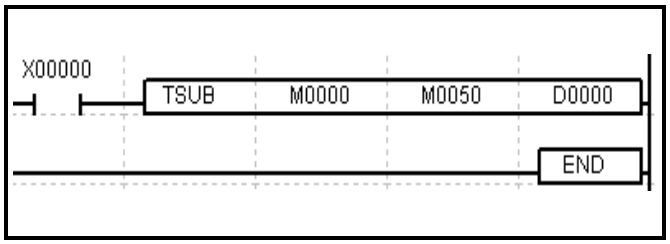
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, M, S, T, C, D, Z, F, UW
		Device address which saves the data to execute the time subtraction operation with S2
		Time data range
S2	WORD	X, Y, M, S, T, C, D, Z, F, UW
		Device address which saves the data to execute the time subtraction operation with S1
		Time data range
D	WORD	Y, M, S, T, C, D, Z, F, UW
		Address to save the operation result
		Time data range

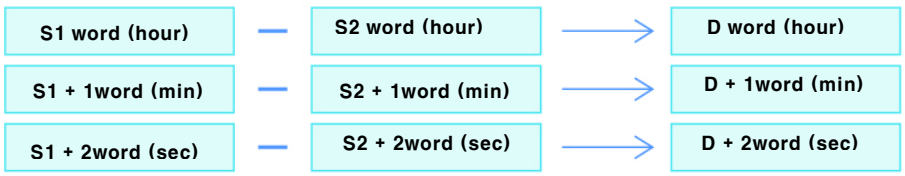
Error	Zero	Carry	Borrow	Step
◎	◎		◎	7

<Ladder>



1. Executes the subtraction operation for each word of S1 device, in which S1(hour)/S1+1(minute)/S1+2 (second) is stored, and the corresponding word of S2 in which S2(hour), S2+1(minute) orS2+2 (second) is stored, and then stores the result into the designated word of D device.
2. If the time is less than 0 o'clock, borrow flag occurs and stores the result after converting into 24-hour data.
3. If the input value is not time data (hour: 0 to 23, minute: 0 to 59, second: 0 to 59) error flag is SET.

(Note) Recognizes and displays the data as binary value.



5.5.217 Clock Instruction (TRD)

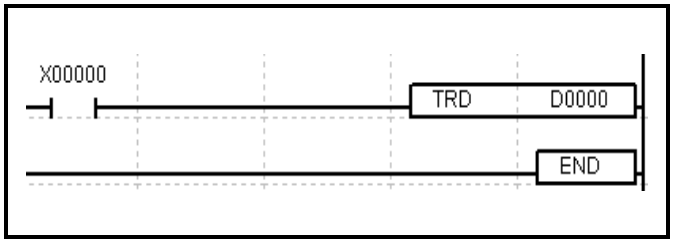
Clock instruction **TRD** **D**

Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

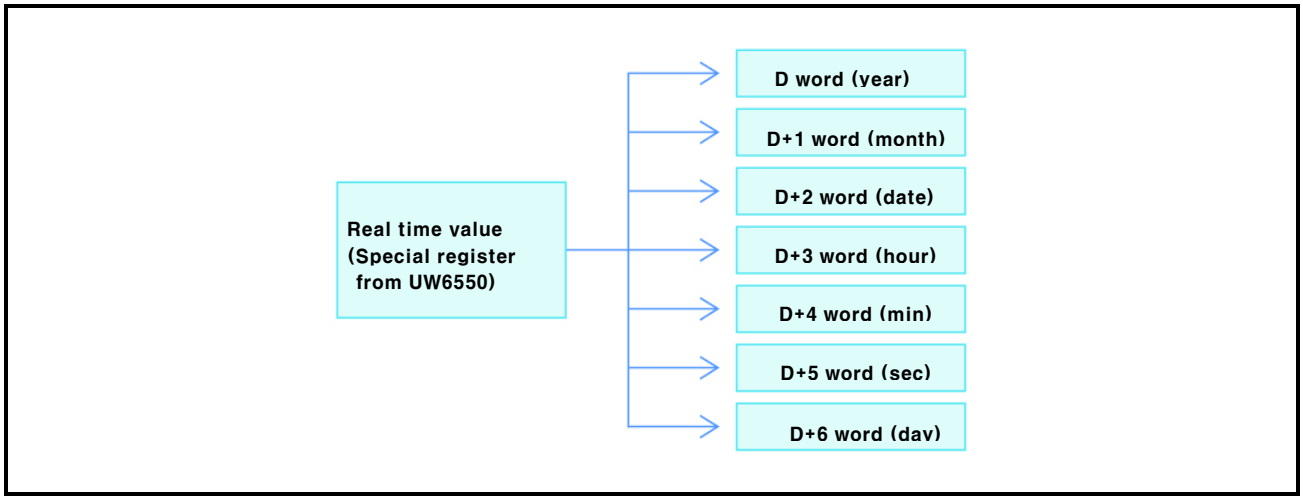
OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	WORD	Y, M, S, T, C, D, Z, F, UW					
		Device address to save the real time value					
		Not applicable					3

<Ladder>



The real time value is stored as below.

1. Year in D word
2. Month in D+1 word
3. Date in D+2 word
4. Hour in D+3 word
5. Minute in D+4 word
6. Second in D+5 word
7. Day of week in D+6 word



5.5.218 Clock Instruction (TWR)

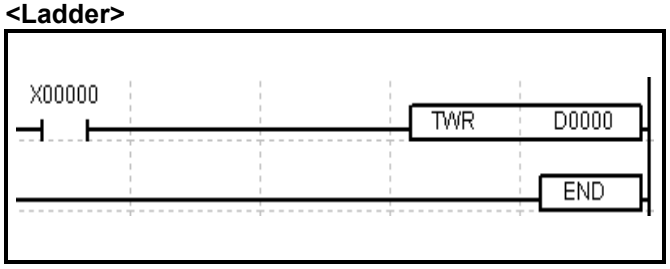
Clock instruction **TWR** **D**

Applicable model

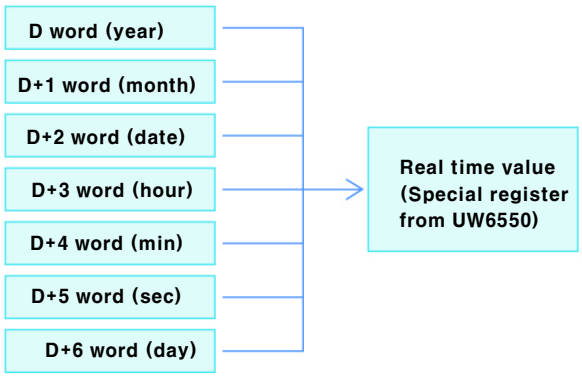
LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
D	WORD	Y, M, S, T, C, D, Z, F, UW					
		Device address which saves the time data to write on special register					
		Time data range					3

<Ladder>



1. Year in D word
2. Month in D+1 word (1 to 12)
3. Date in D+2 word (1 to 31)
4. Hour in D+3 word (1 to 23)
5. Minute in D+4 word (1 to 59)
6. Second in D+5 word (1 to 59)
7. Day of week in D+6 word (0-sunday to 6-saturday) are stored respectively.
8. Stores the time value into the corresponding position of special register.
9. The special register (time setting) is also been running along with executing TWR instruction.
10. If the input data is out of the valid time range, error flag occurs.



5.5.219 Clock Instruction (HOUR)

Clock instruction HOUR S D1 D2

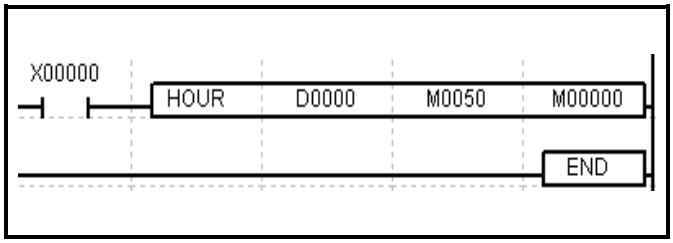
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

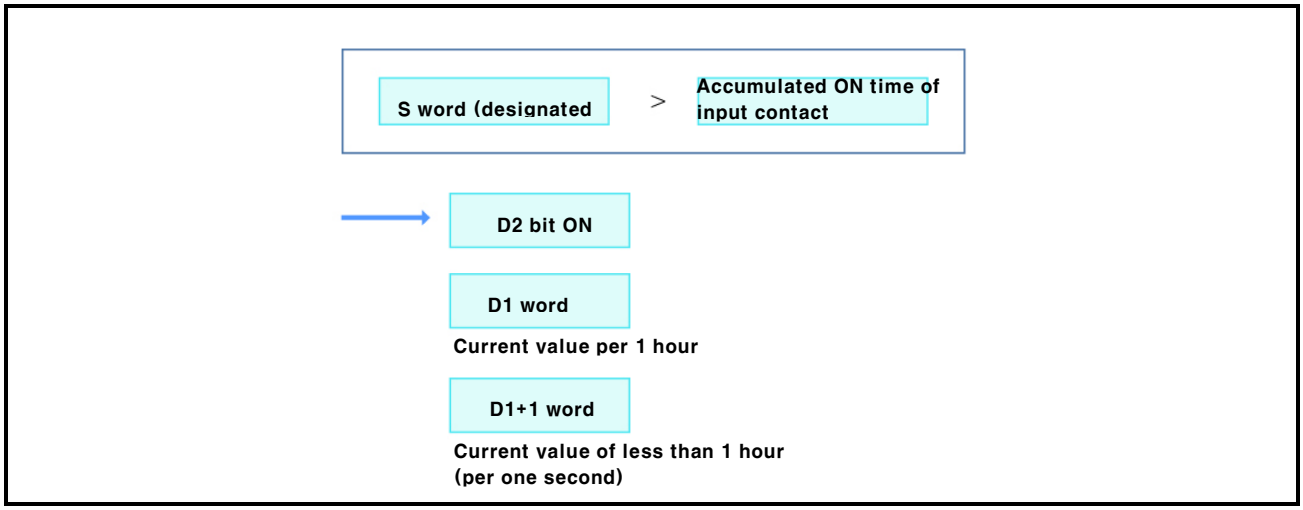
OP	DATA type	Available device / Description / Range
S	WORD	X, Y, M, S, T, C, D, Z, F, UW, integer
		Data device address to designate the accumulated time
		0(h0000) to 65535(hFFFF)
D1	WORD	Y, M, S, T, C, D, Z, F, UW
		Data device address which saves the executed time value
		0(h0000) to 65535(hFFFF)
D2	BIT	Y, M, UB
		The compared result between the executed time (D1) and the designated accumulated time(S)
		Not applicable

Error	Zero	Carry	Borrow	Step
				7

<Ladder>



1. If the input contact retains ON status for the designated time (time unit) in S word device, D2 bit turns ON.
2. The ON time value in D1 word device
3. The current value of less than 1 hour is displayed in D1+1 word device at per one second.



5.5.220 Clock Instruction (TZCP)

Clock instruction	TZCP	S1	S2	S3	D

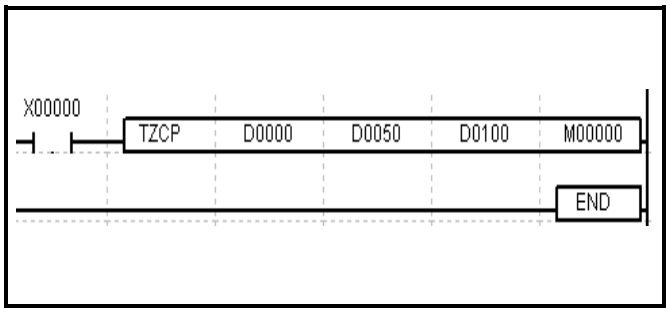
Applicable model

LP-S044, LP-S070, LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S1	WORD	X, Y, M, S, T, C, D, Z, F, UW
		Device address which saves the data to compare with S2 and S3 data
		Time data range
S2	WORD	X, Y, M, S, T, C, D, Z, F, UW
		Device address which saves the data to compare with S1 and S3 data
		Time data range
S3	WORD	X, Y, M, S, T, C, D, Z, F, UW
		Device address which saves the data to compare with S1 and S2 data
		Time data range
D	BIT	Y, M, S, T, C, Z, F, UB
		Bit device address to save comparison result
		Not applicable

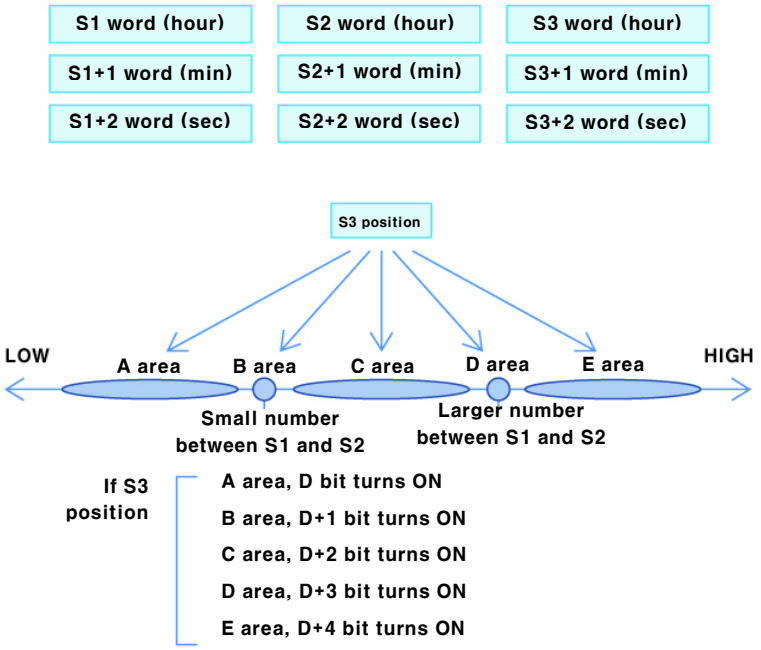
Error	Zero	Carry	Borrow	Step
◎				9

<Ladder>



Hour in S1 word, minute in S1+1 word, second in S1+2 word,
hour in S2 word, minute in S2+1 word, second in S2+2 word,
hour in S3 word, minute in S3+1 word, second in S3+2 word,
are stored respectively and compares the S3 device value between S1 device and S2 device. As a result:

1. If S3 value is less than S1 and S2 value, D bit turns ON.
2. If S3 value is equal to the smaller value of S1 or S2, D+1 bit turns ON.
3. If S3 value is between the values of S1 value and S2 value, D+2 bit turns ON.
4. If S3 value is equal to the bigger value of S1 or S2, D+3 bit turns ON.
5. If S3 value is larger than S1 value and S2 value, D+4 bit turns ON.
6. If the source data is out of the time range (hour: 0 to 23, min: 0 to 59, sec: 0 to 59), error flag occurs.



5.5.221 Motion Instruction (MTVDM)

Motion instruction	MTVDM	S	S1	S2	S3	S4	S5

Applicable model

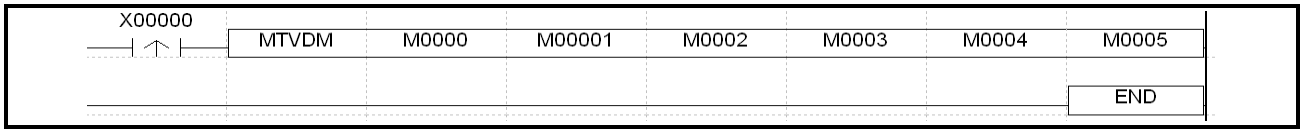
LP-S070,

LP-A070, LP-A104

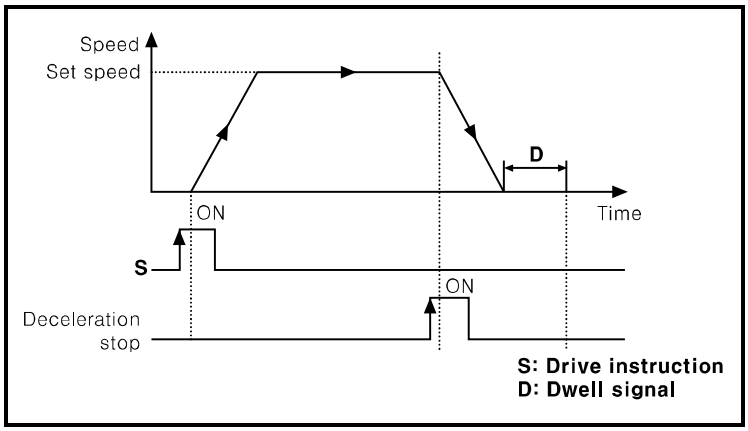
OP	DATA type	Available device / Description / Range
S	WORD	X, M, D, Z, UW, integer
		Channel(Ch1, Ch2)
		1 to 2
S1	BIT	X, M, Z, UB
		Motion drive direction
		1: Forward, 0: Backward
S2	DWORD	X, M, D, Z, UW, integer
		Drive speed
		0 to 100,000
S3	WORD	X, M, D, Z, UW, integer
		Dwell time
		0 to 65536ms
S4	WORD	X, M, D, Z, UW, integer
		Acceleration time
		Select acceleration time 1 to 5 in common configuration
S5	WORD	X, M, D, Z, UW, integer
		Deceleration time
		Select deceleration time 1 to 5 in common configuration

Error	Zero	Carry	Borrow	Step
◎				9

<Ladder>



Speed direct drive instruction: You can designate direct drive data (drive speed, drive direction, etc.) directly and it executes speed drive.



[Note]

1. For utilize direct instruction, set 'TRUE' at 'Enable Ch' of common configuration from [Parameter] - [MOTION] tab in AtLogic.
2. Select accel/deceleration time 1 to 5 in common configuration from [Parameter]-[MOTION] tab in AtLogic.
3. You should check whether the correspond channel is using or not before using direct drive instruction.
4. If using channel is input the other Instruction, using channel error occurs.

※ For more information, refer to Motion of AtLogic user manual.

5.5.222 Motion Instruction (MTPDM)

Motion instruction	MTPDM	S	S1	S2	S3	S4	S5

Applicable model

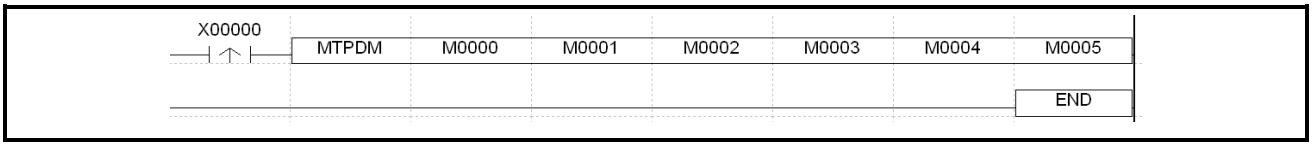
LP-S070,

LP-A070, LP-A104

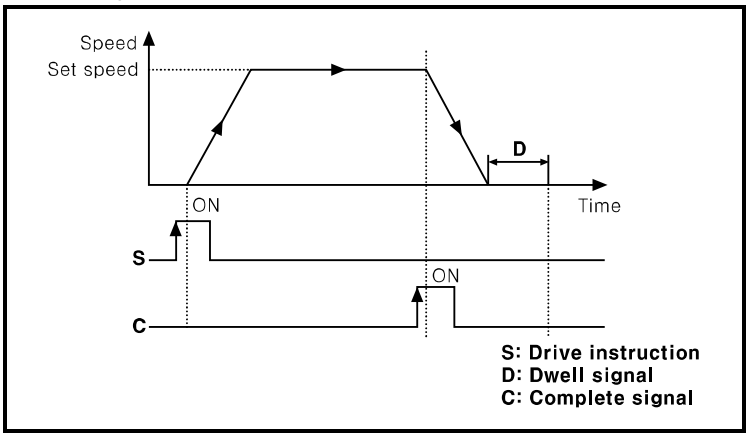
OP	DATA type	Available device / Description / Range
S	WORD	X, M, D, Z, UW, integer
		Channel (Ch1, Ch2)
		1 to 256
S1	DWORD	X, M, D, Z, UW, integer
		Target position
		-2,147,483,648 to 2,147,483,647 (Enable to set the range)
S2	DWORD	X, M, D, Z, UW, integer
		Drive speed
		0 to 100,000
S3	WORD	X, M, D, Z, UW, integer
		Dwell time
		0 to 65536ms
S4	WORD	X, M, D, Z, UW, integer
		Acceleration time
		Select acceleration time 1 to 5 in common configuration
S5	WORD	X, M, D, Z, UW, integer
		Deceleration time
		Select deceleration time 1 to 5 in common configuration

Error	Zero	Carry	Borrow	Step
◎				9

<Ladder>



Position direct drive instruction: You can designate direct drive data (drive speed, drive direction, etc.) directly and it executes position drive.



[Note]

1. For utilize direct instruction, set 'TRUE' at 'Enable Ch' of common configuration from [Parameter] - [MOTION] tab in AtLogic.
2. Select accel/deceleration time 1 to 5 in common configuration from [Parameter]-[MOTION] tab in AtLogic.
3. You should check whether the correspond channel is using or not before using direct drive instruction.
4. If using channel is input the other instruction, using channel error occurs.

※ For more information, refer to Motion of AtLogic user manual.

5.5.223 Motion Instruction (MTIDM)

Motion instruction **MTIDM** **S** **S1**

Applicable model

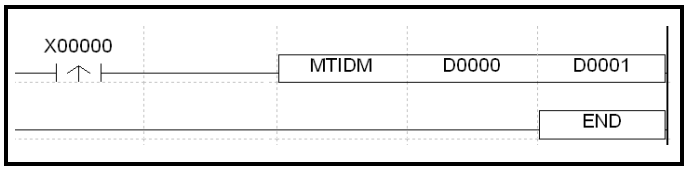
LP-S070,

LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	X, M, D, Z, UW, integer
		Channel(Ch1, Ch2)
		1 to 2
S1	WORD	X, M, D, Z, UW, integer
		Step number
		1 to 99

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



Indirect designate drive instruction: It operates with the number of scripted string in the specified pattern from pattern list.

[Note]

1. For utilize indirect drive instruction, set 'TRUE' at 'Enable Ch' of common configuration from [Parameter]-[MOTION]tab in AtLogic.
2. There should be pattern number to execute of pattern list from [Parameter]-[MOTION] tab in AtLogic.
3. You should check whether the correspond channel is using or not before using drive instruction.

[Pattern stop method]

1) F400 or F402 (Action list stop) + MTSRS

: During pattern drive, if currently executed action list type is speed drive and this instruction is executed, speed drive is finish and it executes the next action list.

2) F401 or F403 (Group stop) + MTSRS

: During group drive, this instruction is executed, it escapes the group and executes the other action list following the group.

3) Not to set special flag

: Pattern drive is finish.

※ For more information, refer to Motion of AtLogic user manual.

5.5.224 Motion Instruction (MTMEC)

Motion instruction **MTMEC** **S**

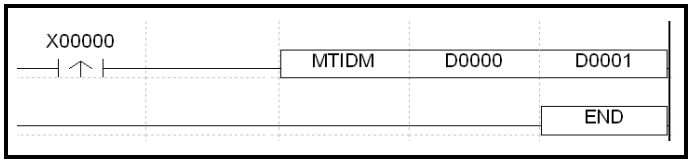
Applicable model

LP-S070,

LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	WORD	X, M, D, Z, UW, integer					
		Channel(Ch1, Ch2)					
		1 to 2	◎				5

<Ladder>



Error remove instruction: This instruction removes the error when error flag occurs by error during motion drive.

※ For more information, refer to Motion of AtLogic user manual.

5.5.225 Motion Instruction (MTEMS)

Motion instruction **MTEMS** **S**

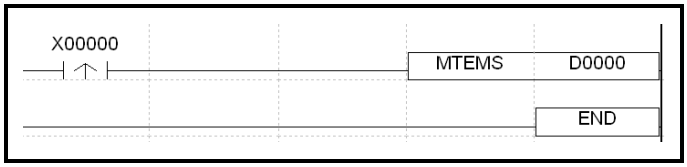
Applicable model

LP-S070,

LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	WORD	X, M, D, Z, UW, integer					
		Channel(Ch1, Ch2)					
		1 to 2	◎				5

<Ladder>



Emergency stop instruction: If there is emergency during motion position driving, you can stop all motion actions by emergency stop instruction.

[Note]
When executing emergency stop instruction, all currently executing motion instructions stop.

※ For more information, refer to Motion of AtLogic user manual.

5.5.226 Motion Instruction (MTCPP)

Motion instruction **MTCPP** **S** **S1**

Applicable model

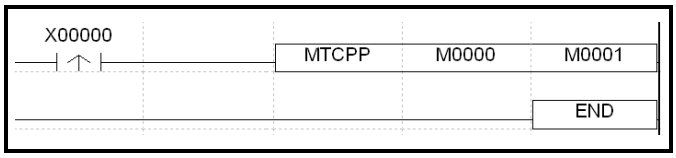
LP-S070,

LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	X, M, D, Z, UW, integer
		Channel(Ch1, Ch2)
		1 to 2
S1	DWORD	X, M, D, Z, UW, integer
		Setting value of new position
		-2,147,483,648 to 2,147,483,647

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



Current position preset instruction: This motion instruction is for re-set the current position.

[Note]
During motion driving, if this instruction is executed, error occurs.

※ For more information, refer to Motion of AtLogic user manual.

5.5.227 Motion Instruction (MTFOS)

Motion instruction **MTFOS** **S**

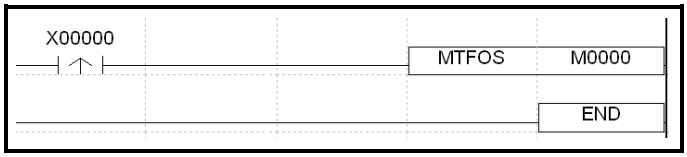
Applicable model

LP-S070,

LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	WORD	X, M, D, Z, UW, integer					
		Channel(Ch1, Ch2)					
		1 to 2	◎				5

<Ladder>



Forced home setting instruction: This instruction sets the specified position as the set home position value in AtLogic.

※ For more information, refer to Motion of AtLogic user manual.

5.5.228 Motion Instruction (MTSRS)

Motion instruction **MTSRS** **S**

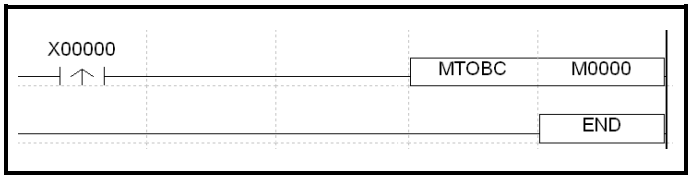
Applicable model

LP-S070,

LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	WORD	X, M, D, Z, UW, integer					
		Channel(Ch1, Ch2)					
		1 to 2	◎				5

<Ladder>



Normal stop instruction: It executes normal stop instruction to the currently motion driving channel.

[Pattern stop method with combination of special flag]

1. F400 or F402 (Action list stop) + MTSRS
   : During pattern drive, if currently executed action list type is speed drive and this instruction is executed, speed drive is finish and it executes the next action list.

2. F401 or F403 (Group stop) + MTSRS
   : During group drive, this instruction is executed, it escapes the group and executes the other action list following the group.

3. Not to set special flag
   : Pattern drive is finish.

4. MTSRS during linear interpolation drive
   : Two axes decelerately stop at the same time.

※ For more information, refer to Motion of AtLogic user manual.

5.5.229 Motion Instruction (MTOBC)

Motion instruction **MTOBC** **S**

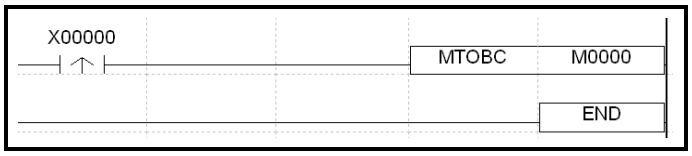
Applicable model

LP-S070,

LP-A070, LP-A104

OP	DATA type	Available device / Description / Range	Error	Zero	Carry	Borrow	Step
S	WORD	X, M, D, Z, UW, integer					
		Channel(Ch1, Ch2)					
		1 to 2	◎				5

<Ladder>

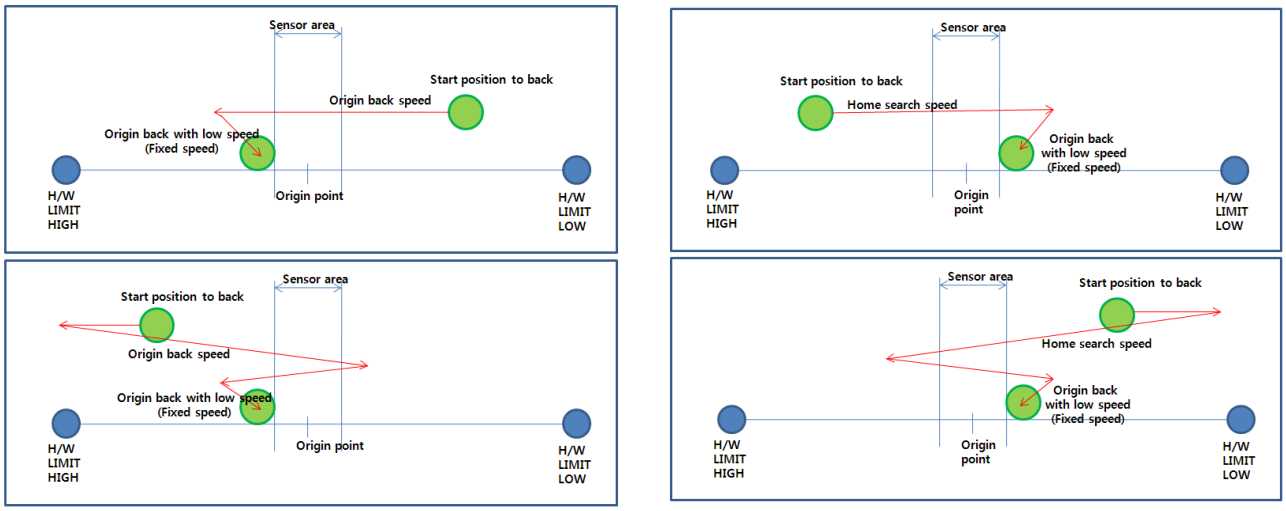


Origin back instruction: During motion position drive, if you want to return to origin, it goes back to the preset origin point.

LP-S070 has two methods for returning the origin.

- H/W origin back: It is the origin back method by home search direction, upper/lower H/W limit, and home sensing which are set in AtLogic.
- S/W origin back: It is the origin back method to move directly to the known origin by S/W.

[Origin back type by home search direction during H/W origin back]



Origin position is defined by set value from atLogic.

※ For more information, refer to Motion of AtLogic user manual.

5.5.230 Motion Instruction (MTOVV)

Motion instruction **MTOVV** **S** **S1**

Applicable model

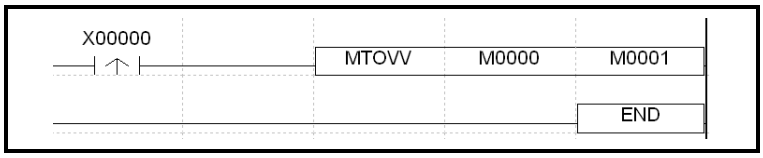
LP-S070,

LP-A070, LP-A104

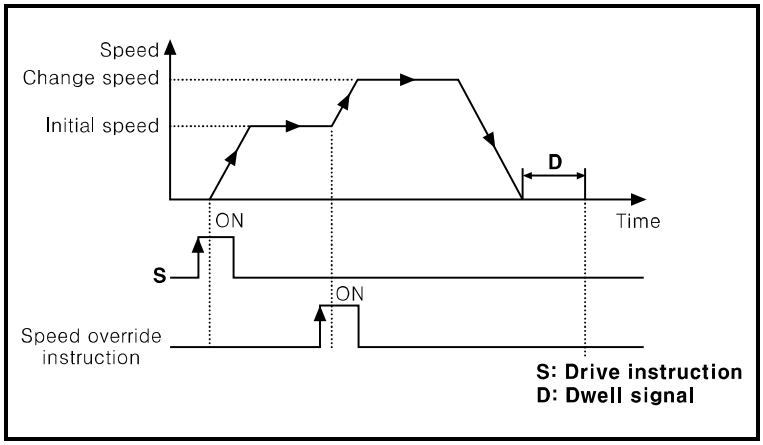
OP	DATA type	Available device / Description / Range
S	WORD	X, M, D, Z, UW, integer
		Channel(Ch1, Ch2)
		1 to 2
S1	DWORD	X, M, D, Z, UW, integer
		Drive speed
		0 to 100kpps

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



Speed override: It converts the currently operating speed set (unit set) to the other speed and operates with the converted speed.



1. Operating speed ≫ Changed speed: It converts to changed speed and operates with the changed speed.
2. Operating speed ≦ Changed speed: It converts to changed speed and operates with the changed speed.
3. Changed speed ＜ Initial speed: When changing speed to the slower than initial speed, it operates constant speed drive without accel/deceleration.

[Note]
1. If the currently not operated channel is executed this instruction, position/speed override change error occurs.
2. If the currently operated channel is executed the other instruction, enable channel error occurs.
3. Be sure that rapid speed changing may cause the pullout of motor.

※ For more information, refer to Motion of AtLogic user manual.

5.5.231 Motion Instruction (MTOVP)

Motion instruction **MTOVP** **S** **S1**

Applicable model

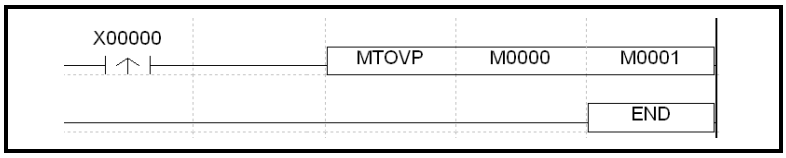
LP-S070,

LP-A070, LP-A104

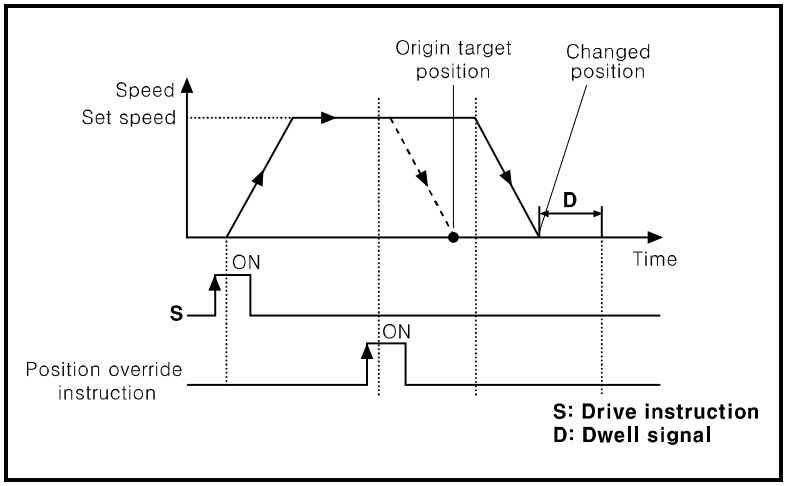
OP	DATA type	Available device / Description / Range
S	WORD	X, M, D, Z, UW, integer
		Channel(Ch1, Ch2)
		1 to 2
S1	WORD	X, M, D, Z, UW, integer
		Changed position
		-2147483647 to 2147483647

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



Position override: It changes the set target position to the designated position by the instruction.



1. Current position ≥ Changed position: It stops with deceleration.
2. Current position << Changed position: It stops with deceleration at the changed position.

[Note]

1. If the currently not operated channel is executed this instruction, position/speed override change error occurs.
2. If the currently operated channel is executed the other instruction, enable channel error occurs.

※ For more information, refer to Motion of AtLogic user manual.

5.5.232 Motion Instruction (MTIPT)

Motion instruction MTIPT S S1 S4 S4

Applicable model

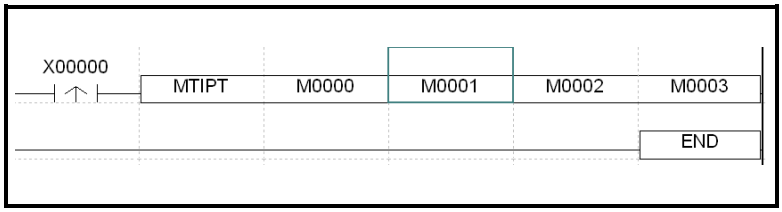
LP-S070,

LP-A070, LP-A104

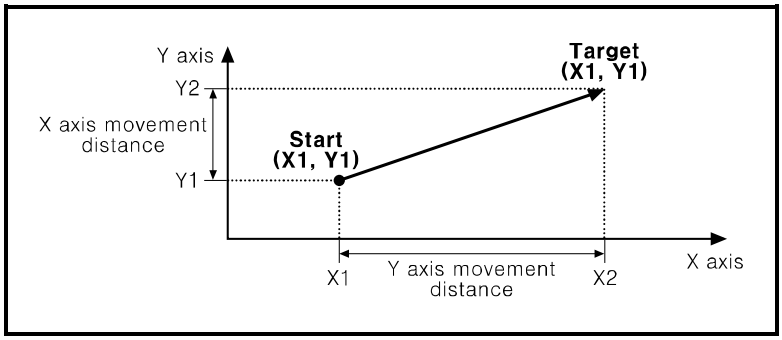
OP	DATA type	Available device / Description / Range
S	WORD	Integer
		Channel number of the first axis(Ch1, Ch2)
		1 to 2
S1	WORD	X, M, D, Z, UW, integer
		Action number of the first axis(it is not pattern number)
		0 to 65535
S3	WORD	Integer
		Channel number of the second axis (Ch0, Ch1)
		1 to 2
S4	WORD	X, M, D, Z, UW, integer
		Action number of the second axis(it is not pattern number)
		0 to 65535

Error	Zero	Carry	Borrow	Step
◎				7

<Ladder>



Line interpolation instruction: It executes line interpolation drive with two axes.



[Note]

1. The action list designated as speed drive is not available as the axis between line interpolations.
2. The axis, which is more distance than the other, is set as main axis.
3. Drive data of sub axis is decided by the calculating from the drive data of main axis.
4. If each distance of two axes is same, CH1 becomes main axis.

※ For more information, refer to Motion of AtLogic user manual.

5.5.233 Motion Instruction (MTUAI)

Motion instruction **MTUAI** **S** **S1**

Applicable model

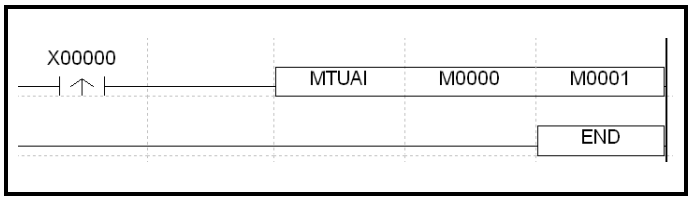
LP-S070,

LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	X, M, D, Z, UW, integer
		Channel(Ch1, Ch2)
		1 to 2
S1	WORD	X, M, D, Z, UW, integer
		Step number
		1 to 99

Error	Zero	Carry	Borrow	Step
◎				5

<Ladder>



Action item drive instruction

: It operates one action of motion referring the number of action item.

[Note]

1. For utilize indirect drive instruction, set 'TRUE' at 'Enable Ch' of common configuration from [Parameter]-[MOTION]tab in AtLogic.
2. There should be pattern number to execute of pattern list from [Parameter]-[MOTION] tab in AtLogic.
3. If the currently operated channel is executed the other instruction, enable channel error occurs.

※ For more information, refer to Motion of AtLogic user manual.

5.5.234 High speed counter Instruction (HSCNT)

High speed counter instruction	HSCNT	S	S1	S2	D	S3

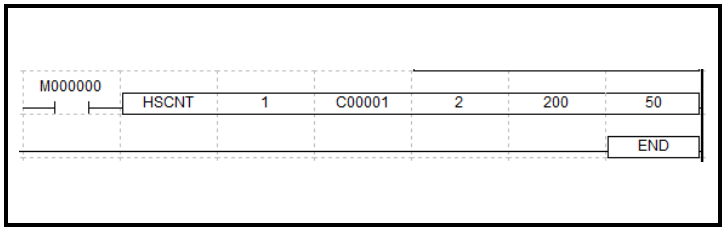
Applicable model

LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	Integer
		Channel(Ch1, Ch2)
		1 to 2
S1	WORD	C, UW
		Counter contact to use
		0 to 65535
S2	WORD	Integer
		High speed counter match value for triggering interrupt (parameter setting)
		1 to 3
D	BIT or CONST	M, D, F, Z, T, Y, C, L, S, UB, 200, 100, 0
		Output device or interrupt option for the current counting value which is counted up to the match value (200: up counting→down counting, 100: down counting→up counting, 0: no output)
		None
S3	WORD	Integer
		Output device ON hold time
		1 to 10000(us), 0: output continues

Error	Zero	Carry	Borrow	Step
◎				7

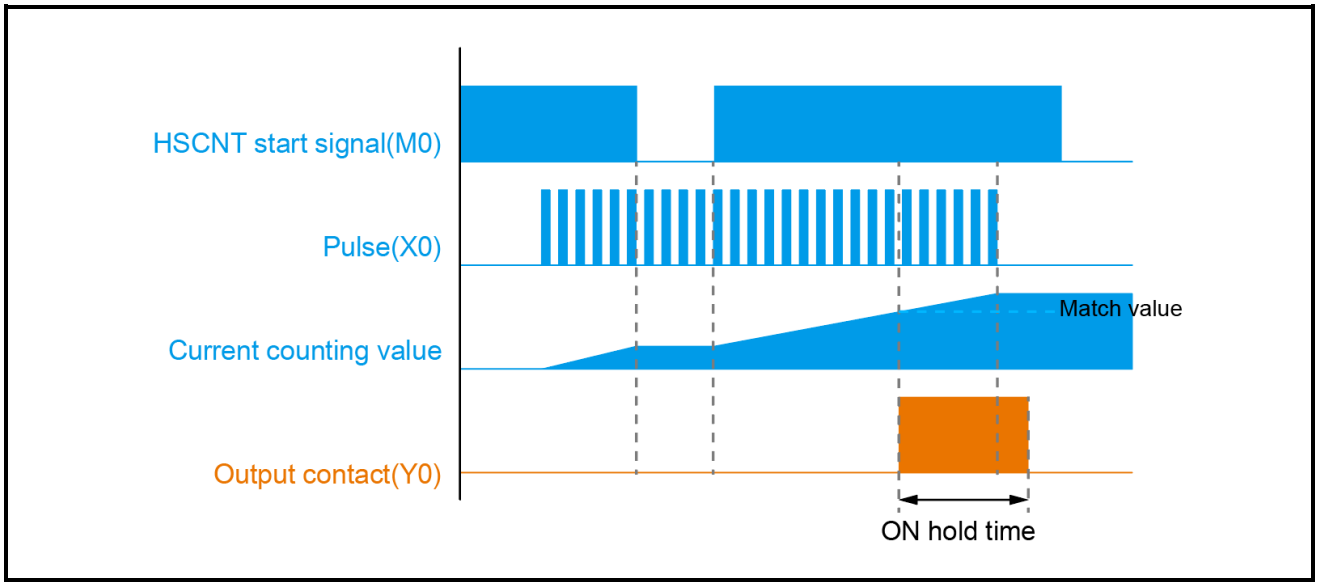
<Ladder>



High speed counting instruction: While the start signal (M0) is ON, when the high-speed input signal is applied to the input channel (S), word device value of the counter contact (S1) counts by 1. When the device value is counted up to the match value (S2), interrupt is triggered or output bit device is ON during set ON hold time (S3).

※ In case of making output pulse through the S3 parameter value, set S3 over 60us

<Time chart>



※ For more information, refer to High-speed counter of AtLogic user manual.

5.5.235 High speed counter Instruction (HSSET)

High speed counter instruction **HSSET** **S** **S1** **S2**

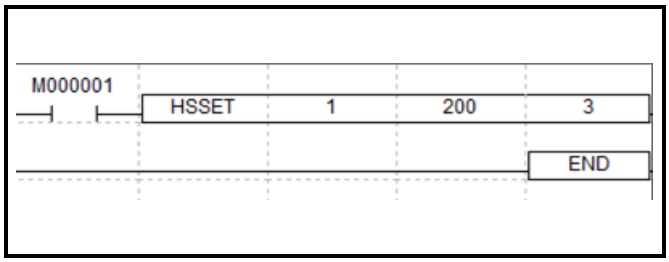
Applicable model

LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	Integer
		Channel(Ch1, Ch2)
		1 to 2
S1	DWORD	Integer
		High speed counter setting value (The value which is set as current counter value at the occurrence of interrupt)
		0 to 16777215
S2	WORD	Integer
		High speed counter match value for triggering interrupt (parameter setting)
		1 to 2

Error	Zero	Carry	Borrow	Step
◎				7

<Ladder>

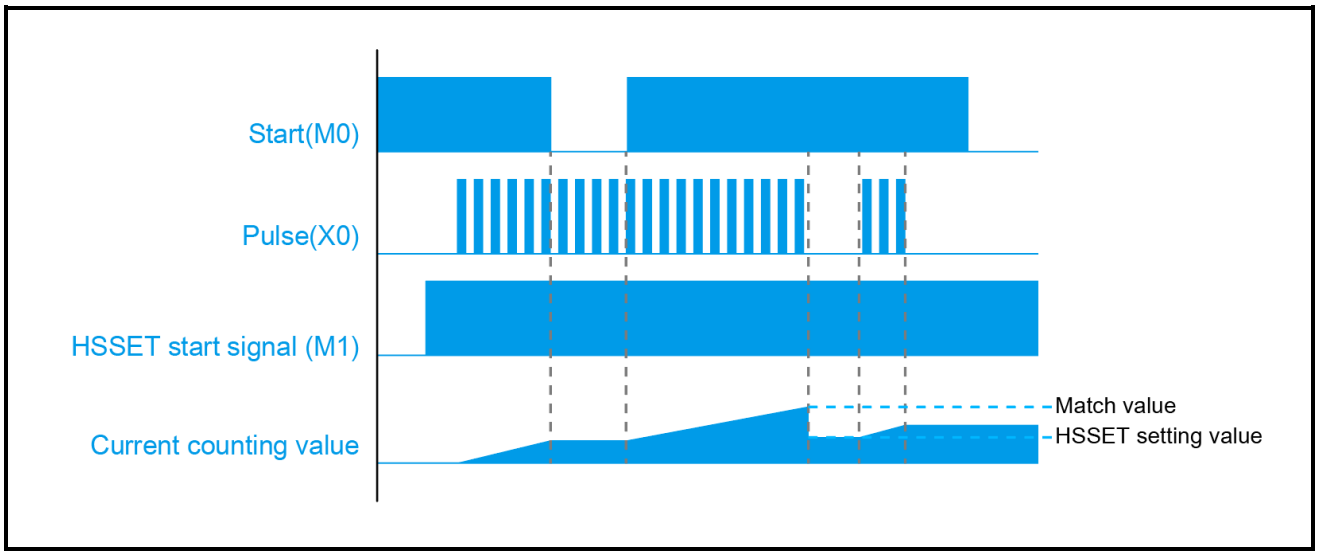


High speed counter set instruction: While the start signal (M1) is ON, The current counting value is counted up to the match value (S2), the current counting value is set to the high speed counter setting value (S1)

Use with HSCNT instruction.

※Only activates when the start signal is ON.

<Time chart>



※ For more information, refer to High-speed counter of AtLogic user manual.

5.5.236 High-speed Counter Instruction (HSRST)

High speed counter instruction **HSRST** **S** **S1**

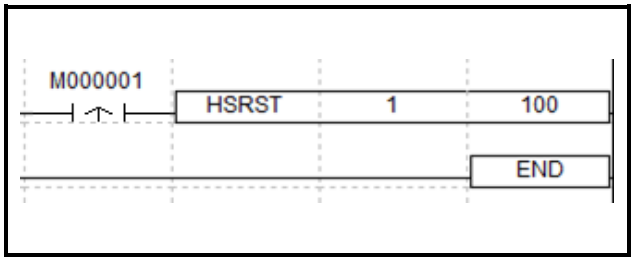
Applicable model

LP-A070, LP-A104

OP	DATA type	Available device / Description / Range
S	WORD	Integer
		Channel(Ch1, Ch2)
		1 to 2
S1	DWORD	Integer
		High-speed counter setting value (The value which is set as current counter value when the device M0 is turned ON in a scan time.)
		0 to 16777215

Error	Zero	Carry	Borrow	Step
◎				7

<Ladder>

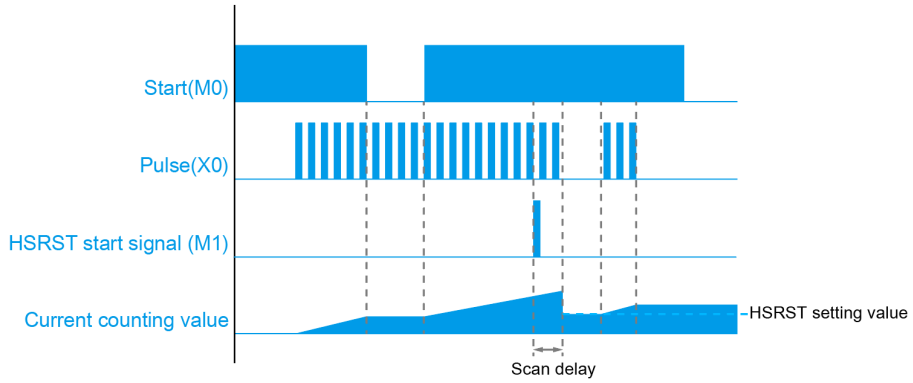


High speed counter reset instruction: When the HSRST start signal (M1) is ON in a PLC program scan, the current counting value is set to designated setting value (S1).

Use with HSCNT instruction.

※There can be scan delay for setting.

<Time chart>



※ For more information, refer to High-speed counter of AtLogic user manual.

6 Appendix

6.1 Error Code and Troubleshooting

(1) Self-diagnosis error code

- LP-S044/LP-S070: UW6540(F0140)
- LP-A070/LP-A104: UW74540(F140)

	Type	Cause of error
0X0010	Watchdog error	Scan time excesses watchdog timer setting value
0X0020	Memory error	When a certain area of memory is the un-approached state.
0x0021	Battery error	When battery value is below the standard level
0x0022	RTC setting error	Disable to set RTC and RTC operation error
0X0030	Program instruction error	When the program contains instructions that are not able to read and inappropriate forms.
0X0031	Program sequence error	When there is not the instructions required to process the program, such as user defined functions, label name, END, RET and IRET, etc.
0X0040	Parameter setting error	When there are some problems in settings for common and expansion parameters.
0X0041	Time-driven error	When it operates longer than the given time-driven run-time.
0X0050	Extended module setting error	In case, the hardware constructions are different from previous parameter settings when applying power again and changing the mode.
0X0051	Extended module attaching and removing error	When the extended module is attached or removed in run mode.
0x0060	Communication fail error	When it is received NAK and data format not able to read.
0x0061	Communication format error	When there are some problems occurred in formats (excess of limited range etc.) and CHECK SUM while download and upload.

(2) Motion error code

- LP-S044/LP-S070: UW6420(F20),UW6421(F21)
- LP-A070/LP-A104: UW74420(F20), UW74421(F21)

	Symptom	Run state	Troubleshooting
1	When inputting other starting instruction signal during using channel	Run	Clear the error by MTMEC(removing error) instruction and executes next start instruction
2	When giving progress instruction to other direction than current progressing direction during consecutive running 'C'	Stop	Edit the pattern list, which has problem. Clear the error by MTMEC(removing error) instruction and executes motion operation
3	When setting position preset during running	Run	Clear the error by MTMEC(removing error) instruction
4	When there is no action list to operate during executing pattern action	Stop	Edit the action list, which has problem. Clear the error by MTMEC(removing error) instruction
5	When action list type is position drive during executing pattern action and destination position is out of S/W limit range	Stop	Check and edit action list and S/W limit value, which have problem. Clear the error by MTMEC(removing error) instruction
10	Excess high low limit error	Stop	Clear the error by MTMEC(removing error) instruction and escape limit with jog operation and execute the next
20	When speed parameter value is higher than maximum speed (100,000PPS) Designated pattern number of MTIDM(Indirect designated drive) instruction is out of 1 to 99	Stop	Clear the error by MTMEC(removing error) instruction and check the set parameter values

※1. Be sure that errors related with motion are remained even if restarting LP.

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* Dimensions or specifications on this manual are subject to change and some models may be discontinued without notice.

MWL-ALV2P1-V1.1-1907US