

XPM(XGF-PD(O)1/2/3/4H)

1. CAM Control

2012. 08. 08

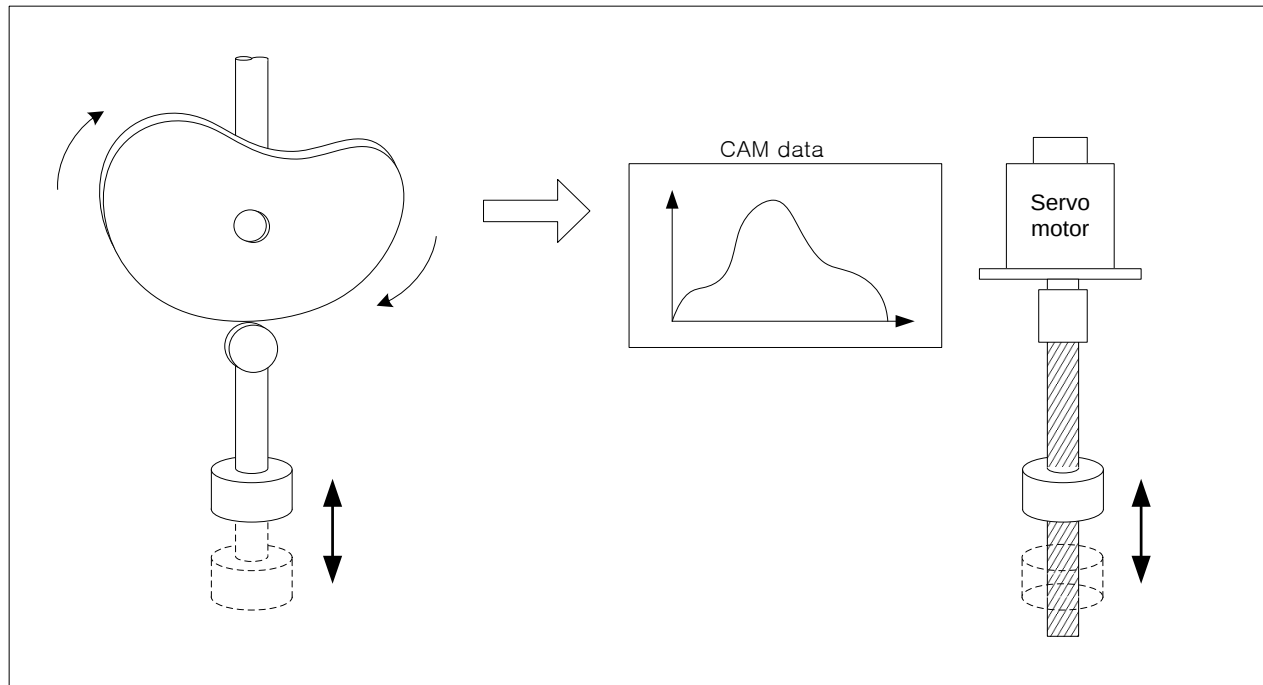
LSIS

1. CAM Operation

This is the command that convert mechanical work to CAM data displayed with CAM curve and then execute CAM axis control synchronizing with the position of main motor.

(1) Characteristics of Control

- Replace existing mechanical work of CAM with software CAM operation



- Up to 9 CAM data blocks and apply it to each axis.
- No.1 ~ 8 CAM(Standard) block consists of 2048 CAM data, No.9 CAM(User) block consist of 30 CAM data

(2) CAM Data

Select CAM block ①

CAM block No. 1

CAM control mode setting ③

Control type ☒ Repeat(Two-way mode) ☐ Increase(Feed mode)

Point unit ④ 100.0

Main/Sub. axis parameter setting ②

	Main Axis	Sub. Axis
Unit	1: mm	1: mm
Travel distance per rot.	50000.0 um	10000.0 um
Pulses per rotation	655360 pls	131072 pls

*pulse: [Pulses per rotation] value is the maximum end position of the Main/Sub axis
 *mm/inch : [Travel distance per rot.] value is the maximum end position of the Main/Sub axis
 *degree : 360.00000 is the maximum end position of the Main axis

CAM block data setting ⑤

	Main Ax. start pos.	Main Ax. end pos.	Sub. Ax. start pos.	Sub. Ax. end pos.	CAM curve
1	0,0	10000,0	0,0	2000,0	Straight Line
2	10000,0	20000,0	2000,0	2000,0	Straight Line
3	20000,0	40000,0	2000,0	8000,0	Straight Line
4	40000,0	50000,0	8000,0	0,0	Straight Line
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					

⑥

Characteristic Curve Setup complete

(2) CAM Data

① CAM block data number

- Up to 8 Independent CAM parameter can be registered (1 ~ 8)

② Main/Sub parameter setting

• Unit

Set the control unit of main/sub axis. (This CAM control unit must be same to the unit set in “basic parameter”)

Item	Unit	Remarks
Unit of main axis	pulse, mm, inch, degree	-
Unit of sub axis	pulse, mm, inch	Degree may not be used.

• Transfer distance per 1 rotation

Set the transfer distance per 1 rotation of main/sub axis. If the unit is “mm” or “inch”, this value is the maximum last position of main/sub axis.

• Setting range for transfer distance per 1rotation

Unit	Setting Range	Remarks
pulse	-	No need to set
mm	0.1 ~ 20000000.0 um	The maximum last position of main/sub axis
inch	0.00001 ~ 2000.00000 inch	The maximum last position of main/sub axis
degree	360.00000 degree (Fixation)	No need to set The maximum last position of main/sub axis

• Pulse per rotation

Set the no. of pulse per a rotation of main/sub axis.

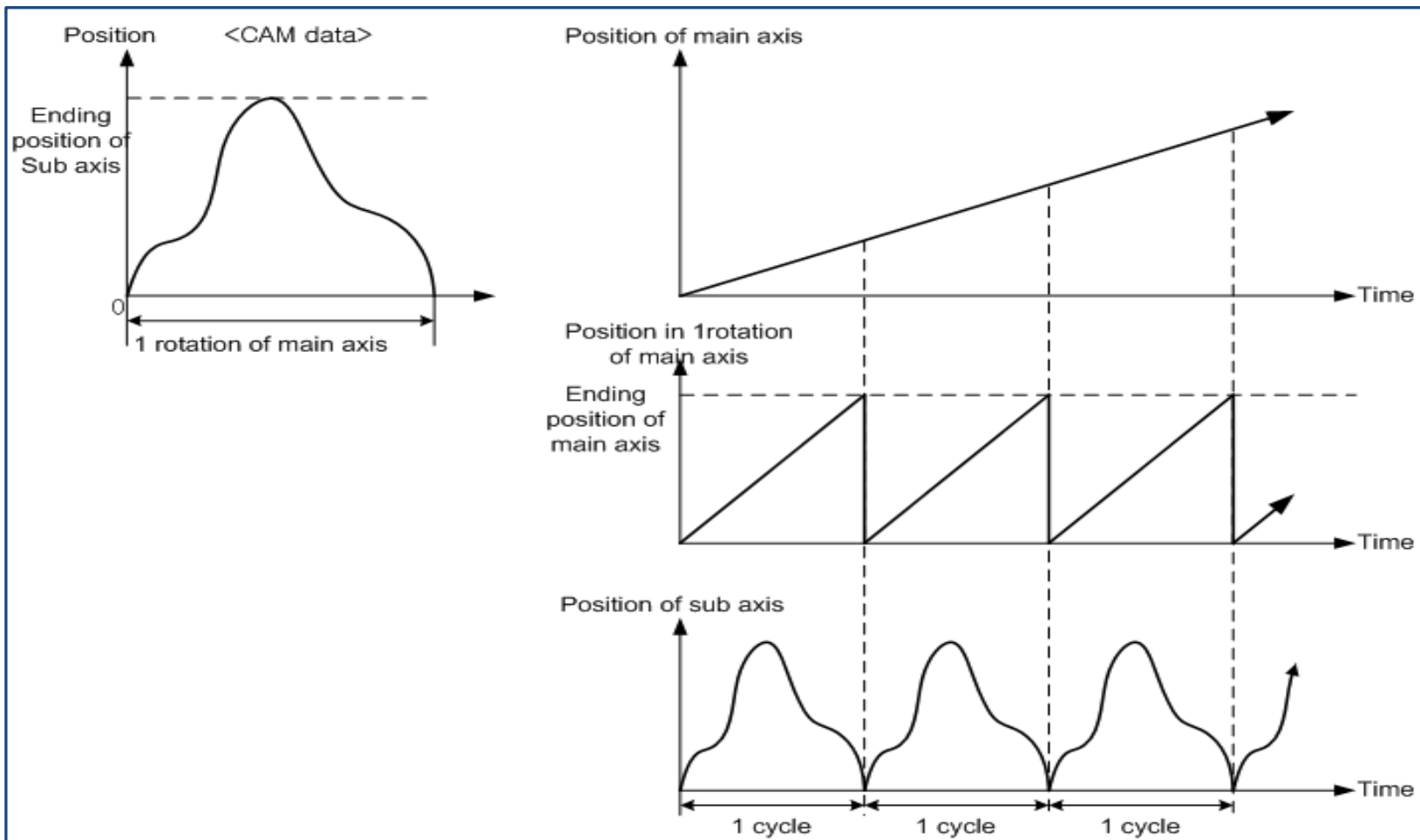
If the unit is “Pulse” then the value is the maximum last position of main/sub axis.

③ CAM control mode setting

▪ Repeat (Two-way mode)

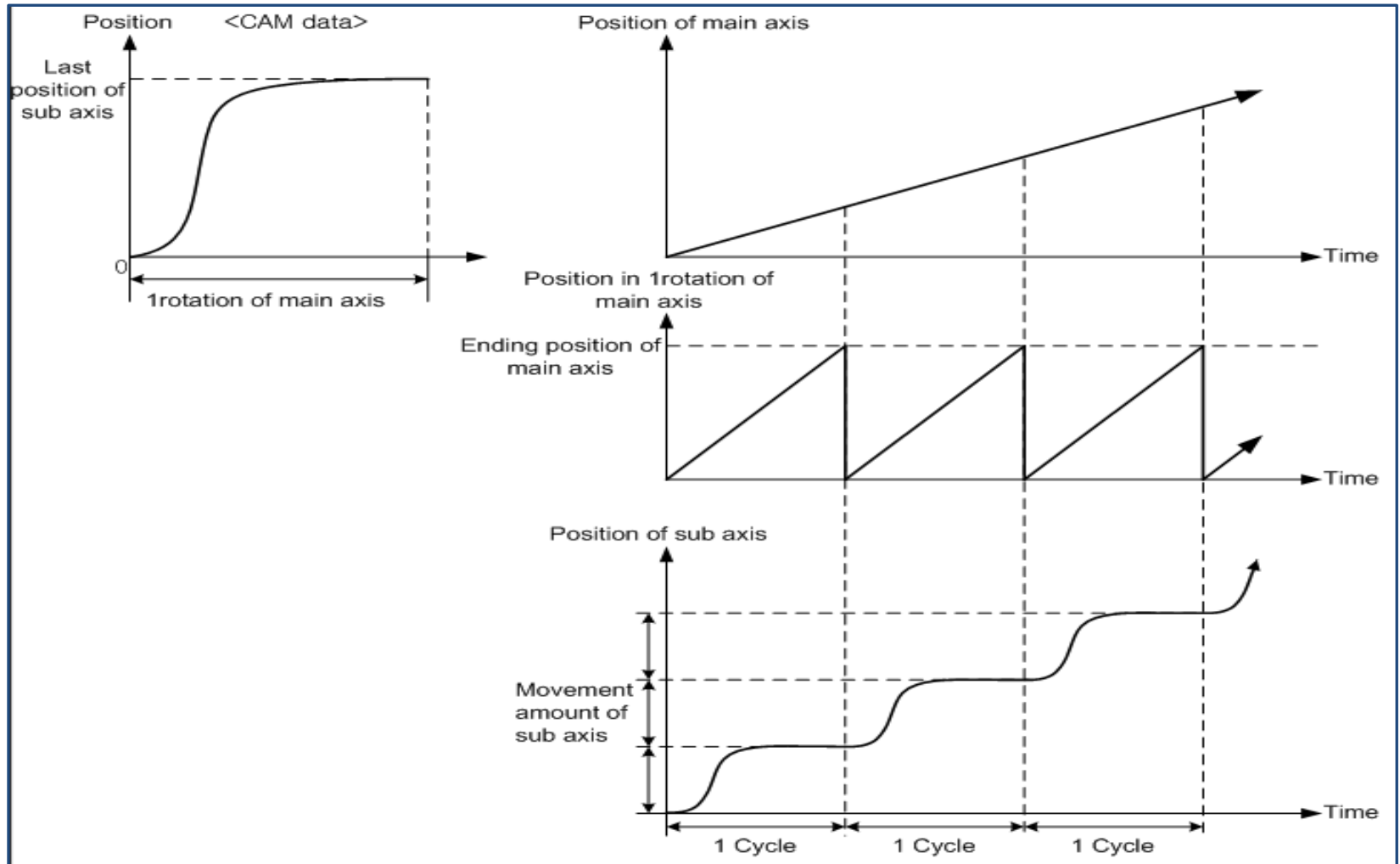
Execute round-trip motion repeatedly in the range already set from starting position of sub axis to ending position according to the position of main axis in 1 rotation.

When CAM data is created in repeat, the ending position of the last step of sub axis must be set as 0.



- Increase (Feed mode)

Execute CAM operation from starting position of sub axis to ending position according to the position in 1 rotation of main axis.

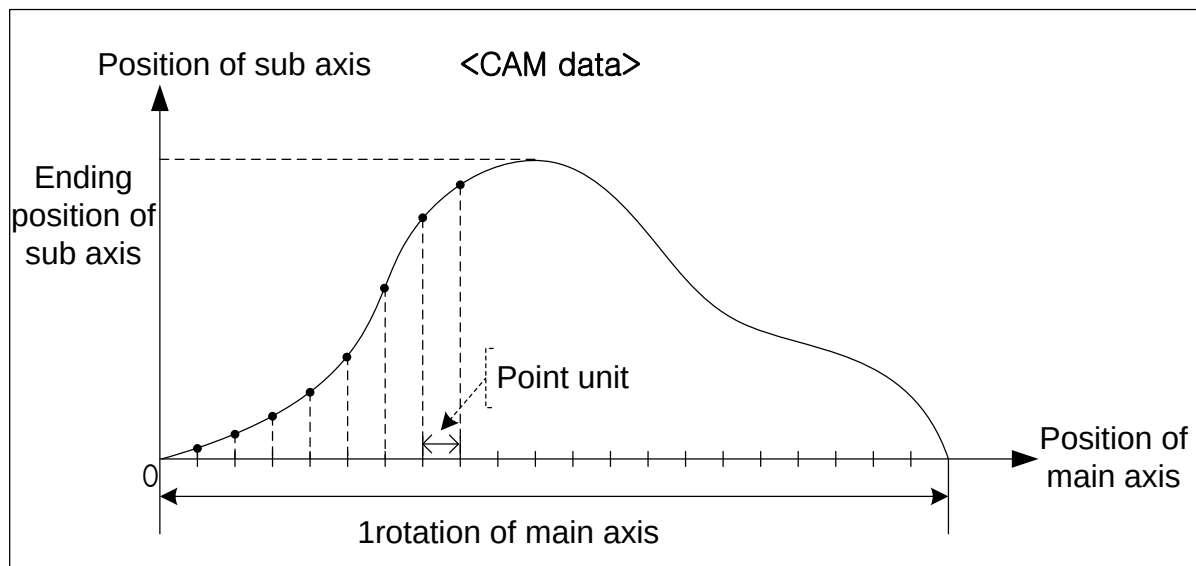


④ Point unit

Set the range resolution from starting position of main axis to ending position of main axis on each step data of CAM block data setting.

When CAM data is created, calculate the position of sub axis corresponding to the position from the starting position of main axis by point unit.

The smaller point unit is, the more no. of CAM data is created, so you may execute much smoother CAM operation. However, if point unit is too small, no. of CAM data exceeds 2048, so user can not create CAM data.



⑤ CAM block data setting

20 data sections may be set in a CAM block and every section may have specific curve.

- **Starting position of main axis**

Set the starting position of main axis in designated section.

Starting position of main axis is the same as the ending position of main axis in previous section.

- **Ending position of main axis**

Set ending position of main axis in designated section.

The ending position of main axis in the last section must be set as much as "the transfer distance per 1rotation" set on "main/sub axis parameter setting".

- **Starting position of sub axis**

Set the starting position of sub axis corresponding to the starting position of main axis in the designated section

Start position of sub axis is the same as the ending position of sub axis in previous section.

- **Ending position of sub axis**

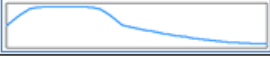
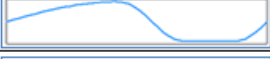
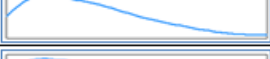
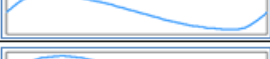
Set ending position of sub axis corresponding to the ending position of main axis in the designated section.

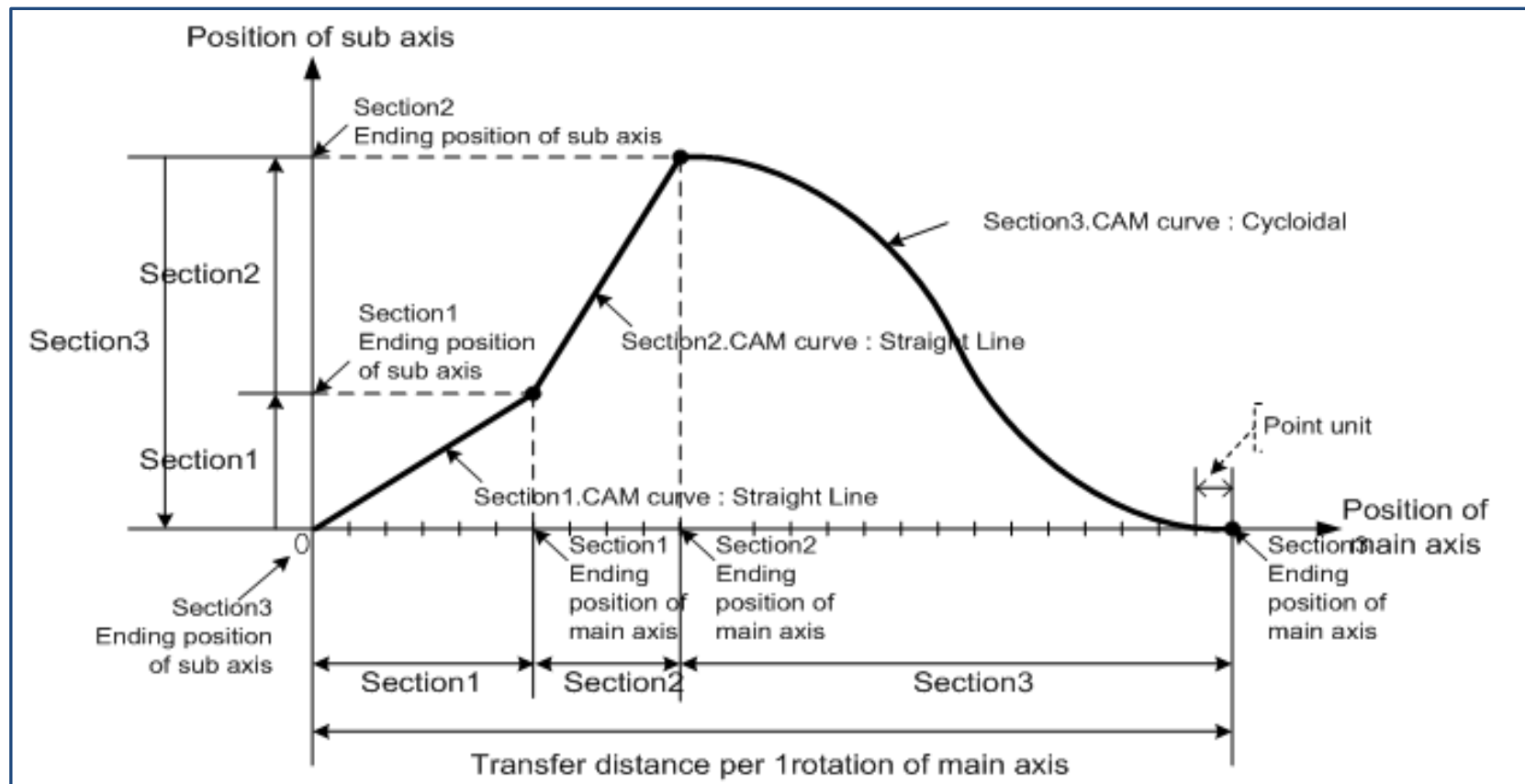
If control method is "Repeat (Two-way mode)", the ending position of sub axis in the last section must be 0.

If control method is "Increase(Feed mode)", the ending position of sub axis in the last section generally has to be set as much as the transfer distance per 1rotation set on "main/sub axis parameter setting".

⑥ Characteristic of CAM curve

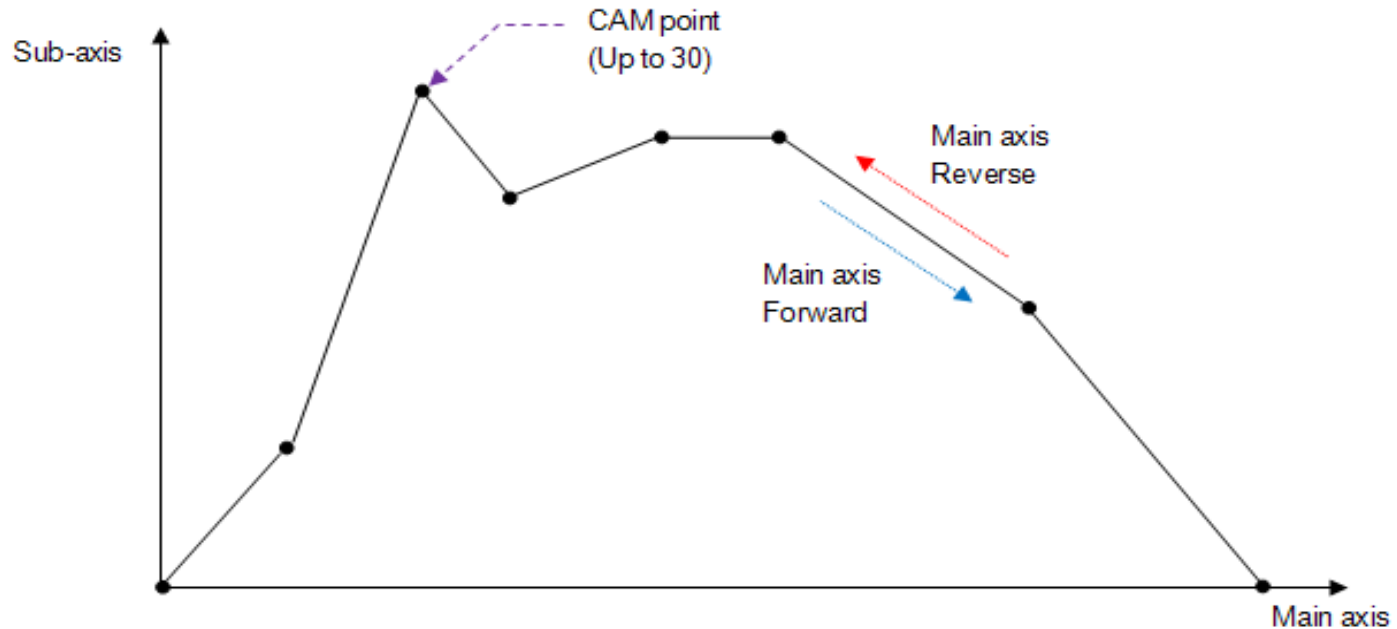
Name	Acc. type	Position ($S_{\max}$)	Speed ($V_{\max}$)	Acc. ($A_{\max}$)	Jerk ($J_{\max}$)
Straight Line		1.00000	0.00000	0.00000	0.00000
Constant Acceleration		1.00000	2.00000	4.00000	0.00000
Simple Harmonic		1.00000	1.57076	4.93409	2.46735
No-Dwell Simple Harmonic		1.00000	1.57076	4.93409	2.46735
Double Harmonic		1.00000	2.04047	5.55125	0.10285
Reverse Double Harmonic		1.00000	2.04048	9.86605	4.93455
No-Dwell Modified Constant Velocity		1.00000	1.22203	7.67383	3.83881
Modified Constant Velocity		1.00000	1.27526	8.00947	0.98712
No-Dwell Modified Trapezoid		1.00000	1.71788	4.19885	2.09942
One-Dwell Modified Trapezoid		1.00000	1.91589	4.43866	55.77788
Modified Trapezoid		1.00000	1.99975	4.88812	0.30562
Asymmetrical Modified Trapezoid		1.00000	1.99982	6.11015	0.47620
One-Dwell Cycloidal		1.00000	1.75953	5.52756	0.17345
Cycloidal		1.00000	1.99985	6.28273	0.19715

Name	Acc. type	Position ($S_{\max}$)	Speed ($V_{\max}$)	Acc. ($A_{\max}$)	Jerk ($J_{\max}$)
Asymmetrical Cycloidal		1.00000	1.99989	7.85304	0.30783
One-Dwell Trapezoid		1.00000	1.73636	4.91007	0.30699
Reverse Trapezoid		1.00000	2.18193	6.16975	0.38579
Trapezoid		1.00000	2.18193	6.17044	0.38579
One-Dwell Modified Sine		1.00000	1.65978	5.21368	0.32603
Modified Sine		1.00000	1.75953	5.52697	0.34562
5th Curve		1.00000	1.87500	5.77350	60.00000
7th Curve		1.00000	2.18750	7.51283	41.99646



(3) User CAM Operation

User CAM operation, like CAM operation, executes CAM axis control in which CAM data shown as CAM curve synchronize with position of the motor set as main-axis. The difference with standard CAM operation is that user doesn't set up CAM data in XG-PM but in PLC program (XG5000), and the number of user CAM data is up to 30.



- Like figure above, user can set up maximum 30 CAM data points, and it makes CAM curve between CAM points with straight line.
- CAM point data means the address of main-axis position and sub-axis position
- CAM data point can be saved at the specified memory address of each axis by using “XVWR” or “XPM_VWR” command.
 ※ To save it to flash memory then execute “XWRT”, “XPM_WRT” instruction after executing “XVWR” or “XPM_VWR”
- CAM data point can be read from the specified memory address of each axis by using “XVRD”, “GETM” or “XPM_VRD” command.

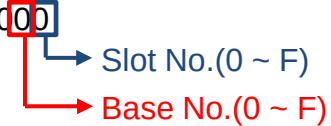
① USER CAM block data setting

Item	Axis1	Axis2	Axis3	Axis4
CAM data number	53330	53452	53574	53696
CAM data 1 of main axis	53332	53454	53576	53698
CAM data 1 of sub axis	53334	53456	53578	53700
CAM data 2 of main axis	53336	53458	53580	53702
CAM data 2 of sub axis	53338	53460	53582	53704
CAM data 3 of main axis	53340	53462	53584	53706
CAM data 3 of sub axis	53342	53464	53586	53708
CAM data 4 of main axis	53344	53466	53588	53710
CAM data 4 of sub axis	53346	53468	53590	53712
CAM data 5 of main axis	53348	53470	53592	53714
CAM data 5 of sub axis	53350	53472	53594	53716
⋮	⋮	⋮	⋮	⋮
CAM data 29 of main axis	53444	53566	53688	53810
CAM data 29 of sub axis	53446	53568	53690	53812
CAM data 30 of main axis	53448	53570	53692	53814
CAM data 30 of sub axis	53450	53572	53694	53816

② USER CAM block data setting

• Command (XGK)

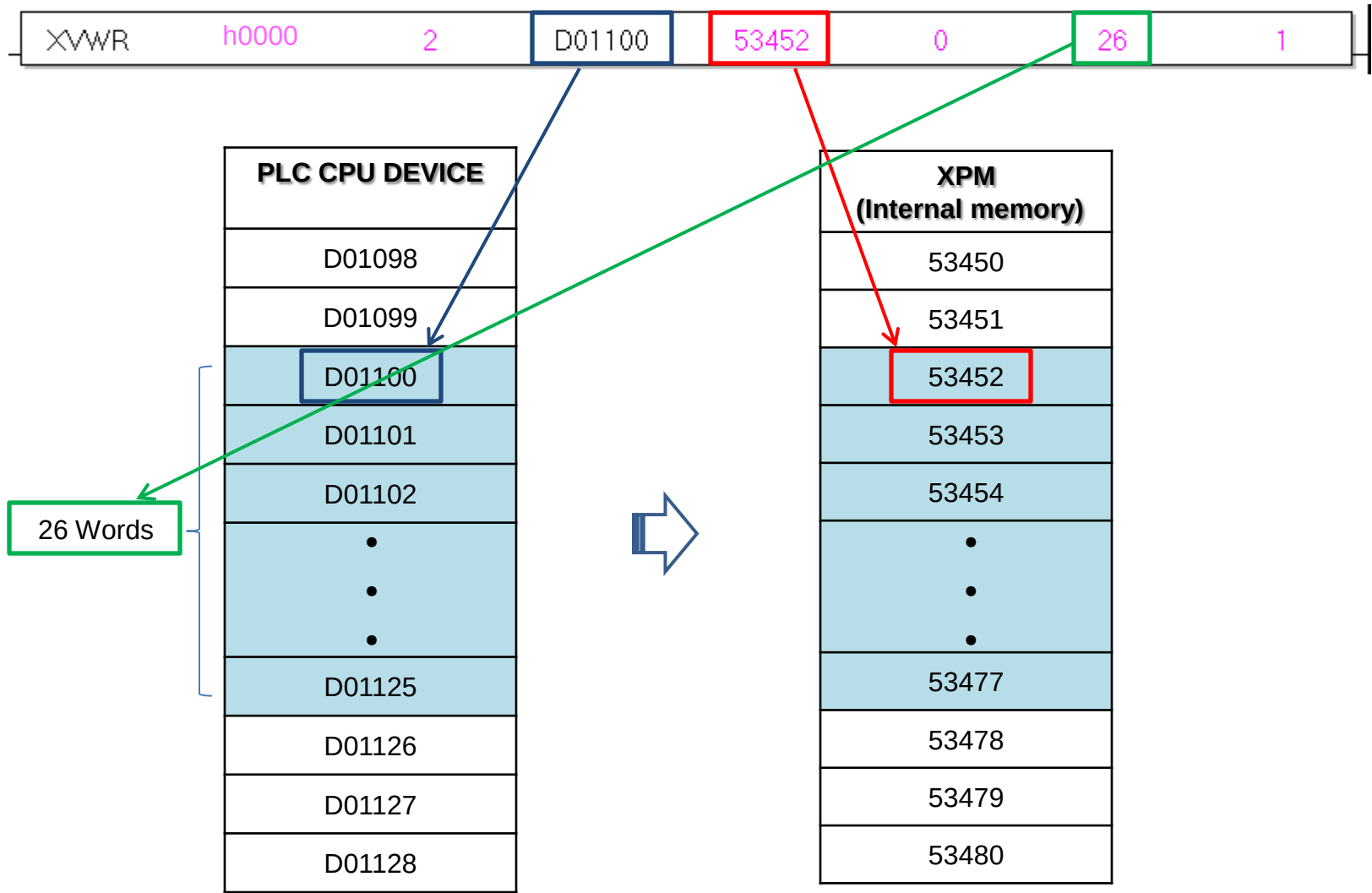
XVWR	h0000	2	D01100	53452	0	D00102	1
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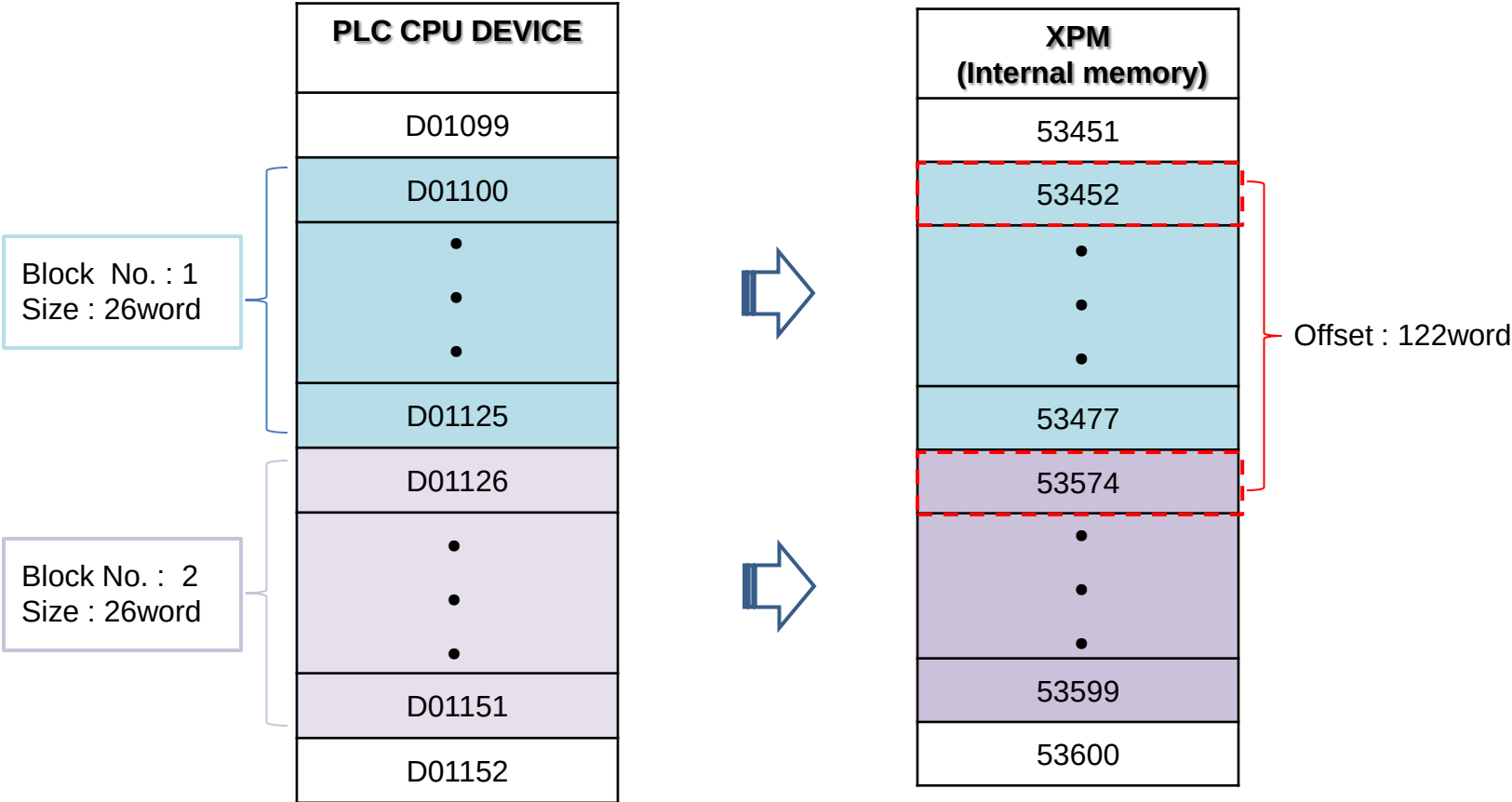
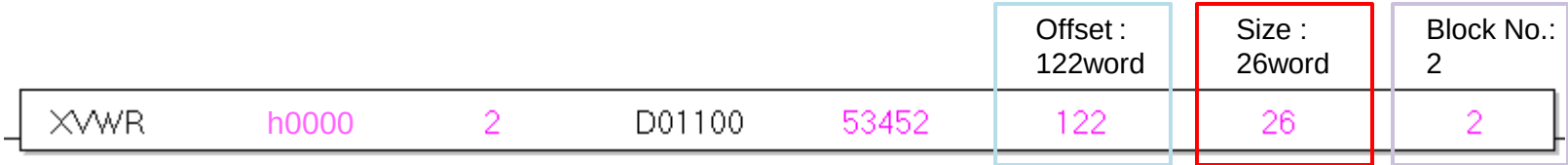
Command	XVWR				Write variable data
Operand	OP1	Slot	Constant	WORD	Base and slot number where positioning module is equipped Ex. H0000 
	OP2	Axis	PMLK,constant,D,Z,R,ZR	WORD	Axis to command (1 ~ 4 ; Axis 1~ Axis 4)
	OP3	Data device	PMLK,constant,D,Z,R,ZR	WORD	Head address where data to write is saved.
	OP4	Write address	PMLK,constant,D,Z,R,ZR	DWORD	Head address to write module internal memory data (0 ~ 54217)
	OP5	Block offset	PMLK,constant,D,Z,R,ZR	DWORD	Offset between blocks (0 ~ 54217)
	OP6	Block size	PMLK,constant,D,Z,R,ZR	WORD	Size of one block (1 ~ 128)
	OP7	No. of block	PMLK,constant,D,Z,R,ZR	WORD	No. of block to read (1 ~ 128)

※ Remark :

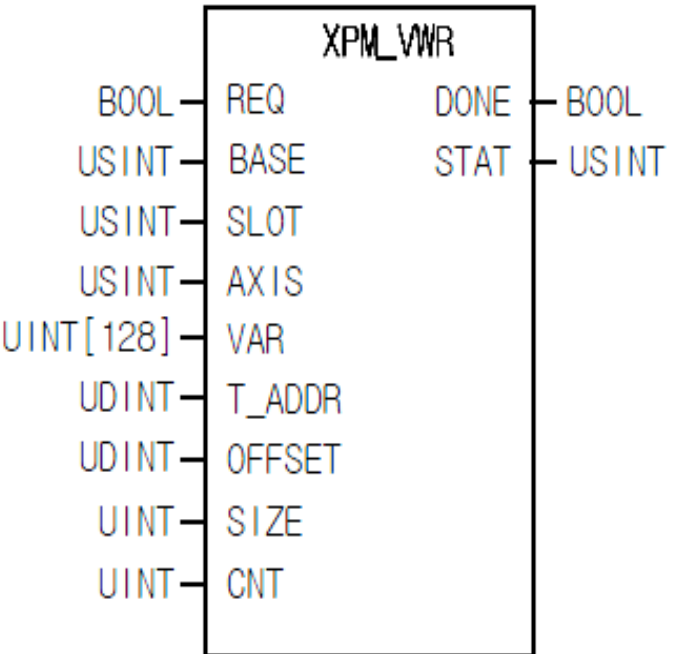
- “XVWR” Instruction transfer data from CPU device to the RAM memory of XPM module
- To save the RAM memory data into flash memory of XPM module then execute “ XWRT” instruction

• Usage(XGK)

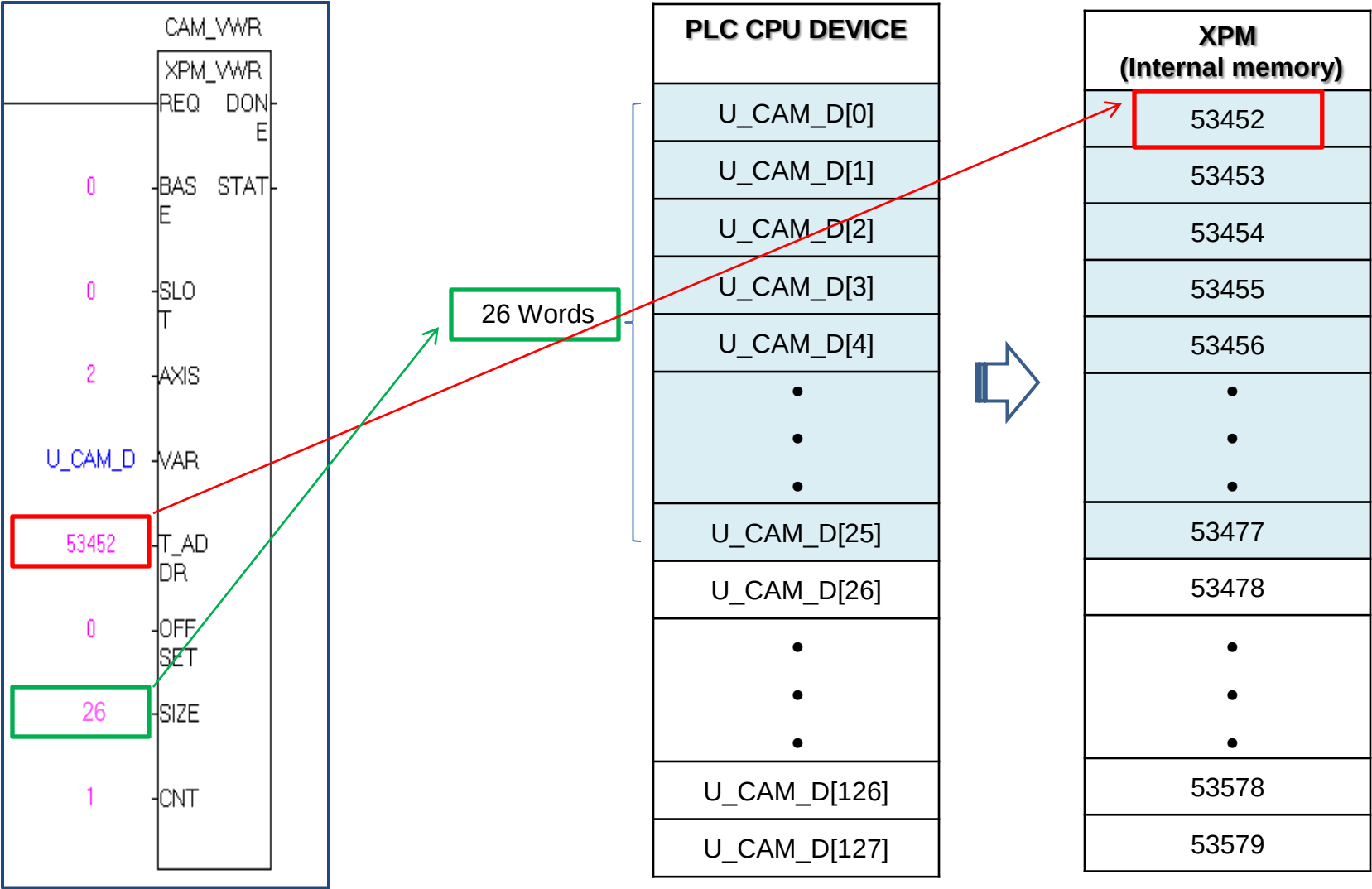


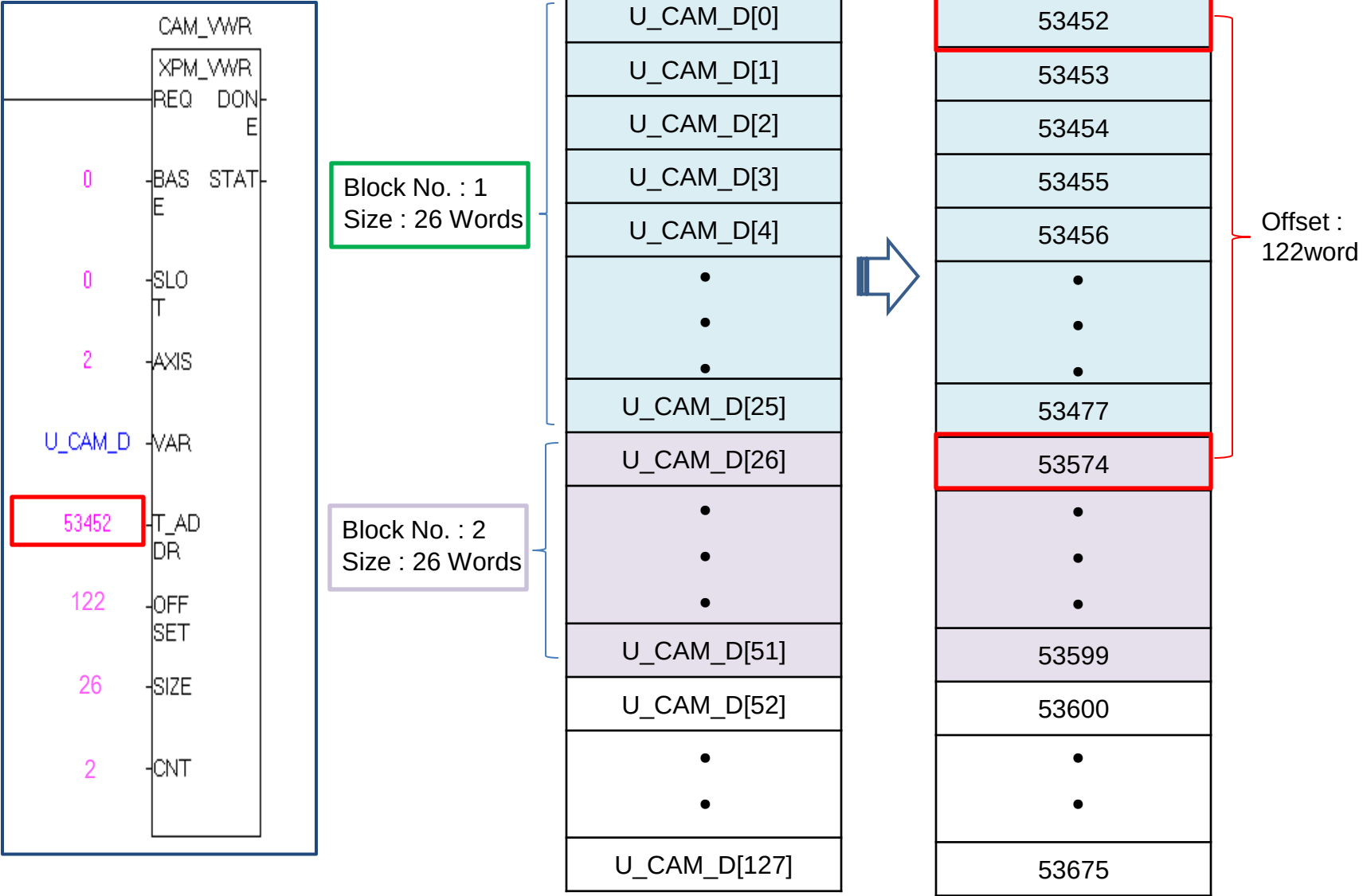


• Function Block(XGI)

Form of Function Block	Description
	Input REQ : Request for execution of function block BASE : Set the base no. with module SLOT : Set the slot no. with module AXIS : Axis to command (1~4 : Axis1 ~ Axis4) VAR : PLC device where Write Data is saved T_ADDR : Module internal memory head address where data is written (0 ~ 54217) OFFSET : Offset between Write data blocks (0 ~ 54217) SIZE : Size of block to write 1 ~ 128 CNT : No. of Write data block 1 ~ 128 Output DONE : Maintain 1 after first operation STAT : Output the error no. in operation

• Usage(XGI)





③ USER CAM block data reading

- Command (XGK)

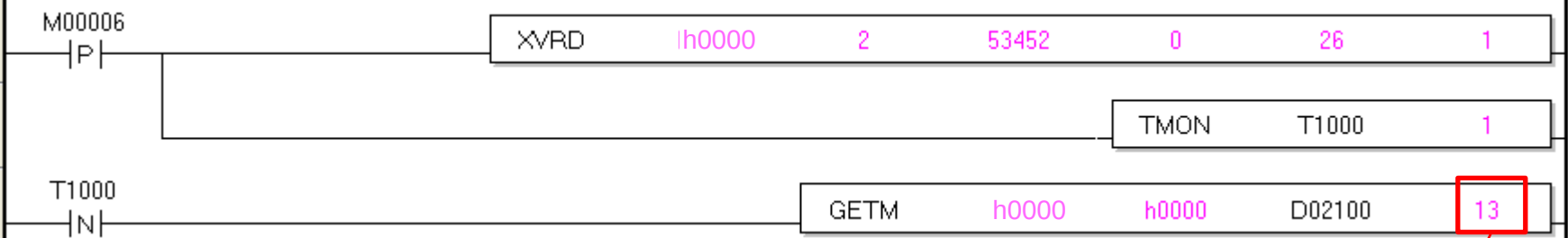
XVRD	h0000	2	53452	0	D00300	1
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Command	XVRD				Read variable data
Operand	OP1	Slot	Constant	WORD	Base and slot number where positioning module is equipped
	OP2	Axis	PMLK,constant,D,Z,R,ZR	WORD	Axis to command (1~4 : Axis1 ~ Axis4)
	OP3	Read address	PMLK,constant,D,Z,R,ZR	DWORD	Head address of data in module internal memory to read (0 ~ 54217)
	OP4	Block offset	PMLK,constant,D,Z,R,ZR	DWORD	Offset between blocks (0 ~ 54217)
	OP5	Block size	PMLK,constant,D,Z,R,ZR	WORD	Size of one block (1 ~ 128)
	OP6	No. of block	PMLK,constant,D,Z,R,ZR	WORD	No. of block to read (1 ~ 128)

GETM	h0000	h0000	D01250	20
------	-------	-------	--------	----

Command	GETM				Operation
Operand	OP1	Slot	Constant	WORD	Slot No. installed with positioning module
	OP2	Axis	Constant	WORD	Always "H0000"
	OP3	Save Device	PMLK,constant,D,Z,R,ZR	WORD	Save data read from XPM to PLC device
	OP4	Op. numbers	Constant	WORD	Read data numbers in double word

• Usage(XGK)



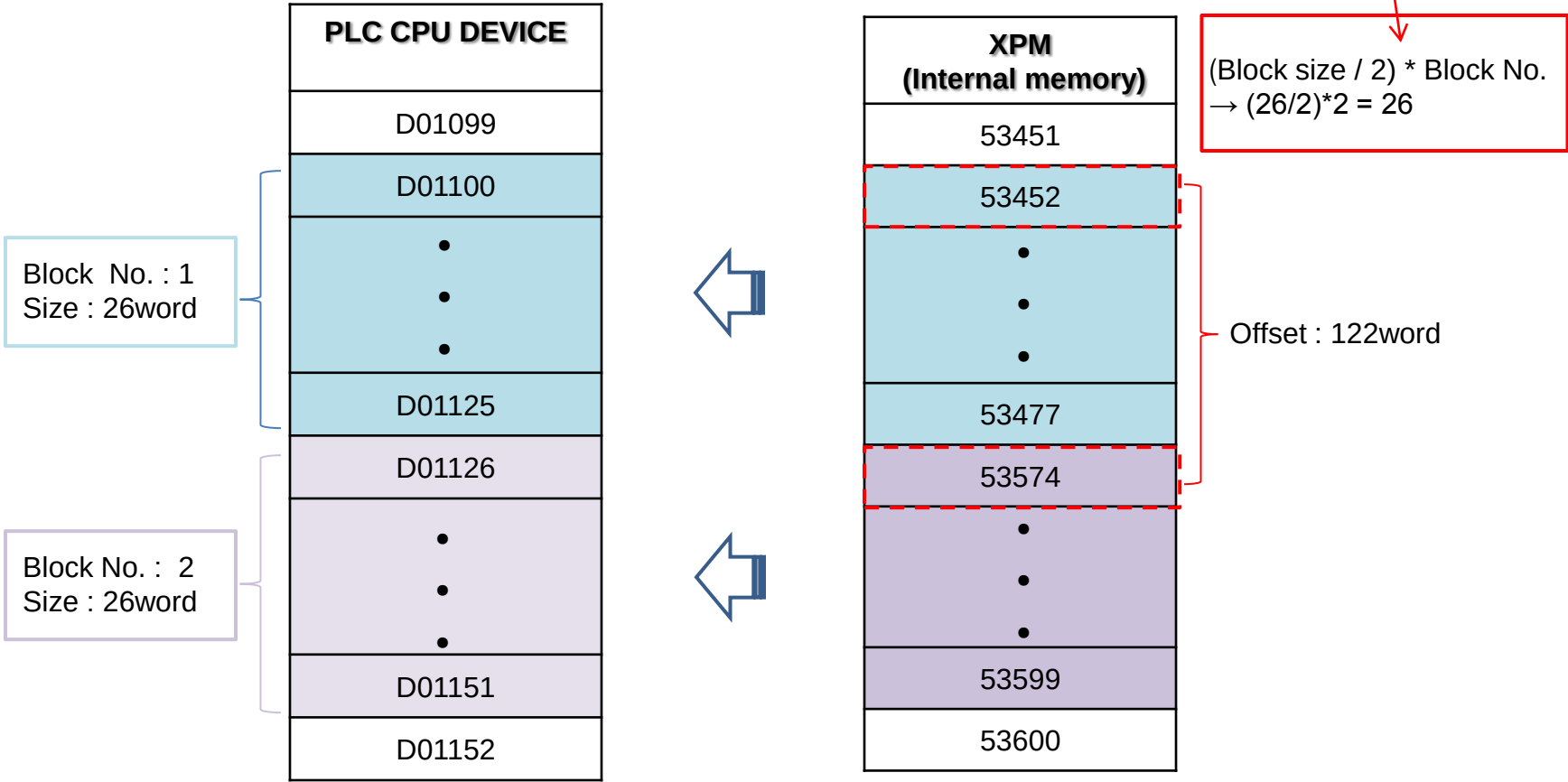
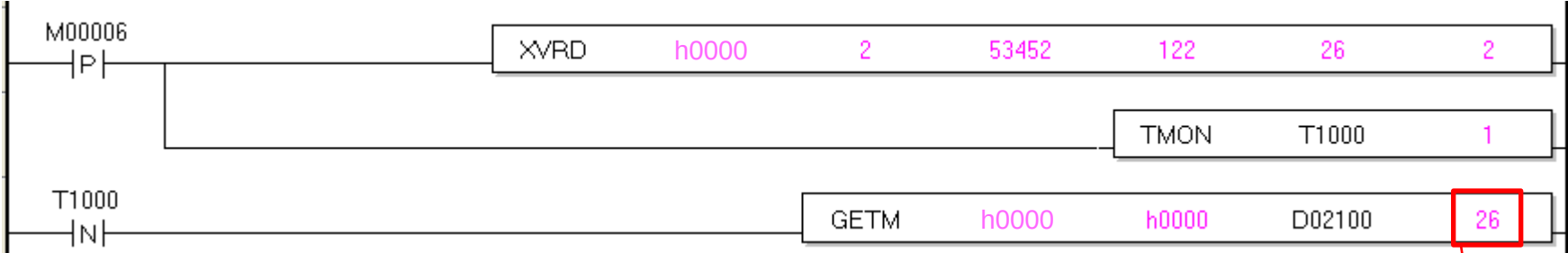
(Block size / 2) * Block No.
→ (26/2)*1 = 13

26 Words

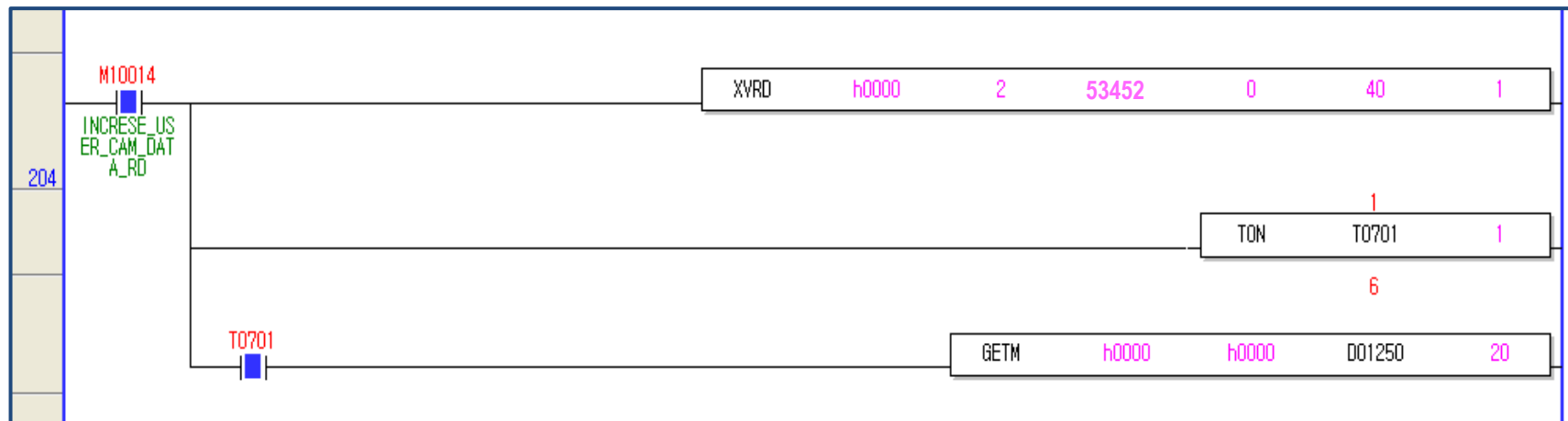
PLC CPU DEVICE
D01098
D01099
D01100
D01101
D01102
•
•
•
D01025
D01026
D01027
D01028



XPM (Internal memory)
53450
53451
53452
53453
53454
•
•
•
53477
53478
53479
53480

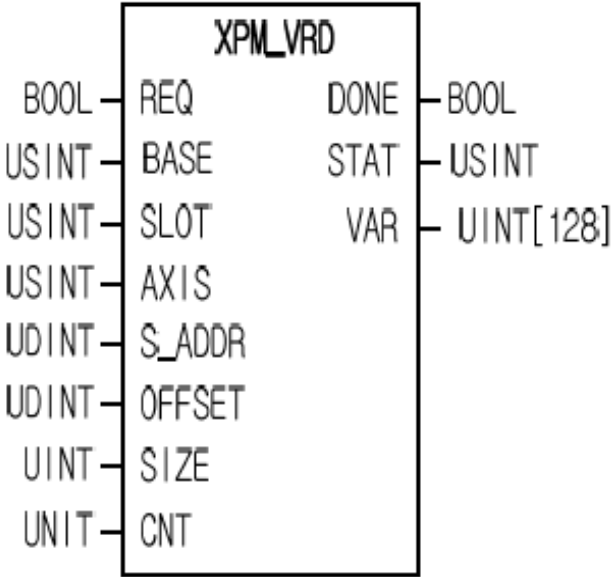


• Example

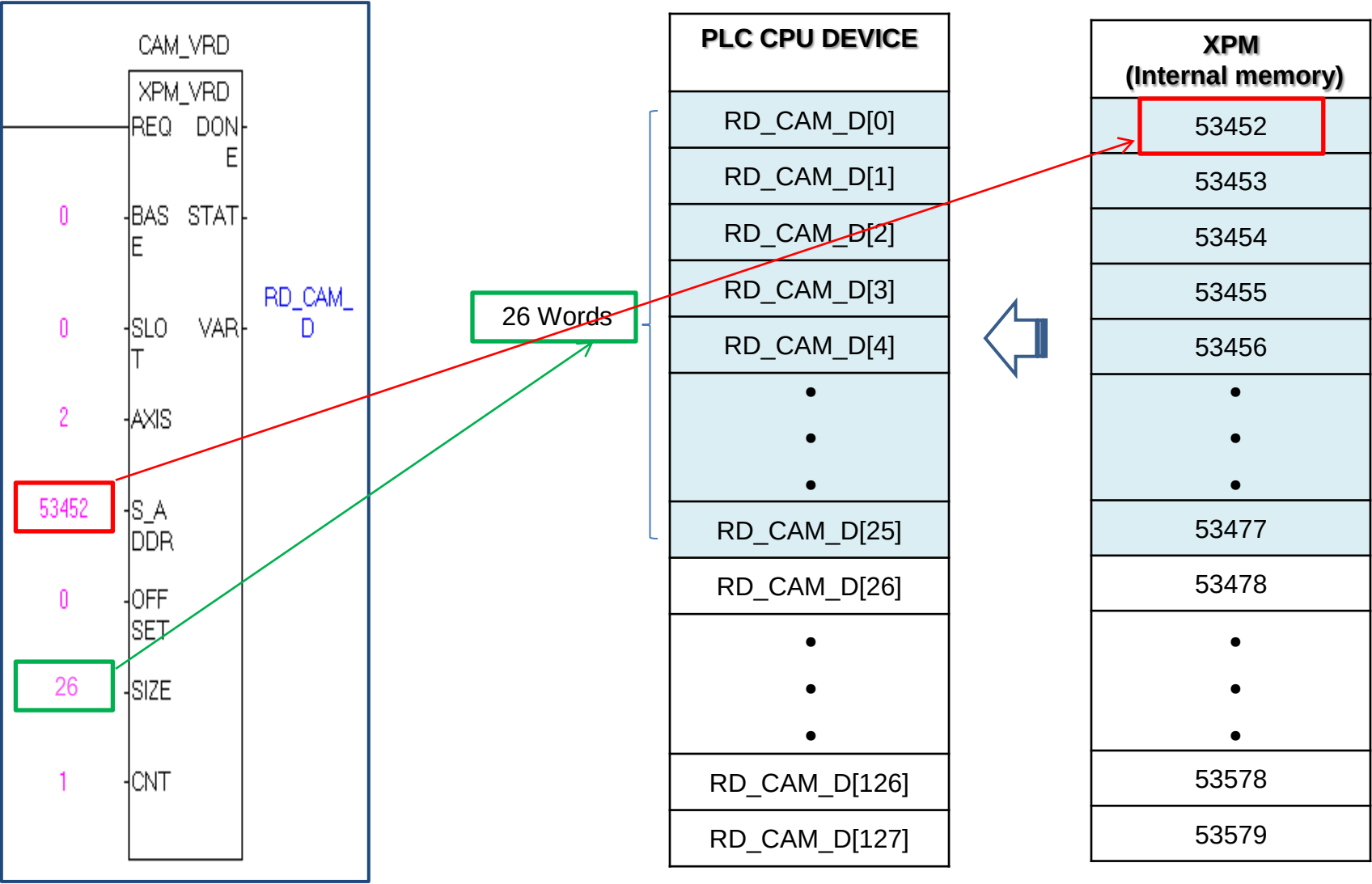


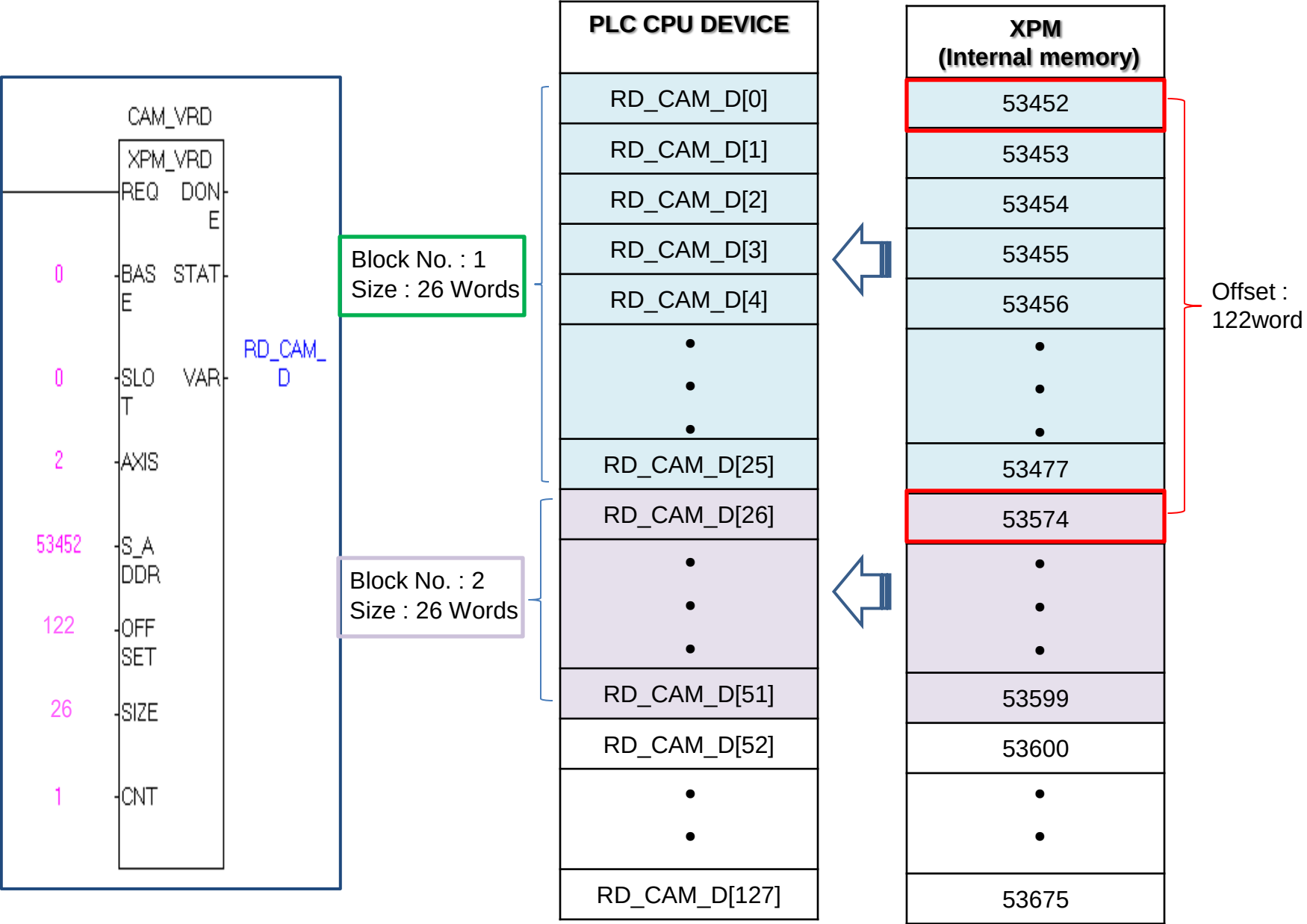
	PLC	Type	Device/Variable	Value	Variable/Device
1	NewPLC	DINT	D01250	± 10	6
2	NewPLC	DINT	D01252	± 10	0
3	NewPLC	DINT	D01254	± 10	0
4	NewPLC	DINT	D01256	± 10	100000
5	NewPLC	DINT	D01258	± 10	30000
6	NewPLC	DINT	D01260	± 10	500000
7	NewPLC	DINT	D01262	± 10	40000
8	NewPLC	DINT	D01264	± 10	700000
9	NewPLC	DINT	D01266	± 10	50000
10	NewPLC	DINT	D01268	± 10	900000
11	NewPLC	DINT	D01270	± 10	100000
12	NewPLC	DINT	D01272	± 10	1000000
13	NewPLC	DINT	D01274	± 10	100000
14	NewPLC	DINT	D01276	± 10	0

- Command (XGK)

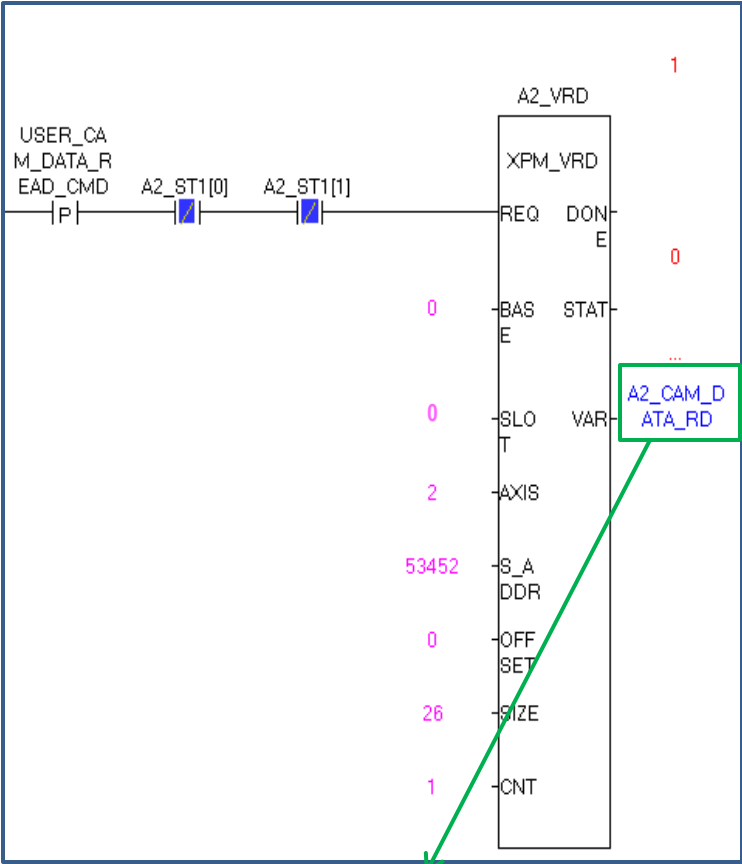
Form of Function Block	Description
	Input REQ : Request for execution of function block BASE : Set the base no. with module SLOT : Set the slot no. with module AXIS : Axis to command (1~4 : Axis 1 ~ Axis 4) S_ADDR : Module internal memory head address of Read Data (0 ~ 54217) OFFSET : Offset between Read Data blocks (0 ~ 54217) SIZE : Block size of Read data 1 ~ 128 CNT : No. of Read Data block 1 ~ 128 Output DONE : Maintain 1 after first operation STAT : Output the error no. in operation VAR : PLC device where Read Data is saved

• Usage(XGI)





• Example



Variable: A2_CAM_DATA_RD

Data Type: ARRAY[0..127] OF UINT

Variable Kind: VAR

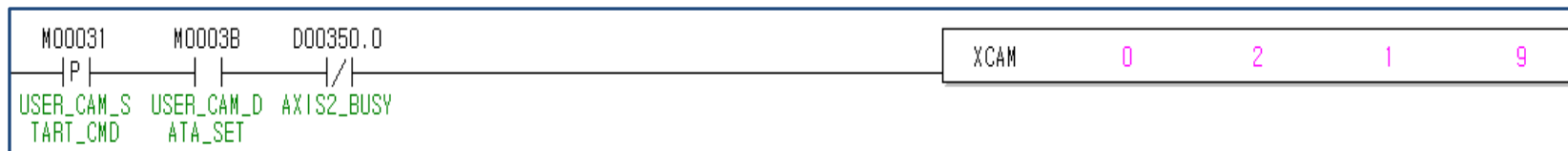
Address: %MW200 Settings...

Initial Value: Initialization...

	PLC	Program	Variable/Device	Value	Type
1	NewPLC	<GLOBAL>	%MD100	<u>±10</u>	6 DINT
2	NewPLC	<GLOBAL>	%MD101	<u>±10</u>	0 DINT
3	NewPLC	<GLOBAL>	%MD102	<u>±10</u>	0 DINT
4	NewPLC	<GLOBAL>	%MD103	<u>±10</u>	100000 DINT
5	NewPLC	<GLOBAL>	%MD104	<u>±10</u>	150000 DINT
6	NewPLC	<GLOBAL>	%MD105	<u>±10</u>	500000 DINT
7	NewPLC	<GLOBAL>	%MD106	<u>±10</u>	300000 DINT
8	NewPLC	<GLOBAL>	%MD107	<u>±10</u>	700000 DINT
9	NewPLC	<GLOBAL>	%MD108	<u>±10</u>	500000 DINT
10	NewPLC	<GLOBAL>	%MD109	<u>±10</u>	900000 DINT
11	NewPLC	<GLOBAL>	%MD110	<u>±10</u>	0 DINT
12	NewPLC	<GLOBAL>	%MD111	<u>±10</u>	1000000 DINT
13	NewPLC	<GLOBAL>	%MD112	<u>±10</u>	0 DINT
14	NewPLC	<GLOBAL>	%MD113	<u>±10</u>	0 DINT
15	NewPLC	<GLOBAL>	%MD114	<u>±10</u>	0 DINT
16	NewPLC	<GLOBAL>	%MD115	<u>±10</u>	0 DINT

(4) CAM Operation

- Command(XGK)



Command	XCAM				Operation
Operand	OP1	Slot	Constant	WORD	Slot No. installed with positioning module
	OP2	Axis	PMLK,constant,D,Z,R,ZR	WORD	Command axis (1~ 4 : Axis 1 ~ Axis 4)
	OP3	Main axis	PMLK,constant,D,Z,R,ZR	WORD	Main axis (1~ 4 : Axis 1 ~ Axis 4) (9 : External Encoder)
	OP4	Block	PMLK,constant,D,Z,R,ZR	WORD	Cam data block to apply to operation (1 ~ 9)

- ※ In the example program above, if CAM operation command is executed, axis2 (sub axis) is indicated as “In operation” but the motor does not operate actually. When axis1 starts operating as a main axis, motor of axis2 starts operating toward sub axis location depending on target position address which set on cam block (OP4).
- ※ If speed of main axis is too fast and speed of sub axis exceeds speed limit, error (code:708) arises. In this case, sub axis will be stop according to the dec. parameter no.1

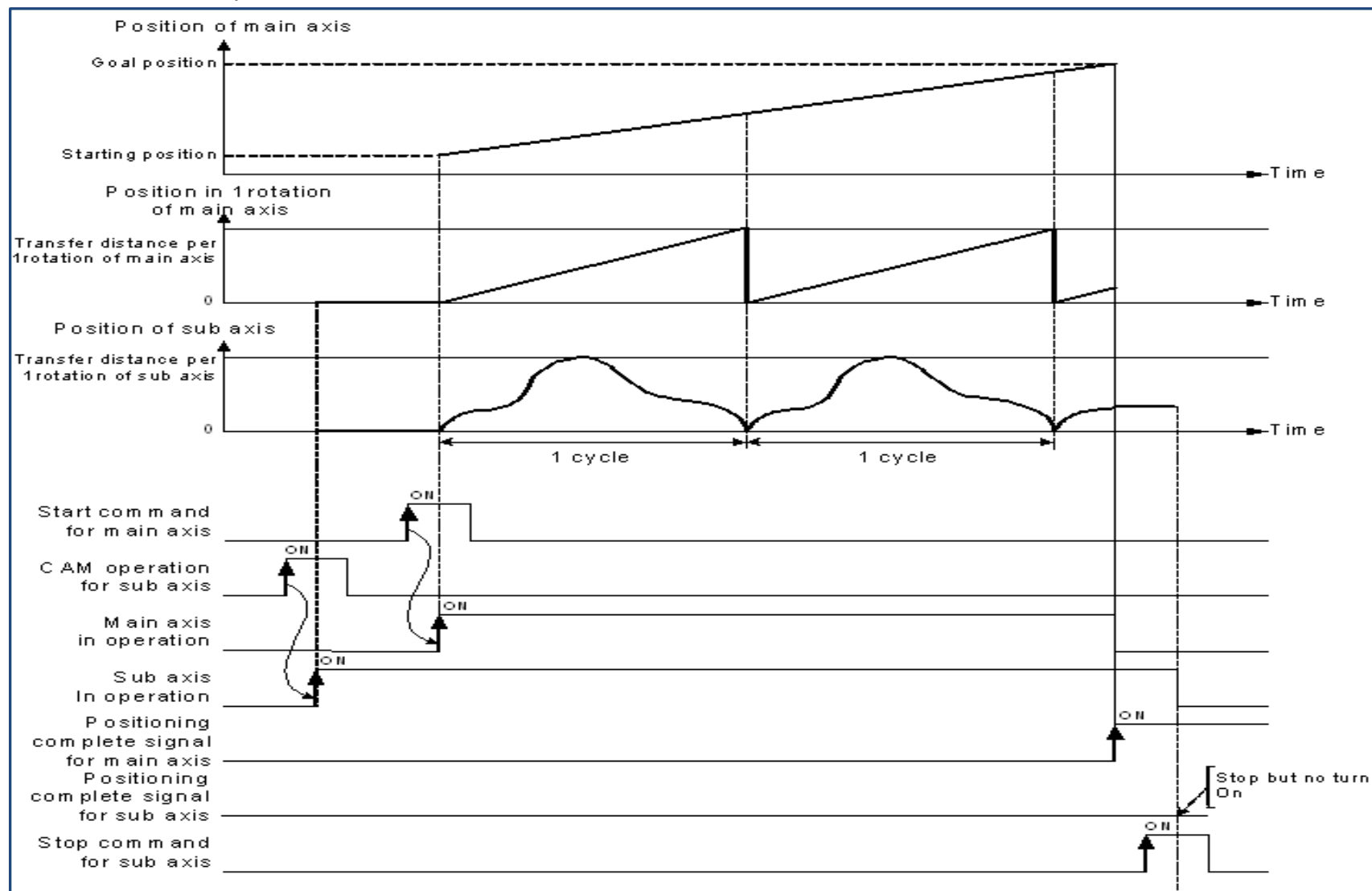
- Command(XGI)

Form of Function Block	Description
	Input REQ : Request for execution of function block BASE : Set the base no. with module SLOT : Set the slot no. with module AXIS : Axis to command (1 ~4 : Axis1 ~ Axis4) MST_AXIS : Set main axis (1 ~4 : Axis1 ~ Axis4) (9: External Encoder) CAM_BLK : Set CAM block 1 ~ 9: Block1 ~ Block9 Output DONE : Maintain 1 after first operating STAT : Output the error no. in operation

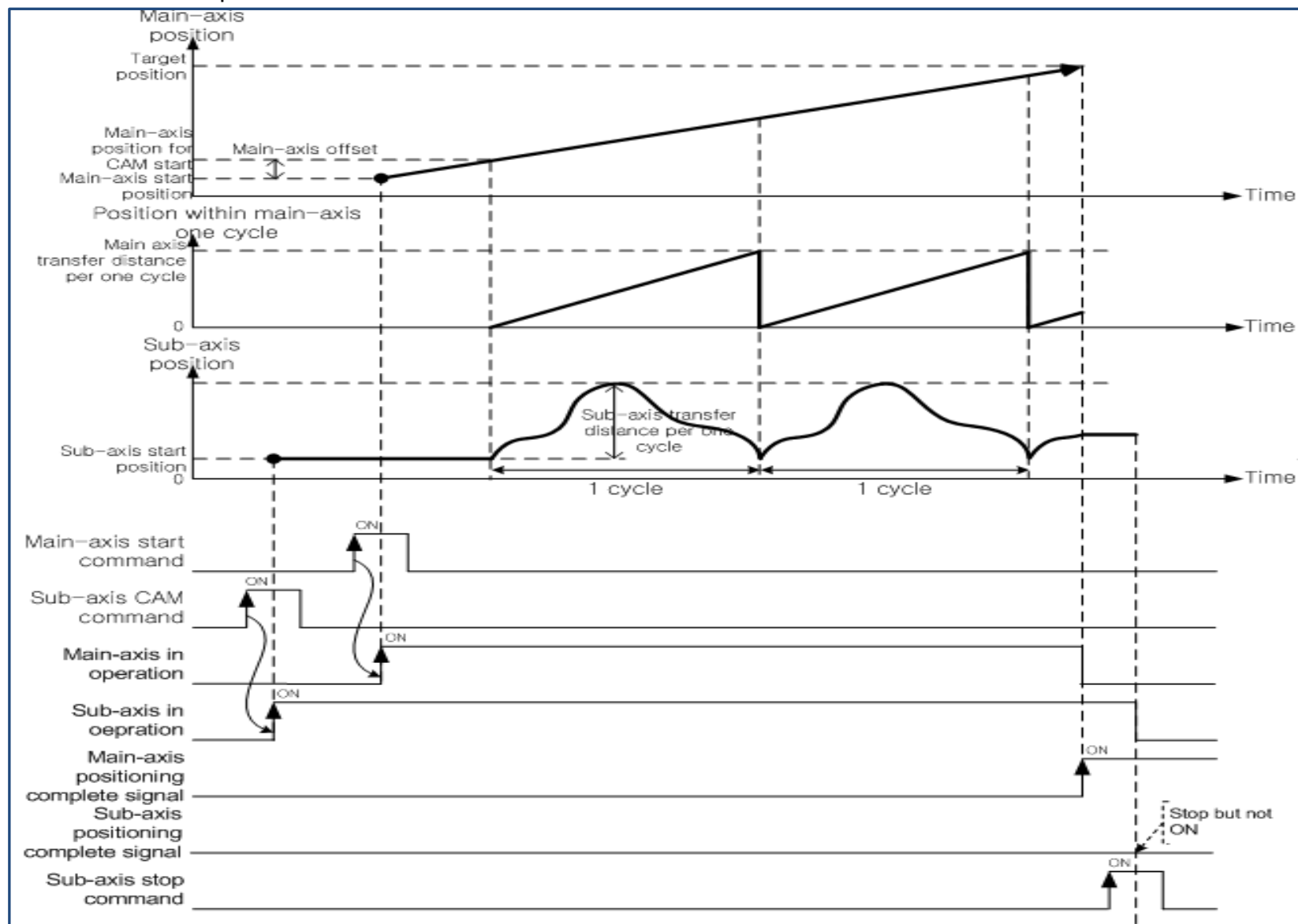
- ① Give “CAM Operation” command to the axis designated as the axis of positioning module with BASE (Base no. of Positioning module) and SLOT (Slot no. of Positioning module).
- ② Execute CAM operation with CAM main axis and CAM data block.
- ③ When executing CAM operation, sub axis is indicated that it is in operation but it does not work actually.
When main axis starts, the motor of sub axis starts working according to the data value of CAM data block which already set on CAM block (CAM_BLK)
- ④ Set an axis to command from 1(axis 1) ~ 4(axis 4). If you set wrongly, “Error6” arises.
- ⑤ Set main axis of CAM operation at MST_AXIS and available value is 1(axis1)~4(axis4), 9(External encoder).
In case other values are set “Error 11” occurs.
- ⑥ Set CAM block number in CAM_BLK and available value is 1(block 1) ~ 9(block 9).
In case other values are set, “Error 11” occurs.
- ⑦ Standard CAM data may be set on positioning package and you may set max. 8 blocks (block1~block8).

(5) CAM Operation Timing

① General CAM operation

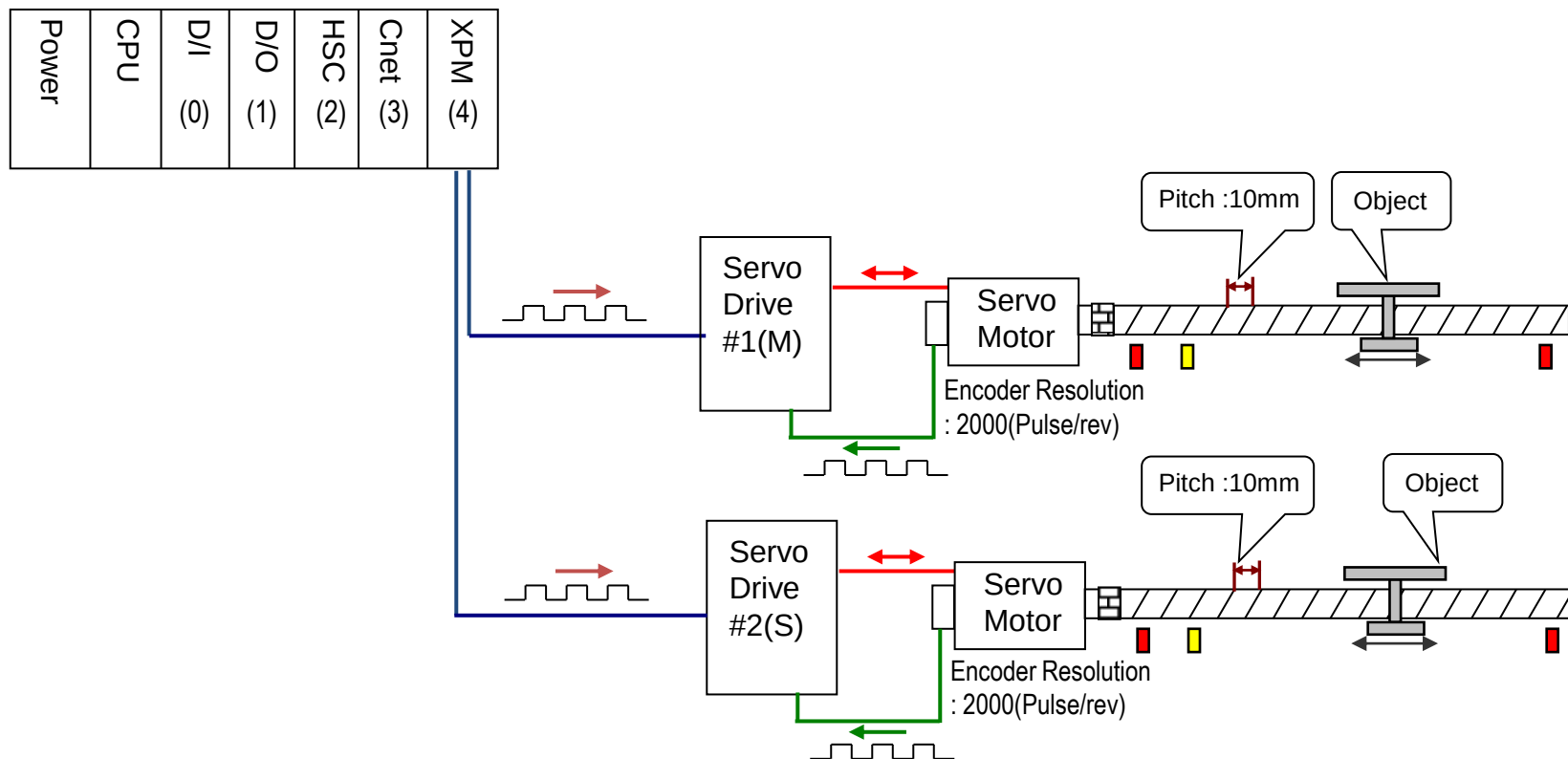


② Main-axis offset-specified CAM start command



2. User CAM Operation _ Sample

- The sample program is mode based on following configuration conditions



2. User CAM Operation _ Sample

(1) Sample program (Repeat) condition

- We have two axes and operate the motors as main axis(1-axis) and sub axis (2-axis)

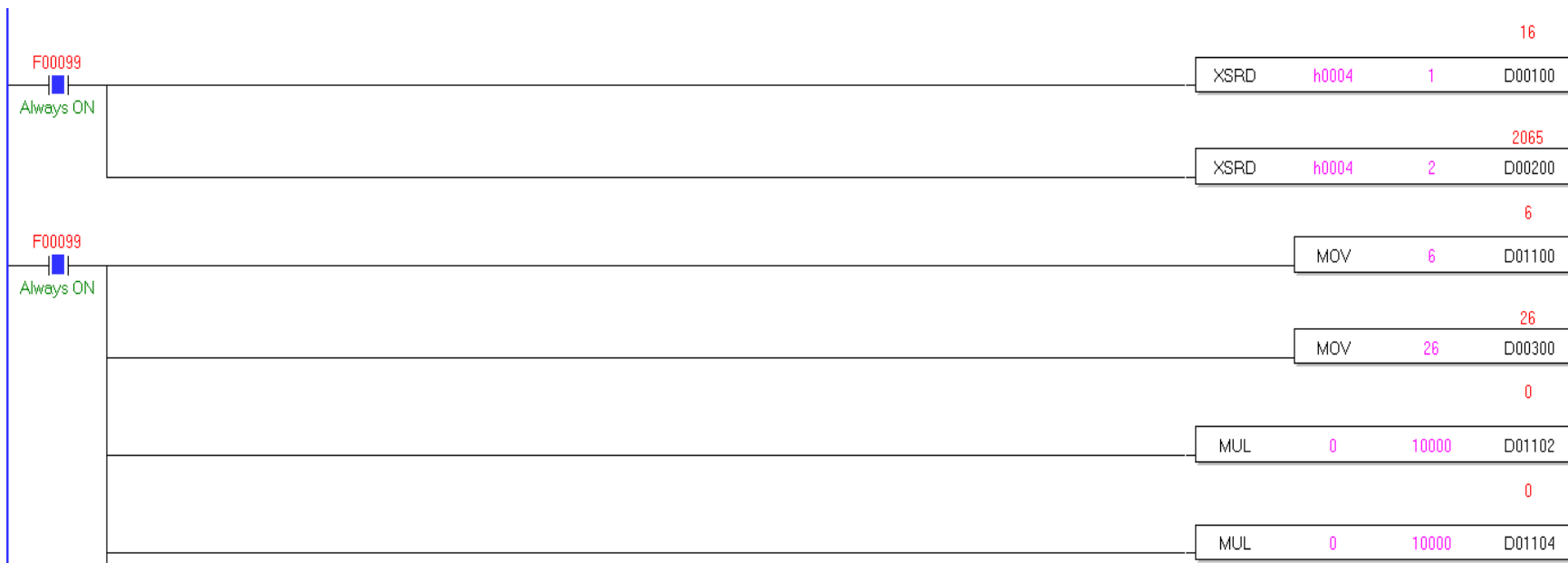
① Basic parameter of axes

	Item ▼	1 Axis	2 Axis
Basic Parameter	Unit	1: mm	1: mm
	Pulses per rotation	8000 pls	8000 pls
	Travel per rotation	10.0 um	10.0 um
	Unit multiplier	3: x1000	3: x1000
	Speed command unit	0: Unit/Time	0: Unit/Time
	Pulse output mode	1: PLS/DIR	1: PLS/DIR
	Bias speed	0.01 mm/m	0.01 mm/m
	Speed limit	50000.00 mm/m	50000.00 mm/m
	Acc. time1	100 ms	100 ms
	Acc. time2	200 ms	200 ms
	Acc. time3	300 ms	300 ms
	Acc. time4	500 ms	500 ms
	Dec. time 1	100 ms	100 ms
	Dec. time 2	200 ms	200 ms
	Dec. time 3	300 ms	300 ms
	Dec. time 4	500 ms	500 ms
	Dec. time for emg. stop	0 ms	0 ms

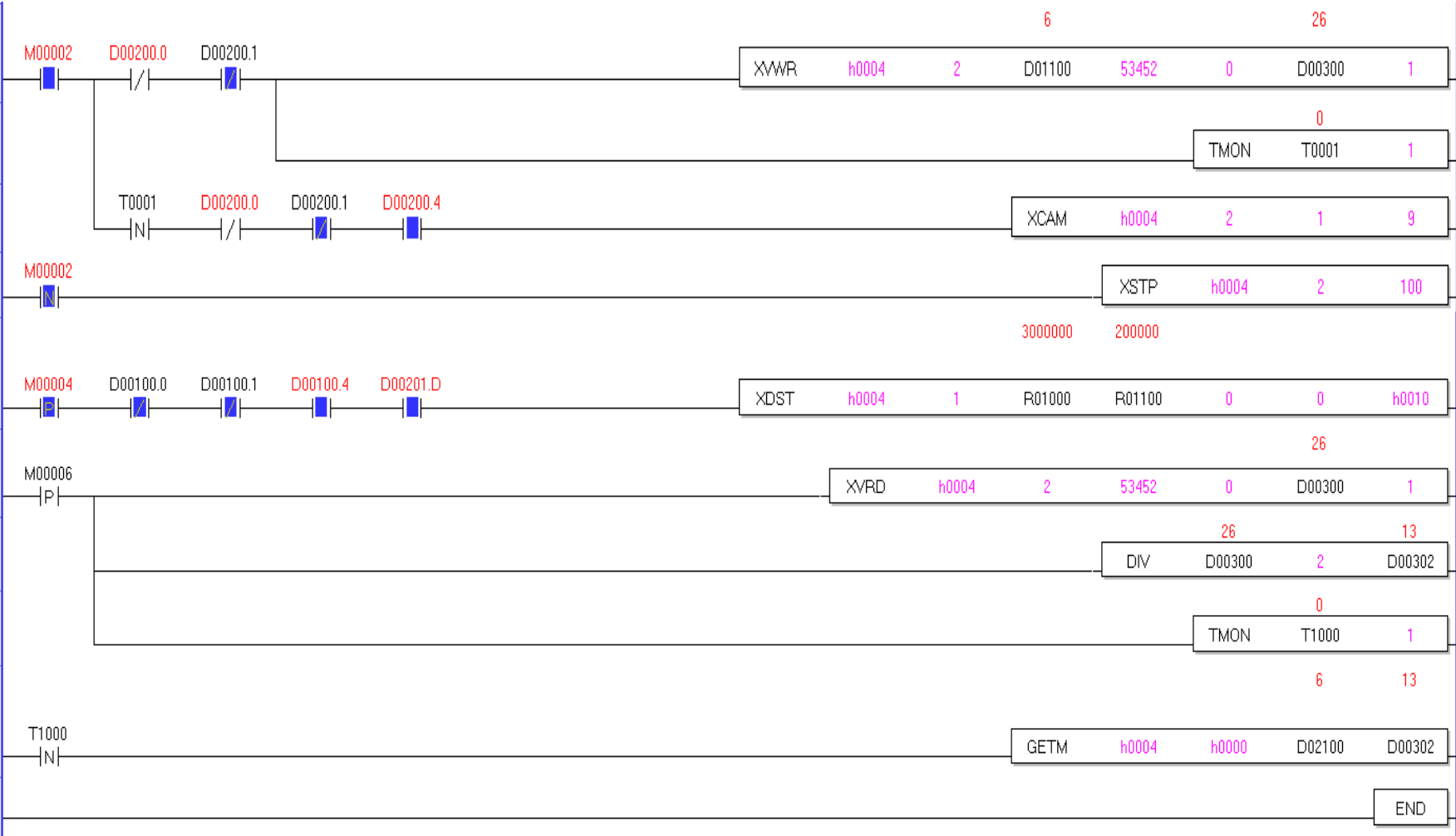
② Cam data table

Step	Main axis position	Sub axis position
1 st	0mm	0mm
2 th	10mm	15mm
3 th	50mm	30mm
4 th	70mm	50mm
5 th	90mm	0mm
6 th	100mm	0mm

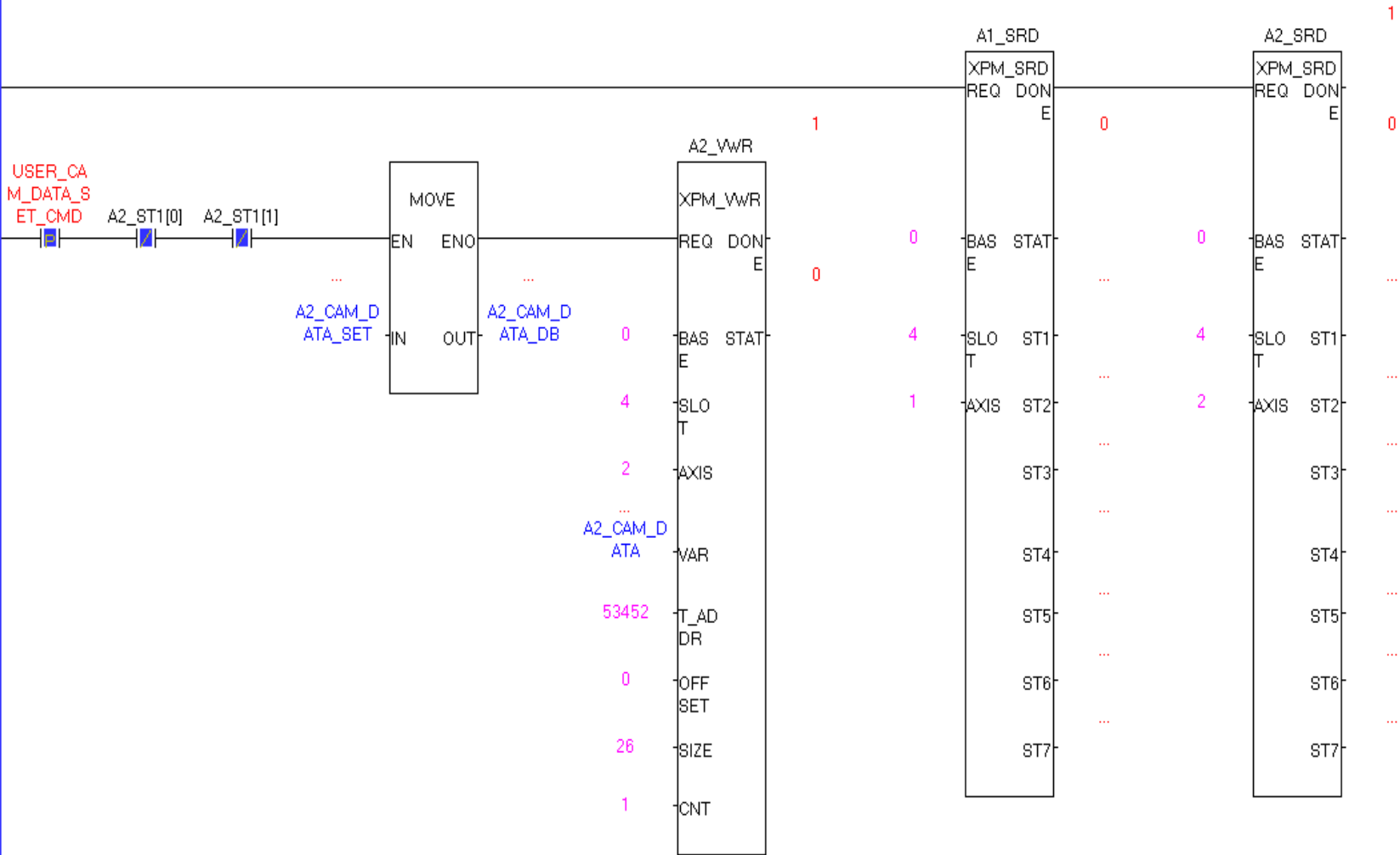
③ control program

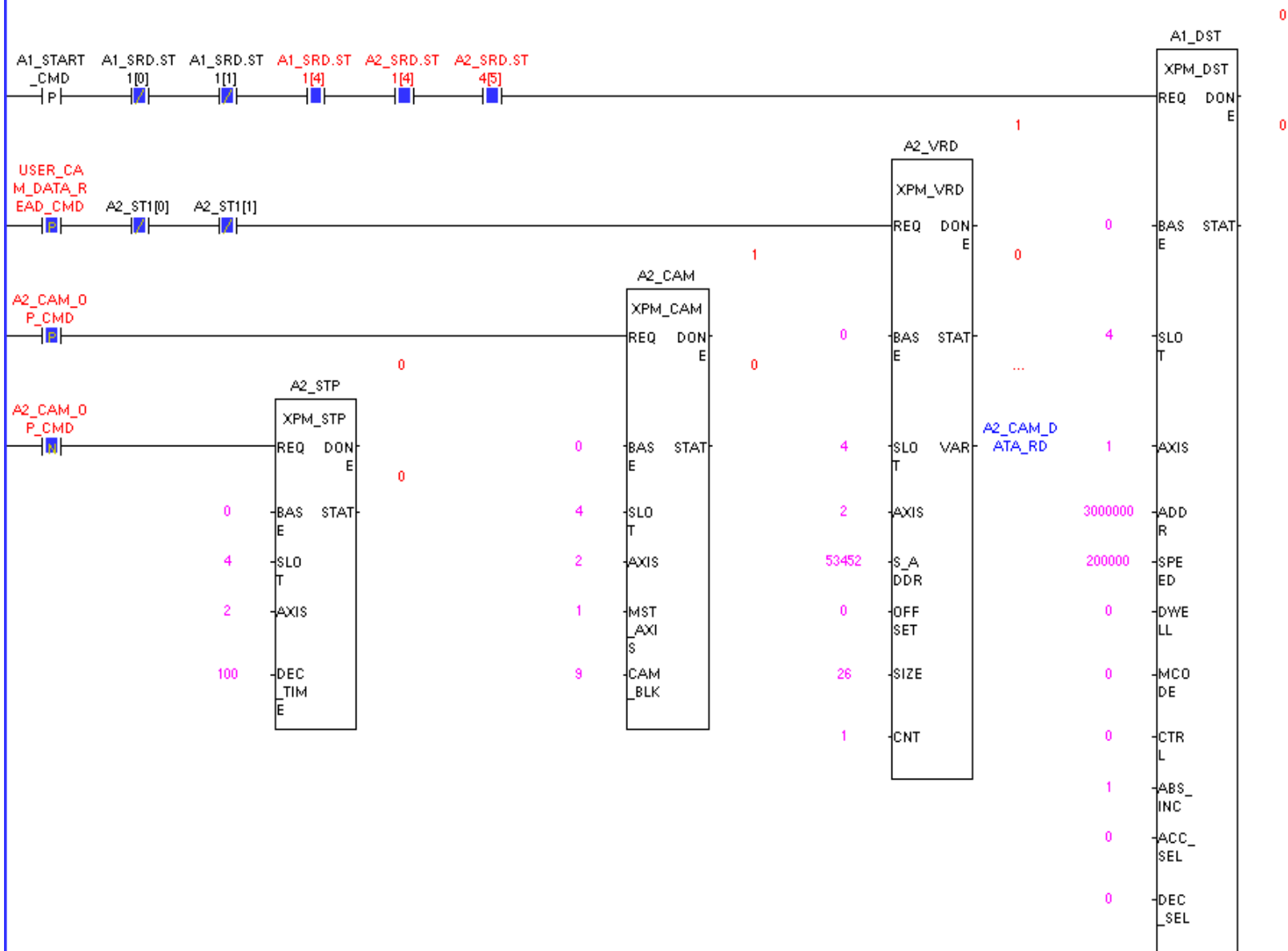


				100000
	MUL	10	10000	D01106
				150000
	MUL	15	10000	D01108
				500000
	MUL	50	10000	D01110
				300000
	MUL	30	10000	D01112
				700000
	MUL	70	10000	D01114
				500000
	MUL	50	10000	D01116
				900000
	MUL	90	10000	D01118
				0
	MUL	0	10000	D01120
				1000000
	MUL	100	10000	D01122
				0
	MUL	0	10000	D01124



③ control program(XGI)





♣ Variable(Setting)

• A2_CAM_DATA_SET

	Variable	Type	Address	Initial Value
1	A2_CAM_DATA_SET[0]	DINT		6
2	A2_CAM_DATA_SET[1]	DINT		0
3	A2_CAM_DATA_SET[2]	DINT		0
4	A2_CAM_DATA_SET[3]	DINT		100000
5	A2_CAM_DATA_SET[4]	DINT		150000
6	A2_CAM_DATA_SET[5]	DINT		500000
7	A2_CAM_DATA_SET[6]	DINT		300000
8	A2_CAM_DATA_SET[7]	DINT		700000
9	A2_CAM_DATA_SET[8]	DINT		500000
10	A2_CAM_DATA_SET[9]	DINT		900000
11	A2_CAM_DATA_SET[10]	DINT		0
12	A2_CAM_DATA_SET[11]	DINT		1000000
13	A2_CAM_DATA_SET[12]	DINT		0



• A2_CAM_DATA_DB

Variable:

Data Type:

Variable Kind:

Address:

Initial Value:



• A2_CAM_DATA

Variable:

Data Type:

Variable Kind:

Address:

Initial Value:



Item		A2_CAM_DATA_SET	Initail Value	A2_CAM_DATA_DB	A2_CAM_DATA		AXIS2
CAM No.		A2_CAM_DATA_SET[0]	6	%MD0	A2_CAM_DATA[0~1]	%MW0~1	53452~3
1 st	M	A2_CAM_DATA_SET[1]	0	%MD1	A2_CAM_DATA[2~3]	%MW2~3	53454~5
	S	A2_CAM_DATA_SET[2]	0	%MD2	A2_CAM_DATA[4~5]	%MW4~5	53456~7
2 nd	M	A2_CAM_DATA_SET[3]	100000	%MD3	A2_CAM_DATA[6~7]	%MW6~7	53458~9
	S	A2_CAM_DATA_SET[4]	150000	%MD4	A2_CAM_DATA[8~9]	%MW8~9	53460~1
3 th	M	A2_CAM_DATA_SET[5]	500000	%MD5	A2_CAM_DATA[10~11]	%MW10~11	53462~3
	S	A2_CAM_DATA_SET[6]	300000	%MD6	A2_CAM_DATA[12~13]	%MW12~13	53464~5
4 th	M	A2_CAM_DATA_SET[7]	700000	%MD7	A2_CAM_DATA[14~15]	%MW14~15	53466~7
	S	A2_CAM_DATA_SET[8]	500000	%MD8	A2_CAM_DATA[16~17]	%MW16~17	53468~9
5 th	M	A2_CAM_DATA_SET[9]	900000	%MD9	A2_CAM_DATA[18~19]	%MW18~19	53470~1
	S	A2_CAM_DATA_SET[10]	0	%MD10	A2_CAM_DATA[20~21]	%MW20~21	53472~3
6 th	M	A2_CAM_DATA_SET[11]	1000000	%MD11	A2_CAM_DATA[22~23]	%MW22~23	53474~5
	S	A2_CAM_DATA_SET[12]	0	%MD12	A2_CAM_DATA[24~25]	%MW24~25	53476~7

♣ Variable(Monitoring)

• A2_CAM_DATA_RD

Variable:

Data Type: ▼

Variable Kind: ▼

Address:

Initial Value:



	PLC	Program	Variable/Device	Value	Type
1	NewPLC	<GLOBAL>	%MD100	6	DINT
2	NewPLC	<GLOBAL>	%MD101	0	DINT
3	NewPLC	<GLOBAL>	%MD102	0	DINT
4	NewPLC	<GLOBAL>	%MD103	100000	DINT
5	NewPLC	<GLOBAL>	%MD104	150000	DINT
6	NewPLC	<GLOBAL>	%MD105	500000	DINT
7	NewPLC	<GLOBAL>	%MD106	300000	DINT
8	NewPLC	<GLOBAL>	%MD107	700000	DINT
9	NewPLC	<GLOBAL>	%MD108	500000	DINT
10	NewPLC	<GLOBAL>	%MD109	900000	DINT
11	NewPLC	<GLOBAL>	%MD110	0	DINT
12	NewPLC	<GLOBAL>	%MD111	1000000	DINT
13	NewPLC	<GLOBAL>	%MD112	0	DINT
14	NewPLC	<GLOBAL>	%MD113	0	DINT
15	NewPLC	<GLOBAL>	%MD114	0	DINT
16	NewPLC	<GLOBAL>	%MD115	0	DINT



(2) Sample program (Increase) condition

- We have two axes and operate the motors as main axis(1-axis) and sub axis (2-axis)

① Basic parameter of axes

	Item ▼	1 Axis	2 Axis
Basic Parameter	Unit	1: mm	1: mm
	Pulses per rotation	8000 pls	8000 pls
	Travel per rotation	10.0 um	10.0 um
	Unit multiplier	3: x1000	3: x1000
	Speed command unit	0: Unit/Time	0: Unit/Time
	Pulse output mode	1: PLS/DIR	1: PLS/DIR
	Bias speed	0.01 mm/m	0.01 mm/m
	Speed limit	50000.00 mm/m	50000.00 mm/m
	Acc. time1	100 ms	100 ms
	Acc. time2	200 ms	200 ms
	Acc. time3	300 ms	300 ms
	Acc. time4	500 ms	500 ms
	Dec. time 1	100 ms	100 ms
	Dec. time 2	200 ms	200 ms
	Dec. time 3	300 ms	300 ms
	Dec. time 4	500 ms	500 ms
	Dec. time for emg. stop	0 ms	0 ms

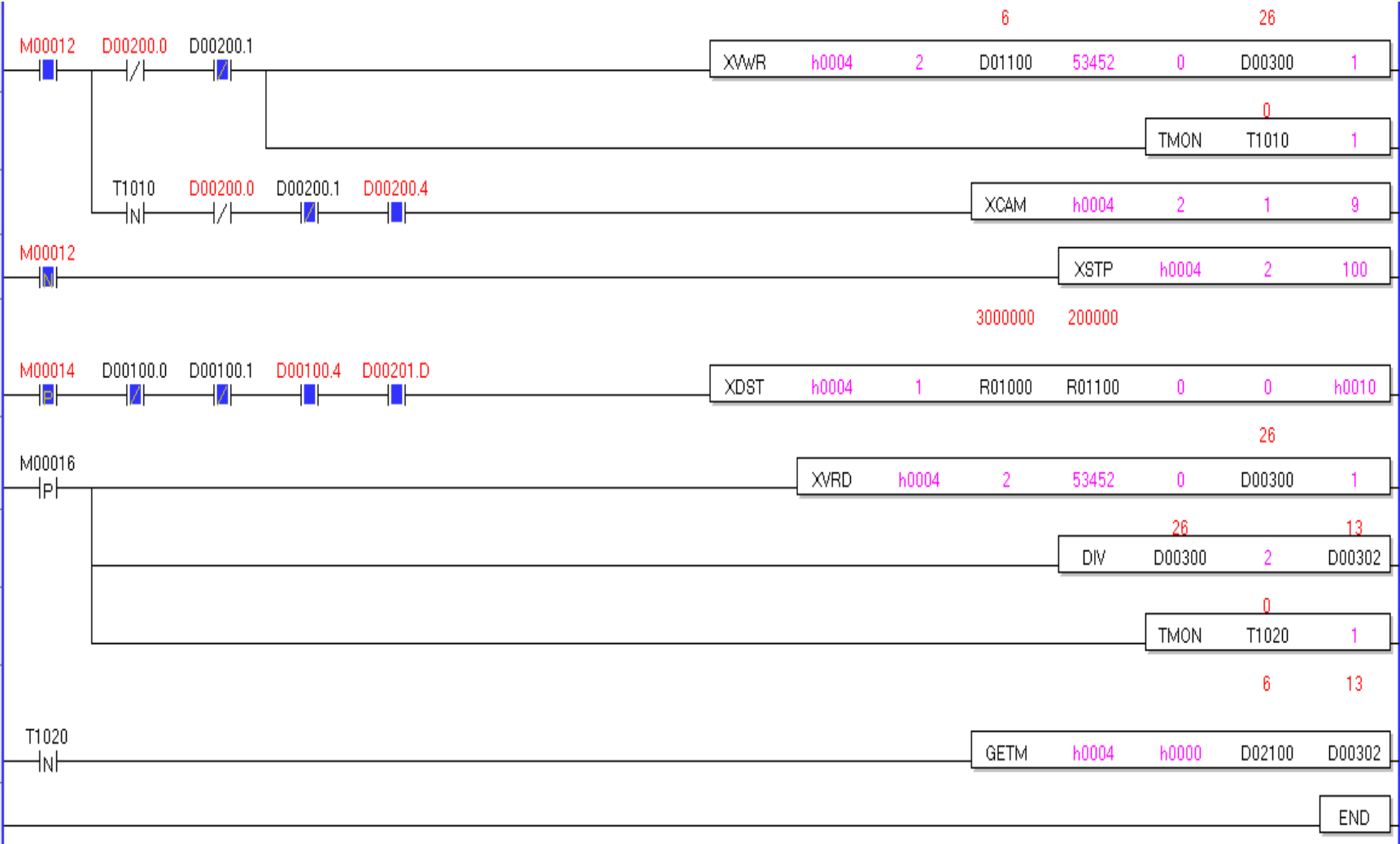
② Cam data table

Step	Main axis position	Sub axis position
1 st	0mm	0mm
2 th	10mm	5mm
3 th	50mm	40mm
4 th	70mm	15mm
5 th	90mm	70mm
6 th	100mm	70mm

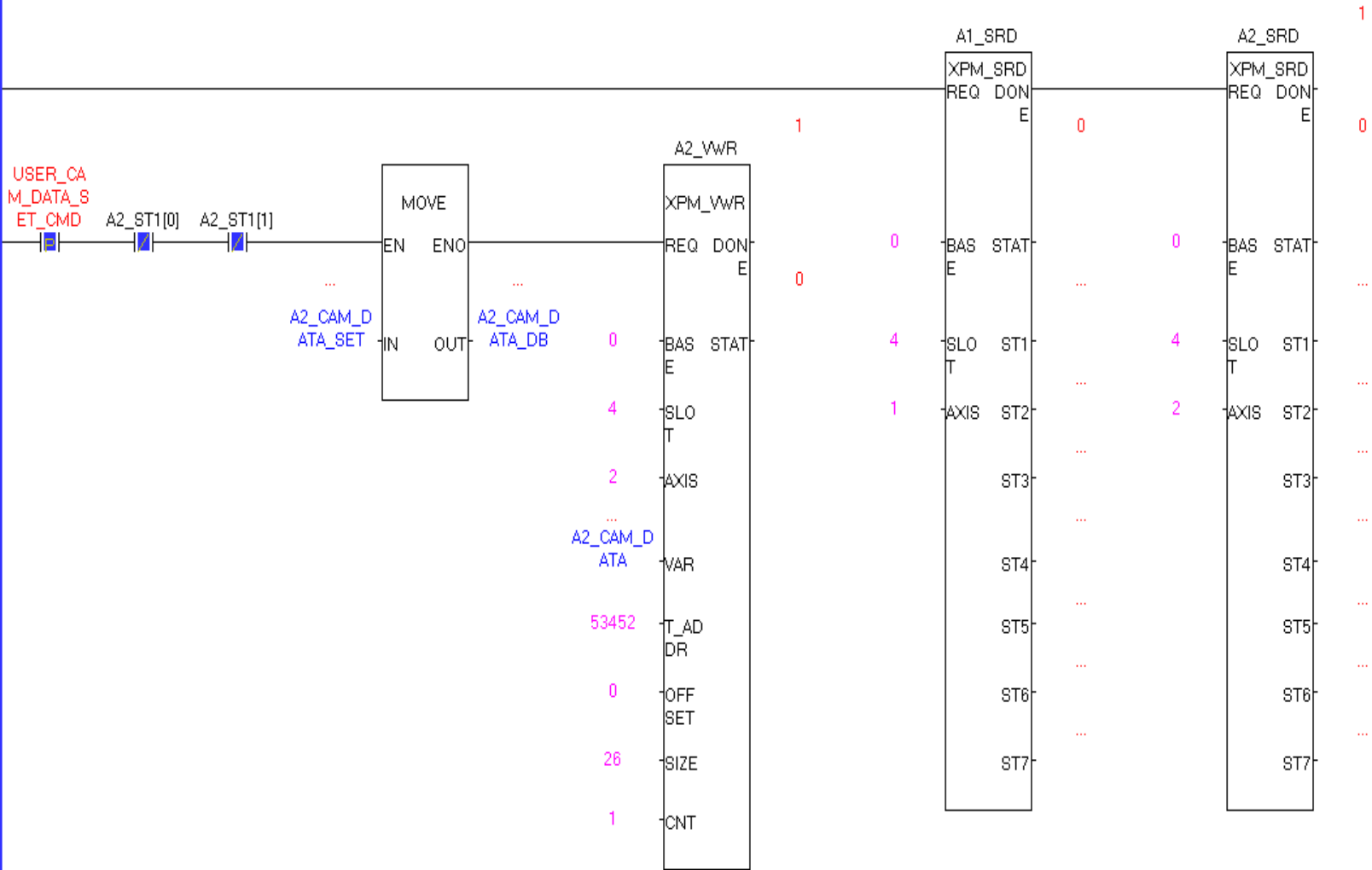
③ control program(XGK)

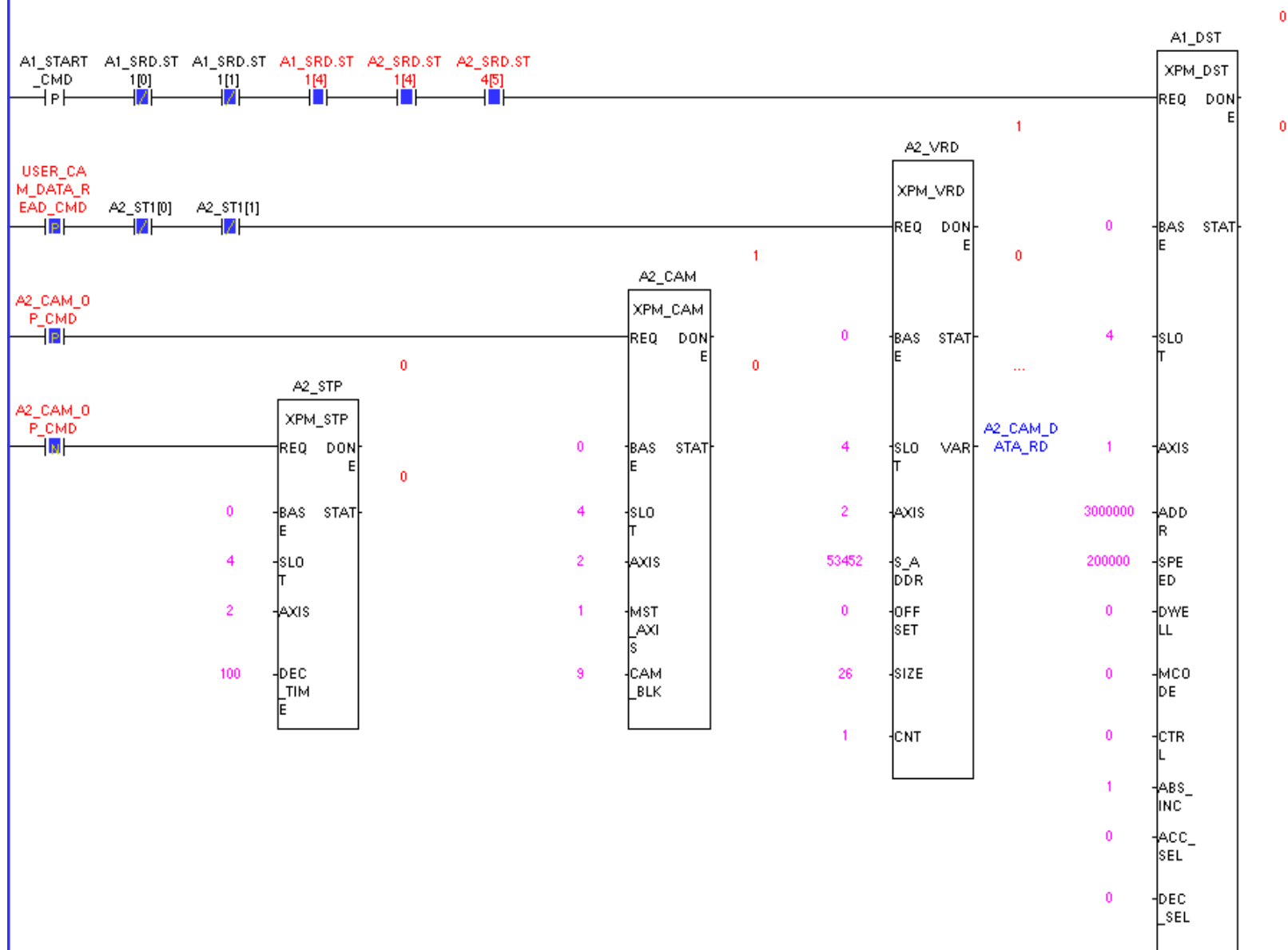


					100000
	MUL	10	10000	D01106	
					50000
	MUL	5	10000	D01108	
					500000
	MUL	50	10000	D01110	
					400000
	MUL	40	10000	D01112	
					700000
	MUL	70	10000	D01114	
					150000
	MUL	15	10000	D01116	
					900000
	MUL	90	10000	D01118	
					700000
	MUL	70	10000	D01120	
					1000000
	MUL	100	10000	D01122	
					700000
	MUL	70	10000	D01124	



③ control program(XGI)





♣ Variable (Setting)

• A2_CAM_DATA_SET

	Variable	Type	Address	Initial Value
1	A2_CAM_DATA_SET[0]	DINT		6
2	A2_CAM_DATA_SET[1]	DINT		0
3	A2_CAM_DATA_SET[2]	DINT		0
4	A2_CAM_DATA_SET[3]	DINT		100000
5	A2_CAM_DATA_SET[4]	DINT		50000
6	A2_CAM_DATA_SET[5]	DINT		500000
7	A2_CAM_DATA_SET[6]	DINT		400000
8	A2_CAM_DATA_SET[7]	DINT		700000
9	A2_CAM_DATA_SET[8]	DINT		150000
10	A2_CAM_DATA_SET[9]	DINT		900000
11	A2_CAM_DATA_SET[10]	DINT		700000
12	A2_CAM_DATA_SET[11]	DINT		1000000
13	A2_CAM_DATA_SET[12]	DINT		700000



• A2_CAM_DATA_DB

Variable:

Data Type: ▼

Variable Kind: ▼

Address:

Initial Value:



• A2_CAM_DATA

Variable:

Data Type: ▼

Variable Kind: ▼

Address:

Initial Value:



Item		A2_CAM_DATA_SET	Initial Value	A2_CAM_DATA_DB	A2_CAM_DATA		AXIS2
CAM No.		A2_CAM_DATA_SET[0]	6	%MD0	A2_CAM_DATA[0~1]	%MW0~1	53452~3
1 st	M	A2_CAM_DATA_SET[1]	0	%MD1	A2_CAM_DATA[2~3]	%MW2~3	53454~5
	S	A2_CAM_DATA_SET[2]	0	%MD2	A2_CAM_DATA[4~5]	%MW4~5	53456~7
2 nd	M	A2_CAM_DATA_SET[3]	100000	%MD3	A2_CAM_DATA[6~7]	%MW6~7	53458~9
	S	A2_CAM_DATA_SET[4]	50000	%MD4	A2_CAM_DATA[8~9]	%MW8~9	53460~1
3 th	M	A2_CAM_DATA_SET[5]	500000	%MD5	A2_CAM_DATA[10~11]	%MW10~11	53462~3
	S	A2_CAM_DATA_SET[6]	400000	%MD6	A2_CAM_DATA[12~13]	%MW12~13	53464~5
4 th	M	A2_CAM_DATA_SET[7]	700000	%MD7	A2_CAM_DATA[14~15]	%MW14~15	53466~7
	S	A2_CAM_DATA_SET[8]	150000	%MD8	A2_CAM_DATA[16~17]	%MW16~17	53468~9
5 th	M	A2_CAM_DATA_SET[9]	900000	%MD9	A2_CAM_DATA[18~19]	%MW18~19	53470~1
	S	A2_CAM_DATA_SET[10]	700000	%MD10	A2_CAM_DATA[20~21]	%MW20~21	53472~3
6 th	M	A2_CAM_DATA_SET[11]	1000000	%MD11	A2_CAM_DATA[22~23]	%MW22~23	53474~5
	S	A2_CAM_DATA_SET[12]	700000	%MD12	A2_CAM_DATA[24~25]	%MW24~25	53476~7

♣ Variable(Monitoring)

• A2_CAM_DATA_RD

Variable:

Data Type: ▼

Variable Kind: ▼

Address:

Initial Value:



	PLC	Program	Variable/Device	Value	Type
1	NewPLC	<GLOBAL>	%MD100	6	DINT
2	NewPLC	<GLOBAL>	%MD101	0	DINT
3	NewPLC	<GLOBAL>	%MD102	0	DINT
4	NewPLC	<GLOBAL>	%MD103	100000	DINT
5	NewPLC	<GLOBAL>	%MD104	50000	DINT
6	NewPLC	<GLOBAL>	%MD105	500000	DINT
7	NewPLC	<GLOBAL>	%MD106	400000	DINT
8	NewPLC	<GLOBAL>	%MD107	700000	DINT
9	NewPLC	<GLOBAL>	%MD108	150000	DINT
10	NewPLC	<GLOBAL>	%MD109	900000	DINT
11	NewPLC	<GLOBAL>	%MD110	700000	DINT
12	NewPLC	<GLOBAL>	%MD111	1000000	DINT
13	NewPLC	<GLOBAL>	%MD112	700000	DINT
14	NewPLC	<GLOBAL>	%MD113	0	DINT
15	NewPLC	<GLOBAL>	%MD114	0	DINT
16	NewPLC	<GLOBAL>	%MD115	0	DINT

