



Industrial Automation Headquarters

Delta Electronics, Inc.
Taoyuan Technology Center
No.18, Xinglong Rd., Taoyuan City,
Taoyuan County 33068, Taiwan
TEL: 886-3-362-6301 / FAX: 886-3-371-6301

Asia

Delta Electronics (Jiangsu) Ltd.
Wujiang Plant 3
1688 Jiangxing East Road,
Wujiang Economic Development Zone
Wujiang City, Jiang Su Province,
People's Republic of China (Post code: 215200)
TEL: 86-512-6340-3008 / FAX: 86-769-6340-7290

Delta Greentech (China) Co., Ltd.
238 Min-Xia Road, Pudong District,
ShangHai, P.R.C.
Post code : 201209
TEL: 86-21-58635678 / FAX: 86-21-58630003

Delta Electronics (Japan), Inc.
Tokyo Office
2-1-14 Minato-ku Shibadaimon,
Tokyo 105-0012, Japan
TEL: 81-3-5733-1111 / FAX: 81-3-5733-1211

Delta Electronics (Korea), Inc.
1511, Byucksan Digital Valley 6-cha, Gasan-dong,
Geumcheon-gu, Seoul, Korea, 153-704
TEL: 82-2-515-5303 / FAX: 82-2-515-5302

Delta Electronics Int'l (S) Pte Ltd
4 Kaki Bukit Ave 1, #05-05, Singapore 417939
TEL: 65-6747-5155 / FAX: 65-6744-9228

Delta Electronics (India) Pvt. Ltd.
Plot No 43 Sector 35, HSIIDC
Gurgaon, PIN 122001, Haryana, India
TEL : 91-124-4874900 / FAX : 91-124-4874945

Americas

Delta Products Corporation (USA)
Raleigh Office
P.O. Box 12173, 5101 Davis Drive,
Research Triangle Park, NC 27709, U.S.A.
TEL: 1-919-767-3800 / FAX: 1-919-767-8080

Delta Greentech (Brasil) S.A
Sao Paulo Office
Rua Itapeva, 26 - 3° andar Edificio Itapeva One-Bela Vista
01332-000-São Paulo-SP-Brazil
TEL: +55 11 3568-3855 / FAX: +55 11 3568-3865

Europe

Deltronics (The Netherlands) B.V.
Eindhoven Office
De Witbogt 15, 5652 AG Eindhoven, The Netherlands
TEL: 31-40-2592850 / FAX: 31-40-2592851

*We reserve the right to change the
information in this catalogue without prior notice.

DELTA_NC300_O_EN_20130624

Delta CNC Solution NC300 Series Operation Manual



Delta CNC Solution NC300 Series Operation Manual

www.delta.com.tw/ia



Table of content

Chapter 1: Table of group menu

1.1 Table of system group menu	1-1
1.2 Primary control panel function keys	1-9
1.3 Secondary control panel function keys.....	1-11

Chapter 2: Table of function groups

2.1 Auto mode (AUTO)	2-1
2.2 Edit mode (EDIT)	2-1
2.3 Manual mode (MDI)	2-1
2.4 Hand wheel mode (MPG)	2-1
2.5 Jog mode (JOG)	2-2
2.6 Home mode (HOME)	2-2

Chapter 3: POS group

3.1 Absolute coordinate	3-1
3.2 Relative coordinate	3-2
3.3 Mechanical coordinate	3-3

Chapter 4: PRG group

4.1 Add (create new file).....	4-8
4.2 Copy	4-9
4.3 Paste	4-10
4.4 Delete (for files and folders)	4-11
4.5 Select/Deselect multiple files	4-12
4.6 Rename	4-15
4.7 Add folder	4-16
4.8 File searching	4-17
4.9 File merge	4-18

4.10 Macro file	4-18
4.11 File editing.....	4-19
4.11.1 Search by line number	4-20
4.11.2 Search by keywords.....	4-21
4.11.3 Block starting / ending point	4-22
4.11.4 Delete (lines and blocks).....	4-23
4.11.5 Copy and paste (line and block)	4-24
4.11.6 Undo	4-25
4.12 Other mode functions	4-26

Chapter 5: OFS group

5.1 Coordinates setting	5-1
5.1.1 Auto setting	5-2
5.1.2 Absolute input	5-8
5.1.3 Incremental input.....	5-10
5.1.4 Rectangle center	5-11
5.1.5 Circle center	5-14
5.2 Tool register	5-16
5.3 Tool magazine register	5-21
5.4 Macro variable	5-27
5.4.1 Local variable	5-27
5.4.2 Global variable	5-28
5.4.3 Retaining variable	5-28

Chapter 6: GRA group

6.1 Switch the angle of view.....	6-5
-----------------------------------	-----

Chapter 7: ALM group

7.1 Alarm.....	7-1
7.2 Message log.....	7-2

Chapter 8: DGN group

8.1	Machining information	8-1
8.2	User variable	8-4
8.3	MLC	8-5
8.3.1	Bit.....	8-6
8.3.2	Register.....	8-7
8.3.3	Device monitoring	8-9
8.3.4	Search line	8-11
8.3.5	Editor.....	8-11
8.3.6	Operation	8-14
8.4	System monitoring	8-16
8.4.1	Variable	8-16
8.4.2	I/O monitoring	8-19
8.4.3	Servo monitoring	8-20
8.5	Password setting.....	8-21
8.5.1	System permission.....	8-21
8.5.2	Equipment permission.....	8-22
8.5.3	User permission	8-24
8.5.4	Timed use	8-26
8.6	System information	8-30
8.7	Gain adjustment.....	8-32
8.8	Import.....	8-37
8.9	Export.....	8-38
8.10	Multi language download	8-39
8.11	System recovery	8-39
8.12	LOGO download	8-40

Chapter 9: PAR Group

9.1	Operation parameter	9-1
9.2	Tool magazine parameter.....	9-2
9.3	Machining parameter	9-3

9.4	Spindle parameter	9-4
9.5	Mechanical parameter	9-5
9.6	Origin parameter	9-6
9.7	Compensation parameter.....	9-7
9.8	System parameter.....	9-9
9.9	MLC setting.....	9-11
9.10	Graph parameter.....	9-12
9.11	Network setup	9-13
9.12	Servo parameter	9-15
9.13	Channel setup.....	9-16
9.14	RIO setting	9-18
9.15	Search	9-19

Chapter 10: SOFT group

10.1	Control panel	10-1
10.2	Factor regulation	10-3
10.3	Axis operation	10-4

Appendix A: Group function map

Chapter 1: Table of group menu

1.1 Table of system group menu

<u>POS coordinates function</u>			
Layer 1	Layer 2	Layer 3	Layer 4
ABS	-	-	-
REL	CLR ALL	-	-
	CLR X	-	-
	CLR Y	-	-
	CLR Z	-	-
	CLR A		
	CLR B		
	CLR C		
MECH	-	-	-

[Edit mode]

<u>PRG program function</u> file manager			
Layer 1	Layer 2	Layer 3	Layer 4
NEW FILE	-	-	-
COPY FILE	-	-	-
PASTE	-	-	-
DEL (file/folder)			
SEL TOGL			
CANCEL			
FOLDER	-	-	-
RENAME			
FIND FILE	-	-	-
MERGE	-	-	-
MACRO		-	-

<u>PRG program function</u> file editor			
Layer 1	Layer 2	Layer 3	Layer 4
File editing	COPY		-
	PASTE		-
	DEL	-	-
	UNDO	-	-
	B START	-	-
	B END		-
	LABLE		
	STRING	NEXT PREV	

[Auto mode]

Layer 1	Layer 2	Layer 3	Layer 4
SF set	-	-	-
START	RUN		

[JOG / MPG mode] program editing

Layer 1	Layer 2	Layer 3	Layer 4
SF set	-	-	-

[Manual mode] program editing

Layer 1	Layer 2	Layer 3	Layer 4
LOAD	-	-	-
SAVE	-	-	-
CLEAR	-	-	-

<u>Offset (OFS) function</u>			
Layer 1	Layer 2	Layer 3	Layer 4
COORD	AUTO	CLR REL	-
		CLR ALL	-
		SET L	-
		SET L/2	-
		SET P	-
	ABS	-	-
	INC	-	-
	SQUARE	X1	-
		X2	-
		Y1	-
		Y2	-
		SET	-
		SET Z	-
	CIRCLE	P1	-
		P2	-
		P3	-
		SET	-
		SET Z	-
CUTTER	ABS	-	-
	INC	-	-
	H SET	-	-
	CLEAR	H/D	-
		WEAR	-
		LIFE	-
		ALL	-
MAGA	Maga 1	SET (※ jog mode)	-
		RST ALL(※ jog mode)	-
		LOCK (※ jog mode)	-
	Maga 2	SET (※ jog mode)	
		RST ALL(※ jog mode)	
		LOCK (※ jog mode)	
MACRO	LOCAL	-	-
	GLOBAL	-	-
	HOLD	-	-

Graphic (GRA) function

Layer 1	Layer 2	Layer 3	Layer 4
VIEW	X-Y	-	-
	Y-Z	-	-
	X-Z	-	-
	CLEAR	-	-

Alarm (ALM) function

Layer 1	Layer 2	Layer 3	Layer 4
ALARM		-	-
HISTORY	CLR ALL	-	-

Diagnosis (DGN) function

Layer 1	Layer 2	Layer 3	Layer 4
PROCESS	SET	-	-
	CLR TIME	-	-
	CLR NR	-	-
USER VAR	US DEC	-	-
	HEX		
	S DEC		
	FLOAT		
MLC	BIT	DEL	
		X	-
		Y	-
		M	-
		A	-
		T	-
	REG	C	-
		T	-
		C (16)	-
		C (32)	
		D	
		US DEC	
		HEX	
		S DEC	-
		FLOAT	-
	DEV MON	US DEC	-
		HEX	
		S DEC	
		FLOAT	
	EDITOR (※ edit mode)	LD	-
		LDI	-
		LDP	-
		LDF	-

		OUT	-
		APP	-
		—	-
			-
		DEL V-LN	-
		ADD LN	-
		DEL LN	-
		DEL	-
		LABLE	-
		TABLE	-
		SYMBOL	X
			Y
			M
			A
			T
			C
			D
			P
			I
			DEL
			COPY
			PASTE
		SAVE	-
		IMPORT	IMPORT
		EXPORT	EXPORT
			NEW FILE
		JUMP TO	-
		SELECT	-
		CUT	-
		COPY	-
		PASTE	-
	SET(※ edit mode)	ON	-
		OFF	-
		RUN/STOP	-
	JUMP TO		

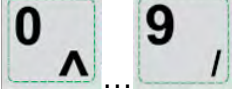
<u>Diagnosis (DGN) function</u>			
Layer 1	Layer 2	Layer 3	Layer 4
SYS MONI	VAR MONI	SYS VAR	-
		CH VAR	
		AXIS VAR	-
		IF VAR	
		US DEC	-
		BIN	
		HEX	
		S DEC	
STATUS	I/O MONI		
	SRV MONI	-	-
	SYSTEM		
PWD	FW SN		
	HW SN		
	S SCP	LOCK/UNLOCK	-
	M SCP	PWD CHG	-
		LOCK/UNLOCK	-
		RST U1	
		RST U2	
	U1 SCP	PWD CHG	-
		LOCK/UNLOCK	-
	U2 SCP	PWD CHG	
		LOCK/UNLOCK	
	EXPIRE	SETTING	
		RELEASE	-
		EXP SCP	PWD CHG LOCK/UNLOCK
TUNING (※ jog or hand wheel mode)	NEXT AX	-	-
	READ	-	-
	COMPUTE		
	WR GAIN	-	-
	WR NOTH	-	-
	RUN	-	-
	JOG ←		-
	JOG →		-
	POS 1		-
	POS 2		-
	TAP RIV	TAP SET	-
	SERVO	-	-
TEXT WR			
IMPORT	IMPORT	-	-
EXPORT	EXPORT	-	-
RECOVER	OK	-	-
LOGO WR	-	-	-

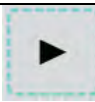
<u>System parameter (PAR) function</u>			
Layer 1	Layer 2	Layer 3	Layer 4
OPERATE	-	-	-
MAGA	-	-	-
PROCESS	-	-	-
SPINDLE	-	-	-
MACHINE	-	-	-
HOME	-	-	-
COMP	OK	-	-
	mm	-	-
	mm+	-	-
	um	-	-
	um+	-	-
	IMPORT	-	-
	IMPORT+	-	-
SYSTEM	DEFAULT	-	-
	COLOR	-	-
MLC	DEFAULT	-	-
	COLOR	-	-
GRAPHIC	DEFAULT	-	-
	COLOR	-	-
ETH.	DEFAULT	-	-
SERVO	READ	-	-
CONFIG	OK	-	-
SET RIO	OK	-	-
SEARCH	-	-	-

<u>SOFT group selection function (without physical control panel)</u>				
Control panel functions	Program execution	Hand wheel simulation	Tool magazine forward	Spindle forward
	Stop execution	Mechanical lock	Tool magazine backward	Spindle stop
	Single step pause	Program dry run	Chip removal forward	Spindle backward
	Selection stop	Mechanical lock	Chip removal backward	
	Single step ignore	Z-axis lock	Blow air	Spindle positioning
	Cutting fluid	Working light	Program protection	Limit remove
Factor adjust	Increasing	-	-	-
	decreasing	-	-	-
	100%	-	-	-
	0%	-	-	-
Axis operations	X←	-	-	-
	X→	-	-	-
	Y↗	-	-	-
	Y↘	-	-	-
	Z↑	-	-	-
	Z↓	-	-	-

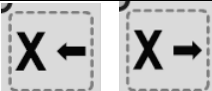
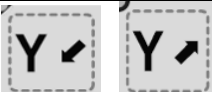
<u>Software group – selection function (with physical control panel)</u>			
Layer 1	Layer 2	Layer 3	Layer 4
Control panel functions	Program dry run	Chip removal forward	-
	Function lock	Chip removal backward	-
	Z-axis lock	Auto power off	-
	Mechanical lock	Z-axis lock	-
	Spindle positioning	Self-define 1	-
	Blow air	Self-define 2	-

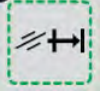
1.2 Primary control panel function keys

Name	Description	Modes that having this function
	One of the group keys. Coordinates display group key.	Every mode
	One of the group keys. Program edit group key.	Every mode
	One of the group keys. Coordinates setup and tool offset setup group key.	Every mode
	One of the group keys. Diagnosis function, system parameter, and system status group key.	Every mode
	One of the group keys. Alarm display group key.	Every mode
	One of the group keys. Path display group key.	Every mode
	Special group key. System parameter setup group key.	Every mode
	Special group key. Software control panel group key.	Every mode
	Reset key	Every mode
	Axis position and command code	PRG group
	Numeric key (computing symbol)	PRG, OFS, DGN group
	Decimal point (computing symbol)	PRG, OFS group
	Negative sign (computing symbol)	PRG, OFS group
	Page up and page down respectively	PRG, OFS, DGN group

Name	Description	Modes that having this function
   	Arrow keys (Up, Down, Left and Right) (computing symbol)	PRG, OFS, DGN group
	Jump to beginning (end) of word	PRG group
	Space	PRG group
	Upper/lower case shift	PRG group
	Delete (Insert)	PRG group
	Delete letter in front of cursor	PRG group
	Enter key	PRG, OFS, DGN group
	Exit dialog box	PRG, DGN group
	Parentheses	PRG group
 	Left and right function key	Every mode and group function
 	Function key	Every mode and group function

1.3 Secondary control panel function keys

Name	Description
	Auto mode: The program executes the specific mode
	Edit mode: File management and program editing mode
	Jog mode: Machine tools operation mode
	Hand wheel mode: Hand wheel operates machine tools axis
	Manual mode: Simple program input and execution mode
	Homing mode: Rapidly return to home sensor
	X-axis forward, X-axis backward: In JOG mode, manually operate X-axis in forward or backward direction
	Y-axis forward, Y-axis backward: In JOG mode, manually operate Y-axis in forward or backward direction
	Z-axis forward, Z-axis backward: In JOG mode, manually operate Z-axis in forward or backward direction
	Rotation-axis forward, Rotation-axis backward: In JOG mode, manually rotate the axis in forward or backward direction
	Spindle forward: Spindle moves forward in manual control
	Spindle stop: Spindle stops in manual control
	Spindle backward: Spindle moves backward in manual control
	Cut feeding and jog ratio increasing/decreasing adjustment
	Fast feeding ratio increasing/decreasing adjustment
	Spindle speed ratio increasing/decreasing adjustment

Name	Description
	Single step pause: After enabling the function, the system stops execution when finish one single step.
	Limit release: When the limit protection is effective, it is the main key to clear the limit alarm.
	Single step ignore: Enter “ / ” in the front and press  to enable this function.
	Tool magazine forward: In safe mode, it enables the tool magazine to move one position
	Tool magazine backward: In safe mode, it enables the tool magazine to reverse one position
	Selection stop: Press  and enter M01 command to enable this function
	Hand wheel simulation: During the program execution, after enabling this function, the hand wheel can be used to control the speed
	Cutting fluid ON/OFF: The switch of switching On/Off the cutting fluid
	Working light: The switch of turning On/Off the working light

Chapter 2: Table of function groups

2.1 Auto mode (AUTO)

The system must be in AUTO mode before a program can be executed. This enables users to validate machining program, cutting conditions, and coordinates of positions before execution as well as to avoid unexpected operation by incorrectly pressing keys in non-auto mode. The AUTO mode allows running program only. Users cannot edit the program nor do manual axial offset among other operations.

2.2 Edit mode (EDIT)

Program editing only can be done in EDIT mode. In EDIT mode, users may fully access various program editing functions available in PROGRAM group. Please note that program cannot be executed and do manual axial offset either as only the file editing function is available in this mode.

2.3 Manual mode (MDI)

- Users can input a single step program with screens available in PRG group and run it in MDI mode. As most MDI programs are simple ones manually entered by users, there is no need to have too much program content. MDI's PRG group screens allow a single step program of up to 17 statements. General program editing and editing and manual axial operations are unavailable in MDI mode.

2.4 Hand wheel mode (MPG)

- Manual axial offset for each axis with external hand wheel can be done in MPG mode for fast and solid axial movements. The program editing, execution, and jog operations are prohibited in MPG mode.

2.5 Jog mode (JOG)

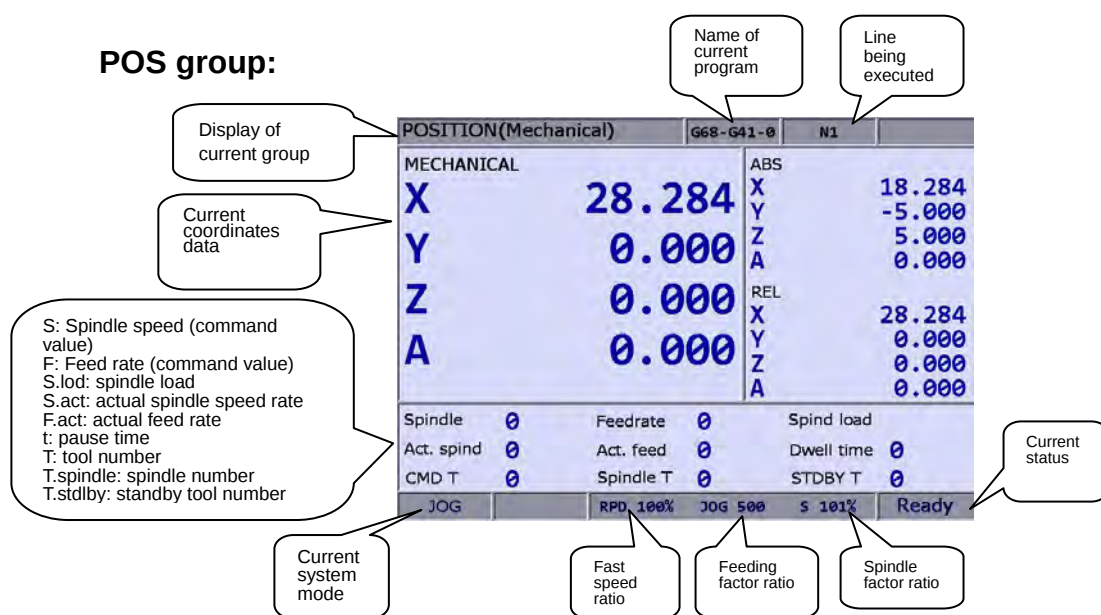
- Pressing relevant axial movement keys in secondary control panel can do axial jog offset in JOG mode. The speed and distance of each jog movement is controlled by the jog factor key. With the rapid feeding activation key and axial keys, the workbench can be moved. The axial moving speed is set by the rapid factor and can enable moving the workbench in long distance of each axis. Both program execution and editing functions are unavailable in JOG mode. Only manual axial offset with relevant axial movement keys can do in secondary control panel.

2.6 Home mode (HOME)

- The HOME mode simplifies the manual origin reset operation. When it is in HOME mode, the axis will return to its mechanical origin by pressing all the axial movement keys in secondary control panel. After re-starting the controller, it is required to reset each axis to its mechanical origin by running the HOME mode first for executing the program. Otherwise, the controller stops the program execution function.

Group screen overview

- Screens of function groups of this controller provide a full range of information. Some of the screens of each group are illustrated below.



As shown in the figure above, the system status column tells the status of this system for the controller user's reference. Valid statuses of the system in terms of priority are: MLC stop, servo not ready, emergency stop, in process, in operation, program stop, and preparation completed.

PRG group: (auto mode)

Display of current group

Program content being executed

Information of each coordinate that has being executed

Current system mode

Name of current program

Line being executed

F.act: actual feed rate
S.act: actual spindle speed
D: tool diameter compensation ID
H: tool length compensation ID
T: tool ID
F: Feed rate
S: Spindle speed
t: pause time
CYC: Single processing time

Current command status

Each current motion rate

PROGRAM(Program execute)		037	N1
00037			
N10	G00 G57 Z 0.25000	F.act 0	F 0
N20	G00 X 0.36264 Y 0.34746	S.act 0	S 0
N30	G01 Z-0.10000 F 200.	D 0	H 0
N40	G01 X 0.33430 Y 0.37996 F500.00	T 0	t 0
N50	G01 X 0.31345 Y 0.41995	CYC	00:00:00
N60	G01 X 0.29428 Y 0.48578	M00	G00 G17 G90 G23
N70	G01 X 0.29178 Y 0.55160	G94	G21 G40 G49 G80
N80	G01 X 0.30345 Y 0.61243	G98	G50 G64 G69 G15
N90	G01 X 0.33179 Y 0.66909	G54	
MECH ABS RESIDUAL G54			
X	28.284	X 18.284	X 0.000
Y	0.000	Y -5.000	Y 0.000
Z	0.000	Z 5.000	Z 0.000
A	0.000	A 0.000	A 0.000
AUTO RPD 100% F 30% S 101%			

Edit mode:

File list
Display folder and program files

File information
Display data on size of file/folder, modification date and time, etc.

File contents
Display program statements contained in the file

PROGRAM(File manage)		037	N1
CF:	Size Date Time		
00819.NC	497 KB 2008/06/30 04:51		
01433.NC	24 MB 2011/12/08 15:33		
0102-GMC	6 MB 2012/07/25 14:54		
00920.NC	335 KB 2008/02/05 00:02		
01453.NC	24 MB 2012/04/16 18:13		
00422	189 B 2012/06/27 18:50		
015.NC	144 B 2012/06/21 11:15		
01044.NC	115 B 2008/03/11 07:27		
03007	271 KB 2012/02/23 18:27		
00401	276 B 2012/03/26 13:58		
0447	367 B 2012/07/31 16:39		
037	271 KB 2012/05/15 13:05		
02005	84 B 2013/01/29 09:51		
EDIT			

PROGRAM(File edit)		037	N1	SFT
00037				
N10	G00 G57 Z 0.25000			
N20	G00 X 0.36264 Y 0.34746			
N30	G01 Z-0.10000 F 200.			
N40	G01 X 0.33430 Y 0.37996 F500.00			
N50	G01 X 0.31345 Y 0.41995			
N60	G01 X 0.29428 Y 0.48578			
N70	G01 X 0.29178 Y 0.55160			
N80	G01 X 0.30345 Y 0.61243			
N90	G01 X 0.33179 Y 0.66909			
N100	G01 X 0.36931 Y 0.72325			
N110	G01 X 0.41432 Y 0.76741			
N120	G01 X 0.46851 Y 0.80741			
N130	G01 X 0.52770 Y 0.83990			
N140	G01 X 0.55354 Y 0.85157			
N150	G01 X 0.58189 Y 0.86157			
N160	G01 X 0.61023 Y 0.87073			
EDIT				

Manual mode:

PROGRAM(Program execute)				MDI	N1	
G00G90G40G49G17					ABS	
G58X0.0Y0.0					X	18.284
G01X100.0Y0.0F1000					Y	-5.000
X100.0Y100.0					Z	5.000
X0.0Y100.0					A	0.000
X0.0Y0.0					RESIDUAL	
M30					X	0.000
					Y	0.000
					Z	0.000
					A	0.000
M00 G00 G17 G90 G23 G94 G21 G40 G49 G80 G98 G50 G64 G69 G15						
G54						
F 0 S 0 D 0 H 0 T 0 t 0						
MDI				RPD 100%	F 30%	S 101%
						Ready

Manual mode

The information of feed rate, spindle speed and compensation information

Coordinates information

Display the information of absolute/remaining coordinate

Command status

OFS group: (coordinates system data)

OFFSET(Set coord system)				037	N1	
OFFSET G54				MECH	REL	
X	0.000	X	0.000	X	28.284	X 28.284
Y	0.000	Y	0.000	Y	0.000	Y 0.000
Z	0.000	Z	0.000	Z	0.000	Z 0.000
A	0.000	A	0.000	A	0.000	A 0.000
G55 G56						
X	55.000	X	56.000			
Y	55.000	Y	56.000			
Z	-55.000	Z	-56.000			
A	0.000	A	0.000			
AUTO				RPD 100%	F 30%	S 101%

Coordinates system setup
Offset coordinates
/G54~G59Coordinates information
Mechanical/relative
coordinates

Tool data:

OFFSET(Cutter register)				037	N1	
Num	Length	Radius	Len wear	Rad wear	LIFE	
1	-50.000	1.000	0.000	0.000	1	
2	-100.000	5.000	-1.000	-0.500	0	
3	-100.000	3.000	0.000	0.000	0	
4	-100.000	4.000	0.000	0.000	0	
5	0.000	5.000	0.000	0.000	0	
6	-60.000	6.000	0.000	0.000	0	
7	-70.000	7.000	0.000	0.000	0	
8	-80.000	8.000	0.000	0.000	0	
9	-90.000	9.000	0.000	0.000	0	
10	-100.000	10.000	0.000	0.000	0	
11	-110.000	11.000	0.000	0.000	0	
12	-120.000	12.000	0.000	0.000	0	
13	0.000	13.000	0.000	0.000	0	
14	-140.000	14.000	0.000	0.000	0	
15	-150.000	15.000	0.000	0.000	0	
				MECH	Z	0.000
AUTO				RPD 100%	F 30%	S 101%
						Ready

Compensation ID
(H/D)Compensation data input
columnCompensation data
Tool length and
diameter as well
as length and
diameter
compensationAuxiliary display
Display current
mechanical
coordinates and
actual position of
the Z-axis

Gain adjustment:

Servo parameter ID
Servo parameter ID
and name

DIAGNOSE(Servo Tuning)				037	N1	SFT
Ch	Axis	Current	JL/Jm			
No.	Parameter Name	Calculate	In Drive			
P1-37	Load Inertia Ratio	0.0	0.0	MECH 28.285		
P2-00	Position Loop P gain	157	157	POS 1 -----		
P2-02	Position Feedforward	50	50	POS 2 -----		
P2-04	Speed Loop P gain	628	628	Rigidity 1		
P2-06	Speed Loop I gain	100	100	BW 100 Hz		
P2-25	OSC. Reject filter	16	16	JL/Jm 4.0		
P2-26	External Noise Reject	100	100	Acc. Time 200 ms		
P2-49	Speed D Filter and J Suppression	[0F]:800	[0F]:800	S Time 20 ms		
P2-47	Auto Resonance Suppression Sel	1	1	Speed 3000 mm		
P2-23	Notch filter Freq(1)	1000	1000	Interval 500 ms		
P2-24	Notch filter Gain(1)	0	0			
P2-43	Notch filter Freq(2)	1000	1000			
P2-44	Notch filter Gain(2)	0	0			
P2-45	Notch filter Freq(3)	1000	1000			
P2-46	Notch filter Gain(3)	0	0			
JOG				Ready		

Anchor point setup
Anchor point 1/
Anchor point 2

Adjustment conditions

Calculation result after adjustment

Display calculation result of auto gain

System existing settings

Display active servo settings

MLC operation/edit:

MLC program

Input column

DIAGNOSE(MLC Edit)				037	N1	
M500	FCMP	D1388	M83			
M67	M68	F2.000				
M1083						
X257						
X258						
X259						
X260						
X257	X258	X259	X260	MOV K0 K1M1122		
X257	X258	X259	X260	MOV K1 K1M1122		
X257	X258	X259	X260	MOV K2 K1M1122		
LD M500						
EDIT				R:0, C:1	1513/10240	Ready

ALM group:

The screenshot displays the "ALARM(Alarm)" screen. At the top, there are four status boxes: "G42-G01-G", "N14", and "SFT". Below these, the main area shows alarm information for entry "1":

Alarm occurring in chronological sequence	Alarm category ID	Alarm message	Date/Time
1	B100	KNIFE INTERFERENCE	2013/04/24 16:59:45

At the bottom of the screen, there is a row of controls: "AUTO", "ALARM" (highlighted with a red box), "RPD 100%", "F 30%", "S 101%", and "STOP".

GRA group:

GRAPHIC(X-Y plane)

0102-GMC

N1

MECH

X 113.000

Y 77.000

Z -59.000

A 0.000

ABS

X 54.000

Y 18.000

Z 0.000

A 0.000

AUTO

RPD 100%

F 30%

S 101%

Path diagram
Display program path

Coordinate information
Mechanical
coordinate/absolute
coordinate

Chapter 3: POS group

The POS group function displays data on mechanical, absolute, and relative coordinates. The basic display contains three axis coordinates (X, Y, Z). The display can up to three straight line axes and one rotation axis based on the settings of the number of rotation axes.

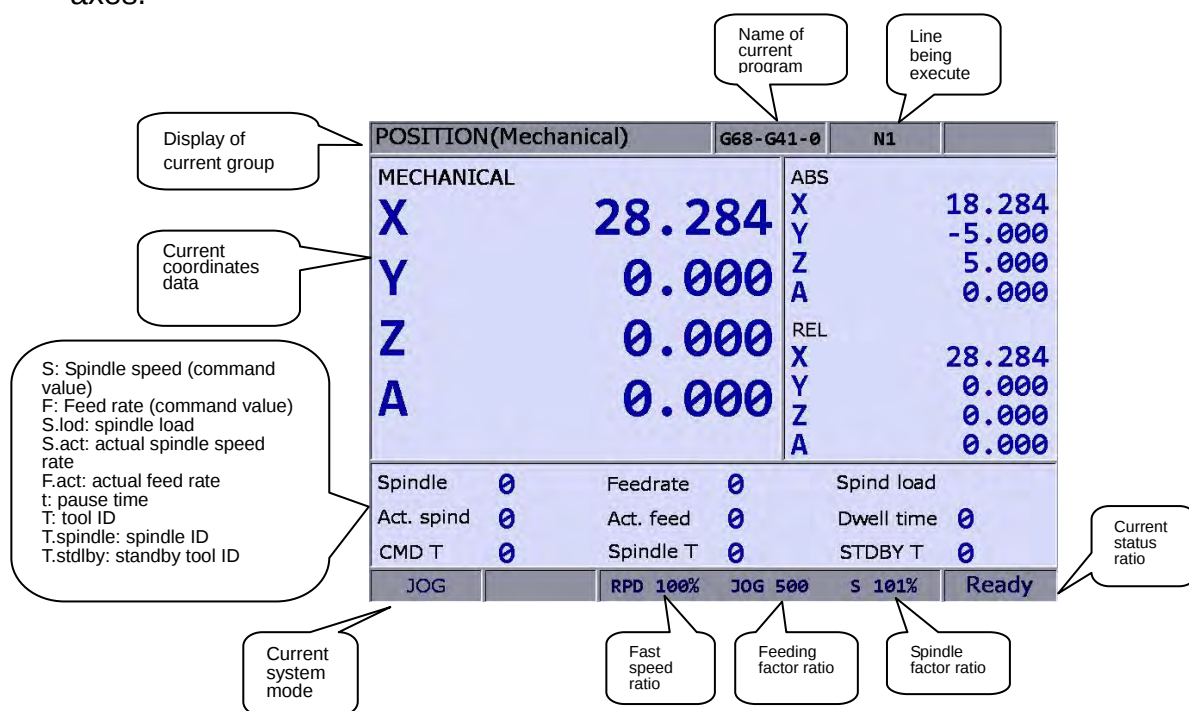


Figure: 3-1-1

3.1 Absolute coordinate

- The absolute coordinates are based on the origin of the machining program. These coordinates data are used to provide the coordinates in the program and can validate the movement position of the single program step.

See below for operation details:

- (1) Press **POS** key to open the coordinate group function display with absolute coordinates, relative coordinates, and mechanical coordinate options in the function bar.

- (2) Press **F1** key (ABS) to enter the absolute coordinates screen.

3.2 Relative coordinate

- The relative coordinate display movement distance against the origin.

See below for operation details:

(1) Press  key to open the coordinate group function display with absolute coordinate, relative coordinate, and mechanical coordinate options in the function bar.

(2) Press  key (REL) to enter the relative coordinate screen.

(3) Press  key (CLR ALL) in the lower layer function bar to clear relative coordinate of all axes.

Press  key (CLR X) to clear the value shown on relative coordinate of the X-axis.

Press  key (CLR Y) to clear the value shown on relative coordinate of the Y-axis.

Press  key (CLR Z) to clear the value shown on relative coordinate of the Z-axis.

Press  key (CLR A) to clear the value shown on relative coordinate of the A-axis.

Press  key (CLR B) to clear the value shown on relative coordinate of the B-axis.

Or press  key (CLR C) of the next page to clear the value shown on relative coordinate of the C-axis.

3.3 Mechanical coordinate

- The mechanical coordinate cannot be cleared and do not vary with the selected workpiece coordinates. And the mechanical coordinate data are unchangeable.

See below for operation details:

- (1) Press  key to open the coordinate group function display with absolute coordinate, relative coordinate, and mechanical coordinate in the function bar.
- (2) Press  key (MECH) to enter the mechanical coordinate screen.

(This page is intentionally left blank.)

Chapter 4: PRG group

The PRG group manages and edits G code and macro files. The file explorer is divided into three sections: (1) CF Card, internal memory, USB drive, and network; (2) folders and G code files; (3) G code files only. Each section has its exclusive functions, e.g. breakpoint search function under auto mode and program entry and execution under manual mode. Program modification and management functions are also provided here, including program file management and editing.

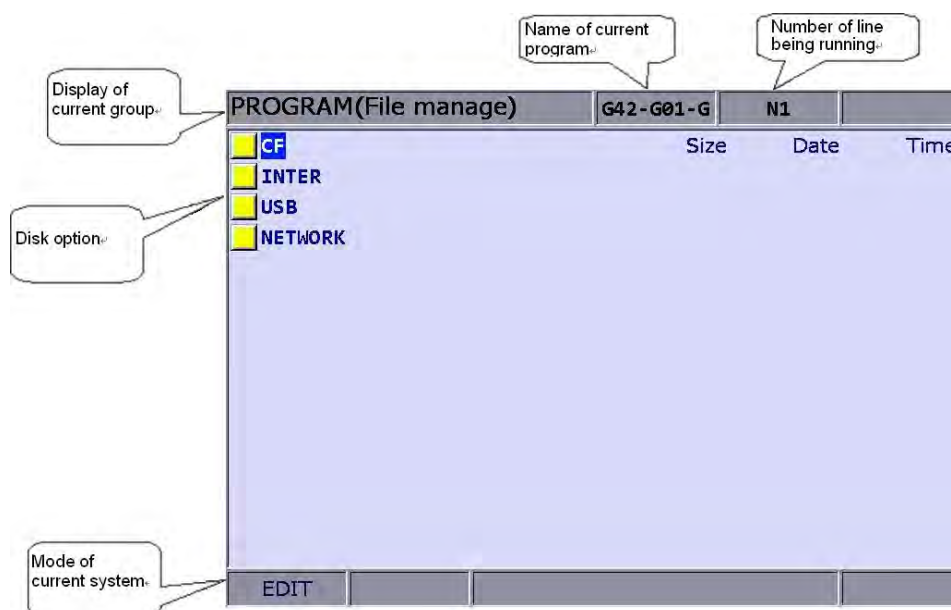


Figure 4-0-1

- (1) Switch to **Edit mode**, press the  key in first control panel and displays the screen of [Program Function].

- (2) Press  or  or  or  keys to move the cursor in the file explorer screen and press  key to enter the sub-manager screen to select G code files.

- (3) Select the desired G code file, press  key to enter the file editing screen.

Then, press  or  keys (scrolling one line up or down) or  or  keys (scrolling twenty lines up or down) to show the file contents.

Network setup parameters		
Code	Name	Range or Formats
10030	Host name	Length: 1~8 Actual setting: 1~8 characters
10031	IP address	Length: xxx · xxx · xxx · xxx Actual setting: 192 · 168 · 0 · 2
10032	Subnet mask	Length: xxx · xxx · xxx · xxx Actual setting: 255 · 255 · 255 · 0
10033	Default gateway	Length: xxx · xxx · xxx · xxx Actual setting: 0 · 0 · 0 · 0
10034	Network function ON	Length: 0~1 Actual setting: 1
10035	DHCP ON	Length: 0~1 Actual setting: 0
10036	IP address of remote computer 1	Length: xxx · xxx · xxx · xxx Actual setting: 192 · 168 · 0 · 1
10037	IP address of remote computer 2	Length: xxx · xxx · xxx · xxx Actual setting: 0 · 0 · 0 · 0
10038	IP address of remote computer 3	Length: xxx · xxx · xxx · xxx Actual setting: 0 · 0.0 · 0
10039	IP address of remote computer 4	Length: xxx · xxx · xxx · xxx Actual setting: 0 · 0 · 0 · 0
10040	IP address of remote computer 5	Length: xxx · xxx · xxx · xxx Actual setting: 0 · 0 · 0 · 0
10041	IP address of remote folder sharing	Length: 0~5 Actual setting: 0

Communication protocol of PC: Set up TCP/IP in Networking of the operating system (see Figure 4-0-3) or **CNC Network software → Setup**

Set up networking in PC operating system:

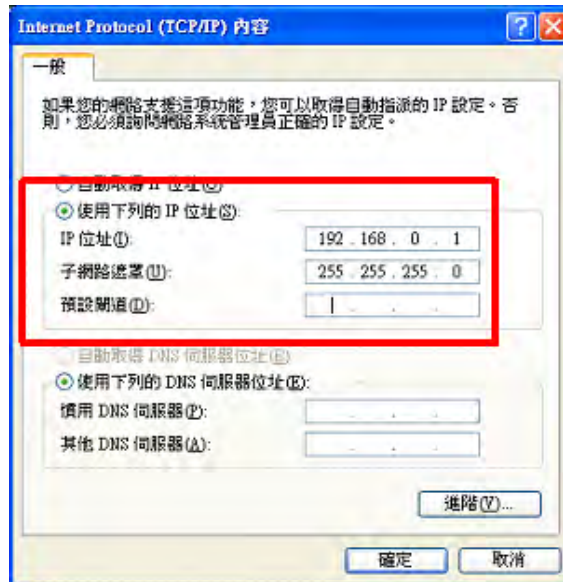


Figure 4-0-3

- Steps:** (a) Check "Use the following IP address" option then enter in sequence:
"IP address": **192 . 168 . 0 . 1**
"Subnet mask": **255 . 255 . 255 . 0**
(b) Press OK to complete the setting.

Networking settings at Network software end:



Figure 4-0-4

- Steps:** (a) Execute the CNC Network software, enter the Setup screen and enter the settings listed below in sequence:
"IP address": **192 . 168 . 0 . 1**
"Subnet mask": **255 . 255 . 255 . 0**
(b) Press "Search CNC" key after entry is completed to connect with the CNC based on the settings given here.

■ DNC connection:

Through Network software, users may open the shared files in file sharing list. Then, execute G code in transmission-along-with-machining (DNC) mode via Ethernet. No extra disk space is required for file storage as only the path of shared files is recorded.

See the operation steps described below:

1. Finish the Network setup of PC and NC300 system through Ethernet communication setting.
2. Start the CNC Network software.
3. Click Function bar **__DNC operation tab**.

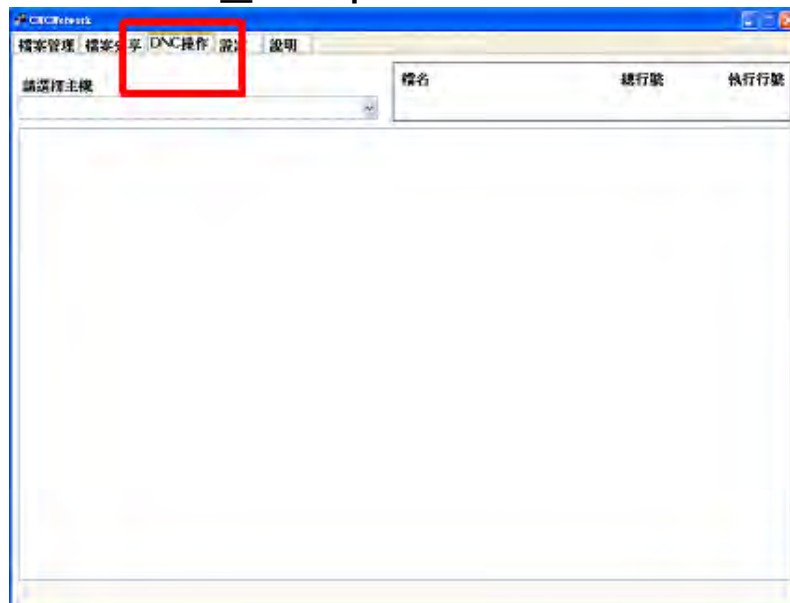


Figure 4-0-5

4. Enter the "**Edit mode**" of NC300 system then enter the top layer NETWORK\Option in file explorer.



Figure 4-0-6

5. Shared files display. Select and open the G code file that has been set to share from the shared file.
6. Set NC300 to "**Auto mode**" then execute the Cycle start command to start running the G code file by DNC connection. The execution method is the same as the general file.
7. During DNC execution, contents of the file are displayed in the function window of the CNC Network software's DNC operation, including name of connected system, name of running DNC file, total number of lines, executing line number and file contents. (File contents scroll down along with the execution progress as shown in Figure 4-0-8).

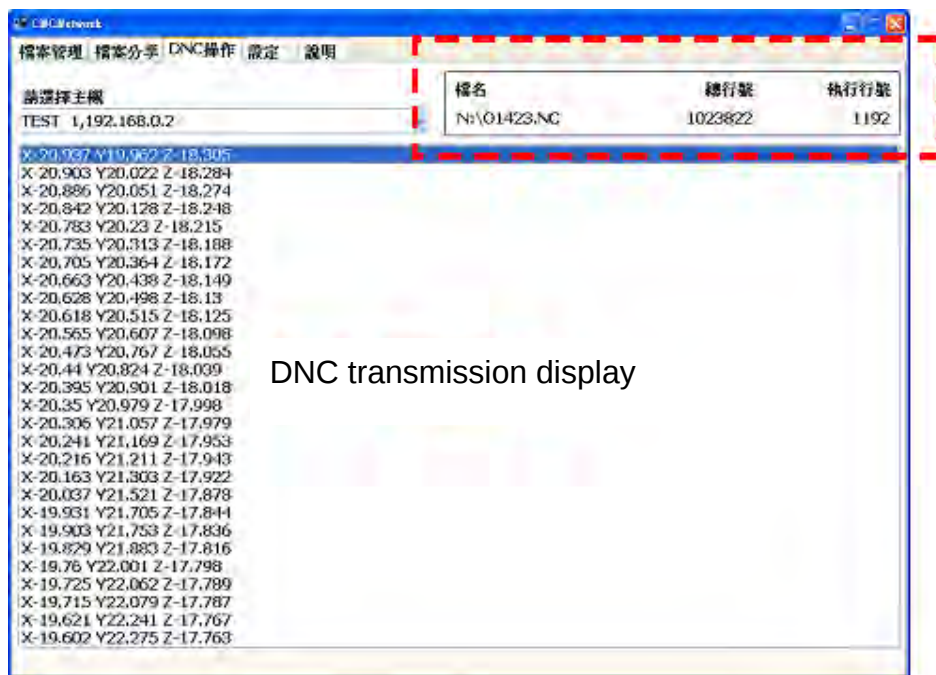


Figure 4-0-8

4.1 Add (create new file)

- Users may use the Add function in "Edit mode" to create a new G code file from the controller interface. See the operation steps described below:

(1) Set the system to "Edit mode".

(2) Press  key, the screen of switching groups will be the [Program menu].

(3) In file explorer, press , , or   keys to move the cursor to the disk location and data layer for file creation (e.g. the 2nd or the 3rd layer under CF or USB directory).

(4) Press  key (NEW file) and the file name setup dialog box will pop up.

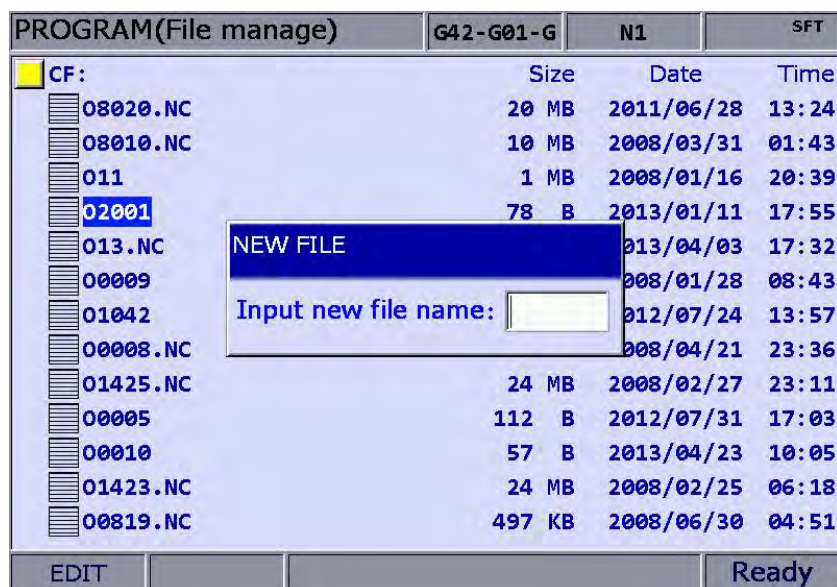


Figure 4-1-1

(5) Type alphanumeric letters (symbols are not included) in the box and press  key to create a new file.

Format of file name:

File format specifications	
Format of machining file name (G code)	No restriction on format of master file name (file name must be unique in one directory)
	O + 0001~8999 (for subroutines)
Format of macro file name (O Macro)	O + 9000~9999
Remarks in file name	Suffix a '-' symbol in the file name along with more alphanumeric letters
Format of M macro file name	M + 10000~29999
Format of G macro file name	G + 30000~49999
Maximum length of file name	31
Storage location	Second and third management layer
Restriction symbol in file name	* / \ < > ? " :

Note:

- (a) File name must be unique in one directory, e.g. O0001 and O1 are treated as the same.
- (b) Only the machining files are displayed in file explorer. The macro files display only upon special permission.

4.2 Copy

Use this option to copy existing files in the disk drive; see the operation steps described below:

- (1) Set the system to "**Edit mode**".

- (2) Press  key and the screen of switching group will be the [Program menu].

- (3) In file explorer, press  or  or   keys to move the cursor to disk location and data layer of the source file (e.g. the 2nd or 3rd layer under the CF or USB directory).

- (4) Move the cursor to the location of the target file.

- (5) Press  key (Copy file) to copy the file. Please note that it is required to execute the "Paste" function to create the target file.

4.3 Paste

- As described in Section 4-2, it is required to execute this function together with the Copy function to copy a file. This function is one of the PRG file explorer functions. See the operation steps described below (continued from Section 4-2).

(1) Press   or   keys to move the cursor to the disk, data directory or layer of the target file.

(2) Enter the directory of the target file, press  key (Paste), enter a new name or accept the old name of the target file in the popup dialog box. Press  key and the copy and paste functions are completed.

Note:

- (a) Please note that if the newly copied file exists in the same directory, then its name must differ from the source one.
- (b) The system prompts an information box with the message 'Please copy a file at first' if no copy operation has been done beforehand. The file past function has no effect.

4.4 Delete (for files and folders)

- This function deletes files and folders below the root layer.

See the operation steps described below:

- (1) Set the system to "Edit mode".

- (2) Press  key and the screen of switching group will be the [Program menu].

- (3) In file explorer, press  or  or   keys to move the cursor to disk location and data layer of the file or folder to be deleted.

- (4) Point to the file or folder to be deleted.

- (5) Press  key (DEL) and the "Do you really want to delete?" dialog box will pop up. Press "Y" and  key to delete the selected file or folder.

Note: The deleted file cannot be recovered by undoing the delete operation.

4.5 Select/Deselect multiple files

- In addition to single file operation, users may use the select/deselect function key from the function bar in file explorer menu to select/deselect multiple files for copying or deleting.

See the operation steps described below:

- (1) Set the system to **"Edit mode"**.

- (2) Press  and the screen of switching group will be the [Program menu].

- (3) Enter the folder of multiple file selection.

- (4) Press ;  keys or   keys to point to the desired files.

Press  key (SEL TOGL) to select or deselect (see Figure 4-5-1). For files

that have been selected, pressing the  key (SEL TOGL) again will cancel their selection.

PROGRAM(File manage)		G42-G01-G	N1	
CF:\POSITION		Size	Date	Time
	05405-1	1019 B	2012/07/20	10:07
	05405-2	330 B	2012/07/20	10:13
	05406-1	164 B	2012/07/24	09:03
	05406-2	164 B	2012/07/24	09:09
	1000	156 B	2012/08/30	14:35
	1111	65 B	2012/09/10	16:48
	1112	56 B	2012/07/10	16:45
	1113	65 B	2012/08/10	17:23
	1001	93 B	2012/09/04	15:07
	5401-01	303 B	2012/11/02	13:35
	G54-G28	499 B	2012/07/09	14:30
	G54-G28-1	753 B	2012/06/29	15:39
	05401	286 B	2012/06/26	08:53
EDIT				

Figure 4-5-1

- (5) Press  key (Copy file) to copy multiple files.

(6) Point to another directory, press  key (Paste) to paste multiple files as shown in Figure 4-5-2.

PROGRAM(File manage)		G42-G01-G	N1	
CF: \COPY		Size	Date	Time
	1000	156 B	2013/04/24	17:32
	1111	65 B	2013/04/24	17:32
	1112	56 B	2013/04/24	17:32
	1001	93 B	2013/04/24	17:32
EDIT				

Figure 4-5-2

See the operation steps described below:

- (1) Set the system to "**Edit mode**".

- (2) Press  key and the screen of switching group will be the [Program menu].
 (3) Enter the folder of multiple file selection.

- (4) In file explorer, press ;  keys or   keys to point to the desired files. Press  key (SEL TOGL) for selection. For files that have been selected, pressing the  key (SEL TOGL) again will cancel their selection.

- (5) Press  key (DEL) and the "Do you really want to delete?" dialog box will pop up (see Figure 4-5-3). Press "Y" and  key to delete the selected files.

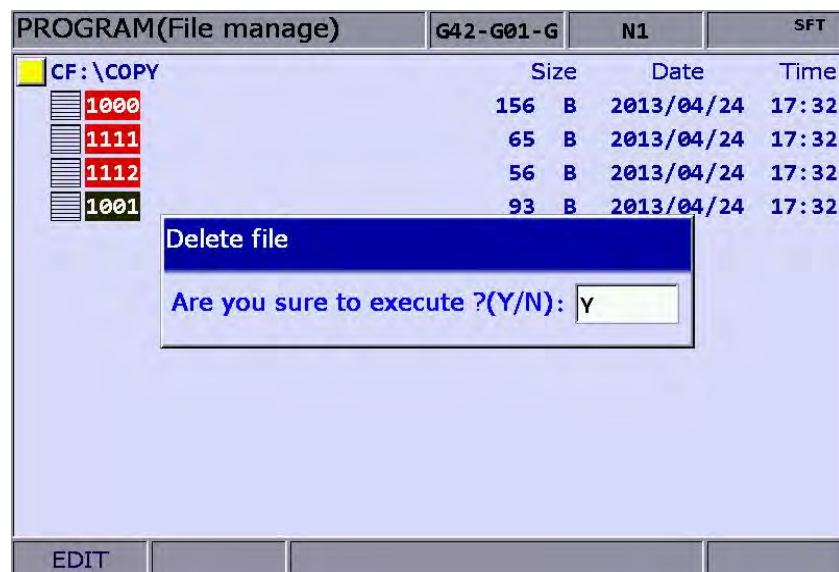


Figure 4-5-3

Note:

- (a) Multiple files can be copied only to another folder. If trying to copy multiple files in the same folder, the system prompts users to select another destination path and ignore the paste operation.
- (b) When duplicated file names are encountered while copying multiple files, the NC300 numerical control system prompts users with an overwrite option dialog box. Users can select "Y" (yes) to overwrite the existing file, or select "N" (no) or press "EXIT" key to ignore the pasting operation.

4.6 Rename

- Use this function to change the name of existing files. See the operation steps described below:

(1) Set the system to "**Edit mode**".

(2) Press  key and the screen of switching group will be the [Program menu].

(3) In file explorer, press , , or   keys to move the cursor to the disk location and data layer for file creation (e.g. the 2nd or 3rd layer under the CF or USB directory).

(4) Press  key to select the next option page.

(5) Point to the file that desired to rename and press  key (Rename) and the file name input dialog will pop up.

(6) Enter a new name of the file which differs from any file in the directory and press  key.

Note:

- (a) A G code file can be added in layer two or three but not layer one in file explorer.
- (b) Naming and format for the file name during renaming follows the same rule of adding a new file. If the name of a file after renaming is the same as an existing file in the directory, the system prompts users with an error message and aborts the renaming operation.

4.7 Add folder

- This function adds a new folder in the second layer of the file explorer for G code files. The second layer may thus contain both G code files and folders.

See the operation steps described below:

- (1) Set the system to "Edit mode".
- (2) Press  key and the screen of switching group will be the [Program menu].
- (3) Press  key to enter the next page.
- (4) Press  key (FOLDEL) in the second layer of the file explorer to display the dialog box for directory name.

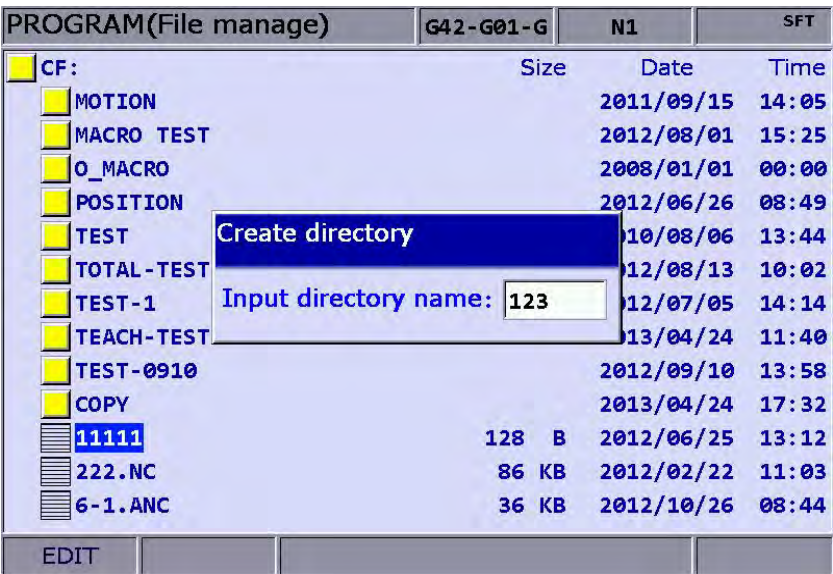


Figure 4-7-1

- (5) Enter the name of the directory and press  key to complete the creation.

This creates a new folder in the second layer of the file explorer and does file creation and editing of files (such as G code files) at the third layer of the file explorer.

Format of directory name:

Format of directory name	
Format of directory file name	Any alphanumeric letter
Maximum length of directory name	31
Storage location	The 2nd management layer

4.8 File searching

- This function enables users search among many files and open a desired G code file. With a given file name users can search and open files quickly.

(1) Set the system to "**Edit mode**".

(2) Press  key and the screen of switching group will be the [Program menu].

(3) In file explorer, press  or  keys or   keys to move the cursor, press  key to enter the target location in the second or third layer.

(4) Press  key to select the next option page.

(5) Press  key (FIND FILE), and the file name input dialog will pop up. Enter the desired file name and press  key to search and open the target file.

Note:

- (a) Instead of searching all directories, this file searching function is limited to one directory.
- (b) This function searches exact instead of fuzzy file names.

4.9 File merge

- This function copies and merges two G code files into one.

See the operation steps described below:

- (1) Set the system to "**Edit mode**".

- (2) Press  key and the screen of switching group will be [Program menu].

- (3) Press ;  keys or   keys to move the cursor, press  key to enter the target location in the second or third layer.

- (4) Select the G code file that desire to copy.

- (5) Press  key (Copy file) to save the file in the system's clipboard.
- (6) Move the cursor to the directory of the target file to be merged.

- (7) Press  key to select the next option page.

- (8) Press  key (MERGE) and the file name input dialog will pop up. Enter the desired file name and press  key to open the target file.

- (9) Move the cursor to the location in the target file where desire the source file to be copied to. Press  key (Paste) and the confirm dialog box will pop up.

Press "Y" (Yes) and  key to merge both files.

- (10) Execute auto save, including switch mode, open other files or press the RESET key, to complete the merge operation.

4.10 Macro file

- This function manages and edits equipment specific macro files. With proper permissions, users can use all the edit functions to manage and edit macro files as described in **Section 4.10**. Otherwise, users can only browse existing macro files but cannot view or edit the contents. **For macro file edit permission, please contact the local service provider.**

4.11 File editing

- The edit group function enables users to edit and manage G code files. After a G code file is opened, the file explorer enters the file editing page. Point the cursor to any location in the file, use the text, number, or edit key in the first control panel to edit as required. After the editing is completed, switch mode, execute RESET or open other files will automatically save the file.

See the steps described below for file editing:

- (1) Set the system to "**Edit mode**".

- (2) Press  key and the screen of switching group will be the [Program menu].

- (3) Press  or  keys or   keys to move the cursor, press  key to enter the target location in the second or third layer.

- (4) Select the desired G code file, press  key to open the file in edit mode.

- (5) Use     keys to point the cursor to any location in the file.

- (6) Use the text, number, or edit key in the first control panel to edit as required.

- (7) Save the changes by performing auto save operations, including switch mode, open other files, or press RESET.

Edit function specifications:

Edit function specifications	
The maximum number of characters per line	255
Available editing modes	Edit mode
Size limit of editable files	Only the file with size less than 500KB can be edited.

Note: The edit relevant function bar displays only when entering the "edit mode" of the file management or edit function. Otherwise, in non-edit mode, the PRG group function provides views and coordinates information display of currently open files only.

4.11.1 Search by line number

- This function enables users to search contents in running G code files by line number.

See the steps described below for file editing:

- (1) Set the system to "Edit mode".

- (2) Press  key and the screen of switching group will be the [Program menu].

- (3) Press  keys or  keys or   keys to move the cursor, and then press  key to enter the target location in the second or third layer.

- (4) Point to the desired G code file, press  key to open the file and enter the edit mode.

- (5) Press  function key to select the next option page.

- (6) Press  key (LABEL) and the line number input dialog box (key pad 0~9) will pop up.

- (7) Enter the desired line number and press  key. The cursor moves to the given line number and finish searching.

Line number search specifications

Line number search specifications	
Maximum length of searching string	62
Format of searching string	Actual line number of program (key pad 0~9)

4.11.2 Search by keywords



This function enables users to search the program by keywords. Searching results vary with the fuzziness of selected keywords.

See the steps described below for file editing:

- (1) Set the system to **"Edit mode"**.

- (2) Press  key and the screen of switching group will be the [Program menu].

- (3) Press ;  keys or   keys to move the cursor, press  key to enter the target location in the second or third layer.

- (4) Point to the desired G code file, press  key to open the file and enter the edit mode.

- (5) Press  key to select the next option page.

- (6) Press  key (STRING) and the keyword input dialog box will pop up.

- (7) Enter the desired keywords and press  key. The cursor moves to the first location where the keyword occurred in the file.

- (8) The keywords are highlighted in block and the 'Forward' and 'Backward' options are displayed in the function bar.

- (9) Press  key (NEXT) to search the next match. Press  key (PREV) to search the previous match.

- (10) Press  key to exit the keyword search page. The function bar resumes displaying normal file editing options.

- (11) Return to the edit function bar, repeat step (6) ~ (9) to search with other keywords.

Keyword searching specifications

Keyword searching specifications	
Maximum length of keyword	63

4.11.3 Block starting/ending point



This function simplifies file editing in case a large section of program modification is required. Users can define a block by defining its beginning and ending point with the cursor then edit the block with normal delete, copy and paste functions.

See the steps described below:

- (1) Set the system to **"Edit mode"**.

- (2) Press  key and the screen of switching group will be the [Program menu].

- (3) Press   keys or   keys to move the cursor, press  key to enter the target location in the second or third layer.

- (4) Point to the desired G code file, press  key to open the file and enter the edit mode.

- (5) Press  key (B start) to set the current cursor position as the start of the block.

- (6) Use     keys to move the cursor to the desired block end.

- (7) Press  key (B end) to set the current cursor position as the end of the block. See the figure below.



Figure 4-11-1

(8) Follows step (5) ~ (7), press  key (DEL) to delete text in a given block.

(9) Follows step (5) ~ (7), press  key (Copy) to copy text in a given block.

Move the cursor to the desired paste area, and press  key (Paste) to paste the selected text.

4.11.4 Delete (lines and blocks)

- This function deletes the entire line where the cursor is located or the block set up earlier. It also can delete the text of the entire block with the setting of block at start and end point.

See the steps described below:

(1) Set the system to **"Edit mode"**.

(2) Press  key and the screen of switching group will be the [Program menu].

(3) Press   keys or   keys to move the cursor, press  key to enter the target location in the second or third layer.

(4) Point to the desired G code file, press  key to open the file and enter the edit mode.

(5) Move the cursor to the line to be deleted and press  key (DEL) to delete the entire line.

(6) Delete a program block in the same way as described in **Section 4-11-3**. See step (8) for defining the starting and ending points of a block.

4.11.5 Copy and paste (line and block)

- Move the cursor to the desired line, press the copy function key to the clipboard, and paste to the selected location. This function applies to text in a given block.

See the operation steps described below:

- (1) Set the system to "**Edit mode**".

- (2) Press  key and the screen of switching group will be the [Program menu].

- (3) Press  or  keys or   keys to move the cursor, press  key to enter the target location in the second or third layer.

- (4) Point to the desired G code file, press  key to open the file and enter the edit mode.

- (5) Move the cursor to the desired line for copying, press  key (Copy).

- (6) Move the cursor to the target paste location and press  key (Paste) to paste the line.

- (7) The entire block can be copied as described in **Section 4-11-3**. See step (9) for defining the starting and ending points of a block.

4.11.6 Undo

- Users can press the 'undo' key to cancel previous editing operations for up to several steps.

See the steps described below:

- (1) Set the system to "**Edit mode**".

- (2) Press  key and the screen of switching group will be the [Program menu].

- (3) Press   keys or   keys to move the cursor, press  key to enter the target location in the second or third layer.

- (4) Point to the desired G code file, press  key to open the file and enter the edit mode.

- (5) Press  key (Undo) to undo the last editing operation.

4.12 Other mode functions

■ Auto mode (AUTO):

After entering the PRG group screen, the contents of the currently opened G code file display. The status information of the currently opened/executed file as well as the line being executed can be viewed. The PRG group function in auto mode displays program execution relevant information and coordinates of movements during program running.

See the operation steps described below:

- (1) Press  key in "Auto mode" to display program running status in full screen as illustrated in the figure below.

PROGRAM(Program execute)	037	N1	
00037			
N10 G00 G57 Z 0.25000			
N20 G00 X 0.36264 Y 0.34746			
N30 G01 Z-0.10000 F 200.			
N40 G01 X 0.33430 Y 0.37996 F500.00			
N50 G01 X 0.31345 Y 0.41995			
N60 G01 X 0.29428 Y 0.48578			
N70 G01 X 0.29178 Y 0.55160			
N80 G01 X 0.30345 Y 0.61243			
N90 G01 X 0.33179 Y 0.66909			
N100 G01 X 0.36931 Y 0.72325			
N110 G01 X 0.41432 Y 0.76741			
N120 G01 X 0.46851 Y 0.80741			
N130 G01 X 0.52770 Y 0.83990			
N140 G01 X 0.55354 Y 0.85157			
N150 G01 X 0.58189 Y 0.86157			
N160 G01 X 0.61023 Y 0.87073			
AUTO		RPD 100%	F 30% S 101%

Figure 4-12-1

- (2) Press **PRG** key again as described above to switch to the program and coordinates combine screen as illustrated below.

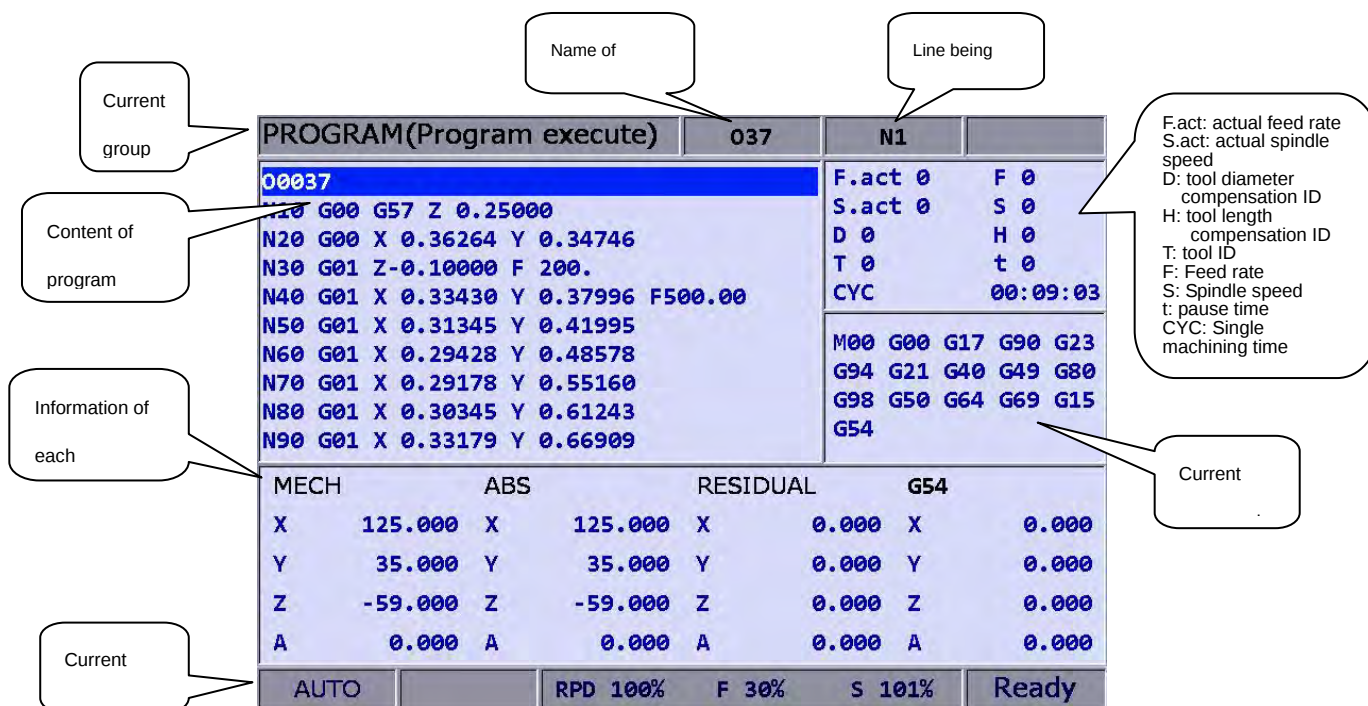


Figure 4-12-2

The **breakpoint search** function in auto mode can be used to track an auto recorded line number after program abortion (see DGN_system information for relevant information screen). The program for tracking from cursor position to selected searching line/sequence number employs internal fast computing and running; see the figure below for illustration.

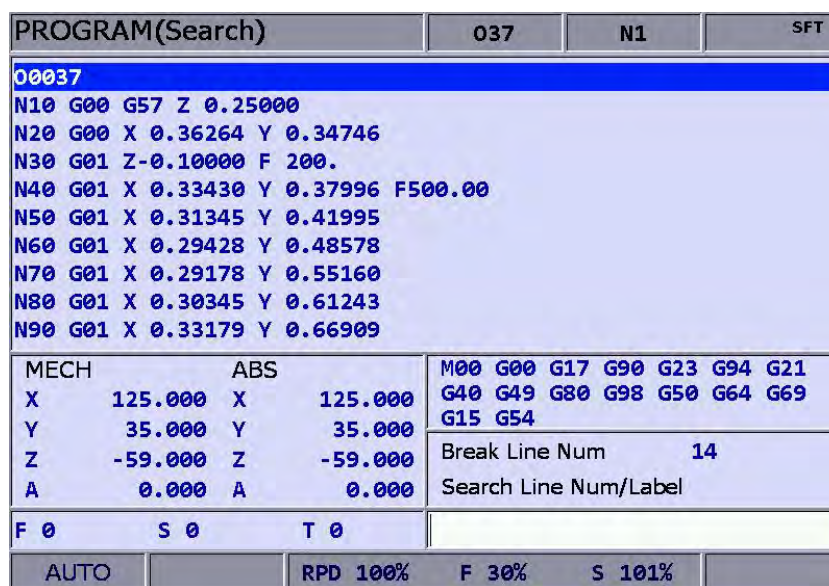


Figure 4-12-3

See the operation steps described below:

- (1) Press  key in "**Auto mode**" to enter the program running screen.
- (2) Press  key (START) and the breakpoint search screen pops up.
- (3) Based on the breakpoint line number information, enter the desired program line or sequence number. Press  key to complete the setting.
- (4) Press  key (RUN) to move the cursor to the re-starting line or sequence number by internal operation.
- (5) The steps before the specified line number are executed by the controller internally with results recorded automatically. The system stops at the breakpoint line and waits for its execution.
- (6) Press "Cycle start" key to resume normal program execution.

Note:

- (1) The system stops program execution when it reaches the re-start step. The line remains unexecuted until the Cycle start is pressed and the system resumes normal operation.
- (2) Valid search formats are the line and N number of the program.
- (3) During program running or after breakpoint search is defined as in program running status, any breakpoint search request will be ignored.

The **SF setup** function can be used to change the feeding speed (F command) and spindle speed (S command) during G code execution, see as Figure 4-12-4 below. After the setting of SF and entering the new command value, the speed command is changed.



Figure 4-12-4

See the operation steps described below:

- (1) Press  key to enter the program execution screen in Auto mode.
- (2) Press  key (SF set) and the SF command input dialog box will pop up.
- (3) Enter new S or F values, press  key and the speed is changed.

Note:

- (1) The SF settings are valid during single execution only while the S and F values in the G code remain intact. For a G code that requires repeated execution, it is recommended to edit the program and ensure the accuracy of speed commands.
- (2) A revised S value will apply to the spindle speed in the G code immediately while the F value setup applies and the new feed speed (F command) takes effect only after new data in the system buffer is processed.
- (3) Do not use this function to change the existing speed command for a G code program without S and F commands.

■ JOG and handwheel mode (JOG, MPG):

See the SF setting steps described below:

(1) In JOG mode or MPG mode, press  key to enter into the program execution screen.

(2) Press  key (SF set) and the SF command input dialog box will pop up.

(3) Enter new S or F values, press  key, and the speed is changed.

■ Manual mode (MDI):

The PRG group function provides simplified program entry, save, clear, and execution functions in manual mode. See the figure below for the program editing screen. This is exclusive to manual mode. Before the manual edited program is loaded in the system only the cursor displays. Users can enter up to 17 lines of program steps. It is required to **load** the program again before running it. Otherwise, it cannot be executed.

PROGRAM(Program execute)	MDI	N1	
G00G90G40G49G17		ABS	
G58X0.0Y0.0		X	125.000
G01X100.0Y0.0F1000		Y	35.000
X100.0Y100.0		Z	-59.000
X0.0Y100.0		A	0.000
X0.0Y0.0		RESIDUAL	
M30		X	0.000
		Y	0.000
		Z	0.000
		A	0.000
M00 G00 G17 G90 G23 G94 G21 G40 G49 G80 G98 G50 G64 G69 G15			
G54			
F 0	S 0	D 0	H 0
		T 0	t 0
MDI		RPD 100%	F 30%
		S 101%	Ready

Figure 4-12-5

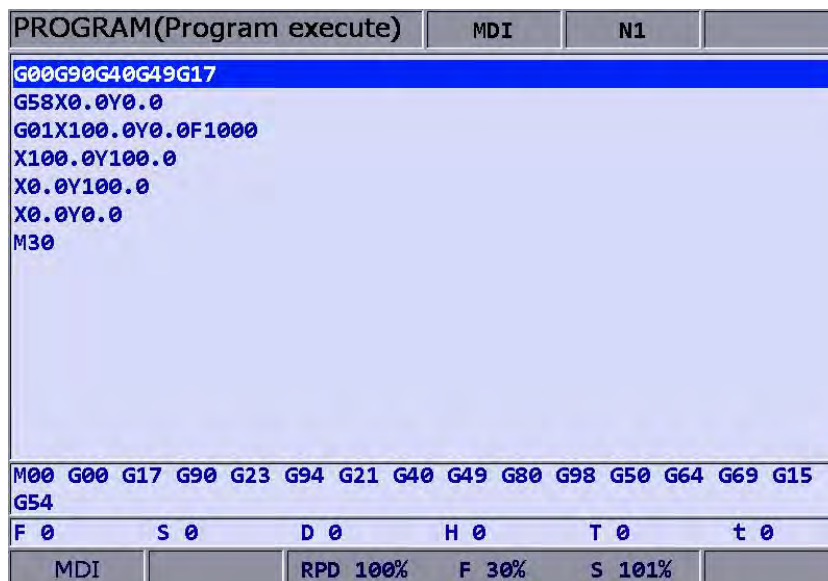


Figure 4-12-6

The file **save** function saves the manual edit file in the current directory with the naming rule that described in **Section 4-1**. The **Add file** function requires giving a unique name in the current directory and with a format compliant with this standard. The **clear** function removes contents in the programming page of manual mode. It functions the same as pressing and holds the RESET key for 3 seconds.

Note:

The RESET key has two functions in manual mode. The first one is the same as in auto mode which aborts the execution of a program and returns to the first line of a manual entry program. The second can clear the contents in the manual entry area by pressing and holding for 3 seconds.

(This page is intentionally left blank.)

Chapter 5: OFS group

The OFS group provides setup functions for workpiece setup, cutting tool's length or diameter compensation, and variables of macros.

5.1 Coordinates setting

The coordinate system (G54~G59) provides multiple workpiece coordinates system setup function. Together with the workpiece coordinates system (G54 ~G59) command, the G code command not only simplifies coordinate calculation during program coding but also enhances flexibility in changing coordinate data for machining. This data table enables users to designate coordinate data by working together with any workpiece coordinates system command in G54~G59 of G code as illustrated in the figure below.



Figure 5-1-1

See the operation steps described below:

- (1) Press **OFS** key to enter the [Offset menu].
- (2) Press **F1** key (Coord) to enter the coordinates system setup function bar screen.

Note:

- (a) To set up coordinates system only when no machining program is executing. During program execution, data entry is rejected by the system.
- (b) The end of execution of a single step program is defined as not in running status while a paused program is in running status.

5.1.1 Auto setting

- The auto setting function inputs the current position of each axis to the coordinates system (G54~G59) where the cursor is. The input method includes single axis, multiple axis and L/2. The L/2 input shall work together with the relevant axis clear function. The auto setting function also clears the numeric values of a given coordinates system with sub-functions of relative clear, all clear, L input, L/2 input and P input.
- The **All Clear function** clears all axis value of the current coordinates system to zero while all other coordinate systems' value remains intact.

See the operation steps described below:

- (1) Press  key to enter the [Offset menu].
- (2) Press  key (Coord) to enter the coordinates system setup function bar screen.
- (3) Press  key (Auto) to switch to the screen with the coordinates auto setup function bar.
- (4) Use     keys to move the cursor to the position of coordinate system group designation.
- (5) Press  key (CLR ALL) to remove all coordinates group data where the cursor resides.

- **Relative clear:** Relative coordinates data corresponding to cursor position is removed by this function. Axis types are determined by cursor position. Relative coordinates irrelevant to the cursor remain intact. This function clears relative coordinate value in the coordinates display rather than data of the actual workpiece coordinates system.
- **L/2 input:** This function sets up a coordinates system with the origin at the center of an object. It replaces manual calculation and entry steps with the system's auto calculations and setting. It requires an accompanying relative clearing function.

See the operation steps described below: (illustration based on X-axis)

- (1) In **[Jog mode]** or **[Hand wheel mode]**, move the machine axially to the initial X-axis contact point of the workpiece.
- (2) Press  key to enter the [Offset menu].
- (3) Press  key (Coord) to enter the coordinates system setup function bar screen.
- (4) Press  key (Auto) to switch to the screen with the coordinates auto setup function bar.
- (5) Use     keys to move the cursor to the X-axis coordinates column position for coordinate system group designation.
- (6) Press  key (CLR REL), the relative coordinates data corresponding to the cursor position is reset to zero and the system temporarily sets this point as the X-axis starting point of the workpiece as illustrated in the figure below.

OFFSET(Set coord system)				MDI	N1	
G57		G58		MECH	REL	
X	57.000	X	58.000	X	125.000	X 0.000
Y	57.000	Y	58.000	Y	35.000	Y 35.000
Z	-57.000	Z	-58.000	Z	-59.000	Z -59.000
A	0.000	A	0.000	A	0.000	A 0.000
G59						
X	59.000					
Y	59.000					
Z	-59.000					
A	0.000					
				MDI	RPD 100%	F 30% S 101% Ready

Figure 5-1-2

- (7) Move the machine axially to the X-axis contact point at the other end of the workpiece.
- (8) Press  key (SET L/2) to set the X-axis center of the coordinates system at half the axial length from the mechanical origin to the workpiece X-axis automatically. This is now the working coordinate origin of the X-axis as illustrated in the figure below.

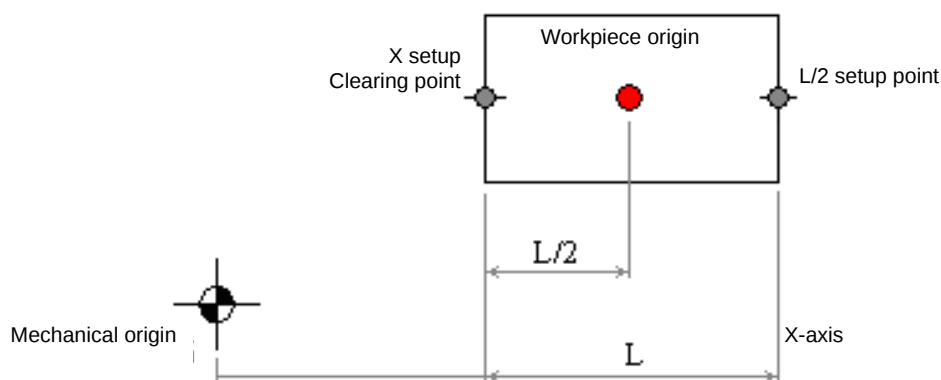


Figure 5-1-3

- **L input:** This function auto inputs the current mechanical coordinates by individual axis. When the cursor is moved to the X, Y, or Z field of the specified coordinates system, the L input function inputs the current mechanical coordinates into the highlighted coordinate field. This function inputs one set of axis coordinates data at one time. See the operation steps described below:

- (1) In **[Jog mode]** or **[Hand wheel mode]**, move the machine axially to the initial X-axis contact point of the workpiece.

- (2) Press **OFS** key to enter the [Offset menu].

- (3) Press **F1** key (Coord) to enter the coordinates system setup function bar screen.

- (4) Press **F1** key (Auto) to switch to the screen with the coordinates auto setup function bar.

- (5) Use **↑;**, **↓,**, **←&**, **→#** keys to move the cursor to the data position for designating the coordinates system group and axis direction, e.g. the X-, Y-, or Z-axis setup position.

- (6) Press **F3** key (SET L) and the axis coordinates data input from highlighted position is complete.

◆ Example of L input:

Example of L input (for the X-axis): Move the machine axially to the specified coordinate position, as with the X-axis workpiece origin shown in Figure 5-1-4.

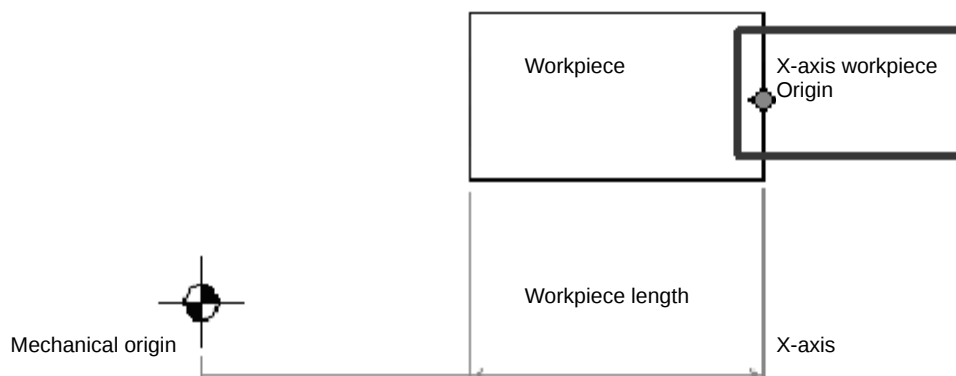


Figure 5-1-4

The mechanical coordinate data is shown in mechanical coordinate fields of Figure 5-1-5. Move the cursor to the desired coordinate group as with the G56 group in Figure 5-1-5, press **F3** key (SET L), and then the X-axis data of the mechanical coordinate is inputted to the X-axis fields of the G56 coordinate group automatically. The single axis data input of the coordinate group is now completed.

OFFSET(Set coord system)				MDI	N1	
OFFSET		G54		MECH		REL
X	0.000	X	0.000	X	125.000	X 0.000
Y	0.000	Y	0.000	Y	35.000	Y 35.000
Z	0.000	Z	0.000	Z	-59.000	Z -59.000
A	0.000	A	0.000	A	0.000	A 0.000
G55		G56				
X	55.000	X	56.000			
Y	55.000	Y	56.000			
Z	-55.000	Z	-56.000			
A	0.000	A	0.000			
MDI		RPD 100%		F 30%		S 101%
						Ready

Figure 5-1-5

- **P input:** This function inputs the coordinate center of multiple axes concurrently after the workpiece center point is calibrated. With P input function, more than one axis, including X, Y, Z can be inputted.

See the operation steps described below:

- (1) In **[Jog mode]** or **[Hand wheel mode]**, move the machine axially to the initial X-axis contact point of the workpiece.

- (2) Press  key to enter the [Offset menu].

- (3) Press  key (Coord) to enter the coordinates system setup function bar screen.

- (4) Press  key (Auto) to switch to the screen with the coordinates auto setup function bar.

- (5) Use     keys to move the cursor to the data position for the coordinates system group.

- (6) Press  key (SET P), multiple axis data is now automatically inputted into the highlighted coordinate group fields.

Note: Do not clear axis coordinates values by pressing the **All Clear** function key after coordinate of other axes have been setup as this may erase coordinates data that does not desire to delete.

- ◆ Example of P input:
Move the machine axially to the specified coordinate position, e.g. the workpiece origin in Figure 5-1-6. (Figure 5-1-6 indicates the relative position of the X- and Y-axis but not the Z-axis.)

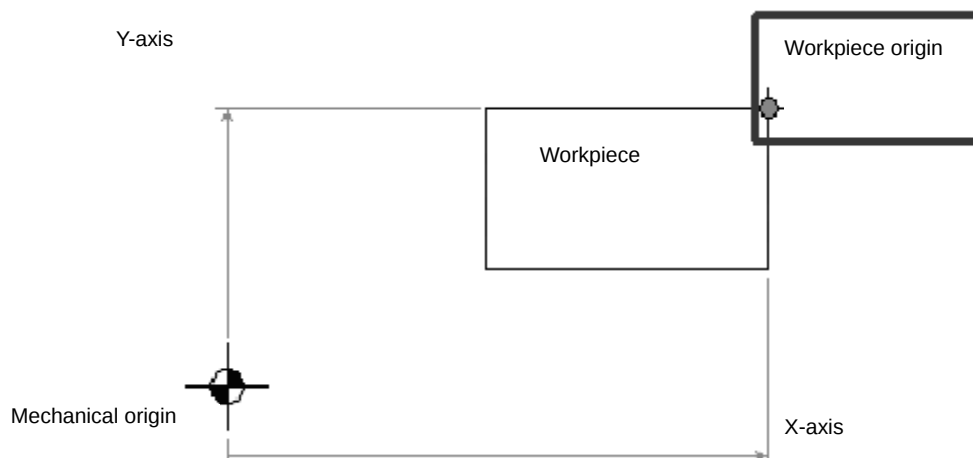


Figure 5-1-6

After the workpiece origin is calibrated, the mechanical coordinate data is shown in the mechanical coordinate fields in Figure 5-1-7. Move the cursor to point to the desired coordinates group (e.g. the G56 group in Figure 5-1-7). Press **F5** key (SET P), and then the X-, Y-, and Z-axis data of the mechanical coordinate are inputted to the mechanical coordinate fields of the G56 coordinates group. That is, the multiple axis data input for the axis group is completed.

OFFSET(Set coord system)				MDI	N1	
OFFSET		G54		MECH	REL	
X	0.000	X	0.000	X	125.000	X 0.000
Y	0.000	Y	0.000	Y	35.000	Y 35.000
Z	0.000	Z	0.000	Z	-59.000	Z -59.000
A	0.000	A	0.000	A	0.000	A 0.000
G55		G56				
X	55.000	X	56.000			
Y	55.000	Y	56.000			
Z	-55.000	Z	-56.000			
A	0.000	A	0.000			
MDI		RPD 100%		F 30%	S 101%	Ready

Figure 5-1-7

5.1.2 Absolute input

- The coordinates system value can be inputted manually by absolute or incremental value setups. This section explains the steps for absolute input.

See the operation steps described below:

- (1) Press  key to enter the [Offset menu].
- (2) Press  key (Coord) to enter the coordinates system setup function bar screen.
- (3) Use     keys to move the cursor to the X-, Y-, and Z-axis setup positions for coordinates system designation.
- (4) Input positive or negative values by pressing keys  . To input a negative value, press  key in advance. Press  key to confirm the unit of values.
- (5) Press  key (ABS) to enter the value of the coordinate axis.

Note:

- (a) The unit of value is mm. Value without decimal points is in unit of μm . That is, input value 123456 indicates 123.456 mm.
- (b) The absolute input can be made by step (5) as described above or by pressing the **ENTER** key.

◆ Example of absolute input:

Move the tool center from mechanical origin to the X and Y position of mechanical origin, then register the coordinates data of X and Y in the coordinates system setup function (G54~G59) of the controller's OFS group. Finally, run the relevant workpiece coordinates system command in the G code program to assign workpiece coordinates system origin setup.

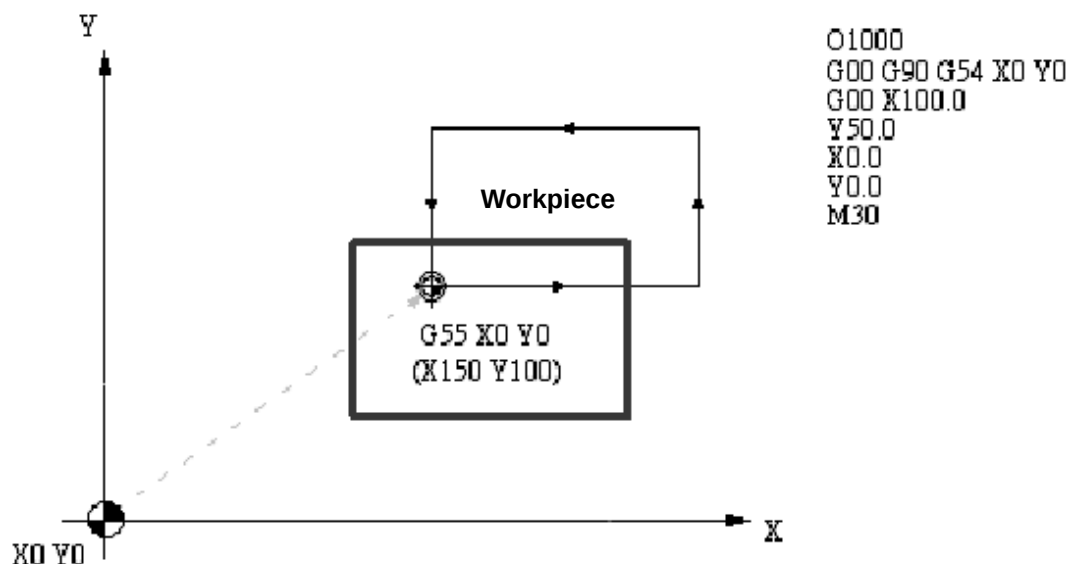


Figure 5-1-8

OFFSET(Set coord system)				MDI	N1	
OFFSET		G54		MECH		REL
X	0.000	X	0.000	X	125.000	X 0.000
Y	0.000	Y	0.000	Y	35.000	Y 35.000
Z	0.000	Z	0.000	Z	-59.000	Z -59.000
A	0.000	A	0.000	A	0.000	A 0.000
G55		G56				
X	150.000	X	56.000			
Y	100.000	Y	56.000			
Z	0.000	Z	-56.000			
A	0.000	A	0.000			
MDI		RPD 100%		F 30%	S 101%	

Figure 5-1-9

5.1.3 Incremental input

- This is one of the two manual coordinates system numeric data input methods. This function is suitable for fine tuning values entered by incremental input. For example, for original value = 150.000 with an incremental input of 5.000, the new value shall be 155.000.

See the operation steps described below:

- (1) Press  key to enter the [Offset menu].
- (2) Press  key (Coord) to enter the coordinates system setup function bar screen.
- (3) Use     keys to move the cursor to the X, Y, Z axis setup position for coordinates system designation.
- (4) Input positive or negative values by pressing keys   -  . To input a negative value, press  key in advance. Press   key to confirm the unit of value.
- (5) Press  key (INC) to increase or decrease the coordinate axis position depending on whether the value is greater or less than zero.

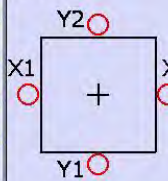
Note:

- (a) Ensure the accuracy of the input value and method when setting up coordinate values manually as the risks of invalid movement position caused by invalid coordinate values are very big.

5.1.4 Rectangle center

- This function assists users in setting up coordinate data of the center of a rectangle object with a rectangle drawing as shown in the figure below. The system converts data of the four corner points into coordinate data of the object's actual center as illustrated in the figure below.

OFFSET(Set coord system)				MDI	N4
OFFSET		G54		MECH	REL
X	0.000	X	0.000	X	60.000
Y	0.000	Y	0.000	Y	80.000
Z	0.000	Z	0.000	Z	-59.000
A	0.000	A	0.000	A	0.000
G55		G56		G54	
X	150.000	X	56.000	X1:	30.000
Y	100.000	Y	56.000	X2:	60.000
Z	0.000	Z	-56.000	Y1:	20.000
A	0.000	A	0.000	Y2:	80.000



MDI		RPD 100%	F 30%	S 101%
-----	--	----------	-------	--------

Figure 5-1-10

See the operation steps described below:

- (1) Press  key to enter the [Offset menu].
- (2) Press  key (Coord) to enter the coordinates system setup function bar screen.
- (3) Use     keys to move the cursor to data fields for coordinates system designation.
- (4) Press  key (SQUARE) to enter the rectangle center page.

- (5) As guided by the rectangle shown in the screen, move the spindle center to the mechanical position of X1, X2, Y1, Y2, press     (X1, X2, Y1, Y2) keys to set up the coordinates data of each point.
- (6) Press  key (Set) after coordinates of the four points are set, the system determines the coordinate data of the rectangle center and inputs the data to the coordinates system.
- (7) Set up coordinate position by moving the Z-axis, press  key (SET Z) to set up the Z-axis coordinates of the workpiece coordinates group.

- ◆ Example of rectangle center:
Assign fields of coordinates group. Manually move the spindle to the four corners of the object, input the X and Y coordinates of these 4 points as shown in Figure 5-1-11.

OFFSET(Set coord system)				MDI	N4
OFFSET		G54		MECH	REL
X	0.000	X	0.000	X	60.000
Y	0.000	Y	0.000	Y	80.000
Z	0.000	Z	0.000	Z	-59.000
A	0.000	A	0.000	A	0.000
G55		G56		G54	
X	150.000	X	56.000	X1: 30.000 X2: 60.000 Y1: 20.000 Y2: 80.000	
Y	100.000	Y	56.000		
Z	0.000	Z	-56.000		
A	0.000	A	0.000		
				MDI RPD 100% F 30% S 101%	

Figure 5-1-11

After the coordinates of the four rectangle corner points are set, press **F5** key (Set); the system then takes out the actual mechanical coordinates value of the rectangle object center and sets up given coordinates system data as shown in Figure 5-1-12.

OFFSET(Set coord system)				MDI	N4
OFFSET		G54		MECH	REL
X	0.000	X	45.000	X	60.000
Y	0.000	Y	50.000	Y	80.000
Z	0.000	Z	0.000	Z	-59.000
A	0.000	A	0.000	A	0.000
G55		G56		G54	
X	150.000	X	56.000	X1: 30.000 X2: 60.000 Y1: 20.000 Y2: 80.000	
Y	100.000	Y	56.000		
Z	0.000	Z	-56.000		
A	0.000	A	0.000		
				MDI RPD 100% F 30% S 101% STOP	

Figure 5-1-12

5.1.5 Circle center

- This function sets up the coordinates data of the center of any ball matter. Select any 3 points on the ball object and set up their coordinates data; the circle center function can determine the coordinates of the object center as shown in the figure below:

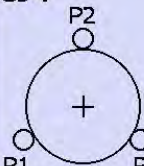
OFFSET(Set coord system)				MDI	N4	
OFFSET		G54		MECH	REL	
X	0.000	X	0.000	X	60.000	X -65.000
Y	0.000	Y	0.000	Y	80.000	Y 80.000
Z	0.000	Z	0.000	Z	-59.000	Z -59.000
A	0.000	A	0.000	A	0.000	A 0.000
G55		G56		G54	P1	
X	150.000	X	56.000		X: 0.000	
Y	100.000	Y	56.000		Y: 0.000	
Z	0.000	Z	-56.000		P2 X: 0.000	
A	0.000	A	0.000		Y: 0.000	
					P3 X: 0.000	
					Y: 0.000	
				MDI	RPD 100%	F 30% S 101%

Figure 5-1-13

See the operation steps described below:

- (1) Press  key to enter the [Offset menu].
- (2) Press  key (Coord) to enter the coordinates system setup function bar screen.
- (3) Use , , , and  keys to move the cursor to data fields for coordinates system designation.
- (4) Press  key (CIRCLE) to enter the circle center page.
- (5) Move the mechanical position of P1, P2, P3 as guided, press  (P1),  (P2),  (P3) keys to set them up one by one.
- (6) After setting up coordinates of the three points on a circle, press  key (Set); the system then determines the coordinates data of the circle center and inputs the data to the coordinates system.
- (7) Set up coordinate position by moving the Z-axis, press  key (SET Z) to set up the Z-axis coordinates of the workpiece coordinates group.

◆ Example of circle center

This function applies to any workpiece in ball shape. Manually move the spindle to access any three outer points on the circle, and then set up the coordinate value of these three points by relevant function keys as shown in Figure 5-1-14.

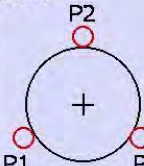
OFFSET(Set coord system)				037	N1	
OFFSET		G54		MECH		REL
X	0.000	X	0.000	X	89.191	X -35.808
Y	0.000	Y	0.000	Y	84.683	Y 84.683
Z	0.000	Z	0.000	Z	-59.000	Z -59.000
A	0.000	A	0.000	A	0.000	A 0.000
G55		G56		G54		
X	150.000	X	56.000			
Y	100.000	Y	56.000			
Z	0.000	Z	-56.000			
A	0.000	A	0.000			
				P1		
				X: 65.716		
				Y: 87.133		
				P2		
				X: 71.916		
				Y: 96.941		
				P3		
				X: 89.191		
				Y: 84.683		
JOG		RPD 100%		JOG 500		S 101%
						STOP

Figure 5-1-14

After the coordinates of any three outer points are set, press **F4** key (Set), the system then takes out the actual mechanical coordinates value of the circle center and sets up given coordinates system data as shown in Figure 5-1-15.

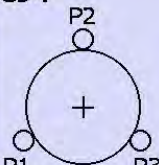
OFFSET(Set coord system)				037	N1		
OFFSET		G54		MECH	REL		
X	0.000	X	77.519	X	89.191	X	-35.808
Y	0.000	Y	86.536	Y	84.683	Y	84.683
Z	0.000	Z	0.000	Z	-59.000	Z	-59.000
A	0.000	A	0.000	A	0.000	A	0.000
G55		G56		G54		P1	
X	150.000	X	56.000			X:	65.716
Y	100.000	Y	56.000			Y:	87.133
Z	0.000	Z	-56.000			X:	71.916
A	0.000	A	0.000			Y:	96.941
						P3	
				X:	89.191		
				Y:	84.683		
JOG				RPD 100%	JOG 500	S 101%	

Figure 5-1-15

5.2 Tool register

- This function varies with tool length compensation (G43 or G44, or cancel command G49) or diameter compensation (G41 or G42, or cancel command G40). The tool register function covers tool length compensation, diameter compensation, length wear compensation, diameter wear compensation, and tool life span management functions.

The data fields correspond to H (tool length compensation) and D (tool diameter compensation) codes assigned by the machining program. The tool register settings can assign tool length or tool diameter fields data to meet a given machining path and size without program modifications. The numeric data setup covers absolute input, incremental input, H setup, and data clearance functions. See the figure below for the tool compensation function screen.

OFFSET (Cutter register)						037	N1
Num	Length	Radius	Len wear	Rad wear	LIFE		
1	-50.000	20.000	0.000	0.000	1		
2	-100.000	5.000	-1.000	-0.500	0		
3	-100.000	3.000	0.000	0.000	0		
4	-100.000	4.000	0.000	0.000	0		
5	0.000	5.000	0.000	0.000	0		
6	-60.000	6.000	0.000	0.000	0		
7	-70.000	7.000	0.000	0.000	0		
8	-80.000	8.000	0.000	0.000	0		
9	-90.000	9.000	0.000	0.000	0		
10	-100.000	10.000	0.000	0.000	0		
11	-110.000	11.000	0.000	0.000	0		
12	-120.000	12.000	0.000	0.000	0		
13	0.000	13.000	0.000	0.000	0		
14	-140.000	14.000	0.000	0.000	0		
15	-150.000	15.000	0.000	0.000	0		
						MECH	Z -59.000
JOG		RPD 100%		JOG 500	S 101%	STOP	

Callouts:

- Compensation code (H/D)
- Compensation data: Tool length, Tool diameter, Length compensation, Diameter compensation
- Compensation data Input fields
- Auxiliary display: Mechanical coordinates and actual position of current Z-axis

Figure 5-2-1

Range of tool register values	
Input range of tool length data	-2000.0 ~ 2000.0 mm
Input range of tool diameter data	-150.0 ~ 150.0 mm
Input range of tool length wear compensation data	-2000.0 ~ 2000.0 mm
Input range of tool diameter wear compensation data	-150.0 ~ 150.0 mm
Input range of tool life span	0 ~ 99999999 serves

- **Absolute input:** This is one of the manual data input methods. Use this function to input absolute values of tool length, tool diameter, wear compensation or tool life span data. Press **ENTER** key to do absolute value input.

See the operation steps described below:

- (1) Press  key to enter the [Offset menu].
- (2) Press  key (CUTTER) to enter the screen with the tool register function bar.
- (3) Use , , ,  keys to move the cursor to data fields for tool length, diameter, wear, or life span designation.
- (4) Input positive or negative values by pressing keys  - . To input a negative value, press  key in advance. Press  key before entering the tool compensation data to ensure the unit of value. Only positive integers are valid input for tool life span.
- (5) Press  key (ABS) to register absolute values.

Note:

The tool data fields are for individual compensation values. For example, when the length fields are highlighted, then the input data are for tool length compensation values.

- **Incremental input:** This is one of the manual data input methods. Use this function to input incremental values of tool length, tool diameter, wear compensation or tool life span data.

See the operation steps described below for incremental input:

- (1) Press  key to enter the [Offset menu].
- (2) Press  key (CUTTER) to enter the screen with the tool register function bar.
- (3) Use , , , and  keys to move the cursor to data fields for tool length, diameter, wear, or life span designation.
- (4) Input positive or negative values by pressing keys   -  . To input a negative value, press  key in advance. Press   key before entering the tool compensation data to ensure the unit of value. Only positive integers are valid input for tool life span.
- (5) Press  key (INC) to register incremental values.

- **H setup:** This function auto inputs the Z-axis height of current mechanical coordinates in assigned tool length compensation data (H) exclusively. It has merit in that it can prevent input error during manual setup by users as well as reduce the time required for value setup.

See the operation steps described below:

- (1) In **[Jog mode]** or **[Hand wheel mode]**, move the Z-axis to given coordinates height.
- (2) Press  key to enter the [Offset menu].
- (3) Press  key (CUTTER) to enter the screen with the tool register function bar.
- (4) Use     keys to move the cursor to the tool length fields for tool code designation.
- (5) Press  key (SET H) to set the coordinates of the current Z-axis mechanical coordinates value to given data fields.

Note:

- (a) The H setup function applies to tool length data fields only.
- (b) Do not change values in OFS group during program execution. Enter values only when the program stops. The program stop status includes the program is fully not in operation, a single step initiated single step is completed, and after the RESET key is pressed.
- (c) The length wear value is reset to zero when inputting tool length value with H setup.

- **Clear:** This function clears tool compensation values with options of geometry, wear, life span, and all clear.

Geometry clear: clear all tool length and diameter values.

Wear clear: clear all tool length compensation and diameter compensation values.

Life span clear: clear all tool life span values.

All clear: clear all tool registry data.

See the operation steps described below:

- (1) Press  key to enter the [Offset menu].
- (2) Press  key (CUTTER) to enter the screen with tool register function bar.
- (3) Press  key (Clear) to enter the clear function bar display.
- (4) Press  key (H/D) to clear tool length and diameter values. Press  key (Wear) to clear all tool length compensation and diameter compensation values. Press  key (Life) to clear all tool life span values. Press  key (All) to clear all tool registry data.

5.3 Tool magazine register

- This function manages tool positions the relative tool magazine code after tool exchanges. The tool magazine data is a table recording the actual tool pot positions and tool ID of the current machine. It not only records and displays the tool pot position of individual tools but also changes the tool sequence in tool magazine data fields with proper permission. This enhances the tool magazine management function by parameter settings.

The tool magazine register function can run in Jog mode only as shown in the figure below.

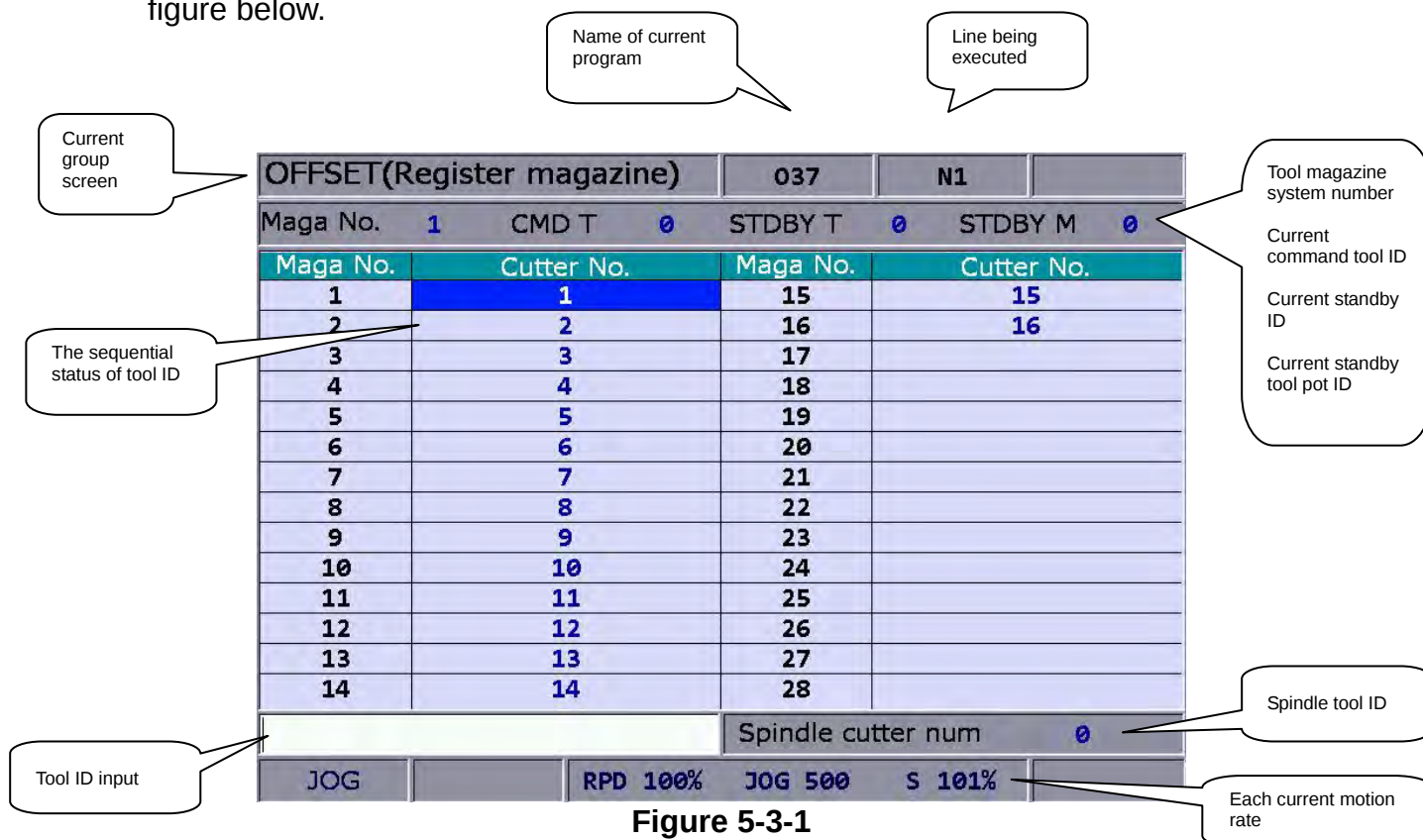


Figure 5-3-1

See the operation steps described below for tool magazine setup:

- (1) Set the system to "Jog mode".

- (2) Press **OFS** key to enter the [Offset menu].

- (3) Press **F3** key (MAGA) to enter the tool magazine data setup function screen.

- (4) Use **↑**, **↓**, **←**, **→** keys to move the cursor to assigned data fields.

- (5) Enter newly changed tool ID, press **F1** key (Set) (or press **ENTER** key) to set up new tool magazine position.

- ◆ Example of tool ID exchange:
If the assigned tool ID duplicates one in existence, then it exchanges it with the one at the original place automatically. This ensures that each tool ID in the tool magazine does not duplicate another and prevents incorrect tool calling.

OFFSET(Register magazine)		037	N1				
Maga No.	1	CMD T	0	STDBY T	0	STDBY M	0
Maga No.	Cutter No.	Maga No.	Cutter No.				
1	1	15	15				
2	2	16	16				
3	3	17					
4	4	18					
5	5	19					
6	6	20					
7	7	21					
8	8	22					
9	9	23					
10	10	24					
11	11	25					
12	12	26					
13	13	27					
14	14	28					
		Spindle cutter num		0			
JOG		RPD 100%	JOG 500	S 101%	STOP		

Figure 5-3-2

OFFSET(Register magazine)		037	N1				
Maga No.	1	CMD T	0	STDBY T	0	STDBY M	0
Maga No.	Cutter No.		Maga No.	Cutter No.			
1	2		15	15			
2	1		16	16			
3	3		17				
4	4		18				
5	5		19				
6	6		20				
7	7		21				
8	8		22				
9	9		23				
10	10		24				
11	11		25				
12	12		26				
13	13		27				
14	14		28				
			Spindle cutter num		0		
JOG		RPD 100%	JOG 500	S 101%	STOP		

Figure 5-3-3

OFFSET(Register magazine)				037	N1		
Maga No.	1	CMD T	0	STDBY T	0	STDBY M	0
Maga No.	Cutter No.		Maga No.	Cutter No.			
1	2		15	15			
2	1		16	16			
3	5		17				
4	4		18				
5	3		19				
6	6		20				
7	7		21				
8	8		22				
9	9		23				
10	10		24				
11	11		25				
12	12		26				
13	13		27				
14	14		28				
				Spindle cutter num			0
JOG	RPD 100%		JOG 500	S 101%		STOP	

Figure 5-3-4

■ **Operation description:**

Figure 5-3-2: initial status of the tool magazine with tools in it in numeric sequence

Figure 5-3-3: set position 1 = 2, and tools ID 1 and 2 in tool magazine 1 and 2 exchanges with each other.

Figure 5-3-4: set position 3 = 5, and tools ID 3 and 5 in tool magazine 3 and 5 exchanges with each other.

This demonstrates that tool IDs in the tool magazine exchange with each other after the tool ID of a given tool magazine number is changed. This eliminates errors caused by invalid tool ID accessing.

- **All reset:** The tool register option also provides the tool magazine position reset function. This resets the tool ID in the tool magazine to its initial default, i.e. both tool magazine and tool ID are in numeric sequence. This function resets the tool magazine tool ID to its original value for tool ID misplacement troubleshooting or tool ID reset.

See the operation steps described below:

- (1) Set the system to "**Jog mode**".

- (2) Press  key to enter the [Offset menu].

- (3) Press  key (MAGA) to enter the tool magazine data setup function screen.

- (4) Press  key (RST ALL) to reset all tool magazine position records.

- **Tool magazine block:** This function blocks the tool magazine position not used by the program. Tools in a blocked tool magazine position cannot be called. If they are called incorrectly, the system blocks their use, warns with an error message, and halts program execution. This provides one more protection mechanism against errors caused by incorrect tool calling. For example, users can block a tool magazine position with damaged positioning latch or that might interfere with adjacent large diameter tools. A blocked tool magazine position is identified by a different color.

See the operation steps described below:

- (1) Set the system to **Jog mode**.

- (2) Press  key to enter the **Offset menu**.

- (3) Press  key (MAGA) to enter the tool magazine data setup function screen.

- (4) Use     keys to move the cursor to tool magazine designation data fields.

- (5) Press  key (LOCK) to block the tool magazine position as shown in Figure 5-3-5.

OFFSET(Register magazine)		037	N1	
Maga No.	1	CMD T	1	STDBY T 0 STDBY M 0
Maga No.	Cutter No.	Maga No.	Cutter No.	
1	1	15	15	
2	2	16	16	
3	3	17		
4	4	18		
5	5	19		
6	6	20		
7	7	21		
8	8	22		
9	9	23		
10	10	24		
11	11	25		
12	12	26		
13	13	27		
14	14	28		
		Spindle cutter num 0		
JOG		RPD 100%	JOG 500	S 101% STOP

Figure 5-3-5

To unblock the tool magazine, continue with the steps described below:

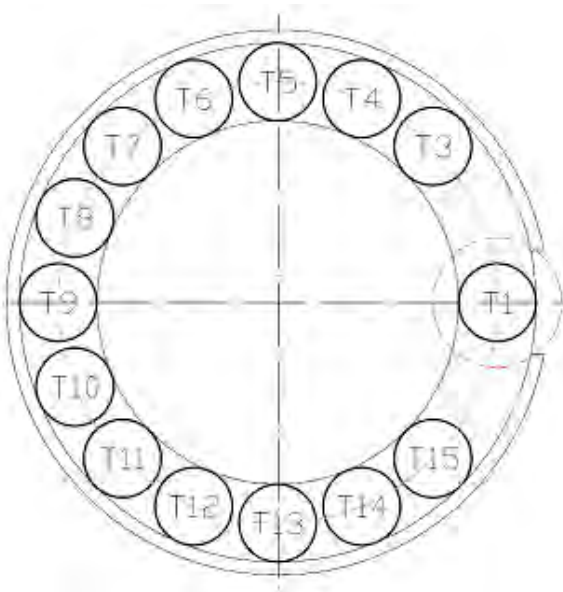
- (6) In the tool magazine setup screen press     keys to move the cursor to blocked fields.
- (7) Input the specified tool ID, press  to unblock the tool magazine position.

- ◆ Example of tool magazine block:
Use this function to block a tool magazine adjacent to one that has a large diameter tool. Blocking these two tool magazines can stop the operation of an improper tool ID calling program and protects tools from colliding with large-diameter tools in neighboring tool magazine.

OFFSET(Register magazine)		037	N1	
Maga No.	1	CMD T	1	STDBY T 0 STDBY M 0
Maga No.	Cutter No.	Maga No.	Cutter No.	
1	1	15	15	
2	2	16	16	
3	3	17		
4	4	18		
5	5	19		
6	6	20		
7	7	21		
8	8	22		
9	9	23		
10	10	24		
11	11	25		
12	12	26		
13	13	27		
14	14	28		
		Spindle cutter num		0
JOG		RPD 100%	JOG 500	S 101% STOP

Assumption:
T1 holds a large diameter tool and sided by T2 and T16. To prevent them from interfering with each other, block T2 and T16 with this function as shown in the figure to the left.

Figure 5-3-6



When T1 holds a large diameter tool, it may interfere with adjacent tools as shown in the figure to the left. Once blocked by this function, the T2 and T16 tool magazine positions cannot be called any more.

Figure 5-3-7

※ Multi tool magazines management function

- For applications that require multiple tool magazine management systems, users may open the multi tool magazine management function through the tool magazine parameter once properly permitted. Users may assign a different number of tool pots for each tool magazine as well as the corresponding tool ID. The [Tool Magazine 1 and 2] function bars are used for managing tool ID in either tool magazine system. Please contact an equipment dealer/service provider for multi tool magazine relevant functions.

OFFSET(Register magazine)		037	N1	
Maga No.	1	CMD T	1	STDBY T 0 STDBY M 0
Maga No.	Cutter No.	Maga No.	Cutter No.	
1	1	15	15	
2	2	16	16	
3	3	17		
4	4	18		
5	5	19		
6	6	20		
7	7	21		
8	8	22		
9	9	23		
10	10	24		
11	11	25		
12	12	26		
13	13	27		
14	14	28		
		Spindle cutter num		0
JOG		RPD 100%	JOG 500	S 101% STOP

Figure 5-3-8

Note:

- The tool magazine ID can be set up in "**Jog mode**" (JOG) only. The tool magazine setup option is hidden in other modes.
- The special user permission is a must to do tool magazine ID setup or reset.
- Tool ID in one tool magazine cannot duplicate another. If the assigned tool ID duplicates one in existence, then it exchanges it with the one at the original place automatically. This ensures that each tool ID in the tool magazine does not duplicate another and prevents incorrect tool calling.
- When the spindle's initial tool ID is set to T0, once T0 is placed in one tool magazine, that tool magazine is recorded as the position of T0 and cannot be blocked. When the field of tool magazine is T0, it is not allowed to block and the message "**Tool ID Tool magazine cannot be blocked**" will pop up.

5.4 Macro variable

- Use variable input setup of this function along with variable command for various MLC data I/O, condition computing, and controls. The macro variable function covers local, global, and retaining variables with values in double precision format.

OFFSET(Macro var-local)		037	N1
No.	Value	No.	Value
1	0.000	16	0.000
2	0.000	17	0.000
3	0.000	18	0.000
4	0.000	19	0.000
5	0.000	20	0.000
6	0.000	21	0.000
7	0.000	22	0.000
8	0.000	23	0.000
9	0.000	24	0.000
10	0.000	25	0.000
11	0.000	26	0.000
12	0.000	27	0.000
13	0.000	28	0.000
14	0.000	29	0.000
15	0.000	30	0.000
JOG		RPD 100%	JOG 500 S 101% STOP

Figure 5-4

5.4.1 Local variable

Local variables are used by the macro program in the local area and are **numbered from 1~50**.

See the operation steps described below:

- (1) Press  key to enter the [Offset menu].
- (2) Press  key (Macro) to enter the variable value entry screen.
- (3) Press  key (Local) to enter the entry screen for field ID starting with number 1.
- (4) Use     keys to move the cursor to the desired variable data field.
- (5) Enter variable settings, press  key to complete the setting.

5.4.2 Global variable

- Global variables are variables shared by the main programs, sub routines, and macro program and are **numbered from 51~250**.

See the operation steps described below:

- (1) Press  key to enter the [Offset menu].
- (2) Press  key (Macro) to enter the variable value entry screen.
- (3) Press  key (Global) to enter the entry screen for field ID starting with number 51.
- (4) Use     keys to move the cursor to the desired variable data field.
- (5) Enter variable settings and press  key to complete the setting.

5.4.3 Retaining variable

- These variables maintain system specific status data after power outage and are **numbered from 1601~1800**.

See the operation steps described below:

- (1) Press  key to enter the Offset menu.
- (2) Press  key (Macro) to enter the variable value entry screen.
- (3) Press  key (Hold) to enter the entry screen for field ID started with number 1601.
- (4) Use     keys to move the cursor to the desired variable data field.
- (5) Enter variable settings and press  key to complete the setting.

Chapter 6: GRA group

The GRA group function displays trails during program running to help in ensuring correctness of the G code operation. Users can set up graphic parameters for motion ranges and graphic proportions of different machining paths.

The default graphic center is at the center of the plotting area, X0, Y0 or Z0 position. With a fixed graph frame, set up workpiece offset parameter to move the graph center together with its origin. **That is to say, set positive coordinate to move the graph rightward (or upward) and negative to move leftward (or downward).** The graph parameters setting includes workpiece range (length, width, and height) and offset against graph origin (X offset, Y offset, Z offset). See Section **PAR group** on setting up graph parameters.

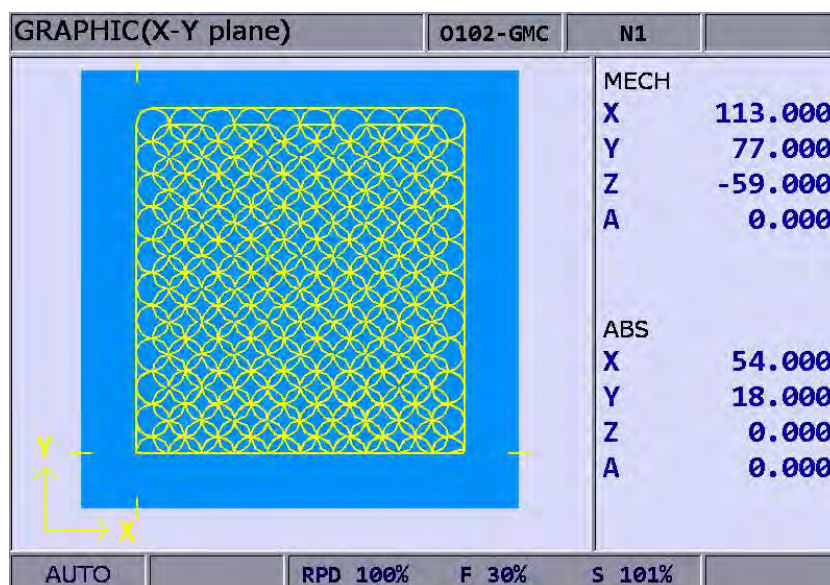


Figure 6-0-1

PAR graph parameters:

14000	Graphic line color	65504	
14001	Graphic background color	1183	
14002	Graphic line width	2	
14003	Graphic stock width	80	
14004	Graphic stock height	80	
14005	Graphic stock length	150	
14006	Graphic stock X offset	-30	
14007	Graphic stock Y offset	-30	
14008	Graphic stock Z offset	50	

Figure 6-0-2

Meaning of each parameter:

Line color	Color of lines in trail graph (range: 0~65535)
Background color	Color of background in trail graph (range: 0~65535)
Line width	Width of lines in trail graph (range: 0~4)
Workpiece width	Setting of graph width (range: 0~10000 mm)
Workpiece height	Setting of graph height (range: 0~10000 mm)
Workpiece length	Setting of graph length (range: 0~10000 mm)
Workpiece X offset amount	Offset distance of graph frame in X direction (range: -10000~10000 mm)
Workpiece Y offset amount	Offset distance of graph frame in Y direction (range: -10000~10000 mm)
Workpiece Z offset amount	Offset distance of graph frame in Z direction (range: -10000~10000 mm)

Effect of workpiece offset parameter:

The graph display varies with graph parameters set to the same workpiece range but different workpiece offset values as illustrated below (illustrated with X—Y plane):

PARAMETER(Graphic)		037	N1	SFT
No.	Parameter Name	Value		
14000	Graphic line color	65504		
14001	Graphic background color	1183		
14002	Graphic line width	2		
14003	Graphic stock width	200		
14004	Graphic stock height	200		
14005	Graphic stock length	150		
14006	Graphic stock X offset	60		
14007	Graphic stock Y offset	60		
14008	Graphic stock Z offset	50		
		Range: -10000 ~ 10000 (mm)		
JOG		Ch 0	1/1	STOP

Figure 6-0-3

- (1) Set up parameter 14006 ~ 14007 for workpiece's X and Y offset values to zero. This results in a trail graph as shown below.

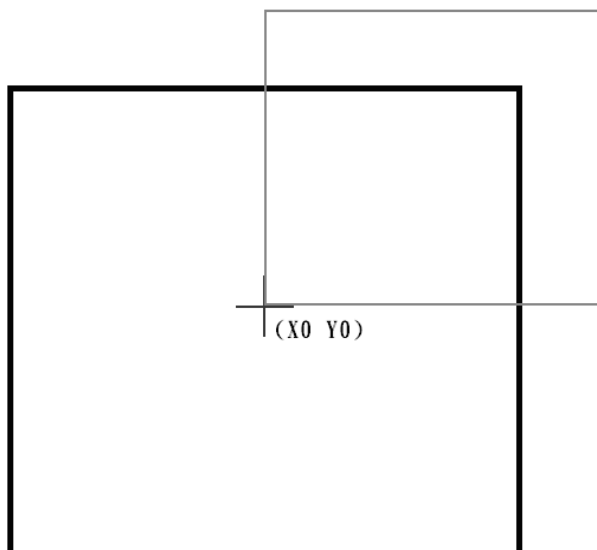


Figure 6-0-4

- (2) Set up parameter 14006 ~ 14007 for workpiece's X and Y offset values to 60. This results in a trail graph as shown below.

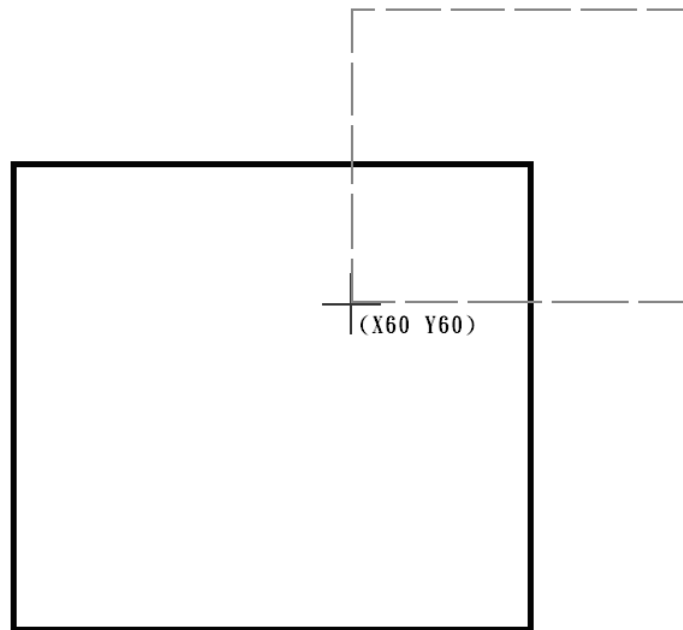


Figure 6-0-5

- (3) Set up parameter 14006 ~ 14007 for workpiece's X and Y offset values to minus 60. This results in a trail graph as shown below.

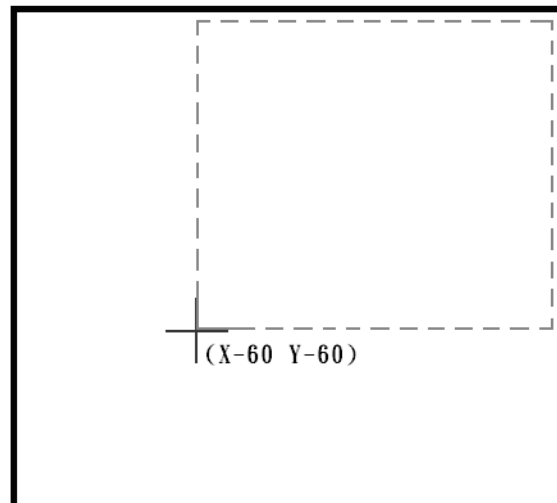


Figure 6-0-6

6.1 Switch the angle of view

- This function switches the angle of view in X—Y, Y—Z and X—Z plane for a given program movement trail.

See the operation steps described below:

- (1) Press  key to enter the [graph function] page.
- (2) Press  key (VIEW) to enter the plane switch function page.
- (3) Press  (X—Y) key to display X—Y plane movement trail.
Press  (Y—Z) key to display Y—Z plane movement trail.
Press  (X—Z) key to display X—Z plane movement trail.
- (4) Press  key (CLEAR) to clear the trail graphs in X—Y, Y—Z, X—Z plane.

◆ Application example 1:

For a program trail with actual movement range 60×60 (mm) and origin offset X0 Y0, firstly set up graph parameters in the **PAR** group as shown in Figure 6-1-1 (plotting range 100×100 mm).

PARAMETER(Graphic)		037	N1	SFT
No.	Parameter Name	Value		
14000	Graphic line color	65504		
14001	Graphic background color	1183		
14002	Graphic line width	2		
14003	Graphic stock width	100		
14004	Graphic stock height	100		
14005	Graphic stock length	150		
14006	Graphic stock X offset	-50		
14007	Graphic stock Y offset	-50		
14008	Graphic stock Z offset	50		
		Range: -10000 ~ 10000 (mm)		
JOG		Ch 0	1/1	

Figure 6-1-1

Change the system page to **GRA** group and run the G code program after graph parameters are set. As the plotting range is much greater than the physical trails and both the graph and physical trail centers are located at the lower left, the trail graph is shown off center as shown in Figure 6-1-2.

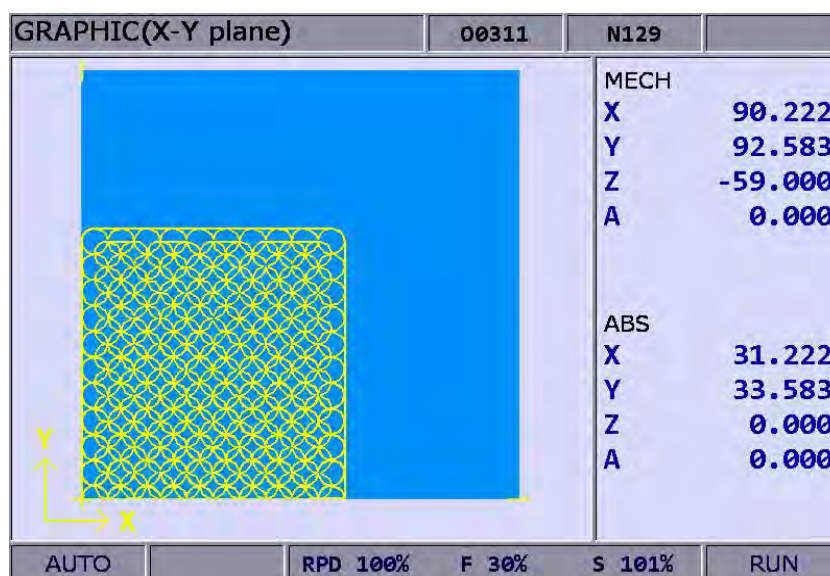


Figure 6-1-2

◆ Application example 2:

For the same program trail of Example 1, the plotting range can be changed to 70×70 (mm) and the offset of the plotting starting point to X-30 Y-30 as shown in Figure 6-1-3.

PARAMETER(Graphic)		00311	N180	SFT
No.	Parameter Name	Value		
14000	Graphic line color	65504		
14001	Graphic background color	1183		
14002	Graphic line width	2		
14003	Graphic stock width	70		
14004	Graphic stock height	70		
14005	Graphic stock length	150		
14006	Graphic stock X offset	-30		
14007	Graphic stock Y offset	-30		
14008	Graphic stock Z offset	50		
		Range: -10000 ~ 10000 (nm)		
AUTO		Ch 0	1/1	RUN

Figure 6-1-3

Change the system page to **GRA** group and run the G code program and enlarged movement trails which are displayed as shown in Figure 6-1-4.

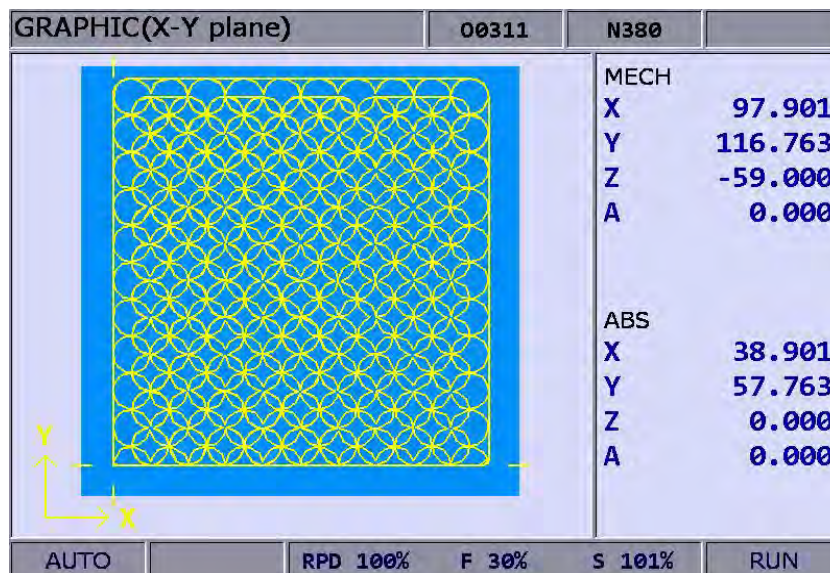


Figure 6-1-4

(This page is intentionally left blank.)

Chapter 7: ALM group

The system prompts an alarm message for any program execution or command format error. The ALM group function displays current alarms sent by the system to help users in program debugging. It also features an alarm message log function.

7.1 Alarm

- It is required to troubleshoot the issue that caused the alarm then press the **RESET** key to reset the system back to initial status. See the figure below for the alarm display screen with marked alert area.

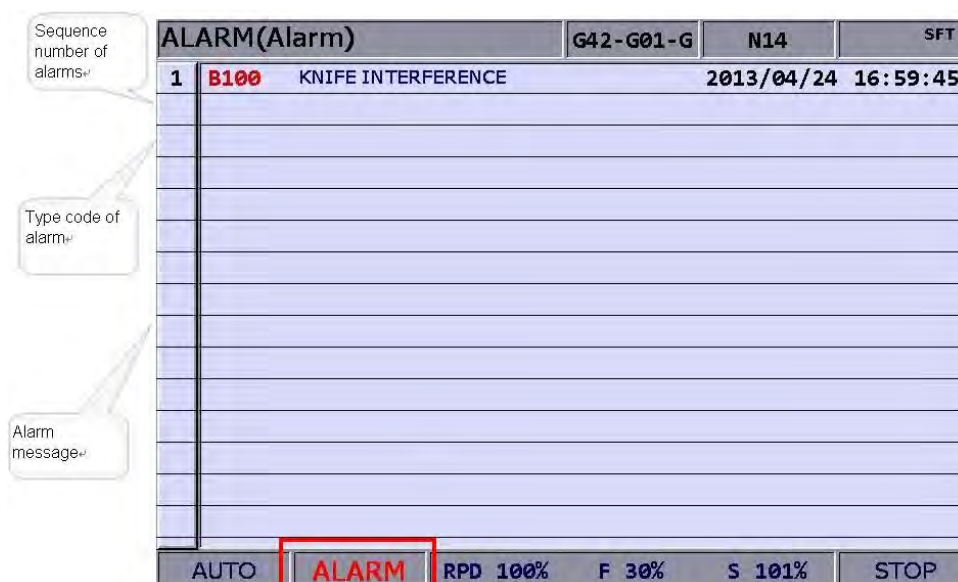


Figure 7-1-1

See the steps described below for the alarm message display and clear:

- (1) Press  key to enter the [alarm function] page.
- (2) Press  key (Alarm) to enter the current alarm message screen.
- (3) Use  key to clear the alarm message now shown on the screen.

7.2 Message log

- This function records alarms and alarm process data generated by the system. Users may review all errors during program execution by sequence of alarm time and type for troubleshooting and analysis. Data contained in each alarm record covers the time and name of alarm.

The alarm history can contain up to 512 records. In addition to viewing them, all can be deleted as shown in the figure below.

ALARM(History)			00311	N452	
31	B103	ARC INTERF		2013/04/15	19:45:17
32	B103	ARC INTERF		2013/04/15	19:45:09
33	B103	ARC INTERF		2013/04/15	19:10:24
34	B103	ARC INTERF		2013/04/15	19:09:49
35	B103	ARC INTERF		2013/04/15	19:08:55
36	B103	ARC INTERF		2013/04/15	18:14:06
37	B600	PPI TOKEN ERROR (0, Line: 364)		2013/04/11	10:42:47
38	B604	PPI NONEXIST (0, Line: 2)		2013/04/10	14:25:18
39	B604	PPI NONEXIST (0, Line: 2)		2013/04/10	14:24:51
40	B604	PPI NONEXIST (0, Line: 2)		2013/04/10	14:24:25
41	B017	INVALID TOOL ASSIGNMENT		2013/04/10	13:37:31
42	B017	INVALID TOOL ASSIGNMENT		2013/04/10	13:37:11
43	B017	INVALID TOOL ASSIGNMENT		2013/04/10	13:36:43
44	B017	INVALID TOOL ASSIGNMENT		2013/04/10	13:36:11
45	1E00	X Axis : AL009 Excessive deviation		2013/04/10	10:23:29
AUTO			RPD 100%	F 30%	S 101% RUN

Figure 7-2-1

See the steps described below to clear all alarm history:

- (1) Press  key to enter the [alarm function] page.
- (2) Press  key (History) to enter the alarm history page.
- (3) Press  key (CLR ALL) and the confirmation dialog box will pop up.
- (4) Press "Y" (yes) key then press  key and all alarm records are removed.

Note: The system switches to ALM group screen whenever there is error occurred. Users can also set up parameter 10016 (The popup screen when an alarm occurs). The system will not switch to ALM screen automatically when an alarm occurs.

Chapter 8: DGN group

The DGN group provides machining information, user variable, system monitoring, gain adjustment, and system interface functions to optimize the system. MLC diagnostics function is also provided for system to do MLC status monitoring or forced device ON/OFF, and password setup function for permission management. With this function, various system parameters can be imported / exported.

8.1 Machining information

- This function sets up a number of machined and target machining workpieces. It also resets the time and count of machined pieces and target ones. See the figure below for the machining information page:

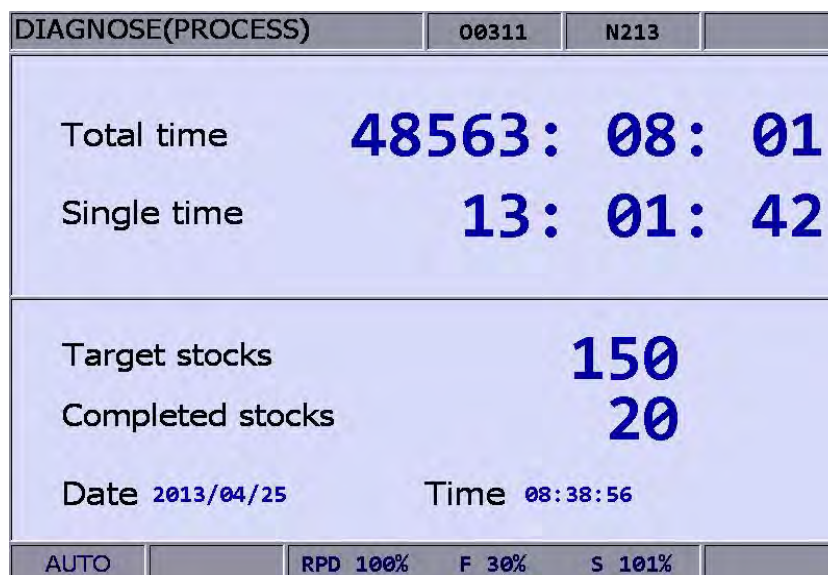
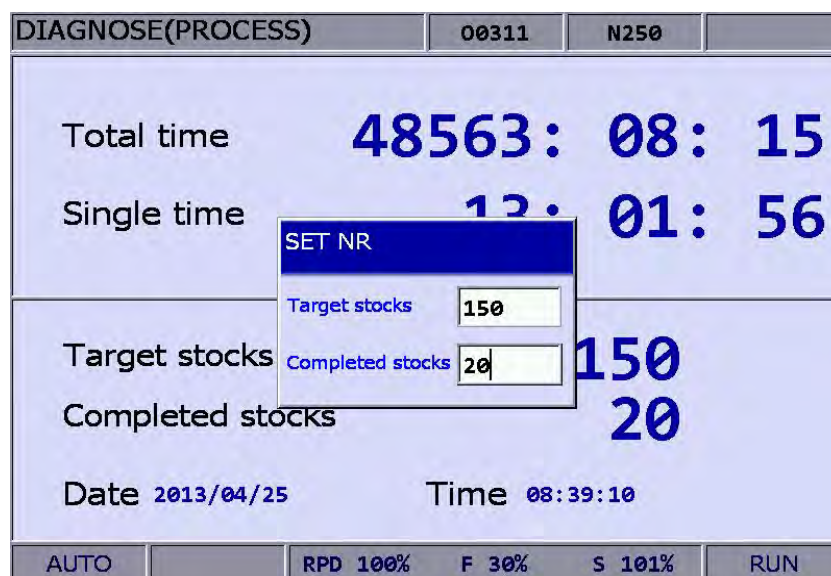


Figure 8-1-1

See the operation steps described below for machining information setup:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PROCESS) to enter the machining information page.

- (3) Press  key (Set NR) to pop up the machining count setup screen as shown in the figure below.



The screen displays the following information:

DIAGNOSE(PROCESS)		00311	N250
Total time	48563: 08: 15		
Single time	12. 01: 56		
Target stocks	150		
Completed stocks	20		
Date	2013/04/25	Time	08:39:10
AUTO RPD 100% F 30% S 101% RUN			

A 'SET NR' dialog box is overlaid on the screen, containing:

- Target stocks: 150
- Completed stocks: 20

Figure 8-1-2

- (4) Use ;  keys to point to the desired field.
- (5) Enter value in range of 0~9999 and press  key to complete the setting.

Users can use the machining information function to reset the machining time and count data of the system as of now. See the operation steps described below for machining time clearing:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PROCESS) to enter the machining information page.
- (3) Press  key (CLR TIME) and the confirmation dialog box will pop up.
- (4) Press "Y" (Yes) key and press  to reset the time of a single piece workpiece machining time.

See the operation steps described below for machining count clearing:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PROCESS) to enter the machining information page.
- (3) Press  key (CLR NR) to pop up the confirmation dialog box.
- (4) Press "Y" (Yes) key and press  to reset the count of workpieces that have been machined.

8.2 User variable

- This function enables users to update and display device data in the embedded registers (range D512~D1023). By displaying device types in registers users may change and monitor settings in the registers (D512 ~ D1023) for easier relevant devices control.

DIAGNOSE(User Variable)			00311	N312	
No.	REG (D)	Value	Comment		
0	512	3	+-		
1	1000	0			
2	1005	0			
3	1010	65535			
4	1013	0			
5	1020	65535			
6	1023	150			
7					
8					
9					
10					
11					
12					
13					
14					
AUTO		RPD 100%	F 30%	S 101%	RUN

Figure 8-2-1

See the operation steps described below:

(1) Press  key to enter the [diagnostics function] page.

(2) Press  (User VAR) key to enter the setup page.

(3) Use ; , or   keys to point to the desired data field.

(4) Enter the desired register number (D512~D1023), press  key to display device data of the register.

(5) Point to desired register data field, enter the appropriate value, press  key to set up device of the register.

(6) Use  (US DEC),  (HEX),  (S DEC) or  (FLOAT) to select the display format.

(7) Point to the desired register data field, press  key (DEL) to delete data in the register.

8.3 MLC

- The MLC diagnostics function displays current status of each MLC device for monitoring and forced ON/OFF. This not only helps in inspecting system status or driving MLC device but also provides MLC editing function as shown in Figure 8-3-1. The MLC diagnostics function covers bit device status, register status, device monitoring, MLC status operation and MLC editing function. See the sections below for operation steps.



Figure 8-3-1

8.3.1 Bit

- MLC programs use many device commands to trigger ON/OFF operation. Status of these devices can be seen in this function screen. The bit function displays bit type device of MLC, searches devices, and forces ON/OFF operation.

See the operation steps described below: (illustrated with M device)

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (MLC) to enter the sub menu of MLC diagnostics.
- (3) Press  key (Bit) to enter the bit device status display.
- (4) Press  key (M) to switch to device M status display as shown in figure below.

DIAGNOSE(MLC Bit Device)					00311	N337				
	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
M0	0	0	0	0	0	0	0	0	1	0
M10	1	0	0	0	0	0	0	0	0	1
M20	0	0	0	0	0	0	0	0	0	0
M30	0	0	0	1	0	0	0	0	0	0
M40	0	0	0	0	0	0	0	0	0	0
M50	0	0	0	0	0	0	0	0	0	0
M60	0	0	0	0	0	0	0	0	0	0
M70	0	0	0	0	0	0	0	0	0	0
M80	0	0	0	0	0	0	0	0	0	0
M90	0	0	0	0	0	0	0	0	0	0
M100	1	0	0	0	0	0	0	0	0	0
M110	0	0	0	0	0	0	0	0	0	0
M120	0	0	0	0	0	0	0	0	0	0
M130	0	0	0	0	0	0	0	0	0	0
M140	0	0	0	0	0	0	0	0	0	0
AUTO					RPD 100% F 30% S 101%					

Figure 8-3-2

Point to or search for the desired device field with the steps (1) ~ (4). See step (5) for device searching.

- (5) Enter the device name (e.g. 107), press  key (M) to point to the desired device (M107).

The device status can be changed only when the system is in "**NON-auto**" mode. See step (6) for forced ON/OFF operation.

- (6) Select the device for the desired status change, press "**1**" and press  key to force it ON (if it is in OFF status) or press "**0**" and press  key to force it OFF (if it is in ON status) .

8.3.2 Register

- Please refer to **Section 8-3-1**. As most system functions are triggered by MLC program, the MLC device features both bit and word type devices. This section explains operation on word type devices.

See the operation steps described below: (illustrated with register T)

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (MLC) to enter the sub menu of MLC diagnostics.
- (3) Press  key (REG) to enter the register device display.

DIAGNOSE(MLC Reg Device)		00311	N431
Dev	Value	Dev	Value
T0	2	T15	0
T1	1	T16	0
T2	0	T17	0
T3	0	T18	0
T4	0	T19	0
T5	0	T20	0
T6	0	T21	0
T7	0	T22	0
T8	0	T23	0
T9	0	T24	0
T10	0	T25	0
T11	0	T26	0
T12	0	T27	0
T13	0	T28	0
T14	0	T29	0
AUTO		RPD 100%	F 30% S 101%

Figure 8-3-3

- (4) Press  key (T) to enter the register T value setup page.
- (5) Enter the device name (e.g. "10"), press  key to search device T10.

(6) Switch to the function bar in the last page. Use  (US DEC),  (HEX),

 (S DEC) or  (FLOAT) to select the display format.

(7) Enter the setting value in the input column and press  key.

8.3.3 Device monitoring

- This function sets up monitoring functions for up to 45 devices.
See the operation steps described below:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (MLC) to enter the sub menu of MLC diagnostics.
- (3) Press  key (DEV MON) to enter the device name entry screen as shown in figure 8-3-4.

DIAGNOSE(MLC Dev Monit)				00311	N70	
No.	Dev	Value	Status	Comment		
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
AUTO				RPD 100%	F 30%	S 101%

Figure 8-3-4

- (4) Enter the device name to be monitored as shown in figure 8-3-5. Up to 45 monitoring data entries can be set.

DIAGNOSE(MLC Dev Monit)				00311	N49	SFT
No.	Dev	Value	Status	Comment		
0	X113	####	0			
1	Y113	####	0	NC		
2	D1350	0	##			
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
AUTO				RPD 100%	F 30%	S 101%

Figure 8-3-5

Device: Enter the name of device to be monitored in the highlighted field.

Value: Set up device status in the highlighted field.

Status: Enter digit 0 or 1 to set device status.

Different numeral systems can be used to switch between views of user settings including signed or unsigned decimal, hexadecimal numeral and floating point numerals. See Figure 8-3-6 for hexadecimal conversion and Figure 8-3-7 for floating point display.

DIAGNOSE(MLC Dev Monit)				00311	N21	
No.	Dev	Value	Status	Comment		
0	X113	####	0			
1	Y113	####	0	NC		
2	D1350	0x0000	##			
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
				AUTO		
				RPD 100%	F 30%	S 101%
				RUN		

Figure 8-3-6

DIAGNOSE(MLC Dev Monit)				00311	N388	SFT
No.	Dev	Value	Status	Comment		
0	X113	####	0			
1	Y113	####	0	NC		
2	D1350	0.000	##			
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
				AUTO		
				RPD 100%	F 30%	S 101%

Figure 8-3-7

8.3.4 Search line

- Most system functions rely on devices triggered by some MLC programs which are basically a set of command lines. This function enables users to search a program by line number.

See the operation steps described below for searching a desired line in a MLC program.

- Press **DGN** key to enter the [diagnostics function] page.
- Press **F3** key (MLC) to enter the sub menu of MLC diagnostics.
- Enter the desired MLC program line number, press **F5** key (JUMP TO) to go to the desired line.

8.3.5 Editor

- The edit function in DGN group can manage and edit MLC program. Its operation interface enables users to edit the MLC program directly. **This function can be run in "Edit mode" only.**

I. Basic MLC command

- A basic MLC command (including: LD, LDI, LDP, LDF, OUT, APP, —, |, INV) can be created with the functions described in this section. See Figure 8-3-3 for illustration.



Figure 8-3-8

See the operation steps described below for command LD:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (MLC) to enter the sub menu of MLC diagnostics.
- (3) Press  key (EDITOR) to enter the MLC program editor screen as shown in Figure 8-3-6.
- (4) Use , , ,  keys to move the cursor to the desired edit place.
- (5) Enter device name, press  key (LD) and the device is created successfully.

The steps described above apply to the creation of basic commands LDI, LDP, LDF, OUT, APP while step (1)~(4) apply to commands "—" and " | ". Then, use the corresponding function key to complete the command as described above.

The labeling function in MLC program is used to divide the section of the program and can be set in MLC program.

To assign form values for basic commands, please press the form function key to enter the setup page as shown in the figure below.

DIAGNOSE(MLC Table)		00311	N417	SFT
No.	Value	No.	Value	
0	0	15	12600	
1	20			
2	32			
3	50			
4	79			
5	126			
6	200			
7	320			
8	500			
9	790			
10	1260			
11	2000			
12	3200			
13	5000			
14	7900			
EDIT		R:139, C:1	1513/10240	STOP

Figure 8-3-9

II. Editing (cut, copy, and paste)

- This is an MLC exclusive editing function. Users can use it for single line delete, cut, or copy or do the same to the MLC device command by circling. After an MLC program is edited, load it for compiling and saving.

See the operation steps described below for the MLC editing function:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (MLC) to enter the sub menu of MLC diagnostics.
- (3) Press  key (EDITOR) to enter the MLC program editing page as shown in Figure 8-3-6.
- (4) Use     keys to move the cursor to the desired edit place.
- (5) Press  key repeatedly to point to the last row of the function page in this layer.
- (6) Select the desired function key, such as  (CUT) to edit the selected line as required.

For MLC program editing, please press the relevant function key. Available functions are: circle, delete, cut, copy, paste, insert and delete line.

III. Symbol

- This function enables users to search, delete, copy, and paste various types of devices. Available MLC program devices are represented by symbols: X, Y, M, A, T, C, D, P and I.

See the operation steps described below:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (MLC) to enter the sub menu of MLC diagnostics.
- (3) Press  key (EDITOR) to enter the MLC program editing screen as shown in Figure 8-3-6.
- (4) Use     keys to move the cursor to the desired edit place.

- (5) Press  key to switch the function bar to the third row of the function page in this layer.
- (6) Press  key (SYMBOL) to enter the device symbol function bar display.
- (7) Select the device type specific function key (e.g. Device X). Press  key (X) to enter X device specific list and do delete, copy or paste function as desired.

The same operation steps (Section III: Symbol) apply to other symbols.

IV. MLC load, import, and export

- After a MLC program is edited, it is required to save it for re-compiling. The function of saving includes compile and save. Then, users should re-start the system to update the MLC program. Import and export MLC files can be done by using proper function key.

8.3.6 Operation

- The MLC program starts running automatically after the system is power on. The operation function can be used to manually switch the MLC program's running. That is, it manually switches MLC running status from ON to OFF and vice versa. This is usually used for testing or inspecting system's MLC devices.

See the operation steps described below:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (MLC) to enter the sub menu of MLC diagnostics.
- (3) Press  key (SET) to enter the MLC execution status screen.
- (4) Press  key (RUN/STOP) to switch execution status of MLC program.

Note:

The status information can be viewed when "MLC stops" after the MLC program execution is halted.

- The function option can be used to force ON or OFF a MLC device.

See the operation steps described below for forced ON:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (MLC) to enter the sub menu of MLC diagnostics.
- (3) Press  key (SET) to enter the MLC execution status screen.
- (4) Use ; , ,  keys to point to a desired device position.
- (5) Press  key (ON) to switch on a device.

See the operation steps described below for forced OFF:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (MLC) to enter the sub menu of MLC diagnostics.
- (3) Press  key (SET) to enter the MLC execution status screen.
- (4) Use ; , ,  keys to point to the desired device position.
- (5) Press  key (OFF) to switch off the device.

8.4 System monitoring

- Computing results of the system can be displayed by type with this function.

8.4.1 Variable

- System variables: VS0 ~ VS31 and VS100 ~ VS131.

See the operation steps described below:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (SYS MONI) to enter the system monitoring function screen.
- (3) Press  key (VAR MONI) to display the variable monitoring screen.
- (4) Press  key (SYS VAR) to enter the system variable monitoring screen.
- (5) Use   keys to scroll to the screen containing the desired variable item or;
- (6) enter the full name of the desired system variable and press  key or enter the variable code and press  key (SYS VAR) to search the desired system variable screen.

DIAGNOSE(System Var)		00311	N417	SFT
Num	Value	Num	Value	
VS0	0	VS16	0	
VS1	0	VS17	0	
VS2	0	VS18	0	
VS3	4	VS19	0	
VS4	0	VS20	0	
VS5	0	VS21	0	
VS6	0	VS22	0	
VS7	0	VS23	0	
VS8	0	VS24	0	
VS9	0	VS25	0	
VS10	0	VS26	0	
VS11	0	VS27	0	
VS12	0	VS28	0	
VS13	0	VS29	0	
VS14	0	VS30	0	
VS15	0	VS31	0	
EDIT				

Figure 8-4-1

- Channel variable: VC0~VC31, VC100~VC131 and VC200~VC231.

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (SYS MONI) to enter the system monitoring function screen.
- (3) Press  key (VAR MONI) to enter the variable monitoring screen.
- (4) Press  key (CH VAR) to enter the channel monitoring screen.
- (5) Use   keys to scroll the screen containing desired variable item or;
- (6) enter the full name of the desired system variable and press  key or enter the variable code and press  key (CH VAR) to search the desired channel monitoring screen.

- Axis variable: VA0~VC31, VA100~VA131 and VA200~VA231.

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (SYS MONI) to enter the system monitoring function screen.
- (3) Press  key (VAR MONI) to enter the variable monitoring screen.
- (4) Press  key (AXIS VAR) to enter the axis variable monitoring screen.
- (5) Use   keys to scroll the screen containing the desired variable item or;
- (6) enter the full name of the desired system variable and press  key or enter the variable code and press  key (AXIS VAR) to search the desired axis variable screen.

- Interface variable: VH0~VH31, VH200~VH231 and VH400~VH431 and VH800~VH863.

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (SYS MONI) to enter the system monitoring function screen.
- (3) Press  key (VAR MONI) to enter the variable monitoring screen.
- (4) Press  key (IF VAR) to enter the interface variable monitoring screen.
- (5) Use   keys to scroll the screen containing the desired variable item or;
- (6) enter the full name of the desired system variable and press  key or enter the variable code and press  key (IF VAR) to search the desired interface variable screen.

Use different numeral systems to switch between views of user settings including signed or unsigned numeral system, binary system and hexadecimal numeral.

8.4.2 I/O monitoring

- NC300 system can add an external device control switch through its I/O expansion module. Users can monitor the status of the expansion control panel connected to the I/O port.

See the operation steps described below:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (SYS MONI) to enter the system monitoring function screen.
- (3) Press  key (I/O MONI) to enter the status monitoring screen for the I/O expansion module.

8.4.3 Servo monitoring

- This function enables users to monitor the status of the servo drive including channel ports and servo status. It provides the current status of the servo drive connected to the system as shown in Figure 8-4-2. Here, the servo of axes Y, Z, A and the spindle are all in OFF status and only the X-axis remains in ON status.

DIAGNOSE(Servo Monitor)				00311	N417	SFT			
Port	Channel	Ax	Servo Status	LOAD	Peak	MECH	Home	ABS	RST
1	0	X	ON	0 %	6 %	101.000	OK		
2	0	Y	OFF				OK		
3	0	Z	OFF				OK		
4	0	A	OFF				OK		
9	0	SP1	OFF				OK		
EDIT					STOP				

Figure 8-4-2

See the operation steps described below:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (SYS MONI) to enter the system monitoring screen.
- (3) Press  key (SERVO) to enter the servo monitoring screen.

8.5 Password setting

- This function enables users to set up different level of permissions for the system (system maintenance), equipment (mechanical equipment) and users (operation and use). It prevents unauthorized users from changing system settings.

8.5.1 System permission

- The system permission function covers permission lock and permission unlock. The password is composed of up to four alphanumeric characters (symbols excluded).

See the operation steps described below for permission lock and unlock:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to enter the password setup function bar.
- (3) Press  key (S SCP) to enter the system permission lock/unlock function bar.
- (4) ※ Press  key (LOCK) to lock system permission when it is in revoked status.
- (5) ※ Press  key (UNLOCK) and an entry dialog box pops up for users to enter permission password.
- (6) Enter a valid password, press  key and the permission is revoked.

8.5.2 Equipment permission

- This function covers password change, permission lock, permission unlock, user 1 reset and user 2 reset. The password is composed of up to four alphanumeric characters (symbols excluded).

See the operation steps described below for changing equipment permissions:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to enter the password setup function bar.
- (3) Press  key (M SCP) to enter the equipment permission function bar.
- (4) Press  key (PWD CHG) and an entry dialog box pops up as shown in Figure 8-5-1. Enter old password, new password, and new password again (for confirmation) as prompted.
- (5) Enter passwords as prompted and press  key.

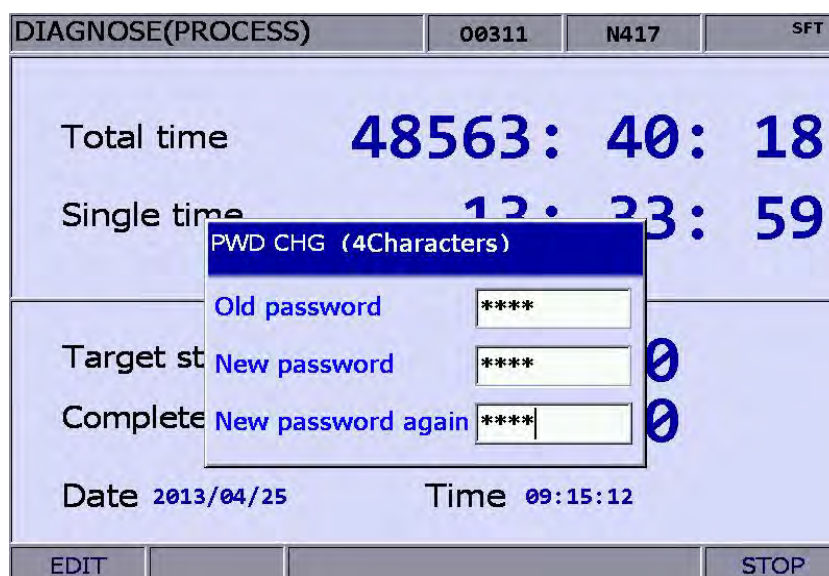


Figure 8-5-1

See the operation steps described below for equipment permission resetting:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to enter the password setup function bar.
- (3) Press  key (M SCP) to enter the equipment permission function bar.
- (4) ※ Press  key (UNLOCK) and an entry dialog box pops up for users to enter a password when equipment permission is locked.
- (5) Enter a valid password, press  key and the equipment permission is revoked.

Note:

The default password of equipment permission is 0000, which means the permission is unlocked and all functions can be accessed. When the password is modified, the equipment permission is enabled and it means the related functions can be accessed with the permission only.

See the operation steps described below for equipment permission lock up:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to enter the password setup function bar.
- (3) Press  key (M SCP) to enter the equipment permission function bar.
- (4) ※ Press  key (LOCK) to lock permission when it is revoked.

User reset function allows the equipment supplier to reset the user's password. Once the client forgets the password, the equipment supplier is able to reset as the default password. This function is active only when the password is not the default value. See below for the operation steps.

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to display the password setup function bar.
- (3) Press  key (M SCP) to display the equipment permission function bar.
- (4) Press  key (RST U1) /  key (RST U2) to reset the user's password.

8.5.3 User permission

- Users can set up permission for users 1 and 2. The permission function covers password change, permission lock and permission unlock. The password is composed of up to four alphanumeric characters (symbols excluded).

See the operation steps described below for user password change: (illustrated with user permission 1)

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to enter the password setup function bar.
- (3) ※ Press  key (U1 SCP) and the password entry dialog box for unlocking user permission 1 displays if the user permission 1 is locked.
- (4) Enter valid password for user permission 1, press  key to revoke user permission 1 and display relevant function items.
- (5) Press  key (PWD CHG) and an entry dialog box pops up for users to enter old password, new password, and new password again (for confirmation) as prompted.
- (6) Enter passwords as prompted and press  key.

See the operation steps described below for user permission reset:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to enter the password setup function bar.
- (3) ※ Press  key (U1 SCP) and the password entry dialog box for unlocking user permission 1 displays if the user permission 1 is locked.
- (4) Enter valid password for user permission 1, press  key to revoke user permission 1 and display relevant function items.

See the operation steps described below for user permission lockup:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to enter the password setup function bar.
- (3) ※ Press  key (U1 SCP) to display relevant function items if user permission 1 is revoked.
- (4) Press  key (LOCK) to resume locking user permission 1.

Note:

The function of user permission is the same as equipment permission. Its default password is 0000, which means all functions are available. If the user password is changed, the user permission is enabled.

8.5.4 Timed use

- Users can assign a timed use of the controller to limit its use in a set period of time. The system controls given days or hours for the use of the controller automatically. Users can revoke or reset the time limit only with valid permission when the time limit is active. The "deadline" in the time limit screen remains blank when no time limit is set or the limit is revoked as shown in Figure 8-5-2. If there is an active time limit in existence and it is not revoked, the "**deadline**" in the time limit screen indicates a valid due date as shown in Figure 8-5-3:

DIAGNOSE(Expiration)	00311	N417	SFT
Deadline:			
Date 2013/04/25		Time 09:17:24	
EDIT			

Figure 8-5-2

DIAGNOSE(Expiration)	00311	N417	SFT
Deadline: 2013/05/25			
Date 2013/04/25		Time 09:32:59	
EDIT			STOP

Figure 8-5-3

This screen helps users to know to which date the controller can be used normally. After the due date, the system will be locked unless the time limit is revoked or extended to a later date. Otherwise, no G code program can be executed manually or automatically. **Please contact the dealer/service provider in case it is overdue.**

This function enables users to set up a time limit when there is no time limit in existence. See the operation steps described below for **time limit** setup:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to enter the password setup function bar.
- (3) Press  key (EXPIRE) to display the time limit information.
- (4) Press  key (SETTING) to enter the limit setup page.
- (5) After entering the password of legal permission, the system's time limit control is activated.

See the operation steps described below for revoking a time limit. **Please contact the dealer/service provider for further information.**

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to enter the password setup function bar.
- (3) Press  key (EXPIRE) to display the remaining time information.
- (4) Press  key (RELEASE) to pop up the limit revoking dialog box as shown in Figure 8-5-4.



Figure 8-5-4

- (5) With proper authorization, enter an activation code, press  key, restart the system and the time limit is now revoked.

Note:

After the time limit is revoked, the "deadline" field turns blank, as shown in Figure 8-5-5, and indicates that the system does not have a time limit set up.

DIAGNOSE(Expiration)	00311	N417	SFT
Deadline:			
Date 2013/04/25		Time 09:17:24	
EDIT			

Figure 8-5-5

The management of time limit permission must go through the proper authorization to lock or unlock the time limit permission. When time limit is activated, only when entering the correct password can the permission be revoked. After the permission is revoked, all time limit function is available, including password change, permission lock/revoke and etc. The password is composed of up to 4 alphanumeric characters (symbol excluded).

See the operation steps described below for changing the password of time limit.

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to enter the password setup function bar.
- (3) Press  key (EXPIRE) to display the remaining time information.
- (4) ✕ Press  key (EXP SCP) and the password entry dialog box for unlocking time limit permission displays if the time limit permission is locked.
- (5) Enter valid password for time limit permission, press  key to revoke time limit permission and display relevant function items.

- (6) Press  key (PWD CHG), and an entry dialog box pops up for users to enter old password, new password, and new password again (for confirmation) as prompted.
- (7) Enter passwords as prompted and press  key.

See the operation steps described below for revoking the time limit permission.

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to enter the password setup function bar.
- (3) Press  key (EXPIRE) to display the remaining time information.
- (4) ✕ Press  key (EXP SCP) and the password entry dialog box pops up for unlocking time limit permission displays if the time limit permission is locked.
- (5) Enter valid password for time limit permission, press  key to revoke time limit permission and display relevant function items.

See the operation steps described below for locking the time limit permission.

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (PWD) to enter the password setup function bar.
- (3) Press  key (EXPIRE) to display the remaining time information.
- (4) ✕ Press  key (EXP SCP) for displaying the relevant function items if the time limit permission is revoked.
- (5) Press  key (LOCK) and resume the permission lock.

8.6 System information

- This function provides program version of hardware, software and firmware of this system as required for system maintenance and performance optimization. It covers the options of system status and hardware, software and firmware serial number.

See the operation steps described below for system status display:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (STATUS) to enter the system information screen.
- (3) Press  key (SYSTEM) to enter the system status information screen.

The software and firmware serial number function displays the software and firmware version number as well.

See the operation steps described below:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (STATUS) to enter the system information screen.
- (3) Press  key (FW SN) to display software and firmware version information as shown in the figure below.

[illegible]

Figure 8-6-1

See the operation steps described below for hardware serial number display:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key (STATUS) to enter the system information screen.
- (3) Press  key (HW SN) to display hardware version information.

8.7 Gain adjustment

- The auto adjusted gain compensation enables the system and the servo drive to work out even better motion control to meet different mechanical requirements of various machines. The NC300 controller retrieves initial parameters of the servo, calibrates motion control with gain adjustment function and feeds back the calculated gains to the servo drive to unify control parameters of the controller and the servo for easier system gain adjustment enhancement and the best control accuracy. Sub menu items of this function are described with the function screen as shown in the figure below.

The screenshot shows the **DIAGNOSE(Servo Tuning)** screen. At the top, it displays **00311**, **N1**, and **SFT**. Below this, there are fields for **Ch** (0), **Axis** (X), **Current** (0 %), and **JL/Jm** (0.0). The main area is divided into two columns: a table of parameters and a list of adjustment conditions.

No.	Parameter Name	Calculate	In Drive
P1-37	Load Inertia Ratio	0.0	0.0
P2-00	Position Loop P gain	157	157
P2-02	Position Feedforward	50	50
P2-04	Speed Loop P gain	628	628
P2-06	Speed Loop I gain	100	100
P2-25	OSC. Reject filter	16	16
P2-26	External Noise Reject	100	100
P2-49	Speed D Filter and J Suppression	[0F]:800	[0F]:800
P2-47	Auto Resonance Suppression Sel	1	1
P2-23	Notch filter Freq(1)	1000	1000
P2-24	Notch filter Gain(1)	0	0
P2-43	Notch filter Freq(2)	1000	1000
P2-44	Notch filter Gain(2)	0	0
P2-45	Notch filter Freq(3)	1000	1000
P2-46	Notch filter Gain(3)	0	0

On the right side, there are adjustment conditions: **MECH** (101.012), **POS 1** (-----), **POS 2** (-----), **Rigidity** (1), **BW** (100 Hz), **JL/Jm** (4.0), **Acc. Time** (200 ms), **S Time** (20 ms), **Speed** (3000 rpm), and **Interval** (500 ms). At the bottom, there are buttons for **JOG** and **Ready**.

Callouts explain the following:

- Servo parameter ID**: Points to the parameter ID and name in the table.
- Anchor point setup**: Points to the **POS 1** and **POS 2** fields.
- Adjustment conditions**: Points to the right-hand side of the screen.
- Calculated results after adjustments**: Points to the **Calculate** column.
- Existing settings of the system**: Points to the **In Drive** column.

- Next axis:** This function switches axial gain settings. The auto gain can be adjusted by individual axis. After the first axis is adjusted, users need to switch to the next one for its adjustment. See the operation steps described below:

- Press **DGN** key to enter the [diagnostics function] page.
- Press **▶** key to enter the next function page.
- Press **F1** key (TUNING) to enter the auto gain setup page.
- Press **F1** key (NEX AX) to switch to the next axis for its axial gain parameters setup.

- **Read the Servo:** After the auto gain adjustment function is activated, its parameter values have been synchronized with those of the servo. To accommodate the function of gain adjustment, the calculated results after auto gain operation are not written back to the servo. This function can be used to recover servo parameters.

See the operation steps described below:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key to switch to the next function page.
- (3) Press  key (TUNING) to enter the auto gain setup page.
- (4) Press  key (READ) to return parameter values to the controller from the servo.

- **Start, Jog←, Jog→, Positioning 1, Positioning 2:** This sets up the operation of auto gain adjustment. It starts the action of auto gain, and sets up anchor point direction and operation. See the operation steps described below for continuous operation.

See the operation steps described below for single axis operation:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key to switch to the next function page.
- (3) Press  key (TUNING) to enter the auto gain setup page.
- (4) Press  key to switch to the next function page.
- (5) Press  key (JOG ←) to offset gain motion to the anchor point to the left.
- (6) Press  key (POS 1) to set the point as the left anchor point of the gain motion.
- (7) Press  key (JOG →) to offset gain motion to the anchor point to the right.
- (8) Press  key (POS 2) to set the point as the right anchor point of the gain motion. The gain trip is now limited between both points.
- (9) Press  key (RUN) to execute gain adjustment motion.
- (10) Press  key (STOP) during auto adjustment motion to complete the gain adjustment motion. The system then calculates the best gain value automatically.

- **Gain calculation:** Users can change low-frequency rigid, bandwidth, or inertia ratio to fit individual machines. These values can be generated by this function automatically. See the operation steps described below for single axis operation:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key to switch to the next function page.
- (3) Press  key (TUNING) to enter the auto gain setup page.
- (4) Use  and  keys to point to the low-frequency rigid, bandwidth, or inertia ratio fields to enter settings respectively.
- (5) Press  key (COMPUTE) to generate new gain values.

- **Gain and resonance write-in:** New gain values are generated after the auto gain adjustment operation has stopped. If they are the expected optimization values, please use this function to write them in the servo. See the operation steps described below:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  function key to switch to the next function page.
- (3) Press  key (TUNING) to enter the auto gain setup page.
- (4) Gain values are generated automatically after gain adjustment operation.
- (5) Press  key (WR GAIN) to write gain values in the servo. Press  key (WR NOTH) to write resonance suppression values in the servo.

Note:

- (a) The newly generated gain adjustment results must be written in the servo before it can take effect.
- (b) After gain and resonance write-in function is executed, the servo parameters are updated and the old ones cannot be recovered. Please do the write-in with care.

- **Tapping adjustment:** This function fine tunes the machine and servo for tapping application. See the operation steps described below:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key to switch to the next function page.
- (3) Press  key (TUNING) to enter the auto gain setup page.
- (4) Complete X, Y, Z axes and spindle's gain adjustment first.
- (5) Press  key continuously to enter the last page.
- (6) Press  key (TAP RIV) to prompt the operation screen.
- (7) Press  key (TAP SET) again and the confirmation dialog box will pop up.

Press **Y** (Yes) key and press  key to fine tune the machine for tapping operation.

- **Servo parameter:** This function sets up the parameter for easy servo parameter display and setup in the gain adjustment screen:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key to switch to the next function page.
- (3) Press  key (TUNING) to enter the auto gain setup page.
- (4) Continuously press  key to enter the last page.
- (5) Press  key (SERVO) to enter the servo parameter screen.
- (6) Point to the desired field and type in relevant data, press  key to set up a given field.

8.8 Import

- The system features a parameter import/export function for managing system parameters. Users can import correct parameters to the system to return it to normal or export existing parameters for backup. It is used for system recovery or optimization. This function can be used only with proper permissions. It recovers system abnormalities caused by parameter errors at fast speed.

See the operation steps described below for parameter import:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key to switch to the next function page.
- (3) Press  function (IMPORT) key to search parameter files in the USB drive (with file name in format of GMCEExport.ncp).
- (4) Use     keys in the parameter file selection interface, press  key to check the parameter items for import.
- (5) Press  key (IMPORT) to import the selected parameter files.

8.9 Export

- **Export function:** System parameters may be regulated to meet the requirements of different scenarios during actual application. After the system is optimized, this function can be used to export parameter values for backup and control. This function can be used only with proper permissions.

See the operation steps described below for parameter export:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key to switch to the next function page.
- (3) Press  key (EXPORT) to enter the parameter export selection screen.
- (4) Use     keys in the parameter file selection interface, press  key to check the parameter items for export.
- (5) Press  key (EXPORT) to export the selected parameter files to a USB drive.

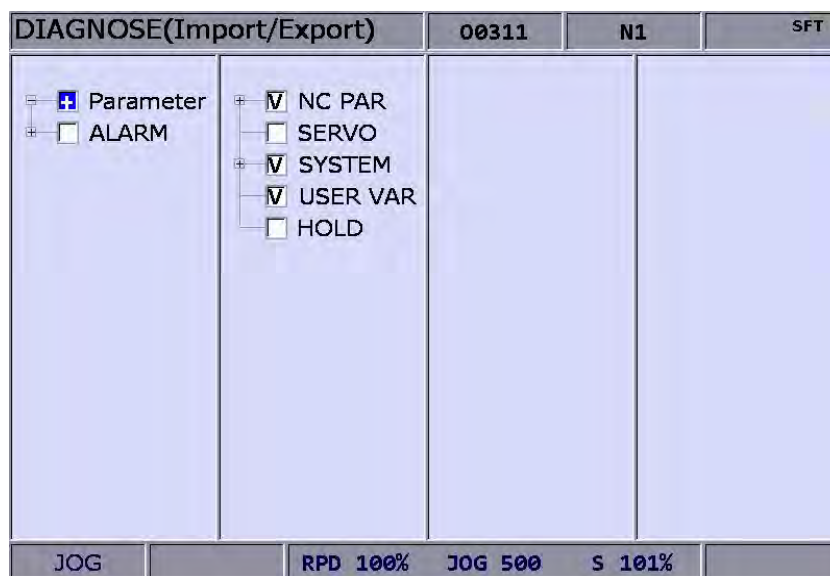


Figure 8-9-1

8.10 Multi language download

- Language support of the group screens and function bars includes both Chinese and English. For other language support, please enhance the interface language with this multi-language downloading function. **Please contact the dealer/service provider for details.**

8.11 System recovery

- This function can be used to recover a system in the status of severe error, malfunctioning or system data damage with the previous parameter backup file. Enter the restore options screen. Checked items are data that have been damaged and can be restored with this function. This function can be used only with proper permissions.

See the operation steps described below:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Press  key to enter the next function bar page.
- (3) Press  key (RECOVER) and the user permission dialog box will pop up.
- (4) Use     keys in the parameter file selection interface, press  key to check the desired restore file.
- (5) Press  key at the item that has been checked to uncheck it.
- (6) Press  key (OK) to start system recovery.

8.12 LOGO download

- The startup screen of the system can be customized with user exclusive contents for logo presentation or other uses with this function. This function can be used only with proper permissions.

See the operation steps described below:

- (1) Press  key to enter the [diagnostics function] page.
- (2) Continuously press  key to enter the function bar for displaying the next page.
- (3) Insert a USB drive containing the correct NC300 system startup screen file.
- (4) Press  key (LOGO WR) to read the system startup screen file.
- (5) Use     keys in the restore selection screen, press  key to check the desired recovery parameter items.
- (6) Restart the system after the LOGO image file is updated.

Chapter 9: PAR group

PAR Group regulates and sets up a full range of system control and computing parameters for easy management and optimized setup. The PAR group covers the setup of parameters for operation, tool magazine, machining, spindle, mechanical, origin, compensation, and system.

9.1 Operation parameter

- Users can combine the execution and computing of a macro program in the G code file for composite motions. Users also can control or execute the execution of a macro program in the **operation parameter** screen.

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key (Operate) to enter the operation parameter setup screen.
- (3) Use ; ;  &  # keys to point to the desired data field, and type in proper values (Refer to the recommended values displayed at lower right corner of the screen) as shown in Figure 9-1-1.
- (4) Press  key to complete setting up the field.

PARAMETER(Operation)		00311	N1	SFT
No.	Parameter Name			Value
3	GO9010	R		0
4	GO9011	R		0
5	GO9012	R		23
6	GO9013	R		24
7	GO9014	R		0
8	GO9015	R		0
9	GO9016	R		0
10	GO9017	R		0
11	GO9018	R		0
12	GO9019	R		0
13	MO9020	R		0
14	MO9021	R		6
15	MO9022	R		0
16	MO9023	R		16
17	MO9024	R		0
		Range: 0 ~ 1000		
JOG		Ch 0	1/6	Ready

Figure 9-1-1

9.2 Tool magazine parameter

- The tool magazine parameters set up relevant functions of the tool magazine including its mechanical type, quantity, and startup. For settings of tool magazine hardware relevant parameters, please contact the dealer/service provider.

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key (Maga) to enter the tool magazine parameter setup screen.
- (3) Use  and  keys to point to the desired data field, and type in proper values (Refer to the recommended values displayed at lower right corner of the screen) as shown in Figure 9-2-1.
- (4) Press  key to complete setting up the field.

PARAMETER(Magazine)		00311	N1	SFT
No.	Parameter Name	Value		
304	Magazine selection	P	18432	
	• ATC enable flag		1	
	• Set the magazine tool channel		0	
	• ATC type		1	
	• Set the search mode of the ATC tool change		0	
	• Control type		0	
336	Magazine control	P	0	
	• ATC type		0	
337	Magazine selection	P	1	
	• Enable ATC 1		1	
	• Enable ATC 2		0	
338	ATC 1 station	P	16	
339	ATC 1 init number	P	0	
340	ATC 1 start number	P	1	
341	ATC 2 station	P	50	
		Range: 0 ~ 1		
JOG		Ch 0	1/2	Ready

Figure 9-2-1

9.3 Machining parameter

- The machining parameter sets up parameters for the maximum cutting speed, cutting and smoothing acceleration and deceleration time. These parameters have a heavy impact on machining quality. For the best operation effect, please set up these parameters based on actual requirements.

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key (Process) to enter the machining parameter setup screen.
- (3) Use ;  keys to point to the desired data field, and type in proper values (Refer to the recommended values displayed at lower right corner of the screen) as shown in Figure 9-3-1.
- (4) Press  key to complete setting up the field.

PARAMETER(Process)		00311	N1	SFT
No.	Parameter Name			Value
307	Channel utility	P		197
	• Skip signal channel selection			0
	• Break point return			1
	• EMG stop mode			0
309	Nominal arc feed rate	R		1500
310	Minimal arc feed rate	R		500
311	Overlapped speed reduction ratio	R		50
315	F0 Speed	P		10
316	G00 Rapid speed	R		30000
317	G00 Rapid ACC/DEC time	R		200
318	Maximum moving speed	R		30000
319	ACC/DEC time	R		200
320	S curve time constant	R		20
321	ACC/DEC time	R		15
322	S curve time constant	R		5
		Range: 0 ~ 2		
JOG		Ch 0	1/3	

Figure 9-3-1

9.4 Spindle parameter

- The spindle parameters set up various spindle function including gains, maximum speed, and positioning errors.

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key (Spindle) to enter the spindle parameter setup screen.
- (3) Use ;  keys to point to the desired data field, type in proper values (Refer to the recommended values displayed at lower right corner of the screen) as shown in Figure 9-4-1.
- (4) Press  key to complete setting up the field.

PARAMETER(Spindle)		00311	N1	SFT
No.	Parameter Name			Value
399	Spindle mode	P		9
	• Spindle control flag			1
	• Closed loop control flag			0
	• Spindle control output			2
	• SP Type			0
	• Encoder type			0
401	Spindle import number	P		8
402	1st encoder pulse	P		1280
403	1st Gain	P		50
404	1st positioning speed	P		100
405	1st Spindle offset	R		0
406	1st speed in range	P		10
407	1st position In range	P		100
408	1st zero speed	P		5
409	1st Spindle speed	P		20000
		Range: 0 ~ 1		
JOG		Ch 0	1/2	Ready

Figure 9-4-1

9.5 Mechanical parameter

- Users can set up the mechanical equipment relevant parameters of software/hardware limit, screw guide pitch and number of pulses of encoder.

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key (Machine) to enter the mechanical parameter setup screen.
- (3) Use ;  keys to point to the desired data field, type in proper values (Refer to the recommended values displayed at lower right corner of the screen) as shown in Figure 9-5-1.
- (4) Press  key to complete setting up the field.

PARAMETER(Machine)		00311	N1	
No.	Parameter Name	X	Y	Z
602	1st Upper soft limit	R 100000.000	100000.000	100000.000
603	1st Lower soft limit	R -100000.000	-100000.000	-100000.000
604	2ed Upper soft limit	R 100000.000	100000.000	100000.000
605	2ed Lower soft limit	R -100000.000	-100000.000	-100000.000
628	Port polarity	P 0	0	0
	• CWL polarity	0	0	0
	• CCWL polarity	0	0	0
	• Home dog polarity	0	0	0
630	Encoder pulse count	P 1280	1280	1280
631	Shaft gear number	P 1	1	1
632	Motor gear number	P 1	1	1
633	Lead screw pitch	P 10	10	10
634	Control utility	P 1	1	1
	• Rotation mode	0	0	0
		Range: -100000 ~ 100000 (mm)		
JOG		Ch 0	1/1	

Figure 9-5-1

9.6 Origin parameter

- The origin parameter sets up coordinates from mechanical origin to the fourth reference point and origin searching mode.

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key (Home) to enter the origin parameter setup screen.
- (3) Use ;  keys to point to the desired data field, type in proper values (Refer to the recommended values displayed at lower right corner of the screen) as shown in Figure 9-6-1.
- (4) Press  key to complete setting up the field.

PARAMETER(Home)		00311	N1	SFT
No.	Parameter Name	X	Y	Z
606	Home absolute coordinate	P 0.000	0.000	0.000
607	2nd ref. position	P 0.000	0.000	0.000
608	3rd ref. position	P 0.000	0.000	0.000
609	4th ref. position	P 0.000	0.000	0.000
610	2nd ref. position range	P 0.000	0.000	0.000
616	Homing mode	P 1	1	1
617	Homing criteria	P 1	1	1
	• Homing search direction	1	1	1
618	Rapid home speed	R 2000	2000	2000
619	Creep speed	R 200	200	200
620	Reference moving speed	R 10	10	10
		Range: -100000000 ~ 100000000		
JOG	Ch 0	1/1		

Figure 9-6-1

9.7 Compensation parameter

- The compensation parameter sets up relevant compensation data to compensate errors caused by mechanical factors during actual machine operation. That is to say, the compensation is given by the control system with considering the machine features.

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key to enter the page containing this function bar.
- (3) Press  key (Comp) to enter the compensation parameter setup screen.
- (4) Use ; , keys to point to the desired data field, type in proper values (Refer to the recommended values displayed at lower right corner of the screen) as shown in Figure 9-7-1.

PARAMETER(Compensation)		00311	N1	
No.	Parameter Name	X	Y	Z
1000	Backlash amount	R 0.00000	0.00000	0.00000
1001	Compensation time	R 0	0	0
1002	Compensation delay time	R 0	0	0
1003	Friction comp amount	R 0.00000	0.00000	0.00000
1004	Friction comp time	R 0	0	0
1005	Friction comp delay time	R 0	0	0
1006	Compensation utility	R 0	0	0
	• Absolute or Relative	0	0	0
	• Friction positive direction	0	0	0
	• Friction negative direction	0	0	0
	• Friction compensation mode	0	0	0
	• LSC direction	0	0	0
1007	LSC point number	R 0	0	0
1008	LSC Space	R 0.00000	0.00000	0.00000
1009	LSC Offset	R 0.00000	0.00000	0.00000
		Range: -2 ~ 2 (mm, inch)		
JOG		Ch 0	1/10	

Figure 9-7-1

- (5) Press  key to complete setting up the field.
- (6) The field of input length compensation is determined by the length unit. Press  key (mm) to type in absolute length compensation in unit of millimeter; press  key (mm+) to type in incremental length compensation in unit of millimeter; press  key (um) to type in absolute length compensation in unit

of um; or press **F6** key (um+) to type in incremental length compensation in unit of um.

(7) Compensation data generated by calibration instruments can be converted by

the CNC SOFT program. Press **F1** key (import) to import compensation data

which is the absolute type data import; or press **F2** key (import +) to import compensation data as the incremental type of data import.

(8) After entering all compensation value, press **F1** key (OK) to confirm and update the compensation parameters.

9.8 System parameter

- The system parameters enable users to customize operation environment including system date, system time, background color of screen, function bar color, and tab color.

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key to enter the page containing this function bar.
- (3) Press  key (System) to enter the system parameter setup screen.
- (4) Use ;  keys to point to the desired data field, type in proper values (Refer to the recommended values displayed at lower right corner of the screen) as shown in Figure 9-8-1.

PARAMETER(System)		00311	N1	SFT
No.	Parameter Name	Value		
10000	Date	2013/04/25		
10001	Time	09:51:53		
10002	Language	0		
10003	Brightness	50		
10004	User defined language	1		
10009	Synchronous coordinate display	1		
10010	Enable screen saver	1		
10011	Screen saver time 1	10		
10012	Screen saver brightness 1	30		
10013	Screen saver time 2	30		
10014	Screen saver brightness 2	10		
10016	System utility	5		
	• Reset system at EMG releasing	1		
	• Displaying soft at startup	0		
	• Pop alarm screen	1		
		Format: Year / Month / Day		
JOG		Ch 0	1/3	Ready

Figure 9-8-1

- (5) Press  key to complete setting up the field.
- (6) As for the setting of color items, press  key (Color) and the color selection dialog box will pop up.

(7) To reset the system environment back to its factory defaults status, press  key (Default) and a confirmation dialog box displays.

(8) Press "Y" (Yes) and  key to reset the system back to its factory defaults status.

9.9 MLC setting

- This function sets up the display environment of the component device and color of the MLC ladder diagram.

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key to enter the page containing this function bar.
- (3) Press  key (MLC) to enter the MLC setup screen.
- (4) Use ; , keys to point to the desired data field, type in proper values (Refer to the recommended values displayed at lower right corner of the screen) as shown in Figure 9-9-1.

PARAMETER(MLC)		00311	N1	
No.	Parameter Name	Value		
12000	Program title	for pc edit		
12001	Company name			
12002	Designer name			
12003	Show comments	0		
12004	Show symbol	0		
12005	Ladder color	0		
12006	Ladder text color	0		
12007	Ladder symbol color	0		
12008	Ladder cursor color	31		
12009	Ladder monitor color	2016		
12010	Ladder device comment color	36864		
12011	Ladder segment comment color	36864		
12012	Ladder row comment color	36864		
12013	Ladder monitor value color	63488		
12014	NC special device color	8799		
		Length: 0 ~ 20		
JOG		Ch 0	1/2	Ready

Figure 9-9-1

- (5) Press  key to complete setting up the field.
- (6) As for the setting of color item, press  key (Color) and the color selection dialog box will pop up.
- (7) To reset the system environment back to its factory defaults status, press  key (Default) and a confirmation dialog box displays.
- (8) Press "Y" (Yes) and  key to reset the system back to its factory defaults status.

9.10 Graph parameter

- The graph parameter defines the display range of motion trails and provides GRA group required plotting settings. Users can define offset to graph the initial point with the workpiece (X, Y, Z) offset parameter. If initial point offset settings = 0, then there is no offset to the plotting initial point.

PARAMETER(Graphic)		00311	N1	SFT
No.	Parameter Name		Value	
14000	Graphic line color		65504	
14001	Graphic background color		1183	
14002	Graphic line width		2	
14003	Graphic stock width		70	
14004	Graphic stock height		70	
14005	Graphic stock length		150	
14006	Graphic stock X offset		-30	
14007	Graphic stock Y offset		-30	
14008	Graphic stock Z offset		50	
		Range: 0 ~ 65535		
JOG		Ch 0	1/1	Ready

Figure 9-10-1

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key to enter the page containing this function bar.
- (3) Press  key (Graphic) to enter the graph parameter setup screen.
- (4) Use  and  keys to point to the desired data field, type in proper values (Refer to the recommended values displayed at lower right corner of the screen) as shown in Figure 9-10-1.
- (5) Press  key to complete setting up the field.
- (6) As for the setting of color item, press  key (Color) and the color selection dialog box will pop up.
- (7) To reset the system environment back to its factory defaults status, press  key (Default) and a confirmation dialog box displays.
- (8) Press "Y" (Yes) and  key to reset the system back to its factory defaults status.

9.11 Network Setup

- This function enables users to remote connect to a PC through Ethernet communication. Working together with CNC Network software and the network setting of the NC300 numerical control system, users can use one PC to control multiple NC300 controllers for online file management, file sharing, file management and transmission-along-with-machining (DNC) through remote network communication.

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key to enter the page containing this function bar.
- (3) Press  key (ETH) to enter the network setup page.
- (4) Use ;  keys to point to the desired data field, type in proper values (Refer to the recommended values displayed at lower right corner of the screen) as shown in Figure 9-11-1.
- (5) Press  key to complete setting up the field.

PARAMETER(Ethernet)		00311	N1
No.	Parameter Name	Value	
10030	Host Name	P	CNC 001
10031	IP Address	P	192.168. 0. 2
10032	Subnet Mask	P	255.255.255. 0
10033	Default Gateway	P	0. 0. 0. 0
10034	Ethernet Enable	P	1
10035	DHCP Enable	P	0
10036	PC1's IP Address		192.168. 0. 1
10037	PC2's IP Address		0. 0. 0. 0
10038	PC3's IP Address		0. 0. 0. 0
10039	PC4's IP Address		0. 0. 0. 0
10040	PC5's IP Address		0. 0. 0. 0
10041	Network Sharing IP Address		0

Length: 1 ~ 8

JOG

Ch 0

1/1

Ready

Figure 9-11-1

Parameter code	Parameter Name	Parameter Range or format
10030	Host name	Length:1~8 Actual setting: 1~8 characters
10031	IP address	Data format: xxx.xxx.xxx.xxx Actual setting: 192.168.0.2
10032	Subnet mask	Data format: xxx.xxx.xxx.xxx Actual setting: 255.255.255.0
10033	Default gateway	Data format: xxx.xxx.xxx.xxx Actual setting: 0.0.0.0
10034	Networking enabled	Data range: 0~1 Actual setting: 1
10035	DHCP enabled	Data range: 0~1 Actual setting: 0
10036 ~ 10040	Remote computer IP address 1~5	Data format: xxx.xxx.xxx.xxx Actual setting: 192.168.0.1

9.12 Servo parameter

- Through the servo parameter setup screen, the servo end can control and set up parameters.

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key to enter the page containing this function bar.
- (3) Press  key (Servo) to enter the servo parameter setup screen.
- (4) Use ;  keys to point to the desired data field, type in proper values (Refer to the recommended values displayed at lower right corner of the screen).
- (5) Press  key to complete setting up the field.

PARAMETER(Servo)			00311	N1	SFT
Group	No.	Parameter Name	X	Y	Z
P0	0	Firmware Version	1738		
P1	1	Control Mode and Output Dirl	8		
P1	8	Smooth Constant of Position	0		
P1	36	Accel /Decel S-curve	0		
P1	44	Gear Ratio(Numerator N1)	1		
P1	45	Gear Ratio(Denominator M1)	1		
P1	55	Maximum Speed Limit	3000		
P1	62	Friction Compensation(%)	0		
P1	63	Friction Compensation(ms)	1		
P1	68	Position Command Moving Filter	4		
P2	0	Position Loop Gain(Kpp)	157		
P2	1	Kpp Gain Switching Rate	15		
P2	2	Position Feed Forward Gain(Kpf)	50		
P2	3	Smooth Constant of Kpf Gain	35		
P2	4	Speed Loop Gain(Kvp)	628		
			Range: 0 ~ 0		
JOG		Ch 0	1/3		

Figure 9-12-1

9.13 Channel setup

- This function sets up the number and definition of the axis employed by a system as shown in Figure 9-13-1. The system mode cannot be set up in Auto and Manual modes.

PARAMETER(Ch/Axis Setting)						00311	N1	
Channel	Axis	Enable	NC	MLC	Port	Disp Name	Used port	
CH 0	X	☒	☒	☐	1		1 ☒ CH0 X	
	Y	☒	☒	☐	2		2 ☒ CH0 Y	
	Z	☒	☒	☐	3		3 ☒ CH0 Z	
	A	☒	☒	☐	4		4 ☒ CH0 A	
	B	☐	☐	☐			5 ☐	
	C	☐	☐	☐			6 ☐	
	U	☐	☐	☐			7 ☐	
	V	☐	☐	☐			8 ☐	
	W	☐	☐	☐			9 ☐	
	SP1	☒	☐	☐	9		9 ☒ CH0 SP1	

JOG RPD 100% JOG 500 S 101% Ready

Figure 9-13-1

See the operation steps described below:

(1) Press  key to enter the [Parameter Setup function] screen.

(2) Press  key repeatedly to enter the page containing this function bar.

(3) Press  key (Config) to enter the channel setup screen.

(4) Use ;  keys to point to the desired axis function fields, press  key to check the axis and activate its attributes. Users can select either the NC or MLC axis attribute as desired.

(5) To define axis attributes: Use ; ;  &  keys to point to the desired field and press  key to check the field.

(6) After the axis attribute is defined, use ; ;  &  keys to point to the port field of the axis, press  key and the port number entry box will pop up, press  [ / keys to enter a unique port number, press  key and the port number of the axis is set.



- (7) Press  key (OK) after all axes are defined.
- (8) Restart the NC300 numerical control system to effect the changes that just made.

Note:

- (a) Please check to activate the axis name before enabling the axis. Users can set up the definition to control the axis only after it is activated. Either the NC or MLC axis can be selected, but not both, and assign a port number (unique from other axis port numbers).
- (b) To revoke (cancel) axis function: point to the desired field, press the ENTER key to uncheck it, and the function of this axis is disabled.
- (c) Parameter fields marked with the letter 'P' indicates that changes can take effect only after the NC300 numerical control is restarted. Otherwise, changes take effect immediately.

9.14 RIO setting

- The NC300 numerical control system can add external control devices through its I/O expansion module. The I/O function module can be enabled in RIO setup page as shown in Figure 9-14-1. See the operation steps described below:

PARAMETER(RIO Setting)				00311	N1	SFT
RIO Status	Enable	RIO type	Port polarity	Disc.	Home Limit	
1	OFF	☒		☐	CH0	
2	OFF	☐		☐	X	☐
3	OFF	☐		☐	Y	☐
4	OFF	☐		☐	Z	☐
5	OFF	☐		☐	A	☐
6	OFF	☐		☐	B	☐
7	OFF	☐		☐	C	☐
8	OFF	☐		☐	U	☐
					V	☐
					W	☐
						Filter level
						0

JOG RPD 100% JOG 500 S 101%

Figure 9-14-1

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Press  key to enter the page containing this function bar.
- (3) Press  key (Set RIO) to enter the I/O expansion module setup page.
- (4) Use  and  keys to point to the desired RIO port fields, press  key to check the field and display the I/O setup screen of the selected port.
- (5) Use  and  keys to point to the polarity setup field, press  key and the entry box will pop up, press  key after data entry and the polarity is set.
- (6) Then, use  and  keys to move to the disconnection output field, press  key to check/uncheck setup values.
- (7) Press  key (OK) after all I/O modules function are set.

9.15 Search

- This function enables users to search and point to desired parameter fields with a parameter code for faster and easier access to the screen containing a given parameter.

See the operation steps described below:

- (1) Press  key to enter the [Parameter Setup function] screen.
- (2) Continuous press  key to enter the page containing this function bar.
- (3) Type in the parameter code to be searched in the field located at the lower bottom of the screen.
- (4) Press  key (Search) to start searching.

Note:

Apart from using the function key to search the parameter, users can enter the parameter number in the screen of PAR group. The method is: **S + parameter number** and then press ENTER.

(This page is intentionally left blank.)

Chapter 10: SOFT group

SOFT group is a special control feature provided by NC300 numerical controller to replace the physical secondary control panel or special operation functions. With the CNC SOFT software, users can add a secondary control panel screen and use it to do exactly the operations available in the physical secondary control panel. This function can be used in environments without physical secondary control panel to support special repair servicing needs. Users may use it to add software keys with self-developed special controls for expanded functionality. This group function can replace the physical secondary control panel's control or function options.

10.1 Control panel (without physical operation panel)

- See Figure 10-1-1 for an example of the function devices offered by this function. Keys and buttons of a physical secondary control panel are simulated with control components. Each device is turned on or off with relevant function key. Device types and priorities vary with user preference. Icons are sorted from bottom to top.

See the operation steps described below for the operation of the control panel:

- (1) Press  key to enter the SOFT group screen.
- (2) Press  key (control panel) to enter the device function bar screen.
- (3) Use   keys to access the corresponding device function page as shown in Figure 10-1-1.



Figure 10-1-1

- (4) Use  ~  keys to enable or disable device function.

Control panel (with physical operation panel)

- The software panel can define additional functions and locations which are required by expanded requirements. In a machine with physical secondary control panel, use the CNC SOFT software to add auxiliary configuration functions, including spindle tool release, auto chip removal, and auto power off in the screen as shown in Figure 10-1-2.



Figure 10-1-2

See the operation steps described below for the operation of the control panel:

- (1) Press **SOFT** key to enter the SOFT group screen.
- (2) Press **F1** key (control panel) to enter the device function bar screen.
- (3) Use **↑;** and **↓,** keys to access the corresponding device function page.
- (4) Use **F1** ~ **F6** keys to enable or disable device function.

10.2 Factor regulation (without physical operation panel)

- Available factors are: cut feeding rate, fast feed rate, spindle speed, jog, and handwheel.

Use the up and down arrow keys to select factor type and operation as shown in Figure 10-2-1.

Range of cut feeding rate: 0% ~ 150% (in steps of 10%).

Range of fast feeding rate: F0, 25, 50, 100(%).

Range of spindle speed: 50% ~ 120% (in steps of 10%).

Range of jog factor: 0, 2, 3, 5, 8, 13, 20, 32, 50, 80, 120, 200, 320, 500, 790, 1260 mm/min.

Range of handwheel factor: 0.001, 0.01, 0.1 (mm)



Figure 10-2-1

See the operation steps described below for factor regulation:

- (1) Press **SOFT** key to enter the SOFT group screen.
- (2) Press **F2** key (factor regulation) to enter the factor regulation setup screen.
- (3) Use **↑;** and **↓,** keys to point the setup box to the desired regulation icon as shown in Figure 10-2-1.
- (4) Available options in the setup box are: increasing, decreasing, 100%, and 0%. Press the relevant function key to adjust factors as desired.

10.3 Axis operation (without physical operation panel)

- Use the SOFT group function to set the machine's individual axis for axial movements through software panel as shown in Figure 10-3-1.



Figure 10-3-1

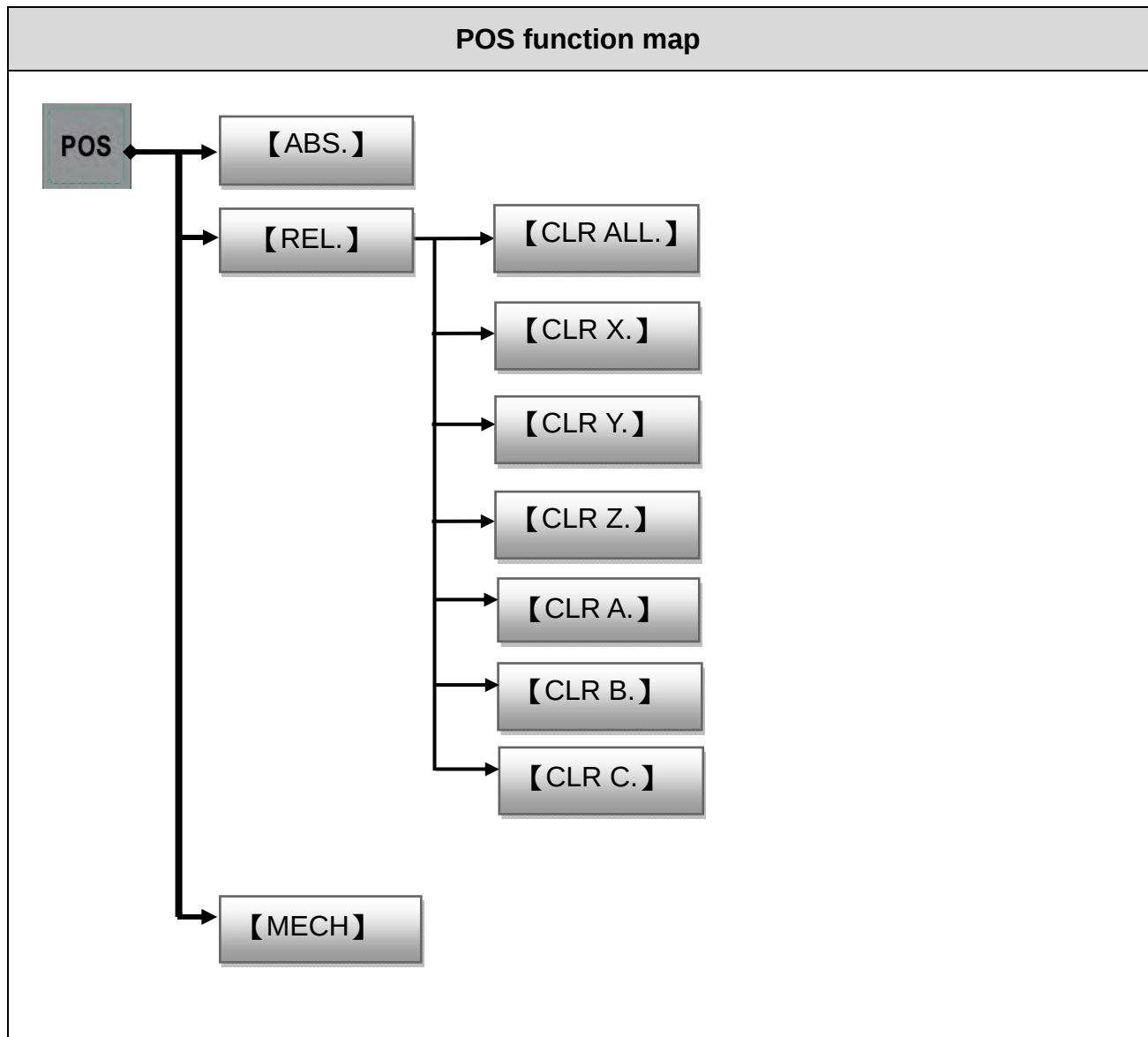
See the operation steps described below for axis operation:

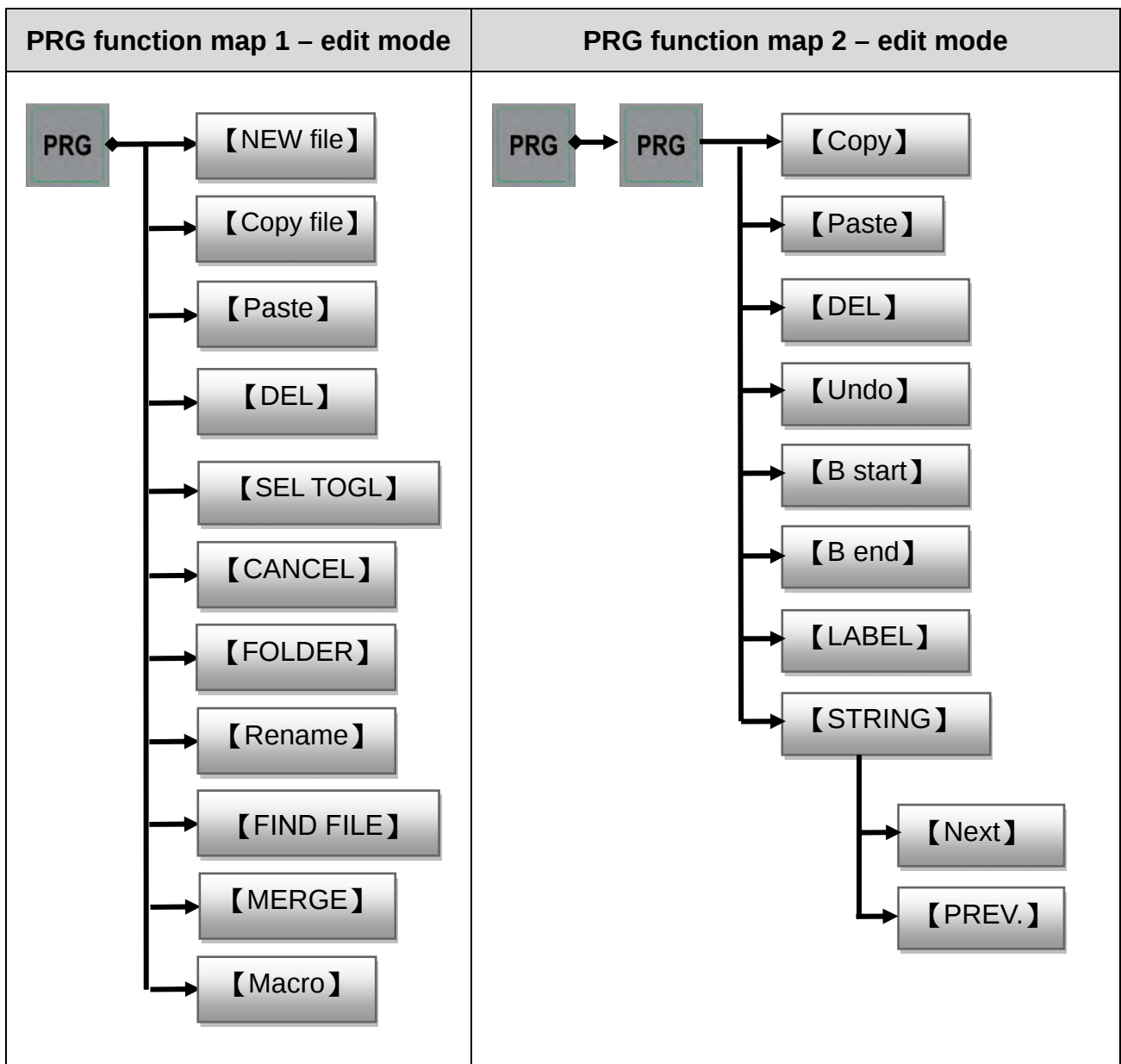
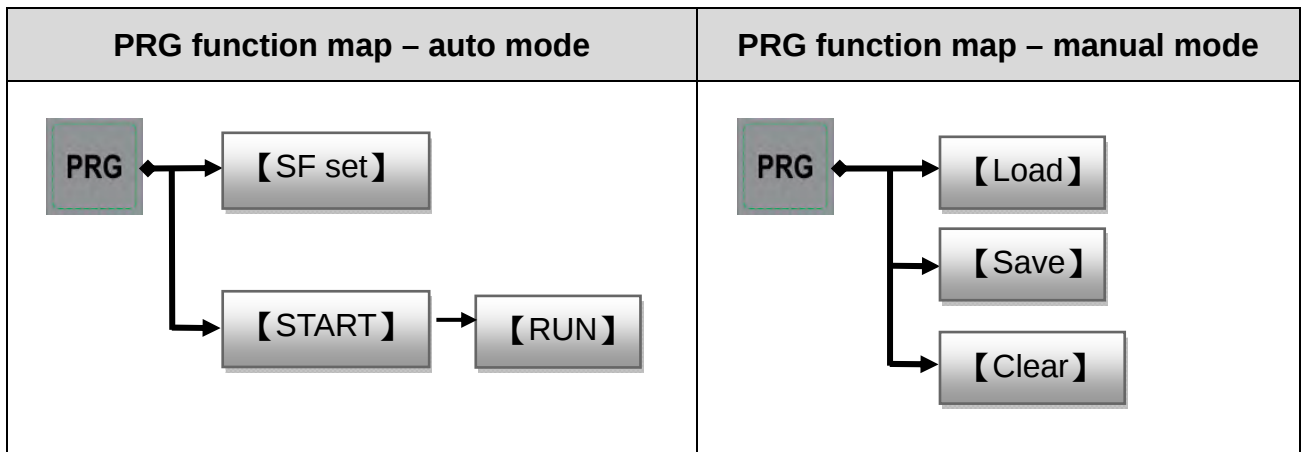
- (1) Press **SOFT** key to enter the SOFT group function screen.
- (2) Press **F2** key (axis operation) to enter the axis operation screen.
- (3) Use **F1** ~ **F6** keys to do axial movements.

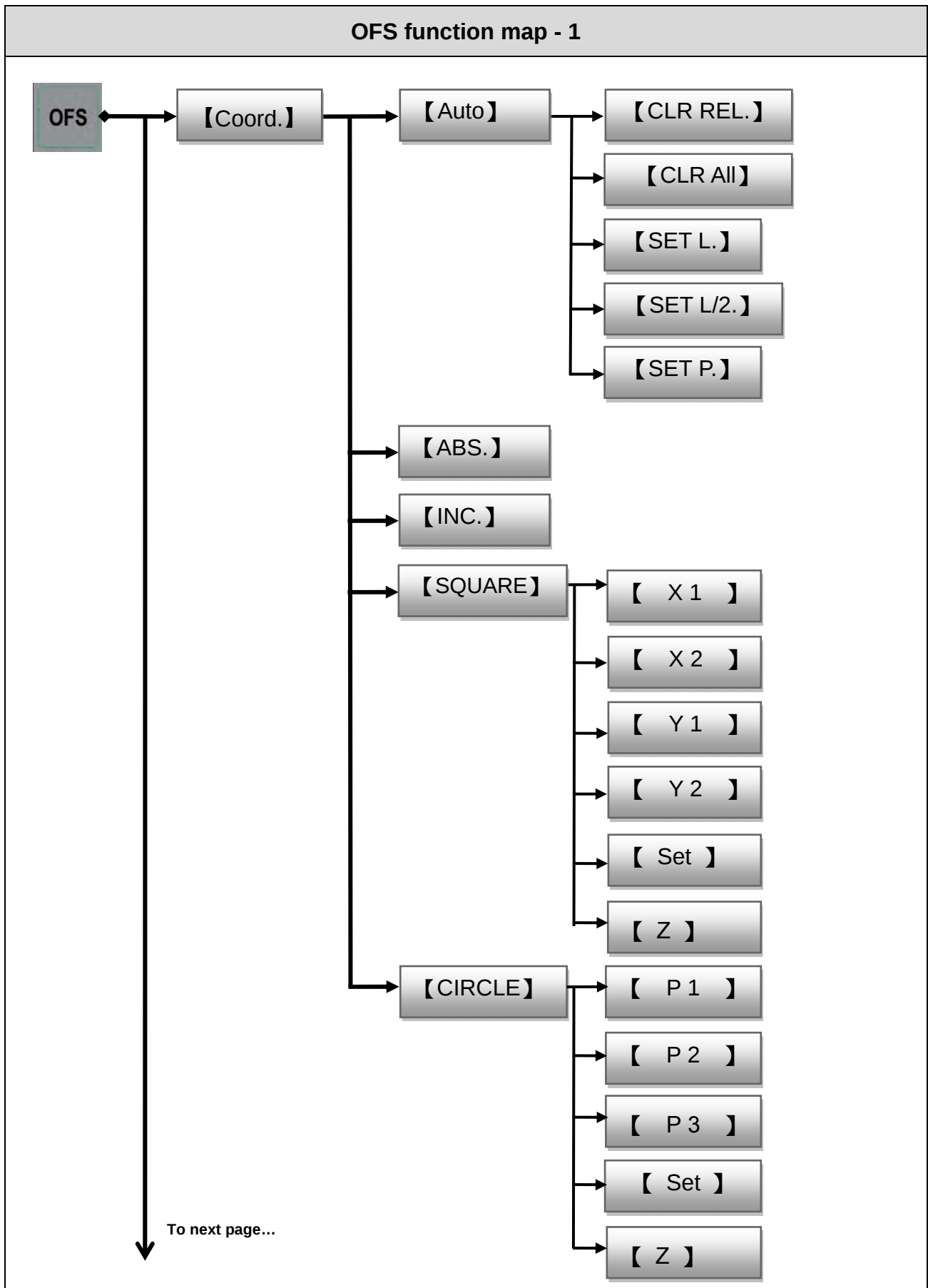
Note:

- (1) Configuration illustrations described here prioritize functions that are more likely to be used during machining. For instance, program execution, execution stops, and single step execution are placed in the first row. (They can be arranged as desired by the software.)
- (2) The travel distance (or speed) of axis operation varies with factor settings as described in Section 10.2.

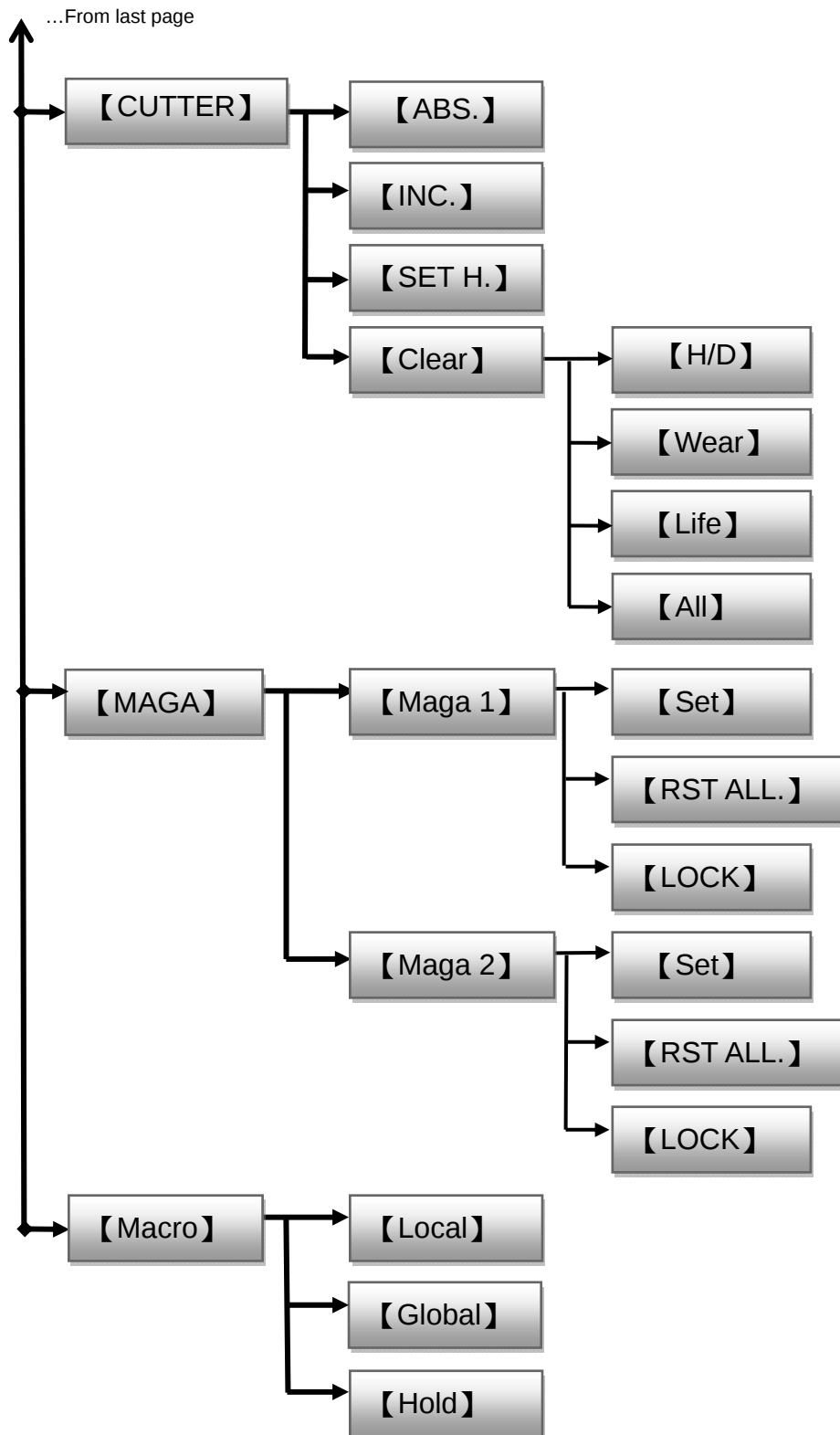
Appendix A: Group function map

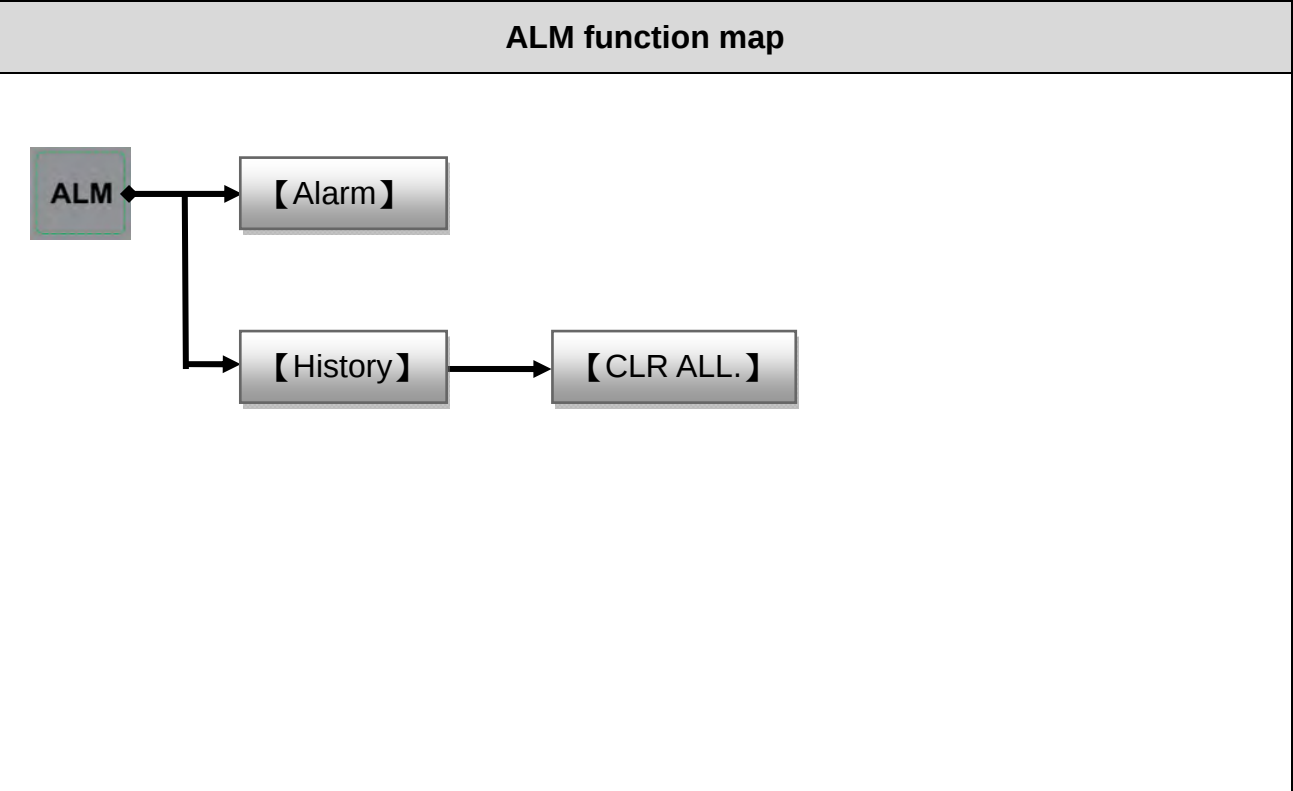
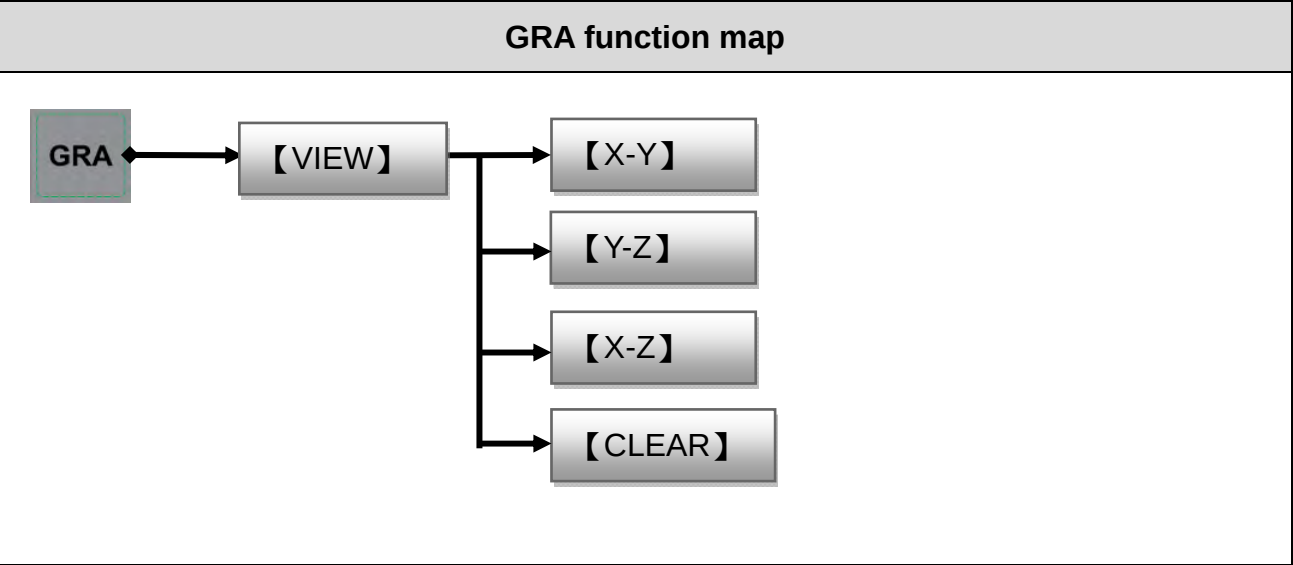


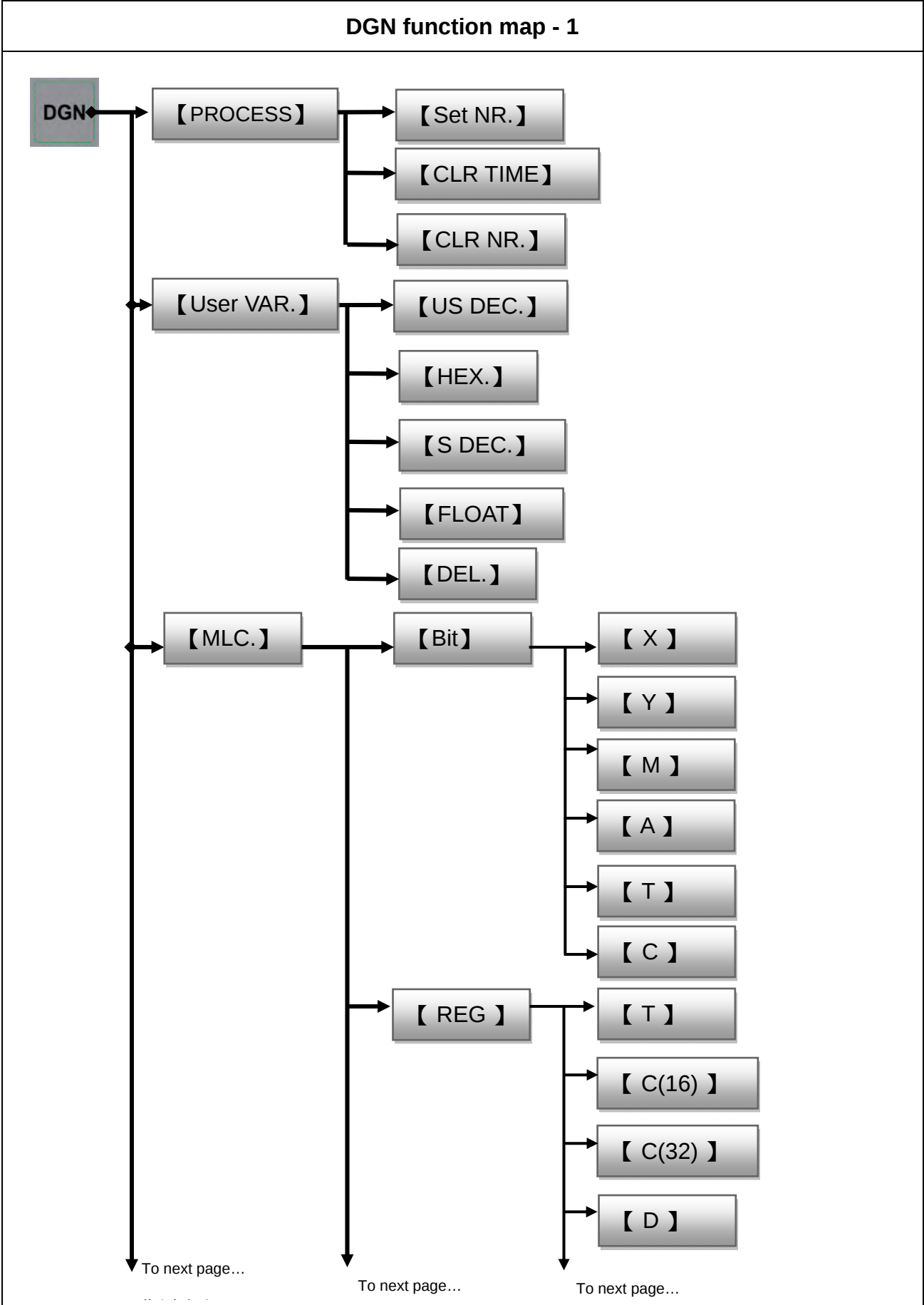


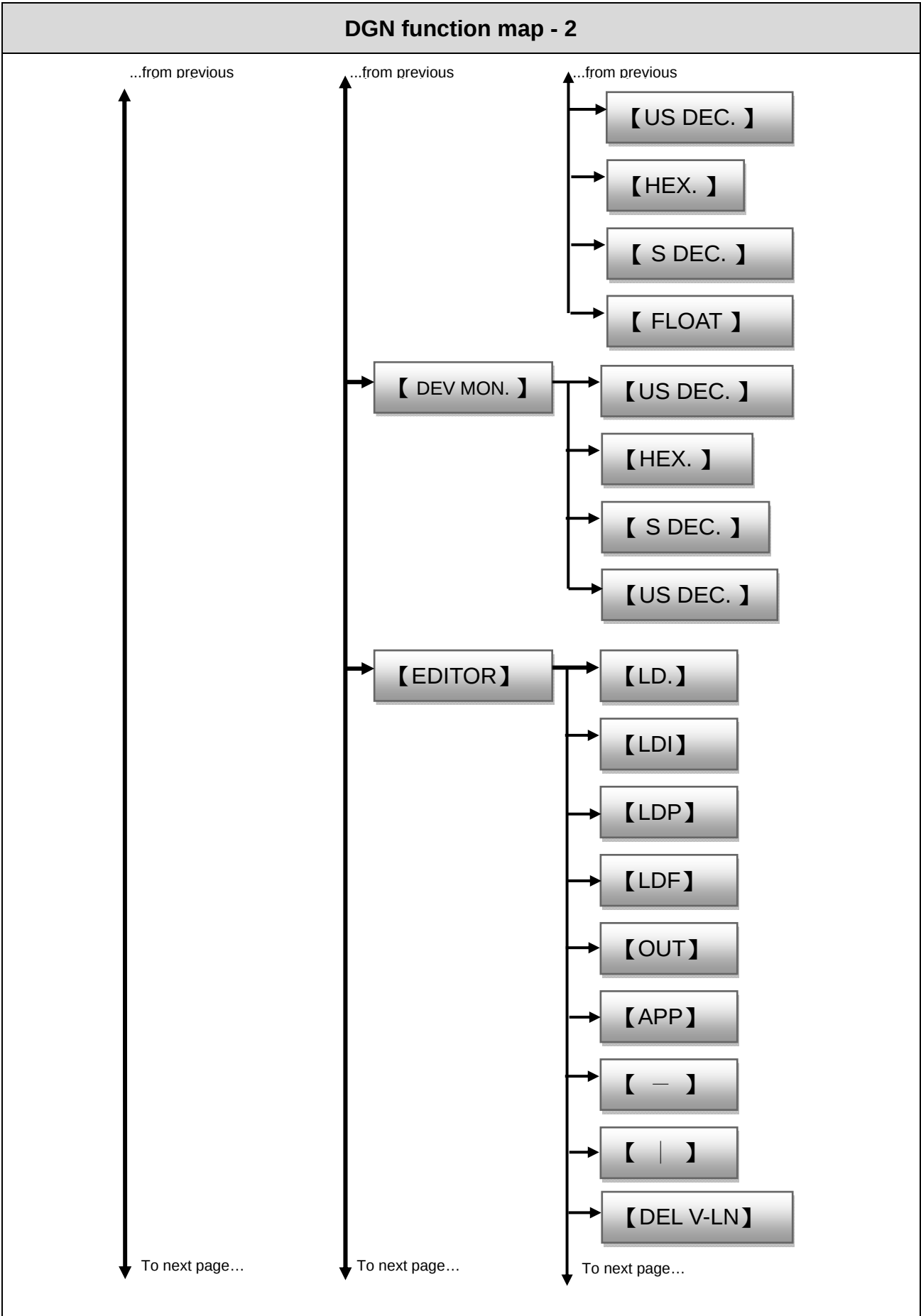


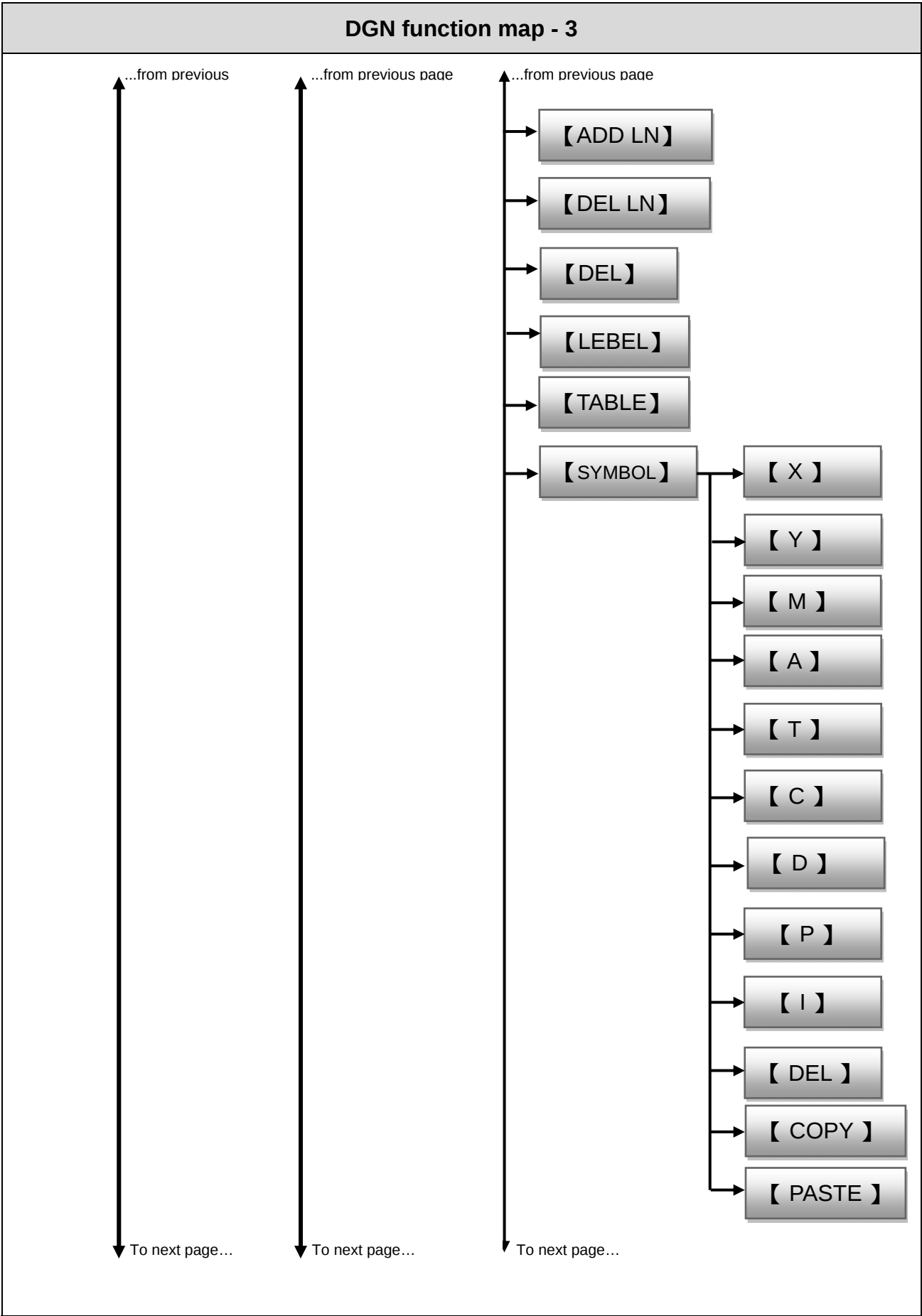
OFS function map - 2

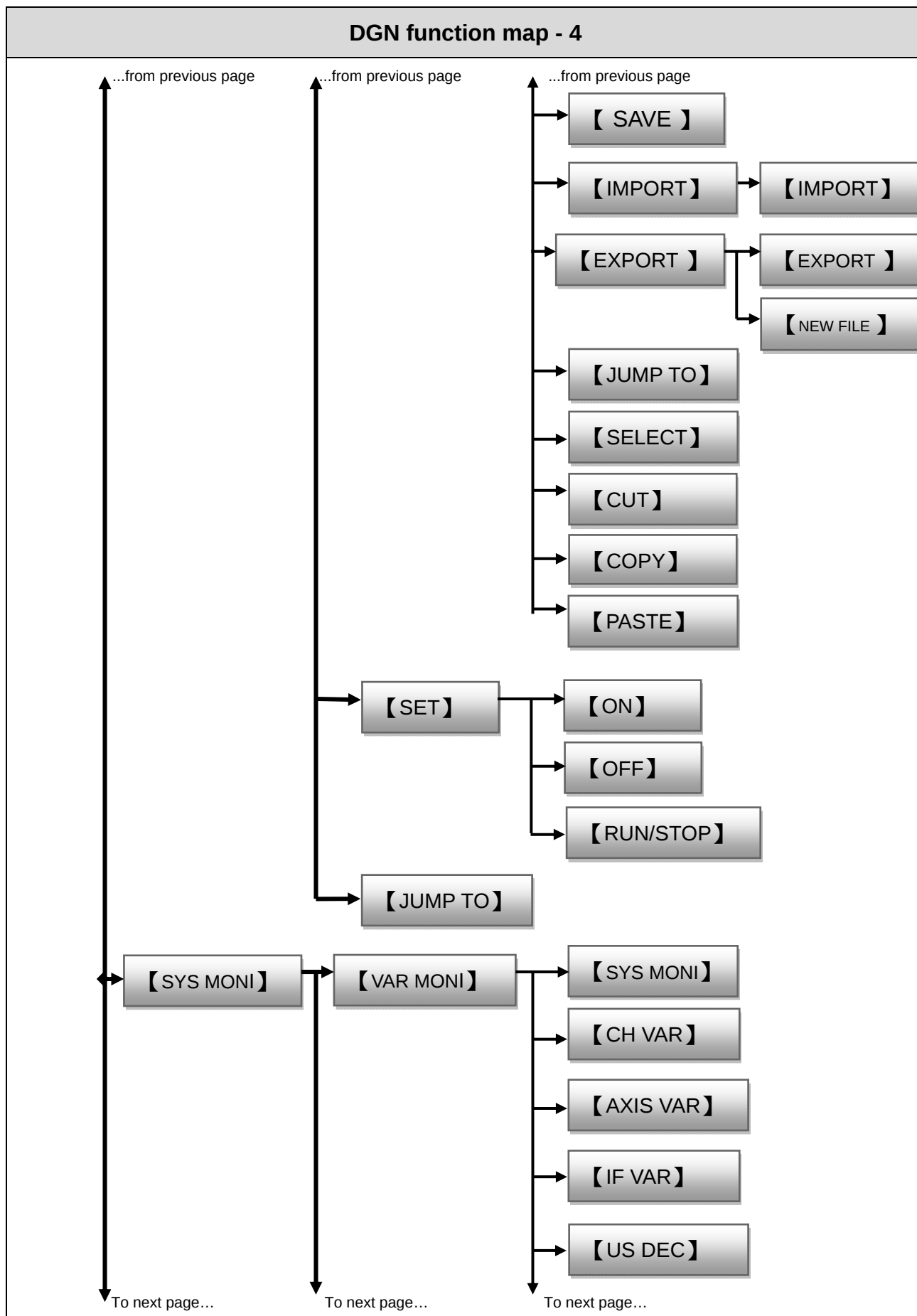


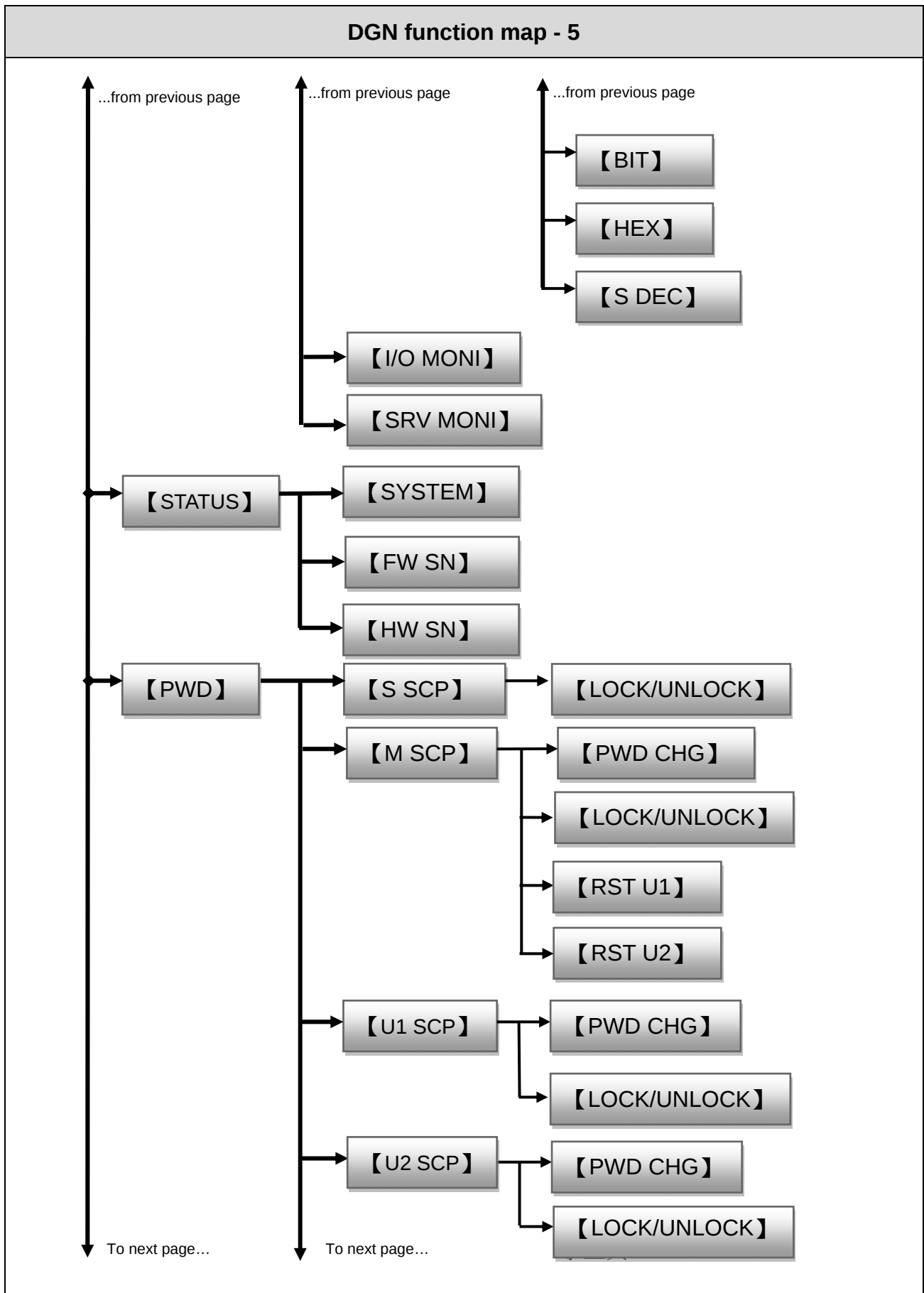


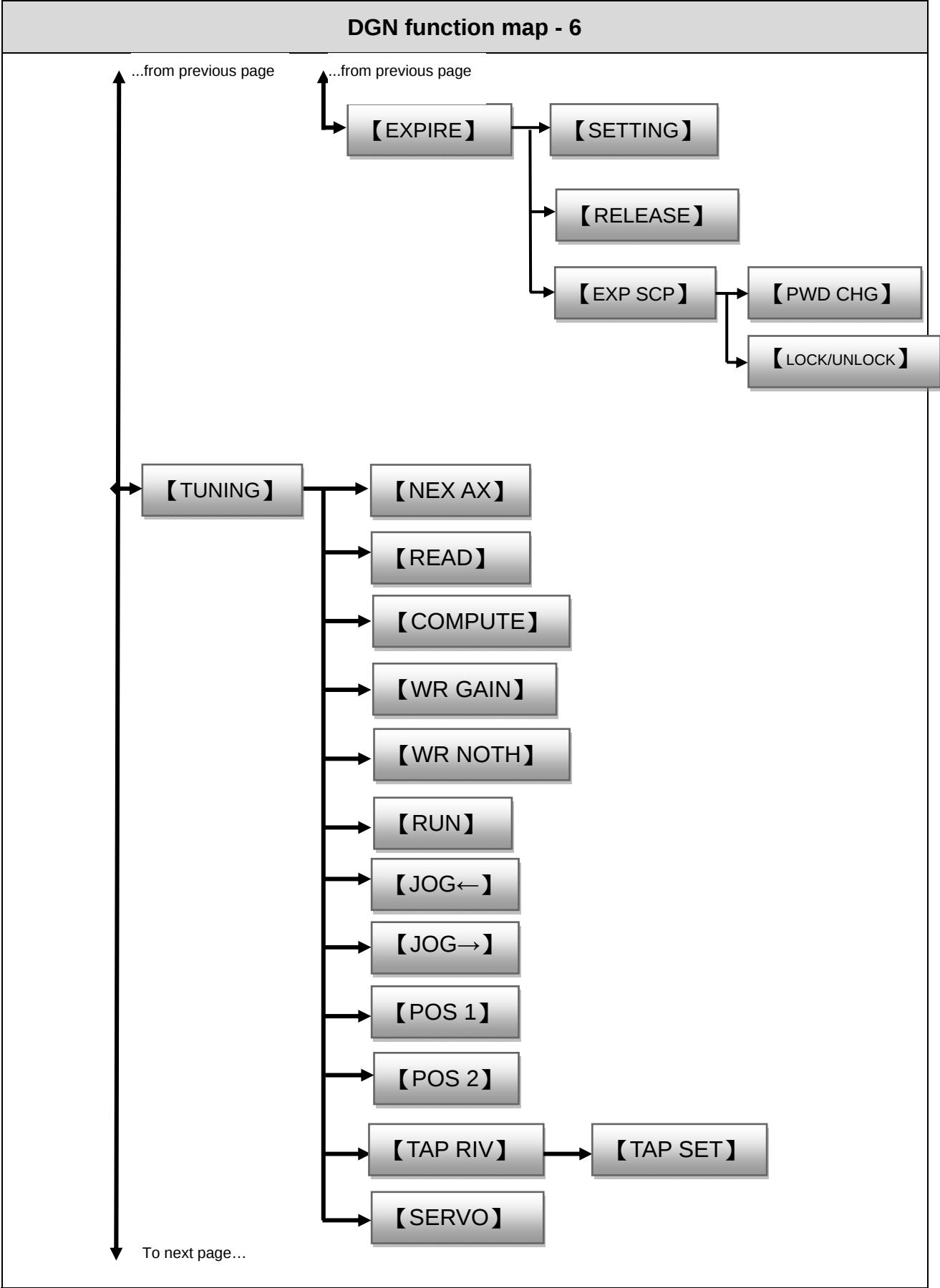


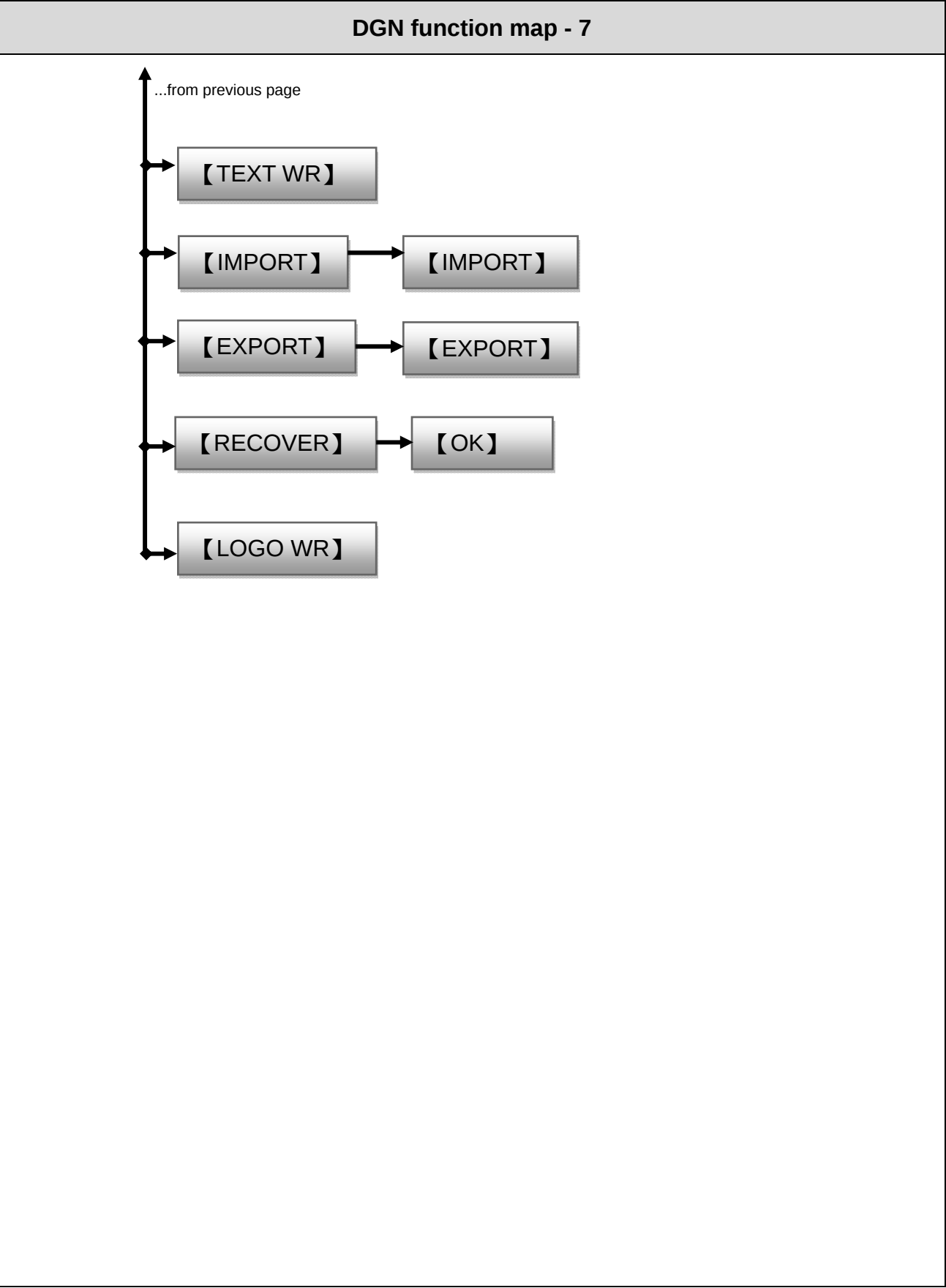












PAR function map - 1

