Pulser3
Installation Manual

HSC Kontrol Otomasyon

www.hsckontrol.com

HSC KONTROL OTOMASYON

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About the Document

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CONTENT

1. SAFETY WARNINGS

This section outlines the safety precautions related to the use of CNC units. To ensure the safe operation of machines equipped with a CNC unit, it is essential that users adhere to these precautions.

The maintenance of machines equipped with CNC units involves various hazards. Maintenance should only be performed by qualified technicians.

Users must read, understand, and comply with the safety regulations provided by the machine manufacturer.

This section details the necessary precautions to protect the machine installation team and the end user, as well as to prevent potential damage to the machine. Please ensure that all precautions are followed.

⚠	*Failure to implement the required safety measures and/or performing unauthorized procedures may result in accidents that could lead to injury of the user or the installation/maintenance team and/or cause damage to the equipment.*

1.1. Protective Cover

⚠	*The machine should not be operated without the protective cover. A safety sensor that checks whether the cover is closed must be connected. In necessary situations, the machine operation should be halted using a light barrier. If the protective cover is absent or left open during operation, the workpiece, chips detached from it, or cutting tools and other machine components may be ejected, potentially causing severe injuries.*

⚠	*Removing the protective cover may cause the user's clothing to get caught in the spindle or other components, leading to injury. When monitoring the operation of the machine, maintain a safe distance to prevent your clothing from becoming entangled in any machine parts.*

⚠	*During maintenance or troubleshooting, if the protective cover is removed, test the machine without any workpiece attached. When testing the machine, ensure you stand as far away as possible in a safe location.*

1.2. Main Power Switch

⚠	*If a part of the machine is to be replaced, the main power switch must always be turned off.*

⚠	*The main power switch must be turned off during machine installation and/or testing, maintenance, and troubleshooting. Under no circumstances should anyone enter or climb on the machine while the main power switch is on. Additionally, no modifications should be made to the electrical installation, as this could result in severe injuries.*

⚠	*CNC machines contain high-voltage areas within their panels. Do not touch these areas under any circumstances. These zones should be clearly marked by the machine manufacturer.*

⚠	*There may be sharp corners in the panels used in CNC machines. Exercise caution while working in this area.*

1.3. Automatic Operation

⚠	*Do not start the automatic workpiece machining process without first ensuring that the machine is fully operational. Before commencing production, test the program to be run without any tools or workpieces attached to ensure it operates correctly. Only begin production after confirming that it produces the desired results. If the machine's proper functioning is not verified, it may lead to unexpected behavior, potentially damaging the workpiece and/or the machine or causing injury to the user.*

⚠	*Ensure that the specified feed rate is suitable for the intended operation. Generally, each machine has a maximum allowable feed rate. The appropriate feed rate varies depending on the intended machining process. Refer to the manual prepared by the machine manufacturer to specify the maximum allowable feed rate. Operating the machine at a speed different from the recommended rate may result in unexpected behavior, potentially damaging the workpiece and/or the machine or causing injury to the user.*

⚠	*Ensure that the tool compensation and work offset values are entered correctly and that the selections are made accurately. Incorrect entry of tool compensation values or work offset values, or failure to make the correct selections for these commands, may result in unexpected machine behavior, potentially damaging the workpiece and/or the machine or causing injury to the user.*

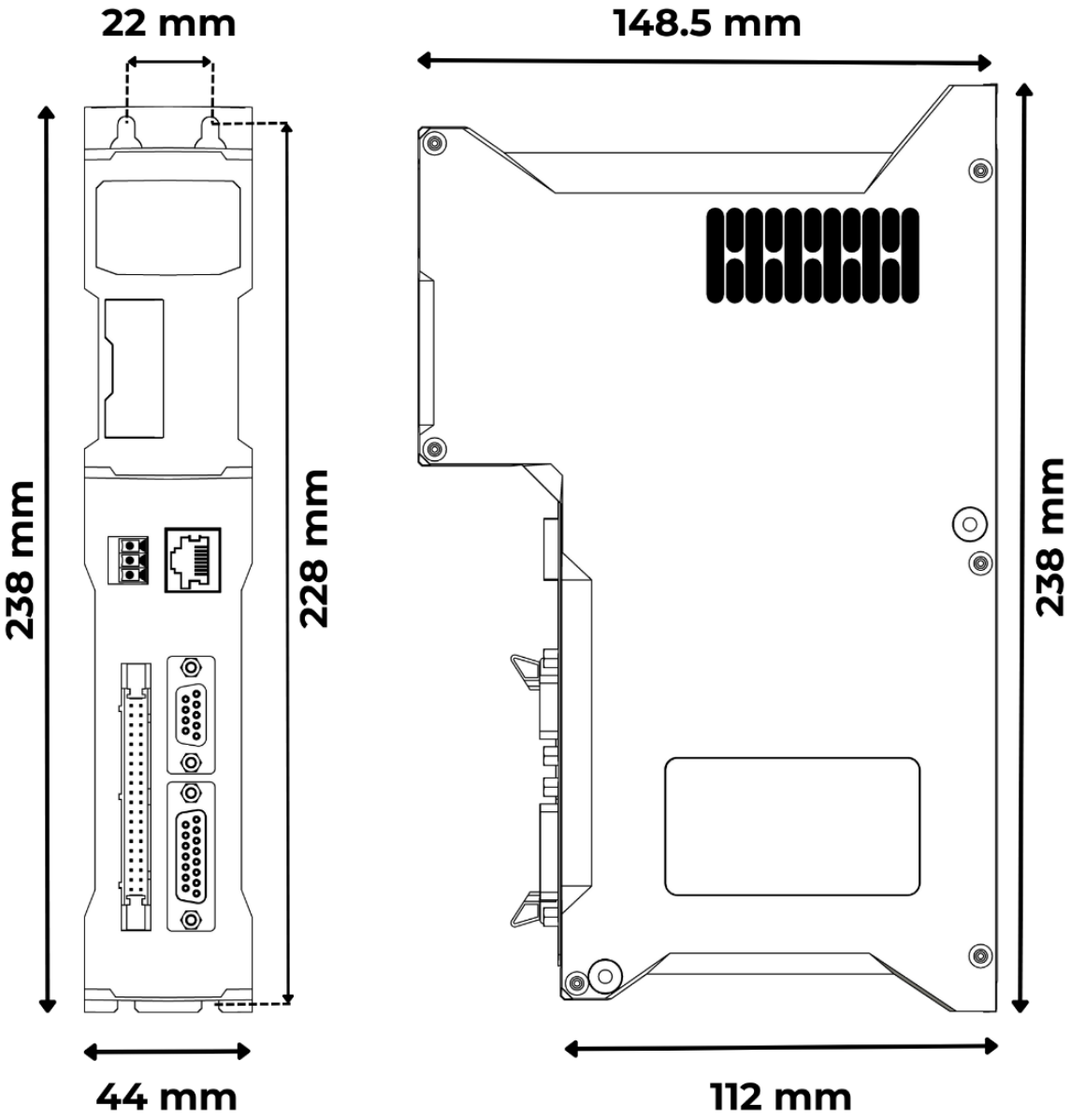
2. SPECIFICATIONS

Function	Description
Controlled Axes	• 8 axes simultaneous. Closed-loop control. • Ethernet-based RTEX or EtherCAT communication. • Axis names can be configured via parameters as X,Y,Z,A,B,C,U,V, W,and E. • Each axis can be selected as either linear or rotary type. • Each axis can switch between "axis mode" and "spindle mode." • The position update time for the axes is 1 ms or 2 ms. • Generating third-degree motion profiles by reading the following lines..
Minimum Precision for Axes	• 0.0001mm / 0.0001 inch
Motion Control Modes	• RAPID, linear interpolation, circular interpolation.
Maximum Movement Speeds of the Axes	• 100,000 mm/min.
Maximum Cutting Speed	• 100,000 mm/min.
Axis Backlash Compensation Function	• Yes
Internal PLC	• Yes • 20 KByte program memory. • 1 KByte user general-purpose bit/word. • 48 Timer • 48 Counter • 200 words of permanent memory.
Internal Digital Inputs	• 20 opto-isolated 24V DC PNP/NPN inputs.
Internal Digital Outputs	• 16 opto-isolated 24V DC NPN outputs (max. 50 mA)
Internal Analog Outputs	• 1 channel 12-bit +/-10V bipolar.
External M.P.G. Port	• Var. 6 adet eksen seçim girişi, 3 adet adım seçim girişi ve 1 adet acil stop girişi. Tüm girişler 24V DC PNP/NPN. 1 Adet 5V A/B M.p.g. sayıcı girişi.
Spindle enkoder bağlantı girişi	• Yes. 6 axis selection inputs, 3 step selection inputs, and 1 emergency stop input. All inputs are 24V DC PNP/NPN. 1 channel 5V line driver M.P.G. encoder input.
Internal Program Memory	• • 32 GByte micro SD.
External Program Transfer	• Programs can be transferred via USB flash drive. • Programs can be transferred via Ethernet using the internal FTP client feature. • Programs can be transferred via Ethernet using the internal FTP host feature.
Library	• Subprogram names ranging from O9000 to O9999 can be used. • Alphanumeric file names can be used. • File names must be a maximum of 32 characters. • Line creation, deletion, and insertion. • Inline deletion, editing, and insertion. • Option to restrict editing/deleting of O9xxxx.cnc programs. • KEY function to prohibit the operator from editing/deleting programs. • . Support for file extensions: .nc, .cnc, .tap.
Operating Modes	• MDI • EDIT • AUTO • JOG • M.P.G. • HOME

Function	Description
Macro Programming	• Yes. Programmable macros using the G65 Lxx command. • Additionally, commands such as #A = #B + 2 can be written directly for ease of use. • 10 custom G codes can be defined, allowing redirection to the corresponding subprogram when the G code is processed. • 10 custom M codes can be defined, allowing redirection to the corresponding subprogram when the M code is processed.
Spindle Control	• Support for 4-speed operation. • Option for manual gear shifting. • Option for automatic gear shifting. • The speed range of all gears and the analog output command can be adjusted via parameters. • The spindle can be slowed down to a speed specified by the parameter using the SLOW function. • The spindle can be stopped at an angle set by the parameter using the SPOS function (Orientation).
Tool Control	• Automatic tool change support • Maximum of 255 tool calls. • A.T.C. function by directly associating the M06 command with the O9001.cnc program.
User (M) Functions	• 255 programmable user functions. • All non-standard M codes are redirected to the PLC, allowing each M code to be customized by the user.
Compensation Commands	• Tool length compensation with G43, G44, and G49. • 50 tool length and length wear compensation parameters.
Windows-Based Operation	• Operates with Windows 10 operating system. • With HSC Studio, all tasks such as modifying parameters, system parameters, ladder programming, and interface design can be performed from a single platform. • Supports up to 10 languages for the user interface. • Generates 3D toolpath graphics. • Displays a 3D view of the workpiece using an .STL file
Operation with HMI	• HMI sizes ranging from 7” to 21.5” are available. • Easy operation with intuitive menu design. • Multilingual support. • All content is prepared in two languages, Turkish and English. Users can switch between languages, and new languages can be added.
Alarm	• In addition to the system's built-in alarms, 32 PLC-triggered alarms and 16 macro-triggered alarms can be programmed by the user. The descriptions of these alarms can be selected by the user.
Operator Functions	• SBK, MLK, DRN, BDT • MPG RUN: Program control with M.P.G. • MSIM: Skip M code feature. • Automatic Zeroing of Axes at Their Positions. • Automatic Zeroing of Axes at Half of Their Position. • In case of Emergency Stop/Reset/Power Failure, it saves the current line in memory. The operator can continue from this line. • G code files can be simulated by following the toolpath in both forward and reverse directions.

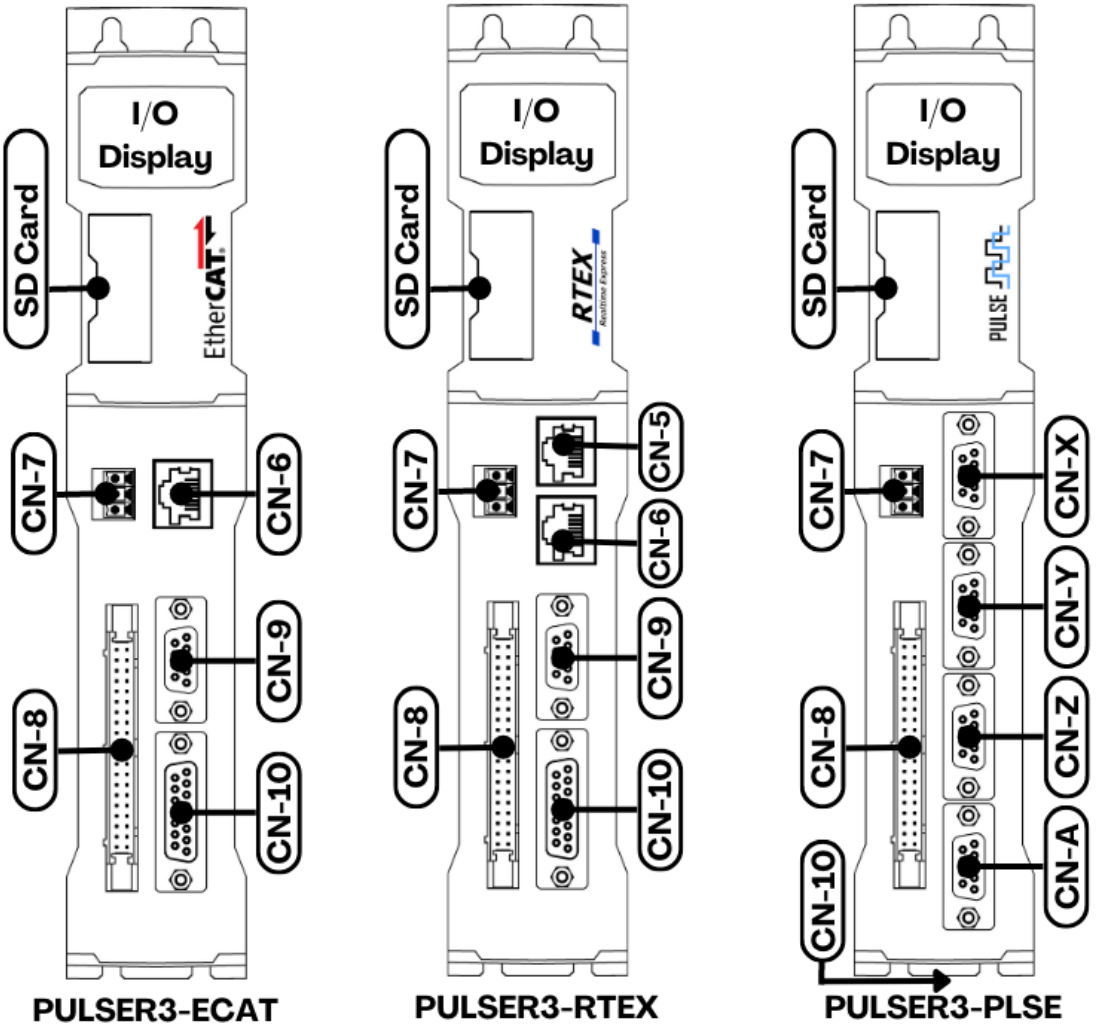
	PULSER3-ECAT	PULSER3-RTEX	PULSER3-PLSE
Memory	32 Gbyte Micro SD Memory Card	32 Gbyte Micro SD Memory Card	32 Gbyte Micro SD Memory Card
Power	24V DC 500 mA	24V DC 500 mA	24V DC 500 mA
Inputs	20 Digital (PNP/NPN)	20 Digital (PNP/NPN)	20 Digital (PNP/NPN)
	1 Unit 100 kHz Handwheel	1 Unit 100 kHz Handwheel	1 Unit 100 kHz Handwheel
Outputs	16 Digital Outputs, 50 mA NPN	16 Digital Outputs, 50 mA NPN	16 Digital Outputs, 50 mA NPN
	1 Unit 12 Bit +/-10V Bipolar Analog Output (Spindle Speed Command)	1 Unit 12 Bit +/-10V Bipolar Analog Output (Spindle Speed Command)	1 Unit 12 Bit +/-10V Bipolar Analog Output (Spindle Speed Command)
Servo Control	1 Unit EtherCAT Communication Port	1 Unit RTEX (Realtime Express) Communication Port	4 Line Driver Pulse Output Connectors
Communication	1 Unit Ethernet MODBUS-TCP/IP	1 Unit Ethernet MODBUS-TCP/IP	1 Unit Ethernet MODBUS-TCP/IP
	1 Unit CAN BUS (External Expansion Modules)	1 Unit CAN BUS (External Expansion Modules)	1 Unit CAN BUS (External Expansion Modules)
	1 Unit RS-485 Modbus (MP-1 Machine Panel)	1 Unit RS-485 Modbus (MP-1 Machine Panel)	1 Unit RS-485 Modbus (MP-1 Machine Panel)
Encoder	1 Unit Line Driver Encoder Input (Spindle Feedback)	1 Unit Line Driver Encoder Input (Spindle Feedback)	None

3. PRODUCT DIMENSIONS

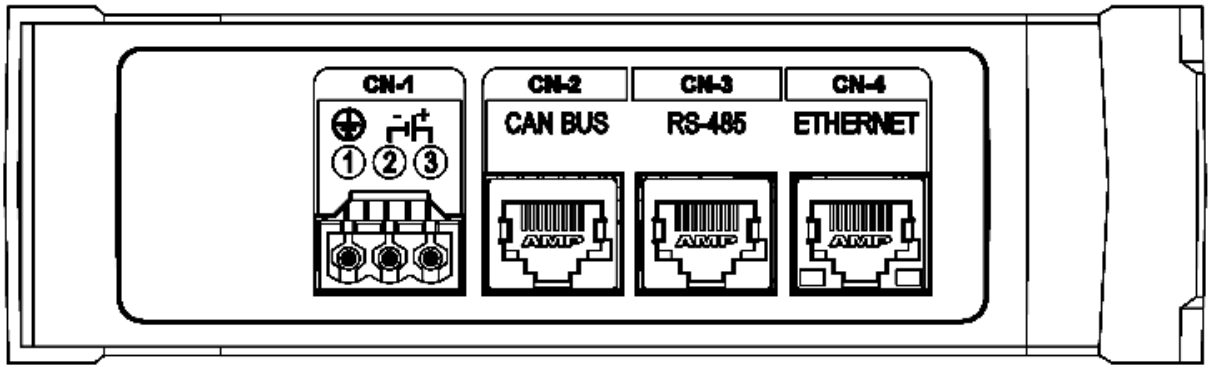


ℹ	*Use M4 screws to mount the Pulser3 CNC control unit.*

4. CONNECTOR DESCRIPTIONS



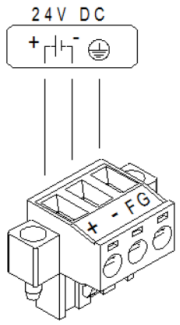
(Front View)



(Top View)

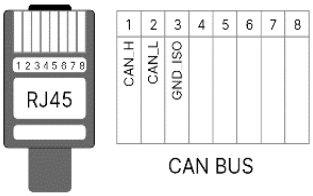
Connector	PULSER3-ECAT	PULSER3-RTEX	PULSER3-PLSE
CN-1	24V DC Power Supply	24V DC Power Supply	24V DC Power Supply
CN-2	CAN-BUS Communication	CAN-BUS Communication	CAN-BUS Communication
CN-3	RS-485 Communication	RS-485 Communication	RS-485 Communication
CN-4	Ethernet Modbus TCP-IP	Ethernet Modbus TCP-IP	Ethernet Modbus TCP-IP
CN-5	None	Rtex TX	None
CN-6	EtherCAT	Rtex RX	None
CN-7	Analog Output	Analog Output	Analog Output
CN-8	Digital Input/Digital Output	Digital Input/Digital Output	Digital Input/Digital Output
CN-9	Spindle Encoder	Spindle Encoder	None
CN-10	External Handwheel	External Handwheel	External Handwheel
CN-X	None	None	X Axis Pulse Output
CN-Y	None	None	Y Axis Pulse Output
CN-Z	None	None	Z Axis Pulse Output
CN-A	None	None	4. Axis Pulse Output

4.1. Power Connector (CN-1)



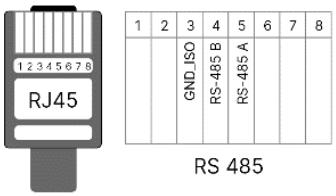
- Connect the Pulser 3 CNC Controller to the 24V DC power supply as shown..
- The Pulser 3 CNC Controller must always be grounded with a grounding conductor connected to the grounding terminal.
- Note: The tightening torque for the CN-1 Connector is 0.5-0.6 Nm.

4.2. CAN BUS Connector (CN-2)



- Used for communication with external expansion modules.
- Ensure to use CAT6 cable for CAN BUS connection.

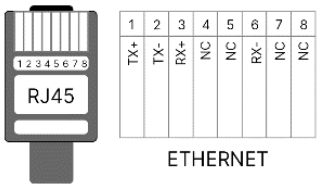
4.3. RS-485 MODBUS RTU Connector (CN-3)



- RS-485 : Used for MP1 Machine panel communication. The default port settings are as follows.
- Baudrate: 19200 Data Lenght: 8
- Parity: None Stop Bit: 1

Ensure to use CAT6 cable for RS-485 connections.

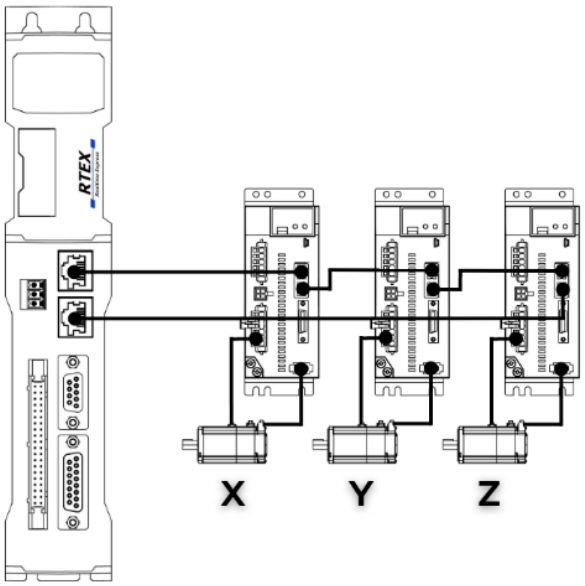
4.4. Ethernet Modbus TCP/IP Connector (CN-4)



- The Ethernet port is used for communication between the HMI and the PC.
- Default Ethernet port settings:
- Device ID: 1
- IP Address: 192.168.1.100
- Gateway: 192.168.1.1
- Subnet Mask: 255.255.255.0
- Port: 502
- Please ensure to use CAT6 cable for Ethernet connections

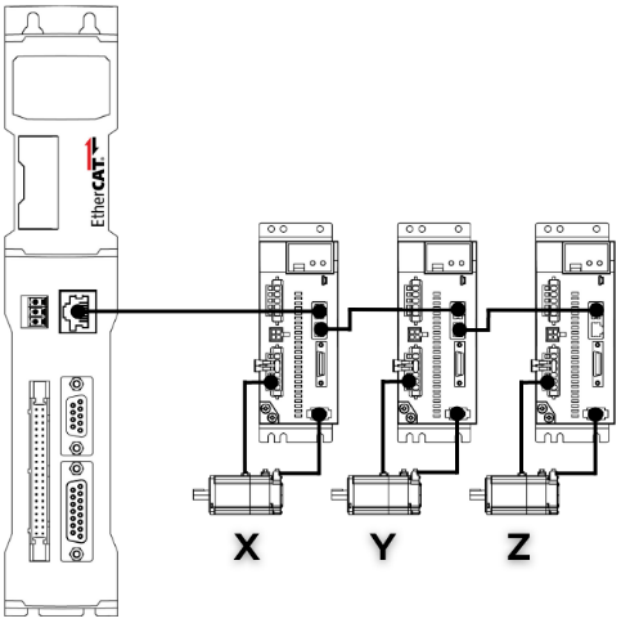
4.5. PULSER3-RTEX Connectors (CN-5 and CN-6)

- Used for communication with Panasonic servo drives via RTEX (Realtime Express)
- Supported drives: Panasonic A5N / A6N
- Communication cable: STP cable (Category 5e or higher)

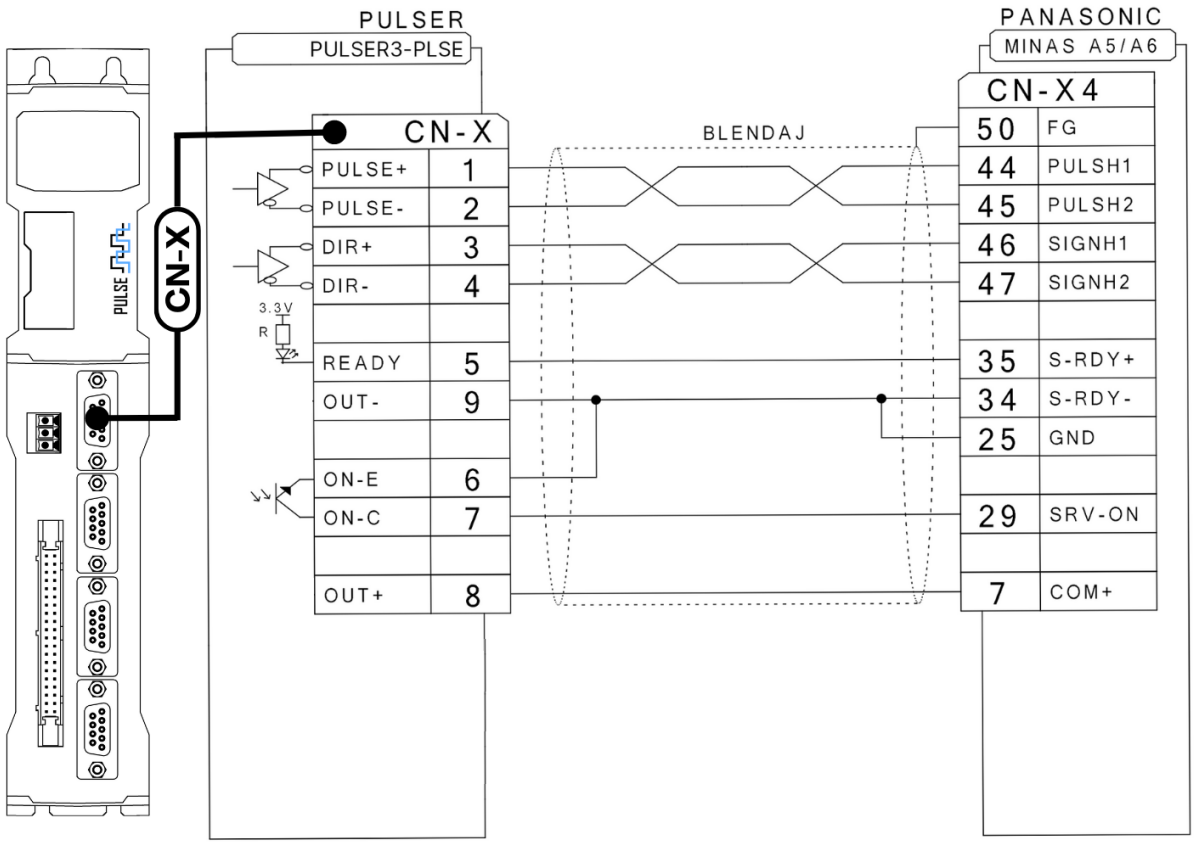


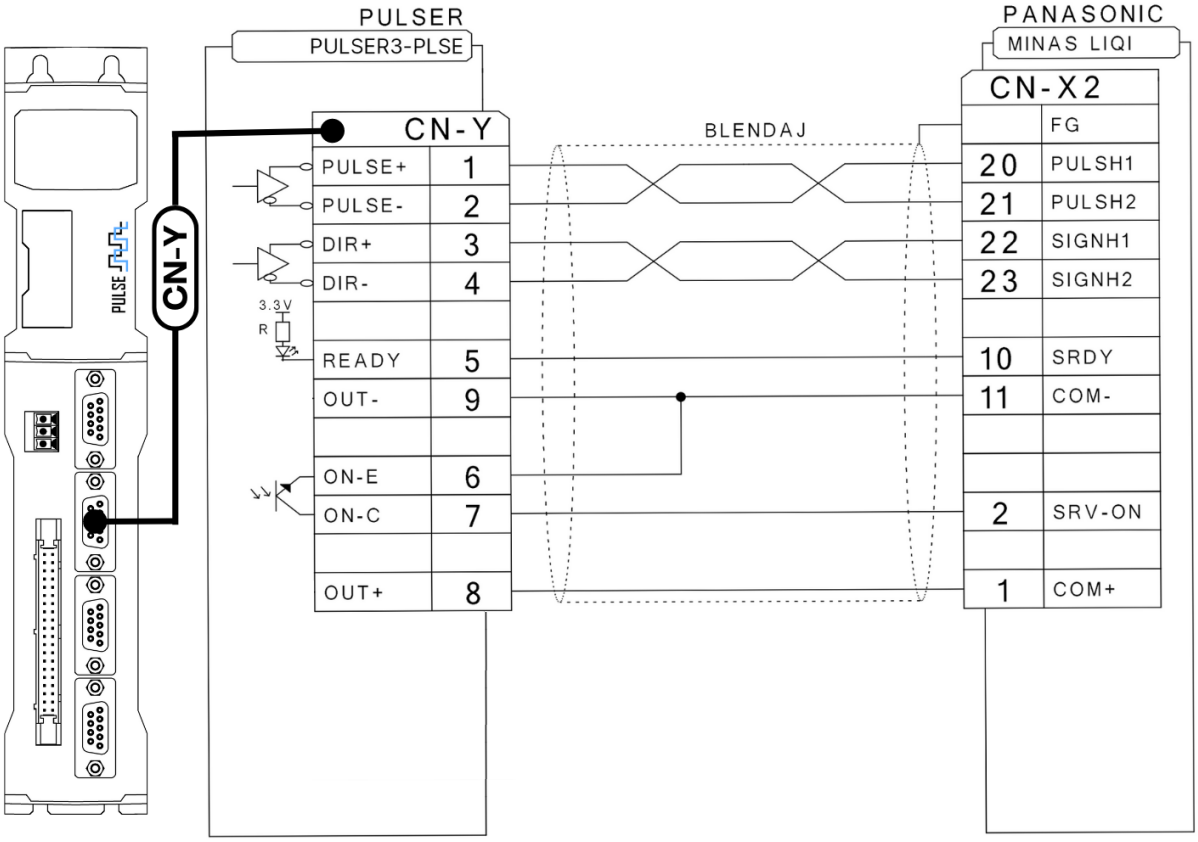
4.6. PULSER3-ECAT Connector (CN-6)

- EtherCAT communication is used for communication with various servo drives.
- Supported drives: Panasonic A6B, A6BL, A5MB
- Communication cable: STP cable (Category 5e or higher)



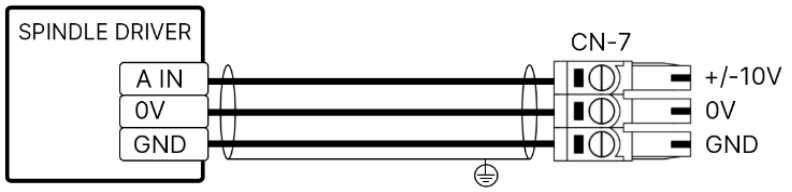
4.7. PULSER3-PLSE Axis Connection Connectors (CN-X~CN-A)



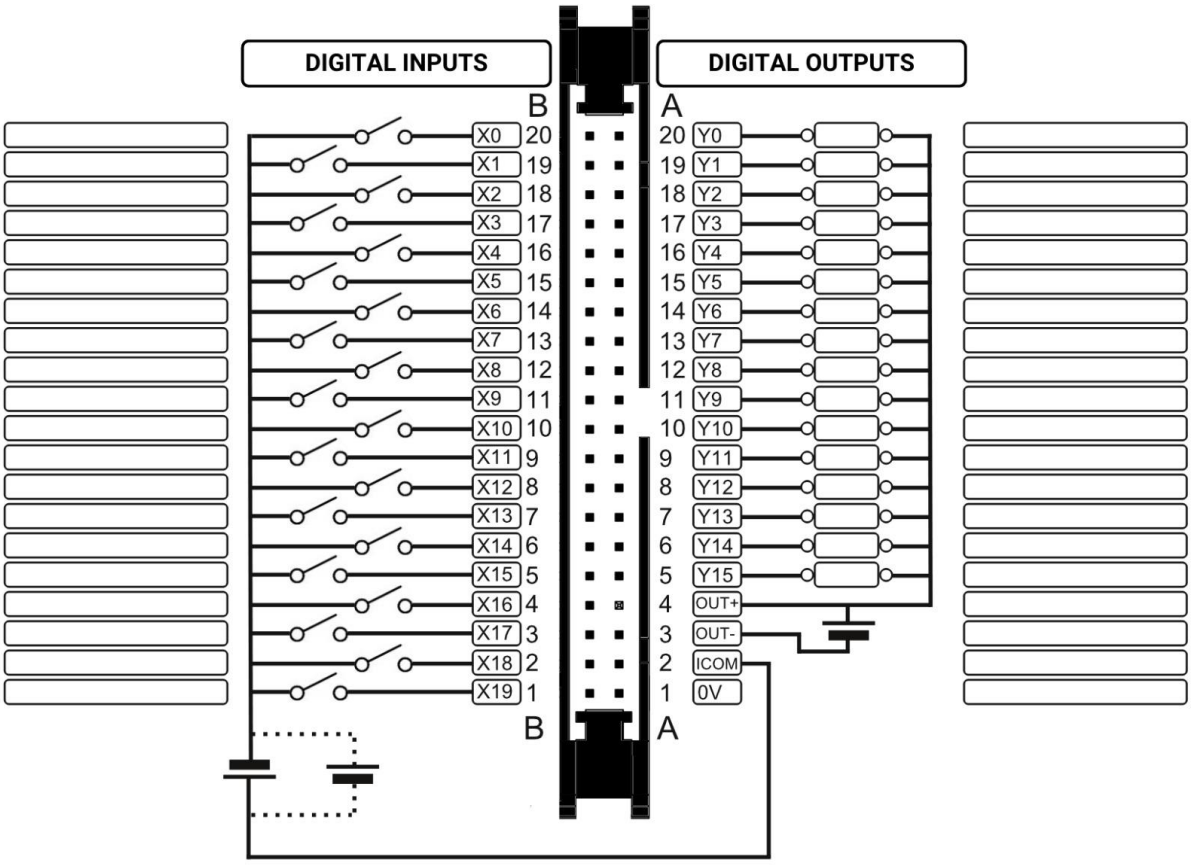


4.8. Analog Output Connector (CN-7)

- Analog Output: 0-10V 20 mA Bipolar
- The analog output voltage is scaled according to the spindle S command. The maximum speed selection must be made from the spindle parameters.

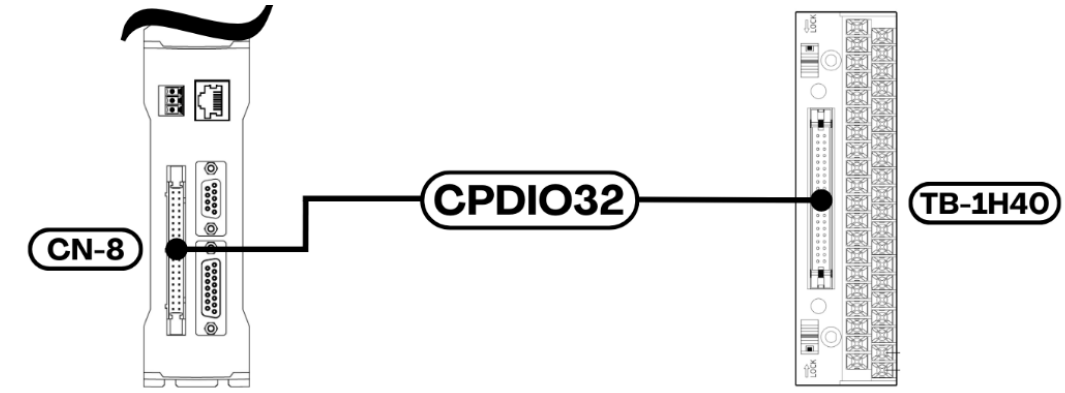


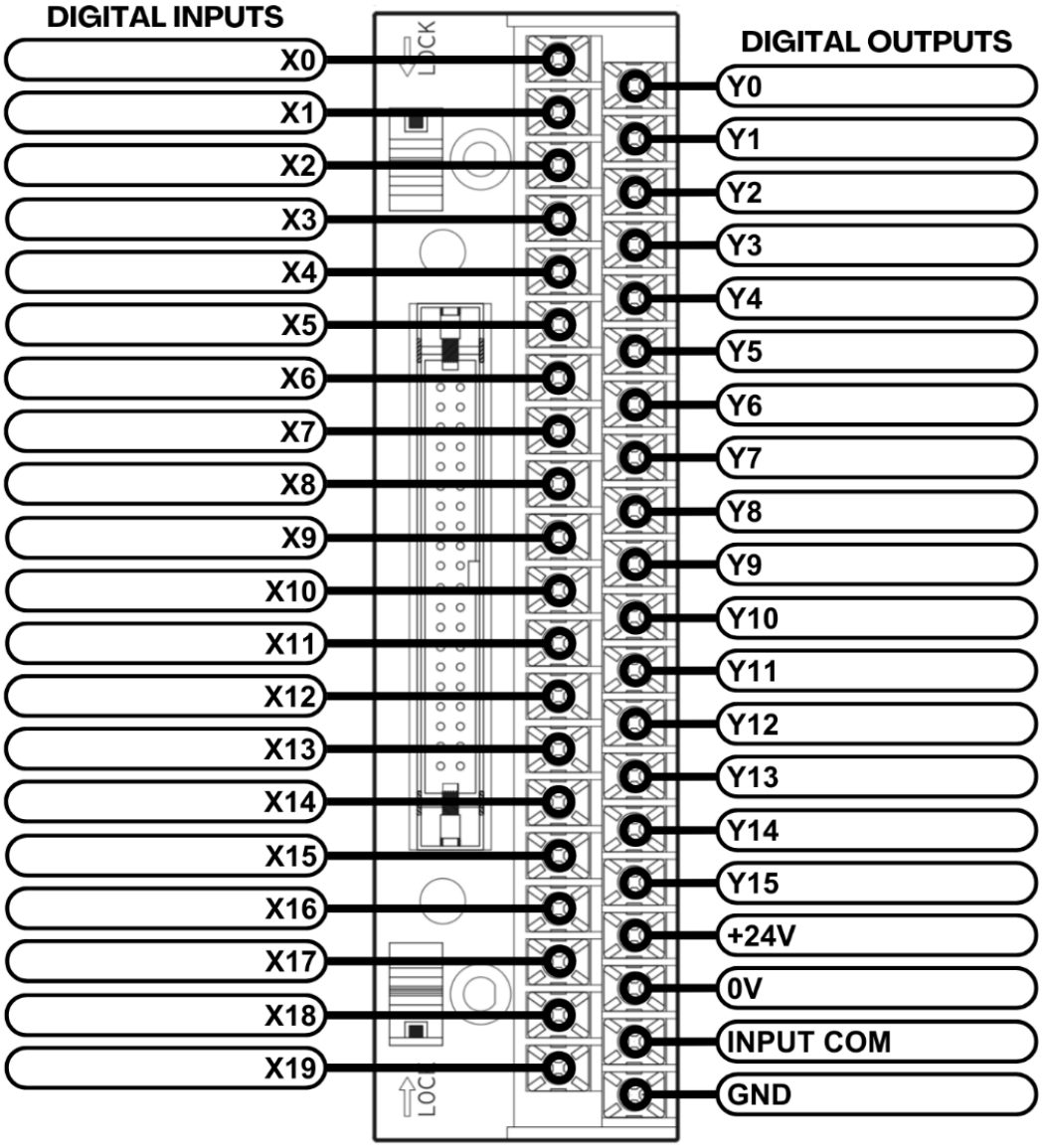
4.9. Digital Input / Output Connector (CN-8)



- Digital inputs are AC. The PNP/NPN selection is determined by the (+/-) voltage applied to the IN COM (Pin A2) terminal. The IN COM connection also changes the PNP/NPN selection for X20-X29 inputs located on the CN-10 Connector.
- Digital outputs are NPN with a capacity of 50 mA. Use relays for higher current requirements.

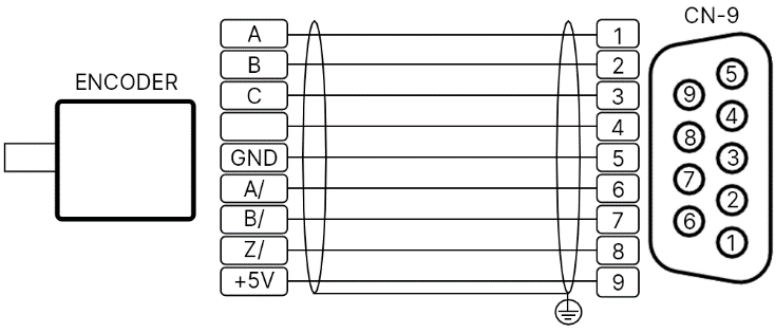
4.10. TB-1H40 Digital Input/Output Terminal



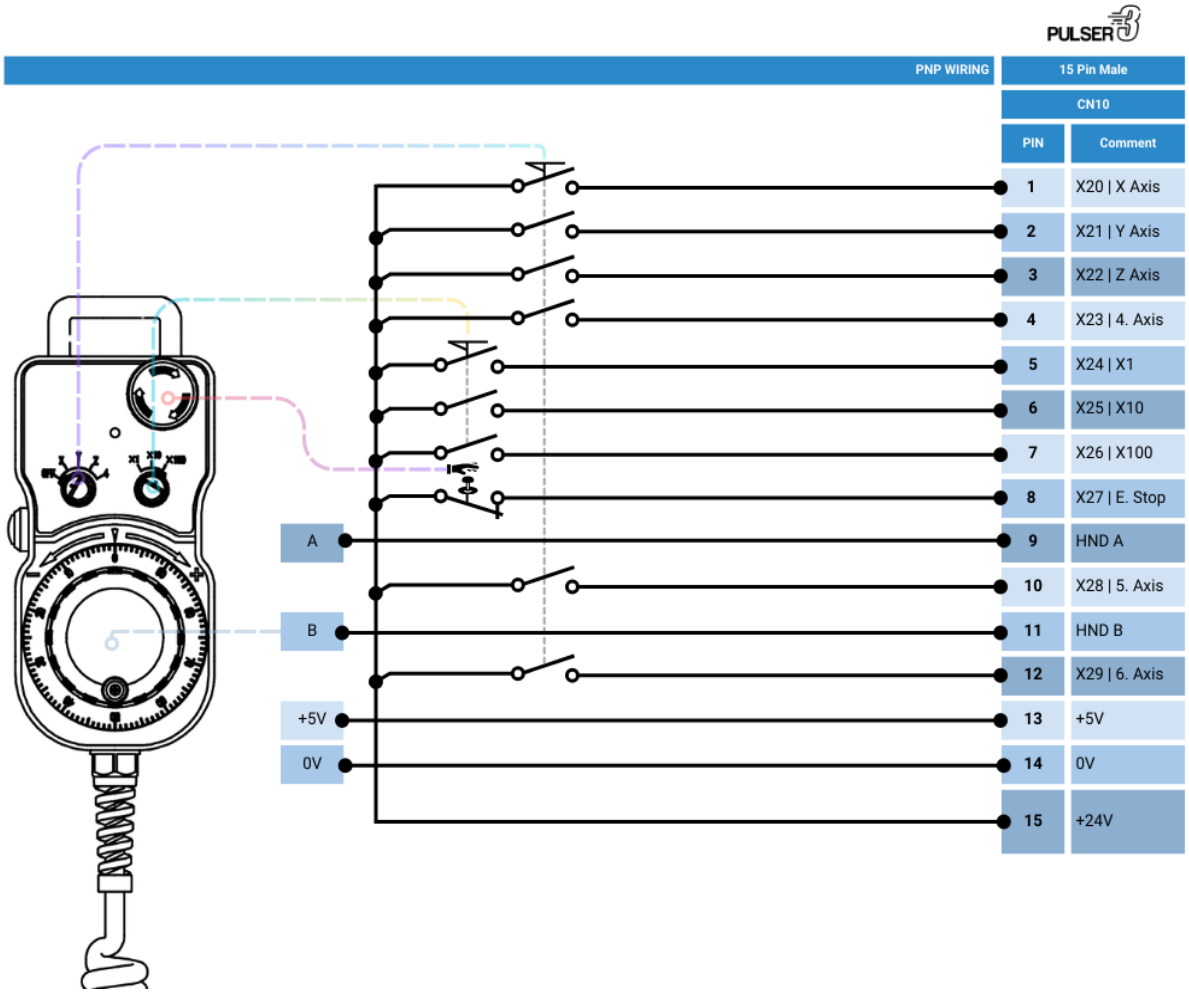


4.11. Spindle Encoder Connector (CN-9)

- The spindle encoder is used in the M19 (Orientation) operation.

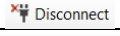
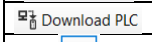


4.12. External Handwheel (M.P.G.) Connector (CN-10)



5. HSC STUDIO

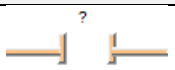
5.1. Menus

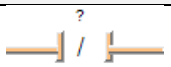
Icon	Description
	Create a new project
	Open an existing project
	Save the project to disk
	Save the project to disk with a different name
	Undo the last change
	Redo the last change
	Cut the selected object
	Copy the selected object
	Paste the cut/copied object
	Delete the selected object
	Search within ladder programs
	Open the variable list
	Add a line to the ladder program
	Add/Delete a vertical line to/from the ladder program
	Add a contact command to the ladder program
	Add a coil command to the ladder program
	Add a function command to the ladder program
	Add a comment line to the ladder program
	Insert Down
	Insert Up
	elete the selected ladder rung
	Compile the ladder programs
	Connect to the Pulser
	Disconnect from the Pulser
	Download the ladder programs to the Pulser
	Enable online monitoring of the ladder
	Disable online monitoring of the ladder

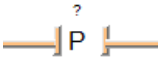
Icon	Descrciption
	Starts the interface simulation without connecting to devices
	Starts the interface simulation by connecting to devices
	Switches HSC Studio to working mode
	HMI Design: Selection Mode
	HMI Design: Creates a new text object
	HMI Design: Creates a new rectangle object
	HMI Design: Creates a new bit control object
	HMI Design: Creates a new function button object
	HMI Design: Creates a new word indicator object
	HMI Design: Creates a new word button object
	HMI Design: Creates a new numeric display/input object
	HMI Design: Creates a new character display/input object
	HMI Design: Creates a new progress bar object
	HMI Design: Creates a new slider object
	HMI Design: Creates a new list object
	HMI Design: Creates a new graphic indicator object
	HMI Design: Creates a new alarm list object
	Bring the selected HMI object to the front
	Send the selected HMI object to the back
	Language selection
	Status selection
	Copies all properties of the selected object's selected state to other states

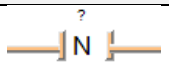
5.2. Internal PLC Commands

5.2.0. Contact Commands

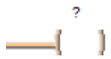
Command	Description	Icon
LD	Logical result bit is subjected to a logical AND operation with the OP1 bit and stored as the logical result bit.	
Parameters		
OP1	Bit to be checked.	bool
OP2	-	-
OP3	-	-

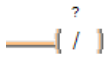
Command	Description	Icon
LD.N	The logical result bit is subjected to a logical AND operation with the inverted state of the OP1 bit and stored as the logical result bit.	
Parameters		
OP1	Bit to be checked.	bool
OP2	-	-
OP3	-	-

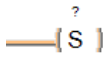
Command	Description	Icon
LD.RE	The logical result bit is subjected to a logical AND operation with the rising edge of the OP1 bit and stored as the logical result bit.	
Parameters		
OP1	Bit to be checked.	bool
OP2	-	-
OP3	-	-

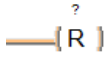
Command	Description	Icon
LD.FE	The logical result bit is subjected to a logical AND operation with the falling edge of the OP1 bit and stored as the logical result bit.	
Parameters		
OP1	Bit to be checked.	bool
OP2	-	-
OP3	-	-

5.2.1. Coil Commands

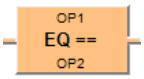
Command	Description	Icon
ST	Copies the logical result bit to OP1.	
Parameters		
OP1	The address of the bit to which the logical result bit will be copied.	bool
OP2	-	-
OP3	-	-

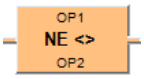
Command	Description	Icon
ST.N	Copies the inverted logical result bit to OP1.	
Parameters		
OP1	The address of the bit to which the inverted logical result bit will be copied.	bool
OP2	-	-
OP3	-	-

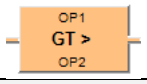
Command	Description	Icon
SET	If the logical result bit is '1', sets the OP1 bit to '1'.	
Parameters		
OP1	The address of the bit to be set (changed to '1').	bool
OP2	-	-
OP3	-	-

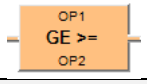
Command	Description	Icon
RESET	If the logical result bit is '1', sets the OP1 bit to '0'.	
Parameters		
OP1	The address of the bit to be reset (changed to '0').	bool
OP2	-	-
OP3	-	-

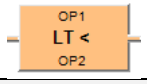
5.2.2. Comparison Commands (16 bit)

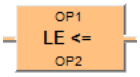
Command	Description	Icon
EQ	Checks if OP1 is equal to OP2.	
Parameters		
OP1	First value for the comparison operation.	Int16/Constant
OP2	Second value for the comparison operation.	Int16/Constant
OP3	-	-

Command	Description	Icon
NE	Checks if OP1 is not equal to OP2.	
Parameters		
OP1	First value for the comparison operation.	Int16/Constant
OP2	Second value for the comparison operation.	Int16/Constant
OP3	-	-

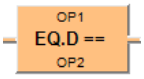
Command	Description	Icon
GT	Checks if the value of OP1 is greater than the value of OP2.	
Parameters		
OP1	First value for the comparison operation.	Int16/Constant
OP2	Second value for the comparison operation.	IInt16/Constant
OP3	-	-

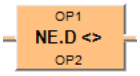
Command	Description	Icon
GE	Checks if the value of OP1 is greater than or equal to the value of OP2.	
Parameters		
OP1	First value for the comparison operation.	Int16/Constant
OP2	Second value for the comparison operation.	Int16/Constant
OP3	-	-

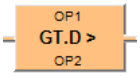
Command	Description	Icon
LT	Checks if the value of OP1 is less than the value of OP2.	
Parameters		
OP1	First value for the comparison operation.	Int16/Constant
OP2	Second value for the comparison operation.	Int16/Constant
OP3	-	-

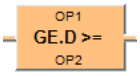
Command	Description	Icon
LE	Checks if the value of OP1 is less than or equal to the value of OP2.	
Parameters		
OP1	First value for the comparison operation.	Int16/Constant
OP2	Second value for the comparison operation.	Int16/Constant
OP3	-	-

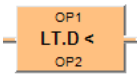
5.2.3. Comparison Commands (32 bit)

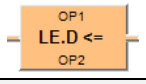
Command	Description	Icon
EQ.D	Checks if OP1 is equal to OP2.	
Parameters		
OP1	First value for the comparison operation.	Int32Constant
OP2	Second value for the comparison operation.	Int32Constant
OP3	-	-

Command	Description	Icon
NE.D	Checks if OP1 is not equal to OP2.	
Parameters		
OP1	First value for the comparison operation.	Int32Constant
OP2	Second value for the comparison operation.	Int32Constant
OP3	-	-

Command	Description	Icon
GT.D	Checks if the value of OP1 is greater than the value of OP2.	
Parameters		
OP1	First value for the comparison operation.	Int32Constant
OP2	Second value for the comparison operation.	Int32Constant
OP3	-	-

Command	Description	Icon
GE.D	Checks if the value of OP1 is greater than or equal to the value of OP2.	
Parameters		
OP1	First value for the comparison operation.	Int32Constant
OP2	Second value for the comparison operation.	Int32Constant
OP3	-	-

Command	Description	Icon
LT.D	Checks if the value of OP1 is less than the value of OP2.	
Parameters		
OP1	First value for the comparison operation.	Int32Constant
OP2	Second value for the comparison operation.	Int32Constant
OP3	-	-

Command	Description	Icon
LE.D	Checks if the value of OP1 is less than or equal to the value of OP2.	
Parameters		
OP1	First value for the comparison operation.	Int32Constant
OP2	Second value for the comparison operation.	Int32Constant
OP3	-	-

5.2.4. Mathematical Operation Commands (16 bit)

Command	Description	Icon
ADD	Sums the value of OP2 and the value of OP3, and loads the result into OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int16
OP2	First value for the addition operation.	Int16/Constant
OP3	Second value for the addition operation.	Int16/Constant

Command	Description	Icon
SUB	Subtracts the value of OP3 from the value of OP2 and loads the result into OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int16
OP2	First value for the subtraction operation.	Int16/Constant
OP3	Second value for the subtraction operation.	Int16/Constant

Command	Description	Icon
MUL	Multiplies the value of OP2 by the value of OP3 and loads the result into OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int16
OP2	First value for the multiplication operation.	Int16/Constant
OP3	Second value for the multiplication operation.	Int16/Constant

Command	Description	Icon
DIV	Divides the value of OP2 by the value of OP3 and loads the result into OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int16
OP2	First value for the division operation.	Int16/Constant
OP3	Second value for the division operation.	Int16/Constant

Command	Description	Icon
MOD	Divides the value of OP2 by the value of OP3 and loads the remainder of the division into OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int16
OP2	First value for the modulus operation.	Int16/Constant
OP3	Second value for the modulus operation.	Int16/Constant

Command	Description	Icon
MOV	Copies the value of OP2 to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int16
OP2	Source value for the loading operation.	Int16/Constant
OP3	-	-

Command	Description	Icon
ABS	Takes the absolute value of OP2 and copies it to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int16
OP2	Source value for the absolute value operation.	Int16/Constant
OP3	-	-

5.2.5. Mathematical Operation Commands (32 bit)

Command	Description	Icon
ADD.D	Sums the value of OP2 and the value of OP3, and copies the result to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int32
OP2	First value for the addition operation.	Int32Constant
OP3	Second value for the addition operation.	Int32Constant

Command	Description	Icon
SUB.D	Subtracts the value of OP3 from the value of OP2 and copies the result to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int32
OP2	First value for the subtraction operation.	Int32Constant
OP3	Second value for the subtraction operation.	Int32Constant

Command	Description	Icon
MUL.D	Multiplies the value of OP2 by the value of OP3 and copies the result to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int32
OP2	First value for the multiplication operation.	Int32Constant
OP3	Second value for the multiplication operation.	Int32Constant

Command	Description	Icon
DIV.D	Divides the value of OP2 by the value of OP3 and copies the result to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int32
OP2	First value for the division operation.	Int32Constant
OP3	Second value for the division operation.	Int32Constant

Command	Description	Icon
MOD.D	Divides the value of OP2 by the value of OP3 and copies the remainder of the division to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int32
OP2	First value for the modulus operation.	Int32Constant
OP3	Second value for the modulus operation.	Int32Constant

Command	Description	Icon
MOV.D	Copies the value of OP2 to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int32
OP2	Source value for the loading operation.	Int32Constant
OP3	-	-

Command	Description	Icon
ABS.D	Takes the absolute value of OP2 and copies it to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int32
OP2	Source value for the absolute value operation.	Int32Constant
OP3	-	-

5.2.6. Logical Operation Commands

Command	Description	Icon
WAND	Performs a logical AND operation between the value of OP2 and the value of OP3, and copies the result to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int16
OP2	First value for the logical AND operation.	Int16/Constant
OP3	Second value for the logical AND operation.	Int16/Constant

Command	Description	Icon
WOR	Performs a logical OR operation between the value of OP2 and the value of OP3, and copies the result to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int16
OP2	First value for the logical OR operation.	Int16/Constant
OP3	Second value for the logical OR operation.	Int16/Constant

Command	Description	Icon
WXOR	Performs a logical XOR operation between the value of OP2 and the value of OP3, and copies the result to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int16
OP2	First value for the logical XOR operation.	Int16/Constant
OP3	Second value for the logical XOR operation.	Int16/Constant

Command	Description	Icon
SHL	Shifts the value of OP2 to the left by the amount of OP3 and copies the result to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int16
OP2	Source value for the shift operation.	Int16/Constant
OP3	Number of bits for the shift operation.	Constant

Command	Description	Icon
SHR	Shifts the value of OP2 to the right by the amount of OP3 and copies the result to OP1.	
Parameters		
OP1	The variable to which the result of the operation will be assigned.	Int16
OP2	Source value for the shift operation.	Int16/Constant
OP3	Number of bits for the shift operation.	Constant

5.2.7. Timer Commands

Command	Description	Icon
TMR	Counts the time specified by OP2, and when the target value is reached, sets the Txx bit indicated by OP1 to "1".	
Parameters		
OP1	Timer number (Max. 48).	Txx
OP2	Time value (1 = 100ms, 10 = 1s).	Int16/Constant
OP3	-	-

5.2.8. Counter Commands

Command	Description	Icon
CTR	Increments the counter value at the rising edge of each logic result bit, and when it is greater than or equal to OP2, it sets the Cxx bit specified by OP1 to “1”.	
Parameters		
OP1	Counter number (Max. 32).	Cxx
OP2	Counter target value.	Int16/Constant
OP3	-	-

5.2.9. Other Commands

Command	Description	Icon
ALT	Inverts the OP1 bit at the rising edge of each logic result bit.	
Parameters		
OP1	Address of the bit to be inverted.	bool
OP2	Auxiliary bit address required for the command to function.	bool
OP3	-	-

Command	Description	Icon
PID	Executes the PID function and loads the result into OP1.	
Parameters		
OP1	The address where the result of the PID operation will be loaded.	Int16
OP2	The starting address of the PID variable block.	Int16
OP3	-	-

To execute the PID command, the variable block specified by the starting address in OP2 must be created. The PID command requires 11 words.

In sequence;

OP2 + 0: Actual Value

OP2 + 1: Set Value

OP2 + 2: P Value

OP2 + 3: I Value

OP2 + 4: D Value

OP2 + 5: PID output minimum limit value

OP2 + 6: PID output maximum limit value

OP2 + 7: It must be allocated for the command to function

OP2 + 8: It must be allocated for the command to function

OP2 + 9: It must be allocated for the command to function

OP2 + 10: It must be allocated for the command to function

Örnek :

	identifier	device	address
	PID_ActualValue	Pulser3	1300
	PID_SetValue	Pulser3	1301
	PID_P	Pulser3	1302
	PID_I	Pulser3	1303
	PID_D	Pulser3	1304
	PID_Min	Pulser3	1305
	PID_Max	Pulser3	1306
	PID_Sys1	Pulser3	1307
	PID_Sys2	Pulser3	1308
	PID_Sys3	Pulser3	1309
	PID_Sys4	Pulser3	1310

Command	Description	Görsel
MBS	Informs the system of the Modbus master communication options.	
Parameters		
OP1	The slave ID number of the device to be communicated with.	Int16/Constant
OP2	The Modbus function to be processed.	Int16/Constant
OP3	Timeout duration for the command response (1 = 100ms).	Int16/Constant

Supported Modbus functions for **OP2**:

1: Read coils(0x01)

2: Read inputs (0x02)

3: Read holding registers (0x03)

4: Read input registers (0x04)

5: Write single coil (0x05)

6: Write single register (0x06)

15: Write multiple coils (0x0F)

16: Write multiple registers (0x10)

Command	Description	Görsel
MBE	Initiates the Modbus master communication process.	
Parameters		
OP1	The starting address in Pulser3 for read/write operations.	Int16
OP2	The starting address in the slave device for read/write operations.	Int16/Constant
OP3	The amount of data to be transferred.	Int16/Constant

Before the **MBE** command is executed, the communication options must be informed to the system via the **MBS** command. For this command to function, **SPRM19** (RS485 Port Mode) should be set to **2** or **3**. Port settings can be made using **SPRM16-SPRM18**. When the **MBE** command is executed, the system sets the **c_PIOP** bit to "**1**" to indicate that the communication process is taking place on the port. When the communication process is successfully completed, both the **c_PIOP** and **c_PIER** bits are set to "**0**". If the communication process times out, the **c_PIOP** bit is set to "**0**", while the **c_PIER** bit is set to "**1**". If the **c_PIER** bit is "**1**" when the **MBE** command is executed, it will be reset to "**0**" by the system.

Command	Description	Görsel
TMAX	Informs the system of the maximum number of tools for tool change auxiliary commands.	
Parameters		
OP1	The maximum number of tools that can be used on the machine.	Int16/Constant
OP2	-	-
OP3	-	-

For the **TROT, TSRC, TSET**, and **TCLR** commands to function, the maximum number of tools must be communicated to the system using the **TMAX** command

Command	Description	Görsel
TROT	In machines with a circular rotating turret/magazine, calculates the shortcut to reach the desired tool and loads it into OP1.	
Parameters		
OP1	The direction of rotation to reach the desired tool (0: clockwise / 1: counterclockwise).	Int16
OP2	The desired tool number.	Int16/Constant
OP3	The current tool number.	Int16/Constant

Command	Description	Görsel
TSRC	In machines where tools are arranged in a magazine in a mixed order, the system searches for the desired tool in the bins and loads the found bin number into OP1. The result will be a value between 1 and the maximum number of tools. If the desired tool is not found in the bins, the value 0 will be loaded into OP1.	
Parameters		
OP1	The bin number where the desired tool is located.	Int16
OP2	The desired tool number.	Int16/Constant
OP3	The starting address of the bin variables.	Int16

Command	Description	Görsel
TGET	In machines where tools are arranged in a mixed order in the magazine, it loads the tool number located in the bin specified by OP2 into the address specified by OP1. OP3 must be specified as the starting point of the bin variables.	
Parameters		
OP1	The address where the found tool number will be assigned.	Int16
OP2	The bin whose tool number is to be retrieved.	Int16/Constant
OP3	The starting address of the bin variables.	Int16

Command	Description	Görsel
TSET	In machines where tools are arranged in a mixed order in the magazine, it loads the tool number specified by OP2 into the bin specified by OP1. OP3 must be specified as the starting point of the bin variables.	
Parameters		
OP1	The bin number where the assignment is to be made.	Int16/Constant
OP2	The tool number to be assigned to the bin.	Int16/Constant
OP3	The starting address of the bin variables.	Int16

Command	Description	Görsel
TCLR	In machines where tools are arranged in a mixed order in the magazine, it sequentially loads values from 1 to the maximum number of tools into the variables specified by OP1, which indicates the starting point of the bin variables.	
Parameters		
OP1	The starting address of the bin variables.	Int16
OP2	-	-
OP3	-	-

5.3. C# Macro

The HMI can execute C# macros. Each macro program must contain a Main function, and the code to be executed should be written within this function:

```
public void Main()
{
      // The content of the macro program.
}
```

Embedded Data Types:

```
public enum HMI_DataFormat
{
   BCD_16bit = 0,
   BCD_32bit,
   HEX_16bit,
   HEX_32bit,
   BIN_16bit,
   BIN_32bit,
   Unsigned_16bit,
   Signed_16bit,
   Unsigned_32bit,
   Signed_32bit,
   Float_32bit
}


public enum HMI_Alignment
{
   Center = 0,
   Left,
   Right,
   Top,
   Bottom,
   TopLeft,
   TopRight,
   BottomLeft,
   BottomRight
}
```

Embedded Functions:

```
/// <summary>
/// Reading data in bit size/// </summary>
/// <param name="address"> Address to be read </param>
/// <param name="data"> The variable where the read value will be loaded </param>
/// <returns> If the read operation is successful, 'true'; otherwise, 'false'
public bool ReadBool(string address, ref bool data)

/// <summary>
/// Writing data in bit size
/// </summary>
/// <param name="address"> The address where the data will be written </param>
/// <param name="data"> Set value </param>
/// <returns> If the read operation is successful, 'true'; otherwise, 'false'
public bool WriteBool(string address, bool data)

/// <summary>
/// 16-bit/32-bit data read
/// </summary>
/// <param name="data_format"> Data format </param>
/// <param name="address"> Address to read from </param>
/// <param name="data"> The variable where the read value will be loaded </param>
/// <returns> If the read operation is successful, 'true'; otherwise, 'false'
public bool ReadNumber(HMI_DataFormat data_format, string address, ref long data)

/// <summary>
/// 16-bit/32-bit data write
/// </summary>
/// <param name="data_format"> Data format </param>
/// <param name="address"> Address to write from </param>
/// <param name="data"> Set value </param>
/// <returns> If the read operation is successful, 'true'; otherwise, 'false'
public bool WriteNumber(HMI_DataFormat data_format, string address, long data)

/// <summary>
/// Reads data in string format
/// </summary>
/// <param name="address"> Address to read from </param>
/// <param name="str_word_length"> The word length of the data </param>
/// <param name="data"> The variable where the read value will be stored </param>
/// <returns> If the read operation is successful, 'true'; otherwise, 'false'
public bool ReadString(string address, int str_word_length, ref string data)

/// <summary>
/// Writing data in string format
/// </summary>
/// <param name="address"> The address where the data will be written </param>
/// <param name="str_word_length"> The word length of the data </param>
/// <param name="data"> Set value </param>
/// <returns> If the read operation is successful, 'true'; otherwise, 'false'
public bool WriteString(string address, int str_word_length, string data)
```

```
/// <summary>
/// Changes the selected language
/// </summary>
/// <param name="lang"> The language number to be selected </param>
public void ChangeLanguage(int lang)

/// <summary>
/// Returns the selected language
/// </summary>
/// <returns> The selected language number </returns>
public int GetLanguage()

/// <summary>
/// Change the active window
/// </summary>
/// <param name="window_name"> The name of the window to be opened </param>
public void ChangeWindow(string window_name)

/// <summary>
/// Opening a pop-up window
/// </summary>
/// <param name="window_name"> The name of the window to be opened as a pop-up</param>
public void OpenPopup(string window_name)

/// <summary>
/// Opening a pop-up window
/// </summary>
/// <param name="window_name"> The name of the window to be opened as a pop-up</param>
/// <param name="align"> Alignment option of the opened window </param>
public void OpenPopup(string window_name, HMI_Alignment align)

/// <summary>
/// Closes the pop-up window at the top
/// </summary>
public void ClosePopup()

/// <summary>
/// Closes the pop-up window with the specified name
/// </summary>
/// <param name="window_name"> The name of the window to be closed </param>
public void ClosePopup(string window_name)

/// <summary>
/// Copies the G-code file with its extension to Pulser3
/// </summary>
/// <param name="file_name"> The name of the file to be copied </param>
public void CopyGCode(string file_name)

/// <summary>
/// Resets Pulser3 (The reset bit is set to 1 and then to 0)
/// </summary>
/// <param name="address"> The address to be used for the reset </param>
public void Reset(string address)
```

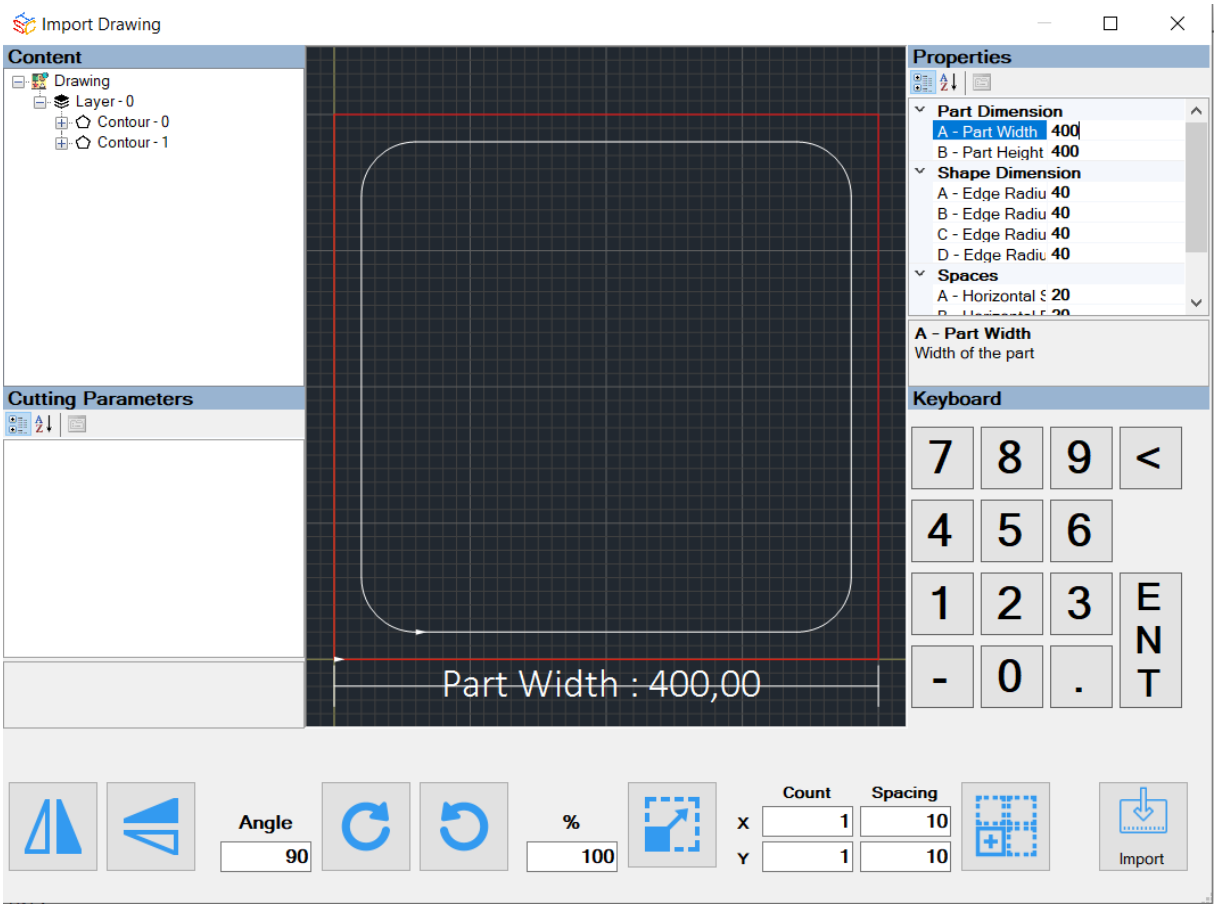
```
/// <summary>
/// Executes the sent G-code line in MDI mode
/// </summary>
/// <param name="gcode"> The G-code line to be processed </param>
public void ExecuteLine(string gcode, string mdi_start_adr)

/// <summary>
/// Sets the specified bit to '1'
/// </summary>
/// <param name="address"> The bit address to be set </param>
public void SetBit(string address)

/// <summary>
/// Sets the specified bit to '0'
/// </summary>
/// <param name="address"> The bit address to be reset </param>
public void ResetBit(string address)

/// <summary>
/// Wait
/// </summary>
/// <param name="delay_time"> Wait value (milliseconds)</param>
public void Delay(int delay_time)

/// <summary>
/// Calls the macro program
/// </summary>
/// <param name="macro_name"> The name of the macro program to be executed </param>
public void CallMacro(string macro_name)
```

5.4. Predefined Shapes

New shapes can be created to enable the operator to generate G-code from predefined shapes using specified parameters. To add a new predefined shape, right-click on the Shapes tab in the project tree and click the Add New Shape button. In the dialog that appears, enter the shape's name and press OK. Double-clicking on the created shape will display its contents. The C# language is also used to create shapes. Each shape must contain a Draw function, where the visual representation of the shape should be defined.

```
public void Draw(string selectedPropertyName)
{
    // The shape is created within this function
}
```

An example shape has been created below:



```
//-----------------------------------------------------------------------------------------
// SECTION - 1
// Local variables of the shape to be created
//-----------------------------------------------------------------------------------------
private float partWidth = 400;
private float partHeight = 400;

private float edgeRadius1 = 40;
private float edgeRadius2 = 40;
private float edgeRadius3 = 40;
private float edgeRadius4 = 40;

private float xStartSpace = 20;
private float xEndSpace = 20;
private float yStartSpace = 20;
private float yEndSpace = 20;


//-----------------------------------------------------------------------------------------
// SECTION - 2
// Properties of the shape to be created
// Properties added here are automatically displayed in the shape editing form
//-----------------------------------------------------------------------------------------
[Category("Part Dimension"),
DisplayName("A - Part Width"),
DescriptionAttribute("Width of the part")]
public float PartWidth
{
   get
   {
      return partWidth;
   }
   set
   {
      if (value != 0) partWidth = value;
   }
}

[Category("Part Dimension"),
DisplayName("B - Part Height"),
DescriptionAttribute("Height of the part")]
public float PartHeight
{
   get
   {
      return partHeight;
   }
   set
   {
      if (value != 0) partHeight = value;
   }
}
```

```
[Category("Spaces"),
DisplayName("A - Horizontal Start Space"),
DescriptionAttribute("Horizontal Start Space of shape")]
public float XStartSpace
{
   get
   {
      return xStartSpace;
   }
   set
   {
      if (value > 0) xStartSpace = value;
   }
}

[Category("Spaces"),
DisplayName("B - Horizontal End Space"),
DescriptionAttribute("Horizontal End Space of shape")]
public float XEndSpace
{
   get
   {
      return xEndSpace;
   }
   set
   {
      if (value > 0) xEndSpace = value;
   }
}

[Category("Spaces"),
DisplayName("C - Vertical Start Space"),
DescriptionAttribute("Vertical Start Space of shape")]
public float YStartSpace
{
   get
   {
      return yStartSpace;
   }
   set
   {
      if (value > 0) yStartSpace = value;
   }
}

[Category("Spaces"),
DisplayName("D - Vertical End Space"),
DescriptionAttribute("Vertical End Space of shape")]
public float YEndSpace
{
   get
   {
      return yEndSpace;
   }
   set
   {
      if (value > 0) yEndSpace = value;
   }
}
```

```
[Category("Shape Dimension"),
DisplayName("A - Edge Radius 1"),
DescriptionAttribute("Edge radius for first edge")]
public float EdgeRadius1
{
   get
   {
      return edgeRadius1;
   }
   set
   {
      if (value > 0) edgeRadius1 = value;
   }
}

[Category("Shape Dimension"),
DisplayName("B - Edge Radius 2"),
DescriptionAttribute("Edge radius for second edge")]
public float EdgeRadius2
{
   get
   {
      return edgeRadius2;
   }
   set
   {
      if (value > 0) edgeRadius2 = value;
   }
}

[Category("Shape Dimension"),
DisplayName("C - Edge Radius 3"),
DescriptionAttribute("Edge radius for third edge")]
public float EdgeRadius3
{
   get
   {
      return edgeRadius3;
   }
   set
   {
      if (value > 0) edgeRadius3 = value;
   }
}

[Category("Shape Dimension"),
DisplayName("D - Edge Radius 4"),
DescriptionAttribute("Edge radius for fourth edge")]
public float EdgeRadius4
{
   get
   {
      return edgeRadius4;
   }
   set
   {
      if (value > 0) edgeRadius4 = value;
   }
}
```

```
//-----------------------------------------------------------------------------------
// SECTION - 3
// Drawing of the shape
// When HSC Studio wants to display predefined shapes to the user,it calls this method
//-----------------------------------------------------------------------------------

/// <summary>
/// The shape should be drawn within this method
/// <param name="selectedPropertyName"> The property that is clicked
/// (Property) name</param>
/// </summary>
public void Draw(string selectedPropertyName)
{

   // ------ Shape
   Contour c = new Contour();
   doc.Model.Add(c);

   Line line1 = new Line(XStartSpace + EdgeRadius1,
                         YStartSpace,
                         PartWidth - XEndSpace - EdgeRadius2,
                         YStartSpace);
   Arc arc2 = new Arc(PartWidth - XEndSpace - EdgeRadius2,
                         YStartSpace + EdgeRadius2,
                         EdgeRadius2, ToRadian(270.0F),
                         ToRadian(0.0F));

   Line line2 = new Line(PartWidth - XEndSpace,
                         YStartSpace + EdgeRadius2,
                         PartWidth - XEndSpace,
                         PartHeight - YEndSpace - EdgeRadius3);
   Arc arc3 = new Arc(PartWidth - XEndSpace - EdgeRadius3,
                         PartHeight - YEndSpace - EdgeRadius3,
                         EdgeRadius3,
                         ToRadian(0.0F),
                         ToRadian(90.0F));

   Line line3 = new Line(PartWidth - XEndSpace - EdgeRadius3,
                         PartHeight - YEndSpace,
                         XStartSpace + EdgeRadius4,
                         PartHeight - YEndSpace);
   Arc arc4 = new Arc(XStartSpace + EdgeRadius4,
                         PartHeight - YEndSpace - EdgeRadius4,
                         EdgeRadius4,
                         ToRadian(90.0F),
                         ToRadian(180.0F));

   Line line4 = new Line(XStartSpace,
                         PartHeight - YEndSpace - EdgeRadius4,
                         XStartSpace,
                         YStartSpace + EdgeRadius1);
   Arc arc1 = new Arc(XStartSpace + EdgeRadius1,
                         YStartSpace + EdgeRadius1,
                         EdgeRadius1,
                         ToRadian(180.0F),
                         ToRadian(270.0F));
```

```
c.Add(line1);
c.Add(arc2);
c.Add(line2);
c.Add(arc3);
c.Add(line3);
c.Add(arc4);
c.Add(line4);
c.Add(arc1);
// ------ End of shape


// ------ Outer frame
Contour cBorder = new Contour();
doc.Model.Add(cBorder);

Line lineBorder1 = new Line(0, 0, PartWidth, 0);
Line lineBorder2 = new Line(PartWidth, 0, PartWidth, PartHeight);
Line lineBorder3 = new Line(PartWidth, PartHeight, 0, PartHeight);
Line lineBorder4 = new Line(0, PartHeight, 0, 0);
lineBorder1.Label = "Border";
lineBorder2.Label = "Border";
lineBorder3.Label = "Border";
lineBorder4.Label = "Border";
lineBorder1.Style.Color = new Color(0xFFFF0000, false);
lineBorder2.Style.Color = new Color(0xFFFF0000, false);
lineBorder3.Style.Color = new Color(0xFFFF0000, false);
lineBorder4.Style.Color = new Color(0xFFFF0000, false);

cBorder.Add(lineBorder1);
cBorder.Add(lineBorder2);
cBorder.Add(lineBorder3);
cBorder.Add(lineBorder4);
// ----- End of outer frame


// ----- Guideline indicators
if (selectedPropertyName == "A - Part Width")
{
   Dimension d = new Dimension(0, -20, PartWidth, -20, 30);
   d.String = "Part Width : <>";
   c.Add(d);
}
else if (selectedPropertyName == "B - Part Height")
{
   Dimension d = new Dimension(-20, 0, -20, PartHeight, 30);
   d.String = "Part Height : <>";
   c.Add(d);
}

else if (selectedPropertyName == "A - Horizontal Start Space")
{
   Dimension d = new Dimension(0, -5, XStartSpace, -5, 30);
   d.String = "X StartSpace: <>";
   c.Add(d);
}
```

```
    else if (selectedPropertyName == "B - Horizontal End Space")
    {
        Dimension d = new Dimension(PartWidth - XEndSpace, -5, PartWidth, -5, 30);
        d.String = "X EndSpace: <>";
        c.Add(d);
    }
    else if (selectedPropertyName == "C - Vertical Start Space")
    {
        Dimension d = new Dimension(-5, 0, -5, YStartSpace, 30);
        d.String = "Y StartSpace: <>";
        c.Add(d);
    }
    else if (selectedPropertyName == "D - Vertical End Space")
    {
        Dimension d = new Dimension(-5, PartHeight - YEndSpace, -5, PartHeight, 30);
        d.String = "Y EndSpace: <>";
        c.Add(d);
    }
    else if (selectedPropertyName == "A - Edge Radius 1")
    {
        Dimension d = new Dimension(XStartSpace, -5,
                                    XStartSpace + EdgeRadius1, -5, 30);
        d.String = "Radius 1 : <>";
        c.Add(d);
    }
    else if (selectedPropertyName == "B - Edge Radius 2")
    {
        Dimension d = new Dimension(PartWidth - XEndSpace - EdgeRadius2,
                                    -5, PartWidth - XEndSpace, -5, 30);
        d.String = "Radius 2 : <>";
        c.Add(d);
    }
    else if (selectedPropertyName == "C - Edge Radius 3")
    {
        Dimension d = new Dimension(PartWidth - XEndSpace - EdgeRadius3,
                                    PartHeight + 5, PartWidth - XEndSpace,
                                    PartHeight + 5, 30);
        d.String = "Radius 3 : <>";
        c.Add(d);
    }
    else if (selectedPropertyName == "D - Edge Radius 4")
    {
        Dimension d = new Dimension(XStartSpace, PartHeight + 5,
                                    XStartSpace + EdgeRadius1,
                                    PartHeight + 5, 30);
        d.String = "Radius 4 : <>";
        c.Add(d);
    }
    // ----- End of guideline indicators


}
```

```
//--------------------------------------------------------------------------------
// SECTION - 4
// Helper methods/assignments used for drawing the shape
// "It is not mandatory. However, placing the entire code
// within the Draw method could lead to complexity,
// so it has been divided into separate methods//-----------------------------------
-------------------------------------------

/// <summary>
/// Converts the given degree value to radians
/// <param name="deg"> The degree value to be converted to radians </param>
/// </summary>
private float ToRadian(float deg)
{
   return (deg * (float)Math.PI) / 180.0F;
}
```

5.5. Post Processor

When a DXF file or a predefined shape is to be converted into G-code and imported into the system, the Post Processor macro is used. When the operator opens a DXF file or one of the predefined shapes, HSC Studio sequentially scans the shapes and directs them to the Post Processor macro. The Post Processor macro, like other C# macros, should be created in the macros section under the name PostPro. HSC Studio includes a predefined post class to transfer the relevant values to this macro program and accumulate the generated G-codes. This class can be accessed within the macro program without the need for any assignments. The created macro must contain a function named PostProCmd. HSC Studio sends the outputs to this function as a string.

```
public void PostProCmd(string cmd)
{
   // Post processor redirections should be made here.
}
```

Post Processor command list:

```
Init
Finish
Comment
BeginLayer
EndLayer
Line
Arc
StartDistance
EndDistance
```

post class:

```
public float Tolerance = 0.1F;


public int CompSide = 0;

public float StartX = 0;
public float StartY = 0;
public float StartZ = 0;
public float EndX = 0;
public float EndY = 0;
public float EndZ = 0;
public float ArcCenterX = 0;
public float ArcCenterY = 0;
public float ArcRadius = 0;
public bool ArcDir = false;

public float ZRetract = 0;
public float ZSafePos = 0;
public float ZCutPos = 0;

public int Tool = 0;
public float Feed = 0;
public float ZFeed = 0;

public int SpindleDir = 0;
public int SpindleSpeed = 0;

public string Comment = "";
public string LayerName = "";
public string Label = "";
```

```
/// <summary>
/// Adds the given string to the Output variable
/// </summary>
/// <param name="s"> The string to be added to the Output variable </param>
/// <returns></returns>
public void Add(string s)


/// <summary>
/// Adds the given string to the Output variable,
//appending newline characters at the end
/// </summary>
/// <param name="s"> The string to be added to the Output variable, with newline
///characters appended </param>
/// <returns></returns>
public void AddLine(string s)


/// <summary>
/// Formats the given double value and command, then returns it as a string
/// </summary>
/// <param name="cmd"></param>
/// <param name="n"></param>
/// <returns></returns>
public string Cmd(string cmd, float n, int precision)
```

Example Post Processor Macro:

```
// Local variables
int precision = 4;       // Number of decimal places
int compSide = 0;        // Tool radius compensation direction(0: OFF,1:LEFT,2: RIGHT)
int spdDir = 0;          // Last spindle rotation direction
int spdSpeed = 0;        // Last spindle speed
int tool = 0;            // Last tool
float curX = float.MinValue;        // Last processed X position
float curY = float.MinValue;        // Last processed Y position
float curZ = float.MinValue;        // Last processed Z position
float curF = float.MinValue;        // Last given feedrate command
int NCounter = 1;
bool g50_1 = false;

/// <summary>
/// Leave blank
/// </summary>
public void Main()
{
}

/// <summary>
/// Main method for conversion
/// <param name="cmd">Command</param>
/// </summary>
public void PostProCmd(string cmd)
{
   switch (cmd)
   {
      case "Init":
         Init();
         break;
      case "Finish":
         Finish();
         break;
      case "Comment":
         Comment();
         break;
      case "BeginLayer":
         BeginLayer();
         break;
      case "EndLayer":
         EndLayer();
         break;
      case "Line":
         Line();
         break;
      case "Arc":
         Arc();
         break;
      case "StartDistance":
         break;
      case "EndDistance":
         break;
      default:
         break;
   }
}
```

```
/// <summary>
/// Called just before starting to generate the G-code file
/// Required initial assignments can be made here
/// </summary>
private void Init()
{
   compSide = 0;
   feed = 0;
   spdDir = 0;
   spdSpeed = 0;
   tool = 0;
   curX = float.MinValue;
   curY = float.MinValue;
   curZ = float.MinValue;
   curF = float.MinValue;


   post.AddLine("(THIS FILE IS CREATED BY HSC STUDIO)");
   post.AddLine("(-- www.hsckontrol.com ---)");
   post.AddLine("");
   post.AddLine("G54 G90 G00 G40 G49 G80 G21");
   post.AddLine("");
}

/// <summary>
/// Code block to be written at the end of the file
/// </summary>
private void Finish()
{

   // Turn off tool radius compensation (if enabled)
   if (compSide != 0) post.AddLine("G40");

   // Spindle stop
   post.AddLine("M5");


   // To the Z reference position
   post.AddLine("G53 G90 G00 Z0.");
   post.AddLine("M30 (END OF PROGRAM)");
   post.AddLine("%");

   // Save to the G-code file
   string file_name = "C:\\shape.cnc";
   using (StreamWriter writer = new StreamWriter(file_name, false))
   {
      writer.Write(post.Output);
   }

   // Copy to Pulser
   CopyGCode(file_name);

}
```

```
/// <summary>
/// Description
/// <param name="post.Comment"> Description content </param>
/// </summary>
private void Comment()
{
   post.AddLine("(" + post.Comment + ")");
}


/// <summary>
/// A new layer is being started
/// </summary>
private void BeginLayer()
{

}

/// <summary>
/// Layer completed
/// </summary>
private void EndLayer()
{

}


/// <summary>
/// Code block required for linear cutting motion
/// <param name="post.StartX"> Starting X coordinate of the motion </param>
/// <param name="post.StartY"> Starting Y coordinate of the motion </param>
/// <param name="post.StartZ"> Starting Z coordinate of the motion </param>
/// <param name="post.EndX"> Target X coordinate of the motion </param>
/// <param name="post.EndY"> Target Y coordinate of the motion </param>
/// <param name="post.EndZ"> Target Z coordinate of the motion </param>
/// </summary>
private void Line()
{

   // Frame lines are skipped
   if (post.Label == "Border") return;

   // If necessary, a rapid move to the starting point of the motion
   RapidMoveToStartPos();

   // Move to the Z starting coordinate
   if (curZ != post.StartZ)
   {
      // Slow move to the Z axis cutting start coordinate
      post.AddLine("G01" + post.Cmd("Z", post.StartZ, precision) +
                   post.Cmd("F", post.ZFeed, precision));
      curZ = post.StartZ;
   }

   // Pouring start has been completed
   if (g50_1 == true)
   {
      post.Add("G50.1 ");
      g50_1 = false;
   }
```

```
   // Linear cutting command
   post.Add("G01 ");

   // X target
   if (post.StartX != post.EndX)
      post.Add(post.Cmd("X", post.EndX, precision));

   // Y target
   if (post.StartY != post.EndY)
      post.Add(post.Cmd("Y", post.EndY, precision));

   // Z target
   if (post.StartZ != post.EndZ)
      post.Add(post.Cmd("Z", post.EndZ, precision));

   // F target
   if (curF != post.Feed)
      post.Add(post.Cmd("F", post.Feed, 1));

   // End of The Line
   post.AddLine("");

   // Save the current position
   curX = post.EndX;
   curY = post.EndY;
   curZ = post.EndZ;
   curF = post.Feed;

}


/// <summary>
/// Code block required for circular cutting motion
/// <param name="post.StartX"> Starting X coordinate of the movement </param>
/// <param name="post.StartY"> Starting Y coordinate of the movement </param>
/// <param name="post.StartZ"> Starting Z coordinate of the movement </param>
/// <param name="post.EndX"> Target X coordinate of the movement </param>
/// <param name="post.EndY"> Target Y coordinate of the movement </param>
/// <param name="post.EndZ"> Target Z coordinate of the movement </param>
/// <param name="post.ArcCenterX"> X coordinate of the circle center </param>
/// <param name="post.ArcCenterY"> Y coordinate of the circle center </param>
/// <param name="post.ArcRadius"> Radius of the circle </param>
/// <param name="post.ArcDir"> Direction of the circle rotation false:CCW,true:CW
/// </summary>
private void Arc()
{

   // Frame lines are skipped
   if (post.Label == "Border") return;

   // Rapid move to the starting point of the motion if necessary
   RapidMoveToStartPos();

   // Move to the Z starting coordinate
   if (curZ != post.StartZ)
   {
      // Slow move to the Z axis cutting start coordinate
      post.AddLine("G01" + post.Cmd("Z", post.StartZ, precision) +
                   post.Cmd("F", post.ZFeed, precision));
      curZ = post.StartZ;
   }
```

```
   // Pouring start has been completed
   if (g50_1 == true)
   {
      post.Add("G50.1 ");
      g50_1 = false;
   }

   // Arc cutting command
   if (post.ArcDir == false) post.Add("G03 ");
   else post.Add("G02 ");

   // X target
   if (post.StartX != post.EndX)
      post.Add(post.Cmd("X", post.EndX, precision));

   // Y target
   if (post.StartY != post.EndY)
      post.Add(post.Cmd("Y", post.EndY, precision));

   // Z target
   if (post.StartZ != post.EndZ)
      post.Add(post.Cmd("Z", post.EndZ, precision));

   // Arc center X (I command)
   post.Add(post.Cmd("I", post.ArcCenterX - post.StartX, precision));

   // Arc center Y (J command)
   post.Add(post.Cmd("J", post.ArcCenterY - post.StartY, precision));

   // F target
   if (curF != post.Feed)
      post.Add(post.Cmd("F", post.Feed, 1));

   // End of The Line
   post.AddLine("");

   // Store current position
   curX = post.EndX;
   curY = post.EndY;
   curZ = post.EndZ;
   curF = post.Feed;
}


/// <summary>
/// Rapid move to the start of the motion - if necessary
/// </summary>
private void RapidMoveToStartPos()
{
     /*
      if(post.Tool != tool){
         post.AddLine( "M06 T" + post.Tool.ToString());
         post.AddLine( "G43 H" + post.Tool.ToString());
         tool = post.Tool;
      }
    */
```

```
   if ((post.SpindleDir != spdDir) || (post.SpindleSpeed != spdSpeed))
   {
      switch (post.SpindleDir)
      {
         case 1:
            post.AddLine("M03 S" + post.SpindleSpeed.ToString());
            break;
         case 2:
            post.AddLine("M04 S" + post.SpindleSpeed.ToString());
            break;
         default:
            post.AddLine("M05");
            break;
      }
      spdDir = post.SpindleDir;
      spdSpeed = post.SpindleSpeed;
   }

   if ((Math.Abs(post.StartX - curX) > post.Tolerance)
        || (Math.Abs(post.StartY - curY) > post.Tolerance))
   {
      // Disable tool radius compensation (if enabled) before rapid move
      if (compSide != 0) post.AddLine("G40");

      // Rapid move to Z retract position
      post.AddLine("G00" + post.Cmd("Z", post.ZRetract, precision));

      // Add N numbers
      post.AddLine("N" + NCounter++.ToString());

      // Enable tool radius compensation before starting cutting
      if (post.CompSide == 1) post.AddLine("G41 D" + post.Tool.ToString());
      else if (post.CompSide == 2) post.AddLine("G42 D" + post.Tool.ToString());
      compSide = post.CompSide;


      // Rapid move to the XY cutting start point
      post.AddLine("G00" + post.Cmd("X", post.StartX, precision) +
                   post.Cmd("Y", post.StartY, precision));


      // Z Rapid move to the axis safety point
      post.AddLine("G50.2 G00" + post.Cmd("Z", post.ZSafePos, precision));

      // Slow move to the Z-axis cutting coordinate
      post.AddLine("G01" + post.Cmd("Z", post.StartZ, precision) +
                   post.Cmd("F", post.ZFeed, precision));


      // Store current position
      curX = post.StartX;
      curY = post.StartY;
      curZ = post.StartZ;
      curF = post.ZFeed;

   }
}
```

6. PROGRAMMING

6.1. G Code List

Function	Group	Milling	Lathe
Rapid positioning	1	G00	G00
Ping pong rapid positioning	1	G00.1	G00.1
Linear interpolation	1	**G01**	**G01**
Circular interpolation(Clockwise)	1	G02	G02
Circular interpolation(Counter clockwise)	1	G03	G03
Dwell	0	G04	G04
Programmable data input	0	G10	G10
Cartesian coord. system selection	17	**G15**	**G15**
Polar coordinate system selection	17	G16	G16
XY Plane selection	2	**G17**	G17
ZX Plane selection	2	G18	**G18**
YZ Plane selection	2	G19	G19
Inch system selection	6	**G20**	**G20**
Millimeter system selection	6	G21	G21
Axis limit setting On	4	-	G22
Axis limit setting Off	4	-	**G23**
Move to reference point	0	G28	G28
Move to the 2. 3. 4. ref.point	0	G30	G30
Motion skip (SKIP) function	0	G31	G31
Constant-Pitch threading	1	G33	G33
Constant-Pitch threading with rotary axis	1	G33.1	G33.1
Variable-Pitch threading	1	G34	G34
Variable-Pitch threading with rotary axis	1	G34.1	G34.1
Tool radius compensation Off	7	**G40**	**G40**
Tool radius compensation left	7	G41	G41
Tool radius compensation right	7	G42	G42
Tool length offset compensation(+)	8	G43	-
RTCP On	8	G43.4	-
Tool length offset compensation(-)	8	G44	-
Tool length compensation + RTCP Off	8	**G49**	-
At the end of motion, motion signal is active	0	G50.1	G50.1
At the end of motion, motion signal is inactive	0	G50.2	G50.2
Temporary coordinate system	0	G52	G52
Machine coordinate system	0	G53	G53
1. Work offset selection	14	**G54**	**G54**
2. Work offset selection	14	G55	G55
3. Work offset selection	14	G56	G56
4. Work offset selection	14	G57	G57
5. Work offset selection	14	G58	G58
6. Work offset selection	14	G59	G59
7. Work offset selection	14	G59.1	G59.1
8. Work offset selection	14	G59.2	G59.2
9. Work offset selection	14	G59.3	G59.2
10. Work offset selection	14	G59.4	G59.4

Function	Group	Milling	Lathe
Exact stop check	15	G61	G61
Continuous cutting mode	15	**G64**	**G64**
Macro command	0	G65	G65
Macro modal call	12	G66	G66
Macro modal call cancel	12	**G67**	**G67**
Rotate coordinate system	0	G68	-
Turn Off coord. system rotation	0	G69	-
Turret mirroring On	0	-	G68
Turret mirroring Off	0	-	**G69**
Laser On (Piercing)	0	G70	-
Laser Lead in	0	G70.1	-
Lazer cutting	0	G70.2	-
Lazer lead out	0	G70.3	-
Laser Off	0	G71	-
Laser height calibration	0	G72	-
Laser single shot test	0	G72.1	-
Laser gas test	0	G72.2	-
Laser gas test cancel		G72.3	-
Peck drilling cycle	9	G73	-
Reverse tapping cycle for milling	9	G74	-
Fine boring cycle for milling	9	G76	-
Cancel canned cycle	9	**G80**	-
Simple drilling cycle	9	G81	-
Drilling cycle/reverse boring	9	G82	-
Peck drilling cycle	9	G83	-
Tapping cycle	9	G84	-
Boring cycle	9	G85	-
Boring cycle	9	G86	-
Boring cycle, backboring	9	G87	-
Boring cycle	9	G88	-
Boring cycle	9	G89	-
Absolute programming	3	**G90**	**G90**
Incremental programming	3	G91	G91
Coord. system/Spindle max. speed	0	G92	G92
Feedrate per minute	5	**G94**	**G94**
Feedrate per revolution	5	G95	G95
Fixed surface speed control On	13	-	G96
Fixed surface speed control Off	13	-	**G97**
Return to Z point in canned cycle	10	**G98**	**G98**
Return to R point In canned cycle	10	G99	G99

G codes active at startup are highlighted in bold. G codes are divided into two groups: one-shot and modal G codes. Group 0 G codes are one-shot and lose their validity after the line is completed. All other G codes remain in memory until another G code from the same group is issued.

6.2. M Code List

Code	Function	Note
M00	Program stop	<CNC>
M01	Optional program stop	<CNC>
M02	End of program	<CNC>
M03	Spindle start clockwise	
M04	Spindle start counterclockwise	
M05	Spindle stop	
M06	Tool change	It is generally used in milling models
M07	Coolant ON – Mist coolant/Coolant thru spindle	It is generally used in milling models
M08	Coolant ON – Flood coolant	
M09	Coolant OFF	
M10	Milling: Lock the table	Lathe: Chuck clamp
M11	Milling: Unlock the table	Lathe: Chuck unclamp
M13	Spindle2 start clockwise	
M14	Spindle2 start counterclockwise	
M15	Spindle 2 stop	
M19	Spindle orientation	It is generally used in milling models
M20	Spindle orientation cancel	It is generally used in milling models
M21	Tool clamp	It is generally used in milling models
M22	Tool unclamp	It is generally used in milling models
M25	C/Spd axis spindle control	
M26	C/Spd axis C-axis control	
M30	End of program (Return to start)	<CNC>
M98	Subprogram call	<CNC>
M99	Return from subprogram	<CNC>

Note: M codes are divided into two groups: those directly interpreted by the CNC system and those left to the user. The M00, M01, M02, M30, M98, and M99 codes are interpreted by the CNC system and are not recommended to be modified. All other M codes are assigned by the machine manufacturer. A list of commonly used M codes is provided above. However, these M codes may be assigned to different functions by the machine manufacturer. You can obtain the appropriate list of M codes for your machine from your machine manufacturer.

6.3. Subprograms

When subprograms used in the system are called, the selected program pauses at the running line and redirects to the first line of the relevant subprogram. Upon encountering the M99 command within the subprogram, the system returns to the line in the main program where it paused and continues execution from there. A group of operations that need to be repeated multiple times can be grouped into a subprogram, such as tool change subprogram, table change subprogram, or tool zeroing subprogram.

The filenames of the subprograms must be in the **Oxxxx.cnc** format. A numerical value should be written instead of xxxx. For example, the file O9001.cnc defines the subprogram numbered 9001.

Correct Subprogram Filename Examples:

O0001.cnc

O1234.cnc

O9001.cnc

O9009.cnc

Incorrect Subprogram Filename Examples:

0001.cnc

4.cnc

SUB1.cnc

ABC.cnc

"The **M99** command should be placed at the last line of the subprograms. A maximum of 2 nested subprograms can be called in the system. Macro commands can be used within subprograms. Other commands in the lines directed to the subprogram are not processed and are redirected to the subprogram.

6.4. Calling Subprograms with M98 Command

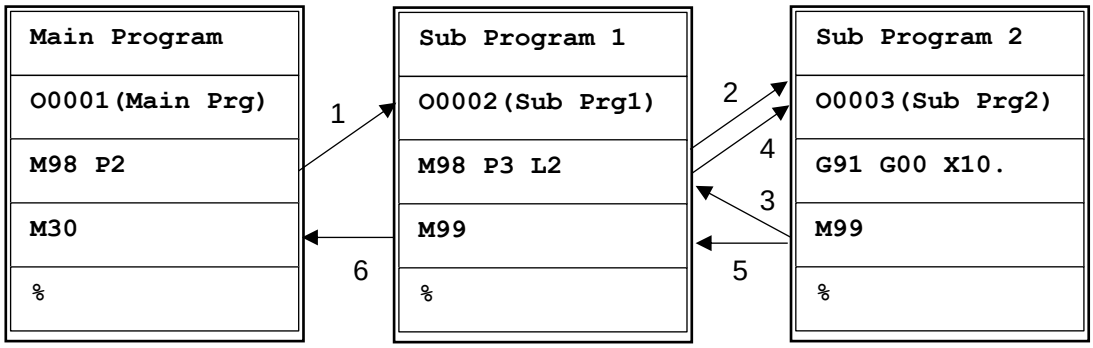
The subprogram call can be performed using the M98 command.

Format:	M98 P_ L_

P: Subprogram number (0~9999)

L: Repeat count (1~9999)

If the subprogram is to be executed only once, the L command may be omitted.



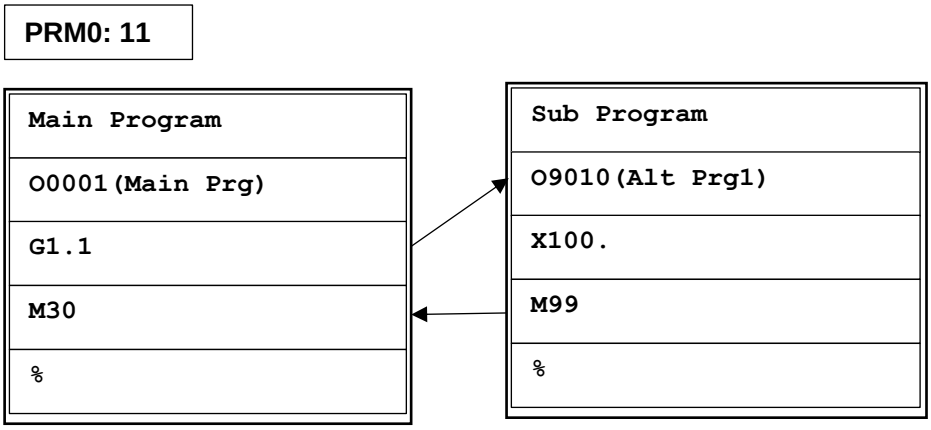
Example of nested subprogram call

6.5. "6.5. Calling Subprograms with User-Defined G Code

A subprogram call can be performed with a G code defined by the user. Up to 10 special G codes can be created. Each special G code is sequentially directed to these subprograms, starting from the subprogram numbered O9010. The G codes to be directed to the subprogram should be entered into the **PRM0-PRM9** parameters. These parameters should be specified in the **0.0** format. For example, if the subprogram **O9010.cnc** is to be called with the **G51** code, the value **510** should be entered into **PRM0**. Similarly, if the subprogram **O9011.cnc** is to be called with the **G51.1** code, the value **511** should be entered into **PRM1**.

The values entered into these parameters mask the G codes defined in the system. When G0 is redirected to a subprogram, the G0 code loses all its functions within the system.

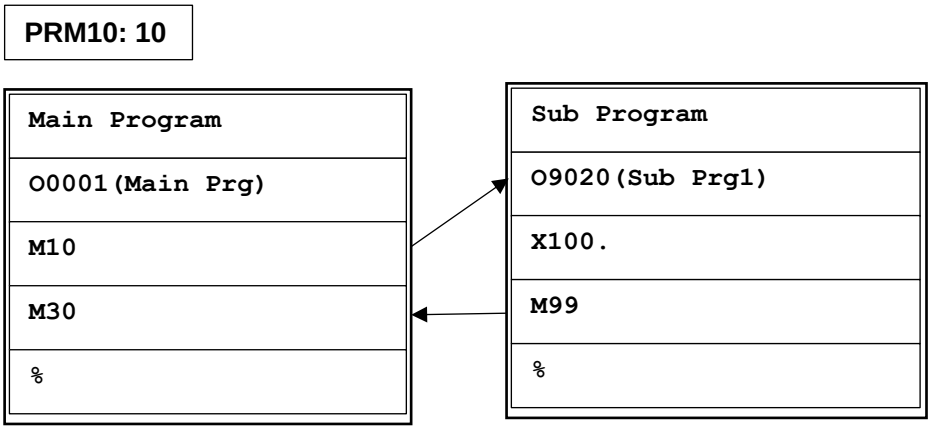
Example:



6.6. Calling Subprograms with User-Defined M Code

A subprogram call can be performed with an M code defined by the user. Up to 10 special M codes can be created. Each special M code is sequentially directed to these subprograms, starting from the subprogram numbered **O9020**. The M codes to be directed to the subprogram should be entered into the **PRM10-PRM19** parameters. A value between 0 and 255 can be given. The values entered into these parameters mask the M codes defined in the system.

Example:

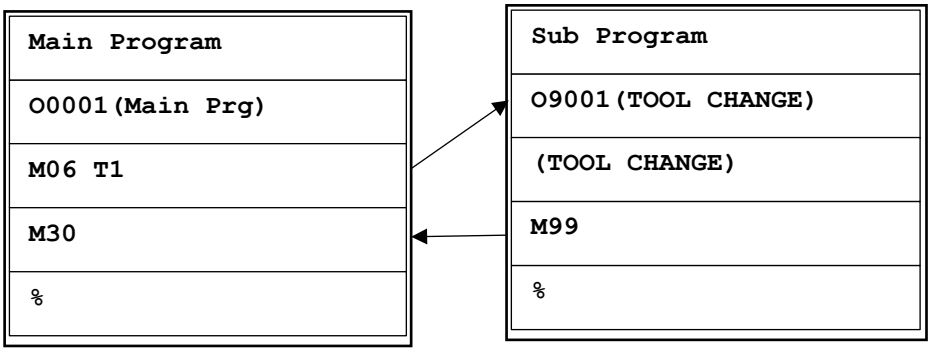


6.7. Calling Subprogram O9001 with M06

The M06 code is used by many machine manufacturers as a tool change command. Similarly, the subprogram number O9001 is often preferred for the tool change subprogram. When the parameter that enables M06 to automatically call O9001 (**PRM317**) is activated (set to 1), the system automatically directs to the O9001 subprogram upon the M06 command..

Example:

PRM250: 1



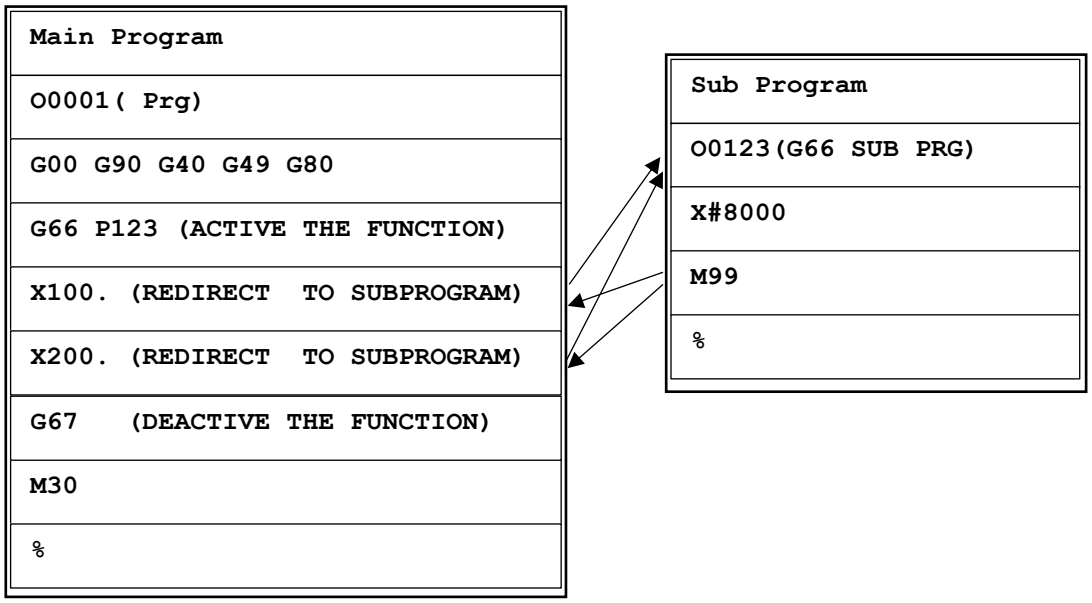
6.8. Repeating Subprogram Call with G66/G67

Unlike other subprogram call processes, with the G66 code, each line can be directed to a subprogram without the need for an additional code. The repeating subprogram call is activated with the G66 code. The number of the subprogram to be called is specified with the P code written on the same line. All codes between this line and the G67 line are redirected to the subprogram specified by the P code without being processed.

Format:	**G66 P_**

P: Subprogram number (0~9999)

Example:



6.9. O9009: Resume Subprogram

When automatic operation is paused by the user, halted due to an issue, or interrupted by a power outage, the system saves the current line number being processed along with the real-time positions of the axes. It can then resume from this point. For this feature to be valid, PRM400 must be activated (set to 1). Additionally, the spindle start and stop M codes should be entered into parameters PRM403-PRM405. When the system detects a request to resume from the midpoint, it validates the G codes from the beginning of the selected program up to the line to be executed. Subsequently, it loads the required positions of the axes along with the selected tool and spindle state into variables #8050~#8067 and calls the subprogram O9009.cnc. O9009 is reserved for this operation and cannot be changed. All necessary preparations for resuming from the midpoint should be made within the 'O9009' program.

Address	Variable	Description	Format
16030~16031	#8015	Desired operation 1: Starting from the saved point 2: Stop->Run transition 3: Run->Stop transition 4: Sim->Run transition 5: Stop->Sim transition	0
16100~16101	#8050	X axis position for resuming operation	0.0000
16102~16103	#8051	Y axis position for resuming operation	0.0000
16104~16105	#8052	Z axis position for resuming operation	0.0000
16106~16107	#8053	4th axis position for resuming operation	0.0000
16108~16109	#8054	5th axis position for resuming operation	0.0000
16110~16111	#8055	6th axis position for resuming operation	0.0000
16112~16113	#8056	7th axis position for resuming operation	0.0000
16114~16115	#8057	8th axis position for resuming operation	0.0000
16120~16121	#8060	Spindle status for resuming operation (0: STOP/1: CW/2: CCW)	0
16122~16123	#8061	Spindle RPM for resuming operation	0
16124~16125	#8062	Tool number for resuming operation	0
16126~16127	#8063	Spindle 2 status for resuming operation (0: STOP/1: CW/2: CCW)	0
16128~16129	#8064	Spindle 2 RPM for resuming operation	0
16130~16131	#8065	Laser/plasma start command for resuming operation (0: None / 1: Present)	0
16132~16133	#8066	Laser/plasma status for resuming operation 0: Off 1: Piercing 2: Lead-In 3: Cutting 4: Lead-Out	0
16134~16135	#8067	Plasma AHC status for resuming operation 0: Off / 1: On	0

Sample resuming start subprogram for CNC router (O9009.cnc)

```
O9009(RESUME-START-STOP)
(--- RESUME --------------------------)
N100 IF #8015 <> 1 THEN GOTO 200
N120 G53 G90 G00 X#2000 Y#2001 Z0.
N125 G43 H#100    (ACTIVATE TOOL LENGTH OFFSET)
N130 IF #8062 <= 0 THEN GOTO 800
N135 M6 T#8062            (GET TOOL)
N140 IF #8060 <> 1 THEN GOTO 150
N145 M03 S#8061             (SPINDLE CW START)
GOTO 170
N150 IF #8060 <> 2 THEN GOTO 160
M04 S#8061                  (SPINDLE CCW START)
GOTO 170
N160 IF #8060 <> 0 THEN GOTO 810
M05                         (SPINDLE STOP)
N170 G53 G90 G00 X#8050 Y#8051
N180 G53 G01 Z#8052
N190 M00
N199 GOTO 900
```

```
(--- STOP-> RUN TRANSITION-----------------)
N200 IF #8015 <> 2 THEN GOTO 300
G40 G69
N220 G53 G90 G00 X#2000 Y#2001 Z0.
N225 G43 H#100   (ACTIVATE TOOL LENGTH OFFSET)
N230 IF #8062 <= 0 THEN GOTO 800
M6 T#8062                  (GET TOOL)
N240 IF #8060 <> 1 THEN GOTO 250
M03 S#8061                 (SPINDLE CW START)
GOTO 270
N250 IF #8060 <> 2 THEN GOTO 260
M04 S#8061                 (SPINDLE CCW START)
GOTO 270
N260 IF #8060 <> 0 THEN GOTO 810
M05                        (SPINDLE STOP)
N270 G53 G90 G00 X#8050 Y#8051
N271 G53 G90 G01 Z#8052
N280 (M00)
N299 GOTO 900
(--- RUN-> STOP TRANSITION----------------)
N300 IF #8015 <> 3 THEN GOTO 400
N310 M05                   (SPINDLE STOP)
G40 G69
N399 GOTO 900
(--- SIM-> RUN TRANSITION -----------------)
N400 IF #8015 <> 4 THEN GOTO 500
N420 G53 G90 G00 Z0.
N425 G43 H#100 (ACTIVATE TOOL LENGTH OFFSET)
N430 IF #8062 <= 0 THEN GOTO 800
M6 T#8062                 (GET TOOL)
N440 IF #8060 <> 1 THEN GOTO 450
M03 S#8061                 (SPINDLE CW START)
GOTO 470
N450 IF #8060 <> 2 THEN GOTO 460
M04 S#8061                 (SPINDLE CCW START)
GOTO 470
N460 IF #8060 <> 0 THEN GOTO 810
M05                        (SPINDLE STOP)
N470 G53 G90 G00 X#8050 Y#8051
N480 G53 G01 Z#8052
N499 GOTO 900
(--- STOP-> SIM TRANSITION -----------------)
N500 IF #8015 <> 5 THEN GOTO 900
N510 G53 G90 G00 Z0.
N520 G53 G90 G00 X#8050 Y#8051
N530 (M00)
N550 (M03)                 (SPINDLE START)
N599 GOTO 900
(--- ALARMS---------------------------------)
N800 ALM 10 (WRONG TOOL COMMAND ALARM)
N805 GOTO 900
N810 ALM 11 (SPINDLE ROTATION COMMAND ALARM)
N815 GOTO 900
N900 G90 G43 H#100
N999 M99 (RETURN)
%
```

6.10. Commands Redirected to the Subprogram

When the subprogram redirection command is detected, the commands within this code block are not processed by the interpreter and are instead loaded into variables numbered #8000~#8049 and #8100~#8149. Thus, these commands can be controlled within the subprogram and used for different purposes.

In the code block specified below, the system detects that a subprogram is called and does not send a movement command to the X-axis. Instead, it loads the value 1000000 into variable #8000 and the value 1 into variable #8100. As indicated in the table below, the formats of the commands are divided into integers and decimal numbers. Since axis commands are in decimal, the command 100.0000 is interpreted without the decimal point (1000000) and loaded into variable #8000.

Main Program

```
O0001(MAIN PROG)
M98 P1000 G00 X100 (CALL SUBPROGRAM O1000.cnc)
M30                (END OF THE PROGRAM)
%
```

Sub Program (O1000.cnc)

```
O1000(SUB PROG)
IF #8100 == 0 THEN GOTO 99 (RETURN IF NO X COMMAND GIVEN)
X#8000             (MOVE X AXIS)
N99 M99            (RETURN TO MAIN PROGRAM)
%
```

Address	Variable	Description	Format
16000~16001	#8000	X Axis value in the line directed to subprogram	0.0000
16002~16003	#8001	Y Axis value in the line directed to subprogram	0.0000
16004~16005	#8002	Z Axis value in the line directed to subprogram	0.0000
16006~16007	#8003	4th Axis value in the line directed to subprogram	0.0000
16008~16009	#8004	5th Axis value in the line directed to subprogram	0.0000
16010~16011	#8005	6th Axis value in the line directed to subprogram	0.0000
16012~16013	#8006	7th Axis value in the line directed to subprogram	0.0000
16014~16015	#8007	8th Axis value in the line directed to subprogram	0.0000
16018~16019	#8009	D value in the line directed to subprogram	0
16020~16021	#8010	F value in the line directed to subprogram	0.0000
16022~16023	#8011	H value in the line directed to subprogram	0
16024~16025	#8012	I value in the line directed to subprogram	0.0000
16026~16027	#8013	J value in the line directed to subprogram	0.0000
16028~16029	#8014	K value in the line directed to subprogram	0.0000
16030~16031	#8015	L value in the line directed to subprogram	0
16032~16033	#8016	M value in the line directed to subprogram	0
16036~16037	#8018	P value in the line directed to subprogram	0
16038~16039	#8019	Q value in the line directed to subprogram	0.0000
16040~16041	#8020	R value in the line directed to subprogram	0.0000
16042~16043	#8021	S value in the line directed to subprogram	0
16044~16045	#8022	T value in the line directed to subprogram	0
16044~16045	#8023	B value in the line directed to subprogram	0
16060~16061	#8030	Group 0 G value in the line directed to subprogram	0.0
16062~16063	#8031	Group 1 G value in the line directed to subprogram	0.0
16064~16065	#8032	Group 2 G value in the line directed to subprogram	0.0
16066~16067	#8033	Group 3 G value in the line directed to subprogram	0.0
16068~16069	#8034	Group 4 G value in the line directed to subprogram	0.0
16070~16071	#8035	Group 5 G value in the line directed to subprogram	0.0
16072~16073	#8036	Group 6 G value in the line directed to subprogram	0.0
16074~16075	#8037	Group 7 G value in the line directed to subprogram	0.0
16076~16077	#8038	Group 8 G value in the line directed to subprogram	0.0
16078~16079	#8039	Group 9 G value in the line directed to subprogram	0.0
16080~16081	#8040	Group 10 G value in the line directed to subprogram	0.0
16082~16083	#8041	Group 11 G value in the line directed to subprogram	0.0
16084~16085	#8042	Group 12 G value in the line directed to subprogram	0.0
16086~16087	#8043	Group 13 G value in the line directed to subprogram	0.0
16088~16089	#8044	Group 14 G value in the line directed to subprogram	0.0
16090~16091	#8045	Group 15 G value in the line directed to subprogram	0.0
16092~16093	#8046	Group 16 G value in the line directed to subprogram	0.0
16094~16095	#8047	Group 17 G value in the line directed to subprogram	0.0
16096~16097	#8048	Group 18 G value in the line directed to subprogram	0.0
16098~16099	#8049	Group 19 G value in the line directed to subprogram	0.0

Addres	Variable	Description	Format
16200~16201	#8100	X Axis bit in the line directed to subprogram	0
16202~16203	#8101	Y Axis bit in the line directed to subprogram	0
16204~16205	#8102	Z Axis bit in the line directed to subprogram	0
16206~16207	#8103	4th Axis bit in the line directed to subprogram	0
16208~16209	#8104	5th Axis bit in the line directed to subprogram	0
16210~16211	#8105	6th Axis bit in the line directed to subprogram	0
16212~16213	#8106	7th Axis bit in the line directed to subprogram	0
16214~16215	#8107	8th Axis bit in the line directed to subprogram	0
16218~16219	#8109	D bit in the line directed to subprogram	0
16220~16221	#8110	F bit in the line directed to subprogram	0
16222~16223	#8111	H bit in the line directed to subprogram	0
16224~16225	#8112	I bit in the line directed to subprogram	0
16226~16227	#8113	J bit in the line directed to subprogram	0
16228~16229	#8114	K bit in the line directed to subprogram	0
16230~16231	#8115	L bit in the line directed to subprogram	0
16232~16233	#8116	M bit in the line directed to subprogram	0
16236~16237	#8118	P bit in the line directed to subprogram	0
16238~16239	#8119	Q bit in the line directed to subprogram	0
16240~16241	#8120	R bit in the line directed to subprogram	0
16242~16243	#8121	S bit in the line directed to subprogram	0
16244~16245	#8122	T bit in the line directed to subprogram	0
16244~16245	#8123	B bit in the line directed to subprogram	0
16260~16261	#8130	Group 0 G bit in the line directed to subprogram	0
16262~16263	#8131	Group 1 G bit in the line directed to subprogram	0
16264~16265	#8132	Group 2 G bit in the line directed to subprogram	0
16266~16267	#8133	Group 3 G bit in the line directed to subprogram	0
16268~16269	#8134	Group 4 G bit in the line directed to subprogram	0
16270~16271	#8135	Group 5 G bit in the line directed to subprogram	0
16272~16273	#8136	Group 6 G bit in the line directed to subprogram	0
16274~16275	#8137	Group 7 G bit in the line directed to subprogram	0
16276~16277	#8138	Group 8 G bit in the line directed to subprogram	0
16278~16279	#8139	Group 9 G bit in the line directed to subprogram	0
16280~16281	#8140	Group 10 G bit in the line directed to subprogram	0
16282~16283	#8141	Group 11 G bit in the line directed to subprogram	0
16284~16285	#8142	Group 12 G bit in the line directed to subprogram	0
16286~16287	#8143	Group 13 G bit in the line directed to subprogram	0
16288~16289	#8144	Group 14 G bit in the line directed to subprogram	0
16290~16291	#8145	Group 15 G bit in the line directed to subprogram	0
16292~16293	#8146	Group 16 G bit in the line directed to subprogram	0
16294~16295	#8147	Group 17 G bit in the line directed to subprogram	0
16296~16297	#8148	Group 18 G bit in the line directed to subprogram	0
16298~16299	#8149	Group 19 G bit in the line directed to subprogram	0

6.11. Macro Commands

G Code	L Code	Operation	Definition
G65	L01	Assignment	#A = #B
G65	L02	Addition operation	#A = #B + #C
G65	L03	Subtraction operation	#A = #B - #C
G65	L04	Multiplication operation	#A = #B * #C
G65	L05	Division operation	#A = #B / #C
G65	L06	Block assignment	#A = BMOV[5, 3]
G65	L11	Logical OR operation	#A = #B | #C
G65	L12	Logical AND operation	#A = #B & #C
G65	L13	Logical XOR (Exclusive OR) operation	#A = #B ^ #C
G65	L14	Right shift	#A = SHR[#B, 3]
G65	L15	Left shift	#A = SHL[#B, 3]
G65	L21	Square root operation	#A = SQR[16]
G65	L22	Absolute value operation	#A = ABS[-16]
G65	L23	Modulus operation	#A = 18 % 4
G65	L24	Conversion from BCD code to Binary code	#A = BIN[18]
G65	L25	Conversion from Binary code to BCD code	#A = BCD[18]
G65	L27	Right triangle hypotenuse calculation	#A = SQRA[10, 15]
G65	L28	Right triangle side calculation	#A = SQRS[10, 15]
G65	L31	Sine calculation	#A = SIN[#B, 450000]
G65	L32	Cosine calculation	#A = COS[#B, 450000]
G65	L33	Tangent calculation	#A = TAN[#B, 450000]
G65	L34	Arctangent calculation	#A = ATAN[#C, #B]
G65	L35	Arcsine calculation	#A = ASIN[#B, #C]
G65	L36	Arccosine calculation	#A = ACOS[#B, #C]
G65	L80	Unconditional branching to a specific line	GOTO 300
G65	L81	Conditional branching to a specific line	IF #A == 100 THEN GOTO 300
G65	L82	Conditional branching to a specific line	IF #A <> 100 THEN GOTO 300
G65	L83	Conditional branching to a specific line	IF #A > 100 THEN GOTO 300
G65	L84	Conditional branching to a specific line	IF #A < 100 THEN GOTO 300
G65	L85	Conditional branching to a specific line	IF #A >= 100 THEN GOTO 300
G65	L86	Conditional branching to a specific line	IF #A <= 100 THEN GOTO 300
G65	L87	Unconditional branching to a specific line with cursor	INDX 10
G65	L99	Trigger an alarm	ALM 1

7. MEMORY STRUCTURE (ALL)

7.1. Overwiew

Variable No	Modbus TCP Address	Description	Length
0	0	General purpose Non-Holding operatorv variables	200
100	200	General purpose Holding operator variables	200
	400	Built-In inputs	4
	404	External inputs (External module 1)	4
	408	External inputs (External module 2)	4
	412	External inputs (External module 3)	4
	416	External inputs (External module 4)	4
	420	External inputs (External module 5)	4
	424	External inputs (External module 6)	4
	428	External inputs (External module 7)	4
	432	External inputs (External module 8)	4
	436	External inputs (External module 9)	4
	440	External inputs (External module 10)	4
	444	Spindle encoder counter	2
	446	M.P.G. counter	2
	448	Signals Sent from CNC to PLC	32
	480	Alarm bits	32
	512	Reserved	12
	524	Machine panel buttons	4
	528	Timers (48x4Word)	192
	720	Counters (48x4Word)	128
	848	PLC axis statuses	64
	912	PLC auxiliary bits (used by PLC software)	88
	1000	Built-in outputs	2
	1002	Reserved	1
	1003	Built-in analog output	1
	1004	External outputs (External Module 1)	4
	1008	External outputs (External Module 2)	4
	1012	External outputs (External Module 3)	4
	1016	External outputs (External Module 4)	4
	1020	External outputs (External Module 5)	4
	1024	External outputs (External Module 6)	4
	1028	External outputs (External Module 7)	4
	1032	External outputs (External Module 8)	4
	1036	External outputs (External Module 9)	4
	1040	External outputs (External Module 10)	4
	1048	Signals sent from PLC to CNC	32
	1080	Reserved	12
	1092	Machine panel LEDs	4
	1096	Reserved PLC memory area for general purpose use	704
	1100	PLC axis commands	64
	1800	Reserved holding PLC memory area for general purpose use	200
1000	2000	Reserved for system use	2000
2000	4000	System actual value display area	2000
3000	6000	Reserved for system use	800
3400	6800	Tool length compensation values (100 units)	100
3500	7000	Tool radius compensation values (100 units)	100
3600	7200	Tool length wear compensation values (100 units)	100
3700	7400	Tool radius wear compensation values (100 units)	100
3800	7600	Work offset values (G54~G59.4, G92)	176
4000	8000	General-purpose holding operator variables	2000
5000	10000	Reserved for system use	2000
6000	12000	G code list, library, MDI box, FTP file name	2000
7000	14000	Parameters (500 units)	1000
7500	15000	System parameters (500 units)	1000
8000	16000	Commands directed to subprogram	200
8100	16200	Bits directed to subprogram	200
8200	16400	Reserved for system use	3600

7.2. Content

Abbreviations used for read/write permissions:

G: Gcode

H : HMI

P : PLC

Variables No	Modbus TCP Address	Content								Read Acces	Write Acces
GENERAL PURPOSE USER VARIABLES											
0	**0**	**General purpose user variable 0**								**H, G**	**H, G**
1	**2**	**General purpose user variable 1**								**H, G**	**H, G**
2	**4**	**General purpose user variable 2**								**H, G**	**H, G**
…	**…**	**…**								**…**	**…**
97	**194**	**General purpose user variable 97**								**H, G**	**H, G**
98	**196**	**General purpose user variable 98**								**H, G**	**H, G**
99	**198**	**General purpose user variable 99**								**H, G**	**H, G**
GENERAL PURPOSE HOLDING USER VARIABLES											
100	**200**	**General purpose holding user variable 0**								**H, G**	**H, G**
101	**202**	**General purpose holding user variable 1**								**H, G**	**H, G**
102	**204**	**General purpose holding user variable 2**								**H, G**	**H, G**
…	**…**	**…**								**…**	**…**
197	**394**	**General purpose holding user variable 97**								**H, G**	**H, G**
198	**396**	**General purpose holding user variable 98**								**H, G**	**H, G**
199	**398**	**General purpose holding user variable 99**								**H, G**	**H, G**
INTERNAL PLC AREA											
	400	X15	X14	X13	X12	X11	X10	X9	X8	**H,P**	**-**
		X7	X6	X5	X4	X3	X2	X1	X0		
	401	-	-	X29	X28	X27	X26	X25	X24	**H,P**	**-**
		X23	X22	X21	X20	X19	X18	X17	X16		
	404	External inputs (External module 1)								**H,P**	
	408	External inputs (External module 2)								**H,P**	
	412	External inputs (External module 3)								**H,P**	
	416	External inputs (External module 4)								**H,P**	
	420	External inputs (External module 5)								**H,P**	
	424	External inputs (External module 6)								**H,P**	
	428	External inputs (External module 7)								**H,P**	
	432	External inputs (External module 8)								**H,P**	
	436	External inputs (External module 9)								**H,P**	
	440	External inputs (External module 10)								**H,P**	
	448	c_F1S	c_F250 MS	c_TOUT	c_MP	c_PIER	c_PIOP	c_MSGN	c_EDITF	**H,P**	**-**
		c_PTR	c_PSE	c_SPL	c_STL	c_RST	c_SALM	c_ALM	c_PON		
	449	c_SCCW2	c_SCW2	c_SCCW	c_SCW	c_M30	c_M02	c_M01	c_M00	**H,P**	**-**
		c_GR4	c_GR3	c_GR2	c_GR1	c_BF	c_TF	c_SF	c_MF		
	450	c_MCODE								**H,P**	**-**
	451	c_SCODE								**H,P**	**-**
	452	c_TCODE								**H,P**	**-**
	453	c_BCODE								**H,P**	**-**
	454	c_ZP82	c_ZP72	c_ZP62	c_ZP52	c_ZP42	c_PZ2	c_ZPY2	c_ZPX2	**H,P**	**-**
		c_ZP8	c_ZP7	c_ZP6	c_ZP5	c_ZP4	c_ZPZ	c_ZPY	c_ZPX		
	455	c_ZP84	c_ZP74	c_ZP64	c_ZP54	c_ZP44	c_ZPZ4	c_ZPY4	c_ZPX4	**H,P**	**-**
		c_ZP83	c_ZP73	c_ZP63	c_ZP53	c_ZP43	c_ZPZ3	c_ZPY3	c_ZPX3		
	456	c_RDY8	c_RDY7	c_RDY6	c_RDY5	c_RDY4	c_RDYZ	c_RDYY	c_RDYX	**H,P**	-
		c_PAX8	c_PAX7	c_PAX6	c_PAX5	c_PAX4	c_PAXZ	c_PAXY	c_PAXX		
	457	c_PEND	c_PENU							**H,P**	-
	458	c_AZS2	c_AZS1	c_AYS2	c_AYS1	c_AXS2	c_AXS1	c_A6S2	c_A6S1	**H,P**	-
		c_A5S2	c_A5S1	c_A4S2	c_A4S1	c_SPOSC	c_JZS	c_SLOW	c_SPOS		
	459	c_SOUT								**H,P**	-
	460	c_SOUT2								**H,P**	-
	461	-	-	-	-	-	-	-	c_LEN	**H,P**	-
		c_TIPP	c_TIPF	c_TIPT	c_GASA	c_GASW	c_DAIR	c_N2	c_O2		
	462	-	-	-	-	-	-	-	-	**H,P**	
		-	-	-	c_PRTOC	c_AHCON	c_PNCE	c_PRDYA	c_PCUT		
	463	-	-	-	-	-	-	-	-	**H,P**	

Variables No	Modbus TCP Address	Content								Read Acces	Write Acces
		-	-	-	-	c_A8S2	c_A8S1	c_A7S2	C_A7S1		
	480	w_ALM0									
...	**...**	**...**								**...**	**...**
	498	w_ALM18								**H,P**	
	524	mb_JN	mb_RAPID	mb_JP	mb_U	mb_A	mb_Z	mb_Y	mb_X	**H,P**	-
		mb_ROV100	mb_ROV50	mb_ROV25	mb_ROV0	mb_RESET	mb_STOP	mb_START	mb_ESP		
	525	mb_FOV8	mb_FOV4	mb_FOV2	mb_FOV1	mb_MODE8	mb_MODE4	mb_MODE2	mb_MODE1	**H,P**	-
		mb_FN2	mb_FN1	mb_HOME	mb_TOOL	mb_COOL	mb_SCCW	mb_SSTOP	mb_SCW		
	526	-	-	-	-	-	-	-	-	**H,P**	-
		-	-	-	-	mb_SOV8	mb_SOV4	mb_SOV2	mb_SOV1		
	848	c_TRQX								**H,P**	
	850	c_TRQY								**H,P**	
	852	c_TRQZ								**H,P**	
	854	c_TRQ4								**H,P**	
	856	c_TRQ5								**H,P**	
	858	c_TRQ6								**H,P**	
	860	c_TRQ7								**H,P**	
	862	c_TRQ8								**H,P**	
	864	c_CURX								**H,P**	
	866	c_CURY								**H,P**	
	868	c_CURZ								**H,P**	
	870	c_CUR4								**H,P**	
	872	c_CUR5								**H,P**	
	874	c_CUR6								**H,P**	
	876	c_CUR7								**H,P**	
	878	c_CUR8								**H,P**	
	880	c_FBX								**H,P**	
	882	c_FBY								**H,P**	
	884	c_FBZ								**H,P**	
	886	c_FB4								**H,P**	
	888	c_FB5								**H,P**	
	890	c_FB6								**H,P**	
	892	c_FB7								**H,P**	
	894	c_FB8								**H,P**	
	1000	Y15	Y14	Y13	Y12	Y11	Y10	Y9	Y8	**H,P**	**H,P**
		Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0		
	1003	AOUT0								**H,P**	**H,P**
	1004	External outputs (External module 1)								**H,P**	**H,P**
	1008	External outputs (External module 2)								**H,P**	**H,P**
	1012	External outputs (External module 3)								**H,P**	**H,P**
	1016	External outputs (External module 4)								**H,P**	**H,P**
	1020	External outputs (External module 5)								**H,P**	**H,P**
	1024	External outputs (External module 6)								**H,P**	**H,P**
	1028	External outputs (External module 7)								**H,P**	**H,P**
	1032	External outputs (External module 8)								**H,P**	**H,P**
	1036	External outputs (External module 9)								**H,P**	**H,P**
	1040	External outputs (External module 10)								**H,P**	**H,P**
	1048	p_JN8	p_JN7	p_JN6	p_JN5	p_JN4	p_JNZ	p_JNY	p_JNX	**H,P**	**H,P**
		p_JP8	p_JP7	p_JP6	p_JP5	p_JP4	p_JPZ	p_JPY	p_JPX		
	1049	p_HX8	p_HX7	p_HX6	p_HX5	p_HX4	p_HXZ	p_HXY	p_HXX	**H,P**	**H,P**
		p_DEC8	p_DEC7	p_DEC6	p_DEC5	p_DEC4	p_DECZ	p_DECY	p_DECX		
	1050	p_ITL8	p_ITL7	p_ITL6	p_ITL5	p_ITL4	p_ITLZ	p_ITLY	p_ITLX	**H,P**	**H,P**
		p_ON8	p_ON7	p_ON6	p_ON5	p_ON4	p_ONZ	p_ONY	p_ONX		
	1051	p_A8S2	p_A7S2	p_A6S2	p_A5S2	p_A4S2	p_AZS2	p_AYS2	p_AXS2	**H,P**	**H,P**
		p_A8S1	p_A7S1	p_A6S1	p_A5S1	p_A4S1	p_AZS1	p_AYS1	p_AXS1		
	1052	p_RST8	p_RST7	p_RST6	p_RST5	p_RST4	p_RSTZ	p_RSTY	p_RSTX	**H,P**	**H,P**
		p_PAX8	p_PAX7	p_PAX6	p_PAX5	p_PAX4	p_PAXZ	p_PAXY	p_PAXX		
	1053	p_HOM8	p_HOM7	p_HOM6	p_HOM5	p_HOM4	p_HOMZ	p_HOMY	p_HOMX	**H,P**	**H,P**
		p_POS8	p_POS7	p_POS6	p_POS5	p_POS4	p_POSZ	p_POSY	p_POSX		
	1055	p_8NLIM	p_7NLIM	p_6NLIM	p_5NLIM	p_4NLIM	p_ZNLIM	p_YNLIM	p_XNLIM	**H,P**	**H,P**
		p_8PLIM	p_7PLIM	p_6PLIM	p_5PLIM	p_4PLIM	p_ZPLIM	p_YPLIM	p_XPLIM		
	1056	p_SN8	p_SN7	p_SN6	p_SN5	p_SN4	p_SNZ	p_SNY	p_SNX	**H,P**	**H,P**
		p_SP8	p_SP7	p_SP6	p_SP5	p_SP4	p_SPZ	p_SPY	p_SPX		
	1057	p_HOV1000	p_HOV100	p_HOV10	p_HOV1	-	p_SOV4	p_SOV2	p_SOV1	**H,P**	**H,P**

Variables No	Modbus TCP Address	Content								Read Acces	Write Acces
		p_ROV4	p_ROV3	p_ROV2	p_ROV1	p_FOV8	p_FOV4	p_FOV2	p_FOV1		
	1058	p_ESP	p_STP	p_STT	P_HOLD	p_ERST	p_RAPID	p_KEY	p_ITL_ALL	**H,P**	**H,P**
		p_DRN	p_BDT	p_MLK	p_SBK	p_OPS	p_MODE4	p_MODE2	p_MODE1		
	1059	p_FIN	p_RTAP	p_SPOSC	p_RWD	p_FWD	p_RESUME	p_SKIP	p_SDIR	**H,P**	**H,P**
		p_SSP	p_SLOW	p_SPOS	p_SAR	p_GRO4	p_GRO3	p_GRO2	p_GRO1		
	1060	p_ALM15	p_ALM14	p_ALM13	p_ALM12	p_ALM11	p_ALM10	p_ALM9	p_ALM8	**H,P**	**H,P**
		p_ALM7	p_ALM6	p_ALM5	p_ALM4	p_ALM3	p_ALM2	p_ALM1	p_ALM0		
	1061	p_ALM31	p_ALM30	p_ALM29	p_ALM28	p_ALM27	p_ALM26	p_ALM25	p_ALM24	**H,P**	**H,P**
		p_ALM23	p_ALM22	p_ALM21	p_ALM20	p_ALM19	p_ALM18	p_ALM17	p_ALM16		
	1062	p_PEND	p_PENU	-	-	-	-	p_SLIM2	p_S2OV4	**H,P**	**H,P**
		p_S2OV2	p_S2OV1	p_SDIR2	p_SSP2	-	p_MSIM	p_MPGRUN	p_RAPIDLOCK		
	1063	-	-	-	-	-	-	-	-	**H,P**	**H,P**
		-	p_GON	p_LSP	p_LSC	p_LZNM	p_LSIM	p_LTEST	p_RESRDY		
	1064	-	-	-	-	-	-	-	-	**H,P**	**H,P**
		-	p_PPTR	p_PMRK	p_PRIPC	p_PSSRF	p_PTEST	p_PSIM	p_AHCOFF		
	1092	ml_JN	ml_RAPID	ml_JP	ml_U	ml_A	ml_Z	ml_Y	ml_X	**H,P**	**H,P**
		ml_ROV100	ml_ROV50	ml_ROV25	ml_ROV0	ml_RESET	ml_STOP	ml_START	-		
	1093	-	-	-	-	-	-	-	-	**H,P**	**H,P**
		ml_FN2	ml_FN1	ml_HOME	ml_TOOL	ml_COOL	ml_SCCW	ml_SSTOP	ml_SCW		
	1100	p_TLIMX								**H,P**	**H,P**
	1102	p_TLIMY								**H,P**	**H,P**
	1104	p_TLIMZ								**H,P**	**H,P**
	1106	p_TLIM4								**H,P**	**H,P**
	1108	p_TLIM5								**H,P**	**H,P**
	1110	p_TLIM6								**H,P**	**H,P**
	1112	p_TLIM7								**H,P**	**H,P**
	1114	p_TLIM8								**H,P**	**H,P**
	1116	p_VELX								**H,P**	**H,P**
	1118	p_VELY								**H,P**	**H,P**
	1120	p_VELZ								**H,P**	**H,P**
	1122	p_VEL4								**H,P**	**H,P**
	1124	p_VEL5								**H,P**	**H,P**
	1126	p_VEL6								**H,P**	**H,P**
	1128	p_VEL7								**H,P**	**H,P**
	1130	p_VEL8								**H,P**	**H,P**
	1132	p_TARX								**H,P**	**H,P**
	1134	p_TARY								**H,P**	**H,P**
	1136	p_TARZ								**H,P**	**H,P**
	1138	p_TAR4								**H,P**	**H,P**
	1140	p_TAR5								**H,P**	**H,P**
	1142	p_TAR6								**H,P**	**H,P**
	1144	p_TAR7								**H,P**	**H,P**
	1146	p_TAR8								**H,P**	**H,P**
	1800	int_PLCHoldingReg0									
…	**…**	**…**								**…**	**…**
	1999	int_PLCHoldingReg199									
	2000	dint_PLDR_Handshake_Cmd									
	2002	dint_PLDR_Handshake_Res									
	2004	dint_PLDR_Cmd									
	2006	dint_PLDR_Stat									
	2008	dint_PLDR_Address									
	2010	dint_PLDR_Length									
	2012	dint_PLDR_CRC									
	2014	dint_PLDR_CRC2									
	2020	dint_PLDR_Data									

REAL-TIME STATUS INFORMATION SENT FROM CNC TO HMI				
2000	**4000~4001**	**X axis actual machine coordinate**	**H,G**	**-**
2001	**4002~4003**	**Y axis actual machine coordinate**	**H,G**	**-**
2002	**4004~4005**	**Z axis actual machine coordinate**	**H,G**	**-**
2003	**4006~4007**	**4th axis actual machine coordinate**	**H,G**	**-**
2004	**4008~4009**	**5th axis actual machine coordinate**	**H,G**	**-**
2005	**4010~4011**	**6th axis actual machine coordinate**	**H,G**	**-**
2006	**4012~4013**	**7th axis actual machine coordinate**	**H,G**	**-**

2007	4014~4015	8th axis actual machine coordinate	H,G	-
2010	4020~4021	X axis actual absolute coordinate	H,G	-
2011	4022~4023	Y axis actual absolute coordinate	H,G	-
2012	4024~4025	Z axis actual absolute coordinate	H,G	-
2013	4026~4027	4th axis actual absolute coordinate	H,G	-
2014	4028~4029	5th axis actual absolute coordinate	H,G	-
2015	4030~4031	6th axis actual absolute coordinate	H,G	-
2016	4032~4033	7th axis actual absolute coordinate	H,G	-
2017	4034~4035	8th axis actual absolute coordinate	H,G	-
2020	4040~4041	X axis actual relative coordinate	H,G	-
2021	4042~4043	Y axis actual relative coordinate	H,G	-
2022	4044~4045	Z axis actual relative coordinate	H,G	-
2023	4046~4047	4th axis actual relative coordinate	H,G	-
2024	4048~4049	5th axis actual relative coordinate	H,G	-
2025	4050~4051	6th axis actual relative coordinate	H,G	-
2026	4052~4053	7th axis actual relative coordinate	H,G	-
2027	4054~4055	8th axis actual relative coordinate	H,G	-
2030	4060~4061	X axis actual distance to target	H,G	-
2031	4062~4063	Y axis actual distance to target	H,G	-
2032	4064~4065	Z axis actual distance to target	H,G	-
2033	4066~4067	4th axis actual distance to target	H,G	-
2034	4068~4069	5th axis actual distance to target	H,G	-
2035	4070~4071	6th axis actual distance to target	H,G	-
2036	4072~4073	7th axis actual distance to target	H,G	-
2037	4074~4075	8th axis actual distance to target	H,G	-
2040	4080~4081	Pulses sent to the servo motor on the X axis	H,G	-
2041	4082~4083	Pulses sent to the servo motor on the Y axis	H,G	-
2042	4084~4085	Pulses sent to the servo motor on the Z axis	H,G	-
2043	4086~4087	Pulses sent to the servo motor on the 4th axis	H,G	-
2044	4088~4089	Pulses sent to the servo motor on the 5th axis	H,G	-
2045	4090~4091	Pulses sent to the servo motor on the 6ht axis	H,G	-
2046	4092~4093	Pulses sent to the servo motor on the 7th axis	H,G	-
2047	4094~4095	Pulses sent to the servo motor on the 8th axis	H,G	-
2050	4100~4101	X axis actual encoder value	H,G	-
2051	4102~4103	Y axis actual encoder value	H,G	-
2052	4104~4105	Z axis actual encoder value	H,G	-
2053	4106~4107	4th axis actual encoder value	H,G	-
2054	4108~4109	5th axis actual encoder value	H,G	-
2055	4110~4111	6th axis actual encoder value	H,G	-
2056	4112~4113	7th axis actual encoder value	H,G	-
2057	4114~4115	8th axis actual encoder value	H,G	-
2060	4120~4121	X axis actual position deviation	H,G	-
2061	4122~4123	Y axis actual position deviation	H,G	-
2062	4124~4125	Z axis actual position deviation	H,G	-
2063	4126~4127	4th axis actual position deviation	H,G	-
2064	4128~4129	5th axis actual position deviation	H,G	-
2065	4130~4131	6th axis actual position deviation	H,G	-
2066	4132~4133	7th axis actual position deviation	H,G	-
2067	4134~4135	8th axis actual position deviation	H,G	-
2070	4140~4141	X axis reference operation completed	H,G	-
2071	4142~4143	Y axis reference operation completed	H,G	-
2072	4144~4145	Z axis reference operation completed	H,G	-
2073	4146~4147	4th axis reference operation completed	H,G	-
2074	4148~4149	5th axis reference operation completed	H,G	-
2075	4150~4151	6th axis reference operation completed	H,G	-
2076	4152~4153	7th axis reference operation completed	H,G	-
2077	4154~4155	8th axis reference operation completed	H,G	-
2090	4180~4181	X axis slot number	H,G	-
2091	4182~4183	Y axis slot number	H,G	-
2092	4184~4185	Z axis slot number	H,G	-
2093	4186~4187	4th axis slot number	H,G	-
2094	4188~4189	5th axis slot number	H,G	-
2095	4190~4191	6th axis slot number	H,G	-
2096	4192~4193	7th axis slot number	H,G	-

2097	4194~4195	8th axis slot number	H,G	-
2100	4200~4201	X axis servo ready	H,G	-
2101	4202~4203	Y axis servo ready	H,G	-
2102	4204~4205	Z axis servo ready	H,G	-
2103	4206~4207	4th axis servo ready	H,G	-
2104	4208~4209	5th axis servo ready	H,G	-
2105	4210~4211	6th axis servo ready	H,G	-
2106	4212~4213	7th axis servo ready	H,G	-
2107	4214~4215	8th axis servo ready	H,G	-
2110	4220~4221	X axis SERVO-ON status	H,G	-
2111	4222~4223	Y axis SERVO-ON status	H,G	-
2112	4224~4225	Z axis SERVO-ON status	H,G	-
2113	4226~4227	4th axis SERVO-ON status	H,G	-
2114	4228~4229	5th axis SERVO-ON status	H,G	-
2115	4230~4231	6th axis SERVO-ON status	H,G	-
2116	4232~4233	7th axis SERVO-ON status	H,G	-
2117	4234~4235	8th axis SERVO-ON status	H,G	-
2120	4240~4241	X axis in position value	H,G	-
2121	4242~4243	Y axis in position value	H,G	-
2122	4244~4245	Z axis in position value	H,G	-
2123	4246~4247	4th axis in position value	H,G	-
2124	4248~4249	5th axis in position value	H,G	-
2125	4250~4251	6th axis in position value	H,G	-
2126	4252~4253	7th axis in position value	H,G	-
2127	4254~4255	8th axis in position value	H,G	-
2200	4400~4401	Last given cutting feed command	H,G	-
2201	4402~4403	Cutting feed rate ratio	H,G	-
2202	4404~4405	Scaled actual cutting feed ratio	H,G	-
2203	4406~4407	Real cutting feed rate	H,G	-
2205	4410~4411	Actual cutting feed rate in JOG mode	H,G	-
2210	4420~4421	Last given spindle1 speed command	H,G	-
2211	4422~4423	Spindle1 speed ratio	H,G	-
2212	4424~4425	Actual spindle1 speed	H,G	-
2213	4426~4427	Actual real spindle1 speed (Encoder)	H,G	
2214	4428~4429	Spindle1 encoder count value	H,G	
2215	4430~4431	Last given spindle2 speed command	H,G	-
2216	4432~4433	Spindle2 speed ratio	H,G	-
2217	4434~4435	Ratioed spindle2 speed	H,G	-
2219	4438~4439	Actual spindle1 angle	H,G	-
2220	4440~4441	Last given tool number command	H,G	-
2221	4442~4443	Number of parts produced	H,G	-
2222	4444~4445	G-code program cycle time - Seconds	H,G	-
2223	4446~4447	G-code program cycle time - Minutes	H,G	-
2224	4448~4449	G-code program cycle time - Hours	H,G	-
2225	4450~4451	Actual rapid feed rate ratio	H,G	-
2226	4452~4453	Actual M.P.G. step ratio	H,G	-
2227	4454~4455	Actual system operating mode	H,G	-
2228	4456~4457	Emergency stop status	H,G	-
2229	4458~4459	Actual system status (Ready/Not ready)	H,G	-
2230	4460~4461	Last selected G-code program number (Oxxxx)	H,G	-
2231	4462~4463	Last processed line number (Nxxxx)	H,G	-
2233	4466~4467	Remaining part count before alarm	H,G	H
2234	4468~4469	Working time – Seconds	H,G	-
2235	4470~4471	Working time – Minutes	H,G	-
2236	4472~4473	Working time – Hours	H,G	-
2237	4474~4475	Actual system running status	H,G	-
2238	4476~4477	Total system uptime seconds	H,G	-
2239	4478~4479	Total running time in seconds	H,G	-
2240	4480~4481	Total cuting time in seconds	H,G	-
2241	4482~4483	Total alarm time in seconds	H,G	-
2242	4484~4485	Total piercing count for laser/plasma cutters	H,G	-
2245	4490~4491	Index number of the currently processed line	H,G	-

2246	4492~4493	Index number of the stopped line	H,G	-
2247	4494~4495	Current value of tool life counter	H,G	-
2250	4500~4501	Last executed G-code for Group 0	H,G	-
2251	4502~4503	Last executed G-code for Group 1	H,G	-
2252	4504~4505	Last executed G-code for Group 2	H,G	-
2253	4506~4507	Last executed G-code for Group 3	H,G	-
2254	4508~4509	Last executed G-code for Group 4	H,G	-
2255	4510~4511	Last executed G-code for Group 5	H,G	-
2256	4512~4513	Last executed G-code for Group 6	H,G	-
2257	4514~4515	Last executed G-code for Group 7	H,G	-
2258	4516~4517	Last executed G-code for Group 8	H,G	-
2259	4518~4519	Last executed G-code for Group 9	H,G	-
2260	4520~4521	Last executed G-code for Group 10	H,G	-
2261	4522~4523	Last executed G-code for Group 11	H,G	-
2262	4524~4525	Last executed G-code for Group 12	H,G	-
2263	4526~4527	Last executed G-code for Group 13	H,G	-
2264	4528~4529	Last executed G-code for Group 14	H,G	-
2265	4530~4531	Last executed G-code for Group 15	H,G	-
2266	4532~4533	Last executed G-code for Group 16	H,G	-
2267	4534~4535	Last executed G-code for Group 17	H,G	-
2268	4536~4537	Last executed G-code for Group 18	H,G	-
2269	4538~4539	Last executed G-code for Group 19	H,G	-
2270	4540~4541	Last executed M-code	H,G	-
2271	4542~4543	Last executed D-code	H,G	-
2272	4544~4545	Last executed H-code	H,G	-
2280	4560~4561	Selected work offset index	H,G	-
2281	4562~4563	Selected work offset value for X axis	H,G	-
2282	4564~4565	Selected work offset value for Y axis	H,G	-
2283	4566~4567	Selected work offset value for Z axis	H,G	-
2284	4568~4569	Selected work offset value for 4th axis	H,G	-
2285	4570~4571	Selected work offset value for 5th axis	H,G	-
2286	4572~4573	Selected work offset value for 6th axis	H,G	-
2287	4574~4575	Selected work offset value for 7th axis	H,G	-
2288	4576~4577	Selected work offset value for 8th axis	H,G	-
2300	4600~4601	File size of the selected program	H,G	-
2301	4602~4603	File size of Subprogram 1	H,G	-
2302	4604~4605	File size of Subprogram 2	H,G	-
2303	4606~4607	File size of Subprogram 3	H,G	-
2310	4620~4621	X minimum position of the selected program (mac)	H,G	-
2311	4622~4623	Y minimum position of the selected program (mac)	H,G	-
2312	4624~4625	Z minimum position of the selected program (mac)	H,G	-
2313	4626~4627	4th minimum position of the selected program (mac)	H,G	-
2314	4628~4629	5th minimum position of the selected program (mac)	H,G	-
2315	4630~4631	6th minimum position of the selected program (mac)	H,G	-
2316	4632~4633	7th minimum position of the selected program (mac)	H,G	-
2317	4634~4635	8th minimum position of the selected program (mac)	H,G	-
2320	4640~4641	X maximum position of the selected program (mac)	H,G	-
2321	4642~4643	Y maximum position of the selected program (mac)	H,G	-
2322	4644~4645	Z maximum position of the selected program (mac)	H,G	-
2323	4646~4647	4th maximum position of the selected program (mac)	H,G	-
2324	4648~4649	5th maximum position of the selected program (mac)	H,G	-
2325	4650~4651	6th maximum position of the selected program (mac)	H,G	-
2326	4652~4653	7th maximum position of the selected program (mac)	H,G	-
2327	4654~4655	8th maximum position of the selected program (mac)	H,G	-
2330	4660~4661	Amount of movement of X axis in the selected program	H,G	-
2331	4662~4663	Amount of movement of Y axis in the selected program	H,G	-
2332	4664~4665	Amount of movement of Z axis in the selected program	H,G	-
2333	4666~4667	Amount of movement of 4th axis in the selected program	H,G	-
2334	4668~4669	Amount of movement of 5th axis in the selected program	H,G	-
2335	4670~4671	Amount of movement of 6th axis in the selected program	H,G	-
2336	4672~4673	Amount of movement of 7th axis in the selected program	H,G	-
2337	4674~4675	Amount of movement of 8th axis in the selected program	H,G	-
2350	4700~4701	Laser sensor value	H,G	-
2351	4702~4703	Laser sensor position	H,G	-
2352	4704~4705	Laser current focus target	H,G	-
2353	4706~4707	Laser current height target	H,G	-

2354	4708~4709	Laser actual pressure	H,G	-
2355	4710~4711	Laser current pressure target	H,G	-
2356	4712~4713	Laser actual pressure analog value	H,G	-
2357	4714~4715	Laser current pressure target analog value	H,G	-
2358	4716~4717	Laser actual power	H,G	-
2359	4718~4719	Laser current power target	H,G	-
2360	4720~4721	Laser actual power analog value	H,G	-
2361	4722~4723	Laser current power target analog value	H,G	-
2362	4724~4725	Laser current duty target	H,G	-
2363	4726~4727	Laser current duty target analog value	H,G	-
2364	4728~4729	Laser current frequency target	H,G	-
2365	4730~4731	Laser head control status	H,G	-
2370	4740~4741	Actual cutting number (Laser)	H,G	-
2371	4742~4743	Actual part number (Laser)	H,G	-
2390	4780~4781	Plasma actual analog input value	H,G	-
2391	4782~4783	AHC actual calculated arc voltage (Plasma)	H,G	-
2400	4800~4801	Main loop execution time of the CNC system (microseconds)	H,G	-
2401	4802~4803	Maximum main loop execution time of the CNC system (microseconds)	H,G	-
2404	4808~4809	CNC RT loop interrupt time (microseconds)	H,G	-
2405	4810~4811	Measured maximum real-time cutting time (microseconds)	H,G	-
2406	4812~4813	Time spent in real-time interrupt (microseconds)	H,G	-
2407	4814~4815	Maximum time spent in real-time interrupt (microseconds)	H,G	-
2408	4816~4817	RTEX interrupt execution time (microseconds)	H,G	-
2409	4818~4819	Measured maximum RTEX communication interrupt time (microseconds)	H,G	-
2410	4820~4821	Servo communication time (microseconds)	H,G	-
2411	4822~4823	Measured maximum time for servo communication (microseconds)	H,G	-
2412	4824~4825	PLC cycle time (microseconds)	H,G	-
2413	4826~4827	Measured maximum PLC cycle time (microseconds)	H,G	-
2414	4828~4829	PLC operating status	H,G	-
2415	4830~4831	PLC error code	H,G	-
2418	4832~4833	SD Card maximum block read time (microseconds)	H,G	-
2419	4834~4835	SD Card maximum block write time (microseconds)	H,G	-
2500	5000~5001	Display a pop-up on the screen for file operations	H,G	-
2501	5002~5003	Popup bar value (0-100)	H,G	-
2510	5020~5021	Software version of the cnc kernel(major)	H,G	-
2511	5022~5023	Software version of the cnc kernel (minor)	H,G	-
2512	5024~5025	Software version of the laser/plasma module	H,G	-
2513	5026~5027	Software add-ons	H,G	-
2550	5100~5131	Last comment text executed in G-code	H,G	-
TOOL LENGTH OFFSET VALUES				
3400	6800~6801	Length compensation value of tool 1	H,G	H,G
3401	6802~6803	Length compensation value of tool 2	H,G	H,G
3402	6804~6805	Length compensation value of tool 3	H,G	H,G
…	…	…	…	…
3497	6994~6995	Length compensation value of tool 98	H,G	H,G
3498	6996~6997	Length compensation value of tool 99	H,G	H,G
3499	6998~6999	Length compensation value of tool 100	H,G	H,G
TOOL RADIUS OFFSET VALUES				
3500	7000~7001	Radius compensation value of tool 1	H,G	H,G
3501	7002~7003	Radius compensation value of tool 2	H,G	H,G
3502	7004~7005	Radius compensation value of tool 3	H,G	H,G
…	…	…	…	…
3597	7194~7195	Radius compensation value of tool 98	H,G	H,G
3598	7196~7197	Radius compensation value of tool 99	H,G	H,G
3599	7198~7199	Radius compensation value of tool 100	H,G	H,G
TOOL LENGTH WEAR OFFSET VALUES				
3600	7200~7201	Length compensation wear value of tool 1	H,G	H,G
3601	7202~7203	Length compensation wear value of tool 2	H,G	H,G
3602	7204~7205	Length compensation wear value of tool 3	H,G	H,G
…	…	…	…	…
3697	7394~7395	Length compensation wear value of tool 98	H,G	H,G

3698	7396~7397	Length compensation wear value of tool 99	H,G	H,G
3699	7398~7399	Length compensation wear value of tool 100	H,G	H,G
TOOL RADIUS WEAR OFFSET VALUES				
3700	7400~7401	Radius compensation wear value of tool 1	H,G	H,G
3701	7402~7403	Radius compensation wear value of tool 2	H,G	H,G
3702	7404~7405	Radius compensation wear value of tool 3	H,G	H,G
…	…	…	…	…
3797	7594~7595	Radius compensation wear value of tool 98	H,G	H,G
3798	7596~7597	Radius compensation wear value of tool 99	H,G	H,G
3799	7598~7599	Radius compensation wear value of tool 100	H,G	H,G
WORK OFFSETS				
3800	7600~7601	X axis part zero offset value - G54	H,G	H,G
3801	7602~7603	Y axis part zero offset value - G54	H,G	H,G
3802	7604~7605	Z axis part zero offset value - G54	H,G	H,G
3803	7606~7607	4th axis part zero offset value - G54	H,G	H,G
3804	7608~7609	5th axis part zero offset value - G54	H,G	H,G
3805	7610~7611	6th axis part zero offset value - G54	H,G	H,G
3806	7612~7613	7th axis part zero offset value - G54	H,G	H,G
3807	7614~7615	8th axis part zero offset value - G54	H,G	H,G
3808	7616~7617	X axis part zero offset value - G55	H,G	H,G
3809	7618~7619	Y axis part zero offset value - G55	H,G	H,G
3810	7620~7621	Z axis part zero offset value - G55	H,G	H,G
3811	7622~7623	4th axis part zero offset value - G55	H,G	H,G
3812	7624~7625	5th axis part zero offset value - G55	H,G	H,G
3813	7626~7627	6th axis part zero offset value - G55	H,G	H,G
3814	7628~7629	7th axis part zero offset value - G55	H,G	H,G
3815	7630~7631	8th axis part zero offset value - G55	H,G	H,G
3816	7632~7633	X axis part zero offset value - G56	H,G	H,G
3817	7634~7635	Y axis part zero offset value - G56	H,G	H,G
3818	7636~7637	Z axis part zero offset value - G56	H,G	H,G
3819	7638~7639	4th axis part zero offset value - G56	H,G	H,G
3820	7640~7641	5th axis part zero offset value - G56	H,G	H,G
3821	7642~7643	6th axis part zero offset value - G56	H,G	H,G
3822	7644~7645	7th axis part zero offset value - G56	H,G	H,G
3823	7646~7647	8th axis part zero offset value - G56	H,G	H,G
3824	7648~7649	X axis part zero offset value - G57	H,G	H,G
3825	7650~7651	Y axis part zero offset value - G57	H,G	H,G
3826	7652~7653	Z axis part zero offset value - G57	H,G	H,G
3827	7654~7655	4th axis part zero offset value - G57	H,G	H,G
3828	7656~7657	5th axis part zero offset value - G57	H,G	H,G
3829	7658~7659	6th axis part zero offset value - G57	H,G	H,G
3830	7660~7661	7th axis part zero offset value - G57	H,G	H,G
3831	7662~7663	8th axis part zero offset value - G57	H,G	H,G
3832	7664~7665	X axis part zero offset value - G58	H,G	H,G
3833	7666~7667	Y axis part zero offset value - G58	H,G	H,G
3834	7668~7669	Z axis part zero offset value - G58	H,G	H,G
3835	7670~7671	4th axis part zero offset value - G58	H,G	H,G
3836	7672~7673	5th axis part zero offset value - G58	H,G	H,G
3837	7674~7675	6th axis part zero offset value - G58	H,G	H,G
3838	7676~7677	7th axis part zero offset value - G58	H,G	H,G
3839	7678~7679	8th axis part zero offset value - G58	H,G	H,G
3840	7680~7681	X axis part zero offset value - G59	H,G	H,G
3841	7682~7683	Y axis part zero offset value - G59	H,G	H,G
3842	7684~7685	Z axis part zero offset value - G59	H,G	H,G
3843	7686~7687	4th axis part zero offset value - G59	H,G	H,G
3844	7688~7689	5th axis part zero offset value - G59	H,G	H,G
3845	7690~7691	6th axis part zero offset value - G59	H,G	H,G
3846	7692~7693	7th axis part zero offset value - G59	H,G	H,G
3847	7694~7695	8th axis part zero offset value - G59	H,G	H,G
3848	7696~7697	X axis part zero offset value - G59.1	H,G	H,G
3849	7698~7699	Y axis part zero offset value - G59.1	H,G	H,G
3850	7700~7701	Z axis part zero offset value - G59.1	H,G	H,G
3851	7702~7703	4th axis part zero offset value - G59.1	H,G	H,G

3852	7704~7705	5th axis part zero offset value - G59.1	H,G	H,G
3853	7706~7707	6th axis part zero offset value - G59.1	H,G	H,G
3854	7708~7709	7th axis part zero offset value - G59.1	H,G	H,G
3855	7710~7711	8th axis part zero offset value - G59.1	H,G	H,G
3856	7712~7713	X axis part zero offset value - G59.2	H,G	H,G
3857	7714~7715	Y axis part zero offset value - G59.2	H,G	H,G
3858	7716~7717	Z axis part zero offset value - G59.2	H,G	H,G
3859	7718~7719	4th axis part zero offset value - G59.2	H,G	H,G
3860	7720~7721	5th axis part zero offset value - G59.2	H,G	H,G
3861	7722~7723	6th axis part zero offset value - G59.2	H,G	H,G
3862	7724~7725	7th axis part zero offset value - G59.2	H,G	H,G
3863	7726~7727	8th axis part zero offset value - G59.2	H,G	H,G
3864	7728~7729	X axis part zero offset value - G59.3	H,G	H,G
3865	7730~7731	Y axis part zero offset value - G59.3	H,G	H,G
3866	7732~7733	Z axis part zero offset value - G59.3	H,G	H,G
3867	7734~7735	4th axis part zero offset value - G59.3	H,G	H,G
3868	7736~7737	5th axis part zero offset value - G59.3	H,G	H,G
3869	7738~7739	6th axis part zero offset value - G59.3	H,G	H,G
3870	7740~7741	7th axis part zero offset value - G59.3	H,G	H,G
3871	7742~7743	8th axis part zero offset value - G59.3	H,G	H,G
3872	7744~7745	X axis part zero offset value - G59.4	H,G	H,G
3873	7746~7747	Y axis part zero offset value - G59.4	H,G	H,G
3874	7748~7749	Z axis part zero offset value - G59.4	H,G	H,G
3875	7750~7751	4th axis part zero offset value - G59.4	H,G	H,G
3876	7752~7753	5th axis part zero offset value - G59.4	H,G	H,G
3877	7754~7755	6th axis part zero offset value - G59.4	H,G	H,G
3878	7756~7757	7th axis part zero offset value - G59.4	H,G	H,G
3879	7758~7759	8th axis part zero offset value - G59.4	H,G	H,G
3880	7760~7761	X axis part zero offset value – G92	H,G	H,G
3881	7762~7763	Y axis part zero offset value – G92	H,G	H,G
3882	7764~7765	Z axis part zero offset value – G92	H,G	H,G
3883	7766~7767	4th axis part zero offset value – G92	H,G	H,G
3884	7768~7769	5th axis part zero offset value – G92	H,G	H,G
3885	7770~7771	6th axis part zero offset value – G92	H,G	H,G
3886	7772~7773	7th axis part zero offset value – G92	H,G	H,G
3887	7774~7775	8th axis part zero offset value – G92	H,G	H,G
3900	7800~7801	Part dimension X value	H,G	H,G
3901	7802~7803	Part dimension Y value	H,G	H,G
3902	7804~7805	Part dimension Z value	H,G	H,G
3910	7820~7821	Manual JOG movement speed	H,G	H,G
3911	7822~7823	X axis manual step distance	H,G	H,G
3912	7824~7825	Y axis manual step distance	H,G	H,G
3913	7826~7827	Z axis manual step distance	H,G	H,G
3914	7828~7829	4th axis manual step distance	H,G	H,G
3915	7830~7831	5th axis manual step distance	H,G	H,G
3916	7832~7833	6th axis manual step distance	H,G	H,G
3917	7834~7835	7th axis manual step distance	H,G	H,G
3918	7836~7837	8th axis manual step distance	H,G	H,G
3919	7838~7839	Temporary live offset	H,G	H,G
3920	7840~7841	X axis manual step speed	H,G	H,G
3921	7842~7843	Y axis manual step speed	H,G	H,G
3922	7844~7845	Z axis manual step speed	H,G	H,G
3923	7846~7847	4th axis manual step speed	H,G	H,G
3924	7848~7849	5th axis manual step speed	H,G	H,G
3925	7850~7851	6th axis manual step speed	H,G	H,G
3926	7852~7853	7th axis manual step speed	H,G	H,G
3927	7854~7855	8th axis manual step speed	H,G	H,G
EXTENDED GENERAL PURPOSE HOLDING USER VARIABLES				
4000	8000~8001	Extended general-purpose holding user variable 0	H,G	H,G
4001	8002~8003	Extended general-purpose holding user variable 1	H,G	H,G
4002	8004~8005	Extended general-purpose holding user variable 2	H,G	H,G
…	…	…	…	…
4997	9994~9995	Extended general-purpose holding user variable 997	H,G	H,G
4998	9996~9997	Extended general-purpose holding user variable 998	H,G	H,G

4999	9998~9999	Extended general-purpose holding user variable 999	H,G	H,G
G CODE LIST AND LIBRARY CONTENT / MDI INPUT BOX / HMI OPERATIONS				
6000	12000~12001	User function command variable	H	H
6001	12002~12003	User function helper variable	H	H
6002	12004~12005	N number to which the cursor will be moved	H	H
6003	12006~12007	O number to which the cursor will be moved	H	H
6010	12020~12051	MDI data input box (max. 64 characters)	H	H
6100	12200~12201	Line count of the selected program	H	-
6101	12202~12203	Cursor position in the selected program	H	-
6102	12204~12205	Current page number in the selected program	H	-
6103	12206~12207	Cursor position within the page of the selected program	H	-
6104	12208~12209	Refresh request for selected program content	H	-
6110	12220~12251	The 1st displayed line of the selected program (max. 64 characters)	H	-
6126	12252~12283	The 2nd displayed line of the selected program (max. 64 characters)	H	-
6142	12284~12315	The 3rd displayed line of the selected program (max. 64 characters)	H	-
6158	12316~12347	The 4th displayed line of the selected program (max. 64 characters)	H	-
6174	12348~12379	The 5th displayed line of the selected program (max. 64 characters)	H	-
6190	12380~12411	The 6th displayed line of the selected program (max. 64 characters)	H	-
6206	12412~12443	The 7th displayed line of the selected program (max. 64 characters)	H	-
6222	12444~12475	The 8th displayed line of the selected program (max. 64 characters)	H	-
6238	12476~12507	The 9th displayed line of the selected program (max. 64 characters)	H	-
6254	12508~12539	The 10th displayed line of the selected program (max. 64 characters)	H	-
6270	12540~12571	The 11th displayed line of the selected program (max. 64 characters)	H	-
6286	12572~12603	The 12th displayed line of the selected program (max. 64 characters)	H	-
6302	12604~12635	The 13th displayed line of the selected program (max. 64 characters)	H	-
6318	12636~12667	The 14th displayed line of the selected program (max. 64 characters)	H	-
6334	12668~12699	The 15th displayed line of the selected program (max. 64 characters)	H	-
6350	12700~12731	The 16th displayed line of the selected program (max. 64 characters)	H	-
6366	12732~12763	The 17th displayed line of the selected program (max. 64 characters)	H	-
6382	12764~12795	The 18th displayed line of the selected program (max. 64 characters)	H	-
6398	12796~12827	The 19th displayed line of the selected program (max. 64 characters)	H	-
6414	12828~12859	The 20th displayed line of the selected program (max. 64 characters)	H	-
6430	12860~12861	Line count of the comment list	H	-
6431	12862~12863	Cursor position in the commment	H	-
6432	12864~12865	Page number of the displayed area	H	-
6433	12866~12867	Cursor position of the displayed area	H	-
6434	12868~12869	Refresh request for selected program content	H	-
6440	12880~12911	The 1st displayed line of the comment list(max. 64 characters)	H	-
6456	12912~12943	The 2nd displayed line of the comment list(max. 64 characters)	H	-
6472	12944~12975	The 3rd displayed line of the comment list(max. 64 characters)	H	-
6488	12976~12307	The 4th displayed line of the comment list(max. 64 characters)	H	-
6504	13008~13039	The 5th displayed line of the comment list(max. 64 characters)	H	-
6520	13040~13071	The 6th displayed line of the comment list(max. 64 characters)	H	-
6536	13072~13103	The 7th displayed line of the comment list(max. 64 characters)	H	-
6552	13104~13135	The 8th displayed line of the comment list(max. 64 characters)	H	-
6568	13136~13167	The 9th displayed line of the comment list(max. 64 characters)	H	-
6584	13168~13199	The 10th displayed line of the comment list(max. 64 characters)	H	-
6600	13200~13201	Item count of the program library	H	-
6601	13202~13203	Cursor position in the library	H	-
6602	13204~13205	Page number displayed in the library	H	-
6603	13206~13207	Cursor position on the displayed page	H	-
6604	13208~13209	Refresh request for the library content	H	-
6610	13220~13251	The 1st displayed line of the library content (max. 64 characters)	H	-
6626	13252~13283	The 2nd displayed line of the library content (max. 64 characters)	H	-
6642	13284~13315	The 3rd displayed line of the library content (max. 64 characters)	H	-
6658	13316~13347	The 4th displayed line of the library content (max. 64 characters)	H	-
6674	13348~13379	The 5th displayed line of the library content (max. 64 characters)	H	-
6690	13380~13411	The 6th displayed line of the library content (max. 64 characters)	H	-
6706	13412~13443	The 7th displayed line of the library content (max. 64 characters)	H	-
6722	13444~13475	The 8h displayed line of the library content (max. 64 characters)	H	-
6738	13476~13507	The 9th displayed line of the library content (max. 64 characters)	H	-
6754	13508~13539	The 10th displayed line of the library content (max. 64 characters)	H	-
6770	13540~13571	The 11th displayed line of the library content (max. 64 characters)	H	-
6786	13572~13603	The 12th displayed line of the library content (max. 64 characters)	H	-
6802	13604~13635	The 13th displayed line of the library content (max. 64 characters)	H	-
6818	13636~13667	The 14th displayed line of the library content (max. 64 characters)	H	-
6834	13668~13699	The 15th displayed line of the library content (max. 64 characters)	H	-

6850	13700~13731	The 16th displayed line of the library content (max. 64 characters)	H	-
6866	13732~13763	The 17th displayed line of the library content (max. 64 characters)	H	-
6882	13764~13795	The 18th displayed line of the library content (max. 64 characters)	H	-
6898	13796~13827	The 19th displayed line of the library content (max. 64 characters)	H	-
6914	13828~13859	The 20th displayed line of the library content (max. 64 characters)	H	-
6965	13930~13961	Name of the selected program (max 64 characters)	H	-
6981	13962~13993	Name of the file to be downloaded from the FTP host	H	H
PARAMETERS				
7000	14000~14001	G code to be used to call subprogram no 9010.cnc	H,G	H
7001	14002~14003	G code to be used to call subprogram no 9011.cnc	H,G	H
7002	14004~14005	G code to be used to call subprogram no 9012.cnc	H,G	H
7003	14006~14007	G code to be used to call subprogram no 9013.cnc	H,G	H
7004	14008~14009	G code to be used to call subprogram no 9014.cnc	H,G	H
7005	14010~14011	G code to be used to call subprogram no 9015.cnc	H,G	H
7006	14012~14013	G code to be used to call subprogram no 9016.cnc	H,G	H
7007	14014~14015	G code to be used to call subprogram no 9017.cnc	H,G	H
7008	14016~14017	G code to be used to call subprogram no 9018.cnc	H,G	H
7009	14018~14019	G code to be used to call subprogram no 9019.cnc	H,G	H
7010	14020~14021	M code to be used to call subprogram no 9020.cnc	H,G	H
7011	14022~14023	M code to be used to call subprogram no 9021.cnc	H,G	H
7012	14024~14025	M code to be used to call subprogram no 9022.cnc	H,G	H
7013	14026~14027	M code to be used to call subprogram no 9023.cnc	H,G	H
7014	14028~14029	M code to be used to call subprogram no 9024.cnc	H,G	H
7015	14030~14031	M code to be used to call subprogram no 9025.cnc	H,G	H
7016	14032~14033	M code to be used to call subprogram no 9026.cnc	H,G	H
7017	14034~14035	M code to be used to call subprogram no 9027.cnc	H,G	H
7018	14036~14037	M code to be used to call subprogram no 9028.cnc	H,G	H
7019	14038~14039	M code to be used to call subprogram no 9029.cnc	H,G	H
7024	14048~14049	Position numerator value of X axis	H,G	H
7025	14050~14051	Position numerator value of Y axis	H,G	H
7026	14052~14053	Position numerator value of Z axis	H,G	H
7027	14054~14055	Position numerator value of 4th axis	H,G	H
7028	14056~14057	Position numerator value of 5th axis	H,G	H
7029	14058~14059	Position numerator value of 6th axis	H,G	H
7030	14060~14061	Position numerator value of 7th axis	H,G	H
7031	14062~14063	Position numerator value of 8th axis	H,G	H
7032	14064~14065	Position denominator value of X axis	H,G	H
7033	14066~14067	Position denominator value of Y axis	H,G	H
7034	14068~14069	Position denominator value of Z axis	H,G	H
7035	14070~14071	Position denominator value of 4th axis	H,G	H
7036	14072~14073	Position denominator value of 5th axis	H,G	H
7037	14074~14075	Position denominator value of 6th axis	H,G	H
7038	14076~14077	Position denominator value of 7th axis	H,G	H
7039	14078~14079	Position denominator value of 8th axis	H,G	H
7040	14080~14081	Number of encoder pulses per revolution of X axis	H,G	H
7041	14082~14083	Number of encoder pulses per revolution of Y axis	H,G	H
7042	14084~14085	Number of encoder pulses per revolution of Z axis	H,G	H
7043	14086~14087	Number of encoder pulses per revolution of 4th axis	H,G	H
7044	14088~14089	Number of encoder pulses per revolution of 5th axis	H,G	H
7045	14090~14091	Number of encoder pulses per revolution of 6th axis	H,G	H
7046	14092~14093	Number of encoder pulses per revolution of 7th axis	H,G	H
7047	14094~14095	Number of encoder pulses per revolution of 8th axis	H,G	H
7048	14096~14097	Allowed maximum rapid speed of X axis(Automatic mode)	H,G	H
7049	14098~14099	Allowed maximum rapid speed of Y axis(Automatic mode)	H,G	H
7050	14100~14101	Allowed maximum rapid speed of Z axis(Automatic mode)	H,G	H
7051	14102~14103	Allowed maximum rapid speed of 4th axis(Automatic mode)	H,G	H
7052	14104~14105	Allowed maximum rapid speed of 5th axis(Automatic mode)	H,G	H
7053	14106~14107	Allowed maximum rapid speed of 6th axis(Automatic mode)	H,G	H
7054	14108~14109	Allowed maximum rapid speed of 7th axis(Automatic mode)	H,G	H
7055	14110~14111	Allowed maximum rapid speed of 8th axis(Automatic mode)	H,G	H
7056	14112~14113	Allowed maximum rapid speed of X axis(JOG mode)	H,G	H
7057	14114~14115	Allowed maximum rapid speed of Y axis(JOG mode)	H,G	H

7058	14116~14117	Allowed maximum rapid speed of Z axis(JOG mode)	H,G	H
7059	14118~14119	Allowed maximum rapid speed of 4th axis(JOG mode)	H,G	H
7060	14120~14121	Allowed maximum rapid speed of 5th axis(JOG mode)	H,G	H
7061	14122~14123	Allowed maximum rapid speed of 6th axis(JOG mode)	H,G	H
7062	14124~14125	Allowed maximum rapid speed of 7th axis(JOG mode)	H,G	H
7063	14126~14127	Allowed maximum rapid speed of 8th axis(JOG mode)	H,G	H
7064	14128~14129	Maximum allowed jerk value of X axis	H,G	H
7065	14130~14131	Maximum allowed jerk value of Y axis	H,G	H
7066	14132~14133	Maximum allowed jerk value of Z axis	H,G	H
7067	14134~14135	Maximum allowed jerk value of 4th axis	H,G	H
7068	14136~14137	Maximum allowed jerk value of 5th axis	H,G	H
7069	14138~14139	Maximum allowed jerk value of 6th axis	H,G	H
7070	14140~14141	Maximum allowed jerk value of 7th axis	H,G	H
7071	14142~14143	Maximum allowed jerk value of 8th axis	H,G	H
7072	14144~14145	Maximum acceleration/deceleration value of X axis	H,G	H
7073	14146~14147	Maximum acceleration/deceleration value of Y axis	H,G	H
7074	14148~14149	Maximum acceleration/deceleration value of Z axis	H,G	H
7075	14150~14151	Maximum acceleration/deceleration value of 4th axis	H,G	H
7076	14152~14153	Maximum acceleration/deceleration value of 5th axis	H,G	H
7077	14154~14155	Maximum acceleration/deceleration value of 6th axis	H,G	H
7078	14156~14157	Maximum acceleration/deceleration value of 7th axis	H,G	H
7079	14158~14159	Maximum acceleration/deceleration value of 8th axis	H,G	H
7080	14160~14161	Positive software limit of X axis	H,G	H
7081	14162~14163	Positive software limit of Y axis	H,G	H
7082	14164~14165	Positive software limit of Z axis	H,G	H
7083	14166~14167	Positive software limit of 4th axis	H,G	H
7084	14168~14169	Positive software limit of 5th axis	H,G	H
7085	14170~14171	Positive software limit of 6th axis	H,G	H
7086	14172~14173	Positive software limit of 7th axis	H,G	H
7087	14174~14175	Positive software limit of 8th axis	H,G	H
7088	14176~14177	Negative software limit of X axis	H,G	H
7089	14178~14179	Negative software limit of Y axis	H,G	H
7090	14180~14181	Negative software limit of Z axis	H,G	H
7091	14182~14183	Negative software limit of 4th axis	H,G	H
7092	14184~14185	Negative software limit of 5th axis	H,G	H
7093	14186~14187	Negative software limit of 6th axis	H,G	H
7094	14188~14189	Negative software limit of 7th axis	H,G	H
7095	14190~14191	Negative software limit of 8th axis	H,G	H
7096	14192~14193	Backlash compensation value of X axis	H,G	H
7097	14194~14195	Backlash compensation value of Y axis	H,G	H
7098	14196~14197	Backlash compensation value of Z axis	H,G	H
7099	14198~14199	Backlash compensation value of 4th axis	H,G	H
7100	14200~14201	Backlash compensation value of 5th axis	H,G	H
7101	14202~14203	Backlash compensation value of 6th axis	H,G	H
7102	14204~14205	Backlash compensation value of 7th axis	H,G	H
7103	14206~14207	Backlash compensation value of 8th axis	H,G	H
7104	14208~14209	Junction deviation value of X axis	H,G	H
7105	14210~14211	Junction deviation value of Y axis	H,G	H
7106	14212~14213	Junction deviation value of Z axis	H,G	H
7107	14214~14215	Junction deviation value of 4th axis	H,G	H
7108	14216~14217	Junction deviation value of 5th axis	H,G	H
7109	14218~14219	Junction deviation value of 6th axis	H,G	H
7110	14220~14221	Junction deviation value of 7th axis	H,G	H
7111	14222~14223	Junction deviation value of 8th axis	H,G	H
7112	14224~14225	In-position value of X axis	H,G	H
7113	14226~14227	In-position value of Y axis	H,G	H
7114	14228~14229	In-position value of Z axis	H,G	H
7115	14230~14231	In-position value of 4th axis	H,G	H
7116	14232~14233	In-position value of 5th axis	H,G	H
7117	14234~14235	In-position value of 6th axis	H,G	H
7118	14236~14237	In-position value of 7th axis	H,G	H
7119	14238~14239	In-position value of 8th axis	H,G	H
7120	14240~14241	Allowed maximum position deviation of X axis	H,G	H
7121	14242~14243	Allowed maximum position deviation of Y axis	H,G	H

7122	14244~14245	Allowed maximum position deviation of Z axis	H,G	H
7123	14246~14247	Allowed maximum position deviation of 4th axis	H,G	H
7124	14248~14249	Allowed maximum position deviation of 5th axis	H,G	H
7125	14250~14251	Allowed maximum position deviation of 6th axis	H,G	H
7126	14252~14253	Allowed maximum position deviation of 7th axis	H,G	H
7127	14254~14255	Allowed maximum position deviation of 8th axis	H,G	H
7128	14256~14257	First homing direction of X axis	H,G	H
7129	14258~14259	First homing direction of Y axis	H,G	H
7130	14260~14261	First homing direction of Z axis	H,G	H
7131	14262~14263	First homing direction of 4th axis	H,G	H
7132	14264~14265	First homing direction of 5th axis	H,G	H
7133	14266~14267	First homing direction of 6th axis	H,G	H
7134	14268~14269	First homing direction of 7th axis	H,G	H
7135	14270~14271	First homing direction of 8th axis	H,G	H
7136	14272~14273	Second homing direction of X axis	H,G	H
7137	14274~14275	Second homing direction of Y axis	H,G	H
7138	14276~14277	Second homing direction of Z axis	H,G	H
7139	14278~14279	Second homing direction of 4th axis	H,G	H
7140	14280~14281	Second homing direction of 5th axis	H,G	H
7141	14282~14283	Second homing direction of 6th axis	H,G	H
7142	14284~14285	Second homing direction of 7th axis	H,G	H
7143	14286~14287	Second homing direction of 8th axis	H,G	H
7144	14288~14289	First homing speed of X axis	H,G	H
7145	14290~14291	First homing speed of Y axis	H,G	H
7146	14292~14293	First homing speed of Z axis	H,G	H
7147	14294~14295	First homing speed of 4th axis	H,G	H
7148	14296~14297	First homing speed of 5th axis	H,G	H
7149	14298~14299	First homing speed of 6th axis	H,G	H
7150	14300~14301	First homing speed of 7th axis	H,G	H
7151	14302~14303	First homing speed of 8th axis	H,G	H
7152	14304~14305	Second homing speed of X axis	H,G	H
7153	14306~14307	Second homing speed of Y axis	H,G	H
7154	14308~14309	Second homing speed of Z axis	H,G	H
7155	14310~14311	Second homing speed of 4th axis	H,G	H
7156	14312~14313	Second homing speed of 5th axis	H,G	H
7157	14314~14315	Second homing speed of 6th axis	H,G	H
7158	14316~14317	Second homing speed of 7th axis	H,G	H
7159	14318~14319	Second homing speed of 8th axis	H,G	H
7160	14320~14321	Home position shift value of X axis	H,G	H
7161	14322~14323	Home position shift value of Y axis	H,G	H
7162	14324~14325	Home position shift value of Z axis	H,G	H
7163	14326~14327	Home position shift value of 4th axis	H,G	H
7164	14328~14329	Home position shift value of 5th axis	H,G	H
7165	14330~14331	Home position shift value of 6th axis	H,G	H
7166	14332~14333	Home position shift value of 7th axis	H,G	H
7167	14334~14335	Home position shift value of 8th axis	H,G	H
7168	14336~14337	Second home position of X axis	H,G	H
7169	14338~14339	Second home position of Y axis	H,G	H
7170	14340~14341	Second home position of Z axis	H,G	H
7171	14342~14343	Second home position of 4th axis	H,G	H
7172	14344~14345	Second home position of 5th axis	H,G	H
7173	14346~14347	Second home position of 6th axis	H,G	H
7174	14348~14349	Second home position of 7th axis	H,G	H
7175	14350~14351	Second home position of 8th axis	H,G	H
7176	14352~14353	Third home position of X axis	H,G	H
7177	14354~14355	Third home position of Y axis	H,G	H
7178	14356~14357	Third home position of Z axis	H,G	H
7179	14358~14359	Third home position of 4th axis	H,G	H
7180	14360~14361	Third home position of 5th axis	H,G	H
7181	14362~14363	Third home position of 6th axis	H,G	H
7182	14364~14365	Third home position of 7th axis	H,G	H
7183	14366~14367	Third home position of 8th axis	H,G	H
7184	14368~14369	Fourth home position of X axis	H,G	H
7185	14370~14371	Fourth home position of Y axis	H,G	H

7186	14372~14373	Fourth home position of Z axis	H,G	H
7187	14374~14375	Fourth home position of 4th axis	H,G	H
7188	14376~14377	Fourth home position of 5th axis	H,G	H
7189	14378~14379	Fourth home position of 6th axis	H,G	H
7190	14380~14381	Fourth home position of 7th axis	H,G	H
7191	14382~14383	Fourth home position of 8th axis	H,G	H
7192	14384~14385	Reference position source selection of X axis	H,G	H
7193	14386~14387	Reference position source selection of Y axis	H,G	H
7194	14388~14389	Reference position source selection of Z axis	H,G	H
7195	14390~14391	Reference position source selection of 4th axis	H,G	H
7196	14392~14393	Reference position source selection of 5th axis	H,G	H
7197	14394~14395	Reference position source selection of 6th axis	H,G	H
7198	14396~14397	Reference position source selection of 7th axis	H,G	H
7199	14398~14399	Reference position source selection of 8th axis	H,G	H
7200	14400~14401	Maximum acceleration/deceleration value during cutting of X axis(Feed rate)	H,G	H
7201	14402~14403	Maximum acceleration/deceleration value during cutting of Y axis(Feed rate)	H,G	H
7202	14404~14405	Maximum acceleration/deceleration value during cutting of Z axis(Feed rate)	H,G	H
7203	14406~14407	Maximum acceleration/deceleration value during cutting of 4th axis(Feed rate)	H,G	H
7204	14408~14409	Maximum acceleration/deceleration value during cutting of 5th axis(Feed rate)	H,G	H
7205	14410~14411	Maximum acceleration/deceleration value during cutting of 6th axis(Feed rate)	H,G	H
7206	14412~14413	Maximum acceleration/deceleration value during cutting of 7th axis(Feed rate)	H,G	H
7207	14414~14415	Maximum acceleration/deceleration value during cutting of 8th axis(Feed rate)	H,G	H
7208	14416~14417	Position numerator value of X axis encoder	H,G	H
7209	14418~14419	Position numerator value of Y axis encoder	H,G	H
7210	14420~14421	Position numerator value of Z axis encoder	H,G	H
7211	14422~14423	Position numerator value of 4th axis encoder	H,G	H
7212	14424~14425	Position numerator value of 5th axis encoder	H,G	H
7213	14426~14427	Position numerator value of 6th axis encoder	H,G	H
7214	14428~14429	Position numerator value of 7th axis encoder	H,G	H
7215	14430~14431	Position numerator value of 8th axis encoder	H,G	H
7216	14432~14433	Position denominator value of X axis encoder	H,G	H
7217	14434~14435	Position denominator value of Y axis encoder	H,G	H
7218	14436~14437	Position denominator value of Z axis encoder	H,G	H
7219	14438~14439	Position denominator value of 4th axis encoder	H,G	H
7220	14440~14441	Position denominator value of 5th axis encoder	H,G	H
7221	14442~14443	Position denominator value of 6th axis encoder	H,G	H
7222	14444~14445	Position denominator value of 7th axis encoder	H,G	H
7223	14446~14447	Position denominator value of 8th axis encoder	H,G	H
7224	14448~14449	2nd positive software limit of X axis	H,G	H
7225	14450~14451	2nd positive software limit of Y axis	H,G	H
7226	14452~14453	2nd positive software limit of Z axis	H,G	H
7227	14454~14455	2nd positive software limit of 4th axis	H,G	H
7228	14456~14457	2nd positive software limit of 5th axis	H,G	H
7229	14458~14459	2nd positive software limit of 6th axis	H,G	H
7230	14460~14461	2nd positive software limit of 7th axis	H,G	H
7231	14462~14463	2nd positive software limit of 8th axis	H,G	H
7232	14464~14465	2nd negative software limit of X axis	H,G	H
7233	14466~14467	2nd negative software limit of Y axis	H,G	H
7234	14468~14469	2nd negative software limit of Z axis	H,G	H
7235	14470~14471	2nd negative software limit of 4th axis	H,G	H
7236	14472~14473	2nd negative software limit of 5th axis	H,G	H
7237	14474~14475	2nd negative software limit of 6th axis	H,G	H
7238	14476~14477	2nd negative software limit of 7th axis	H,G	H
7239	1478~14479	2nd negative software limit of 8th axis	H,G	H
7300	14600~14601	Cutting speed initial value	H,G	H
7301	14602~14603	Maximum allowable cutting speed in automatic mode	H,G	H
7302	14604~14605	Jog mode cutting speed	H,G	H
7303	14606~14607	Rapid speed at 0% selection	H,G	H
7304	14608~14609	Inhibit jog moves before homing	H,G	H
7305	14610~14611	Acceleration/Deceleration type	H,G	H
7306	14612~14613	Allowed chordal tolerance for arc moves	H,G	H
7307	14614~14615	Minimum segment length for arc moves	H,G	H
			H,G	H
7310	14620~14621	Alowed junction acceleration value	H,G	H
7311	14622~14623	M.P.G. mode acceleration/deceleration value	H,G	H

7312	14624~14625	G73 retract distance	H,G	H
7313	14626~14627	G83 rapid distance from the last position	H,G	H
7314	14628~14629	G76/G87 retract axis and direction selection (MILL)	H,G	H
7315	14630~14631	Dwell before retraction for G74/G84 (ms	H,G	H
			H,G	H
7317	14634~14635	M06 command calls subprogram O9001.cnc	H,G	H
7318	14636~14637	Hide O9xxx.cnc programs in the library	H,G	H
7319	14638~14639	Edit lock for O9xxx.cnc programs	H,G	H
7320	14640~14641	Selection of the plane where tool compensation will be applied	H,G	H
7321	14642~14643	In-Position check	H,G	H
7322	14644~14645	SAR (Spindle speed arrived) signal check	H,G	H
7324	14648~14649	Enable open CNC mode	H,G	H
7325	14650~14651	Subprogram number for open CNC mode	H,G	H
7326	14652~14653	Selection of the plane for tool life counter	H,G	H
7327	14654~14655	Tool life counter alarm distance	H,G	H
7328	14656~14657	MSTB functions completed signal control delay	H,G	H
7330	14660~14661	Parameters unit selection	H,G	H
7331	14662~14663	Move the program cursor to the beginning when the ESP or reset button is pressed	H,G	H
7332	14664~14665	Selection of 0.1 step for rapid override	H,G	H
7333	14666~14667	Delete all other G-codes when a new G-code is loaded via FTP	H,G	H
7334	14668~14669	Automatically clear limit alarms when axes are within limits	H,G	H
7335	14670~14671	G52 Offset mode	H,G	H
7336	14672~14673	Drilling unit offset activation	H,G	H
7337	14674~14675	Stored stroke check mode	H,G	H
7338	14676~14677	Step speed source selection	H,G	H
7340	14680~14681	Initial speed of spindle 1	H,G	H
7341	14682~14683	Analog output polarity of spindle 1	H,G	H
7342	14684~14685	Minimum analog output value of spindle 1	H,G	H
7343	14686~14687	Maximum analog output value of spindle 1	H,G	H
7344	14688~14689	Analog output offset value of spindle 1	H,G	H
7345	14690~14691	Maximum spindle 1 speed for gear 1	H,G	H
7346	14692~14693	Minimum spindle 1 speed for gear 2	H,G	H
7347	14694~14695	Maximum spindle 1 speed for gear 2	H,G	H
7348	14696~14697	Minimum spindle 1 speed for gear 3	H,G	H
7349	14698~14699	Maximum spindle 1 speed for gear 3	H,G	H
7350	14700~14701	Minimum spindle 1 speed for gear 4	H,G	H
7351	14702~14703	Maximum spindle 1 speed for gear 4	H,G	H
7352	14704~14705	Acceleration/Deceleration time of spindle 1	H,G	H
7353	14706~14707	1Gear change mode of spindle 1	H,G	H
7354	14708~14709	Gear change speed of spindle 1 (SLOW)	H,G	H
7355	14710~14711	Orientation speed of spindle 1 (SOR)	H,G	H
7356	14712~14713	Orientation gain of spindle 1 (SOR)	H,G	H
7357	14714~14715	Orientation Z phase search direction of Spindle 1 (SOR)	H,G	H
7358	14716~14717	Orientation position shift value of spindle 1 (SOR)	H,G	H
7359	14718~14719	Orientation completed range of spindle 1 (SOR)	H,G	H
7360	14720~14721	Number of encoder pulses per revolution of spindle 1	H,G	H
7361	14722~14723	Encoder numerator value of spindle 1	H,G	H
7362	14724~14725	Encoder denominator value of spindle 1	H,G	H
7370	14740~14741	Initial speed of spindle 2	H,G	H
7371	14742~14743	Analog output polarity of spindle 2	H,G	H
7372	14744~14745	Minimum analog output value of spindle 2	H,G	H
7373	14746~14747	Maximum analog output value of spindle 2	H,G	H
7374	14748~14749	Analog output offset value of spindle 2	H,G	H
7375	14750~14751	Maximum spindle 2 speed	H,G	H
7382	14764~14765	Acceleration/Deceleration time of spindle 2	H,G	H
7400	14800~14801	Resume function	H,G	H
7402	14804~14805	Resume function pause mode selection	H,G	H
7403	14806~14807	Resume function spindle CW M code	H,G	H
7404	14808~14809	Resume function spindle CCW M code	H,G	H
7405	14810~14811	Resume function spindle STOP M code	H,G	H
7410	14820~14821	G00.1 (Ping Pong) arc distance	H,G	H
7411	14822~14823	G00.1 (Ping Pong) retract distance before rapid motion	H,G	H

7412	14824~14825	G00.1 (Ping Pong) chord length of arc motion	H,G	H
7413	14826~14827	G00.1 (Ping Pong) safe position (machine value)	H,G	H
7415	14830~14831	Enable automatic pen up/down control	H,G	H
7416	14832~14833	Cutting knife plane selection	H,G	H
7417	14834~14835	Cutting knife continuous cutting angle	H,G	H
7420	14840~14841	Graphics plane selection for HMIs	H,G	H
7421	14842~14843	X axis maximum stroke for HMI graphics	H,G	H
7422	14844~14845	X axis minimum stroke for HMI graphics	H,G	H
7423	14846~14847	Y axis maximum stroke for HMI graphics	H,G	H
7424	14848~14849	Y axis minimum stroke for HMI graphics	H,G	H
7425	14850~14851	Z axis maximum stroke for HMI graphics	H,G	H
7426	14852~14853	Z axis minimum stroke for HMI graphics	H,G	H
7430	14860~14861	Diameter programming for lathe machines	H,G	H
SYSTEM PARAMETERS				
7500	15000~15001	Name of X axis	H,G	H
7501	15002~15003	Name of Y axis	H,G	H
7502	15004~15005	Name of Z axis	H,G	H
7503	15006~15007	Name of 4th axis	H,G	H
7504	15008~15009	Name of 5th axis	H,G	H
7505	15010~15011	Name of 6th axis	H,G	H
7506	15012~15013	Name of 7th axis	H,G	H
7507	15014~15015	Name of 8th axis	H,G	H
7508	15016~15017	Driver ID of X axis	H,G	H
7509	15018~15019	Driver ID of Y axis	H,G	H
7510	15020~15021	Driver ID of Z axis	H,G	H
7511	15022~15023	Driver ID of 4th axis	H,G	H
7512	15024~15025	Driver ID of 5th axis	H,G	H
7513	15026~15027	Driver ID of 6th axis	H,G	H
7514	15028~15029	Driver ID of 7th axis	H,G	H
7515	15030~15031	Driver ID of 8th axis	H,G	H
7516	15032~15033	RS485 port baud rate	H,G	H
7517	15034~15035	RS485 port bit length	H,G	H
7518	15036~15037	RS485 port parity and stop bits	H,G	H
7519	15038~15039	RS485 port mode	H,G	H
7520	15040~15041	Delay time to recover servo communication after ESP released	H,G	H
7521	15042~15043	CAN BUS port mode	H,G	H
7522	15044~15045	Directly read the SKIP signal from the input	H,G	H
7523	15046~15047	Directly copy the spindle analog value to the analog output	H,G	H
7524	15048~15049	Absolute encoder selection for X axis	H,G	H
7525	15050~15051	Absolute encoder selection for Y axis	H,G	H
7526	15052~15053	Absolute encoder selection for Z axis	H,G	H
7527	15054~15055	Absolute encoder selection for 4th axis	H,G	H
7528	15056~15057	Absolute encoder selection for 5th axis	H,G	H
7529	15058~15059	Absolute encoder selection for 6th axis	H,G	H
7530	15060~15061	Absolute encoder selection for 7th axis	H,G	H
7531	15062~15063	Absolute encoder selection for 8th axis	H,G	H
7532	15064~15065	Enable external IO module 1	H,G	H
7533	15066~15067	Enable external IO module 2	H,G	H
7534	15068~15069	Enable external IO module 3	H,G	H
7535	15070~15071	Enable external IO module 4	H,G	H
7536	15072~15073	Enable external IO module 5	H,G	H
7537	15074~15075	Enable external IO module 6	H,G	H
7538	15076~15077	Enable external IO module 7	H,G	H
7539	15078~15079	Enable external IO module 8	H,G	H
7540	15080~15081	Enable external IO module 9	H,G	H
7541	15082~15083	Enable external IO module 10	H,G	H
7550	15100~15101	Machine type selection	H,G	H
7556	15112~15113	Read DEC(deceleration) signal from input directly for X axis	H,G	H
7557	15114~15115	Read DEC(deceleration) signal from input directly for Y axis	H,G	H
7558	15116~15117	Read DEC(deceleration) signal from input directly for Z axis	H,G	H
7559	15118~15119	Read DEC(deceleration) signal from input directly for 4th axis	H,G	H
7560	15120~15121	Read DEC(deceleration) signal from input directly for 5th axis	H,G	H
7561	15122~15123	Read DEC(deceleration) signal from input directly for 6th axis	H,G	H
7562	15124~15125	Read DEC(deceleration) signal from input directly for 7th axis	H,G	H

7563	15126~15127	Read DEC(deceleration) signal from input directly for 8th axis	H,G	H
7564	15128~15129	Disable the 'servo not ready' alarm for X axis	H,G	H
7565	15130~15131	Disable the 'servo not ready' alarm for Y axis	H,G	H
7566	15132~15133	Disable the 'servo not ready' alarm for Z axis	H,G	H
7567	15134~15135	Disable the 'servo not ready' alarm for 4th axis	H,G	H
7568	15136~15137	Disable the 'servo not ready' alarm for 5th axis	H,G	H
7569	15138~15139	Disable the 'servo not ready' alarm for 6th axis	H,G	H
7570	15140~15141	Disable the 'servo not ready' alarm for 7th axis	H,G	H
7571	15142~15143	Disable the 'servo not ready' alarm for 8th axis	H,G	H
7580	15160~15161	Delay before 'servo not ready' alarm (ms)	H,G	H
7581	15162~15163	Modbus TCP communication timeout (ms)	H,G	H
7582	15164~15165	Ethernet port IP address byte 3	H,G	H
7583	15166~15167	Ethernet port IP address byte 2	H,G	H
7584	15168~15169	Ethernet port IP address byte 1	H,G	H
7585	15170~15171	Ethernet port IP address byte 0	H,G	H
7586	15172~15173	Ethernet port subnet mask byte 3	H,G	H
7587	15174~15175	Ethernet port subnet mask byte 2	H,G	H
7588	15176~15177	Ethernet port subnet mask byte 1	H,G	H
7589	15178~15179	Ethernet port subnet mask byte 0	H,G	H
7590	15180~15181	Ethernet port default gateway byte 3	H,G	H
7591	15182~15183	Ethernet port default gateway byte 2	H,G	H
7592	15184~15185	Ethernet port default gateway byte 1	H,G	H
7593	15186~15187	Ethernet port default gateway byte 0	H,G	H
7594	15188~15189	FTP host IP address byte 3	H,G	H
7595	15190~15191	FTP host IP address byte 2	H,G	H
7596	15192~15193	FTP host IP address byte 1	H,G	H
7597	15194~15195	FTP host IP address byte 0	H,G	H
7600	15200~15201	Kinematics Type	H,G	H
7601	15202~15203	Kinematics Parameter 1	H,G	H
7602	15204~15205	Kinematics Parameter 2	H,G	H
7603	15206~15207	Kinematics Parameter 3	H,G	H
7604	15208~15209	Kinematics Parameter 4	H,G	H
7605	15210~15211	Kinematics Parameter 5	H,G	H
7606	15212~15213	Kinematics Parameter 6	H,G	H
7607	15214~15215	Kinematics Parameter 7	H,G	H
7608	15216~15217	Kinematics Parameter 8	H,G	H
7609	15218~15219	Kinematics Parameter 9	H,G	H
7610	15220~15221	Kinematics Parameter 10	H,G	H
7611	15222~15223	Kinematics Parameter 11	H,G	H
7612	15224~15225	Kinematics Parameter 12	H,G	H
7613	15226~15227	Kinematics Parameter 13	H,G	H
7614	15228~15229	Kinematics Parameter 14	H,G	H
7615	15230~15231	Kinematics Parameter 15	H,G	H
7616	15232~15233	Kinematics Parameter 16	H,G	H
7617	15234~15235	Kinematics Parameter 17	H,G	H
7618	15236~15237	Kinematics Parameter 18	H,G	H
7619	15238~15239	Kinematics Parameter 19	H,G	H
7620	15240~15241	Kinematics Parameter 20	H,G	H
7621	15242~15243	Kinematics Parameter 21	H,G	H
7622	15244~15245	Kinematics Parameter 22	H,G	H
7623	15246~15247	Kinematics Parameter 23	H,G	H
7624	15248~15249	Kinematics Parameter 24	H,G	H
7625	15250~15251	Kinematics Parameter 25	H,G	H
7626	15252~15253	Kinematics Parameter 26	H,G	H
7627	15254~15255	Kinematics Parameter 27	H,G	H
7628	15256~15257	Kinematics Parameter 28	H,G	H
7629	15258~15259	Kinematics Parameter 29	H,G	H
7630	15260~15261	Kinematics Parameter 30	H,G	H
7631	15262~15263	Kinematics Parameter 31	H,G	H
7632	15264~15265	Kinematics Parameter 32	H,G	H
7633	15266~15267	Kinematics Parameter 33	H,G	H
7634	15268~15269	Kinematics Parameter 34	H,G	H
7635	15270~15271	Kinematics Parameter 35	H,G	H
7636	15272~15273	Kinematics Parameter 36	H,G	H
7637	15274~15275	Kinematics Parameter 37	H,G	H
7638	15276~15277	Kinematics Parameter 38	H,G	H
7639	15278~15279	Kinematics Parameter 39	H,G	H
7640	15280~15281	Kinematics Parameter 40	H,G	H
7641	15282~15283	Kinematics Parameter 41	H,G	H

7642	15284~15285	Kinematics Parameter 42	H,G	H
7643	15286~15287	Kinematics Parameter 43	H,G	H
7644	15288~15289	Kinematics Parameter 44	H,G	H
7645	15290~15291	Kinematics Parameter 45	H,G	H
7646	15292~15293	Kinematics Parameter 46	H,G	H
7647	15294~15295	Kinematics Parameter 47	H,G	H
7648	15296~15297	Kinematics Parameter 48	H,G	H
7649	15298~15299	Kinematics Parameter 49	H,G	H
7700	15400~15401	Name of the servo driver of X axis (char. 0-3) (EtherCAT)	H,G	H
7701	15402~15403	Name of the servo driver of X axis (char. 4-7) (EtherCAT)	H,G	H
7702	15404~15405	Name of the servo driver of X axis (char. 8-11) (EtherCAT)	H,G	H
7703	15406~15407	Name of the servo driver of X axis (char. 12-15) (EtherCAT)	H,G	H
7704	15408~15409	Name of the servo driver of X axis (char. 16-19) (EtherCAT)	H,G	H
7705	15410~15411	Name of the servo driver of X axis (char. 20-23) (EtherCAT)	H,G	H
7706	15412~15413	Name of the servo driver of X axis (char. 24-27) (EtherCAT)	H,G	H
7707	15414~15415	Name of the servo driver of X axis (char. 28-31) (EtherCAT)	H,G	H
7708	15416~15417	Name of the servo driver of X axis (char. 32-35) (EtherCAT)	H,G	H
7709	15418~15419	Name of the servo driver of X axis (char. 36-39) (EtherCAT)	H,G	H
7710	15420~15421	Name of the servo driver of Y axis (char. 0-3) (EtherCAT)	H,G	H
7711	15422~15423	Name of the servo driver of Y axis (char. 4-7) (EtherCAT)	H,G	H
7712	15424~15425	Name of the servo driver of Y axis (char. 8-11) (EtherCAT)	H,G	H
7713	15426~15427	Name of the servo driver of Y axis (char. 12-15) (EtherCAT)	H,G	H
7714	15428~15429	Name of the servo driver of Y axis (char. 16-19) (EtherCAT)	H,G	H
7715	15430~15431	Name of the servo driver of Y axis (char. 20-23) (EtherCAT)	H,G	H
7716	15432~15433	Name of the servo driver of Y axis (char. 24-27) (EtherCAT)	H,G	H
7717	15434~15435	Name of the servo driver of Y axis (char. 28-31) (EtherCAT)	H,G	H
7718	15436~15437	Name of the servo driver of Y axis (char. 32-35) (EtherCAT)	H,G	H
7719	15438~15439	Name of the servo driver of Y axis (char. 36-39) (EtherCAT)	H,G	H
7720	15440~15441	Name of the servo driver of Z axis (char. 0-3) (EtherCAT)	H,G	H
7721	15442~15443	Name of the servo driver of Z axis (char. 4-7) (EtherCAT)	H,G	H
7722	15444~15445	Name of the servo driver of Z axis (char. 8-11) (EtherCAT)	H,G	H
7723	15446~15447	Name of the servo driver of Z axis (char. 12-15) (EtherCAT)	H,G	H
7724	15448~15449	Name of the servo driver of Z axis (char. 16-19) (EtherCAT)	H,G	H
7725	15450~15451	Name of the servo driver of Z axis (char. 20-23) (EtherCAT)	H,G	H
7726	15452~15453	Name of the servo driver of Z axis (char. 24-27) (EtherCAT)	H,G	H
7727	15454~15455	Name of the servo driver of Z axis (char. 28-31) (EtherCAT)	H,G	H
7728	15456~15457	Name of the servo driver of Z axis (char. 32-35) (EtherCAT)	H,G	H
7729	15458~15459	Name of the servo driver of Z axis (char. 36-39) (EtherCAT)	H,G	H
7730	15460~15461	Name of the servo driver of 4th axis (char. 0-3) (EtherCAT)	H,G	H
7731	15462~15463	Name of the servo driver of 4th axis (char. 4-7) (EtherCAT)	H,G	H
7732	15464~15465	Name of the servo driver of 4th axis (char. 8-11) (EtherCAT)	H,G	H
7733	15466~15467	Name of the servo driver of 4th axis (char. 12-15) (EtherCAT)	H,G	H
7734	15468~15469	Name of the servo driver of 4th axis (char. 16-19) (EtherCAT)	H,G	H
7735	15470~15471	Name of the servo driver of 4th axis (char. 20-23) (EtherCAT)	H,G	H
7736	15472~15473	Name of the servo driver of 4th axis (char. 24-27) (EtherCAT)	H,G	H
7737	15474~15475	Name of the servo driver of 4th axis (char. 28-31) (EtherCAT)	H,G	H
7738	15476~15477	Name of the servo driver of 4th axis (char. 32-35) (EtherCAT)	H,G	H
7739	15478~15479	Name of the servo driver of 4th axis (char. 36-39) (EtherCAT)	H,G	H
7740	15480~15481	Name of the servo driver of 5th axis (char. 0-3) (EtherCAT)	H,G	H
7741	15482~15483	Name of the servo driver of 5th axis (char. 4-7) (EtherCAT)	H,G	H
7742	15484~15485	Name of the servo driver of 5th axis (char. 8-11) (EtherCAT)	H,G	H
7743	15486~15487	Name of the servo driver of 5th axis (char. 12-15) (EtherCAT)	H,G	H
7744	15488~15489	Name of the servo driver of 5th axis (char. 16-19) (EtherCAT)	H,G	H
7745	15490~15491	Name of the servo driver of 5th axis (char. 20-23) (EtherCAT)	H,G	H
7746	15492~15493	Name of the servo driver of 5th axis (char. 24-27) (EtherCAT)	H,G	H
7747	15494~15495	Name of the servo driver of 5th axis (char. 28-31) (EtherCAT)	H,G	H
7748	15496~15497	Name of the servo driver of 5th axis (char. 32-35) (EtherCAT)	H,G	H
7749	15498~15499	Name of the servo driver of 5th axis (char. 36-39) (EtherCAT)	H,G	H
7750	15500~15501	Name of the servo driver of 6th axis (char. 0-3) (EtherCAT)	H,G	H
7751	15502~15503	Name of the servo driver of 6th axis (char. 4-7) (EtherCAT)	H,G	H
7752	15504~15505	Name of the servo driver of 6th axis (char. 8-11) (EtherCAT)	H,G	H
7753	15506~15507	Name of the servo driver of 6th axis (char. 12-15) (EtherCAT)	H,G	H
7754	15508~15509	Name of the servo driver of 6th axis (char. 16-19) (EtherCAT)	H,G	H
7755	15510~15511	Name of the servo driver of 6th axis (char. 20-23) (EtherCAT)	H,G	H
7756	15512~15513	Name of the servo driver of 6th axis (char. 24-27) (EtherCAT)	H,G	H
7757	15514~15515	Name of the servo driver of 6th axis (char. 28-31) (EtherCAT)	H,G	H
7758	15516~15517	Name of the servo driver of 6th axis (char. 32-35) (EtherCAT)	H,G	H
7759	15518~15519	Name of the servo driver of 6th axis (char. 36-39) (EtherCAT)	H,G	H
7760	15520~15521	Name of the servo driver of 7th axis (char. 0-3) (EtherCAT)	H,G	H
7761	15522~15523	Name of the servo driver of 7th axis (char. 4-7) (EtherCAT)	H,G	H
7762	15524~15525	Name of the servo driver of 7th axis (char. 8-11) (EtherCAT)	H,G	H

7763	15526~15527	Name of the servo driver of 7th axis (char. 12-15) (EtherCAT)	H,G	H
7764	15528~15529	Name of the servo driver of 7th axis (char. 16-19) (EtherCAT)	H,G	H
7765	15530~15531	Name of the servo driver of 7th axis (char. 20-23) (EtherCAT)	H,G	H
7766	15532~15533	Name of the servo driver of 7th axis (char. 24-27) (EtherCAT)	H,G	H
7767	15534~15535	Name of the servo driver of 7th axis (char. 28-31) (EtherCAT)	H,G	H
7768	15536~15537	Name of the servo driver of 7th axis (char. 32-35) (EtherCAT)	H,G	H
7769	15538~15539	Name of the servo driver of 7th axis (char. 36-39) (EtherCAT)	H,G	H
7770	15540~15541	Name of the servo driver of 8th axis (char. 0-3) (EtherCAT)	H,G	H
7771	15542~15543	Name of the servo driver of 8th axis (char. 4-7) (EtherCAT)	H,G	H
7772	15544~15545	Name of the servo driver of 8th axis (char. 8-11) (EtherCAT)	H,G	H
7773	15546~15547	Name of the servo driver of 8th axis (char. 12-15) (EtherCAT)	H,G	H
7774	15548~15549	Name of the servo driver of 8th axis (char. 16-19) (EtherCAT)	H,G	H
7775	15550~15551	Name of the servo driver of 8th axis (char. 20-23) (EtherCAT)	H,G	H
7776	15552~15553	Name of the servo driver of 8th axis (char. 24-27) (EtherCAT)	H,G	H
7777	15554~15555	Name of the servo driver of 8th axis (char. 28-31) (EtherCAT)	H,G	H
7778	15556~15557	Name of the servo driver of 8th axis (char. 32-35) (EtherCAT)	H,G	H
7779	15558~15559	Name of the servo driver of 8th axis (char. 36-39) (EtherCAT)	H,G	H
7780	15560~15561	RXPDO assignment address of X axis (EtherCAT)	H,G	H
7781	15562~15563	RXPDO assignment address of Y axis (EtherCAT)	H,G	H
7782	15564~15565	RXPDO assignment address of Z axis (EtherCAT)	H,G	H
7783	15566~15567	RXPDO assignment address of 4th axis (EtherCAT)	H,G	H
7784	15568~15569	RXPDO assignment address of 5th axis (EtherCAT)	H,G	H
7785	15570~15571	RXPDO assignment address of 6th axis (EtherCAT)	H,G	H
7786	15572~15573	RXPDO assignment address of 7th axis (EtherCAT)	H,G	H
7787	15574~15575	RXPDO assignment address of 8th axis (EtherCAT)	H,G	H
7788	15576~15577	TXPDO assignment address of X axis (EtherCAT)	H,G	H
7789	15578~15579	TXPDO assignment address of Y axis (EtherCAT)	H,G	H
7790	15580~15581	TXPDO assignment address of Z axis (EtherCAT)	H,G	H
7791	15582~15583	TXPDO assignment address of 4th axis (EtherCAT)	H,G	H
7792	15584~15585	TXPDO assignment address of 5th axis (EtherCAT)	H,G	H
7793	15586~15587	TXPDO assignment address of 6th axis (EtherCAT)	H,G	H
7794	15588~15589	TXPDO assignment address of 7th axis (EtherCAT)	H,G	H
7795	15590~15591	TXPDO assignment address of 8th axis (EtherCAT)	H,G	H
7796	15592~15593	RXPDO address of X axis (EtherCAT)	H,G	H
7797	15594~15595	RXPDO address of Y axis (EtherCAT)	H,G	H
7798	15596~15597	RXPDO address of Z axis (EtherCAT)	H,G	H
7799	15598~15599	RXPDO address of 4th axis (EtherCAT)	H,G	H
7800	15600~15601	RXPDO address of 5th axis (EtherCAT)	H,G	H
7801	15602~15603	RXPDO address of 6th axis (EtherCAT)	H,G	H
7802	15604~15605	RXPDO address of 7th axis (EtherCAT)	H,G	H
7803	15606~15607	RXPDO address of 8th axis (EtherCAT)	H,G	H
7804	15608~15609	TXPDO address of X axis (EtherCAT)	H,G	H
7805	15610~15611	TXPDO address of Y axis (EtherCAT)	H,G	H
7806	15612~15613	TXPDO address of Z axis (EtherCAT)	H,G	H
7807	15614~15615	TXPDO address of 4th axis (EtherCAT)	H,G	H
7808	15616~15617	TXPDO address of 5th axis (EtherCAT)	H,G	H
7809	15618~15619	TXPDO address of 6th axis (EtherCAT)	H,G	H
7810	15620~15621	TXPDO address of 7th axis (EtherCAT)	H,G	H
7811	15622~15623	TXPDO address of 8th axis (EtherCAT)	H,G	H
7812	15624~15625	Control word address and data type of X axis (EtherCAT)	H,G	H
7813	15626~15627	Control word address and data type of Y axis (EtherCAT)	H,G	H
7814	15628~15629	Control word address and data type of Z axis (EtherCAT)	H,G	H
7815	15630~15631	Control word address and data type of 4th axis (EtherCAT)	H,G	H
7816	15632~15633	Control word address and data type of 5th axis (EtherCAT)	H,G	H
7817	15634~15635	Control word address and data type of 6th axis (EtherCAT)	H,G	H
7818	15636~15637	Control word address and data type of 7th axis (EtherCAT)	H,G	H
7819	15638~15639	Control word address and data type of 8th axis (EtherCAT)	H,G	H
7820	15640~15641	Mode of operation address and data type of X axis (EtherCAT)	H,G	H
7821	15642~15643	Mode of operation address and data type of Y axis (EtherCAT)	H,G	H
7822	15644~15645	Mode of operation address and data type of Z axis (EtherCAT)	H,G	H
7823	15646~15647	Mode of operation address and data type of 4th axis (EtherCAT)	H,G	H
7824	15648~15649	Mode of operation address and data type of 5th axis (EtherCAT)	H,G	H
7825	15650~15651	Mode of operation address and data type of 6th axis (EtherCAT)	H,G	H
7826	15652~15653	Mode of operation address and data type of 7th axis (EtherCAT)	H,G	H
7827	15654~15655	Mode of operation address and data type of 8th axis (EtherCAT)	H,G	H

7828	15656~15657	Target position address and data type of X axis (EtherCAT)	H,G	H
7829	15658~15659	Target position address and data type of Y axis (EtherCAT)	H,G	H
7830	15660~15661	Target position address and data type of Z axis (EtherCAT)	H,G	H
7831	15662~15663	Target position address and data type of 4th axis (EtherCAT)	H,G	H
7832	15664~15665	Target position address and data type of 5th axis (EtherCAT)	H,G	H
7833	15666~15667	Target position address and data type of 6th axis (EtherCAT)	H,G	H
7834	15668~15669	Target position address and data type of 7th axis (EtherCAT)	H,G	H
7835	15670~15671	Target position address and data type of 8th axis (EtherCAT)	H,G	H
7836	15672~15673	Target velocity address and data type of X axis (EtherCAT)	H,G	H
7837	15674~15675	Target velocity address and data type of Y axis (EtherCAT)	H,G	H
7838	15676~15677	Target velocity address and data type of Z axis (EtherCAT)	H,G	H
7839	15678~15679	Target velocity address and data type of 4th axis (EtherCAT)	H,G	H
7840	15680~15681	Target velocity address and data type of 5th axis (EtherCAT)	H,G	H
7841	15682~15683	Target velocity address and data type of 6th axis (EtherCAT)	H,G	H
7842	15684~15685	Target velocity address and data type of 7th axis (EtherCAT)	H,G	H
7843	15686~15687	Target velocity address and data type of 8th axis (EtherCAT)	H,G	H
7844	15688~15689	Maximum torque address and data type of X axis (EtherCAT)	H,G	H
7845	15690~15691	Maximum torque address and data type of Y axis (EtherCAT)	H,G	H
7846	15692~15693	Maximum torque address and data type of Z axis (EtherCAT)	H,G	H
7847	15694~15695	Maximum torque address and data type of 4th axis (EtherCAT)	H,G	H
7848	15696~15697	Maximum torque address and data type of 5t axis (EtherCAT)	H,G	H
7849	15698~15699	Maximum torque address and data type of 6th axis (EtherCAT)	H,G	H
7850	15700~15701	Maximum torque address and data type of 7th axis (EtherCAT)	H,G	H
7851	15702~15703	Maximum torque address and data type of 8th axis (EtherCAT)	H,G	H
7852	15704~15705	Touch probe control address and data type of X axis (EtherCAT)	H,G	H
7853	15706~15707	Touch probe control address and data type of Y axis (EtherCAT)	H,G	H
7854	15708~15709	Touch probe control address and data type of Z axis (EtherCAT)	H,G	H
7855	15710~15711	Touch probe control address and data type of 4th axis (EtherCAT)	H,G	H
7856	15712~15713	Touch probe control address and data type of 5th axis (EtherCAT)	H,G	H
7857	15714~15715	Touch probe control address and data type of 6th axis (EtherCAT)	H,G	H
7858	15716~15717	Touch probe control address and data type of 7th axis (EtherCAT)	H,G	H
7859	15718~15719	Touch probe control address and data type of 8th axis (EtherCAT)	H,G	H
7860	15720~15721	Status word address and data type of X axis (EtherCAT)	H,G	H
7861	15722~15723	Status word address and data type of Y axis (EtherCAT)	H,G	H
7862	15724~15725	Status word address and data type of Z axis (EtherCAT)	H,G	H
7863	15726~15727	Status word address and data type of 4th axis (EtherCAT)	H,G	H
7864	15728~15729	Status word address and data type of 5th axis (EtherCAT)	H,G	H
7865	15730~15731	Status word address and data type of 6th axis (EtherCAT)	H,G	H
7866	15732~15733	Status word address and data type of 7th axis (EtherCAT)	H,G	H
7867	15734~15735	Status word address and data type of 8th axis (EtherCAT)	H,G	H
7868	15736~15737	1 Mode of operation display address and data type of X axis (EtherCAT)	H,G	H
7869	15738~15739	1 Mode of operation display address and data type of Y axis (EtherCAT)	H,G	H
7870	15740~15741	1 Mode of operation display address and data type of Z axis (EtherCAT)	H,G	H
7871	15742~15743	1 Mode of operation display address and data type of 4th axis (EtherCAT)	H,G	H
7872	15744~15745	1 Mode of operation display address and data type of 5th axis (EtherCAT)	H,G	H
7873	15746~15747	1 Mode of operation display address and data type of 6th axis (EtherCAT)	H,G	H
7874	15748~15749	1 Mode of operation display address and data type of 7th axis (EtherCAT)	H,G	H
7875	15750~15751	1 Mode of operation display address and data type of 8th axis (EtherCAT)	H,G	H
7876	15752~15753	Actual position address and data type of X axis (EtherCAT)	H,G	H
7877	15754~15755	Actual position address and data type of Y axis (EtherCAT)	H,G	H
7878	15756~15757	Actual position address and data type of Z axis (EtherCAT)	H,G	H
7879	15758~15759	Actual position address and data type of 4th axis (EtherCAT)	H,G	H
7880	15760~15760	Actual position address and data type of 5th axis (EtherCAT)	H,G	H
7881	15762~15763	Actual position address and data type of 6th axis (EtherCAT)	H,G	H
7882	15764~15765	Actual position address and data type of 7th axis (EtherCAT)	H,G	H
7883	15766~15767	Actual position address and data type of 8th axis (EtherCAT)	H,G	H
7884	15768~15769	Actual velocity address and data type of X axis (EtherCAT)	H,G	H
7885	15770~15771	Actual velocity address and data type of Y axis (EtherCAT)	H,G	H
7886	15772~15773	Actual velocity address and data type of Z axis (EtherCAT)	H,G	H
7887	15774~15775	Actual velocity address and data type of 4th axis (EtherCAT)	H,G	H
7888	15776~15777	Actual velocity address and data type of 5th axis (EtherCAT)	H,G	H
7889	15778~15779	Actual velocity address and data type of 6th axis (EtherCAT)	H,G	H
7890	15780~15781	Actual velocity address and data type of 7th axis (EtherCAT)	H,G	H
7891	15782~15783	Actual velocity address and data type of 8th axis (EtherCAT)	H,G	H

7892	15784~15785	Actual torque address and data type of X axis (EtherCAT)	H,G	H
7893	15786~15787	Actual torque address and data type of Y axis (EtherCAT)	H,G	H
7894	15788~15789	Actual torque address and data type of Z axis (EtherCAT)	H,G	H
7895	15790~15791	Actual torque address and data type of 4th axis (EtherCAT)	H,G	H
7896	15792~15793	Actual torque address and data type of 5th axis (EtherCAT)	H,G	H
7897	15794~15795	Actual torque address and data type of 6th axis (EtherCAT)	H,G	H
7898	15796~15797	Actual torque address and data type of 7th axis (EtherCAT)	H,G	H
7899	15798~15799	Actual torque address and data type of 8th axis (EtherCAT)	H,G	H
7900	15800~15801	Touch probe status address and data type of X axis (EtherCAT)	H,G	H
7901	15802~15803	Touch probe status address and data type of Y axis (EtherCAT)	H,G	H
7902	15804~15805	Touch probe status address and data type of Z axis (EtherCAT)	H,G	H
7903	15806~15807	Touch probe status address and data type of 4th axis (EtherCAT)	H,G	H
7904	15808~15809	Touch probe status address and data type of 5th axis (EtherCAT)	H,G	H
7905	15810~15811	Touch probe status address and data type of 6th axis (EtherCAT)	H,G	H
7906	15812~15813	Touch probe status address and data type of 7th axis (EtherCAT)	H,G	H
7907	15814~15815	Touch probe status address and data type of 8th axis (EtherCAT)	H,G	H
7908	15816~15817	Touch probe value address and data type of X axis (EtherCAT)	H,G	H
7909	15818~15819	Touch probe value address and data type of Y axis (EtherCAT)	H,G	H
7910	15820~15821	Touch probe value address and data type of Z axis (EtherCAT)	H,G	H
7911	15822~15823	Touch probe value address and data type of 4th axis (EtherCAT)	H,G	H
7912	15824~15825	Touch probe value address and data type of 5th axis (EtherCAT)	H,G	H
7913	15826~15827	Touch probe value address and data type of 6th axis (EtherCAT)	H,G	H
7914	15828~15829	Touch probe value address and data type of 7th axis (EtherCAT)	H,G	H
7915	15830~15831	Touch probe value address and data type of 8th axis (EtherCAT)	H,G	H
7916	15832~15833	Error code address and data type of X axis (EtherCAT)	H,G	H
7917	15834~15835	Error code address and data type of Y axis (EtherCAT)	H,G	H
7918	15836~15837	Error code address and data type of Z axis (EtherCAT)	H,G	H
7919	15838~15839	Error code address and data type of 4th axis (EtherCAT)	H,G	H
7920	15840~15841	Error code address and data type of 5th axis (EtherCAT)	H,G	H
7921	15842~15843	Error code address and data type of 6th axis (EtherCAT)	H,G	H
7922	15844~15845	Error code address and data type of 7th axis (EtherCAT)	H,G	H
7923	15846~15847	Error code address and data type of 8th axis (EtherCAT)	H,G	H
7924	15848~15849	Cyclic position mode selection value of X axis (EtherCAT)	H,G	H
7925	15850~15851	Cyclic position mode selection value of Y axis (EtherCAT)	H,G	H
7926	15852~15853	Cyclic position mode selection value of Z axis (EtherCAT)	H,G	H
7927	15854~15855	Cyclic position mode selection value of 4th axis (EtherCAT)	H,G	H
7928	15856~15857	Cyclic position mode selection value of 5th axis (EtherCAT)	H,G	H
7929	15858~15859	Cyclic position mode selection value of 6th axis (EtherCAT)	H,G	H
7930	15860~15861	Cyclic position mode selection value of 7th axis (EtherCAT)	H,G	H
7931	15862~15863	Cyclic position mode selection value of 8th axis (EtherCAT)	H,G	H
7932	15864~15865	Control word bit order of X axis (EtherCAT)	H,G	H
7933	15866~15867	Control word bit order of Y axis (EtherCAT)	H,G	H
7934	15868~15869	Control word bit order of Z axis (EtherCAT)	H,G	H
7935	15870~15871	Control word bit order of 4th axis (EtherCAT)	H,G	H
7936	15872~15873	Control word bit order of 5th axis (EtherCAT)	H,G	H
7937	15874~15875	Control word bit order of 6th axis (EtherCAT)	H,G	H
7938	15876~15877	Control word bit order of 7th axis (EtherCAT)	H,G	H
7939	15878~15879	Control word bit order of 8th axis (EtherCAT)	H,G	H
7940	15880~15881	Status word bit order of X axis (EtherCAT)	H,G	H
7941	15882~15883	Status word bit order of Y axis (EtherCAT)	H,G	H
7942	15884~15885	Status word bit order of Z axis (EtherCAT)	H,G	H
7943	15886~15887	Status word bit order of 4th axis (EtherCAT)	H,G	H
7944	15888~15889	Status word bit order of 5th axis (EtherCAT)	H,G	H
7945	15890~15891	Status word bit order of 6th axis (EtherCAT)	H,G	H
7946	15892~15893	Status word bit order of 7th axis (EtherCAT)	H,G	H
7947	15894~15895	Status word bit order of 8th axis (EtherCAT)	H,G	H
7948	15896~15897	Touch probe disable/enable value of X axis (EtherCAT)	H,G	H
7949	15898~15899	Touch probe disable/enable value of Y axis (EtherCAT)	H,G	H
7950	15900~15901	Touch probe disable/enable value of Z axis (EtherCAT)	H,G	H
7951	15902~15903	Touch probe disable/enable value of 4th axis (EtherCAT)	H,G	H
7952	15904~15903	Touch probe disable/enable value of 5th axis (EtherCAT)	H,G	H
7953	15906~15907	Touch probe disable/enable value of 6th axis (EtherCAT)	H,G	H
7954	15908~15909	Touch probe disable/enable value of 7th axis (EtherCAT)	H,G	H
7955	15910~15911	Touch probe disable/enable value of 8th axis (EtherCAT)	H,G	H

7956	15912~15913	Touch probe status word bit order of X axis (EtherCAT)	H,G	H
7957	15914~15915	Touch probe status word bit order of Y axis (EtherCAT)	H,G	H
7958	15916~15917	Touch probe status word bit order of Z axis (EtherCAT)	H,G	H
7959	15918~15919	Touch probe status word bit order of 4th axis (EtherCAT)	H,G	H
7960	15920~15921	Touch probe status word bit order of 5th axis (EtherCAT)	H,G	H
7961	15922~15923	Touch probe status word bit order of 6th axis (EtherCAT)	H,G	H
7962	15924~15925	Touch probe status word bit order of 7th axis (EtherCAT)	H,G	H
7963	15926~15927	Touch probe status word bit order of 8th axis (EtherCAT)	H,G	H
7964	15928~15929	Address and data type of the optional sdo1 parameter of X axis (EtherCAT)	H,G	H
7965	15930~15931	Address and data type of the optional sdo1 parameter of Y axis (EtherCAT)	H,G	H
7966	15932~15933	Address and data type of the optional sdo1 parameter of Z axis (EtherCAT)	H,G	H
7967	15934~15935	Address and data type of the optional sdo1 parameter of 4th axis (EtherCAT)	H,G	H
7968	15936~15937	Address and data type of the optional sdo1 parameter of 5th axis (EtherCAT)	H,G	H
7969	15938~15939	Address and data type of the optional sdo1 parameter of 6th axis (EtherCAT)	H,G	H
7970	15940~15941	Address and data type of the optional sdo1 parameter of 7th axis (EtherCAT)	H,G	H
7971	15942~15943	Address and data type of the optional sdo1 parameter of 8th axis (EtherCAT)	H,G	H
7972	15944~15945	Address and data type of the optional sdo2 parameter of X axis (EtherCAT)	H,G	H
7973	15946~15947	Address and data type of the optional sdo2 parameter of X axis (EtherCAT)	H,G	H
7974	15948~15949	Address and data type of the optional sdo2 parameter of X axis (EtherCAT)	H,G	H
7975	15950~15951	Address and data type of the optional sdo2 parameter of X axis (EtherCAT)	H,G	H
7976	15952~15953	Address and data type of the optional sdo2 parameter of X axis (EtherCAT)	H,G	H
7977	15954~15955	Address and data type of the optional sdo2 parameter of X axis (EtherCAT)	H,G	H
7978	15956~15957	Address and data type of the optional sdo2 parameter of X axis (EtherCAT)	H,G	H
7979	15958~15959	Address and data type of the optional sdo2 parameter of X axis (EtherCAT)	H,G	H
7980	15960~15961	Optional sdo1 value of X axis (EtherCAT)	H,G	H
7981	15962~15963	Optional sdo1 value of Y axis (EtherCAT)	H,G	H
7982	15964~15965	Optional sdo1 value of Z axis (EtherCAT)	H,G	H
7983	15966~15967	Optional sdo1 value of 4th axis (EtherCAT)	H,G	H
7984	15968~15969	Optional sdo1 value of 5th axis (EtherCAT)	H,G	H
7985	15970~15971	Optional sdo1 value of 6th axis (EtherCAT)	H,G	H
7986	15972~15973	Optional sdo1 value of 7th axis (EtherCAT)	H,G	H
7987	15974~15975	Optional sdo1 value of 8th axis (EtherCAT)	H,G	H
7988	15976~15977	Optional sdo2 value of X axis (EtherCAT)	H,G	H
7989	15978~15979	Optional sdo2 value of Y axis (EtherCAT)	H,G	H
7990	15980~15981	Optional sdo2 value of Z axis (EtherCAT)	H,G	H
7991	15982~15983	Optional sdo2 value of 4th axis (EtherCAT)	H,G	H
7992	15984~15985	Optional sdo2 value of 5th axis (EtherCAT)	H,G	H
7993	15986~15987	Optional sdo2 value of 6th axis (EtherCAT)	H,G	H
7994	15988~15989	Optional sdo2 value of 7th axis (EtherCAT)	H,G	H
7995	15990~15991	Optional sdo2 value of 8th axis (EtherCAT)	H,G	H
COMMAND VALUES SENT FROM THE INTERPRETER TO THE SUBPROGRAM				
8000	16000~16001	X axis value in the line directed to the subprogram	H,G	-
8001	16002~16003	Y axis value in the line directed to the subprogram	H,G	-
8002	16004~16005	Z axis value in the line directed to the subprogram	H,G	-
8003	16006~16007	4th axis value in the line directed to the subprogram	H,G	-
8004	16008~16009	5th axis value in the line directed to the subprogram	H,G	-
8005	16010~16011	6th axis value in the line directed to the subprogram	H,G	-
8006	16012~16013	7th axis value in the line directed to the subprogram	H,G	-
8007	16014~16015	8th axis value in the line directed to the subprogram	H,G	-
8009	16018~16019	D value in the line directed to the subprogram	H,G	-
8010	16020~16021	F value in the line directed to the subprogram	H,G	-
8011	16022~16023	H value in the line directed to the subprogram	H,G	-
8012	16024~16025	I value in the line directed to the subprogram	H,G	-
8013	16026~16027	J value in the line directed to the subprogram	H,G	-
8014	16028~16029	K value in the line directed to the subprogram	H,G	-
8015	16030~16031	L value in the line directed to the subprogram	H,G	-
8016	16032~16033	M value in the line directed to the subprogram	H,G	-
8018	16036~16037	P value in the line directed to the subprogram	H,G	-
8019	16038~16039	Q value in the line directed to the subprogram	H,G	-
8020	16040~16041	R value in the line directed to the subprogram	H,G	-
8021	16042~16043	S value in the line directed to the subprogram	H,G	-
8022	16044~16045	T value in the line directed to the subprogram	H,G	-
8023	16044~16045	B value in the line directed to the subprogram	H,G	-
8030	16060~16061	Group 0 G value in the line directed to subprogram	H,G	-

8031	16062~16063	Group 1 G value in the line directed to subprogram	H,G	-
8032	16064~16065	Group 2 G value in the line directed to subprogram	H,G	-
8033	16066~16067	Group 3 G value in the line directed to subprogram	H,G	-
8034	16068~16069	Group 4 G value in the line directed to subprogram	H,G	-
8035	16070~16071	Group 5 G value in the line directed to subprogram	H,G	-
8036	16072~16073	Group 6 G value in the line directed to subprogram	H,G	-
8037	16074~16075	Group 7 G value in the line directed to subprogram	H,G	-
8038	16076~16077	Group 8 G value in the line directed to subprogram	H,G	-
8039	16078~16079	Group 9 G value in the line directed to subprogram	H,G	-
8040	16080~16081	Group 10 G value in the line directed to subprogram	H,G	-
8041	16082~16083	Group 11 G value in the line directed to subprogram	H,G	-
8042	16084~16085	Group 12 G value in the line directed to subprogram	H,G	-
8043	16086~16087	Group 13 G value in the line directed to subprogram	H,G	-
8044	16088~16089	Group 14 G value in the line directed to subprogram	H,G	-
8045	16090~16091	Group 15 G value in the line directed to subprogram	H,G	-
8046	16092~16093	Group 16 G value in the line directed to subprogram	H,G	-
8047	16094~16095	Group 17 G value in the line directed to subprogram	H,G	-
8048	16096~16097	Group 18 G value in the line directed to subprogram	H,G	-
8049	16098~16099	Group 19 G value in the line directed to subprogram	H,G	-
COMMAND BITS SENT FROM THE INTERPRETER TO THE SUBPROGRAM				
8100	16200~16201	X Axis bit in the line directed to subprogram	H,G	-
8101	16202~16203	Y Axis bit in the line directed to subprogram	H,G	-
8102	16204~16205	Z Axis bit in the line directed to subprogram	H,G	-
8103	16206~16207	4th Axis bit in the line directed to subprogram	H,G	-
8104	16208~16209	5th Axis bit in the line directed to subprogram	H,G	-
8105	16210~16211	6th Axis bit in the line directed to subprogram	H,G	-
8106	16212~16213	7th Axis bit in the line directed to subprogram	H,G	-
8107	16214~16215	8th Axis bit in the line directed to subprogram	H,G	-
8109	16218~16219	D bit in the line directed to subprogram	H,G	-
8110	16220~16221	F bit in the line directed to subprogram	H,G	-
8111	16222~16223	H bit in the line directed to subprogram	H,G	-
8112	16224~16225	I bit in the line directed to subprogram	H,G	-
8113	16226~16227	J bit in the line directed to subprogram	H,G	-
8114	16228~16229	K bit in the line directed to subprogram	H,G	-
8115	16230~16231	L bit in the line directed to subprogram	H,G	-
8116	16232~16233	M bit in the line directed to subprogram	H,G	-
8118	16236~16237	P bit in the line directed to subprogram	H,G	-
8119	16238~16239	Q bit in the line directed to subprogram	H,G	-
8120	16240~16241	R bit in the line directed to subprogram	H,G	-
8121	16242~16243	S bit in the line directed to subprogram	H,G	-
8122	16244~1645	T bit in the line directed to subprogram	H,G	-
8123	16244~16245	B bit in the line directed to subprogram	H,G	-
8130	16260~16261	Group 0 G bit in the line directed to subprogram	H,G	-
8131	16262~16263	Group 1 G bit in the line directed to subprogram	H,G	-
8132	16264~16265	Group 2 G bit in the line directed to subprogram	H,G	-
8133	16266~16267	Group 3 G bit in the line directed to subprogram	H,G	-
8134	16268~16269	Group 4 G bit in the line directed to subprogram	H,G	-
8135	16270~16271	Group 5 G bit in the line directed to subprogram	H,G	-
8136	16272~16273	Group 6 G bit in the line directed to subprogram	H,G	-
8137	16274~16275	Group 7 G bit in the line directed to subprogram	H,G	-
8138	16276~16277	Group 8 G bit in the line directed to subprogram	H,G	-
8139	16278~16279	Group 9 G bit in the line directed to subprogram	H,G	-
8140	16280~16281	Group 10 G bit in the line directed to subprogram	H,G	-
8141	16282~16283	Group 11 G bit in the line directed to subprogram	H,G	-
8142	16284~16285	Group 12 G bit in the line directed to subprogram	H,G	-
8143	16286~16287	Group 13 G bit in the line directed to subprogram	H,G	-
8144	16288~16289	Group 14 G bit in the line directed to subprogram	H,G	-
8145	16290~16291	Group 15 G bit in the line directed to subprogram	H,G	-
8146	16292~16293	Group 16 G bit in the line directed to subprogram	H,G	-
8147	16294~16295	Group 17 G bit in the line directed to subprogram	H,G	-
8148	16296~16297	Group 18 G bit in the line directed to subprogram	H,G	-
8149	16298~16299	Group 19 G bit in the line directed to subprogram	H,G	-

8. MEMORY STRUCTURE (DETAILS)

8.1. General Purpose User Variables

8.1.0. General Purpose Non Holding User Variables

Address	Description	Minimum	Maximum	Format	Unit
0~1	General purpose user variable 0	-2147483648	2147483647		
2~3	General purpose user variable 1	-2147483648	2147483647		
4~5	General purpose user variable 2	-2147483648	2147483647		
…	…	-2147483648	2147483647		
…	…	-2147483648	2147483647		
…	…	-2147483648	2147483647		
194~195	General purpose user variable 97	-2147483648	2147483647		
196~197	General purpose user variable 98	-2147483648	2147483647		
198~199	General purpose user variable 99	-2147483648	2147483647		

There are a total of 100 general-purpose non-holding user variables. They start from address 0 and continue sequentially. They can store 32-bit data. These variables can be used for purposes such as holding user macros/package program data. When the power is turned off and then on again, the contents of these variables are reset.

8.1.1. General Purpose Holding User Variables

Address	Description	Minimum	Maximum	Format	Unit
200~201	**General purpose holding user variable 0**	-2147483648	2147483647		
202~203	**General purpose holding user variable 1**	-2147483648	2147483647		
204~205	**General purpose holding user variable 2**	-2147483648	2147483647		
…	**…**	-2147483648	2147483647		
…	**…**	-2147483648	2147483647		
…	**…**	-2147483648	2147483647		
394~395	**General purpose holding user variable 97**	-2147483648	2147483647		
396~397	**General purpose holding user variable 98**	-2147483648	2147483647		
398~399	**General purpose holding user variable 99**	-2147483648	2147483647		

There are a total of 100 general purpose holding user variables. They start from address 200 and continue sequentially. They can store 32-bit data. These variables can be used for purposes such as holding user macros/package program data. When the power is turned off and then on again, the contents of these variables remain unchanged.

8.2. Digital Inputs

Address			Description						
400			**Digital Inputs**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	X15	X14	X13	X12	X11	X10	X9	X8	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		X7	X6	X5	X4	X3	X2	X1	X0

Bit15 **X15**: Built-in digital input 15

Bit14 **X14**: Built-in digital input 14

Bit13 **X13**: Built-in digital input 13

Bit12 **X12**: Built-in digital input 12

Bit11 **X11**: Built-in digital input 11

Bit10 **X10**: Built-in digital input 10

Bit9 **X9**: Built-in digital input 9

Bit8 **X8**: Built-in digital input 8

Bit7 **X7**: Built-in digital input 7

Bit6 **X6**: Built-in digital input 6

Bit5 **X5**: Built-in digital input 5

Bit4 **X4**: Built-in digital input 4

Bit3 **X3**: Built-in digital input 3

Bit2 **X2**: Built-in digital input 2

Bit1 **X1**: Built-in digital input 1

Bit0 **X0**: Built-in digital input 0

Address			Description						
401			**Digital Inputs**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
			X29	X28	X27	X26	X25	X24	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		X23	X22	X21	X20	X19	X18	X17	X16

Bit15

Bit14

Bit13 **X29**: Built-in digital input 29

Bit12 **X28**: Built-in digital input 28

Bit11 **X27**: Built-in digital input 27

Bit10 **X26**: Built-in digital input 26

Bit9 **X25**: Built-in digital input 25

Bit8 **X24**: Built-in digital input 24

Bit7 **X23**: Built-in digital input 23

Bit6 **X22**: Built-in digital input 22

Bit5 **X21**: Built-in digital input 21

Bit4 **X20**: Built-in digital input 20

Bit3 **X19**: Built-in digital input 19

Bit2 **X18**: Built-in digital input 18

Bit1 **X17**: Built-in digital input 17

Bit0 **X16**: Built-in digital input 16

8.3. Signals Sent from CNC to Internal PLC

Address			Description						
448			**Signals Sent from CNC to Internal PLC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	c_F1MS	c_F250MS	c_TOUT	c_MP	c_PIER	c_PIOP	c_MSGN	c_EDITF	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_PTR	c_PSE	c_SPL	c_STL	c_RST	c_SALM	c_ALM	c_PON

Bit15 **c_F1S**: 1-second flasher

Bit14 **c_F250MS**: 250 millisecond flasher

Bit13 **c_TOUT**: Modbus TCP communication timed out

Bit12 **c_MP**: The machine panel (MP1) is active in the system parameters

Bit11 **c_PIER**: RS485 port in error state

Bit10 **c_PIOP**: RS485 port in operation

Bit9 **c_MSGN**: User triggered motion signal

Bit8 **c_EDITF**: The user executed a function that requires EDIT mode

Bit7 **c_PTR**: System is transitioning from pause to automatic operation

Bit6 **c_PSE**: System is paused (Feed Hold)

Bit5 **c_SPL**: System has finished executing G code in auto or MDI mode

Bit4 **c_STL**: System is executing G code in auto or MDI mode

Bit3 **c_RST**: The RESET command has been given to the system

Bit2 **c_SALM**: System is in servo alarm state (It will be '1' only in the case of axis alarms)

Bit1 **c_ALM**: System is in alarm state (Including servo alarms)

Bit0 **c_PON**: Power on (Always true)

Address				Description					
449				**Signals Sent from CNC to Internal PLC**					
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	c_SCCW2	c_SCW2	c_SCCW	c_SCW	c_M30	c_M02	c_M01	c_M00	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_GR4	c_GR3	c_GR2	c_GR1	c_BF	c_TF	c_SF	c_MF

Bit15 **c_SCCW2**: Spindle2 counter clockwise output

Bit14 **c_SCW2**: Spindle2 clockwise output

Bit13 **c_SCCW**: Spindle1 counter clockwise output

Bit12 **c_SCW**: Spindle1 clockwise output

Bit11 **c_M30**: M30 code is executed in the program

Bit10 **c_M02**: M02 code is executed in the program

Bit9 **c_M01**: M01 code is executed in the program

Bit8 **c_M00**: M00 code is executed in the program

Bit7 **c_GR4**: The given spindle speed is within the range of the 4th gear

Bit6 **c_GR3**: The given spindle speed is within the range of the 3rd gear

Bit5 **c_GR2**: The given spindle speed is within the range of the 2nd gear

Bit4 **c_GR1**: The given spindle speed is within the range of the 1st gear

> For these commands to work, the 'Spindle Gear Change Mode' parameter must be set to 'Automatic' and the speed ranges of the gears must be entered into the relevant parameters.

Bit3 **c_BF**: The B code is being processed in the program. The Bxxx value is loaded at the c_BCODE address

> For this command to work, the axis names must NOT contain 'B'.

Bit2 **c_TF**: The T code is being processed in the program. The Txxx value is loaded at the c_TCODE address

Bit1 **c_SF**: The S code is being processed in the program. The Sxxx value is loaded at the c_SCODE address

Bit0 **c_MF**: The M code is being processed in the program. The Mxxx value is loaded at the c_MCODE address

Address	Description								
450	**Signals Sent from CNC to INTERNAL PLC**								
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	c_MCODE (High 8 bits)								
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_MCODE (Low 8 bits)							

Bit0-15 **c_MCODE**: The M code value executed by the system

Address	Description								
451	**Signals Sent from CNC to INTERNAL PLC**								
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	c_SCODE (High 8 bits)								
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_SCODE (Low 8 bits)							

Bit0-15 **c_SCODE**: The S code value executed by the system

Address	Description								
452	**Signals Sent from CNC to INTERNAL PLC**								
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	c_TCODE (High 8 bits)								
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_TCODE (Low 8 bits)							

Bit0-15 **c_TCODE**: The T code value executed by the system

Address	Description								
453	**Signals Sent from CNC to INTERNAL PLC**								
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	c_BCODE (High 8 bits)								
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_BCODE (Low 8 bits)							

Bit0-15 **c_BCODE**: The B code value executed by the system

When the system is operating in automatic or MDI mode and encounters Mxx, Sxx, Txx, Bxx commands, it loads the values of these commands into the corresponding addresses and then sets the relevant bits of c_MF, c_SF, c_TF, and c_BF to "1".
Example:
O000(MSTB Code Demo)
G00 G90 X100. Y100. ----> **Move to position X100.0 Y100.0**
M03 S100 ----> **When the system reaches this line, it loads the value "3" into the c_MCODE address and the value 100 into the c_SCODE address. c_MF is set to "1", and c_SF is set to "1". After the Internal PLC completes these commands, it sets the p_FIN bit to "1" to allow the line to be passed.**
M30 ----> **End of program**
%

Address			Description						
454			**Signals Sent from CNC to Internal PLC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	c_ZP82	c_ZP72	c_ZP62	c_ZP52	c_ZP42	c_ZPZ2	c_ZPY2	c_ZPX2	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_ZP8	c_ZP7	c_ZP6	c_ZP5	c_ZP4	c_ZPZ	c_ZPY	c_ZPX

Bit15 **c_ZP82**: 8th Axis is at the 2nd reference point

Bit14 **c_ZP72**: 7th Axis is at the 2nd reference point

Bit13 **c_ZP62**: 6th Axis is at the 2nd reference point

Bit12 **c_ZP52**: 5th Axis is at the 2nd reference point

Bit11 **c_ZP42**: 4th Axis is at the 2nd reference point

Bit10 **c_ZPZ2**: Z Axis is at the 2nd reference point

Bit9 **c_ZPY2**: Y Axis is at the 2nd reference point

Bit8 **c_ZPX2**: X Axis is at the 2nd reference point

Bit7 **c_ZP8**: 8th Axis is at the reference point

Bit6 **c_ZP7**: 7th Axis is at the reference point

Bit5 **c_ZP6**: 6th Axis is at the reference point

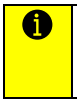
Bit4 **c_ZP5**: 5th Axis is at the reference point

Bit3 **c_ZP4**: 4th Axis is at the reference point

Bit2 **c_ZPZ**: Z Axis is at the reference point

Bit1 **c_ZPY**: Y Axis is at the reference point

Bit0 **c_ZPX**: X Axis is at the reference point



The ZPx bits indicate that the axes are at their actual reference points.
The ZPx2 bits indicate that the axes are at the position defined in the "2nd Reference Point" parameter.To send the axes to the 2nd reference point, the G30 P2 command is used.

Address			Description						
455			**Signals Sent from CNC to Internal PLC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	c_ZP84	c_ZP74	c_ZP64	c_ZP54	c_ZP44	c_ZPZ4	c_ZPY4	c_ZPX4	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_ZP83	c_ZP73	c_ZP63	c_ZP53	c_ZP43	c_ZPZ3	c_ZPY3	c_ZPX3

Bit15 **c_ZP84**: 8th Axis is at the 4th reference point

Bit14 **c_ZP74**: 7th Axis is at the 4th reference point

Bit13 **c_ZP64**: 6th Axis is at the 4th reference point

Bit12 **c_ZP54**: 5th Axis is at the 4th reference point

Bit11 **c_ZP44**: 4th Axis is at the 4th reference point

Bit10 **c_ZPZ4**: Z Axis is at the 4th reference point

Bit9 **c_ZPY4**: Y Axis is at the 4th reference point

Bit8 **c_ZPX4**: X Axis is at the 4th reference point

Bit7 **c_ZP83**: 8th Axis is at the 3rd reference point

Bit6 **c_ZP73**: 7th Axis is at the 3rd reference point

Bit5 **c_ZP63**: 6th Axis is at the 3rd reference point

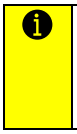
Bit4 **c_ZP53**: 5th Axis is at the 3rd reference point

Bit3 **c_ZP43**: 4th Axis is at the 3rd reference point

Bit2 **c_ZPZ3**: Z Axis is at the 3rd reference point

Bit1 **c_ZPY3**: Y Axis is at the 3rd reference point

Bit0 **c_ZPX3**: X Axis is at the 3rd reference point



The ZPx3 bits indicate that the axes are at the position defined in the "3rd Reference Point" parameter.To send the axes to the 3rd reference point, use the G30 P3 command.
The ZPx4 bits indicate that the axes are at the position defined in the "4th Reference Point" parameter.To send the axes to the 4th reference point, use the G30 P4 command.

Address			Description						
456			**Signals Sent from CNC to Internal PLC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	c_RDY8	c_RDY7	c_RDY6	c_RDY5	c_RDY4	c_RDYZ	c_RDYY	c_RDYX	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_PAX8	c_PAX7	c_PAX6	c_PAX5	c_PAX4	c_PAXZ	c_PAXY	c_PAXX

Bit15 **c_RDY8**: 8th Axis servo ready (No alarm in the driver)

Bit14 **c_RDY7**: 7th Axis servo ready (No alarm in the driver)

Bit13 **c_RDY6**: 6th Axis servo ready (No alarm in the driver)

Bit12 **c_RDY5**: 5th Axis servo ready (No alarm in the driver)

Bit11 **c_RDY4**: 4th Axis servo ready (No alarm in the driver)

Bit10 **c_RDYZ**: Z Axis servo ready (No alarm in the driver)

Bit9 **c_RDYY**: Y Axis servo ready (No alarm in the driver)

Bit8 **c_RDYX**: X Axis servo ready (No alarm in the driver)

Bit7 **c_PAX8**: The control of the 8th axis has been handed over to the Internal PLC

Bit6 **c_PAX7**: The control of the 7th axis has been handed over to the Internal PLC

Bit5 **c_PAX6**: The control of the 6th axis has been handed over to the Internal PLC

Bit4 **c_PAX5**: The control of the 5th axis has been handed over to the Internal PLC

Bit3 **c_PAX4**: The control of the 4th axis has been handed over to the Internal PLC

Bit2 **c_PAXZ**: The control of the Z axis has been handed over to the Internal PLC

Bit1 **c_PAXY**: The control of the Y axis has been handed over to the Internal PLC

Bit0 **c_PAXX**: The control of the X axis has been handed over to the Internal PLC

Address		Description							
457		**Signals Sent from CNC to Internal PLC**							
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	c_PEND	c_PENU							
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**

Bit15 **c_PEND**: Pen down command for plotters/cutting knife tables

Bit14 **c_PENU**: Pen up command for plotters/cutting knife tables

Bit13

Bit12

Bit11

Bit10

Bit9

Bit8

Bit7

Bit6

Bit5

Bit4

Bit3

Bit2

Bit1

Bit0

Address	Description
458	**Signals Sent from CNC to Internal PLC**

Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**
	c_AZS2	c_AZS1	c_AYS2	c_AYS1	c_AXS2	c_AXS1	c_A6S2	c_A6S1

	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_A5S2	c_A5S1	c_A4S2	c_A4S1	c_SPOSC	c_JZS	c_SLOW	c_SPOS

Bit15 **c_AZS2**: Axis Z is ready to use as spindle 2

Bit14 **c_AZS1**: Axis Z is ready to use as spindle 1

Bit13 **c_AYS2**: Axis Y is ready to use as spindle 2

Bit12 **c_AYS1**: Axis Y is ready to use as spindle 1

Bit11 **c_AXS2**: Axis X is ready to use as spindle 2

Bit10 **c_AXS1**: Axis X is ready to use as spindle 1

Bit9 **c_A6S2**: Axis 6 is ready to use as spindle 2

Bit8 **c_A6S1**: Axis 6 is ready to use as spindle 1

Bit7 **c_A5S2**: Axis 5 is ready to use as spindle 2

Bit6 **c_A5S1**: Axis 5 is ready to use as spindle 1

Bit5 **c_A4S2**: Axis 4 is ready to use as spindle 2

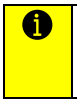
Bit4 **c_A4S1**: Axis 4 is ready to use as spindle 1

Bit3 **c_SPOSC**: Spindle orientation request in canned cycles

Bit2 **c_JZS**: All axes stopped in JOG mode

Bit1 **c_SLOW**: Spindle reduced to low speed

Bit0 **c_SPOS**: Spindle orientation command completed



With the Pulser3 CNC controller, all axes can be set as normal axes or as Spindle 1 or Spindle 2. The information that the axis has been set as a spindle can be read via the c_AxSx bits.

Address	Description								
459	**Signals Sent from CNC to Internal PLC**								
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	c_SOUT (High 8 bit)								
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_SOUT (Low 8 bit)							

Bit0-15 **c_SOUT**: Analog output value for the desired spindle 1 speed

Address	Description								
460	**Signals Sent from CNC to Internal PLC**								
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	c_SOUT2 (High 8 bit)								
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_SOUT2 (Low 8 bit)							

Bit0-15 **c_SOUT2**: Analog output value for the desired spindle 2 speed

The system converts the given spindle speed command into an analog signal based on the spindle speed ratio and the relevant gear parameters, and loads it to these addresses. The relevant data can be copied to the AOUT0 address and directed to the analog output.

Address	Description								
461	**Signals Sent from CNC to Internal PLC**								
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
								c_LEN	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		c_TIPP	c_TIPF	c_TIPT	c_GASA	c_GASW	c_DAIR	c_N2	c_O2

Bit15

Bit14

Bit13

Bit12

Bit11

Bit10

Bit9

Bit8 **c_LEN**: Laser enable output signal

Bit7 **c_TIPP**: Laser tip at piercing start position signa

Bit6 **c_TIPF**: Laser nozzle moved away from the metal (tip far signal)

Bit5 **c_TIPT**: Laser nozzle touched the metal (tip touch signal)

Bit4 **c_GASA**: Laser cutting low gas pressure alarm

Bit3 **c_GASW**: Laser cutting low gas pressure warning

Bit2 **c_DAIR**: Laser cutting dry air selection

Bit1 **c_N2**: Laser cutting nitrogen (N2) selection

Bit0 **c_O2**: Laser cutting oxygen (O2) selection

These signals are only valid in laser cutting software. They are not included in standard software.

Address	Description								
462	**Signals Sent from CNC to Internal PLC**								
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
					c_PRTOC	c_AHCON	c_PNCE	c_PRDYA	c_PCUT

Bit15

Bit14

Bit13

Bit12

Bit11

Bit10

Bit9

Bit8

Bit7

Bit6

Bit5

Bit4 **c_PRTOC**: Plasma is ready for cutting

Bit3 **c_AHCON**: AHC active (Automatic Height Control)

Bit2 **c_PNCE**: Plasma nozzle contact active (Nozzle Contact Enable)

Bit1 **c_PRDYA**: Plasma ready signal is off

Bit0 **c_PCUT**: Plasma ON signal

These signals are only valid in plasma cutting software. They are not included in standard software.

Address	Description
463	**Signals Sent from CNC to Internal PLC**

Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
						c_A8S2	c_A8S1	c_A7S2	c_A7S1

Bit15

Bit14

Bit13

Bit12

Bit11

Bit10

Bit9

Bit8

Bit7

Bit6

Bit5

Bit4

Bit3 **c_A8S2**: Axis 8 is ready to use as spindle 2

Bit2 **c_A8S1**: Axis 8 is ready to use as spindle 1

Bit1 **c_A7S2**: Axis 7 is ready to use as spindle 2

Bit0 **c_A7S1**: Axis 7 is ready to use as spindle 1

8.4. Machine Panel Buttons (MP1)

Address	Description
524	**MP1 Machine Panel Buttons**

Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	mb_JN	mb_RAPID	mb_JP	mb_U	mb_A	mb_Z	mb_Y	mb_X	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		mb_ROV100	mb_ROV50	mb_ROV25	mb_ROV0	mb_RESET	mb_STOP	mb_START	mb_ESP

Bit15 **mb_JN**: Negative(-) direction movement command in JOG mode

Bit14 **mb_RAPID**: RAPID speed selection button

Bit13 **mb_JP**: Positive(-) direction movement command in JOG mode

Bit12 **mb_U**: U / (5th) axis selection button

Bit11 **mb_A**: A / (4th) axis selection button

Bit10 **mb_Z**: Z axis selection button

Bit9 **mb_Y**: Y axis selection button

Bit8 **mb_X**: X axis selection button

Bit7 **mb_ROV100**: Rapid movement (G00) 100% speed rate selection button

Bit6 **mb_ROV50**: Rapid movement (G00) 50% speed rate selection button

Bit5 **mb_ROV25**: Rapid movement (G00) 25% speed rate selection button

Bit4 **mb_ROV0**: Rapid movement (G00) 0% speed rate selection button

Bit3 **mb_RESET**: Reset button

Bit2 **mb_STOP**: Automatic pause button (Normally Closed Contact)

Bit1 **mb_START**: Start button

Bit0 **mb_ESP**: Emergency stop button (Normally Closed Contact)

These definitions are based on the standard MP1 machine panel. On other machine panels, the definitions of these addresses may differ.

Address	Description
525	**MP1 Machine Panel Buttons**

Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**
	mb_FOV8	Mb_FOV4	mb_FOV2	mb_FOV1	mb_MODE8	mb_MODE4	mb_MODE2	mb_MODE1

	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		mb_FN2	mb_FN1	mb_HOME	mb_TOOL	mb_COOL	mb_SCCW	mb_SSTOP	mb_SCW

Bit15 **mb_FOV8**: Cutting feed ratio switch bit 3

Bit14 **mb_FOV4**: Cutting feed ratio switch bit 2

Bit13 **mb_FOV2**: Cutting feed ratio switch bit 1

Bit12 **mb_FOV1**: Cutting feed ratio switch bit 0

Bit11 **mb_MODE8**: Mode selection switch bit 3

Bit10 **mb_MODE4**: Mode selection switch bit 2

Bit9 **mb_MODE2**: Mode selection switch bit 1

Bit8 **mb_MODE1**: Mode selection switch bit 0

> The MP1 machine panel does not have a mode selection switch. However, a port has been provided at the back of the machine panel for connections, which can be connected externally.

Bit7 **mb_FN2**: General purpose operation button 2

Bit6 **mb_FN1**: General purpose operation button 1

Bit5 **mb_HOME**: Send axes to home position button

Bit4 **mb_TOOL**: Tool release button

Bit3 **mb_COOL**: Coolant on button

Bit2 **mb_SCCW**: Spindle counterclockwise(CCW) rotation button

Bit1 **mb_SSTOP**: Spindle stop button

Bit0 **mb_SCW**: Spindle clockwise(CW) rotation button

> These definitions are based on the standard MP1 machine panel. On other machine panels, the definitions of these addresses may differ.

Address	Description
526	**MP1 Machine Panel Buttons**

Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
						mb_SOV8	mb_SOV4	mb_SOV2	mb_SOV1

Bit15

Bit14

Bit13

Bit12

Bit11

Bit10

Bit9

Bit8

Bit7

Bit6

Bit5

Bit4

Bit3 **mb_SOV8**: Spindle speed ratio switch bit 3

Bit2 **mb_SOV4**: Spindle speed ratio switch bit 2

Bit1 **mb_SOV2**: Spindle speed ratio switch bit 1

Bit0 **mb_SOV1**: Spindle speed ratio switch bit 0

ℹ	The spindle speed ratio switch on the MP1 machine panel can be set to a value between 0 and 7.

ℹ	These definitions are based on the standard MP1 machine panel. On other machine panels, the definitions of these addresses may differ.

8.5. Axis Feedbacks

Address	Description
	Axis Feedbacks
848~849	c_TRQX
850~851	c_TRQY
852~853	c_TRQZ
854~855	c_TRQ4
856~857	c_TRQ5
858~859	c_TRQ6
860~861	c_TRQ7
862~863	c_TRQ8

Bit0-31 **c_TRQX**: X Axis actual torque value

Bit0-31 **c_TRQY**: Y Axis actual torque value

Bit0-31 **c_TRQZ**: Z Axis actual torque value

Bit0-31 **c_TRQ4**: 4th Axis actual torque value

Bit0-31 **c_TRQ5**: 5th Axis actual torque value

Bit0-31 **c_TRQ6**: 6th Axis actual torque value

Bit0-31 **c_TRQ7**: 7th Axis actual torque value

Bit0-31 **c_TRQ8**: 8th Axis actual torque value

Address	Description
	Axis Feedbacks
864~865	c_CURX
866~867	c_CURY
868~869	c_CURZ
870~871	c_CUR4
872~873	c_CUR5
874~875	c_CUR6
876~877	c_CUR7
878~879	c_CUR8

Bit0-31 **c_CURX**: X Axis actual position

Bit0-31 **c_CURY**: Y Axis actual position

Bit0-31 **c_CURZ**: Z Axis actual position

Bit0-31 **c_CUR4**: 4th Axis actual position

Bit0-31 **c_CUR5**: 5th Axis actual position

Bit0-31 **c_CUR6**: 6th Axis actual position

Bit0-31 **c_CUR7**: 7th Axis actual position

Bit0-31 **c_CUR8**: 8th Axis actual position

Address	Description
	Axis Feedbacks
880~881	c_FBX
882~883	c_FBY
884~885	c_FBZ
886~887	c_FB4
888~889	c_FB5
890~891	c_FB6
892~893	c_FB7
894~895	c_FB8

Bit0-31 **c_FBX**: X axis actual encoder count value

Bit0-31 **c_FBY**: Y axis actual encoder count value

Bit0-31 **c_FBZ**: Z axis actual encoder count value

Bit0-31 **c_FB4**: 4th axis actual encoder count value

Bit0-31 **c_FB5**: 5th axis actual encoder count value

Bit0-31 **c_FB6**: 6th axis actual encoder count value

Bit0-31 **c_FB7**: 7th axis actual encoder count value

Bit0-31 **c_FB8**: 8th axis actual encoder count value

8.6. Digital Outputs

Address	Description								
1000	**Digital Outputs**								
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	Y15	Y14	Y13	Y12	Y11	Y10	Y9	Y8	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0

Bit15 **Y15**: Built-in digital output 15

Bit14 **Y14**: Built-in digital output 14

Bit13 **Y13**: Built-in digital output 13

Bit12 **Y12**: Built-in digital output 12

Bit11 **Y11**: Built-in digital output 11

Bit10 **Y10**: Built-in digital output 10

Bit9 **Y9**: Built-in digital output 9

Bit8 **Y8**: Built-in digital output 8

Bit7 **Y7**: Built-in digital output 7

Bit6 **Y6**: Built-in digital output 6

Bit5 **Y5**: Built-in digital output 5

Bit4 **Y4**: Built-in digital output 4

Bit3 **Y3**: Built-in digital output 3

Bit2 **Y2**: Built-in digital output 2

Bit1 **Y1**: Built-in digital output 1

Bit0 **Y0**: Built-in digital output 0

8.7. Analog Output

Address			Description						
1003			**Analog Output**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	AOUT0 (High 8 bit)								
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		AOUT0 (Low 8 bit)							

Bit0-15 **AOUT0**: Analog output value

ℹ	The analog output value on Pulser3 is set using this address. It can be used for Spindle 1 speed, Spindle 2 speed, or general-purpose applications. The analog output is 12-bit bipolar. When 0 is written to this field, -10V is output. When 2000 is written to this field, 0V is output. When 4000 is written to this field, +10V is output.

8.8. Signals Sent from Internal PLC to CNC

Address			Description						
1048			**Signals Sent from Internal PLC to CNC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_JN8	p_JN7	p_JN6	p_JN5	p_JN4	p_JNZ	p_JNY	p_JNX	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_JP8	p_JP7	p_JP6	p_JP5	p_JP4	p_JPZ	p_JPY	p_JPX

Bit15 **p_JN8**: 8th axis JOG/HOME mode negative (-) direction movement request

Bit14 **p_JN7**: 7th axis JOG/HOME mode negative (-) direction movement request

Bit13 **p_JN6**: 6th axis JOG/HOME mode negative (-) direction movement request

Bit12 **p_JN5**: 5th axis JOG/HOME mode negative (-) direction movement request

Bit11 **p_JN4**: 4th axis JOG/HOME mode negative (-) direction movement request

Bit10 **p_JNZ**: Z axis JOG/HOME mode negative (-) direction movement request

Bit9 **p_JNY**: Y axis JOG/HOME mode negative (-) direction movement request

Bit8 **p_JNX**: X axis JOG/HOME mode negative (-) direction movement request

Bit7 **p_JP8**: 8th axis JOG/HOME mode positive (+) direction movement request

Bit6 **p_JP7**: 7th axis JOG/HOME mode positive (+) direction movement request

Bit5 **p_JP6**: 6th axis JOG/HOME mode positive (+) direction movement request

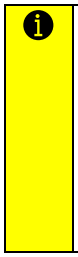
Bit4 **p_JP5**: 5th axis JOG/HOME mode positive (+) direction movement request

Bit3 **p_JP4**: 4th axis JOG/HOME mode positive (+) direction movement request

Bit2 **p_JPZ**: Z axis JOG/HOME mode positive (+) direction movement request

Bit1 **p_JPY**: Y axis JOG/HOME mode positive (+) direction movement request

Bit0 **p_JPX**: X axis JOG/HOME mode positive (+) direction movement request



For these bits to operate, JOG, MPG, or HOME mode must be selected.
In JOG mode, the axes are moved at a constant speed in the (+)/(-) direction. When the p_RAPID bit is "0", the axes move at the valid cutting speed, and when the p_RAPID bit is "1", the axes move at the maximum RAPID speed set for each axis. FOV and ROV ratios apply.
In MPG mode, the selected X1, X10, X100, or X1000 steps are controlled, and the corresponding axis is moved in the (+)/(-) direction by the selected step amount.
In HOME mode, the axes are sent to the home position. During the reference search process, the bit must remain in the "1" position.

Address				Description					
1049				**Signals Sent from Internal PLC to CNC**					
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_HX8	p_HX7	p_HX6	p_HX5	p_HX4	p_HXZ	p_HXY	p_HXX	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_DEC8	p_DEC7	p_DEC6	p_DEC5	p_DEC4	p_DECZ	p_DECY	p_DECX

Bit15 **p_HX8**: In MPG mode, 8th axis is selected

Bit14 **p_HX7**: In MPG mode, 7th axis is selected

Bit13 **p_HX6**: In MPG mode, 6th axis is selected

Bit12 **p_HX5**: In MPG mode, 5th axis is selected

Bit11 **p_HX4**: In MPG mode, 4th axis is selected

Bit10 **p_HXZ**: In MPG mode, Z axis is selected

Bit9 **p_HXY**: In MPG mode, Y axis is selected

Bit8 **p_HXX**: In MPG mode, X axis is selected

Bit7 **p_DEC8**: 8th axis deceleration (reference) signal in HOME mode

Bit6 **p_DEC7**: 7th axis deceleration (reference) signal in HOME mode

Bit5 **p_DEC6**: 6th axis deceleration (reference) signal in HOME mode

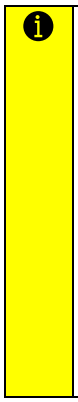
Bit4 **p_DEC5**: 5th axis deceleration (reference) signal in HOME mode

Bit3 **p_DEC4**: 4th axis deceleration (reference) signal in HOME mode

Bit2 **p_DECZ**: Z axis deceleration (reference) signal in HOME mode

Bit1 **p_DECY**: Y axis deceleration (reference) signal in HOME mode

Bit0 **p_DECX**: X axis deceleration (reference) signal in HOME mode



The p_DECx bits are used to inform the system when the axis reaches the reference switch during the homing process. Reference switches are normally open and should be connected directly to these bits. If they are normally closed, they should be inverted before connecting. When the system receives a reference command, it searches for this signal at the speed specified in the "1. Home Speed" parameter. Once the signal is reached, the axis is moved in the specified direction at the speed defined in the "2. Home Speed" parameter until the signal reaches "0". The reference process is completed either here or in the first motor "Z" phase, depending on the "Prm192~Prm197: Axes reference without reset pulse" parameter.

The p_HXx bits inform the system which axis or axes will move when the user turns the handwheel in MPG mode. The axis selection switch on the hand panel can be directly connected to these bits.

Address			Description						
1050			**Signals Sent from Internal PLC to CNC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_ITL8	p_ITL7	p_ITL6	p_ITL5	p_ITL4	p_ITLZ	p_ITLY	p_ITLX	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_ON8	p_ON7	p_ON6	p_ON5	p_ON4	p_ONZ	p_ONY	p_ONX

Bit15 **p_ITL8**: 8th axis motion interlock signal (Normally Closed)

Bit14 **p_ITL7**: 7th axis motion interlock signal (Normally Closed)

Bit13 **p_ITL6**: 6th axis motion interlock signal (Normally Closed)

Bit12 **p_ITL5**: 5th axis motion interlock signal (Normally Closed)

Bit11 **p_ITL4**: 4th axis motion interlock signal (Normally Closed)

Bit10 **p_ITLZ**: Z axis motion interlock signal (Normally Closed)

Bit9 **p_ITLY**: Y axis motion interlock signal (Normally Closed)

Bit8 **p_ITLX**: X axis motion interlock signal (Normally Closed)

Bit7 **p_ON8**: 8th axis servo ON signal

Bit6 **p_ON7**: 7th axis servo ON signal

Bit5 **p_ON6**: 6th axis servo ON signal

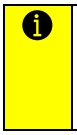
Bit4 **p_ON5**: 5th axis servo ON signal

Bit3 **p_ON4**: 4th axis servo ON signal

Bit2 **p_ONZ**: Z axis servo ON signal

Bit1 **p_ONY**: Y axis servo ON signal

Bit0 **p_ONX**: X axis servo ON signal



The p_ONx bits are used to activate the ON signal sent to the servo motors. A condition of "c_SALM" = "0" is set in the section that activates these bits to prevent the vertical axes from dropping in case of any servo motor alarm. Additionally, in rotary table applications, the motor can be deactivated to relieve it from the load.

The p_ITLx bits are used to prohibit the movement of the axes. They should normally be kept in the "1" position. When set to "0" for any reason, the system behaves as if it is executing all movement commands; however, it does not send these commands to the servo motor. If the given command exceeds the allowed maximum position deviation (PRM120~127), the system enters alarm state. While these bits are in the "0" position, movement commands are accumulated and are sent to the respective axis when the bit is set back to "1". This may result in sudden jumps in the axes.

Address			Description						
1051			**Signals Sent from Internal PLC to CNC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_A8S2	p_A7S2	p_A6S2	p_A5S2	p_A4S2	p_AZS2	p_AYS2	p_AXS2	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_A8S1	p_A7S1	p_A6S1	p_A5S1	p_A4S1	p_AZS1	p_AYS1	p_AXS1

Bit15 **p_A8S2**: Request to link 8th axis rotation to the 2nd Spindle speed command

Bit14 **p_A7S2**: Request to link 7th axis rotation to the 2nd Spindle speed command

Bit13 **p_A6S2**: Request to link 6th axis rotation to the 2nd Spindle speed command

Bit12 **p_A5S2**: Request to link 5th axis rotation to the 2nd Spindle speed command

Bit11 **p_A4S2**: Request to link 4th axis rotation to the 2nd Spindle speed command

Bit10 **p_AZS2**: Request to link Z axis rotation to the 2nd Spindle speed command

Bit9 **p_AYS2**: Request to link Y axis rotation to the 2nd Spindle speed command

Bit8 **p_AXS2**: Request to link X axis rotation to the 2nd Spindle speed command

Bit7 **p_A8S1**: Request to link 8th axis rotation to the 1st Spindle speed command

Bit6 **p_A7S1**: Request to link 7th axis rotation to the 1st Spindle speed command

Bit5 **p_A6S1**: Request to link 6th axis rotation to the 1st Spindle speed command

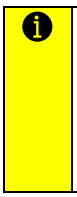
Bit4 **p_A5S1**: Request to link 5th axis rotation to the 1st Spindle speed command

Bit3 **p_A4S1**: Request to link 4th axis rotation to the 1st Spindle speed command

Bit2 **p_AZS1**: Request to link Z axis rotation to the 1st Spindle speed command

Bit1 **p_AYS1**: Request to link Y axis rotation to the 1st Spindle speed command

Bit0 **p_AXS1**: Request to link X axis rotation to the 1st Spindle speed command



With the Pulser3 CNC controller, all axes can be configured as either normal axes or as Spindle 1 or Spindle 2. To configure an axis as a spindle, these bits are set to "1" from the PLC, notifying the system that the axis is selected as a spindle. Once the axis is switched to spindle mode, M3, M4, M5, and Sxxx commands are used for Spindle 1, while M13, M14, M15, and Pxxx commands are used for Spindle 2. The corresponding axis type should be selected as ROT/SPD in the system parameters(SPRM1~7).

Address			Description						
1052			**Signals Sent from Internal PLC to CNC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_RST8	p_RST7	p_RST6	p_RST5	p_RST4	p_RSTZ	p_RSTY	p_RSTX	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_PAX8	p_PAX7	p_PAX6	p_PAX5	p_PAX4	p_PAXZ	p_PAXY	p_PAXX

Bit15 **p_RST8**: Cancel the movement command of the 8th axis controlled by the PLC

Bit14 **p_RST7**: Cancel the movement command of the 7th axis controlled by the PLC

Bit13 **p_RST6**: Cancel the movement command of the 6th axis controlled by the PLC

Bit12 **p_RST5**: Cancel the movement command of the 5th axis controlled by the PLC

Bit11 **p_RST4**: Cancel the movement command of the 4th axis controlled by the PLC

Bit10 **p_RSTZ**: Cancel the movement command of the Z axis controlled by the PLC

Bit9 **p_RSTY**: Cancel the movement command of the Y axis controlled by the PLC

Bit8 **p_RSTX**: Cancel the movement command of the X axis controlled by the PLC

Bit7 **p_PAX8**: Request to transfer 8th axis control to the PLC

Bit6 **p_PAX7**: Request to transfer 7th axis control to the PLC

Bit5 **p_PAX6**: Request to transfer 6th axis control to the PLC

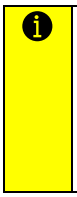
Bit4 **p_PAX5**: Request to transfer 5th axis control to the PLC

Bit3 **p_PAX4**: Request to transfer 4th axis control to the PLC

Bit2 **p_PAXZ**: Request to transfer Z axis control to the PLC

Bit1 **p_PAXY**: Request to transfer Y axis control to the PLC

Bit0 **p_PAXX**: Request to transfer X axis control to the PLC



Any axis can be controlled by the PLC when needed. To control an axis from the PLC, the corresponding **p_PAXx** bit must be set to "1". The CNC checks if there is no movement on the relevant axis to transfer control to the PLC or to take control back from the PLC. If there is movement on the axis or if the CNC's motion buffer is full, this transition does not occur. The current control status of the axis can be monitored using the **c_PAXx** bits. Once an axis is switched to PLC mode, the **p_JPx** and **p_JNx** bits can still be used for JOG movement.

Address			Description						
1053			**Signals Sent from Internal PLC to CNC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_HOM8	p_HOM7	p_HOM6	p_HOM5	p_HOM4	p_HOMZ	p_HOMY	p_HOMX	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_POS8	p_POS7	p_POS6	p_POS5	p_POS4	p_POSZ	p_POSY	p_POSX

Bit15 **p_HOM8**: Request to find home position for 8th axis controlled by PLC

Bit14 **p_HOM7**: Request to find home position for 7th axis controlled by PLC

Bit13 **p_HOM6**: Request to find home position for 6th axis controlled by PLC

Bit12 **p_HOM5**: Request to find home position for 5th axis controlled by PLC

Bit11 **p_HOM4**: Request to find home position for 4th axis controlled by PLC

Bit10 **p_HOMZ**: Request to find home position for Z axis controlled by PLC

Bit9 **p_HOMY**: Request to find home position for Y axis controlled by PLC

Bit8 **p_HOMX**: Request to find home position for X axis controlled by PLC

Bit7 **p_POS8**: Request to movement 8th axis to the specified target in PLC control mode

Bit6 **p_POS7**: Request to movement 7th axis to the specified target in PLC control mode

Bit5 **p_POS6**: Request to movement 6th axis to the specified target in PLC control mode

Bit4 **p_POS5**: Request to movement 5th axis to the specified target in PLC control mode

Bit3 **p_POS4**: Request to movement 4th axis to the specified target in PLC control mode

Bit2 **p_POSZ**: Request to movement Z axis to the specified target in PLC control mode

Bit1 **p_POSY**: Request to movement Y axis to the specified target in PLC control mode

Bit0 **p_POSX**: Request to movement X axis to the specified target in PLC control mode

Address	Description								
1055	**Signals Sent from Internal PLC to CNC**								
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_8NLIM	p_7NLIM	p_6NLIM	p_5NLIM	p_4NLIM	p_ZNLIM	p_YNLIM	p_XNLIM	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_8PLIM	p_7PLIM	p_6PLIM	p_5PLIM	p_4PLIM	p_ZPLIM	p_YPLIM	p_XPLIM

Bit15 **p_8NLIM**: 8th axis negative (-) direction limit sensor signal (Normally Closed)

Bit14 **p_7NLIM**: 7th axis negative (-) direction limit sensor signal (Normally Closed)

Bit13 **p_6NLIM**: 6th axis negative (-) direction limit sensor signal (Normally Closed)

Bit12 **p_5NLIM**: 5th axis negative (-) direction limit sensor signal (Normally Closed)

Bit11 **p_4NLIM**: 4th axis negative (-) direction limit sensor signal (Normally Closed)

Bit10 **p_ZNLIM**: Z axis negative (-) direction limit sensor signal (Normally Closed)

Bit9 **p_YNLIM**: Y axis negative (-) direction limit sensor signal (Normally Closed)

Bit8 **p_XNLIM**: X axis negative (-) direction limit sensor signal (Normally Closed)

Bit7 **p_8PLIM**: 8th axis positive (+) direction limit sensor signal (Normally Closed)

Bit6 **p_7PLIM**: 7th axis positive (+) direction limit sensor signal (Normally Closed)

Bit5 **p_6PLIM**: 6th axis positive (+) direction limit sensor signal (Normally Closed)

Bit4 **p_5PLIM**: 5th axis positive (+) direction limit sensor signal (Normally Closed)

Bit3 **p_4PLIM**: 4th axis positive (+) direction limit sensor signal (Normally Closed)

Bit2 **p_ZPLIM**: Z axis positive (+) direction limit sensor signal (Normally Closed)

Bit1 **p_YPLIM**: Y axis positive (+) direction limit sensor signal (Normally Closed)

Bit0 **p_XPLIM**: X axis positive (+) direction limit sensor signal (Normally Closed)

Address			Description						
1056			**Signals Sent from Internal PLC to CNC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_SN8	p_SN7	p_SN6	p_SN5	p_SN4	p_SNZ	p_SNY	p_SNX	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_SP8	p_SP7	p_SP6	p_SP5	p_SP4	p_SPZ	p_SPY	p_SPX

Bit15 **p_SN8**: 8th axis negative (-) direction stepping command (MPG Mode)

Bit14 **p_SN7**: 7th axis negative (-) direction stepping command (MPG Mode)

Bit13 **p_SN6**: 6th axis negative (-) direction stepping command (MPG Mode)

Bit12 **p_SN5**: 5th axis negative (-) direction stepping command (MPG Mode)

Bit11 **p_SN4**: 4th axis negative (-) direction stepping command (MPG Mode)

Bit10 **p_SNZ**: Z axis negative (-) direction stepping command (MPG Mode)

Bit9 **p_SNY**: Y axis negative (-) direction stepping command (MPG Mode)

Bit8 **p_SNX**: X axis negative (-) direction stepping command (MPG Mode)

Bit7 **p_SP8**: 8th axis positive (+) direction stepping command (MPG Mode)

Bit6 **p_SP7**: 7th axis positive (+) direction stepping command (MPG Mode)

Bit5 **p_SP6**: 6th axis positive (+) direction stepping command (MPG Mode)

Bit4 **p_SP5**: 5th axis positive (+) direction stepping command (MPG Mode)

Bit3 **p_SP4**: 4th axis positive (+) direction stepping command (MPG Mode)

Bit2 **p_SPZ**: Z axis positive (+) direction stepping command (MPG Mode)

Bit1 **p_SPY**: Y axis positive (+) direction stepping command (MPG Mode)

Bit0 **p_SPX**: X axis positive (+) direction stepping command (MPG Mode)

Address			Description						
1057			**Signals Sent from Internal PLC to CNC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_HOV1000	p_HOV100	p_HOV10	p_HOV1		p_SOV4	p_SOV2	p_SOV1	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_ROV4	p_ROV3	p_ROV2	p_ROV1	p_FOV8	p_FOV4	p_FOV2	p_FOV1

Bit15 **p_HOV1000**: MPG mode step ratio 1.000 step selection

Bit14 **p_HOV100**: MPG mode step ratio 0.1000 step selection

Bit13 **p_HOV10**: MPG mode step ratio 0.0100 step selection

Bit12 **p_HOV1**: MPG mode step ratio 0.0010 step selection

Bit11

Bit10 **p_SOV4**: Spindle1 rotation speed ratio bit 2

Bit9 **p_SOV2**: Spindle1 rotation speed ratio bit 1

Bit8 **p_SOV1**: Spindle1 rotation speed ratio bit 0

Bit7 **p_ROV4**: Rapid movement speed ratio 100%

Bit6 **p_ROV3**: Rapid movement speed ratio 50%

Bit5 **p_ROV2**: Rapid movement speed ratio 25%

Bit4 **p_ROV1**: Rapid movement speed ratio 0%

Bit3 **p_FOV8**: Cutting feed ratio bit 3

Bit2 **p_FOV4**: Cutting feed ratio bit 2

Bit1 **p_FOV2**: Cutting feed ratio bit 1

Bit0 **p_FOV1**: Cutting feed ratio bit 0

	To adjust cutting feed ratio			
p_FOV8	**p_FOV4**	**p_FOV2**	**p_FOV1**	**Cutting Feed Ratio**
0	0	0	0	%0
0	0	0	1	%10
0	0	1	0	%20
0	0	1	1	%30
0	1	0	0	%40
0	1	0	1	%50
0	1	1	0	%60
0	1	1	1	%70
1	0	0	0	%80
1	0	0	1	%90
1	0	1	0	%100
1	0	1	1	%110
1	1	0	0	%120
1	1	0	1	%130
1	1	1	0	%140
1	1	1	1	%150

When **PRM332 = 0**, p_ROVx is executed as follows

	To adjust rapid speed ratio			
p_ROV4	**p_ROV3**	**p_ROV2**	**p_ROV1**	**Rapid Speed Ratio**
X	x	x	1	%0
X	x	1	0	%25
X	1	0	0	%50
1	0	0	0	%100

When **PRM332 = 1**, p_ROVx is executed as follows

	To adjust rapid speed ratio			
p_ROV4	**p_ROV3**	**p_ROV2**	**p_ROV1**	**Rapid Speed Ratio**
0	0	0	0	%0
0	0	0	1	%10
0	0	1	0	%20
0	0	1	1	%30
0	1	0	0	%40
0	1	0	1	%50
0	1	1	0	%60
0	1	1	1	%70
1	0	0	0	%80
1	0	0	1	%90
1	0	1	0	%100
1	0	1	1	%100
1	1	0	0	%100
1	1	0	1	%100
1	1	1	0	%100
1	1	1	1	%100

	To adjust spindle1 rotation speed ratio			
-	**p_SOV4**	**p_SOV2**	**p_SOV1**	**Spindle1 Rotation Speed Ratio**
-	0	0	0	%50
-	0	0	1	%60
-	0	1	0	%70
-	0	1	1	%80
-	1	0	0	%90
-	1	0	1	%100
-	1	1	0	%110
-	1	1	1	%120

"When the cutting feed ratio is set to 0%, all movements, including RAPID movements, are paused.

Address				Description					
1058				**Signals Sent from Internal PLC to CNC**					
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_ESP	p_STP	p_STT	p_HOLD	p_ERST	p_RAPID	p_KEY	p_ITL_ALL	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_DRN	p_BDT	p_MLK	p_SBK	p_OPS	p_MODE4	p_MODE2	p_MODE1

Bit15 **p_ESP**: Emergency Stop signal (Normally Closed)

Bit14 **p_STP**: Automatic Program Stop (Feed Hold) (Normally Closed)

Bit13 **p_STT**: Automatic Program Start

Bit12 **p_HOLD**: Axis Motion Hold

Bit11 **p_ERST**: External RESET signal

Bit10 **p_RAPID**: RAPID movement selection in JOG mode. Dry-Run rapid movement selection

Bit9 **p_KEY**: Program Editing/Deletion Lock

Bit8 **p_ITL_ALL**: Motion Interlock for All Axes (Normally Closed)

Bit7 **p_DRN**: Function to Perform All Cutting Operations at Maximum Speed (Dry Run)

Bit6 **p_BDT**: Function to Skip Lines Starting with '/' (Block Delete)

Bit5 **p_MLK**: Function to Prohibit Axis Movement (Machine Lock)

Bit4 **p_SBK**: Single Block Function for Each START Signal (Single Block)

Bit3 **p_OPS**: Optional Stop Active (M01)

Bit2 **p_MODE4**: Operation Mode Selection Bit 2

Bit1 **p_MODE2**: Operation Mode Selection Bit 1

Bit0 **p_MODE1**: Operation Mode Selection Bit 0

Operation Mode Selection

-	p_MODE4	p_MODE2	p_MODE1	Operation Mode
-	0	0	0	MDI Mode (Manual Data Input – Single Block Program Execution)
-	0	0	1	EDIT Mode (Program Loading/Editing)
-	0	1	0	AUTO Mode (Automatic Operation Mode)
-	0	1	1	JOG Mode (Manual Control Mode)
-	1	0	0	MPG Mode (Handwheel Mode)
-	1	0	1	HOME Mode (Reference Positioning Mode)

If the system is running a program in automatic mode, it will not switch to another mode even if selected. The program must be paused, stopped, or completed.

The p_ITL_ALL bit is used to prohibit the movement of all axes. It should normally be kept in the "1" position. When set to "0" for any reason, the system behaves as if it is executing all movement commands; however, it does not send these commands to the servo motor. If the given command exceeds the allowed maximum position deviation (PRM120~127), the system enters alarm state. While this bit is in the "0" position, movement commands are accumulated and are sent to the respective axis when the bit is set back to "1". This may result in sudden jumps in the axes.

Address			Description						
1059			**Signals Sent from Internal PLC to CNC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_FIN	p_RTAP	p_SPOSC	p_RWD	p_FWD	p_RESUME	p_SKIP	p_SDIR	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_SSP	p_SLOW	p_SPOS	p_SAR	p_GRO4	p_GRO3	p_GRO2	p_GRO1

Bit15 **p_FIN**: M, S, T, and B commands are completed. The next line can be proceeded with.

Bit14 **p_RTAP**: Rigid tapping is active (Tapping with encoder synchronization).

Bit13 **p_SPOSC**: Spindle 1 orientation is completed in canned cycles.

Bit12 **p_RWD**: Request for program reverse simulation.

Bit11 **p_FWD**: Request for program forward simulation.

Bit10 **p_RESUME**: Request to continue from the point where the program was stopped.

Bit9 **p_SKIP**: Request to skip without completing movement in G31 line.

Bit8 **p_SDIR**: 1st Spindle Rotation Direction (0: CW / 1: CCW).

Bit7 **p_SSP**: 1st Spindle STOP (Normally Closed).

Bit6 **p_SLOW**: 1st Spindle low speed command.

Bit5 **p_SPOS**: 1st Spindle orientation command.

Bit4 **p_SAR**: 1st Spindle has reached the desired speed (Speed Arrived).

Bit3 **p_GRO4**: In manual gear shift mode, the user selected the 4th gear.

Bit2 **p_GRO3**: In manual gear shift mode, the user selected the 3rd gear.

Bit1 **p_GRO2**: In manual gear shift mode, the user selected the 2nd gear.

Bit0 **p_GRO1**: In manual gear shift mode, the user selected the 1st gear.

Address				Description					
1060				**Signals Sent from Internal PLC to CNC**					
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_ALM15	p_ALM14	p_ALM13	p_ALM12	p_ALM11	p_ALM10	p_ALM9	p_ALM8	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_ALM7	p_ALM6	p_ALM5	p_ALM4	p_ALM3	p_ALM2	p_ALM1	p_ALM0

Bit15 **p_ALM15**: PLC alarm 15

Bit14 **p_ALM14**: PLC alarm 14

Bit13 **p_ALM13**: PLC alarm 13

Bit12 **p_ALM12**: PLC alarm 12

Bit11 **p_ALM11**: PLC alarm 11

Bit10 **p_ALM10**: PLC alarm 10

Bit9 **p_ALM9**: PLC alarm 9

Bit8 **p_ALM8**: PLC alarm 8

Bit7 **p_ALM7**: PLC alarm 7

Bit6 **p_ALM6**: PLC alarm 6

Bit5 **p_ALM5**: PLC alarm 5

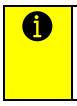
Bit4 **p_ALM4**: PLC alarm 4

Bit3 **p_ALM3**: PLC alarm 3

Bit2 **p_ALM2**: PLC alarm 2

Bit1 **p_ALM1**: PLC alarm 1

Bit0 **p_ALM0**: PLC alarm 0



These bits can be used to indicate an alarm related to the machine. If any of these bits is set to "1", the system will enter an alarm state, and if the program is running in automatic mode, it will be stopped. The description of each alarm should be written in HSC Studio.

Address			Description						
1061			**Signals Sent from Internal PLC to CNC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	p_ALM31	p_ALM30	p_ALM29	p_ALM28	p_ALM27	p_ALM26	p_ALM25	p_ALM24	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_ALM23	p_ALM22	p_ALM21	p_ALM20	p_ALM19	p_ALM18	p_ALM17	p_ALM16

Bit15 **p_ALM31**: PLC alarm 31

Bit14 **p_ALM30**: PLC alarm 30

Bit13 **p_ALM29**: PLC alarm 29

Bit12 **p_ALM28**: PLC alarm 28

Bit11 **p_ALM27**: PLC alarm 27

Bit10 **p_ALM26**: PLC alarm 26

Bit9 **p_ALM25**: PLC alarm 25

Bit8 **p_ALM24**: PLC alarm 24

Bit7 **p_ALM23**: PLC alarm 23

Bit6 **p_ALM22**: PLC alarm 22

Bit5 **p_ALM21**: PLC alarm 21

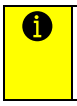
Bit4 **p_ALM20**: PLC alarm 20

Bit3 **p_ALM19**: PLC alarm 19

Bit2 **p_ALM18**: PLC alarm 18

Bit1 **p_ALM17**: PLC alarm 17

Bit0 **p_ALM16**: PLC alarm 16



These bits can be used to indicate an alarm related to the machine. If any of these bits is set to "1", the system will enter an alarm state, and if the program is running in automatic mode, it will be stopped. The description of each alarm should be written in HSC Studio.

Address			Description						
1062			**Signals Sent from Internal PLC to CNC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
							p_SLIM2	p_S2OV4	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		p_S2OV2	p_S2OV1	p_SDIR2	p_SSP2		p_MSIM	p_MPGRUN	p_RAPIDLOCK

Bit15 **p_PEND**: Pen down feedback for plotters/cutting knife tables

Bit14 **p_PENU**: Pen up feedback for plotters/cutting knife tables

Bit13

Bit12

Bit11

Bit10

Bit9 **p_SLIM2**: Activate 2nd software limits (PRM224~239)

Bit8 **p_S2OV4**: Spindle1 rotation speed ratio bit 2

Bit7 **p_S2OV2**: Spindle2 rotation speed ratio bit 1

Bit6 **p_S2OV1**: Spindle2 rotation speed ratio bit 0

Bit5 **p_SDIR2**: Spindle2 Rotation Direction (0: CW / 1: CCW)

Bit4 **p_SSP2**: Spindle2 STOP (Normally Closed)

Bit3

Bit2 **p_MSIM**: Function to skip M codes

Bit1 **p_MPGRUN**: Program advancement function with handwheel

Bit0 **p_RAPIDLOCK**: Request to prohibit rapid movements

	To adjust spindle2 rotation speed ratio			
-	**p_S2OV4**	**p_S2OV2**	**p_S2OV1**	**Spindle2 Rotation Speed Ratio**
-	0	0	0	%50
-	0	0	1	%60
-	0	1	0	%70
-	0	1	1	%80
-	1	0	0	%90
-	1	0	1	%100
-	1	1	0	%110
-	1	1	1	%120

p_MSIM bit should be used with caution. When this function is activated, all user M codes are assumed to be processed and are skipped. While this function is active, all M codes, including those for the spindle, are disabled. In such a case, the part will move without the spindle rotating.

Address			Description						
1063			**Signals Sent from Internal PLC to CNC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
			p_GON	p_LSP	p_LSC	p_LZNM	p_LSIM	p_LTEST	p_RESRDY

Bit15

Bit14

Bit13

Bit12

Bit11

Bit10

Bit9

Bit8

Bit7

Bit6 **p_GON**: Go to the specified part number(N Number).

Bit5 **p_LSP**: Activate laser single part cutting mode.

Bit4 **p_LSC**: Activate single cutting mode for laser.

Bit3 **p_LZNM**: In laser cutting, no Z movement is performed in G00.1 commands

Bit2 **p_LSIM**: Activate laser simulation function

Bit1 **p_LTEST**: Activate laser test cutting function

Bit0 **p_RESRDY**: Laser resonator ready

These signals are only valid in laser cutting software. They are not included in standard software.

Address			Description						
1064			**Signals Sent from Internal PLC to CNC**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
			p_PPTR	p_PMRK	p_PRIPC	p_PSSRF	p_PTEST	p_PSIM	p_AHCOFF

Bit15

Bit14

Bit13

Bit12

Bit11

Bit10

Bit9

Bit8

Bit7

Bit6 **p_PPTR**: Activate plasma pointer.

Bit5 **p_PMRK**: Activate plasma marker.

Bit4 **p_PRIPC**: Activate plasma rip cut cutting mode.

Bit3 **p_PSSRF**: Activate plasma sheet surface cutting mode.

Bit2 **p_PTEST**: Activate plasma cutting test function.

Bit1 **p_PSIM**: Activate plasma cutting simulation function.

Bit0 **p_AHCOFF**: Plasma cutting AHC (Automatic Z Height Control) disabled.

These signals are only valid in plasma cutting software. They are not included in standard software.

8.9. Machine Panel LEDs (MP1)

Address			Description						
1092			**MP1 Machine Panel LEDs**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	ml_JN	ml_RAPID	ml_JP	ml_U	ml_A	ml_Z	ml_Y	ml_X	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		ml_ROV100	ml_ROV50	ml_ROV25	ml_ROV0	ml_RESET	ml_STOP	ml_START	

Bit15 **ml_JN**: JOG (-) direction movement LED

Bit14 **ml_RAPID**: RAPID speed selection LED

Bit13 **ml_JP**: JOG (+) direction movement LED

Bit12 **ml_U**: U / (5th) axis selection LED

Bit11 **ml_A**: A / (4th) axis selection LED

Bit10 **ml_Z**: Z axis selection LED

Bit9 **ml_Y**: Y axis selection LED

Bit8 **ml_X**: X axis selection LED

Bit7 **ml_ROV100**: Rapid motion (G00) 100% speed ratio selection LED

Bit6 **ml_ROV50**: Rapid motion (G00) 50% speed ratio selection LED

Bit5 **ml_ROV25**: Rapid motion (G00) 25% speed ratio selection LED

Bit4 **ml_ROV0**: Rapid motion (G00) 0% speed ratio selection LED

Bit3 **ml_RESET**: RESET button LED

Bit2 **ml_STOP**: Automatic stop button light

Bit1 **ml_START**: Start button light.

Bit0

These definitions are based on the standard MP1 machine panel. On other machine panels, the definitions of these addresses may differ.

Address			Description						
1093			**MP1 Machine Panel LEDs**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		ml_FN2	ml_FN1	ml_HOME	ml_TOOL	ml_COOL	ml_SCCW	ml_SSTOP	ml_SCW

Bit15

Bit14

Bit13

Bit12

Bit11

Bit10

Bit9

Bit8

Bit7 **ml_FN2**: General-purpose function button 2 LED

Bit6 **ml_FN1**: General-purpose function button 1 LED

Bit5 **ml_HOME**: HOME button LED

Bit4 **ml_TOOL**: TOOL button LED

Bit3 **ml_COOL**: COOL button LED

Bit2 **ml_SCCW**: Spindle counterclockwise rotation button LED

Bit1 **ml_SSTOP**: Spindle stop button LED

Bit0 **ml_SCW**: Spindle clockwise rotation button LED

ℹ	These definitions are based on the standard MP1 machine panel. On other machine panels, the definitions of these addresses may differ.

8.10. PLC Axis Commands

Address	Description
	PLC Axis Commands
1100~1101	p_TLIMX
1102~1103	p_TLIMY
1104~1105	p_TLIMZ
1106~1107	p_TLIM4
1108~1109	p_TLIM5
1110~1111	p_TLIM6
1112~1113	p_TLIM7
1114~1115	p_TLIM8

Bit0-31 **p_TLIMX**: X Axis maximum torque value

Bit0-31 **p_TLIMY**: Y Axis maximum torque value

Bit0-31 **p_TLIMZ**: Z Axis maximum torque value

Bit0-31 **p_TLIM4**: 4th Axis maximum torque value

Bit0-31 **p_TLIM5**: 5th Axis maximum torque value

Bit0-31 **p_TLIM6**: 6th Axis maximum torque value

Bit0-31 **p_TLIM7**: 7th Axis maximum torque value

Bit0-31 **p_TLIM8**: 8th Axis maximum torque value

ℹ	p_TLIMx addresses are only valid in the Pulser3-ECAT mode. Regardless of whether an axis is in PLC mode, they have been continuously active. If the maximum torque value is reduced to the point where the axis cannot move, a movement command is given, and the torque is then increased again, sudden jumps may occur on the corresponding axis.

Address	Description
	PLC Axis Commands
1116~1117	p_VELX
1118~1119	p_VELY
1120~1121	p_VELZ
1122~1123	p_VEL4
1124~1125	p_VEL5
1126~1127	p_VEL6
1128~1129	p_VEL7
1130~1131	p_VEL8

Bit0-31 **p_VELX**: Target speed value of the X axis during PLC control mode

Bit0-31 **p_VELY**: Target speed value of the Y axis during PLC control mode

Bit0-31 **p_VELZ**: Target speed value of the Z axis during PLC control mode

Bit0-31 **p_VEL4**: Target speed value of the 4th aAxis during PLC control mode

Bit0-31 **p_VEL5**: Target speed value of the 5th axis during PLC control mode

Bit0-31 **p_VEL6**: Target speed value of the 6th axis during PLC control mode

Bit0-31 **p_VEL7**: Target speed value of the 7th axis during PLC control mode

Bit0-31 **p_VEL8**: Target speed value of the 8th axis during PLC control mode

Address	Description
	PLC Axis Commands
1132~1133	p_TARX
1134~1135	p_TARY
1136~1137	p_TARZ
1138~1139	p_TAR4
1140~1141	p_TAR5
1142~1143	p_TAR6
1144~1145	p_TAR7
1146~1147	p_TAR8

Bit0-31 **p_TARX**: Target position of the X Axis during PLC control mode movement

Bit0-31 **p_TARY**: Target position of the Y Axis during PLC control mode movement

Bit0-31 **p_TARZ**: Target position of the Z Axis during PLC control mode movement

Bit0-31 **p_TAR4**: Target position of the 4th Axis during PLC control mode movement

Bit0-31 **p_TAR5**: Target position of the 5th Axis during PLC control mode movement

Bit0-31 **p_TAR6**: Target position of the 6th Axis during PLC control mode movement

Bit0-31 **p_TAR7**: Target position of the 7th Axis during PLC control mode movement

Bit0-31 **p_TAR8**: Target position of the 8th Axis during PLC control mode movement

8.11. Memory Area Allocated for the User

A general-purpose memory area of 600 words is available for use with the Internal PLC. It can be freely used during installing.

Address	Description
	General-Purpose Memory Area Allocated for the User
1200	
1201	
.	
.	
.	
1799	

A general-purpose holding memory area of 200 words is available for use with the Internal PLC. This area remains unchanged when power is lost. It can be freely used during installation.

Address	Description
	General-Purpose Holding Memory Area Allocated for the User
1800	
1801	
.	
.	
.	
1999	

8.12. Internal PLC Management

Address	Description
	PLC Management
2000~2001	PLC Loader handshake command
2002~2003	PLC Loader handshake response
2004~2005	PLC Loader command
2006~2007	PLC Loader status
2008~2009	PLC Loader address
2010~2011	PLC Loader data length
2012~2013	PLC Loader CRC
2014~2015	PLC Loader CRC2
2020~2021	PLC Loader data start

This area is used by HSC Studio to perform PLC loading operations. The range from 2000 to 3999 must not be used in the project.

8.13. Real-Time Status Information Sent from CNC to HMI

8.13.0. Actual Machine Coordinates of Axes

Address	Description	Unit
4000~4001	Actual machine coordinate of X axis	mm / inch
4002~4003	Actual machine coordinate of Y axis	**Minimum**
4004~4005	Actual machine coordinate of Z axis	-999999999
4006~4007	Actual machine coordinate of 4th axis	**Maximum**
4008~4009	Actual machine coordinate of 5th axis	999999999
4010~4011	Actual machine coordinate of 6th axis	**Format**
4012~4013	Actual machine coordinate of 7th axis	0.0000
4014~4015	Actual machine coordinate of 8th axis	

Actual machine coordinates are determined by considering the reference points of the axes as zero. The machine coordinates of the axes in the system can be monitored in real-time on the operator screen using the addresses specified above. In HSC Studio, monitoring can be performed on the page by selecting a numeric object with the data format set to Signed 32-bit (Signed_32bit). These addresses are read-only and cannot be modified.

8.13.1. Actual Absolute Coordinates of Axes

Address	Description	Unit
4020~4021	Actual absolute coordinate of X axis	mm / inch
4022~4023	Actual absolute coordinate of Y axis	**Minimum**
4024~4025	Actual absolute coordinate of Z axis	-999999999
4026~4027	Actual absolute coordinate of 4th axis	**Maximum**
4028~4029	Actual absolute coordinate of 5th axis	999999999
4030~4031	Actual absolute coordinate of 6th axis	**Format**
4032~4033	Actual absolute coordinate of 7th axis	0.0000
4034~4035	Actual absolute coordinate of 8th axis	

Absolute coordinates are generated by considering the current selected work offset value as zero. The absolute coordinates of the axes in the system can be monitored in real-time on the operator screen using the addresses mentioned above. In HSC Studio, monitoring can be performed on the page by selecting the numeric object with the data format set to Signed 32-bit (Signed_32bit). These addresses are read-only and cannot be written to.

8.13.2. Actual Relative Coordinates of Axes

Address	Description	Unit
4040~4041	Actual relative coordinate of X axis	mm / inch
4042~4043	Actual relative coordinate of Y axis	**Minimum**
4044~4045	Actual relative coordinate of Z axis	-999999999
4046~4047	Actual relative coordinate of 4th axis	**Maximum**
4048~4049	Actual relative coordinate of 5th axis	999999999
4050~4051	Actual relative coordinate of 6th axis	**Format**
4052~4043	Actual relative coordinate of 7th axis	0.0000
4054~4055	Actual relative coordinate of 8th axis	

8.13.3. Actual Distance to Target Coordinates of Axes

Address	Description	Unit
4060~4061	Actual distance to target coordinate of X axis	mm / inch
4062~4063	Actual distance to target coordinate of Y axis	**Minimum**
4064~4065	Actual distance to target coordinate of Z axis	-999999999
4066~4067	Actual distance to target coordinate of 4th axis	**Maximum**
4068~4069	Actual distance to target coordinate of 5th axis	999999999
4070~4071	Actual distance to target coordinate of 6th axis	**Format**
4072~4073	Actual distance to target coordinate of 7th axis	0.0000
4074~4075	Actual distance to target coordinate of 8th axis	

8.13.4. Last Pulse Target Commands Sent to Servo Motors

Address	Description	Unit
4080~4081	Last pulse position sent to the X axis servo motor	pulse
4082~4083	Last pulse position sent to the Y axis servo motor	**Minimum**
4084~4085	Last pulse position sent to the Z axis servo motor	-999999999
4086~4087	Last pulse position sent to the 4th axis servo motor	**Maximum**
4088~4089	Last pulse position sent to the 5th axis servo motor	999999999
4090~4091	Last pulse position sent to the 6th axis servo motor	**Format**
4092~4093	Last pulse position sent to the 7th axis servo motor	0
4094~4095	Last pulse position sent to the 8th axis servo motor	

8.13.5. Actual Encoder Counter Values of Axes

Address	Description	Unit
4100~4101	Actual encoder value of X axis	pulse
4102~4103	Actual encoder value of Y axis	**Minimum**
4104~4105	Actual encoder value of Z axis	-999999999
4106~4107	Actual encoder value of th axis	**Maximum**
4108~4109	Actual encoder value of 5th axis	999999999
4110~4111	Actual encoder value of 6th axis	**Format**
4112~4113	Actual encoder value of 7th axis	0
4114~4115	Actual encoder value of 8th axis	

8.13.6. Actual Position Deviation Value of Axes

Address	Description	Unit
4120~4121	X axis actual position deviation	mm / inch
4122~4123	Y axis actual position deviation	**Minimum**
4124~4125	Z axis actual position deviation	-999999999
4126~4127	4th axis actual position deviation	**Maximum**
4128~4129	5th axis actual position deviation	999999999
4130~4131	6th axis actual position deviation	**Format**
4132~4133	7th axis actual position deviation	0.0000
4134~4135	8th axis actual position deviation	

8.13.7. Axes Reference Operation Completed

Address	Description	Unit
4140~4141	X axis reference operation completed	
4142~4143	Y axis reference operation completed	**Minimum**
4144~4145	Z axis reference operation completed	0
4146~4147	4th axis reference operation completed	**Maximum**
4148~4149	5th axis reference operation completed	1
4150~4151	6th axis reference operation completed	**Format**
4152~4153	7th axis reference operation completed	0
4154~4155	8th axis reference operation completed	

8.13.8. Slot (Sequence) Number Assigned to the Axes

Address	Description	Unit
4180~4181	Slot to which the X axis is connected	
4182~4183	Slot to which the Y axis is connected	**Minimum**
4184~4185	Slot to which the Z axis is connected	0
4186~4187	Slot to which the 4th axis is connected	**Maximum**
4188~4189	Slot to which the 5th axis is connected	Number of Axes
4190~4191	Slot to which the 6th axis is connected	**Format**
4192~4193	Slot to which the 7th axis is connected	0
4194~4195	Slot to which the 8th axis is connected	

8.13.9. Status of the Axes 'Servo READY' Signals

Address	Description	Unit
4200~4201	X axis 'Servo READY' status	
4202~4203	Y axis 'Servo READY' status	**Minimum**
4204~4205	Z axis 'Servo READY' status	0
4206~4207	4th axis 'Servo READY' status	**Maximum**
4208~4209	5th axis 'Servo READY' status	1
4210~4211	6th axis 'Servo READY' status	**Format**
4212~4213	7th axis 'Servo READY' status	0
4214~4215	8th axis 'Servo READY' status	

8.13.10. Status of the Axes' 'Servo-ON' Signals

Address	Description	Unit
4220~4221	X axis 'Servo -ON' status	
4222~4223	Y axis 'Servo -ON' status	**Minimum**
4224~4225	Z axis 'Servo -ON' status	0
4226~4227	4th axis 'Servo -ON' status	**Maximum**
4228~4229	5th axis 'Servo -ON' status	1
4230~4231	6th axis 'Servo -ON' status	**Format**
4232~4233	7th axis 'Servo -ON' status	0
4234~4235	8th axis 'Servo -ON' status	

8.13.11. Information of the Axes within the In Position Range

Address	Description	Unit
4240~4241	X axis in-position value	
4242~4243	Y axis in-position value	**Minimum**
4244~4245	Z axis in-position value	0
4246~4247	4th axis in-position value	**Maximum**
4248~4249	5th axis in-position value	1
4250~4251	6th axis in-position value	**Format**
4252~4253	7th axis in-position value	0
4254~4255	8th axis in-position value	

8.13.12. Cutting Feed Status

Address	Description	Minimum	Maximum	Format	Unit
4400~4401	Last given cutting feed command	0	99999999	0.0000	unit/min
4402~4403	Cutting feed rate ratio	0	150	0	%
4404~4405	Scaled actual cutting feed ratio	0	99999999	0.0000	unit /min
4406~4407	Real cutting feed rate	0	99999999	0.0000	unit /min
4410~4411	Actual cutting feed rate in JOG mode	0	99999999	0.0000	unit /min

8.13.13. Spindle1 Status

Address	Description	Minimum	Maximum	Format	Unit
4420~4421	Last given spindle1 speed command	0	99999	0	rpm/min
4422~4423	Spindle1 speed ratio	50	120	0	%
4424~4425	Actual spindle1 speed	0	99999	0	rpm/min
4426~4427	Actual real spindle1 speed (Encoder)	0	99999	0	rpm/min
4428~4429	Spindle1 encoder count value	-2147483648	2147483647	0	pulse
4438~4439	Actual spindle1 angle	0	3600000	0.0000	degree

8.13.14. Spindle2 Status

Address	Description	Minimum	Maximum	Format	Unit
4430~4431	Last given spindle2 speed command	0	99999	0	rpm/min
4432~4433	Spindle2 speed ratio	50	120	0	%
4434~4435	Ratioed spindle2 speed	0	99999	0	rpm/min

8.13.15. CNC General Status

Address	Description	Minimum	Maximum	Format	Unit
4440~4441	Last given tool number command	0	99999	0	-
4442~4443	Number of parts produced	0	999999999	0	quantity
4444~4445	G-code program cycle time - Seconds	0	60	0	sec
4446~4447	G-code program cycle time - Minutes	0	60	0	min
4448~4449	G-code program cycle time - Hours	0	999	0	hour
4450~4451	Actual rapid feed rate ratio	0	100	0	%
4452~4453	Actual M.P.G. step ratio	1	1000	0	step
4454~4455	Actual system operating mode	0	5	0	
4456~4457	Emergency stop status	0	1	0	bool
4458~4459	Actual system status (Ready/Not ready)	0	1	0	bool
4460~4461	Last selected G-code program number (Oxxxx)	0	9999	0	
4462~4463	Last processed line number (Nxxxx)	0	999999	0	
4466~4467	Remaining part count before alarm	0	999999999	0	
4468~4469	Working time – Seconds	0	60	0	sec
4470~4471	Working time – Minutes	0	60	0	min
4472~4473	Working time – Hours	0	999	0	hour
4474~4475	Actual system running status	0	1	0	bool
4476~4477	Total system uptime seconds	0	999999999	0	sec
4478~4479	Total time the system has operated in automatic mode	0	999999999	0	sec
4480~4481	Total time the system has performed cutting operations	0	999999999	0	sec
4482~4483	Total time the system has remained in alarm state	0	999999999	0	sec
4484~4485	Total piercing count (Plasma/Laser)	0	999999999	0	quantity
4490~4491	Index number of the currently processed line	0	999999999	0	
4492~4493	Index number of the stopped line	0	999999999	0	
4494~4495	Current value of the tool life counter	0	999999999	0	meter

8.13.16. Last Executed Commands

Address	Description	Minimum	Maximum	Format	Unit
4500~4501	Last executed G-code for Group 0	0	999	0.0	
4502~4503	Last executed G-code for Group 1	0	999	0.0	
4504~4505	Last executed G-code for Group 2	0	999	0.0	
4506~4507	Last executed G-code for Group 3	0	999	0.0	
4508~4509	Last executed G-code for Group 4	0	999	0.0	
4510~4511	Last executed G-code for Group 5	0	999	0.0	
4512~4513	Last executed G-code for Group 6	0	999	0.0	
4514~4515	Last executed G-code for Group 7	0	999	0.0	
4516~4517	Last executed G-code for Group 8	0	999	0.0	
4518~4519	Last executed G-code for Group 9	0	999	0.0	
4520~4521	Last executed G-code for Group 10	0	999	0.0	
4522~4523	Last executed G-code for Group 11	0	999	0.0	
4524~4525	Last executed G-code for Group 12	0	999	0.0	
4526~4527	Last executed G-code for Group 13	0	999	0.0	
4528~4529	Last executed G-code for Group 14	0	999	0.0	
4530~4531	Last executed G-code for Group 15	0	999	0.0	
4532~4533	Last executed G-code for Group 16	0	999	0.0	
4534~4535	Last executed G-code for Group 17	0	999	0.0	
4536~4537	Last executed G-code for Group 18	0	999	0.0	
4538~4539	Last executed G-code for Group 19	0	999	0.0	
4540~4541	Last executed M-code	0	999	0	
4542~4543	Last executed D-code	0	999	0	
4544~4545	Last executed H-code	0	999	0	
4560~4561	Selected work offset index	0	8	0	
4562~4563	Selected work offset value of X axis	-999999999	999999999	0.0000	mm/inch
4564~4565	Selected work offset value of Y axis	-999999999	999999999	0.0000	mm/inch
4566~4567	Selected work offset value of Z axis	-999999999	999999999	0.0000	mm/inch
4568~4569	Selected work offset value of 4th axis	-999999999	999999999	0.0000	mm/inch
4570~4571	Selected work offset value of 5th axis	-999999999	999999999	0.0000	mm/inch
4572~4573	Selected work offset value of 6th axis	-999999999	999999999	0.0000	mm/inch
4574~4575	Selected work offset value of 7th axis	-999999999	999999999	0.0000	mm/inch
4576~4577	Selected work offset value of 8th axis	-999999999	999999999	0.0000	mm/inch

8.13.17. Minimum and maximum motion coordinates of the selected program

Address	Description	Unit
4620~4621	X minimum position of the selected program (machine coordinate)	mm / inch
4622~4623	Y minimum position of the selected program (machine coordinate)	**Minimum**
4624~4625	Z minimum position of the selected program (machine coordinate)	-999999999
4626~4627	4th minimum position of the selected program (machine coordinate)	**Maximum**
4628~4629	5th minimum position of the selected program (machine coordinate)	999999999
4630~4631	6th minimum position of the selected program (machine coordinate)	**Format**
4632~4633	7th minimum position of the selected program (machine coordinate)	0.0000
4634~4635	8th minimum position of the selected program (machine coordinate)	

Address	Description	Unit
4640~4641	X maximum position of the selected program (machine coordinate)	mm / inch
4642~4643	Y maximum position of the selected program (machine coordinate)	**Minimum**
4644~4645	Z maximum position of the selected program (machine coordinate)	-999999999
4646~4647	4th maximum position of the selected program (machine coordinate)	**Maximum**
4648~4649	5th maximum position of the selected program (machine coordinate)	999999999
4650~4651	6th maximum position of the selected program (machine coordinate)	**Format**
4652~4653	7th maximum position of the selected program (machine coordinate)	0.0000
4654~4655	8th maximum position of the selected program (machine coordinate)	

Address	Description	Unit
4660~4661	Amount of movement of X axis in the selected program	mm / inch
4662~4663	Amount of movement of Y axis in the selected program	**Minimum**
4664~4665	Amount of movement of Z axis in the selected program	-999999999
4666~4667	Amount of movement of 4th axis in the selected program	**Maximum**
4668~4669	Amount of movement of 5th axis in the selected program	999999999
4670~4671	Amount of movement of 6th axis in the selected program	**Format**
4672~4673	Amount of movement of 7th axis in the selected program	0.0000
4674~4675	Amount of movement of 8th axis in the selected program	

8.13.18. Real-Time Status Indicators of Laser Cutting

Address	Description	Minimum	Maximum	Format	Unit
4700~4701	Laser sensor analog value	0	999999999	0	
4702~4703	**Laser sensor position**	-999999999	999999999	0.0000	mm/inch
4704~4705	Current focus target of laser	-999999999	999999999	0.0000	mm/inch
4706~4707	Current height target of laser	-999999999	999999999	0.0000	mm/inch
4708~4709	Actual pressure of laser	0	999999999	0.00	bar
4710~4711	Current pressure target of laser	0	999999999	0.00	bar
4712~4713	Actual pressure analog input value	0	999999999	0	
4714~4715	Actual pressure analog output value	0	999999999	0	
4716~4717	Actual power of laser	0	999999999	0	watt
4718~4719	Current power target of laser	0	999999999	0	watt
4720~4721	Actual power analog input value	0	999999999	0	
4722~4723	Actual power analog output value	0	999999999	0	
4724~4725	Current duty target of laser	0	100	0	%
4726~4727	Current duty target analog output value of laser	0	100	0	
4728~4729	Current frequency target of laser	0	5000	0	Hz
4730~4731	Laser control module current status	0	23	0	
4740~4741	Actual cutting number	0	999999999	0	quantity
4742~4743	Actual part number	0	999999999	0	quantity

These values can only be read in the laser cutting head control software.

8.13.19. Real-Time Status Indicators of Plasma Cuting

Address	Description	Minimum	Maximum	Format	Unit
4780~4781	Plasma actual analog input value	0	999999999	0	
4782~4783	AHC actual calculated arc voltage	0	999999999	0.00	V

These values can only be read in the plasma cutting head control software.

8.13.20. System Performance, Version, and Add-on Informations

Address	Description	Minimum	Maximum	Format	Unit
4800~4801	Main loop execution time of the CNC system	0	2147483647	0	microsecond
4802~4803	Maximum main loop execution time of the CNC system	0	2147483647	0	microsecond
4808~4809	CNC RT loop interrupt time	0	2147483647	0	microsecond
4810~4811	CNC RT loop maximum interrupt time	0	2147483647	0	microsecond
4812~4813	Time spent in real-time interrupt	0	2147483647	0	microsecond
4814~4815	Maximum time spent in real-time interrupt	0	2147483647	0	microsecond
4816~4817	RTEX interrupt execution time	0	2147483647	0	microsecond
4818~4819	Measured maximum RTEX communication interrupt time	0	2147483647	0	microsecond
4820~4821	Servo communication time	0	2147483647	0	microsecond
4822~4823	Measured maximum time for servo communication	0	2147483647	0	microsecond
4824~4825	PLC cycle time	0	2147483647	0	microsecond
4826~4827	Measured maximum PLC cycle time	0	2147483647	0	microsecond
4828~4829	PLC operating status	0	2147483647	0	
4830~4831	PLC error code	0	2147483647	0	
4836~4837	SD Card maximum block read time	0	2147483647	0	microsecond
4838~4839	SD Card maximum block write time	0	2147483647	0	microsecond
5000~5001	Display a pop-up on the screen for file operations	0	1	0	
5002~5003	Popup bar value (0-100)	0	100	0	%
5020~5021	Software version of the cnc kernel(major)	0	2147483647	0	
5022~5023	Software version of the cnc kernel (minor)	0	2147483647	0	
5024~5025	Software version of the laser/plasma module	0	2147483647	0	
5030~5031	Software add-ons	0	2147483647	0	

Address				Description					
5030				**Software add-ons**					
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
							PLASMA	LASER	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
							ECAT	RTEX	PLSE

Bit9 **PLASMA**: Plasma control module active

Bit8 **LASER**: Laser control module active

Bit2 **ECAT**: Device type: Pulser3-ECAT

Bit1 **RTEX**: Device type: Pulser3-RTEX

Bit0 **PLSE**: Device type: Pulser3-PLSE

8.14. Compensation and Offset Values (Tool / Work Offset)

8.14.0. Tool Length Compensation Values (Milling Model)

Address	Description	Minimum	Maximum	Format	Unit
6800~6801	Length compensation value of tool 1	-2147483648	2147483647	0.0000	mm/inch
6802~6803	Length compensation value of tool 2	-2147483648	2147483647	0.0000	mm/inch
6804~6805	Length compensation value of tool 3	-2147483648	2147483647	0.0000	mm/inch
6806~6807	Length compensation value of tool 4	-2147483648	2147483647	0.0000	mm/inch
6808~6809	Length compensation value of tool 5	-2147483648	2147483647	0.0000	mm/inch
6810~6811	Length compensation value of tool 6	-2147483648	2147483647	0.0000	mm/inch
6812~6813	Length compensation value of tool 7	-2147483648	2147483647	0.0000	mm/inch
6814~6815	Length compensation value of tool 8	-2147483648	2147483647	0.0000	mm/inch
6816~6817	Length compensation value of tool 9	-2147483648	2147483647	0.0000	mm/inch
6818~6819	Length compensation value of tool 10	-2147483648	2147483647	0.0000	mm/inch
6820~6821	Length compensation value of tool 11	-2147483648	2147483647	0.0000	mm/inch
6822~6823	Length compensation value of tool 12	-2147483648	2147483647	0.0000	mm/inch
6824~6825	Length compensation value of tool 13	-2147483648	2147483647	0.0000	mm/inch
6826~6827	Length compensation value of tool 14	-2147483648	2147483647	0.0000	mm/inch
6828~6829	Length compensation value of tool 15	-2147483648	2147483647	0.0000	mm/inch
6830~6831	Length compensation value of tool 16	-2147483648	2147483647	0.0000	mm/inch
6832~6833	Length compensation value of tool 17	-2147483648	2147483647	0.0000	mm/inch
6834~6835	Length compensation value of tool 18	-2147483648	2147483647	0.0000	mm/inch
6836~6837	Length compensation value of tool 19	-2147483648	2147483647	0.0000	mm/inch
6838~6839	Length compensation value of tool 20	-2147483648	2147483647	0.0000	mm/inch
6840~6841	Length compensation value of tool 21	-2147483648	2147483647	0.0000	mm/inch
6842~6843	Length compensation value of tool 22	-2147483648	2147483647	0.0000	mm/inch
6844~6845	Length compensation value of tool 23	-2147483648	2147483647	0.0000	mm/inch
6846~6847	Length compensation value of tool 24	-2147483648	2147483647	0.0000	mm/inch
6848~6849	Length compensation value of tool 25	-2147483648	2147483647	0.0000	mm/inch
6850~6851	Length compensation value of tool 26	-2147483648	2147483647	0.0000	mm/inch
6852~6853	Length compensation value of tool 27	-2147483648	2147483647	0.0000	mm/inch
6854~6855	Length compensation value of tool 28	-2147483648	2147483647	0.0000	mm/inch
6856~6857	Length compensation value of tool 29	-2147483648	2147483647	0.0000	mm/inch
6858~6859	Length compensation value of tool 30	-2147483648	2147483647	0.0000	mm/inch
6860~6861	Length compensation value of tool 31	-2147483648	2147483647	0.0000	mm/inch
6862~6863	Length compensation value of tool 32	-2147483648	2147483647	0.0000	mm/inch
6864~6865	Length compensation value of tool 33	-2147483648	2147483647	0.0000	mm/inch
6866~6867	Length compensation value of tool 34	-2147483648	2147483647	0.0000	mm/inch
6868~6869	Length compensation value of tool 35	-2147483648	2147483647	0.0000	mm/inch
6870~6871	Length compensation value of tool 36	-2147483648	2147483647	0.0000	mm/inch
6872~6873	Length compensation value of tool 37	-2147483648	2147483647	0.0000	mm/inch
6874~6875	Length compensation value of tool 38	-2147483648	2147483647	0.0000	mm/inch
6876~6877	Length compensation value of tool 39	-2147483648	2147483647	0.0000	mm/inch
6878~6879	Length compensation value of tool 40	-2147483648	2147483647	0.0000	mm/inch
6880~6881	Length compensation value of tool 41	-2147483648	2147483647	0.0000	mm/inch
6882~6883	Length compensation value of tool 42	-2147483648	2147483647	0.0000	mm/inch
6884~6885	Length compensation value of tool 43	-2147483648	2147483647	0.0000	mm/inch
6886~6887	Length compensation value of tool 44	-2147483648	2147483647	0.0000	mm/inch
6888~6889	Length compensation value of tool 45	-2147483648	2147483647	0.0000	mm/inch
6890~6891	Length compensation value of tool 46	-2147483648	2147483647	0.0000	mm/inch
6892~6893	Length compensation value of tool 47	-2147483648	2147483647	0.0000	mm/inch
6894~6895	Length compensation value of tool 48	-2147483648	2147483647	0.0000	mm/inch
6896~6897	Length compensation value of tool 49	-2147483648	2147483647	0.0000	mm/inch
6898~6899	Length compensation value of tool 50	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
6900~6901	Length compensation value of tool 51	-2147483648	2147483647	0.0000	mm/inch
6902~6903	Length compensation value of tool 52	-2147483648	2147483647	0.0000	mm/inch
6904~6905	Length compensation value of tool 53	-2147483648	2147483647	0.0000	mm/inch
6906~6907	Length compensation value of tool 54	-2147483648	2147483647	0.0000	mm/inch
6908~6909	Length compensation value of tool 55	-2147483648	2147483647	0.0000	mm/inch
6910~6911	Length compensation value of tool 56	-2147483648	2147483647	0.0000	mm/inch
6912~6913	Length compensation value of tool 57	-2147483648	2147483647	0.0000	mm/inch
6914~6915	Length compensation value of tool 58	-2147483648	2147483647	0.0000	mm/inch
6916~6917	Length compensation value of tool 59	-2147483648	2147483647	0.0000	mm/inch
6918~6919	Length compensation value of tool 60	-2147483648	2147483647	0.0000	mm/inch
6920~6921	Length compensation value of tool 61	-2147483648	2147483647	0.0000	mm/inch
6922~6923	Length compensation value of tool 62	-2147483648	2147483647	0.0000	mm/inch
6924~6925	Length compensation value of tool 63	-2147483648	2147483647	0.0000	mm/inch
6926~6927	Length compensation value of tool 64	-2147483648	2147483647	0.0000	mm/inch
6928~6929	Length compensation value of tool 65	-2147483648	2147483647	0.0000	mm/inch
6930~6931	Length compensation value of tool 66	-2147483648	2147483647	0.0000	mm/inch
6932~6933	Length compensation value of tool 67	-2147483648	2147483647	0.0000	mm/inch
6934~6935	Length compensation value of tool 68	-2147483648	2147483647	0.0000	mm/inch
6936~6937	Length compensation value of tool 69	-2147483648	2147483647	0.0000	mm/inch
6938~6939	Length compensation value of tool 70	-2147483648	2147483647	0.0000	mm/inch
6940~6941	Length compensation value of tool 71	-2147483648	2147483647	0.0000	mm/inch
6942~6943	Length compensation value of tool 72	-2147483648	2147483647	0.0000	mm/inch
6944~6945	Length compensation value of tool 73	-2147483648	2147483647	0.0000	mm/inch
6946~6947	Length compensation value of tool 74	-2147483648	2147483647	0.0000	mm/inch
6948~6949	Length compensation value of tool 75	-2147483648	2147483647	0.0000	mm/inch
6950~6951	Length compensation value of tool 76	-2147483648	2147483647	0.0000	mm/inch
6952~6953	Length compensation value of tool 77	-2147483648	2147483647	0.0000	mm/inch
6954~6955	Length compensation value of tool 78	-2147483648	2147483647	0.0000	mm/inch
6956~6957	Length compensation value of tool 79	-2147483648	2147483647	0.0000	mm/inch
6958~6959	Length compensation value of tool 80	-2147483648	2147483647	0.0000	mm/inch
6960~6961	Length compensation value of tool 81	-2147483648	2147483647	0.0000	mm/inch
6962~6963	Length compensation value of tool 82	-2147483648	2147483647	0.0000	mm/inch
6964~6965	Length compensation value of tool 83	-2147483648	2147483647	0.0000	mm/inch
6966~6967	Length compensation value of tool 84	-2147483648	2147483647	0.0000	mm/inch
6968~6969	Length compensation value of tool 85	-2147483648	2147483647	0.0000	mm/inch
6970~6971	Length compensation value of tool 86	-2147483648	2147483647	0.0000	mm/inch
6972~6973	Length compensation value of tool 87	-2147483648	2147483647	0.0000	mm/inch
6974~6975	Length compensation value of tool 88	-2147483648	2147483647	0.0000	mm/inch
6976~6977	Length compensation value of tool 89	-2147483648	2147483647	0.0000	mm/inch
6978~6979	Length compensation value of tool 90	-2147483648	2147483647	0.0000	mm/inch
6980~6981	Length compensation value of tool 91	-2147483648	2147483647	0.0000	mm/inch
6982~6983	Length compensation value of tool 92	-2147483648	2147483647	0.0000	mm/inch
6984~6985	Length compensation value of tool 93	-2147483648	2147483647	0.0000	mm/inch
6986~6987	Length compensation value of tool 94	-2147483648	2147483647	0.0000	mm/inch
6988~6989	Length compensation value of tool 95	-2147483648	2147483647	0.0000	mm/inch
6990~6991	Length compensation value of tool 96	-2147483648	2147483647	0.0000	mm/inch
6992~6993	Length compensation value of tool 97	-2147483648	2147483647	0.0000	mm/inch
6994~6995	Length compensation value of tool 98	-2147483648	2147483647	0.0000	mm/inch
6996~6997	Length compensation value of tool 99	-2147483648	2147483647	0.0000	mm/inch
6998~6999	Length compensation value of tool 100	-2147483648	2147483647	0.0000	mm/inch

8.14.1. Tool Radius Compensation Values (Milling Model)

Address	Description	Minimum	Maximum	Format	Unit
7000~7001	Radius compensation value of tool 1	-2147483648	2147483647	0.0000	mm/inch
7002~7003	Radius compensation value of tool 2	-2147483648	2147483647	0.0000	mm/inch
7004~7005	Radius compensation value of tool 3	-2147483648	2147483647	0.0000	mm/inch
7006~7007	Radius compensation value of tool 4	-2147483648	2147483647	0.0000	mm/inch
7008~7009	Radius compensation value of tool 5	-2147483648	2147483647	0.0000	mm/inch
7010~7011	Radius compensation value of tool 6	-2147483648	2147483647	0.0000	mm/inch
7012~7013	Radius compensation value of tool 7	-2147483648	2147483647	0.0000	mm/inch
7014~7015	Radius compensation value of tool 8	-2147483648	2147483647	0.0000	mm/inch
7016~7017	Radius compensation value of tool 9	-2147483648	2147483647	0.0000	mm/inch
7018~7019	Radius compensation value of tool 10	-2147483648	2147483647	0.0000	mm/inch
7020~7021	Radius compensation value of tool 11	-2147483648	2147483647	0.0000	mm/inch
7022~7023	Radius compensation value of tool 12	-2147483648	2147483647	0.0000	mm/inch
7024~7025	Radius compensation value of tool 13	-2147483648	2147483647	0.0000	mm/inch
7026~7027	Radius compensation value of tool 14	-2147483648	2147483647	0.0000	mm/inch
7028~7029	Radius compensation value of tool 15	-2147483648	2147483647	0.0000	mm/inch
7030~7031	Radius compensation value of tool 16	-2147483648	2147483647	0.0000	mm/inch
7032~7033	Radius compensation value of tool 17	-2147483648	2147483647	0.0000	mm/inch
7034~7035	Radius compensation value of tool 18	-2147483648	2147483647	0.0000	mm/inch
7036~7037	Radius compensation value of tool 19	-2147483648	2147483647	0.0000	mm/inch
7038~7039	Radius compensation value of tool 20	-2147483648	2147483647	0.0000	mm/inch
7040~7041	Radius compensation value of tool 21	-2147483648	2147483647	0.0000	mm/inch
7042~7043	Radius compensation value of tool 22	-2147483648	2147483647	0.0000	mm/inch
7044~7045	Radius compensation value of tool 23	-2147483648	2147483647	0.0000	mm/inch
7046~7047	Radius compensation value of tool 24	-2147483648	2147483647	0.0000	mm/inch
7048~7049	Radius compensation value of tool 25	-2147483648	2147483647	0.0000	mm/inch
7050~7051	Radius compensation value of tool 26	-2147483648	2147483647	0.0000	mm/inch
7052~7053	Radius compensation value of tool 27	-2147483648	2147483647	0.0000	mm/inch
7054~7055	Radius compensation value of tool 28	-2147483648	2147483647	0.0000	mm/inch
7056~7057	Radius compensation value of tool 29	-2147483648	2147483647	0.0000	mm/inch
7058~7059	Radius compensation value of tool 30	-2147483648	2147483647	0.0000	mm/inch
7060~7061	Radius compensation value of tool 31	-2147483648	2147483647	0.0000	mm/inch
7062~7063	Radius compensation value of tool 32	-2147483648	2147483647	0.0000	mm/inch
7064~7065	Radius compensation value of tool 33	-2147483648	2147483647	0.0000	mm/inch
7066~7067	Radius compensation value of tool 34	-2147483648	2147483647	0.0000	mm/inch
7068~7069	Radius compensation value of tool 35	-2147483648	2147483647	0.0000	mm/inch
7070~7071	Radius compensation value of tool 36	-2147483648	2147483647	0.0000	mm/inch
7072~7073	Radius compensation value of tool 37	-2147483648	2147483647	0.0000	mm/inch
7074~7075	Radius compensation value of tool 38	-2147483648	2147483647	0.0000	mm/inch
7076~7077	Radius compensation value of tool 39	-2147483648	2147483647	0.0000	mm/inch
7078~7079	Radius compensation value of tool 40	-2147483648	2147483647	0.0000	mm/inch
7080~7081	Radius compensation value of tool 41	-2147483648	2147483647	0.0000	mm/inch
7082~7083	Radius compensation value of tool 42	-2147483648	2147483647	0.0000	mm/inch
7084~7085	Radius compensation value of tool 43	-2147483648	2147483647	0.0000	mm/inch
7086~7087	Radius compensation value of tool 44	-2147483648	2147483647	0.0000	mm/inch
7088~7089	Radius compensation value of tool 45	-2147483648	2147483647	0.0000	mm/inch
7090~7091	Radius compensation value of tool 46	-2147483648	2147483647	0.0000	mm/inch
7092~7093	Radius compensation value of tool 47	-2147483648	2147483647	0.0000	mm/inch
7094~7095	Radius compensation value of tool 48	-2147483648	2147483647	0.0000	mm/inch
7096~7097	Radius compensation value of tool 49	-2147483648	2147483647	0.0000	mm/inch
7098~7099	Radius compensation value of tool 50	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7100~7101	Radius compensation value of tool 51	-2147483648	2147483647	0.0000	mm/inch
7102~7103	Radius compensation value of tool 52	-2147483648	2147483647	0.0000	mm/inch
7104~7105	Radius compensation value of tool 53	-2147483648	2147483647	0.0000	mm/inch
7106~7107	Radius compensation value of tool 54	-2147483648	2147483647	0.0000	mm/inch
7108~7109	Radius compensation value of tool 55	-2147483648	2147483647	0.0000	mm/inch
7110~7111	Radius compensation value of tool 56	-2147483648	2147483647	0.0000	mm/inch
7112~7113	Radius compensation value of tool 57	-2147483648	2147483647	0.0000	mm/inch
7114~7115	Radius compensation value of tool 58	-2147483648	2147483647	0.0000	mm/inch
7116~7117	Radius compensation value of tool 59	-2147483648	2147483647	0.0000	mm/inch
7118~7119	Radius compensation value of tool 60	-2147483648	2147483647	0.0000	mm/inch
7120~7121	Radius compensation value of tool 61	-2147483648	2147483647	0.0000	mm/inch
7122~7123	Radius compensation value of tool 62	-2147483648	2147483647	0.0000	mm/inch
7124~7125	Radius compensation value of tool 63	-2147483648	2147483647	0.0000	mm/inch
7126~7127	Radius compensation value of tool 64	-2147483648	2147483647	0.0000	mm/inch
7128~7129	Radius compensation value of tool 65	-2147483648	2147483647	0.0000	mm/inch
7130~7131	Radius compensation value of tool 66	-2147483648	2147483647	0.0000	mm/inch
7132~7133	Radius compensation value of tool 67	-2147483648	2147483647	0.0000	mm/inch
7134~7135	Radius compensation value of tool 68	-2147483648	2147483647	0.0000	mm/inch
7136~7137	Radius compensation value of tool 69	-2147483648	2147483647	0.0000	mm/inch
7138~7139	Radius compensation value of tool 70	-2147483648	2147483647	0.0000	mm/inch
7140~7141	Radius compensation value of tool 71	-2147483648	2147483647	0.0000	mm/inch
7142~7143	Radius compensation value of tool 72	-2147483648	2147483647	0.0000	mm/inch
7144~7145	Radius compensation value of tool 73	-2147483648	2147483647	0.0000	mm/inch
7146~7147	Radius compensation value of tool 74	-2147483648	2147483647	0.0000	mm/inch
7148~7149	Radius compensation value of tool 75	-2147483648	2147483647	0.0000	mm/inch
7150~7151	Radius compensation value of tool 76	-2147483648	2147483647	0.0000	mm/inch
7152~7153	Radius compensation value of tool 77	-2147483648	2147483647	0.0000	mm/inch
7154~7155	Radius compensation value of tool 78	-2147483648	2147483647	0.0000	mm/inch
7156~7157	Radius compensation value of tool 79	-2147483648	2147483647	0.0000	mm/inch
7158~7159	Radius compensation value of tool 80	-2147483648	2147483647	0.0000	mm/inch
7160~7161	Radius compensation value of tool 81	-2147483648	2147483647	0.0000	mm/inch
7162~7163	Radius compensation value of tool 82	-2147483648	2147483647	0.0000	mm/inch
7164~7165	Radius compensation value of tool 83	-2147483648	2147483647	0.0000	mm/inch
7166~7167	Radius compensation value of tool 84	-2147483648	2147483647	0.0000	mm/inch
7168~7169	Radius compensation value of tool 85	-2147483648	2147483647	0.0000	mm/inch
7170~7171	Radius compensation value of tool 86	-2147483648	2147483647	0.0000	mm/inch
7172~7173	Radius compensation value of tool 87	-2147483648	2147483647	0.0000	mm/inch
7174~7175	Radius compensation value of tool 88	-2147483648	2147483647	0.0000	mm/inch
7176~7177	Radius compensation value of tool 89	-2147483648	2147483647	0.0000	mm/inch
7178~7179	Radius compensation value of tool 90	-2147483648	2147483647	0.0000	mm/inch
7180~7181	Radius compensation value of tool 91	-2147483648	2147483647	0.0000	mm/inch
7182~7183	Radius compensation value of tool 92	-2147483648	2147483647	0.0000	mm/inch
7184~7185	Radius compensation value of tool 93	-2147483648	2147483647	0.0000	mm/inch
7186~7187	Radius compensation value of tool 94	-2147483648	2147483647	0.0000	mm/inch
7188~7189	Radius compensation value of tool 95	-2147483648	2147483647	0.0000	mm/inch
7190~7191	Radius compensation value of tool 96	-2147483648	2147483647	0.0000	mm/inch
7192~7193	Radius compensation value of tool 97	-2147483648	2147483647	0.0000	mm/inch
7194~7195	Radius compensation value of tool 98	-2147483648	2147483647	0.0000	mm/inch
7196~7197	Radius compensation value of tool 99	-2147483648	2147483647	0.0000	mm/inch
7198~7199	Radius compensation value of tool 100	-2147483648	2147483647	0.0000	mm/inch

8.14.2. Tool Length Compensation Wear Values (Milling Model)

Address	Description	Minimum	Maximum	Format	Unit
7200~7201	Length compensation wear value of tool 1	-2147483648	2147483647	0.0000	mm/inch
7202~7203	Length compensation wear value of tool 2	-2147483648	2147483647	0.0000	mm/inch
7204~7205	Length compensation wear value of tool 3	-2147483648	2147483647	0.0000	mm/inch
7206~7207	Length compensation wear value of tool 4	-2147483648	2147483647	0.0000	mm/inch
7208~7208	Length compensation wear value of tool 5	-2147483648	2147483647	0.0000	mm/inch
7210~7211	Length compensation wear value of tool 6	-2147483648	2147483647	0.0000	mm/inch
7212~7213	Length compensation wear value of tool 7	-2147483648	2147483647	0.0000	mm/inch
7214~7215	Length compensation wear value of tool 8	-2147483648	2147483647	0.0000	mm/inch
7216~7217	Length compensation wear value of tool 9	-2147483648	2147483647	0.0000	mm/inch
7218~7219	Length compensation wear value of tool 10	-2147483648	2147483647	0.0000	mm/inch
7220~7221	Length compensation wear value of tool 11	-2147483648	2147483647	0.0000	mm/inch
7222~7223	Length compensation wear value of tool 12	-2147483648	2147483647	0.0000	mm/inch
7224~7225	Length compensation wear value of tool 13	-2147483648	2147483647	0.0000	mm/inch
7226~7227	Length compensation wear value of tool 14	-2147483648	2147483647	0.0000	mm/inch
7228~7229	Length compensation wear value of tool 15	-2147483648	2147483647	0.0000	mm/inch
7230~7231	Length compensation wear value of tool 16	-2147483648	2147483647	0.0000	mm/inch
7232~7233	Length compensation wear value of tool 17	-2147483648	2147483647	0.0000	mm/inch
7234~7235	Length compensation wear value of tool 18	-2147483648	2147483647	0.0000	mm/inch
7236~7237	Length compensation wear value of tool 19	-2147483648	2147483647	0.0000	mm/inch
7238~7239	Length compensation wear value of tool 20	-2147483648	2147483647	0.0000	mm/inch
7240~7241	Length compensation wear value of tool 21	-2147483648	2147483647	0.0000	mm/inch
7242~7243	Length compensation wear value of tool 22	-2147483648	2147483647	0.0000	mm/inch
7244~7245	Length compensation wear value of tool 23	-2147483648	2147483647	0.0000	mm/inch
7246~7247	Length compensation wear value of tool 24	-2147483648	2147483647	0.0000	mm/inch
7248~7249	Length compensation wear value of tool 25	-2147483648	2147483647	0.0000	mm/inch
7250~7251	Length compensation wear value of tool 26	-2147483648	2147483647	0.0000	mm/inch
7252~7253	Length compensation wear value of tool 27	-2147483648	2147483647	0.0000	mm/inch
7254~7255	Length compensation wear value of tool 28	-2147483648	2147483647	0.0000	mm/inch
7256~7257	Length compensation wear value of tool 29	-2147483648	2147483647	0.0000	mm/inch
7258~7259	Length compensation wear value of tool 30	-2147483648	2147483647	0.0000	mm/inch
7260~7261	Length compensation wear value of tool 31	-2147483648	2147483647	0.0000	mm/inch
7262~7263	Length compensation wear value of tool 32	-2147483648	2147483647	0.0000	mm/inch
7264~7265	Length compensation wear value of tool 33	-2147483648	2147483647	0.0000	mm/inch
7266~7267	Length compensation wear value of tool 34	-2147483648	2147483647	0.0000	mm/inch
7268~7269	Length compensation wear value of tool 35	-2147483648	2147483647	0.0000	mm/inch
7270~7271	Length compensation wear value of tool 36	-2147483648	2147483647	0.0000	mm/inch
7272~7273	Length compensation wear value of tool 37	-2147483648	2147483647	0.0000	mm/inch
7274~7275	Length compensation wear value of tool 38	-2147483648	2147483647	0.0000	mm/inch
7276~7277	Length compensation wear value of tool 39	-2147483648	2147483647	0.0000	mm/inch
7278~7279	Length compensation wear value of tool 40	-2147483648	2147483647	0.0000	mm/inch
7280~7281	Length compensation wear value of tool 41	-2147483648	2147483647	0.0000	mm/inch
7282~7283	Length compensation wear value of tool 42	-2147483648	2147483647	0.0000	mm/inch
7284~7285	Length compensation wear value of tool 43	-2147483648	2147483647	0.0000	mm/inch
7286~7287	Length compensation wear value of tool 44	-2147483648	2147483647	0.0000	mm/inch
7288~7289	Length compensation wear value of tool 45	-2147483648	2147483647	0.0000	mm/inch
7290~7291	Length compensation wear value of tool 46	-2147483648	2147483647	0.0000	mm/inch
7292~7293	Length compensation wear value of tool 47	-2147483648	2147483647	0.0000	mm/inch
7294~7295	Length compensation wear value of tool 48	-2147483648	2147483647	0.0000	mm/inch
7296~7297	Length compensation wear value of tool 49	-2147483648	2147483647	0.0000	mm/inch
7298~7299	Length compensation wear value of tool 50	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7300~7301	Length compensation wear value of tool 51	-2147483648	2147483647	0.0000	mm/inch
7302~7303	Length compensation wear value of tool 52	-2147483648	2147483647	0.0000	mm/inch
7304~7305	Length compensation wear value of tool 53	-2147483648	2147483647	0.0000	mm/inch
7306~7307	Length compensation wear value of tool 54	-2147483648	2147483647	0.0000	mm/inch
7308~7308	Length compensation wear value of tool 55	-2147483648	2147483647	0.0000	mm/inch
7310~7311	Length compensation wear value of tool 56	-2147483648	2147483647	0.0000	mm/inch
7312~7313	Length compensation wear value of tool 57	-2147483648	2147483647	0.0000	mm/inch
7314~7315	Length compensation wear value of tool 58	-2147483648	2147483647	0.0000	mm/inch
7316~7317	Length compensation wear value of tool 59	-2147483648	2147483647	0.0000	mm/inch
7318~7319	Length compensation wear value of tool 60	-2147483648	2147483647	0.0000	mm/inch
7320~7321	Length compensation wear value of tool 61	-2147483648	2147483647	0.0000	mm/inch
7322~7323	Length compensation wear value of tool 62	-2147483648	2147483647	0.0000	mm/inch
7324~7325	Length compensation wear value of tool 63	-2147483648	2147483647	0.0000	mm/inch
7326~7327	Length compensation wear value of tool 64	-2147483648	2147483647	0.0000	mm/inch
7328~7329	Length compensation wear value of tool 65	-2147483648	2147483647	0.0000	mm/inch
7330~7331	Length compensation wear value of tool 66	-2147483648	2147483647	0.0000	mm/inch
7332~7333	Length compensation wear value of tool 67	-2147483648	2147483647	0.0000	mm/inch
7334~7335	Length compensation wear value of tool 68	-2147483648	2147483647	0.0000	mm/inch
7336~7337	Length compensation wear value of tool 69	-2147483648	2147483647	0.0000	mm/inch
7338~7339	Length compensation wear value of tool 70	-2147483648	2147483647	0.0000	mm/inch
7240~7341	Length compensation wear value of tool 71	-2147483648	2147483647	0.0000	mm/inch
7342~7343	Length compensation wear value of tool 72	-2147483648	2147483647	0.0000	mm/inch
7344~7345	Length compensation wear value of tool 73	-2147483648	2147483647	0.0000	mm/inch
7346~7347	Length compensation wear value of tool 74	-2147483648	2147483647	0.0000	mm/inch
7348~7349	Length compensation wear value of tool 75	-2147483648	2147483647	0.0000	mm/inch
7350~7351	Length compensation wear value of tool 76	-2147483648	2147483647	0.0000	mm/inch
7352~7353	Length compensation wear value of tool 77	-2147483648	2147483647	0.0000	mm/inch
7354~7355	Length compensation wear value of tool 78	-2147483648	2147483647	0.0000	mm/inch
7356~7357	Length compensation wear value of tool 79	-2147483648	2147483647	0.0000	mm/inch
7358~7359	Length compensation wear value of tool 80	-2147483648	2147483647	0.0000	mm/inch
7360~7361	Length compensation wear value of tool 81	-2147483648	2147483647	0.0000	mm/inch
7362~7363	Length compensation wear value of tool 82	-2147483648	2147483647	0.0000	mm/inch
7364~7365	Length compensation wear value of tool 83	-2147483648	2147483647	0.0000	mm/inch
7366~7367	Length compensation wear value of tool 84	-2147483648	2147483647	0.0000	mm/inch
7368~7369	Length compensation wear value of tool 85	-2147483648	2147483647	0.0000	mm/inch
7370~7371	Length compensation wear value of tool 86	-2147483648	2147483647	0.0000	mm/inch
7372~7373	Length compensation wear value of tool 87	-2147483648	2147483647	0.0000	mm/inch
7374~7375	Length compensation wear value of tool 88	-2147483648	2147483647	0.0000	mm/inch
7376~7377	Length compensation wear value of tool 89	-2147483648	2147483647	0.0000	mm/inch
7378~7379	Length compensation wear value of tool 90	-2147483648	2147483647	0.0000	mm/inch
7380~7381	Length compensation wear value of tool 91	-2147483648	2147483647	0.0000	mm/inch
7382~7383	Length compensation wear value of tool 92	-2147483648	2147483647	0.0000	mm/inch
7384~7385	Length compensation wear value of tool 93	-2147483648	2147483647	0.0000	mm/inch
7386~7387	Length compensation wear value of tool 94	-2147483648	2147483647	0.0000	mm/inch
7388~7389	Length compensation wear value of tool 95	-2147483648	2147483647	0.0000	mm/inch
7390~7391	Length compensation wear value of tool 96	-2147483648	2147483647	0.0000	mm/inch
7392~7393	Length compensation wear value of tool 97	-2147483648	2147483647	0.0000	mm/inch
7394~7395	Length compensation wear value of tool 98	-2147483648	2147483647	0.0000	mm/inch
7396~7397	Length compensation wear value of tool 99	-2147483648	2147483647	0.0000	mm/inch
7398~7399	Length compensation wear value of tool 100	-2147483648	2147483647	0.0000	mm/inch

8.14.3. Tool Radius Compensation Wear Values (Milling Model)

Address	Description	Minimum	Maximum	Format	Unit
7400~7401	Radius compensation wear value of tool 1	-2147483648	2147483647	0.0000	mm/inch
7402~7403	Radius compensation wear value of tool 2	-2147483648	2147483647	0.0000	mm/inch
7404~7405	Radius compensation wear value of tool 3	-2147483648	2147483647	0.0000	mm/inch
7406~7407	Radius compensation wear value of tool 4	-2147483648	2147483647	0.0000	mm/inch
7408~7409	Radius compensation wear value of tool 5	-2147483648	2147483647	0.0000	mm/inch
7410~7411	Radius compensation wear value of tool 6	-2147483648	2147483647	0.0000	mm/inch
7412~7413	Radius compensation wear value of tool 7	-2147483648	2147483647	0.0000	mm/inch
7414~7415	Radius compensation wear value of tool 8	-2147483648	2147483647	0.0000	mm/inch
7416~7417	Radius compensation wear value of tool 9	-2147483648	2147483647	0.0000	mm/inch
7418~7419	Radius compensation wear value of tool 10	-2147483648	2147483647	0.0000	mm/inch
7420~7421	Radius compensation wear value of tool 11	-2147483648	2147483647	0.0000	mm/inch
7422~7423	Radius compensation wear value of tool 12	-2147483648	2147483647	0.0000	mm/inch
7424~7425	Radius compensation wear value of tool 13	-2147483648	2147483647	0.0000	mm/inch
7426~7427	Radius compensation wear value of tool 14	-2147483648	2147483647	0.0000	mm/inch
7428~7429	Radius compensation wear value of tool 15	-2147483648	2147483647	0.0000	mm/inch
7430~7431	Radius compensation wear value of tool 16	-2147483648	2147483647	0.0000	mm/inch
7432~7433	Radius compensation wear value of tool 17	-2147483648	2147483647	0.0000	mm/inch
7434~7435	Radius compensation wear value of tool 18	-2147483648	2147483647	0.0000	mm/inch
7436~7437	Radius compensation wear value of tool 19	-2147483648	2147483647	0.0000	mm/inch
7438~7439	Radius compensation wear value of tool 20	-2147483648	2147483647	0.0000	mm/inch
7440~7441	Radius compensation wear value of tool 21	-2147483648	2147483647	0.0000	mm/inch
7442~7443	Radius compensation wear value of tool 22	-2147483648	2147483647	0.0000	mm/inch
7444~7445	Radius compensation wear value of tool 23	-2147483648	2147483647	0.0000	mm/inch
7446~7447	Radius compensation wear value of tool 24	-2147483648	2147483647	0.0000	mm/inch
7448~7449	Radius compensation wear value of tool 25	-2147483648	2147483647	0.0000	mm/inch
7450~7451	Radius compensation wear value of tool 26	-2147483648	2147483647	0.0000	mm/inch
7452~7453	Radius compensation wear value of tool 27	-2147483648	2147483647	0.0000	mm/inch
7454~7455	Radius compensation wear value of tool 28	-2147483648	2147483647	0.0000	mm/inch
7456~7457	Radius compensation wear value of tool 29	-2147483648	2147483647	0.0000	mm/inch
7458~7459	Radius compensation wear value of tool 30	-2147483648	2147483647	0.0000	mm/inch
7460~7461	Radius compensation wear value of tool 31	-2147483648	2147483647	0.0000	mm/inch
7462~7463	Radius compensation wear value of tool 32	-2147483648	2147483647	0.0000	mm/inch
7464~7465	Radius compensation wear value of tool 33	-2147483648	2147483647	0.0000	mm/inch
7466~7467	Radius compensation wear value of tool 34	-2147483648	2147483647	0.0000	mm/inch
7468~7469	Radius compensation wear value of tool 35	-2147483648	2147483647	0.0000	mm/inch
7470~7471	Radius compensation wear value of tool 36	-2147483648	2147483647	0.0000	mm/inch
7472~7473	Radius compensation wear value of tool 37	-2147483648	2147483647	0.0000	mm/inch
7474~7475	Radius compensation wear value of tool 38	-2147483648	2147483647	0.0000	mm/inch
7476~7477	Radius compensation wear value of tool 39	-2147483648	2147483647	0.0000	mm/inch
7478~7479	Radius compensation wear value of tool 40	-2147483648	2147483647	0.0000	mm/inch
7480~7481	Radius compensation wear value of tool 41	-2147483648	2147483647	0.0000	mm/inch
7482~7483	Radius compensation wear value of tool 42	-2147483648	2147483647	0.0000	mm/inch
7484~7485	Radius compensation wear value of tool 43	-2147483648	2147483647	0.0000	mm/inch
7486~7487	Radius compensation wear value of tool 44	-2147483648	2147483647	0.0000	mm/inch
7488~7489	Radius compensation wear value of tool 45	-2147483648	2147483647	0.0000	mm/inch
7490~7491	Radius compensation wear value of tool 46	-2147483648	2147483647	0.0000	mm/inch
7492~7493	Radius compensation wear value of tool 47	-2147483648	2147483647	0.0000	mm/inch
7494~7495	Radius compensation wear value of tool 48	-2147483648	2147483647	0.0000	mm/inch
7496~7497	Radius compensation wear value of tool 49	-2147483648	2147483647	0.0000	mm/inch
7498~7499	Radius compensation wear value of tool 50	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7500~7501	Radius compensation wear value of tool 51	-2147483648	2147483647	0.0000	mm/inch
7502~7503	Radius compensation wear value of tool 52	-2147483648	2147483647	0.0000	mm/inch
7504~7505	Radius compensation wear value of tool 53	-2147483648	2147483647	0.0000	mm/inch
7506~7507	Radius compensation wear value of tool 54	-2147483648	2147483647	0.0000	mm/inch
7508~7509	Radius compensation wear value of tool 55	-2147483648	2147483647	0.0000	mm/inch
7510~7511	Radius compensation wear value of tool 56	-2147483648	2147483647	0.0000	mm/inch
7512~7513	Radius compensation wear value of tool 57	-2147483648	2147483647	0.0000	mm/inch
7514~7515	Radius compensation wear value of tool 58	-2147483648	2147483647	0.0000	mm/inch
7516~7517	Radius compensation wear value of tool 59	-2147483648	2147483647	0.0000	mm/inch
7518~7519	Radius compensation wear value of tool 60	-2147483648	2147483647	0.0000	mm/inch
7520~7521	Radius compensation wear value of tool 61	-2147483648	2147483647	0.0000	mm/inch
7522~7523	Radius compensation wear value of tool 62	-2147483648	2147483647	0.0000	mm/inch
7524~7525	Radius compensation wear value of tool 63	-2147483648	2147483647	0.0000	mm/inch
7526~7527	Radius compensation wear value of tool 64	-2147483648	2147483647	0.0000	mm/inch
7528~7529	Radius compensation wear value of tool 65	-2147483648	2147483647	0.0000	mm/inch
7530~7531	Radius compensation wear value of tool 66	-2147483648	2147483647	0.0000	mm/inch
7532~7533	Radius compensation wear value of tool 67	-2147483648	2147483647	0.0000	mm/inch
7534~7535	Radius compensation wear value of tool 68	-2147483648	2147483647	0.0000	mm/inch
7536~7537	Radius compensation wear value of tool 69	-2147483648	2147483647	0.0000	mm/inch
7538~7539	Radius compensation wear value of tool 70	-2147483648	2147483647	0.0000	mm/inch
7540~7541	Radius compensation wear value of tool 71	-2147483648	2147483647	0.0000	mm/inch
7542~7543	Radius compensation wear value of tool 72	-2147483648	2147483647	0.0000	mm/inch
7544~7545	Radius compensation wear value of tool 73	-2147483648	2147483647	0.0000	mm/inch
7546~7547	Radius compensation wear value of tool 74	-2147483648	2147483647	0.0000	mm/inch
7548~7549	Radius compensation wear value of tool 75	-2147483648	2147483647	0.0000	mm/inch
7550~7551	Radius compensation wear value of tool 76	-2147483648	2147483647	0.0000	mm/inch
7552~7553	Radius compensation wear value of tool 77	-2147483648	2147483647	0.0000	mm/inch
7554~7555	Radius compensation wear value of tool 78	-2147483648	2147483647	0.0000	mm/inch
7556~7557	Radius compensation wear value of tool 79	-2147483648	2147483647	0.0000	mm/inch
7558~7559	Radius compensation wear value of tool 80	-2147483648	2147483647	0.0000	mm/inch
7560~7561	Radius compensation wear value of tool 81	-2147483648	2147483647	0.0000	mm/inch
7562~7563	Radius compensation wear value of tool 82	-2147483648	2147483647	0.0000	mm/inch
7564~7565	Radius compensation wear value of tool 83	-2147483648	2147483647	0.0000	mm/inch
7566~7567	Radius compensation wear value of tool 84	-2147483648	2147483647	0.0000	mm/inch
7568~7569	Radius compensation wear value of tool 85	-2147483648	2147483647	0.0000	mm/inch
7570~7571	Radius compensation wear value of tool 86	-2147483648	2147483647	0.0000	mm/inch
7572~7573	Radius compensation wear value of tool 87	-2147483648	2147483647	0.0000	mm/inch
7574~7575	Radius compensation wear value of tool 88	-2147483648	2147483647	0.0000	mm/inch
7576~7577	Radius compensation wear value of tool 89	-2147483648	2147483647	0.0000	mm/inch
7578~7579	Radius compensation wear value of tool 90	-2147483648	2147483647	0.0000	mm/inch
7580~7581	Radius compensation wear value of tool 91	-2147483648	2147483647	0.0000	mm/inch
7582~7583	Radius compensation wear value of tool 92	-2147483648	2147483647	0.0000	mm/inch
7584~7585	Radius compensation wear value of tool 93	-2147483648	2147483647	0.0000	mm/inch
7586~7587	Radius compensation wear value of tool 94	-2147483648	2147483647	0.0000	mm/inch
7588~7589	Radius compensation wear value of tool 95	-2147483648	2147483647	0.0000	mm/inch
7590~7591	Radius compensation wear value of tool 96	-2147483648	2147483647	0.0000	mm/inch
7592~7593	Radius compensation wear value of tool 97	-2147483648	2147483647	0.0000	mm/inch
7594~7595	Radius compensation wear value of tool 98	-2147483648	2147483647	0.0000	mm/inch
7596~7597	Radius compensation wear value of tool 99	-2147483648	2147483647	0.0000	mm/inch
7598~7599	Radius compensation wear value of tool 100	-2147483648	2147483647	0.0000	mm/inch

8.14.4. Geometry X Offset Values (Lathe Mode)

Address	Description	Minimum	Maximum	Format	Unit
6800~6801	Geometry X offset value of tool 1	-2147483648	2147483647	0.0000	mm/inch
6802~6803	Geometry X offset value of tool 2	-2147483648	2147483647	0.0000	mm/inch
6804~6805	Geometry X offset value of tool 3	-2147483648	2147483647	0.0000	mm/inch
6806~6807	Geometry X offset value of tool 4	-2147483648	2147483647	0.0000	mm/inch
6808~6809	Geometry X offset value of tool 5	-2147483648	2147483647	0.0000	mm/inch
6810~6811	Geometry X offset value of tool 6	-2147483648	2147483647	0.0000	mm/inch
6812~6813	Geometry X offset value of tool 7	-2147483648	2147483647	0.0000	mm/inch
6814~6815	Geometry X offset value of tool 8	-2147483648	2147483647	0.0000	mm/inch
6816~6817	Geometry X offset value of tool 9	-2147483648	2147483647	0.0000	mm/inch
6818~6819	Geometry X offset value of tool 10	-2147483648	2147483647	0.0000	mm/inch
6820~6821	Geometry X offset value of tool 11	-2147483648	2147483647	0.0000	mm/inch
6822~6823	Geometry X offset value of tool 12	-2147483648	2147483647	0.0000	mm/inch
6824~6825	Geometry X offset value of tool 13	-2147483648	2147483647	0.0000	mm/inch
6826~6827	Geometry X offset value of tool 14	-2147483648	2147483647	0.0000	mm/inch
6828~6829	Geometry X offset value of tool 15	-2147483648	2147483647	0.0000	mm/inch
6830~6831	Geometry X offset value of tool 16	-2147483648	2147483647	0.0000	mm/inch
6832~6833	Geometry X offset value of tool 17	-2147483648	2147483647	0.0000	mm/inch
6834~6835	Geometry X offset value of tool 18	-2147483648	2147483647	0.0000	mm/inch
6836~6837	Geometry X offset value of tool 19	-2147483648	2147483647	0.0000	mm/inch
6838~6839	Geometry X offset value of tool 20	-2147483648	2147483647	0.0000	mm/inch
6840~6841	Geometry X offset value of tool 21	-2147483648	2147483647	0.0000	mm/inch
6842~6843	Geometry X offset value of tool 22	-2147483648	2147483647	0.0000	mm/inch
6844~6845	Geometry X offset value of tool 23	-2147483648	2147483647	0.0000	mm/inch
6846~6847	Geometry X offset value of tool 24	-2147483648	2147483647	0.0000	mm/inch
6848~6849	Geometry X offset value of tool 25	-2147483648	2147483647	0.0000	mm/inch
6850~6851	Geometry X offset value of tool 26	-2147483648	2147483647	0.0000	mm/inch
6852~6853	Geometry X offset value of tool 27	-2147483648	2147483647	0.0000	mm/inch
6854~6855	Geometry X offset value of tool 28	-2147483648	2147483647	0.0000	mm/inch
6856~6857	Geometry X offset value of tool 29	-2147483648	2147483647	0.0000	mm/inch
6858~6859	Geometry X offset value of tool 30	-2147483648	2147483647	0.0000	mm/inch
6860~6861	Geometry X offset value of tool 31	-2147483648	2147483647	0.0000	mm/inch
6862~6863	Geometry X offset value of tool 32	-2147483648	2147483647	0.0000	mm/inch
6864~6865	Geometry X offset value of tool 33	-2147483648	2147483647	0.0000	mm/inch
6866~6867	Geometry X offset value of tool 34	-2147483648	2147483647	0.0000	mm/inch
6868~6869	Geometry X offset value of tool 35	-2147483648	2147483647	0.0000	mm/inch
6870~6871	Geometry X offset value of tool 36	-2147483648	2147483647	0.0000	mm/inch
6872~6873	Geometry X offset value of tool 37	-2147483648	2147483647	0.0000	mm/inch
6874~6875	Geometry X offset value of tool 38	-2147483648	2147483647	0.0000	mm/inch
6876~6877	Geometry X offset value of tool 39	-2147483648	2147483647	0.0000	mm/inch
6878~6879	Geometry X offset value of tool 40	-2147483648	2147483647	0.0000	mm/inch
6880~6881	Geometry X offset value of tool 41	-2147483648	2147483647	0.0000	mm/inch
6882~6883	Geometry X offset value of tool 42	-2147483648	2147483647	0.0000	mm/inch
6884~6885	Geometry X offset value of tool 43	-2147483648	2147483647	0.0000	mm/inch
6886~6887	Geometry X offset value of tool 44	-2147483648	2147483647	0.0000	mm/inch
6888~6889	Geometry X offset value of tool 45	-2147483648	2147483647	0.0000	mm/inch
6890~6891	Geometry X offset value of tool 46	-2147483648	2147483647	0.0000	mm/inch
6892~6893	Geometry X offset value of tool 47	-2147483648	2147483647	0.0000	mm/inch
6894~6895	Geometry X offset value of tool 48	-2147483648	2147483647	0.0000	mm/inch
6896~6897	Geometry X offset value of tool 49	-2147483648	2147483647	0.0000	mm/inch
6898~6899	Geometry X offset value of tool 50	-2147483648	2147483647	0.0000	mm/inch

8.14.5. Geometry Y Offset Values (LAthe Model)

Address	Description	Minimum	Maximum	Format	Unit
6900~6901	Geometry Y offset value of tool 1	-2147483648	2147483647	0.0000	mm/inch
6902~6903	Geometry Y offset value of tool 2	-2147483648	2147483647	0.0000	mm/inch
6904~6905	Geometry Y offset value of tool 3	-2147483648	2147483647	0.0000	mm/inch
6906~6907	Geometry Y offset value of tool 4	-2147483648	2147483647	0.0000	mm/inch
6908~6909	Geometry Y offset value of tool 5	-2147483648	2147483647	0.0000	mm/inch
6910~6911	Geometry Y offset value of tool 6	-2147483648	2147483647	0.0000	mm/inch
6912~6913	Geometry Y offset value of tool 7	-2147483648	2147483647	0.0000	mm/inch
6914~6915	Geometry Y offset value of tool 8	-2147483648	2147483647	0.0000	mm/inch
6916~6917	Geometry Y offset value of tool 9	-2147483648	2147483647	0.0000	mm/inch
6918~6919	Geometry Y offset value of tool 10	-2147483648	2147483647	0.0000	mm/inch
6920~6921	Geometry Y offset value of tool 11	-2147483648	2147483647	0.0000	mm/inch
6922~6923	Geometry Y offset value of tool 12	-2147483648	2147483647	0.0000	mm/inch
6924~6925	Geometry Y offset value of tool 13	-2147483648	2147483647	0.0000	mm/inch
6926~6927	Geometry Y offset value of tool 14	-2147483648	2147483647	0.0000	mm/inch
6928~6929	Geometry Y offset value of tool 15	-2147483648	2147483647	0.0000	mm/inch
6930~6931	Geometry Y offset value of tool 16	-2147483648	2147483647	0.0000	mm/inch
6932~6933	Geometry Y offset value of tool 17	-2147483648	2147483647	0.0000	mm/inch
6934~6935	Geometry Y offset value of tool 18	-2147483648	2147483647	0.0000	mm/inch
6936~6937	Geometry Y offset value of tool 19	-2147483648	2147483647	0.0000	mm/inch
6938~6939	Geometry Y offset value of tool 20	-2147483648	2147483647	0.0000	mm/inch
6940~6941	Geometry Y offset value of tool 21	-2147483648	2147483647	0.0000	mm/inch
6942~6943	Geometry Y offset value of tool 22	-2147483648	2147483647	0.0000	mm/inch
6944~6945	Geometry Y offset value of tool 23	-2147483648	2147483647	0.0000	mm/inch
6946~6947	Geometry Y offset value of tool 24	-2147483648	2147483647	0.0000	mm/inch
6948~6949	Geometry Y offset value of tool 25	-2147483648	2147483647	0.0000	mm/inch
6950~6951	Geometry Y offset value of tool 26	-2147483648	2147483647	0.0000	mm/inch
6952~6953	Geometry Y offset value of tool 27	-2147483648	2147483647	0.0000	mm/inch
6954~6955	Geometry Y offset value of tool 28	-2147483648	2147483647	0.0000	mm/inch
6956~6957	Geometry Y offset value of tool 29	-2147483648	2147483647	0.0000	mm/inch
6958~6959	Geometry Y offset value of tool 30	-2147483648	2147483647	0.0000	mm/inch
6960~6961	Geometry Y offset value of tool 31	-2147483648	2147483647	0.0000	mm/inch
6962~6963	Geometry Y offset value of tool 32	-2147483648	2147483647	0.0000	mm/inch
6964~6965	Geometry Y offset value of tool 33	-2147483648	2147483647	0.0000	mm/inch
6966~6967	Geometry Y offset value of tool 34	-2147483648	2147483647	0.0000	mm/inch
6968~6969	Geometry Y offset value of tool 35	-2147483648	2147483647	0.0000	mm/inch
6970~6971	Geometry Y offset value of tool 36	-2147483648	2147483647	0.0000	mm/inch
6972~6973	Geometry Y offset value of tool 37	-2147483648	2147483647	0.0000	mm/inch
6974~6975	Geometry Y offset value of tool 38	-2147483648	2147483647	0.0000	mm/inch
6976~6977	Geometry Y offset value of tool 39	-2147483648	2147483647	0.0000	mm/inch
6978~6979	Geometry Y offset value of tool 40	-2147483648	2147483647	0.0000	mm/inch
6980~6981	Geometry Y offset value of tool 41	-2147483648	2147483647	0.0000	mm/inch
6982~6983	Geometry Y offset value of tool 42	-2147483648	2147483647	0.0000	mm/inch
6984~6985	Geometry Y offset value of tool 43	-2147483648	2147483647	0.0000	mm/inch
6986~6987	Geometry Y offset value of tool 44	-2147483648	2147483647	0.0000	mm/inch
6988~6989	Geometry Y offset value of tool 45	-2147483648	2147483647	0.0000	mm/inch
6990~6991	Geometry Y offset value of tool 46	-2147483648	2147483647	0.0000	mm/inch
6992~6993	Geometry Y offset value of tool 47	-2147483648	2147483647	0.0000	mm/inch
6994~6995	Geometry Y offset value of tool 48	-2147483648	2147483647	0.0000	mm/inch
6996~6997	Geometry Y offset value of tool 49	-2147483648	2147483647	0.0000	mm/inch
6998~6999	Geometry Y offset value of tool 50	-2147483648	2147483647	0.0000	mm/inch

8.14.6. Geometry Z Offset Values (Lathe Model)

Address	Description	Minimum	Maximum	Format	Unit
7000~7001	Geometry Z offset value of tool 1	-2147483648	2147483647	0.0000	mm/inch
7002~7003	Geometry Z offset value of tool 2	-2147483648	2147483647	0.0000	mm/inch
7004~7005	Geometry Z offset value of tool 3	-2147483648	2147483647	0.0000	mm/inch
7006~7007	Geometry Z offset value of tool 4	-2147483648	2147483647	0.0000	mm/inch
7008~7009	Geometry Z offset value of tool 5	-2147483648	2147483647	0.0000	mm/inch
7010~7011	Geometry Z offset value of tool 6	-2147483648	2147483647	0.0000	mm/inch
7012~7013	Geometry Z offset value of tool 7	-2147483648	2147483647	0.0000	mm/inch
7014~7015	Geometry Z offset value of tool 8	-2147483648	2147483647	0.0000	mm/inch
7016~7017	Geometry Z offset value of tool 9	-2147483648	2147483647	0.0000	mm/inch
7018~7019	Geometry Z offset value of tool 10	-2147483648	2147483647	0.0000	mm/inch
7020~7021	Geometry Z offset value of tool 11	-2147483648	2147483647	0.0000	mm/inch
7022~7023	Geometry Z offset value of tool 12	-2147483648	2147483647	0.0000	mm/inch
7024~7025	Geometry Z offset value of tool 13	-2147483648	2147483647	0.0000	mm/inch
7026~7027	Geometry Z offset value of tool 14	-2147483648	2147483647	0.0000	mm/inch
7028~7029	Geometry Z offset value of tool 15	-2147483648	2147483647	0.0000	mm/inch
7030~7031	Geometry Z offset value of tool 16	-2147483648	2147483647	0.0000	mm/inch
7032~7033	Geometry Z offset value of tool 17	-2147483648	2147483647	0.0000	mm/inch
7034~7035	Geometry Z offset value of tool 18	-2147483648	2147483647	0.0000	mm/inch
7036~7037	Geometry Z offset value of tool 19	-2147483648	2147483647	0.0000	mm/inch
7038~7039	Geometry Z offset value of tool 20	-2147483648	2147483647	0.0000	mm/inch
7040~7041	Geometry Z offset value of tool 21	-2147483648	2147483647	0.0000	mm/inch
7042~7043	Geometry Z offset value of tool 22	-2147483648	2147483647	0.0000	mm/inch
7044~7045	Geometry Z offset value of tool 23	-2147483648	2147483647	0.0000	mm/inch
7046~7047	Geometry Z offset value of tool 24	-2147483648	2147483647	0.0000	mm/inch
7048~7049	Geometry Z offset value of tool 25	-2147483648	2147483647	0.0000	mm/inch
7050~7051	Geometry Z offset value of tool 26	-2147483648	2147483647	0.0000	mm/inch
7052~7053	Geometry Z offset value of tool 27	-2147483648	2147483647	0.0000	mm/inch
7054~7055	Geometry Z offset value of tool 28	-2147483648	2147483647	0.0000	mm/inch
7056~7057	Geometry Z offset value of tool 29	-2147483648	2147483647	0.0000	mm/inch
7058~7059	Geometry Z offset value of tool 30	-2147483648	2147483647	0.0000	mm/inch
7060~7061	Geometry Z offset value of tool 31	-2147483648	2147483647	0.0000	mm/inch
7062~7063	Geometry Z offset value of tool 32	-2147483648	2147483647	0.0000	mm/inch
7064~7065	Geometry Z offset value of tool 33	-2147483648	2147483647	0.0000	mm/inch
7066~7067	Geometry Z offset value of tool 34	-2147483648	2147483647	0.0000	mm/inch
7068~7069	Geometry Z offset value of tool 35	-2147483648	2147483647	0.0000	mm/inch
7070~7071	Geometry Z offset value of tool 36	-2147483648	2147483647	0.0000	mm/inch
7072~7073	Geometry Z offset value of tool 37	-2147483648	2147483647	0.0000	mm/inch
7074~7075	Geometry Z offset value of tool 38	-2147483648	2147483647	0.0000	mm/inch
7076~7077	Geometry Z offset value of tool 39	-2147483648	2147483647	0.0000	mm/inch
7078~7079	Geometry Z offset value of tool 40	-2147483648	2147483647	0.0000	mm/inch
7080~7081	Geometry Z offset value of tool 41	-2147483648	2147483647	0.0000	mm/inch
7082~7083	Geometry Z offset value of tool 42	-2147483648	2147483647	0.0000	mm/inch
7084~7085	Geometry Z offset value of tool 43	-2147483648	2147483647	0.0000	mm/inch
7086~7087	Geometry Z offset value of tool 44	-2147483648	2147483647	0.0000	mm/inch
7088~7089	Geometry Z offset value of tool 45	-2147483648	2147483647	0.0000	mm/inch
7090~7091	Geometry Z offset value of tool 46	-2147483648	2147483647	0.0000	mm/inch
7092~7093	Geometry Z offset value of tool 47	-2147483648	2147483647	0.0000	mm/inch
7094~7095	Geometry Z offset value of tool 48	-2147483648	2147483647	0.0000	mm/inch
7096~7097	Geometry Z offset value of tool 49	-2147483648	2147483647	0.0000	mm/inch
7098~7099	Geometry Z offset value of tool 50	-2147483648	2147483647	0.0000	mm/inch

8.14.7. Geometry X Offset Wear Values (Lathe Model)

Address	Description	Minimum	Maximum	Format	Unit
7100~7101	Geometry X offset wear value of tool 1	-2147483648	2147483647	0.0000	mm/inch
7102~7103	Geometry X offset wear value of tool 2	-2147483648	2147483647	0.0000	mm/inch
7104~7105	Geometry X offset wear value of tool 3	-2147483648	2147483647	0.0000	mm/inch
7106~7107	Geometry X offset wear value of tool 4	-2147483648	2147483647	0.0000	mm/inch
7108~7109	Geometry X offset wear value of tool 5	-2147483648	2147483647	0.0000	mm/inch
7110~7111	Geometry X offset wear value of tool 6	-2147483648	2147483647	0.0000	mm/inch
7112~7113	Geometry X offset wear value of tool 7	-2147483648	2147483647	0.0000	mm/inch
7114~7115	Geometry X offset wear value of tool 8	-2147483648	2147483647	0.0000	mm/inch
7116~7117	Geometry X offset wear value of tool 9	-2147483648	2147483647	0.0000	mm/inch
7118~7119	Geometry X offset wear value of tool 10	-2147483648	2147483647	0.0000	mm/inch
7120~7121	Geometry X offset wear value of tool 11	-2147483648	2147483647	0.0000	mm/inch
7122~7123	Geometry X offset wear value of tool 12	-2147483648	2147483647	0.0000	mm/inch
7124~7125	Geometry X offset wear value of tool 13	-2147483648	2147483647	0.0000	mm/inch
7126~7127	Geometry X offset wear value of tool 14	-2147483648	2147483647	0.0000	mm/inch
7128~7129	Geometry X offset wear value of tool 15	-2147483648	2147483647	0.0000	mm/inch
7130~7131	Geometry X offset wear value of tool 16	-2147483648	2147483647	0.0000	mm/inch
7132~7133	Geometry X offset wear value of tool 17	-2147483648	2147483647	0.0000	mm/inch
7134~7135	Geometry X offset wear value of tool 18	-2147483648	2147483647	0.0000	mm/inch
7136~7137	Geometry X offset wear value of tool 19	-2147483648	2147483647	0.0000	mm/inch
7138~7139	Geometry X offset wear value of tool 20	-2147483648	2147483647	0.0000	mm/inch
7140~7141	Geometry X offset wear value of tool 21	-2147483648	2147483647	0.0000	mm/inch
7142~7143	Geometry X offset wear value of tool 22	-2147483648	2147483647	0.0000	mm/inch
7144~7145	Geometry X offset wear value of tool 23	-2147483648	2147483647	0.0000	mm/inch
7146~7147	Geometry X offset wear value of tool 24	-2147483648	2147483647	0.0000	mm/inch
7148~7149	Geometry X offset wear value of tool 25	-2147483648	2147483647	0.0000	mm/inch
7150~7151	Geometry X offset wear value of tool 26	-2147483648	2147483647	0.0000	mm/inch
7152~7153	Geometry X offset wear value of tool 27	-2147483648	2147483647	0.0000	mm/inch
7154~7155	Geometry X offset wear value of tool 28	-2147483648	2147483647	0.0000	mm/inch
7156~7157	Geometry X offset wear value of tool 29	-2147483648	2147483647	0.0000	mm/inch
7158~7159	Geometry X offset wear value of tool 30	-2147483648	2147483647	0.0000	mm/inch
7160~7161	Geometry X offset wear value of tool 31	-2147483648	2147483647	0.0000	mm/inch
7162~7163	Geometry X offset wear value of tool 32	-2147483648	2147483647	0.0000	mm/inch
7164~7165	Geometry X offset wear value of tool 33	-2147483648	2147483647	0.0000	mm/inch
7166~7167	Geometry X offset wear value of tool 34	-2147483648	2147483647	0.0000	mm/inch
7168~7169	Geometry X offset wear value of tool 35	-2147483648	2147483647	0.0000	mm/inch
7170~7171	Geometry X offset wear value of tool 36	-2147483648	2147483647	0.0000	mm/inch
7172~7173	Geometry X offset wear value of tool 37	-2147483648	2147483647	0.0000	mm/inch
7174~7175	Geometry X offset wear value of tool 38	-2147483648	2147483647	0.0000	mm/inch
7176~7177	Geometry X offset wear value of tool 39	-2147483648	2147483647	0.0000	mm/inch
7178~7179	Geometry X offset wear value of tool 40	-2147483648	2147483647	0.0000	mm/inch
7180~7181	Geometry X offset wear value of tool 41	-2147483648	2147483647	0.0000	mm/inch
7182~7183	Geometry X offset wear value of tool 42	-2147483648	2147483647	0.0000	mm/inch
7184~7185	Geometry X offset wear value of tool 43	-2147483648	2147483647	0.0000	mm/inch
7186~7187	Geometry X offset wear value of tool 44	-2147483648	2147483647	0.0000	mm/inch
7188~7189	Geometry X offset wear value of tool 45	-2147483648	2147483647	0.0000	mm/inch
7190~7191	Geometry X offset wear value of tool 46	-2147483648	2147483647	0.0000	mm/inch
7192~7193	Geometry X offset wear value of tool 47	-2147483648	2147483647	0.0000	mm/inch
7194~7195	Geometry X offset wear value of tool 48	-2147483648	2147483647	0.0000	mm/inch
7196~7197	Geometry X offset wear value of tool 49	-2147483648	2147483647	0.0000	mm/inch
7198~7199	Geometry X offset wear value of tool 50	-2147483648	2147483647	0.0000	mm/inch

8.14.8. Geometry Y Offset Wear Values (Lathe Model)

Address	Description	Minimum	Maximum	Format	Unit
7200~7201	Geometry Y offset wear value of tool 1	-2147483648	2147483647	0.0000	mm/inch
7202~7203	Geometry Y offset wear value of tool 2	-2147483648	2147483647	0.0000	mm/inch
7204~7205	Geometry Y offset wear value of tool 3	-2147483648	2147483647	0.0000	mm/inch
7206~7207	Geometry Y offset wear value of tool 4	-2147483648	2147483647	0.0000	mm/inch
7208~7208	Geometry Y offset wear value of tool 5	-2147483648	2147483647	0.0000	mm/inch
7210~7211	Geometry Y offset wear value of tool 6	-2147483648	2147483647	0.0000	mm/inch
7212~7213	Geometry Y offset wear value of tool 7	-2147483648	2147483647	0.0000	mm/inch
7214~7215	Geometry Y offset wear value of tool 8	-2147483648	2147483647	0.0000	mm/inch
7216~7217	Geometry Y offset wear value of tool 9	-2147483648	2147483647	0.0000	mm/inch
7218~7219	Geometry Y offset wear value of tool 10	-2147483648	2147483647	0.0000	mm/inch
7220~7221	Geometry Y offset wear value of tool 11	-2147483648	2147483647	0.0000	mm/inch
7222~7223	Geometry Y offset wear value of tool 12	-2147483648	2147483647	0.0000	mm/inch
7224~7225	Geometry Y offset wear value of tool 13	-2147483648	2147483647	0.0000	mm/inch
7226~7227	Geometry Y offset wear value of tool 14	-2147483648	2147483647	0.0000	mm/inch
7228~7229	Geometry Y offset wear value of tool 15	-2147483648	2147483647	0.0000	mm/inch
7230~7231	Geometry Y offset wear value of tool 16	-2147483648	2147483647	0.0000	mm/inch
7232~7233	Geometry Y offset wear value of tool 17	-2147483648	2147483647	0.0000	mm/inch
7234~7235	Geometry Y offset wear value of tool 18	-2147483648	2147483647	0.0000	mm/inch
7236~7237	Geometry Y offset wear value of tool 19	-2147483648	2147483647	0.0000	mm/inch
7238~7239	Geometry Y offset wear value of tool 20	-2147483648	2147483647	0.0000	mm/inch
7240~7241	Geometry Y offset wear value of tool 21	-2147483648	2147483647	0.0000	mm/inch
7242~7243	Geometry Y offset wear value of tool 22	-2147483648	2147483647	0.0000	mm/inch
7244~7245	Geometry Y offset wear value of tool 23	-2147483648	2147483647	0.0000	mm/inch
7246~7247	Geometry Y offset wear value of tool 24	-2147483648	2147483647	0.0000	mm/inch
7248~7249	Geometry Y offset wear value of tool 25	-2147483648	2147483647	0.0000	mm/inch
7250~7251	Geometry Y offset wear value of tool 26	-2147483648	2147483647	0.0000	mm/inch
7252~7253	Geometry Y offset wear value of tool 27	-2147483648	2147483647	0.0000	mm/inch
7254~7255	Geometry Y offset wear value of tool 28	-2147483648	2147483647	0.0000	mm/inch
7256~7257	Geometry Y offset wear value of tool 29	-2147483648	2147483647	0.0000	mm/inch
7258~7259	Geometry Y offset wear value of tool 30	-2147483648	2147483647	0.0000	mm/inch
7260~7261	Geometry Y offset wear value of tool 31	-2147483648	2147483647	0.0000	mm/inch
7262~7263	Geometry Y offset wear value of tool 32	-2147483648	2147483647	0.0000	mm/inch
7264~7265	Geometry Y offset wear value of tool 33	-2147483648	2147483647	0.0000	mm/inch
7266~7267	Geometry Y offset wear value of tool 34	-2147483648	2147483647	0.0000	mm/inch
7268~7269	Geometry Y offset wear value of tool 35	-2147483648	2147483647	0.0000	mm/inch
7270~7271	Geometry Y offset wear value of tool 36	-2147483648	2147483647	0.0000	mm/inch
7272~7273	Geometry Y offset wear value of tool 37	-2147483648	2147483647	0.0000	mm/inch
7274~7275	Geometry Y offset wear value of tool 38	-2147483648	2147483647	0.0000	mm/inch
7276~7277	Geometry Y offset wear value of tool 39	-2147483648	2147483647	0.0000	mm/inch
7278~7279	Geometry Y offset wear value of tool 40	-2147483648	2147483647	0.0000	mm/inch
7280~7281	Geometry Y offset wear value of tool 41	-2147483648	2147483647	0.0000	mm/inch
7282~7283	Geometry Y offset wear value of tool 42	-2147483648	2147483647	0.0000	mm/inch
7284~7285	Geometry Y offset wear value of tool 43	-2147483648	2147483647	0.0000	mm/inch
7286~7287	Geometry Y offset wear value of tool 44	-2147483648	2147483647	0.0000	mm/inch
7288~7289	Geometry Y offset wear value of tool 45	-2147483648	2147483647	0.0000	mm/inch
7290~7291	Geometry Y offset wear value of tool 46	-2147483648	2147483647	0.0000	mm/inch
7292~7293	Geometry Y offset wear value of tool 47	-2147483648	2147483647	0.0000	mm/inch
7294~7295	Geometry Y offset wear value of tool 48	-2147483648	2147483647	0.0000	mm/inch
7296~7297	Geometry Y offset wear value of tool 49	-2147483648	2147483647	0.0000	mm/inch
7298~7299	Geometry Y offset wear value of tool 50	-2147483648	2147483647	0.0000	mm/inch

8.14.9. Geometry Z Offset Wear Values (Lathe Model)

Address	Description	Minimum	Maximum	Format	Unit
7300~7301	Geometry Z offset wear value of tool 1	-2147483648	2147483647	0.0000	mm/inch
7302~7303	Geometry Z offset wear value of tool 2	-2147483648	2147483647	0.0000	mm/inch
7304~7305	Geometry Z offset wear value of tool 3	-2147483648	2147483647	0.0000	mm/inch
7306~7307	Geometry Z offset wear value of tool 4	-2147483648	2147483647	0.0000	mm/inch
7308~7308	Geometry Z offset wear value of tool 5	-2147483648	2147483647	0.0000	mm/inch
7310~7311	Geometry Z offset wear value of tool 6	-2147483648	2147483647	0.0000	mm/inch
7312~7313	Geometry Z offset wear value of tool 7	-2147483648	2147483647	0.0000	mm/inch
7314~7315	Geometry Z offset wear value of tool 8	-2147483648	2147483647	0.0000	mm/inch
7316~7317	Geometry Z offset wear value of tool 9	-2147483648	2147483647	0.0000	mm/inch
7318~7319	Geometry Z offset wear value of tool 10	-2147483648	2147483647	0.0000	mm/inch
7320~7321	Geometry Z offset wear value of tool 11	-2147483648	2147483647	0.0000	mm/inch
7322~7323	Geometry Z offset wear value of tool 12	-2147483648	2147483647	0.0000	mm/inch
7324~7325	Geometry Z offset wear value of tool 13	-2147483648	2147483647	0.0000	mm/inch
7326~7327	Geometry Z offset wear value of tool 14	-2147483648	2147483647	0.0000	mm/inch
7328~7329	Geometry Z offset wear value of tool 15	-2147483648	2147483647	0.0000	mm/inch
7330~7331	Geometry Z offset wear value of tool 16	-2147483648	2147483647	0.0000	mm/inch
7332~7333	Geometry Z offset wear value of tool 17	-2147483648	2147483647	0.0000	mm/inch
7334~7335	Geometry Z offset wear value of tool 18	-2147483648	2147483647	0.0000	mm/inch
7336~7337	Geometry Z offset wear value of tool 19	-2147483648	2147483647	0.0000	mm/inch
7338~7339	Geometry Z offset wear value of tool 20	-2147483648	2147483647	0.0000	mm/inch
7240~7341	Geometry Z offset wear value of tool 21	-2147483648	2147483647	0.0000	mm/inch
7342~7343	Geometry Z offset wear value of tool 22	-2147483648	2147483647	0.0000	mm/inch
7344~7345	Geometry Z offset wear value of tool 23	-2147483648	2147483647	0.0000	mm/inch
7346~7347	Geometry Z offset wear value of tool 24	-2147483648	2147483647	0.0000	mm/inch
7348~7349	Geometry Z offset wear value of tool 25	-2147483648	2147483647	0.0000	mm/inch
7350~7351	Geometry Z offset wear value of tool 26	-2147483648	2147483647	0.0000	mm/inch
7352~7353	Geometry Z offset wear value of tool 27	-2147483648	2147483647	0.0000	mm/inch
7354~7355	Geometry Z offset wear value of tool 28	-2147483648	2147483647	0.0000	mm/inch
7356~7357	Geometry Z offset wear value of tool 29	-2147483648	2147483647	0.0000	mm/inch
7358~7359	Geometry Z offset wear value of tool 30	-2147483648	2147483647	0.0000	mm/inch
7360~7361	Geometry Z offset wear value of tool 31	-2147483648	2147483647	0.0000	mm/inch
7362~7363	Geometry Z offset wear value of tool 32	-2147483648	2147483647	0.0000	mm/inch
7364~7365	Geometry Z offset wear value of tool 33	-2147483648	2147483647	0.0000	mm/inch
7366~7367	Geometry Z offset wear value of tool 34	-2147483648	2147483647	0.0000	mm/inch
7368~7369	Geometry Z offset wear value of tool 35	-2147483648	2147483647	0.0000	mm/inch
7370~7371	Geometry Z offset wear value of tool 36	-2147483648	2147483647	0.0000	mm/inch
7372~7373	Geometry Z offset wear value of tool 37	-2147483648	2147483647	0.0000	mm/inch
7374~7375	Geometry Z offset wear value of tool 38	-2147483648	2147483647	0.0000	mm/inch
7376~7377	Geometry Z offset wear value of tool 39	-2147483648	2147483647	0.0000	mm/inch
7378~7379	Geometry Z offset wear value of tool 40	-2147483648	2147483647	0.0000	mm/inch
7380~7381	Geometry Z offset wear value of tool 41	-2147483648	2147483647	0.0000	mm/inch
7382~7383	Geometry Z offset wear value of tool 42	-2147483648	2147483647	0.0000	mm/inch
7384~7385	Geometry Z offset wear value of tool 43	-2147483648	2147483647	0.0000	mm/inch
7386~7387	Geometry Z offset wear value of tool 44	-2147483648	2147483647	0.0000	mm/inch
7388~7389	Geometry Z offset wear value of tool 45	-2147483648	2147483647	0.0000	mm/inch
7390~7391	Geometry Z offset wear value of tool 46	-2147483648	2147483647	0.0000	mm/inch
7392~7393	Geometry Z offset wear value of tool 47	-2147483648	2147483647	0.0000	mm/inch
7394~7395	Geometry Z offset wear value of tool 48	-2147483648	2147483647	0.0000	mm/inch
7396~7397	Geometry Z offset wear value of tool 49	-2147483648	2147483647	0.0000	mm/inch
7398~7399	Geometry Z offset wear value of tool 50	-2147483648	2147483647	0.0000	mm/inch

8.14.10. Geometry Tool Type Values (Lathe Model)

Address	Description	Minimum	Maximum	Format	Unit
7400~7401	Tool type value of tool 1	-2147483648	2147483647	0	
7402~7403	Tool type value of tool 2	-2147483648	2147483647	0	
7404~7405	Tool type value of tool 3	-2147483648	2147483647	0	
7406~7407	Tool type value of tool 4	-2147483648	2147483647	0	
7408~7409	Tool type value of tool 5	-2147483648	2147483647	0	
7410~7411	Tool type value of tool 6	-2147483648	2147483647	0	
7412~7413	Tool type value of tool 7	-2147483648	2147483647	0	
7414~7415	Tool type value of tool 8	-2147483648	2147483647	0	
7416~7417	Tool type value of tool 9	-2147483648	2147483647	0	
7418~7419	Tool type value of tool 10	-2147483648	2147483647	0	
7420~7421	Tool type value of tool 11	-2147483648	2147483647	0	
7422~7423	Tool type value of tool 12	-2147483648	2147483647	0	
7424~7425	Tool type value of tool 13	-2147483648	2147483647	0	
7426~7427	Tool type value of tool 14	-2147483648	2147483647	0	
7428~7429	Tool type value of tool 15	-2147483648	2147483647	0	
7430~7431	Tool type value of tool 16	-2147483648	2147483647	0	
7432~7433	Tool type value of tool 17	-2147483648	2147483647	0	
7434~7435	Tool type value of tool 18	-2147483648	2147483647	0	
7436~7437	Tool type value of tool 19	-2147483648	2147483647	0	
7438~7439	Tool type value of tool 20	-2147483648	2147483647	0	
7440~7441	Tool type value of tool 21	-2147483648	2147483647	0	
7442~7443	Tool type value of tool 22	-2147483648	2147483647	0	
7444~7445	Tool type value of tool 23	-2147483648	2147483647	0	
7446~7447	Tool type value of tool 24	-2147483648	2147483647	0	
7448~7449	Tool type value of tool 25	-2147483648	2147483647	0	
7450~7451	Tool type value of tool 26	-2147483648	2147483647	0	
7452~7453	Tool type value of tool 27	-2147483648	2147483647	0	
7454~7455	Tool type value of tool 28	-2147483648	2147483647	0	
7456~7457	Tool type value of tool 29	-2147483648	2147483647	0	
7458~7459	Tool type value of tool 30	-2147483648	2147483647	0	
7460~7461	Tool type value of tool 31	-2147483648	2147483647	0	
7462~7463	Tool type value of tool 32	-2147483648	2147483647	0	
7464~7465	Tool type value of tool 33	-2147483648	2147483647	0	
7466~7467	Tool type value of tool 34	-2147483648	2147483647	0	
7468~7469	Tool type value of tool 35	-2147483648	2147483647	0	
7470~7471	Tool type value of tool 36	-2147483648	2147483647	0	
7472~7473	Tool type value of tool 37	-2147483648	2147483647	0	
7474~7475	Tool type value of tool 38	-2147483648	2147483647	0	
7476~7477	Tool type value of tool 39	-2147483648	2147483647	0	
7478~7479	Tool type value of tool 40	-2147483648	2147483647	0	
7480~7481	Tool type value of tool 41	-2147483648	2147483647	0	
7482~7483	Tool type value of tool 42	-2147483648	2147483647	0	
7484~7485	Tool type value of tool 43	-2147483648	2147483647	0	
7486~7487	Tool type value of tool 44	-2147483648	2147483647	0	
7488~7489	Tool type value of tool 45	-2147483648	2147483647	0	
7490~7491	Tool type value of tool 46	-2147483648	2147483647	0	
7492~7493	Tool type value of tool 47	-2147483648	2147483647	0	
7494~7495	Tool type value of tool 48	-2147483648	2147483647	0	
7496~7497	Tool type value of tool 49	-2147483648	2147483647	0	
7498~7499	Tool type value of tool 50	-2147483648	2147483647	0	

8.14.11. Geometry Tool Radius Values (Lathe Model)

Address	Description	Minimum	Maximum	Format	Unit
7500~7501	Tool radius value of tool 1	-2147483648	2147483647	0.0000	mm/inch
7502~7503	Tool radius value of tool 2	-2147483648	2147483647	0.0000	mm/inch
7504~7505	Tool radius value of tool 3	-2147483648	2147483647	0.0000	mm/inch
7506~7507	Tool radius value of tool 4	-2147483648	2147483647	0.0000	mm/inch
7508~7509	Tool radius value of tool 5	-2147483648	2147483647	0.0000	mm/inch
7510~7511	Tool radius value of tool 6	-2147483648	2147483647	0.0000	mm/inch
7512~7513	Tool radius value of tool 7	-2147483648	2147483647	0.0000	mm/inch
7514~7515	Tool radius value of tool 8	-2147483648	2147483647	0.0000	mm/inch
7516~7517	Tool radius value of tool 9	-2147483648	2147483647	0.0000	mm/inch
7518~7519	Tool radius value of tool 10	-2147483648	2147483647	0.0000	mm/inch
7520~7521	Tool radius value of tool 11	-2147483648	2147483647	0.0000	mm/inch
7522~7523	Tool radius value of tool 12	-2147483648	2147483647	0.0000	mm/inch
7524~7525	Tool radius value of tool 13	-2147483648	2147483647	0.0000	mm/inch
7526~7527	Tool radius value of tool 14	-2147483648	2147483647	0.0000	mm/inch
7528~7529	Tool radius value of tool 15	-2147483648	2147483647	0.0000	mm/inch
7530~7531	Tool radius value of tool 16	-2147483648	2147483647	0.0000	mm/inch
7532~7533	Tool radius value of tool 17	-2147483648	2147483647	0.0000	mm/inch
7534~7535	Tool radius value of tool 18	-2147483648	2147483647	0.0000	mm/inch
7536~7537	Tool radius value of tool 19	-2147483648	2147483647	0.0000	mm/inch
7538~7539	Tool radius value of tool 20	-2147483648	2147483647	0.0000	mm/inch
7540~7541	Tool radius value of tool 21	-2147483648	2147483647	0.0000	mm/inch
7542~7543	Tool radius value of tool 22	-2147483648	2147483647	0.0000	mm/inch
7544~7545	Tool radius value of tool 23	-2147483648	2147483647	0.0000	mm/inch
7546~7547	Tool radius value of tool 24	-2147483648	2147483647	0.0000	mm/inch
7548~7549	Tool radius value of tool 25	-2147483648	2147483647	0.0000	mm/inch
7550~7551	Tool radius value of tool 26	-2147483648	2147483647	0.0000	mm/inch
7552~7553	Tool radius value of tool 27	-2147483648	2147483647	0.0000	mm/inch
7554~7555	Tool radius value of tool 28	-2147483648	2147483647	0.0000	mm/inch
7556~7557	Tool radius value of tool 29	-2147483648	2147483647	0.0000	mm/inch
7558~7559	Tool radius value of tool 30	-2147483648	2147483647	0.0000	mm/inch
7560~7561	Tool radius value of tool 31	-2147483648	2147483647	0.0000	mm/inch
7562~7563	Tool radius value of tool 32	-2147483648	2147483647	0.0000	mm/inch
7564~7565	Tool radius value of tool 33	-2147483648	2147483647	0.0000	mm/inch
7566~7567	Tool radius value of tool 34	-2147483648	2147483647	0.0000	mm/inch
7568~7569	Tool radius value of tool 35	-2147483648	2147483647	0.0000	mm/inch
7570~7571	Tool radius value of tool 36	-2147483648	2147483647	0.0000	mm/inch
7572~7573	Tool radius value of tool 37	-2147483648	2147483647	0.0000	mm/inch
7574~7575	Tool radius value of tool 38	-2147483648	2147483647	0.0000	mm/inch
7576~7577	Tool radius value of tool 39	-2147483648	2147483647	0.0000	mm/inch
7578~7579	Tool radius value of tool 40	-2147483648	2147483647	0.0000	mm/inch
7580~7581	Tool radius value of tool 41	-2147483648	2147483647	0.0000	mm/inch
7582~7583	Tool radius value of tool 42	-2147483648	2147483647	0.0000	mm/inch
7584~7585	Tool radius value of tool 43	-2147483648	2147483647	0.0000	mm/inch
7586~7587	Tool radius value of tool 44	-2147483648	2147483647	0.0000	mm/inch
7588~7589	Tool radius value of tool 45	-2147483648	2147483647	0.0000	mm/inch
7590~7591	Tool radius value of tool 46	-2147483648	2147483647	0.0000	mm/inch
7592~7593	Tool radius value of tool 47	-2147483648	2147483647	0.0000	mm/inch
7594~7595	Tool radius value of tool 48	-2147483648	2147483647	0.0000	mm/inch
7596~7597	Tool radius value of tool 49	-2147483648	2147483647	0.0000	mm/inch
7598~7599	Tool radius value of tool 50	-2147483648	2147483647	0.0000	mm/inch

8.14.12. Work Offset Values

Address	Description	Minimum	Maximum	Format	Unit
7600~7601	X axis part zero offset value – (G54)	-2147483648	2147483647	0.0000	mm/inch
7602~7603	Y axis part zero offset value – (G54)	-2147483648	2147483647	0.0000	mm/inch
7604~7605	Z axis part zero offset value – (G54)	-2147483648	2147483647	0.0000	mm/inch
7606~7607	4th axis part zero offset value – (G54)	-2147483648	2147483647	0.0000	mm/inch
7608~7609	5th axis part zero offset value – (G54)	-2147483648	2147483647	0.0000	mm/inch
7610~7611	6th axis part zero offset value – (G54)	-2147483648	2147483647	0.0000	mm/inch
7612~7613	7th axis part zero offset value – (G54)	-2147483648	2147483647	0.0000	mm/inch
7614~7615	8th axis part zero offset value – (G54)	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7616~7617	X axis part zero offset value – (G55)	-2147483648	2147483647	0.0000	mm/inch
7618~7619	Y axis part zero offset value – (G55)	-2147483648	2147483647	0.0000	mm/inch
7620~7621	Z axis part zero offset value – (G55)	-2147483648	2147483647	0.0000	mm/inch
7622~7623	4th axis part zero offset value – (G55)	-2147483648	2147483647	0.0000	mm/inch
7624~7625	5th axis part zero offset value – (G55)	-2147483648	2147483647	0.0000	mm/inch
7626~7627	6th axis part zero offset value – (G55)	-2147483648	2147483647	0.0000	mm/inch
7628~7629	7th axis part zero offset value – (G55)	-2147483648	2147483647	0.0000	mm/inch
7630~7631	8th axis part zero offset value – (G55)	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7632~7633	X axis part zero offset value – (G56)	-2147483648	2147483647	0.0000	mm/inch
7634~7635	Y axis part zero offset value – (G56)	-2147483648	2147483647	0.0000	mm/inch
7636~7637	Z axis part zero offset value – (G56)	-2147483648	2147483647	0.0000	mm/inch
7638~7639	4th axis part zero offset value – (G56)	-2147483648	2147483647	0.0000	mm/inch
7640~7641	5th axis part zero offset value – (G56)	-2147483648	2147483647	0.0000	mm/inch
7642~7643	6th axis part zero offset value – (G56)	-2147483648	2147483647	0.0000	mm/inch
7644~7645	7th axis part zero offset value – (G56)	-2147483648	2147483647	0.0000	mm/inch
7646~7647	8th axis part zero offset value – (G56)	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7648~7649	X axis part zero offset value – (G57)	-2147483648	2147483647	0.0000	mm/inch
7650~7651	Y axis part zero offset value – (G57)	-2147483648	2147483647	0.0000	mm/inch
7652~7653	Z axis part zero offset value – (G57)	-2147483648	2147483647	0.0000	mm/inch
7654~7655	4th axis part zero offset value – (G57)	-2147483648	2147483647	0.0000	mm/inch
7656~7657	5th axis part zero offset value – (G57)	-2147483648	2147483647	0.0000	mm/inch
7658~7659	6th axis part zero offset value – (G57)	-2147483648	2147483647	0.0000	mm/inch
7660~7661	7th axis part zero offset value – (G57)	-2147483648	2147483647	0.0000	mm/inch
7662~7663	8th axis part zero offset value – (G57)	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7664~7665	X axis part zero offset value – (G58)	-2147483648	2147483647	0.0000	mm/inch
7666~7667	Y axis part zero offset value – (G58)	-2147483648	2147483647	0.0000	mm/inch
7668~7669	Z axis part zero offset value – (G58)	-2147483648	2147483647	0.0000	mm/inch
7670~7671	4th axis part zero offset value – (G58)	-2147483648	2147483647	0.0000	mm/inch
7672~7673	5th axis part zero offset value – (G58)	-2147483648	2147483647	0.0000	mm/inch
7674~7675	6th axis part zero offset value – (G58)	-2147483648	2147483647	0.0000	mm/inch
7676~7677	7th axis part zero offset value – (G58)	-2147483648	2147483647	0.0000	mm/inch
7678~7679	8th axis part zero offset value – (G58)	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7680~7681	X axis part zero offset value – (G59)	-2147483648	2147483647	0.0000	mm/inch
7682~7683	Y axis part zero offset value – (G59)	-2147483648	2147483647	0.0000	mm/inch
7684~7685	Z axis part zero offset value – (G59)	-2147483648	2147483647	0.0000	mm/inch
7686~7687	4th axis part zero offset value – (G59)	-2147483648	2147483647	0.0000	mm/inch
7688~7689	5th axis part zero offset value – (G59)	-2147483648	2147483647	0.0000	mm/inch
7690~7691	6th axis part zero offset value – (G59)	-2147483648	2147483647	0.0000	mm/inch
7692~7693	7th axis part zero offset value – (G59)	-2147483648	2147483647	0.0000	mm/inch
7694~7695	8th axis part zero offset value – (G59)	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7696~7697	X axis part zero offset value – (G59.1)	-2147483648	2147483647	0.0000	mm/inch
7698~7699	Y axis part zero offset value – (G59.1)	-2147483648	2147483647	0.0000	mm/inch
7700~7701	Z axis part zero offset value – (G59.1)	-2147483648	2147483647	0.0000	mm/inch
7702~7703	4th axis part zero offset value – (G59.1)	-2147483648	2147483647	0.0000	mm/inch
7704~7705	5th axis part zero offset value – (G59.1)	-2147483648	2147483647	0.0000	mm/inch
7706~7707	6th axis part zero offset value – (G59.1)	-2147483648	2147483647	0.0000	mm/inch
7708~7709	7th axis part zero offset value – (G59.1)	-2147483648	2147483647	0.0000	mm/inch
7710~7711	8th axis part zero offset value – (G59.1)	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7712~7713	X axis part zero offset value – (G59.2)	-2147483648	2147483647	0.0000	mm/inch
7714~7715	Y axis part zero offset value – (G59.2)	-2147483648	2147483647	0.0000	mm/inch
7716~7717	Z axis part zero offset value – (G59.2)	-2147483648	2147483647	0.0000	mm/inch
7718~7719	4th axis part zero offset value – (G59.2)	-2147483648	2147483647	0.0000	mm/inch
7720~7721	5th axis part zero offset value – (G59.2)	-2147483648	2147483647	0.0000	mm/inch
7722~7723	6th axis part zero offset value – (G59.2)	-2147483648	2147483647	0.0000	mm/inch
7724~7725	7th axis part zero offset value – (G59.2)	-2147483648	2147483647	0.0000	mm/inch
7726~7727	8th axis part zero offset value – (G59.2)	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7728~7729	X axis part zero offset value – (G59.3)	-2147483648	2147483647	0.0000	mm/inch
7730~7731	Y axis part zero offset value – (G59.3)	-2147483648	2147483647	0.0000	mm/inch
7732~7733	Z axis part zero offset value – (G59.3)	-2147483648	2147483647	0.0000	mm/inch
7734~7735	4th axis part zero offset value – (G59.3)	-2147483648	2147483647	0.0000	mm/inch
7736~7737	5th axis part zero offset value – (G59.3)	-2147483648	2147483647	0.0000	mm/inch
7738~7739	6th axis part zero offset value – (G59.3)	-2147483648	2147483647	0.0000	mm/inch
7740~7741	7th axis part zero offset value – (G59.3)	-2147483648	2147483647	0.0000	mm/inch
7742~7743	8th axis part zero offset value – (G59.3)	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7744~7745	X axis part zero offset value – (G59.4)	-2147483648	2147483647	0.0000	mm/inch
7746~7747	Y axis part zero offset value – (G59.4)	-2147483648	2147483647	0.0000	mm/inch
7748~7749	Z axis part zero offset value – (G59.4)	-2147483648	2147483647	0.0000	mm/inch
7750~7751	4th axis part zero offset value – (G59.4)	-2147483648	2147483647	0.0000	mm/inch
7752~7753	5th axis part zero offset value – (G59.4)	-2147483648	2147483647	0.0000	mm/inch
7754~7755	6th axis part zero offset value – (G59.4)	-2147483648	2147483647	0.0000	mm/inch
7756~7757	7th axis part zero offset value – (G59.4)	-2147483648	2147483647	0.0000	mm/inch
7758~7759	8th axis part zero offset value – (G59.4)	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
7760~7761	X axis part zero offset value – (G92)	-2147483648	2147483647	0.0000	mm/inch
7762~7763	Y axis part zero offset value – (G92)	-2147483648	2147483647	0.0000	mm/inch
7764~7765	Z axis part zero offset value – (G92)	-2147483648	2147483647	0.0000	mm/inch
7766~7767	4th axis part zero offset value – (G92)	-2147483648	2147483647	0.0000	mm/inch
7768~7769	5th axis part zero offset value – (G92)	-2147483648	2147483647	0.0000	mm/inch
7770~7771	6th axis part zero offset value – (G92)	-2147483648	2147483647	0.0000	mm/inch
7772~7773	7th axis part zero offset value – (G92)	-2147483648	2147483647	0.0000	mm/inch
7774~7775	8th axis part zero offset value – (G92)	-2147483648	2147483647	0.0000	mm/inch

8.14.13. Part Dimension Values

Address	Description	Minimum	Maximum	Format	Unit
7800~7801	Part dimension X value	0	2147483647	0.0000	mm/inch
7802~7803	Part dimension Y value	0	2147483647	0.0000	mm/inch
7804~7805	Part dimension Z value	0	2147483647	0.0000	mm/inch

8.14.14. Manual movement speed selection value

Address	Description	Minimum	Maximum	Format	Unit
7820~7821	Manual movement speed value	0	1000000000	0.0000	unit/min

8.14.15. Manual Step Distance Values

Address	Description	Minimum	Maximum	Format	Unit
7822~7823	X axis manual step distance	-2147483648	2147483647	0.0000	mm/inch
7824~7825	Y axis manual step distance	-2147483648	2147483647	0.0000	mm/inch
7826~7827	Z axis manual step distance	-2147483648	2147483647	0.0000	mm/inch
7828~7829	4th axis manual step distance	-2147483648	2147483647	0.0000	mm/inch
7830~7831	5th axis manual step distance	-2147483648	2147483647	0.0000	mm/inch
7832~7833	6th axis manual step distance	-2147483648	2147483647	0.0000	mm/inch
7834~7835	7th axis manual step distance	-2147483648	2147483647	0.0000	mm/inch
7836~7837	8th axis manual step distance	-2147483648	2147483647	0.0000	mm/inch

8.14.16. Temporary Offset Value

Address	Description	Minimum	Maximum	Format	Unit
7838~7839	Temporary live offset value	-30000	30000	0.0000	unit/min

8.14.17 Manual Step Speed Values

Address	Description	Minimum	Maximum	Format	Unit
7840~7841	X axis manual step speed	0	1000000000	0.0000	unit/min
7842~7843	Y axis manual step speed	0	1000000000	0.0000	unit/min
7844~7845	Z axis manual step speed	0	1000000000	0.0000	unit/min
7846~7847	4th axis manual step speed	0	1000000000	0.0000	unit/min
7848~7849	5th axis manual step speed	0	1000000000	0.0000	unit/min
7850~7851	6th axis manual step speed	0	1000000000	0.0000	unit/min
7852~7853	7th axis manual step speed	0	1000000000	0.0000	unit/min
7854~7855	8th axis manual step speed	0	1000000000	0.0000	unit/min

8.15 Extended General-Purpose Holding User Variables

8.15.0 Standard Software

Address	Description	Minimum	Maximum	Format	Unit
8000~8001	General-purpose holding user variable (extended) 0	-2147483648	2147483647		
8002~8003	General-purpose holding user variable (extended) 1	-2147483648	2147483647		
8004~8005	General-purpose holding user variable (extended) 2	-2147483648	2147483647		
…	…	-2147483648	2147483647		
…	…	-2147483648	2147483647		
…	…	-2147483648	2147483647		
9994~9995	General-purpose holding user variable (extended) 997	-2147483648	2147483647		
9996~9997	General-purpose holding user variable (extended) 998	-2147483648	2147483647		
9998~9999	General-purpose holding user variable (extended) 999	-2147483648	2147483647		

There are a total of 1000 extended general-purpose holding user variables. They are sequentially assigned starting from address 8000. They can store 32-bit data. These variables can be used for purposes such as storing user macros or program package data. When the power is turned off and then on again, the contents of these variables remain unchanged

8.15.1 Drilling Unit Active

When drilling group offsets are activated with PRM336, variables from 4500 to 4649 are used as 50 tool offsets. To make these offsets valid, the G43/G44 H command must also be issued. The first tool of the drilling group starts from tool 51. For the first tool, G43/G44 H51 should be given.

Address	Description	Minimum	Maximum	Format	Unit
9000~9001	Drilling group 1st tool X offset	-2147483648	2147483647	0.0000	mm/inch
9002~9003	Drilling group 1st tool Y offset	-2147483648	2147483647	0.0000	mm/inch
9004~9005	Drilling group 1st tool Z offset	-2147483648	2147483647	0.0000	mm/inch
…	…	-2147483648	2147483647	0.0000	mm/inch
…	…	-2147483648	2147483647	0.0000	mm/inch
…	…	-2147483648	2147483647	0.0000	mm/inch
9294~9295	Drilling group 50th tool X offset	-2147483648	2147483647	0.0000	mm/inch
9296~9297	Drilling group 50th tool Y offset	-2147483648	2147483647	0.0000	mm/inch
9298~9299	Drilling group 50th tool Z offset	-2147483648	2147483647	0.0000	mm/inch

8.15.2 Laser Cutting Software

The list of parameters used in the laser cutting machine is as follows:

Address	Description	Minimum	Maximum	Format	Unit
8000~8001	Laser height axis slot number	0	6	0	
8002~8003	Focus axis slot number	0	6	0	
8004~8005	Tip touch minimum value	-2147483648	2147483647	0	
8006~8007	Tip far maximum value	-2147483648	2147483647	0	
8008~8009	Number of samples during calibration	2	19	0	count
8010~8011	Laser height axis safety position	-2147483648	2147483647	0.0000	mm/inch
8012~8013	Number of retry attempts for type touch alarm	0	2147483647	0	count
8014~8015	Gas injection time before automatic operation	0	999999	0	ms

Address	Description	Minimum	Maximum	Format	Unit
8020~8021	Z calibration 1st measurement position	-2147483648	2147483647	0.0000	mm/inch
8022~8023	Z calibration 2nd measurement position	-2147483648	2147483647	0.0000	mm/inch
8024~8025	Z calibration 3rd measurement position	-2147483648	2147483647	0.0000	mm/inch
8026~8027	Z calibration 4th measurement position	-2147483648	2147483647	0.0000	mm/inch
8028~8029	Z calibration 5th measurement position	-2147483648	2147483647	0.0000	mm/inch
8030~8031	Z calibration 5th measurement position	-2147483648	2147483647	0.0000	mm/inch
8032~8033	Z calibration 7th measurement position	-2147483648	2147483647	0.0000	mm/inch
8034~8035	Z calibration 8th measurement position	-2147483648	2147483647	0.0000	mm/inch
8036~8037	Z calibration 9th measurement position	-2147483648	2147483647	0.0000	mm/inch
8038~8039	Z calibration 10th measurement position	-2147483648	2147483647	0.0000	mm/inch
8040~8041	Z calibration 11th measurement position	-2147483648	2147483647	0.0000	mm/inch
8042~8043	Z calibration 12th measurement position	-2147483648	2147483647	0.0000	mm/inch
8044~8045	Z calibration 13th measurement position	-2147483648	2147483647	0.0000	mm/inch
8046~8047	Z calibration 14th measurement position	-2147483648	2147483647	0.0000	mm/inch
8048~8049	Z calibration 15th measurement position	-2147483648	2147483647	0.0000	mm/inch
8050~8051	Z calibration 16th measurement position	-2147483648	2147483647	0.0000	mm/inch
8052~8053	Z calibration 17th measurement position	-2147483648	2147483647	0.0000	mm/inch
8054~8055	Z calibration 18th measurement position	-2147483648	2147483647	0.0000	mm/inch
8056~8057	Z calibration 19th measurement position	-2147483648	2147483647	0.0000	mm/inch

Address	Description	Minimum	Maximum	Format	Unit
8060~8061	Z calibration 1st measured analog value	-2147483648	2147483647	0	
8062~8063	Z calibration 2nd measured analog value	-2147483648	2147483647	0	
8064~8065	Z calibration 3st measured analog value	-2147483648	2147483647	0	
8066~8067	Z calibration 4th measured analog value	-2147483648	2147483647	0	
8068~8069	Z calibration 5th measured analog value	-2147483648	2147483647	0	
8070~8071	Z calibration 6th measured analog value	-2147483648	2147483647	0	
8072~8073	Z calibration 7th measured analog value	-2147483648	2147483647	0	
8074~8075	Z calibration 8th measured analog value	-2147483648	2147483647	0	
8076~8077	Z calibration 9th measured analog value	-2147483648	2147483647	0	
8078~8079	Z calibration 10th measured analog value	-2147483648	2147483647	0	
8080~8081	Z calibration 11th measured analog value	-2147483648	2147483647	0	
8082~8083	Z calibration 12th measured analog value	-2147483648	2147483647	0	
8084~8085	Z calibration 13th measured analog value	-2147483648	2147483647	0	
8086~8087	Z calibration 14th measured analog value	-2147483648	2147483647	0	
8088~8089	Z calibration 15th measured analog value	-2147483648	2147483647	0	
8090~8091	Z calibration 16th measured analog value	-2147483648	2147483647	0	
8092~8093	Z calibration 17th measured analog value	-2147483648	2147483647	0	
8094~8095	Z calibration 18th measured analog value	-2147483648	2147483647	0	
8096~8097	Z calibration 19th measured analog value	-2147483648	2147483647	0	

Address	Description	Minimum	Maximum	Format	Unit
8100~8101	Height control PID P gain	0	10000	0.00	
8102~8103	Height control PID I gain	0	10000	0.00	
8104~8105	Height control PID D gain	0	10000	0.00	
8106~8107	Height control PID min. output value	-10000	10000	0.00	
8108~8109	Height control PID max. output value	-10000	10000	0.00	
8110~8111	Height control PID max. output speed	0	100000	0	
8112~8113	Number of piercing steps to be processed	1	10	0	step

Address	Description	Minimum	Maximum	Format	Unit
8120~8121	Piercing 1st step piercing time	0	100000	0	ms
8122~8123	Piercing 1st step gas type	0	2	0	
8124~8125	Piercing 1st step focus initial position	-250000	250000	0.0000	mm/inch
8126~8127	Piercing 1st step focus target position	-250000	250000	0.0000	mm/inch
8128~8129	Piercing 1st step initial Z position	0	300000	0.0000	mm/inch
8130~8131	Piercing 1st step target Z position	0	300000	0.0000	mm/inch
8132~8133	Piercing 1st step pressure initial value	0	10000	0.00	bar
8134~8135	Piercing 1st step pressure target value	0	10000	0.00	bar
8136~8137	Piercing 1st step power initial value	0	100000	0	W
8138~8139	Piercing 1st step power target value	0	100000	0	W
8140~8141	Piercing 1st step duty initial value	0	100	0	%
8142~8143	Piercing 1st step duty target value	0	100	0	%
8144~8145	Piercing 1st step frequency initial value	0	5000	0	hz
8146~8147	Piercing 1st step frequency target value	0	5000	0	hz

Address	Description	Minimum	Maximum	Format	Unit
8160~8161	Piercing 2nd step piercing time	0	100000	0	ms
8162~8163	Piercing 2nd step gas type	0	2	0	
8164~8165	Piercing 2nd step focus initial position	-250000	250000	0.0000	mm/inch
8166~8167	Piercing 2nd step focus target position	-250000	250000	0.0000	mm/inch
8168~8169	Piercing 2nd step initial Z position	0	300000	0.0000	mm/inch
8170~8171	Piercing 2nd step target Z position	0	300000	0.0000	mm/inch
8172~8173	Piercing 2nd step pressure initial value	0	10000	0.00	bar
8174~8175	Piercing 2nd step pressure target value	0	10000	0.00	bar
8176~8177	Piercing 2nd step power initial value	0	100000	0	W
8178~8179	Piercing 2nd step power target value	0	100000	0	W
8180~8181	Piercing 2nd step duty initial value	0	100	0	%
8182~8183	Piercing 2nd step duty target value	0	100	0	%
8184~8185	Piercing 2nd step frequency initial value	0	5000	0	hz
8186~8187	Piercing 2nd step frequency target value	0	5000	0	hz

Address	Description	Minimum	Maximum	Format	Unit
8200~8201	Piercing 3rd step piercing time	0	100000	0	ms
8202~8203	Piercing 3rd step gas type	0	2	0	
8204~8205	Piercing 3rd step focus initial position	-250000	250000	0.0000	mm/inch
8206~8207	Piercing 3rd step focus target position	-250000	250000	0.0000	mm/inch
8208~8209	Piercing 3rd step initial Z position	0	300000	0.0000	mm/inch
8210~8211	Piercing 3rd step target Z position	0	300000	0.0000	mm/inch
8212~8213	Piercing 3rd step pressure initial value	0	10000	0.00	bar
8214~8215	Piercing 3rd step pressure target value	0	10000	0.00	bar
8216~8217	Piercing 3rd step power initial value	0	100000	0	W
8218~8219	Piercing 3rd step power target value	0	100000	0	W
8220~8221	Piercing 3rd step duty initial value	0	100	0	%
8222~8223	Piercing 3rd step duty target value	0	100	0	%
8224~8225	Piercing 3rd step frequency initial value	0	5000	0	hz
8226~8227	Piercing 3rd step frequency target value	0	5000	0	hz

Address	Description	Minimum	Maximum	Format	Unit
8240~8241	Piercing 4th step piercing time	0	100000	0	ms
8242~8243	Piercing 4th step gas type	0	2	0	
8244~8245	Piercing 4th step focus initial position	-250000	250000	0.0000	mm/inch
8246~8247	Piercing 4th step focus target position	-250000	250000	0.0000	mm/inch
8248~8249	Piercing 4th step initial Z position	0	300000	0.0000	mm/inch
8250~8251	Piercing 4th step target Z position	0	300000	0.0000	mm/inch
8252~8253	Piercing 4th step pressure initial value	0	10000	0.00	bar
8254~8255	Piercing 4th step pressure target value	0	10000	0.00	bar
8256~8257	Piercing 4th step power initial value	0	100000	0	W
8258~8259	Piercing 4th step power target value	0	100000	0	W
8260~8261	Piercing 4th step duty initial value	0	100	0	%
8262~8263	Piercing 4th step duty target value	0	100	0	%
8264~8265	Piercing 4th step frequency initial value	0	5000	0	hz
8266~8267	Piercing 4th step frequency target value	0	5000	0	hz

Address	Description	Minimum	Maximum	Format	Unit
8280~8281	Piercing 5th step piercing time	0	100000	0	ms
8282~8283	Piercing 5th step gas type	0	2	0	
8284~8285	Piercing 5th step focus initial position	-250000	250000	0.0000	mm/inch
8286~8287	Piercing 5th step focus target position	-250000	250000	0.0000	mm/inch
8288~8289	Piercing 5th step initial Z position	0	300000	0.0000	mm/inch
8290~8291	Piercing 5th step target Z position	0	300000	0.0000	mm/inch
8292~8293	Piercing 5th step pressure initial value	0	10000	0.00	bar
8294~8295	Piercing 5th step pressure target value	0	10000	0.00	bar
8296~8297	Piercing 5th step power initial value	0	100000	0	W
8298~8299	Piercing 5th step power target value	0	100000	0	W
8300~8301	Piercing 5th step duty initial value	0	100	0	%
8302~8303	Piercing 5th step duty target value	0	100	0	%
8304~8305	Piercing 5th step frequency initial value	0	5000	0	hz
8306~8307	Piercing 5th step frequency target value	0	5000	0	hz

Address	Description	Minimum	Maximum	Format	Unit
8320~8321	Piercing 6th step piercing time	0	100000	0	ms
8322~8323	Piercing 6th step gas type	0	2	0	
8324~8325	Piercing 6th step focus initial position	-250000	250000	0.0000	mm/inch
8326~8327	Piercing 6th step focus target position	-250000	250000	0.0000	mm/inch
8328~8329	Piercing 6th step initial Z position	0	300000	0.0000	mm/inch
8330~8331	Piercing 6th step target Z position	0	300000	0.0000	mm/inch
8332~8333	Piercing 6th step pressure initial value	0	10000	0.00	bar
8334~8335	Piercing 6th step pressure target value	0	10000	0.00	bar
8336~8337	Piercing 6th step power initial value	0	100000	0	W
8338~8339	Piercing 6th step power target value	0	100000	0	W
8340~8341	Piercing 6th step duty initial value	0	100	0	%
8342~8343	Piercing 6th step duty target value	0	100	0	%
8344~8345	Piercing 6th step frequency initial value	0	5000	0	hz
8346~8347	Piercing 6th step frequency target value	0	5000	0	hz

Address	Description	Minimum	Maximum	Format	Unit
8360~8361	Piercing 7th step piercing time	0	100000	0	ms
8362~8363	Piercing 7th step gas type	0	2	0	
8364~8365	Piercing 7th step focus initial position	-250000	250000	0.0000	mm/inch
8366~8367	Piercing 7th step focus target position	-250000	250000	0.0000	mm/inch
8368~8369	Piercing 7th step initial Z position	0	300000	0.0000	mm/inch
8370~8371	Piercing 7th step target Z position	0	300000	0.0000	mm/inch
8372~8373	Piercing 7th step pressure initial value	0	10000	0.00	bar
8374~8375	Piercing 7th step pressure target value	0	10000	0.00	bar
8376~8377	Piercing 7th step power initial value	0	100000	0	W
8378~8379	Piercing 7th step power target value	0	100000	0	W
8380~8381	Piercing 7th step duty initial value	0	100	0	%
8382~8383	Piercing 7th step duty target value	0	100	0	%
8384~8385	Piercing 7th step frequency initial value	0	5000	0	hz
8386~8387	Piercing 7th step frequency target value	0	5000	0	hz

Address	Description	Minimum	Maximum	Format	Unit
8400~8401	Piercing 8th step piercing time	0	100000	0	ms
8402~8403	Piercing 8th step gas type	0	2	0	
8404~8405	Piercing 8th step focus initial position	-250000	250000	0.0000	mm/inch
8406~8407	Piercing 8th step focus target position	-250000	250000	0.0000	mm/inch
8408~8409	Piercing 8th step initial Z position	0	300000	0.0000	mm/inch
8410~8411	Piercing 8th step target Z position	0	300000	0.0000	mm/inch
8412~8413	Piercing 8th step pressure initial value	0	10000	0.00	bar
8414~8415	Piercing 8th step pressure target value	0	10000	0.00	bar
8416~8417	Piercing 8th step power initial value	0	100000	0	W
8418~8419	Piercing 8th step power target value	0	100000	0	W
8420~8421	Piercing 8th step duty initial value	0	100	0	%
8422~8423	Piercing 8th step duty target value	0	100	0	%
8424~8425	Piercing 8th step frequency initial value	0	5000	0	hz
8426~8427	Piercing 8th step frequency target value	0	5000	0	hz

Address	Description	Minimum	Maximum	Format	Unit
8440~8441	Piercing 9th step piercing time	0	100000	0	ms
8442~8443	Piercing 9th step gas type	0	2	0	
8444~8445	Piercing 9th step focus initial position	-250000	250000	0.0000	mm/inch
8446~8447	Piercing 9th step focus target position	-250000	250000	0.0000	mm/inch
8448~8449	Piercing 9th step initial Z position	0	300000	0.0000	mm/inch
8450~8451	Piercing 9th step target Z position	0	300000	0.0000	mm/inch
8452~8453	Piercing 9th step pressure initial value	0	10000	0.00	bar
8454~8455	Piercing 9th step pressure target value	0	10000	0.00	bar
8456~8457	Piercing 9th step power initial value	0	100000	0	W
8458~8459	Piercing 9th step power target value	0	100000	0	W
8460~8461	Piercing 9th step duty initial value	0	100	0	%
8462~8463	Piercing 9th step duty target value	0	100	0	%
8464~8465	Piercing 9th step frequency initial value	0	5000	0	hz
8466~8467	Piercing 9th step frequency target value	0	5000	0	hz

Address	Description	Minimum	Maximum	Format	Unit
8480~8481	Piercing 10th step piercing time	0	100000	0	ms
8482~8483	Piercing 10th step gas type	0	2	0	
8484~8485	Piercing 10th step focus initial position	-250000	250000	0.0000	mm/inch
8486~8487	Piercing 10th step focus target position	-250000	250000	0.0000	mm/inch
8488~8489	Piercing 10th step initial Z position	0	300000	0.0000	mm/inch
8490~8491	Piercing 10th step target Z position	0	300000	0.0000	mm/inch
8492~8493	Piercing 10th step pressure initial value	0	10000	0.00	bar
8494~8495	Piercing 10th step pressure target value	0	10000	0.00	bar
8496~8497	Piercing 10th step power initial value	0	100000	0	W
8498~8499	Piercing 10th step power target value	0	100000	0	W
8500~8501	Piercing 10th step duty initial value	0	100	0	%
8502~8503	Piercing 10th step duty target value	0	100	0	%
8504~8505	Piercing 10th step frequency initial value	0	5000	0	hz
8506~8507	Piercing 10th step frequency target value	0	5000	0	hz

Address	Description	Minimum	Maximum	Format	Unit
8600~8601	Analog to bar conversion multiplier value	1	1000000	0	
8602~8603	Analog to bar conversion divisor value	1	1000000	0	
8604~8605	Bar to analog conversion multiplier value	1	1000000	0	
8606~8607	Bar to analog conversion divisor value	1	1000000	0	
8608~8609	Analog to power conversion multiplier value	1	1000000	0	
8610~8611	Analog to power conversion divisor value	1	1000000	0	
8612~8613	Power to analog conversion multiplier value	1	1000000	0	
8614~8615	Power to analog conversion divisor value	1	1000000	0	
8616~8617	Duty to analog conversion multiplier value	1	1000000	0	
8618~8619	Duty to analog conversion divisor value	1	1000000	0	
8620~8621	Pressure analog input offset value	0	32767	0	
8622~8623	Low gas pressure warning level	0	10000	0.00	bar
8624~8625	Low gas pressure warning delay	0	100000	0	ms
8626~8627	Low pressure alarm level	0	10000	0.00	bar
8628~8629	Low pressure alarm delay	0	100000	0	ms

The list of technology blocks used in the laser cutting machine is as follows:

Address	Description	Minimum	Maximum	Format	Unit
8720~8721	Selected technology block	0	9	0	

Address	Description	Minimum	Maximum	Format	Unit
8800~8801	Tech. block 1: Cutting power	0	100000	0	W
8802~8803	Tech. block 1: Cutting height	0	250000	0.0000	mm/inch
8804~8805	Tech. block 1: Cutting feed	0	100000	0	
8806~8807	Tech. block 1: Gas type	0	2	0	
8808~8809	Tech. block 1: Gas pressure	0	10000	0.00	bar
8810~8811	Tech. block 1: Lead-In power	0	100000	0	W
8812~8813	Tech. block 1: Lead-In feed	0	100000	0	
8814~8815	Tech. block 1: Lead-In duty	0	100	0	%
8816~8817	Tech. block 1: Lens	0	2	0	
8818~8819	Tech. block 1: Nozzle type	-2147483648	2147483647	0	string
8820~8821	Tech. block 1: Nozzle type	-2147483648	2147483647	0	string
8822~8823	Tech. block 1: Focus position	-250000	250000	0.0000	mm/inch
8824~8825	Tech. block 1: Inner kerf	0	10000	0.0000	mm/inch
8826~8827	Tech. block 1: Outer kerf	0	10000	0.0000	mm/inch
8828~8829	Tech. block 1: Axis acceleration value	0	10000	0.00	%
8830~8831	Tech. block 1: Frequency	0	100000	0	hz
8832~8833	Tech. block 1: Duty	0	100	0	%
8834~8835	Tech. block 1: Lead-In delay	0	100000	0	ms
8836~8837	Tech. block 1: Tip-Touch alarm delay	0	100000	0	ms
8838~8839	Tech. block 1: Z axis operation mode	0	1	0	
8840~8841	Tech. block 1: Corner power	0	100000	0	W
8842~8843	Tech. block 1: Corner frequency	0	100000	0	hz
8844~8845	Tech. block 1: Corner duty	0	100	0	%
8846~8847	Tech. block 1: Corner cutting feed	0	100000	0	
8848~8849	Tech. block 1: Corner gas pressure	0	10000	0.00	bar

Address	Description	Minimum	Maximum	Format	Unit
8860~8861	Tech. block 2: Cutting power	0	100000	0	W
8862~8863	Tech. block 2: Cutting height	0	250000	0.0000	mm/inch
8864~8865	Tech. block 2: Cutting feed	0	100000	0	
8866~8867	Tech. block 2: Gas type	0	2	0	
8868~8869	Tech. block 2: Gas pressure	0	10000	0.00	bar
8870~8871	Tech. block 2: Lead-In power	0	100000	0	W
8872~8873	Tech. block 2: Lead-In feed	0	100000	0	
8874~8875	Tech. block 2: Lead-In duty	0	100	0	%
8876~8877	Tech. block 2: Lens	0	2	0	
8878~8879	Tech. block 2: Nozzle type	-2147483648	2147483647	0	string
8880~8881	Tech. block 2: Nozzle type	-2147483648	2147483647	0	string
8882~8883	Tech. block 2: Focus position	-250000	250000	0.0000	mm/inch
8884~8885	Tech. block 2: Inner kerf	0	10000	0.0000	mm/inch
8886~8887	Tech. block 2: Outer kerf	0	10000	0.0000	mm/inch
8888~8889	Tech. block 2: Axis acceleration value	0	10000	0.00	%
8890~8891	Tech. block 2: Frequency	0	100000	0	hz
8892~8893	Tech. block 2: Duty	0	100	0	%
8894~8895	Tech. block 2: Lead-In delay	0	100000	0	ms
8896~8897	Tech. block 2: Tip-Touch alarm delay	0	100000	0	ms
8898~8899	Tech. block 2: Z axis operation mode	0	1	0	
8900~8901	Tech. block 2: Corner power	0	100000	0	W
8902~8903	Tech. block 2: Corner frequency	0	100000	0	hz
8904~8905	Tech. block 2: Corner duty	0	100	0	%
8906~8907	Tech. block 2: Corner cutting feed	0	100000	0	
8908~8909	Tech. block 2: Corner gas pressure	0	10000	0.00	bar

Address	Description	Minimum	Maximum	Format	Unit
8920~8921	Tech. block 3: Cutting power	0	100000	0	W
8922~8923	Tech. block 3: Cutting height	0	250000	0.0000	mm/inch
8924~8925	Tech. block 3: Cutting feed	0	100000	0	
8926~8927	Tech. block 3: Gas type	0	2	0	
8928~8929	Tech. block 3: Gas pressure	0	10000	0.00	bar
8930~8931	Tech. block 3: Lead-In power	0	100000	0	W
8932~8933	Tech. block 3: Lead-In feed	0	100000	0	
8934~8935	Tech. block 3: Lead-In duty	0	100	0	%
8936~8937	Tech. block 3: Lens	0	2	0	
8938~8939	Tech. block 3: Nozzle type	-2147483648	2147483647	0	string
8940~8941	Tech. block 3: Nozzle type	-2147483648	2147483647	0	string
8942~8943	Tech. block 3: Focus position	-250000	250000	0.0000	mm/inch
8944~8945	Tech. block 3: Inner kerf	0	10000	0.0000	mm/inch
8946~8947	Tech. block 3: Outer kerf	0	10000	0.0000	mm/inch
8948~8949	Tech. block 3: Axis acceleration value	0	10000	0.00	%
8950~8951	Tech. block 3: Frequency	0	100000	0	hz
8952~8953	Tech. block 3: Duty	0	100	0	%
8954~8955	Tech. block 3: Lead-In delay	0	100000	0	ms
8956~8957	Tech. block 3: Tip-Touch alarm delay	0	100000	0	ms
8958~8959	Tech. block 3: Z axis operation mode	0	1	0	
8960~8961	Tech. block 3: Corner power	0	100000	0	W
8962~8963	Tech. block 3: Corner frequency	0	100000	0	hz
8964~8965	Tech. block 3: Corner duty	0	100	0	%
8966~8967	Tech. block 3: Corner cutting feed	0	100000	0	
8968~8969	Tech. block 3: Corner gas pressure	0	10000	0.00	bar

Address	Description	Minimum	Maximum	Format	Unit
8980~8981	Tech. block 4: Cutting power	0	100000	0	W
8982~8983	Tech. block 4: Cutting height	0	250000	0.0000	mm/inch
8984~8985	Tech. block 4: Cutting feed	0	100000	0	
8986~8987	Tech. block 4: Gas type	0	2	0	
8988~8989	Tech. block 4: Gas pressure	0	10000	0.00	bar
8990~8991	Tech. block 4: Lead-In power	0	100000	0	W
8992~8993	Tech. block 4: Lead-In feed	0	100000	0	
8994~8995	Tech. block 4: Lead-In duty	0	100	0	%
8996~8997	Tech. block 4: Lens	0	2	0	
8998~8999	Tech. block 4: Nozzle type	-2147483648	2147483647	0	string
9000~9001	Tech. block 4: Nozzle type	-2147483648	2147483647	0	string
9002~9003	Tech. block 4: Focus position	-250000	250000	0.0000	mm/inch
9004~9005	Tech. block 4: Inner kerf	0	10000	0.0000	mm/inch
9006~9007	Tech. block 4: Outer kerf	0	10000	0.0000	mm/inch
9008~9009	Tech. block 4: Axis acceleration value	0	10000	0.00	%
9010~9011	Tech. block 4: Frequency	0	100000	0	hz
9012~9013	Tech. block 4: Duty	0	100	0	%
9014~9015	Tech. block 4: Lead-In delay	0	100000	0	ms
9016~9017	Tech. block 4: Tip-Touch alarm delay	0	100000	0	ms
9018~9019	Tech. block 4: Z axis operation mode	0	1	0	
9020~9021	Tech. block 4: Corner power	0	100000	0	W
9022~9023	Tech. block 4: Corner frequency	0	100000	0	hz
9024~9025	Tech. block 4: Corner duty	0	100	0	%
9026~9027	Tech. block 4: Corner cutting feed	0	100000	0	
9028~9029	Tech. block 4: Corner gas pressure	0	10000	0.00	bar

Address	Description	Minimum	Maximum	Format	Unit
9040~9041	Tech. block 5: Cutting power	0	100000	0	W
9042~9043	Tech. block 5: Cutting height	0	250000	0.0000	mm/inch
9044~9045	Tech. block 5: Cutting feed	0	100000	0	
9046~9047	Tech. block 5: Gas type	0	2	0	
9048~9049	Tech. block 5: Gas pressure	0	10000	0.00	bar
9050~9051	Tech. block 5: Lead-In power	0	100000	0	W
9052~9053	Tech. block 5: Lead-In feed	0	100000	0	
9054~9055	Tech. block 5: Lead-In duty	0	100	0	%
9056~9057	Tech. block 5: Lens	0	2	0	
9058~9059	Tech. block 5: Nozzle type	-2147483648	2147483647	0	string
9060~9061	Tech. block 5: Nozzle type	-2147483648	2147483647	0	string
9062~9063	Tech. block 5: Focus position	-250000	250000	0.0000	mm/inch
9064~9065	Tech. block 5: Inner kerf	0	10000	0.0000	mm/inch
9066~9067	Tech. block 5: Outer kerf	0	10000	0.0000	mm/inch
9068~9069	Tech. block 5: Axis acceleration value	0	10000	0.00	%
9070~9071	Tech. block 5: Frequency	0	100000	0	hz
9072~9073	Tech. block 5: Duty	0	100	0	%
9074~9075	Tech. block 5: Lead-In delay	0	100000	0	ms
9076~9077	Tech. block 5: Tip-Touch alarm delay	0	100000	0	ms
9078~9079	Tech. block 5: Z axis operation mode	0	1	0	
9080~9081	Tech. block 5: Corner power	0	100000	0	W
9082~9083	Tech. block 5: Corner frequency	0	100000	0	hz
9084~9085	Tech. block 5: Corner duty	0	100	0	%
9086~9087	Tech. block 5: Corner cutting feed	0	100000	0	
9088~9089	Tech. block 5: Corner gas pressure	0	10000	0.00	bar

Address	Description	Minimum	Maximum	Format	Unit
9100~9101	Tech. block 6: Cutting power	0	100000	0	W
9102~9103	Tech. block 6: Cutting height	0	250000	0.0000	mm/inch
9104~9105	Tech. block 6: Cutting feed	0	100000	0	
9106~9107	Tech. block 6: Gas type	0	2	0	
9108~9109	Tech. block 6: Gas pressure	0	10000	0.00	bar
9110~9111	Tech. block 6: Lead-In power	0	100000	0	W
9112~9113	Tech. block 6: Lead-In feed	0	100000	0	
9114~9115	Tech. block 6: Lead-In duty	0	100	0	%
9116~9117	Tech. block 6: Lens	0	2	0	
9118~9119	Tech. block 6: Nozzle type	-2147483648	2147483647	0	string
9120~9121	Tech. block 6: Nozzle type	-2147483648	2147483647	0	string
9122~9123	Tech. block 6: Focus position	-250000	250000	0.0000	mm/inch
9124~9125	Tech. block 6: Inner kerf	0	10000	0.0000	mm/inch
9126~9127	Tech. block 6: Outer kerf	0	10000	0.0000	mm/inch
9128~9129	Tech. block 6: Axis acceleration value	0	10000	0.00	%
9130~9131	Tech. block 6: Frequency	0	100000	0	hz
9132~9133	Tech. block 6: Duty	0	100	0	%
9134~9135	Tech. block 6: Lead-In delay	0	100000	0	ms
9136~9137	Tech. block 6: Tip-Touch alarm delay	0	100000	0	ms
9138~9139	Tech. block 6: Z axis operation mode	0	1	0	
9140~9141	Tech. block 6: Corner power	0	100000	0	W
9142~9143	Tech. block 6: Corner frequency	0	100000	0	hz
9144~9145	Tech. block 6: Corner duty	0	100	0	%
9146~9147	Tech. block 6: Corner cutting feed	0	100000	0	
9148~9149	Tech. block 6: Corner gas pressure	0	10000	0.00	bar

Address	Description	Minimum	Maximum	Format	Unit
9160~9161	Tech. block 7: Cutting power	0	100000	0	W
9162~9163	Tech. block 7: Cutting height	0	250000	0.0000	mm/inch
9164~9165	Tech. block 7: Cutting feed	0	100000	0	
9166~9167	Tech. block 7: Gas type	0	2	0	
9168~9169	Tech. block 7: Gas pressure	0	10000	0.00	bar
9170~9171	Tech. block 7: Lead-In power	0	100000	0	W
9172~9173	Tech. block 7: Lead-In feed	0	100000	0	
9174~9175	Tech. block 7: Lead-In duty	0	100	0	%
9176~9177	Tech. block 7: Lens	0	2	0	
9178~9179	Tech. block 7: Nozzle type	-2147483648	2147483647	0	string
9180~9181	Tech. block 7: Nozzle type	-2147483648	2147483647	0	string
9182~9183	Tech. block 7: Focus position	-250000	250000	0.0000	mm/inch
9184~9185	Tech. block 7: Inner kerf	0	10000	0.0000	mm/inch
9186~9187	Tech. block 7: Outer kerf	0	10000	0.0000	mm/inch
9188~9189	Tech. block 7: Axis acceleration value	0	10000	0.00	%
9190~9191	Tech. block 7: Frequency	0	100000	0	hz
9192~9193	Tech. block 7: Duty	0	100	0	%
9194~9195	Tech. block 7: Lead-In delay	0	100000	0	ms
9196~9197	Tech. block 7: Tip-Touch alarm delay	0	100000	0	ms
9198~9199	Tech. block 7: Z axis operation mode	0	1	0	
9200~9201	Tech. block 7: Corner power	0	100000	0	W
9202~9203	Tech. block 7: Corner frequency	0	100000	0	hz
9204~9205	Tech. block 7: Corner duty	0	100	0	%
9206~9207	Tech. block 7: Corner cutting feed	0	100000	0	
9208~9209	Tech. block 7: Corner gas pressure	0	10000	0.00	bar

Address	Description	Minimum	Maximum	Format	Unit
9220~9221	Tech. block 8: Cutting power	0	100000	0	W
9222~9223	Tech. block 8: Cutting height	0	250000	0.0000	mm/inch
9224~9225	Tech. block 8: Cutting feed	0	100000	0	
9226~9227	Tech. block 8: Gas type	0	2	0	
9228~9229	Tech. block 8: Gas pressure	0	10000	0.00	bar
9230~9231	Tech. block 8: Lead-In power	0	100000	0	W
9232~9233	Tech. block 8: Lead-In feed	0	100000	0	
9234~9235	Tech. block 8: Lead-In duty	0	100	0	%
9236~9237	Tech. block 8: Lens	0	2	0	
9238~9239	Tech. block 8: Nozzle type	-2147483648	2147483647	0	string
9240~9241	Tech. block 8: Nozzle type	-2147483648	2147483647	0	string
9242~9243	Tech. block 8: Focus position	-250000	250000	0.0000	mm/inch
9244~9245	Tech. block 8: Inner kerf	0	10000	0.0000	mm/inch
9246~9247	Tech. block 8: Outer kerf	0	10000	0.0000	mm/inch
9248~9249	Tech. block 8: Axis acceleration value	0	10000	0.00	%
9250~9251	Tech. block 8: Frequency	0	100000	0	hz
9252~9253	Tech. block 8: Duty	0	100	0	%
9254~9255	Tech. block 8: Lead-In delay	0	100000	0	ms
9256~9257	Tech. block 8: Tip-Touch alarm delay	0	100000	0	ms
9258~9259	Tech. block 8: Z axis operation mode	0	1	0	
9260~9261	Tech. block 8: Corner power	0	100000	0	W
9262~9263	Tech. block 8: Corner frequency	0	100000	0	hz
9264~9265	Tech. block 8: Corner duty	0	100	0	%
9266~9267	Tech. block 8: Corner cutting feed	0	100000	0	
9268~9269	Tech. block 8: Corner gas pressure	0	10000	0.00	bar

Address	Description	Minimum	Maximum	Format	Unit
9280~9281	Tech. block 9: Cutting power	0	100000	0	W
9282~9283	Tech. block 9: Cutting height	0	250000	0.0000	mm/inch
9284~9285	Tech. block 9: Cutting feed	0	100000	0	
9286~9287	Tech. block 9: Gas type	0	2	0	
9288~9289	Tech. block 9: Gas pressure	0	10000	0.00	bar
9290~9291	Tech. block 9: Lead-In power	0	100000	0	W
9292~9293	Tech. block 9: Lead-In feed	0	100000	0	
9294~9295	Tech. block 9: Lead-In duty	0	100	0	%
9296~9297	Tech. block 9: Lens	0	2	0	
9298~9299	Tech. block 9: Nozzle type	-2147483648	2147483647	0	string
9300~9301	Tech. block 9: Nozzle type	-2147483648	2147483647	0	string
9302~9303	Tech. block 9: Focus position	-250000	250000	0.0000	mm/inch
9304~9305	Tech. block 9: Inner kerf	0	10000	0.0000	mm/inch
9306~9307	Tech. block 9: Outer kerf	0	10000	0.0000	mm/inch
9308~9309	Tech. block 9: Axis acceleration value	0	10000	0.00	%
9310~9311	Tech. block 9: Frequency	0	100000	0	hz
9312~9313	Tech. block 9: Duty	0	100	0	%
9314~9315	Tech. block 9: Lead-In delay	0	100000	0	ms
9316~9317	Tech. block 9: Tip-Touch alarm delay	0	100000	0	ms
9318~9319	Tech. block 9: Z axis operation mode	0	1	0	
9320~9321	Tech. block 9: Corner power	0	100000	0	W
9322~9323	Tech. block 9: Corner frequency	0	100000	0	hz
9324~9325	Tech. block 9: Corner duty	0	100	0	%
9326~9327	Tech. block 9: Corner cutting feed	0	100000	0	
9328~9329	Tech. block 9: Corner gas pressure	0	10000	0.00	bar

Address	Description	Minimum	Maximum	Format	Unit
9340~9341	Tech. block 10: Cutting power	0	100000	0	W
9342~9343	Tech. block 10: Cutting height	0	250000	0.0000	mm/inch
9344~9345	Tech. block 10: Cutting feed	0	100000	0	
9346~9347	Tech. block 10: Gas type	0	2	0	
9348~9349	Tech. block 10: Gas pressure	0	10000	0.00	bar
9350~9351	Tech. block 10: Lead-In power	0	100000	0	W
9352~9353	Tech. block 10: Lead-In feed	0	100000	0	
9354~9355	Tech. block 10: Lead-In duty	0	100	0	%
9356~9357	Tech. block 10: Lens	0	2	0	
9358~9359	Tech. block 10: Nozzle type	-2147483648	2147483647	0	string
9360~9361	Tech. block 10: Nozzle type	-2147483648	2147483647	0	string
9362~9363	Tech. block 10: Focus position	-250000	250000	0.0000	mm/inch
9364~9365	Tech. block 10: Inner kerf	0	10000	0.0000	mm/inch
9366~9367	Tech. block 10: Outer kerf	0	10000	0.0000	mm/inch
9368~9369	Tech. block 10: Axis acceleration value	0	10000	0.00	%
9370~9371	Tech. block 10: Frequency	0	100000	0	hz
9372~9373	Tech. block 10: Duty	0	100	0	%
9374~9375	Tech. block 10: Lead-In delay	0	100000	0	ms
9376~9377	Tech. block 10: Tip-Touch alarm delay	0	100000	0	ms
9378~9379	Tech. block 10: Z axis operation mode	0	1	0	
9380~9381	Tech. block 10: Corner power	0	100000	0	W
9382~9383	Tech. block 10: Corner frequency	0	100000	0	hz
9384~9385	Tech. block 10: Corner duty	0	100	0	%
9386~9387	Tech. block 10: Corner cutting feed	0	100000	0	
9388~9389	Tech. block 10: Corner gas pressure	0	10000	0.00	bar

8.15.3 Plasma Cutting Software

The list of parameters used in the plasma cutting machine is as follows:

Address	Description	Minimum	Maximum	Format	Unit
8000~8001	Height control (AHC) axis selection	1	6	0	
8002~8003	Height control PID P gain	0	10000	0.00	
8004~8005	Height control PID I gain	0	10000	0.00	
8006~8007	Height control PID D gain	0	10000	0.00	
8008~8009	Height control PID min. output value	-10000	10000	0.00	
8010~8011	Height control PID max. output value	-10000	10000	0.00	
8012~8013	Height control PID max. output speed	0	100000	0	unit/min
8014~8015	ip touch search speed	0	100000	0	unit/min
8016~8017	Waiting time to move after receiving plasma ready signal	0	100000	0	ms
8018~8019	Waiting time for PID to engage after cutting starts	0	100000	0	ms
8020~8021	Digital input number to which the tip touch signal is connected	0	19	0	
8022~8023	Digital input number to which the plasma ready signal is connected	0	19	0	
8024~8025	Address where the arc voltage signal will be read	0	3999	0	
8026~8027	Servo torque value to be used during tip touch probing	0	3000	0.0	%
8028~8029	Torque tolerance reached during tip touch probing	0	1000	0.0	%
8030~8031	Analog -> Arc voltage conversion multiplier	1	100000	0	
8032~8033	Analog -> Arc voltage conversion divisor	1	100000	0	
8034~8035	Machine coordinate to be reached with rapid speed before piercing	-2000000000	2000000000	0.0000	mm/inch
8036~8037	Waiting time before triggering an alarm after the plasma ready signal is lost during cutting	0	100000	0	ms
8038~8039	Cancel plasma ready signal lost alarm	0	1	0	bool
8040~8041	AHC shutdown distance at the end of the line	0	2000000000	0.0000	mm/inch
8042~8043	Offset number used for marking	1	10	0	
8044~8045	Arc voltage offset value	0	10000	0.00	V
8046~8047	Z coordinate for sheet surface cutting	-2000000000	2000000000	0.0000	mm/inch
8048~8049	Lift to Z safe coordinate with G71	0	1	0	bool
8050~8051	Marking X offset value	-2000000000	2000000000	0.0000	mm/inch
8052~8053	Marking Y offset value	-2000000000	2000000000	0.0000	mm/inch
8054~8055	Laser pointer X offset value	-2000000000	2000000000	0.0000	mm/inch
8056~8057	Laser pointer Y offset value	-2000000000	2000000000	0.0000	mm/inch

Plasma cutting machine technology block data are as follows:

Address	Description	Minimum	Maximum	Format	Unit
8200~8201	Material type	0	2000000000	0	
8202~8203	Material thickness	0	2000000000	0.0000	mm/inch
8204~8205	Cutting power	0	2000000000	0	A
8206~8207	Cutting speed	0	2000000000	0.0000	unit/min
8208~8209	Piercing height	0	2000000000	0.0000	mm/inch
8210~8211	Cutting height	0	2000000000	0.0000	mm/inch
8212~8213	Piercing time	0	2000000000	0	ms
8214~8215	Arc voltage	0	2000000000	0.00	V
8216~8217	Reserved				
8218~8219	Kerf	0	2000000000	0.0000	mm/inch
8220~8221	Consumable material image	0	2000000000	0	
8222~8223	Plasma unit type	0	2000000000	0	
8224~8225	Marking speed	0	2000000000	0.0000	unit/min

8.16. G-code Content / Library / MDI Input Box and HMI Operations

8.16.0. HMI Operator Operations Variables

Adres	Description	Minimum	Maximum	Default
12000~12001	HMI operator operations variable	0	2147483647	0
12002~12003	HMI operator operations auxiliary variable	0	2147483647	0
12004~12005	N number to be searched within the G-code file	0	2147483647	0
12006~12007	O number to be searched within the G-code file	0	2147483647	0

By assigning predefined values to the variable at this address, operations such as automatic workpiece zeroing, program selection, and editing can be performed. The list of operations is provided below:

İşlem Kodu	Description
10	Create a new G-code file
11	Select the G-code file where the cursor is located
12	Delete the G-code file where the cursor is located
13	Search for the G-code file named in the MDI input box in the library
14	Move the cursor to the top of the library list
15	Select the G-code file named in the MDI input box
16	Search the N number written to addresses 12004~12005 in the G-code file
17	Search the O number written to addresses 12006~12007 in the G-code file
18	Search for the N number written to addresses 12004~12005 and the O number written to addresses 12006~12007 in the G-code file
19	Copy the line where the cursor is located in the G-code file to the MDI input box.
20	Add a blank line below the line where the cursor is located in the G-code file
21	Add the line written in the MDI input box below the line where the cursor is located in the G-code file
22	Replace the line where the cursor is located in the G-code file with the line written in the MDI input box
23	Delete the line where the cursor is located in the G-code file
25	Search for the code written in the MDI input box in the selected G-code file.
30	Undo the last delete, add, or edit operation in the selected G-code file
34	Download the G-code file from the FTP server to the library (The file to be downloaded must have its name written in addresses 13962~13993)
50	Set the X-axis absolute position to '0' (automatic calculation for G54-G59.4)
51	Set the Y-axis absolute position to '0' (automatic calculation for G54-G59.4)
52	Set the Z-axis absolute position to '0' (automatic calculation for G54-G59.4)
53	Set the 4th-axis absolute position to '0' (automatic calculation for G54-G59.4)
54	Set the 5th-axis absolute position to '0' (automatic calculation for G54-G59.4)
55	Set the 6th-axis absolute position to '0' (automatic calculation for G54-G59.4)
56	Set the 7th-axis absolute position to '0' (automatic calculation for G54-G59.4)
57	Set the 8th-axis absolute position to '0' (automatic calculation for G54-G59.4)

İşlem Kodu	Description
60	Set the X-axis absolute position to the center of the workpiece (1/2) to '0' (automatic calculation for G54-G59.4)
61	Set the Y-axis absolute position to the center of the workpiece (1/2) to '0' (automatic calculation for G54-G59.4)
62	Set the Z-axis absolute position to the center of the workpiece (1/2) to '0' (automatic calculation for G54-G59.4)
63	Set the 4th-axis absolute position to the center of the workpiece (1/2) to '0' (automatic calculation for G54-G59.4)
64	Set the 5th-axis absolute position to the center of the workpiece (1/2) to '0' (automatic calculation for G54-G59.4)
65	Set the 6th-axis absolute position to the center of the workpiece (1/2) to '0' (automatic calculation for G54-G59.4)
66	Set the 7th-axis absolute position to the center of the workpiece (1/2) to '0' (automatic calculation for G54-G59.4)
67	Set the 8th-axis absolute position to the center of the workpiece (1/2) to '0' (automatic calculation for G54-G59.4)
70	Set the X-axis incremental position to '0'
71	Set the Y-axis incremental position to '0'
72	Set the Z-axis incremental position to '0'
73	Set the 4th-axis incremental position to '0'
74	Set the 5th-axis incremental position to '0'
75	Set the 6th-axis incremental position to '0'
76	Set the 7th-axis incremental position to '0'
77	Set the 8th-axis incremental position to '0'
80	Set the X-axis incremental position to the center of the workpiece (1/2) to '0'
81	Set the Y-axis incremental position to the center of the workpiece (1/2) to '0'
82	Set the Z-axis incremental position to the center of the workpiece (1/2) to '0'
83	Set the 4th-axis incremental position to the center of the workpiece (1/2) to '0'
84	Set the 5th-axis incremental position to the center of the workpiece (1/2) to '0'
85	Set the 6th-axis incremental position to the center of the workpiece (1/2) to '0'
86	Set the 7th-axis incremental position to the center of the workpiece (1/2) to '0'
87	Set the 8th-axis incremental position to the center of the workpiece (1/2) to '0'
90	Reset the part counter value
91	Set the X-axis G92 offset value to '0'
92	Set the Y-axis G92 offset value to '0'
93	Set the Z-axis G92 offset value to '0'
94	Set the 4th-axis G92 offset value to '0'
95	Set the 5th-axis G92 offset value to '0'
96	Set the 6th-axis G92 offset value to '0'
97	Reset the tool life counter
98	Set the 7th-axis G92 offset value to '0'
99	Set the 8th-axis G92 offset value to '0'
200	Move the cursor down one line in the G-code file
201	Move the cursor up one line in the G-code file
202	Move the cursor down one page in the G-code file
203	Move the cursor up one page in the G-code file
204	Refresh the variables displaying the content of the G-code file
205	Move the cursor in the G-code file to the line written to variables 12002~12003
206	Move the cursor to the top of the G-code file

İşlem Kodu	Description
210	Move the cursor down one line in the library content
211	Move the cursor up one line in the library content
212	Move the cursor down one page in the library content
213	"Move the cursor up one page in the library content
214	Refresh the variables displaying the library content
215	Move the library cursor to the line specified in variables 12002~12003
230	Adjust the number of lines to be displayed in the G-code file according to the value written in variables 12002~12003 (Minimum: 1, Maximum: 20)
231	Adjust the number of lines to be displayed in the library content according to the value written in variables 12002~12003 (Minimum: 1, Maximum: 20)
240	Move the cursor down one line in the comment list
241	Move the cursor up one line in the comment list
242	Move the cursor down one page in the comment list
243	Move the cursor up one page in the comment list
250	Shift the selected offset value of the X axis so that the current position of the X axis equals the value entered in the MDI data entry box
251	Shift the selected offset value of the X axis so that the current position of the Y axis equals the value entered in the MDI data entry box
252	Shift the selected offset value of the X axis so that the current position of the Z axis equals the value entered in the MDI data entry box
253	Shift the selected offset value of the X axis so that the current position of the 4th axis equals the value entered in the MDI data entry box
254	Shift the selected offset value of the X axis so that the current position of the 5th axis equals the value entered in the MDI data entry box
255	Shift the selected offset value of the X axis so that the current position of the 6th axis equals the value entered in the MDI data entry box
256	Shift the selected offset value of the X axis so that the current position of the 7th axis equals the value entered in the MDI data entry box
257	Shift the selected offset value of the X axis so that the current position of the 8th axis equals the value entered in the MDI data entry box
270	Shift the geometry offset value of the selected tool so that the current position of the X axis equals the value entered in the MDI data entry box (Lathe model only)
271	Shift the geometry offset value of the selected tool so that the current position of the Y axis equals the value entered in the MDI data entry box (Lathe model only)
272	Shift the geometry offset value of the selected tool so that the current position of the Z axis equals the value entered in the MDI data entry box (Lathe model only)

8.16.1. MDI Data Input Box

Address	Description	Minimum	Maximum	Unit
12020~12051	MDI data input box(Maximum 64 characters)			ascii

The MDI data input box is used by the user for purposes such as naming programs, editing program content, searching, and executing MDI code lines. A maximum of 64 characters can be entered.

8.16.2. Content of the Selected G-code File

Address	Description	Minimum	Maximum	Unit
12200~12201	Selected program line length	0	2147483647	
12202~12203	Cursor position within the selected program	0	2147483647	
12204~12205	Current page number in the selected program	0	2147483647	
12206~12207	Cursor position in the displayed area	0	2147483647	
12208~12209	Refresh request for selected program content	0	2147483647	
12220~12251	1st line of the displayed area of the selected program (maximum 64 characters)			ascii
12252~12283	2nd line of the displayed area of the selected program (maximum 64 characters)			ascii
12284~12315	3rd line of the displayed area of the selected program (maximum 64 characters)			ascii
12316~12347	4th line of the displayed area of the selected program (maximum 64 characters)			ascii
12348~12379	5th line of the displayed area of the selected program (maximum 64 characters)			ascii
12380~12411	6th line of the displayed area of the selected program (maximum 64 characters)			ascii
12412~12443	7th line of the displayed area of the selected program (maximum 64 characters)			ascii
12444~12475	8th line of the displayed area of the selected program (maximum 64 characters)			ascii
12476~12507	9th line of the displayed area of the selected program (maximum 64 characters)			ascii
12508~12539	10th line of the displayed area of the selected program (maximum 64 characters)			ascii
12540~12571	11th line of the displayed area of the selected program (maximum 64 characters)			ascii
12572~12603	12th line of the displayed area of the selected program (maximum 64 characters)			ascii
12604~12635	13th line of the displayed area of the selected program (maximum 64 characters)			ascii
12636~12667	14th line of the displayed area of the selected program (maximum 64 characters)			ascii
12668~12699	15th line of the displayed area of the selected program (maximum 64 characters)			ascii
12700~12731	16th line of the displayed area of the selected program (maximum 64 characters)			ascii
12732~12763	17th line of the displayed area of the selected program (maximum 64 characters)			ascii
12764~12795	18th line of the displayed area of the selected program (maximum 64 characters)			ascii
12796~12827	19th line of the displayed area of the selected program (maximum 64 characters)			ascii
12828~12859	20th line of the displayed area of the selected program (maximum 64 characters)			ascii

This area is used to display the content of the selected/executed G-code file. Apart from the refresh request variable, no other addresses should be written to.

8.16.3. Comment List Within the Program

Address	Description	Minimum	Maximum	Unit
12860~12861	Selected program line length	0	2147483647	
12862~12863	Cursor position within the selected program	0	2147483647	
12864~12865	Current page number in the selected program	0	2147483647	
12866~12867	Cursor position in the displayed area	0	2147483647	
12868~12869	Refresh request for selected program content	0	2147483647	
12880~12911	1st line of the displayed area of the selected program (maximum 64 characters)			ascii
12912~12943	2nd line of the displayed area of the selected program (maximum 64 characters)			ascii
12944~12975	3rd line of the displayed area of the selected program (maximum 64 characters)			ascii
12976~13007	4th line of the displayed area of the selected program (maximum 64 characters)			ascii
13008~13039	5th line of the displayed area of the selected program (maximum 64 characters)			ascii
13040~13071	6th line of the displayed area of the selected program (maximum 64 characters)			ascii
13072~13103	7th line of the displayed area of the selected program (maximum 64 characters)			ascii
13104~13135	8th line of the displayed area of the selected program (maximum 64 characters)			ascii
13136~13167	9th line of the displayed area of the selected program (maximum 64 characters)			ascii
13168~13199	10th line of the displayed area of the selected program (maximum 64 characters)			ascii

This area is used to display the comments within the selected/executed G-code file. Writing to addresses other than the update request variable should not be performed.

8.16.4. Library Content

Address	Description	Minimum	Maximum	Unit
13200~13201	Number of programs in the library	0	2147483647	
13202~13203	Cursor position in the library	0	2147483647	
13204~13205	Number of the displayed area in the library	0	2147483647	
13206~13207	Cursor position on the displayed area	0	2147483647	
13208~13209	Library content refresh request	0	2147483647	
13220~13251	1st line of the displayed area of the library content (maximum 64 characters)			ascii
13252~13283	2nd line of the displayed area of the library content (maximum 64 characters)			ascii
13284~13315	3rd line of the displayed area of the library content (maximum 64 characters)			ascii
13316~13347	4th line of the displayed area of the library content (maximum 64 characters)			ascii
13348~13379	5th line of the displayed area of the library content (maximum 64 characters)			ascii
13380~13411	6th line of the displayed area of the library content (maximum 64 characters)			ascii
13412~13443	7th line of the displayed area of the library content (maximum 64 characters)			ascii
13444~13475	8th line of the displayed area of the library content (maximum 64 characters)			ascii
13476~13507	9th line of the displayed area of the library content (maximum 64 characters)			ascii
13508~13539	10th line of the displayed area of the library content (maximum 64 characters)			ascii
13540~13571	11th line of the displayed area of the library content (maximum 64 characters)			ascii
13572~13603	12th line of the displayed area of the library content (maximum 64 characters)			ascii
13604~13635	13th line of the displayed area of the library content (maximum 64 characters)			ascii
13636~13667	14th line of the displayed area of the library content (maximum 64 characters)			ascii
13668~13699	15th line of the displayed area of the library content (maximum 64 characters)			ascii
13700~13731	16th line of the displayed area of the library content (maximum 64 characters)			ascii
13732~13763	17th line of the displayed area of the library content (maximum 64 characters)			ascii
13764~13795	18th line of the displayed area of the library content (maximum 64 characters)			ascii
13796~13827	19th line of the displayed area of the library content (maximum 64 characters)			ascii
13828~13859	20th line of the displayed area of the library content (maximum 64 characters)			ascii

This area is used to display the library content. Writing operations to addresses other than the update request variable should not be performed.

8.16.5. Name of the Selected G-Code File

Address	Description	Minimum	Maximum	Unit
13930~13961	Name of the selected G-code file (maximum 64 characters)			ascii

8.16.6. File Name to be Downloaded From the FTP Server

Address	Description	Minimum	Maximum	Unit
13962~13993	Name of the file to be downloaded from the FTP server(maximum 64 characters)			ascii

8.17. Parameters

8.17.0. PRM0-PRM9: Calling a Subprogram with a custom G-code

Address	Description	Unit
14000~14001	G code to be used to call subprogram no 9010.cnc	
14002~14003	G code to be used to call subprogram no 9011.cnc	**Minimum**
14004~14005	G code to be used to call subprogram no 9012.cnc	-1
14006~14007	G code to be used to call subprogram no 9013.cnc	**Maximum**
14008~14009	G code to be used to call subprogram no 9014.cnc	999
14010~14011	G code to be used to call subprogram no 9015.cnc	**Default**
14012~14013	G code to be used to call subprogram no 9016.cnc	-1
14014~14015	G code to be used to call subprogram no 9017.cnc	**Format**
14016~14017	G code to be used to call subprogram no 9018.cnc	0.0
14018~14019	G code to be used to call subprogram no 9019.cnc	

The values entered for these parameters must be in the format xx.x. For example, if a subprogram is to be called with the G01.1 code, the corresponding parameter should be set to 11. Similarly, if a subprogram is to be called with the G50 code, 500 should be written. The G-code value entered for these parameters will be masked by the interpreter and will not be executed.

8.17.1. PRM10-PRM19: Calling a subprogram with a custom M-code

Address	Description	Unit
14020~14021	M code to be used to call subprogram no 9020.cnc	
14022~14023	M code to be used to call subprogram no 9021.cnc	**Minimum**
14024~14025	M code to be used to call subprogram no 9022.cnc	-1
14026~14027	M code to be used to call subprogram no 9023.cnc	**Maximum**
14028~14029	M code to be used to call subprogram no 9024.cnc	255
14030~14031	M code to be used to call subprogram no 9025.cnc	**Default**
14032~14033	M code to be used to call subprogram no 9026.cnc	-1
14034~14035	M code to be used to call subprogram no 9027.cnc	**Format**
14036~14037	M code to be used to call subprogram no 9028.cnc	0
14038~14039	M code to be used to call subprogram no 9029.cnc	

The M-code value entered for these parameters will be masked by the interpreter and will not be executed.

8.17.2. PRM24-PRM31: Axis measurement calibration numerator value

Address	Description	Unit
14048~14049	X-axis measurement calibration numerator value	
14050~14051	Y-axis measurement calibration numerator value	**Minimum**
14052~14053	Z-axis measurement calibration numerator value	1
14054~14055	4th-axis measurement calibration numerator value	**Maximum**
14056~14057	5th-axis measurement calibration numerator value	10000000
14058~14059	6th-axis measurement calibration numerator value	**Default**
14060~14061	7th-axis measurement calibration numerator value	1
14062~14063	8th-axis measurement calibration numerator value	**Format**
		0

8.17.3. PRM32-PRM39: Axis measurement calibration denominator value

Address	Description	Unit
14064~14065	X-axis measurement calibration denominator value	
14066~14067	Y-axis measurement calibration denominator value	**Minimum**
14068~14069	Z-axis measurement calibration denominator value	1
14070~14071	4th-axis measurement calibration denominator value	**Maximum**
14072~14073	5th-axis measurement calibration denominator value	10000000
14074~14075	6th-axis measurement calibration denominator value	**Default**
14076~14077	7th-axis measurement calibration denominator value	1
14078~14079	8th-axis measurement calibration denominator value	**Format**
		0

These parameters are used for the measurement calibration of the axes. The displayed values on the screen are multiplied by the numerator parameter and then divided by the denominator parameter, and the resulting value is sent to the drives.
Formula :

Pulse Amount = (Distance * Numerator Parameter) / Denominator Parameter
Note: The distance is evaluated as an integer without a decimal point. (e.g., 5.0000 mm is considered as 50000)

Example:

Lead screw pitch = 5mm
Pulse count required for one revolution of the motor (PPR) = 10000 pulse
Reduction ratio = 0.5 (1:2)

Numerator Parameter (Motor PPR) = 10000
Denominator Parameter (Pitch * Reduction ratio) = 50000 * 0.5 = 25000

When simplified;
Numerator Parameter = 10
Denominator Parameter = 25

Follow these steps while changing the parameters:
1- Turn off the emergency stop line.
2- Change the parameters.
3- Turn off the power switch (wait for at least 30 seconds).
4- Turn on the power switch and then perform the tests.

8.17.4. PRM40-PRM47: Encoder pulse count of the axes

Address	Description	Unit
14080~14081	X-axis encoder pulse count	pals
14082~14083	Y-axis encoder pulse count	**Minimum**
14084~14085	Z-axis encoder pulse count	1
14086~14087	4th-axis encoder pulse count	**Maximum**
14088~14089	5th-axis encoder pulse count	999999999
14090~14091	6th-axis encoder pulse count	**Default**
14092~14093	7th-axis encoder pulse count	10000
14094~14095	8th-axis encoder pulse count	**Format**
		0

8.17.5. PRM48-PRM55: Allowed maximum rapid speeds of the axes (Automatic)

Address	Description	Unit
14096~14097	X Axis maximum RAPID speed (Automatic mode)	(mm/inch)/min
14098~14099	Y Axis maximum RAPID speed (Automatic mode)	**Minimum**
14100~14101	Z Axis maximum RAPID speed (Automatic mode)	1
14102~14103	4th Axis maximum RAPID speed (Automatic mode)	**Maximum**
14104~14105	5th Axis maximum RAPID speed (Automatic mode)	100000
14106~14107	6th Axis maximum RAPID speed (Automatic mode)	**Default**
14108~14109	7th Axis maximum RAPID speed (Automatic mode)	5000
14110~14111	8th Axis maximum RAPID speed (Automatic mode)	**Format**
		0

With these parameters, the maximum rapid speeds of each axis in automatic mode can be adjusted individually in mm/inch per minute.

8.17.6. PRM56-PRM63: Allowed maximum rapid speeds of the axes (Jog)

Address	Description	Unit
14112~14113	X Axis maximum RAPID speed (JOG mode)	(mm/inch)/min
14114~14115	Y Axis maximum RAPID speed (JOG mode)	**Minimum**
14116~14117	Z Axis maximum RAPID speed (JOG mode)	0
14118~14119	4th Axis maximum RAPID speed (JOG mode)	**Maximum**
14120~14121	5th Axis maximum RAPID speed (JOG mode)	100000
14122~14123	6th Axis maximum RAPID speed (JOG mode)	**Default**
14124~14125	7th Axis maximum RAPID speed (JOG mode)	5000
14126~14127	8th Axis maximum RAPID speed (JOG mode)	**Format**
		0

With these parameters, the maximum rapid speeds of each axis in jog mode can be adjusted individually in mm/inch per minute. If -0- is entered for these parameter values, PRM48-PRM53 will be valid for jog mode rapid speed.

8.17.7. PRM64-PRM71: Maximum jerk values of the axes

Address	Description	Unit
14128~14129	X-axis maximum jerk	(mm/inch)/sec^3
14130~14131	Y-axis maximum jerk	**Minimum**
14132~14133	Z-axis maximum jerk	1
14134~14135	4th-axis maximum jerk	**Maximum**
14136~14137	5th-axis maximum jerk	1000000
14138~14139	6th-axis maximum jerk	**Default**
14140~14141	7th-axis maximum jerk	15000
14142~14143	8th-axis maximum jerk	**Format**
		0

8.17.8. PRM72-PRM79: Maximum acceleration (Acc/Dec) values of the axes

Address	Description	Unit
14144~14145	X-axis maximum acceleration	(mm/inch)/sec^2
14146~14147	Y-axis maximum acceleration	**Minimum**
14148~14149	Z-axis maximum acceleration	1
14150~14151	4th-axis maximum acceleration	**Maximum**
14152~14153	5th-axis maximum acceleration	100000
14154~14155	6th-axis maximum acceleration	**Default**
14156~14157	7th-axis maximum acceleration	1000
14158~14159	8th-axis maximum acceleration	**Format**
		0

8.17.9. PRM80-PRM87: Positive (+) direction software limits of the axes

Address	Description	Unit
14160~14161	X-axis positive (+) direction software limit	mm/inch
14162~14163	Y-axis positive (+) direction software limit	**Minimum**
14164~14165	Z-axis positive (+) direction software limit	-2000000000
14166~14167	4th-axis positive (+) direction software limit	**Maximum**
14168~14169	5th-axis positive (+) direction software limit	2000000000
14170~14171	6th-axis positive (+) direction software limit	**Default**
14172~14173	7th-axis positive (+) direction software limit	2000000000
14174~14175	8th-axis positive (+) direction software limit	**Format**
		0.0000

With these parameters, the positive direction software limits of each axis can be set in mm/inch. Software limits can be selected either before or after the axis limit switches. When the axes reach their software limit positions, the system enters alarm mode, and the message "AXIS X (+) SOFTWARE LIMIT" appears on the alarm screen. To clear this alarm, the axis must be moved in the negative direction, and then the alarm should be cleared using the Reset button. In systems without absolute encoders, software limits become effective after the reference (Home) position is established. In systems with absolute encoders, software limits are effective when the system is powered on.

8.17.10. PRM88-PRM95: Negative (-) direction software limits of the axes

Address	Description	Unit
14176~14177	X-axis negative () direction software limit	mm/inch
14178~14179	Y-axis negative () direction software limit	**Minimum**
14180~14181	Z-axis negative () direction software limit	-2000000000
14182~14183	4th-axis negative () direction software limit	**Maximum**
14184~14185	5th-axis negative () direction software limit	2000000000
14186~14187	6th-axis negative () direction software limit	**Default**
14188~14189	7th-axis negative () direction software limit	-2000000000
14190~14191	8th-axis negative () direction software limit	**Format**
		0.0000

With these parameters, the negative direction software limits of each axis can be set in mm/inch. Software limits can be selected either before or after the axis limit switches. When the axes reach their software limit positions, the system enters alarm mode, and the message "AXIS X (-) SOFTWARE LIMIT" appears on the alarm screen. To clear this alarm, the axis must be moved in the positive direction, and then the alarm should be cleared using the Reset button. In systems without absolute encoders, software limits become effective after the reference (Home) position is established. In systems with absolute encoders, software limits are effective when the system is powered on.

8.17.11. PRM96-PRM103: Mechanical backlash compensation values of the axes

Address	Description	Unit
14192~14193	X-axis mechanical backlash compensation value	mm/inch
14194~14195	Y-axis mechanical backlash compensation value	**Minimum**
14196~14197	Z-axis mechanical backlash compensation value	0
14198~14199	4th-axis mechanical backlash compensation value	**Maximum**
14200~14201	5th-axis mechanical backlash compensation value	100000
14202~14203	6th-axis mechanical backlash compensation value	**Default**
14204~14205	7th-axis mechanical backlash compensation value	0
14206~14207	8th-axis mechanical backlash compensation value	**Format**
		0.0000

With these parameters, if mechanical backlash occurs when the axis motors begin to rotate in the opposite direction, these values are used by the CNC controller to compensate for the backlash. When the axis motor starts rotating in the opposite direction, it first moves by the amount specified in these parameters and then processes the NC command.

8.17.12. PRM104-PRM111: Allowable deviation values during line transitions

Address	Description	Unit
14208~14209	X-axis junction deviation value	mm/inch
14210~14211	Y-axis junction deviation value	**Minimum**
14212~14213	Z-axis junction deviation value	1
14214~14215	4th-axis junction deviation value	**Maximum**
14216~14217	5th-axis junction deviation value	10000
14218~14219	6th-axis junction deviation value	**Default**
14220~14221	7th-axis junction deviation value	500
14222~14223	8th-axis junction deviation value	**Format**
		0.0000

8.17.13. PRM112-PRM119: In-position range of the axes

Address	Description	Unit
14224~14225	In-position range value of X-axis	mm/inch
14226~14227	In-position range value of Y-axis	**Minimum**
14228~14229	In-position range value of Z-axis	1
14230~14231	In-position range value of 4th-axis	**Maximum**
14232~14233	In-position range value of 5th-axis	2000000000
14234~14235	In-position range value of 6th-axis	**Default**
14236~14237	In-position range value of 7th-axis	200
14238~14239	In-position range value of 8th-axis	**Format**
		0.0000

8.17.14. PRM120-PRM127: Maximum allowable deviation values

Address	Description	Unit
14240~14241	Allowed maximum position deviation for X-axis	mm/inch
14242~14243	Allowed maximum position deviation for Y-axis	**Minimum**
14244~14245	Allowed maximum position deviation for Z-axis	1
14246~14247	Allowed maximum position deviation for 4th-axis	**Maximum**
14248~14249	Allowed maximum position deviation for 5th-axis	2000000000
14250~14251	Allowed maximum position deviation for 6th-axis	**Default**
14252~14253	Allowed maximum position deviation for 7th-axis	1000000
14254~14255	Allowed maximum position deviation for 8th-axis	**Format**
		0.0000

8.17.15. PRM128-PRM135: Reference homing operation 1st directions

Address	Description	Unit
14256~14257	X-axis reference homing operation 1st movement direction	0: (+), 1: (-)
14258~14259	Y-axis reference homing operation 1st movement direction	**Minimum**
14260~14261	Z-axis reference homing operation 1st movement direction	0
14262~14263	4th-axis reference homing operation 1st movement direction	**Maximum**
14264~14265	5th-axis reference homing operation 1st movement direction	1
14266~14267	6th-axis reference homing operation 1st movement direction	**Default**
14268~14269	7th-axis reference homing operation 1st movement direction	0
14270~14271	8th-axis reference homing operation 1st movement direction	**Format**
		0

8.17.16. PRM136-PRM143: Reference homing operation 2nd directions

Address	Description	Unit
14272~14273	X-axis reference homing operation 2nd movement direction	0: (+), 1: (-)
14274~14275	Y-axis reference homing operation 2nd movement direction	**Minimum**
14276~14277	Z-axis reference homing operation 2nd movement direction	0
14278~14279	4th-axis reference homing operation 2nd movement direction	**Maximum**
14280~14281	5th-axis reference homing operation 2nd movement direction	1
14282~14283	6th-axis reference homing operation 2nd movement direction	**Default**
14284~14285	7th-axis reference homing operation 2nd movement direction	1
14286~14287	8th-axis reference homing operation 2nd movement direction	**Format**
		0

8.17.17. PRM144-PRM151: Reference homing operation 1st speeds

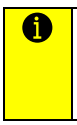
Address	Description	Unit
14288~14289	X-axis reference homing operation 1st speed	(mm/inch)/min
14290~14291	Y-axis reference homing operation 1st speed	**Minimum**
14292~14293	Z-axis reference homing operation 1st speed	0
14294~14295	4th-axis reference homing operation 1st speed	**Maximum**
14296~14297	5th-axis reference homing operation 1st speed	100000
14298~14299	6th-axis reference homing operation 1st speed	**Default**
14300~14301	7th-axis reference homing operation 1st speed	1000
14302~14303	8th-axis reference homing operation 1st speed	**Format**
		0

8.17.18. PRM152-PRM159: Reference homing operation 2nd speeds

Address	Description	Unit
14304~14305	X-axis reference homing operation 2nd speed	(mm/inch)/min
14306~14307	Y-axis reference homing operation 2nd speed	**Minimum**
14308~14309	Z-axis reference homing operation 2nd speed	0
14310~14311	4th-axis reference homing operation 2nd speed	**Maximum**
14312~14313	5th-axis reference homing operation 2nd speed	100000
14314~14315	6th-axis reference homing operation 2nd speed	**Default**
14316~14317	7th-axis reference homing operation 2nd speed	500
14318~14319	8th-axis reference homing operation 2nd speed	**Format**
		0

8.17.19. PRM160-PRM167: Reference point shift values

Address	Description	Unit
14320~14321	Home position shift value of X-axis	mm/inch
14322~14323	Home position shift value of Y-axis	**Minimum**
14324~14325	Home position shift value of Z-axis	-2000000000
14326~14327	Home position shift value of 4th-axis	**Maximum**
14328~14329	Home position shift value of 5th-axis	2000000000
14330~14331	Home position shift value of 6th-axis	**Default**
14332~14333	Home position shift value of 7th-axis	0
14334~14335	Home position shift value of 8th-axis	**Format**
		0.0000



With these parameters, the reference point of each axis relative to the reference switch can be shifted by a certain value in mm or inches. The system will record the machine's zero point after this operation. If the reference shift is to be selected in the positive direction, a positive value should be entered in the parameter, and if selected in the negative direction, a negative value should be entered.

8.17.20. PRM168-PRM175: 2nd home (reference) position of axes

Address	Description	Unit
14336~14337	2nd home (reference) position of X-axis	mm/inch
14338~14339	2nd home (reference) position of Y-axis	**Minimum**
14340~14341	2nd home (reference) position of Z-axis	-2000000000
14342~14343	2nd home (reference) position of 4th-axis	**Maximum**
14344~14345	2nd home (reference) position of 5th-axis	2000000000
14346~14347	2nd home (reference) position of 6th-axis	**Default**
14348~14349	2nd home (reference) position of 7th-axis	0
14350~14351	2nd home (reference) position of 8th-axis	**Format**
		0.0000

In the Pulser 3 CNC controller, each axis has three additional reference points besides the machine reference point. The movement to these reference points is done using the G28 Px code (where x = 2, 3, 4). With the above parameters, the second reference point of the axes is specified. When setting these parameters, machine values should be entered.

8.17.21. PRM176-PRM183: 3rd home (reference) position of axes

Address	Description	Unit
14352~14353	3rd home (reference) position of X-axis	mm/inch
14354~14355	3rd home (reference) position of Y-axis	**Minimum**
14356~14357	3rd home (reference) position of Z-axis	-2000000000
14358~14359	3rd home (reference) position of 4th-axis	**Maximum**
14360~14361	3rd home (reference) position of 5th-axis	2000000000
14362~14363	3rd home (reference) position of 6th-axis	**Default**
14364~14365	3rd home (reference) position of 7th-axis	0
14366~14367	3rd home (reference) position of 8th-axis	**Format**
		0.0000

With the above parameters, the third reference point of the axes is specified. Machine values should be entered when setting these parameters..

8.17.22. PRM184-PRM191: 4th home (reference) position of axes

Address	Description	Unit
14368~14369	4th home (reference) position of X-axis	mm/inch
14370~14371	4th home (reference) position of Y-axis	**Minimum**
14372~14373	4th home (reference) position of Z-axis	-2000000000
14374~14375	4th home (reference) position of 4th-axis	**Maximum**
14376~14377	4th home (reference) position of 5th-axis	2000000000
14378~14379	4th home (reference) position of 6th-axis	**Default**
14380~14381	4th home (reference) position of 7th-axis	0
14382~14383	4th home (reference) position of 8th-axis	**Format**
		0.0000

With the above parameters, the fourth reference point of the axes is specified. Machine coordinates should be entered when setting these parameters.

8.17.23. PRM192-PRM199: Reference position source selection

When Pulser3 completes the reference process, it can use three different sources for the -0- position. In the standard mode, the axis reference switch is released, and the first Z-phase position captured by the servo is considered as the -0- point. In the second option, the position at the point where the switch is released is taken as the -0- point. In another option, after releasing the switch, the Z-phase is searched, and when this signal is triggered, the last feedback value read is accepted as the -0- point.

Address	Description	Unit
14384~14385	X-axis reference position source selection	
14386~14387	Y-axis reference position source selection	**Minimum**
14388~14389	Z-axis reference position source selection	0
14390~14391	4th-axis reference position source selection	**Maximum**
14392~14393	5th-axis reference position source selection	2
14394~14395	6th-axis reference position source selection	**Default**
14396~14397	7th-axis reference position source selection	0
14398~14399	8th-axis reference position source selection	**Format**
		0

0: Standard Mode (Recommended)

1: Reference only with the switch (Deviations may occur)

2: Consider the last feedback value read with the Z-phase as the -0- point

8.17.24. PRM200-PRM207: Maximum accelerations of the axes during cutting

Address	Description	Unit
14400~14401	Maximum acceleration during cutting for X-axis	(mm/inch)/sec^2
14402~14403	Maximum acceleration during cutting for Y-axis	**Minimum**
14404~14405	Maximum acceleration during cutting for Z-axis	0
14406~14407	Maximum acceleration during cutting for 4th-axis	**Maximum**
14408~14409	Maximum acceleration during cutting for 5th-axis	100000
14410~14411	Maximum acceleration during cutting for 6th-axis	**Default**
14412~14413	Maximum acceleration during cutting for 7th-axis	1000
14414~14415	Maximum acceleration during cutting for 8th-axis	**Format**
		0

When -0- is entered for these parameter values, the maximum acceleration to be used during cutting for the respective axis is taken from the PRM72-PRM77 parameters.

8.17.25. PRM208-PRM215: Feedback calibration numerator values

Address	Description	Unit
14416~14417	X-axis feedback calibration numerator value	
14418~14419	Y-axis feedback calibration numerator value	**Minimum**
14420~14421	Z-axis feedback calibration numerator value	0
14422~14423	4th-axis feedback calibration numerator value	**Maximum**
14424~14425	5th-axis feedback calibration numerator value	10000000
14426~14427	6th-axis feedback calibration numerator value	**Default**
14428~14429	7th-axis feedback calibration numerator value	0
14430~14431	8th-axis feedback calibration numerator value	**Format**
		0

8.17.26. PRM216-PRM223: Feedback calibration denominator values

Address	Description	Unit
14432~14433	X-axis feedback calibration denominator value	
14434~14435	Y-axis feedback calibration denominator value	**Minimum**
14436~14437	Z-axis feedback calibration denominator value	0
14438~14439	4th-axis feedback calibration denominator value	**Maximum**
14440~14441	5th-axis feedback calibration denominator value	10000000
14442~14443	6th-axis feedback calibration denominator value	**Default**
14444~14445	7th-axis feedback calibration denominator value	0
14446~14447	8th-axis feedback calibration denominator value	**Format**
		0

8.17.27. PRM224-PRM231: 2nd positive (+) direction software limits of the axes

Address	Description	Unit
14448~14449	X-axis 2nd positive (+) direction software limit	mm/inch
14450~14451	Y-axis 2nd positive (+) direction software limit	**Minimum**
14452~14453	Z-axis 2nd positive (+) direction software limit	-2000000000
14454~14455	4th-axis 2nd positive (+) direction software limit	**Maximum**
14456~14457	5th-axis 2nd positive (+) direction software limit	2000000000
14458~14459	6th-axis 2nd positive (+) direction software limit	**Default**
14460~14461	7th-axis 2nd positive (+) direction software limit	2000000000
14462~14463	8th-axis 2nd positive (+) direction software limit	**Format**
		0.0000

8.17.28. PRM232-PRM239: 2nd negative (-) direction software limits of the axes

Address	Description	Unit
14464~14465	X-axis 2nd negative (-) direction software limit	mm/inch
14466~14467	Y-axis 2nd negative (-) direction software limit	**Minimum**
14468~14469	Z-axis 2nd negative (-) direction software limit	-2000000000
14470~14471	4th-axis 2nd negative (-) direction software limit	**Maximum**
14472~14473	5th-axis 2nd negative (-) direction software limit	2000000000
14474~14475	6th-axis 2nd negative (-) direction software limit	**Default**
14476~14477	7th-axis 2nd negative (-) direction software limit	-2000000000
14478~14479	8th-axis 2nd negative (-) direction software limit	**Format**
		0.0000

8.17.29. PRM300: Cutting speed initial value

Address	Description	Minimum	Maximum	Default
14600~14601	Cutting speed to be valid when the system is initialized	1	100000	1000
			Format	**Unit**
			0	(mm/inch)/min

With this parameter, the cutting (G01) speed, which will be valid (in mm/inch per minute) before any speed command is given when the machine is started, is specified.

8.17.30. PRM301: Maximum allowable cutting speed

Address	Description	Minimum	Maximum	Default
14602~14603	Maximum allowable cutting speed	1	100000	5000
			Format	**Unit**
			0	(mm/inch)/min

This parameter specifies the maximum cutting (G01) speed (in mm/inch per minute) that the machine can reach in manual and automatic modes. If the system receives a cutting speed command higher than this value, it will enter an alarm state.

8.17.31. PRM302: Cutting speed in manual (Jog mode)

Address	Description	Minimum	Maximum	Default
14604~14605	Cutting speed in manual (jog mode)	0	100000	0
			Format	**Unit**
			0	(mm/inch)/min

This parameter specifies the cutting speed in manual (jog) mode of the machine (mm/inch) / min. If -0- is entered for this parameter, the jog mode cutting speed will be the last given F command.

8.17.32. PRM303: Rapid speed value at 0% rate of axes

Address	Description	Minimum	Maximum	Default
14606~14607	Rapid speed value at 0% rate of axes	1	100000	500
			Format	**Unit**
			0	(mm/inch)/min

This parameter specifies the valid rapid speed (in mm/inch per minute) when the 0% speed rate is selected. Other speed rates are applied by scaling the values in the PRM48PRM55 parameters in automatic mode or the PRM56PRM63 parameters in manual mode.

8.17.33. PRM304: Inhibit Rapid/Jog motion before homing

Address	Description	Minimum	Maximum	Default
14608~14609	Inhibit Rapid/Jog motion before homing	0	2	0
			Format	Unit
			0	

With these parameters, for safety reasons, rapid or jog (manual) movements can be inhibited before the machine homing process.
0 = No inhibition.
1 = Inhibits rapid movement (movement can occur without pressing the Rapid button).
2 = Completely inhibits jog (manual) movements.

8.17.34. PRM305: Acceleration/Deceleration type of axes

Address	Description	Minimum	Maximum	Default
14610~14611	Acceleration/Deceleration type of axes	0	1	0
			Format	Unit
			0	

These parameters are used to select the acceleration/deceleration (ramp) types of the axes.
0 = Linear
1 = S-CURVE

8.17.35. PRM306: Allowed chordal tolerance for arc moves

Address	Description	Minimum	Maximum	Default
14612~14613	Allowed chordal tolerance for arc moves	1	100000	200
			Format	Unit
			0.0000	mm/inch

8.17.36. PRM307: Minimum segment length for arc moves

Address	Description	Minimum	Maximum	Default
14614~14615	Minimum segment length for arc moves	1	100000	200
			Format	Unit
			0.0000	mm/inch

8.17.37. PRM310: Allowed junction acceleration value

Address	Description	Minimum	Maximum	Default
14620~14621	Allowed junction acceleration value	1	100000	1000
			Format	Unit
			0	(mm/inch)/sec^2

8.17.38. PRM311: Acceleration/deceleration value in M.P.G. mode

Address	Description	Minimum	Maximum	Default
14622~14623	Acceleration/deceleration value in M.P.G. mode	1	100000	750
			Format	Unit
			0	(mm/inch)/sec^2

8.17.39. PRM312: Retract distance in G73 cycle

Address	Description	Minimum	Maximum	Default
14624~14625	Retract distance in G73 cycle	0	2000000000	20000
			Format	**Unit**
			0.0000	mm/inch

8.17.40. PRM313: Rapid movement distance in G83 cycle

Address	Description	Minimum	Maximum	Default
14626~14627	Rapid movement distance in G83 cycle	0	2000000000	20000
			Format	**Unit**
			0.0000	mm/inch

8.17.41. PRM314: G76/G87 retract axis and direction selection (MILL)

Address	Description	Minimum	Maximum	Default
14628~14629	G76/G87 retract axis and direction selection (MILL)	0	5	0
			Format	**Unit**
			0	-

0: X+ **1:** X-

2: Y+ **3:** Y-

4: Z+ **5:** Z-

8.17.42. PRM315: Dwell before retraction for G74/G84

Address	Description	Minimum	Maximum	Default
14630~14631	G74/G84 dwell time before retraction	0	100000	0
			Format	**Unit**
			0	ms

8.17.43. PRM317: M06 command calls O9001.cnc

Address	Description	Minimum	Maximum	Default
14634~14635	M06 command calls the O9001.cnc subprogram.	0	1	1
			Format	**Unit**
			0	bool

8.17.44. PRM318: Hide files named O9xxx.cnc

Address	Description	Minimum	Maximum	Default
14636~14637	Files named O9xxx.cnc are not displayed in the library	0	1	0
			Format	**Unit**
			0	bool

8.17.45. PRM319: Edit lock for files named O9xxx.cnc

Address	Description	Minimum	Maximum	Default
14638~14639	The deletion and editing of files named O9xxx.cnc are prohibited	0	1	0
			Format	**Unit**
			0	bool

8.17.46. PRM320: The plane where the tool length wear will be applied

Address	Description	Minimum	Maximum	Default
14640~14641	Selection of the plane where the tool length wear will be applied	0	1	0
			Format	**Unit**
			0	

0: Tool length wear is always applied to the Z axis

1: Tool length wear is applied to the hole axis based on the selected plane

8.17.47. PRM321: Position check to complete the executed line

Address	Description	Minimum	Maximum	Default
14642~14643	Verify that all axes are within the desired position range to complete the executed line. See: PRM112-PRM117	0	1	0
			Format	**Unit**
			0	bool

8.17.48. PRM322: Speed control to complete the executed line

Address	Description	Minimum	Maximum	Default
14644~14645	Check if the spindle arrived at the desired speed signal to complete the executed line	0	1	0
			Format	**Unit**
			0	bool

8.17.49. PRM324-PRM325: Open CNC mode

Address	Description	Minimum	Maximum	Default
14648~14649	All commands except M99 and M30 are directed to the subprogram specified in PRM325	0	1	0
			Format	**Unit**
			0	bool

Address	Description	Minimum	Maximum	Default
14650~14651	Subprogram number to which commands will be directed in open CNC mode	0	9999	0
			Format	**Unit**
			0	

8.17.50. PRM326-PRM327: Tool life counter

With these parameters, the system can be set to trigger an alarm after the tool or consumable performs a certain amount of cutting. Rapid movements are not added to the distance counter. The axes for which the distance during cutting will be calculated are selected with PRM326. The alarm distance is selected with PRM327.

Address	Description	Minimum	Maximum	Default
14652~14653	Selection of the plane where the tool life will be calculated	0	5	0
			Format	**Unit**
			0	

0: Disabled

1: XY

2: ZX

3: YZ

4: XYZ

5: XYZ456

Address	Description	Minimum	Maximum	Default
14654~14655	Tool life counter alarm distance	0	2000000000	0
			Format	**Unit**
			0	meter/feet

8.17.51. PRM328: MSTB commands completion check delay

Address	Description	Minimum	Maximum	Default
14656~14657	The completion of MSTB commands is signaled to the system via the p_FIN signal. This parameter sets the time after which this signal should be checked, after the MSTB commands are directed to the PLC	0	10000	200
			Format	**Unit**
			0	ms

8.17.52. PRM330: Selection of the unit of measurement for the parameters

Address	Description	Minimum	Maximum	Default
14660~14661	Selection of the unit of measurement for the parameters	0	1	0
			Format	Unit
			0	

0: The unit of measurement for the parameters and offset values is mm

1: The unit of measurement for the parameters and offset values is inch

ℹ	The selected unit of measurement is not determined by this parameter. It is set by the G20 and G21 commands. If the selected unit of measurement differs from the value of this parameter when the system is turned off and back on, all parameter, measurement, and offset values are scaled according to the last selected unit of measurement, and this parameter automatically saves the last selected unit of measurement.

8.17.53. PRM331: Automatically reset the G-code cursor to the beginning

Address	Description	Minimum	Maximum	Default
14662~14663	Automatically reset the G-code cursor to the beginning	0	3	0
			Format	Unit
			0	

0: Disabled

1: When the emergency stop button is pressed, the cursor is moved to the beginning of the G-code file

2: When the reset button is pressed, the cursor is moved to the beginning of the G-code file

3: When the emergency stop or reset button is pressed, the cursor is moved to the beginning of the G-code file

8.17.54. PRM332: Rapid speed rate unit

Address	Description	Minimum	Maximum	Default
14664~14665	Selection of rapid speed rate	0	1	0
			Format	Unit
			0	

0: p_ROVx bits are processed in standard mode

1: p_ROVx bits are processed at a rate of 0.1

8.17.55. PRM333: Automatically select the last G-code file uploaded via FTP

Address	Description	Minimum	Maximum	Default
14666~14667	The last G-code file uploaded via FTP is automatically selected, and all other files in the library are deleted	0	1	0
			Format	**Unit**
			0	

0: Disabled

1: Enabled

ℹ	O9xxx.cnc files are deleted during this operation by checking the PRM319 parameter. If PRM319 = 1, these files are not deleted.

8.17.56. PRM334: Automatic clearing of limit alarms

Address	Description	Minimum	Maximum	Default
14668~14669	When the axes are retracted into the limits, previously issued limit alarms are automatically cleared	0	1	0
			Format	**Unit**
			0	

0: Disabled

1: Enabled

8.17.57. PRM335: G52 offset mode

Address	Description	Minimum	Maximum	Default
14670~14671	Selection of G52 offset mode	0	1	0
			Format	**Unit**
			0	

0: Standart

1: Direct offset assignment mode

8.17.58. PRM336: Drilling unit offset activation

Address	Description	Minimum	Maximum	Default
14672~14673	Activating drilling unit offsets	0	1	0
			Format	**Unit**
			0	

0: Drilling unit offsets are disabled

1: Drilling unit offsets are enabled

This parameter is used for offsetting the tools in the X, Y, and Z axes on machines where the drilling unit is installed. Offsets should be arranged starting from variable number 4500 in the X, Y, and Z order.

8.17.59. PRM340-PRM369: Spindle 1 parameters

PRM340: Spindle 1 initial speed

Address	Description	Minimum	Maximum	Default
14680~14681	Spindle 1 rotation speed to be valid when the system is initialized	0	100000	1000
			Format	**Unit**
			0	rpm

PRM341: Spindle 1 analog output polarity

Address	Description	Minimum	Maximum	Default
14682~14683	Selection of spindle 1 analog output polarity	0	3	0
			Format	**Unit**
			0	

0: CW(+), CCW(-)

1: CW(-), CCW(+)

2: CW(+), CCW(+)

3: CW(-), CCW(-)

PRM342: Spindle 1 minimum analog output value

Address	Description	Minimum	Maximum	Default
14684~14685	Spindle 1 minimum analog output value	0	16383	0
			Format	**Unit**
			0	

PRM343: Spindle 1 maximum analog output value

Address	Description	Minimum	Maximum	Default
14686~14687	Spindle 1 maximum analog output value	1	16383	2000
			Format	**Unit**
			0	

The minimum and maximum analog output values for each gear are determined by PRM342 and PRM343. When the speed command is set to 0 at any revolution, the value specified in PRM342 is output as the analog signal. Similarly, when the maximum speed of any gear is given as a command, the value specified in PRM343 is output as the analog signal. The Pulser3 analog output can range between 0 and 2047. When the value 2047 is written, a 10V analog output will be measured.

PRM344: Spindle 1 analog output offset value

Address	Description	Minimum	Maximum	Default
14688~14689	Spindle 1 analog output offset value	-1000	1000	0
			Format	**Unit**
			0	

PRM345-PRM351: Spindle 1 speed ranges according to gears

Address	Description	Unit
14690~14691	Maximum rotation speed for gear 1 (Default: 1000)	rpm
14692~14693	Minimum rotation speed for gear 2	**Minimum**
14694~14695	Maximum rotation speed for gear 2	0
14696~14697	Minimum rotation speed for gear 3	**Maximum**
14698~14699	Maximum rotation speed for gear 3	100000
14700~14701	Minimum rotation speed for gear 4	**Default**
14702~14703	Maximum rotation speed for gear 4	0
		Format
		0

Pulser3 supports up to 4 gears. The speed ranges for these gears are configured in PRM345 to PRM351. The minimum speed of Gear 1 is always considered as 0.

PRM352: Spindle 1 acceleration/deceleration time

Address	Description	Minimum	Maximum	Default
14704~14705	Spindle 1 acceleration/deceleration time	1	30000	1000
			Format	**Unit**
			0	ms

PRM353: Spindle 1 gear change mode

Address	Description	Minimum	Maximum	Default
14706~14707	Spindle 1 gear change mode	0	1	1
			Format	**Unit**
			0	

0: Manual gear change mode

1: Automatic gear change mode

PRM354: Spindle 1 gear change rotation speed(SLOW)

Address	Description	Minimum	Maximum	Default
14708~14709	Spindle 1 gear change rotation speed	0	100000	10
			Format	**Unit**
			0	rpm

PRM355: The spindle 1 orientation rotation speed

Address	Description	Minimum	Maximum	Default
14710~14711	The spindle 1 orientation rotation speed (positioning)	0	100000	10
			Format	**Unit**
			0	rpm

PRM356: The spindle 1 orientation cycle gain

Address	Description	Minimum	Maximum	Default
14712~14713	The spindle 1 orientation cycle gain(positioning)	0	32767	750
			Format	**Unit**
			0	

PRM357: The spindle 1 orientation rotation direction

Address	Description	Minimum	Maximum	Default
14714~14715	The spindle 1 orientation rotation direction (positioning)	0	1	0
			Format	**Unit**
			0	

0: CW

1: CCW

PRM358: Spindle 1 orientation position shift value

Address	Description	Minimum	Maximum	Default
14716~14717	Position shift value in pulse units from the Z phase position during spindle 1 orientation operation	-2000000000	2000000000	0
			Format	**Unit**
			0	pulse

PRM359: Spindle 1 orientation completed range

Address	Description	Minimum	Maximum	Default
14718~14719	Acceptable error range between the target position and the actual position for spindle 1 orientation completion	0	2000000000	100
			Format	**Unit**
			0	pulse

PRM360: Spindle 1 number of encoder pulses per revolution

Address	Description	Minimum	Maximum	Default
14720~14721	Pulse number of spindle 1 encoder	1	999999999	1024
			Format	Unit
			0	pulse

PRM361: Spindle 1 encoder pulse numerator

Address	Description	Minimum	Maximum	Default
14722~14723	Spindle 1 encoder pulse numerator	0	100000	1
			Format	Unit
			0	

PRM362: Spindle 1 encoder pulse denominator

Address	Description	Minimum	Maximum	Default
14724~14725	Spindle 1 encoder pulse denominator	0	100000	1
			Format	Unit
			0	

8.17.60. PRM370-PRM399: Spindle 2 parameters

PRM370: Spindle 2 initial speed

Address	Description	Minimum	Maximum	Default
14740~14741	Spindle 2 rotation speed to be valid when the system is initialized	0	100000	1000
			Format	Unit
			0	rpm

PRM371: Spindle 2 analog output offset value

Address	Description	Minimum	Maximum	Default
14742~14743	Spindle 1 analog output offset value	0	3	0
			Format	Unit
			0	

0: CW(+), CCW(-)

1: CW(-), CCW(+)

2: CW(+), CCW(+)

3: CW(-), CCW(-)

PRM372: Spindle 2 minimum analog output value

Address	Description	Minimum	Maximum	Default
14744~14745	Spindle 2 minimum analog output value	0	16383	0
			Format	**Unit**
			0	

PRM373: Spindle 2 maximum analog output value

Address	Description	Minimum	Maximum	Default
14746~14747	Spindle 2 maximum analog output value	1	16383	2000
			Format	**Unit**
			0	

PRM374: Spindle 2 analog output offset value

Address	Description	Minimum	Maximum	Default
14748~14749	Spindle 2 analog output offset value	-1000	1000	0
			Format	**Unit**
			0	

PRM375: Spindle 2 maximum rotation speed

Address	Description	Minimum	Maximum	Default
14750~14751	Spindle 2 maximum rotation speed	0	100000	1000
			Format	**Unit**
			0	rpm

PRM382: Spindle 2 acceleration/deceleration time

Address	Description	Minimum	Maximum	Default
14764~14765	Spindle 2 acceleration/deceleration time	1	30000	1000
			Format	**Unit**
			0	ms

8.17.61. PRM400-PRM405: Resuming the Program from the Middle and Simulation

Pulser3 has the ability to start scanning from the middle of a processed program. The resume program start point is created when one of the five conditions is met.:

- when the automatic operation is paused/stopped
- when an alarm occurs during automatic operation
- when the reset button is pressed during automatic operation
- when the emergency stop button is pressed during automatic operation
- when power is lost during automatic operation

The resume start point is stored in memory until automatic operation is restarted or another G-code file is selected. A request to move to this point is indicated by the p_RESUME signal. Before activating the signal, the automatic operation mode must be selected. Once the signal is activated, the system scans the selected program from the beginning until the line where automatic operation was stopped. During the scan, no movement commands are processed. If any of the M-codes specified in PRM403-PRM405 parameters are encountered during the scanning process, the spindle's last rotation direction is saved in memory. After the scan is completed, the O9009.cnc subprogram is called. This subprogram should be prepared to move the axes to the last position reached and, if necessary, operate the spindle or plasma unit. Upon the return from this subprogram, the system continues its normal operation.

PRM400: Resume function

Address	Description	Minimum	Maximum	Default
14800~14801	Resume function	0	1	0
			Format	**Unit**
			0	

0: Disabled

1: Enabled

When this parameter is set to 0, if the cursor is not at the beginning of the G-code file and automatic operation is started, the program will begin by executing the current line. When this parameter is set to 1, if the cursor is not at the beginning of the G-code file and automatic operation is started, the selected G-code file will be scanned from the beginning up to the line where the cursor is located, with movement commands being skipped. After the O9009.cnc subprogram is called, the line where the cursor is located will be executed, and operation will continue.

PRM402: Resume function pause mode selection

Address	Description	Minimum	Maximum	Default
14804~14805	Resume function pause mode selection	0	2	0
			Format	Unit
			0	

0: Pause

1: Pause -> Stop

2: Stop

PRM403: Resume function for spindle CW M code

Address	Description	Minimum	Maximum	Default
14806~14807	Resume function for spindle CW M code	-1	9999	3
			Format	Unit
			0	

PRM404: Resume function for spindle CCW M code

Address	Description	Minimum	Maximum	Default
14808~14809	Resume function for spindle CCW M code	-1	9999	4
			Format	Unit
			0	

PRM405: Resume function for spindle STOP M code

Address	Description	Minimum	Maximum	Default
14810~14811	Resume function for spindle STOP M code	-1	9999	5
			Format	Unit
			0	

8.17.62. PRM410-PRM413: G00.1 (Ping-Pong Motion) Parameters

The G00.1 command is used to move axes rapidly from their current position to another position. Unlike the G00 command, it adapts the motion of the hole axis to form an arc during the movement. The G00.1 command operates as follows:

- The hole axis is raised by the value of PRM411 from its current position
- If the distance from the current position of the X and Y axes to the target position is less than or equal to PRM410, the Z axis will perform an arc motion, being PRM412 units above the point where the Z axis is at the exact midpoint of the movement
- If the distance from the current position of the X and Y axes to the target position is greater than PRM410, the Z axis is raised to the position specified by PRM413, and the XY movement is performed. After the XY movement is completed, the Z axis is lowered to the position where it started its movement.

PRM410: G00.1 arc motion distance

Address	Description	Minimum	Maximum	Default
14820~14821	G00.1 arc motion distance	-2000000000	2000000000	2000000
			Format	**Unit**
			0.0000	mm/inch

PRM411: G00.1 retract distance before rapid motion

Address	Description	Minimum	Maximum	Default
14822~14823	G00.1 retract distance before rapid motion	-2000000000	2000000000	100000
			Format	**Unit**
			0.0000	mm/inch

PRM412: G00.1 chordal length of arc motion

Address	Description	Minimum	Maximum	Default
14824~14825	G00.1 chordal length of arc motion	-2000000000	2000000000	100000
			Format	**Unit**
			0.0000	mm/inch

PRM413: G00.1 safe position for arc motion (machine value)

Address	Description	Minimum	Maximum	Default
14826~14827	G00.1 safe position for arc motion (machine value)	-2000000000	2000000000	0
			Format	**Unit**
			0.0000	mm/inch

8.17.63. PRM415-PRM417: Pen/Cutting knife control

PRM415: Automatic pen up-down control for plotter/cutter tables

Address	Description	Minimum	Maximum	Default
14830~14831	Automatic pen up-down control for plotter/cutter tables	0	1	0
			Format	**Unit**
			0	

0: Disabled

1: Enabled

PRM416: Cutting knife plane selection

Address	Description	Minimum	Maximum	Default
14832~14833	Cutting knife plane selection	0	3	0
			Format	**Unit**
			0	

0: Depends on active selected plane

1: Always apply the XY plane

2: Always apply the ZX plane

3: Always apply the YZ plane

PRM417: Cutting knife continuous cutting angle

Address	Description	Minimum	Maximum	Default
14834~14835	Cutting knife continuous cutting angle	0	3599999	1000
			Format	**Unit**
			0.0000	derece

8.17.64. PRM420-PRM426: 2D tool path creation in HMI projects

Pulser3 can be operated with both industrial computers and industrial HMIs. This parameter group is only required in projects using HMI. When HSC Studio software is used, this parameter group should be disabled. The tool path graphic information is saved in a file named gfx.dat after selecting the G-code file. On the HMI side, this file should be interpreted and the tool path graphic should be displayed.

PRM420: Graphics plane selection for HMIs

Address	Description	Minimum	Maximum	Default
14840~14841	Graphics plane selection for HMIs	0	3	0
			Format	**Unit**
			0	

0: Disabled

1: The graphic is created according to the XY plane

2: The graphic is created according to the ZX plane

3: The graphic is created according to the YZ plane

PRM421-PRM426: Axis limit values for toolpath graphics

Address	Description	Unit
14842~14843	Toolpath graphic X-axis minimum value	mm/inch
14844~14845	Toolpath graphic X-axis maximum value	**Minimum**
14846~14847	Toolpath graphic Y-axis minimum value	-32768
14848~14849	Toolpath graphic Y-axis maximum value	**Maximum**
14850~14851	Toolpath graphic Z-axis minimum value	32767
14852~14853	Toolpath graphic Z-axis maximum value	**Default**
		0
		Format
		0

8.17.65. PRM430-PRM439: Lathe software parameters

PRM430: Diameter programming

Address	Description	Minimum	Maximum	Default
14860~14861	Radius/diameter programming mode selection	0	1	0
			Format	**Unit**
			0	

0: Radius programming mode

1: Diameter programming mode

8.18. System Parameters

8.18.0. SPRM0-SPRM7: Axis name and type selection

With these parameters, the names and types of axes used in the machine are assigned. The assignment must start from SPRM0 and proceed sequentially, with unused axes set to a value of 0. Although the names and types of the first three axes can be changed for flexibility, it is recommended to set them as X, Y, and Z. If a different configuration is applied, circular interpolation and some plane-based functions may not work properly.

For a lathe machine, the names of the first three axes must be set as X, Y, and Z. The Y-axis slot number is set to 0 and left as a virtual axis.

Auxiliary axes must be defined after the main axes, such as X, Y, Z, A, X2, Y2. The software limits for auxiliary axes are disabled, and they operate according to the limit values of the main axis.

Axes named as X-ROT indicate that they are rotary axes but specify that the rotary axis has a limit. Software limits are active, and the given commands are processed as they are.

Axes named as x-ROT/Spindle indicate that they are rotary axes without limits for continuous rotation. Software limits are disabled for this type of axis. Additionally, commands given within the range of 0-360 are positioned from the nearest point of the rotation, regardless of the absolute coordinate. These axes can also operate as spindles and can switch between axis and spindle modes.

In the Pulser3-PLSE model, these parameters should be set sequentially as X, Y, Z, and the 4th axis name. None of the first four axis names should be set to "0". The 5th, 6th, 7th, and 8th axis names, however, should be set to "0".

Address	Description	Unit
15000~15001	Name of X axis	0
15002~15003	Name of Y axis	**Minimum**
15004~15005	Name of Z axis	0
15006~15007	Name of 4th axis	**Maximum**
15008~15009	Name of 5th axis	34
15010~15011	Name of 6th axis	**Default**
15012~15013	Name of 7th axis	1,2,3,0,0,0
15014~15015	Name of 8th axis	**Format**
		0

Axis name and type selection table:

Value	Axis name and type	Linear/Rotary	Spindle Mode	Software Limits
0	Disabled	-	-	-
1	X	Linear	No	Active
2	Y	Linear	No	Active
3	Z	Linear	No	Active
4	X2 (Gantry slave)	Linear	No	Inactive
5	Y2 (Gantry slave)	Linear	No	Inactive
6	Z2 (Gantry slave)	Linear	No	Inactive
7	A	Linear	No	Active
8	B	Linear	No	Active
9	C	Linear	No	Active
10	U	Linear	No	Active
11	V	Linear	No	Active
12	W	Linear	No	Active
13	A-ROT	Rotary	No	Active
14	B-ROT	Rotary	No	Active
15	C-ROT	Rotary	No	Active
16	A-ROT/Spindle	Rotary	Yes	Inactive
17	B-ROT/Spindle	Rotary	Yes	Inactive
18	C-ROT/Spindle	Rotary	Yes	Inactive
19	E (Extruder)	Linear	No	Active
20	X-ROT	Rotary	No	Active
21	Y-ROT	Rotary	No	Active
22	Z-ROT	Rotary	No	Active
23	X-ROT/Spindle	Rotary	Yes	Inactive
24	Y-ROT/Spindle	Rotary	Yes	Inactive
25	Z-ROT/Spindle	Rotary	Yes	Inactive
26	A2 (Gantry slave)	Rotary	No	Inactive
27	B2 (Gantry slave)	Rotary	No	Inactive
28	C2 (Gantry slave)	Rotary	No	Inactive
29	U2 (Gantry slave)	Rotary	No	Inactive
30	V2 (Gantry slave)	Rotary	No	Inactive
31	W2 (Gantry slave)	Rotary	No	Inactive
32	A-TAN	Rotary	Yes	Inactive
33	B-TAN	Rotary	Yes	Inactive
34	C-TAN	Rotary	Yes	Inactive

8.18.1. SPRM8-SPRM15: Axis Slot (Sequence) Number

In the Pulser3-RTEX and Pulser3-ECAT models, the communication cable for the servos starts from the controller and is sequentially connected to the axis drivers. In this connection, which axis is assigned to which driver is determined by the parameters below. In the Pulser3-PLSE model, these sequence numbers should be set as 1, 2, 3, 4, 0, 0 in order.

Address	Description	Unit
15016~15017	Driver ID of X axis	0
15018~15019	Driver ID of Y axis	**Minimum**
15020~15021	Driver ID of Z axis	0
15022~15023	Driver ID of 4th axis	**Maximum**
15024~15025	Driver ID of 5th axis	8
15026~15027	Driver ID of 6th axis	**Default**
15028~15029	Driver ID of 7th axis	1,2,3,0,0,0
15030~15031	Driver ID of 8th axis	**Format**
		0

8.18.2. SPRM16-SPRM19: RS485 port usage mode and settings

SPRM16: RS485 port baud rate

Address	Description	Minimum	Maximum	Default
15032~15033	RS485 port baud rate	0	500000	0
			Format	**Unit**
			0	

n <= 0: 19200

0 > n < 1200: 1200

1200 >= n <= 500000: n

SPRM17: RS485 Port bit length

Address	Description	Minimum	Maximum	Default
15034~15035	RS485 Port bit length	0	1	0
			Format	**Unit**
			0	

0: 8 bit

1: 7 bit

SPRM18: RS485 Port parity and stop bit selection

Address	Description	Minimum	Maximum	Default
15036~15037	RS485 Port parity and stop bit selection	0	5	0
			Format	**Unit**
			0	

0: Parity: None / Stop bit: 1

1: Parity: Even / Stop bit: 1

2: Parity: Odd / Stop bit: 1

3: Parity: None / Stop bit: 2

4: Parity: Even / Stop bit: 2

5: Parity: Odd / Stop bit: 2

SPRM19: RS485 Port operation mode

Address	Description	Minimum	Maximum	Default
15038~15039	RS485 Port operation mode	0	3	0
			Format	Unit
			0	

0: Disable

1: Automatic communication with the machine panel (MP1) in the background

2: The port is used by the internal PLC with the Modbus RTU master protocol

3: The port is used by the internal PLC with the Modbus ASCII master protocol.

8.18.3. SPRM20: Delay time to recover servo bus after ESP released

When the emergency stop (ESP) line is active and the real-time communication bus with the servo drives is lost, the real-time communication bus will be attempted to be re-established after the time specified in this parameter. If the parameter value is set to 0, this feature is disabled.

Address	Description	Minimum	Maximum	Default
15040~15041	Delay time to recover servo bus after ESP released	0	100000	0
			Format	Unit
			0	ms

8.18.4. SPRM21: CAN bus port mode

Address	Description	Minimum	Maximum	Default
15042~15043	CAN bus port mode	0	2	0
			Format	Unit
			0	

0: Used for standard IO communication

1: Pulse output is used as master for axes 5-8

2: For axes 5 to 8, pulse output is used as a slave

8.18.5. SPRM22: Read SKIP signal from input directly

The SKIP signal is transmitted to the system using ladder programming with HSC Studio. However, as the PLC cycle time increases, delays in transmitting the SKIP signal may occur. To eliminate these delays, any internal digital input can be selected as the SKIP signal source using the parameter below.

Address	Description	Minimum	Maximum	Default
15044~15045	Read SKIP signal from input directly	0	229	0
			Format	**Unit**
			0	

0: Disabled

1xx: 1 = Normally open contact, xx = Digital input number. Example: 105 for X5.

2xx: 2 = Normally closed contact, xx = Digital input number. Example: 205 for X5.

8.18.6. SPRM23: Copy spindle analog value to the analog output directly

The speed command given for Spindle 1 is converted to an analog value and loaded into the c_SOUT variable, and the user is expected to transfer this value to the analog output using a MOV command. However, if positioning(orientation) is to be used, especially for Spindle 1, delays may occur due to the PLC cycle time, which could lead to inaccurate positioning. In such applications, the spindle 1 analog output value calculated by this parameter can be directly copied to the internal analog output. When this parameter is activated, any loads to the AOUT0 address in the PLC program will be invalid.

Address	Description	Minimum	Maximum	Default
15046~15047	Copy spindle 1 analog output value directly to the built-in analog output	0	1	0
			Format	**Unit**
			0	

0: Disable

1: Enable

8.18.7. SPRM24-SPRM31: Absolute working mode for axes

When an axis is intended to be operated in absolute mode, this can be set using these parameters. The axis to be operated in absolute mode must have a battery connection to its driver (if required), and the necessary settings for absolute operation must be configured. For axes operated in absolute mode, the system reads its position as soon as communication with the driver is established and stores this position as the current machine position in memory. Each time the system is powered off and on, this information is read from the driver. Additionally, when axes are operated in absolute mode, the software limits for the axis are activated without the need for a reference operation.

Address	Description	Unit
15048~15049	Absolute encoder selection for X axis	0
15050~15051	Absolute encoder selection for Y axis	**Minimum**
15052~15053	Absolute encoder selection for Z axis	0
15054~15055	Absolute encoder selection for 4th axis	**Maximum**
15056~15057	Absolute encoder selection for 5th axis	1
15058~15059	Absolute encoder selection for 6th axis	**Default**
15061~15063	Absolute encoder selection for 7th axis	0
15064~15065	Absolute encoder selection for 8th axis	**Format**
		0

0: The axis operates in standard mode. Software limits are activated after the reference process.

1: The axis operates in absolute mode, requiring no reference process. Software limits are always active.

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8.18.8. SPRM32-SPRM41: External IO Module Selection

Pulser3, in addition to the built-in 20DI/16DO digital IO points, can control more IO points with external expansion modules. Up to 10 external modules can be connected to the device. These modules are controlled via the internal CAN-BUS line. Depending on the connection, the module's sequence number should be set using the buttons on each external module. The sequence number should start from 1 and continue sequentially. At the end of the line, the CAN-BUS termination switch of the remaining modules should be activated, while the switches for the intermediate modules should be turned off.

Address	Description	Unit
15064~15065	Enable external IO module 1	0
15066~15067	Enable external IO module 2	**Minimum**
15068~15069	Enable external IO module 3	0
15070~15071	Enable external IO module 4	**Maximum**
15072~15073	Enable external IO module 5	1
15074~15075	Enable external IO module 6	**Default**
15076~15077	Enable external IO module 7	0
15078~15079	Enable external IO module 8	**Format**
15080~15081	Enable external IO module 9	0
15082~15083	Enable external IO module 10	

0: No external IO module

1: External IO module present

8.18.9. SPRM50: Machine Type

Pulser3 core software is designed for milling machines, but it also contains different software versions or uses for other machine types. The standard software includes embedded features for turning models as well. This parameter informs the system whether the machine being installed is a milling or turning machine. When the milling model is selected, up to 100 tool offset values can be used, while only up to 50 tool offset values are available when the turning model is selected. Although the tool offset memory is shared between the milling and lathe models, the values have different meanings. Please review the values in the tool offset section.

Address	Description	Minimum	Maximum	Default
15100~15101	Machine Type	0	5555	0
			Format	**Unit**
			0	

0: Milling

5555: Lathe

8.18.10. SPRM56-SPRM63: Direct connection of DEC signals to inputs

The p_DECx signal is transmitted to the system using ladder programming in HSC Studio. However, as the PLC cycle time increases, delays in transmitting p_DECx signals may occur. To eliminate these delays, any internal digital input can be selected as the p_DECx signal source using the parameter below.

Address	Description	Minimum	Maximum	Default
15112~15113	Read DEC signal from input directly for X axis	0	229	0
15114~15115	Read DEC signal from input directly for Y axis	0	229	0
15116~15117	Read DEC signal from input directly for Z axis	0	229	0
15118~15119	Read DEC signal from input directly for 4th axis	0	229	0
15120~15121	Read DEC signal from input directly for 5th axis	0	229	0
15122~15123	Read DEC signal from input directly for 6th axis	0	229	0
15124~15125	Read DEC signal from input directly for 7th axis	0	229	0
15126~15127	Read DEC signal from input directly for 8th axis	0	229	0
			Format	**Unit**
			0	

0: Disabled

1xx: 1 = Normally open contact, xx = digital input number. Example: 105 for X5

2xx: 2 = Normally closed contact, xx = digital input number. Example: 205 for X5.

8.18.11. SPRM64-SPRM71: Masking of servo alarms

This parameter allows servo alarms of the axes to be masked and ignored. Even if the servo enters an alarm state, the system will not generate an alarm and will continue to operate. This feature is intended for testing purposes and for using stepper motors in the Pulser3-PLSE model. After the test is completed, it must be disabled. If left enabled and one of the axes enters an alarm state, the machine will continue operating, potentially causing collisions with the processed part or other parts of the machine, leading to significant material damage and/or serious injuries.

Address	Description	Unit
15128~15129	Disable the 'servo not ready' alarm for X axis	0
15130~15131	Disable the 'servo not ready' alarm for Y axis	**Minimum**
15132~15133	Disable the 'servo not ready' alarm for Z axis	0
15134~15135	Disable the 'servo not ready' alarm for 4th axis	**Maximum**
15136~15137	Disable the 'servo not ready' alarm for 5th axis	1
15138~15139	Disable the 'servo not ready' alarm for 6th axis	**Default**
15140~15141	Disable the 'servo not ready' alarm for 7th axis	0
15142~15143	Disable the 'servo not ready' alarm for 8th axis	**Format**
		0

0: Servo alarms enabled

1: Disable servo alarms

8.18.12. SPRM80: Waiting time before servo alarm

When a servo alarm occurs on any axis, the delay value to transition the system into an alarm state is set.

Address	Description	Minimum	Maximum	Default
15160~15161	Delay before 'servo not ready' alarm	0	10000	500
			Format	**Unit**
			0	ms

8.18.13. SPRM81: Modbus TCP communication timeout duration

After the communication between an industrial PC or HMI and Pulser3 via Modbus TCP is established and then terminated or interrupted, the timeout period for control is set. Once the connection is lost, after the duration specified in this parameter, the c_TOUT bit will be set to '1', notifying the internal PLC that the connection is lost and necessary actions should be taken. In the internal PLC section, it is recommended to take precautions such as stopping automatic operation, disabling the motion command source signals, and turning off the spindle/laser light/plasma fire.

Address	Description	Minimum	Maximum	Default
15162~15163	Modbus TCP communication timeout	0	10000	100
			Format	**Unit**
			0	ms

8.18.14. SPRM82-SPRM97: Ethernet Port IP Settings

The IP settings for the internal Ethernet port on Pulser3 can be configured using the following parameters. The default Ethernet settings for Pulser3 are as follows::

Default IP address: **192.168.1.100**

Default subnet mask: **255.255.255.0**

Default gateway: **192.168.1.1**

If an HMI is used as the interface and the G-code download operation is to be performed using the HMI's FTP host feature, the IP address of the HMI should be entered in the SPRM94-SPRM97 parameters. If these parameter values are left as 0, Pulser3 will attempt to connect to the address 192.168.1.231. Pulser3 will connect to the FTP host using port 21 and try to download the requested file. The user credentials and file path used for this connection are as follows:

Username: **uploadhis**

Password: **111111**

File path : **/usbdisk/disk_a_1/**

Address	Description	Unit
15164~15165	IP address byte 3	0
15166~15167	IP address byte 2	**Minimum**
15168~15169	IP address byte 1	0
15170~15171	IP address byte 0	**Maximum**
15172~15173	Subnet mask byte 3	255
15174~15175	Subnet mask byte 2	**Default**
15176~15177	Subnet mask byte 1	0
15178~15179	Subnet mask byte 0	**Format**
15180~15181	Default gateway byte 3	0
15182~15183	Default gateway byte 2	
15184~15185	Default gateway byte 1	
15186~15187	Default gateway byte 0	
15188~15189	FTP host IP address byte 3	
15190~15191	FTP host IP address byte 3	
15192~15193	FTP host IP address byte 3	
15194~15195	FTP host IP address byte 3	

8.18.15. SPRM100-SPRM149: Kinematic Parameters

Address	Description	Minimum	Maximum	Default
15200~15201	Kinematics Type	0	0	0
15202~15203	Kinematics Parameter 1	-999999999	999999999	
15204~15205	Kinematics Parameter 2	-999999999	999999999	
15206~15207	Kinematics Parameter 3	-999999999	999999999	
15208~15209	Kinematics Parameter 4	-999999999	999999999	
15210~15211	Kinematics Parameter 5	-999999999	999999999	
15212~15213	Kinematics Parameter 6	-999999999	999999999	
15214~15215	Kinematics Parameter 7	-999999999	999999999	
15216~15217	Kinematics Parameter 8	-999999999	999999999	
15218~15219	Kinematics Parameter 9	-999999999	999999999	
15220~15221	Kinematics Parameter 10	-999999999	999999999	
15222~15223	Kinematics Parameter 11	-999999999	999999999	
15224~15225	Kinematics Parameter 12	-999999999	999999999	
15226~15227	Kinematics Parameter 13	-999999999	999999999	
15228~15229	Kinematics Parameter 14	-999999999	999999999	
15230~15231	Kinematics Parameter 15	-999999999	999999999	
15232~15233	Kinematics Parameter 16	-999999999	999999999	
15234~15235	Kinematics Parameter 17	-999999999	999999999	
15236~15237	Kinematics Parameter 18	-999999999	999999999	
15238~15239	Kinematics Parameter 19	-999999999	999999999	
15240~15241	Kinematics Parameter 20	-999999999	999999999	
15242~15243	Kinematics Parameter 21	-999999999	999999999	
15244~15245	Kinematics Parameter 22	-999999999	999999999	
15246~15247	Kinematics Parameter 23	-999999999	999999999	
15248~15249	Kinematics Parameter 24	-999999999	999999999	
15250~15251	Kinematics Parameter 25	-999999999	999999999	
15252~15253	Kinematics Parameter 26	-999999999	999999999	
15254~15255	Kinematics Parameter 27	-999999999	999999999	
15256~15257	Kinematics Parameter 28	-999999999	999999999	
15258~15259	Kinematics Parameter 29	-999999999	999999999	
15260~15261	Kinematics Parameter 30	-999999999	999999999	
15262~15263	Kinematics Parameter 31	-999999999	999999999	
15264~15265	Kinematics Parameter 32	-999999999	999999999	
15266~15267	Kinematics Parameter 33	-999999999	999999999	
15268~15269	Kinematics Parameter 34	-999999999	999999999	
15270~15271	Kinematics Parameter 35	-999999999	999999999	
15272~15273	Kinematics Parameter 36	-999999999	999999999	
15274~15275	Kinematics Parameter 37	-999999999	999999999	
15276~15277	Kinematics Parameter 38	-999999999	999999999	
15278~15279	Kinematics Parameter 39	-999999999	999999999	
15280~15281	Kinematics Parameter 40	-999999999	999999999	
15282~15283	Kinematics Parameter 41	-999999999	999999999	
15284~15285	Kinematics Parameter 42	-999999999	999999999	
15286~15287	Kinematics Parameter 43	-999999999	999999999	
15288~15289	Kinematics Parameter 44	-999999999	999999999	
15290~15291	Kinematics Parameter 45	-999999999	999999999	
15292~15293	Kinematics Parameter 46	-999999999	999999999	
15294~15295	Kinematics Parameter 47	-999999999	999999999	
15296~15297	Kinematics Parameter 48	-999999999	999999999	
15298~15299	Kinematics Parameter 49	-999999999	999999999	

8.18.16. SPRM200-SPRM499: EtherCAT Parameters

This parameter group is only applicable to the Pulser3-ECAT model and has no functionality in other models. In the standard software of Pulser3-ECAT, PDO maps are fixed. The addresses of these objects can be modified; however, the map itself cannot be changed. The system performs the homing process using the touch probe feature, which must be supported by the drive in use. The standard PDO maps are as follows:

RXPDO Assignment Address: 0x1C12

0x1600: RXPDO		
Address	**Description**	**Data type**
0x6040	Control Word	UINT16
0x6060	Mode Of Operation	UINT8
0x607A	Target Position	INT32
0x60FF	Target Velocity	INT32
0x6072	Maximum Torque	UINT16
0x60B8	Touch Probe Function	UINT16

TXPDO Assignment Address: 0x1C13

0x1A00: TXPDO		
Address	**Description**	**Data type**
0x6041	Status Word	UINT16
0x6061	Mode Of Operation Display	UINT8
0x6064	Actual Position	INT32
0x606C	Actual Velocity	INT32
0x6077	Actual Torque	INT16
0x60B9	Touch Probe Status	UINT16
0x60BA	Touch Probe Latch Value	INT32
0x603F	Error Code	UINT16

Control Word Content:

Address		Description							
0x6040		**Control Word**							
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
		fr				eo	qs	ev	so

Bit15

Bit14

Bit13

Bit12

Bit11

Bit10

Bit9

Bit8

Bit7 **fr**: Fault reset

Bit6

Bit5

Bit4

Bit3 **eo**: Enable operation

Bit2 **qs**: Quick stop

Bit1 **ev**: Enable voltage

Bit0 **so**: Switch on

Status Word Content:

Address			Description						
0x6041			**Status Word**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
			sod	qs	ve	f	oe	so	rtso

Bit15

Bit14

Bit13

Bit12

Bit11

Bit10

Bit9

Bit8

Bit7

Bit6 **sod**: Switch on disabled

Bit5 **qs**: Quick stop

Bit4 **ve**: Voltage enabled

Bit3 **f**: Fault

Bit2 **oe**: Operation enabled

Bit1 **so**: Switched on

Bit0 **rtso**: Ready to switch on

Touch Probe Function Contents:

Address			Description						
0x60B8			**Touch Probe Function**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
				ene	epe		tz	ct	etb1

Bit15

Bit14

Bit13

Bit12

Bit11

Bit10

Bit9

Bit8

Bit7

Bit6

Bit5 **ene**: Enable sampling at negative edge

Bit4 **epe**: Enable sampling at positive edge

Bit3

Bit2 **tz**: 0: Trigger with touch probe 1 input / 1: Trigger with Z phase of encoder

Bit1 **ct**: 0: Trigger first event / 1: Continuous

Bit0 **etb1**: 0: Switch off touch probe 1 / 1: Enable touch probe 1

Touch Probe Status Contents:

Address			Description						
0x60B9			**Touch Probe Status**						
Bit	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	
	Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
							nes	pes	ten

Bit15

Bit14

Bit13

Bit12

Bit11

Bit10

Bit9

Bit8

Bit7

Bit6

Bit5

Bit4

Bit3

Bit2 **nes**: Touch probe 1 positive edge value stored

Bit1 **pes**: Touch probe 1 positive edge value stored

Bit0 **ten**: Touch probe 1 is enabled

SPRM200-SPRM279: Axis Servo Drive Names

These parameters specify the names of the axis servos. If a name is specified for any servo, the system compares this name with the one in the drive during the first communication. If the names in the system and in the drive do not match, real-time communication will not be initiated. If this parameter group is left as 0, the comparison will not be performed.

Address	Description	Unit
15400~15419	The name of the servo driver for axis 1	ASCII in HEX
15420~15439	The name of the servo driver for axis 2	**Minimum**
15440~15459	The name of the servo driver for axis 3	0
15460~15479	The name of the servo driver for axis 4	**Maximum**
15480~15499	The name of the servo driver for axis 5	255
15500~15519	The name of the servo driver for axis 6	**Default**
15520~15539	The name of the servo driver for axis 7	0
15540~15559	The name of the servo driver for axis 8	**Format**
		0

SPRM280-SPRM287: RXPDO Assignment Addresses

Address	Description	Unit
15560~15561	The RXPDO assignment address of axis 1	HEX
15562~15563	The RXPDO assignment address of axis 2	**Minimum**
15564~15565	The RXPDO assignment address of axis 3	0
15566~15567	The RXPDO assignment address of axis 4	**Maximum**
15568~15569	The RXPDO assignment address of axis 5	0xFFFF
15570~15571	The RXPDO assignment address of axis 6	**Default**
15572~15573	The RXPDO assignment address of axis 7	0x1C12
15574~15575	The RXPDO assignment address of axis 8	**Format**

SPRM288-SPRM295: TXPDO Assignment Addresses

Address	Description	Unit
15576~15577	The TXPDO assignment address of axis 1	HEX
15578~15579	The TXPDO assignment address of axis 2	**Minimum**
15580~15581	The TXPDO assignment address of axis 3	0
15582~15583	The TXPDO assignment address of axis 4	**Maximum**
15584~15585	The TXPDO assignment address of axis 5	0xFFFF
15586~15587	The TXPDO assignment address of axis 6	**Default**
15588~15589	The TXPDO assignment address of axis 7	0x1C13
15590~15591	The TXPDO assignment address of axis 8	**Format**

SPRM296-SPRM303: RXPDO Addresses

Address	Description	Unit
15592~15593	The RXPDO address of axis 1	HEX
15594~15595	The RXPDO address of axis 2	**Minimum**
15596~15597	The RXPDO address of axis 3	0
15598~15599	The RXPDO address of axis 4	**Maximum**
15600~15601	The RXPDO address of axis 5	0xFFFF
15602~15603	The RXPDO address of axis 6	**Default**
15604~15605	The RXPDO address of axis 7	0x1600
15606~15607	The RXPDO address of axis 8	**Format**

SPRM304-SPRM311: TXPDO Addresses

Address	Description	Unit
15608~15609	The TXPDO address of axis 1	HEX
15610~15611	The TXPDO address of axis 2	**Minimum**
15612~15613	The TXPDO address of axis 3	0
15614~15615	The TXPDO address of axis 4	**Maximum**
15616~15617	The TXPDO address of axis 5	0xFFFF
15618~15619	The TXPDO address of axis 6	**Default**
15620~15621	The TXPDO address of axis 7	0x1A00
15622~15623	The TXPDO address of axis 8	**Format**

SPRM312-SPRM319: Control Word Address and Data Types

Address	Description	Unit
15624~15625	The control word address and data type of axis 1	HEX
15626~15627	The control word address and data type of axis 2	**Minimum**
15628~15629	The control word address and data type of axis 3	0xFFFFFFFF
15630~15631	The control word address and data type of axis 4	**Maximum**
15632~15633	The control word address and data type of axis 5	0x7FFFFFFF
15634~15635	The control word address and data type of axis 6	**Default**
15636~15637	The control word address and data type of axis 7	0x60400010
15638~15639	The control word address and data type of axis 8	**Format**

High 16 bit: Control Word adress

Low 16 bit: Data type

SPRM320-SPRM327: Operation mode address and data types

Address	Description	Unit
15640~15641	Mode of operation address and data type of axis 1	HEX
15642~15643	Mode of operation address and data type of axis 2	**Minimum**
15644~15645	Mode of operation address and data type of axis 3	0xFFFFFFFF
15646~15647	Mode of operation address and data type of axis 4	**Maximum**
15648~15649	Mode of operation address and data type of axis 5	0x7FFFFFFF
15650~15651	Mode of operation address and data type of axis 6	**Default**
15652~15653	Mode of operation address and data type of axis 7	0x60600008
15654~15655	Mode of operation address and data type of axis 8	**Format**

High 16 bit: Address for writing the mode of operation

Low 16 bit: Data type

SPRM328-SPRM335: Target position address and data types

Address	Description	Unit
15656~15657	Target position address and data type of axis 1	HEX
15658~15659	Target position address and data type of axis 2	**Minimum**
15660~15661	Target position address and data type of axis 3	0xFFFFFFFF
15662~15663	Target position address and data type of axis 4	**Maximum**
15664~15665	Target position address and data type of axis 5	0x7FFFFFFF
15666~15667	Target position address and data type of axis 6	**Default**
15668~15669	Target position address and data type of axis 7	0x607A0020
15670~15671	Target position address and data type of axis 8	**Format**

High 16 bit: Address to write the target position

Low 16 bit: Data type

SPRM336-SPRM343: Target velocity address and data type

Address	Description	Unit
15672~15673	Target velocity address and data type of axis 1	HEX
15674~15675	Target velocity address and data type of axis 2	**Minimum**
15676~15677	Target velocity address and data type of axis 3	0xFFFFFFFF
15678~15679	Target velocity address and data type of axis 4	**Maximum**
15680~15681	Target velocity address and data type of axis 5	0x7FFFFFFF
15682~15683	Target velocity address and data type of axis 6	**Default**
15684~15685	Target velocity address and data type of axis 7	0x60FF0020
15686~15687	Target velocity address and data type of axis 8	**Format**

High 16 bit: Address to write the target velocity

Low 16 bit: Data type

SPRM344-SPRM351: Maximum torque address and data type

Address	Description	Unit
15688~15689	Maximum torque address and data type of axis 1	HEX
15690~15691	Maximum torque address and data type of axis 2	**Minimum**
15692~15693	Maximum torque address and data type of axis 3	0xFFFFFFFF
15694~15695	Maximum torque address and data type of axis 4	**Maximum**
15696~15697	Maximum torque address and data type of axis 5	0x7FFFFFFF
15698~15699	Maximum torque address and data type of axis 6	**Default**
15700~15701	Maximum torque address and data type of axis 7	0x60720010
15702~15703	Maximum torque address and data type of axis 8	**Format**

High 16 bit: Address to write the maximum torque

Low 16 bit: Data type

SPRM352-SPRM359: Touch Probe Control address and data types

Address	Description	Unit
15704~15705	Touch probe control address and data type of axis 1	HEX
15706~15707	Touch probe control address and data type of axis 2	**Minimum**
15708~15709	Touch probe control address and data type of axis 3	0xFFFFFFFF
15710~15711	Touch probe control address and data type of axis 4	**Maximum**
15712~15713	Touch probe control address and data type of axis 5	0x7FFFFFFF
15714~15715	Touch probe control address and data type of axis 6	**Default**
15716~15717	Touch probe control address and data type of axis 7	0x60B80010
15718~15719	Touch probe control address and data type of axis 8	**Format**

High 16 bit: Address to write the touch probe control

Low 16 bit: Data type

SPRM360-SPRM367: Status word address and data types

Address	Description	Unit
15720~15721	Status word address and data type of axis 1	HEX
15722~15723	Status word address and data type of axis 2	**Minimum**
15724~15725	Status word address and data type of axis 3	0xFFFFFFFF
15726~15727	Status word address and data type of axis 4	**Maximum**
15728~15729	Status word address and data type of axis 5	0x7FFFFFFF
15730~15731	Status word address and data type of axis 6	**Default**
15732~15733	Status word address and data type of axis 7	0x60410010
15734~15735	Status word address and data type of axis 8	**Format**

High 16 bit: Address where the status word will be read

Low 16 bit: Data type

SPRM368-SPRM375: Mode of operation monitoring address and data type

Address	Description	Unit
15736~15737	Mode of operation display address and data type of axis 1	HEX
15738~15739	Mode of operation display address and data type of axis 2	**Minimum**
15740~15741	Mode of operation display address and data type of axis 3	0xFFFFFFFF
15742~15743	Mode of operation display address and data type of axis 4	**Maximum**
15744~15745	Mode of operation display address and data type of axis 5	0x7FFFFFFF
15746~15747	Mode of operation display address and data type of axis 6	**Default**
15748~15749	Mode of operation display address and data type of axis 7	0x60610008
15750~15751	Mode of operation display address and data type of axis 8	**Format**

High 16 bit: Address where the mode of operation will be read

High 16 bit: Data type

SPRM376-SPRM383: Actual position address and data type

Address	A Description	Unit
15752~15753	Actual position address and data type of axis 1	HEX
15754~15755	Actual position address and data type of axis 2	**Minimum**
15756~15757	Actual position address and data type of axis 3	0xFFFFFFFF
15758~15759	Actual position address and data type of axis 4	**Maximum**
15760~15761	Actual position address and data type of axis 5	0x7FFFFFFF
15762~15763	Actual position address and data type of axis 6	**Default**
15764~15765	Actual position address and data type of axis 7	0x60640020
15766~15767	Actual position address and data type of axis 8	**Format**

High 16 bit: Address where the actual position is read

Low 16 bit: Data type

SPRM384-SPRM391: Actual speed address and data types

Address	Description	Unit
15768~15769	Actual velocity address and data type of axis 1	HEX
15770~15771	Actual velocity address and data type of axis 2	**Minimum**
15772~15773	Actual velocity address and data type of axis 3	0xFFFFFFFF
15774~15775	Actual velocity address and data type of axis 4	**Maximum**
15776~15777	Actual velocity address and data type of axis 5	0x7FFFFFFF
15778~15779	Actual velocity address and data type of axis 6	**Default**
15780~15781	Actual velocity address and data type of axis 7	0x606C0020
15782~15783	Actual velocity address and data type of axis 8	**Format**

High 16 bit: Address where the actual speed will be read

Low 16 bit: Data type

SPRM392-SPRM399: Actual torque address and data type

Address	Description	Unit
15784~15785	Actual torque address and data type of axis 1	HEX
15786~15787	Actual torque address and data type of axis 2	**Minimum**
15788~15789	Actual torque address and data type of axis 3	0xFFFFFFFF
15790~15791	Actual torque address and data type of axis 4	**Maximum**
15792~15793	Actual torque address and data type of axis 5	0x7FFFFFFF
15794~15795	Actual torque address and data type of axis 6	**Default**
15796~15797	Actual torque address and data type of axis 7	0x60770010
15798~15799	Actual torque address and data type of axis 8	**Format**

High 16 bit: Address where the actual torque will be read

Low 16 bit: Data type

SPRM400-SPRM407: Touch Probe Status Address and Data Type

Address	Description	Unit
15800~15801	Touch probe status address and data type of axis 1	HEX
15802~15803	Touch probe status address and data type of axis 2	**Minimum**
15804~15805	Touch probe status address and data type of axis 3	0xFFFFFFFF
15806~15807	Touch probe status address and data type of axis 4	**Maximum**
15808~15809	Touch probe status address and data type of axis 5	0x7FFFFFFF
15810~15811	Touch probe status address and data type of axis 6	**Default**
15812~15813	Touch probe status address and data type of axis 7	0x60B90010
15814~15815	Touch probe status address and data type of axis 8	**Format**

High 16 bit: Address where the touch probe status will be read

Low 16 bit: Data type

SPRM408-SPRM415: Touch probe value address and data types

Address	Description	Unit
15816~15817	Touch probe value address and data type of axis 1	HEX
15818~15819	Touch probe value address and data type of axis 2	**Minimum**
15820~15821	Touch probe value address and data type of axis 3	0xFFFFFFFF
15822~15823	Touch probe value address and data type of axis 4	**Maximum**
15824~15825	Touch probe value address and data type of axis 5	0x7FFFFFFF
15826~15827	Touch probe value address and data type of axis 6	**Default**
15828~15829	Touch probe value address and data type of axis 7	0x60BA0020
15830~15831	Touch probe value address and data type of axis 8	**Format**

High 16 bit: The address where the touch probe value will be read

Low 16 bit: Data type

SPRM416-SPRM423: Error code monitoring address and data types

Address	Description	Unit
15832~15833	Error code address and data type of axis 1	HEX
15834~15835	Error code address and data type of axis 2	**Minimum**
15836~15837	Error code address and data type of axis 3	0xFFFFFFFF
15838~15839	Error code address and data type of axis 4	**Maximum**
15840~15841	Error code address and data type of axis 5	0x7FFFFFFF
15842~15843	Error code address and data type of axis 6	**Default**
15844~15845	Error code address and data type of axis 7	0x603F0010
15846~15847	Error code address and data type of axis 8	**Format**

High 16 bit: The address where the error code will be read

Low 16 bit: Data type

SPRM424-SPRM431: Cyclic position mode selection value

Address	Description	Unit
15848~15849	Cyclic position mode selection value of axis 1	HEX
15850~15851	Cyclic position mode selection value of axis 2	**Minimum**
15852~15853	Cyclic position mode selection value of axis 3	0x00000000
15854~15855	Cyclic position mode selection value of axis 4	**Maximum**
15856~15857	Cyclic position mode selection value of axis 5	0x000000FF
15858~15859	Cyclic position mode selection value of axis 6	**Default**
15860~15861	Cyclic position mode selection value of axis 7	0x00000008
15862~15863	Cyclic position mode selection value of axis 8	**Format**

SPRM432-SPRM439: Control word bit order

Address	Description	Unit
15864~15865	Control word bit order of axis 1	HEX
15866~15867	Control word bit order of axis 2	**Minimum**
15868~15869	Control word bit order of axis 3	0xFFFFFFFF
15870~15871	Control word bit order of axis 4	**Maximum**
15872~15873	Control word bit order of axis 5	0x7FFFFFFF
15874~15875	Control word bit order of axis 6	**Default**
15876~15877	Control word bit order of axis 7	0x00073210
15878~15879	Control word bit order of axis 8	**Format**

Digit 1: Switch On (so) bit order

Digit 2: Enable Voltage (eo) bit order

Digit 3: Quick Stop (qs) bit order

Digit 4: Enable Operation (eo) bit order

Digit 5: Fault Reset (fr) bit order

SPRM440-SPRM447: Status word bit order

Address	Description	Unit
15880~15881	Status word bit order of axis 1	HEX
15882~15883	Status word bit order of axis 2	**Minimum**
15884~15885	Status word bit order of axis 3	0xFFFFFFFF
15886~15887	Status word bit order of axis 4	**Maximum**
15888~15889	Status word bit order of axis 5	0x7FFFFFFF
15890~15891	Status word bit order of axis 6	**Default**
15892~15893	Status word bit order of axis 7	0x06543210
15894~15895	Status word bit order of axis 8	**Format**

Digit 1: Ready To Switch On (rtso) bit order

Digit 2: Switched On (so) bit order

Digit 3: Operation Enabled (oe) bit order

Digit 4: Fault (f) bit order

Digit 5: Voltage Enabled (ve) bit order

Digit 6: Quick Stop (qs) bit order

Digit 7: Switch On Disabled (sod) bit order

SPRM448-SPRM455: Touch probe diasble/enable values

Address	Description	Unit
15896~15897	Touch probe disable/enable value of axis 1	HEX
15898~15899	Touch probe disable/enable value of axis 2	**Minimum**
15900~15901	Touch probe disable/enable value of axis 3	0xFFFFFFFF
15902~15903	Touch probe disable/enable value of axis 4	**Maximum**
15904~15905	Touch probe disable/enable value of axis 5	0x7FFFFFFF
15906~15907	Touch probe disable/enable value of axis 6	**Default**
15908~15909	Touch probe disable/enable value of axis 7	0x00150000
15910~15911	Touch probe disable/enable value of axis 8	**Format**

High 16 bit: Touch probe activation value

Low 16 bit: Touch probe deactivation value

SPRM456-SPRM463: Touch Probe Status word bit order

Address	Description	Unit
15912~15913	Touch probe status word bit order of axis 1	HEX
15914~15915	Touch probe status word bit order of axis 2	**Minimum**
15916~15917	Touch probe status word bit order of axis 3	0xFFFFFFFF
15918~15919	Touch probe status word bit order of axis 4	**Maximum**
15920~15921	Touch probe status word bit order of axis 5	0x7FFFFFFF
15922~15923	Touch probe status word bit order of axis 6	**Default**
15924~15925	Touch probe status word bit order of axis 7	0x00000010
15926~15927	Touch probe status word bit order of axis 8	**Format**

Digit1: Touch probe activated signal bit order

Digit2: Touch probe value detected signal bit order

SPRM464-SPRM471: Address and data type of the optional SDO1 value to be written

Address	Description	Unit
15928~15929	Address and data type of the optional sdo1 parameter of the axis 1	HEX
15930~15931	Address and data type of the optional sdo1 parameter of the axis 2	**Minimum**
15932~15933	Address and data type of the optional sdo1 parameter of the axis 3	0xFFFFFFFF
15934~15935	Address and data type of the optional sdo1 parameter of the axis 4	**Maximum**
15936~15937	Address and data type of the optional sdo1 parameter of the axis 5	0x7FFFFFFF
15938~15939	Address and data type of the optional sdo1 parameter of the axis 6	**Default**
15940~15941	Address and data type of the optional sdo1 parameter of the axis 7	0x00000000
15942~15943	Address and data type of the optional sdo1 parameter of the axis 8	**Format**

High 16 bit: Index

Bit 8-15: Data type

Bit 0-7 Sub-Index

SPRM472-SPRM479: Address and data type of the optional SDO2 value to be written

Address	Description	Unit
15944~15945	Address and data type of the optional sdo2 parameter of the axis 1	HEX
15946~15947	Address and data type of the optional sdo2 parameter of the axis 2	**Minimum**
15948~15949	Address and data type of the optional sdo2 parameter of the axis 3	0xFFFFFFFF
15950~15951	Address and data type of the optional sdo2 parameter of the axis 4	**Maximum**
15952~15953	Address and data type of the optional sdo2 parameter of the axis 5	0x7FFFFFFF
15954~15955	Address and data type of the optional sdo2 parameter of the axis 6	**Default**
15956~15957	Address and data type of the optional sdo2 parameter of the axis 7	0x00000000
15958~15959	Address and data type of the optional sdo2 parameter of the axis 8	**Format**

High 16 bit: Index

Bit 8-15: Data type

Bit 0-7 Sub-Index

SPRM480-SPRM487: Optional SDO1 value

Address	Description	Unit
15960~15961	Optional sdo1 value of the axis 1	HEX
15962~15963	Optional sdo1 value of the axis 2	**Minimum**
15964~15965	Optional sdo1 value of the axis 3	0xFFFFFFFF
15966~15967	Optional sdo1 value of the axis 4	**Maximum**
15968~15969	Optional sdo1 value of the axis 5	0x7FFFFFFF
15970~15971	Optional sdo1 value of the axis 6	**Default**
15972~15973	Optional sdo1 value of the axis 7	0x00000000
15974~15975	Optional sdo1 value of the axis 8	**Format**

SPRM488-SPRM495: Optional SDO2 value

Address	Description	Unit
15976~15977	Optional sdo2 value of the axis 1	HEX
15978~15979	Optional sdo2 value of the axis 2	**Minimum**
15980~15981	Optional sdo2 value of the axis 3	0xFFFFFFFF
15982~15983	Optional sdo2 value of the axis 4	**Maximum**
15984~15985	Optional sdo2 value of the axis 5	0x7FFFFFFF
15986~15987	Optional sdo2 value of the axis 6	**Default**
15988~15989	Optional sdo2 value of the axis 7	0x00000000
15990~15991	Optional sdo2 value of the axis 8	**Format**

8.19.0. Informatıons Sent From Interpreter To Subprogram

8.19.1. Command values sent from the interpreter to the subprogram

Address	Değişken	Description	Format
16000~16001	#8000	X axis value in the line directed to the subprogram	0.0000
16002~16003	#8001	Y axis value in the line directed to the subprogram	0.0000
16004~16005	#8002	Z axis value in the line directed to the subprogram	0.0000
16006~16007	#8003	4th axis value in the line directed to the subprogram	0.0000
16008~16009	#8004	5th axis value in the line directed to the subprogram	0.0000
16010~16011	#8005	6th axis value in the line directed to the subprogram	0.0000
16012~16013	#8006	7th axis value in the line directed to the subprogram	0.0000
16014~16015	#8007	8th axis value in the line directed to the subprogram	0.0000
16018~16019	#8009	D value in the line directed to the subprogram	0
16020~16021	#8010	F value in the line directed to the subprogram	0.0000
16022~16023	#8011	H value in the line directed to the subprogram	0
16024~16025	#8012	I value in the line directed to the subprogram	0.0000
16026~16027	#8013	J value in the line directed to the subprogram	0.0000
16028~16029	#8014	K value in the line directed to the subprogram	0.0000
16030~16031	#8015	L value in the line directed to the subprogram	0
16032~16033	#8016	M value in the line directed to the subprogram	0
16036~16037	#8018	P value in the line directed to the subprogram	0
16038~16039	#8019	Q value in the line directed to the subprogram	0.0000
16040~16041	#8020	R value in the line directed to the subprogram	0.0000
16042~16043	#8021	S value in the line directed to the subprogram	0
16044~16045	#8022	T value in the line directed to the subprogram	0
16044~16045	#8023	B value in the line directed to the subprogram	0
16060~16061	#8030	Group 0 G value in the line directed to subprogram	0.0
16062~16063	#8031	Group 1 G value in the line directed to subprogram	0.0
16064~16065	#8032	Group 2 G value in the line directed to subprogram	0.0
16066~16067	#8033	Group 3 G value in the line directed to subprogram	0.0
16068~16069	#8034	Group 4 G value in the line directed to subprogram	0.0
16070~16071	#8035	Group 5 G value in the line directed to subprogram	0.0
16072~16073	#8036	Group 6 G value in the line directed to subprogram	0.0
16074~16075	#8037	Group 7 G value in the line directed to subprogram	0.0
16076~16077	#8038	Group 8 G value in the line directed to subprogram	0.0
16078~16079	#8039	Group 9 G value in the line directed to subprogram	0.0
16080~16081	#8040	Group 10 G value in the line directed to subprogram	0.0
16082~16083	#8041	Group 11 G value in the line directed to subprogram	0.0
16084~16085	#8042	Group 12 G value in the line directed to subprogram	0.0
16086~16087	#8043	Group 13 G value in the line directed to subprogram	0.0
16088~16089	#8044	Group 14 G value in the line directed to subprogram	0.0
16090~16091	#8045	Group 15 G value in the line directed to subprogram	0.0
16092~16093	#8046	Group 16 G value in the line directed to subprogram	0.0
16094~16095	#8047	Group 17 G value in the line directed to subprogram	0.0
16096~16097	#8048	Group 18 G value in the line directed to subprogram	0.0
16098~16099	#8049	Group 19 G value in the line directed to subprogram	0.0

8.19.2. Command bits sent from the interpreter to the subprogram

Address	Değişken	Description	Format
16200~16201	#8100	X Axis bit in the line directed to subprogram	0
16202~16203	#8101	Y Axis bit in the line directed to subprogram	0
16204~16205	#8102	Z Axis bit in the line directed to subprogram	0
16206~16207	#8103	4th Axis bit in the line directed to subprogram	0
16208~16209	#8104	5th Axis bit in the line directed to subprogram	0
16210~16211	#8105	6th Axis bit in the line directed to subprogram	0
16212~16213	#8106	7th Axis bit in the line directed to subprogram	0
16214~16215	#8107	8th Axis bit in the line directed to subprogram	0
16218~16219	#8109	D bit in the line directed to subprogram	0
16220~16221	#8110	F bit in the line directed to subprogram	0
16222~16223	#8111	H bit in the line directed to subprogram	0
16224~16225	#8112	I bit in the line directed to subprogram	0
16226~16227	#8113	J bit in the line directed to subprogram	0
16228~16229	#8114	K bit in the line directed to subprogram	0
16230~16231	#8115	L bit in the line directed to subprogram	0
16232~16233	#8116	M bit in the line directed to subprogram	0
16236~16237	#8118	P bit in the line directed to subprogram	0
16238~16239	#8119	Q bit in the line directed to subprogram	0
16240~16241	#8120	R bit in the line directed to subprogram	0
16242~16243	#8121	S bit in the line directed to subprogram	0
16244~16245	#8122	T bit in the line directed to subprogram	0
16244~16245	#8123	B bit in the line directed to subprogram	0
16260~16261	#8130	Group 0 G bit in the line directed to subprogram	0
16262~16263	#8131	Group 1 G bit in the line directed to subprogram	0
16264~16265	#8132	Group 2 G bit in the line directed to subprogram	0
16266~16267	#8133	Group 3 G bit in the line directed to subprogram	0
16268~16269	#8134	Group 4 G bit in the line directed to subprogram	0
16270~16271	#8135	Group 5 G bit in the line directed to subprogram	0
16272~16273	#8136	Group 6 G bit in the line directed to subprogram	0
16274~16275	#8137	Group 7 G bit in the line directed to subprogram	0
16276~16277	#8138	Group 8 G bit in the line directed to subprogram	0
16278~16279	#8139	Group 9 G bit in the line directed to subprogram	0
16280~16281	#8140	Group 10 G bit in the line directed to subprogram	0
16282~16283	#8141	Group 11 G bit in the line directed to subprogram	0
16284~16285	#8142	Group 12 G bit in the line directed to subprogram	0
16286~16287	#8143	Group 13 G bit in the line directed to subprogram	0
16288~16289	#8144	Group 14 G bit in the line directed to subprogram	0
16290~16291	#8145	Group 15 G bit in the line directed to subprogram	0
16292~16293	#8146	Group 16 G bit in the line directed to subprogram	0
16294~16295	#8147	Group 17 G bit in the line directed to subprogram	0
16296~16297	#8148	Group 18 G bit in the line directed to subprogram	0
16298~16299	#8149	Group 19 G bit in the line directed to subprogram	0

8.19.3. Values sent to the resuming subprogram (O9009)

Address	Değişken	Description	Format
16030~16031	#8015	Desired operation 1: Starting from the saved point 2: Stop->Run transition 3: Run->Stop transition 4: Sim->Run transition 5: Stop->Sim transition	0
16100~16101	#8050	X axis position for resuming operation	0.0000
16102~16103	#8051	Y axis position for resuming operation	0.0000
16104~16105	#8052	Z axis position for resuming operation	0.0000
16106~16107	#8053	4th axis position for resuming operation	0.0000
16108~16109	#8054	5th axis position for resuming operation	0.0000
16110~16111	#8055	6th axis position for resuming operation	0.0000
16112~16113	#8056	7th axis position for resuming operation	0.0000
16114~16115	#8057	8th axis position for resuming operation	0.0000
16120~16121	#8060	Spindle status for resuming operation (0: STOP/1: CW/2: CCW)	0
16122~16123	#8061	Spindle RPM for resuming operation	0
16124~16125	#8062	Tool number for resuming operation	0
16126~16127	#8063	Spindle 2 status for resuming operation (0: STOP/1: CW/2: CCW)	0
16128~16129	#8064	Spindle 2 RPM for resuming operation	0
16130~16131	#8065	Laser/plasma start command for resuming operation (0: None / 1: Present)	0
16132~16133	#8066	Laser/plasma status for resuming operation 0: Off 1: Piercing 2: Lead-In 3: Cutting 4: Lead-Out	0
16134~16135	#8067	Plasma AHC status for resuming operation 0: Off / 1: On	0

9. ALARM LIST AND TROUBLESHOOTING

9.18.0. Alarm List

Alarm No	Description	Suggestions
ALM<020>	Unknown system error	An unexpected situation has occurred in the system's core software. Please contact HSC Control.

Alarm No	Description	Suggestions
ALM<022>	Nvalid negative value	A G-code block cannot have negative values assigned to the commands D, F, H, L, N, O, S, or T. Replace the value assigned to these commands with a positive one. In a variable pitch threading cycle, if the pitch value within the motion is calculated as a negative value due to the given pitch change amount and length, modify either the pitch change amount or the motion length.

Alarm No	Description	Suggestions
ALM<023>	Invalid ”D” value	The D value specified alongside the G41/G42 commands exceeds the supported maximum tool offset. Enter a value between 0 and 100 for the D command.

Alarm No	Description	Suggestions
ALM<024>	Invalid ”G” value	The value written next to the G command must be between 0 and 99.9.

Alarm No	Description	Suggestions
ALM<025>	Invalid ”H” value	The H value specified next to the G43/G44 commands exceeds the supported maximum tool offset. Enter a value between 0 and 100 for the H command.

Alarm No	Description	Suggestions
ALM<027>	Invalid ”M” value	The value specified next to the M commands must be between 0 and 9999.

Alarm No	Description	Suggestions
ALM<028>	Invalid ”P” value	The P value specified next to the G10 command is out of range. Refer to the Pulser3 Programming Manual. In laser cutting software, the technology block can take a value between 0 and 9. The G30 command is missing the P command, or the specified P value is not between 2 and 4. Add a P command with a value between P2 and P4 to the G30 command.

Alarm No	Description	Suggestions
ALM<029>	Invalid ”T” value	In the lathe software, the specified T value is greater than the supported maximum number of tools. Enter a value between 1 and 50.

Alarm No	Description	Suggestions
ALM<030>	Invalid variable value	The variable number specified next to a command must be between 0 and 19999. The variable number to be read by the PC or HMI must be between 0 and 19999.

Alarm No	Description	Suggestions
ALM<032>	Invalid ”L” value	The L value specified next to the M98 command must be between 1 and 9999999. The L value specified next to the G10 command is out of range. Refer to the Pulser3 Programming Manual.

Alarm No	Description	Suggestions
ALM<033>	There is a syntax error in the G-code line	Each G-code line must contain a maximum of 63 characters. Reduce the number of characters in the problematic line. A value might be missing next to a command. Ensure that all commands are followed by adjacent values. A value might be written without a preceding command. Each opened parenthesis must be closed. Verify the correct order and number of parentheses. The value written next to a command should consist of digits and a dot. The number of digits should not exceed 10. Next to a variable sign (#), only the minus sign (-) and digits should be written on the left side.

Alarm No	Description	Suggestions
ALM<034>	There is a missing command in the G-code line	A rotary axis target command (A/B/C) has not been specified next to the G33.1 or G34.1 command. Add a rotary axis target command next to these commands. In the lathe software, the S command has either not been written or its value has been set to 0 next to the G96 command. Write an S command greater than 0 next to the G96 command.

Alarm No	Description	Suggestions
ALM<041>	The 'P' command is missing	Add a valid 'P' command next to the G98 command. Add a valid 'P' command next to the G10 command. Add a valid 'P' command next to the G65 command. In the laser cutting software, add a valid 'P' command next to the G72.1 command. If the G72, G74, G76, G82, G84, G87, G88, or G89 commands are being processed for the first time, add a valid 'P' command next to them.

Alarm No	Description	Suggestions
ALM<042>	The 'Q' command is missing	Add a valid 'Q' command next to the G65 command. In the laser cutting software, add a valid 'Q' command next to the G72.1 or G72.2 command. If the G72, G73, G76, G83, or G87 commands are being processed for the first time, add a valid 'Q' command next to them.

Alarm No	Description	Suggestions
ALM<043>	The 'R' command is missing	Add a valid 'R' command next to the G10 command. Add a valid 'R' command next to the G65 command . Add a valid 'R' command next to the G68 command. In the laser cutting software, add a valid 'R' command next to the G72.1 or G72.2 command. If the repetitive cycle commands are being processed for the first time, add a valid 'R' command next to them.

Alarm No	Description	Suggestions
ALM<044>	The 'X' command is missing	If the repetitive cycle commands are being processed for the first time in the YZ plane, add a valid 'X' command next to them.

Alarm No	Description	Suggestions
ALM<045>	The 'Y' command is missing	If the repetitive cycle commands are being processed for the first time in the ZX plane, add a valid 'Y' command next to them.

Alarm No	Description	Suggestions
ALM<046>	The 'Z' command is missing	If the repetitive cycle commands are being processed for the first time in the XY plane, add a valid 'Z' command next to them.

Alarm No	Description	Suggestions
ALM<047>	'R' or 'IJK' commands are missing	An 'R' or 'IJK' command must be added next to a circular motion command (G02/G03).

Alarm No	Description	Suggestions
ALM<048>	'R' and 'IJK' commands are provided together	'R' and 'IJK' commands must not be written together next to a circular motion command (G02/G03)

Alarm No	Description	Suggestions
ALM<049>	Use the 'R' command in polar mode	When the polar coordinate system is activated, only the 'R' command can be written next to a circular motion command (G02/G03). 'IJK' commands cannot be used.

Alarm No	Description	Suggestions
ALM<051>	The 'F' command is missing	If the threading commands are being processed for the first time, add a valid 'F' command next to them.

Alarm No	Description	Suggestions
ALM<056>	The start and end coordinates of the arc are the same	When an 'R' command is added to a circular motion command (G02/G03), the start and end coordinates of the arc must not be the same.

Alarm No	Description	Suggestions
ALM<057>	The radius of the arc is too small	The given radius of the arc is too small to be processed. Enter a larger radius value.

Alarm No	Description	Suggestions
ALM<058>	The radius of the arc is zero	The given radius of the arc is 0. Enter a radius value greater than zero.

Alarm No	Description	Suggestions
ALM<059>	The start and end radius of the arc are different	The difference between the start and end radius of the given arc is outside the tolerance.

Alarm No	Description	Suggestions
ALM<061>	The 'R' value is smaller than the 'Z' value	In canned cycle commands, the value of the 'R' command must be greater than the target value of the hole axis (G17: Z / G18: Y / G19: X).

Alarm No	Description	Suggestions
ALM<065>	Turn off tool radius compensation to change the plane	When the tool radius compensation command is activated, the plane cannot be changed. Turn off radius compensation with the G40 command before the plane commands (G17/G18/G19).

Alarm No	Description	Suggestions
ALM<072>	Turn off tool radius compensation	Turn off tool radius compensation before the G94/G95 commands. Turn off tool radius compensation before the G15/G16 commands. "Turn off tool radius compensation before the canned cycle commands. Turn off tool radius compensation before the G28 and G30 commands. Turn off tool radius compensation before the G31 command. Turn off tool radius compensation before the G92 command.

Alarm No	Description	Suggestions
ALM<075>	Invalid macro command	There is no macro command corresponding to the L value specified next to the G65 command.

Alarm No	Description	Suggestions
ALM<076>	The macro command is missing	Add a valid 'L' command next to the G65 command.

Alarm No	Description	Suggestions
ALM<077>	G66 is already active	Nested G66 commands have been written. Terminate the active macro command with G67 before issuing a new G66 command.

Alarm No	Description	Suggestions
ALM<078>	The 'P' command must be specified with a variable	Specify the value of the 'P' command next to the G65 command with a variable.

Alarm No	Description	Suggestions
ALM<079>	Division by zero error in macro commands	A division by zero operation is requested in macro commands. Division by zero is not allowed. Check that the divisor is a non-zero value before the macro command.

Alarm No	Description	Suggestions
ALM<080>	The 'Q' value in the macro command is zero	In the ATN, SINH, COSH macro commands, the specified divisor is zero. Division by zero is not allowed. Check that the divisor is a non-zero value before the macro command.

Alarm No	Description	Suggestions
ALM<085>	A maximum of two nested subprogram calls are allowed	

Alarm No	Description	Suggestions
ALM<086>	Invalid subprogram number	The 'P' value specified next to the G66 command must be between 0 and 9999. The 'P' value specified next to the M98 command must be between 0 and 9999.

Alarm No	Description	Suggestions
ALM<087>	The program is already open	The subprogram to be called has already been selected as the main program or opened as a subprogram and has not been closed yet. To call the subprogram again, the M99 command must be used to return from the subprogram to the main program.

Alarm No	Description	Suggestions
ALM<088>	Program not found	The search operation within the G-code file was unsuccessful. The searched word was not found. The search operation within the library was unsuccessful. The requested G-code file was not found. A request to jump to an N command line was made, but the specified N number was not found.

Alarm No	Description	Suggestions
ALM<089>	The program already exists	The G-code file to be created already exists in the library. Create it with a different name.

Alarm No	Description	Suggestions
ALM<099>	End of program	The end of the G-code file was reached, but none of the termination commands (M02/M30/M99) were found. Add one of these commands (M02/M30/M99) at the end of the file. M02/M30/M99 were found at the end of the G-code file, but no newline character was added after these commands. Add a blank line at the end of the file. When simulating in reverse, the program start was reached. You can press the reset button to continue. A request to jump to an N command line was made, but the specified N number was not found.

Alarm No	Description	Suggestions
ALM<100>	Restart the system	The unit of measurement has been changed with G20 or G21. Turn off the system's power and turn it on again. The new unit of measurement will be valid when the system restarts.

Alarm No	Description	Suggestions
ALM<109>	Machine panel communication timeout	Machine panel communication could not be started or has timed out. Check the Ethernet cable used in the machine panel line. Ensure that the cable is at least CAT6. Verify that all grounding lines of the machine comply with the standards. Ensure that the machine is properly grounded according to the standards. Check that there is no issue with the power line of the machine panel. If the machine panel is not in use, enter the appropriate setting value for SPRM19.

Alarm No	Description	Suggestions
ALM<110>	Real time communicatıon initializatıon error	Communication with the servo drives could not be started. Ensure that the cables are properly connected. Verify that the Ethernet cable used for ECAT and RTEX models is at least CAT6. Ensure that the SPRM0-SPRM16 parameters are properly configured. Check that all servo drives are powered on. Verify that all grounding lines of the machine comply with the standards. Ensure that the machine is grounded according to the standards. Ensure that the Pulser3 model used is compatible with the same protocol as the servo drives.

Alarm No	Description	Suggestions
ALM<113>	External I/O module communication timeout	Communication with the external I/O module could not be started or has timed out. Check the Ethernet cable used in the external I/O module line. Ensure that the cable is at least CAT6. Verify that all grounding lines of the machine comply with the standards. Ensure that the machine is grounded according to the standards. Check that there is no issue with the power line of the machine panel. Verify that the SPRM32-SPRM41 parameters are properly configured according to the number of external I/O modules used. Check that the selection buttons on the external I/O modules are properly configured. Ensure that there is no issue with the power line of the external I/O modules.

Alarm No	Description	Suggestions
ALM<114>	Parameter has been changed	A parameter has been changed by the user, and this alarm was triggered for safety purposes. If any measurement(PRM24-PRM39) or feedback calibration parameters have been modified, turn off the system and turn it on again. For other parameters, press the Reset button.

Alarm No	Description	Suggestions
ALM<120>	Communication with the servo drive with serial number 1 could not be established	Communication with the servo drive specified by the slot number cannot be established. Ensure that the cables are properly connected. Verify that the Ethernet cable used in ECAT and RTEX models is at least CAT6. Make sure that the SPRM0-SPRM16 parameters are properly configured. Check that all servo drives are powered on. Verify that all grounding lines of the machine comply with the standards. Ensure that the machine is grounded according to the standards. Ensure that the Pulser3 model used is compatible with the same protocol as the servo drives.
ALM<121>	Communication with the servo drive with serial number 2 could not be established	
ALM<122>	Communication with the servo drive with serial number 3 could not be established	
ALM<123>	Communication with the servo drive with serial number 4 could not be established	
ALM<124>	Communication with the servo drive with serial number 5 could not be established	
ALM<125>	Communication with the servo drive with serial number 6 could not be established	
ALM<126>	Communication with the servo drive with serial number 7 could not be established	
ALM<127>	Communication with the servo drive with serial number 8 could not be established	

Alarm No	Description	Suggestions
ALM<128>	Data reading error	Data reading from internal memory has failed. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<129>	Data writing error	Data writing to internal memory has failed. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<130>	Parameters could not be read	Parameters saved to internal memory could not be read properly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<131>	Parameters could not be written	Parameters saved to internal memory could not be written properly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<132>	Invalid parameter value	One or more values entered for the parameters are outside the allowed range. Please adjust the entered parameter values according to the allowed range

Alarm No	Description	Suggestions
ALM<133>	System parameters could not be read	The system parameters saved in the internal memory could not be read properly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<134>	The system parameters could not be written	The system parameters saved in the internal memory could not be written correctly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<135>	Invalid system parameter value	One or more values entered for the system parameters are outside the allowed range. Please adjust the entered system parameter values to be within the permitted range.

Alarm No	Description	Suggestions
ALM<140>	The program could not be created	The G-code file could not be created. Ensure that the SD card is inserted in the Pulser3. Check that the SD card is formatted in FAT32. Replace the SD card if necessary.

Alarm No	Description	Suggestions
ALM<141>	The program could not be deleted	The G-code file could not be deleted. Ensure that the SD card on the Pulser3 is formatted with FAT32. If necessary, replace the SD card.

Alarm No	Description	Suggestions
ALM<142>	The program could not be read	The G-code file could not be read. Ensure that the SD card is inserted into the Pulser3. Check that the SD card is formatted with FAT32. Verify that the subprogram to be called exists on the SD card. Ensure the subprogram is named OXXXX.cnc (XXXX: 0-9999). Replace the SD card.

Alarm No	Description	Suggestions
ALM<143>	The program could not be written	The G-code file could not be written. Check that the SD card on the Pulser3 is formatted as FAT32. Replace the SD card.

Alarm No	Description	Suggestions
ALM<150>	Tool offset values could not be read	The tool offset values stored in the internal memory could not be read properly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<151>	The tool offset values could not be written	The tool offset values saved in the internal memory could not be written correctly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<152>	The part zero offset values could not be read	The part offset values stored in the internal memory could not be read correctly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<153>	The part offset values could not be written	The part offset values stored in the internal memory could not be written properly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<154>	Holding user variables could not be read	The holding user variables saved in the internal memory could not be read correctly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<155>	Holding user variables could not be written	The holding user variables stored in internal memory could not be written properly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<156>	Stored general data could not be read	General values such as the last selected tool, the number of parts produced, and the selected measurement unit stored in internal memory could not be read properly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<157>	Stored general data could not be written	The stored general data, such as the last selected tool, the number of produced parts, and the selected unit of measurement, could not be written properly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<158>	Holding data of the internal PLC could not be read	The internal PLC permanent memory area stored in the internal memory could not be read properly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<159>	The internal PLC holding data could not be written	The internal PLC permanent memory area stored in the internal memory could not be written correctly. Please contact HSC Kontrol.

Alarm No	Description	Suggestions
ALM<170>	Network Initialization Error	TCP connection cannot be established or proper read/write operation cannot be performed. Please contact HSC Kontrol.
ALM<171>	Network Data Read Error	
ALM<172>	Network Data Write Error	
ALM<173>	Unknown Error in Network Read/Write	

Alarm No	Description	Suggestions
ALM<190>	X Axis Servo Alarm	The servo driver of the specified axis is in an alarm state. Check the error code on the servo driver and refer to the documentation of the used servo model.
ALM<191>	Y Axis Servo Alarm	
ALM<192>	Z Axis Servo Alarm	
ALM<193>	4th Axis Servo Alarm	
ALM<194>	5th Axis Servo Alarm	
ALM<195>	6th Axis Servo Alarm	
ALM<196>	7th Axis Servo Alarm	
ALM<197>	8th Axis Servo Alarm	

Alarm No	Description	Suggestions
ALM<200>	X axis is at the (+) direction limit switch	The specified axis has reached the positive (+) direction limit switch. Move the axis in the reverse direction. Check the limit switch and stopper. Ensure the switch connection is secure.
ALM<201>	Y axis is at the (+) direction limit switch	
ALM<202>	Z axis is at the (+) direction limit switch	
ALM<203>	4th axis is at the (+) direction limit switch	
ALM<204>	5th axis is at the (+) direction limit switch	
ALM<205>	6th axis is at the (+) direction limit switch	
ALM<206>	7th axis is at the (+) direction limit switch	
ALM<207>	8th axis is at the (+) direction limit switch	

Alarm No	Description	Suggestions
ALM<210>	X axis is at the (-) direction limit switch	The specified axis has reached the negative (-) direction limit switch. Move the axis in the reverse direction. Check the limit switch and stopper. Ensure the switch connection is secure.
ALM<211>	Y axis is at the (-) direction limit switch	
ALM<212>	Z axis is at the (-) direction limit switch	
ALM<213>	4th axis is at the (-) direction limit switch	
ALM<214>	5th axis is at the (-) direction limit switch	
ALM<215>	6th axis is at the (-) direction limit switch	
ALM<216>	7th axis is at the (-) direction limit switch	
ALM<217>	8th axis is at the (-) direction limit switch	

Alarm No	Description	Suggestions
ALM<220>	The position difference of X axis is too high	The difference between the commanded position and the feedback position of the specified axis is greater than the value specified in PRM120-PRM125. The servo system is unable to follow the command. Check the load on the servo. A command is being sent above the maximum pulse output frequency of 100kHz for the PLSE model. Reduce the axis operating speed or adjust the axis measurement calibration values.
ALM<221>	The position difference of Y axis is too high	
ALM<222>	The position difference of Z axis is too high	
ALM<223>	The position difference of 4th axis is too high	
ALM<224>	The position difference of 5th axis is too high	
ALM<225>	The position difference of 6th axis is too high	
ALM<226>	The position difference of 7th axis is too high	
ALM<227>	The position difference of 8th axis is too high	

Alarm No	Description	Suggestions
ALM<230>	X Axis has reached the positive (+) software limit	The specified axis has reached the positive (+) software limit. Move the axis in the opposite direction.
ALM<231>	Y Axis has reached the positive (+) software limit	
ALM<232>	Z Axis has reached the positive (+) software limit	
ALM<233>	4th Axis has reached the positive (+) software limit	
ALM<234>	5th Axis has reached the positive (+) software limit	
ALM<235>	6th Axis has reached the positive (+) software limit	
ALM<236>	7th Axis has reached the positive (+) software limit	
ALM<237>	8th Axis has reached the positive (+) software limit	

Alarm No	Description	Suggestions
ALM<240>	X Axis has reached the negative (-) software limit	The specified axis has reached the negative (-) software limit. Move the axis in the opposite direction.
ALM<241>	Y Axis has reached the negative (-) software limit	
ALM<242>	Z Axis has reached the negative (-) software limit	
ALM<243>	4th Axis has reached the negative (-) software limit	
ALM<244>	5th Axis has reached the negative (-) software limit	
ALM<245>	6th Axis has reached the negative (-) software limit	
ALM<246>	7th Axis has reached the negative (-) software limit	
ALM<247>	8th Axis has reached the negative (-) software limit	

Alarm No	Description	Suggestions
ALM<252>	Tool life counter has reached the target value	Reset the tool life counter.

Alarm No	Description	Suggestions
ALM<253>	Tip touch error	Check the consumables.

Alarm No	Description	Suggestions
ALM<256>	PLC Alarm 0	These alarms are defined by the machine manufacturer. Please contact the machine manufacturer.
ALM<257>	PLC Alarm 1	
ALM<258>	PLC Alarm 2	
ALM<259>	PLC Alarm 3	
ALM<260>	PLC Alarm 4	
ALM<261>	PLC Alarm 5	
ALM<262>	PLC Alarm 6	
ALM<263>	PLC Alarm 7	
ALM<264>	PLC Alarm 8	
ALM<265>	PLC Alarm 9	
ALM<266>	PLC Alarm 10	
ALM<267>	PLC Alarm 11	
ALM<268>	PLC Alarm 12	
ALM<269>	PLC Alarm 13	
ALM<270>	PLC Alarm 14	
ALM<271>	PLC Alarm 15	
ALM<272>	PLC Alarm 16	
ALM<273>	PLC Alarm 17	
ALM<274>	PLC Alarm 18	
ALM<275>	PLC Alarm 19	
ALM<276>	PLC Alarm 20	
ALM<277>	PLC Alarm 21	
ALM<278>	PLC Alarm 22	
ALM<279>	PLC Alarm 23	
ALM<280>	PLC Alarm 24	
ALM<281>	PLC Alarm 25	
ALM<282>	PLC Alarm 26	
ALM<283>	PLC Alarm 27	
ALM<284>	PLC Alarm 28	
ALM<285>	PLC Alarm 29	

ALM<286>	PLC Alarm 30	
ALM<287>	PLC Alarm 31	

Alarm No	Description	Suggestions
ALM<288>	Macro Alarm 0	These alarms are defined by the machine manufacturer. Contact the machine manufacturer.
ALM<289>	Macro Alarm 1	
ALM<290>	Macro Alarm 2	
ALM<291>	Macro Alarm 3	
ALM<292>	Macro Alarm 4	
ALM<293>	Macro Alarm 5	
ALM<294>	Macro Alarm 6	
ALM<295>	Macro Alarm 7	
ALM<296>	Macro Alarm 8	
ALM<297>	Macro Alarm 9	
ALM<298>	Macro Alarm 10	
ALM<299>	Macro Alarm 11	
ALM<300>	Macro Alarm 12	
ALM<301>	Macro Alarm 13	
ALM<302>	Macro Alarm 14	
ALM<303>	Macro Alarm 15	

10. MAIN SOFTWARE UPDATE PROCESS

1. Before updating the Pulser3 software, press the emergency stop button and turn off the main power switch after taking the necessary safety precautions.
2. Request the "Pulser3.bin" file to update the Pulser3 software.
3. If the file was sent as a .zip, extract it from the .zip archive.
4. Gently press the micro SD card once in the forward direction to remove it from the Pulser3.
5. Use an adapter to insert the micro SD card into your computer.
6. Copy the "Pulser3.bin" file directly to the root directory (it should not be copied into any folder).
7. Verify that the main power switch is turned off and insert the micro SD card into Pulser3.
8. Turn on the main power switch.
9. 9. The screen of the Pulser3 CNC controller will display "**Firmware Found**" and "**Signature OK**." Wait for the **Checking** bar to fill. Once it is filled, "**File OK**" will appear, and the **Writing** bar will start to fill. After it is completed, the screen will display "**SUCCESS**," and the main software will be updated.

11. SERVO DRIVER SETTINGS

11.18.0. Panasonic Minas A6 Servo (EtherCAT)

Parameter	Description	Setting Value
Pr00.02	Real Time Auto Tunning	0 (Disabled)
Pr01.00	Position Loop Gain	96.0
Pr01.01	Velocity Loop Gain	54.0
Pr04.01	D11 Signal Selection	65793
Pr04.02	D12 Signal Selection	131586
6091-01h	Position Numerator	00800000h
6092-01h	Position Denominator	00002710h
607E	Rotational Direction Setup	E0h

Not: The EtherCAT ID settings on Panasonic Servo Motor Drives are made using the address switches, and the parameter settings are done using the Panaterm program.

11.19.0. INVT SV-DA Servo (EtherCAT)

Parameter	Description	Setting Value
P0.02	Forward Rotation Of Motor	1
P0.70	Absolute Encoder Mode Setting	1 (Multiple Circles)
P0.71	Absolute Encoder Multi-Turn Zeroing	1
P4.00	EtherCAT Node ID	It is determined according to the order
P4.07	EtherCAT Synchronous Cycle	3 (2ms)
P4.08	EtherCAT Synchronous Type	2 (DC Mode(SYNC0))

Closed-loop operation:

Deckel Maho example settings

The number of teeth on the coupling of the motor: 28

The number of teeth on the coupling of the lead screw: 77

The resolution of the scale: 0.001mm

Pitch: 5.000mm

P4.61 = 44/77 * 5000

= 2857.14

Parameter	Description	Setting Value
P0.22	Pulse Number Per Motor Resolution	0
P0.25	Numerator Of 1st Electronic Gear Ratio	1
P0.26	Denominator Of 1st Electronic Gear Ratio	1
P0.38	Enable Fully-Closed Loop	1
P2.00	1st Speed Gain	108
P2.01	1st Speed Integral Time Constant	21
P2.02	1st Position Gain	192
P4.60	Frequency Division Molecular Of External Linear Encoder	Motor resolution (838860800)
P4.61	Frequency Division Denominator Of External Linear Encoder	The pulse value read from R0.57 when P0.03=0 285714
P4.62	Direction Reversal Of External Linear Encoder	It is set to 1 when necessary. (When reversed, the motor vibrates.)

Pulser3 Numerator: 1

Pulser3 Denominator: 10

11.20.0. Delta ASD-A2 Servo (EtherCAT)

To change the motor rotation direction:

Parameter	Description	Setting Value
P1-01	Control Mode And Output Direction	0x000C or 0x010C
P3-12	-	0x0100

11.21.0. Inovance SV660N Servo (EtherCAT)

Parameter	Description	Setting Value
H02-00	Control Mode	9 (EtherCAT)
H02-02	Direction Of Rotation	0/1
H0E-21	Alias ID	It is determined according to the order
H05-07	Numerator Of Electronic Gear Ratio	8388608 (For 23-Bit Encoder)
H05-09	Denominator Of Electronic Gear Ratio	10000
H09-00	Gain Auto Tunning	0: Off / 1: On
H09-03	Online Interia Auto Tunning	0: Off / 1: On
H02-01	Absolute Mode	0/1
H0D-20	Encoder Counter Reset	2 (Clear Alarm And Multi Turn Data)
H02-31	Factory Defaults	1 (Done if necessary)