QUADRA 5 Axis WET Robot

Command Reference

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Command and Response Structure

Software commands on the Robot are composed of ASCII strings (characters or numbers) that can be subdivided into "field". Software replies on the Robot are also composed of ASCII strings (characters and numbers) that can be subdivided into "field". These fields indicate the command type or the variable name, or contain data.

1. Command Fields

Command fields are composed the command name and the logical branch of command (as needed).

2. Data Fields

Data fields are composed of the data requested by a variable or the data returned on a variable.

3. Variable Fields

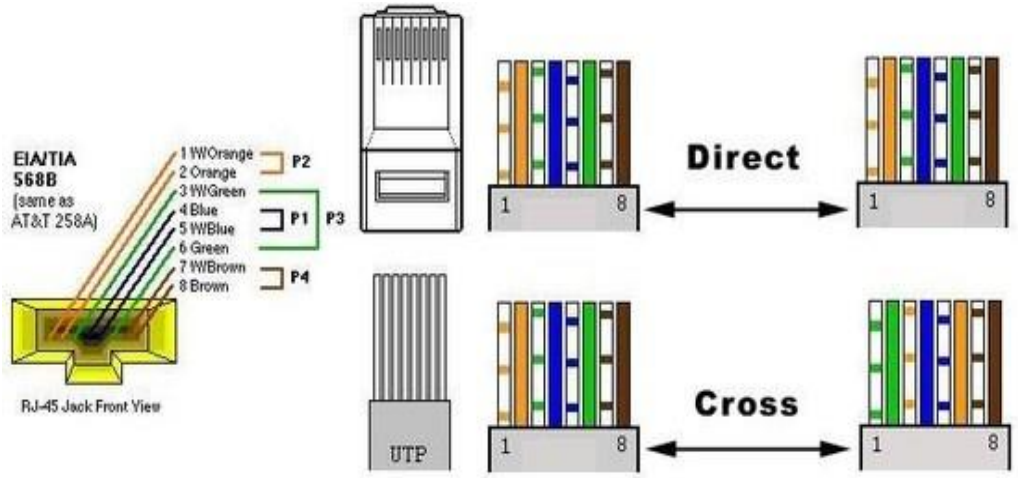
Variable fields are composed of the variable names used to clearly indicate specific items on the command.

In the example below, "PICK" is a variable indicating the reply type and its data type, "ARM" is also a variable indicating the replied data type, and "4", "1", and "A" are data fields.

PICK 4 SLOT 1 ARM A

Communication Protocol

TCP/IP Communication Pin Description



TCP/IP Communication Setting(Controller)

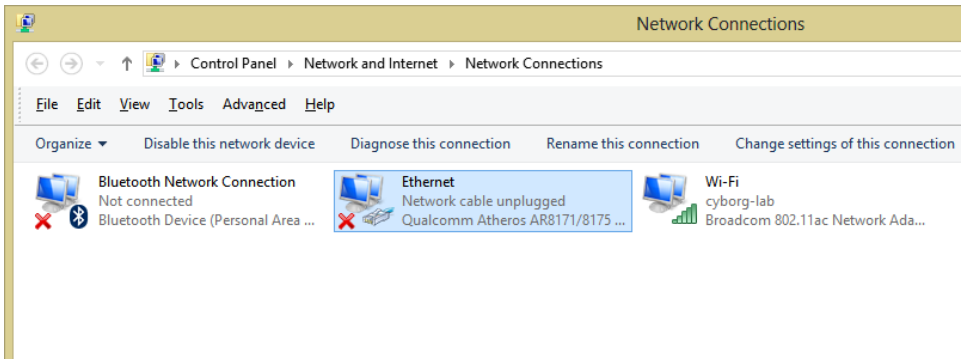
Item	Detail
IP Address	Default : 192.168.0.1 Supported IP Format : nnn.nnn.nnn.nnn
Port Number	10100

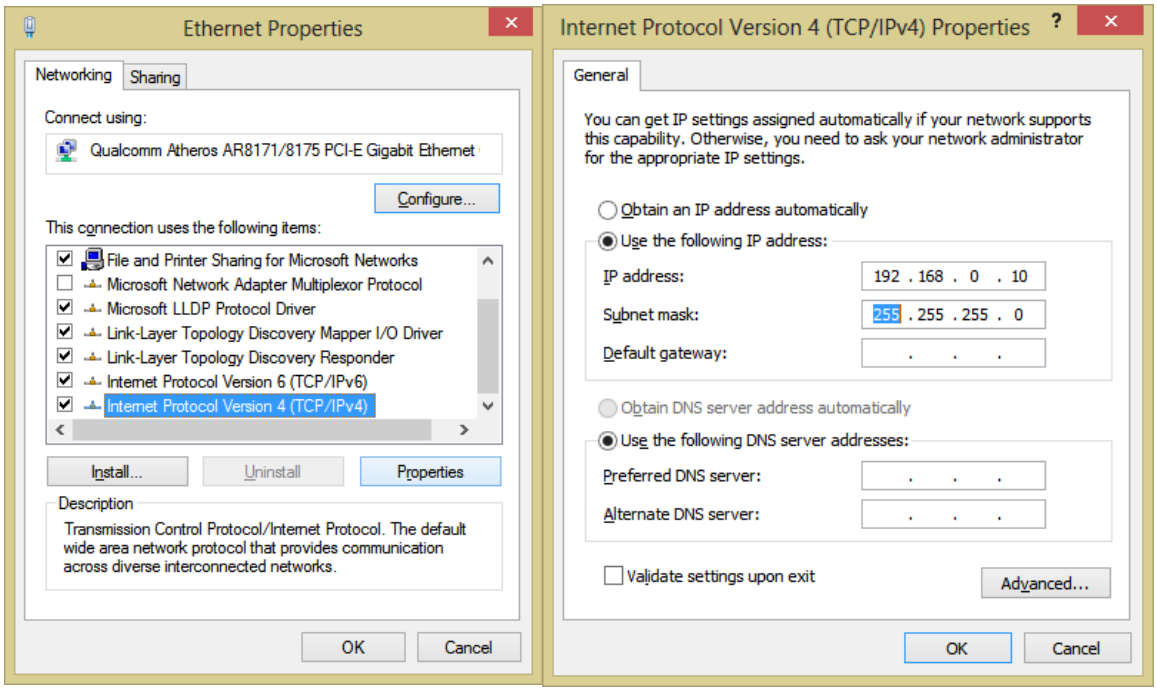
The IP Address can be changed through the controller settings.

Need to consult with our company if the Port Number needs to be changed.

TCP/IP Communication Setting(Host)

Additional settings below is required to connect our controller with the Host (PC).





IP Address: 192.168.0.10 – 192.168.0.100 (e.g. 192.168.0.55)

Subnet mask: 255.255.255.0

The settings are applicable in case of using 192.168.0.1 which is the default factory setting.

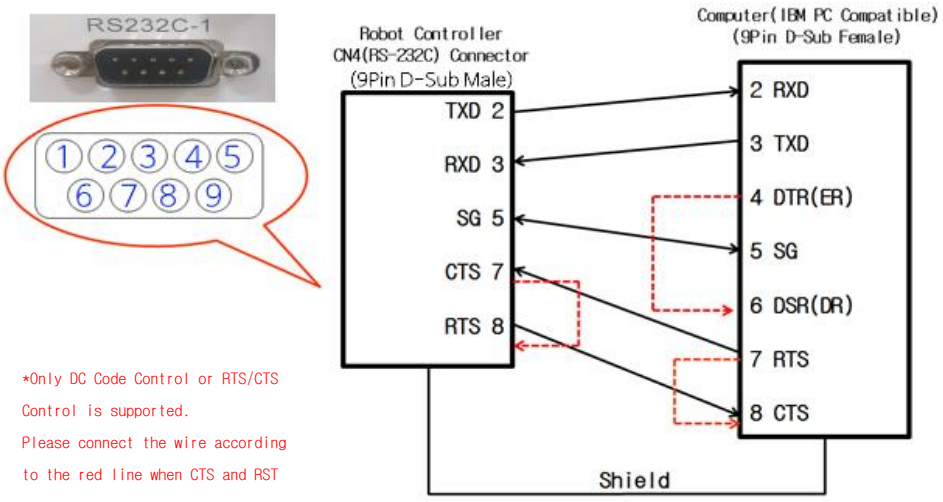
If the controller IP Address is modified, the settings above also must be changed.

RS-232C Communication Control Format

Item	Specification	Notes
Method	Asynchronous	
Baud rate	19200	
Data bit	8 bit	
Stop bit	1 bit	
Parity	None	
Flow control	None	

RS-232C Connector Pin Description

Pin No.	Description
1	Not Used
2	Rx
3	Tx
4	Not Used
5	GND
6	Not Used
7	Not Used
8	Not Used
9	Not Used



Communication Format

The Command sent from Host to Robot is composed of instructions and delimiters.

Instructions are composed of the strings designated as a form of Character Strings and sent by attaching Carriage Return (CR) at the end of the command.

CMD	CR

CMD: Command String And Command Parameters

CR: End of Command (0x0D)

Reception Confirmation on Command

Once the Robot receives command, it responds whether the command is received properly.

[_ACK] Returned if the command String and Parameter are normal.

[_NAK] NAK is generated if a wrong command is received.

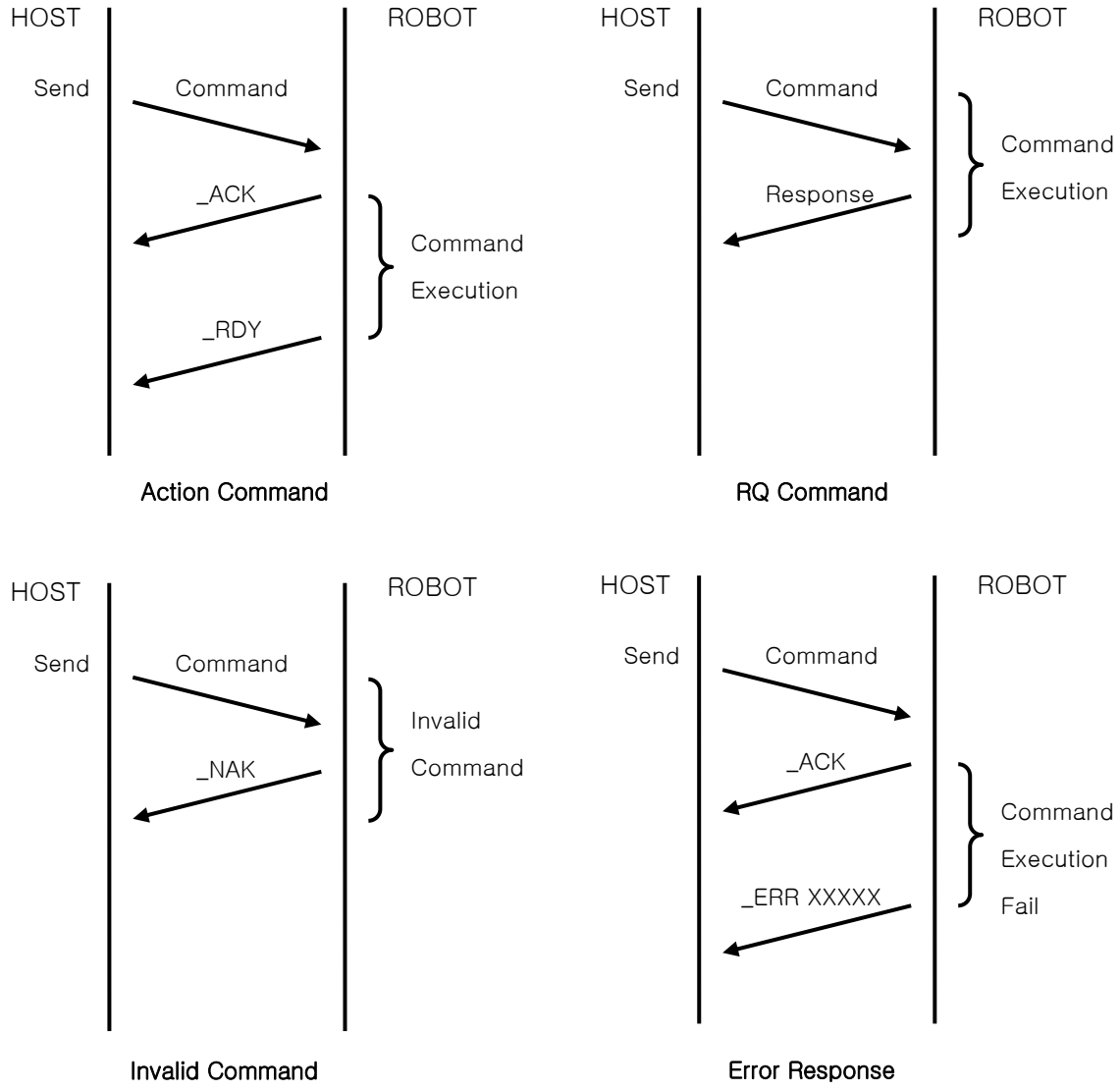
Response

For the response on the command received from Host, the result is sent after execution of the command is completed. If execution of the command is completed properly, _RDY is sent if the command is an Action command or the relevant information is sent to Host in case of an information request, depending on the response type of the command. Send the Error Code if an Error has occurred while executing a command. Responses are generally composed of responses and delimiters (0x0D).

The response in case of an Error while executing a command is composed of the identification character '_ERR' indicating that it is an error and a five-digit Code, and sent to Host by attaching CR (0x0D) after it.

_ERR	Code	CR

Error Response Format



Command Types

The Robot will receive two types of software commands including action command and request command from the host controller. Each of these commands are used for different purposes. The commands list by each type is in the Quick Reference Tables of this chapter.

1. Action Commands

Action commands move a Robot component or perform a task on the component.

2. Request Commands

Request commands request action status or value of the action Parameter.

Note:

Space and carriage return are not indicated in the command reference. It is considered that there is a space between fields and there is carriage return at the end of all Strings.

Example:

<> Space(ASCII 32)

<CR> Carriage return(ASCII 0X0D)

PICK <>1<>SLOT<>2<>ARM<>B<CR>

The command above instructs the Robot pick up wafer from the slots of station numbers 1 and 2 using arm 'B'. If the arm is not specified, the Robot uses 'A' which is the default arm.

Variable of a command and the number/order of data field are fixed. It is recommended to issue a command by filling up all data fields.

Command Syntax

A command syntax is variable and follows the minimum format convention. The command field must be located at the very left under any circumstances and the related data also must be in the applicable order and location. CYMECHS recommends following the order presented in this manual on each command.

The format which each command can assume appears in the example below. As shown in the first example, the order and the number of factors must be adjusted.

Standard Format and Standard Order (3 Variables)

PICK 1 SLOT 4 ARM A (O)

2 Variables

PICK 1 SLOT 4 (X)

Response Types and Syntax

The Robot sends three types of signals including data, error signal and ready signal to the Host controller.

All commands sent to the Robot is recognized as appropriate "Ready Response" for the current operation mode. If the command is a "request command", a response on the request is provided before the "Ready Response" as explained in the command reference. If the command generates a state of error, an "Error Response" is provided before the "Ready Response". If the Request Response generates an error, only the "Error Response" is returned.

Response Types

- Request Response is a response to return the information requested by the host controller.
- Error Response is a response to inform that an error has occurred and show which error has occurred.
- Ready Response is a response which shows that the Robot is read to receive a new command.

Software responses are composed of a series of ASCII fields. The number of characters in each field is variable.
Therefore, a space (ASCII32, indicated as <> in the example below) in order to show that one field has ended and the next field has started.
To show that the response has ended, a carriage return (ASCII13, indicated as <Return> in the example below) is required. Responses are always indicated in upper case.

Note: The space and the carriage return are not indicated inside the command reference. It is considered that there is a space between fields and there is carriage return at the end of all strings.

Example:

HOME<>ALL<Return>

The command above instructs the Robot to return to the absolute position of ALL axes.
In the example above, the space is indicated as "<>" and carriage return is indicated as "<Return>". In the rest of the examples presented in this manual, the space is indicated as " " and considered as having carriage return at the end of command.

Response Syntax

While the syntax of response varies depending on the created response type, the Robot always sends a carriage return after the response.

Request Response

A response on the request command follows the format of the request as it is. The command below shows few requests on the communication parameter and the response format. The response shown below is the reaction on the RQ WAFER command.

Request

RQ WAFER ARM arm

Response

WAFER arm Y

Error Response

The return code on all errors have a rule under any circumstances. The error codes list appears at the last part of this chapter. In case of an error when processing a command or when operating, the Robot sends an error signal and followed by a carriage return to the host controller.

_ERR 00002

Ready Responses

Once the Robot is ready to receive a Command by completing the action in progress, it instantly sends a Ready string.

_RDY

Command Quick Reference Tables

The table below is a standard commands list and used only for quick reference.
See the relevant command Page for detailed information and directions.

Action & Non-Action Commands

Command	Description	Remarks
HLLO	Command for confirmation of communication status	
CLEAR	Clears the Error.	
HOME	Returns the ROBOT to the starting point.	
GOTO	Moves an arm to the designated station.	
PICK	Performs the PICK action at the designated station.	
PLACE	Performs the PLACE action at the designated station.	
ZAXIS	Performs UP and DOWN actions at the designated station.	
SERVO	Turns ON/OFF the ROBOT's SERVO.	
GRIP	Moves the Grip Holder of the Robot's and forward or reverse.	
CHECKWAFER	Checks existence of the Endeffector's Wafer.	
PAUSE	Pauses the Robot (pauses by deceleration).	
RESTART	Operates by continuing the previous command after unpausing.	
ESTOP	Stops the Robot as an emergency.	

Request Commands

Command	Description	Remarks
RQ OPMODE	Returns the Operation mode. (CDM/HOST)	
RQ VERSION	Returns the software version number.	
RQ WAFER	Returns the Wafer Load status of the ROBOT.	
RQ HISPD	Returns the set speed value of the Robot's Wafer Unload state (high speed).	
RQ LOSPD	Returns the set speed value of the Robot's Wafer Load state (low speed).	
RQ GRIPCHECK	Returns the Grip status of the ROBOT's Endeffector.	
RQ ERR	Returns the most recent Error Code.	
RQ POS	Returns the Robot's current position information.	
RQ TEACH	Returns the Teach value of the designated Station.	
RQ ABS	Returns the Robot's current coordinates data.	
RQ OFFSET	Returns the saved Offset value.	
RQ SERVO	Returns the ROBOT's SERVO ON/OFF status.	

Set Commands

Command	Description	Remarks
SET HISPD	Sets the speed of the Robot's Wafer Unload state (high speed).	
SET LOSPD	Sets the speed of the Robot's Wafer Load state (low speed).	
SET TEACH	Sets the Robot's current/designated posture and position as Teaching value.	
SET OFFSET	Sets the Offset value.	

Command Reference

Command reference describes the commands supported by CYMECHS Robot in detail.

Purpose: Briefly describes the functions of the command.

Format: Shows the command format on the Robot including the factor name required by the command.

Response: Shows the standard response replied on the command.

Factor: Describes each factor contained in the command syntax.

Description: Describes the command and its functions in detail.

Example: Provides the examples of using the command.

Command Reference

HLLO

Purpose

Used as a non-intrusive command to check whether the Robot reacts to the communication.

Format

HLLO

Response

Hello

Description

No action is performed. Used as a non-intrusive command to check whether the Robot reacts.

Example

HLLO

Hello

CLEAR

Purpose

Used for Alarm Clear or Reset as Error has occurred in the Robot.

Format

CLEAR

Response

_ACK

_RDY

Description

Clear command clears all errors and alarms.

Example

CLEAR

_ACK

_RDY

HOME

Purpose

Move to the Robot's HOME position.

Format

HOME [ALL]

Factor

ALL: Z1 and Z2 perform the "home" sequence after Reset/Alarm Clear, T1/T2/A/B move to the safe position and finish performing the "home" sequence.

Caution

An articulated robot cannot perform the HOME action by each axis as there is possibility of interference and collision when performing HOME action on each individual axis.

Description

The HOME command moves to the position defined as HOME in order to build the initial position of each axis correctly.

If the robot is already at HOME when the HOME command is inputted, no movement will occur.

Example

In the example below, all arms will be retracted first and move to the HOME position. After the Arm Retract is complete, they will move to Z1 axis, Z2 axis and HOME positions.

HOME ALL
_ACK
_RDY

GOTO

Purpose

Move to the designated station.

Format

GOTO N [station] R [EX|RE] Z [UP|DN] SLOT [num] ARM [arm]

Factor

station: Designates the station number. Range: 1-16

EX|RE: Specifies the Arm's radial position.

EX = extended

RE = retracted

UP|DN: Specifies the Arm's vertical placement.

UP = up

DN = down

slot: Shows the slot which the arm must move to. Values from 1 to n are used for the station. Here, n shows the slot number at the designated station.

arm: Shows the arm which must move. A or B

Description

All parameters must be sent in order.

If the arm moves, checkup and movement take place in the following order according to the order given on the currently defined on the load.

- Once "N" (station number), "SLOT", and "R RE" (Retract) are designated, the arm is retracted only if it is not retracted yet.
- The rotating axis and the Z-axis will move to the target position at the same time.
- The arm will be extended if the Extend command is issued. At this time, be sure to issue the Extend command after operating by designating as "R RE".

Example

In the example below, Arm B is extended after moving to the Low Position of STATION 5, SLOT 1, and Z-axis.

[host]GOTO N 5 R RE Z DN SLOT 1 ARM B
[robot]_ACK
[robot]_RDY

[host]GOTO N 5 R EX Z DN SLOT 1 ARM B
[robot]_ACK
[robot]_RDY

Reference: PICK, PLACE

PICK

Purpose

Make the robot arm pick up the wafer from the designated station and slot number.

Format

PICK [station] SLOT [slot] ARM [arm]

Factor

station: The station number to pick up the Wafer. Range: 1-16

slot: The slot number to pick up the Wafer. In case of a multi-slot station, the slot number must be designated only to indicate the slot numbers other than 1.

arm: The arm to pick up the Wafer (A and B).

Description

During the PICK action, the robot's movement speed and acceleration varies depending on the existence of wafer. If there is Wafer in the Arm to transfer the Wafer, it will move as "with wafer" (low) speed and acceleration. If two arms are empty, it will operate as high speed on all axes of the robot.

The sequence during the PICK action is as shown below.

- Retract the arm as appropriate speed and acceleration profile for the currently defined load.
- Perform downward and rotation movements at the same time with the designated station and slot numbers
  as appropriate speed and acceleration profile for the currently defined load.
- Extend the arm to the R position of the corresponding station as appropriate speed and acceleration profile for the currently defined load.
- Move the arm to the UP position and pick up the wafer as appropriate speed and acceleration profile for the currently defined load.
- Define the arm to perform the PICK movement as "loaded" state.
- Retract the arm as appropriate speed and acceleration profile for the currently defined load.

Example

In the example below, the robot will move as follows:
The robot will retract the arm, rotate based on Arm A to Slot 1 of station #2, extend the arm, raise up the arm (pick up the wafer) and retract the arm.

```
PICK 2 SLOT 1 ARM A
_ACK
GRIPTIME ON ARM A 324
_RDY
```

PLACE

Purpose

Make the robot arm place the wafer at the designated station and slot number.

Format

PLACE [station] SLOT [slot] ARM [arm]

Factor

station: The station number to place the Wafer. Range: 1-16

slot: The slot number to place the Wafer.

arm: The arm to pick up the Wafer (A and B).

Description

During the PLACE action, the robot's movement speed and acceleration varies depending on the existence of wafer. If there is Wafer in the Arm to transfer the Wafer, it will move as "with wafer" (low) speed and acceleration. If two arms are empty, it will operate as high speed on all axes of the robot.

The sequence during the PLACE action is as shown below.

- Retract the arm as appropriate speed and acceleration profile for the currently defined load.
- Perform downward and rotation movements at the same time with the designated station and slot numbers
  Move upward and rotate toward the up position at the same time.
- Extend the arm to the R position of the corresponding station as appropriate speed and acceleration profile for the currently defined load.
- Move the arm to the down position and place the wafer as appropriate speed and acceleration profile for the currently defined load.
- Define the arm to perform the PLACE movement as "unloaded" state.
- Retract the arm as appropriate speed and acceleration profile for the currently defined load.

Example

In the example below, the robot will move as follows:
The robot will retract the arm, rotate based on Arm A to Slot 2 of station #5, extend the arm, move down the arm (put down the wafer) and retract the arm.

```
PLACE 5 SLOT 2 ARM A
_ACK
GRIPTIME OFF ARM A 256
_RDY
```

ZAXIS

Purpose

Perform UP and DOWN movements on the ROBOT.

Format

ZAXIS [station] SLOT [slot] [UP|DN] ARM [arm]

Factor

station: The station number to place the Wafer. Range: 1-16

slot: The slot number to place the Wafer. Range: 1-8

UP|DN: Designates the up/down movement position of the ROBOT.

arm: Designates the Arm to move the Wafer.

Description

During the ZAXIS action, the previous station and the current station must match to enable Up/Down movement.

If they do not match, _NAK will be returned.

Caution UP/DOWN movement is possible even if the Arm is extended.

The current Station and the previous Station must match.

Example

In the example below, the robot will move as follows:

The robot will retract the arm, move to the DOWN Position of Station 5/SLOT 1/Z-axis and move up from Station 5/SLOT 1 position by receiving the ZAXIS command.

GOTO N 5 R RE Z DN SLOT 1 ARM B

_ACK

_RDY

ZAXIS 5 SLOT 1 UP ARM B

_ACK

_RDY

SERVO

Purpose

Turn ON/OFF the robot's servo control.

Format

SERVO [ON|OFF]

Factor

ON|OFF: Designates whether to turn ON/OFF the SERVO.

Description

The SERVO OFF command turns OFF the servo of all axes. The SERVO ON command turns ON the servo of all axes.

Example

SERVO ON

_ACK

_RDY

VAC

Purpose

Perform Vacuum On/Off on the ROBOT.

Format

VAC [ON|OFF] ARM [A/B]

Description

The VAC command is executed in order to turn On/Off the robot's Vacuum.

Example

VAC [ON] ARM [A]

PAUSE

Purpose

Pause the robot's movement.

Format

PAUSE

Description

Pauses all movements by deceleration and becomes a standby state.

Example

PAUSE

_ACK

_RDY

RESTART

Purpose

Restart the paused robot.

Format

RESTART

Description

Continues operation of the robot's movement which became a paused state.

Example

RESTART

_ACK

_RDY

ESTOP

Purpose

Stop the robot's movement.

Format

ESTOP

Description

The ESTOP command instantly stops all movements in progress, stops servo on all axes and maintains the reference state.

Example

ESTOP

_ACK

_RDY

RQ OPMODE

Purpose

Return one state of the Host command on whether the current control is Teaching Pendant.

Format

RQ OPMODE

Response

CDM (Control Display Module when it is Teaching Pendant)

HOST (When it is Host command)

Example

In the example below, the state of control is requested.

[host] RQ OPMODE

[robot] CDM

RQ VERSION

Purpose

Request the software version.

Format

RQ VERSION

Response

VER xxxxxxxx

Description

This command is provided to check the software version.

Example

RQ VERSION

VER 12345678

RQ WAFER

Purpose

Return the existence status of Wafer.

Format

RQ WAFER ARM [arm]

Response

WAFER [arm] [status]

Factor

arm:

A	Requests the status of Arm A.
B	Requests the status of Arm B.
ALL	Requests the status of arms A and B.

status:

N	Shows that there is no wafer above the End effect.
N	Shows that there is wafer above the End effect.
ERR	Shown when the status of Arm is unknown.

Description

Able to find out the existence of wafer above the Endeffector.

Example

Below is an example of requesting the existence of wafer in Arm A and returning the existence of wafer above the end effect.

RQ WAFER ARM A
WAFER A Y

RQ WAFER ARM ALL
WAFER A Y B N

RQ HISPD

Purpose

Return the movement speed in the Wafer Unload state of the robot.

Format

RQ HISPD ALL

Response

HISPD ALL [speed]

Factor

speed: Shows a speed setting from 1 to 100 (Unit: %)

Example

Below is an example of requesting and returning the movement speed setting in the Wafer Unload state.

The current speed setting is 30%.

RQ HISPD ALL

HISPD ALL 30

RQ LOSPD

Purpose

Return the movement speed in the Wafer load state of the robot.

Format

RQ LOSPD ALL

Response

LOSPD ALL [speed]

Factor

speed: Shows a speed setting from 1 to 100 (Unit: %)

Example

Below is an example of requesting and returning the movement speed setting in the Wafer load state.

The current speed setting is 30%.

RQ LOSPD ALL

LOSPD ALL 30

RQ VAC

Purpose

Return one state among VACUUM ON/OFF/ERR on the current robot.

Format

RQ VAC ARM [arm]

Response

VAC arm status

Factor

arm:

A	Requests the status of Arm A.
B	Requests the status of Arm B.
ALL	Requests the status of arms A and B.

status:

Y	Shows that the robot's VACUUM is an ON state.
N	Shows that the robot's VACUUM is an OFF state.

Description

You can check whether the current VACUUM is ON, OFF or ERROR state.

Example

Below is an example of returning whether the current VACUUM is ON, OFF or ERROR state.
It is an example where the current Vacuum state of Arm A is OFF and OFF is returned by the request of the Host.

RQ VAC ARM A
VAC A N

Below is an example of requesting and returning the Vacuum state of both Arm A and Arm B from the Host.

RQ VAC ARM ALL
VAC A Y B Y

RQ ERR

Purpose

Return the most recent Error Code.

Format

RQ ERR

Response

ERR XXXXX

Description

You can check the Error occurred most recently.

Example

Below is an example of returning the most recent Error Code.

It is an example of returning the Error occurred in case of performing a Pick action in a state of loading the Wafer for the most recent Error.

RQ ERR

ERR 22106

RQ POS

Purpose

Return the current position.

Format

RQ POS [axis]

Response

POS [axis] [angle|mm]

Factor

axis:

T1	Returns the current position (angle) value of T1 Axis.
T2	Returns the current position (angle) value of T2 Axis.
Z1	Returns the current position (mm) value of Z Axis.
Z2	Returns the current position (mm) value of Z2 Axis.
A	Requests the current position (angle) value of A Axis.
B	Requests the current position (angle) value of B Axis.
R	Requests the current position (mm) values of Arm A and Arm B.
ALL	Requests the current position values of all axes.

angle: Shows the angle value. (Unit: degree)

mm: Shows the distance value. (Unit: mm)

Description

You can check the current Angle Data of the designated Axis.

Example

RQ POS T1

POS T1 270.000

RQ POS R

POS A 30.000 B 90.000

RQ POS ALL

POS T1 270.000 T2 270.000 Z1 40.000 Z2 40.000 A 30.000 B 90.000

RQ TEACH

Purpose

Return the Teach value of the designated Station.

Format

RQ TEACH [station] [arm] [state]

Response

TEACH [station] [arm] [state] T1 [t1] T2 [t2] A [a] B[b] Z1 [zup] [zmid] [zlow] [pitch]

Factor

station: Designates the Station to request the TEACH value.

arm: Designates the Arm to request the TEACH value.

state: Designates the posture to request the TEACH value (before entry: BW, after entry: FW)

t1: Requests the T1 TEACH value of the designated Station and Arm.

t2: Requests the T2 TEACH value of the designated Station and Arm.

a: Requests the A value of the designated Station and Arm.

b: Requests the B value of the designated Station and Arm.

zup: Requests the Z-Up TEACH value of the designated Station, Arm and Slot 1.

zmid: Requests the Z-Mid TEACH value of the designated Station, Arm and Slot 1.

zlow: Requests the Z-Low TEACH value of the designated Station, Arm and Slot 1.

pitch: Requests the Slot pitch of the designated Station.

Description

Check the TEACH value stored to Slot 1 from the designated Station.

Example

RQ TEACH 1 B BW

TEACH 1 B BW T1 123.456 T2 123.456 A 123.456 B 123.456 Z1 123.456 123.456 123.456 12.345

RQ ABS

Purpose

Return the Robot's current coordinates data.

Format

RQ ABS

Response

ABS X [x] Y [y] Z [z] [R|L] YAW [yaw]

Factor

x: Displays the x-coordinate value on the standard coordinates of end-effector.

y: Displays the y-coordinate value on the standard coordinates of end-effector.

z: Displays the z-coordinate value on the standard coordinates of end-effector.

R|L:

R: Right, each link is bent to the right.

L: Left, each link is bent to the left.

yaw: Displays the yaw rotation on the standard coordinates of end-effector.

Description

Return the Robot's current position coordinates data.

Example

RQ ABS

ABS X 123.456 Y 123.456 Z 123.456 R YAW 123.456

RQ OFFSET

Purpose

Return the Pick/Place Offset value.

Format

RQ OFFSET [station] [arm] [PK|PL]

Response

OFFSET [station] [arm] [PK|PL] [offset]

Factor

station:	Designates the Station to request the offset value.
arm:	Designates the Arm to request the offset value.
PK|PL:	Designate whether it is PICK offset or Place offset.
offset:	The saved Pick/Place offset value (-5.000 ~ +5.000 mm)

Description

You can check the set Pick/Place offset.

Example

RQ OFFSET 1 A PL

OFFSET 1 A PL -1.234

RQ SERVO

Purpose

Check the power supply status of the ROBOT's SERVO.

Format

RQ SERVO

Response

SERVO [ON|OFF]

Description

ON|OFF: Displays the ROBOT SERVO ON/OFF status.

Description

You can check the SERVO ON/OFF status.

Example

RQ SERVO

SERVO ON

SET HISPD

Purpose

Set the movement speed in the Wafer Unload state.

Format

SET HISPD ALL [speed]

Response

HISPD ALL [speed]

Factor

speed: Set speed from 1 to 100.(Unit: %)

Example

Below is an example of setting and returning the movement speed as 50% in the Wafer Unload state.

SET HISPD ALL 50
HISPD ALL 50

SET LOSPD

Purpose

Set the movement speed in the Wafer Load state.

Format

SET LOSPD ALL [speed]

Response

LOSPD ALL [speed]

Factor

speed: Set speed from 1 to 100.(Unit: %)

Example

Below is an example of setting and returning the movement speed as 50% in the Wafer Load state.

SET LOSPD ALL 50
LOSPD ALL 50

SET TEACH

Purpose

Save current position or designated value as Teach value.

Format

SET TEACH [station] [arm] [state]

SET TEACH [station] [arm] [state] T1 [t1] T2 [t2] A [a] B [b] Z1 [zup] [zmid] [zlow] [pitch]

Response

TEACH [station] [arm] [state] T1 [t1] T2 [t2] A [a] B [b] Z1 [zup] [zmid] [zlow] [pitch]

Factor

station: Designates the Station to save the TEACH value.

arm: Designates the Arm to save the TEACH value.

state: Designates the posture to save the TEACH value (before entry: BWR, after entry: FWR)

t1: Saves the T1 value of the designated Station and Arm.

t2: Saves the T2 value of the designated Station and Arm.

a: Saves the A value of the designated Station and Arm.

b: Saves the B value of the designated Station and Arm.

zup: Saves the Z-Up value of the designated Station, Arm and Slot 1.

zmid: Saves the Z-Mid value of the designated Station, Arm and Slot 1.

zlow: Saves the Z-Low value of the designated Station, Arm and Slot 1.

pitch: Saves the Slot pitch of the designated Station.

Description

You can save the current position as TEACH value and also save by inputting the settings by each factor. Save the relevant TEACH value to the designated Station, Arm, posture, and Slot 1.

Example

SET TEACH 1 A BWR

TEACH 1 A BWR T1 123.456 T2 123.456 A 123.456 B 123.456 Z1 123.456 123.456 123.456 12.345 Z2 123.456

SET TEACH 1 A FWR T1 123.456 T2 123.456 A 123.456 B 123.456 Z1 123.456 123.456 123.456 12.345

TEACH 1 A FWR T1 123.456 T2 123.456 A 123.456 B 123.456 Z1 123.456 123.456 123.456 12.345

SET OFFSET

Purpose

Set the Pick/Place Offset value.

Format

SET OFFSET [station] [arm] [PK|PL] [offset]

Response

OFFSET [station] [arm] [PK|PL] [offset]

Factor

station:	Designates the Station to set the offset value.
arm:	Designates the Arm to set the offset value.
PK|PL:	Designate whether it is PICK offset or Place offset.
offset:	Pick/Place offset setting (-5.000 - +5.000 mm)

Description

Set the Pick/Place Offset value.

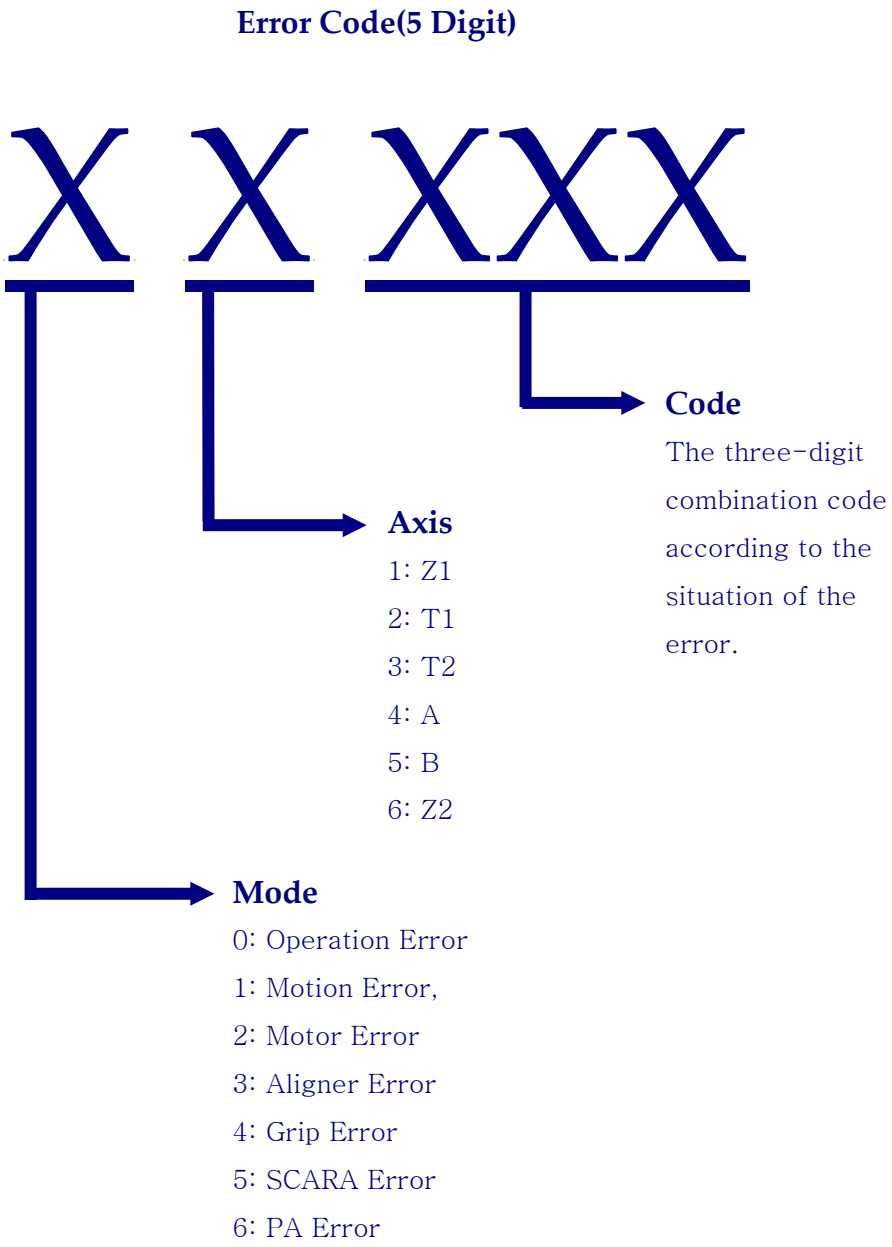
Example

SET OFFSET PK 1.234

OFFSET PK 1.234

Error Code

The Error Code is configured as a five-digit number and the configuration on each digit is as follows: The first digit is indicated as six modes to show the location of the error, the second digit indicates the axis where the error had occurred and the remaining third digit indicates a three-digit code in combination according to the situation of the error.



Error Code Description

x is a number by each axis (1: Z1-Axis, 2: T1-Axis, 3: T2-Axis, 4: Ra-Axis, 5: Rb-Axis, Z2-Axis)

Mode	Code	Description
Operation	00001	Liveman Error
	00002	There is no wafer
	00003	There is a wafer
	00004	Check operation mode
	00005	Home all is not done
	00006	Controller is not ready
	00007	Station or slot number is wrong
	00008	Command is not correct
	00009	E-Stop/User IO is disconnected
	00010	Station is not match with arm
	00011	Goto is not do after arm changed
	00012	Error is not Cleared
	00100	Initialization is failed, Reboot Robot Controller
	00101	Host COM was not Initialized
	00102	TP COM was not Initialized
	00103	Check CDA Pressure
Motion	10001	RA is not retracted
	10002	RB is not retracted
	10005	Check extend interlock
	10009	Check sensor signal
	10010	Drive is not Enabled
	10012	Error Clear is failed
Motor	2x000	Check motion board connection with drive
	2x011	Control power supply under voltage protection
	2x012	Overvoltage protection
	2x013	Main power supply under voltage protection
	2x014	Over current protection
	2x015	Over-heat protection
	2x016	Over-load protection
	2x018	Over regeneration load protection
	2x021	Encoder communication error protection
	2x023	Encoder communication data error protection
	2x024	Position deviation excess protection
	2x025	Hybrid deviation excess error protection
	2x026	Over-speed protection

	2x027	Electronic gear error protection
Motor	2x028	External scale communication data error protection
	2x029	Deviation counter overflow protection
	2x034	Software limit protection
	2x035	External scale communication error protection
	2x036	EEPROM parameter error protection
	2x037	EEPROM check code error protection
	2x038	Over-travel inhibit input protection
	2x039	Analog input excess protection
	2x040	Absolute system down error protection
	2x041	Absolute counter over error protection
	2x042	Absolute over-speed error protection
	2x044	Absolute single turn counter error protection
	2x045	Absolute multi-turn counter error protection
	2x047	Absolute status error protection
	2x048	Encoder Z-phase error protection
	2x049	Encoder CS signal error protection
	2x050	External scale status 0 error protection
	2x051	External scale status 1 error protection
	2x052	External scale status 2 error protection
	2x053	External scale status 3 error protection
	2x054	External scale status 4 error protection
	2x055	External scale status 5 error protection
	2x065	CCWTL input excess protection
	2x066	CWTL input excess protection
	2x095	Motor automatic recognition error protection
	2x100	Motor Power on is failed
	2x101	Over Time Error
	2x102	Check Reference Position
	2x103	Check Current Position
	2x104	Motor Power is not On
	2x105	Check Extend Interlock IO
	2x106	Check Wafer Presence
	2x107	Check Current Position & Encoder value
	2x108	Home Define is failed, Check serial cable with drive
	2x109	Check Grip Status
	2x120	Negative end limit protection
	2x121	Positive end limit protection

Grip	4x100	Gripper is not Move to UnGrip position
	4x101	Gripper is not Move to Grip position
	4x106	Check Wafer Presence
	4x109	Check Grip Status
	4x130	Place Moving Check Wafer Present
	4x131	Place Done Check Wafer
	4x140	Pick Moving Check Wafer Present
	4x141	Pick Done Check Wafer
	4x200	Check Wafer Error : Pick Start
	4x201	Check Wafer Error : Pick Extend
	4x210	Check Wafer Error : Place Start
	4x211	Check Wafer Error : Place Extend
	4x400	UnGrip Fail : Check Sensor Please
	4x401	Grip Fail : Check Sensor Please
SCARA	5x001	Illegal command
	5x002	Wrong number of stage
	5x003	Wrong number of arm
	5x004	Wrong number of slot
	5x005	Illegal speed range
	5x006	Wrong number of robot axis
	5x007	Invalid value of axis location
	5x008	Illegal argument value
	5x010	Invalid argument type
	5x011	Invalid robot number
	5x012	Invalid value of pitch
	5x013	Invalid value of up stroke
	5x014	Invalid value of down stroke
	5x015	Invalid value of total number of slot
	5x016	Invalid value of mapping speed
	5x017	Invalid value of reference thickness
	5x018	Invalid value of thickness margin
	5x019	Invalid value of existence margin
	5x020	Invalid robot type number
	5x021	Invalid arm type number
	5x022	Invalid value of total number of axis
	5x023	Invalid grip type number
	5x024	Invalid value of mapping sensor
	5x025	Invalid value of traverse axis

5x026	Invalid value of arm location
5x027	Invalid value of On/Off
5x028	Invalid signal number
5x029	Invalid value of delay time
5x031	Invalid value of retry count on error
5x033	Invalid value of arm distance
5x034	Invalid value of protruded material detect start position
5x035	Invalid value of protruded material detect count
5x036	Invalid value of clearance
5x037	Invalid value of material state
5x038	Invalid value of mode
5x039	Invalid value of offset
5x041	Invalid value of aligner argument
5x042	Aligner communication time-out error
5x043	Invalid value of IO
5x051	Data read busy
5x052	Data write busy
5x053	Robot control busy
5x054	Aligner busy
5x055	Ardiono busy*
5x061	Flash Busy
5x081	Stage info file load error
5x180	File Read Error
5x181	Pattern file load error
5x182	Profile file load error
5x184	Stage info file load error
5x185	Robot type file load error
5x186	Option file load error
5x201	Robot is busy
5x202	Servo power is off
5x203	On E-Stop
5x204	Robot is paused
5x205	Robot is not paused
5x206	Robot is not executing command
5x207	Robot is stopped
5x208	Robot has an error
5x209	Servo power is on
5x211	Robot paused by I/O signal

	5x212	Robot is manual mode
	5x213	Robot is auto mode
	5x215	Robot Stopped by Extend Signal Disable
	5x222	Error on material status during mapping
	5x224	Material detected before mapping
	5x225	Station does not match previous one
	5x232	Map scan data does not exist
	5x233	Map scan data does not Match
	5x234	Map scan data detected over slot
	5x241	Robot hand is already flipped
	5x242	Robot hand is not flipped
	5x243	Robot can't flip this position
	5x261	Aligner module is not connected
	5x262	Aligner connect fail
	5x271	Need re-set variable pitch
	5x291	Need stage teaching
	5x292	Need stage parameter config
	5x293	This stage is flipped location
	5x294	This stage is not flipped location
	5x295	Clearance value is set to be wrong
	5x301	Handling material before GETFROM
	5x302	Not Handling material before PUTINTO
	5x303	Not Handling material after GETFROM
	5x304	Handling material before PUTINTO
	5x307	Illegal Check sensor status
	5x312	Current robot position is dangerous
	5x350	Slave Servo ON Timeout
	5x401	Data read error
	5x402	Writing host serial port time-out error
PA	6x1xx	Robot Related Errors
	6x2xx	Standard System Errors
	6x3xx	Hardware Device Related Errors
	6x4xx	Configuration Parameter Database, Datalogger, and CPU Monitor Errors
	6x500~	Input and Output Errors
	6x550~	Controller Errors
	6x6xx	Network, Socket, and Communication Errors
	6x7xx,6x8xx	Language Related Errors
	6x9xx	Servo Related Errors