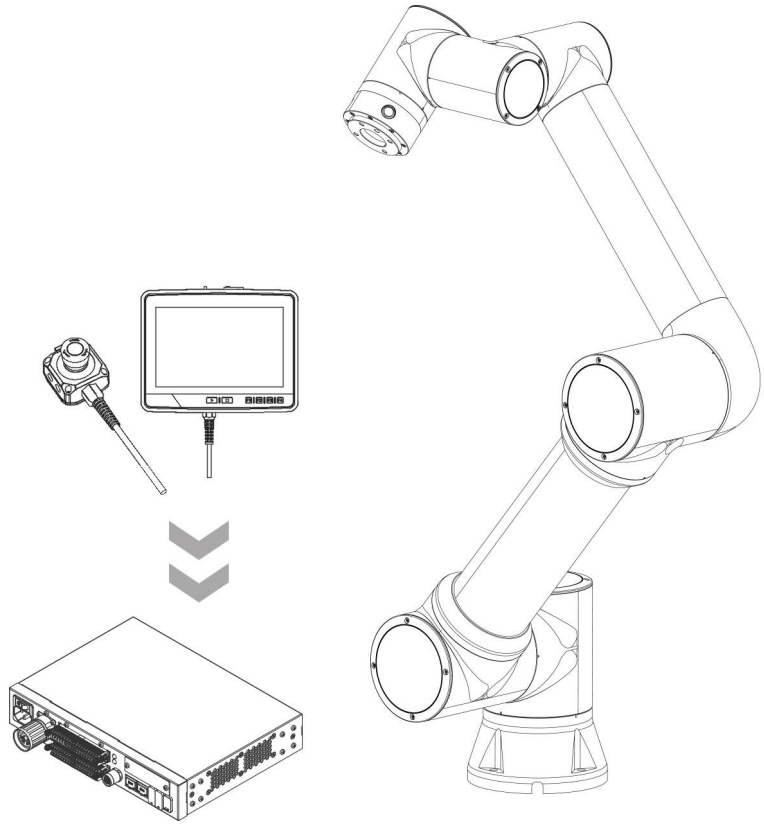
FAIRINO

Cobot Controller Communication Instruction Protocol (V3.9.6)

User Manual



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Data Encoding 20200310

Illustrate:

(1) This manual is applicable to cobots of WebApp version 3.9.6, and the contents of the manual are subject to change without notice. To view other versions of the cobot controller communication command protocol, please log in to the FAO documentation:

Chinese (simplified Chinese) online document link： https://fairino-doc-zhs.readthedocs.io/

Chinese (Traditional) link： https://fairino-doc-zht.readthedocs.io/

English link： https://fairino-doc-en.readthedocs.io/

Japanese link： https://fairino-doc-ja.readthedocs.io/

(2) All protocol instruction examples in this manual are based on the FR5 robot as an example and are for reference only. Different robot models and different postures will lead to different parameters, please refer to the specific protocol format for the actual operation protocol.

Catalogue

1 Overview

This version of the collaborative robot controller communication instruction protocol is only applicable to the FR series robot V3.9.6 version controller general instruction.

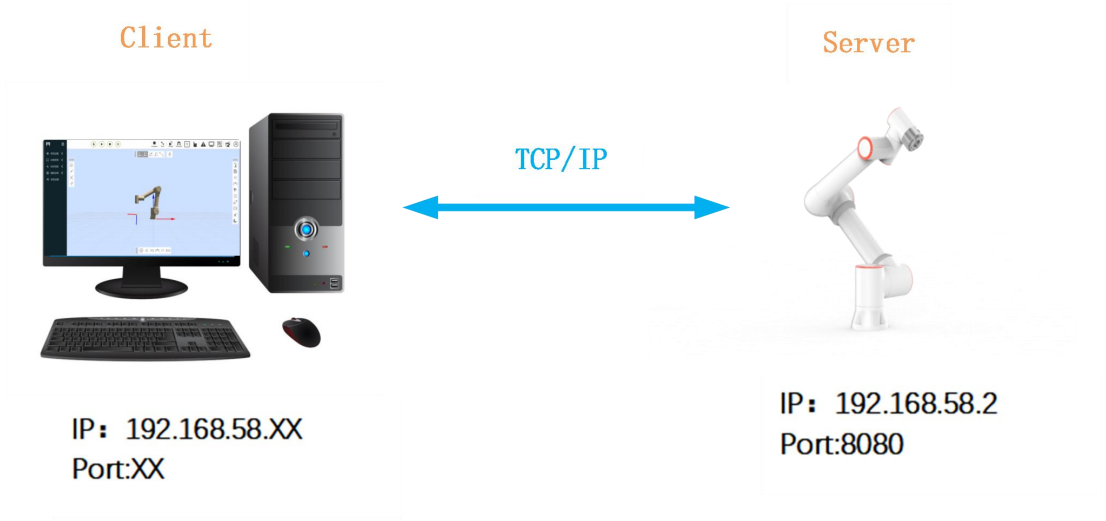

Figure 1-1, system block diagram

1.1 Communication protocol standard format

Table 1-1-1 Communication protocol format

The frame header	break	ID	break	type of instruction	break	DL	break	Data content	break	End of frame
/f/b	III	CNT	III	CMD_ID	III	LEN	III	DATA	III	/b/f

Table 1-1-2 Detailed description of the agreement content

	content	define
1	The frame header	The agreement is "/f/b", which is the beginning of a frame
2	End of frame	The agreement is "/b/f", which is the end of a frame
3	break	The term "III" is used to divide the fields
4	type of instruction	Used for calibration of specific instructions, see data content for details

5	ID	The unique identifier of the message, which corresponds to the message in the response. It can also be understood as the frame count, uint16_t
6	DL	The length of the data content
7	Data content	According to the instruction, the stored contents are different. For details of the specific format, see the data content

1.2 Version update instructions

This version of the protocol applies to V3.9.6 collaborative robots and has the following changes compared to V3.9.5,The new interface functions are as follows:

Table 1-2-1 Add instruction interface in the version

指令名称	description
ServoMITStart()	Start the ServoMIT movement
ServoMITEnd()	End the ServoMIT movement
ServoMIT()	ServoMIT Movement
ServoJV()	ServoJV Movement
SetLaserWeldingStart()	Turn the laser welder on and off
SetLaserWeldingEnable()	Laser welding machines make it possible to...
ResetLaserWeldingErr()	Laser welding machine fault reset
GetLaserWeldingRunningState()	Obtain the operating status of the laser welder
GetLaserWeldingErrState()	Get the fault status of the laser welder
SetLaserWeldingParam()	Write the configuration parameters for one of the 10 process groups into the laser welding machine and configure them for the machine.
GetLaserWeldingParamTarget()	Obtain the configuration parameters for one of the 10 process groups of the laser welding

	machine.
GetLaserWeldingParamActual()	Get the current active configuration parameters of the laser welder
SetLaserWeldingEnableExtDoNum()	The laser welding machine is equipped with extended IO, and the DO port is enabled.
SetLaserWeldingStartExtDoNum()	The laser welding machine is equipped with extended IO and has DO ports activated.
SetLaserWeldingErrResetExtDoNum()	The laser welding machine is equipped with an extended IO port and a fault reset function for the DO port.
SetLaserWeldingRunningStateExtDiNum()	Configure the operating status (light output state) of the laser welding machine - Extended DI
SetLaserWeldingErrStateExtDiNum()	Configure the operating status (light output state) of the laser welding machine - Extended DI

2 Robot motion commands

2.1 MoveJ()

Control the robot's PTP joint movement.

Table 2-1 MoveJ() instruction protocol 1

	order	type	name	description
parameter	1	float	J1	J1 target joint position, unit: [°]
	2	float	J2	J2 target joint position, unit: [°]
	3	float	J3	J3 target joint position, unit: [°]
	4	float	J4	J4 target joint position, unit: [°]
	5	float	J5	J5 target joint position, unit: [°]
	6	float	J6	J6 target joint position, unit: [°]
	7	float	x	Target Cartesian position x, unit: [mm]
	8	float	y	Target Cartesian position y, unit: [mm]
	9	float	z	Target Cartesian position z, unit: [mm]
	10	float	rx	The target Cartesian position rx, unit: [°]
	11	float	ry	The target Cartesian position ry, unit: [°]
	12	float	rz	The target Cartesian pose is rz, unit: [°]
	13	int	toolNum	Tool number，0 to 14
	14	int	workPieceNum	Workpiece number，0 to 14
	15	float	speed	Speed percentage, 0 to 100
	16	float	acc	Acceleration percentage, 0 to 100
	17	int	ovl	Speed scale factor, 0 to 100
	18	float	exaxisPos1	Extend the position of axis 1, unit: [mm]
	19	float	exaxisPos2	Extend axis 2 position, unit: [mm]
	20	float	exaxisPos3	Extend axis 3 position, unit: [mm]
	21	float	exaxisPos4	Extend axis 4 position, unit: [mm]
	22	float	blendT	[-1]: Stop (block) at this position; [0~500]: Smooth time (non-block), unit [ms]
	23	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece coordinate system, 2-tool coordinate system, 3-base coordinate system

	24	float	dt_x	Offset x, unit: [mm]
	25	float	dt_y	Offset y, unit: [mm]
	26	float	dt_z	Offset z, unit: [mm]
	27	float	dt_rx	Offset rx, unit: [°]
	28	float	dt_ry	Offset ry, unit: [°]
	29	float	dt_rz	Offset rz, unit: [°]
returned value		int	errcode	Error code
Command number	201			
instance	Send the frame	/f/bIII4III201III152IIIMoveJ(-116.061,-90.725,91.261,-90.757,-90.399,2.142,100,498.776,474.670,-179.764,-0.390,-28.204,0,0,100,180,100,0.000,0.000,0.000,0.000,0,0,0,0,0,0,0,0)III/b/f		
	Receive frame	/f/bIII4III201III1III1III/b/f		

Table 2-2 MoveJ() command protocol 2 (for laser point taking)

	order	type	name	description
	1	int	count	The number of parameters below is 29 by default
	2	float	J1	J1 target joint position, unit: [°]
	3	float	J2	J2 target joint position, unit: [°]
	4	float	J3	J3 target joint position, unit: [°]
	5	float	J4	J4 target joint position, unit: [°]
	6	float	J5	J5 target joint position, unit: [°]
	7	float	J6	J6 target joint position, unit: [°]
	8	float	x	Target Cartesian position x, unit: [mm]
parameter	9	float	y	Target Cartesian position y, unit: [mm]
	10	float	z	Target Cartesian position z, unit: [mm]
	11	float	rx	The target Cartesian position rx, unit: [°]
	12	float	ry	The target Cartesian position ry, unit: [°]
	13	float	rz	The target Cartesian pose is rz, unit: [°]
	14	int	toolNum	Tool number，0 to 14
	15	int	workPieceNum	Workpiece number，0 to 14
	16	float	speed	Speed percentage, 0 to 100
	17	float	acc	Acceleration percentage, 0 to 100

	18	int	ovl	Speed scale factor, 0 to 100
	19	float	exaxisPos1	Extend axis 1 position, unit: [mm]
	20	float	exaxisPos2	Extend axis 2 position, unit: [mm]
	21	float	exaxisPos3	Extend axis 3 position, unit: [mm]
	22	float	exaxisPos4	Extended axis 4 position, unit: [mm]
	23	float	blendT	[-1]: Stop (block) at this position; [0~500]: Smooth time (non-block), unit [ms]
	24	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece coordinate system, 2-tool coordinate system, 3-base coordinate system
	25	float	dt_x	Offset x, unit: [mm]
	26	float	dt_y	Offset y, unit: [mm]
	27	float	dt_z	Offset z, unit: [mm]
	28	float	dt_rx	Offset rx, unit: [°]
	29	float	dt_ry	Offset ry, unit: [°]
	30	float	dt_rz	Offset rz, unit: [°]
returned value		int	errcode	Error code
Command number	201			
instance	Send the frame	/f/bIII4III201III156IIIMoveJ(29,{-116.061,-90.725,91.261,-90.757,-90.399,2.142,100,498.776,474.670,-179.764,-0.390,-28.204,0,0,100,180,100,0.000,0.000,0.000,0.000,0,0,0,0,0,0,0,0})III/b/f		
	Receive frame	/f/bIII4III201III1III1III/b/f		

Table 2-3 MoveJ() instruction protocol 3

	order	type	name	description
parameter	1	char	pointName[128]	The target point name can be recorded by WebAPP
returned value		int	errcode	Error code
Command number	201			
instance	Send the frame	/f/bIII4III201III11IIIMoveJ(“P1”)III/b/f		
	Receive frame	/f/bIII4III201III1III1III/b/f		

2.2 MoveC()

Control the robot's Cartesian arc motion.

Table 2-4 MoveC() instruction protocol 1

	order	type	name	description
parameter	1	float	J1	Target joint position 1 unit:[°]
	2	float	J2	
	3	float	J3	
	4	float	J4	
	5	float	J5	
	6	float	J6	
	7	float	x	Target pose 1 Unit: [mm] rxryrz Unit: [°]
	8	float	y	
	9	float	z	
	10	float	rx	
	11	float	ry	
	12	float	rz	
	13	int	toolNum	Tool number1，0 to 14
	14	int	workPieceNum	Workpiece number1，0 to 14
	15	float	speed	Speed percentage 1,0 to 100
	16	float	acc	Acceleration percentage 1,0 to 100
	17	float	exaxisPos1	Extend axis 1 position, unit: [mm]
	18	float	exaxisPos2	Extend axis 2 position, unit: [mm]
	19	float	exaxisPos3	Extend axis 3 position, unit: [mm]
	20	float	exaxisPos4	Extended axis 4 position, unit: [mm]
	21	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece coordinate system, 2-tool coordinate system, 3-base coordinate system
	22	float	dt_x	Point 1 offset Unit: [mm] rxryrz Unit: [°]
	23	float	dt_y	
	24	float	dt_z	
	25	float	dt_rx	

26	float	dt_ry	
27	float	dt_rz	
28	float	J1	
29	float	J2	
30	float	J3	Target joint position 2
31	float	J4	unit:[°]
32	float	J5	
33	float	J6	
34	float	x	
35	float	y	
36	float	z	Target pose 2
37	float	rx	Unit: [mm]
38	float	ry	rxryrz Unit: [°]
39	float	rz	
40	int	toolNum	Tool number2，0 to 14
41	int	workPieceNum	Workpiece number2，0 to 14
42	float	speed	Speed percentage 2,0 to 100
43	float	acc	Acceleration percentage 2,0 to 100
44	float	exaxisPos1	Extend the position of axis 1, unit: [mm]
45	float	exaxisPos2	Extend axis 2 position, unit: [mm]
46	float	exaxisPos3	Extend axis 3 position, unit: [mm]
47	float	exaxisPos4	Extended axis 4 position, unit: [mm]
48	uint8_t	offset_flag	Whether to do offset, 0-no,1-workpiece coordinate system, 2-tool coordinate system, 3-base coordinate system
49	float	dt_x	Point 2 offset
50	float	dt_y	Unit: [mm]
51	float	dt_z	rxryrz Unit: [°]
52	float	dt_rx	

	53	float	dt_ry	
	54	float	dt_rz	
	55	uint8_t	ovl	Speed scale factor, 0 to 100
	56	float	blendR	[-1]: Stop (block) at this position; [0~1000] Smooth radius (non-block), unit [mm]
	57	float	oacc	Acceleration scaling factor
	58	uint8_t	velAccParamMode	Velocity acceleration parameter mode: 0-percentage; 1- Practical physical significance (mm/s, mm/s2)
returned value		int	errcode	Error code
Command number	202			
instance	Send frame	/f/bIII121III202III304IIIMoveC(-4.291,-46.450,70.119,-113.669,-90.000,148.229,-848.172,-95.810,290.300,-180.000,-0.000,-62.520,0,0,100,100,0.000,0.000,0.000,0.000,0,0,0,0,0,0,0,14.319,-89.969,90.041,-89.922,0.998,0.001,-432.777,-383.942,701.040,8.630,88.991,-67.053,0,0,100,180,0.000,0.000,0.000,0.000,0,0,0,0,0,0,0,100,-1,100,0)III/b/f		
	Receive frame	/f/bIII4III202III1III1III/b/f		

Table 2-5 MoveC() instruction protocol 2

	order	type	name	description
parameter	1	char	pointName[128]	The name of the midpoint can be recorded by WebAPP
	2	char	pointName[128]	The target point name can be recorded by WebAPP
returned value		int	errcode	Error code
Command number	202			
instance	Send the frame	/f/bIII4III202III16IIIMoveJ(“P1”,“P2”)III/b/f		
	Receive frame	/f/bIII4III202III1III1III/b/f		

2.3 MoveL()

Control the robot's Cartesian space linear motion.

Table 2-6 MoveL() instruction protocol 1

	order	type	name	description

parameter	1	float	J1	J1 target joint position, unit: [°]
	2	float	J2	J2 target joint position, unit: [°]
	3	float	J3	J3 target joint position, unit: [°]
	4	float	J4	J4 target joint position, unit: [°]
	5	float	J5	J5 target joint position, unit: [°]
	6	float	J6	J6 target joint position, unit: [°]
	7	float	x	Target Cartesian position x, unit: [mm]
	8	float	y	Target Cartesian position y, unit: [mm]
	9	float	z	Target Cartesian position z, unit: [mm]
	10	float	rx	The target Cartesian position rx, unit: [°]
	11	float	ry	The target Cartesian position ry, unit: [°]
	12	float	rz	The target Cartesian pose is rz, unit: [°]
	13	int	toolNum	Tool number，0 to 14
	14	int	workPieceNum	Workpiece number，0 to 14
	15	float	speed	Speed percentage, 0 to 100
	16	float	acc	Acceleration percentage, 0~100
	17	int	ovl	Speed scale factor, 0~100
	18	float	blendR	[-1]: Stop (block) at this position; [0~1000]: Smooth radius (non-block), unit [mm]
	19	uint8_t	blendMode	Transition mode: 0: internal transition, 1: corner point transition
	20	float	exaxisPos1	Extend shaft 1 position, unit: [mm]
	21	float	exaxisPos2	Extend axis 2 position, unit: [mm]
	22	float	exaxisPos3	Extend axis 3 position, unit: [mm]
	23	float	exaxisPos4	Extend axis 4 position, unit: [mm]
	24	uint8_t	search_flag	Whether the welding wire is located, 0-no, 1-yes
	25	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece coordinate system, 2-tool coordinate system, 3-base coordinate system
	26	float	dt_x	Offset x, unit: [mm]
	27	float	dt_y	Offset y, unit: [mm]

	28	float	dt_z	Offset z, unit: [mm]
	29	float	dt_rx	Offset rx, unit: [°]
	30	float	dt_ry	Offset ry, unit: [°]
	31	float	dt_rz	Offset rz, unit: [°]
	32	float	oacc	Acceleration scaling factor
	33	uint8_t	velAccParamMode	Velocity acceleration parameter mode: 0-percentage; 1- Practical physical significance (mm/s, mm/s2)
returned value	int	errcode	Error code	
Command number	203			
instance	Send the frame	/f/bIII123III203III164IIIMoveL(3.580,-83.769,132.494,-138.725,-90.000,156.101,-423.534,-185.807,290.307,-180.000,-0.000,-62.521,0,0,100,100,100,-1,0,0.000,0.000,0.000,0.000,0,0,0,0,0,0,0,0)III/b/f		
	Receive frame	/f/bIII4III203III1III1III/b/f		

Table 2-7 MoveL() command protocol 2 (for laser tracking)

	order	type	name	description
parameter	1	char	param_name[20]	The default is "seamPos", weld identification point
	2	int	toolNum	Tool number，0 to 14
	3	int	workPieceNum	Workpiece number，0 to 14
	4	float	speed	Speed percentage, 0 to 100
	5	float	acc	Acceleration percentage, 0~100
	6	int	ovl	Speed scale factor, 0 to 100
	7	float	blendR	Smooth radius, 0~10mm
	8	uint8_t	flag	1-Execute record data, 0-Execute planning data
	9	uint8_t	plateType	Set the type of welding plate. The default value is 0
returned value		int	errcode	Error code
Command number	203			
instance	Send the frame	/f/bIII123III203III45IIIMoveL(“seamPos”,0,0,100,100,100,0,0,0)III/b/f		
	Receive frame	/f/bIII4III203III1III1III/b/f		

Table 2-8 MoveL() instruction protocol 3

	order	type	name	description
parameter	1	char	pointName[128]	The target point name can be recorded by WebAPP
returned value		int	errcode	Error code
Command number	203			
instance	Send the frame	/f/bIII4III2031III11IIIMoveL(“P1”)III/b/f		
	Receive frame	/f/bIII4III201III1III1III/b/f		

2.4 StartJOG()

Control the robot's single axis point command.

Table 2-9 StartJOG() Directive protocol

	order	type	name	description
parameter	1	uint8_t	motionCmd	Movement command, 0-joint coordinate, 2-base coordinate, 4-tool coordinate
	2	uint8_t	jointNum	Joints j1~j6 (1~6), Cartesian x, y, z, a, b, c (1~6)
	3	uint8_t	direction	Turning direction: 0-reverse, negative direction, 1-forward, positive direction
	4	float	vel	Speed percentage, 0~100
	5	float	acc	Acceleration percentage, 0 to 100
	6	float	maxDistance	Maximum distance or Angle of single point movement, unit mm or °
returned value		int	errcode	Error code
Command number	232			
instance	Send the frame	/f/bIII127III232III25IIIStartJOG(0,3,1,30,180,30)III/b/f		
	Receive frame	/f/bIII4III232III1III1III/b/f		

2.5 ServoJ()

Control the robot servo to be in place and execute joint space commands.

Table 2-10 ServoJ() Directive protocol

	order	type	name	description
parameter	1	float	j1	joint position unit:[°]

	2	float	j2	
	3	float	j3	
	4	float	j4	
	5	float	j5	
	6	float	j6	
	7	float	exaxisPos1	Extend the position of axis 1, unit: [mm]
	8	float	exaxisPos2	Extend axis 2 position, unit: [mm]
	9	float	exaxisPos3	Extend axis 3 position, unit: [mm]
	10	float	exaxisPos4	Extended axis 4 position, unit: [mm]
	11	float	acc	Acceleration ratio, 0~100, default is 0
	12	float	vel	Speed ratio, 0~100, default is 0
	13	float	interval	instruction cycle [s]
	14	float	filterTime	Filter time [s], temporarily unavailable
	15	float	posGain	The proportional amplifier for the target position is temporarily unavailable
returned value		int	errcode	Error code
Command number	376			
instance	Send frame	/f/bIII4III376III90IIIServoJ(-47.195,-173.820,104.056,-110.230,137.199,134.998,0.000,0.000,.000,.000,0,0,10,0,0)III/b/f		
	Receive frame	/f/bIII4III376III1III1III/b/f		

2.6 ServoCart()

Control the robot servo to position and execute Cartesian space commands.

Table 2-11 ServoCart() Directive protocol

	order	type	name	description
parameter	1	uint8_t	posMode	Position type: 0-absolute position, 1-relative position (base coordinate system), 2-relative position (tool coordinate system)
	2	float	x	Cartesian position

		float	y	Unit: [mm]
		float	z	Rx, ry, rz unit: [°]
		float	rx	
		float	ry	
		float	rz	
		float	x_gain	
		float	y_gain	
	3	float	z_gain	The pose ratio coefficient can be used in the case of relative pose
		float	rx_gain	
		float	ry_gain	
		float	rz_gain	
	4	float	exaxisPos 1	Extension axis 1 position, unit: [mm or]
		float	exaxisPos 2	Extension axis 2 position, unit: [mm or]
		float	exaxisPos 3	Extension axis 3 position, unit: [mm or]
		float	exaxisPos 4	Extension axis 4 position, unit: [mm or]
	5	float	acc	Acceleration ratio, 0~100, default is 0
	6	float	vel	Speed ratio, 0~100, default is 0
	7	float	interval	instruction cycle [s]
	8	float	filterTime	Filter time [s], temporarily unavailable
	9	float	posGain	The proportional amplifier for target position is temporarily unavailable
returned value		int	errcode	Error code
Command number	377			
instance	Send the frame	/f/bIII4III377III99IIIServoCart(0,{848.172,-95.810,290.300,-180.000,-0.000,-62.520},{0,0,0,0,0,0},{0,0,0,0},0,0,0.01,0,0)III/b/f		
	Receive frame	/f/bIII4III377III1III1III/b/f		

2.7 Circle()

Control the robot's circular motion command.

Table 2-12 Circle() Directive protocol 1

	order	type	name	description
parameter	1	float	J1	Target joint position 1 unit:[°]
	2	float	J2	
	3	float	J3	
	4	float	J4	
	5	float	J5	
	6	float	J6	
	7	float	x	Target pose 1 Unit: [mm] rxryrz Unit: [°]
	8	float	y	
	9	float	z	
	10	float	rx	
	11	float	ry	
	12	float	rz	
	13	int	toolNum	Tool number1，0 to 14
	14	int	workPieceNum	Workpiece number1，0 to 14
	15	float	speed	Speed percentage 1,0 to 100
	16	float	acc	Acceleration percentage 1,0~100
	17	float	exaxisPos1	Extend the position of axis 1, unit: [mm]
	18	float	exaxisPos2	Extend axis 2 position, unit: [mm]
	19	float	exaxisPos3	Extend axis 3 position, unit: [mm]
	20	float	exaxisPos4	Extended axis 4 position, unit: [mm]
	21	float	J1	Target joint position 2 unit:[°]
	22	float	J2	
	23	float	J3	
	24	float	J4	
	25	float	J5	
	26	float	J6	
	27	float	x	Target pose 2 Unit: [mm] rxryrz Unit: [°]
	28	float	y	
	29	float	z	
	30	float	rx	
	31	float	ry	
	32	float	rz	

	33	int	toolNum	Tool number2，0 to 14
	34	int	workPieceNum	Workpiece number2，0 to 14
	35	float	speed	Speed percentage 2,0 to 100
	36	float	acc	Acceleration percentage 2,0 to 100
	37	float	exaxisPos1	Extend axis 1 position, unit: [mm]
	38	float	exaxisPos2	Extend axis 2 position, unit: [mm]
	39	float	exaxisPos3	Extend axis 3 position, unit: [mm]
	40	float	exaxisPos4	Extended axis 4 position, unit: [mm]
	41	uint8_t	ovl	Speed scale factor, 0 to 100
	42	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece coordinate system, 2-tool coordinate system, 3-base coordinate system
	43	float	dt_x	Point 2 offset Unit: [mm] rxryrz Unit: [°]
	44	float	dt_y	
	45	float	dt_z	
	46	float	dt_rx	
	47	float	dt_ry	
	48	float	dt_rz	
	49	float	oacc	Acceleration scaling factor
	50	float	blendR	[-1]: Stop (block) at this position; [0~1000] Smooth radius (non-blocking), unit [mm]
	51	uint8_t	velAccParamMode	Velocity acceleration parameter mode: 0-percentage; 1- Practical physical significance (mm/s, mm/s2)
returned value		int	errcode	Error code
Command number	540			
instance	Send the frame	/f/bIII131III540III281IIICircle(-4.291,-46.450,70.119,-113.669,-90.000,148.229,-848.172,-95.810,290.300,-180.000,-0.000,-62.520,0,0,100,100,0.000,0.000,0.000,0.000,14.319,-89.969,90.041,-89.922,0.998,0.001,-432.777,-383.942,701.040,8.630,88.991,-67.053,0,0,100,180,0.000,0.000,0.000,0.000,10,0,0,0,0,0,0,0)III/b/f			
	Receive frame	/f/bIII4III540III1III1III/b/f		

Table 2-13 Circle() Directive protocol 2

	order	type	name	description
parameter	1	char	pointName[128]	The name of the midpoint can be recorded by WebAPP

returned value	2	char	pointName[128]	The target point name can be recorded by WebAPP
		int	errcode	Error code
Command number	540			
instance	Send the frame	/f/bIII4III540III4IIICircle(“P1”,“P2”)III/b/f		
	Receive frame	/f/bIII4III540III1III1III/b/f		

2.8 Spiral()

Control the robot's helical motion command.

Table 2-14 Spiral() Directive protocol 1

	order	type	name	description
parameter	1	float	J1	Target joint position 1 unit:[°]
	2	float	J2	
	3	float	J3	
	4	float	J4	
	5	float	J5	
	6	float	J6	
	7	float	x	Target pose 1 Unit: [mm] rxryrz Unit: [°]
	8	float	y	
	9	float	z	
	10	float	rx	
	11	float	ry	
	12	float	rz	
	13	int	toolNum	Tool number1，0 to 14
	14	int	workPieceNum	Workpiece number1，0 to 14
	15	float	speed	Speed percentage 1,0~100
	16	float	acc	Acceleration percentage 1,0~100
	17	float	exaxisPos1	Extend axis 1 position, unit: [mm]

18	float	exaxisPos2	Extend axis 2 position, unit: [mm]
19	float	exaxisPos3	Extend axis 3 position, unit: [mm]
20	float	exaxisPos4	Extend axis 4 position, unit: [mm]
21	float	J1	
22	float	J2	
23	float	J3	Target joint position 2
24	float	J4	unit:[°]
25	float	J5	
26	float	J6	
27	float	x	
28	float	y	Target pose 2 Unit: [mm] rxryrz Unit: [°]
29	float	z	
30	float	rx	
31	float	ry	
32	float	rz	
33	int	toolNum	Tool number2，0 to 14
34	int	workPieceNum	Workpiece number2，0 to 14
35	float	speed	Speed percentage 2,0 to 100
36	float	acc	Acceleration percentage 2,0 to 100
37	float	exaxisPos1	Extend the position of axis 1, unit: [mm]
38	float	exaxisPos2	Extend axis 2 position, unit: [mm]
39	float	exaxisPos3	Extend axis 3 position, unit: [mm]
40	float	exaxisPos4	Extended axis 4 position, unit: [mm]
41	float	J1	
42	float	J2	
43	float	J3	Target joint position 3
44	float	J4	unit:[°]
45	float	J5	
46	float	J6	

47	float	x	Target pose 3 Unit: [mm] rxryrz Unit: [°]
48	float	y	
49	float	z	
50	float	rx	
51	float	ry	
52	float	rz	
53	int	toolNum	Tool number3，0 to 14
54	int	workPieceNum	Workpiece number3，0 to 14
55	float	speed	Speed percentage 3,0 to 100
56	float	acc	Acceleration percentage 3,0 to 100
57	float	exaxisPos1	Extend axis 1 position, unit: [mm]
58	float	exaxisPos2	Extend axis 2 position, unit: [mm]
59	float	exaxisPos3	Extend axis 3 position, unit: [mm]
60	float	exaxisPos4	Extended axis 4 position, unit: [mm]
61	uint8_t	ovl	Speed scale factor, 0 to 100
62	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece coordinate system, 2-tool coordinate system, 3-base coordinate system
63	float	dt_x	Point 2 offset Unit: [mm] rxryrz Unit: [°]
64	float	dt_y	
65	float	dt_z	
66	float	dt_rx	
67	float	dt_ry	
68	float	dt_rz	
69	double	circleNum	Number of spiral turns
70	double	rxChange	Pose Angle correction-rx
71	double	ryChange	Pose Angle correction-ry
72	double	rzChange	Pose Angle correction-rz
73	double	radiusAdd	Radius increment-unit: mm
74	double	rotAxisAdd	Axis increment-unit: mm

	75	uint8_t	oacc	Acceleration scale factor, 0~100
returned value		int	errcode	Error code
Command number	552			
instance	Send the frame	/f/bIII133III552III428IIISpiral(3.580,-83.769,132.494,-138.725,-90.000,156.101,-423.534,-185.807,290.307,-180.000,-0.000,-62.521,0,0,100,100,0.000,0.000,0.000,0.000,-4.291,-46.450,70.119,-113.669,-90.000,148.229,-848.172,-95.810,290.300,-180.000,-0.000,-62.520,0,0,100,100,0.000,0.000,0.000,0.000,14.319,-89.969,90.041,-89.922,0.998,0.001,-432.777,-383.942,701.040,8.630,88.991,-67.053,0,0,100,180,0.000,0.000,0.000,0.000,20,0,0,0,0,0,0,5,0,0,0,10,10)III/b/f	
	Receive frame	/f/bIII4III552III1III1III/b/f		

2.9 NewSpiral()

Control the robot's new helical motion command.

Table 2-15 NewSpiral() Directive protocol

	order	type	name	description
parameter	1	float	J1	Target joint position 1 unit:[°]
	2	float	J2	
	3	float	J3	
	4	float	J4	
	5	float	J5	
	6	float	J6	
	7	float	x	Target pose 1 Unit: [mm] rxryrz Unit: [°]
	8	float	y	
	9	float	z	
	10	float	rx	
	11	float	ry	
	12	float	rz	
	13	int	toolNum	Tool number1，0 to 14
	14	int	workPieceNum	Workpiece number1，0 to 14

	15	float	speed	Speed percentage 1,0~100
	16	float	acc	Acceleration percentage 1,0 to 100
	17	float	exaxisPos1	Extend the position of axis 1, unit: [mm]
	18	float	exaxisPos2	Extend axis 2 position, unit: [mm]
	19	float	exaxisPos3	Extend axis 3 position, unit: [mm]
	20	float	exaxisPos4	Extended axis 4 position, unit: [mm]
	21	uint8_t	ovl	Speed scale factor, 0 to 100
	22	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece/base coordinate system
	23	float	dt_x	Position offset Unit: [mm] rxryrz Unit: [°]
	24	float	dt_y	
	25	float	dt_z	
	26	float	dt_rx	
	27	float	dt_ry	
	28	float	dt_rz	
	29	double	circleNum	Number of spiral turns
	30	double	circleAngle	Slope Angle of the spiral, unit °
	31	double	radiusInitial	Initial radius, unit: mm
	32	double	radiusAdd	Radius increment, unit: mm
	33	double	rotAxisAdd	Increment in the direction of rotation, unit: mm
	34	uint8_t	rotDirection	Rotation direction, 0: clockwise, 1: counterclockwise
	35	uint8_t	velAccParamMode	Velocity and acceleration parameter model, 0: constant angular velocity, 1: constant linear velocity
returned value		int	errcode	Error code
Command number	577			
instance	Send the frame	/f/bIII4III577III183IIINewSpiral(3.580,-83.769,132.494,-138.725,-90.000,156.101,-423.534,-185.807,290.307,-180.000,-0.000,-62.521,0,0,100,100,0.000,0.000,0.000,0.000,100,2,50,0,0,-30,0,0,5,30,50,10,10,0,0)III/b/f		
	Receive frame	/f/bIII4III577III1III1III/b/f		

2.10 HorizonSpiralMotionStart()

Control the horizontal spiral motion start command.

Table 2-16 HorizonSpiralMotionStart() Directive protocol

	order	type	name	description
parameter	1	double	radius	Initial radius, unit: mm
	2	double	revPerSec	Rotation speed, unit rev/s
	3	double	rotDirection	Rotation direction, 0: clockwise, 1: counterclockwise
	4	double	dipAngle	dip
returned value		int	errcode	Error code
Command number	870			
instance	Send the frame	/f/bIII4IIII870III37IIIHorizonSpiralMotionStart(100,50,0,20)III/b/f		
	Receive frame	/f/bIII4IIII870III1III1III/b/f		

2.11 HorizonSpiralMotionEnd()

Control the end command of horizontal spiral motion of the robot.

Table 2-17 HorizonSpiralMotionEnd() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	871			
instance	Send the frame	/f/bIII4IIII871III24IIIHorizonSpiralMotionEnd()III/b/f		
	Receive frame	/f/bIII4IIII871III1III1III/b/f		

2.12 MoveCart()

Control the robot's Cartesian spatial point-to-point motion command.

Table 2-18 MoveCart() Directive protocol

	order	type	name	description
parameter	1	table	pos={x,y,z,rx,ry,rz}	Target position, xyz unit: [mm], rxryrz unit: [°]
	2	int	toolNum	Tool number，0 to 14
	3	int	workPieceNum	Workpiece number，0 to 14
	4	float	speed	Speed percentage, 0~100
	5	float	acc	Acceleration percentage, 0 to 100
	6	float	ovl	Speed scale factor, 0~100
	7	float	blend	[-1.0] is not smooth, the movement is in place, 0~500 smoothing time, unit ms
	8	int	config	The default value of the joint space configuration is-1 (solve based on the current position), and 0~7 are solved according to the specific joint space configuration
returned value		int	errcode	Error code
Command number	351			
instance	Send the frame	/f/bIII4III351III79IIIMoveCart({-423.534,-185.807,290.307,-180.000,-0.000,-62.521},1,1,50,50,50,0,-1)III/b/f		
	Receive frame	/f/bIII4III351III1III1III/b/f		

2.13 dmpMotion()

Control the DMP joint movement of the robot.

Table 2-19 dmpMotion Directive protocol

	order	type	name	description
parameter	1	float	J1	Target joint position 1 unit:[°]
		float	J2	
		float	J3	
		float	J4	

		float	J5	
		float	J6	
		float	x	
		float	y	
		float	z	Target pose 1
	2	float	rx	Unit: [mm]
		float	ry	rxryrz Unit: [°]
		float	rz	
	3	int	toolNum	Tool number1， 0 to 14
	4	int	workPieceNum	Workpiece number， 0 to 14
	5	float	vel	Speed ratio, 0~100, default is 0
	6	float	acc	Acceleration percentage, 0 to 100
	7	float	ovl	Speed scale factor, 0~100
		float	exaxisPos1	Extend the position of axis 1, unit: [mm]
	8	float	exaxisPos2	Extend axis 2 position, unit: [mm]
		float	exaxisPos3	Extend axis 3 position, unit: [mm]
		float	exaxisPos4	Extended axis 4 position, unit: [mm]
	9	float	oacc	Acceleration scale factor, 0~100
returned value		int	errcode	Error code
Command number		352		
instance	Send frames	/f/bIII24III352III153IIIdmpMotion({3.580,-83.769,132.494,-138.725,-90.000,156.101},{-423.534,-185.807,290.307,-180.000,-0.000,-62.521},0,0,100,100,100,{0.000,0.000,0.000,0.000})III/b/f		
	Receive frame	/f/bIII4III352III1III1III/b/f		

2.14 SplineStart()

Control the robot spline curve planning start command.

Table 2-20 SplineStart() Directive protocol

	order	type	name	description

returned value		int	errcode	Error code
Command number	346			
instance	Send the frame	/f/bIII4III346III13IIISplineStart()III/b/f		
	Receive frame	/f/bIII4III346III1III1III/b/f		

2.15 SplinePTP()

Control the robot spline PTP motion command.

Table 2-21 SplinePTP Directive protocol 1

	order	type	name	description
parameter	1	float	J1	Target joint position unit:[°]
	2	float	J2	
	3	float	J3	
	4	float	J4	
	5	float	J5	
	6	float	J6	
	7	float	x	Target pose Unit: [mm] rxryrz Unit: [°]
	8	float	y	
	9	float	z	
	10	float	rx	
	11	float	ry	
	12	float	rz	
	13	int	toolNum	Tool number，0 to 14
	14	int	workPieceNum	Workpiece number，0 to 14
	15	float	speed	Speed percentage, 0 to 100
	16	float	acc	Acceleration percentage, 0 to 100
	17	float	ovl	Speed scale factor, 0 to 100
	18	float	oacc	Acceleration scale factor, 0~100

returned value		int	errcode	Error code
Command number	347			
instance	Send the frame	/f/bIII26III347III123IIISplinePTP(3.580,-83.769,132.494,-138.725,-90.000,156.101,-423.534,-185.807,290.307,-180.000,-0.000,-62.521,0,0,100,100,100)III/b/f		
	Receive frame	/f/bIII4III347III1III1III/b/f		

Table 2-22 SplinePTP Directive protocol 2

	order	type	name	description
parameter	1	char	pointName[128]	The target point name can be recorded by WebAPP
returned value		int	errcode	Error code
Command number	347			
instance	Send the frame	/f/bIII26III347III19IIISplinePTP(“P1”)III/b/f		
	Receive frame	/f/bIII4III347III1III1III/b/f		

2.16 SplineLINE()

Control the robot spline LINE motion command.

Table 2-23 SplineLINE() Directive protocol

	order	type	name	description
parameter	1	float	J1	Target joint position unit:[°]
	2	float	J2	
	3	float	J3	
	4	float	J4	
	5	float	J5	
	6	float	J6	
	7	float	x	Target pose Unit: [mm] rxryrz Unit: [°]
	8	float	y	
	9	float	z	
	10	float	rx	

	11	float	ry	
	12	float	rz	
	13	int	toolNum	Tool number，0 to 14
	14	int	workPieceNum	Workpiece number，0 to 14
	15	float	speed	Speed percentage, 0 to 100
	16	float	acc	Acceleration percentage, 0 to 100
	17	float	ovl	Speed scale factor, 0 to 100
	18	float	oacc	Acceleration scale factor, 0 to 100
returned value		int	errcode	Error code
Command number	348			
instance	Send the frame	/f/bIII26III348III124IIISplineLINE(3.580,-83.769,132.494,-138.725,-90.000,156.101,-423.534,-185.807,290.307,-180.000,-0.000,-62.521,0,0,100,100,100)III/b/f		
	Receive frame	/f/bIII4III348III1III1III/b/f		

2.17 SplineCIRC()

Control the motion command of robot spline CIRC.

Table 2-24 SplineCIRC() Directive protocol

	order	type	name	description
parameter	1	float	J1	
	2	float	J2	
	3	float	J3	Target joint position 1
	4	float	J4	unit:[°]
	5	float	J5	
	6	float	J6	
	7	float	x	Target pose 1
	8	float	y	Unit: [mm]
	9	float	z	rxryrz Unit: [°]

	10	float	rx	
	11	float	ry	
	12	float	rz	
	13	int	toolNum	Tool number1，0 to 14
	14	int	workPieceNum	Workpiece number1，0 to 14
	15	float	speed	Speed percentage 1,0~100
	16	float	acc	Acceleration percentage 1, 0 to 100
	17	float	J1	
	18	float	J2	
	19	float	J3	Target joint position 2
	20	float	J4	unit:[°]
	21	float	J5	
	22	float	J6	
	23	float	x	
	24	float	y	Target pose 2 Unit: [mm] rxryrz Unit: [°]
	25	float	z	
	26	float	rx	
	27	float	ry	
	28	float	rz	
	29	int	toolNum	Tool number2，0 to 14
	30	int	workPieceNum	Workpiece number2，0 to 14
	31	float	speed	Speed percentage 2,0 to 100
	32	float	acc	Acceleration percentage 2,0 to 100
	33	uint8_t	ovl	Speed scale factor, 0 to 100
	34	float	oacc	Acceleration scale factor, 0~100
returned value		int	errcode	Error code
Command number	349			

instance	Send the frame	/f/bIII4III349III232IIISplineCIRC(3.580,-83.769,132.494,-138.725,-90.000,156.101,-423.534,-185.807,290.307,-180.000,-0.000,-62.521,0,0,100,100,-4.291,-46.450,70.119,-113.669,-90.000,148.229,-848.172,-95.810,290.300,-180.000,-0.000,-62.520,0,0,100,100,100)III/b/f
	Receive frame	/f/bIII4III349III1III1III/b/f

2.18 SplineEnd()

Control the robot spline curve planning end instruction.

Table 2-25 SplineEnd() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	350			
instance	Send the frame	/f/bIII4III350III11IIISplineEnd()III/b/f		
	Receive frame	/f/bIII4III350III1III1III/b/f		

2.19 NewSplineStart()

Control the robot spline curve motion start command, can set the path point.

Table 2-26 NewSplineStart() Directive protocol

	order	type	name	description
parameter	1	uint8_t	ctlPoint	0-Given path point, the trajectory passes through the path point 1-Given control points, there are at least 4 control points, and the trajectory does not pass through the control points
	2	int	averageTime	Global average connection time (ms) (10 ~) Default 2000
returned value		int	errcode	Error code
Command number	553			
instance	Send the frame	/f/bIII4III553III22IIINewSplineStart(0,2000)III/b/f		
	Receive frame	/f/bIII4III553III1III1III/b/f		

2.20 NewSplinePoint()

Control the robot spline curve motion command.

Table 2-27 NewSplinePoint() Directive protocol

	order	type	name	description
parameter	1	float	J1	Target joint position unit:[°]
	2	float	J2	
	3	float	J3	
	4	float	J4	
	5	float	J5	
	6	float	J6	
	7	float	x	Target pose Unit: [mm] rxryrz Unit: [°]
	8	float	y	
	9	float	z	
	10	float	rx	
	11	float	ry	
	12	float	rz	
	13	int	toolNum	Tool number，0 to 14
	14	int	workPieceNum	Workpiece number，0 to 14
	15	float	speed	Speed percentage, 0~100
	16	float	acc	Acceleration percentage, 0 to 100
	17	float	ovl	Speed scale percentage, 0 to 100
	18	float	blendR	Smooth radius, unit mm
	19	uint8_t	lastFlag	Is it the last point? 0-no, 1-yes
returned value		int	errcode	Error code
Command number	555			
instance	Send the frame	/f/bIII4III555III132IIINewSplinePoint(3.580,-83.769,132.494,-138.725,-90.000,156.101,-423.534,-185.807,290.307,-180.000,-0.000,-62.521,0,0,100,100,100,0,0)III/b/f		

	Receive frame	/f/bIII4III555III1III1III/b/f

2.21 NewSplineEnd()

Control the end command of robot spline curve movement.

Table 2-28 NewSplineEnd() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	554			
instance	Send the frame	/f/bIII4III554III14IIINewSplineEnd()III/b/f		
	Receive frame	/f/bIII4III554III1III1III/b/f		

2.22 unifCircle()

Control the robot's uniform circular motion command.

Table 2-29 unifCircle() Directive protocol

	order	type	name	description
parameter	1	float	J1	Target joint position unit:[°]
		float	J2	
		float	J3	
		float	J4	
		float	J5	
		float	J6	
	2	float	x	Target pose Unit: [mm] rxryrz Unit: [°]
		float	y	
		float	z	
		float	rx	
		float	ry	
		float	rz	

	3	int	toolNum	Tool number，0 to 14
	4	int	workPieceNum	Workpiece number，0 to 14
	5	double	radius	Speed percentage 1,0 to 100
	6	double	anvel	Acceleration percentage 1,0 to 100
returned value		int	errcode	Error code
Command number	644			
instance	Send the frame	/f/bIII4III644III124IIIunifCircle({3.580,-83.769,132.494,-138.725,-90.000,156.101},{-423.534,-185.807,290.307,-180.000,-0.000,-62.521},0,0,100,100)III/b/f		
	Receive frame	/f/bIII4III644III1III1III/b/f		

2.23 MoveLinear()

Control the robot's linear motion command.

Table 2-30 MoveLinear() Directive protocol 1

	order	type	name	description
parameter	1	float	x	Target pose Unit: [mm] rxryrz Unit: [°]
	2	float	y	
	3	float	z	
	4	float	rx	
	5	float	ry	
	6	float	rz	
	7	int	toolNum	Tool number，0 to 14
	8	int	workPieceNum	Workpiece number，0 to 14
	15	float	speed	Speed percentage, 0 to 100
	17	int	ovl	Speed scale factor, 0 to 100
	18	float	exaxisPos1	Extend axis 1 position, unit: [mm]
	19	float	exaxisPos2	Extend axis 2 position, unit: [mm]

	20	float	exaxisPos3	Extend axis 3 position, unit: [mm]
	21	float	exaxisPos4	Extended axis 4 position, unit: [mm]
	22	float	blendT	[-1]: Stop (block) at this position; [0~500]: Smooth time (non-block), unit [ms]
	23	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece/base coordinate system, 2-tool coordinate system
	24	float	dt_x	offset Unit: [mm] rxryrz Unit: [°]
	25	float	dt_y	
	26	float	dt_z	
	27	float	dt_rx	
	28	float	dt_ry	
	29	float	dt_rz	
	30	float	oacc	Acceleration scale factor 0-100
	31	int	simFlag	Simulation mark; 1-simulation trajectory starting point; 2-simulation trajectory midpoint; 3-simulation trajectory end point
returned value		int	errcode	Error code
Command number	856			
instance	Send the frame	/f/bIII123III856III169IIIMoveLinear(3.580,-83.769,132.494,-138.725,-90.000,156.101,-423.534,-185.807,290.307,-180.000,-0.000,-62.521,0,0,100,100,100,-1,0.000,0.000,0.000,0.000,0,0,0,0,0,0,0,0,1)III/b/f		
	Receive frame	/f/bIII4III856III1III1III/b/f		

Table 2-31 MoveLinear() Directive protocol 2

	order	type	name	description
parameter	1	char	pointName[128]	The target point name can be recorded by WebApp
	2	int	simFlag	Simulation mark; 1-simulation trajectory starting point; 2-simulation trajectory midpoint; 3-simulation trajectory end point
returned		int	errcode	Error code

value		
Command number	856	
instance	Send the frame	/f/bIII4IIII856III22IIIMoveLinear(“P1”,1)III/b/f
	Receive frame	/f/bIII4IIII856III1III1III/b/f

2.24 MoveAxes()

Control the robot's circular motion command.

Table 2-32 MoveAxes() Directive protocol 1

	order	type	name	description
parameter	1	float	J1	Target joint position 1 unit:[°]
	2	float	J2	
	3	float	J3	
	4	float	J4	
	5	float	J5	
	6	float	J6	
	7	float	x	Target pose 1 Unit: [mm] rxryrz Unit: [°]
	8	float	y	
	9	float	z	
	10	float	rx	
	11	float	ry	
	12	float	rz	
	13	int	toolNum	Tool number1，0 to 14
	14	int	workPieceNum	Workpiece number1，0 to 14
	15	float	speed	Speed percentage 1,0~100
	16	float	acc	Acceleration percentage 1,0 to 100
	17	float	exaxisPos1	Extend axis 1 position, unit: [mm]
	18	float	exaxisPos2	Extend axis 2 position, unit: [mm]

19	float	exaxisPos3	Extend axis 3 position, unit: [mm]
20	float	exaxisPos4	Extended axis 4 position, unit: [mm]
21	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece/base coordinate system
22	float	dt_x	Point 1 offset Unit: [mm] rxryrz Unit: [°]
23	float	dt_y	
24	float	dt_z	
25	float	dt_rx	
26	float	dt_ry	
27	float	dt_rz	
28	float	J1	Target joint position 2 unit:[°]
29	float	J2	
30	float	J3	
31	float	J4	
32	float	J5	
33	float	J6	
34	float	x	Target pose 2 Unit: [mm] rxryrz Unit: [°]
35	float	y	
36	float	z	
37	float	rx	
38	float	ry	
39	float	rz	
40	int	toolNum	Tool number2，0 to 14
41	int	workPieceNum	Workpiece number2，0 to 14
42	float	speed	Speed percentage 2,0~100
43	float	acc	Acceleration percentage 2,0 to 100
44	float	exaxisPos1	Extend axis 1 position, unit: [mm]
45	float	exaxisPos2	Extend axis 2 position, unit: [mm]
46	float	exaxisPos3	Extend axis 3 position, unit: [mm]

	47	float	exaxisPos4	Extended axis 4 position, unit: [mm]
	48	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece/base coordinate system
	49	float	dt_x	Point 2 offset Unit: [mm] rxryrz Unit: [°]
	50	float	dt_y	
	51	float	dt_z	
	52	float	dt_rx	
	53	float	dt_ry	
	54	float	dt_rz	
	55	uint8_t	ovl	Speed scale factor, 0 to 100
	56	float	blendR	[-1]: Stop (block) at this position; [0~1000] Smooth radius (non-block), unit [mm]
	57	float	oacc	Acceleration scale factor 0-100
	58	int	simFlag	Simulation mark; 1-simulation trajectory starting point; 2-simulation trajectory midpoint; 3-simulation trajectory end point
returned value		int	errcode	Error code
Command number	858			
instance	Send the frame	/f/bIII121III858III307IIIMoveAxes(-4.291,-46.450,70.119,-113.669,-90.000,148.229,-848.172,-95.810,290.300,-180.000,-0.000,-62.520,0,0,100,100,0.000,0.000,0.000,0.000,0,0,0,0,0,0,0,14.319,-89.969,90.041,-89.922,0.998,0.001,-432.777,-383.942,701.040,8.630,88.991,-67.053,0,0,100,180,0.000,0.000,0.000,0.000,0,0,0,0,0,0,0,100,-1,100,1)III/b/f		
	Receive frame	/f/bIII4III858III1III1III/b/f		

Table 2-33 MoveAxes() Directive protocol 2

	order	type	name	description
parameter	1	char	pointName1[128]	The name of the midpoint can be recorded by WebApp
	2	char	pointName2[128]	The target point name can be recorded by WebApp
	3	int	simFlag	Simulation mark; 1-simulation trajectory starting point; 2-simulation trajectory midpoint; 3-simulation trajectory end

				point
returned value		int	errcode	Error code
Command number	858			
instance	Send the frame	/f/bIII4III858III29IIIMoveAxes(“P1”,”P2”,1)III/b/f		
	Receive frame	/f/bIII4III858III1III1III/b/f		

2.25 JointOverSpeedProtectStart()

Control the robot joint overspeed protection start command.

Table 2-34 JointOverSpeedProtectStart() Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	Protection policy, 0: off, 1: standard, 2: stop when the speed exceeds the limit, 3: adaptive speed reduction
	2	int	speedPercent	Allow speed reduction threshold, percentage, 0-100
returned value		int	errcode	Error code
Command number	969			
instance	Send the frame	/f/bIII4III969III5IIIJointOverSpeedProtectStart(0,0)III/b/f		
	Receive frame	/f/bIII4III969III1III1III/b/f		

2.26 JointOverSpeedProtectEnd()

Control the robot joint overspeed protection end instruction.

Table 2-35 JointOverSpeedProtectEnd() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	970			

instance	Send the frame	/f/bIII4III970III0IIIJointOverSpeedProtectEnd()III/b/f
	Receive frame	/f/bIII4III201III1III1III/b/f

2.27 SingularAvoidStart()

Control the robot's strange posture protection start command.

Table 2-36 SingularAvoidStart() Directive protocol

	order	type	name	description
parameter	1	uint8_t	protectMode	Odd protection mode, 0: joint mode, 1: Cartesian mode
	2	float	minShoulderPos	The range of adjustment of shoulder (mm) is greater than 0, and the default value is 100
	3	float	minElbowPos	The range of eccentric adjustment (mm) is greater than 0, and the default value is 50
	4	float	minWristPos	Wrist strange adjustment range (°), value> 0, default 10
returned value		int	errcode	Error code
Command number	1042			
instance	Send the frame	/f/bIII4III1042III31IIISingularAvoidStart(0,100,50,10)III/b/f		
	Receive frame	/f/bIII4III1042III1III1III/b/f		

2.28 SingularAvoidEnd()

Control the robot's strange posture protection end command.

Table 2-37 SingularAvoidEnd() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1043			

instance	Send the frame	/f/bIII4III1043III18IIISingularAvoidEnd()III/b/f
	Receive frame	/f/bIII4III1043III1III1III/b/f

2.29 SimMoveJ()

Control the robot MoveJ simulation movement.

Table 2-38 SimMoveJ() Directive protocol 1

	order	type	name	description
parameter	1	float	J1	Target joint position unit:[°]
	2	float	J2	
	3	float	J3	
	4	float	J4	
	5	float	J5	
	6	float	J6	
	7	float	x	Target pose Unit: [mm] rxryrz Unit: [°]
	8	float	y	
	9	float	z	
	10	float	rx	
	11	float	ry	
	12	float	rz	
	13	int	toolNum	Tool number，0 to 14
	14	int	workPieceNum	Workpiece number，0 to 14
	15	float	speed	Speed percentage, 0 to 100
	16	float	acc	Acceleration percentage, 0 to 100
	17	int	ovl	Speed scale factor, 0 to 100
	18	float	exaxisPos1	Extend the position of axis 1, unit: [mm]
	19	float	exaxisPos2	Extend axis 2 position, unit: [mm]
	20	float	exaxisPos3	Extend axis 3 position, unit: [mm]

	21	float	exaxisPos4	Extend axis 4 position, unit: [mm]
	22	float	blendT	[-1]: Stop (block) at this position; [0~500]: Smooth time (non-block), unit [ms]
	23	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece/base coordinate system, 2-tool coordinate system
	24	float	dt_x	offset Unit: [mm] rxryrz Unit: [°]
	25	float	dt_y	
	26	float	dt_z	
	27	float	dt_rx	
	28	float	dt_ry	
	29	float	dt_rz	
	30	float	oacc	Acceleration scale factor 0-100
	31	int	simFlag	Simulation mark; 1-simulation trajectory starting point; 2-simulation trajectory midpoint; 3-simulation trajectory end point
returned value		int	errcode	Error code
Command number	1028			
instance	Send the frame	/f/bIII4III1028III164IIISimMoveJ(-116.061,-90.725,91.261,-90.757,-90.399,2.142,100,498.776,474.670,-179.764,-0.390,-28.204,0,0,100,180,100,0.000,0.000,0.000,0.000,0,0,0,0,0,0,0,0,0,1)III/b/f		
	Receive frame	/f/bIII4III1028III1III1III/b/f		

Table 2-39 SimMoveJ() Directive protocol 2

	order	type	name	description
parameter	1	char	pointName[128]	The target point name can be recorded by WebApp
	2	int	simFlag	Simulation mark; 1-simulation trajectory starting point; 2-simulation trajectory midpoint; 3-simulation trajectory end point
returned value		int	errcode	Error code
Command number	1028			

instance	Send the frame	/f/bIII4III1028III20IIISimMoveJ(“P1”,1)III/b/f
	Receive frame	/f/bIII4III1028III1III1III/b/f

2.30 SimMoveL()

Control the robot MoveL simulation movement.

Table 2-40 SimMoveL() Directive protocol 1

	order	type	name	description
parameter	1	float	J1	Target joint position unit:[°]
	2	float	J2	
	3	float	J3	
	4	float	J4	
	5	float	J5	
	6	float	J6	
	7	float	x	Target pose Unit: [mm] rxryrz Unit: [°]
	8	float	y	
	9	float	z	
	10	float	rx	
	11	float	ry	
	12	float	rz	
	13	int	toolNum	Tool number，0 to 14
	14	int	workPieceNum	Workpiece number，0 to 14
	15	float	speed	Speed percentage, 0~100
	16	float	acc	Acceleration percentage, 0~100
	17	int	ovl	Speed scale factor, 0~100
	18	float	blendR	[-1]: Stop (block) at this position; [0~1000] Smooth radius (non-block), unit [mm]
	19			

	20	float	exaxisPos1	Extend the position of axis 1, unit: [mm]
	21	float	exaxisPos2	Extend axis 2 position, unit: [mm]
	22	float	exaxisPos3	Extend axis 3 position, unit: [mm]
	23	float	exaxisPos4	Extend axis 4 position, unit: [mm]
	24	uint8_t	search_flag	Whether welding wire is located, 0-no, 1-yes
	25	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece/base coordinate system, 2-tool coordinate system
	26	float	dt_x	offset Unit: [mm] rxryrz Unit: [°]
	27	float	dt_y	
	28	float	dt_z	
	29	float	dt_rx	
	30	float	dt_ry	
	31	float	dt_rz	
	32	float	oacc	Acceleration scale factor 0-100
	33	int	simFlag	Simulation mark; 1-simulation trajectory starting point; 2-simulation trajectory midpoint; 3-simulation trajectory end point
returned value		int	errcode	Error code
Command number	1029			
instance	Send the frame	/f/bIII4III1029III166IIISimMoveL(-116.061,-90.725,91.261,-90.757,-90.399,2.142,100,498.776,474.670,-179.764,-0.390,-28.204,0,0,100,180,100,0.000,0.000,0.000,0.000,0,0,0,0,0,0,0,0,0,0,1)III/b/f		
	Receive frame	/f/bIII4III1029III1III1III/b/f		

Table 2-41 SimMoveL() Directive protocol 2

	order	type	name	description
parameter	1	char	param_name[20]	The default is "seamPos", weld identification point
	2	int	toolNum	Tool number， 0 to 14

	3	int	workPieceNum	Workpiece number，0 to 14
	4	float	speed	Speed percentage, 0~100
	5	float	acc	Acceleration percentage, 0 to 100
	6	int	ovl	Speed scale factor, 0~100
	7	float	blendR	Smooth radius, 0~10mm
	8	uint8_t	flag	1-Execute record data, 0-Execute planning data
	9	uint8_t	plateType	Set the type of welding plate. The default value is 0
	10	float	oacc	Acceleration scale factor 0-100
	11	int	simFlag	Simulation mark; 1-simulation trajectory starting point; 2-simulation trajectory midpoint; 3-simulation trajectory end point
returned value		int	errcode	Error code
Command number	1029			
instance	Send the frame	/f/bIII4III1029III52IIISimMoveL(“seamPos”,0,0,100,80,100,0.000,0,0,0,0)III/b/f		
	Receive frame	/f/bIII4III1029III1III1III/b/f		

Table 2-42 SimMoveL() Directive protocol 3

	order	type	name	description
parameter	1	char	pointName[128]	The target point name can be recorded by WebApp
	2	int	simFlag	Simulation mark; 1-simulation trajectory starting point; 2-simulation trajectory midpoint; 3-simulation trajectory end point
returned value		int	errcode	Error code
Command number	202			
instance	Send the frame	/f/bIII4III1029III20IIISimMoveL(“P1”,1)III/b/f		

	Receive frame	/f/bIII4III1029III1III1III/b/f

2.31 SimMoveC()

Control the robot MoveC simulation movement.

Table 2-43 SimMoveC() Directive protocol 1

	order	type	name	description
parameter	1	float	J1	Target joint position 1 unit:[°]
	2	float	J2	
	3	float	J3	
	4	float	J4	
	5	float	J5	
	6	float	J6	
	7	float	x	Target pose 1 Unit: [mm] rxryrz Unit: [°]
	8	float	y	
	9	float	z	
	10	float	rx	
	11	float	ry	
	12	float	rz	
	13	int	toolNum	Tool number1，0 to 14
	14	int	workPieceNum	Workpiece number1，0 to 14
	15	float	speed	Speed percentage 1,0 to 100
	16	float	acc	Acceleration percentage 1,0 to 100
	17	float	exaxisPos1	Extend the position of axis 1, unit: [mm]
	18	float	exaxisPos2	Extend axis 2 position, unit: [mm]
	19	float	exaxisPos3	Extend axis 3 position, unit: [mm]
	20	float	exaxisPos4	Extend axis 4 position, unit: [mm]
	21	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece/base coordinate system

22	float	dt_x	Point 1 offset Unit: [mm] rxryrz Unit: [°]
23	float	dt_y	
24	float	dt_z	
25	float	dt_rx	
26	float	dt_ry	
27	float	dt_rz	
28	float	J1	Target joint position 2 unit:[°]
29	float	J2	
30	float	J3	
31	float	J4	
32	float	J5	
33	float	J6	
34	float	x	Target pose 2 Unit: [mm] rxryrz Unit: [°]
35	float	y	
36	float	z	
37	float	rx	
38	float	ry	
39	float	rz	
40	int	toolNum	Tool number2，0 to 14
41	int	workPieceNum	Workpiece number2，0 to 14
42	float	speed	Speed percentage 2,0~100
43	float	acc	Acceleration percentage 2,0 to 100
44	float	exaxisPos1	Extend the position of axis 1, unit: [mm]
45	float	exaxisPos2	Extend axis 2 position, unit: [mm]
46	float	exaxisPos3	Extend axis 3 position, unit: [mm]
47	float	exaxisPos4	Extended axis 4 position, unit: [mm]
48	uint8_t	offset_flag	Whether to do offset, 0-no, 1-workpiece/base coordinate system
49	float	dt_x	Point 2 offset

	50	float	dt_y	Unit: [mm]
	51	float	dt_z	rxryrz Unit: [°]
	52	float	dt_rx	
	53	float	dt_ry	
	54	float	dt_rz	
	55	uint8_t	ovl	Speed scale factor, 0~100
	56	float	blendR	[-1]: Stop (block) at this position; [0~1000] Smooth radius (non-block), unit [mm]
	57	float	oacc	Acceleration scale factor 0-100
	58	int	simFlag	Simulation mark; 1-simulation trajectory starting point; 2-simulation trajectory midpoint; 3-simulation trajectory end point
returned value		int	errcode	Error code
Command number	1030			
instance	Send the frame	/f/bIII121III1030III307IIISimMoveC(-4.291,-46.450,70.119,-113.669,-90.000,148.229,-848.172,-95.810,290.300,-180.000,-0.000,-62.520,0,0,100,100,0.000,0.000,0.000,0.000,0,0,0,0,0,0,0,14.319,-89.969,90.041,-89.922,0.998,0.001,-432.777,-383.942,701.040,8.630,88.991,-67.053,0,0,100,180,0.000,0.000,0.000,0.000,0,0,0,0,0,0,0,100,-1,100,1)III/b/f		
	Receive frame	/f/bIII4III1030III1III1III/b/f		

Table 2-44 SimMoveC() Directive protocol 2

	order	type	name	description
parameter	1	char	pointName1[128]	The name of the midpoint can be recorded by WebApp
	2	char	pointName2[128]	The target point name can be recorded by WebApp
	3	int	simFlag	Simulation mark; 1-simulation trajectory starting point; 2-simulation trajectory midpoint; 3-simulation trajectory end point
returned value		int	errcode	Error code
Command number	1030			
instance	Send	/f/bIII4III1030III29IIISimMoveC(“P1”,”P2”,1)III/b/f		

	the frame	
	Receive frame	/f/bIII4III1030III1III1III/b/f

2.32 ServoJTStart()

Joint torque control begins。

Table2-45 ServoJTStart()Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1199			
instance	Send the frame	/f/bIII4III1199III14IIIServoJTStart()III/b/f		
	Receive frame	/f/bIII4III1199III1III1III/b/f		

2.33 ServoJT()

Joint torque control。

Table2-46 ServoJT()Directive protocol

	order	type	name	description
parameter	1	float	torque[6]	Unit of joint torque:[Nm]
	2	float	interval	Instruction cycle, units， range[0.001-0.008]
returned value		int	errcode	Error code
Command number	1200			
instance	Send the frame	/f/bIII4III1200III90IIIServoJT({0.001,0.024,0.017,0.008,0.003,0.001},0)III/b/f		
	Receive frame	/f/bIII4III1200III1III1III/b/f		

2.34 ServoJTEnd()

Joints torque control is over。

Table2-47 ServoJTEnd ()Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1201			
instance	Send the frame	/f/bIII4III1201III12IIIServoJTEnd()III/b/f		
	Receive frame	/f/bIII4III1201III1III1III/b/f		

2.35 STOP

Stop the robot from moving。

Table2-48 STOPDirective protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	102			
instance	Send the frame	/f/bIII4III102III4IIISTOPIII/b/f		
	Receive frame	/f/bIII4III102III1III1III/b/f		

2.36 MoveToLaserSeamPos()

Movement to the laser sensor locing point。

Table 2-49 MoveToLaserSeamPos() protocol

	order	type	name	description
parameter	1	int	move_flag	Motion type 0-PTP 1-LIN
	2	int	ovl	Speed scaling factor
	3	int	flag	Weld cache data selection 0 - Execution planning data 1 - Execution record data
	4	int	plateType	Plate type: 0-corrugated plate; 1 - corrugated board; 2 - fence board; 3 - oil drum; 4- Corrugated carapace steel
	5	int	trackOffectType	Laser sensor offset type: 0-no offset; 1-Basis coordinate system offset; 2 - Tool coordinate system offset; 3-Laser sensor raw data offset
	6	int	trackOffset	Offset
returned value		int	errcode	Error code
Command number	1253			
instance	Send the frame	/f/bIII4III1253III45IIIMoveToLaserSeamPos(1,100,1,0,0,{0,0,0,0,0,0})III/b/f		
	Receive frame	/f/bIII4III1253III1III1III/b/f		

2.37 MoveToIntersectLineStart()

Move to the intersection line starting point.

Table2-50 MoveToIntersectLineStar() instruction protocol

	order	type	name	description
parameter	1	float	pointMainDesc [6*6]	Cartesian, who is in charge of six teaching points; [P1x, P1y, P1z, P1a, P1b, P1c, P2x, P2y, P2z, P2a, P2b, P2c, … P6x, P6y, P6z, P6a, P6b, P6c] (mm °)
	2	float	extAxisMain[6 *4]	Manage six teaching points for extended axis positioning [P1Axis1, P1Axis2, P1Axis3, P1Axis4, P2Axis1, P2Axis2, P2Axis3, P2Axis4, … P6Axis1, P6Axis2, P6Axis3, P6Axis4] (°)
	3	float	pointPieceDesc [6*6]	Cartesian of 6 teaching points of the pipe joint; [P1x, P1y, P1z, P1a, P1b, P1c, P2x, P2y, P2z, P2a, P2b, P2c, … P6x, P6y, P6z, P6a, P6b, P6c] (mm °)
	4	float	extAxisPiece[6 *4]	Extend the axis position by connecting six teaching points[P1Axis1, P1Axis2, P1Axis3, P1Axis4, P2Axis1, P2Axis2, P2Axis3, P2Axis4, … P6Axis1, P6Axis2, P6Axis3, P6Axis4] (°)
	5	uint8_t	extAxisFlag	Whether to enable the extended axis; 0-Disable; 1-Enable
	6	float	startExaxis[4]	Starting point extended axis position (°)
	7	int	tool	Tool number
	8	int	user	Workpiece number
	9	float	vel	Speed percentage
	10	float	acc	Acceleration percentage
	11	float	ovl	Speed scaling factor
	12	float	oacc	Acceleration scaling factor
	13	uint8_t	moveType	Motion type; 0-PTP; 1-LIN
	14	uint8_t	moveDirection	Motion direction; 0-Clockwise; 1-Counterclockwise
	15	float	offsetPos[6]	Offset (mm, °)
returned value		int	errcode	Error code
Command number	1280			
instance	Send	/f/bIII4III1280III980IIIMoveToIntersectLineStart({490.004,-383.194,4		

	the frame	02.735,-9.332,-1.528,69.594,444.950,-407.117,389.011,-5.546,-2.196,65.279,445.168,-463.605,355.759,-1.544,-10.886,57.104,507.529,-485.385,343.013,-0.786,-4.834,61.799,554.390,-442.647,367.701,-4.761,-10.181,64.925,532.552,-394.003,396.467,-13.732,-13.592,67.411},{-29.996,0.000,0.000,0.000,-29.996,-0.000,0.000,0.000,-29.996,0.000,0.000,0.000,-29.996,0.000,0.000,0.000,-29.996,-0.000,0.000,0.000,-29.996,0.000,0.000,0.000},{505.571,-192.408,316.759,38.098,37.051,139.447,533.837,-201.558,332.340,34.644,42.339,137.748,530.386,-225.085,373.808,35.431,45.111,137.560,485.646,-229.195,383.778,33.870,45.173,137.064,460.551,-212.161,354.256,28.856,45.602,135.930,474.217,-197.124,324.611,42.469,41.133,148.167},{-29.996,-0.000,0.000,0.000,-29.996,0.000,0.000,0.000,-29.996,0.000,0.000,0.000,-29.996,0.000,0.000,0.000,-29.996,-0.000,0.000,0.000,-29.996,-0.000,0.000,0.000},1,{-29.996,-0.000,0.000,0.000},2,0,100,100,12,12,1,1,{0,2,0,-2,0,0})III/b/f
	Receive frame	/f/bIII4III1280III1III1III/b/f

2.38 MoveIntersectLine()

Motion of intersection line.

Table2-51 MoveIntersectLine()instruction protocol

	order	type	name	description
parameter	1	float	pointMainDesc [6*6]	Cartesian, who is in charge of six teaching points;[P1x, P1y, P1z, P1a, P1b, P1c, P2x, P2y, P2z, P2a, P2b, P2c, … P6x, P6y, P6z, P6a, P6b, P6c] (mm °)
	2	float	extAxisMain[6*4]	Manage six teaching points for extended axis positioning[P1Axis1, P1Axis2, P1Axis3, P1Axis4, P2Axis1, P2Axis2, P2Axis3, P2Axis4, … P6Axis1, P6Axis2, P6Axis3, P6Axis4] (°)
	3	float	pointPieceDesc [6*6]	The Cartesian coordinate system of the six teaching points of the pipe joint;[P1x, P1y, P1z, P1a, P1b, P1c, P2x, P2y, P2z, P2a, P2b, P2c, … P6x, P6y, P6z, P6a, P6b, P6c] (mm °)
	4	float	extAxisPiece[6*4]	Extend the axis position by connecting six teaching points[P1Axis1, P1Axis2, P1Axis3, P1Axis4, P2Axis1, P2Axis2, P2Axis3, P2Axis4, … P6Axis1, P6Axis2, P6Axis3, P6Axis4] (°)
	5	uint8_t	extAxisFlag	Whether to enable the extended axis; 0-Disable; 1-Enable
	6	float	startExaxis[4]	Starting point extended axis position (°)
	7	int	tool	Tool number

	8	int	user	Workpiece number
	9	float	vel	Speed percentage
	10	float	acc	Acceleration percentage
	11	float	ovl	Speed scaling factor
	12	float	oacc	Acceleration scaling factor
	13	uint8_t	moveDirection	Motion direction; 0-Clockwise; 1-Counterclockwise
	14	float	offsetPos[6]	Offset (mm, °)
returned value		int	errcode	Error code
Command number	1281			
instance	Send the frame	/f/bIII4III1281III1050IIIMoveIntersectLine({490.004,-383.194,402.735,-9.332,-1.528,69.594,444.950,-407.117,389.011,-5.546,-2.196,65.279,445.168,-463.605,355.759,-1.544,-10.886,57.104,507.529,-485.385,343.013,-0.786,-4.834,61.799,554.390,-442.647,367.701,-4.761,-10.181,64.925,532.552,-394.003,396.467,-13.732,-13.592,67.411},{-29.996,0.000,0.000,0.000,-29.996,-0.000,0.000,0.000,-29.996,0.000,0.000,0.000,-29.996,0.000,0.000,0.000,-29.996,-0.000,0.000,0.000,-29.996,0.000,0.000,0.000},{505.571,-192.408,316.759,38.098,37.051,139.447,533.837,-201.558,332.340,34.644,42.339,137.748,530.386,-225.085,373.808,35.431,45.111,137.560,485.646,-229.195,383.778,33.870,45.173,137.064,460.551,-212.161,354.256,28.856,45.602,135.930,474.217,-197.124,324.611,42.469,41.133,148.167},{-29.996,-0.000,0.000,0.000,-29.996,0.000,0.000,0.000,-29.996,0.000,0.000,0.000,-29.996,-0.000,0.000,0.000,-29.996,-0.000,0.000,0.000,-29.996,0.000,0.000,0.000},1,{-29.996,-0.000,0.000,0.000,-44.994,90.000,0.000,0.000,-59.992,0.002,0.000,0.000,-44.994,-89.997,0.000,0.000},2,0,100,100,5,5,1,{0,2,0,-2,0,0})III/b/f	
	Receive frame	/f/bIII4III1281III1III1III/b/f		

2.39 MoveStationary()

The on-site planning interpolation instruction.

Table2-52 MoveStationary()instruction protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1296			
instance	Send the frame	/f/bIII4III1296III16IIIMoveStationary()III/b/f		
	Receive frame	/f/bIII4III1296III1III1III/b/f		

2.40 MoveToTPDStart()

Move to the starting point of the TPD trajectory recording.

Table2-53 MoveToTPDStart() instruction protocol

	order	type	name	description
parameter	1	char *	tpdName	TPD trajectory file name
	2	uint8_t	moveType	Motion type，0-PTP，1-LIN
	3	float	ovl	Speed scaling factor
returned value		int	errcode	Error code
Command number	1312			
instance	Send the frame	/f/bIII4III1312III32IIIMoveToTPDStart("tpd.lua",0,25)III/b/f		
	Receive frame	/f/bIII4III1312III1III1III/b/f		

2.41 OriginPointWeaveStart()

Fixed-point oscillation begins.

Table2-54 OriginPointWeaveStart() instruction protocol

	order	type	name	description
parameter	1	int	weaveNum	Swing number[0-7]
	2	int	mode	0-Tool coordinate system; 1-Reference point
	3	double	refPoint[6]	Reference point[x,y,z,a,b,c]
	4	double	weaveTime	Swinging time [s][0-1000]
returned value		int	errcode	Error code
Command number	1315			
instance	Send the frame	/f/bIII4III1315III79IIIOriginPointWeaveStart(0,1,{400.021,300.022,299.996,179.997,-0.003,-90.956},3)III/b/f		
	Receive frame	/f/bIII4III1315III1III1III/b/f		

2.42 OriginPointWeaveEnd()

Fixed-point oscillation has ended.

Table2-55 OriginPointWeaveEnd() instruction protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1316			

instance	Send the frame	/f/bIII4III1316III23IIIOriginPointWeaveEnd()III/b/f
	Receive frame	/f/bIII4III1316III1III1III/b/f

2.43 ServoMITStart()

Start the ServoMIT movement.

Table2-56 ServoMITStart() instruction protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1334			
instance	Send the frame	/f/bIII4III1334III15IIIServoMITStart()III/b/f		
	Receive frame	/f/bIII4III1334III1III1III/b/f		

2.44 ServoMITEnd()

End the ServoMIT movement.

Table2-57 ServoMITEnd() instruction protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1335			
instance	Send the frame	/f/bIII4III1335III13IIIServoMITEnd()III/b/f		
	Receive frame	/f/bIII4III1335III1III1III/b/f		

2.45 ServoMIT()

ServoMIT movement.

Table2-58 ServoMIT() instruction protocol

	order	type	name	description
parameter	1	float[6]	posGain[6]	position gain
	2	float[6]	desPos[6]	Expected Position(°)

returned value	3	float[6]	velGain[6]	speed gain
	4	float[6]	desVel[6]	Expected speed(° /s)
	5	float[6]	torque_ff[6]	Feedforward torque(Nm)
	6	float	interval	control cycle(s)
		int	errcode	Error code
Command number	1336			
instance	Send the frame	/f/bIII4III1336III178IIIServoMIT({0.0,0.0,0.0,0.0,0.0,0.0,0.0},{0.0,0.0,0.0,0.0,0.0,0.0,0.0},{0.0,0.0,0.0,0.0,0.0,0.0,0.0},{0.0,0.0,0.0,0.0,0.0,0.0,0.0},{0.015200,-0.425600,-0.159000,-0.012160,0.000640,0.000640},0.008)III/b/f		
	Receive frame	/f/bIII4III1336III1III1III/b/f		

2.46 ServoJV()

ServoJV movement.

Table2-59 ServoJV() instruction protocol

	order	type	name	description
parameter	1	float	j1	Joint speed Unit:[°/s]
		float	j2	
		float	j3	
		float	j4	
		float	j5	
		float	j6	
	2	float	exaxisPos1	expansion axis speed, unit：[mm/s]
		float	exaxisPos2	
		float	exaxisPos3	
		float	exaxisPos4	
	3	float	acc	Acceleration ratio, 0 - 100, default: 0
	4	float	vel	Speed ratio, 0 - 100, default: 0
	5	float	interval	instruction cycle s
	6	float	filterTime	Filter time [s] is temporarily unavailable

	7	float	posGain	The target location scale amplifier is temporarily unavailable
	8	uint64_t	servoJCmdNum	The order parameter: if it is 0, the table does not require a timestamp update.
returned value		int	errcode	Error code
Command number	1337			
instance	Send the frame	/f/bIII4III1337III69IIIServoJV({10,10,10,10,10,10},{0.000,0.000,0.000,0.000},0,0,0.01,0,0,0)III/b/f		
	Receive frame	/f/bIII4III1337III1III1III/b/f		

3 Robot IO instructions

3.1 figure IO

3.1.1 SetDO()

set up DO.

Table 3-1-1 SetDO() instruction protocol

	order	type	name	description
parameter	1	int	nIO	DO number
	2	int	bopen	Switch, 0-off, 1-on
	3	int	smooth	Whether the transition is smooth or not, 0-not smooth, 1-smooth
	4	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		int	errcode	Error code
Command number	204			
instance	Send the frame	/f/bIII32III204III14IIISetDO(0,0,0,0)III/b/f		
	Receive frame	/f/bIII32III204III1III1III/b/f		

3.1.2 GetDI()

gain DI.

Table 3-1-2 GetDI() instruction protocol

	order	type	name	description
parameter	1	int	nIO	DI number
	2	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		uint8_t	value	DI price
Command number	212			
instance	Send frame	/f/bIII4III212III10IIIGetDI(0,0)III/b/f		

	Receive frame	/f/bIII4III212III1III1III/b/f

3.1.3 GetDO()

gain DO.

Table 3-1-2 GetDO() instruction protocol

	order	type	name	description
parameter	1	int	nIO	DO number
	2	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		uint8_t	value	DO price
Command number	1317			
instance	Send frame	/f/bIII4III1317III10IIIGetDO(0,0)III/b/f		
	Receive frame	/f/bIII4III1317III1III1III/b/f		

3.1.4 SetToolDO()

installing internet assistant DO.

Table 3-1-3 SetToolDO() Directive protocol

	order	type	name	description
parameter	1	int	nIO	DO number
	2	int	bopen	Switch, 0-off, 1-on
	3	int	smooth	Whether the transition is smooth, 0-not smooth, 1-smooth
	4	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		int	errcode	Error code
Command number	210			
instance	Send the frame	/f/bIII32III210III18IIISetToolDO(0,0,0,0)III/b/f		
	Receive frame	/f/bIII32III210III1III1III/b/f		

3.1.5 GetToolDI()

Get the tool DI.

Table 3-1-4 GetToolDI() Instruction protocol

	order	type	name	description
parameter	1	int	nIO	DI number
		uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		uint8_t	value	DI price
Command number	213			
instance	Send the frame	/f/bIII32III213III14IIIGetToolDI(0,0)III/b/f		
	Receive frame	/f/bIII32III213III1III1III/b/f		

3.1.6 GetToolDO()

gain tool DO.

Table 3-1-2 GetToolDO() instruction protocol

	order	type	name	description
parameter	1	int	nIO	DO number
	2	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		uint8_t	value	DO price
Command number	1319			
instance	Send frame	/f/bIII4III1319III14IIIGetToolDO(0,0)III/b/f		
	Receive frame	/f/bIII4III1319III1III1III/b/f		

3.2 imitate IO

3.2.1 SetAO()

set up AO.

Table 3-2-1 SetAO() instruction protocol

	order	type	name	description
parameter	1	int	nIO	AO number
	2	double	value	set value
	3	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		int	errcode	Error code
Command number	209			
instance	Send the frame	/f/bIII38III209III17IIISetAO(0,409.50,0)III/b/f		
	Receive frame	/f/bIII38III209III1III1III/b/f		

3.2.2 GetAI()

gain AI.

Table 3-2-2 GetAI() instruction protocol

	order	type	name	description
parameter	1	int	nIO	AI number
	2	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		float	value	AI price
Command number	214			
instance	Send the frame	/f/bIII38III214III10IIIGetAI(0,0)III/b/f		
	Receive frame	/f/bIII38III214III6III409.50III/b/f		

3.2.3 GetAO()

gain AO.

Table 3-1-2 GetAO() instruction protocol

	order	type	name	description

parameter	1	int	nIO	AO number
	2	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		uint8_t	value	AO price
Command number	1318			
instance	Send frame	/f/bIII4III1318III10IIIGetAO(0,0)III/b/f		
	Receive frame	/f/bIII4III1318III2III20III/b/f		

3.2.4 SetToolAO()

installing internet assistant AO.

Table 3-2-3 SetToolAO() Directive protocol

	order	type	name	description
parameter	1	int	nIO	AO number
	2	double	value	set value
	3	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		int	errcode	Error code
Command number	211			
instance	Send the frame	/f/bIII38III211III21IIISetToolAO(0,409.50,0)III/b/f		
	Receive frame	/f/bIII38III209III1III1III/b/f		

3.2.5 GetToolAI()

Get the AI tool.

Table 3-2-4 GetToolAI() Directive protocol

	order	type	name	description
parameter	1	int	nIO	AI number
	2	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		float	value	AI price

Command number	215	
instance	Send the frame	/f/bIII38III215III14IIIGetToolAI(0,0)III/b/f
	Receive frame	/f/bIII38III215III6III409.50III/b/f

3.2.6 GetToolAO()

gain tool AO.

Table 3-1-2 GetToolAO() instruction protocol

	order	type	name	description
parameter	1	int	nIO	tool AO number
	2	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		uint8_t	value	AO price
Command number	1320			
instance	Send frame	/f/bIII4III1320III14IIIGetToolAO(0,0)III/b/f		
	Receive frame	/f/bIII4III1320III2III20III/b/f		

3.3 invented IO

3.3.1 SetVirtualDI()

Set up a virtual DI.

Table 3-3-1 SetVirtualDI() Directive protocol

	order	type	name	description
parameter	1	uint8_t	id	number
	2	uint8_t	value	set value
returned value		int	errcode	Error code
Command number	560			
instance	Send frames	/f/bIII36III560III17IIISetVirtualDI(0,0)III/b/f		

	Receive frame	/f/bIII36III560III1III1III/b/f

3.3.2 GetVirtualDI()

Get a virtual DI.

Table 3-3-2 GetVirtualDI() Directive protocol

	order	type	name	description
parameter	1	uint8_t	id	number
returned value		uint8_t	value	DI price
Command number	561			
instance	Send the frame	/f/bIII36III561III15IIIGetVirtualDI(0)III/b/f		
	Receive frame	/f/bIII36III561III1III0III/b/f		

3.3.3 SetVirtualToolDI()

Set up the virtual tool DI.

Table 3-3-3 SetVirtualToolDI() Directive protocol

	order	type	name	description
parameter	1	uint8_t	id	number
	2	uint8_t	value	set value
returned value		int	errcode	Error code
Command number	562			
instance	Send the frame	/f/bIII36III562III21IIISetVirtualToolDI(0,0)III/b/f		
	Receive frame	/f/bIII36III562III1III1III/b/f		

3.3.4 GetVirtualToolDI()

Get the virtual tool DI.

Table 3-3-4 GetVirtualToolDI() Directive protocol

	order	type	name	description
parameter	1	uint8_t	id	number
returned value		uint8_t	value	DI price
Command number	563			
instance	Send the frame	/f/bIII36III563III19IIIGetVirtualToolDI(0)III/b/f		
	Receive frame	/f/bIII36III563III1III0III/b/f		

3.3.5 SetVirtualAI()

Set up virtual AI.

Table 3-3-5 SetVirtualAI() Directive protocol

	order	type	name	description
parameter	1	uint8_t	id	number
	2	float	value	set value
returned value		int	errcode	Error code
Command number	564			
instance	Send the frame	/f/bIII37III564III18IIISetVirtualAI(0,10)III/b/f		
	Receive frame	/f/bIII37III564III1III1III/b/f		

3.3.6 GetVirtualAI()

Get virtual AI.

Table 3-3-6 GetVirtualAI() Directive protocol

	order	type	name	description

parameter	1	uint8_t	id	number
returned value		float	value	AI price
Command number	565			
instance	Send the frame	/f/bIII37III565III15IIIGetVirtualAI(0)III/b/f		
	Receive frame	/f/bIII37III565III2III10III/b/f		

3.3.7 SetVirtualToolAI()

Set up virtual tool AI.

Table 3-3-7 SetVirtualToolAI() Directive protocol

	order	type	name	description
parameter	1	uint8_t	id	number
	2	float	value	set value
returned value		int	errcode	Error code
Command number	564			
instance	Send the frame	/f/bIII37III564III18IIISetVirtualToolAI(0,10)III/b/f		
	Receive frame	/f/bIII37III564III1III1III/b/f		

3.3.8 GetVirtualToolAI()

Get virtual tools AI.

Table 3-3-8 GetVirtualToolAI() Directive protocol

	order	type	name	description
parameter	1	uint8_t	id	number
returned value		float	value	AI price
Command number	567			
instance	Send the frame	/f/bIII37III567III19IIIGetVirtualToolAI(0)III/b/f		

	Receive frame	/f/bIII37III567III2III10III/b/f

3.4 wait IO

3.4.1 WaitDI()

Set DI waiting time.

Table 3-4-1 WaitDI() Directive protocol

	order	type	name	description
parameter	1	int	nIO	DI number
	2	int	bopen	Switch, 0-off, 1-on
	3	int	ms_time	Maximum waiting time, in ms
	4	uint8_t	errorAlarm	Whether to continue exercising
returned value		int	errcode	Error code
Command number	218			
instance	Send the frame	/f/bIII4III218III17IIIWaitDI(0,1,100,0)III/b/f		
	Receive frame	/f/bIII4III218III1III1III/b/f		

3.4.2 WaitAI()

Set the AI waiting time.

Table 3-4-2 WaitAI() Directive protocol

	order	type	name	description
parameter	1	int	nIO	AI number
	2	int	sign	symbol
	3	int	bopen	Switch, 0-off, 1-on
	4	int	ms_time	Maximum waiting time, in ms
	5	uint8_t	errorAlarm	Whether to continue exercising
returned value		int	errcode	Error code

Command number	220	
instance	Send the frame	/f/bIII4III220III19IIIWaitAI(1,1,1,100,0)III/b/f
	Receive frame	/f/bIII4III220III1III1III/b/f

3.4.3 WaitToolDI()

Set the DI wait time.

Table 3-4-3 WaitToolDI() Directive protocol

	order	type	name	description
parameter	1	int	nIO	DI number
	2	int	bopen	Switch, 0-off, 1-on
	3	int	ms_time	Maximum waiting time, in ms
	4	uint8_t	errorAlarm	Whether to continue exercising
returned value		int	errcode	Error code
Command number	219			
instance	Send the frame	/f/bIII4III219III21IIIWaitToolDI(1,1,100,0)III/b/f		
	Receive frame	/f/bIII4III219III1III1III/b/f		

3.4.4 WaitToolAI()

Set the AI wait time for the tool.

Table 3-4-4 WaitToolAI() Directive protocol

	order	type	name	description
parameter	1	int	nIO	AI number
	2	int	sign	symbol
	3	int	bopen	Switch, 0-off, 1-on
	4	int	ms_time	Maximum waiting time, in ms
	5	uint8_t	errorAlarm	Whether to continue exercising

returned value		int	errcode	Error code
Command number	221			
instance	Send the frame	/f/bIII4III221III23IIIWaitToolAI(1,1,1,100,0)III/b/f		
	Receive frame	/f/bIII4III221III1III1III/b/f		

3.5 IO set up

3.5.1 SetDOConfig()

Set DO configuration.

Table 3-5-1 SetDOConfig() Directive protocol

	order	type	name	description
parameter	1	int	DOconfig0	do switch
	2	int	DOconfig1	
	3	int	DOconfig2	
	4	int	DOconfig3	
	5	int	DOconfig4	
	6	int	DOconfig5	
	7	int	DOconfig6	
	8	int	DOconfig7	
returned value		int	errcode	Error code
Command number	324			
instance	Send the frame	/f/bIII291III324III28IIISetDOConfig(1,0,0,0,0,0,0,0)III/b/f		
	Receive frame	/f/bIII291III324III1III1III/b/f		

3.5.2 SetDIConfig()

Set DI configuration.

Table 3-5-2 SetDIConfig() Directive protocol

	order	type	name	description
parameter	1	uint8_t	DOconfig0	do switch
	2	uint8_t	DOconfig1	
	3	uint8_t	DOconfig2	
	4	uint8_t	DOconfig3	
	5	uint8_t	DOconfig4	
	6	uint8_t	DOconfig5	
	7	uint8_t	DOconfig6	
	8	uint8_t	DOconfig7	
returned value		int	errcode	Error code
Command number	323			
instance	Send the frame	/f/bIII239III323III28IIISetDIConfig(0,1,1,1,1,1,1,1)III/b/f		
	Receive frame	/f/bIII239III323III1III1III/b/f		

3.5.3 SetDOConfigLevel()

Set the DO configuration high and low level valid.

Table 3-5-3 SetDOConfigLeve() Directive protocol

	order	type	name	description
parameter	1	uint8_t	DOconfig0	do switch
	2	uint8_t	DOconfig1	
	3	uint8_t	DOconfig2	
	4	uint8_t	DOconfig3	
	5	uint8_t	DOconfig4	
	6	uint8_t	DOconfig5	
	7	uint8_t	DOconfig6	

	8	uint8_t	DOconfig7	
returned value		int	errcode	Error code
Command number	336			
instance	Send the frame	/f/bIII291III336III33IIISetDOConfigLevel(1,0,0,0,0,0,0,0)III/b/f		
	Receive frame	/f/bIII291III336III1III1III/b/f		

3.5.4 SetDIConfigLevel()

Set the DI to configure high and low levels valid.

Table 3-5-4 SetDIConfigLevel() Instruction protocol

	order	type	name	description
parameter	1	uint8_t	DOconfig0	do switch
	2	uint8_t	DOconfig1	
	3	uint8_t	DOconfig2	
	4	uint8_t	DOconfig3	
	5	uint8_t	DOconfig4	
	6	uint8_t	DOconfig5	
	7	uint8_t	DOconfig6	
	8	uint8_t	DOconfig7	
returned value		int	errcode	Error code
Command number	335			
instance	Send the frame	/f/bIII239III335III33IIISetDIConfigLevel(0,1,1,1,1,1,1,1)III/b/f		
	Receive frame	/f/bIII239III335III1III1III/b/f		

3.5.5 SetToolDOConfig()

Set up the tool DO configuration.

Table 3-5-5 SetToolDOConfig() Directive protocol

	order	type	name	description
parameter	1	int	DOconfig0	do switch
	2	int	DOconfig1	
returned value		int	errcode	Error code
Command number	370			
instance	Send the frame	/f/bIII239III370III20IIISetToolDOConfig(0,1)III/b/f		
	Receive frame	/f/bIII239III370III1III1III/b/f		

3.5.6 SetToolDIConfig()

Set up the tool DI configuration.

Table 3-5-6 SetToolDIConfig() Directive protocol

	order	type	name	description
parameter	1	int	DOconfig0	do switch
	2	int	DOconfig1	
returned value		int	errcode	Error code
Command number	369			
instance	Send the frame	/f/bIII4III369III20IIISetToolDIConfig(0,1)III/b/f		
	Receive frame	/f/bIII4III369III1III1III/b/f		

3.5.7 SetToolDOConfigLevel()

Set tool DO configuration for high and low levels is valid.

Table 3-5-7 SetToolDOConfigLevel() Directive protocol

	order	type	name	description
parameter	1	int	DOconfig0	do switch
	2	int	DOconfig1	

returned value		int	errcode	Error code
Command number	372			
instance	Send the frame	/f/bIII4III372III25IIISetToolDOConfigLevel(0,1)III/b/f		
	Receive frame	/f/bIII4III372III1III1III/b/f		

3.5.8 SetToolDIConfigLevel()

Set tool DI configuration for high and low levels is valid.

Table 3-5-8 SetToolDIConfigLevel() Directive protocol

	order	type	name	description
parameter	1	int	DOconfig0	do switch
	2	int	DOconfig1	
returned value		int	errcode	Error code
Command number	371			
instance	Send the frame	/f/bIII274III371III25IIISetToolDIConfigLevel(1,1)III/b/f		
	Receive frame	/f/bIII274III371III1III1III/b/f		

3.5.9 SetOutputResetCtlBoxDO()

Set whether the output is reset after the control box DO stops/pauses.

Table 3-5-9 SetOutputResetCtlBoxDO() Directive protocol

	order	type	name	description
parameter	1	uint8_t	resetFlag	Set whether the output is reset after the control box DO stops/pauses, 0: not reset, 1: reset
	2	uint8_t	reloadFlag	After resuming the pause, reload DO: 0: no reload, 1: reload
returned value		int	errcode	Error code
Command number	898			

instance	Send the frame	/f/bIII296III898III27IIISetOutputResetCtlBoxDO(1,0)III/b/f
	Receive frame	/f/bIII296III898III1III1III/b/f

3.5.10 SetOutputResetCtlBoxAO()

Set whether the output is reset after AO stop/pause of the control box.

Table 3-5-10 SetOutputResetCtlBoxAO() Directive protocol

	order	type	name	description
parameter	1	uint8_t	resetFlag	Set whether the output is reset after AO stop/pause of the control box, 0: not reset, 1: reset
	2	uint8_t	reloadFlag	After resuming the pause, AO reloads: 0: no reload, 1: reload
returned value		int	errcode	Error code
Command number	899			
instance	Send frame	/f/bIII4III899III27IIISetOutputResetCtlBoxAO(1,0)III/b/f		
	Receive frame	/f/bIII4III899III1III1III/b/f		

3.5.11 SetOutputResetAxleDO()

Set whether the output is reset after the end of DO stop/pause.

Table 3-5-11 SetOutputResetAxleDO() Directive protocol

	order	type	name	description
parameter	1	uint8_t	resetFlag	Set whether the output is reset after the end of DO stop/pause, 0: not reset, 1: reset
	2	uint8_t	reloadFlag	After resuming the pause, reload DO: 0: no reload, 1: reload
returned value		int	errcode	Error code
Command number	900			

instance	Send the frame	/f/bIII4III900III25IIISetOutputResetAxleDO(1,0)III/b/f
	Receive frame	/f/bIII4III900III1III1III/b/f

3.5.12 SetOutputResetAxleAO()

Set whether the output is reset after the end AO stop/pause.

Table 3-5-12 SetOutputResetAxleAO() Instruction protocol

	order	type	name	description
parameter	1	uint8_t	resetFlag	Set whether the output is reset after the end of AO stop/pause, 0: not reset, 1: reset
	2	uint8_t	reloadFlag	After resuming the pause, AO reloads: 0: no reload, 1: reload
returned value		int	errcode	Error code
Command number	901			
instance	Send the frame	/f/bIII4III901III25IIISetOutputResetAxleAO(1,0)III/b/f		
	Receive frame	/f/bIII4III901III1III1III/b/f		

3.5.13 SetOutputResetToolDO()

Set the tool DO to stop/pause and check if the output is reset.

Table 3-5-13 SetOutputResetToolDO() Directive protocol

	order	type	name	description
parameter	1	uint8_t	resetFlag	Set SmartTolol DO to stop/pause and output whether the output is reset or not. 0: no reset, 1: reset
returned value		int	errcode	Error code
Command number	904			
instance	Send the frame	/f/bIII4III904III23IIISetOutputResetToolDO(1)III/b/f		

	Receive frame	/f/bIII4III904III1III1III/b/f

3.6 IO filtering

3.6.1 SetDIFilterTime()

Set DI filter time.

Table 3-6-1 SetDIFilterTime() Directive protocol

	order	type	name	description
parameter	1	int	ms_filter_time	Filter time, unit ms
returned value		int	errcode	Error code
Command number	222			
instance	Send the frame	/f/bIII257III222III18IIISetDIFilterTime(0)III/b/f		
	Receive frame	/f/bIII257III222III1III1III/b/f		

3.6.2 SetAxleDIFilterTime()

Set the end DI filter time.

Table 3-6-2 SetAxleDIFilterTime() Directive protocol

	order	type	name	description
parameter	1	int	ms_filter_time	Filter time, unit ms
returned value		int	errcode	Error code
Command number	223			
instance	Send the frame	/f/bIII258III223III22IIISetAxleDIFilterTime(0)III/b/f		
	Receive frame	/f/bIII258III223III1III1III/b/f		

3.6.3 SetAIFilterTime()

Set the AI filter time.

Table 3-6-3 SetAIFilterTime() Directive protocol

	order	type	name	description
parameter	1	int	id	AI number
	2	int	ms_filter_time	Filter time, unit ms
returned value		int	errcode	Error code
Command number	224			
instance	Send the frame	/f/bIII260III224III20IIISetAIFilterTime(1,0)III/b/f		
	Receive frame	/f/bIII260III224III1III1III/b/f		

3.6.4 SetAxleAIFilterTime()

Set the end AI filter time.

Table 3-6-4 SetAxleAIFilterTime() Directive protocol

	order	type	name	description
parameter	1	int	id	AI number
	2	int	ms_filter_time	Filter time, unit ms
returned value		int	errcode	Error code
Command number	225			
instance	Send the frame	/f/bIII261III225III24IIISetAxleAIFilterTime(0,0)III/b/f		
	Receive frame	/f/bIII261III225III1III1III/b/f		

3.6.5 SetToolBoxDIFilterTime()

Set the DI filter time in the toolbox.

Table 3-6-5 SetToolBoxDIFilterTime() Directive protocol

	order	type	name	description

parameter	1	int	ms_filter_time	Filter time, unit ms
returned value		int	errcode	Error code
Command number	665			
instance	Send the frame	/f/bIII262III665III25IIISetToolBoxDIFilterTime(0)III/b/f		
	Receive frame	/f/bIII262III665III1III1III/b/f		

4 Expand the axis IO

4.1 SetAuxDO()

Set up the extended DO.

Table 4-1 SetAuxDO() Directive protocol

	order	type	name	description
parameter	1	int	nIO	DO number
	2	int	bopen	Switch, 0-off, 1-on
	3	int	smooth	Whether the transition is smooth, 0-not smooth, 1-smooth
	4	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		int	errcode	Error code
Command number	667			
instance	Send the frame	/f/bIII17III667III17IIISetAuxDO(0,0,0,0)III/b/f		
	Receive frame	/f/bIII17III667III1III1III/b/f		

4.1.1 GetAuxDO()

gain aux DO.

Table 3-1-2 GetAuxDO() instruction protocol

	order	type	name	description
parameter	1	int	nIO	DO number
	2	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		uint8_t	value	DO price
Command number	1321			
instance	Send frame	/f/bIII4III1321III13IIIGetAuxDO(0,0)III/b/f		
	Receive frame	/f/bIII4III1321III1III1III/b/f		

4.2 SetAuxAO()

Set up the extended AO.

Table 4-2 SetAuxAO() Directive protocol

	order	type	name	description
parameter	1	int	nIO	AO number
	2	double	value	set value
	3	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		int	errcode	Error code
Command number	668			
instance	Send the frame	/f/bIII32III668III21IIISetAuxAO(0,2047.50,0)III/b/f		
	Receive frame	/f/bIII32III668III1III1III/b/f		

4.2.1 GetAuxAO()

gain aux AO.

Table 3-1-2 GetAuxAO() instruction protocol

	order	type	name	description
parameter	1	int	nIO	AO number
	2	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		uint8_t	value	AO price
Command number	1322			
instance	Send frame	/f/bIII4III1322III10IIIGetAuxAO(0,0)III/b/f		
	Receive frame	/f/bIII4III1322III2III20III/b/f		

4.3 SetAuxDIFilterTime()

Set the extended DI filter time.

Table 4-3 SetAuxDIFilterTime() Directive protocol

	order	type	name	description
parameter	1	int	ms_filter_time	Filter time, unit ms
returned value		int	errcode	Error code
Command number	669			
instance	Send the frame	/f/bIII263III669III21IIISetAuxDIFilterTime(0)III/b/f		
	Receive frame	/f/bIII263III669III1III1III/b/f		

4.4 SetAuxAIFilterTime()

Set the extended AI filter time.

Table 4-4 SetAuxAIFilterTime() Directive protocol

	order	type	name	description
parameter	1	int	id	AI number
	2	int	ms_filter_time	Filter time, unit ms
returned value		int	errcode	Error code
Command number	670			
instance	Send frame	/f/bIII255III670III24IIISetAuxAIFilterTime(3,50)III/b/f		
	Receive frame	/f/bIII255III670III1III1III/b/f		

4.5 WaitAuxDI()

Wait for the extended DI.

Table 4-5 WaitAuxDI() Directive protocol

	order	type	name	description
parameter	1	int	nIO	DI number
	2	int	bopen	Switch, 0-off, 1-on
	3	int	ms_time	Maximum waiting time, in ms

	4	uint8_t	errorAlarm	Whether to continue exercising
returned value		int	errcode	Error code
Command number	671			
instance	Send the frame	/f/bIII4IIII671IIII20IIIWaitAuxDI(1,0,100,0)III/b/f		
	Receive frame	/f/bIII4IIII671IIII1IIII1IIII/b/f		

4.6 WaitAuxAI()

Waiting for the extended AI.

Table 4-6 WaitAuxAI() Directive protocol

	order	type	name	description
parameter	1	int	nIO	AI number
	2	int	sign	symbol
	3	int	bopen	Switch, 0-off, 1-on
	4	int	ms_time	Maximum waiting time, in ms
	5	uint8_t	errorAlarm	Whether to continue exercising
returned value		int	errcode	Error code
Command number	672			
instance	Send the frame	/f/bIII4IIII672IIII22IIIWaitAuxAI(1,1,0,100,0)III/b/f		
	Receive frame	/f/bIII4IIII672IIII1IIII1IIII/b/f		

4.7 GetAuxDI()

Get extended DI.

Table 4-7 GetAuxDI() Directive protocol

	order	type	name	description

parameter	1	int	nIO	DI number
	2	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		uint8_t	value	DI price
Command number	673			
instance	Send the frame	/f/bIII4IIII673III13IIIGetAuxDI(1,0)III/b/f		
	Receive frame	/f/bIII4IIII673III1III1III/b/f		

4.8 GetAuxAI()

Get extended AI.

Table 4-8 GetAuxAI() Directive protocol

	order	type	name	description
parameter	1	int	nIO	AI number
	2	uint8_t	isNoBlock	Whether to block, 0: block, 1: not block
returned value		float	value	AI price
Command number	674			
instance	Send the frame	/f/bIII4IIII674III13IIIGetAuxAI(1,0)III/b/f		
	Receive frame	/f/bIII4IIII674III2III10III/b/f		

4.9 SetAxleExtIOConfig()

Configure the end expansion IO.

Table 4-9 SetAxleExtIOConfig() Directive protocol

	order	type	name	description
parameter	1	int	id_company	manufacturer
	2	int	id_device	device number
	3	int	id_softversion	software release
	4	int	id_bus	Bus location

returned value		float	value	AI price
Command number	681			
instance	Send the frame	/f/bIII28III681III28IIISetAxleExtIOConfig(49,0,0,1)III/b/f		
	Receive frame	/f/bIII28III681III1III1III/b/f		

4.10 GetAxleExtIOConfig()

Get end extension configuration information.

Table 4-10 GetAxleExtIOConfig() Directive protocol

	order	type	name	description
returned value	1	int	id	number
	2	int	id_company	manufacturer
	3	int	id_device	device number
	4	int	id_softversion	software release
Command number	682			
instance	Send the frame	/f/bIII29III682III20IIIGetAxleExtIOConfig()III/b/f		
	Receive frame	/f/bIII29III682III12III30 00 00 00 III/b/f		

4.11 SetAxleExtDO()

Set the end of the extended digital output.

Table 4-11 SetAxleExtDO() Directive protocol

	order	type	name	description
parameter	1	uint32_t	value	set value
returned value		int	errcode	Error code
Command number	678			
instance	Send the frame	/f/bIII4III678III15IIISetAxleExtDO(1)III/b/f		

	Receive frame	/f/bIII4III678III1III1III/b/f

4.12 GetAxleExtDI()

Get the end extension digital output.

Table 4-12 GetAxleExtDI() Directive protocol

	order	type	name	description
returned value	1	uint32_t	value	set value
Command number	677			
instance	Send the frame	/f/bIII4III677III14IIIGetAxleExtDI()III/b/f		
	Receive frame	/f/bIII4III677III1III1III/b/f		

4.13 SetAxleExtDIFilterTime()

Set the end expansion digital input filter time.

Table 4-13 SetAxleExtDIFilterTime() Directive protocol

	order	type	name	description
parameter	1	int	ms_filter_time	Filter time, unit ms
returned value		int	errcode	Error code
Command number	679			
instance	Send the frame	/f/bIII268III679III25IIISetAxleExtDIFilterTime(0)III/b/f		
	Receive frame	/f/bIII268III679III1III1III/b/f		

4.14 SetOutputResetExtDO()

Set whether the output is reset after the expansion DO stop/pause.

Table 4-14 SetOutputResetExtDO() Directive protocol

	order	type	name	description
parameter	1	uint8_t	resetFlag	Set whether the output is reset after the expansion DO stop/pause is set, 0: not reset, 1: reset
	2	uint8_t	reloadFlag	After resuming the pause, reload DO: 0: no reload, 1: reload
returned value		int	errcode	Error code
Command code	902			
instance	Send the frame	/f/bIII4III902III24IIISetOutputResetExtDO(1,0)III/b/f		
	Receive frame	/f/bIII4III902III1III1III/b/f		

4.15 SetOutputResetExtAO()

Set whether the output is reset after the expansion AO stop/pause.

Table 4-15 SetOutputResetExtAO() Directive protocol

	order	type	name	description
parameter	1	uint8_t	resetFlag	Set whether the output is reset after the expansion AO stop/pause, 0: no reset, 1: reset
	2	uint8_t	reloadFlag	After resuming the pause, AO reloads: 0: no reload, 1: reload
returned value		int	errcode	Error code
Command number	903			
instance	Send the frame	/f/bIII4III903III24IIISetOutputResetExtAO(1,0)III/b/f		
	Receive frame	/f/bIII4III903III1III1III/b/f		

5 Robot setup instructions

5.1 General Settings

5.1.1 RobotIPConfig()

Robot IP configuration.

Table 5-1-1 RobotIPConfig() Directive protocol

	order	type	name	description
parameter	1	string	ip	robot IP
returned value		int	errcode	Error code
Command number	263			
instance	Send the frame	/f/bIII4III263III26IIIRobotIPConfig(192.168.58.2)III/b/f		
	Receive frame	/f/bIII4III263III1III1III/b/f		

5.1.2 SetQNXSystemTime()

Set the controller system time.

Table 5-1-2 SetQNXSystemTime() Directive protocol

	order	type	name	description
parameter	1	char	s_day_mon_year[64]	Year, month and day, such as "13 3 2024" (March 13,2024)
	2	char	s_hour_min[64]	Time division, such as "1544" (15:44)
returned value		int	errcode	Error code
Command number	343			
instance	Send the frame	/f/bIII19III343III36IIISetQNXSystemTime("27 3 2025","1705")III/b/f		
	Receive frame	/f/bIII19III343III1III1III/b/f		

5.1.3 Mode()

Set the robot hand to automatic mode.

Table 5-1-3 Mode() instruction protocol

	order	type	name	description
parameter	1	uint8_t	mode	0-automatic mode, 1-manual mode
returned value		int	errcode	Error code
Command number	303			
instance	Send the frame	/f/bIII20III303III7IIIMode(0)III/b/f		
	Receive frame	/f/bIII20III303III1III1III/b/f		

5.1.4 SetRobotInstallPos()

Set the robot installation mode.

Table 5-1-4 SetRobotInstallPos() Directive protocol

	order	type	name	description
parameter	1	uint8_t	installPos	0-paperback, 1-side, 2-hanging
returned value		int	errcode	Error code
Command number	337			
instance	Send the frame	/f/bIII23III337III21IIISetRobotInstallPos(0)III/b/f		
	Receive frame	/f/bIII23III337III1III1III/b/f		

5.1.5 RobotEnable()

Set up robot enablement.

Table 5-1-5 RobotEnable() Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	0-disable, 1-enable

returned value		int	errcode	Error code
Command number	302			
instance	Send the frame	/f/bIII39III302III14IIIRobotEnable(0)III/b/f		
	Receive frame	/f/bIII39III302III1III1III/b/f		

5.1.6 RobotSingleJointEnable()

Set the robot single joint enable.

Table 5-1-6 RobotSingleJointEnable() Directive protocol

	order	type	name	description
parameter	1	uint8_t	jNum	Joint numbering
returned value		int	errcode	Error code
Command number	820			
instance	Send the frame	/f/bIII42III820III25IIIRobotSingleJointEnable(1)III/b/f		
	Receive frame	/f/bIII42III820III1III1III/b/f		

5.1.7 RobotSingleJointDisable()

Set the robot single joint to enable.

Table 5-1-7 RobotSingleJointDisable() Directive protocol

	order	type	name	description
parameter	1	uint8_t	jNum	Joint numbering
returned value		int	errcode	Error code
Command number	821			
instance	Send the frame	/f/bIII43III821III26IIIRobotSingleJointDisable(1)III/b/f		
	Receive frame	/f/bIII43III821III1III1III/b/f		

5.1.8 SetSpeed()

Set the percentage of robot movement speed.

Table 5-1-8 SetSpeed() Directive protocol

	order	type	name	description
parameter	1	uint8_t	speed	Robot movement speed percentage
returned value		int	errcode	Error code
Command number	206			
instance	Send the frame	/f/bIII44III206III12IIISetSpeed(32)III/b/f		
	Receive frame	f/bIII44III206III1III1III/b/f		

5.1.9 SetCustSpeedManualToAuto()

Table 5-1-9 SetCustSpeedManualToAuto() Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	Manual and automatic mode, 0 manual, 1 automatic
	2	float	speed	Customize speed
returned value		int	errcode	Error code
Command number	750			
instance	Send the frame	/f/bIII66III750III30IIISetCustSpeedManualToAuto(0,20)III/b/f		
	Receive frame	/f/bIII66III750III1III1III/b/f		

5.1.10 SetOaccScale()

Set the percentage of robot acceleration.

Table 5-1-10 SetOaccScale() Directive protocol

	order	type	name	description

parameter	1	float	oacc	Robot acceleration percentage
returned value		int	errcode	Error code
Command number	640			
instance	Send the frame	/f/bIII36III640III16IIISetOaccScale(50)III/b/f		
	Receive frame	/f/bIII36III640III1III1III/b/f		

5.1.11 SetMaxCartVelAcc()

Set the maximum speed and acceleration percentage of the robot.

Table 5-1-11 SetMaxCartVelAcc() Directive protocol

	order	type	name	description
parameter	1	double	max_velratio	Maximum robot speed percentage
	2	double	max_velratio	Maximum percentage of robot acceleration
returned value		int	errcode	Error code
Command number	849			
instance	Send the frame	/f/bIII55III849III26IIISetMaxCartVelAcc(999,2999)III/b/f		
	Receive frame	/f/bIII55III849III1III1III/b/f		

5.1.12 SetDefaultVelAccRatio()

Set the default speed and acceleration percentage of the machine.

Table 5-1-12 SetDefaultVelAccRatio() Directive protocol

	order	type	name	description
parameter	1	double	def_velratio	Default percentage of robot speed
	2	double	def_velratio	Default percentage of robot acceleration
returned value		int	errcode	Error code
Command number	850			

instance	Send the frame	/f/bIII56III850III30IIISetDefaultVelAccRatio(29,29.9)III/b/f
	Receive frame	/f/bIII56III850III1III1III/b/f

5.1.13 SetMinVelAccRatio()

Set the minimum speed and minimum acceleration percentage of the machine.

Table 5-1-13 SetMinVelAccRatio() Directive protocol

	order	type	name	description
parameter	1	double	min_velratio	Minimum percentage of robot speed
	2	double	min_velratio	Minimum percentage of robot acceleration
returned value		int	errcode	Error code
Command number	851			
instance	Send the frame	/f/bIII57III851III22IIISetMinVelAccRatio(1,1)III/b/f		
	Receive frame	/f/bIII57III851III1III1III/b/f		

5.1.14 SetRobotType()

Set the robot model.

Table 5-1-14 SetRobotType() Directive protocol

	order	type	name	description
parameter	1	int	robot_type	Robot model
returned value		int	errcode	Error code
Command number	425			
instance	Send the frame	/f/bIII82III425III17IIISetRobotType(103)III/b/f		
	Receive frame	/f/bIII82III425III1III1III/b/f		

5.1.15 SetJointStiffnessType()

Set the robot joint stiffness type.

Table 5-1-15 SetJointStiffnessType() Directive protocol

	order	type	name	description
parameter	1	int	type	Robot joint stiffness type, range [0,1]
	2	int	FreeRot	End rotation configuration, 0:180,1:360
returned value		int	errcode	Error code
Command number	822			
instance	Send the frame	/f/bIII83III822III26IIISetJointStiffnessType(0,0)III/b/f		
	Receive frame	/f/bIII83III822III1III1III/b/f		

5.1.16 SetAccFeedForwardRatio()

Set the robot acceleration feedforward coefficient.

Table 5-1-16 SetAccFeedForwardRatio() Directive protocol

	order	type	name	description
parameter	1	double	accffRatio1	1-axis acceleration feedforward coefficient
	2	double	accffRatio2	2-axis acceleration feedforward coefficient
	3	double	accffRatio3	3-axis acceleration feedforward coefficient
	4	double	accffRatio4	4-axis acceleration feedforward coefficient
	5	double	accffRatio5	5-axis acceleration feedforward coefficient
	6	double	accffRatio6	6-axis acceleration feedforward coefficient
returned value		int	errcode	Error code

Command number	634	
instance	Send the frame	/f/bIII97III634III60IIISetAccFeedForwardRatio (0.000,0.000,0.000,0.000,0.000,0.000)III/b/f
	Receive frame	/f/bIII97III634III1III1III/b/f

5.1.17 SetDynFeedForwardRatio()

Set the robot dynamic prefeed coefficient.

Table 5-1-17 SetDynFeedForwardRatio() Directive protocol

	order	type	name	description
parameter	1	double	dynffRatio1	1-axis dynamic pre-feed coefficient
	2	double	dynffRatio2	2-axis dynamic pre-feed coefficient
	3	double	dynffRatio3	3-axis dynamic pre-feed coefficient
	4	double	dynffRatio4	4-axis dynamic pre-feed coefficient
	5	double	dynffRatio5	5-axis dynamic pre-feed coefficient
	6	double	dynffRatio6	6-axis dynamic pre-feed coefficient
returned value		int	errcode	Error code
Command number	635			
instance	Send the frame	/f/bIII98III635III60IIISetDynFeedForwardRatio (1.000,1.000,1.000,1.000,1.000,1.000)III/b/f		
	Receive frame	/f/bIII98III635III1III1III/b/f		

5.1.18 SetVelFeedForwardRatio()

Set the robot speed feedforward coefficient.

Table 5-1-18 SetVelFeedForwardRatio() Instruction protocol

	order	type	name	description
parameter	1	double	velffRatio1	1 shaft speed feedforward coefficient
	2	double	velffRatio2	2 shaft speed feedforward coefficient
	3	double	velffRatio3	3-axis speed feedforward coefficient

	4	double	velffRatio4	4-axis speed feedforward coefficient
	5	double	velffRatio5	5 shaft speed feedforward coefficient
	6	double	velffRatio6	6 shaft speed feedforward coefficient
returned value		int	errcode	Error code
Command number	660			
instance	Send the frame	/f/bIII99III660III60IIISetVelFeedForwardRatio (1.000,1.000,1.000,1.000,1.000,1.000)III/b/f		
	Receive frame	/f/bIII99III660III1III1III/b/f		

5.1.19 SetReduceMode1speed()

Set the robot reduction mode 1 joint speed, TCP speed

Table 5-1-19 SetReduceMode1Speed() Directive protocol

	order	type	name	description
parameter	1	double	Jspeed[6]	Six joint speeds, in units of "/s"
	2	double	cspeed	TCP speed, unit mm/s
returned value		int	errcode	Error code
Command number	744			
instance	Send the frame	/f/bIII284III744III44IIISetReduceMode1Speed({36,36,36,36,36,36},200)III/b/f		
	Receive frame	/f/bIII284III744III1III1III/b/f		

5.1.20 SetReduceMode2speed()

Set the robot reduction mode 2 joint speed, TCP speed

Table 5-1-20 SetReduceMode2Speed() Directive protocol

	order	type	name	description
parameter	1	double	Jspeed[6]	Six joint speeds, units "/s
	2	double	cspeed	TCP speed, unit mm/s
returned value		int	errcode	Error code

Command number	745	
instance	Send the frame	/f/bIII101III745III44IIISetReduceMode2Speed({18,18,18,18,18,18},100)III/b/f
	Receive frame	/f/bIII101III745III1III1III/b/f

5.1.21 SetRobotWorkHomePoint()

Set the robot operation origin.

Table 5-1-21 SetRobotWorkHomePoint() Directive protocol

	order	type	name	description
parameter	1	double	home_joint1	Joint 1 position, unit °
	2	double	home_joint2	Joint 2 position, unit °
	3	double	home_joint3	Joint 3 position, unit °
	4	double	home_joint4	Joint 4 position, unit °
	5	double	home_joint5	Joint 5 position, unit °
	6	double	home_joint6	Joint 6 position, unit °
returned value		int	errcode	Error code
Command number	428			
instance	Send the frame	/f/bIII179III428II87IIISetRobotWorkHomePoint(87.901000,-113.479000,121.917000,-105.537000,-91.070000,0.036000)III/b/f		
	Receive frame	/f/bIII179III428III1III1III/b/f		

5.1.22 SetAxleLEDColour()

Set the end light color.

Table 5-1-22 SetAxleLEDColour() Directive protocol

	order	type	name	description
parameter	1	uint8_t	colourflag	0: green light, 1: blue light, 2: white and green light, 3: purple light, 4: red light, 5: green light flashing, 6: first purple light flashing in bright blue light, 7: first red

				light flashing in bright green light
returned value		int	errcode	Error code
Command number	926			
instance	Send the frame	/f/bIII103III926III19IIISetAxleLEDColour(0)III/b/f		
	Receive frame	/f/bIII103III926III1III1III/b/f		

5.1.23 SetEndDragBtnConfig()

Set the robot end drag button control state.

Table 5-1-23 SetEndDragBtnConfig() Directive protocol

	order	type	name	description
parameter	1	uint8_t	controlType	Drag start and stop mode: 0-long press mode: 1-trigger mode
	2	uint8_t	triggerTimeout	Enter/Exit drag timeout time s (1-10)
	3	uint8_t	triggerTimes	Number of times to press the end button to enter/exit the drag state (1-10)
	4	uint16_t	dragstateTimeout	If the time is exceeded without dragging, the automatic exit state will be dragged out for s (1-600)
returned value		int	errcode	Error code
Command number	988			
instance	Send the frame	/f/bIII122III988III29IIISetEndDragBtnConfig(0,1,1,10)III/b/f		
	Receive frame	/f/bIII122III988III1III1III/b/f		

5.1.24 SetInputShapingParam()

Set the robot input to the shaping parameters.

Table 5-1-24 SetInputShapingParam() Directive Agreement

	order	type	name	description

parameter	1	float	frequence	natural frequency
	2	float	damping_ratio	damping ratio
	3	int	type	Type of shaping machine: 1ZV; 2ZVD; 3EI
	4	int	flag	Shaping marker: 0 off; 1 on
returned value		int	errcode	Error code
Command number	1144			
instance	Send the frame	/f/bIII94III1144III36IIISetInputShapingParam(20.4,0.035,2,1)III/b/f		
	Receive frame	/f/bIII94III1144III1III1III/b/f		

5.1.25 ShutDownRobotOS()

Set the controller to shut down the operating system.

Table 5-1-25 ShutDownRobotOS() Directive Agreement

	order	type	name	description
returned value		int	errcode	Error code
Command number	1174			
instance	Send the frame	/f/bIII122III1174III17IIIShutDownRobotOS()III/b/f		
	Receive frame	/f/bIII122III1174III1III1III/b/f		

5.1.26 SetAllDHCompensation()

Set full parameter compensation for the robot.

Table 5-1-26 SetAllDHCompensation() Directive Agreement

	order	type	name	description
parameter	1	double	d[6]	Linkage offset, unit: mm
	2	double	theta[6]	Zero position of the joint, unit°
	3	double	a[6]	Link length, unit mm

	4	double	alpha[6]	Link twist Angle, unit°
	5	double	beta[6]	Linkage offset Angle, unit°
returned value		int	errcode	Error code
Command number	1142			
instance	Send the frame	/f/bIII149III1142III319IIISetAllDHCompensation({0.000000,0.000000,0.000000,-1.114854,1.377591,0.000000},{-0.000000,0.054163,-0.039966,0.659209,0.103233,-0.000000},{-0.609213,-0.429353,-0.709429,-1.153374,-1.317483,0.000000},{0.023079,-0.003995,-0.153555,0.090924,-0.739509,0.000000},{0.000000,0.006700,-0.078805,0.000000,0.000000,0.000000})III/b/f		
	Receive frame	/f/bIII149III1142III1III1III/b/f		

5.1.27 SetPTPTimeSyncPara()

PTP Time functionparameter set up。

Table5-1-27 SetPTPTimeSyncPara()Directive protocol

	order	type	name	description
parameter	1	uint8_t	mode	PTP For timing function, 0 is not enabled, 1 is software timing, and 2 is hardware timing
	2	uint8_t	eth	PTP is a time network card, 0: eth0,1: eth1
	3	uint8_t	debugEnable	Log recording enabled, 0: disabled, 1: enabled
	4	uint8_t	timeDetectEnable	Time synchronization accuracy detection enabled, 0: not enabled, 1: enabled
returned value		int	errcode	Error code
Command number	1193			
instance	Send the frame	/f/bIII149III1193III27IIISetPTPTimeSyncPara(2,0,1,0)III/b/f		
	Receive frame	/f/bIII149III1193III1III1III/b/f		

5.1.28 GetPTPTimESyncPara()

Get PTP time parameter。

Table5-1-28 GetPTPTimESyncPara()Directive protocol

	order	type	name	description
returned value	1	uint8_t	mode	PTP time function, 0 is not enabled, 1 is software time, 2 is hardware time
	2	uint8_t	eth	PTP is a time network card, 0: eth0, 1: eth1
	3	uint8_t	debugEnable	Log recording enabled, 0: disabled, 1: enabled
	4	uint8_t	timeDetectEnable	Time synchronization accuracy detection enabled, 0: not enabled, 1: enabled
Command number	1194			
instance	Send the frame	/f/bIII149III1194III20IIIGetPTPTimESyncPara()III/b/f		
	Receive frame	/f/bIII149III1194III7III2,0,1,0III/b/f		

5.1.29 SetSingleEnconderZeroStart()

Set the single joint encoder to start zeroing。

Table5-1-29 SetSingleEnconderZeroStart()Directive protocol

	order	type	name	description
parameter	1	uint8_t	slaveId	joint id
returned value		int	errcode	Error code
Command number	1189			
instance	Send the frame	/f/bIII103III1189III29IIISetSingleEnconderZeroStart(1)III/b/f		
	Receive frame	/f/bIII103III1189III1III1III/b/f		

5.1.30 SetSingleEnconderZeroStop()

Set the single joint encoder to stop zeroing。

Table5-1-30 SetSingleEnconderZeroStop()Directive protocol

	order	type	name	description
parameter	1	uint8_t	slaveId	joint id
returned value		int	errcode	Error code
Command number	1190			
instance	Send the frame	/f/bIII103III1190III28IIISetSingleEnconderZeroStop(1)III/b/f		
	Receive frame	/f/bIII103III1190III1III1III/b/f		

5.1.31 SetAutoFIRPlanningParam()

Set the automatic planning parameters for FIR speed of LIN, ARC and PTP motion.

Table5-1-31 SetAutoFIRPlanningParam()Directive protocol

	order	type	name	description
parameter	1	int	status	FIRparameter Automatic configuration on/off flag; 0-off; 1-on
	2	double	adaFactor	Automatically configure the adjustment coefficient
returned value		int	errcode	Error code
Command number	1202			
instance	Send the frame	/f/bIII103III1202III28IIISetAutoFIRPlanningParam(1,1)III/b/f		
	Receive frame	/f/bIII103III1202III1III1III/b/f		

5.1.32 SetKeepAliveParam()

Set up KeepAlive global parameter。

Table5-1-32 SetKeepAliveParam()Directive protocol

	order	type	name	description
parameter	1	int	port	The specified port number. The ports currently open include: 20002,20004,8083, and 8080
	2	int	keepidle_s	The time to start the probe when the connection is idle, in seconds
	3	int	keepcnt	Maximum number of heartbeat packet probes
	4	int	keepintvl	The sending interval of the probe packet, in seconds
returned value		int	errcode	Error code
Command number	1203			
instance	Send the frame	/f/bIII103III1203III35IIISetKeepAliveParam(20002,100,1000,1)III/b/f		
	Receive frame	/f/bIII103III1203III1III1III/b/f		

5.1.33 SetErrStateHoldEnable()

Enable all the drivers after the error occurs。

Table5-1-33 SetErrStateHoldEnable()Directive protocol

	order	type	name	description
parameter	1	uint8_t	enable	0-disabled; 1-enabled
returned value		int	errcode	Error code
Command number	1206			
instance	Send the frame	/f/bIII103III1206III24IIISetErrStateHoldEnable(1)III/b/f		
	Receive frame	/f/bIII103III1206III1III1III/b/f		

5.1.34 SetLimitRingVisible()

Set whether the limit ring is displayed-if not displayed, the back end does not

parse the data-optimization time。

Table5-1-34 SetLimitRingVisible()Directive protocol

	order	type	name	description
parameter	1	uint8_t	enable	0-disabled; 1-enabled
returned value		int	errcode	Error code
Command number	1215			
instance	Send the frame	/f/bIII103III1215III22IIISetLimitRingVisible(1)III/b/f		
	Receive frame	/f/bIII103III1215III1III1III/b/f		

5.1.35 SetStatePeriod()

Set the port cycle to 20002。

Table5-1-35 SetStatePeriod()Directive protocol

	order	type	name	description
parameter	1	int	port	Port (currently only supports 20002)
	2	int	period	Cycle, unit is ms, 20002 range is 100~1000ms
returned value		int	errcode	Error code
Command number	1207			
instance	Send the frame	/f/bIII103III1207III25IIISetStatePeriod(20002,100)III/b/f		
	Receive frame	/f/bIII103III1207III1III1III/b/f		

5.1.36 SetWideBoxTempFanMonitorParam()

Set the monitoring parameters of temperature and fan speed of the voltage control box.

Table 5-1-36 SetWideBoxTempFanMonitorParam() instruction protocol

	order	type	name	description

parameter	1	uint8_t	enable	0-disable, 1-enable control box temperature and fan current status monitoring
	2	uint8_t	period	Monitoring cycle (1~100), unit: second
returned value		int	errcode	Error code
Command number	1217			
instance	Send the frame	/f/bIII92III1217III34IIISetWideBoxTempFanMonitorParam(0,1)III/b/f		
	Receive frame	/f/bIII92III1217III1III1III/b/f		

5.1.37 SetServoJRpyEnable()

Set the switch to reply whether the servoj command is issued successfully.

Table 5-1-37 SetServoJRpyEnable() instruction protocol

	order	type	name	description
parameter	1	uint8_t	enable	0: Off, 1: On
returned value		int	errcode	Error code
Command number	1220			
instance	Send the frame	/f/bIII92III1220III21IIISetServoJRpyEnable(1)III/b/f		
	Receive frame	/f/bIII92III1220III1III1III/b/f		

5.1.38 SetPowerOnEnable()

Set whether the boot is automatically enabled.

Table 5-1-38 SetPowerOnEnable()instruction protocol

	order	type	name	description
parameter	1	uint8_t	status	0 - do not enable, 1 - enable
returned value		int	errcode	Error code
Command number	847			
instance	Send the frame	/f/bIII92III847III19IIISetPowerOnEnable(1)III/b/f		
	Receive frame	/f/bIII92III847III1III1III/b/f		

5.1.39 SetExAxisRobotPlan()

Set the Extended Axis synchronization motion strategy with the robot.

Table 5-1-39 SetExAxisRobotPlan()instruction protocol

	order	type	name	description
parameter	1	uint8_t	status	0: Robot-based, 1: Expansion axis synchronized with robot
returned value		int	errcode	Error code
Command number	1227			
instance	Send the frame	/f/bIII92III1227III21IIISetExAxisRobotPlan(1)III/b/f		
	Receive frame	/f/bIII92III1227III1III1III/b/f		

5.1.40 SetBase2TimefftFlag()

Set the adaptive INF notch parameters.

Table5-1-40 SetBase2TimefftFlag()instruction protocol

	order	type	name	description
parameter	1	float	notch_depth	Notch depth, 0-1
	2	float	notch_width	Notch width, 0-1
	3	float	phase_coefficient	Phase improvement coefficient, unit HZ, 0-1
	4	uint8_t	flag	Flag bit: 0 (closed); 1 (On)
returned value		int	errcode	Error code
Command number	1247			
instance	Send the frame	/f/bIII92III1247III35IIISetBase2TimefftFlag(0.05,0.3,0.3,1)III/b/f		
	Receive frame	/f/bIII92III1247III1III1III/b/f		

5.1.41 SetAdmittanceParams()

Set the joint force sensor parameters。

Table 5-1-41 SetAdmittanceParams ()Directive protocol

	order	type	name	description
parameter	1	int	AdmittanceFlag	Marker 1 - Correction Zero 0 - Correction Zero
	2	float[6]	m	Six-dimensional array of mass coefficients
	3	float[6]	b	Damping coefficient six-dimensional array
	4	float[6]	k	Stiffness coefficient six-dimensional array
	5	float[6]	threashold	Six-dimensional data of force control threshold
returned value		int	errcode	Error code
Command number	1249			
instance	Send the frame	/f/bIII66III1249III270IIISetAdmittanceParams(0,{1.0000000,1.0000000,1.0000000,1.0000000,1.0000000,1.0000000},{1.0000000,1.0000000,1.0000000,1.0000000,1.0000000,1.0000000},{1.0000000,1.0000000,1.0000000,1.0000000,1.0000000,1.0000000},{0.2000000,0.2000000,0.2000000,0.2000000,0.2000000,0.2000000})III/b/f		
	Receive frame	/f/bIII66III1249III1III1III/b/f		

5.1.42 SetTorqueDetectionSwitch()

Turn on the torque detection before dragging。

Table 5-1-42 SetTorqueDetectionSwitch ()Directive protocol

	order	type	name	description
parameter	1	int	status	0-off 1-on
returned value		int	errcode	Error code
Command number	1250			
instance	Send the frame	/f/bIII68III1250III27IIISetTorqueDetectionSwitch(1)III/b/f		
	Receive frame	/f/bIII68III1250III1III1III/b/f		

5.1.43 ImpedanceControlStartStop()

Turn on impedance control start-stop。

Table 5-1-43 ImpedanceControlStartStop ()Directive protocol

	order	type	name	description
parameter	1	int	status	0-off 1-on
	2	int	workSpace	0-joint 1-decar
	3	int	forceThreshold	Force Threshold （N）
	4	float[6]	m	Six-dimensional array of mass coefficients
	5	float[6]	b	Damping coefficient six-dimensional array
	6	float[6]	k	Stiffness coefficient six-dimensional array
	7	float	maxV	Maximum line speed mm/s
	8	float	maxVA	Maximum line acceleration mm/s2
	9	float	maxW	Maximum angular velocity ° /s
	10	float	maxWA	Maximum angular acceleration ° /s2
returned value		int	errcode	Error code
Command number	1251			
instance	Send the frame	/f/bIII92III1251III137III ImpedanceControlStartStop(1,1,{30,30,30,7,7,7},{0.04,0.04,0.04,0.01,0.01,0.01},{0.1,0.1,0.1,0.08,0.08,0.08},{0,0,0,0,0,0},250,500,90,180)III/b/f		
	Receive frame	/f/bIII92III1251III1III1III/b/f		

5.1.44 SetJointSensorZero()

Set the zero point calibration of the joint torque force sensor。

Table 5-1-43 ImpedanceControlStartStop ()Directive protocol

	order	type	name	description
parameter	1	int	sensorzeroflag	1-4 represents point 1 ~ point 4
returned value		int	errcode	Error code
Command number	1252			

instance	Send the frame	/f/bIII65III1252III21IIISetJointSensorZero(3)III/b/f
	Receive frame	/f/bIII65III1252III1III1III/b/f

5.1.45 SetRobotLock()

Set the shutdown robot expiration lock。

Table 5-1-45 SetRobotLock ()Directive protocol

	order	type	name	description
parameter	1	int	flag	1-Notifications turn on the lock function when it expires 2-lock
returned value		int	errcode	Error code
Command number	1255			
instance	Send the frame	/f/bIII88III1255III15IIISetRobotLock(1)III/b/f		
	Receive frame	/f/bIII88III1255III1III1III/b/f		

5.1.46 SetLinearRailCollisionDetectionFlag()

Set the linear rack guide rail collision detection flag.

Table5-1-46 SetLinearRailCollisionDetectionFlag()instruction protocol

	order	type	name	description
parameter	1	uint8_t	linearRailFlag	Flag for enabling the collision detection function of the linear rack guide rail; 0-off; 1-on
returned value		int	errcode	Error code
Command number	1267			
instance	Send the frame	/f/bIII88III1267III38IIISetLinearRailCollisionDetectionFlag(0)III/b/f		
	Receive frame	/f/bIII88III1267III1III1III/b/f		

5.1.47 SetLinearRailCollisionParam()

Set the parameters for linear rack guide collision detection.

Table5-1-47 SetLinearRailCollisionParam()instruction protocol

	order	type	name	description
parameter	1	int	collisionLevel	The collision level of the linear rack guide rail is 1 to 10. Close (100 points deducted)
	2	float	gearRadius	The gear radius of the linear rack guide rail ranges from 0 to 1000 mm.
	3	float	sliderMass	The slider mass of the linear rack guide rail ranges from 0 to 100 kg.
returned value		int	errcode	Error code
Command number	1268			
instance	Send the frame	/f/bIII88III1268III36IIISetLinearRailCollisionParam(100,0,0)III/b/f		
	Receive frame	/f/bIII88III1268III1III1III/b/f		

5.1.48 JointSensitivityEnable()

Joint torque sensor sensitivity calibration is enabled.

Table5-1-48 JointSensitivityEnable()instruction protocol

	order	type	name	description
parameter	1	uint8_t	flag	0-Off; 1-On
returned value		int	errcode	Error code
Command number	1274			
instance	Send the frame	/f/bIII88III1274III25IIIJointSensitivityEnable(0)III/b/f		
	Receive frame	/f/bIII88III1274III1III1III/b/f		

5.1.49 JointSensitivityCollect()

Joint torque sensor sensitivity data acquisition.

Table5-1-49 JointSensitivityCollect()instruction protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1278			

instance	Send the frame	/f/bIII88III1278III25IIIJointSensitivityCollect()III/b/f
	Receive frame	/f/bIII88III1278III1III1III/b/f

5.1.50 FileUpload()

Use port 20010 to upload files.

Table5-1-50 FileUpload()instruction protocol

	order	type	name	description
parameter	1	int	fileType	File type 0-Lua file; 1-Software upgrade package; 2-Slave firmware; 3-Slave configuration file; 4-Slave encoder; 5-Joint full-parameter configuration file; 6-Linux OS upgrade; 10-Lua terminal open protocol; 11-Controller Lua open protocol; 20-Trajectory J file; 101-breakpoint resume
	2	char	luaName[128]	filename
returned value		int	errcode	Error code
Command number	1285			
instance	Send the frame	/f/bIII88III1285III35IIIFileUpload(1,"C:\software.tar.gz")III/b/f		
	Receive frame	/f/bIII88III1285III1III1III/b/f		

5.1.51 PointTableUpdateLua()

Update the point table with the Lua program.

Table5-1-51 PointTableUpdateLua()instruction protocol

	order	type	name	description
parameter	1	char	luaName[128]	The name of the Lua file to update
returned value		int	errcode	Error code
Command number	1290			
instance	Send the frame	/f/bIII88III1290III35IIIPointTableUpdateLua(“test.lua”)III/b/f		
	Receive frame	/f/bIII88III1290III1III1III/b/f		

5.1.52 SetSmartToolFoolProofing()

Set SmartTool to fail-safe mode.

Table5-1-51 SetSmartToolFoolProofing()instruction protocol

	order	type	name	description
returned value	1	uint8_t	Mode	0-Normal mode, 1-Anti-misoperation mode. To cancel or clear the program, press the button twice.
returned value		int	errcode	Error code
Command number	1300			
instance	Send the frame	/f/bIII88III1300III27IIISetSmartToolFoolProofing(0)III/b/f		
	Receive frame	/f/bIII88III1300III1III1III/b/f		

5.2 Load Settings

5.2.1 SetLoadweight()

Set the load weight.

Table 5-2-1 SetLoadweight() Directive protocol

	order	type	name	description
parameter	1	uint8_t	loadNo	Load number
	2	double	mass	Load weight value
returned value		int	errcode	Error code
Command number	306			
instance	Send the frame	/f/bIII4III306III21IIISetLoadweight(1,0.85)III/b/f		
	Receive frame	/f/bIII4III306III1III1III/b/f		

5.2.2 SetLoadcoord()

Set the load centroid coordinates.

Table 5-2-2 SetLoadcoord() Directive protocol

	order	type	name	description
parameter	1	uint8_t	loadNo	Load number
	2	double	x	center-of-mass coordinate x
	3	double	y	center-of-mass coordinate y
	4	double	z	center-of-mass coordinate z
returned value		int	errcode	Error code
Command number	307			
instance	Send the frame	/f/bIII4III307III21IIISetLoadcoord(1,0,0,0)III/b/f		
	Receive frame	/f/bIII4III307III1III1III/b/f		

5.2.3 SetPayload()

Set the load weight and center of mass coordinates.

Table 5-2-3 SetPayload() Directive protocol

	order	type	name	description
parameter	1	uint8_t	loadNo	Load number
	2	double	mass	Load weight value
	3	double	x	center-of-mass coordinate x
	4	double	y	center-of-mass coordinate y
	5	double	z	center-of-mass coordinate z
returned value		int	errcode	Error code
Command number	848			
instance	Send the frame	/f/bIII454III848III22IIISetPayload(0,0,0,0,0)		
	Receive frame	/f/bIII454III848III1III1III/b/f		

5.3 Tool Settings

5.3.1 SetToolCoord()

Set the value of the tool coordinate system and apply it as the current coordinate system.

Table 5-3-1 SetToolCoord() Directive protocol

	type	name	description
parameter	int	toolNum	Tool coordinate system number
	float	x	Tool position x, unit: [mm]
	float	y	Tool position y, unit: [mm]
	float	z	Tool position z, unit: [mm]
	float	rx	Tool position rx, unit: [°]
	float	ry	Tool position ry, unit: [°]
	float	rz	Tool position rz, unit: [°]
	int	type	0-tool, 1-sensor
	int	install	0-Install the end, 1-outside the robot
	uint8_t	tool_id	Tool ID
	uint8_t	loadNo	Load number
returned value	int	errcode	Error code
Command number	316		
instance	Send the frame	/f/bIII224III316III59IIISetToolCoord(0,3.100,0.000,2.100,0.000,1.100,0.000,0,0,0,0)III/b/f	
	Receive frame	/f/bIII224III316III1III1III/b/f	

5.3.2 ComputeTool()

Coordinate system for calculation tools, used with SetToolPoint() interface.

Table 5-3-2 ComputeTool() Directive protocol

	type	name	description
parameter	\	\	\
returned value	float	x	Tool position x, unit: [mm]
	float	y	Tool position y, unit: [mm]
	float	z	Tool position z, unit: [mm]
	float	rx	Tool position rx, unit: [°]
	float	ry	Tool position ry, unit: [°]
	float	rz	Tool position rz, unit: [°]
Command	314		

number		
instance	Send the frame	/f/bIII4III314III13IIIComputeTool()III/b/f
	Receive frame	/f/bIII4III314III37III3.657,1.454,102.981,0.012,0.098,0.027III/b/f

5.3.3 SetToolList()

Set the tool coordinate system list. This interface only modifies the coordinate system value and does not apply the set coordinate system number to the current coordinate system.

Table 5-3-3 SetToolList() Directive protocol

	type	name	description
parameter	int	toolNum	Tool coordinate system number
	float	x	Tool position x, unit: [mm]
	float	y	Tool position y, unit: [mm]
	float	z	Tool position z, unit: [mm]
	float	rx	Tool position rx, unit: [°]
	float	ry	Tool position ry, unit: [°]
	float	rz	Tool position rz, unit: [°]
	int	type	0-tool, 1-sensor
	int	install	0-Install the end, 1-outside the robot
returned value	int	errcode	Robot instruction interface error code
Command number	319		
instance	Send the frame	/f/bIII4III319III44IIISetToolList(1,0.0,0.0,100.0,0.0,0.0,0.0,0.0,0,0)III/b/f	
	Receive frame	/f/bIII4III319III1III1III/b/f	

5.4 Security Settings

5.4.1 SetLimitPositive()

Set the robot's positive limit Angle.

Table 5-4-1 SetLimitPositive() Directive protocol

	order	type	name	description
parameter	1	double	pos_deg1	1 Joint limit Angle, unit (°)

	2	double	pos_deg2	2. The joint limit angle is (°)
	3	double	pos_deg3	3. The limit angle of joint, unit (°)
	4	double	pos_deg4	4. Joint limit angle, unit (°)
	5	double	pos_deg5	5. Joint limit angle, unit (°)
	6	double	pos_deg6	6. Joint limit angle, unit (°)
returned value		int	errcode	Error code
Command number	308			
instance	Send the frame	/f/bIII506III308III39IIISetLimitPositive(175,85,160,85,175,175)III/b/f		
	Receive frame	/f/bIII506III308III1III1III/b/f		

5.4.2 SetLimitNegative()

Set the robot negative limit Angle.

Table 5-4-2 SetLimitNegative() Directive protocol

	order	type	name	description
parameter	1	double	neg_deg1	1 Joint negative limit Angle, unit (°)
	2	double	neg_deg2	2. Joint negative limit Angle, unit (°)
	3	double	neg_deg3	3 Joint negative limit Angle, unit (°)
	4	double	neg_deg4	4 Joint negative limit Angle, unit (°)
	5	double	neg_deg5	5 Joint negative limit Angle, unit (°)
	6	double	neg_deg6	6 Joint negative limit Angle, unit (°)
returned value		int	errcode	Error code
Command number	309			
instance	Send the frame	/f/bIII507III309III47IIISetLimitNegative(-175,-265,-160,-265,-175,-175)III/b/f		
	Receive frame	/f/bIII507III309III1III1III/b/f		

5.4.3 SetCollisionDetectionMethod()

Set the robot collision detection method.

Table 5-4-3 SetCollisionDetectionMethod() Directive protocol

	order	type	name	description
parameter	1	uint8_t	method	Collision detection mode, 0: current mode, 1: dual encoder mode, 2: simultaneous opening
returned value		int	errcode	Error code
Command number	846			
instance	Send the frame	/f/bIII147III846III30IIISetCollisionDetectionMethod(0)III/b/f		
	Receive frame	/f/bIII147III846III1III1III/b/f		

5.4.4 SetAnticollision()

Set the robot collision level.

Table 5-4-4 SetAnticollision() Directive protocol

	order	type	name	description
parameter	1	uint8_t	type	0-level, 1-percentage
	2	float[6]	level[6]	The collision grade or percentage of the six axes Grade range: 1 to 10, level 1 is the most sensitive Percentage range: 1 to 100,1 is the most sensitive
	3	uint8_t	configFlag	0-Do not update the configuration file, 1-Update the configuration file
returned value		int	errcode	Error code
Command number	305			
instance	Send the frame	/f/bIII201III305III35IIISetAnticollision(1,{5,5,5,5,5,5},1)III/b/f		
	Receive frame	/f/bIII201III305III1III1III/b/f		

5.4.5 SetCollisionStrategy()

Set the robot collision after strategy.

Table 5-4-5 SetCollisionStrategy() Directive protocol

	order	type	name	description
parameter	1	uint8_t	strategy	Control state, 0: error pause, 1: continue to run, 2: error stop, 3: gravity mode, 4: oscillation response mode, 5: collision rebound mode
	2	int	safeTime	Safety stop time [1000-2000]ms
	3	int	safeDistance	Safety stop distance [1-150]mm
	4	int	safeVel	Safety speed mm/s [50-250]
	5	int[6]	safetyMargin[6]	Safety factor [1-10] of 6 shafts
returned value		int	errcode	Error code
Command number	569			
instance	Send the frame	/f/bIII202III569III50IIISetCollisionStrategy(2,1000,150,250,{5,5,5,5,5,5})III/b/f		
	Receive frame	/f/bIII202III569III1III1III/b/f		

5.4.6 SetStaticCollisiononOff()

Set static collision detection to start off.

Table 5-4-6 SetStaticCollisionOnOff() Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	0: off, 1: on
returned value		int	errcode	Error code
Command number	960			
instance	Send the frame	/f/bIII148III960III26IIISetStaticCollisionOnOff(1)III/b/f		
	Receive frame	/f/bIII148III960III1III1III/b/f		

5.4.7 SetPowerLimit()

Set joint torque power detection.

Table 5-4-7 SetPowerLimit() Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	0: off, 1: on
	2	double	power	Set the maximum power, unit W
returned value		int	errcode	Error code
Command number	961			
instance	Send the frame	/f/bIII4III961III18IIISetPowerLimit(0,0)III/b/f		
	Receive frame	/f/bIII4III961III1III1III/b/f		

5.4.8 CustomCollisionDetectionstart()

Custom collision detection threshold function starts to set the collision detection threshold at the joint end and TCP end.

Table 5-4-8 CustomCollisionDetectionstart() Directive protocol

	order	type	name	description
parameter	1	uint8_t	flag	Flag = 1, joint detection is enabled only; flag = 2, TCP detection is enabled only; flag = 3, joint and TCP detection
	2	float[6]	jointDetectionThreshold	Joints collision detection values, j1-j6
	3	float[6]	tcpDetectionThreshold	TCP collision detection values, x-y-z-a-b-c
	4	uint8_t	block	0: non-blocking; 1: blocking
returned value		int	errcode	Error code
Command number	1135			
instance	Send the frame	/f/bIII4III1135III58IIICustomCollisionDetectionstart(0,0,0,0,0,0,0,0,0,0,0,0,0,0)III/b/f		

	Receive frame	/f/bIII4III1135III1III1III/b/f

5.4.9 CustomCollisionDetectionEnd()

Custom collision detection threshold function ends.

Table 5-4-9 CustomCollisionDetectionEnd() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1136			
instance	Send the frame	/f/bIII4III1136III29IIICustomCollisionDetectionEnd()III/b/f		
	Receive frame	/f/bIII4III1136III1III1III/b/f		

5.4.10 SetJointstatusWordErrorStopMode()

Set the robot joint state word exception handling method.

Table 5-4-10 SetJointstatusWordErrorStopMode() Directive protocol

	order	type	name	description
parameter	1	uint8_t	stopMode	0: Do not process, 1: Stop error reporting
returned value		int	errcode	Error code
Command number	1138			
instance	Send the frame	/f/bIII4III1138III34IIISetJointstatusWordErrorStopMode(1)III/b/f		
	Receive frame	/f/bIII4III1138III1III1III/b/f		

5.4.11 SetSafetyStopStrategy()

Set the method of post-processing after security signal is triggered.

Table 5-4-11 SetSafetyStopStrategy() Directive protocol

	order	type	name	description

parameter	1	uint8_t	type	0: Stop, 1: Pause, 2: Shrink Mode 1, 3: Shrink Mode 2
	2	uint8_t	stoppause	Safe stop channel, 0: default, 1: dual channel
returned value		int	errcode	Error code
Command number	584			
instance	Send the frame	/f/bIII279III584III26IIISetSafetyStopStrategy(0,0)III/b/f		
	Receive frame	/f/bIII279III584III1III1III/b/f		

5.4.12 SetSafetyStopSigMode()

Set the security signal mode.

Table 5-4-12 SetSafetyStopSigMode() Directive protocol

	order	type	name	description
parameter	1	uint8_t	mode	0: always on, 1: always off
returned value		int	errcode	Error code
Command number	587			
instance	Send the frame	/f/bIII175III587III23IIISetSafetyStopSigMode(0)III/b/f		
	Receive frame	/f/bIII175III587III1III1III/b/f		

5.4.13 FrictionCompensationOnOff()

Set the joint friction compensation switch.

Table 5-4-13 FrictionCompensationOnOff() Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	0-off, 1-on
returned value		int	errcode	Error code
Command number	338			

instance	Send the frame	/f/bIII233III338III28IIIFrictionCompensationOnOff(1)III/b/f
	Receive frame	/f/bIII233III338III1III1III/b/f

5.4.14 SetFrictionValue_freedom

Set the joint friction compensation coefficient-free installation.

Table 5-4-14 SetFrictionValue_freedom() instruction protocol

	order	type	name	description
parameter	1	float	joint1_level	Joint 1 compensation coefficient, range [0~1]
	2	float	joint2_level	Joint 2 compensation coefficient, range [0~1]
	3	float	joint3_level	Joint 3 compensation coefficient, range [0~1]
	4	float	joint4_level	Joint 4 compensation coefficient, range [0~1]
	5	float	joint5_level	Joint 5 compensation coefficient, range [0~1]
	6	float	joint6_level	Joint 6 compensation coefficient, range [0~1]
returned value		int	errcode	Error code
Command number	637			
instance	Send the frame	/f/bIII176III637III61IIISetFrictionValue_freedom(1.000,1.000,1.000,1.000,1.000,1.000)III/b/f		
	Receive frame	/f/bIII176III637III1III1III/b/f		

5.4.15 AccSmoothStart()

Enable acceleration smoothing command。

Table 5-4-15 AccSmoothStart() Directive Agreement

	order	type	name	description

returned value		int	errcode	Error code
Command number	1146			
instance	Send the frame	/f/bIII176III1146III16IIIAccSmoothStart()III/b/f		
	Receive frame	/f/bIII176III1146III1III1III/b/f		

5.4.16 AccSmoothEnd()

Set acceleration smooth command off.

Table 5-4-16 AccSmoothEnd() Directive Agreement

	order	type	name	description
returned value		int	errcode	Error code
Command number	1147			
instance	Send the frame	/f/bIII176III1147III14IIIAccSmoothEnd()III/b/f		
	Receive frame	/f/bIII176III1147III1III1III/b/f		

5.4.17 SetSoftLimitProtectFlag()

Set the joint soft limit protection function on/off flag。

Table5-4-17 SetSoftLimitProtectFlag()Directive protocol

	order	type	name	description
parameter	1	uint8_t	softLimitFlag	0 is off and 1 is on
returned value		int	errcode	Error code
Command number	1191			
instance	Send the frame	/f/bIII176III1191III26IIISetSoftLimitProtectFlag(1)III/b/f		
	Receive frame	/f/bIII176III1191III1III1III/b/f		

5.4.18 SetLowTempPreheatingAutoCheckParam()

Set low temperature preheating parameter。

Table5-4-18 SetLowTempPreheatingAutoCheckParam()Directive protocol

	order	type	name	description
parameter	1	uint8_t	preHeatingEnable	0-disable, 1-enable low temperature preheating function
	2	int	preHeatingVolt	Low temperature preheating working voltage (1~32767) unit: 0.01V
	3	int	preHeatingTime	Low temperature preheating duration (1~32767) unit: s
	4	int	preHeatingTemp	Low temperature preheating trigger temperature (-32767~0) unit: 0.1℃
returned value	1	int	errcode	Error code
Command number	1195			
instance	Send the frame	/f/bIII92III1195III43IIISetLowTempPreheatingAutoCheckParam(0,1,1,0)III/b/f		
	Receive frame	/f/bIII92III1195III9III20.397933III/b/f		

5.4.19 StartLowTempPreheating()

Start the low temperature preheating。

Table5-4-19 StartLowTempPreheating()Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1197			
instance	Send the frame	/f/bIII176III1197III24IIIStartLowTempPreheating()III/b/f		
	Receive frame	/f/bIII176III1197III1III1III/b/f		

5.4.20 SetJoint2AutoUp()

Set the automatic lifting function of joint 2 parameter。

Table5-4-20 SetJoint2AutoUp()Directive protocol

	order	type	name	description
parameter	1	int	enable	0-disabled, 1-enabled
	2	float	degree	Automatic lifting of motion Angle (-20 degrees to 20 degrees)
	3	int	speed	Automatic lift motion speed (percentage)
returned value	1	int	errcode	Error code
Command number	1204			
instance	Send the frame	/f/bIII92III1204III22IIISetJoint2AutoUp(0,0,0)III/b/f		
	Receive frame	/f/bIII92III1204III1III1III/b/f		

5.4.21 ForceSensorRestartStop()

Force sensor assisted drag triggers collision recovery/closes force sensor assisted drag.

Table 5-4-21 ForceSensorRestartStop() instruction protocol

	order	type	name	description
parameter	1	uint8_t	enable	0-off, 1-on
returned value	1	int	errcode	Error code
Command number	1216			
instance	Send the frame	/f/bIII92III1216III25IIIForceSensorRestartStop(0)III/b/f		
	Receive frame	/f/bIII92III1216III1III1III/b/f		

5.4.22 SetDragGain()

Set the drag compensation switch and drag gain.

Table 5-4-22 SetDragGain() instruction protocol

	order	type	name	description
parameter	1	uint8_t	flag	Switch for compensation; 0-off; 1-on

	2	uint8_t	adaptive_sign	Adaptive switch; 0-off; 1-on
	3	float	gain	Drag the gain setting (0-1)
returned value	1	int	errcode	Error code
Command number	1219			
instance	Send the frame	/f/bIII92III1219III18IIISetDragGain(0,0,0)III/b/f		
	Receive frame	/f/bIII92III1219III1III1III/b/f		

5.4.23 SetCoderCompenParams()

Set the torque compensation function and compensation coefficient.

Table5-4-23 SetCoderCompenParams()Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	0-Off; 1-On
	2	float	torqueCoeff[6]	j1 – j6 compensation coefficients, [0-1]
returned value	1	int	errcode	Error code
Command number	1291			
instance	Send the frame	/f/bIII92III1291III61IIISetCoderCompenParams(1,{0.000,0.000,0.000，0.000,0.000,0.000})III/b/f		
	Receive frame	/f/bIII92III1291III1III1III/b/f		

5.4.24 SetImpulseDetectionOnOff()

Set the impulse detection switch.

Table5-4-24 SetImpulseDetectionOnOff()Directive protocol

	order	type	name	description
parameter	1	uint8_t	flag	0-Off; 1-On
returned value	1	int	errcode	Error code
Command number	1294			
instance	Send the frame	/f/bIII92III1294III27IIISetImpulseDetectionOnOff(1)III/b/f		

	Receive frame	/f/bIII92III1294III1III1III/b/f

5.4.25 SetSafetyStopMoveAscertainParam()

Set robot safety stop safety speed move param。

Table 5-4-24 SetSafetyStopMoveAscertainParam()Directive protocol

	order	type	name	description
parameter	1	uint8_t	flag	0-Off; 1-On
returned value	1	int	errcode	Error code
Command number	1323			
instance	Send the frame	/f/bIII92III1323III34IIISetSafetyStopMoveAscertainParam(1)III/b/f		
	Receive frame	/f/bIII92III1323III1III1III/b/f		

5.4.26 GetSafetyStopMoveAscertainParam()

Get robot safety stop safety speed move param。

Table 5-4-24 GetSafetyStopMoveAscertainParam()Directive protocol

	order	type	name	description
returned value	1	uint8_t	flag	0-Off; 1-On
Command number	1326			
instance	Send the frame	/f/bIII92III1326III34IIIGetSafetyStopMoveAscertainParam(1)III/b/f		
	Receive frame	/f/bIII92III1326III1III1III/b/f		

5.4.27 SetSafetyStopMoveAscertain()

Set robot safety stop safety speed move。

Table 5-4-24 SetSafetyStopMoveAscertain()Directive protocol

	order	type	name	description
returned value	1	int	errcode	Error code

Command number	1324	
instance	Send the frame	/f/bIII92III1324III28IIISetSafetyStopMoveAscertain()III/b/f
	Receive frame	/f/bIII92III1324III1III1III/b/f

6 The robot queries the instruction

6.1 Equipment parameter query

6.1.1 GetMCVersion()

Get the controller software version.

Table 6-1-1 GetMCVersion() Directive protocol

	order	type	name	description
parameter	1	uint8_t	flag	1-Obtain the controller software version
returned value	1	string	version	Controller software version
Command number	400			
instance	Send frame	/f/bIII37III400III15IIIGetMCVersion(1)III/b/f		
	Receive frame	/f/bIII37III400III10IIIV3.7.77-QXIII/b/f		

6.1.2 GetSlaveHardVersion()

Obtain the hardware version number of the receiving station.

Table 6-1-2 GetSlaveHardVersion() Directive protocol

	order	type	name	description
returned value	1	string	version	The 8 station hardware version numbers are connected by commas
Command number	423			
instance	Send the frame	/f/bIII39III423III21IIIGetSlaveHardVersion()III/b/f		

	Receive frame	/f/bIII39III423III35IIIFR-CB-V0.5,/,/,/,/,/,/,FR-TEAM-V1.1III/b/f

6.1.3 GetSlaveFirmVersion()

Get the firmware version number of the receiving station

Table 6-1-3 GetSlaveFirmVersion() Directive protocol

	order	type	name	description
returned value	1	string	version	8 From the firmware version number of the station, connected by comma
Command number	424			
instance	Send the frame	/f/bIII40III424III21IIIGetSlaveFirmVersion()III/b/f		
	Receive frame	/f/bIII40III424III326IIIFR_CTRL_FV2.010.10 May 29 2024 21:00:45,FR_SERVO_FV5.022.12 Mar 3 2025 15:25:41,FR_SERVO_FV5.022.12 Mar 3 2025 15: 25:41,FR_SERVO_FV5.022.12 Mar 3 2025 15:25:41,FR_SERVO_FV5.022.12 Mar 3 2025 15:25:41,FR_SERVO_FV5.022.12 Mar 3 2025 15:25:41,FR_SERVO_FV5.022.12 Mar 3 2025 15:25:41,FR05_End_FV2. 010.08 Mar 12 2025 09:42:30III/b/f		

6.1.4 GetSoftwareVersion()

Get the robot software version number

Table 6-1-4 GetSoftwareVersion() Directive protocol

	order	type	name	description
returned value	1	string	robotModel	Robot model
	2	string	webVersion	webapp edition
	3	string	controllerVersion	Controller version
Command number	905			
instance	Send the frame	/f/bIII4III905III20IIIGetSoftwareVersion()III/b/f		
	Receive frame	/f/bIII4III905III32IIIFR16-V1-001(V6.0),v3.8.1,V3.7.77III/b/f		

6.1.5 GetControlBoxNetMacAddr()

Get the Mac address of the network card in the control box.

Table 6-2-1 GetControlBoxNetMacAddr() Directive protocol

	order	type	name	description
parameter	1	int	netNo	Network card ID, 0-rt0 network card, 1-rt1 network card
returned value	1	char	mac_addr[20]	Network card MAC address
Command number	826			
instance	Send the frame	/f/bIII4III826III26IIIGetControlBoxNetMacAddr(0)III/b/f		
	Receive frame	/f/bIII4III826III12III00E01C1C05FEIII/b/f		

6.1.6 GetRobotSN()

Obtain the robot SN code.

Table 6-1-6 GetRobotSN() Directive Agreement

	order	type	name	description
returned value	1	char[128]	SN	Robot SN code
Command number	1173			
instance	Send the frame	/f/bIII46III1173III12IIIGetRobotSN()III/b/f		
	Receive frame	/f/bIII46III1173III15III0124-002-1424-1III/b/f		

6.1.7 GetNetRobotConfig()

Get the robot network version logo。

Table6-1-7 GetNetRobotConfig()Directive protocol

	order	type	name	description

returned value	1	uint8_t	netFlag	0-non-network version; 1-network version
Command number	1192			
instance	Send the frame	/f/bIII46III1192III19IIIGetNetRobotConfig()III/b/f		
	Receive frame	/f/bIII46III1192III1III0III/b/f		

6.1.8 etSoftwareUpgradeState()

Get the software update status.

Table6-1-8 GetSoftwareUpgradeState()instruction protocol

	order	type	name	description
returned value	1	int	state	Upgrade progress percentage
Command number	1286			
instance	Send the frame	/f/bIII46III1286III25IIIGetSoftwareUpgradeState()III/b/f		
	Receive frame	/f/bIII46III1286III2III40III/b/f		

6.2 Configuration queries

6.2.1 GetToolData()

Get the tool coordinate system.

Table 6-2-2 GetToolData() Directive protocol

	order	type	name	description
parameter	1	uint8_t	toolNo	Enter the Tool number
returned value	1	uint8_t	toolNo	Enter the Tool number
	2	float	x	Tool position x, unit: [mm]
	3	float	y	Tool position y, unit: [mm]

	4	float	z	Tool position z, unit: [mm]
	5	float	rx	Tool position rx, unit: [°]
	6	float	ry	Tool position ry, unit: [°]
	7	float	rz	Tool position rz, unit: [°]
	8	uint8_t	toolID	Item number
	9	uint8_t	loadNo	Load number
Command number	817			
instance	Send the frame	/f/bIII4III817III14IIIGetToolData(1)III/b/f		
	Receive frame	/f/bIII4III817III59III1,0.000000,0.000000,0.000000,0.000000,0.000000,0.000000,0,0III/b/f		

6.2.2 GetWorkpieceData()

Get the workpiece coordinate system.

Table 6-2-3 GetWorkpieceData() Directive protocol

	order	type	name	description
parameter	1	uint8_t	workpieceNo	Enter the Workpiece number, 0 to 14
returned value	1	uint8_t	workpieceNo	Enter the Workpiece number, 0 to 14
	2	float	x	Workpiece position x, unit: [mm]
	3	float	y	Workpiece position y, unit: [mm]
	4	float	z	Workpiece position z, unit: [mm]
	5	float	rx	Workpiece position rx, unit: [°]
	6	float	ry	Workpiece position ry, unit: [°]
	7	float	rz	Workpiece position rz, unit: [°]
	8	int	refFrame	reference coordinate system

Command number	818	
instance	Send the frame	/f/bIII4III818III19IIIGetWorkpieceData(1)III/b/f
	Receive frame	/f/bIII4III818III57III1,0.000000,0.000000,0.000000,0.000000,0.000000,0.000000,0III/b/f

6.2.3 GetLoadData()

Get load information.

Table 6-2-4 GetLoadData() Directive protocol

	order	type	name	description
parameter	1	uint8_t	loadNo	Load number
	1	double	mass	Load weight value
	2	double	x	center-of-mass coordinate x
	3	double	y	center-of-mass coordinate y
	4	double	z	center-of-mass coordinate z
Command number	819			
instance	Send the frame	/f/bIII4III819III14IIIGetLoadData(1)III/b/f		
	Receive frame	/f/bIII4III819III35III0.000000,0.000000,0.000000,0.000000III/b/f		

6.2.4 GetEndDragBtnConfig

Obtain the control status of the robot end drag button.

Table 6-2-5 GetEndDragBtnConfig() Directive protocol

	order	type	name	description
returned value	1	uint8_t	controlType	Drag start and stop mode: 0-long press mode: 1-trigger mode
	2	uint8_t	triggerTimeout	Enter/Exit drag timeout time s (1-10)
	3	uint8_t	triggerTimes	Number of times to press the end button to enter/exit the drag state (1-10)

	4	uint16_t	dragstateTimeout	If the time is exceeded and the drag is not performed, the automatic exit drag state will be performed for s (1-600)
Command number	989			
instance	Send the frame	/f/bIII46III989III21IIIGetEndDragBtnConfig()III/b/f		
	Receive frame	/f/bIII46III989III8III0,1,1,10III/b/f		

6.2.5 ExtAxisGetCoord()

Get the extended axis coordinate system。

Table6-2-5 ExtAxisGetCoord()Directive protocol

	order	type	name	description
returned value	1	float	x	Extend the axis coordinate system x, unit：[mm]
	2	float	y	Extend the axis coordinate system y, unit：[mm]
	3	float	z	Extend the axis coordinate system z, unit：[mm]
	4	float	rx	Extend the axis coordinate system rx, unit：[°]
	5	float	ry	Extend the axis coordinate system ry, unit：[°]
	6	float	rz	Extend the axis coordinate system to rz, unit：[°]
Command number	1198			
instance	Send the frame	/f/bIII4III1198III17IIIExtAxisGetCoord()III/b/f		
	Receive frame	/f/bIII4III1198III53III0.000000,0.000000,0.000000,0.000000,0.000000,0.000000III/b/f		

6.2.6 GetCurExToolCoord()

Gets the current external tool coordinate system.

Table 6-2-6 GetCurExToolCoord()Directive protocol

	order	type	name	description
returned value	1	int	curID	Coordinate system ID

	2	float	x	Coordinate system value x [mm]
	3	float	y	Coordinate system value y [mm]
	4	float	z	Coordinate system value z [mm]
	5	float	rx	Coordinate system value rx [mm]
	6	float	ry	Coordinate system value ry [mm]
	7	float	rz	Coordinate system value rz [mm]
Command number	1259			
instance	Send the frame	/f/bIII4III1259III19IIIGetCurExToolCoord()III/b/f		
	Receive frame	/f/bIII4III1259III55III0,0.000000,0.000000,0.000000,0.000000,0.000000,0.000000III/b/f		

6.2.7 GetToolCoordWithID()

Get the tool coordinate system according to the ID.

Table 6-2-7 GetToolCoordWithID()Directive protocol

	order	type	name	description
parameter	1	int	ID	Coordinate system ID
returned value	1	float	x	Coordinate system value x [mm]
	2	float	y	Coordinate system value y [mm]
	3	float	z	Coordinate system value z [mm]
	4	float	rx	Coordinate system value rx [mm]
	5	float	ry	Coordinate system value ry [mm]
	6	float	rz	Coordinate system value rz [mm]
Command number	1261			
instance	Send the frame	/f/bIII4III1261III21IIIGetToolCoordWithID(1)III/b/f		
	Receive frame	/f/bIII4III1261III57III0.000000,0.000000,136.000000,0.000000,0.000000,135.000000III/b/f		

6.2.8 GetWObjCoordWithID()

Get the workpiece coordinate system according to the ID。

Table 6-2-8 GetWObjCoordWithID()Directive protocol

	order	type	name	description
parameter	1	int	ID	Coordinate system ID
returned value	1	float	x	Coordinate system value x [mm]
	2	float	y	Coordinate system value y [mm]
	3	float	z	Coordinate system value z [mm]
	4	float	rx	Coordinate system value rx [mm]
	5	float	ry	Coordinate system value ry [mm]
	6	float	rz	Coordinate system value rz [mm]
Command number	1262			
instance	Send the frame	/f/bIII4III1262III21IIIGetWObjCoordWithID(1)III/b/f		
	Receive frame	/f/bIII4III1262III58III-600.000000,0.000000,100.000000,0.000000,0.000000,0.000000III/b/f		

6.2.9 GetExToolCoordWithID()

Get the external tool coordinate system according to the ID。

Table 6-2-9 GetExToolCoordWithID() Directive protocol

	order	type	name	description
parameter	1	int	ID	Coordinate system ID
returned value	1	float	x	Coordinate system value x [mm]
	2	float	y	Coordinate system value y [mm]
	3	float	z	Coordinate system value z [mm]
	4	float	rx	Coordinate system value rx [mm]
	5	float	ry	Coordinate system value ry [mm]

	6	float	rz	Coordinate system value rz [mm]
Command number	1263			
instance	Send the frame	/f/bIII4III1263III23IIIGetExToolCoordWithID(1)III/b/f		
	Receive frame	/f/bIII4III1263III53III0.000000,0.000000,0.000000,0.000000,0.000000,0.000000III/b/f		

6.2.10 GetExAxisCoordWithID()

Get the extended axis coordinate system according to the ID.

Table 6-2-10 GetExAxisCoordWithID()Directive protocol

	order	type	name	description
parameter	1	int	ID	Coordinate system ID
returned value	1	float	x	Coordinate system value x [mm]
	2	float	y	Coordinate system value y [mm]
	3	float	z	Coordinate system value z [mm]
	4	float	rx	Coordinate system value rx [mm]
	5	float	ry	Coordinate system value ry [mm]
	6	float	rz	Coordinate system value rz [mm]
Command number	1264			
instance	Send the frame	/f/bIII4III1264III23IIIGetExAxisCoordWithID(1)III/b/f		
	Receive frame	/f/bIII4III1264III66III-981.146000,-65.944000,328.242000,-29.108000,69.346000,-159.444000III/b/f		

6.2.11 GetTargetPayloadWithID()

Get the load mass and center of mass based on the ID。

Table 6-2-11 GetTargetPayloadWithID()Directive protocol

	order	type	name	description
parameter	1	int	ID	Load ID

returned value	1	double	loadWeight	load Weight kg
	2	double	x	Coordinate X(mm)
	3	double	y	Coordinate Y(mm)
	4	double	z	Coordinate Z(mm)
Command number	1269			
instance	Send the frame	/f/bIII4III1269III25IIIGetTargetPayloadWithID(1)III/b/f		
	Receive frame	/f/bIII4III1269III35III0.000000,0.000000,0.000000,0.000000III/b/f		

6.2.12 GetImpulseDetectionOnOff()

Get the status of the impulse detection switch.

Table6-2-13 GetImpulseDetectionOnOff()Directive protocol

	order	type	name	description
returned value	1	uint_8	flag	Switch state: 0 off, 1 on
Command number	1295			
instance	Send the frame	/f/bIII4III1295III26IIIGetImpulseDetectionOnOff()III/b/f		
	Receive frame	/f/bIII4III1295III1III0III/b/f		

6.3 Status parameter query

6.3.1 GetActualJointPosDegree()

Get the current actual position of the joint, in degrees

Table 6-3-1 GetActualJointPosDegree() Directive protocol

	order	type	name	description
returned value	1	float	j1	Joint 1 position [°]
	2	float	j2	Joint 2 position [°]

	3	float	j3	Joint 3 position [°]
	4	float	j4	Joint 4 position [°]
	5	float	j5	Joint 5 position [°]
	6	float	j6	Joint 6 position [°]
Command number	375			
instance	Send the frame	/f/bIII4III375III25IIIGetActualJointPosDegree()III/b/f		
	Receive frame	/f/bIII4III375III64III41.713891,-56.263053,89.381937,-119.227549,-89.816387,156.073953III/b/f		

6.3.2 GetActualJointSpeedsDegree()

Get the current actual speed of the joint, in degrees per second.

Table 6-3-2 GetActualJointSpeedsDegree() Directive protocol

	order	type	name	description
returned value	1	float	j1_speed	Joint 1 position [°/s]
	2	float	j2_speed	Joint 2 position [°/s]
	3	float	j3_speed	Joint 3 position [°/s]
	4	float	j4_speed	Joint 4 position [°/s]
	5	float	j5_speed	Joint 5 position [°/s]
	6	float	j6_speed	Joint 6 position [°/s]
Command number	1150			
instance	Send frames	/f/bIII4III1150III28IIIGetActualJointSpeedsDegree()III/b/f		
	Receive frame	/f/bIII4III1150III54III0.000000,0.000000,-0.021755,0.000000,0.000000,0.000000III/b/f		

6.3.3 GetActualJointSpeedsRadian()

Get the current actual speed of the joint, in radians per second

Table 6-3-3 GetActualJointSpeedsRadian() Directive protocol

	order	type	name	description
returned value	1	float	j1_speed	Joint 1 position [rad/s]
	2	float	j2_speed	Joint 2 position [rad/s]
	3	float	j3_speed	Joint 3 position [rad/s]
	4	float	j4_speed	Joint 4 position [rad/s]
	5	float	j5_speed	Joint 5 position [rad/s]
	6	float	j6_speed	Joint 6 position [rad/s]
Command number	1151			
instance	Send the frame	/f/bIII4IIII1151III28IIIGetActualJointSpeedsRadian()III/b/f		
	Receive frame	/f/bIII4IIII1151III54III0.000000,-0.000380,0.000380,0.000000,0.000000,0.000000III/b/f		

6.3.4 GetActualTCPPose()

Get the actual position and orientation of the current tool

Table 6-3-4 GetActualTCPPose() Directive protocol

	order	type	name	description
returned value	1	float	x	The position and orientation of the tool center in the base coordinate system, Unit: [mm], rxryrz Unit: [°]
	2	float	y	
	3	float	z	
	4	float	rx	
	5	float	ry	
	6	float	rz	
Command number	1152			
instance	Send the frame	/f/bIII4IIII1152III18IIIGetActualTCPPose()III/b/f		
	Receive frame	/f/bIII4IIII1152III67III-439.169312,-604.929077,280.385498,-176.516205,-1.744950,-24.419594III/b/f		

6.3.5 GetActualTCPNum()

Get the current tool number

Table 6-3-5 GetActualTCPNum() Directive protocol

	order	type	name	description
returned value	1	int	tcp_num	Tool number, 0 to 14
Command number	1153			
instance	Send the frame	/f/bIII4III1153III17IIIGetActualTCPNum()III/b/f		
	Receive frame	/f/bIII4III1153III1III0III/b/f		

6.3.6 GetActualToolFlangePose()

Get the current tool flange position

Table 6-3-6 GetActualToolFlangePose() Directive protocol

	order	type	name	description
returned value	1	float	x	The position of the center of the end flange in the base coordinate system, Unit: [mm], rxryrz Unit: [°]
	2	float	y	
	3	float	z	
	4	float	rx	
	5	float	ry	
	6	float	rz	
Command number	1154			
instance	Send the frame	/f/bIII4III1154III25IIIGetActualToolFlangePose()III/b/f		
	Receive frame	/f/bIII4III1154III67III-439.170227,-604.929382,280.389923,-176.516510,-1.744576,-24.419571III/b/f		

6.3.7 GetJointTorques()

Get the current joint torque, unit: Nm

Table 6-3-7 GetJointTorques() Directive protocol

	order	type	name	description
parameter	1	uint8_t	isNoBlock	Whether to block, 0 block, 1 not block
returned value	1	double	jTorque0	Actual torque of joint 1, unit Nm
	2	double	jTorque1	Actual torque of joint 2, unit Nm
	3	double	jTorque2	Actual torque of joint 3, unit Nm
	4	double	jTorque3	Actual torque of joint 4, unit Nm
	5	double	jTorque4	Actual torque of joint 5, unit Nm
	6	double	jTorque5	Actual torque of joint 6, unit Nm
Command number	1155			
instance	Send the frame	/f/bIII4III1155III18IIIGetJointTorques(0)III/b/f		
	Receive frame	/f/bIII4III1155III56III0.015200,-0.425600,-0.159000,-0.012160,0.000640,0.000640III/b/f		

6.3.8 GetTargetPayload()

Get the weight of the current load, unit: Kg

Table 6-3-8 GetTargetPayload() Directive protocol

	order	type	name	description
parameter	1	uint8_t	isNoBlock	Whether to block, 0 block, 1 not block
returned value	1	double	loadWeight	The weight of the active load, in kg
Command number	1156			
instance	Send the frame	/f/bIII4III1156III19IIIGetTargetPayload(0)III/b/f		
	Receive frame	/f/bIII4III1156III8III0.200000III/b/f		

6.3.9 GetTargetPayloadCog()

Get the center of mass of the current load, unit: mm

Table 6-3-9 GetTargetPayloadCog() Directive protocol

	order	type	name	description
parameter	1	uint8_t	isNoBlock	Whether to block, 0 block, 1 not block
returned value	1	double	x	center-of-mass coordinate x
	2	double	y	center-of-mass coordinate y
	3	double	z	center-of-mass coordinate z
Command number	1157			
instance	Send the frame	/f/bIII4III1157III22IIIGetTargetPayloadCog(0)III/b/f		
	Receive frame	/f/bIII4III1157III26III8.000000,9.000000,5.000000III/b/f		

6.3.10 GetTargetTCPPose()

Obtain the target pose of the current tool

Table 6-3-10 GetTargetTCPPose() Directive protocol

	order	type	name	description
parameter	1	uint8_t	isNoBlock	Whether to block, 0 block, 1 not block
returned value	1	float	x	The tool target is the actual position and orientation, Unit: [mm], rxryrz Unit: [°]
	2	float	y	
	3	float	z	
	4	float	rx	
	5	float	ry	
	6	float	rz	
Command number	1158			
instance	Send the frame	/f/bIII4III1158III19IIIGetTargetTCPPose(0)III/b/f		

	Receive frame	/f/bIII4III1158III67III-439.169495,-604.931885,280.395203,-176.517227,-1.744025,-24.419317III/b/f

6.3.11 GetTCPOffset()

Obtain the relative end flange center position of the current tool

Table 6-3-11 GetTCPOffset() Directive protocol

	order	type	name	description
parameter	1	uint8_t	isNoBlock	Whether to block, 0 block, 1 not block
returned value	1	float	x	The current tool is relative to the center position of the end flange, Unit: [mm], rxryrz Unit: [°]
	2	float	y	
	3	float	z	
	4	float	rx	
	5	float	ry	
	6	float	rz	
Command number	1159			
instance	Send the frame	/f/bIII4III1159III15IIIGetTCPOffset(0)III/b/f		
	Receive frame	/f/bIII4III1159III53III0.000000,0.000000,0.000000,0.000000,0.000000,0.000000III/b/f		

6.3.12 GetWObjOffset()

Obtain the position and orientation of the workpiece coordinate system relative to the base coordinate system.

Table 6-3-12 GetWObjOffset() Directive protocol

	order	type	name	description
parameter	1	uint8_t	isNoBlock	Whether to block, 0 block, 1 not block
returned value	1	float	x	The current workpiece coordinate system is relative to the base coordinate system position,
	2	float	y	

	3	float	z	Unit: [mm], rxryrz Unit: [°]
	4	float	rx	
	5	float	ry	
	6	float	rz	
Command number	1160			
instance	Send the frame	/f/bIII4III1160III16IIIGetWObjOffset(0)III/b/f		
	Receive frame	/f/bIII4III1160III53III0.000000,0.000000,0.000000,0.000000,0.000000,0.000000III/b/f		

6.3.13 GetJointSoftLimitDeg()

Get the joint soft limit Angle.

Table 6-3-13 GetJointSoftLimitDeg() Directive protocol

	order	type	name	description
parameter	1	uint8_t	isNoBlock	Whether to block, 0 block, 1 not block
returned value	1	double	jMin1	The minimum soft limit angle of joint 1, unit °
	2	double	jMax1	The maximum soft limit angle of joint 1, unit °
	3	double	jMin2	The minimum soft limit angle of joint 2, unit °
	4	double	jMax2	The maximum soft limit angle of joint 2, unit °
	5	double	jMin3	The minimum soft limit angle of joint 3, unit °
	6	double	jMax3	Maximum soft limit angle of joint 3, unit °
	7	double	jMin4	The minimum soft limit angle of joint 4, unit °
	8	double	jMax4	The maximum soft limit angle of joint 4, unit °

	9	double	jMin5	The minimum soft limit angle of joint 5, unit °
	10	double	jMax5	Maximum soft limit angle of joint 5, unit °
	11	double	jMin6	The minimum soft limit angle of joint 6, unit °
	12	double	jMax6	The maximum soft limit angle of joint 6, unit °
Command number	427			
instance	Send the frame	/f/bIII4III427III23IIIGetJointSoftLimitDeg(0)III/b/f		
	Receive frame	/f/bIII4III427III135III-175.000000,175.000000,-265.000000,85.000000,-160.000000,160.000000,-265.000000,85.000000,-175.000000,175.000000,-175.000000,175.000000III/b/f		

6.3.14 GetRobotMotionStatus()

Obtain the robot's motion status.

Table 6-3-14 GetRobotMotionStatus() Directive protocol

	order	type	name	description
returned value	1	int	error	0-no error, 1-error
	2	int	status	0-not in place, 1-in place
Command number	1161			
instance	Send the frame	/f/bIII4III1161III22IIIGetRobotMotionStatus()III/b/f		
	Receive frame	/f/bIII4III1161III3III0,1III/b/f		

6.3.15 GetRobotMotionDone()

Get the robot in place.

Table 6-3-15 GetRobotMotionDone() Directive protocol

	order	type	name	description
returned value	1	int	motionDone	0-not completed, 1-completed

Command number	1162	
instance	Send the frame	/f/bIII4III1162III20IIIGetRobotMotionDone()III/b/f
	Receive frame	/f/bIII4III1162III1III1III/b/f

6.3.16 GetRobotErrorCode()

Get robot faults.

Table 6-3-16 GetRobotErrorCode() Directive protocol

	order	type	name	description
returned value	1	int	mainCode	Main fault code
	2	int	subCode	A fault code
Command number	1163			
instance	Send the frame	/f/bIII4III1163III19IIIGetRobotErrorCode()III/b/f		
	Receive frame	/f/bIII4III1163III3III0,0III/b/f		

6.3.17 GetMotionQueueLength()

Get the length of the robot motion queue cache.

Table 6-3-17 GetMotionQueueLength() Directive protocol

	order	type	name	description
returned value	1	int	length	Team formation length
Command number	696			
instance	Send the frame	/f/bIII4III696III22IIIGetMotionQueueLength()III/b/f		
	Receive frame	/f/bIII4III696III1III0III/b/f		

6.3.18 GetCalculateNaturalFreq()

Obtain the reference value of natural frequency.

Table 6-3-18 GetCalculateNaturalFreq() Directive Agreement

	order	type	name	description
parameter	1	double[6]	jointPos	The joint angles J1-J6 are set by the user
returned value	1	double	naturalFreq	Estimated value of natural frequency
Command number	1143			
instance	Send the frame	/f/bIII92III1143III71IIIGetCalculateNaturalFreq(21.791,-100.365,111.969,-97.737,-67.195,-37.33)III/b/f		
	Receive frame	/f/bIII92III1143III9III20.397933III/b/f		

6.3.19 GetLowTempPreheatingAutoCheckParam()

Get the low temperature preheating parameter。

Table6-3-18 GetLowTempPreheatingAutoCheckParam()Directive protocol

	order	type	name	description
returned value	1	uint8_t	preHeatingEnable	0-Disabled, 1-Low temperature preheating function enabled
	2	int	preHeatingVolt	Low temperature preheating working voltage (1~32767) unit: 0.01V
	3	int	preHeatingTime	Low temperature preheating duration (1~32767) unit: s
	4	int	preHeatingTemp	Low temperature preheating trigger temperature (-32767~0) unit: 0.1℃
Command number	1196			
instance	Send the frame	/f/bIII92III1196III71IIIGetLowTempPreheatingAutoCheckParam()III/b/f		
	Receive frame	/f/bIII92III1196III7III0,1,1,0III/b/f		

6.3.20 GetWideBoxTempFanMonitorParam()

Obtain the temperature and fan speed monitoring parameters of the wide voltage control box

Table 6-3-20 GetWideBoxTempFanMonitorParam() instruction protocol

	order	type	name	description

returned value	1	uint8_t	enable	0-disable, 1-enable control box temperature and fan current status monitoring
	2	uint8_t	period	Monitoring cycle (1~100), unit: second
Command number	1218			
instance	Send the frame	/f/bIII92III1218III31IIIGetWideBoxTempFanMonitorParam()III/b/f		
	Receive frame	/f/bIII92III1218III3III0,1III/b/f		

6.3.21 GetServoJRpyEnable()

Get the reply switch of whether the servo command is issued successfully.

Table 6-3-21 GetServoJRpyEnable() instruction protocol

	order	type	name	description
returned value	1	uint8_t	enable	0: Off, 1: On
Command number	1221			
instance	Send the frame	/f/bIII92III1221III20IIIGetServoJRpyEnable()III/b/f		
	Receive frame	/f/bIII92III1221III1III1III/b/f		

6.3.22 GetLaserSeamPos()

Get laser sensor locing information。

Table 6-3-21 GetLaserSeamPos ()instruction protocol

	order	type	name	description
parameter	1	int	trackOffectType	Laser sensor offset type: 0-no offset; 1-Basis coordinate system offset; 2 - Tool coordinate system offset; 3-Laser sensor raw data offset
	2	float[6]	offset	Offset coordinates
returned value	1	double[6]	jPos	Joint position[°]
	2	double[6]	descPos	Cartesian position[mm]
	3	int	tool	Tool coordinate system
	4	int	user	Workpiece coordinate system

	5	double[4]	exaxis	Extended axis position
Command number	1254			
instance	Send the frame	/f/bIII92III1254III32IIIGetLaserSeamPos(0,{0,0,0,0,0,0})III/b/f		
	Receive frame	/f/bIII92III1254III167III18.062284,-43.116482,104.987526,28.128956,-90.000000,-59.197208,-343.396973,-219.276398,194.134552,0.000000,-0.000000,48.865074,0,0,0.000000,0.000000,0.000000,0.000000III/b/f		

6.3.23 JointSensitivityCalibration()

Get the joint torque sensor sensitivity calibration results.

Table6-3-23 JointSensitivityCalibration()instruction protocol

	order	type	name	description
returned value	1	float	jointSensitivity[0]	J1 joint sensitivity [0-1]
	2	float	jointSensitivity[1]	J2 joint sensitivity [0-1]
	3	float	jointSensitivity[2]	J3 joint sensitivity [0-1]
	4	float	jointSensitivity[3]	J4 joint sensitivity [0-1]
	5	float	jointSensitivity[4]	J5 joint sensitivity [0-1]
	6	float	jointSensitivity[5]	J6 joint sensitivity [0-1]
	7	float	linearity[0]	j1 joint linearity[0-1]
	8	float	linearity[1]	J2 joint linearity[0-1]
	9	float	linearity[2]	J3 joint linearity[0-1]
	10	float	linearity[3]	J4 joint linearity[0-1]
	11	float	linearity[4]	J5 joint linearity[0-1]
	12	float	linearity[5]	J6 joint linearity[0-1]
Command number	1275			
instance	Send the frame	/f/bIII114III1275III29IIIJointSensitivityCalibration()III/b/f		
	Receive frame	/f/bIII114III1275III108III0.693996,0.693996,-0.815029,0.365998,0.541402,0.541402,0.999769,0.999769,0.999493,0.999818,0.989852,0.989852III/b/f		

6.3.24 GetForwardKin()

The tool pose is obtained by the given joint position.

Table6-3-24 GetForwardKin()instruction protocol

	order	type	name	description
parameter	1	float	j1	joint1 position[°]
	2	float	j2	joint2 position[°]
	3	float	j3	joint3 position[°]
	4	float	j4	joint4 position[°]
	5	float	j5	joint5 position[°]
	6	float	j6	joint6 position[°]
returned value	1	float	x	tool pose，xyz unit：[mm]，rxryrz unit：[°]
	2	float	y	
	3	float	z	
	4	float	rx	
	5	float	ry	
	6	float	rz	
Command number	377			
instance	Send the frame	/f/bIII4III377III40IIIGetForwardKin(357,-526,419,-159,24,-172)III/b/f		
	Receive frame	/f/bIII4III377III64III952.551575,-306.108032,874.683105,154.227066,63.219978,60.372341III/b/f		

6.3.25 GetInverseKinHasSolution()

Inverse kinematics, whether the tool pose solution joint position has a solution.

Table6-3-25 GetInverseKinHasSolution()instruction protocol

	order	type	name	description

parameter	1	uint8_t	type	0-Absolute pose (base coordinate system), 1-Relative pose (base coordinate system), 2-Relative pose (tool coordinate system)
	2	float	x	reference pose， xyz unit：[mm]， rxryrz unit：[°]
		float	y	
		float	z	
		float	rx	
		float	ry	
		float	rz	
	3	float	j1	reference joint1 position[°]
		float	j2	reference joint2 position[°]
		float	j3	reference joint3 position[°]
		float	j4	reference joint4 position[°]
		float	j5	reference joint5 position[°]
		float	j6	reference joint6 position[°]
returned value	1	string	ret	True: Solution exists, False: Solution does not exist
Command number	623			
instance	Send the frame	/f/bIII4III623III81IIIGetInverseKinHasSolution(1,{357,-526,419,-159,24,-172},{-42,-95,-131,-11,93,46 })III/b/f		
	Receive frame	/f/bIII4III623III5IIIFalseIII/b/f		

6.3.26 GetInverseKin()

Inverse kinematics is used to solve the problem, and the joint position is obtained through the tool pose.

Table6-3-26 GetInverseKin()instruction protocol

	order	type	name	description

parameter	1	uint8_t	type	0-Absolute pose (base coordinate system), 1-Relative pose (base coordinate system), 2-Relative pose (tool coordinate system)
	2	float	x	tool pose， xyz unit：[mm]， rxryrz unit：[°]
	3	float	y	
	4	float	z	
	5	float	rx	
	6	float	ry	
	7	float	rz	
	8	int	config	-1: Auto solve, 0-7 corresponds to eight solution sets
returned value	1	float	j1	joint1 position[°]
	2	float	j2	joint2 position[°]
	3	float	j3	joint3 position[°]
	4	float	j4	joint4 position[°]
	5	float	j5	joint5 position[°]
	6	float	j6	joint6 position[°]
Command number	375			
instance	Send the frame	/f/bIII4III375III45IIIGetInverseKin(0,357,-526,419,-159,24,-172,-1)III/b/f		
	Receive frame	/f/bIII4III375III64III-41.941975,-95.192673,-131.576248,-11.925438,93.440025,45.534191III/b/f		

6.3.27 GetInverseKinRef()

Inverse kinematics is used to obtain the joint positions from the tool pose and reference position.

Table6-3-27 GetInverseKinRef()instruction protocol

	order	type	name	description

parameter	1	uint8_t	type	0-Absolute pose (base coordinate system), 1-Relative pose (base coordinate system), 2-Relative pose (tool coordinate system)
	2	float	x	tool pose， xyz unit：[mm]， rxryrz unit：[°]
		float	y	
		float	z	
		float	rx	
		float	ry	
		float	rz	
	3	float	j1	reference joint1 position[°]
		float	j2	reference joint2 position[°]
		float	j3	reference joint3 position[°]
		float	j4	reference joint4 position[°]
		float	j5	reference joint5 position[°]
		float	j6	reference joint6 position[°]
returned value	1	float	j1	joint1 position[°]
	2	float	j2	joint2 position[°]
	3	float	j3	joint3 position[°]
	4	float	j4	joint4 position[°]
	5	float	j5	joint5 position[°]
	6	float	j6	joint6 position[°]
Command number	622			
instance	Send the frame	/f/bIII4III622III73IIIGetInverseKinRef(0,{357,-526,419,-159,24,-172},{-42,-95,-131,-11,93,46 })III/b/f		
	Receive frame	/f/bIII4III622III64III-41.941975,-95.192673,-131.576248,-11.925438,93.440025,45.534191III/b/f		

6.3.28 GetInverseKinExaxis()

The inverse kinematics solution of extended axis coordinate system is proposed.

Table6-3-28 GetInverseKinExaxis()instruction protocol

	order	type	name	description
parameter	1	uint8_t	type	0-Absolute pose (base coordinate system), 1-Relative pose (base coordinate system), 2-Relative pose (tool coordinate system)
		float	x	tool pose，xyz unit：[mm]，rxryrz unit：[°]
		float	y	
		float	z	
		float	rx	
		float	ry	
	2	float	rz	
	3	double[4]	exaxis	extension axis position
	4	int	toolNum	Tool ID，0~14
	5	int	workPieceNum	Workpiece ID，0~14
returned value	1	float	j1	joint1 position[°]
	2	float	j2	joint2 position[°]
	3	float	j3	joint3 position[°]
	4	float	j4	joint4 position[°]
	5	float	j5	joint5 position[°]
	6	float	j6	joint6 position[°]
Command number	1303			
instance	Send the frame	/f/bIII4III1303III65IIIGetInverseKinExaxis(0,{357,-526,419,-159,24,-172},{0,0,0,0},0,0)III/b/f		
	Receive frame	/f/bIII4III1303III64III-41.941975,-95.192673,-131.576248,-11.925438,93.440025,45.534191III/b/f		

7 Robot peripheral instructions

7.1 Claw command

7.1.1 SetGripperConfig()

Configure the jaw information.

Table 7-1-1 SetGripperConfig() Directive protocol

	order	type	name	description
parameter	1	int	id_company	Claw manufacturer
	2	int	id_device	device number
	3	int	id_softversion	software release
	4	int	id_bus	Bus location
returned value		int	errcode	Error code
Command number	226			
instance	Send the frame	/f/bIII309III226III25IIISetGripperConfig(4,0,0,1)III/b/f		
	Receive frame	/f/bIII309III226III1III1III/b/f		

7.1.2 GetGripperConfig()

Get the gripper configuration information.

Table 7-1-2 GetGripperConfig() Directive protocol

	order	type	name	description
returned value	1	int	id_gripper	Clamp number
	2	int	id_company	Claw manufacturer
	3	int	id_device	device number
	4	int	id_softversion	software release
Command number	229			
instance	Send the frame	/f/bIII402III229III18IIIGetGripperConfig()III/b/f		

	Receive frame	/f/bIII402III229III12III30 00 00 00 III/b/f

7.1.3 ActGripper()

Activate the jaws.

Table 7-1-3 ActGripper() Directive protocol

	order	type	name	description
parameter	1	int	index	Clamp number
	2	int	action	0-reset, 1-active
returned value		int	errcode	Error code
Command number	227			
instance	Send the frame	/f/bIII312III227III15IIIActGripper(1,1)III/b/f		
	Receive frame	/f/bIII312III227III1III1III/b/f		

7.1.4 MoveGripper()

Control the movement of the jaws.

Table 7-1-4 MoveGripper() Instruction protocol

	order	type	name	description
parameter	1	int	index	Clamp number
	2	int	pos	Position percentage, range [0~100]
	3	int	vel	Speed percentage, range [0~100]
	4	int	force	Torque percentage, range [0~100]
	5	int	max_time	Maximum waiting time, range [0~30000], unit ms
	6	uint8_t	block	Whether to block, 0-block, 1-non-block
	7	int	type_greipper	Claw type, 0: parallel, 1: rotation
	8	float	rotnum	Number of rotations
	9	int	rotspd	Percentage of rotational speed

	10	int	rottor	Percentage of rotational torque
returned value	1	int	errcode	Error code
Command number	228			
instance	Send the frame	/f/bIII314III228III39IIIMoveGripper(1,51,68,64,30000,0,0,0,0,0)III/b/f		
	Receive frame	/f/bIII314III228III1III1III/b/f		

7.1.5 SetGripperPosThreshold()

Set the jaw position detection threshold.

Table 7-1-5 SetGripperPosThreshold() Directive protocol

	order	type	name	description
parameter	1	uint8_t	threshold	Set the detection threshold [0~99]
returned value		int	errcode	Error code
Command number	923			
instance	Send the frame	/f/bIII4III923III126IIISetGripperPosThreshold(10)III/b/f		
	Receive frame	/f/bIII4III923III1III1III/b/f		

7.1.6 GetGripperPosThreshold()

Get the jaw in place detection threshold.

Table 7-1-6 GetGripperPosThreshold() Directive protocol

	order	type	name	description
returned value	1	uint8_t	threshold	Set the detection threshold [0~99]
Command number	924			
instance	Send the frame	/f/bIII1032III924III24IIIGetGripperPosThreshold()III/b/f		
	Receive frame	/f/bIII1032III924III1III0III/b/f		

7.1.7 GetGripperCurPosition()

Get the current position of the gripper.

Table 7-1-7 GetGripperCurPosition() Directive protocol

	order	type	name	description
returned value	1	int	error	0-error, 1-no error
	2	int	posion	The current position of the gripper
Command number	1045			
instance	Send the frame	/f/bIII4III1045III23IIIGetGripperCurPosition()III/b/f		
	Receive frame	/f/bIII4III1045III3III0 0III/b/f		

7.1.8 GetGripperCurSpeed()

Get the current speed of the gripper.

Table 7-1-8 GetGripperCurSpeed() Directive protocol

	order	type	name	description
returned value	1	int	error	0-error, 1-no error
	2	int	speed	Clamp current speed
Command number	1046			
instance	Send the frame	/f/bIII4III1046III20IIIGetGripperCurSpeed()III/b/f		
	Receive frame	/f/bIII4III1046III3III0 0III/b/f		

7.1.9 GetGripperCurCurrent()

Get the current of the gripper.

Table 7-1-9 GetGripperCurCurrent() Directive protocol

	order	type	name	description

returned value	1	int	error	0-error, 1-no error
	2	int	current	Clamp current at present
Command number	1047			
instance	Send the frame	/f/bIII4III1047III22IIIGetGripperCurCurrent()III/b/f		
	Receive frame	/f/bIII4III1047III3III0 0III/b/f		

7.1.10 GetGripperVoltage()

Get the current voltage of the gripper.

Table 7-1-10 GetGripperVoltage() Directive protocol

	order	type	name	description
returned value	1	int	error	0-error, 1-no error
	2	int	voltage	Clamp current voltage
Command number	811			
instance	Send the frame	/f/bIII4III811III19IIIGetGripperVoltage()III/b/f		
	Receive frame	/f/bIII4III811III3III0 0III/b/f		

7.1.11 GetGripperTemp()

Get the current temperature of the gripper.

Table 7-1-11 GetGripperTemp() Directive protocol

	order	type	name	description
returned value	1	int	error	0-error, 1-no error
	2	int	temp	The current temperature of the jaws
Command number	812			
instance	Send the frame	/f/bIII4III812III16IIIGetGripperTemp()III/b/f		

	Receive frame	/f/bIII4III812III4III0 10III/b/f

7.1.12 GetGripperRotNum()

Get the current number of rotations of the gripper.

Table 7-1-12 GetGripperRotNum() Directive protocol

	order	type	name	description
returned value	1	int	error	0-error, 1-no error
	2	int	rotnum	The current number of rotations of the jaws
Command number	1042			
instance	Send frame	/f/bIII4III1042III18IIIGetGripperRotNum()III/b/f		
	Receive frame	/f/bIII4III1042III3III0 0III/b/f		

7.1.13 GetGripperRotSpeed()

Get the current rotation speed of the gripper.

Table 7-1-13 GetGripperRotSpeed() Directive protocol

	order	type	name	description
returned value	1	int	error	0-error, 1-no error
	2	int	speed	The current rotation speed of the jaws
Command number	1043			
instance	Send the frame	/f/bIII4III1043III20IIIGetGripperRotSpeed()III/b/f		
	Receive frame	/f/bIII4III1043III3III0 0III/b/f		

7.1.14 GetGripperRotTorque()

Get the percentage of the current torque of the gripper.

Table 7-1-14 GetGripperRotTorque() Directive protocol

	order	type	name	description
returned value	1	int	error	0-error, 1-no error
	2	int	torque	Percentage of current rotational torque of the jaws
Command number	1044			
instance	Send the frame	/f/bIII4III1044III21IIIGetGripperRotTorque()III/b/f		
	Receive frame	/f/bIII4III1044III3III0 0III/b/f		

7.1.15 SetGripperDataDisplayFlag()

Set the clamping claw data monitoring function to on state.

Table 7-1-15 SetGripperDataDisplayFlag() Directive protocol

	order	type	name	description
parameter	1	uint8_t	flag	Open state, 0: closed, 1: open
returned value	1	int	errcode	Error code
Command number	1091			
instance	Send the frame	/f/bIII345III1091III28IIISetGripperDataDisplayFlag(1)III/b/f		
	Receive frame	/f/bIII345III1091III1III1III/b/f		

7.1.16 GetGripperDataDisplayFlag()

Get the status of the gripper data monitoring function.

Table 7-1-16 GetGripperDataDisplayFlag() Directive protocol

	order	type	name	description
returned value	1	uint8_t	flag	Open state, 0: closed, 1: open
Command number	1092			

instance	Send frame	/f/bIII23III1092III27IIIGetGripperDataDisplayFlag()III/b/f
	Receive frame	/f/bIII23III1092III1III0III/b/f

7.2 Force control instructions

7.2.1 FT_Guard()

Collision protection.

Table 7-2-1 FT_Guard() instruction protocol

	order	type	name	description
parameter	1	int	actFlag	Whether to open the flag, 0-off, 1-on
	2	int	sensorNum	Torque sensor number
	3	uint8_t	isSelect1	Whether the joint is selected, 0-no, 1-yes
	4	uint8_t	isSelect2	
	5	uint8_t	isSelect3	
	6	uint8_t	isSelect4	
	7	uint8_t	isSelect5	
	8	uint8_t	isSelect6	
	9	double	cur_fx	Current x-direction force, unit: N
	10	double	cur_fy	Current y direction force, unit: N
	11	double	cur_fz	Current z-direction force, unit: N
	12	double	cur_mx	Current torque around x axis, unit: N·m
	13	double	cur_my	Current torque around the y axis, unit: N·m
	14	double	cur_mz	Current torque around z axis, unit: N·m
	15	double	coll_max_threshold_fx	Maximum threshold of x-direction force, unit: N
	16	double	coll_max_threshold_fy	Maximum threshold of y-direction force, unit: N
	17	double	coll_max_threshold_fz	Maximum threshold of force in the z direction, unit: N

	18	double	coll_max_threshold_mx	Maximum torque threshold around the x axis, unit: N·m
	19	double	coll_max_threshold_my	Maximum torque around the y axis threshold, unit: N·m
	20	double	coll_max_threshold_mz	Maximum torque threshold around the z axis, unit: N·m
	21	double	coll_min_threshold_fx	X minimum force threshold, unit: N
	22	double	coll_min_threshold_fy	Y minimum force threshold, unit: N
	23	double	coll_min_threshold_fz	Z direction minimum force threshold, unit: N
	24	double	coll_min_threshold_mx	Minimum torque around the x axis, unit: N·m
	25	double	coll_min_threshold_my	Minimum torque around the axis of rotation, unit: N·m
	26	double	coll_min_threshold_mz	Minimum torque around the z axis, unit: N·m
returned value		int	errcode	Error code
Command number	521			
instance	Send the frame	/f/bIII4III521III85IIIFT_Guard(1,3,1,0,0,0,0,0,0.000,0.000,0.000,0.000,0.000,0.000,1,0,0,0,0,0,1,0,0,0,0,0)III/b/f		
	Receive frame	/f/bIII4III521III1III1III/b/f		

7.2.2 FT_Control()

Constant force control.

Table 7-2-2 FT_Control() instruction protocol 1

	order	type	name	description
parameter	1	uint8_t	status	0-off, 1-on
	2	int	sensorID	Sensor number
	3	uint8_t	isSelectX	Whether to choose: 0-no, 1-no
	4	uint8_t	isSelectY	Whether to choose: 0-no, 1-no

5	uint8_t	isSelectZ	Whether to choose: 0-no, 1-no
6	uint8_t	isSelectTX	Whether to choose: 0-no, 1-no
7	uint8_t	isSelectTY	Whether to choose: 0-no, 1-no
8	uint8_t	isSelectTZ	Whether to choose: 0-no, 1-no
9	double	Fx	Force along x direction, unit: N
10	double	Fy	Force along the y direction, unit: N
11	double	Fz	Force along the z direction, unit: N
12	double	Tx	Torque around the x axis, unit: N·m
13	double	Ty	Torque around the axis of rotation, unit: N·m
14	double	Tz	Torque around the z axis, unit: N·m
15	double	p_f	Force-proportional gain
16	double	i_f	Force-integral gain
17	double	d_f	Force-differential gain
18	double	p_t	Torque-proportional gain
19	double	i_t	Torque-integral gain
20	double	d_t	Torque-differential gain
21	uint8_t	adj_sign	Adaptive start/stop state, 0-off, 1-on
22	uint8_t	ILC_sign	ILC controls the start and stop status, 0-stop, 1-training, 2-practice
23	double	maxDis	Maximum adjustment distance, unit: mm
24	double	maxAng	Maximum adjustment Angle, unit: deg
25	double	polishRadio	Radius of grinding wheel (optional)
26	uint8_t	filter_Sign	Filter on flag
27	uint8_t	posAdapt_sign	The gesture is a sign of the opening
28	double	M0	rx inertia coefficient, range [0.1,10], default value 2
29	double	M1	The inertia coefficient of the IR, ranging from [0.1, 10], with a default value of 2.
30	double	B0	rx damping coefficient, range [0.1,50], default value 8
31	double	B1	rThe damping coefficient of ry ranges

				from [0.1, 50] and defaults to 8.
	32	double	Threshold1	The RX activation threshold ranges from 0 to 10, with a default value of 0.2.
	33	double	Threshold2	The trigger threshold for the IRY, ranging from 0 to 10, defaults to 0.2
	34	double	adjustCoeff1	rx torque adjustment coefficient, range [0,1], default value 1
	35	double	adjustCoeff2	The torque adjustment coefficient, ranging from 0 to 1, defaults to 1.
	36	uint8_t	isNoBlock	0-blocked; 1-not blocked
returned value		int	errcode	Error code
Command number	522			
instance	Send the frame	/f/bIII4III522III94IIIFT_Control(1,3,0,0,1,0,0,0,0,0,-5,0,0,0,0.0001,0,0,0,0,1,0,50,0,0,0,0,2,2,8,8,0.2,0.2,1,1,0)III/b/f		
	Receive frame	/f/bIII4III522III1III1III/b/f		

7.2.3 FT_Activate()

Reset activation.

Table 7-2-3 FT_Activate() instruction protocol 1

	order	type	name	description
parameter	1	uint8_t	actFlag	0-reset, 1-active
returned value		int	errcode	Error code
Command number	524			
instance	Send the frame	/f/bIII84III524III14IIIFT_Activate(0)III/b/f		
	Receive frame	/f/bIII84III524III1III1III/b/f		

7.2.4 FT_SetRCS()

Set the reference coordinate system.

Table 7-2-4 FT_SetRC() instruction protocol 1

	order	type	name	description
reference value	1	int	rcs	Reference coordinate system, 0-tool coordinate system, 1-base coordinate system, 2-custom coordinate system
	2	float[6]	coord[6]	Coordinate system values, x, y, z, rx, ry, rz
returned value		int	errcode	Error code
Command number	525			
instance	Send the frame	/f/bIII86III525III50IIIFT_SetRCS(0,{0.000,0.000,0.000,0.000,0.000,0.000})III/b/f		
	Receive frame	/f/bIII86III525III1III1III/b/f		

7.2.5 FT_SetConfig()

Set configuration information.

Table 7-2-5 FT_SetConfig() instruction protocol 1

	order	type	name	description
reference value	1	int	id_company	Sensor manufacturer, 17-kunwei
	2	int	id_device	Sensor device number, 0-kunwei
	3	int	id_softversion	Software version number, 0-kunwei
	4	int	id_bus	End position, 1-kunwei
returned value		int	errcode	Error code
Command number	526			
instance	Send the frame	/f/bIII82III526III22IIIFT_SetConfig(22,0,0,1)III/b/f		
	Receive frame	/f/bIII82III526III1III1III/b/f		

7.2.6 FT_GetConfig()

Get configuration information.

Table 7-2-6 FT_GetConfig() instruction protocol

	order	type	name	description
returned value	1	int	id_company	Sensor manufacturer, 17-kunwei
	2	int	id_device	Sensor device number, 0-kunwei
	3	int	id_softversion	Software version number, 0-kunwei
	4	int	id_bus	End position, 1-kunwei
Command number	527			
instance	Send the frame	/f/bIII83III527III14IIIFT_GetConfig()III/b/f		
	Receive frame	/f/bIII83III527III12III15 00 00 00 III/b/f		

7.2.7 FT_SetZero()

Set the zero point.

Table 7-2-7 FT_SetZero() instruction protocol

	order	type	name	description
reference value	1	uint8_t	status	0-clear, 1-zero
	2	uint8_t	isNoBlock	0-blocked; 1-not blocked
returned value		int	errcode	Error code
Command number	528			
instance	Send the frame	/f/bIII88III528III15IIIFT_SetZero(1,0)III/b/f		
	Receive frame	/f/bIII88III528III1III1III/b/f		

7.2.8 FT_PdIdenRecord()

Weight identification data recorded.

Table 7-2-8 FT_PdIdenRecord() instruction protocol

	order	type	name	description
reference value	1	int	sensorNum	Sensor number

returned value		int	errcode	Error code
Command number	529			
instance	Send the frame	/f/bIII92III529III18IIIFT_PdIdenRecord(2)III/b/f		
	Receive frame	/f/bIII92III529III1III1III/b/f		

7.2.9 FT_PdIdenCompute()

Weight recognition data calculation.

Table 7-2-9 FT_PdIdenCompute() instruction protocol

	order	type	name	description
returned value	1	double	loadWeight	weight
Command number	530			
instance	Send the frame	/f/bIII93III530III18IIIFT_PdIdenCompute()III/b/f		
	Receive frame	/f/bIII93III530III8III0.010204III/b/f		

7.2.10 FT_PdCogIdenRecord()

Record of centroid identification data.

Table 7-2-10 FT_PdCogIdenRecord() instruction protocol

	order	type	name	description
reference value	1	int	sensorNum	Sensor number
	2	int	dataNum	Data number
returned value		int	errcode	Error code
Command number	531			
instance	Send the frame	/f/bIII101III531III23IIIFT_PdCogIdenRecord(2,3)III/b/f		
	Receive frame	/f/bIII101III531III1III1III/b/f		

7.2.11 FT_PdCogIdenCompute()

Centroid identification data calculation.

Table 7-2-11 FT_PdCogIdenCompute() instruction protocol

	order	type	name	description
returned value	1	double	x	center-of-mass coordinate x
	2	double	y	center-of-mass coordinate y
	3	double	z	center-of-mass coordinate z
Command number	532			
instance	Send the frame	/f/bIII102III532III21IIIFT_PdCogIdenCompute()III/b/f		
	Receive frame	/f/bIII102III532III26III0.000000,0.000000,0.000000III/b/f		

7.2.12 EndForceDragControl()

End force conversion position state control.

Table 7-2-12 EndForceDragControl() Directive protocol

	order	type	name	description
parameter	1	int	status	0-off, 1-on
	2	int	Adaptive_sign	Adaptive start flag 0-close group, 1-start
	3	int	Interfere_ drag_sign	Drag the marker in the interference zone 0-turn off, 1-start
	4	int	singularitycons traintsFlag	Singularity strategy, 0: avoid, 1-exceed
	5	int	forceCollisionF lag	Force collision detection on flag, 0-not on; 1-on
	6	double	M1	inertia coeffecient
	7	double	M2	
	8	double	M3	
	9	double	M4	

	10	double	M5	camping coefficient
	11	double	M6	
	12	double	B1	
	13	double	B2	
	14	double	B3	
	15	double	B4	
	16	double	B5	
	17	double	B6	
	18	double	K1	accommodation coefficient
	19	double	K2	
	20	double	K3	
	21	double	K4	
	22	double	K5	
	23	double	K6	
	24	double	F1	Drag limit
	25	double	F2	
	26	double	F3	
	27	double	F4	
	28	double	F5	
	29	double	F6	
	30	double	Fmax	Maximum drag limit
	31	double	Vmax	Maximum joint speed limit
returned value		int	errcode	Error code

Command number	676	
instance	Send the frame	/f/bIII131III676III190IIIEndForceDragControl(1,0,1,0,0,15.000,15.000,15.000,0.500,0.500,0.100,150.000,150.000,150.000,5.000,5.000,1.000,0.000,0.000,0.000,0.000,0.000,0.000,5.000,5.000,5.000,1.000,1.000,1.000,50,180)III/b/f
	Receive frame	/f/bIII131III676III1III1III/b/f

7.2.13 SetForceSensorDragAutoFlag()

The drag function of the six-dimensional force sensor is automatically switched on.

Table 7-2-13 SetForceSensorDragAutoFlag() Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	0: off, 1: on
returned value		int	errcode	Error code
Command number	801			
instance	Send the frame	/f/bIII146III801III29IIISetForceSensorDragAutoFlag(1)III/b/f		
	Receive frame	/f/bIII146III801III1III1III/b/f		

7.2.14 SetForceSensorPayload()

Set the load weight of the force sensor.

Table 7-2-14 SetForceSensorPayloadC() Directive protocol

	order	type	name	description
parameter	1	double	weight	weight
returned value		int	errcode	Error code
Command number	692			
instance	Send the frame	/f/bIII93III692III24IIISetForceSensorPayload(0)III/b/f		
	Receive frame	/f/bIII93III692III1III1III/b/f		

7.2.15 SetForceSensorPayloadCog()

Set the load center of mass under the force sensor.

Table 7-2-15 SetForceSensorPayloadCog() Directive protocol

	order	type	name	description
parameter	1	double	x	center-of-mass coordinate x
	2	double	y	center-of-mass coordinate y
	3	double	z	center-of-mass coordinate z
returned value		int	errcode	Error code
Command number	693			
instance	Send the frame	f/bIII95III693III31IIISetForceSensorPayloadCog(0,0,0)III/b/f		
	Receive frame	/f/bIII95III693III1III1III/b/f		

7.2.16 GetForceSensorPayload()

The load weight is obtained from the sensor.

Table 7-2-16 GetForceSensorPayload() Directive protocol

	order	type	name	description
returned value	1	double	weight	Weight, unit kg
Command number	694			
instance	Send the frame	/f/bIII4III694III23IIIGetForceSensorPayload()III/b/f		
	Receive frame	/f/bIII4III694III1III0III/b/f		

7.2.17 GetForceSensorPayloadcog()

The load center of mass is obtained by the force sensor.

Table 7-2-17 GetForceSensorPayloadcog() Directive protocol

	order	type	name	description
returned value	1	double	x	The center of mass coordinate x is in mm
	2	double	y	The center of mass coordinate y is in mm

	3	double	z	The center of mass coordinate z is in mm
Command number	695			
instance	Send frame	/f/bIII4III695III26IIIGetForceSensorPayloadcog()III/b/f		
	Receive frame	/f/bIII4III695III5III0,0,0III/b/f		

7.2.18 ForceAndJointImpedanceStartStop()

Set the six-dimensional force and joint impedance mixed drag switch and parameters.

Table 7-2-18 ForceAndJointImpedanceStartStop() Directive protocol

	order	type	name	description
parameter	1	int	status	Control state, 0-off, 1-on
	2	int	impedancemlag	Impedance on/off flag, 0-off, 1-on
	3	double[6]	LamdaGain	Drag gain
	4	double[6]	KGain	Gains in stiffness
	5	double[6]	BGain	Damping gain
	6	double	DragMaxTcpVel	Drag the maximum linear velocity limit at the end
	7	double	DragMaxTcpOriVel	Drag the maximum angular velocity limit at the end
returned value		int	errcode	Error code
Command number	943			
instance	Send the frame	/f/bIII122III943III119IIIForceAndJointImpedanceStartStop(1,0,{0.000,0.000,0.000,0.000,0.000,0.000},{0,0,0,0,0,0},{0,0,0,0,0,0},1000.000,120.000)III/b/f		
	Receive frame	/f/bIII122III943III1III1III/b/f		

7.2.19 GetForceAndTorqueDragState()

Get the status of the drag switch.

Table7-2-19 GetForceAndTorqueDragState() Directive protocol

	order	type	name	description
returned value	1	int	dragStatus	The force sensor assists in locking the control state
	2	int	status	Six-dimensional force assisted drag control state
Command number	944			
instance	Send the frame	/f/bIII115III944III28IIIGetForceAndTorqueDragState()III/b/f		
	Receive frame	/f/bIII115III944III3III0,0III/b/f		

7.2.20 FT_SpiralSearch()

Helical exploration of motion.

Table 7-2-20 FT_SpiralSearch() instruction protocol

	order	type	name	description
parameter	1	int	forceSensorRcs	Force/torque sensor reference coordinate system, 0: sensor coordinate system, 1: base coordinate system
	2	double	dr	Increase the radius of each circle by half a mm
	3	double	fFinish	Force or torque threshold, unit N or Nm
	4	double	time	Maximum exploration time, unit s
	5	double	vmax	Set the maximum line speed, unit mm/s
returned value		int	errcode	Error code
Command number	624			
instance	Send the frame	/f/bIII4III624III30IIIFT_SpiralSearch(0,2,1,60000,2)III/b/f		

	Receive frame	/f/bIII4III624III1III1III/b/f

7.2.21 FT_RotInsertion()

Rotating insertion movement.

Table 7-2-21 FT_RotInsertion() instruction protocol

	order	type	name	description
parameter	1	int	forceSensorRcs	Force/torque sensor reference coordinate system, 0: sensor coordinate system, 1: base coordinate system
	2	double	angVelRot	Angular velocity of rotation, unit °/s
	3	double	forceInsertion	Insert the action force or torque, unit N
	4	double	angleMax	Maximum rotation Angle, unit °
	5	int	orn	Direction 1-2 represents the direction of force fz, mz
	6	double	angAccmax	Maximum rotation angular acceleration, unit °/s
	7	int	rotorn	The rotation direction is 1 for positive and 2 for negative
	8	int	strategy	No force/torque processing strategy detected. 0: Error, 1: Warning, continue motion
returned value		int	errcode	Error code
Command number	625			
instance	Send the frame	/f/bIII4III625III34IIIFT_RotInsertion(0,1,5,300,1,0,1,0)III/b/f		
	Receive frame	/f/bIII4III625III1III1III/b/f		

7.2.22 FT_LinInsertion()

Linear insertion movement.

Table 7-2-22 FT_LinInsertion() instruction protocol

	order	type	name	description
parameter	1	int	forceSensorRcs	Force/torque sensor reference coordinate system, 0: sensor coordinate system, 1: base coordinate system
	2	double	forceGoal	Action termination force threshold, unit N
	3	double	lin_v	Linear speed, unit mm
	4	double	lin a	Linear acceleration, unit mm/s^2
	5	double	distanceMax	Maximum insertion distance, unit mm
	6	int	linorn	The insertion direction is 1 for positive and 2 for negative
returned value		int	errcode	Error code
Command number	626			
instance	Send the frame	/f/bIII4III626III31IIIFT_LinInsertion(0,40,3,0,100,1)III/b/f		
	Receive frame	/f/bIII4III626III1III1III/b/f		

7.2.23 FT_FindSurface()

Surface positioning movement.

Table 7-2-23 FT_FindSurface() instruction protocol

	order	type	name	description
parameter	1	int	forceSensorRcs	Force/torque sensor reference coordinate system, 0: sensor coordinate system, 1: base coordinate system
	2	int	direction	Direction of movement, 1: positive, 2: negative
	3	int	axis	Mobile axis, 1: X, 2: Y, 3: Z
	4	double	lin_v	Linear speed, unit mm
	5	double	lin a	Linear acceleration, unit mm/s^2

	6	double	distanceMax	Maximum exploration distance, unit mm
	7	double	forceGoal	Action termination force threshold, unit N
returned value		int	errcode	Error code
Command number	627			
instance	Send the frame	/f/bIII4IIII627III32IIIFT_FindSurface(0,1,1,1,10,50,50)III/b/f		
	Receive frame	/f/bIII4IIII627III1III1III/b/f		

7.2.24 FT_CalCenterStart()

Calculate the intermediate plane position.

Table 7-2-24 FT_CalCenterStart() instruction protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	628			
instance	Send the frame	/f/bIII4IIII628III19IIIFT_CalCenterStart()III/b/f		
	Receive frame	/f/bIII4IIII628III1III1III/b/f		

7.2.25 FT_CalCenterEnd()

The calculation of the intermediate plane position is complete.

Table 7-2-25 FT_CalCenterEnd() instruction protocol

	order	type	name	description
returned value	1	double[6]	pos	Middle plane position, x, y, z, a, b, c
Command number	629			
instance	Send the frame	/f/bIII4IIII629III17IIIFT_CalCenterEnd()III/b/f		
	Receive frame	/f/bIII4IIII629III1III1III/b/f		

7.2.26 FT_ComplianceStart()

Smooth control is enabled.

Table 7-2-26 FT_ComplianceStart() instruction protocol

	order	type	name	description
parameter	1	double	p	Position adjustment coefficient
	2	double	Fd	Smooth the opening force threshold
returned value		int	errcode	Error code
Command number	661			
instance	Send frames	/f/bIII4III661III28IIIFT_ComplianceStart(0.005,10)III/b/f		
	Receive frame	/f/bIII4III661III1III1III/b/f		

7.2.27 FT_Compliancestop()

Smooth control is off.

Table 7-2-27 FT_ComplianceStop() instruction protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	662			
instance	Send the frame	/f/bIII4III662III19IIIFT_ComplianceStop()III/b/f		
	Receive frame	/f/bIII4III662III1III1III/b/f		

7.2.28 JointHysteresisError()

The hysteresis error of the joint torque sensor.

Table7-2-28 JointHysteresisError()instruction protocol

	order	type	name	description

returned value		int	errcode	Error code
Command number	1287			
instance	Send the frame	/f/bIII115III1287III22IIIJointHysteresisError()III/b/f		
	Receive frame	/f/bIII115III1287III53III0.009375,0.037500,0.012500,0.003125,0.001563,0.003125III/b/f		

7.2.29 JointRepeatability()

The repeatability of the joint torque sensor was calculated.

Table7-2-29 JointRepeatability()instruction protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1288			
instance	Send the frame	/f/bIII116III1288III20IIIJointRepeatability()III/b/f		
	Receive frame	/f/bIII116III1288III53III0.996548,0.996548,0.989834,0.988917,0.938955,0.938955III/b/f		

7.2.30 SetJointTorqueSensorOvershoot()

The overshoot of joint torque sensor is reduced.

Table7-2-30 SetJointTorqueSensorOvershoot()instruction protocol

	order	type	name	description
parameter	1	int	setOvershootFlag	Function enable flag: 0 for off, 1 for on
	2	int	windowK	Slide window size, [2-100]
	3	float[6]	torqueSensorK	J1-J6 gain coefficient, [0-1]
	4	float	overshootSpeed	Speed range: [3-20]
returned value		int	errcode	Error code
Command number	1289			

instance	Send the frame	/f/bIII145III1289III63IIISetJointTorqueSensorOvershoot(1,30,{0.5,0.5,0.5,0.5,0.5,0.5},6)III/b/f
	Receive frame	/f/bIII145III1289III1III1III/b/f

7.2.31 SetDragMode3Param()

Set the DragMode-3 switch and parameters for the drag teaching function.

Table7-2-31 SetDragMode3Param()instruction protocol

	order	type	name	description
returned value	1	uint8_t	dragMode3Flag	Enable flag: 0 to disable, 1 to enable
	2	float	dragMode3Gain[6]	Joint drag gain coefficient: range 0.1 to 1.0
returned value		int	errcode	Error code
Command number	1301			
instance	Send the frame	/f/bIII145III1301III46IIISetDragMode3Param(1,{0.5,0.5,0.5,0.5,0.5,0.5})III/b/f		
	Receive frame	/f/bIII145III1301III1III1III/b/f		

7.2.32 SetJointSensitivityModify()

Sensitivity calibration results correction. The first use requires sensitivity calibration.

Table7-2-32 SetJointSensitivityModify()instruction protocol

	order	type	name	description
returned value	1	float	jointSensitivity[6]	sensitivity coefficient of each joint
returned value		int	errcode	Error code
Command number	1302			
instance	Send the frame	/f/bIII145III1302III71IIISetJointSensitivityModify({0.9817,0.9817,-0.9979,0.6960,0.5625,0.5625})III/b/f		

	Receive frame	/f/bIII145III1302III1III1III/b/f

7.3 Tape tracking

7.3.1 ConveyorStartEnd()

The conveyor belt starts and stops.

Table 7-3-1 ConveyorStartEnd() Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	The conveyor belt tracking mark is 0: tracking end, 1: tracking grab, 2: tracking motion, 3: tracking TPD
returned value		int	errcode	Error code
Command number	358			
instance	Send the frame	/f/bIII4III358III19IIIConveyorStartEnd(0)III/b/f		
	Receive frame	/f/bIII4III358III1III1III/b/f		

7.3.2 ConveyorPointIORecord()

Transit belt IO entry point calibration.

Table 7-3-2 ConveyorPointIORecord() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	359			
instance	Send the frame	/f/bIII4III359III23IIIConveyorPointIORecord()III/b/f		
	Receive frame	/f/bIII4III359III1III1III/b/f		

7.3.3 ConveyorPointARecord()

The point A of the conveyor belt is calibrated.

Table 7-3-3 ConveyorPointARecord() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	360			
instance	Send the frame	/f/bIII4III360III22IIIConveyorPointARecord()III/b/f		
	Receive frame	/f/bIII4III360III1III1III/b/f		

7.3.4 ConveyorRefPointRecord()

Reference point calibration of conveyor belt.

Table 7-3-4 ConveyorRefPointRecord() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	361			
instance	Send the frame	/f/bIII4III361III24IIIConveyorRefPointRecord()III/b/f		
	Receive frame	/f/bIII4III361III1III1III/b/f		

7.3.5 ConveyorPointBRecord()

The point B of the conveyor belt is calibrated.

Table 7-3-5 ConveyorPointBRecord() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	362			
instance	Send the frame	/f/bIII4III362III22IIIConveyorPointBRecord()III/b/f		
	Receive frame	/f/bIII4III362III1III1III/b/f		

7.3.6 ConveyorIODetect()

Workpiece IO detection on conveyor belt.

Table 7-3-6 ConveyorIODetect() Directive protocol

	order	type	name	description
parameter	1	int	max_ms	Circulating inspection time of conveyor belt workpiece
returned value		int	errcode	Error code
Command number	363			
instance	Send the frame	/f/bIII4III363III22IIIConveyorIODetect(1000)III/b/f		
	Receive frame	/f/bIII4III363III1III1III/b/f		

7.3.7 ConveyorGetTrackData()

Get the current position of the object.

Table 7-3-7 ConveyorGetTrackData() Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	The conveyor belt tracking mark is 0: tracking end, 1: tracking grab, 2: tracking motion, 3: tracking TPD
returned value		int	errcode	Error code
Command number	364			
instance	Send the frame	/f/bIII4III364III23IIIConveyorGetTrackData(0)III/b/f		
	Receive frame	/f/bIII4III364III1III1III/b/f		

7.3.8 ConveyorTrackStart()

The conveyor belt tracking begins.

Table 7-3-8 ConveyorTrackStart() Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	The conveyor belt tracking mark is 0: tracking end, 1: tracking grab, 2: tracking motion, 3: tracking TPD
returned value		int	errcode	Error code
Command number	365			
instance	Send the frame	/f/bIII4IIII365IIII21IIIConveyorTrackStart(0)III/b/f		
	Receive frame	/f/bIII4IIII365IIII1IIII1III/b/f		

7.3.9 ConveyorTrackEnd()

The conveyor belt tracking is over.

Table 7-3-9 ConveyorTrackEnd() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	366			
instance	Send the frame	/f/bIII4IIII366IIII18IIIConveyorTrackEnd()III/b/f		
	Receive frame	/f/bIII4IIII366IIII1IIII1III/b/f		

7.3.10 ConveyorSetParam()

Conveyor belt parameter configuration.

Table 7-3-10 ConveyorSetParam() Directive protocol

	order	type	name	description
parameter	1	uint8_t	encChanel	Encoder channel
	2	int	resolution	Encoder resolution
	3	double	lead	helical pitch

	4	uint8_t	wpAxis	Workpiece shaft
	5	uint8_t	vision	Whether it matches the visual
	6	double	speedRatio	This configuration is only for the conveyor belt tracking grab option, ranging from 1 to 100, and other options are defaulted to 1;
returned value		int	errcode	Error code
Command number	367			
instance	Send the frame	/f/bIII4III367III33IIIConveyorSetParam(0,14,1000,1,0,1)III/b/f		
	Receive frame	/f/bIII4III367III1III1III/b/f		

7.3.11 ConveyorCatchPointComp()

Compensation for conveyor belt grab points.

Table 7-3-11 ConveyorCatchPointComp() Directive protocol

	order	type	name	description
parameter	1	double	xComp	Capture the X direction compensation value
	2	double	yComp	Capture the Y direction compensation value
	3	double	zComp	Capture the Z direction compensation value
returned value		int	errcode	Error code
Command number	368			
instance	Send the frame	/f/bIII4III368III29IIIConveyorCatchPointComp(0,0,0)III/b/f		
	Receive frame	/f/bIII4III368III1III1III/b/f		

7.3.12 ConveyorComDetect()

Conveyor belt communication input detection.

Table 7-3-12 ConveyorComDetect() Directive Agreement

	order	type	name	description
parameter	1	int	max_ms	Wait for the timeout time, in milliseconds
returned value		int	errcode	Error code
Command number	1148			
instance	Send the frame	/f/bIII4IIII1148III23IIIConveyorComDetect(1000)III/b/f		
	Receive frame	/f/bIII4IIII1148III1III1III/b/f		

7.3.13 ConveyorComDetectTrigger()

The conveyor belt communication input detection is triggered.

Table 7-3-13 ConveyorComDetectTrigger() Directive Agreement

	order	type	name	description
returned value		int	errcode	Error code
Command number	1149			
instance	Send the frame	/f/bIII4IIII1149III26IIIConveyorComDetectTrigger()III/b/f		
	Receive frame	/f/bIII4IIII1149III1III1III/b/f		

7.4 Extended axis command

7.4.1 ExtAxisActiveECoordsys()

Activate the external axis coordinate system.

Table 7-4-1 ExtAxisActiveECoordSys() Directive protocol

	order	type	name	description
parameter	1	uint8_t	axisNum	External shaft numbering
	2	uint8_t	toolNum	Item number

	3	float	x	External axis pose
	4	float	y	
	5	float	z	
	6	float	a	
	7	float	b	
	8	float	c	
	9	uint8_t	calibFlag	Calibration mark 0-no; 1-yes
returned value		int	errcode	Error code
Command number	287			
instance	Send the frame	/f/bIII31III287III69IIIExtAxisActiveECoordSys(1,1.000,0.000,0.000,0.000,0.000,0.000,0.000)III/b/f		
	Receive frame	/f/bIII31III287III1III1III/b/f		

7.4.2 ExtAxisSetRefPoint()

External axis coordinate system reference point setting, four-point method.

Table 7-4-2 ExtAxisSetRefPoint() Directive protocol

	order	type	name	description
parameter	1	int	PointNum	Point number
returned value		int	errcode	Error code
Command number	288			
instance	Send the frame	/f/bIII32III288III21IIIExtAxisSetRefPoint(1)III/b/f		
	Receive frame	/f/bIII32III288III1III1III/b/f		

7.4.3 ExtAxisComputeECoordsys()

External axis coordinate system calculation, four-point method.

Table 7-4-3 ExtAxisComputeECoordSys() Directive protocol

	order	type	name	description
returned value	1	float	x	The external axis is the position of the base coordinate system
	2	float	y	
	3	float	z	
	4	float	a	
	5	float	b	
	6	float	c	
Command number	289			
instance	Send the frame	/f/bIII36III289III25IIIExtAxisComputeECoordSys()III/b/f		
	Receive frame	/f/bIII36III289III65III18.920321,-366.134888,248.337051,-148.402679,19.313749,146.478699III/b/f		

7.4.4 ExtAxisSetHoming()

External shaft zero setting.

Table 7-4-4 ExtAxisSetHoming() Directive protocol

	order	type	name	description
parameter	1	uint8_t	axisNum	Axis number
	2	uint8_t	homing_mode	reset mode
	3	float	homesearchvel	Find the speed of zero
	4	float	homelatchvel	Find the zero hoop speed
returned value		int	errcode	Error code

Command number	290	
instance	Send the frame	/f/bIII4III290III27IIIExtAxisSetHoming(1,0,50,50)III/b/f
	Receive frame	/f/bIII4III290III1III1III/b/f

7.4.5 ExtAxisParamConfig()

External axis parameter configuration.

Table 7-4-5 ExtAxisParamConfig() Directive protocol

	order	type	name	description
parameter	1	int	axisNum	Axis number
	2	int	type	Extended axis type 0-translation; 1-rotation
	3	float	dir	Extend the axis direction 0-forward; 1-reverse
	4	float	axismax	Maximum position of extension shaft mm
	5	float	axismin	Extended shaft minimum position mm
	6	float	vel	velocity mm/s
	7	float	acc	Acceleration mm/s2
	8	float	lead	helical pitch mm
	9	int	resolution	Encoder resolution
	10	float	offect	Offset of the weld start point expansion axis
	11	int	company	Driver manufacturers 1-Hechuan; 2-Huichuan; 3-Matsushita
	12	int	model	Drive model 1-Harawa-SV-XD3EA040L-E, 2-Harawa-SV-X2EA150A-A, 1-Huichuan-SV620PT5R4I,1-Matsushita-MADLN15SG, 2-Matsushita-MSDLN25SG, 3-Matsushita-MCDLN35SG

	13	int	enctype	Encoder type 0-incremental; 1-absolute value
returned value		int	errcode	Error code
Command number	291			
instance	Send the frame	/f/bIII4III291III54IIIExtAxisParamConfig(1,0,0,100,10,10,10,100,100,0,2,1,0)III/b/f		
	Receive frame	/f/bIII4III291III1III1III/b/f		

7.4.6 SetAxisDHParaconfig()

External shaft system DH parameter configuration.

Table 7-4-6 SetAxisDHParaconfig() Directive protocol

	order	type	name	description
parameter	1	int	config	0-single degree of freedom linear slide rail, 1-two degree of freedom L-type displacement machine, 2-three degree of freedom, 3-four degree of freedom, 4-single degree of freedom displacement machine
	2	float	d1	The external shaft DH parameter d1 mm
	3	float	d2	The external shaft DH parameter d2 mm
	4	float	d3	The external shaft DH parameter d3 mm
	5	float	d4	The external shaft DH parameter d is 4mm
	6	float	a1	The external shaft DH parameter a1 mm
	7	float	a2	The external shaft DH parameter a2 mm
	8	float	a3	The external shaft DH parameter a3 mm
	9	float	a4	The external shaft DH parameter a4 mm
returned value		int	errcode	Error code
Command number	293			

instance	Send the frame	/f/bIII4III293III38IIISetAxisDHParaconfig(0,0,0,0,0,0,0,0,0,0)III/b/f
	Receive frame	/f/bIII4III293III1III1III/b/f

7.4.7 SetRobotPosToAxis()

Set the position of the robot relative to the external axis.

Table 7-4-7 SetRobotPosToAxis() Directive protocol

	order	type	name	description
parameter	1	uint8_t	install_pos	Installation relationship: 0: The robot is installed on the external shaft; 1: The robot is installed outside the external shaft
returned value		int	errcode	Error code
Command number	294			
instance	Send the frame	/f/bIII4III294III20IIISetRobotPosToAxis(1)III/b/f		
	Receive frame	/f/bIII4III294III1III1III/b/f		

7.4.8 ExtAxisStartJog()

The external axis starts to move.

Table 7-4-8 ExtAxisStartJog() Directive protocol

	order	type	name	description
parameter	1	uint8_t	motionCmd	Movement command, 0: joint coordinate start, 1: joint coordinate deceleration stop: 2: base coordinate start, 3: base coordinate deceleration stop, 4: tool coordinate start, 5: tool coordinate deceleration stop, 6: external axis start, 7: external axis deceleration stop, 8: workpiece coordinate start, 9: workpiece coordinate deceleration stop, 10:

				immediate stop
	2	uint8_t	jointNum	Axis number 1-6; external axis number 1-4
	3	uint8_t	direction	Turning direction, 0: reverse, 1: forward
	4	float	vel	Speed percentage
	5	float	acc	Acceleration percentage
	6	float	maxDistance	Maximum distance of single point movement, unit ° or mm
returned value		int	errcode	Error code
Command number	292			
instance	Send the frame	/f/bIII4III292III31IIIExtAxisStartJog(0,1,1,50,50,10)III/b/f		
	Receive frame	/f/bIII4III292III1III1III/b/f		

7.4.9 ExtAxisServoAlarmclear()

Clear the external shaft servo warning.

Table 7-4-9 ExtAxisServoAlarmclear() Directive protocol

	order	type	name	description
parameter	1	uint8_t	axisNum	External shaft number
	2	uint8_t	status	1: Clearing
returned value		int	errcode	Error code
Command number	295			
instance	Send the frame	/f/bIII4III295III27IIIExtAxisServoAlarmclear(1,1)III/b/f		
	Receive frame	/f/bIII4III295III1III1III/b/f		

7.4.10 ExtAxisServoOn()

External shaft servo enabled.

Table 7-4-10 ExtAxisServoOn() Directive protocol

	order	type	name	description
parameter	1	uint8_t	axisNum	External shaft number
	2	uint8_t	status	0: Enable, 1: Enable
returned value		int	errcode	Error code
Command number	296			
instance	Send the frame	/f/bIII4III296III19IIIExtAxisServoOn(1,1)III/b/f		
	Receive frame	/f/bIII4III296III1III1III/b/f		

7.4.11 ExtAxisMoveJ()

The external axis moves to the target position.

Table 7-4-11 ExtAxisMoveJ() Directive protocol

	order	type	name	description
parameter	1	int	synFlag	Synchronous 0-asynchronous 1-synchronous
	2	double	pos1	Axis 1 target position
	3	double	pos2	Axis 2 target position
	4	double	pos3	Axis 3 target position
	5	double	pos4	Axis 4 target position
	6	float	ovl	Speed percentage
	7	float	blendValue	Transition parameters: -1: Stop when in place; 0-99999 smoothing time (ms)
returned value		int	errcode	Error code
Command number	297			
instance	Send the frame	/f/bIII4III297III26IIIExtAxisMoveJ(1,0,0,0,0,20)III/b/f		

	Receive frame	/f/bIII4III297III1III1III/b/f

7.4.12 SetRefPointInExAxisEnd()

Set the calibration reference point in the position of the coordinate system at the end of the displacement machine.

Table 7-4-12 SetRefPointInExAxisEnd() Directive protocol

	order	type	name	description
parameter	1	float	x	Posture parameters
	2	float	y	
	3	float	z	
	4	float	rx	
	5	float	ry	
	6	float	rz	
returned value		int	errcode	Error code
Command number	388			
instance	Send the frame	/f/bIII4III388III73IIISetRefPointInExAxisEnd(-423.534,-185.807,290.307,-180.000,-0.000,-62.521)III/b/f		
	Receive frame	/f/bIII4III388III1III1III/b/f		

7.4.13 PositionorSetRefPoint()

Coordinate system reference point setting for transformation machine, four-point method.

Table 7-4-13 PositionorSetRefPoint() Directive protocol

	order	type	name	description
parameter	1	int	PointNum	Point number
returned value		int	errcode	Error code

Command number	389	
instance	Send frames	/f/bIII4III389III24IIIPositionorSetRefPoint(4)III/b/f
	Receive frame	/f/bIII4III389III1III1III/b/f

7.4.14 PositionorComputeECoordSys()

Coordinate system calculation of displacement machine, four-point method.

Table 7-4-14 PositionorComputeECoordSys() Directive protocol

	order	type	name	description
returned value	1	float	x	The position of the transformation machine relative to the base coordinate system
	2	float	y	
	3	float	z	
	4	float	a	
	5	float	b	
	6	float	c	
Command number	390			
instance	Send the frame	/f/bIII4III390III28IIIPositionorComputeECoordSys()III/b/f		
	Receive frame	/f/bIII4III390III44III116.061 -90.725 91.261 -90.757 -90.399 2.142III/b/f		

7.4.15 GetExAxisDriverConfig()

Obtain configuration information for the external shaft drive.

Table 7-4-15 GetExAxisDriverConfig() Directive protocol

	order	type	name	description
parameter	1	uint8_t	axisNum	External shaft number
returned value	1	int	company	Driver manufacturers 1-Hechuan; 2-Huichuan; 3-Panasonic

	2	int	model	Drive model 1-Hechuan-SV-XD3EA040L-E, 2-Hechuan-SV-X2EA150A-A, 1-Huichuan-SV620PT5R4I,1-Matsushita-MADLN15SG, 2-Matsushita-MSDLN25SG, 3-Matsushita-MCDLN35SG
	3	int	enctype	Encoder type 0-incremental; 1-absolute
Command number	393			
instance	Send the frame	/f/bIII4III393III23IIIGetExAxisDriverConfig()III/b/f		
	Receive frame	/f/bIII4III393III7III1 2 1 0III/b/f		

7.4.16 SetExAxisCmdDoneTime()

Set the completion time of external axis positioning.

Table 7-4-16 SetExAxisCmdDoneTimeC() Directive protocol

	order	type	name	description
parameter	1	double	doneTime	Completion time, unit ms
returned value		int	errcode	Error code
Command number	298			
instance	Send the frame	/f/bIII4III298III26IIISetExAxisCmdDoneTime(1000)III/b/f		
	Receive frame	/f/bIII4III298III1III1III/b/f		

7.4.17 ExtDevSetUDPComParam()

Configure UDP communication parameters.

Table 7-4-17 ExtDevSetUDPComParam() Directive protocol

	order	type	name	description
parameter	1	string	ip	PLCIP address

	2	int	port	port number
	3	int	period	Communication cycle (ms)
	4	uint16_t	lossPkgTime	Packet loss detection period (ms)
	5	uint16_t	lossPkgNum	Number of packet loss
	6	uint16_t	disconnectTime	Confirm the duration of the communication outage
	7	uint16_t	reconnectEnable	Communication disconnection automatic reconnection enabled, 0-not enabled, 1-enabled
	8	uint8_t	reconnectPeriod	Period interval (ms) for automatic reconnection when communication is disconnected
	9	uint16_t	reconnectNum	Number of automatic reconnections when communication is disconnected
	10	uint8_t	selfStartEnable	Communication is enabled by startup, 0-not enabled, 1-enabled
returned value		int	errcode	Error code
Command number	654			
instance	Send the frame	/f/bIII4III654III58IIIExtDevSetUDPComParam(192.168.58.88,2021,2,50,5,50,1,2,5,0)III/b/f		
	Receive frame	/f/bIII4III654III1III1III/b/f		

7.4.18 ExtDevGetUDPComParam()

Get UDP communication parameters.

Table 7-4-18 ExtDevGetUDPComParam() Directive protocol

	order	type	name	description
returned value	1	string	ip	PLCIP address
	2	int	port	port number
	3	int	period	Communication cycle (ms)

	4	uint16_t	lossPkgTime	Packet loss detection period (ms)
	5	uint16_t	lossPkgNum	Number of packet loss
	6	uint16_t	disconnectTime	Confirm the duration of the communication outage
	7	uint16_t	reconnectEnable	Communication disconnection automatic reconnection enabled, 0-not enabled, 1-enabled
	8	uint8_t	reconnectPeriod	Period interval (ms) for automatic reconnection when communication is disconnected
	9	uint16_t	reconnectNum	Number of automatic reconnections when communication is disconnected
	10	uint8_t	selfStartEnable	Communication is enabled by startup, 0-not enabled, 1-enabled
Command number	657			
instance	Send the frame	/f/bIII19III657III22IIIExtDevGetUDPComParam()III/b/f		
	Receive frame	/f/bIII19III657III36III192.168.58.88,2021,2,50,5,50,1,2,5,0III/b/f		

7.4.19 ExtDevLoadUDPDriver()

Load the UDP driver.

Table 7-4-19 ExtDevLoadUDPDriver() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	655			
instance	Send the frame	/f/bIII4III655III21IIIExtDevLoadUDPDriver()III/b/f		
	Receive frame	/f/bIII4III655III1III1III/b/f		

7.4.20 ExtDevUnloadUDPDriver()

Uninstall the UDP driver.

Table 7-4-20 ExtDevUnloadUDPDriver() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	656			
instance	Send the frame	/f/bIII4III656III23IIIExtDevUnloadUDPDriver()III/b/f		
	Receive frame	/f/bIII4III656III1III1III/b/f		

7.4.21 ExtDevUDPClientComReset()

The connection is restored after the UDP communication is unexpectedly disconnected.

Table 7-4-21 ExtDevUDPClientComReset() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	907			
instance	Send the frame	/f/bIII4III907III25IIIExtDevUDPClientComReset()III/b/f		
	Receive frame	/f/bIII4III907III1III1III/b/f		

7.4.22 ExtDevUDPClientComClose()

The connection is closed after the UDP communication is unexpectedly disconnected.

Table 7-4-22 ExtDevUDPClientComClose() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	908			
instance	Send the frame	/f/bIII4III908III25IIIExtDevUDPClientComClose()III/b/f		

	Receive frame	/f/bIII4III908III1III1III/b/f

7.4.23 ExtAxisGetStatus()

Query the status of the UDP extended axis.

Table 7-4-23 ExtAxisGetStatus() Directive protocol

	order	type	name	description
parameter	1	int	axisId	Get the axis number ID of the parameter, range [1~4]
returned value	1	double	exAxisPosBack	External shaft position mm)
	2	double	exAxisSpeedBack	External shaft speed (mm/s)
	3	int	exAxisErorCode	External shaft fault code
	4	uint8_t	exAxisRDY	The servo is ready
	5	uint8_t	exAxisINPOS	Servo in place
	6	uint8_t	exAxisALM	Servo alarm
	7	uint8_t	exAxisFLERR	Follow the error
	8	uint8_t	exAxisNLMT	Go to the negative limit
	9	uint8_t	exAxisPLMT	To the positive limit
	10	uint8_t	exAxisAbSOFLN	The driver 485 bus is disconnected
	11	uint8_t	exAxisOFLN	Communication timeout, the control card communicates with the control box board 485 timeout
	12	uint8_t	exAxisHomeStatus	The external shaft is in the zero state
Command number	964			
instance	Send the frame	/f/bIII4III964III19IIIExtAxisGetStatus(1)III/b/f		

	Receive frame	/f/bIII4III964III1III1III/b/f

7.4.24 TractorEnable()

Control enables the movable device.

Table 7-4-24 TractorEnable() Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	Enabled state, 0: disable, 1: enable
returned value		int	errcode	Error code
Command number	1033			
instance	Send the frame	/f/bIII4III1033III16IIITractorEnable(1)III/b/f		
	Receive frame	/f/bIII4III1033III1III1III/b/f		

7.4.25 TractorHoming()

The current position of the movable device is returned to zero.

Table 7-4-25 TractorHoming() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1034			
instance	Send the frame	/f/bIII4III1034III15IIITractorHoming()III/b/f		
	Receive frame	/f/bIII4III1034III1III1III/b/f		

7.4.26 TractorMoveL()

The mobile device moves a certain length of straight line from its current position.

Table 7-4-26 TractorMoveL() Directive protocol

	order	type	name	description
parameter	1	float	dis	Length of exercise, unit mm
	2	float	ovl	Speed percentage, 0-100
returned value		int	errcode	Error code
Command number	1035			
instance	Send the frame	/f/bIII4III1035III21IIITractorMoveL(1000,50)III/b/f		
	Receive frame	/f/bIII4III1035III1III1III/b/f		

7.4.27 TractorMoveC()

The movable device moves in a circular motion from its current position.

Table 7-4-27 TractorMoveC() Directive protocol

	order	type	name	description
parameter	1	float	radio	Arc radius, unit mm
	2	float	angle	Arc Angle, -360-360
	3	float	ovl	Speed percentage, 0-100
returned value		int	errcode	Error code
Command number	1036			
instance	Send the frame	/f/bIII4III1036III24IIITractorMoveC(100,180,50)III/b/f		
	Receive frame	/f/bIII4III1036III1III1III/b/f		

7.5 Sucker Command

7.5.1 SetSuckerCtrl()

Issue the sucker control command.

Table7-5-1 SetSuckerCtrl()Directive protocol

	order	type	name	description
parameter	1	uint8_t	slaveID	The suction cup to be controlled starts from the station number (starting station number), 0-broadcast mode, which is sent to all stations, 1-20 is the corresponding station number, where 1-10 is the station of port 1, and 11-20 is the station of port 2
	2	uint8_t	len	The number of consecutive writes. The length is invalid when the station number is 0
	3	uint8_t*	ctrlValue	1-suction according to maximum vacuum 2-suction according to set vacuum 3-stop suction
returned value		int	errcode	Error code
Command number	1224			
instance	Send the frame	/f/bIII47III1224III22IIISetSuckerCtrl(0,1,{3})III/b/f		
	Receive frame	/f/bIII47III1224III1III1III/b/f		

7.5.2 GetSuckerState()

Get the status parameters of the sucker.

Table7-5-2 GetSuckerState()Directive protocol

	order	type	name	description
parameter	1	uint8_t	slaveID	The suction cup to be controlled starts from the station number (starting station number), 0-broadcast mode, which is sent to all stations, 1-20 is the corresponding station number, where 1-10 is the station of port 1, and 11-20 is the station of port 2
	1	uint8_t	state	Current status: 0-Release object or suction cup started successfully 1-Detect

returned value				workpiece and adsorb to object 2-Not adsorbed to object 3-Object detached
	2	uint8_t	pressValue	Current vacuum/pressure
	3	int	error	Error code
Command number	1225			
instance	Send the frame	/f/bIII4III1225III17IIIGetSuckerState(1)III/b/f		
	Receive frame	/f/bIII4III1225III8III0,1013,0III/b/f		

7.5.3 WaitSuckerState()

Wait for the sucker control command.

Table7-5-3 WaitSuckerState()Directive protocol

	order	type	name	description
parameter	1	uint8_t	slaveID	The suction cup to be controlled starts from the station number (starting station number), 0-broadcast mode, which is sent to all stations, 1-20 is the corresponding station number, where 1-10 is the station of port 1, and 11-20 is the station of port 2
	2	uint8_t	state	Current status: 0-Release object or suction cup started successfully 1-Detect workpiece and adsorb to object 2-Not adsorbed to object 3-Object detached
	3	int	ms	Overdue time, in ms
returned value		int	errcode	Error code
Command number	1226			
instance	Send the frame	/f/bIII4III1226III25IIIWaitSuckerState(1,1,1000)III/b/f		
	Receive frame	/f/bIII4III1226III1III1III/b/f		

7.6 DFC grinding head instruction

7.6.1 SetDFCForce()

Set the force value for the DFC grinding head。

Table7-6-1 SetDFCForce()instruction protocol

	order	type	name	description
parameter	1	uint8_t	channel	Controlled DFC grinding head channel (0, 1)
	2	uint16_t	force	Set the force value for the DFC grinding head, in N
returned value		int	errcode	Error code
Command number	1282			
instance	Send the frame	/f/bIII47III1282III17IIISetDFCForce(0,30)III/b/f		
	Receive frame	/f/bIII47III1282III1III1III/b/f		

7.6.2 GetDFCState()

Get the force setting feedback value of DFC grinding head.

Table7-6-2 GetDFCState()instruction protocol

	order	type	name	description
returned value	1	uint16_t	error	Current status: 0-Normal; 1-Force control limit alarm
	2	uint16_t	forceFeedback	Real-time force feedback value of DFC grinding head
Command number	1283			
instance	Send the frame	/f/bIII4III1283III13IIIGetDFCState()III/b/f		
	Receive frame	/f/bIII4III1283III4III0,30III/b/f		

7.6.3 SetPolishType()

Set the grinding head device model.

Table7-6-3 SetPolishType()instruction protocol

	order	type	name	description
parameter	1	uint16_t	type	101-Saide grinding head 102-Darou DFC grinding head
returned value		int	errcode	Error code
Command number	1284			
instance	Send the frame	/f/bIII4IIII1284IIII16IIISetPolishType(1)III/b/f		
	Receive frame	/f/bIII4IIII1284IIII1IIII1III/b/f		

8 Robot welding instructions

8.1 ARCStart()

scratch start.

Table 8-1 ARCStart() Directive protocol

	order	type	name	description
parameter	1	uint8_t	io_type	0-Control box IO, 1-Extended IO
	2	uint8_t	arcNum	Welding configuration file number
	3	int	max_wt	Maximum waiting time [ms]
returned value		int	errcode	Error code
Command number	247			
instance	Send the frame	/f/bIII4III247III18IIIARCStart(0,0,1000)III/b/f		
	Receive frame	/f/bIII4III247III1III1III/b/f		

8.2 ARCEnd()

Arcing.

Table 8-2 ARCEnd() Directive protocol

	order	type	name	description
parameter	1	uint8_t	io_type	0-Control box IO, 1-Extended IO
	2	uint8_t	arcNum	Welding configuration file number
	3	int	max_wt	Maximum waiting time [ms]
returned value		int	errcode	Error code
Command number	248			
instance	Send the frame	/f/bIII4III248III18IIIARCEnd(0,0,1000)III/b/f		

	Receive frame	/f/bIII4III248III1III1III/b/f

8.3 WeaveSetPara()

Set welding parameters.

Table 8-3 WeaveSetPara() Directive protocol

	order	type	name	description
parameter	1	uint8_t	weaveNum	Set the welding parameter configuration number
	2	uint8_t	weaveType	Swing type
	3	float	weavefrequency	hunting frequency
	4	uint8_t	weaveincstaytime	0-does not include waiting time, 1-includes waiting time
	5	float	weaverange	amplitude of fluctuation
	6	float	weaveLeftRange	Standing triangular swing left string length (mm)
	7	float	weaveRightRange	Standing triangular swing right string length (mm)
	8	int	weaveAdditionalStayTime	Triangle swing triangle tip waiting time (ms)
	9	int	weave_left_staytime	Left stall time
	10	int	weave_right_staytime	Right stop time
	11	int	weaveCircleRatio	Circular swing correction ratio (0-100)
	12	uint8_t	weaveStationary	Swing position Wait 0-the position continues to move during the waiting time, 1-the position remains stationary during the waiting time
	13	float	weaveYawAngle	Swing direction Angle (swivel around swing Z axis), unit °

returned value		int	errcode	Error code
Command number	252			
instance	Send the frame	/f/bIII22III252III58IIIWeaveSetPara(0,0,1,0,10,0.000000,0.000000,0,100,100,0,0,0)III/b/f		
	Receive frame	/f/bIII4III252III1III1III/b/f		

8.4 WeaveOnlineSetPara()

Set the oscillation parameters online.

Table 8-4 WeaveOnlineSetPara() Instruction protocol

	order	type	name	description
parameter	1	uint8_t	weaveNum	Set the welding parameter configuration number
	2	uint8_t	weaveType	Swing type
	3	float	weavefrequency	hunting frequency
	4	uint8_t	weaveIncStaytime	0-does not include waiting time, 1-includes waiting time
	5	float	weaverange	amplitude of fluctuation
	6	int	weave_left_staytime	Left stall time
	7	int	weave_right_staytime	Right stop time
	8	int	weaveCircleRatio	Circular swing correction ratio (0-100)
	9	uint8_t	weaveStationary	Swing position Wait 0-the position continues to move during the waiting time, 1-the position remains stationary during the waiting time
returned value		int	errcode	Error code
Command number	825			

instance	Send the frame	/f/bIII22III825III58IIIWeaveOnlineSetPara(0,0,1,0,10,100,100,0,0)III/b/f
	Receive frame	/f/bIII4III825III1III1III/b/f

8.5 WeaveStart()

The welding begins.

Table 8-5 WeaveStart() Directive protocol

	order	type	name	description
parameter	1	uint8_t	weaveNum	Set the welding parameter configuration number
returned value		int	errcode	Error code
Command number	253			
instance	Send the frame	/f/bIII22III253III13IIIWeaveStart(0)III/b/f		
	Receive frame	/f/bIII4III253III1III1III/b/f		

8.6 WeaveEnd()

Welding is finished.

Table 8-6 WeaveEnd() Directive protocol

	order	type	name	description
parameter	1	uint8_t	weaveNum	Set the welding parameter configuration number
returned value		int	errcode	Error code
Command number	254			
instance	Send the frame	/f/bIII22III254III11IIIWeaveEnd(0)III/b/f		
	Receive frame	/f/bIII4III254III1III1III/b/f		

8.7 WeaveStartSim()

Welding simulation begins.

Table 8-7 WeaveStartSim() Directive protocol

	order	type	name	description
parameter	1	uint8_t	weaveNum	Set the welding parameter configuration number
returned value		int	errcode	Error code
Command number	687			
instance	Send frame	/f/bIII4IIII687III16IIIWeaveStartSim(1)III/b/f		
	Receive frame	/f/bIII4IIII687III1III1III/b/f		

8.8 WeaveEndSim()

Welding simulation is finished.

Table 8-8 WeaveEndSim() Directive protocol

	order	type	name	description
parameter	1	uint8_t	weaveNum	Set the welding parameter configuration number
returned value		int	errcode	Error code
Command number	688			
instance	Send the frame	/f/bIII4IIII688III14IIIWeaveEndSim(1)III/b/f		
	Receive frame	/f/bIII4IIII688III1III1III/b/f		

8.9 WeaveInspectStart()

Start trajectory detection warning (no movement).

Table 8-9 WeaveInspectStart() Directive protocol

	order	type	name	description
parameter	1	uint8_t	weaveNum	Set the welding parameter configuration number
returned value		int	errcode	Error code
Command number	932			
instance	Send the frame	/f/bIII4III932III20IIIWeaveInspectStart(1)III/b/f		
	Receive frame	/f/bIII4III932III1III1III/b/f		

8.10 WeaveInspectEnd()

Stop trajectory detection warning (no movement).

Table 8-10 WeaveInspectEnd() Directive protocol

	order	type	name	description
parameter	1	uint8_t	weaveNum	Set the welding parameter configuration number
returned value		int	errcode	Error code
Command number	933			
instance	Send the frame	/f/bIII4III933III18IIIWeaveInspectEnd(1)III/b/f		
	Receive frame	/f/bIII4III933III1III1III/b/f		

8.11 WeaveChangeStart()

The welding gradient begins.

Table 8-11 WeaveChangeStart() Directive protocol

	order	type	name	description
parameter	1	uint8_t	weaveNum	Set the welding parameter number
	2	uint8_t	weaveChangeF	1: change the oscillation parameter, 2:

			lag	change the oscillation parameter + welding speed
	3	float	velStart	Start the swing speed in units of cpm
	4	float	velEnd	Swing end speed, in cpm
returned value		int	errcode	Error code
Command number	1124			
instance	Send the frame	/f/bIII4IIII1124III29IIIWeaveChangeStart(1,2,200,100)III/b/f		
	Receive frame	/f/bIII4IIII1124III1III1III/b/f		

8.12 WeaveChangeEnd()

The welding gradient is finished.

Table 8-12 WeaveChangeEnd() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1125			
instance	Send the frame	/f/bIII4IIII1125III16IIIWeaveChangeEnd()III/b/f		
	Receive frame	/f/bIII4IIII1125III1III1III/b/f		

8.13 SetWeldingVoltage()

Set welding voltage, unit: V.

Table 8-13 SetWeldingVoltage() Directive protocol

	order	type	name	description
parameter	1	float	voltage	Welding voltage, unit: V
returned value		int	errcode	Error code
Command number	771			

instance	Send the frame	/f/bIII4III771III20IIISetWeldingVoltage(5)III/b/f
	Receive frame	/f/bIII4III771III1III1III/b/f

8.14 SetWeldingCurrent()

Set welding current, unit: A.

Table 8-14 SetWeldingCurrent() Directive protocol

	order	type	name	description
parameter	1	float	current	Welding current, unit: A
returned value		int	errcode	Error code
Command number	772			
instance	Send frame	/f/bIII4III772III20IIISetWeldingCurrent(3)III/b/f		
	Receive frame	/f/bIII4III772III1III1III/b/f		

8.15 SetExtDIWeldBreakOffRecover()

Configure the welding interruption recovery and exit extended IO port number.

Table 8-15 SetExtDIWeldBreakOffRecover() Directive protocol

	order	type	name	description
parameter	1	int	reweldDINUm	Interrupts restore the IO port number
	2	int	abortWeldDINum	Interrupts exit the IO port number
returned value		int	errcode	Error code
Command number	909			
instance	Send the frame	/f/bIII4III909III32IIISetExtDIWeldBreakOffRecover(1,2)III/b/f		
	Receive frame	/f/bIII4III909III1III1III/b/f		

8.16 LaserTrackingLaserOn()

The laser opens.

Table 8-16 LaserTrackingLaserOn() Directive protocol

	order	type	name	description
parameter	1	int	weld_id	Weld type number
returned value		int	errcode	Error code
Command number	255			
instance	Send the frame	/f/bIII4III255III23IIILaserTrackingLaserOn(0)III/b/f		
	Receive frame	/f/bIII4III255III1III1III/b/f		

8.17 LaserTrackingLaserOff()

The laser shuts off.

Table 8-17 LaserTrackingLaserOff() Directive protocol

	order	type	name	description
parameter	1	int	weld_id	Weld type number
returned value		int	errcode	Error code
Command number	256			
instance	Send the frame	/f/bIII4III256III24IIILaserTrackingLaserOff(0)III/b/f		
	Receive frame	/f/bIII4III256III1III1III/b/f		

8.18 LaserTrackingTrackOn()

Start tracking.

Table 8-18 LaserTrackingTrackOn() Directive protocol

	order	type	name	description

parameter	1	uint8_t	flag	0: Off, 1: On
returned value		int	errcode	Error code
Command number	257			
instance	Send frame	/f/bIII4III257III23IIILaserTrackingTrackOn(1)III/b/f		
	Receive frame	/f/bIII4III257III1III1III/b/f		

8.19 LaserTrackingTrackOff()

End tracking.

Table 8-19 LaserTrackingTrackOff() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	258			
instance	Send the frame	/f/bIII4III258III23IIILaserTrackingTrackOff()III/b/f		
	Receive frame	/f/bIII4III258III1III1III/b/f		

8.20 LaserTrackingSearchStart()

The search begins.

Table 8-20 LaserTrackingSearchStart() Directive protocol

	order	type	name	description
parameter	1	direction	u8	Direction of search, 0: +X, 1: -X, 2: +Y, 3: -Y, 4: +Z, 5: -Z
	2	point_x	float	Find the direction of the end point coordinate, unit mm
	3	point_y	float	
	4	point_z	float	
	5	velocity	unsigned int	Speed, unit%

	6	distance	int	Length, unit mm
	7	maxTime	int	Maximum search time, unit ms
	8	posSensorNum	int	Sensor number
returned value		int	errcode	Error code
Command number	259			
instance	Send the frame	/f/bIII4III259III45IIILaserTrackingSearchStart(0,0,0,0,10,20,100,0)III/b/f		
	Receive frame	/f/bIII4III259III1III1III/b/f		

8.21 LaserTrackingSearchStop()

The search is over.

Table 8-21 LaserTrackingSearchStop() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	260			
instance	Send the frame	/f/bIII4III260III25IIILaserTrackingSearchStop()III/b/f		
	Receive frame	/f/bIII4III260III1III1III/b/f		

8.22 SetLaserTrackingPoint()

Set the sensor reference point.

Table 8-22 SetLaserTrackingPoint() Directive protocol

	order	type	name	description
parameter	1	int	PointNum	Point number
returned value		int	errcode	Error code
Command number	261			

instance	Send the frame	/f/bIII4III261III24IIISetLaserTrackingPoint(1)III/b/f
	Receive frame	/f/bIII4III261III1III1III/b/f

8.23 ComputeLaserTracking()

Calculate the sensor position.

Table 8-23 ComputeLaserTracking() Directive protocol

	order	type	name	description
returned value	1	float	x	
	2	float	y	
	3	float	z	
	4	float	rx	
	5	float	ry	
	6	float	rz	Posture parameters
Command number	262			
instance	Send the frame	/f/bIII4III262III22IIIComputeLaserTracking()III/b/f		
	Receive frame	/f/bIII4III262III11III0 0 0 0 0 0III/b/f		

8.24 SetLaserSensorPoint_EightPoint()

Set the center point of the laser tracking sensor (eight-point method).

Table 8-24 SetLaserSensorPoint_EightPoint() instruction protocol 1

	order	type	name	description
parameter	1	int	PointNum	Point number
returned value		int	errcode	Error code
Command number	273			
instance	Send the frame	/f/bIII4III273III33IIISetLaserSensorPoint_EightPoint(1)III/b/f		

	Receive frame	/f/bIII4III273III1III1III/b/f

8.25 ComputeLaserSensorTCP_EightPoint()

Calculate the center point of the laser tracking sensor (eight-point method).

Table 8-25 ComputeLaserSensorTCP_EightPoint() instruction protocol

	order	type	name	description
returned value	1	float	x	Posture parameters
	2	float	y	
	3	float	z	
	4	float	rx	
	5	float	ry	
	6	float	rz	
Command number	274			
instance	Send the frame	/f/bIII4III274III34IIIComputeLaserSensorTCP_EightPoint()III/b/f		
	Receive frame	/f/bIII4III274III11III0 0 0 0 0 0III/b/f		

8.26 SetLaserSensorPoint_FivePoint()

Set the center point of the laser tracking sensor (five-point method).

Table 8-26 SetLaserSensorPoint_FivePoint() instruction protocol

	order	type	name	description
parameter	1	int	PointNum	Point number
returned value		int	errcode	Error code
Command number	658			
instance	Send frame	/f/bIII4III658III32IIISetLaserSensorPoint_FivePoint(1)III/b/f		
	Receive frame	/f/bIII4III658III1III1III/b/f		

8.27 ComputeLaserSensorTCP_FivePoint()

Calculate the center point of the laser tracking sensor (five-point method).

Table 8-27 ComputeLaserSensorTCP_FivePoint() instruction protocol

	order	type	name	description
returned value	1	float	x	Posture parameters
	2	float	y	
	3	float	z	
	4	float	rx	
	5	float	ry	
	6	float	rz	
	7	double	calibDiffx	Calibration accuracy
	8	double	calibDiffy	
	9	double	calibDiffz	
Command number	659			
instance	Send the frame	/f/bIII4III659III33IIIComputeLaserSensorTCP_FivePoint()III/b/f		
	Receive frame	/f/bIII4III659III16III0 0 0 0 0 0 0 0 0III/b/f		

8.28 SetLaserSensorPoint_ThreePoint()

Set the center point of the laser tracking sensor (three-point method).

Table 8-28 SetLaserSensorPoint_ThreePoint() instruction protocol

	order	type	name	description
parameter	1	int	PointNum	Point number
returned value		int	errcode	Error code
Command number	276			

instance	Send the frame	/f/bIII4III276III33IIISetLaserSensorPoint_ThreePoint(1)III/b/f
	Receive frame	/f/bIII4III276III1III1III/b/f

8.29 ComputeLaserSensorTCP_ThreePoint()

Calculate the center point of the laser tracking sensor (three-point method).

Table 8-29 ComputeLaserSensorTCP_ThreePoint() instruction protocol

	order	type	name	description
returned value	1	float	x	Posture parameters
	2	float	y	
	3	float	z	
	4	float	rx	
	5	float	ry	
	6	float	rz	
Command number	277			
instance	Send the frame	/f/bIII4III277III34IIIComputeLaserSensorTCP_ThreePoint()III/b/f		
	Receive frame	/f/bIII4III277III1IIII0 0 0 0 0 0III/b/f		

8.30 LaserTrackingSensorIPConfig()

Laser tracking sensor IP and port configuration.

Table 8-30 LaserTrackingSensorIPConfig() Directive protocol

	order	type	name	description
parameter	1	string	ip	Laser tracking sensor communication ip
	2	uint16_t	port	Laser tracking sensor communication port
returned value		int	errcode	Error code

Command number	264	
instance	Send the frame	/f/bIII4III264III47IIILaserTrackingSensorIPConfig(192.168.57.10,5020)III/b/f
	Receive frame	/f/bIII4III264III1III1III/b/f

8.31 LoadPosSensorDriver()

Loaded with sensor drive.

Table 8-31 LoadPosSensorDriver() Directive protocol

	order	type	name	description
parameter	1	string	protocol_id	Sensor protocol number
returned value		int	errcode	Error code
Command number	265			
instance	Send the frame	/f/bIII4III265III24IIILoadPosSensorDriver(101)III/b/f		
	Receive frame	/f/bIII4III265III1III1III/b/f		

8.32 UnloadPosSensorDriver()

Uninstall the sensor driver.

Table 8-32 UnloadPosSensorDriver() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	266			
instance	Send the frame	/f/bIII4III266III23IIIUnloadPosSensorDriver()III/b/f		
	Receive frame	/f/bIII4III266III1III1III/b/f		

8.33 SetLTSensorSamplePeriod()

Set the laser tracking sensor sampling cycle.

Table 8-33 SetLTSensorSamplePeriod() Directive protocol

	order	type	name	description
parameter	1	uint8_t	period	sampling period
returned value		int	errcode	Error code
Command number	267			
instance	Send the frame	/f/bIII4III267III27IIISetLTSensorSamplePeriod(25)III/b/f		
	Receive frame	/f/bIII4III267III1III1III/b/f		

8.34 SetLaserSensorCoord()

Set the coordinate system for the laser sensor.

Table 8-34 MoveC() instruction protocol 1

	order	type	name	description
parameter	1	uint8_t	coord	Coordinate system number
returned value		int	errcode	Error code
Command number	280			
instance	Send the frame	/f/bIII4III280III22IIISetLaserSensorCoord(0)III/b/f		
	Receive frame	/f/bIII4III280III1III1III/b/f		

8.35 SetWObjCoordPoint()

Set the workpiece reference point.

Table 8-35 SetWObjCoordPoint() Directive protocol

	order	type	name	description
parameter	1	int	PointNum	Point number
returned value		int	errcode	Error code

Command number	249	
instance	Send the frame	/f/bIII159III249III20IIISetWObjCoordPoint(1)III/b/f
	Receive frame	/f/bIII159III249III1III1III/b/f

8.36 ComputeWObjCoord()

Calculate the coordinate system of the workpiece.

Table 8-36 ComputeWObjCoord() Directive protocol

	order	type	name	description
parameter	1	uint8_t	method	The calibration method is 0-origin-x-axis-z-axis, 1-origin-x-axis-xy+plane
	2	int	refFrame	Referring to the coordinate system of the workpiece, the range [0~19]
returned value	1	float	x	Workpiece coordinate system position
	2	float	y	
	3	float	z	
	4	float	a	
	5	float	b	
	6	float	c	
Command number	250			
instance	Send the frame	/f/bIII162III250III21IIIComputeWObjCoord(1,0)III/b/f		
	Receive frame	/f/bIII162III250III64III25.847116,-537.118591,315.650269,-51.428852,57.740227,-47.675426III/b/f		

8.37 SetWObjCoord()

Application of workpiece coordinate system.

Table 8-37 SetWObjCoord() Directive protocol

	order	type	name	description
parameter	1	int	frameNo	Tool number, range [0~19]
	2	float	x	Workpiece center point position, unit mm or °
	3	float	y	
	4	float	z	
	5	float	rx	
	6	float	ry	
	7	float	rz	
	8	uint8_t	refFrame	reference coordinate system
returned value		int	errcode	Error code
Command number	251			
instance	Send the frame	/f/bIII165III251III53IIISetWObjCoord(0,1.000,0.900,2.000,1.900,3.000,2.900,0)III/b/f		
	Receive frame	/f/bIII165III251III1III1III/b/f		

8.38 SetWObjList()

Set the list of workpieces.

Table 8-38 SetWObjList() Directive protocol

	order	type	name	description
parameter	1	int	frameNo	Tool number, range [0~19]
	2	float	x	Workpiece center point position, unit mm or °
	3	float	y	
	4	float	z	
	5	float	rx	

	6	float	ry	
	7	float	rz	
	8	uint8_t	refFrame	reference coordinate system
returned value		int	errcode	Error code
Command number	383			
instance	Send frame	/f/bIII165III383III52IIISetWObjList(0,1.000,0.900,2.000,1.900,3.000,2.900,0)III/b/f		
	Receive frame	/f/bIII165III383III1III1III/b/f		

8.39 WorkPieceTrsfStart()

The transformation of the workpiece coordinate system begins.

Table 8-39 WorkPieceTrsfStart() Directive protocol

	order	type	name	description
parameter	1	int	workpiece_num	Workpiece coordinate system number, range [0~14]
returned value		int	errcode	Error code
Command number	712			
instance	Send the frame	/f/bIII4III712III21IIIWorkPieceTrsfStart(0)III/b/f		
	Receive frame	/f/bIII4III712III1III1III/b/f		

8.40 WorkPieceTrsfEnd()

The transformation of the workpiece coordinate system is complete.

Table 8-40 WorkPieceTrsfEnd() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	713			

instance	Send the frame	/f/bIII4III713III18IIIWorkPieceTrsfEnd()III/b/f
	Receive frame	/f/bIII4III713III1III1III/b/f

8.41 ToolTrsfStart()

The tool coordinate system transformation begins.

Table 8-41 ToolTrsfStart() Directive protocol

	order	type	name	description
parameter	1	int	tool_num	Tool specification number, range [0~14]
returned value		int	errcode	Error code
Command number	823			
instance	Send the frame	/f/bIII4III823III16IIIToolTrsfStart(0)III/b/f		
	Receive frame	/f/bIII4III823III1III1III/b/f		

8.42 ToolTrsfEnd()

The tool coordinate system transformation is complete.

Table 8-42 ToolTrsfEnd() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	824			
instance	Send the frame	/f/bIII4III824III13IIIToolTrsfEnd()III/b/f		
	Receive frame	/f/bIII4III824III1III1III/b/f		

8.43 SetForwardWireFeed()

Positive wire feeding.

Table 8-43 SetForwardWireFeed() Directive protocol

	order	type	name	description
parameter	1	int	ioType	IO type
	2	int	wireFeed	Wire feeding control 0-stop wire feeding; 1-wire feeding
returned value		int	errcode	Error code
Command number	268			
instance	Send the frame	/f/bIII4III268III23IIISetForwardWireFeed(1,1)III/b/f		
	Receive frame	/f/bIII4III268III1III1III/b/f		

8.44 SetReverseWireFeed()

Reverse wire feeding.

Table 8-44 SetReverseWireFeed() Directive protocol

	order	type	name	description
parameter	1	int	ioType	IO type
	2	int	wireFeed	Wire feeding control 0-stop wire feeding; 1-feed wire
returned value		int	errcode	Error code
Command number	269			
instance	Send the frame	/f/bIII4III269III23IIISetReverseWireFeed(1,0)III/b/f		
	Receive frame	/f/bIII4III269III1III1III/b/f		

8.45 SetAspirated()

Send gas and shut off gas.

Table 8-45 SetAspirated() Directive protocol

	order	type	name	description

parameter	1	int	ioType	IO type
	2	int	airControl	Gas control 0-stop gas; 1-send gas
returned value		int	errcode	Error code
Command number	270			
instance	Send the frame	/f/bIII4III270III17IIISetAspirated(1,1)III/b/f		
	Receive frame	/f/bIII4III270III1III1III/b/f		

8.46 PosSensorPointRecord()

Pose sensor data point record.

Table 8-46 PosSensorPointRecord() Directive protocol

	order	type	name	description
parameter	1	int	frameNo	Tool number, range [0~19]
	2	float	x	Workpiece center point position, unit mm or °
	3	float	y	
	4	float	z	
	5	float	rx	
	6	float	ry	
	7	float	rz	
	8	uint8_t	refFrame	reference coordinate system
returned value		int	errcode	Error code
Command number	278			
instance	Send the frame	/f/bIII4III278III61IIIPosSensorPointRecord(0,1.000,0.900,2.000,1.900,3.000,2.900,0)III/b/f		
	Receive frame	/f/bIII4III278III1III1III/b/f		

8.47 LaserTrackMaxDiffSet()

Set the maximum difference of laser tracking.

Table 8-47 LaserTrackMaxDiffSet() Directive protocol

	order	type	name	description
parameter	1	double	posdiff	Maximum deviation value
returned value		int	errcode	Error code
Command number	279			
instance	Send the frame	/f/bIII4III279III26IIILaserTrackMaxDiffSet(10.0)III/b/f		
	Receive frame	/f/bIII4III279III1III1III/b/f		

8.48 GetLaserSensorConfigInfo()

Obtain laser tracking sensor configuration information.

Table 8-48 GetLaserSensorConfigInfo() Directive protocol

	order	type	name	description
returned value	1	string	ip	Ip
	2	string	port	port number
	3	string	period	sampling period
	4	string	protocol_id	Sensor protocol number
	5	string	coord	Coordinate system number
Command number	283			
instance	Send frame	/f/bIII18III283III26IIIGetLaserSensorConfigInfo()III/b/f		
	Receive frame	/f/bIII18III283III27III192.168.57.10,5020,25,101,0III/b/f		

8.49 LaserSensorRecord()

The laser tracking weld seam data recording starts and stops.

Table 8-49 LaserSensorRecord() Directive protocol

	order	type	name	description
parameter	1	uint8_t	status	0-execute planning data, 1-execute record data, 2-record data, 3-reproduce record data
	2	uint8_t	delayMode	Data processing mode, 0: delay time, 1: delay distance
	3	int	delayTime	The time required for the laser sensor to move from the starting point to the robot welding gun, unit: ms
	4	uint8_t	delayDisExAxisNum	The delay distance corresponds to the external axis number and is expressed in bits
	5	float	delayDis	The distance from the starting point of the laser sensor to the robot welding gun, unit: mm
	6	float	sensitivePara	Response sensitivity coefficient, range (0-1)
	7	uint8_t	trackMode	Fixed-point tracking type: 0: Extended-axis asynchronous motion, 1: Robot
	8	uint8_t	triggerMode	Fixed-point tracking trigger method, 0: tracking duration, 1: IO
	9	double	runTime	Duration of robot fixed-point tracking, in seconds
	10	double	speed	Speed percentage
returned value		int	errcode	Error code
Command number	284			
instance	Send the frame	/f/bIII4III284III48IIILaserSensorRecord(0,0,1000,1,20,0.8,1,0,10,50)III/b/f		
	Receive frame	/f/bIII4III284III1III1III/b/f		

8.50 SeamTrackingSetSensitivity()

Set the weld tracking sensitivity coefficient.

Table 8-50 SeamTrackingSetSensitivity() Directive protocol

	order	type	name	description
parameter	1	double	x_fraction	X-directional sensitivity coefficient
	2	double	y_fraction	Y direction sensitivity coefficient
	3	double	z_fraction	Z direction sensitivity coefficient
returned value		int	errcode	Error code
Command number	636			
instance	Send the frame	/f/bIII4III636III39IIISeamTrackingSetSensitivity(0.9,0.9,0.9)III/b/f		
	Receive frame	/f/bIII4III636III1III1III/b/f		

8.51 MoveLTR()

Laser tracking reproduction.

Table 8-51 MoveLTR() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	285			
instance	Send the frame	/f/bIII4III285III9IIIMoveLTR()III/b/f		
	Receive frame	/f/bIII4III285III1III1III/b/f		

8.52 ComputeLaserOffset()

Calculate the point offset of the laser sensor.

Table 8-52 ComputeLaserOffset() Directive protocol

	order	type	name	description
returned value	1	double	x_offset	X deviation of directivity
	2	double	y_offset	Y deviation of directivity
	3	double	z_offset	Z deviation of directivity
Command number	386			
instance	Send the frame	/f/bIII4III386III25IIIComputeLaserOffset(0,0,0)III/b/f		
	Receive frame	/f/bIII4III386III1III1III/b/f		

8.53 SetLaserOffsetPoint()

Set the laser sensor reference point.

Table 8-53 SetLaserOffsetPoint() Directive protocol

	order	type	name	description
parameter	1	int	PointNum	Point number
	2	int	posSensorNum	Position sensor number 0-14
	3	uint8_t	install	way to install
	4	float	x	Posture parameters
	5	float	y	
	6	float	z	
	7	float	a	
	8	float	b	
	9	float	c	
returned value		int	errcode	Error code
Command number	387			
instance	Send the frame	/f/bIII4III387III38IIISetLaserOffsetPoint(1,0,1,0,0,0,0,0,0)III/b/f		

	Receive frame	/f/bIII4III387III1III1III/b/f

8.54 MoveToLaserRecordStart()

Move to the starting point of the trajectory record.

Table 8-54 MoveToLaserRecordStart() Directive protocol

	order	type	name	description
parameter	1	uint8_t	moveType	Exercise type 0-PTP; 1-LIN
	2	float	ovl	Speed percentage [0-100]
returned value		int	errcode	Error code
Command number	919			
instance	Send the frame	/f/bIII4III919III28IIIMoveToLaserRecordStart(0,50)III/b/f		
	Receive frame	/f/bIII4III919III1III1III/b/f		

8.55 MoveToLaserRecordEnd()

Move to the end of the trajectory record.

Table 8-55 MoveToLaserRecordEnd() Directive protocol

	order	type	name	description
parameter	1	uint8_t	moveType	Exercise type 0-PTP; 1-LIN
	2	float	ovl	Speed percentage [0-100]
returned value		int	errcode	Error code
Command number	920			
instance	Send the frame	/f/bIII4III920III26IIIMoveToLaserRecordEnd(0,50)III/b/f		
	Receive frame	/f/bIII4III920III1III1III/b/f		

8.56 SetLaserSensorUsage()

How laser tracking sensor data is used.

Table 8-56 SetLaserSensorUsage() Directive protocol

	order	type	name	description
parameter	1	uint8_t	usage	Use mode Settings: 0: original data, 1: use YZ direction data
returned value		int	errcode	Error code
Command number	422			
instance	Send the frame	/f/bIII4III422III22IIISetLaserSensorUsage(0)III/b/f		
	Receive frame	/f/bIII4III422III1III1III/b/f		

8.57 WireSearchStart()

Wire positioning begins.

Table 8-57 WireSearchStart() Directive protocol

	order	type	name	description
parameter	1	uint8_t	refPos	1-reference point, 0-contact point
	2	float	search_vel	Location speed, unit:%
	3	int	search_dis	Position distance, unit: mm
	4	uint8_t	autoback_flag	Automatic return flag, 0-not automatic, 1-automatic
	5	float	autoback_vel	Automatic return speed, unit:%
	6	int	autoback_dis	Automatic return distance, unit: mm
	7	uint8_t	offsetFlag	1-offset seeking, 0-teaching point seeking
returned value		int	errcode	Error code
Command number	971			

instance	Send the frame	/f/bIII4III971III33IIIWireSearchStart(1,50,100,0,0,0,0)III/b/f
	Receive frame	/f/bIII4III971III1III1III/b/f

8.58 WireSearchEnd()

Wire positioning is complete.

Table 8-58 WireSearchEnd() Directive protocol

	order	type	name	description
parameter	1	uint8_t	refPos	1-reference point, 0-contact point
	2	float	search_vel	Location speed, unit:%
	3	int	search_dis	Position distance, unit: mm
	4	uint8_t	autoback_flag	Automatic return flag, 0-not automatic, 1-automatic
	5	float	autoback_vel	Automatic return speed, unit:%
	6	int	autoback_dis	Automatic return distance, unit: mm
	7	uint8_t	offsetFlag	1-offset seeking, 0-teaching point seeking
returned value		int	errcode	Error code
Command number	972			
instance	Send the frame	/f/bIII4III972III31IIIWireSearchEnd(1,50,100,0,0,0,0)III/b/f		
	Receive frame	/f/bIII4III972III1III1III/b/f		

8.59 WireSearchWait()

Waiting for location to be completed.

Table 8-59 WireSearchWait() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code

Command number	974	
instance	Send the frame	/f/bIII4III974III16IIIWireSearchWait()III/b/f
	Receive frame	/f/bIII4III974III1III1III/b/f

8.60 ArcWeldTraceControl()

Arc tracking control.

Table 8-60 ArcWeldTraceControl() Directive protocol

	order	type	name	description
parameter	1	int	flag	Switch, 0-off, 1-on
	2	double	delayTime	Delay time, unit ms
	3	int	isleftright	Left deviation compensation
	4	double	klr	Left and right adjustment coefficients (sensitivity)
	5	double	tstartlr	Start compensating time cyc on the left
	6	double	stepmaxlr	Maximum compensation per side mm
	7	double	summaxlr	The maximum total compensation is mm
	8	int	isuplow	Upper deviation compensation
	9	double	kud	Upper and lower adjustment coefficients (sensitivity)
	10	double	tstartud	The upper and lower parts begin to compensate for the time cyc
	11	double	stepmaxud	The maximum compensation per time is mm
	12	double	summaxud	The maximum total compensation is mm
	13	int	axisselect	Select the upper and lower coordinate system, 0 for swing, 1 for tool, and 2 for

				base
	14	int	reference_type	The upper and lower reference current setting method is 0-feedback, 1-constant
	15	double	referSampleStartud	The upper and lower reference current sampling starts counting (feedback), in units of cyc
	16	double	referSampleCountud	Upper and lower reference current sampling cycle count (feedback), unit cyc
	17	double	reference_current	The upper and lower reference current is mA
	18	int	offsetType	The type of bias tracking is 0 for no bias, 1 for sampling, and 2 for percentage
	19	int	offsetValue	Offset sampling start time / offset percentage (-100%, +100%)
returned value		int	errcode	Error code
Command number	686			
instance	Send the frame	/f/bIII4III686III58IIIArcWeldTraceControl(0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0)III/b/f		
	Receive frame	/f/bIII4III686III1III1III/b/f		

8.61 ArcWeldTraceExtAIChannelConfig()

Arc tracking expands AI channel selection.

Table 8-61 ArcWeldTraceExtAIChannelConfig() Directive protocol

	order	type	name	description
parameter	1	uint8_t	channel	Arc tracking extends the AI channel selection, and the channel range is 0-3
returned value		int	errcode	Error code
Command number	691			
instance	Send the frame	/f/bIII4III691III33IIIArcWeldTraceExtAIChannelConfig(0)III/b/f		
	Receive frame	/f/bIII4III691III1III1III/b/f		

8.62 ArcWeldTraceReplayStart()

Arc tracking, multi-layer and multi-channel compensation enabled.

Table 8-62 ArcWeldTraceReplayStart() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	986			
instance	Send the frame	/f/bIII4III986III25IIIArcWeldTraceReplayStart()III/b/f		
	Receive frame	/f/bIII4III986III1III1III/b/f		

8.63 ArcWeldTraceReplayEnd()

Arc tracking, multi-layer and multi-channel compensation is closed.

Table 8-63 ArcWeldTraceReplayEnd() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	987			
instance	Send the frame	/f/bIII4III987III23IIIArcWeldTraceReplayEnd()III/b/f		
	Receive frame	/f/bIII4III987III1III1III/b/f		

8.64 SetWireSearchExtDIONum()

Set the extended IO welding wire location port.

Table 8-64 SetWireSearchExtDIONum() Instruction protocol

	order	type	name	description
parameter	1	int	searchDoneDINum	Wire positioning successfully expanded DI port (0-127)
	2	int	searchStartDO	Welding wire location start and stop

			Num	control extended DO port (0-127)
returned value		int	errcode	Error code
Command number	1036			
instance	Send the frame	/f/bIII4III1036III27IIISetWireSearchExtDIONum(0,1)III/b/f		
	Receive frame	/f/bIII4III1036III1III1III/b/f		

8.65 SetWeldMachineCtrlModeExtDoNum()

Set the expansion IO welding machine as a one-element and control the DO port separately.

Table 8-65 SetWeldMachineCtrlModeExtDoNum() Directive protocol

	order	type	name	description
parameter	1	int	ctrlModeDONum	Switch the welding machine control mode to DO port number
returned value		int	errcode	Error code
Command number	1037			
instance	Send the frame	/f/bIII4III1037III33IIISetWeldMachineCtrlModeExtDoNum(2)III/b/f		
	Receive frame	/f/bIII4III1037III1III1III/b/f		

8.66 SetWeldMachineCtrlMode()

Set the welding machine as one and control it separately.

Table 8-66 SetWeldMachineCtrlMode() Directive protocol

	order	type	name	description
parameter	1	int	ctrlMode	Welding machine control mode; 0-one yuan mode; 1-separate mode
returned value		int	errcode	Error code
Command number	1038			

instance	Send the frame	/f/bIII4III1038III25IIISetWeldMachineCtrlMode(0)III/b/f
	Receive frame	/f/bIII4III1038III1III1III/b/f

8.67 WeldingSetCheckArcIterruptionParam()

Set the arc interruption detection configuration parameters.

Table 8-67 WeldingSetCheckArcIterruptionParam() Directive protocol

	order	type	name	description
parameter	1	uint8_t	checkEnable	Whether to enable arc interruption detection 0-disable 1-enable
	2	uint16_t	arcInterruptTimeLength	Arc interruption confirmation duration (ms) range: 20 ~ 1000
returned value		int	errcode	Error code
Command number	802			
instance	Send the frame	/f/bIII43III802III41IIIWeldingSetCheckArcIterruptionParam(1,500)III/b/f		
	Receive frame	/f/bIII43III802III1III1III/b/f		

8.68 WeldingGetCheckArcIterruptionParam()

Get arc interruption detection configuration parameters.

Table 8-68 WeldingGetCheckArcIterruptionParam() Directive protocol

	order	type	name	description
returned value	1	uint8_t	checkEnable	Whether to enable arc interruption detection 0-disable 1-enable
	2	uint16_t	arcInterruptTimeLength	Arc interruption confirmation duration (ms) range: 20 ~ 1000
Command number	803			
instance	Send the frame	/f/bIII44III803III41IIIWeldingGetCheckArcIterruptionParam(1,500)III/b/f		
	Receive frame	/f/bIII44III803III1III1III/b/f		

8.69 WeldingSetReWeldAfterBreakOffParam()

Set the parameters for interrupting and reconnecting the original weld path.

Table 8-69 WeldingSetReWeldAfterBreakOffParam() Directive protocol

	order	type	name	description
parameter	1	uint8_t	reWeldEnable	Enabled, 0-not enabled, 1-enabled
	2	float	length	Weld overlap length (mm)
	3	float	velocity	Speed of the robotic arm returning from its current position to the arc starting position (%) speed percentage
	4	uint8_t	moveType	The robot arm returns from the current position and moves to the arc position. Motion type 0: Line 1: P2P
returned value		int	errcode	Error code
Command number	804			
instance	Send the frame	/f/bIII4III804III45IIIWeldingSetReWeldAfterBreakOffParam(1,20,50,0)III/b/f		
	Receive frame	/f/bIII4III804III1III1III/b/f		

8.70 WeldingGetReWeldAfterBreakOffParam()

Get the original weld interruption reconnection parameters.

Table 8-70 WeldingGetReWeldAfterBreakOffParam() Directive protocol

	order	type	name	description
returned value	1	uint8_t	reWeldEnable	Enabled, 0-not enabled, 1-enabled
	2	float	length	Weld overlap length (mm)
	3	float	velocity	Speed of the robotic arm returning from its current position to the arc position (%) speed percentage
	4	uint8_t	moveType	The robot arm returns from the current position and moves to the arc position.

		Motion type 0: Line 1: P2P
Command number	805	
instance	Send the frame	/f/bIII818III805III36IIIWeldingGetReWeldAfterBreakOffParam()III/b/f
	Receive frame	/f/bIII818III805III21III0,0.000000,0.000000,0III/b/f

8.71 WeldingStartReWeldAfterBreakOff()

Perform the welding reconnection operation.

Table 8-71 WeldingStartReWeldAfterBreakOff() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	806			
instance	Send the frame	/f/bIII4III806III33IIIWeldingStartReWeldAfterBreakOff()III/b/f		
	Receive frame	/f/bIII4III806III1III1III/b/f		

8.72 WeldingAbortWeldAfterBreakOff()

The welding is terminated after the original weld is broken.

Table 8-72 WeldingAbortWeldAfterBreakOff() Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	807			
instance	Send the frame	/f/bIII4III807III31IIIWeldingAbortWeldAfterBreakOff()III/b/f		
	Receive frame	/f/bIII4III807III1III1III/b/f		

8.73 WeldingSetCurrertRelation()

Set the corresponding relationship between welding current and output analog

quantity.

Table 8-73 WeldingSetCurrertRelation() Directive protocol

	order	type	name	description
parameter	1	float	currentMin	Welding current-linear relationship between analog and quantity of left point current value (A)
	2	float	currentMax	Welding current-analog linear relationship right side point current value (A)
	3	float	outputVoltage Min	Welding current-Linear relationship between analog and linear voltage value (V) at the left point of the analog output (0 ~ 10)
	4	float	outputVoltage Max	Welding current-linear relationship between analog and voltage value (V) at the right side of the point (0 ~ 10)
	5	uint8_t	AOIndex	AO number (optional)
returned value		int	errcode	Error code
Command number	827			
instance	Send the frame	/f/bIII4IIII827III44IIIWeldingSetCurrertRelation(2.5,1.0,5.0,2.0,1)III/b/f		
	Receive frame	/f/bIII4IIII827III1III1III/b/f		

8.74 WeldingSetVoltageRelation()

Set the corresponding relationship between welding voltage and output analog quantity.

Table 8-74 WeldingSetVoltageRelation() Directive protocol

	order	type	name	description
parameter	1	float	weldVoltageMi n	Welding voltage-analog linear relationship left point current value (V)
	2	float	weldVoltageMa	Welding voltage-analog linear relationship right side point current value

			x	(V)
	3	float	weldVoltageoutputVoltageMin	Welding voltage-analog linear relationship left point analog output voltage value (V) (0 ~ 10)
	4	float	weldVoltageoutputVoltageMax	Welding voltage-analog linear relationship right point analog output voltage value (V) (0 ~ 10)
	5	uint8_t	AOIndex	AO number (optional)
returned value		int	errcode	Error code
Command number	828			
instance	Send the frame	/f/bIII4III828III46IIIWeldingSetVoltageRelation(2.50,1.00,5.0,2.0,1)III/b/f		
	Receive frame	/f/bIII4III828III1III1III/b/f		

8.75 WeldingGetCurrertRelation()

Obtain the corresponding relationship between welding current and output analog quantity.

Table 8-75 WeldingGetCurrertRelation() Directive protocol

	order	type	name	description
returned value	1	float	currentMin	Welding current-linear relationship between analog and quantity of left point current value (A)
	2	float	currentMax	Welding current-analog linear relationship right side point current value (A)
	3	float	outputVoltageMin	Welding current-linear relationship between analog quantity The output voltage value (V) on the left side of the analog quantity (0 ~ 10)
	4	float	outputVoltageMax	Welding current-linear relationship between analog and quantity The output voltage value (V) of the analog quantity on the right side (0 ~ 10)

	5	uint8_t	AOIndex	AO number
Command number	829			
instance	Send the frame	/f/bIII4III829III27IIIWeldingGetCurrertRelation()III/b/f		
	Receive frame	/f/bIII4III829III17III2.5,1.0,5.0,2.0,1III/b/f		

8.76 WeldingGetVoltageRelation()

Obtain the corresponding relationship between welding voltage and output analog quantity.

Table 8-76 WeldingGetVoltageRelation() Directive protocol

	order	type	name	description
returned value	1	float	weldVoltageMin	Welding voltage-analog linear relationship left point current value (V)
	2	float	weldVoltageMax	Welding voltage-analog linear relationship right side point current value (V)
	3	float	weldVoltageoutputVoltageMin	Welding voltage-analog linear relationship left point analog output voltage value (V) (0 ~ 10)
	4	float	weldVoltageoutputVoltageMax	Welding voltage-analog linear relationship right point analog output voltage value (V) (0 ~ 10)
	5	uint8_t	AOIndex	AO number (optional)
Command number	830			
instance	Send the frame	/f/bIII4III830III27IIIWeldingGetVoltageRelation()III/b/f		
	Receive frame	/f/bIII4III830III17III2.50,1.00,5.0,2.0,1III/b/f		

8.77 WeldingSetCurrert()

Set the welding current and the corresponding port number.

Table 8-77 WeldingSetCurrert() Directive protocol

	order	type	name	description
parameter	1	uint8_t	ioType	Whether to determine the protocol loading status, 0: no need, 1: yes
	2	float	currentValue	Welding current value (A)
	3	uint8_t	AOIndex	Welding current analog output port
	4	int	blend	0: Not smooth, 1: Smooth
returned value		int	errcode	Error code
Command number	831			
instance	Send the frame	/f/bIII4IIII831III26IIIWeldingSetCurrert(0,5,1,1)III/b/f		
	Receive frame	/f/bIII4IIII831III1III1III/b/f		

8.78 WeldingSetVoltage()

Set the welding voltage and corresponding port number.

Table 8-78 WeldingSetVoltage() Directive protocol

	order	type	name	description
parameter	1	uint8_t	ioType	Whether to determine the protocol loading status, 0: no need, 1: yes
	2	float	voltageValue	Welding voltage value (V)
	3	uint8_t	AOIndex	Welding current analog output port
	4	int	blend	0: Not smooth, 1: Smooth
returned value		int	errcode	Error code
Command number	832			
instance	Send the frame	/f/bIII4IIII832III28IIIWeldingSetVoltage(1,5.0,1,1)III/b/f		
	Receive frame	/f/bIII4IIII832III1III1III/b/f		

8.79 WeldingSetProcessParam()

Set welding process parameters.

Table 8-79 WeldingSetProcessParam() Directive protocol

	order	type	name	description
parameter	1	int	id	Welding process number
	2	float	startCurrent	striking current (A)
	3	float	startVoltage	striking voltage (V)
	4	float	startTime	arcing time (ms)
	5	float	weldCurrent	welding current (A)
	6	float	weldVoltage	Welding voltage (V)
	7	float	endCurrent	Arc current (A)
	8	float	endVoltage	Arc voltage (V)
	9	float	endTime	Arc closing time (ms)
returned value		int	errcode	Error code
Command number	967			
instance	Send the frame	/f/bIII4III967III54IIIWeldingSetProcessParam(1,10.0,5.0,1000,20,3.0,5.0,500)III/b/f		
	Receive frame	/f/bIII4III967III1III1III/b/f		

8.80 WeldingGetProcessParam()

Obtain welding process parameters.

Table 8-80 WeldingGetProcessParam() Directive protocol

	order	type	name	description
parameter	1	int	id	Welding process number
returned value	1	float	startCurrent	striking current (A)

	2	float	startVoltage	striking voltage (V)
	3	float	startTime	arcing time (ms)
	4	float	weldCurrent	welding current (A)
	5	float	weldVoltage	Welding voltage (V)
	6	float	endCurrent	Arc current (A)
	7	float	endVoltage	Arc voltage (V)
	8	float	endTime	Arc closing time (ms)
Command number	968			
instance	Send the frame	/f/bIII4III968III25IIIWeldingGetProcessParam(1)III/b/f		
	Receive frame	/f/bIII4III968III30III1,10.0,5.0,1000,20,3.0,5.0,500III/b/f		

8.81 ArcWeldTraceAIChannelCurrent()

Arc tracking welding current feedback AI channel selection。

Table8-81 ArcWeldTraceAIChannelCurrent()Directive protocol

	order	type	name	description
parameter	1	uint8_t	channel	0: expand AI0, 1: expand AI1, 2: expand AI2, 3: expand AI3, 4: control box AI0, 5: control box AI1
returned value		int	errcode	Error code
Command number	1176			
instance	Send the frame	/f/bIII4III1176III31IIIArcWeldTraceAIChannelCurrent(0)III/b/f		
	Receive frame	/f/bIII4III1176III1III1III/b/f		

8.82 ArcWeldTraceAIChannelVoltage()

Arc tracking welding machine voltage feedback AI channel selection。

Table8-82 ArcWeldTraceAIChannelVoltage()Directive protocol

	order	type	name	description
parameter	1	uint8_t	channel	0: expand AI0, 1: expand AI1, 2: expand AI2, 3: expand AI3, 4: control box AI0, 5: control box AI1
returned value		int	errcode	Error code
Command number	1177			
instance	Send the frame	/f/bIII4IIII1177III31IIIArcWeldTraceAIChannelVoltage(1)III/b/f		
	Receive frame	/f/bIII4IIII1177III1III1III/b/f		

8.83 ArcWeldTraceCurrentPara()

Arc tracking welding current feedback conversion parameter。

Table8-83 ArcWeldTraceCurrentPara()Directive protocol

	order	type	name	description
parameter	1	float	ailow	AI Channel lower limit, default value0V，range[0,10]V
	2	float	aiup	AI Channel upper limit, default value10V，range[0,10]V
	3	float	clow	AI The lower limit of the channel corresponds to the welding current value, which is the default value0A ，range[0,2000]A
	4	float	cup	AI The upper limit of the channel corresponds to the welding current value, which is the default value1000A ，range[0,2000]A
returned value		int	errcode	Error code
Command number	1178			
instance	Send the frame	/f/bIII4IIII1178III36IIIArcWeldTraceCurrentPara(0,10,0,1000)III/b/f		
	Receive frame	/f/bIII4IIII1178III1III1III/b/f		

8.84 ArcWeldTraceVoltagePara()

Arc tracking welding voltage feedback conversion parameter。

Table8-84 ArcWeldTraceVoltagePara()Directive protocol

	order	type	name	description
parameter	1	float	ailow	AI Channel lower limit, default value0V，range[0,10]V
	2	float	aiup	AI Channel upper limit, default value10V，range[0,10]V
	3	float	clow	AI The lower limit of the channel corresponds to the welding voltage value, which is the default value0V ，range[0,200]V
	4	float	cup	AI The upper limit of the channel corresponds to the welding current value, which is the default value 200V ，range[0,200]V
returned value		int	errcode	Error code
Command number	1179			
instance	Send the frame	/f/bIII4III1179III35IIIArcWeldTraceVoltagePara(0,10,0,200)III/b/f		
	Receive frame	/f/bIII4III1179III1III1III/b/f		

8.85 WeldingSetVoltageGradualChangeStart()

Start the welding voltage gradient setting。

Table8-85 WeldingSetVoltageGradualChangeStart()Directive protocol

	order	type	name	description
parameter	1	uint8_t	ioType	0-Control box IO; 1-Digital communication protocol (UDP)
	2	float	voltageStart	Starting voltage, unit V
	3	float	voltageEnd	End voltage, unit V

	4	uint8_t	aoIndex	Control box AO port number (0-1)
	5	int	blend	0-not smooth; 1-smooth
returned value		int	errcode	Error code
Command number	1180			
instance	Send the frame	/f/bIII4III1180III48IIIWeldingSetVoltageGradualChangeStart(0,0,200,0,0)III/b/f		
	Receive frame	/f/bIII4III1180III1III1III/b/f		

8.86 WeldingSetVoltageGradualChangeEnd()

Set the end of the welding voltage gradient。

Table8-86 WeldingSetVoltageGradualChangeEnd()Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1181			
instance	Send the frame	/f/bIII4III1181III35IIIWeldingSetVoltageGradualChangeEnd()III/b/f		
	Receive frame	/f/bIII4III1181III1III1III/b/f		

8.87 WeldingSetCurrentGradualChangeStart()

Start the welding current gradient setting。

Table8-87 WeldingSetCurrentGradualChangeStart()Directive protocol

	order	type	name	description
parameter	1	uint8_t	ioType	0-Control box IO; 1-Digital communication protocol (UDP)
	2	float	currentStart	Start current, unit A
	3	float	currentEnd	Stop the current, unit A
	4	uint8_t	aoIndex	Control box AO port number (0-1)

	5	int	blend	0-not smooth; 1-smooth
returned value		int	errcode	Error code
Command number	1182			
instance	Send the frame	/f/bIII4III1182III49IIIWeldingSetCurrentGradualChangeStart(0,0,1000,0,0)III/b/f		
	Receive frame	/f/bIII4III1182III1III1III/b/f		

8.88 WeldingSetCurrentGradualChangeEnd()

Set the end of the welding current gradient。

Table8-88 WeldingSetCurrentGradualChangeEnd()Directive protocol

	order	type	name	description
returned value		int	errcode	Error code
Command number	1183			
instance	Send the frame	/f/bIII4III1183III35IIIWeldingSetCurrentGradualChangeEnd()III/b/f		
	Receive frame	/f/bIII4III1183III1III1III/b/f		

8.89 WeldingSetCurrent()

Set the welding current and corresponding port number。

Table8-89 WeldingSetCurrent()Directive protocol

	order	type	name	description
parameter	1	uint8_t	ioType	0-Control box IO; 1-Digital communication protocol (UDP)
	2	float	current	Welding current value (A)
	3	uint8_t	AOindex	Welding current analog output port
	4	int	blend	0-not smooth; 1-smooth
returned value		int	errcode	Error code

Command number	1187	
instance	Send the frame	/f/bIII4III1187III28IIIWeldingSetCurrent(0,500,0,0)III/b/f
	Receive frame	/f/bIII4III1187III1III1III/b/f

8.90 WeldingSetVoltage()

Set the welding voltage and corresponding port number。

Table8-90 WeldingSetVoltage()Directive protocol

	order	type	name	description
parameter	1	uint8_t	ioType	0-Control box IO; 1-Digital communication protocol (UDP)
	2	float	voltage	Welding voltage value (V)
	4	uint8_t	AOIndex	Welding voltage analog output port
	5	int	blend	0-not smooth; 1-smooth
returned value		int	errcode	Error code
Command number	1188			
instance	Send the frame	/f/bIII4III1188III28IIIWeldingSetVoltage(0,100,0,0)III/b/f		
	Receive frame	/f/bIII4III1188III1III1III/b/f		

8.91 CustomWeaveSetPara()

Set custom weave parameters.

Table 8-91 CustomWeaveSetPara() Directive protocol

	order	type	name	description
parameter	1	uint8_t	customWeaveID	custom weave ID：0-2
	2	uint8_t	custormPointsNum	Number of weave points 2-10

	order	type	name	description
	3	float	custormPoints Data[30]	Moving endpoint data{x1,y1,z1,x2,y2,z2,…x10,y10,z10}
	4	int	custormStayTi me[10]	weave residence time ms
	5	float	custormFreque ncy	weave frequency Hz
	6	uint8_t	custormIncStay Time	Waiting mode: 0- Cycle does not include waiting time; 1- The cycle includes waiting time
	7	uint8_t	custormStation ary	weave position waiting: 0- Continue to move within the waiting time; The position remains stationary during the waiting time
returned value		int	errcode	Error code
Command number	1265			
instance	Send the frame	/f/bIII132III1265III121IIICustomWeaveSetPara(2,4,{-3,-3,0,-6,0,0,-3,3,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0},{0,0,0,0,0,0,0,0,0,0},1.000,0,0)III/b/f		
	Receive frame	/f/bIII132III1265III1III1III/b/f		

8.92 CustomWeaveGetPara()

Gets custom swing parameters.

Table 8-92 CustomWeaveSetPara() Directive protocol

	order	type	name	description
parameter	1	uint8_t	customWeaveI D	custom weave ID：0-2
returned value	1	uint8_t	custormPoints Num	Number of weave points 2-10
	2	float	custormPoints Data[30]	Moving endpoint data{x1,y1,z1,x2,y2,z2,…x10,y10,z10}
	3	int	custormStayTi me[10]	weave residence time ms
	4	float	custormFreque	weave frequency Hz

			ncy	
	5	uint8_t	custormIncStayTime	Waiting mode: 0- Cycle does not include waiting time; 1- The cycle includes waiting time
	6	uint8_t	custormStationary	weave position waiting: 0- Continue to move within the waiting time; The position remains stationary during the waiting time
Command number	1265			
instance	Send the frame	/f/bIII130III1266III21IIICustomWeaveGetPara(2)III/b/f		
	Receive frame	/f/bIII130III1266III320III{4},{-3.000000,-3.000000,0.000000,-6.000000,0.000000,0.000000,-3.000000,3.000000,0.000000},{0,0,0,0,0,0,0,0,0,0},{1.000000},{0},{0}III/b/f		

8.93 SetLaserWeldingStart()

Set the laser welder on/off.

Table8-93 SetLaserWeldingStart() instruction protocol

	order	type	name	description
parameter	1	uint8_t	io_type	communication type 0-IO 1-UDP
	2	uint8_t	status	control word 0-Light Collection 1-Light Emission
	3	int	max_waittime	maximum latency
returned value		int	errcode	Error code
Command number	1338			
instance	Send the frame	/f/bIII130III1338III31IIISetLaserWeldingStart(1,1,10000)III/b/f		
	Receive frame	/f/bIII130III1338III1III1III/b/f		

8.94 SetLaserWeldingEnable()

The laser welding machine enables this functionality.

Table8-94 SetLaserWeldingEnable() instruction protocol

	order	type	name	description
parameter	1	uint8_t	io_type	communication type 0-IO 1-UDP
	2	uint8_t	status	control word 0-Enable 1-Enable
returned value		int	errcode	Error code
Command number	1339			
instance	Send the frame	/f/bIII130III1339III26IIISetLaserWeldingEnable(1,1)III/b/f		
	Receive frame	/f/bIII130III1339III1III1III/b/f		

8.95 ResetLaserWeldingErr()

Laser welding machine fault reset.

Table8-95 ResetLaserWeldingErr() instruction protocol

	order	type	name	description
parameter	1	uint8_t	io_type	communication type 0-IO 1-UDP
	2	uint8_t	status	control word 0-Invalid 1-Fault reset
returned value		int	errcode	Error code
Command number	1340			
instance	Send the frame	/f/bIII130III1340III25IIIResetLaserWeldingErr(1,1)III/b/f		
	Receive frame	/f/bIII130III1340III1III1III/b/f		

8.96 GetLaserWeldingRunningState()

Obtain the operating status of the laser welder.

Table8-96 GetLaserWeldingRunningState() instruction protocol

	order	type	name	description
parameter	1	uint8_t	io_type	communication type 0-IO 1-UDP
returned value	1	uint8_t	status	0-Downtime 1-Running
Command number	1341			
instance	Send the frame	/f/bIII130III1341III30IIIGetLaserWeldingRunningState(1)III/b/f		
	Receive frame	/f/bIII130III1341III1III1III/b/f		

8.97 GetLaserWeldingErrState()

Obtain the fault status of the laser welder.

Table8-97 GetLaserWeldingErrState() instruction protocol

	order	type	name	description
parameter	1	uint8_t	io_type	communication type 0-IO 1-UDP
returned value	1	uint8_t	status	0-No fault 1-Fault exists
Command number	1342			
instance	Send the frame	/f/bIII130III1342III26IIIGetLaserWeldingErrState(1)III/b/f		
	Receive frame	/f/bIII130III1342III1III1III/b/f		

8.98 SetLaserWeldingParam()

Write the configuration parameters for one of the 10 process groups into the laser welding machine and apply them to the machine.

Table8-98 SetLaserWeldingParam() instruction protocol

	order	type	name	description

parameter	1	uint8_t	io_type	communication type 0-IO 1-UDP
	2	uint8_t	Num	Process Parameter Group Number
	3	uint16_t	scanSpeed	scanning speed
	4	uint16_t	scanWidth	run-length
returned value	5	uint16_t	peakPower	peak power
	6	uint16_t	dutyCycle	duty cycle
	7	uint32_t	Freq	frequency
		int	errcode	Error code
Command number	1343			
instance	Send the frame	/f/bIII130III1343III46IIISetLaserWeldingParam(1,1,2000,3,1500,100,1000)III/b/f		
	Receive frame	/f/bIII130III1343III1III1III/b/f		

8.99 GetLaserWeldingParamTarget()

Obtain the parameter set for the laser welding machine process.

Table8-99 GetLaserWeldingParamTarget() instruction protocol

	order	type	name	description
parameter	1	uint8_t	Num	Process Parameter Group Number
returned value	1	uint16_t	scanSpeed	scanning speed
	2	uint16_t	scanWidth	run-length
	3	uint16_t	peakPower	peak power
	4	uint16_t	dutyCycle	duty cycle
	5	uint32_t	Freq	frequency
Command number	1344			
instance	Send the frame	/f/bIII130III1344III29IIIGetLaserWeldingParamTarget(1)III/b/f		

	Receive frame	/f/bIII130III1344III20III2000,3,1500,100,1000III/b/f

8.100 GetLaserWeldingParamActual()

Obtain the actual process parameters of the laser welding machine.

Table8-100 GetLaserWeldingParamActual() instruction protocol

	order	type	name	description
parameter	1	uint8_t	io_type	communication type 0-IO 1-UDP
returned value	1	uint16_t	scanSpeed	scanning speed
	2	uint16_t	scanWidth	run-length
	3	uint16_t	peakPower	peak power
	4	uint16_t	dutyCycle	duty cycle
	5	uint32_t	Freq	frequency
Command number	1345			
instance	Send the frame	/f/bIII130III1345III29IIIGetLaserWeldingParamActual(1)III/b/f		
	Receive frame	/f/bIII130III1345III20III2000,3,1500,100,1000III/b/f		

8.101 SetLaserWeldingEnableExtDoNum()

The laser welding machine is equipped with extended IO, with the DO port enabled.

Table8-101 SetLaserWeldingEnableExtDoNum() instruction protocol

	order	type	name	description
parameter	1	int	DONum	The laser welding machine supports extended DO port numbers.
returned value		int	errcode	Error code

Command number	1346	
instance	Send the frame	/f/bIII130III1346III32IIISetLaserWeldingEnableExtDoNum(2)III/b/f
	Receive frame	/f/bIII130III1346III1III1III/b/f

8.102 SetLaserWeldingStartExtDoNum()

The laser welding machine is equipped with extended IO and has DO ports activated.

Table8-102 SetLaserWeldingStartExtDoNum() instruction protocol

	order	type	name	description
parameter	1	int	DONum	Extended DO port number for laser welding machine startup
returned value		int	errcode	Error code
Command number	1347			
instance	Send the frame	/f/bIII130III1347III31IIISetLaserWeldingStartExtDoNum(2)III/b/f		
	Receive frame	/f/bIII130III1347III1III1III/b/f		

8.103 SetLaserWeldingErrResetExtDoNum()

The laser welding machine features an extended IO port and a fault reset DO port.

Table8-103 SetLaserWeldingErrResetExtDoNum() instruction protocol

	order	type	name	description
parameter	1	int	DONum	Extended DO port number for fault reset of laser welding machines
returned value		int	errcode	Error code
Command number	1348			

instance	Send the frame	/f/bIII130III1348III34IIISetLaserWeldingErrResetExtDoNum(1)III/b/f
	Receive frame	/f/bIII130III1348III1III1III/b/f

8.104 SetLaserWeldingRunningStateExtDiNum()

Configure the extended DI for the laser welding machine's operating status (light emission state).

Table8-104 SetLaserWeldingRunningStateExtDiNum() instruction protocol

	order	type	name	description
parameter	1	int	DINum	Laser welding machine operating status (light emission status) extended DI port
returned value		int	errcode	Error code
Command number	1349			
instance	Send the frame	/f/bIII130III1349III38IIISetLaserWeldingRunningStateExtDiNum(1)III/b/f		
	Receive frame	/f/bIII130III1349III1III1III/b/f		

8.105 SetLaserWeldingErrStateExtDiNum()

Configure the fault status extension DI for the laser welding machine.

Table8-105 SetLaserWeldingErrStateExtDiNum() instruction protocol

	order	type	name	description
parameter	1	int	DINum	Laser welding machine fault status – Extended DI port
returned value		int	errcode	Error code
Command number	1350			
instance	Send the frame	/f/bIII130III1350III34IIISetLaserWeldingErrStateExtDiNum(1)III/b/f		
	Receive frame	/f/bIII130III1350III1III1III/b/f		

9 Robot communication instructions

9.1 Controller in slave mode

9.1.1 GetFieldBusConfig()

Get slave bus protocol parameters.

Table 9-1-1 GetFieldBusConfig() instruction protocol

	order	type	name	description
returned value	1	uint8_t	boardType	Card manufacturers 0-unidentified card 1-Ji Yuan
	2	uint8_t	protocolType	type 1-PN；2-CCLink； 3-Ethercat；4-EIP
	3	uint8_t	version	version
Command number	1208			
instance	Send the frame	/f/bIII4III1208III19IIIGetFieldBusConfig()III/b/f		
	Receive frame	/f/bIII4III1208III5III1,1,1III/b/f		

9.1.2 FieldBusSlaveWriteDO()

Set the slave DO from the slave mode.

Table 9-1-2 FieldBusSlaveWriteDO () instruction protocol

	order	type	name	description
parameter	1	uint8_t	DOStartIndex	Starting DO number
	2	uint8_t	writeNum	Write the quantity
	3	uint8_t[8]	status	Write the value array
returned value		int	errcode	Error code
Command number	1209			
instance	Send the frame	/f/bIII4III1209III31IIIFieldBusSlaveWriteDO(0,2,{1,1})III/b/f		

	Receive frame	/f/bIII4III1209III1III1III/b/f

9.1.3 FieldBusSlaveWriteAO()

Set the slave AO from the station mode.

Table 9-1-3 FieldBusSlaveWriteAO() instruction protocol

	order	type	name	description
parameter	1	uint8_t	AOStartIndex	Starting AO number
	2	uint8_t	writeNum	Write the quantity
	3	float[8]	status	Write the value array
returned value		int	errcode	Error code
Command number	1210			
instance	Send the frame	/f/bIII4III1210III31IIIFieldBusSlaveWriteDO(0,2,{1,1})III/b/f		
	Receive frame	/f/bIII4III1210III1III1III/b/f		

9.1.4 FieldBusSlaveReadDI()

Get slave DI from the slave mode.

Table 9-1-4 FieldBusSlaveReadDI() instruction protocol

	order	type	name	description
parameter	1	uint8_t	DIStartIndex	Start DI number
	2	uint8_t	writeNum	Read quantity
returned value	1	uint8_t[8]	status	Read the value array
Command number	1211			
instance	Send the frame	/f/bIII4III1211III24IIIFieldBusSlaveReadDI(0,2)III/b/f		
	Receive frame	/f/bIII4III1211III3III1,1III/b/f		

9.1.5 FieldBusSlaveReadAI()

Get slave AI from the slave mode.

Table 9-1-5 FieldBusSlaveReadAI() instruction protocol

	order	type	name	description
parameter	1	uint8_t	AIStartIndex	Start AI number
	2	uint8_t	writeNum	Read quantity
returned value	1	float[8]	status	Read the value array
Command number	1212			
instance	Send the frame	/f/bIII4IIII1212III24IIIFieldBusSlaveReadDI(0,2)III/b/f		
	Receive frame	/f/bIII4IIII1212III3III1,1III/b/f		

9.1.6 FieldBusSlaveWaitDI()

Wait for the slave DI in slave mode.

Table 9-1-6 FieldBusSlaveWaitDI() instruction protocol

	order	type	name	description
parameter	1	uint8_t	DIIndex	Wait for the DI number
	2	uint8_t[8]	status	Wait for the DI value
	3	int	waitMs	Time out (ms)，-1:waiting forever
returned value	1	int	errcode	0: success, -1: not connected, -2: waiting timeout
Command number	1213			
instance	Send the frame	/f/bIII4IIII1213III29IIIFieldBusSlaveWaitDI(0,1,1000)III/b/f		
	Receive frame	/f/bIII4IIII1213III1III0III/b/f		

9.1.7 FieldBusSlaveWaitAI()

Wait for the slave AI in slave mode.

Table 9-1-7 FieldBusSlaveWaitAI() instruction protocol

	order	type	name	description
parameter	1	uint8_t	AIIndex	Wait for the AI number
	2	uint8_t[8]	waitType	Wait for type 0: greater than, 1: less than
	3	float[8]	status	Wait for the AI value
	4	int	waitMs	Time out (ms)，-1:waiting forever
returned value		int	errcode	0: success, -1: not connected, -2: waiting timeout
Command number	1214			
instance	Send the frame	/f/bIII4III1214III33IIIFieldBusSlaveWaitDI(0,0,100,1000)III/b/f		
	Receive frame	/f/bIII4III1214III1III0III/b/f		

9.1.8 SetSlaveProtocol()

Set the protocol from the station.

Table 9-1-8 SetSlaveProtocol() instruction protocol

	order	type	name	description
parameter	1	uint8_t	enable	0: Do not start, 1: Start
	2	uint8_t	type	Protocol type: 1-Siemens, 2-CC-Link, 3-ethcatcat, 4-ethernet/IP
returned value		int	errcode	Error code
Command number	1222			
instance	Send the frame	/f/bIII4III1222III21IIISetSlaveProtocol(1,4)III/b/f		
	Receive frame	/f/bIII4III1222III1III0III/b/f		

9.2 Communication related instruction

9.2.1 SetAxleGenComEnable()

Set terminal universal communication function.

Table9-2-1 SetAxleGenComEnable() instruction protocol

	order	type	name	description
parameter	1	uint8_t	enable	0 disabled, 1 enabled. The PDO object dictionary compatible with devices and other endpoint open protocols is in use.
returned value		int	errcode	Error code
Command number	1305			
instance	Send the frame	/f/bIII4III1305III24IIISetAxleGenComEnable(1)III/b/f		
	Receive frame	/f/bIII4III1305III1III0III/b/f		

9.2.2 SetRobotStopOnComDisc()

Set the parameter to stop the robot when port communication is disconnected.

Table9-2-2 SetRobotStopOnComDisc() instruction protocol

	order	type	name	description
parameter	1	int	comType	Port type：0-8080；1-8083；2-20002；3-20004
	2	int	flag	0-Off; 1-On
	3	int	confirmTime	Communication disconnection confirmation duration (ms) [0-5000]
returned value		int	errcode	Error code
Command number	1313			
instance	Send the frame	/f/bIII4III1313III33IIISetRobotStopOnComDisc(0,1,1000)III/b/f		
	Receive frame	/f/bIII4III1313III1III0III/b/f		

9.2.3 GetRobotStopOnComDisc()

Stop the robot operation when port communication is disconnected.

Table9-2-3 GetRobotStopOnComDisc() instruction protocol

	order	type	name	description
parameter	1	int	comType	Port type；0-8080；1-8083；2-20002；3-20004
returned value	1	int	flag	0-Off; 1-On
	2	int	confirmTime	Communication disconnection confirmation duration (ms) [0-5000]
Command number	1314			
instance	Send the frame	/f/bIII4III1314III26IIIGetRobotStopOnComDisc(0)III/b/f		
	Receive frame	/f/bIII4III1314III3III0,0III/b/f		

10 Robot instruction interface error code

Table 10-1 Controller error code

Error code	description	process mode
0	success	
3	The number of parameters is abnormal	Check the number of interface parameters
4	The parameter value is abnormal	Check the type or range of parameter values
5	The tpd timer failed to start	Check the TPD timer parameter Settings
6	The tpd timer failed to close	Check the TPD timer parameter Settings
7	The tpd file creation failed	Check the TPD file name
8	The tpd file does not exist	Check whether the TPD trajectory file exists or whether the trajectory name is correct
9	The tpd file name was not sent successfully	Check that the TPD track name is correct
10	The content of tpd file is sent failed	Check that the TPD file is correct
11	The program is abnormal and parsing stops	Check the contents of the procedure and the instructions executed when the procedure terminates
12	The contents of the tpd file are inconsistent	Check the contents of the TPD file
13	The number of points in the tpd file is abnormal	Check the contents of the TPD file
14	The instruction execution failed	Check whether the web interface is faulty or whether the status feedback is faulty
15	The number of tpd record points is out of limit	Re-record
16	The agreement has been loaded	Do not reload the protocol repeatedly
17	The agreement is not loaded	Please load the protocol first
18	The program is running	Stop the program before proceeding with other operations
19	The posture sensor communication is abnormal	Check the connection between the robot and the sensor network and the loading of the sensor protocol
20	The tool is not set for welding	Swing welding requires the tool coordinate system to be set with a tool number other than 0
21	The external shaft is not deactivated	Please remove the active extension shaft first
22	The three-point method does not set up the tool	Please set the tool coordinate system first
23	Position sensor data acquisition failed	Check the connection between the robot and the sensor network and the loading of the sensor protocol
24	Eight-point method-the first four points have too much posture change	Please reduce the value of the first four points of attitude change
25	Calculation failed	Redeploy or re-identify
26	Eight-point method-not switched to the base coordinate system	Please switch to the base coordinate system (tool coordinate system with tool number 0) first
27	Eight-point method-the	Please re-calibrate

	calculation result is abnormal	
28	The results of inverse kinematics calculation are abnormal	Check whether the position is reasonable
29	ServoJ Joint overlimit	Check that the joint data is within a reasonable range
30	If the reset fails, please restart	Please disconnect the power and restart the control box
31	If the emergency stop button is released, please disconnect power and restart the control box	Please disconnect power and restart the control box
32	Joint over-limit	Switch to drag mode and move the joint into the soft limit range
33	The external axis is not at zero, and the guide and resolution settings fail	Please check the external shaft setting
34	Workpiece number error	Please check whether the workpiece number is reasonable
35	Please switch to workpiece number 0	Please switch to the workpiece coordinate system of workpiece number 0
36	The file name is too long	Please reduce the length of the file name
37	Tool number error	Please check whether the tool number is reasonable
38	Strange posture	Please change your posture
39	socket The name is invalid	Please check the Socket name
40	Speed percentage exceeds limit	Check whether the speed percentage is reasonable
41	The external shaft has not returned to zero	Please check the external shaft setting
42	The posture changes too much	Insert intermediate postures for transition
43	The conveyor belt detection switch DI is not configured	Please configure the conveyor belt DI detection port
44	The robot's attitude Angle is out of limit	Please check the target posture setting
45	The external axis is not activated	Please check the external shaft setting
46	The synchronization function requires calibration of the external axis	Please check the external shaft setting
47	The external driver information configuration failed	Please check the external shaft setting
48	The external shaft drive information configuration timeout occurred	Please check the external shaft setting
49	External shaft error cannot be enabled	Please check the status of the external shaft
50	Failed to obtain information from the external axis driver	Please check the status of the external shaft
51	The external shaft driver information acquisition timeout	Please check the status of the external shaft

52	The synchronization function cannot be used for single-step operation	Please check the external shaft setting
59	The force/torque sensor is not activated	Stimulate the activity sensor
60	The reference coordinate system of the force/torque sensor has not been switched to the tool	Switch the force sensor coordinate system to the tool
61	The force/torque sensor is not set to zero	Please set the zero point of force/torque sensor first
62	The load of the torque sensor is not set to zero	Please first reset the load of the force/torque sensor
63	Failed to obtain system time	Contact the after-sales engineer to view the controller log
64	Not added to instruction queue	Contact the after-sales engineer to view the controller log
66	The midpoint 1 of the circular/spiral instruction is incorrect	Check whether the data at midpoint 1 is correct
67	The midpoint 2 of the circular/spiral instruction is incorrect	Check whether the data at midpoint 2 is correct
68	The midpoint of the circular/spiral instruction 3 is incorrect	Check whether the data at the midpoint 3 is correct
69	The midpoint of the arc instruction is incorrect	Check that the midpoint data is correct
70	The target point of the arc instruction is incorrect	Check whether the target point data is correct
73	Claw movement error	Check whether the communication status of the clamp is normal
74	The linear command point is incorrect	Check whether the checkpoint data is correct
75	Channel error	Check that the IO number is within the range
76	Waiting for timeout	Check whether the IO signal is input or whether the wiring is correct
82	TPD instruction point error	Re-record the teaching path
83	The TPD directive tool is not compatible with the current tool	Change to the tool coordinate system used for TPD teaching
84	Weld seam location failed	Please check the laser sensor parameter configuration to ensure that the sensor can identify the weld seam
85	Line directive error	Please check whether the position parameters of the instruction point, tool number and workpiece number are configured
90	External axis configuration file check failed	Contact the after-sales engineer to check the controller log
91	The version of the peripheral configuration file does not match	Contact the after-sales engineer to view the controller log
92	The peripheral configuration file is read failed	Contact the after-sales engineer to view the controller log
93	The number of spline instruction points is out of	Please reduce the number of spline instruction points

	limit	
94	The spline instruction point is incorrect	Check whether the checkpoint data is correct
95	The spline parameters are incorrect	Check whether the spline parameters are reasonable
96	Wire positioning failed	Please check the welding wire location parameter configuration
97	The data recorded is empty	Please line up for data recording
98	The main program is not configured	Please configure the main program first
99	The security stop has been triggered	Please check the status of the safety stop signal
100	The job origin has not been configured	Please configure the origin of the job first
101	The robot is not enabled	Please enable the robot first
106	The external shaft is not enabled	Enable the external shaft first
108	The starting point of the helix command is incorrect	Check that the starting point data is correct
110	Please close the drag configuration-impedance callback to enter the interference area	Please close the drag configuration to enter the interference area
111	Please turn off the drag teaching lock free degree function	Please turn off the drag teaching lock freedom function
112	The positioning posture cannot be reached	Check whether the target position is reasonable
114	The DMP instruction point is incorrect	Please check the value of the DMP instruction position
115	Circular motion instruction point error	Please check the target point information of circular motion
116	The extended axis peripheral communication driver is not loaded	Please load the extension shaft communication first
118	The load weight of the force sensor is incorrect	Please check the load weight parameter value under the force sensor
119	The load center of gravity is wrong under the force sensor	Please check the position parameter value of the load center of mass under the force sensor
120	The trajectory command point is incorrect	Please check the trajectory command point
121	The number of trajectory points is 0	Please check the trajectory command point
122	Joint torque exceeds limit	Please check whether the current robot load is too large
123	Please exit the drag mode first	Please exit the drag mode
124	The extended axis parameters are not configured	Please configure the extended axis parameters first
125	Recovery of welding failed-the original program failed	Contact the after-sales engineer to view the controller log
126	Recovery welding failed-unable to obtain the	Contact the after-sales engineer to view the controller log

	restart arc point	
127	Restore welding failed-unable to generate restore program	Contact the after-sales engineer to view the controller log
128	Not in manual mode / stopped	Please switch to manual mode
129	Please switch to the new dynamics mode first	Please switch to the new dynamics mode first
130	The point table does not exist	Check whether the name of the checkpoint is correct
133	Please switch to drag mode / force sensor assisted drag mode first	Please switch to drag mode / force sensor assisted drag mode first
134	The force/torque sensor is unloaded	Check the load of the force/torque sensor
135	The inverse of the matrix of the force/torque sensor is abnormal	Contact the after-sales engineer to view the controller log
138	The detection switch DI is not configured	Please first configure the DI port of the detection switch
139	Please apply the extended axis coordinate system first	Please apply the extended axis coordinate system with a number other than 0 first
140	Please activate the current extension axis first	Please activate the current extension axis first
143	The teaching point information does not exist	Please check that the teaching point information exists
144	The LUA file does not exist	Please check whether the LUA file exists
151	The joint configuration changed	Please check whether the joint configuration of the target position and the current position has changed
152	The spacing between welding instruction points is too small	Check whether the distance between the welding instruction point and the current point is too small
153	The spacing between arc instructions is too small	Please check the spacing of arc instruction points
154	The joint command point is incorrect	Please check the target point information of the instruction
155	The background program failed to start	Please check the content of the background program
156	The background program failed to pause	Contact the after-sales engineer to view the controller log
157	The background program failed to resume	Contact the after-sales engineer to check the controller log
158	The background program deletion failed	Contact the after-sales engineer to view the controller log
159	The number of background programs running exceeds 8	Please check the number of background programs running
160	The speed profile validation failed	Contact the after-sales engineer to view the controller log
161	Load profile validation failed	Contact the after-sales engineer to check the controller log
162	The extended axis in laser tracking cannot move asynchronously	Please adjust the extension shaft movement to synchronous movement
163	The welding procedure contains multiple while	Multiple while nesting cannot be restored from welding interruption

	statements	
164	Segment welding information not returned	Please set the segment welding information
165	CNC communication error	Check CNC communication
166	CNC timeout	CNC timeout
167	CNC communication connection timed out	Check CNC communication
168	The number of monitored numeric variables exceeds the limit.	Check the number of monitored numeric variables
169	The number of character variables exceeds the limit.	Check the number of monitored character variables
170	Workpiece coordinate system not applied	Please check the workpiece coordinate system
171	All joints must be moved within the soft limit range	Please check the joint soft limits
172	Motion speed cannot be 0	Motion speed cannot be 0
173	Acceleration smoothing must be enabled for extended axis Blend motion	Acceleration smoothing must be enabled for extended axis Blend motion
174	Current robot model does not support this function	Current robot model does not support this function
175	Socket not configured	Please configure socket connection information
176	Socket communication connected	Socket communication is connected
177	Socket communication not connected	Please check the socket connection
178	Firmware version too high, current software version not supported	Firmware version is too high, current software version does not support it
179	Firmware version too low, current software version not supported	Firmware version is too low, current software version does not support it
180	G-code file cannot be opened	Contact after-sales engineer to check controller logs
181	G-code parsing failed	Contact after-sales engineer to check controller logs
182	Given physical speed exceeds limit	Contact after-sales engineer to check controller logs
183	Given physical acceleration exceeds limit	Contact after-sales engineer to check controller logs
184	External axis enable failed	Contact after-sales engineer to check controller logs
185	Motion stopped by error signal	Contact after-sales engineer to check controller logs
186	Motion stopped by emergency stop signal	Contact after-sales engineer to check controller logs
187	Collision level too low	Contact after-sales engineer to check controller logs
188	Force control and impedance control both enabled	Force control and impedance control are both enabled
189	Kernel upgrade version verification failed	Contact after-sales engineer to check controller logs
190	Kernel version upgrade failed	Contact after-sales engineer to check controller logs

191	Linear rack guide not activated	Linear rack guide is not activated
192	Current linear rack guide collision detection is only for upright installation	Current linear rack guide collision detection is only for upright installation
193	Torque control speed exceeds limit	Contact after-sales engineer to check controller logs
194	Torque control power exceeds limit	Contact after-sales engineer to check controller logs
195	FR30L base tilt angle must be 0	FR30L base tilt angle must be 0