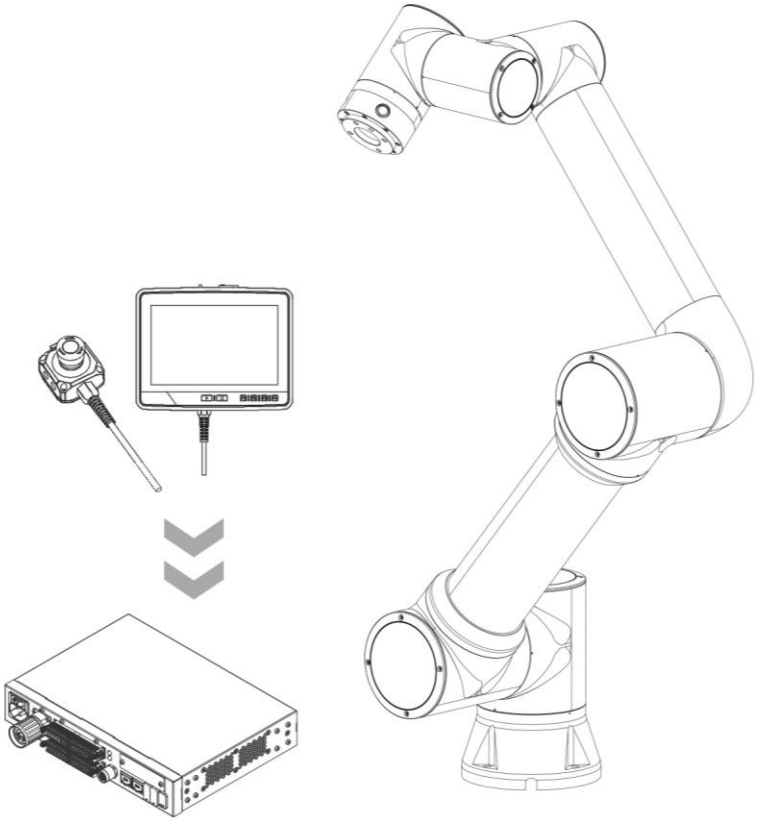
FAIRINO

COLLABORATIVE ROBOT 8083 PORT STATUS FEEDBACK（V3.9.6）

User Manual



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Data Encoding 20200310

Contents

1 Overview of the robot 8083 port status feedback

The user can establish a connection with the 8083 port of the robot controller through TCP/TP, and the 8083 port sends a data frame every 100ms by default after the connection is established, and the data frame contains some real-time status feedback data of the robot for the user's use, and the communication topology diagram is shown in Figure 1-1. In addition, the status feedback cycle is user-configurable, and the status feedback sending cycle of port 8083 can be set in the system settings-> maintenance mode, and the setting range is 8-100ms. As shown in Figure 1-2.

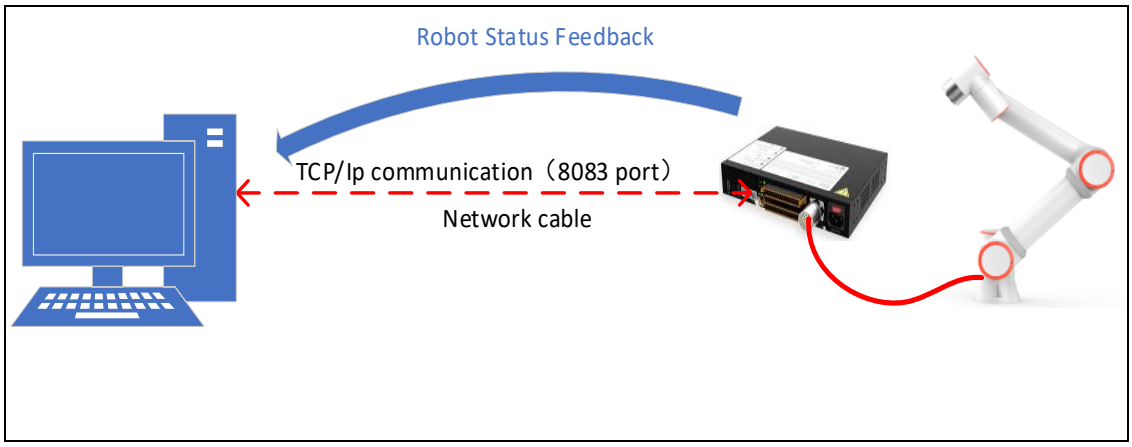

Figure 1-1 Topology of the robot 8083 port status feedback communication

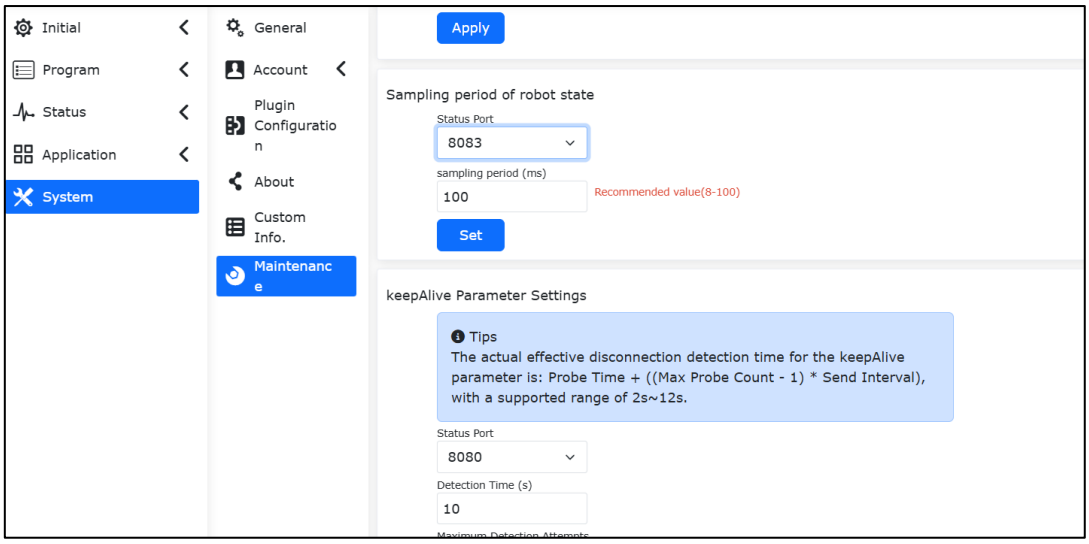

Figure 1-2 Setting the status feedback cycle of port 8083 of the robot

2 Port 8083 Status Feedback Operation Instructions

2.1 Communication protocol format definition

Table 2-1 describes the data frame format of port 8083, which can be unpacked and verified in the following formats:

Table 2-1 Port 8083 data feedback protocol format

Frame Header	Frame Count	The Length of The Data	Data Content	Sum Check
0x5A5A	CNT	LEN	DATA	CHECKSUM

Each of these items is described in detail:

（1） Frame Header: The convention is 0x5A5A, and the data format is uint16_t

（2） Frame Count: Loop count 0-255, data format uint8_t

（3） Data Length: The length of the data content, the data format, uint16_t

（4） Data content: The real-time status feedback data of the robot, see section 2.2 for a detailed description

（5） Sum check: Sum all bytes from the frame header to the data content, and the data format is uint16_t

2.2 Description of the 8083 port status feedback data

2.2.1 A summary table of data contents

After the data frame verification is completed, the state feedback data of the robot at the current moment can be obtained according to the data content, and the specific data content summary table is shown in Table 2-2.

Table 2-2 Port 8083 status data content is summarized

Serial Number	Name	Variable Name	Data Type	Number of Bytes	Detailed Description
1	The running status of the program	program_state	uint8_t	1	1 - Stop; 2 - Run; 3- Suspended; 4- Drag
2	Fault codes	error_code	uint8_t	1	Table 2-3 describes the error code
3	Robot mode	robot_mode	uint8_t	1	0 - automatic mode, 1 - manual mode; 2- Drag mode
4	1 axis current joint position	jt_cur_pos[0]	double	8	[deg]
5	2-axis current joint position	jt_cur_pos[1]	double	8	[deg]
6	3. The current joint position of the axis	jt_cur_pos[2]	double	8	[deg]
7	4-axis current joint position	jt_cur_pos[3]	double	8	[deg]

Table 2-2 (continued)

Serial Number	Name	Variable Name	Data Type	Number of Bytes	Detailed Description
7	4-axis current joint position	jt_cur_pos[3]	double	8	[deg]
8	5 axis current joint position	jt_cur_pos[4]	double	8	[deg]
9	6 axis current joint position	jt_cur_pos[5]	double	8	[deg]
10	The tool's current position x	tl_cur_pos[0]	double	8	[mm]
11	The current position of the tool y	tl_cur_pos[1]	double	8	[mm]
12	The tool's current position z	tl_cur_pos[2]	double	8	[mm]

Table 2-2 (continued)

Serial Number	Name	Variable Name	Data Type	Number of Bytes	Detailed Description
13	Tool current pose a	tl_cur_pos[3]	double	8	[deg]
14	Tool current pose b	tl_cur_pos[4]	double	8	[deg]
15	Tool's current pose c	tl_cur_pos[5]	double	8	[deg]
16	Tool number	toolNum	int	4	-
17	1 axle current torque	jt_cur_tor[0]	double	8	[N·m]
18	2-axis current torque	jt_cur_tor[1]	double	8	[N·m]
19	3-axis current torque	jt_cur_tor[2]	double	8	[N·m]
20	Current torque on 4 axes	jt_cur_tor[3]	double	8	[N·m]

Table 2-2 (continued)

Serial Number	Name	Variable Name	Data Type	Number of Bytes	Detailed Description
21	5-axis current torque	jt_cur_tor[4]	double	8	[N·m]
22	6-axis current torque	jt_cur_tor[5]	double	8	[N·m]
23	Name of the running program	program_name[20]	char	20	-
24	The total number of rows running the program	prog_total_line	uint8_t	1	-
25	Run the current line of the program	prog_cur_line	uint8_t	1	-
26	The digital IO output of the control box is 15-8	cl_dgt_output_h	uint8_t	1	-
27	The digital IO output of the control box is 7-0	cl_dgt_output_l	uint8_t	1	-
28	The tool digital IO output is 7-0	tl_dgt_output_l	uint8_t	1	Only bit0-bit1 works

Table 2-2 (continued)

Serial Number	Name	Variable Name	Data Type	Number of Bytes	Detailed Description
29	The digital IO input of the control box is 15-8	cl_dgt_input_h	uint8_t	1	-
30	The digital IO input of the control box is 7-0	cl_dgt_input_l	uint8_t	1	-
31	The tool digital IO input is 7-0	tl_dgt_input_l	uint8_t	1	Only bit0-bit1 works
32	Force/Torque Transducer Data Fx	FT_data[0]	double	8	[N]
33	Force/Torque Sensor Data Fy	FT_data[1]	double	8	[N]
34	Force/Torque Transducer Data Fz	FT_data[2]	double	8	[N]
35	Force/Torque Transducer Data Tx	FT_data[3]	double	8	[N·m]
36	Force/Torque Transducer Data Ty	FT_data[4]	double	8	[N·m]

Table 2-2 (continued)

Serial Number	Name	Variable Name	Data Type	Number of Bytes	Detailed Description
37	Force/Torque Transducer Data Tz	FT_data[5]	double	8	[N·m]
38	Force/torque sensor activation status	FT_ActStatus	uint8_t	1	0 - reset, 1 - activate
39	Emergency stop signs	EmergencyStop	uint8_t	1	1 - emergency stop, 0 - none
40	Robot movement in place signal	robot_motion_done	int	4	1 - in place, 0 - not in place

Table 2-2 (continued)

Serial Number	Name	Variable Name	Data Type	Number of Bytes	Detailed Description
41	The jaw movement signals in place	gripper_motion_done	uint8_t	1	robotiq: 0-movement is not completed, 1-jaw stop (objects are touched during opening), 2-jaws stop (objects are touched during closing), 3-jaws stop (objects are not touched at the specified position); Huiling, Tianji: 0 - the movement is not completed, 1 - the movement is completed; Dahuan: 0-The movement is not completed, 1-The gripper stops (the object is not clamped), 2-The gripper stops (the object is clamped), 3-The object is clamped and dropped

Table 2-2 (continued)

Serial Number	Name	Variable Name	Data Type	Number of Bytes	Detailed Description
42	External servo drive ID	servo_id	uint8_t	1	Range[1~16]
43	External servo drive fault code	servo_errcode	int32_t	4	It is consistent with the robot-driven fault code
44	External Servo Drive Status (485)	servo_state	int32_t	4	bit0:0 - servo not enabled, 1 - servo enabled bit1: 0 - servo stopped, 1 - servo in operation bit2: 0 - positive limit not triggered, 1 - positive limit triggered bit3: 0 - negative limit not triggered, 1 - negative limit triggered bit4: 0 - positioning not completed, 1 - positioning completed bit5: 0 - zero return is not completed, 1 - zero return completed

Table 2-2 (continued)

Serial Number	Name	Variable Name	Data Type	Number of Bytes	Detailed Description
45	The current position of the external servo	servo_actual_pos	double	8	-
46	The current speed of the external servo	servo_actual_speed	float	4	-
47	The current torque of the external servo	servo_actual_torque	float	4	-
48	External Shaft (UDP) Out of Soft Limit Error	exaxis_out_slimit_error	uint8_t	1	-
49	External Axis (UDP) status	exaxis_status[4]	See Table 2-3 for details	116	For details, see the structure definition, which supports up to 4 axes
50	External Axis (UDP) activation flag	exaxis_active_flag	uint8_t	1	0 - inactive, 1 - activated

Table 2-2 (continued)

Serial Number	Name	Variable Name	Data Type	Number of Bytes	Detailed Description
51	External Axis (UDP) motion state	exaxis_motion_status	uint8_t	1	0 - Finished, 1 - In Motion, 2 - Suspended, 3 - Completed with Stoppage
52	Analog input to the control box	cl_analog_input[2]	uint16_t	4	0-4095
53	End analog input	tl_analog_input	uint16_t	2	0-4095
54	Analog output of the control box	cl_analog_output[2]	uint16_t	4	0-4095
55	End analogue output	tl_analog_output	uint16_t	2	0-4095
56	Wrong gripper number	gripper_fault_id	uint8_t	1	-
57	Gripper malfunction	gripper_fault	uint16_t	2	-
58	The gripper is active	gripper_active	uint16_t	2	-
59	Gripper position	gripper_position	uint8_t	1	-
60	Gripper speed	gripper_speed	int8_t	1	-

Table 2-2 (continued)

Serial Number	Name	Variable Name	Data Type	Number of Bytes	Detailed Description
61	Jaw current	gripper_current	int8_t	1	-
62	Gripper temperature	gripper_temp	int	4	-
63	Gripper voltage	gripper_voltage	int	4	-
64	The current number of turns of the rotary jaw	gripper_rotNum	float	4	-
65	The current speed of the rotating gripper	gripper_rotSpeed	uint8_t	1	percentage
66	The current moment of the rotating jaw	gripper_rotTorque	uint8_t	1	percentage
67	Primary fault code	main_errcode	int	4	-
68	Sub-fault codes	sub_errcode	int	4	-
69	Welding status	welding_state	See Table2-4	2	For details, see the definition of structure
70	SmartTool state	smartToolState	int	4	-

Table 2-2 (continued)

Serial Number	Name	Variable Name	Data Type	Number of Bytes	Detailed Description
71	Current tool coordinate system values	toolCoord[6]	double	48	-
72	Current workpiece coordinate system values	wobjCoord[6]	double	48	-
73	Current external tool coordinate system values	exToolCoord[6]	double	48	-
74	Current extended axis coordinate system values	exAxisCoord[6]	double	48	-
75	Current robot load weight	load	double	8	-
76	Current robot load center of mass	loadCog[3]	double	24	x、y、z

2.2.2 Data Content - Structure Definition

(1) The external axis (UDP) state structure is defined in Table 2-3 below

Table 2-3 Definition of the external axis (UDP) state structure

data type	The name of the variable	The meaning is explained in detail
double	exaxis_pos_back	External shaft position in mm
double	exaxis_speed_back	External shaft speed
int	exaxis_error_code	External shaft fault code
uint8_t	exaxis_rdy	Servo ready
uint8_t	exaxis_inpos	Servo in place
uint8_t	exaxis_alm	Servo alarm
uint8_t	exaxis_flerr	Follow the error
uint8_t	exaxis_nlimit	to the negative limit
uint8_t	exaxis_plimit	to the positive limit
uint8_t	exaxis_absofln	The driver 485 bus is disconnected
uint8_t	exaxis_oflin	The communication timed out, and the communication between the control card and the control box board 485 timed out
uint8_t	exaxis_home_status	The outer shaft is back to zero

(2) The welded structure is defined in Table 2-4 below

Table 2-4 Definition of the welded structure

Data type	The name of the variable	The meaning is explained in detail
uint8_t	breakOffState	Weld Interruption Status: 0 - Welding is not interrupted 1- The welding has been interrupted
uint8_t	weldArcState	Welding arc status: 0 - The arc is not interrupted 1- The arc has been interrupted

Appendix 1 Error Code Correspondence

When an alarm or fault occurs in the robot, the user can obtain the specific content of the current robot error in the "error code" data of the status feedback, as shown below. Appendix 1 Definition of robot error codes Fault Code Description

Appendix 1 Definition of error codes on port 8083

Fault codes	Illustrate
0	No faults
1	Drive failure
2	Failure to exceed the soft limit
3	Collision failures
4	Singular pose
5	Slave error
6	The command point is incorrect
7	IO error
8	The gripper is wrong
9	File error
10	The parameter is incorrect
11	The extension shaft exceeds the soft limit error
12	Joint configuration warnings