Mech-Mind User's Manual

Mech-Mind

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This section introduces the master-control program for YASKAWA robots and the procedure of setting up the communication with a robot through the program.

CHAPTER

YASKAWA SETUP INSTRUCTIONS

This section introduces the process of loading the robot master-control program onto a YASKAWA robot. The process consists of the following steps:

- Check Controller and Software Compatibility
- Setup the Network Connection
- Load the Program File
- Test Robot Connection

Please have a flash drive ready at hand.

Note: The flash drive must:

- Have a storage capacity smaller than 32 GB
- Be formatted to the FAT32 file system

1.1 Check Controller and Software Compatibility

Controller: YRC1000 and DX200

Note: The program is not fully tested on YRC1000 micro controller.

- Controller system software version:
 - YRC1000: no requirement
 - DX200: DN2.25.00A(US/CN)-00 or above
- Option function requirements: must have the MotoPlus and Ethernet functions enabled.

Note: The following instructions are based on YRC1000 controller. Details may differ for DX200 controller.

1.2 Setup the Network Connection

1.2.1 Hardware Connection

Plug the Ethernet cable into:

- An Ethernet port on the IPC
- · LAN2 (CN106) port on YRC1000 controller; CN104 port on DX200 controller

Note:

- LAN1 port on YRC1000 and CN105 port on DX200 are for connecting the teach pendant only.
- If LAN2 port is occupied, please use LAN3 (CN107) instead.

1.2.2 IP Configuration

To allow communication between the IPC and the robot controller, both must have an IP address in the same subnet. This means that the first three numbers of the IP addresses should be the same. For example, 192.168.100.1 and 192.168.100.2 are in the same subnet.

- 1. Press down MAIN MENU when powering on the controller to enter the maintenance mode.
- 2. Select SYSTEM \rightarrow SECURITY \rightarrow MANAGEMENT MODE.



3. Enter the password (the default password is sixteen 9 's), and then press on *Enter*.

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SYSTEM	Ĩ	SECURITY							
		MODE	****	*****					
FILE		C	Current Pass	sword=					
EX. MEMORY	, -								
MotoPlus APL	- ·]								
Hex Dec Bin			7	8	9	Clear			
A	A D		4	5	6	Back space			
В	B E		1	2	3	Cancel			
С		F	0	•	2	Enter			

4. Select SYSTEM \rightarrow SETUP \rightarrow OPTION FUNCTION \rightarrow LAN INTERFACE SETTING.

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SYSTEM			SYSTEM	SETUP			SYSTEM	OPTION FUNCTIO	N	
FILE	VERSION 7		FILE	LANGUAGE	P		FILE	LAN INTERFAC	E SETTING TION SETTING COURSES	
	CONTROLLER			DOPTION BOARD				DAYLIGHT SAV	ING TIME MIZATION	DETAIL
				CMOS MEMORY	1011			TOOL NO. SWI	TCHING CATION	NOT USED USED
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DISPLAY SETUP	ALARM HISTORY		DISPLAY SETUP		••		DISPLAY SETUP	□MotoPlus FUN □AUTOBACKUP(A	C. (P01)	USED NOT USED
<u>Aa</u>	OR CODE		Aa				Aa	□Functional s □SERVO POWER	afety INDIVIDUAL CONTROL	DETAIL DETAIL
	SECURITY									
Nain Nenu	Simple Henu	Maintenance mode	Main Menu	Simple Menu	Naintenance	node	Hain Henu	Simple Menu	Maintenance mode	

5. In IP ADDRESS SETTING(LAN2), select MANUAL SETTING, and then set the IP ADDRESS to one in the same subnet as the IPC, and the SUBNET MASK to 255.255.255.0.

					1	
SYSTEM FILE EX. MEMORY So MotoPlus APL. So DISPLAY SETUP	LAN INTERFACE SETTING HOST SETTING MANUAL SETTING HOST NAME MY-HOST DOMAIN SETTING MANUAL SETTING DOMAIN NAME LOCAL.DOMAIN IP ADDRESS SETTING(LAN2) IP ADDRESS SETTING(LAN2) IP ADDRESS SETTING(LAN3) IP ADDRESS SETTING(LAN3) IP ADDRESS SETTING(LAN3) IP ADDRESS SETTING(LAN3) IP ADDRESS SETTING 0.0 DEFAULT GATEWAY SETTING DEFAULT GATEWAY SETTING 0.0.0.0	SYSTEM FILE EX. MEMORY SO MotoPlus APL. DISPLAY SETUP CA	LAN INTERFACE S HOST NAME DOMAIN SETTING DOMAIN SETTING DOMAIN SETTING DOMAIN SETTING DOMAIN NAME IP ADDRESS SET IP ADDRESS SET IP ADDRESS SUBNET MASK DEFAULT GATEWAY DEFAULT GATE	MANUAL SETTING MANUAL SETTING MY-HOST MANUAL SETTING LOCAL.DOMAIN TING(LAN2) MANUA 1925.2 255.2 TING(LAN3) NOT U 172. 255.2 Y SETTING NOT U EWAY 0.	1 SETTING 168.100.84 55.255.0 16.0 16.0 255.255.2 15ED 0.0.0	
Main Menu	Simple Menu Maintenance mode	Main Menu	Simple Menu	Maintenance m	ode	

6. Press the ENTER key, and then press on YES in the pop-up message.

SYSTEM	LAN INTERFACE SETTING
FILE	HOST SETTING MANUAL SETTING HOST NAME MY-HOST DOMAIN SETTING MANUAL SETTING DOMAIN NAME LOCAL.DOMAIN
EX. MEMORY SD MotoPlus APL.	Modify? YES NO
DISPLAY SETUP	DEFAULT GATEWAY SETTING NOT USED DEFAULT GATEWAY 0. 0. 0. 0
Main Menu	Simple Menu Maintenance mode

1.3 Load the Program File

Attention: Before you start loading the program files to the robot, please perform file backup as needed. For detailed instructions, please refer to the operator's manual of the YASKAWA controller.

1.3.1 Prepare the File

The program files are stored in the installation directory of Mech-Mind Software Suite.

Navigate to xxx\Mech-Mind Software Suite-x.x.x\Mech-Center\Robot_Server\Robot_FullControl\yaskawa, and copy the master-control program to your flash drive:

- If you are using a YRC1000 controller, copy yrc1000.out.
- If you are using a DX200 controller, copy dx200.out.

Note: Copy the file to the root directory of the flash drive. Do not put it in another folder or rename it.

1.3.2 Load the File to the Robot

- 1. Insert the flash drive into the USB port on the back of the teach pendant.
- 2. Under maintenance mode, select *MotoPlus APL*. \rightarrow *DEVICE*.



3. Select USB:Pendant for TARGET DEVICE.

	I		Ø	
	DEVICE			
FILE EX. MEMORY SD MotoPlus APL. SD DISPLAY SETUP Aa	TARGET DEVIO	CE	Pendant B:Pendant B:Controller	
Main Menu	Simple Menu	Maintenance	mode	

4. Select MotoPlus APL. \rightarrow LOAD(USER APPLICATION).



5. Select **YRC1000.OUT** (**DX200.OUT** for DX200 controller), and press **ENTER**. Select **YES** in the pop-up message to start loading the program.

			1				1	
SYSTEM FILE EX. MEMORY SD MotoPlus APL. SD DISPLAY SETUP CA	MotoPlus APL. USB:Pendant (FOLDER : 1 YRC1000.0UT	.0AD) FILE Τ	rPE : VXE,OUT	SYSTEM FILE EX. HEMORY SD MotoPlus APL. SD DISPLAY SETUP Ca	MotoPlus APL. US8:Pendant(I) FOLDER : \ ★YRC1000.0UT	Load?	YPE : VXE,OUT	
Main Menu	Simple Menu	Maintenance m	ode	Main Menu	Simple Menu	Maintenance m	ode	

6. After loading completes, go to *MotoPlus APL*. \rightarrow *FILE LIST*, and you should see **YRC1000.0UT** (DX200.0UT) displayed.

		Ø				(9)	
SYSTEM	MotoPlue API LOAD(USER APPLICATION)	FILE TYPE : VXE,OUT	SYSTEM	MotoPlus APL. USB:Pendant(L _FOLDER :\	0AD) FILE TI	/PE : VXE,OUT	
FILE	FILE LIST		FILE	★YRC1000.OUT		-	
EX. MEMORY			EX. MEMORY				
MotoPlus APL.	DEVICE		MotoPlus APL.				
DISPLAY SE	FOLDER		DISPLAY SETUP				
	MotoPlus FUNC. SETTING						
	LICENSE FILE						
Main Menu	Simple Menu	Maintenance mode	Main Menu	Simple Menu	Maintenance m	ode	

7. Restart the controller without pressing the MAIN MENU key; the program is now running automatically in the background. Turn the mode switch key to PLAY, and proceed to Test Robot Connection.



1.4 Test Robot Connection

1.4.1 Configure Robot in Mech-Viz

- 1. Open Mech-Viz, click New project to create a new project.
- 2. Select the robot model in use in the next page.
- 3. Save the project by pressing Ctrl + S.
- 4. In the toolbar, change the Vel. (velocity) and Acc. (acceleration) parameters to 5%.
- 5. Right-click the project name in Resources and select Autoload Project.

1.4.2 Configure Settings in Mech-Center

- 1. Open Mech-Center and click on Deployment Settings.
- 2. Go to Robot Server, and make sure Use robot server is checked.
- 3. Check if the robot model displayed next to Robot type in Mech-Viz project matches the one in use.
- 4. Set the Robot IP address, and click Save.

1.4.3 Connect to Robot in Mech-Center

- 1. Click Connect Robot in the Toolbar.
- 2. The robot is successfully connected if:
 - A message saying Robot: server connected to the robot shows up in the Log panel, and
 - A robot icon with the robot model shows up in the Service Status panel.

1.4.4 Move the Robot

- 1. In Mech-Viz, click *Sync Robot* in the toolbar to synchronize the pose of the real robot to the simulated robot. Then, click *Sync Robot* again to disable the synchronization.
- 2. Click the **Robot** tab in the lower right, and change the joint position of J1 slightly (for example, from 0° to 3°). The simulated robot will move accordingly.
- 3. Click Move real robot, the real robot should move accordingly.

Attention: When moving the robot, please pay attention to safety hazards. In the case of an emergency, press the emergency stop button on the teach pendant!

As the robot will move at 100% velocity by default, it is recommended to adjust its velocity before running the corresponding Mech-Viz project.

- 12 🗹 🖬 😣 🔯 JOB EDIT DISPLAY UTILITY JOB NOVE JOB S:0000 DOUT MOVE END T00L: ** GENERAL SELECT JOB VARIABLE 🔝 MASTER JOB B001 JOB CAPACITY IN/OUT TR CYCLE ROBOT 91 JOB EDIT(PLAY) SYSTEM INFO $\sim \bigcirc$ MODIFY OFF RATIO 100 % NOVE PLAY EDIT JOB Simple Menu :ool file. Main Menu Using robot without setting t
- 1. Select $JOB \rightarrow SELECT JOB$.

- 2. Select any job in the **JOB LIST**, and then press the **SELECT** key.
- 3. Select UTILITY \rightarrow SPEED OVERRIDE.

JOB	EDIT	DISPLAY			2 📶 🤞	2 @		
	PLAY J:1 CONT	BACK ROL GROUP:	SETUP SPEC: RUN	(AL	S:0000 TOOL: **			
	000	0 NOP 1 MOVJ VJ=!	*SPEED OVERF	RIDE	2			
VARIABLE B001		2 MUVJ VJ-: 3 END	PAM					
ROBOT								
SYSTEM IN	FO SPEE	ED ADJUSTME	NT MODIFY	OFF R	ATIO <u>100</u>	%		
Main Menu	J Simp	ole Menu	an	d Zg in	the tool f	file.	Using robot	wit

4. Press on SPEED ADJUSTMENT and then OFF, press the SELECT key to switch MODIFY to ON.

JOB	EDIT	DISPLAY	UTILITY	12 🗳 🖌	1 😣 🔞 I	。 (望
	PLAYI J:1 CONTI	BACK ROL GROUP:	R1	S TC	3:0000 DOL: **	
	000	D NOP 1 MOVJ VJ=5 2 MOVJ VJ=5	50.00 50.00			
VARIABLE	: 000: 	3 END				
				2		
		D ADJUSTME	NT MODIFY	<mark>off</mark> ratio [100 %	
Main Men	u Simp	le Menu	g,	and Zg in th	e tool file.	Using robot

5. Press on the number after RATIO, and press the **SELECT** key to change the speed ratio. Press on *Enter* to save the change.

JOB	EDIT	DISPLAY	UTILITY	12 🗳 📶 😪	· la 口, la	JOB	ED	IT DI	SPLAY UT		12 🗷	M 🧐 🔟	見御
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Main Menu	u Sim	ole Menu	è :	n the tool file.	Using robot without s	С		F	0			- D	Enter

CHAPTER

TWO

YASKAWA PROGRAM DESCRIPTION

2.1 Occupied IO

Occupied IO	Signal
DI (16)	IN1-IN16
DO (16)	OT1-OT16