COBOTTA Camera

Calibration

Attention

Read this resource material carefully and in its entirety before use, to ensure it is understood and used properly. Failure to properly follow the instructions in the resource materials DPAM provides may result in damage to your equipment. As a result, by using the resource materials, you are assuming the risks associated with modifying your equipment. DENSO holds no liability, implied or otherwise, for damage, injury or any legal responsibility incurred, directly or indirectly from the use of the resource materials, including any loss of data or damage to property which may occur by your use of the resource materials. The use of the resource materials are not recommended unless you have technical knowledge and functional experience with the equipment and related software. DENSO is unable to provide support, remote or otherwise, for the information included in the resource material, nor for the ancillary topics relating to the information included in the resource materials. Therefore, if you are not fully comfortable with it, we strongly recommend that you send your unit to one of our Regional Support Centers for repair. The information contained in the resource materials are subject to change at the sole discretion of DPAM.

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1.1 Overview of COBOTTA Camera Calibration

Secure the COBOTTA to the camera calibration jig.



Connect the COBOTTA, PC and POE hub with LAN cables.



Reset the IP address of the COBOTTA (If needed).



Connect to the COBOTTA using Virtual Teach Pendant



Perform Camera Calibration using HandyEyeCalWiz.exe

Step 1. Secure the COBOTTA onto the camera calibration jig as pictured below using thru bolts from the bottom of the Calibration Jig. Both part numbers below are required.

The Denso Part # for the Camera Calibration Jig is **998994-5050.** The Denso Part # for the Cobotta Jig Stand Upper is **410365-6190.**



Step 2. Connect the COBOTTA, PC, and a POE hub with LAN cable as pictured below.



- Emergency stop switch connector
- **Step 3.** Connect the Power Cable, Emergency Stop Switch and I/O Connector to the COBOTTA.

Step 4. If you do not know the IP address of the COBOTTA robot you will need to reset it to the default address of 192.168.0.1. *(If you already know the IP address of the COBOTTA skip to Step 6).

To reset the IP address, turn on the COBOTTA and press and hold the IP reset button 2 to 3 seconds, allow the COBOTTA complete the boot up sequence.



Step 5. Turn "Off" the power to the COBOTTA, wait at least 6 seconds before turning back "On".



Power switch [OFF]

Step 6. Turn "On" the COBOTTA and your PC. Next start Virtual TP.

Operation Path: [START] \rightarrow [All program data] \rightarrow [DENSO ROBOTICS] \rightarrow [Robot Tools] \rightarrow [Virtual TP] \rightarrow [Virtual TP (RC8)]







Step 8. Enter the Target IP Address of the COBOTTA and then choose [Connect]

Connect			.
Taraet:	192.169.0.1		
Note:			Connect
History			\smile
Connection	Note		
			Delete
		Close	Cancel

Step 9. Select **"Maintainer"** as the user level of the Virtual TP and enter **"5593589"** as the password.

Connection co	onfirmation
?	Do you want to connect to the following controller? IP Address : 192.168.0.1 Serial No.: 10B8025R
User level: Password:	Maintainer
	OK Cancel

Enter password: 5593589.

Step 10. Execute an all axis *Calset*, choose "Move to Calset Position" then choose "Execute Calset".



Step 11. Run the "HandyEyeCalWiz.exe" in the "HandyEyeCalWiz" folder.

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🙀 Libraries	CobottaOffset1	7/12/2018 12:34 PM	XML Document	8 KB	
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a Music	· HandEyeCalWiz	12/6/2018 9:48 PM	Application	88 KB	
Pictures	HandEyeCalWiz.exe.config	2/2/2018 4:31 PM	CONFIG File	2 KB	
Videos	opency_aruco320.dll	2/2/2018 5:55 PM	Application extens	476 KB	
	opency_calib3d320.dll	2/2/2018 5:55 PM	Application edens	1,439 KB	
Computer	opency_core320.dll	2/2/2018 5:55 PM	Application edens	9,007 KB	
	opency_features2d320.dll	2/2/2018 5:55 PM	Application extens	686 KB	
Network	opency_flann320.dll	2/2/2018 5:55 PM	Application extens	415 KB	
	opency_imgcodecs320.dll	2/2/2018 5:55 PM	Application extens	2,301 KB	
	opency_imgproc320.dll	2/2/2018 5:55 PM	Application edens	18,221 KB	
	Setting	9/3/2018 5:48 PM	30ML Document	1 KB	

Step 12. Choose the "Connect" button and confirm that the status changes to "Connected".

🐁 Hand-eye Auto Calibration Wizard
File
IP: 192.168.0.1 Connect Disconnected
J1 J2 J3 J4 J5 J6
[Add] Remove
Check all Calibration Check the result Send the result Pack pose
\sim
🔏 Hand-eye Auto Calibration Wizard
File
IP: 192.168.0.1 Disconnect Connected
J1 J2 J3 J4 J5 J6
Add Remove
Check all Calibration Check the result Send the result Pack pose

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Open		_	
Open the defaul	t poses set Connect	Disconnected	
Save as			
	J4 J5 J6		
Add Remove	J		
Check all Calibr	ation Check the result Send the	Pack pose	
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I open			
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Computer Computer Network	reCalWiz + HandbyeCalWiz + • •		Type File folder File folder XML Docu XML Docu

Step 13. Open "CobottaOffset1" in the "HandEyeCalWiz" folder.

Step 14. Choose the "Check all" button and then click "Yes". *Be careful as robot will move.

🐁 Hand-e	ye Auto	Calibra	tion Wiz	ard					_ X
File									
IP:	1	192.10	58.0.1		Discor	inect	Conne	ected	
		J1	J2	J3	J4	J5	J6		
	0	-77.16	-22.79	128.30	45.92	93.86	0.00 NG		
	1	-75.03	-3.28	119.28	44.27	92.30	0.00 NG	1	
	2	-68.63	14.29	120.88	54.13	80.92	0.00 NG	-	
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?	The r may	obot wi	ill move e, so ple	. Depend ase be ca	ling on ti areful. Do	ne curre o you wa	nt pose car int to move	nera and othe e?	:rs
						\leq	<u>Y</u> es		5

- Step 15. Confirm that 30 images were taken (0 thru 29).
 - -😤 Hand-eye Auto Calibra File IP: 192.168.0.1 Disconnect Connected 73.89 -32.50 137.65 -29.41 88.95 0.00 0K 27 01 7F 4.79 127.95 -38.62 29 92.17 -27.30 139.00 96 37 0.00 OK Remove Add Check all Calibration Check the result Send the result Pack pose

Step 16. Choose the **"Calibration"** button and then choose click **"Yes"** when asked if you want to start the calibration.



Step 17. After the Calibration is completed you should see the Success dialog box appear, choose **"OK"**.



Step 18. Now choose the "Check the result" button and then click "Yes". *Caution the robot will begin to move.

IP:		192.10	58.0.1		Discor	nect	Conr	nected	
	20			******				- 10	
	27	73.89	-32.50	137.65	-29.41	88.95	0.00 0	K	
	28	81.75	4.79	127.95	-38.62	85.40	0.00	K	
	29	92.17	-27,30	139.00	-26.37	96.37	0.00 0	к -	X
Add	Re	move							1000



Step 19. Confirm that the average value (Mean) is under 2mm. If the value is 2mm or more there is an error. Click **"OK".**



Step 20. Choose the "Send the Result" button, then click "Yes".

IP:		192.16	58.0.1		Discon	inect	Con	nected	
	20	1			~~~		0.00	-	
	27	73.89	-32.50	137.65	-29.41	88.95	0.00	OK	
	28	81.75	4.79	127.95	-38.62	85.40	0.00	ок	
	29	92.17	-27.30	139.00	-26.37	96.37	0.00	ок 루	
Add	Rei	move							119



Step 21. Click "OK" to complete the procedure.

*Make a backup of the COBOTTA using WINCAPS III after the camera calibration is complete.

