

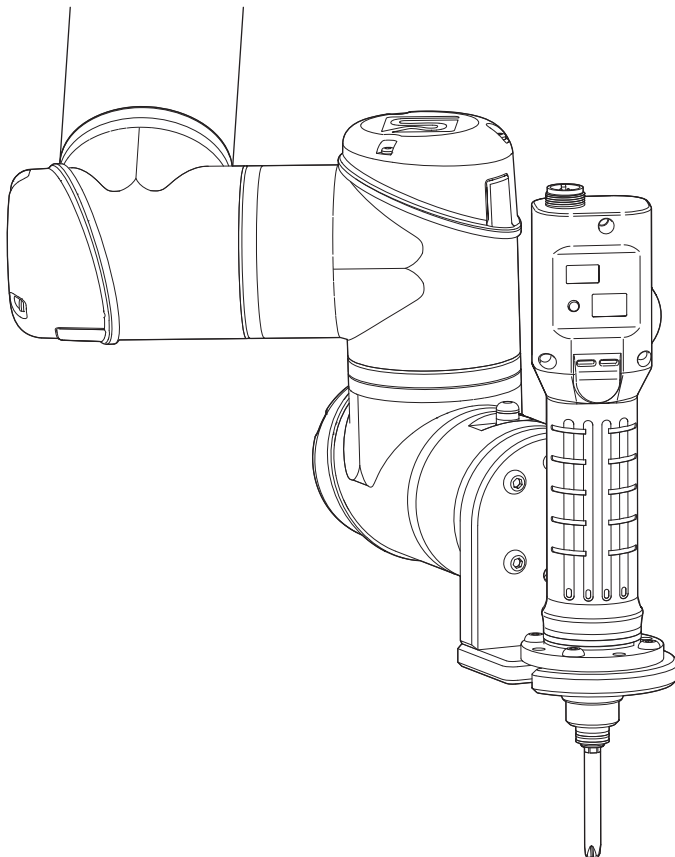
User's Manual

Professional tool

delvo

delvo

Model: DLV45C Series / DCC0241X-AZ



- Please read the manual carefully before you attempt to use your tool so that you may use it properly and safely.
- Keep the manual handy - so you can use it whenever necessary.

• Due to continuous product development/improvement, the specifications and configurations in this document are subject to change without prior notice.

Manufactured by.

NITTO KOHKI CO., LTD.

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Instructions

Thank you very much for your purchase of this NITTO KOHKI product.

Before using your tool, please read this manual carefully so that you may use it properly to get the most out of it.

Please keep this manual handy - so you can use it whenever necessary.

The following safety notations are used throughout the manual to highlight safety precautions for the user and for the tool.



WARNING:

Indicates a potentially hazardous situation which, if not avoided by following the instructions given, could result in death or serious injury.



CAUTION:

Indicates a potentially hazardous situation which, if not avoided by following the instructions given, could result in injury or material damage.

* Please note, however, that failure to observe safety precautions under the "**CAUTION**" category could result in a serious occurrence depending on the situation.

Please observe all safety precautions in the manual.

CAUTION: Important precautions for tool setup, operation and maintenance.

About pictograms



WARNING:

Failure to follow the instructions for handling could cause danger when using the tool.



Using this tool improperly could result in serious injury. Read this instruction manual before using the tool.

Precautions

- Please be noted that NITTO KOHKI shall not be responsible for any damages or loss of profit to the customer, or claims received from a third party as a result of download or use of this application.
- The company names and product names used in this manual are trademarks or registered trademarks of the respective company.
- NITTO KOHKI CO., LTD. owns all rights concerning this application.
- Due to continuous product development/improvement, the specifications of this application and the contents of this manual are subject to change without prior notice.

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1. Product Overview

Application

This is a screw fastening automation system using a current control type electric screwdriver.

Target models

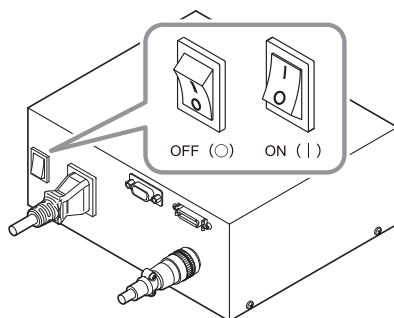
Electric screwdriver	DLV45C12P-A□/DLV45C12L-A□ ● One uppercase letter (A to Z) fits in the □.
Controller	DCC0241X-AZ (Ver. 1.20 or later)

⚠ CAUTION

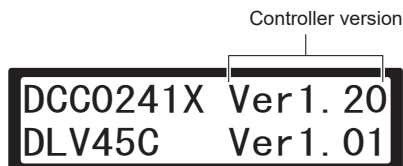
- **Make sure the controller version is 1.20 or later.**
This system does not operate with an earlier version of the controller. To use a version earlier than 1.20, please contact NITTO KOHKI.
- **For details on other usage conditions and product specifications, refer to the instruction manual for the electric screwdriver.**

Version checking method

- 1 Connect the electric screwdriver to the controller**
- 2 Turn ON (I) the power switch of the controller**
A buzzer sounds and the LED lights up.



The electric screwdriver and controller model and the program version are displayed on the LCD screen. The version of the electric screwdriver is not specified.

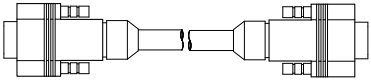
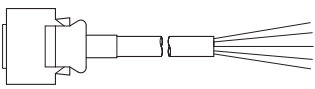
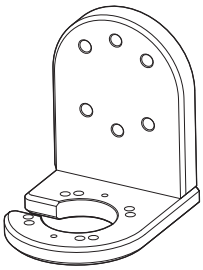
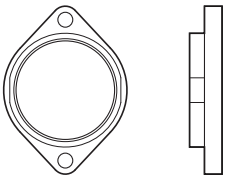
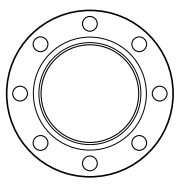
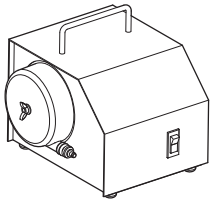


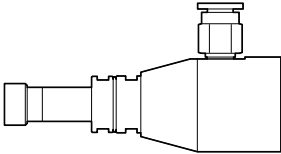
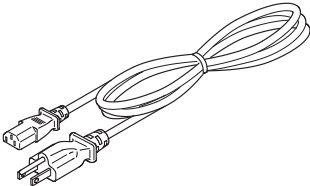

Accessories

The following accessories can be used.

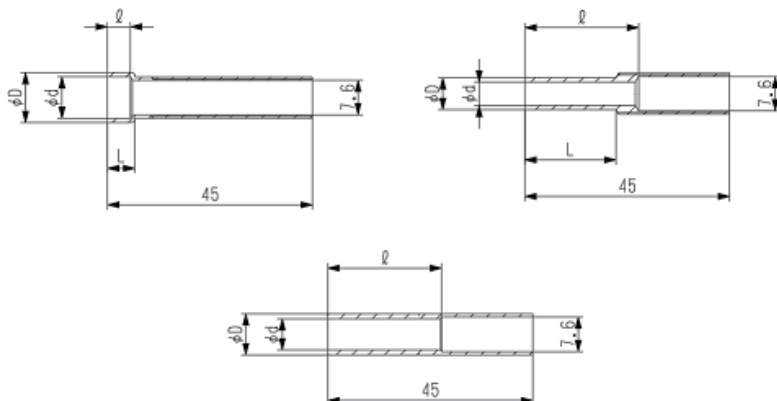
⚠ CAUTION

- Use either DLW9017 or DLW9019 as the coupling.

Product name (model)	Appearance	Specifications, etc.
Communication cable (straight) DLW9092		Connects the controller and the control box
External I/O cable DLW9091		Connected to the controller when using external signals
L-type flange attachment DLW9520		An attachment for installing the electric screwdriver on the universal robot ● Used by mounting the diamond shape flange coupling or flange coupling.
Diamond shape flange coupling DLW9017		For use by mounting in automatic screw fastening machine ● Required when using the flange attachment.
Flange coupling DLW9019		For use by mounting in automatic screw fastening machine ● Required when using the flange attachment.
Screw vacuum pump DLP2530		Connect the tube to the vacuum pickup, and use vacuum pressure to adsorb the screw ● Cannot be turned ON/OFF by an external signal. If you wish to do so, please contact NITTO KOHKI.

Product name (model)	Appearance	Specifications, etc.
Vacuum pickup DLP7401-K		<p>An attachment used to vacuum screws</p> <ul style="list-style-type: none"> ● Attached vacuum sleeve: DLS4220/ DLS4221 ● Use DLP7401-J for the J-bit type electric screwdriver. ● For details on the installation method, refer to the instruction manual for the electric screwdriver. ● For details on other separately sold sleeves, refer to p. 4.
2-m power cord DLW9210		<PS>E standard product for domestic use 2 m long, 3-pin plug (with ground)
Extension cable DLW9310		Extends the length between controller and electric screwdriver 3 m long

Separately sold fusion sleeves for DLP7401-K



Model	ϕd	ϕD	ℓ (mm)	L (mm)	Length	Suitable bit ^{*2} (No. x d x L)	Appearance type
DLS4220	9.1	11	5	6	45	No. 2 x 7 x 75	A
DLS4221	10.6	12.5	5.5	7		-	A
DLS4222 ^{*1}	8	11	5.3	22		-	A
DLS4223 ^{*1}	8.2	10	5	6		No. 2 x 7 x 75	A
DLS4224 ^{*1}	6.8	9	25	-		-	C
DLS4225	4.6	7	25	20		No. 1 x 4 x 75	B
DLS4226	5.1	7	25	20			B
DLS4227	5.6	7	25	20		No. 2 x 4 x 75	B
DLS4228	6.1	9	25	-			C
DLS4229	6.4	9	25	-			C
DLS4230	7.1	9	25	-			C

^{*1} Made-to-order product

^{*2} Select the front nominal number that matches the screw.

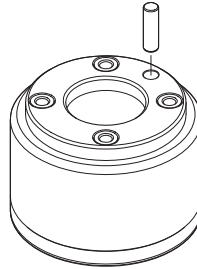
2. Preparation

Installing on the robot

CAUTION

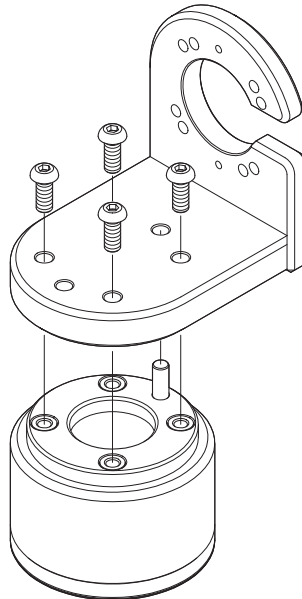
- For safety reasons, install the electric screwdriver on the robot after the bit has been removed.

- 1** Attach the pin of 6 DIA provided with the flange attachment (DLW9520) to the flange part of the robot



- 2** Mount the flange attachment (DLW9520) on the flange part of the robot

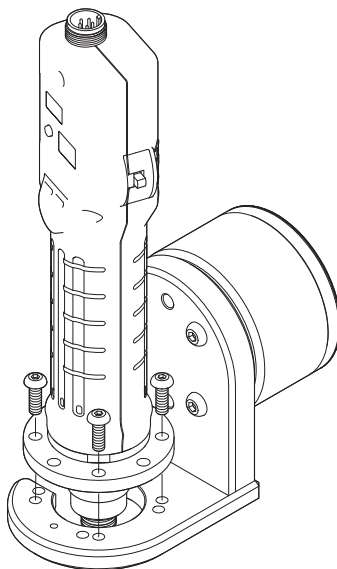
Use four M6 screws of strength class 8.8 (recommended length: 15 mm, recommended torque: 8 Nm, sold separately).



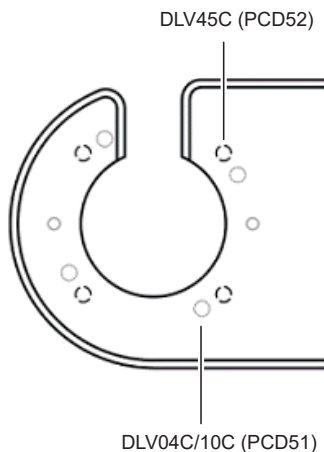
3 Remove the pin of 6 DIA from the flange and mount the electric screwdriver on the flange attachment

Use four M5 screws of strength class 8.8 (recommended length: 15 mm, recommended torque: 4.6 Nm, sold separately).

For details on how to mount the diamond shape flange coupling or the flange coupling, refer to the instruction manual for the electric screwdriver.

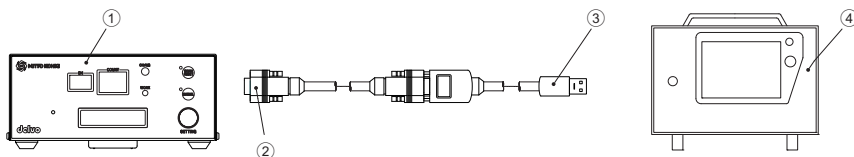


The flange attachment mounting holes are different on the DLV45C and DLV04C/10C.



4 Connect the cables

For details on how to connect the screwdriver cable and power cable, refer to the instruction manual for the electric screwdriver.



- ① Controller (DCC0241X)
- ② Communication cable (straight) DLW9092 (sold separately)
- ③ Cable for converting from RS-232C to USB (commercial item)
- ④ Control box

Emergency stop

Wire so that force stop function of the controller stops the electric screwdriver in the event of an emergency stop of the universal robot.

For details on the wiring method, refer to the user's manual for the universal robot and the instruction manual for the electric screwdriver.

⚠ CAUTION

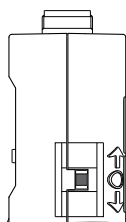
- **Make sure the controller version is 1.20 or later.**
There is no force stop function in versions earlier than 1.20. To use a version earlier than 1.20, please contact NITTO KOHKI.

Changeover switch

To operate this system, set the changeover switch of the electric screwdriver to neutral.

⚠ CAUTION

- **If the changeover switch is in the forward or reverse mode, the electric screwdriver can suddenly start, possibly causing an accident or injury.**



Align the changeover switch to "o"

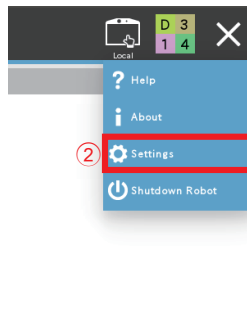
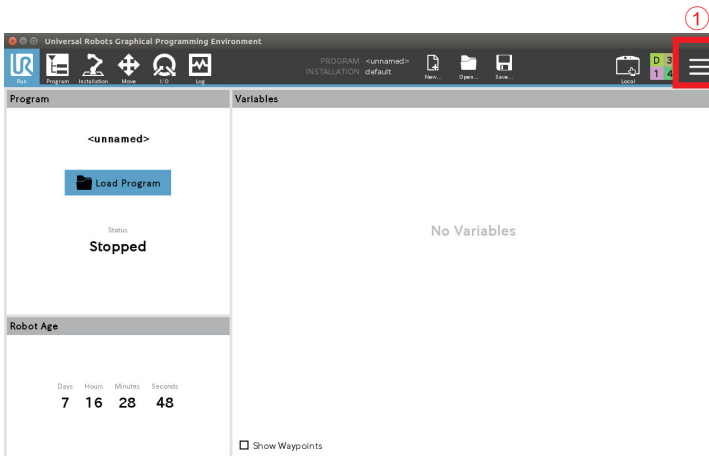
3. Using the Software

URCaps

URCaps NittokohkiScrewdriver (hereinafter, "NittokohkiScrewdriver") provides a program for linking the universal robot and the DCC0241X-AZ controller (hereinafter, "the controller") to operate the electric screwdriver, and a function for changing the settings of the controller from a teaching pendant.

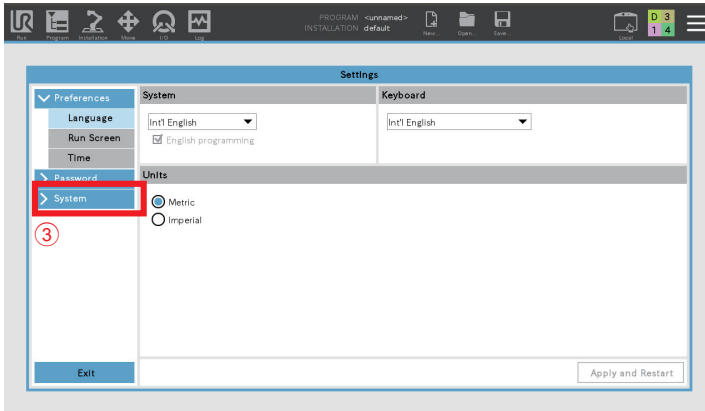
Installing the software

- 1 Download the software from the following URL on your PC, and save it in the USB memory
<https://www.nitto-kohki.co.jp/e/prd/delvo/>
- 2 Connect the USB memory to the teaching pendant
- 3 Click the menu icon (①) and then select [Settings] (②)

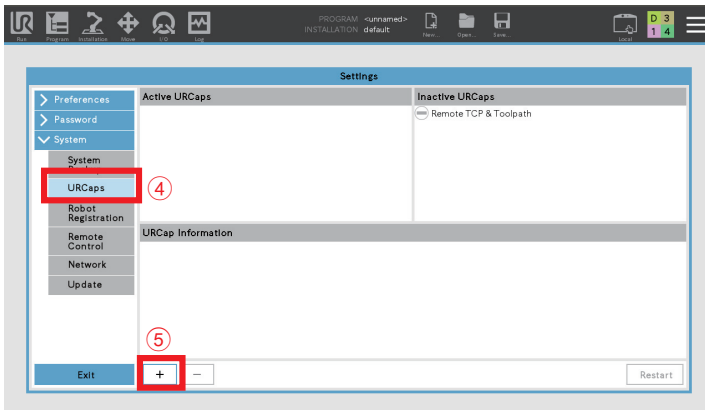


The [Settings] screen is displayed.

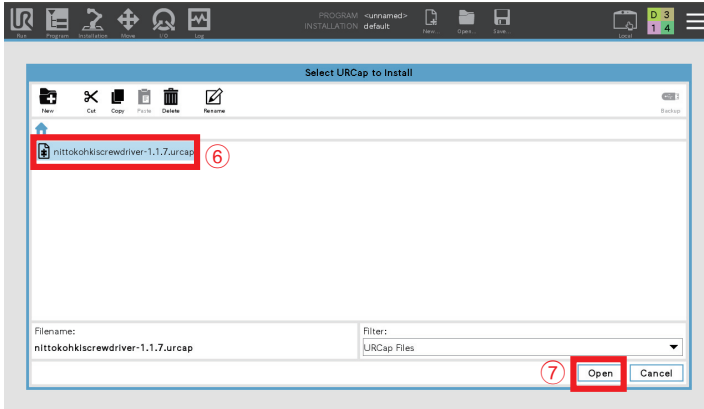
4 Click [System] (③)



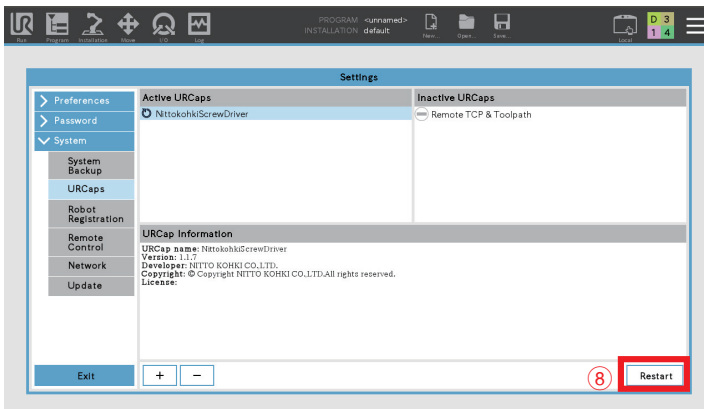
5 Select [URCaps] (④) and then click + (⑤)



- 6** Select [nittokohkiScrewdriver-{N.N.N}.urcap] (⑥), and then click [Open] (⑦)
 {N.N.N} indicates the version



- 7** Click [Restart] (⑧)



The robot restarts and the software installation is complete.

Channel setting

Set screw fastening conditions of each channel.

①	Select the measurement method of the setting times such as initial speed, midterm speed, etc.
②	Select the channel to set from the list of channels. When you select a channel, a message saying [RECEIVING CH SETTING...] is displayed, and the channel settings are acquired.
③	Set the name of the selected channel and the screw fastening conditions.
④	Updates the channel settings with the edited content. During update, a message saying [UPDATING CH SETTING...] is displayed.
⑤	Cancels the edited content and returns the settings to the state prior to editing.

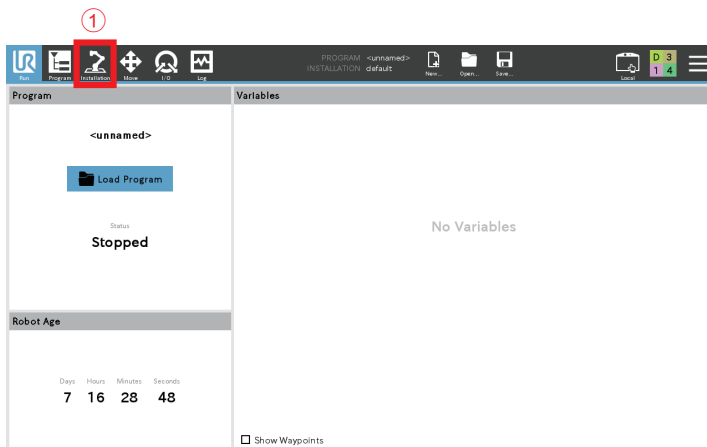
The following settings are available.

	Details	Setting value	Default
-	CH NAME	Up to 50 double-byte characters (100 single-byte characters) ● If the CH name is changed, the [Installation] settings must be updated. The CH name is saved in the robot, and is not reflected in the controller.	-
1	SCREW FASTENING TYPE	SOFT / HARD	SOFT
2	COUNT	0 to 99	4
3	SCREW FASTENING SPEED	Lv1 to Lv9 ● Cannot be input if [SCREW FASTENING TYPE] is [HARD].	Lv5
4	TORQUE	1% to 100%	30%
5	INITIAL SPEED	OFF / Lv1 to Lv9	OFF
6	INITIAL SPEED TIME	0 / 0.01 sec to 9.99 sec*1 0 / 1 to 60000*2 ● Cannot be input if [INITIAL SPEED] is [OFF].	0
7	MIDTERM SPEED	OFF / Lv1 to Lv9	OFF
8	MIDTERM SPEED TIME	0 / 0.01 sec to 9.99 sec*1 0 / 1 to 60000*2 ● Cannot be input if [MIDTERM SPEED] is [OFF].	0
9	REVERSE SPEED	Lv1 to Lv9	Lv9
10	SCREW FASTENING MEASUREMENT LOWER LIMIT	0 / 0.01 sec to 9.99 sec*1 0 / 1 to 60000*2	0
11	SCREW FASTENING MEASUREMENT UPPER LIMIT	0 / 0.01 sec to 9.99 sec*1 0 / 1 to 60000*2	0
12	WORKPIECE SIGNAL	OFF / ON	OFF
13	WORKPIECE SETUP TIME	0 / 0.1 sec to 9.9 sec	0
14	SCREW FASTENING OK(PASS) SIGNAL	OFF / ON	ON
15	OK(PASS) OUTPUT TIMING	COUNT FINISHED / AT WORKPIECE REMOVAL ● Cannot be input if [WORKPIECE SIGNAL] is [OFF].	COUNT FINISHED
16	SCREW FASTENING CONFIRMATION TIME	0 / 0.1 sec to 9.9 sec ● Cannot be input if [COUNT RETURN] is [OFF].	0
17	OPERATION OK(PASS) SOUND	OFF / TYPE1 to TYPE9	TYPE1
18	OPERATION NG (FAIL) SOUND	OFF / TYPE1 to TYPE9	TYPE1
19	COUNT UP SOUND	OFF / TYPE1 to TYPE9	TYPE1
20	AUTO REVERSE	OFF / ON AFTER TORQUE UP / ON AFTER SCREW FASTENING MEASUREMENT LOWER LIMIT	OFF
21	REVERSE TIME	0 / 0.01 sec to 9.99 sec*1 0 / 1 to 60000*2 ● Cannot be input if [AUTO REVERSE] is [OFF].	0
22	COUNT RETURN	OFF / ONE COUNT ONLY / MULTIPLE COUNTS	ONE COUNT ONLY
23	BIT BRAKE	OFF / ON	ON
24	REFASTENING PROHIBITED TIME	0 / 0.1 sec to 9.9 sec	1.0 s
25	SCREWDRIVER LED	OFF / RED / GREEN / BLUE / YELLOW / CYAN / MAGENTA / WHITE	OFF
26	SCREW FASTENING DIRECTION	RIGHT / LEFT	RIGHT

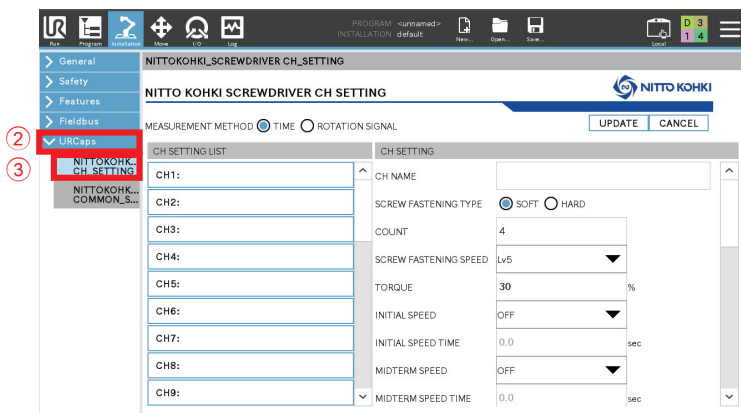
*1 When the [MEASUREMENT METHOD] of the common settings is [TIME]

*2 When the [MEASUREMENT METHOD] of the common settings is [ROTATION SIGNAL]

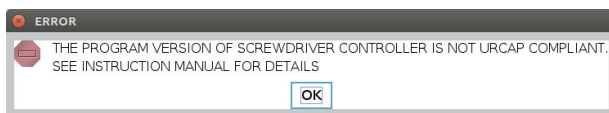
1 Click [Installation] (①)



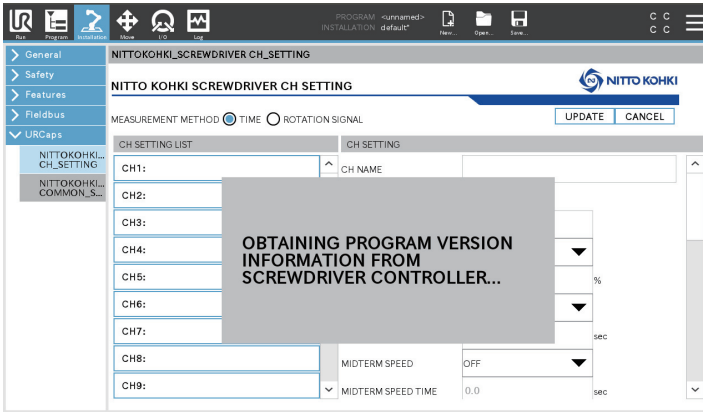
2 Click [URCaps] (②), and then select [NITTOKOHKI_SCREWDRIVER CH_SETTING] (③)



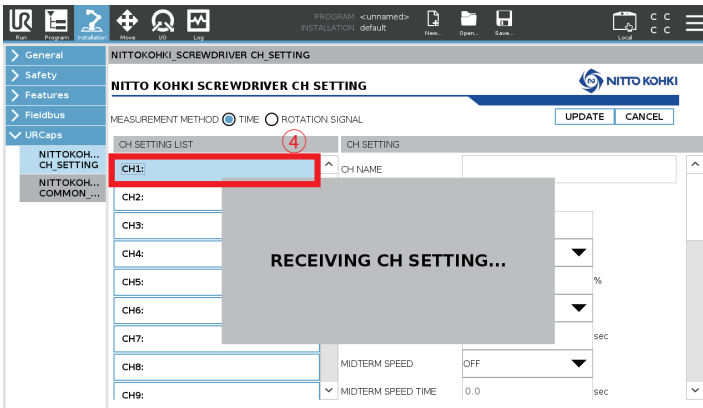
If the following message is displayed when [NITTOKOHKI_SCREWDRIVER CH_SETTING] is selected, the controller version does not support URCaps. Please contact NITTO KOHKI.



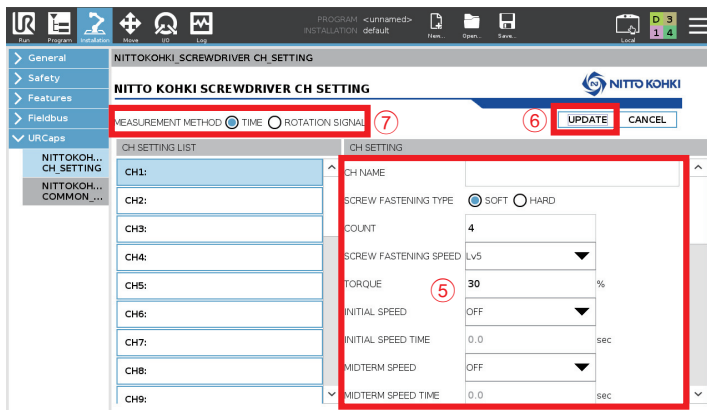
Select [NITTOKOHKI_SCREWDRIVER CH_SETTING] to display [RECEIVING VERSION INFORMATION...].
Wait for the message to disappear.



- 3** Select the channel to edit (④)
[RECEIVING CH SETTING...] is displayed. Wait for the message to disappear.

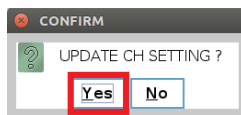


- 4 Edit the setting items (5), and click [UPDATE] (6)**
Select the measurement method of the setting times in (7).

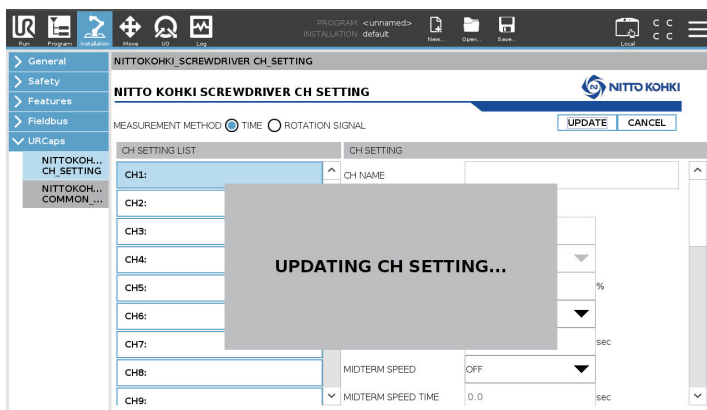


Click [CANCEL] to return to the settings before editing.
A confirmation message is displayed.

- 5 Click [Yes]**



A message saying [UPDATING CH SETTING...] is displayed.



The update is complete when the display is cleared.

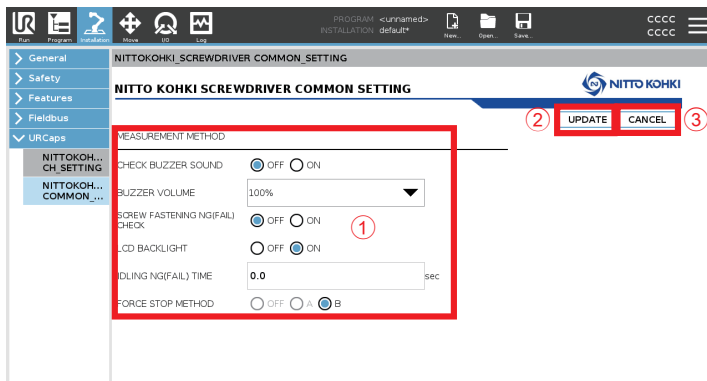
6 Click [Save...] (8), and then click [Save All] (9) or [Save Installation As...] (10)



The installation settings are saved.

Common settings

The common settings can be made from the teaching pendant.

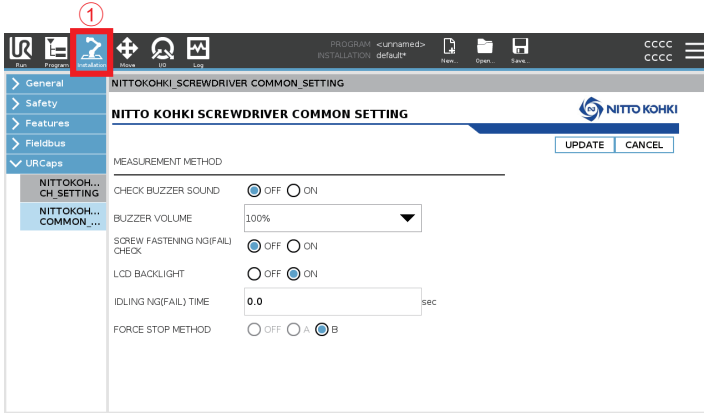


①	Make the common settings for the controller
②	Updates the common settings with the edited content. During update, a message saying [UPDATING COMMON SETTING...] is displayed.
③	Cancels the edited content and returns the settings to the state prior to editing.

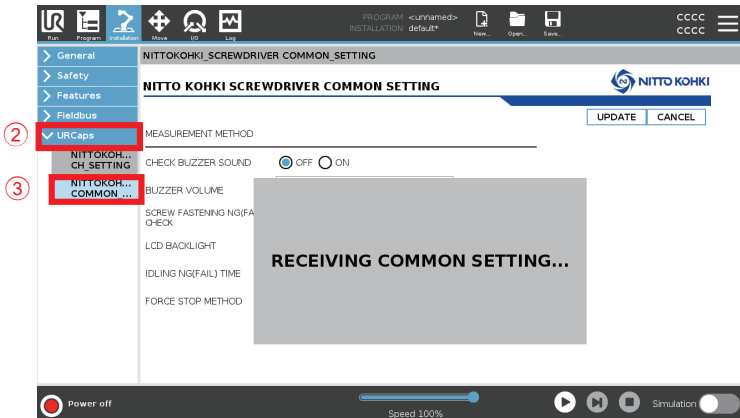
The following settings are available.

	Details	Setting value	Default
-	MEASUREMENT METHOD	TIME / ROTATION SIGNAL ● The setting is made from the Channel Setting screen.	-
1	CHECK BUZZER SOUND	OFF / ON	ON
2	BUZZER VOLUME	OFF / 10% / 30% / 50% / 80% / 100%	100%
3	SCREW FASTENING NG (FAIL) CHECK	OFF / ON	ON
4	LCD BACKLIGHT	OFF / ON	OFF
5	IDLING NG (FAIL) TIME	0 / 0.1 sec to 9.9 sec	0
6	Forced stop	OFF / A / B ● Changes cannot be made.	-

1 Click [Installation] (①)

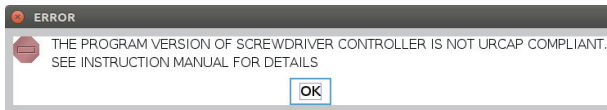


2 Click [URCaps] (②), and then select [NITTOKOHKI_SCREWDRIVER COMMON_SETTING] (③)

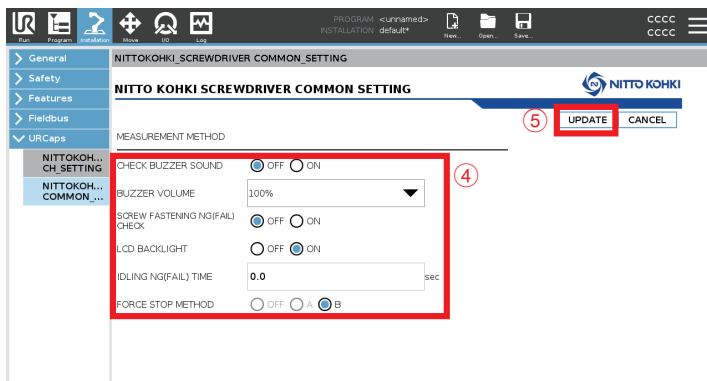


[UPDATING COMMON SETTING...] is displayed. Wait for the message to disappear.

If the following message is displayed when [NITTOKOHKI_SCREWDRIVER COMMON_SETTING] is selected, the controller version does not support URCaps. Please contact NITTO KOHKI.



3 Edit the setting items (④), and click [UPDATE] (⑤)

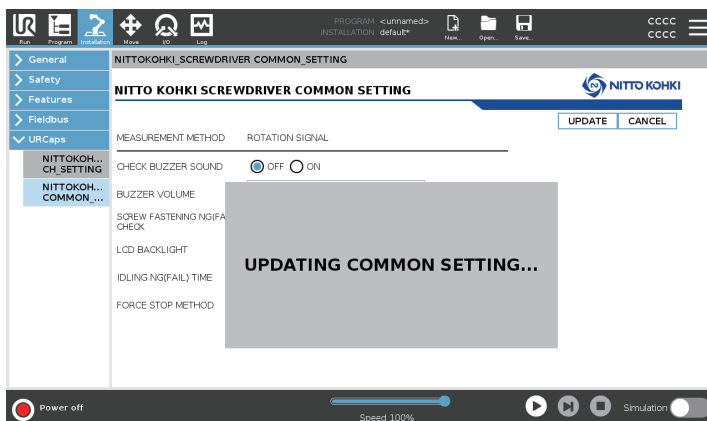


Click [CANCEL] to return to the settings before editing.
A confirmation message is displayed.

4 Click [Yes]



A message saying [UPDATING COMMON SETTING...] is displayed.



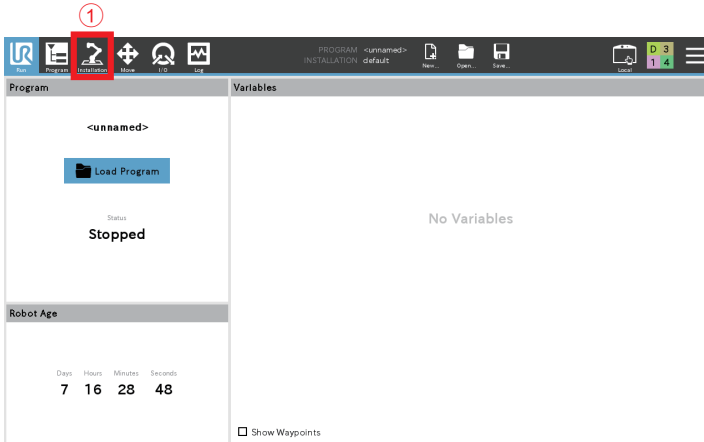
The update is complete when the display is cleared.

Creating the operation program

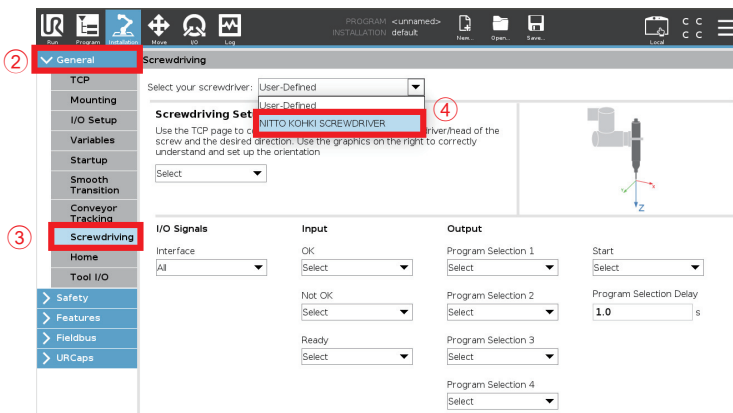
Create the program for operating the electric screwdriver.

For details on the operation program, refer to the user's manual for the universal robot.

1 Click [Installation] (①)



2 Click [General] (②) and then [Screwdriving] (③), and then select [NITTO KOHKI SCREWDRIVER] (④)



3 Select [TCP] (⑤)

To link with the workpiece signal, select the input signal to be linked (⑥)

PROGRAM: <unnamed>
INSTALLATION: default*

Select your screwdriver: NITTO KOHKI SCREWDRIVER

NITTO KOHKI SCREWDRIVER SETUP

SET THE DIRECTION OF THE SCREWDRIVER
TCP ⑤

WORKPIECE SIGNAL
SELECT ⑥

X: 0.00 mm
Y: 0.00 mm
Z: 0.00 mm
FORCE STOP SIGNAL
SELECT
SET THE FORCE STOP METHOD
IN COMMON SETTINGS.

4 Select the forced stop output signal from [Forced stop signal] (⑦)

PROGRAM: <unnamed>
INSTALLATION: default*

Select your screwdriver: NITTO KOHKI SCREWDRIVER

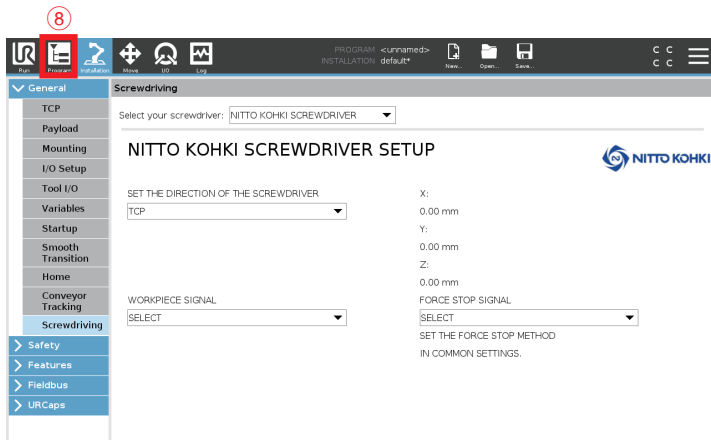
NITTO KOHKI SCREWDRIVER SETUP

SET THE DIRECTION OF THE SCREWDRIVER
TCP

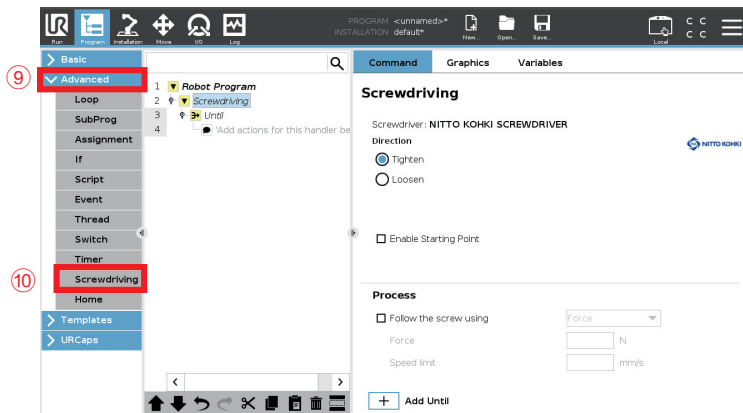
WORKPIECE SIGNAL
SELECT

FORCE STOP SIGNAL
SELECT ⑦
SET THE FORCE STOP METHOD
IN COMMON SETTINGS.

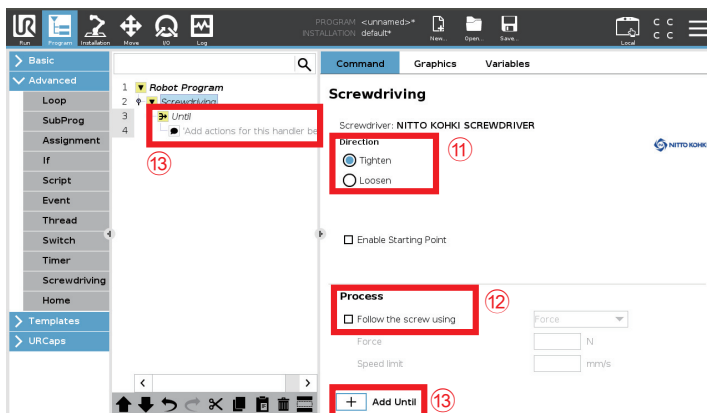
5 Click [Program] (8)



6 Click [Advanced] (9) and select [Screwdriving] (10)



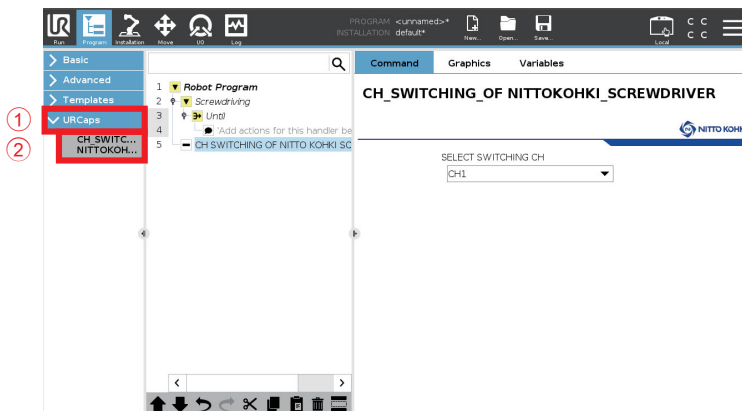
7 Make the following settings



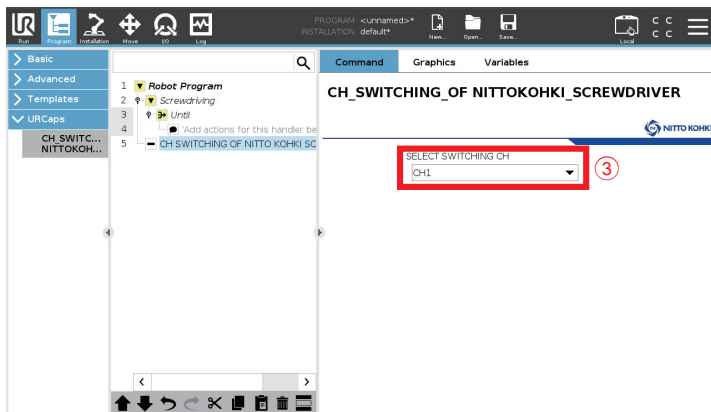
⑪	Select the advancing direction (rotation direction) of the screwdriver. Tighten: Forward rotation Loosen: Reverse rotation
⑫	Set the processing method when the screwdriver is advancing.
⑬	Select the condition for stopping the screwdriver. You can also add conditions.

When only channel switching is performed

1 Click [URCaps] (①), and then select [CH_SWITCHING_OF NITTOKOHKI_SCREWDRIVER] (②)

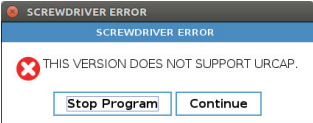
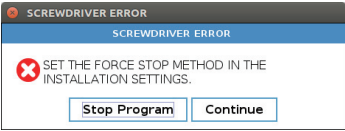



2 Select the channel to switch (③)



4. Appendix

List of error messages

No.	Message	Details
1		The version of the connected controller does not support URCaps.
2		The URCaps forced stop method is OFF, or the forced stop methods of the controller and URCaps do not match.
3		The URCaps forced stop method is the A contact type, or the output signal connected to the controller forced stop signal does not match the set output signal.

Product information

Please refer to the following website for information on NITTO KOHKI products, accessories, dimensional outline drawings, and other public announcements.

Japanese: <https://www.nitto-kohki.co.jp/>

English: <https://www.nitto-kohki.co.jp/e/>



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