

D10en

## **Jeivo** Brushless Type C Series (Current control type)

# Thirty different torque settings can be set on a single screwdriver !

- Current controlled torque system
- Low-voltage brushless motor
- ESD (Electrostatic Discharge) protection structure
- For both hand-held / automated machines (External startup)
- Nine speed settings available
- Automatic three step speed control function
- Two types of measuring methods (Time/Motor rotation signal)
- Seven color indication LED (At the tip of the screwdriver)
- Two external I/O signal connection ports (NPN ⇔ PNP switchable, RS-232C)
- Various settings can be configured via a PC (Free setting software available on NITTO KOHKI website)
- Built-in screw counting function

Model DLV45C / DLV70C

Push to Start Type DLV70C06P

Lever Start Type

DLV45C12L

Controller DCC0241X-AZ











# All in one!

# **Torque and** fastening setting of



## Mechanism of **Current Controlled Torque System**

COUNT

FUNCTION

## 1. Start of fastening

At start-up, a small amount of current is allowed.

## 2. During fastening

As the load increases during fastening, so does the amount of current allowed.

## 3. End of fastening

When the desired current value (adjusted by corresponding torque value) is reached, current flow is cut off and the screwdriver stops.

## **Specifications**

	Model	Dit		Lever Start	DLV45C12L-AY K	DLV70C06L-AY K	
	wouer	DIL		Push to Start	DLV45C12P-AY K	DLV70C06P-AY K	
	Power Sou	rce			From dedicated controller		
	Torque Adj	ustment			From 1 to 100% i	n 1% increments	
	Torque			(Nm [lbf·in])	0.6 to 4.5 [5.3 to 39.8]	2.0 to 7.0 [17.7 to 62.0]	
		SOFT fasten	ing	(min <sup>-1</sup> )	400 to 1200	210 to 650	
	Eroo crood	setting		Speed Level	Level	1 to 9	
Ŀ	FICE SPEEU	HARD fastening		(min <sup>-1</sup> )	100 to 700	100 to 430	
rive		setting		Speed Level	Automatically set by torque setting		
ewd	Power Con	sumption		(W)	44		
Scr	Screw Size (mm)		Machine Screw		3.0 to 6.0	4.5 to 8.0	
i;				Tapping Screw	2.5 to 5.0	4.0 to 6.0	
Electr	Bit Type			(mm)		<u>9</u> <u>6.35</u>	
	Mass			(kg [lbs])	0.63 [1.39]		
	Rated Operation				ON: 0.5 seconds / OFF: 3.5 seconds		
					Bit NK35 (No.2×7×75): 1 pc.		
	Standard A	ccessories			Connection Cord 2 m (	DLW9078): 1 pc.	
					Suspension Bail: 1 nc		

Innut Voltogo			
iliput voltage	100 - 240 V AC, 50/60 Hz		
Output Voltage	40 V DC		
Input Signal Method	Photocoupler input (24 V DC drive (5 mA/1 input), NPN/PNP switchable)		
Output Signal Method	Photocoupler output (30 V DC or less, 80 mA/1 output or less, NPN/PNP switchable)		
Service Power Source	24 V DC (Maximum capacity 200 mA)		
Serial Signal Method	RS-232C		
ESD (Electrostatic Discharge) Protection	Adopted (IEC61340-5-1 compliant)		
Mass (kg [lbs])	1.8 [3.97]		
	Autput Voltage Input Signal Method Intput		

Caution

Speed and torque differs depending on the temperature. (Use within the range of + 10 to +40°C) \*Do not retighten screws that are already tightened. The torque will become larger than

the set torque.

About optional accessories (See page 8 "Optional Accessories") \*The power cord for the controller (DCC0241X-AZ) is sold separately. Ask us for the required power cord when ordering. \*For torque measurements, please use Nitto Kohki's Torque Checker and Soft Joint / Hard Joint (sold separately).

# thirty screwdrivers can be consolidated into one.

5th unit	30th unit	666666	Memorizes
3.0 Nm 1000 min <sup>-1</sup>	 3.0 Nm 400 min <sup>-1</sup>		patterns !

Two types of fastening mode available subject to the workpiece and fastening conditions. Coordinate the actual workpieces, screws and operating conditions and determine the fastening mode, torque range and rotation speed.

## **SOFT / HARD fastening Settings**

## SOFT fastening setting

Suitable for workpieces with high fastening load such as tapping screws or fastening soft objects such as rubber.

## Timing chart

The image of the control action, seating the screw at the set rotation speed.



### Instruction manual P72, P73

## HARD fastening setting

Suitable for workpieces with small fastening load such as threaded holes or rigid bodies such as metal.

## Timing chart

A control that seats the screw at the seating rotation speed according to the torque setting value, when the initial speed time / midterm speed time is elapsed.



\*When measuring the torque with Torque Checker, use Soft Joint (DLW4050) for SOFT fastening setting, use Hard Joint (DLW4040) for HARD fastening setting. (See page 8)

## **Torque range: Output Torque and Rotation Speed**

Instruction manual P11 to P13

There are nine levels for rotation speed setting. (DLV45C: 400 to 1200 min<sup>-1</sup> / DLV70C: 210 to 650 min<sup>-1</sup>) Corresponds to high torque fastening, even at SOFT fastening setting or slow rotation speed. (DLV45C: Corresponds to a maximum of 3 Nm at 400 min<sup>-1</sup> / DLV70C: Corresponds to a maximum of 5 Nm at 210 min<sup>-1</sup>)







## Screw fastening time measuring (Upper / Lower limit)

Instruction manual P33, P34

The upper / lower limit of screw fastening time (correct timer) can be set. It will be judged as "correct fastening" only when the measured time is between the upper limit and lower limit. Either limit can be switched off. (Below times are examples)



## Two types of measuring methods

## Instruction manual P42

There are two methods to measure the setting time of start and midterm.



3

## the setting value intuitively.



## **Rotation direction setting**

Instruction manual P38

Set the direction for forward rotation. "RIGHT" for right-handed screws (clockwise), "LEFT" for left-handed screws (counterclockwise).



## **Channel setting**

### Instruction manual P4, P29, P74, P75

The unit of fastening work performed continuously under the same conditions is called a "channel". Up to thirty channels can be registered in the memory.

Register

Channel

CH1

**Combination up to** 

CH1

eight channels

CH2

 $\Diamond$  Example of motion setting

Channel Motion setting	CH1	CH2	СНЗ	CH4	 СНЗО
1: Screw fastening mode	SOFT	SOFT	HARD	SOFT	 HARD
2: Number of screw fastening	2 pcs.	13 pcs.	5 pcs.	3 pcs.	 20 pcs.
3: Speed level at finish	Lv5	Lv9	AUTO	Lv1	 AUTO
4: Torque	10%	80%	30%	45%	 20%
5: Speed level at start	Lv1	OFF	Lv9	Lv3	 Lv1
6: Rotation time at start	0.1 sec.	_	0.3 sec.	0.8 sec.	 1.0 sec.
7: Speed level at midterm	Lv9	OFF	OFF	Lv8	 Lv7
8: Rotation time at midterm	0.5 sec.	—	—	1.2 sec.	 0.5 sec.
9: Speed level at reverse rotation	Lv9	Lv9	Lv7	Lv5	 Lv5
	•	:	:	÷	 •
26: Rotation direction	RIGHT	RIGHT	RIGHT	LEFT	 RIGHT

## Channel pattern setting

Instruction manual P4, P39, P74

A series of operations combining each channel is called a "channel pattern". Up to eight channels can be registered per channel pattern. Up to thirty channel patterns can be set.

When combining nine or more channels, use multiple channel patterns.



Entry of password to enter channel setting mode can be enabled/disabled. Prevents unintended setting change.



tapped holes.

Temporary fastening

Verifying tapped holes

up or reaching the preset time. Auto reverse mode can be used for temporarily fastening screws or verifying



## Two safety functions

1. Caution mode Instruction manual P45

A torque value that alerts the operator can be set. After the channel is switched, if the torgue exceeds the preset value, a warning is displayed on the counter and the electric screwdriver will not start.





## 2. Refastening prohibited time setting

Instruction manual P37, P38

To prevent additional fastening (second tightening, confirmation tightening, etc.), it can be set so that it does not restart after torque-up (for 0.0 to 9.9 seconds).

Adjust the set value according to the skill level of the operator and the interval between screw fastening operations.



Flashes in red

## External I/O signal

## When connecting to an external device, it can be connected in two ways.

## 1. External I/O Cable

Instruction manual P54 to P60

Use External I/O Cable DLW9091. Compatible with both NPN/PNP.

It can be wired according to the externally connected equipment.



Connector: IEEE1284 half pitch connector (26-pin)

erminal No.	Function	Details	
1	+24 V DC	Built in convice neuron cumply (Conscitu: Maximum 200 mA)	Service
2	0 V DC	Built-In service power supply (Capacity: Maximum 200 mA)	supply
3	Input signal common terminal	nput signal common terminal (See page 53 of instruction manual)	
4	Output signal common terminal	Output signal common terminal (See page 54 of instruction manual)	
5	Switching signal A		
6	Switching signal B		
7	Switching signal C	Specify channel or channel pattern using a 5-bit input signal.	
8	Switching signal D		
9	Switching signal E		Input
10	Forward rotation start	Startup with external input signal.	
11	Reverse rotation start	The electric screwdriver operates while the input signal is ON.	
12	Workpiece	Input workpiece signal (workpiece detection signal output). Workpiece signal is ON while input signal is ON.	•
13	External reset	nput external reset signal	
14	Forced stop	Input the forced stop signal	
15	Channel A		
16	Channel B		
17	Channel C	The channel being operated or being set is ON	
18	Channel D		
19	Channel E		
20	Forward rotation signal	Output signal is ON during forward rotation	
21	Reverse rotation signal	Output signal is ON during reverse rotation	Output
22	Operation OK	Output signal is ON when the screw fastening of the set count is complete and judged as operation OK (PASS).	
23	Count up	Output signal ON for 0.3 seconds when screw fastening is normal (at torque-up).	
24	Operation NG	Output signal ON when workpiece signal is OFF during operation and judged as operation NG (FAIL).	
25	Screw fastening NG	Output signal ON for 0.3 seconds when screw fastening is NG (FAIL).	
26	N/A	No connection	-



Instruction manual P59 to P61

Use Communication Cable (Straight-through) DLW9092 to connect with PCs or sequencers (PLC).



Connector pin layout (D-SUB 9-pin (female))

## ♦ Specifications (RS-232C)

Transmission method	Asynchronous (asynchronous communication)	
Communication line	Full duplex	
Transmission speed	38400 bps	
Number of data	8	
Parity	None	*
Stop bit	1	
Handshake	None	
Delimiter communication separator)	Receive: CR+LF (\r\n) Send: CR+LF (\r\n)	

-						
Pin No.	Signal name	I/O				
2	TxD	OUT (This tool⇒PC)				
3	RxD	IN (PC⇒This tool)				
5	GND	GND				
*Other pipe are pet used						

Other pins are not used

### $\diamond$ Send / receive commands

Operation	Send command	Response from controller
Forward rotation drive	FWD\r\n	FWD\r\n
Reverse rotation drive	RVS\r\n	RVS\r\n
Drive stop	STP\r\n	STP\r\n
Switching channel / channel pattern *1	MOV:p\r\n (p=1 to 30)	At channel switching CH :p\r\n At channel pattern switching CHP:p\r\n
Screw count reset	CRT\r\n	CRT\r\n
Workpiece reset	WRT\r\n	WRT\r\n
Workpiece signal ON	WIN\r\n	WIN\r\n
Workpiece signal OFF	WOT\r\n	WOT\r\n
Resend request *2	RSD:p\r\n (p=1 to 10)	Command sent nth time before, specified by the parameter value
Forced stop	FSP\r\n	FSP\r\n
Canceling a forced stop	FSC\r\n	FSC\r\n

\*1 The switching target differs depending on the setting of the common setting "Channel change type" (CH CHANGE). When the channel pattern is switched, the channel is also switched, so the responses are sent continuously. \*2 Up to the latest ten commands sent from the controller to the PC or sequencer are stored.

When signals could not be received correctly due to noise or some other reason, the command of nth time before, specified by the parameter will be sent from the PC or sequencer.

[Example] Send command "RSD:3\r\n"  $\rightarrow$  Returns the command sent by the controller three times before Since control is performed even when communication between the controller and PC or sequencer fails, use this function when you wish to maintain the reliability of transmission and reception. This command transmission is not included in the ten commands that are stored.

### Notification command

Operation	Notification from controller
At forward rotation drive start	FWD\r\n
At reverse rotation drive start	RVS\r\n
At drive stop completion	STP\r\n
Operation OK (PASS) notification	OK \r\n
Workpiece signal ON	WIN\r\n
Workpiece signal OFF	WOT\r\n
Count up (screw fastening completes normally) notification p = Measured fastening time or signal is output	CUP:p\r\n (p=1 to 60000)
Operation NG (workpiece out while fastening count remaining) notification	WNG\r\n
Screw fastening NG (FAIL) notification p1=Screw fastening NG (FAIL) No. p2=Measured fastening time or signal is output	FNG:p1:p2\r\n
At channel switching	CH :p\r\n (p=1 to 30)
At channel pattern switching	CHP:p\r\n (p=1 to 30)
When a non-supported command or parameter is input	CER\r\n



Insert the separately sold External I/O Cable DLW9091 to the external signal connector to connect between the terminal and wiring.



Insert the separately sold Communication Cable (Straight-through) DLW9092 to the RS-232C connector to connect to a PC or sequencer (PLC).

In addition to RS-232C signals, commands are sent from the controller to the PC or sequencer(PLC) when processing is performed manually or by contact signals.

#### **Communication Cable** (Straight-through) DLW9092 Easy setting with dedicated software CH1 Channels and Channel patterns can be easily set with dedicated software. Download free from our website. ostrio je, 6. CH SETTING 0 : 栗 SIGNAL Website CH1 SETTIN https://www.nitto-kohki.co.jp/e/prd/delvo/ CH3 CH4 CH5 CH5 CH6 CH7 CH8 **Channel setting** ♦ Setting software top page rst : 0.00 ALL C W → [2] Setting application for DCC0241X NITTO KO ••• CH PATTERN SETTING GNIT CH SETTING CH PATTERN NAME CH PATTERN2 CH PATTERN3 CH PATTERN4 CH PATTERN5 CH PATTERN5 CH PATTERN7 Read Settings 1 CH1 CH2 CH3 CH4 from Controller **Channel pattern** CH6 CH11 CH7 CH8 CH9 CH10 CH12 CH13 CH14 CH15 CH PATTERN SETTING 0 setting CH17 CH18 CH19 CH20 CH22 CH23 CH24 CH25 CH16 ← =:: CH PATTERNS CH PATTERNS CH27 CH28 CH29 CH30 COMMON SETTING ALL Pat. WF (GN CH Change Typ Check Buzzer Buzzer Volu **Common setting** ng NG CI LCD Bac ual M Reset Mode Alert Torque Torque Check WRITE -Setting data transmission function between controllers Instruction manual P48 The channel and channel pattern settings can be transmitted to another controller. This is very convenient when the same work is Communication Cable (Crossover) divided into multiple processes. DLW9093 Vacuum Sleeves and applicable Bits Unit: mm Vacuum Sleeve DLS4000 series ◇ Applicable Bit NK35 L1 11 No. 6.35 7.6 7.6 88 7.6 BB 88 9 Ø4 2 L2 . 45 45

Туре С

Model	Ød	ØD	L1	L2	Length	Applicable Bit *2	Shape (Type)	Part No.
DLS4220	9.1	11	5	6		No.2x7x75	A	TD08001
DLS4221	10.6	12.5	5.5	7		No.2x7x75	A	TD08002
DLS4222 *1	8	11	5.3	22		—	A	TD07850
DLS4223 *1	8.2	10	5	6		No.2x7x75	A	TD07851
DLS4224 *1	6.8	9	25	-	45	—	С	TD07852
DLS4225	4.6	7	25	20	45	No.1x4x75	В	TD09344
DLS4226	5.1	7	25	20		No.1x4x75	В	TD09617
DLS4227	5.6	7	25	20	]	No.2x4x75	В	TD09345
DLS4228	6.1	9	25	-		No.2x4x75	С	TD09618
DLS4229	6.4	9	25	-		No.2x4x75	С	TD09619
DLS4230	7.1	9	25	_	]	No.2x4x75	С	TD09620

Туре В

Туре А



No.	ØD	L	Part No.		
	4	75	TD20306		
1	7	50	TD20308		
	7	75	TD20309		
	4	50	TD20316		
0	4	75	TD20317		
2	7	50	TD20319		
	7	75	TD20320		
0	7	50	TD20327		
3	7	75	TD20328		
* See delvo general catalog for other bit types.					

\*1) Made-to-order product \*2) Select the correct size number that fits your screw head

### **Optional Accessories** Grounded 3-Prong Power Cord 2 m **Diamond Shape** Flange Coupling Screw Vacuum Pump Flange Coupling DLP2540 (115 V AC), DLP2570 (230 V AC) DLW9019 DLW9017 DLW9220 North America into deivo DLW9240 Europe DLW9250 For mounting on automated Connect the tube to the vacuum pickup port. UK screw fastening machines The vacuum will pick up the screw. **Torque Checker** Vacuum Pickup Vacuum Sleeve DLP7401-K DLS4000 series . DLT1673A For screw vacuum pickup Select according to the screw shape For torque control of screwdrivers Soft Joint Soft Joint Hard Joint External I/O Cable 3 m Bit is optional DLW4050 [for DLV45C] DLW4080 [for DLV70C] DLW4040 DLW9091 Bit is included Bit is included © \_\_\_\_\_ • The bit for measuring is included. (NK35BN 13×19×10×75) The bit for measuring is not included. (NK35BN 13×19×10×75) For SOFT fastening For HARD fastening torque measurement torque measurement Connect when using external signals Communication Cable 3 m Communication Cable 3 m Extension Cord 3 m (Straight-through) (Crossover) DLW9310 DLW9092 DLW9093 Connect to PCs and PLCs (sequencers) Extends cord length between when using external signals controller and screwdriver Connect controllers to transmit settings Connection Cord 2 m Rubber Grip Pistol Grip Standard **ESD** Protection DRG1000 (Non-ESD) DLW2300ESD DLW9078 accessory of screwdrivers For operator fatigue reduction, For anti-slip when fastening suitable for horizontal fastening Connects controller and screwdriver

See page 12 for External Dimensions

Accessories for "delvo" Brushless Type C Series

**Screw Fastening Monitor** 

Model DTM45 (E

## **Features**

## For traceability management!

## Outputs torque value from a screwdriver (converted value)

- · Converts motor current to torque value at torque-up
- · Sends data to external devices such as computers and PLCs
- The free dedicated software is available on Nitto Kohki website
- OK(Pass)/NG(Fail) can be judged by the output torque (converted value) and screw fastening time

## **Specifications**

1

Model		DTM45	RS-232C
Connectable	Electric screwdriver	DLV45C12L-A // DLV45C12P-A // DLV70C06L-A // DLV70C06P-A // // : Y,Z	Specifications: D-SUB 9-pin (female) Screw: Inch female screw (#4-40)
mouers	Controller	DCC0241X-AZ	
Transmission data		Operation channel/Converted current value*	#4-40 ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (
		Screw fastening time/Rotation signal	
Communication method		<b>RS-232C</b> (When connecting to a PC, please use a conversion adapter available on the market.)	Connection diagram
Standard Accessories		<ul> <li>Connection cord DLW9078 (2 m)</li> <li>Rubber feet</li> </ul>	Screw Faster

Example of connection

\*Converted current value: Motor current value at torque-up converted to a value between 0 to 4095



**Optional Accessory** RS-232C

Communication Cable 3 m

DLW9092

\*Use a conversion adapter and cable (USB Type-B) available on the market to connect to a PC.



Accessories See page 13 for External Dimensions

## **Torque Reaction Arm** Model DRA-SW-650/DRA-SL-650 **DRA-TS-1000**

## **Features**

## For reducing reaction force to an operator and improving quality of screw fastening work!

· Improves operation by reducing reaction force

- · Vertical tightening to the workpiece improves quality of the work\*
- · Low profile type for convenient installation\*
- \*except DRA-TS-1000

## **Specifications**

Model		DRA-SW-650 (Swing type)	DRA-SL-650 (Slide type)
Total height	mm[in]	550 [21.65"]	
Mass	kg[lbs]	4.2 [9.26]	
Maximum operating radius <sup>*1</sup>	mm[in]	R650 [R25.59"] (When arm angle is 30°)	R400 to R650 [R15.75" to R25.59"]
Vertical stroke *2	mm[in]	100 [3.94"] (150 [5.91"] <sup>*</sup> 3)	
Amount of slide	mm[in]	—	250 [9.84"]
Applicable outer diameter of screwdriver mm[in]		30 to 52 dia. [1.18" to 2.05"]	
Maximum screwdriver weight	kg[lbs]	1.0 [2.2]	
Applicable models		All models of "delvo"	
Model		DRA-TS-1000 (Telescope type) *4	
Operation range (Arm length)	mm[in]	503 to 1000 [19.8" to 39.4"] (503 to 1123 [19.8" to 44.2"])	
Mass	kg[lbs]	0.47 [1.04]	
Applicable outer diameter of screwdriver mm[in]		30 to 52 dia. [1.18" to 2.05"]	
Applicable models		All models of "delvo"	

\*1 When an electric screwdriver of 52 mm dia. is attached \*2 When DLV70A is attached \*3 When the stroke extension ASSY is used \*4 Use a tool balancer to hang the screwdriver.

## **Optional Accessories**





## Accessories for robot mounting

See page 14 for External Dimensions

**Floating Unit** Model DLW9510

## **Features**

Absorbs misalignment in the fastening direction by floating mechanism

## **Specifications**

Model	DLW9510	
Pressing Force [N]	7 to 13 (when 6 mm stroke, excluding self-weight)	
Stroke [mm]	6*	
Mass [kg(lbs)]	0.69 [1.52]	
Mounting standard	Compliant with IS09409-1-50-4-M6	
Standard Accessories	$\Phi \textbf{6}$ mm pin for positioning on robot side	

\*For safety reasons, adjust the stroke amount within 6 mm.

Accessories for robot mounting

See page 14 for External Dimensions

## L Type Flange Attachment Model DLW9520

**Features** 

A simplified attachment for robot mounting

**Specifications** 

Model	DLW9520	
Mass [kg(lbs)]	0.35 [0.77]	
Mounting standard	Compliant with IS09409-1-50-4-M6	
Standard Accessories	$\Phi \textbf{6}$ mm pin for positioning on robot side	

## How to mount electric screwdriver on DLW9510 / DLW9520



Remove the coupling of the electric screwdriver, and attach the optional Flange Coupling.

\*The coupling is a left-hand screw.







Mount the electric screwdriver with the Flange Coupling and four hex. socket bolts available on the market. (Recommended: M5 x 15 mm, tensile strength class 10.9)

## Example of installation on automated machines









## •DLV45C12L-AY / DLV70C06L-AY



## •DLV45C12P-AY / DLV70C06P-AY



## •Controller DCC0241X-AZ



## •When Flange Coupling DLW9017/DLW9019 is mounted





## •When Flange Coupling and Vacuum Pickup DLP7401-K is mounted



## •When Vacuum Pickup DLP7401-K is mounted









Robot side (Compliant with ISO9409-1-50-4-M6)



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