delvo Brushless Type C Series (Current control type)

Model
DLV45C

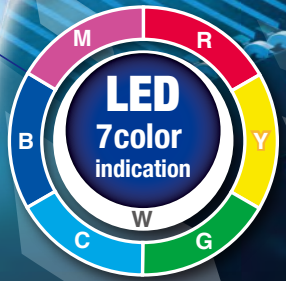
Thirty different torque settings can be set on a single screwdriver !

- 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

Lever Start Type
DLV45C12L

Push to Start Type
DLV45C12P

Controller
DCC0241X-AZ



Website

CE EPA TÜV Rheinland of North America, Inc. US

delvo

All in one !

Torque and fastening setting of

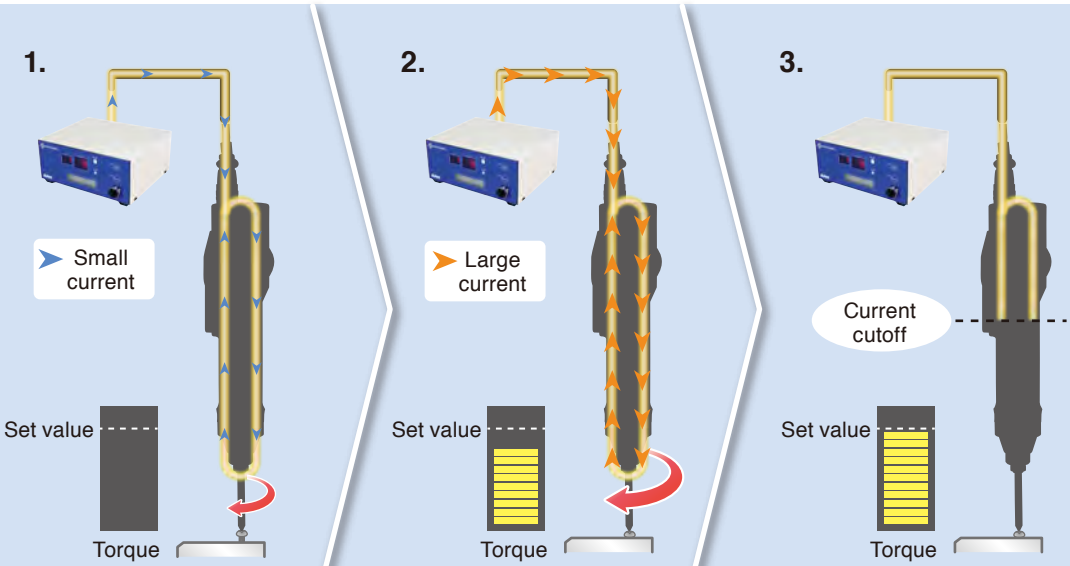
1st unit	2nd unit	3rd unit	4th unit
1.2 Nm 1000 min^{-1}	1.8 Nm 500 min^{-1}	3.0 Nm 800 min^{-1}	1.8 Nm 500 min^{-1}

Delvo Brushless Type C Series (Current control type)

Model **DLV45C**

Brushless Electric Screwdriver for Machine screw (2.5 - 6.0 mm)

Lever Start · Push to Start · Low Voltage · Brushless Motor · Grounded Bit · LED Equipped · ESD Protection · Soft Start · Variable Speed · Soft Stop



Mechanism of Current Controlled Torque System

1. Start of fastening

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

2. During fastening

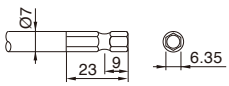
As the load increases during fastening, so does the amount of current allowed.

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

Electric Screwdriver

Model	Bit	DLV45C12L-AY	K	DLV45C12P-AY	K
Starting Method		Lever Start		Push to Start	
Power Source		From dedicated controller			
Torque Adjustment		From 1 to 100% in 1% increments			
Torque	(Nm [lbf·in])	0.6 to 4.5 [5.3 to 39.8]			
Free speed — SOFT fastening setting	(min^{-1})	400 to 1200			
Free speed — SOFT fastening setting	Speed Level	Level 1 to 9			
Free speed — HARD fastening setting	(min^{-1})	100 to 700			
Free speed — HARD fastening setting	Speed Level	Automatically set by torque setting			
Power Consumption	(W)	44			
Screw Size — Machine Screw	(mm)	3.0 to 6.0			
Screw Size — Tapping Screw	(mm)	2.5 to 5.0			
Bit Type	(mm)				
Mass	(kg [lbs])	0.63 [1.39]			
Standard Accessories		Bit NK35 (No.2×7×75): 1 pc. Connection Cord 2 m (DLW9078): 1 pc. Suspension Bail: 1 pc.			

Controller

Model	DCC0241X-AZ
Input 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]

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 9 "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.

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

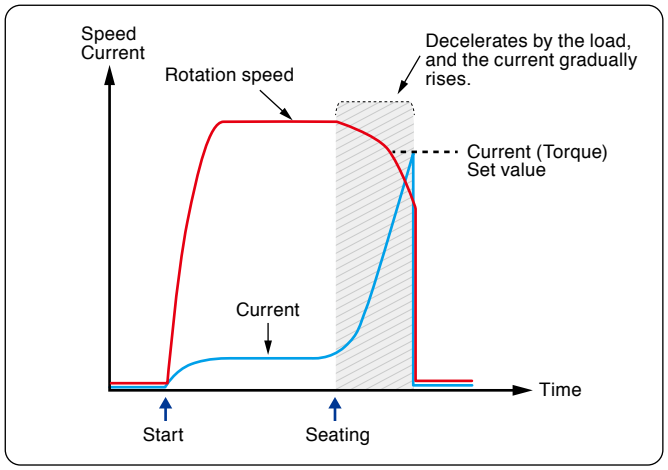
Instruction manual P68, P69

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.

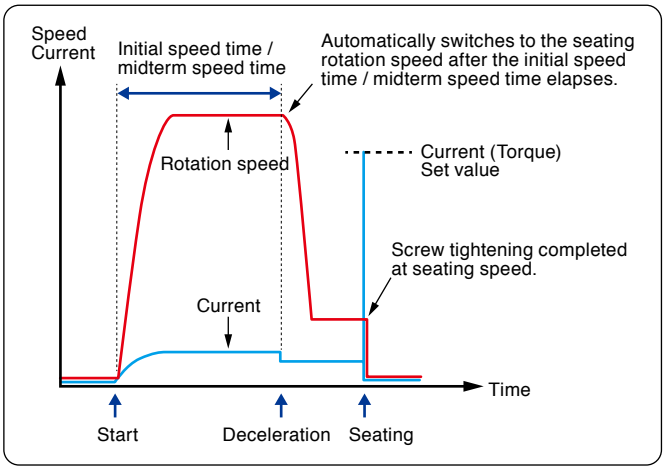


HARD fastening setting

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.



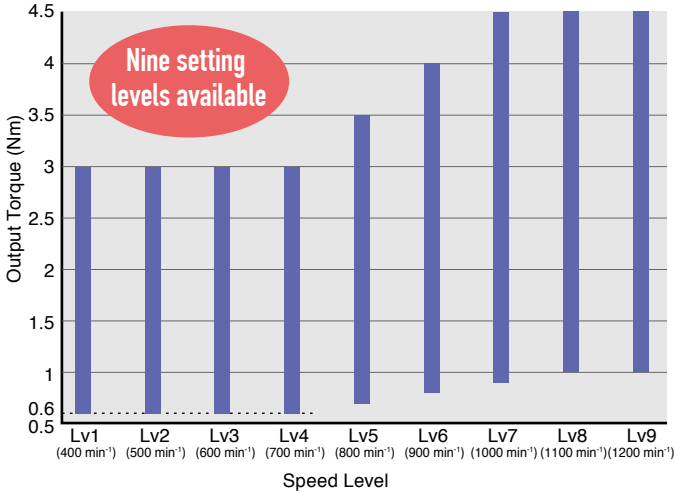
*When measuring the torque with Torque Checker, use Soft Joint (DLW4050) for SOFT fastening setting, use Hard Joint (DLW4040) for HARD fastening setting. (See page 9)

Torque range: Output Torque and Rotation Speed

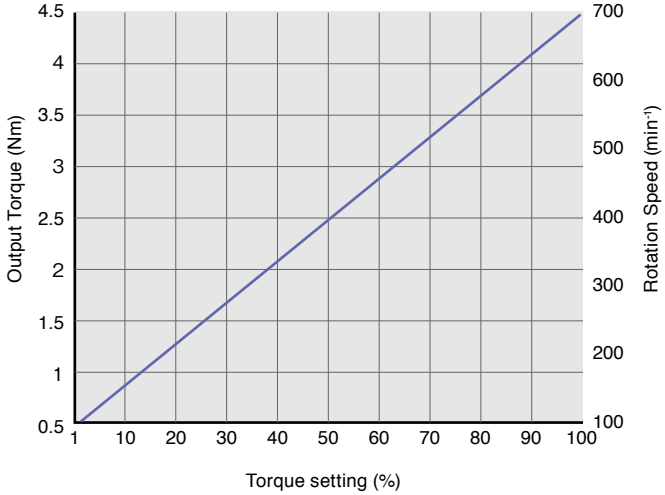
Instruction manual P11, P12

There are nine levels for rotation speed setting. (400 to 1200 min-1)
Corresponds to high torque fastening, even at SOFT fastening setting or slow rotation speed.
(Corresponds to a maximum of 3 Nm at 400 min-1)

Torque Range of SOFT fastening setting



Torque Range of HARD fastening setting



Rotation speed: Built-in automatic speed control function

Instruction manual P30 to P32

Built-in automatic three step variable speed control function.
Enables compatibility of "quality of slow speed" and "efficiency of high speed".

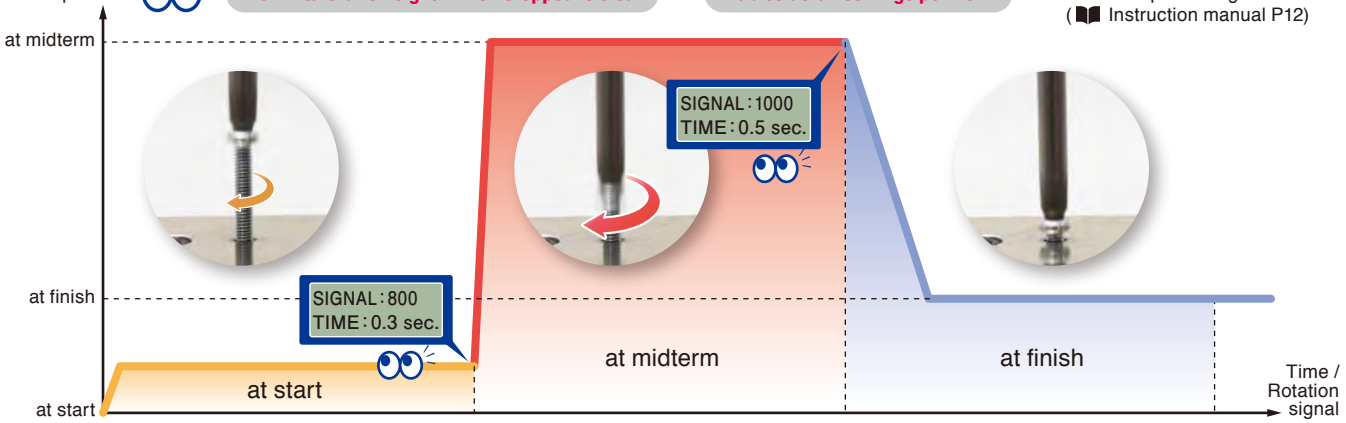
Low speed at start → High speed feeding → Low speed fastening

◇ **Timing chart** (Below rotation speeds and times are examples)

POINT! **Easy screw fastening setting mode**

The time/rotation signal when stopped is clear. ⇒ Enables detail settings per item !

*When HARD fastening setting mode, the rotation speed is decided automatically according to the torque setting. (Instruction manual P12)



Low speed starting reduces the problems at start

- If a bit is not well down in the cross-section of a screw, the cross-section may be damaged.
- If a screw does not fit in a thread, the screw may be cross-threaded and seated partially.

High speed feeding at midterm improves efficiency and quality of fastening work

- High speed feeding at midterm improves efficiency compared with conventional low speed models.
- Low speed starting and low speed fastening at finish improve quality of screw fastening work compared with conventional high speed models.

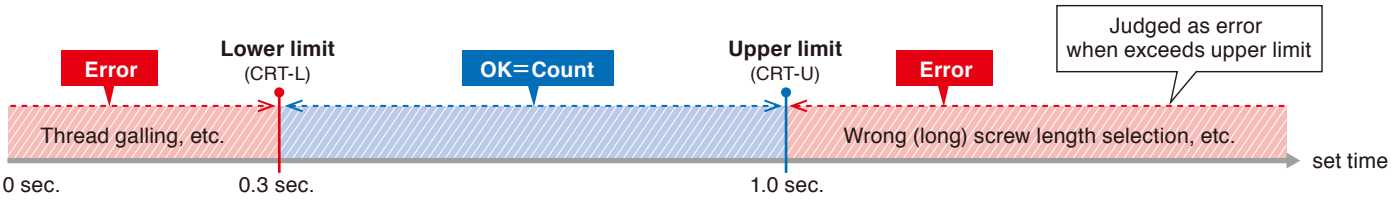
Low speed fastening at finish* reduces the problems at finish

- If a bit is not well down in the cross-section of a screw, the cross-section may be damaged.
- High speed fastening from start to finish generates overshoot torque (over-tightening by an inertial force) and may cause breakage of a screw neck part.

Screw fastening time measuring (Upper / Lower limit)

Instruction manual P32

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.



Two types of measuring methods

Instruction manual P41

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

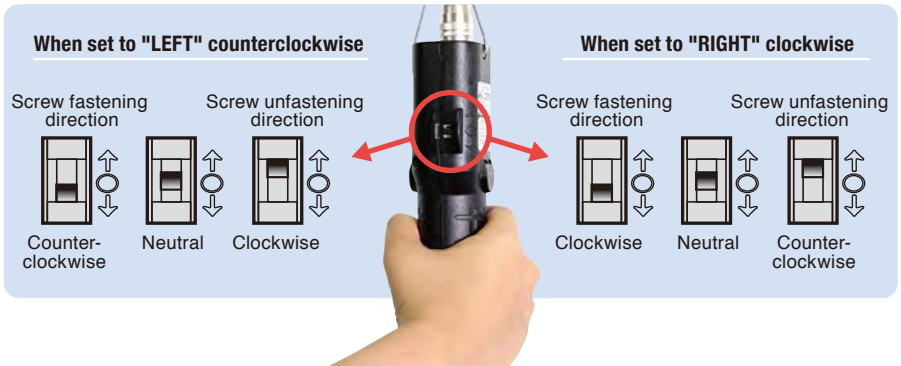
TIME
Measure by time. You can decide the setting value intuitively.

MOTOR SIGNAL
Measure by the motor rotation signal. Even if you change the rotation speed, you do not need to set the measurement time or rotation time.

Rotation direction setting

Instruction manual P37

Specify the rotation direction of forward rotation. "RIGHT" for clockwise, "LEFT" for counterclockwise.



Channel setting

Instruction manual P4, P28, P70

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 up to 30 channels

◇ **Example of motion setting**

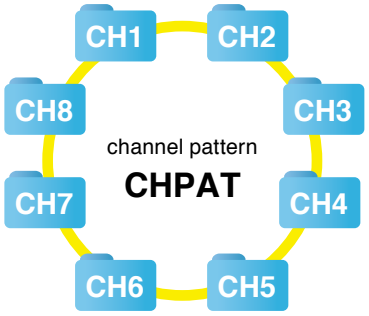
Motion setting \ Channel	CH1	CH2	CH3	CH4	.....	CH30
1: Screw fastening mode	SOFT	SOFT	HARD	SOFT	.....	HARD
2: Number of screw fastening	2 pcs.	13 pcs.	5 pcs.	3 pcs.	.....	20 pcs.
3: Speed level at finish	Lv5	Lv9	AUTO	Lv1	.....	AUTO
4: Torque	10%	80%	30%	45%	.....	20%
5: Speed level at start	Lv1	OFF	Lv9	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, P38, P70

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.

Combination up to eight channels



CHPAT 1 CH3 CH25 CH11 CH10 CH8 CH22 CH15 CH18 **8 channels**

⋮

CHPAT 30 CH5 CH30 CH20 CH13 **4 channels**

◇ **Example of channel pattern**

CHPAT 1 Register four channels

CH11 → CH12 → CH13 → CH14 → End → Repeat

CHPAT 2 **CHPAT 3** Register ten channels

(CHPAT 2)

CH11 → CH12 → CH13 → CH14 → CH15 → CH16 → CH17 → CH18 → Go to CHPAT 3

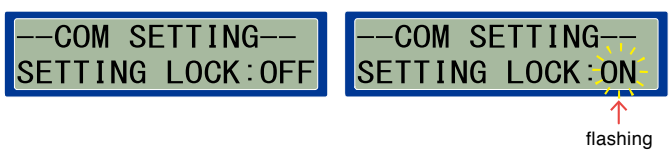
(CHPAT 3)

CH19 → CH20 → End → Go to CHPAT 2

Setting lock function

Instruction manual P42

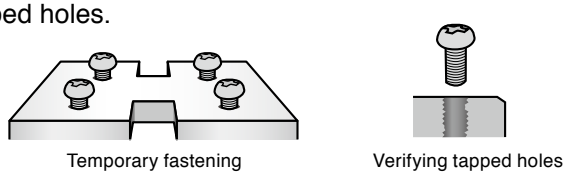
Entry of password to enter channel setting mode can be enabled/disabled. Prevents unintended setting change.



Auto reverse function

Instruction manual P35

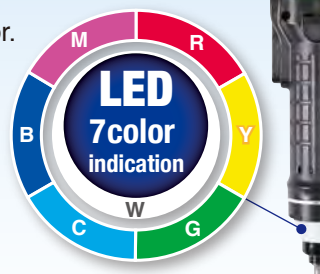
The screwdriver automatically reverses after torque-up or reaching the preset time. Auto reverse mode can be used for temporarily fastening screws or verifying tapped holes.



Built-in LED function

Instruction manual P19, P37

The LED at the tip of the electric screwdriver is always lit in the specified color.
Color coding for each channel is possible.
Also, it lights in the specified color when OK(PASS) / NG(FAIL) / count up.



Status in three colors

Controller

- OK(PASS)
- NG(FAIL)
- Count up

Two safety functions

1. Caution mode

Instruction manual P43

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

Flashes in yellow

2. Refastening prohibited time setting

Instruction manual P36

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.

Controller

Flashes in red

External I/O signal

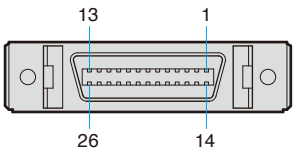
When connecting to an external device, it can be connected in two ways.

1. External I/O Cable

Instruction manual P47 to P52

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)

Terminal No.	Function	Details	I/O
1	+24 V DC	Built-in service power supply (Capacity: Maximum 200 mA)	Service power supply
2	0 V DC		
3	Input signal common terminal	Input signal common terminal (See page 49 of instruction manual)	Input
4	Output signal common terminal	Output signal common terminal (See page 50 of instruction manual)	Output
5	Switching signal A	Specify channel or channel pattern using a 5-bit input signal.	Input
6	Switching signal B		
7	Switching signal C		
8	Switching signal D		
9	Switching signal E		
10	Forward rotation start	Startup with external input signal. The electric screwdriver operates while the input signal is ON.	
11	Reverse rotation start		
12	Workpiece	Input workpiece signal (workpiece detection signal output). Workpiece signal is ON while input signal is ON.	
13	External reset	Input external reset signal	
14	N/A	No connection	—
15	Channel A	The channel being operated or being set is ON	Output
16	Channel B		
17	Channel C		
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	
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	—

2. RS-232C

Instruction manual
P55 to P58

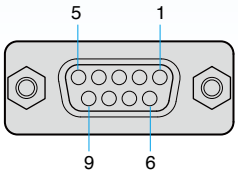
Use Communication Cable (Straight-through) DLW9092 to connect with PCs or sequencers (PLC).

◇ 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 pins are not used



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

◇ 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

*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" →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.

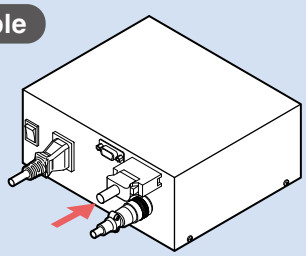
◇ Notification command

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.

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

1. External I/O Cable

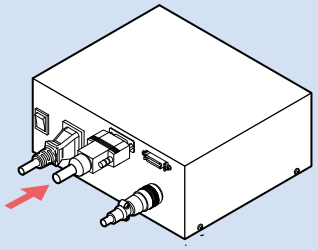
DLW9091



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

2. RS-232C

DLW9092



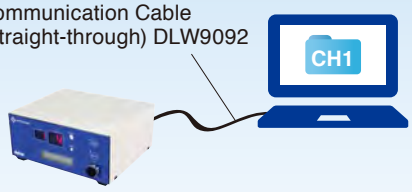
Insert the separately sold Communication Cable (Straight-through) DLW9092 to the RS-232C connector to connect to a PC or sequencer (PLC).

Easy setting with dedicated software

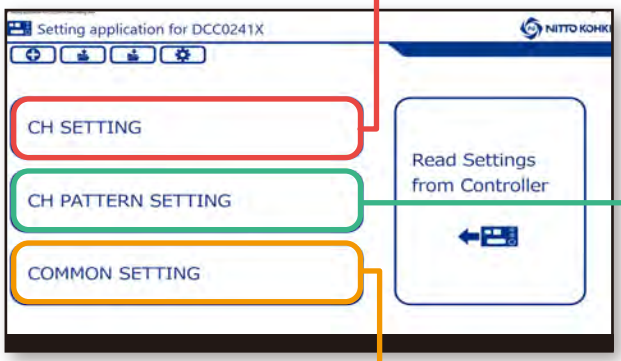
Channels and Channel patterns can be easily set with dedicated software.
Download free from our website.

Website

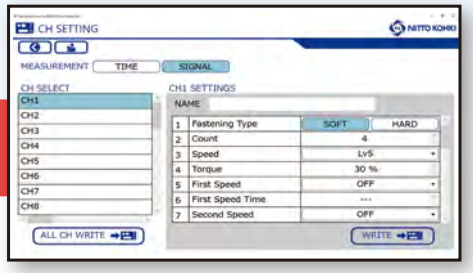
http://www.nitto-kohki.co.jp/prd/delvo/



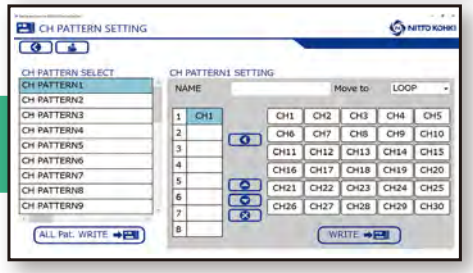
◇ **Setting software top page**



Channel setting



Channel pattern setting

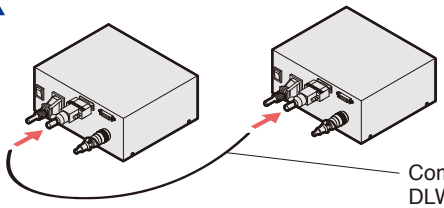


Common setting

Setting data transmission function between controllers

Instruction manual P45

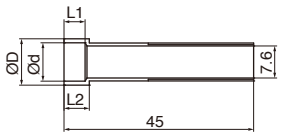
The channel and channel pattern settings can be transmitted to another controller.
This is very convenient when the same work is divided into multiple processes.



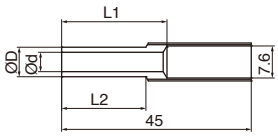
Vacuum Sleeves and applicable Bits

Unit: mm

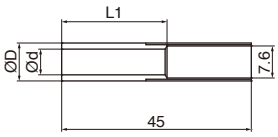
◇ **Vacuum Sleeve DLS4000 series**



Type A



Type B

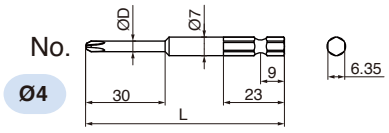


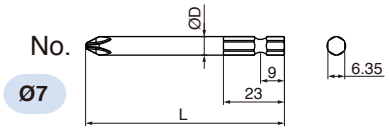
Type C

Model	Ød	ØD	L1	L2	Length	Applicable Bit *2	Shape (Type)	Part No.
DLS4220	9.1	11	5	6	45	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	—		—	C	TD07852
DLS4225	4.6	7	25	20		No.1x4x75	B	TD09344
DLS4226	5.1	7	25	20		No.1x4x75	B	TD09617
DLS4227	5.6	7	25	20		No.2x4x75	B	TD09345
DLS4228	6.1	9	25	—		No.2x4x75	C	TD09618
DLS4229	6.4	9	25	—		No.1x4x75	C	TD09619
DLS4230	7.1	9	25	—		No.2x4x75	C	TD09620

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

◇ **Applicable Bit NK35**





No.	ØD	L	Part No.
1	4	75	TD20306
	7	50	TD20308
	7	75	TD20309
2	4	50	TD20316
	4	75	TD20317
	7	50	TD20319
	7	75	TD20320
3	7	50	TD20327
	7	75	TD20328

* See delvo general catalog for other bit types.

Optional Accessories

Grounded 3-Prong Power Cord 2 m

DLW9220
North America

DLW9240
Europe

DLW9250
UK

Diamond Shape Flange Coupling
DLW9017

For mounting on automated screw fastening machines

Flange Coupling
DLW9019

For mounting on automated screw fastening machines

Screw Vacuum Pump
DLP2540 (115 V AC), DLP2570 (230 V AC)

Connect the tube to the vacuum pickup port. The vacuum will pick up the screw.

Vacuum Pickup
DLP7401-K

For screw vacuum pickup

Vacuum Sleeve
DLS4000 series

Select according to the screw shape

Torque Checker
DLT1673A

For torque control of screwdrivers

Soft Joint
DLW4050

Bit is included

The bit for measuring is included.
(NK35BN 13×19×10×75)

For SOFT fastening torque measurement

Hard Joint
DLW4040

Bit is optional

The bit for measuring is not included.
(NK35BN 13×19×10×75)

For HARD fastening torque measurement

External I/O Cable 3 m
DLW9091

Connect when using external signals

Communication Cable 3 m (Straight-through)
DLW9092

Connect to PCs and PLCs (sequencers) when using external signals

Communication Cable 3 m (Crossover)
DLW9093

Connect controllers to transmit settings

Extension Cord 3 m
DLW9310

Extends cord length between controller and screwdriver

Connection Cord 2 m
DLW9078

Standard accessory of screwdrivers

Connects controller and screwdriver

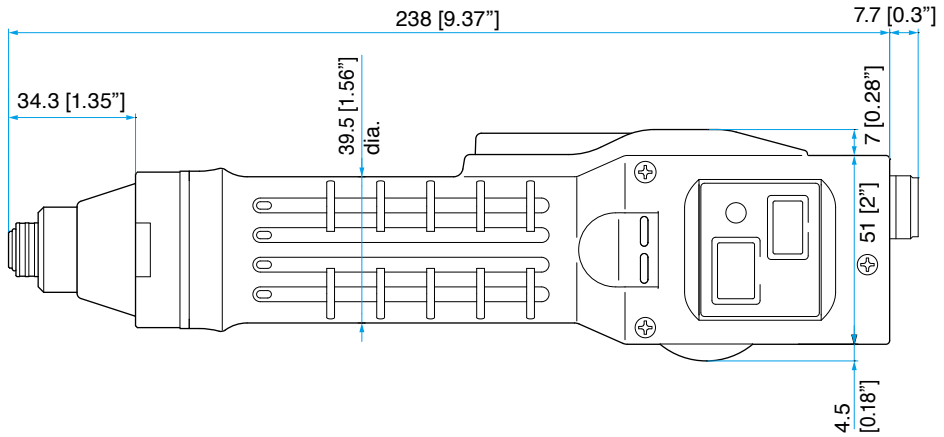
Pistol Grip
DLW2300ESD

ESD Protection

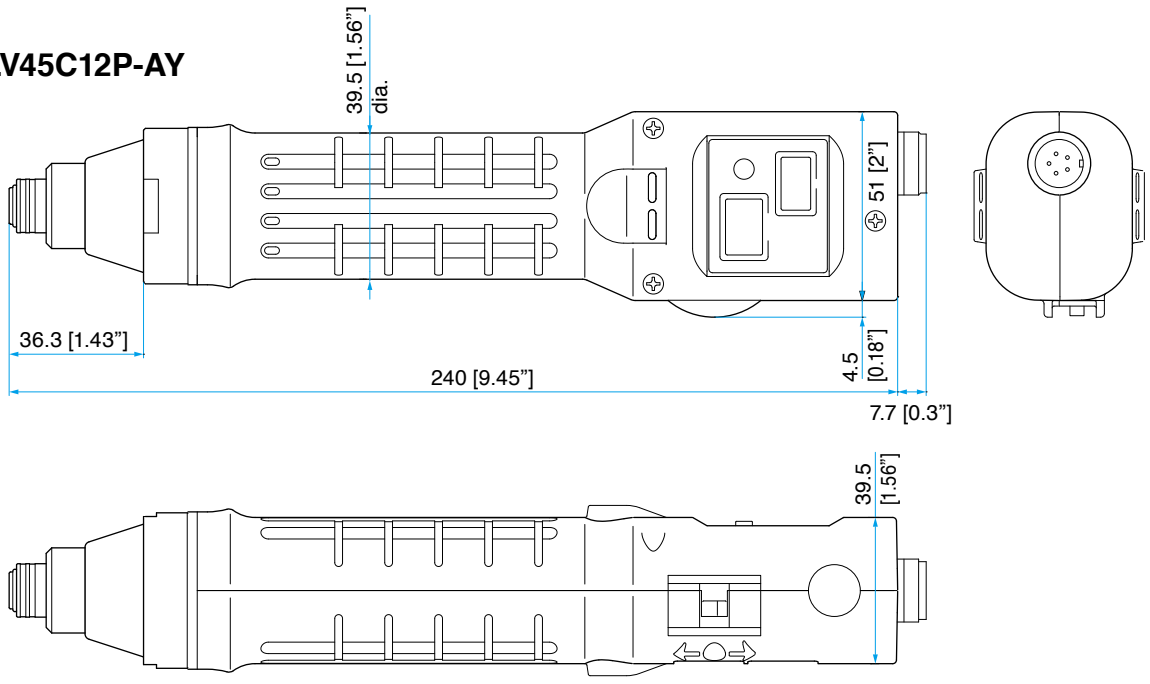
For operator fatigue reduction, suitable for horizontal fastening

External Dimensions

DLV45C12L-AY



DLV45C12P-AY



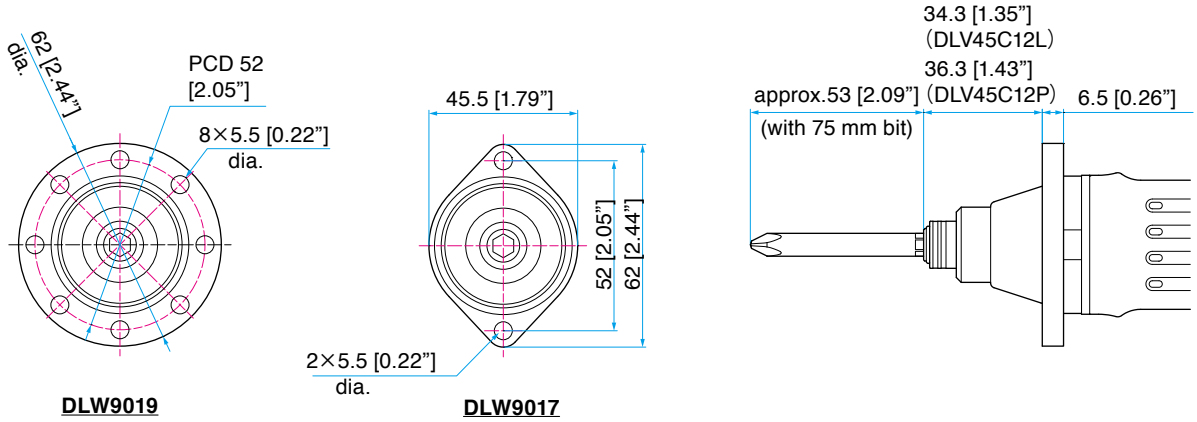
unit: mm [inch]

Example of installation on automated machines

Can be mounted on desktop robots, Cartesian robots, 6-axis robots, etc.

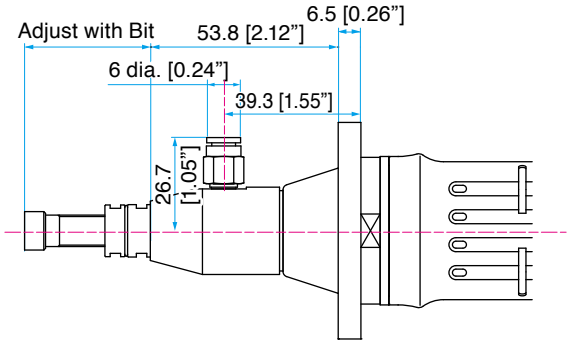
External Dimensions

When Flange Coupling DLW9019/DLW9017 is mounted

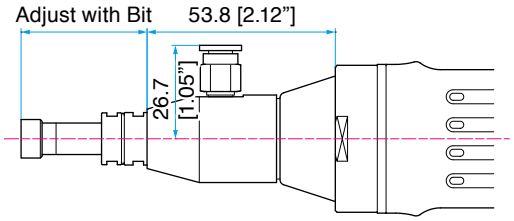


DLW9019 **DLW9017**

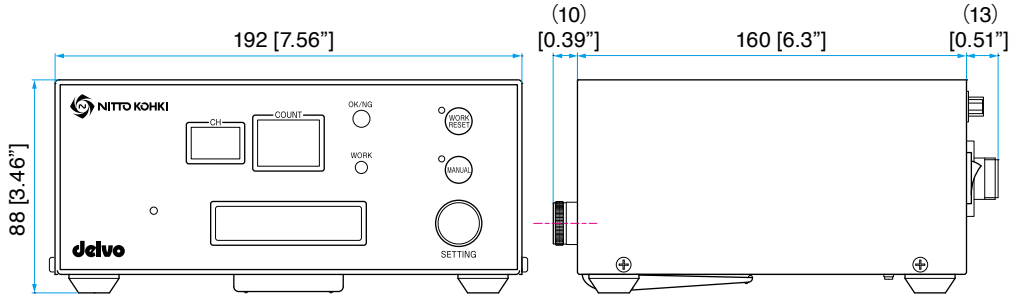
When Flange Coupling and Vacuum Pickup DLP7401-K is mounted

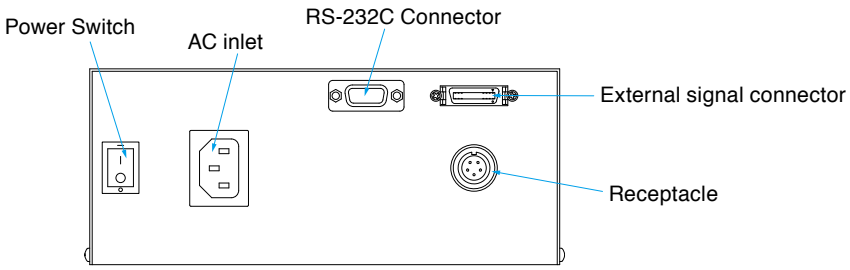


When Vacuum Pickup DLP7401-K is mounted



Controller DCC0241X-AZ





unit: mm [inch]

delvo

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