

# 取扱説明書

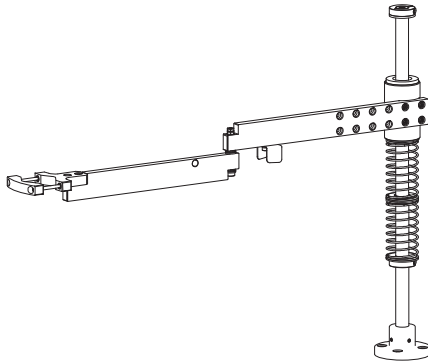
## INSTRUCTION MANUAL

# delvo

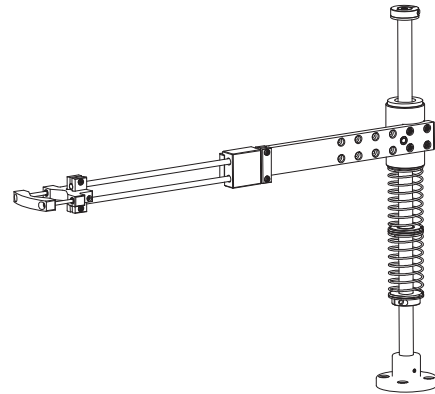
## トルクリアクションアーム TORQUE REACTION ARM

型式：DRA-SW-650 / DRA-SL-650

Model: DRA-SW-650/DRA-SL-650



DRA-SW-650



DRA-SL-650

### 《仕様》

型式		DRA-SW-650	DRA-SL-650
最大可動半径 (φ 52mm 取り付け時)	[mm]	R650 (アーム角 30° 時)	R400 ~ R650
全高	[mm]	550	
重量	[kg]	4.2	
適合ドライバ外径	[mm]	φ 30 ~ 52	
上下ストローク (DLV70A06P/L 取り付け時)	[mm]	100	

### [Specifications]

Model		DRA-SW-650	DRA-SL-650
Maximum operating radius (When an electric screwdriver of 52 mm (2.05) DIA is attached)	[mm (in)]	R650 (R25.59) (When arm angle is 30° )	R400 to R650 (R15.75 to R25.59)
Total height	[mm (in)]	550 (21.65)	
Weight	[kg (lbs)]	4.2 (9.26)	
Compatible outer diameter of screwdriver	[mm (in)]	30 to 52 DIA (1.18 to 2.05)	
Vertical stroke (when the DLV70A06P/L is attached)	[mm (in)]	100 (3.94)	

- 正しく安全にお使いいただくために、ご使用前にこの取扱説明書を必ずお読みください。
- この取扱説明書は、必要となしにすぐ見ることが出来る場所に保管してください。
- 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.

- ・改良のため、仕様および形状等は予告なしに変更することがありますので、ご了承ください。
- ・ Due to continuous product development/improvement, the specifications and configurations in this document are subject to change without prior notice.

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Manufactured by

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(Original Instructions)

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TV08130-0 11/2019

## 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.

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## Precautions on Use (Make sure to follow the instructions given)

Before using your tool, to avoid personal injury always take the basic precautions explained in later sections.

### General power tool safety warnings

#### Personal safety

##### ⚠ WARNING

- **Dress properly.**

Do not wear loose clothing or jewelry which may be entangled in moving parts. Wear a pair of non-slip shoes. If your hair is long, wear a protective cap that fully contains your hair.

- **Always wear eye protection.**

Corrective glasses are not considered to be eye protection. Always wear appropriate eye protection.

- **Wear a dust mask.**

When dust is generated in the workplace, wear a dust mask.

- **Use a dust collector or dust collection equipment correctly.**

If a dust collector or dust collection equipment is available, check that it is connected and used properly. Use of a dust collector can reduce risk caused by dust.

- **When loud noise is generated in the workplace, wear earplugs.**

- **Do not overreach.**

Use a suitable support structure and maintain proper footing and balance at all times.

- **Be on your guard when working.**

Do not use the tool when you are tired.

When using the tool, take due care about the method of handling and working and pay sufficient attention to the surrounding environment.

- **Never touch the tip of moving parts when the tool is running.**

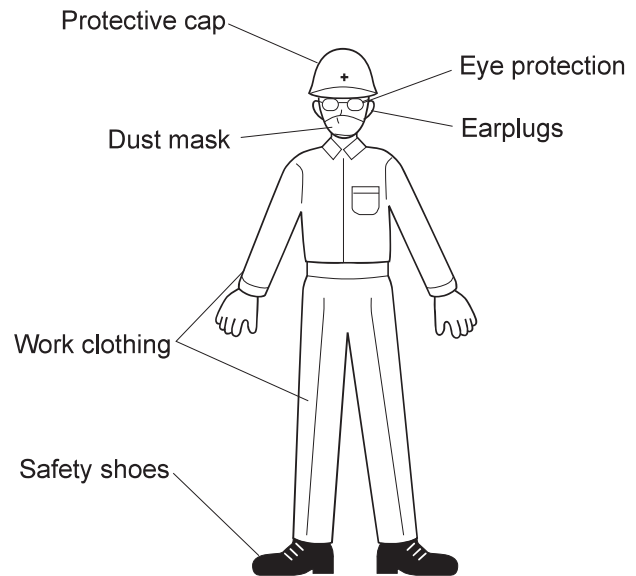
Also, do not direct the tip of moving parts toward people or animals.

- **Be aware of tool vibration and recoil. Some tools can cause a considerable amount of vibration.**

Depending on the type of work, the tool settings, and the length of operation, the tool could place a tremendous burden on your hands, arms and body.

The tool may cause a vibration injury or tendonitis. Avoid long-term use and take appropriate breaks.

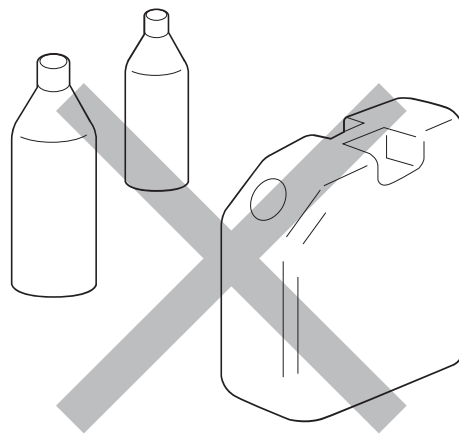
Consult a doctor if you experience any discomfort or pain during operation.



## Work area safety

### ⚠ WARNING

- **Do not use the tool at home.**  
This is a professional tool (industrial or work tool for business). Do not bring the tool home and use it there.
- **Keep the work area clean.**  
Working in a messy work area or work table could cause an accident.
- **Be cautious about the work area.**  
Do not expose the tool to rain.  
Do not use the tool in a damp or wet place.  
Keep the work area well lit.
- **Do not operate the tool in an explosive atmosphere, such as in the presence of flammable liquids (thinner, lacquer, gasoline, etc.) or gas.**
- **Do not let children come close to the work area.**  
Keep children and bystanders away while operating the tool.
- **Some tools generate loud noise.**  
Check that the noise regulations in the current location are complied with.
- **When work has to be done in high locations, make sure there is nobody underneath the work area.**  
Dropping the tool or material could cause an accident or injury.
- **Before starting operation, make sure that there is no conduit, water pipe or gas pipe buried near the work area.**  
If the tool touches a buried object, it could cause electrical shock, electrical leakage, or a gas leak, which could result in an accident.



## Before starting work

### ⚠ WARNING

- **Perform inspection before using the tool.**  
Before using the tool, check for loose screws and for damage to the other parts. Make sure that the tool operates normally and functions as intended.  
Check that there are no problems with the positional adjustment and tightening of moving parts, damage to parts, attachment of parts, and all other positions that could affect operation.
- **Use appropriate tools.**  
Do not force small tools to do the job of a heavy duty tool. Do not use tools for purposes not intended.
- **Do not use the tool in an unreasonable manner.**  
When the specifications are followed, the tool can be used efficiently and safely.
- **Secure workpieces.**  
Where possible use clamps or a vise to hold the work. This is safer than holding the workpiece by hand and keeps both hands free for working.

## Handling tools

### ⚠ WARNING

- **Storage**  
When the tool is not used, store the tool in a dry location. Also, store the tool out of the reach of children.
- **Be cautious about how the tool is carried.**
- **Do not allow the following chemicals to come into contact with the tool as parts could deteriorate.**  
Acetone, benzene, thinner, ketone, ether, trichloroethylene and other similar chemicals

## Maintenance and inspection

### WARNING

- **Do not disassemble or modify the tool.**  
Using the tool after disassembling or modification could cause an accident or injury.
- **Inspect tip tools and accessories.**  
Always inspect the tool for damage or deterioration first.  
If a damage or deterioration is found, stop using the tool immediately.
- **Inspect for damage.**
- **Use genuine parts.**  
If inappropriate parts are used, it could cause an accident or injury.
- **Do not remove the labels or nameplates on the tool.**

## Product specific safety rules

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### WARNING

- **Be cautious of the surroundings when carrying or using the tool.**  
Be aware not to hit any people or objects nearby.
- **After adjustment, be sure to remove tools such as spanners, wrenches, etc.**
- **Do not use the tool in an unreasonable manner.**  
When the specifications are followed, the tool can be used efficiently and safely.  
Do not use the tool outside the specified range of use. Pulling it excessively could cause damage.

### CAUTION

- **Do not use the tool for anything other than screw fastening.**
- **Firmly hold the electric screwdriver when working.**
- **Inspect for damage.**  
Carefully check for damage to accessories or other parts. Check that the tool operates normally and functions appropriately. If the tool is damaged or broken, stop using it immediately.
- **For operation of the electric screwdriver to be attached, refer to the instruction manual for the electric screwdriver.**

## Safety rules for tightening of screws

### ⚠ CAUTION

- **The electric screwdriver torque measured by the Torque Checker (torque sensor) is different from the torque generated at the screw.**

The torque of the electric screwdriver is measured using the Torque Checker (torque sensor) after creating certain conditions at the measurement joint. The torque generated at the screw changes based on the screw (type, size, material, surface roughness, etc.), workpiece wherein the screw is tightened (material, prepared hole diameter, screw tightening depth, surface roughness, stiffness, temperature, etc.), fit of the bit against the screw, tightening speed, lubricant, and human factors (how it is held or the way it is being pressed, such as diagonal tightening).

- **Control the torque properly.**

Be sure to test more than once based on actual screw tightening conditions (screw, workpiece and other conditions). Perform the test periodically.

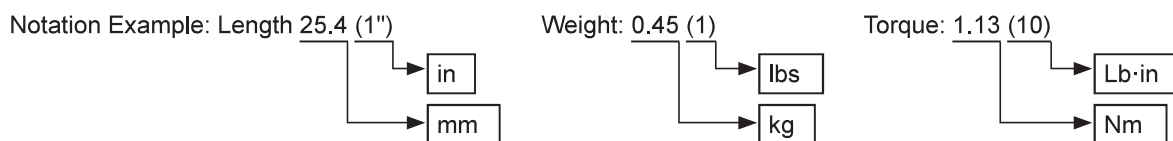
#### Operating Procedure

- (1) Under actual screw tightening conditions, use the screwdriver to tighten the screw.
  - (2) Using a torque wrench, etc., make sure the screw is tightened at the target torque. (Check using the loosening torque method or refastening torque method.)
  - (3) If the screw is not tightened at the correct torque, adjust the torque of the electric screwdriver. Use the electric screwdriver to tighten it again.
  - (4) If the screw is tightened at the correct torque, use the Torque Checker (torque sensor) to maintain the torque of the electric screwdriver that output the correct torque.
- **Specify the value of the actual screw tightening torque based on the tolerance from torque of the electric screwdriver (standard deviation) and the tolerance of the screw tightening conditions (torque coefficient). For details on how to specify the value, refer to JIS B 1083 (latest version) Screw Tightening Rules.**
- We provide information about the tightening torque accuracy of the electric screwdriver as technical data. For details, contact the retailer from whom you purchased the screwdriver or our company.
- **Depending on the speed, the displayed value of the Torque Checker (torque sensor) changes even with the same setting.**

At the measuring joint, certain conditions are created; however, since the impact value fluctuates based on the speed, the value displayed on the Torque Checker changes. The torque value generated from the electric screwdriver does not change. Low-speed rotation has less impact, and tends to suppress the tolerance of the screw tightening conditions (torque coefficient). However, low-speed rotation needs to be held in the hand longer, causing recoil to increase as a result.

### About Unit Notation

This instruction manual is written using both SI units and the imperial measurement method (yards, pounds). Numeric values outside the ( ) are the value in SI units, while those inside the ( ) are the imperial measurement value.



# 1. Product Overview

## Application

This product is designed for exclusive use with the NITTO KOHKI Delvo series and used for absorbing the tightening reaction.

It absorbs the reaction produced when tightening screws or bolts and reduces the strain on the operator. It also provides support for vertical tightening operations and improves the reliability of screw tightening.

## Checking inside the package

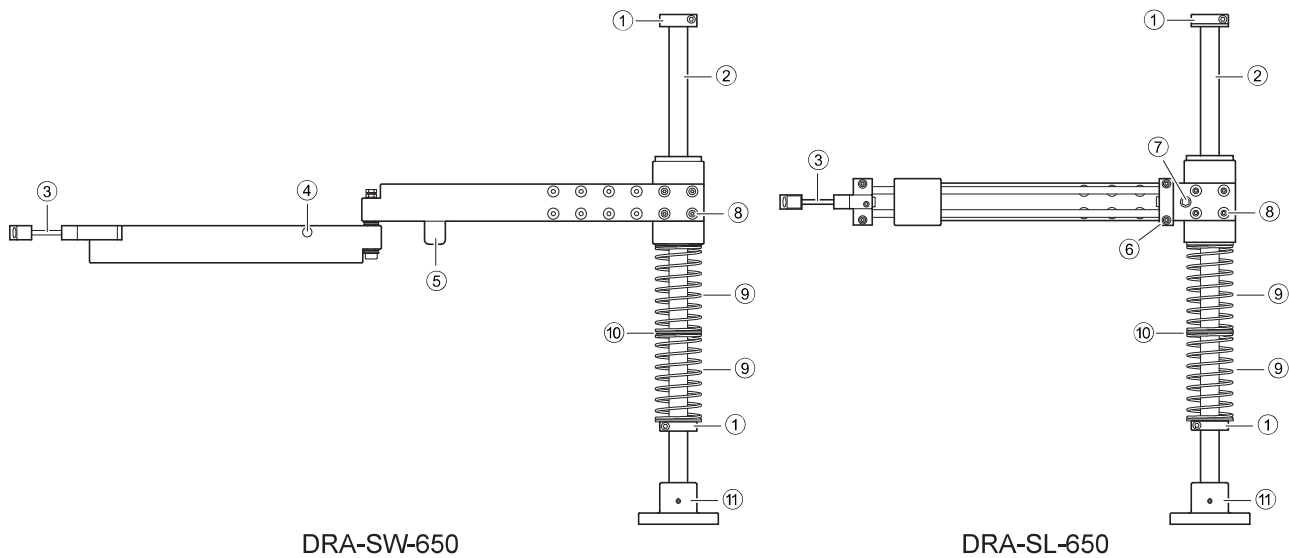
When you open the package box, check the contents of the package and also check for any damage caused by incidents during transportation.

If a problem is found, consult with your dealer where you purchased the product.

DRA-SW-650		DRA-SW-650	
Package content and accessories	Quantity	Package content and accessories	Quantity
Torque reaction arm (main unit)	1	Torque reaction arm (main unit)	1
Hex wrench (diagonal 4 mm (0.16"))	1	Hex wrench (diagonal 4 mm (0.16"))	1
Hex socket head bolt M5 × 35 mm (1.38")	2	Hex socket head bolt M5 × 35 mm (1.38")	2
Instruction Manual (this document)	1	Instruction Manual (this document)	1

The torque reaction arm is disassembled prior to packing. Assemble the tool before use. (p. 22)

## Part names



DRA-SW-650

DRA-SL-650

Name	Function
① Collar	Installed within the range of arm operation. (p. 22)
② Main shaft	
③ Tool clamp	Holds an electric screwdriver or other tool. (p. 24)
④ Neodymium magnet	Secure the arm with the magnet ④ during storage. Also, prevent the arm from coming into contact with the main shaft.
⑤ Arm stopper	
⑥ Shaft clamp	Provided with the neodymium magnet.
⑦ M4 hex head bolt	Secures the arm with the magnet of ⑥ during storage.
⑧ M4 hex socket head bolt 4 pcs.	Used for adjusting the operating radius. (p. 23)
⑨ Push spring	
⑩ Spring guide B	Intermediate spring base. Adjusts vertical stroke.
⑪ Shaft holder	Base. Secured to the work table.

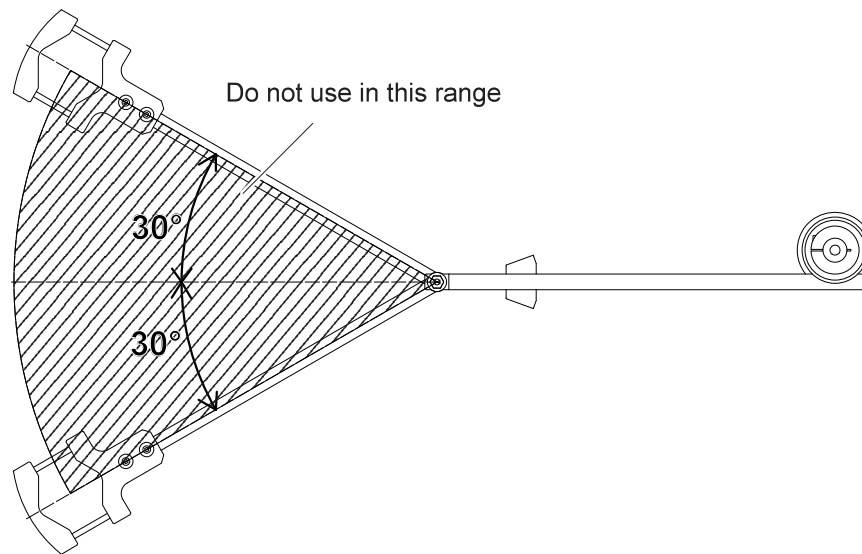


## Specifications

Model		DRA-SW-650	DRA-SL-650
Maximum operating radius (When an electric screwdriver of 52 mm (2.05) DIA is attached)* <sup>1</sup>	[mm (in)]	R650 (R25.59) (when arm angle is 30°)* <sup>2</sup>	R400 to R650 (R15.75 to R25.59)
Total height	[mm (in)]	550 (21.65)	
Weight	[kg (lbs)]	4.2 (9.26)	
Compatible outer diameter of screwdriver	[mm (in)]	30 to 52 DIA (1.18 to 2.05)	
Vertical stroke (when the DLV70A06P/L is attached)* <sup>3</sup>	[mm (in)]	100 (3.94)	

\*1 Operating radius when an electric screwdriver of 52 mm (2.05") DIA is attached. Refer to external dimensions for details. (p. 26)

\*2 Use the DRA-SW-650 at a front end arm angle of  $\pm 30^\circ$  or more.



\*3 Vertical stroke is adjusted by the number of push springs. (p. 22)

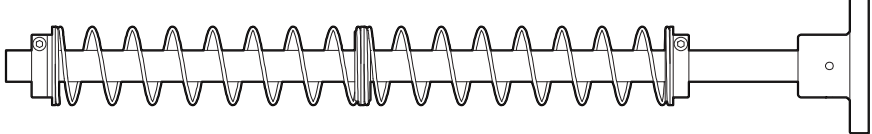
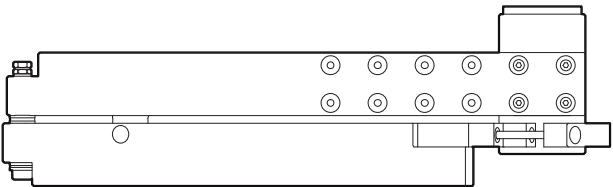
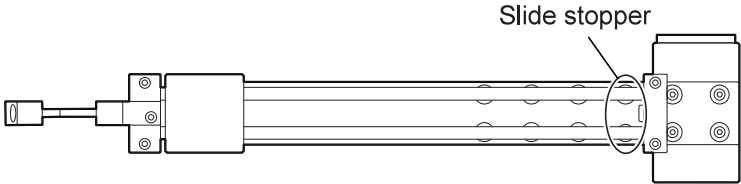
## 2. Installation

### Assembly

#### ⚠ WARNING

- Take care not to get your hand or fingers caught and injured in moving parts during assembly or installation. This operation should be performed by two persons.

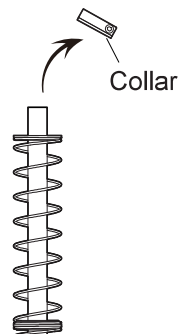
The torque reaction arm is disassembled into the main shaft and the arm prior to packing.

Main shaft	
DRA-SW-650 arm	
DRA-SL-650 arm	 <p>● Since there is a risk of hand entanglement, remove the slide stopper after completing assembly and installation.</p>

#### 1 Secure the main shaft parts to a stable place.

Clamp the flange of the shaft holder with a vise to secure it to the work table or open a hole in the work table and secure the shaft holder to the table using a bolt and nut.

#### 2 Use the supplied hex wrench (diagonal 4 mm (0.16")) to remove the collar on the main shaft.

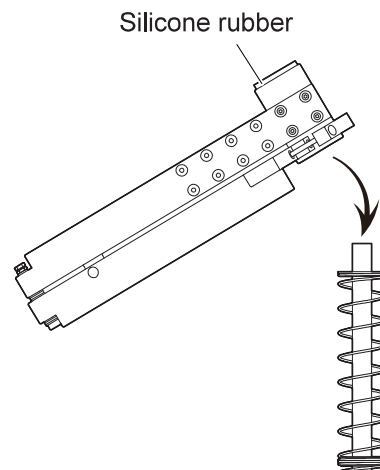


### 3 Change the number of push springs and spring guides B according to the vertical stroke width.

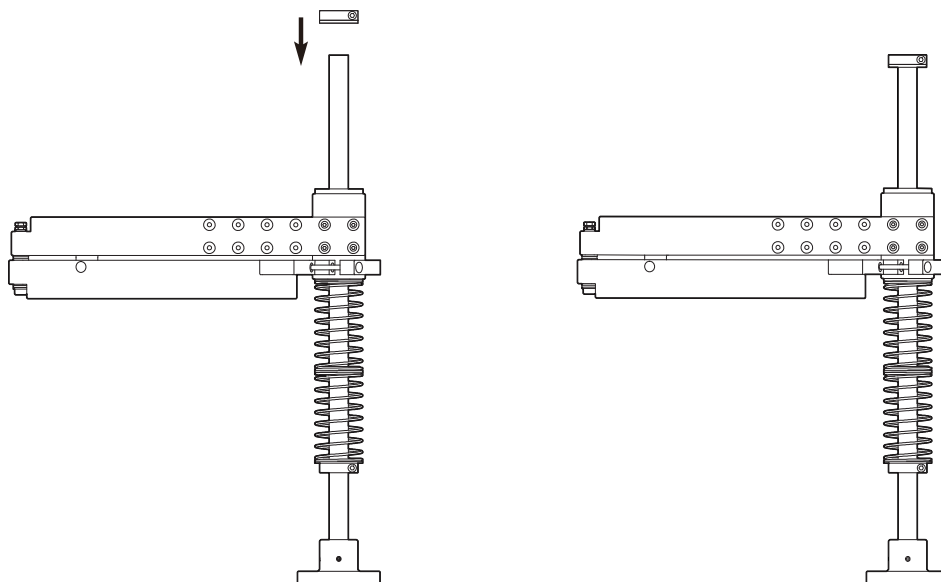
Vertical stroke	Number of push springs
50 mm (1.97")	Push spring × 1
100 mm (3.94")	Push spring × 2, push spring guide B × 1 (at time of shipment)
150 mm (5.91")	Push spring × 3, push spring guide B × 2 (added separately-sold products, p. 25)

Insert the spring guide B between two push springs.

### 4 Insert the arm straight into the main shaft. The silicone rubber of the arm should face upwards.



### 5 Tighten the collar to the main shaft with a tightening torque of 4 Nm (35.4). Insert the collar with the urethane rubber side facing down.



## Adjusting the arm

Adjust the length of the arm to suit the work environment.

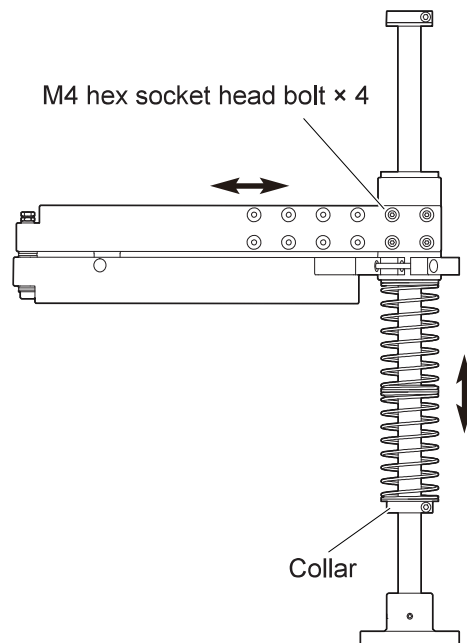
### ⚠ WARNING

- Take care not to get your hand or fingers caught and injured in moving parts during assembly or installation. This operation should be performed by two persons.

### ⚠ CAUTION

- Support the arm when loosening the collar during adjustment to prevent the arm from falling. This operation should be performed by two persons.

- 1** Remove the four M4 hex socket head bolts from the arm.
- 2** Adjust the arm to the required length and use the four M4 hex socket head bolts to fix it.  
Arm length can be adjusted in five steps by 30 mm (1.18").
- 3** Use the supplied hex wrench (diagonal 4 mm (0.16")) to loosen the M5 hex socket head bolt in the collar.
- 4** Adjust the vertical position of the arm as required by workpiece or bit used.
- 5** Tighten the collar to the main shaft with a tightening torque of 4 Nm (35.4).



## Fixing the electric screwdriver

### ⚠ CAUTION

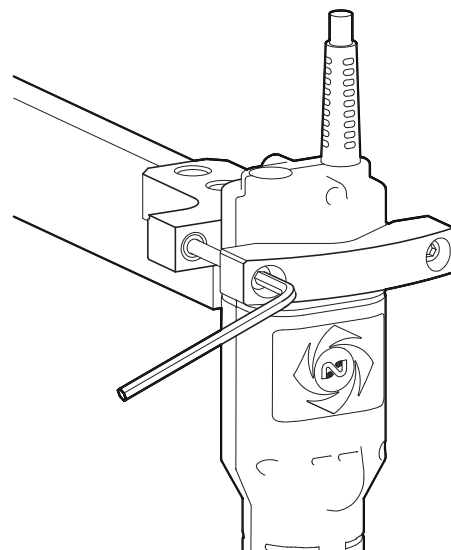
- Remove the power cord of the electric screwdriver before the installation operation to ensure that the electric screwdriver is not activated.
- Be careful not to damage the electric screwdriver when installing it on the arm.
- Before using the electric screwdriver installed on the arm, make sure that it is fixed firmly.

- 1 Insert the electric screwdriver into the tool clamp.
- 2 Tighten the M5 hex socket head bolts on the tool clamp alternately and equally with the supplied hex wrench (4 mm (0.16") width across flats) to fix the electric screwdriver.

Insert the frame top of the electric screwdriver into the tool clamp and fix it securely.

Use the appropriate supplied hex socket head bolts according to the outer diameter of the electric screwdriver.

Outer diameter	Hex socket head bolt
37 to 52 mm DIA (1.46" to 2.05")	M5 hex socket head bolt × 50 mm (1.97", at time of shipment)
30 to 38 mm DIA (1.18" to 1.5")	M5 hex socket head bolt × 35 mm (1.38")



## 3. Appendix

### Maintenance and inspection


#### ⚠ WARNING

- Always perform inspection before using the tool.
- Do not disassemble or alter the tool.
- Use genuine parts.

Inspection	<ul style="list-style-type: none"> <li>● Check for damage, cracks or breaks on the main unit.</li> <li>● Check for loose bolts on the main unit. If screws are loose, tighten them.</li> </ul>
Maintenance	<ul style="list-style-type: none"> <li>● If the main unit is stained, use a dry cloth to wipe it clean.</li> </ul>

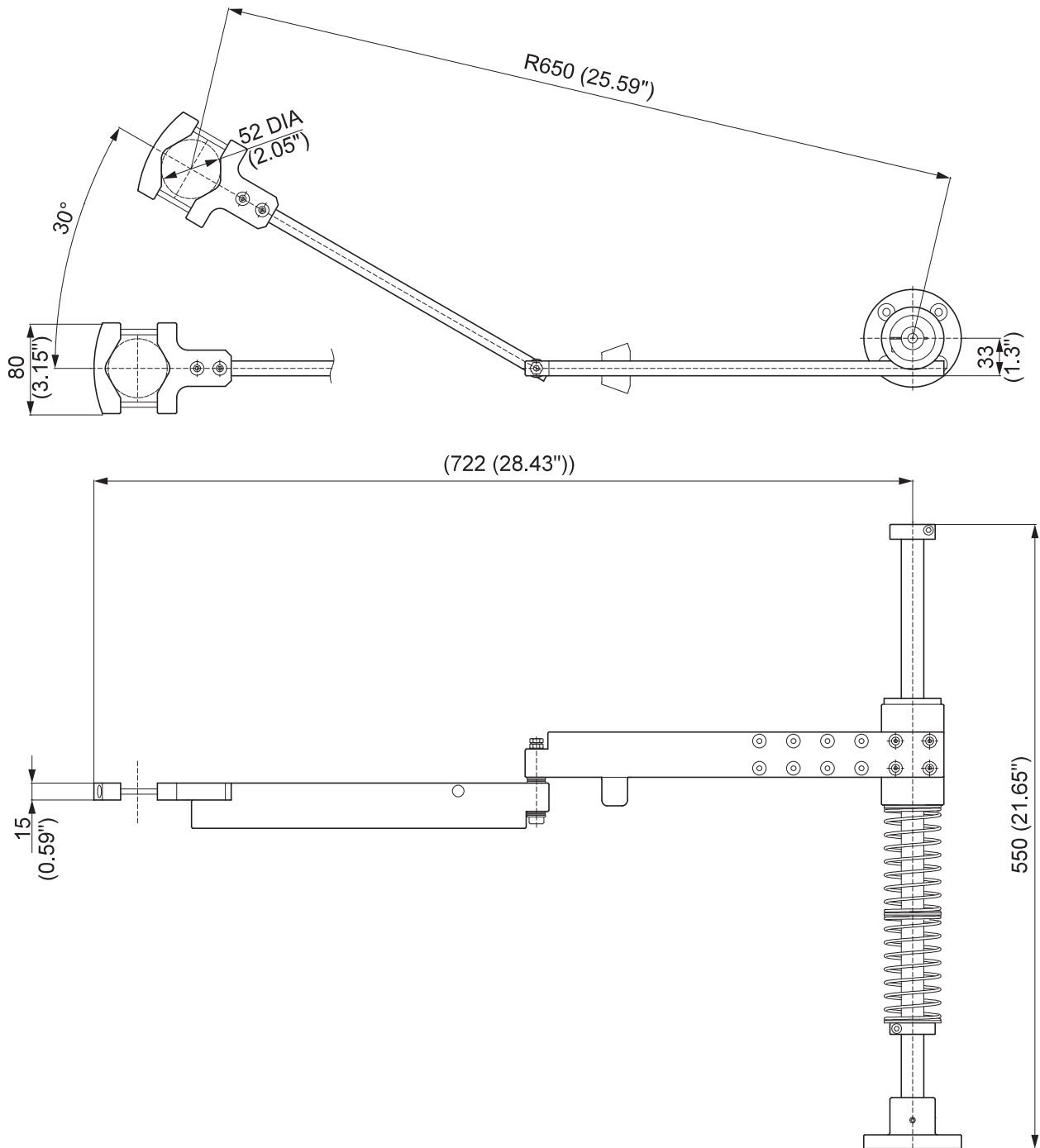
### Separately-sold products

The following products are sold separately. To purchase these items, contact the dealer where you purchased this product.

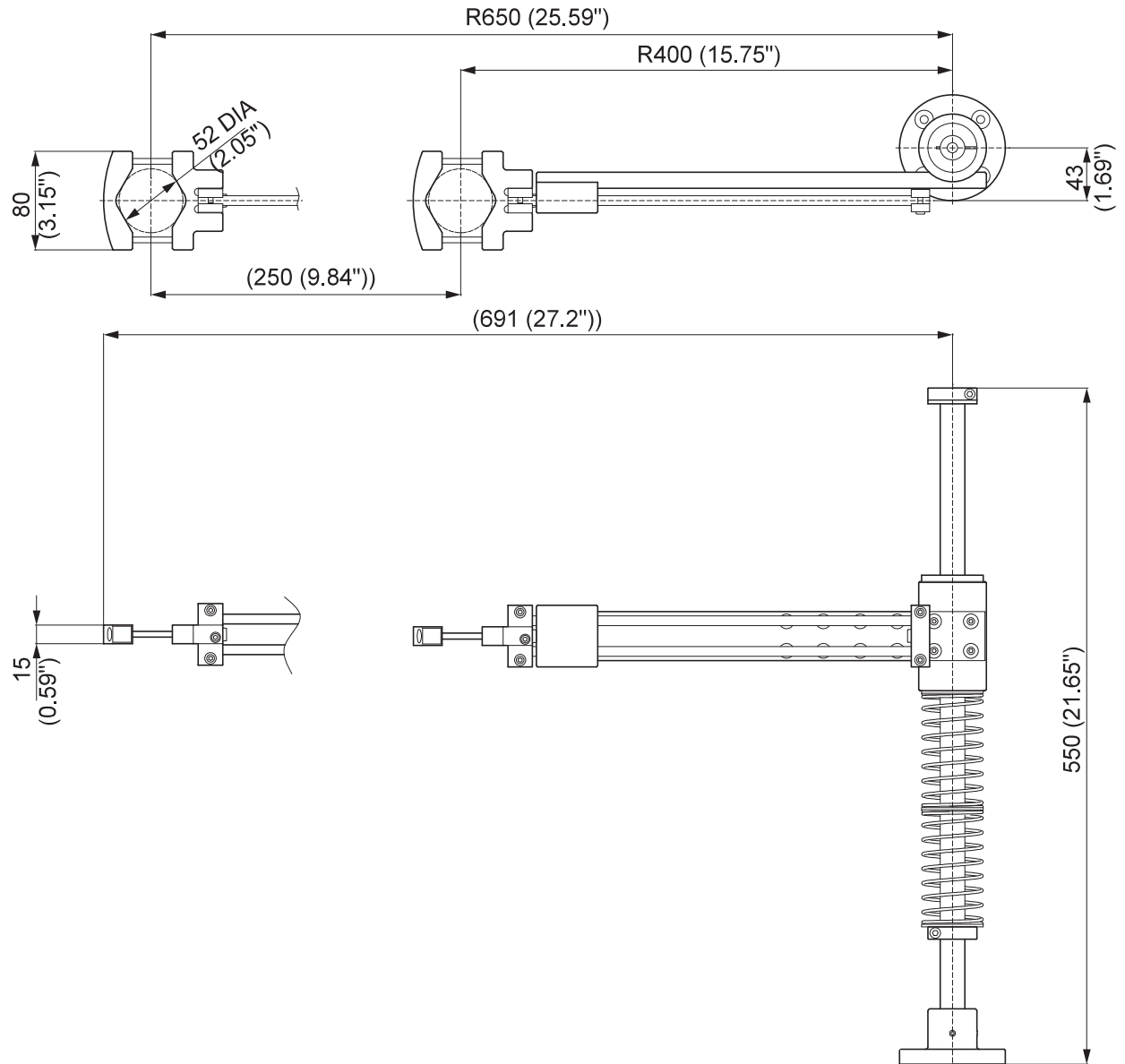
Product name (model)	Appearance	Specifications, etc.
Push spring Spring guide B		For the vertical stroke of 150 mm (5.91") <ul style="list-style-type: none"> <li>● Insert the spring guide B between two push springs.</li> </ul>

## External dimensions

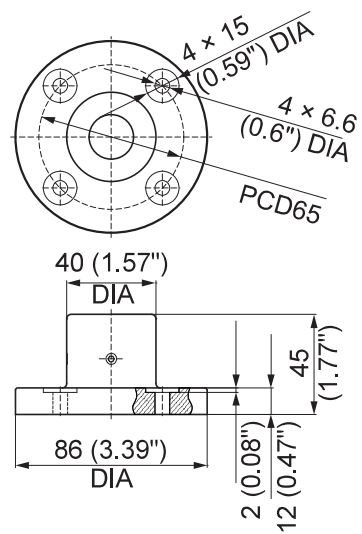
DRA-SW-650



DRA-SL-650



Detail of shaft holder









## ■ Overseas Affiliates / Offices

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