SANYO MACHINE WORKS, LTD.
~Advanced Solutions and Service in Assembly System~

Sanyo machine works
Handheld
Digital control
Nutrunner system

SANYO MACHINE WORKS, LTD.

JQA-QM3832   CM009

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*The above-mentioned specification may be changed without prior notice.

SHD-P2.0-E   2018.09

High quality and performance handheld Nutrunner created by reliable technology.

Sanyo Machine Works has high technology as the first maker sold Nutrunner in Japan. These handheld Nutrunners "SHDN" which are based upon the accumulated experience realize fastening quality and work efficiency at the same time by high fastening accuracy and low reaction technology.
These are sure to contribute to the fastening quality and productivity improvement.

Impact Mode

● **IMPACT MODE**
<Nutrunner mode> is tightening method that continually increase torque, and it has also <Impact mode> that create impact motion by the motor control. By this impact function, tightening load of operator will be decreased a lot. (Patented in Japan)

● **ADJUSTABLE IMPACT**
You can select Nutrunner mode or Impact mode in the fastening program. And you can use flexible impact setting for any kind of work pieces by changeable setting of impact power and impact cycle. (*The tool for inpact mode use only can not use in Nutrunner mode)

Nutrunner Mode Torque Curve
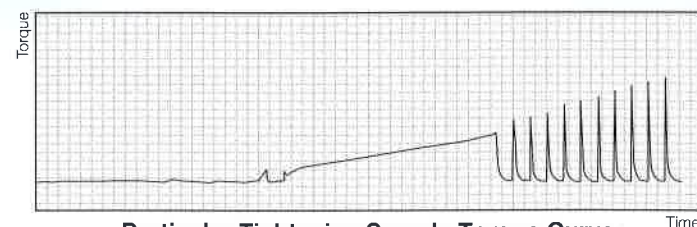
Impact Mode Torque Curve
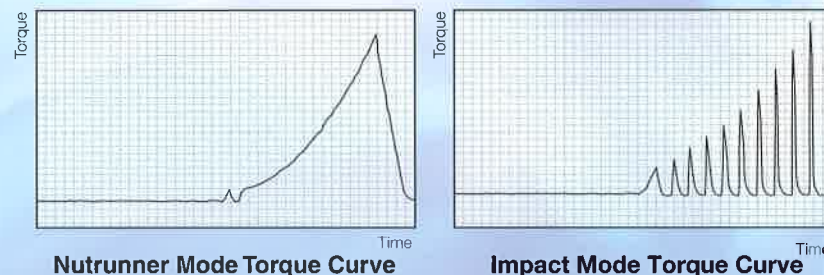
Various Fastening Functions

For the fastening motion, our system adopts program method. You can achieve the following complicated fastening program and make delicately parameter by changing the speed acceleration and fastening speed.
● Torque method, Angle method, timed control method
● Synchronization tightening, Sequence tightening
● Double tightening, Two step tightening, Torque keep, and etc.
● You can do fastening to loosing in just one program for pieces such as stud bolt by impact mode.
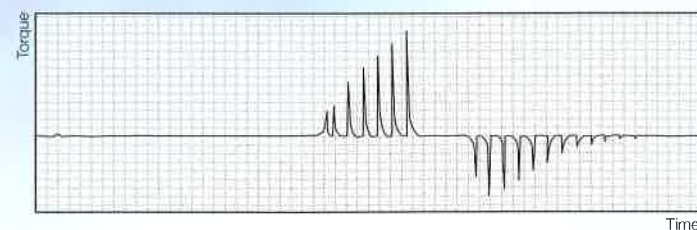
Case 1)
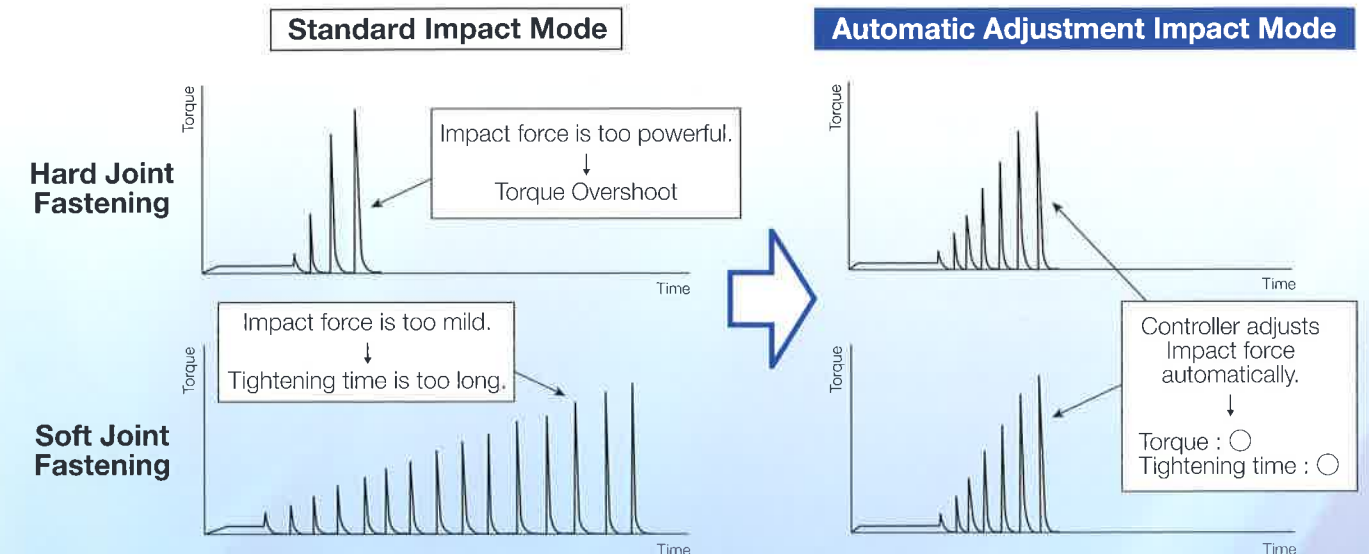Tighten by impact mode.
↓
Loosen by impact mode.

Case 2)
Tighten by Nutrunner mode till the middle.
↓
Tighten by Impact mode till the end.

Particular Tightening Sample Torque Curve

Automatic Adjustment Impact Mode

This function can adjust an impact parameter such as pulse speed and pulse width automatically according to work pieces condition (soft joint / hard joint).
In case of fastening one work piece which has soft joint and hard joint in mixed, it can get the high fastening accuracy and work efficiency by suitable impact tightening.

Standard Impact Mode

Automatic Adjustment Impact Mode

Hard Joint Fastening

Impact force is too powerful.
↓
Torque Overshoot

Soft Joint Fastening

Impact force is too mild.
↓
Tightening time is too long.

Controller adjusts Impact force automatically.

Torque : ○
Tightening time : ○

Various Judgment Functions

It has abundant judgment functions. It is possible to do high quality fastening by detecting a bad thread and fastening because it has the possibility to do several judgment according to the work pieces condition.
NG judgment for over 32 items , Trouble judgment for over 34 items, so there are over 66 items in total.

Batch Count Function

● **FASTENING NUMBER COUNT**
Batch count function which can count fastening numbers and output OK signal when it reaches to the setting fastening number. It can helps to prevent the fastening failure in case of fastening several times for only one work piece.

● **SWITCHING FASTENING PROGRAM**
It is possible to change different programs in the batch count sequence. In case of fastening several times for only one work piece and the each torque is different, it can set up the program at each fastening.

● **VARIOUS OPTION SETTING**
As additional setting, there are many kinds of option settings such as Count UP/DOWN indication, fastening OK count/OK+NG count, count back/forward after loosing. They help for various fastening conditions.

– Tightening Sequence –
① 7N·m
② 7N·m
③ 10N·m
④ 10N·m
⑤ 10N·m
⑥ 10N·m

7 N · m   10 N · m
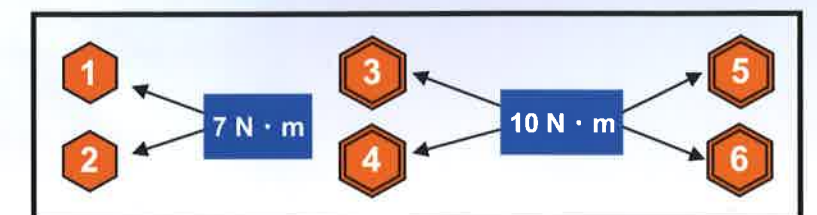
Target torque is changeable according to the tightening sequence.

Compact, Ultra-Light Weight & High Power

●**SMALL & ULTRA-LIGHT TOOL**
Super lightweight 0.95kg (16Nm Pistol type) is realized by the downsized motor and high rigidity resin body.

●**LOW OPERATION TEMPERATURE**
The new designed motor is so efficient because the operating temperature is restrained, even during the continuous duty cycle.

●**THIN & HIGH-FLEX CABLE**
The thin and flexible tool cable makes operators much easier to handle the tool, because it can reduce their strain and fatigue.

●**COMPACT CONTROLLER**
The new space saving and light weight controller can be installed in any location. With its compact size you can install it on various places such as line-side or on top of a cart.

SHD-T2-016P

SHD-T2-030S

High performance & High Durability & High Reliability

●**TOP-LEVEL HIGH-SPEED TOOL IN THE WORLD**
The high speed Pistol tool (SHD-T2-Type), achieves speeds over 3 times faster than an original. With increased brake performance, the tool can reach seating torque at high speeds, and reducing fastening times.

●**SUPER DURABILITY**
One million consecutive running test, at rated torque, guarantees outstanding durability. High precision and high efficiency of the planetary gear contributes toward this high durability and reduces operating noise.

●**NON CONTACT TRIGGER SW**
Non-contact, non-wear trigger switch makes the tool trigger highly durable. Two speed trigger provides more accurate tool socket and fastener thread engagement.

●**LED INDICATOR**
End of cycle data (OK/NG) can be easily confirmed by 3 brightly colored LEDs. The color and status (Blinking/Steady) of the LEDs can be user defined based on error/ fault codes.

●**RESOLVER FOR ANGLE DETECTION**
Resolver for measuring degrees of rotation (Angle Detection) ensures high reliability and anti-shock durability.

●**QUICK & EASY TOOL CHANGE**
All the tools are inspected and calibrated prior to shipping and are ready for production just by hooking up to the controller.

SHD-T2-050A

High Precision & Multi-Function

●**HIGH ACCURACY & QUICK RESPONSE**
Sanyo's designed quick response motor can reach seating torque at maximum speeds with minimal over-run issues, therefore it can fasten highly accurate at decreased cycle times.

●**PROGRAMMABLE & MULTI-FUNCTIONS**
Fastening motions and sequences are fully programmable. You can change fastening parameters such as tightening speed and acceleration ratio. Also, you can program complicated fastening motions such as dual fastening.

●**WIDE COMMUNICATION CAPABILITY**
Fastening data is outputted through the RS232C. Each field bus such as CC-Link, DeviceNet and etc. and Ethernet (TCP/IP) are available by option board. It is needs more than two option boards, you can attach by using expansion unit. (Option board is available up to 4 pcs.)

●**FASTENING DATA STORAGE FUNCTION**
Recordable the fastening data to the memory of the controller. (Up to 22,500 results). Recorded data can be read by Sanyo software <User Interface Terminal>, and it is possible to save and export to excel sheet.

SHD-DT2

Input / Output Board	Sink input (NPN)
	Source input (PNP)
Fieldbus Board	CC-Link
	CC-Link Ver.2
	DeviceNet
	Profibus
	Ethernet/IP
Data Communications Board	Ethernet

Option Board List

User Interface Terminal Software (UIT)

●**NUTRUNNER SUPPORT SOFTWARE**
By using the User Interface Terminal Software, fastening parameters & programs can be set up and storage fastening data and torque curve data can be collected. Recorded data can be saved as a file, and can be outputted to the file such as CSV.
The User Interface Terminal has Basic version which can be used only for the fastening setting and storage fastening data and Full support version which can be used all functions such as data acquisition and etc.

●**FUNCTION**
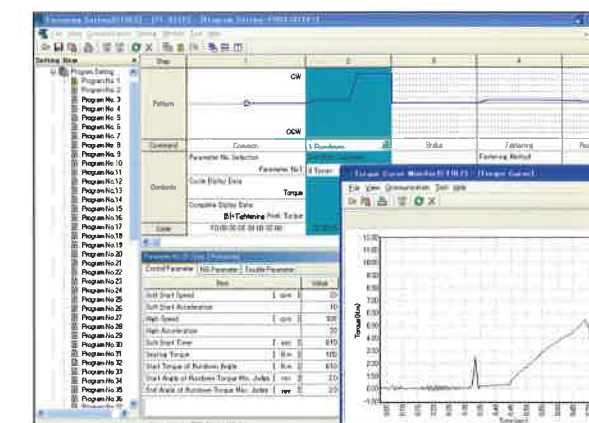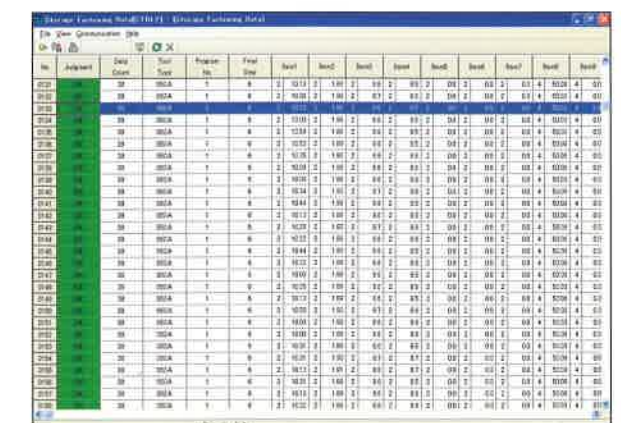<Basic version / Full support version>
・ Fastening setting
・ Fastening data storage
<Full support version only>
・ Fastening data acquisition
・ Torque curve monitor
・ Tool maintenance check
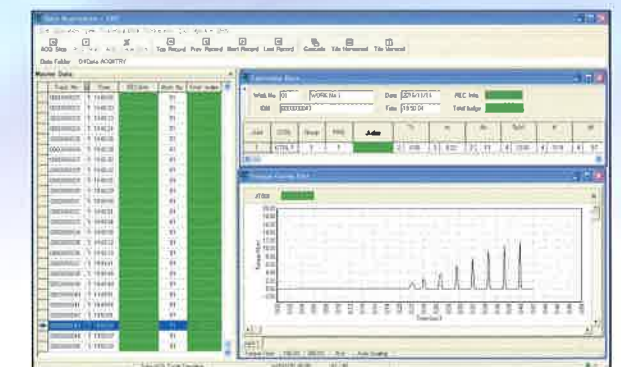
Fastening Data Acquisition Display Screen

Fastening Setting / Torque Curve Monitor Display Screen

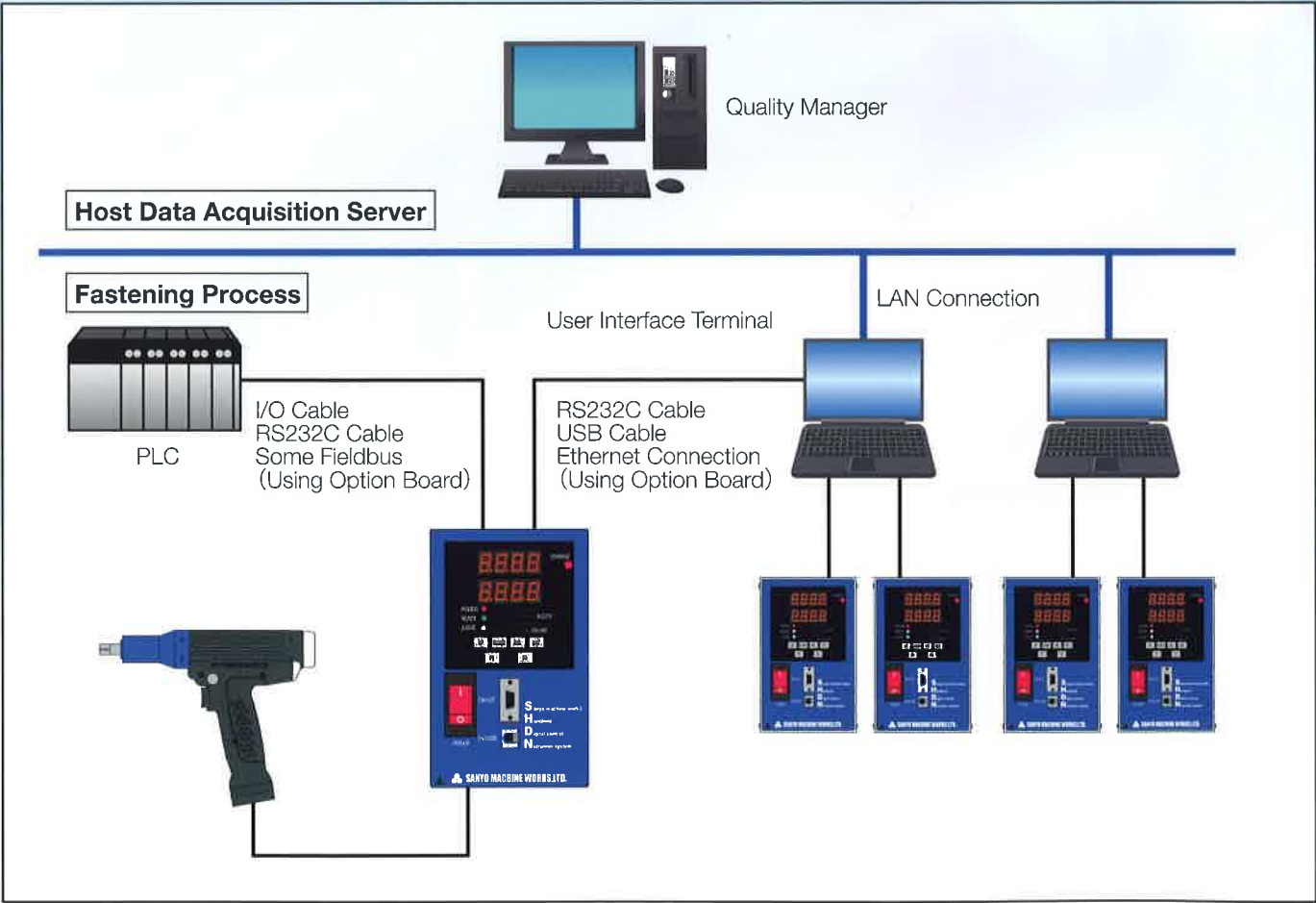**Fastening Data Storage Display Screen**

Quality Manager (QM)

Quality manager is the total management software that can collect fastening data and fastening curve data through the User Interface Terminal. QM has data analysis function such as data acquisition, showing several measurement items at same time trend graph and histogram. (For more information, please contact us.)

System Diagram

SHDN handheld Nutrunner can be connected with several kinds of the interfaces through the controller. For the connection with outside devices, it can be used by an I/O cable or some fieldbus.
And the fastening data such as the torque and result can be sent by RS232C, some fieldbus or Ethernet communication.
By connecting with a PC which is installed User Interface Terminal with the host server PC which is installed Quality Manager, the fastening data and torque curve data from several controllers can be collected automatically to the host server PC.

Quality Manager

Host Data Acquisition Server

Fastening Process

PLC

I/O Cable
RS232C Cable
Some Fieldbus
(Using Option Board)

User Interface Terminal

LAN Connection

RS232C Cable
USB Cable
Ethernet Connection
(Using Option Board)

Cables

Tool Cable

This is a small diameter and flexible cable. It has four king of cable lineup.

Straight tool cable

Elbow type tool cable

Coil type tool cable

Tool Cable Model List

Type	Model	Length (m)
Straight	SHD-CT-H05	5
	SHD-CT-H10	10
	SHD-CT-H15	15
	SHD-CT-H20	20
	SHD-CT-H25	25
	SHD-CT-H30	30
Joint	SHD-CTJ-S__	(*1)
Elbow	SHD-CT-L__-_____ (*2)	(*1)
Coil	Please contact us separately.	

*1 Part of "__" in model must be mentioned cable length.
   Line up of cable length is same as standard cable.
   (About specifications or maximum length, please contact us.)
*2 The end of model name is different according to the Elbow metal direction what you hope.

Power Cable

Power cable has two kinds of 100V and 200V. Primary power source side is a round terminal basically.
(*Accept an offer for connector which is different type for each country.)

100V power cable

200V power cable

Power Cable Model List

Type	Model	Length (m)
100V	SHD-CPP-03	3
200V	SHD-CPT-02	2
	SHD-CPT-03	3
	SHD-CPT-05	5

I/O Cable

I/O cable has two kinds of cable lineup.

Standard I/O cable

Terminal base

I/O Cable Model List

Type	Model	Length (m)
Standard	SHD-CI-03	3
	SHD-CI-05	5
	SHD-CI-10	10
Terminal Base	SHD-CIT	-

Tool Hanger

Pistol type has three kind of hanger lineup, and Angle type has two kind of hanger lineup.

Pistol tool Horizontality

Pistol tool Verticality

Pistol tool Head-down

Angle tool Horizontality

Angle tool Verticality

Hanger Model List

Type	Model	Direction
Pistol	SHD-HP-H	Horizontality
	SHD-HP-V	Verticality
	SHD-HP-U	Inverse
Angle	SHD-HA-H	Horizontality
	SHD-HA-V	Verticality

Tool Cover

This is protection resin cover according to the each tool.

Pistol tool cover

Angle tool cover

Tool Cover Model List

Type	Model	Tool Model
High-Speed Pistol	SHD-P2-010P	SHD-T2-010P
		SHD-T2-012P
	SHD-P2-020P	SHD-T2-020P
High-Speed Impact Pistol	SHD-P2-016P	SHD-T2-016P
	SHD-P2-050P	SHD-T2-050P
Pistol	SHD-P1-012P	SHD-T1-012P
		SHD-T1-020P
Angle	SHD-P1-020A	SHD-T1-020A
	SHD-P2-050A	SHD-T2-050A
	SHD-P2-100A	SHD-T2-100A
	SHD-P2-150A	SHD-T2-150A

Option Board

Option board has fieldbus board and data communication board. In case of two option boards using at the same time, an expansion unit is necessary to be attached to the controller. (Option board is available up to 4 pcs.)

Controller with option board

Controller with expansion unit

Option Board Model List

Type	Model	Specification
I/O	SIO-NPN	NPN
	SIO-PNP	PNP
Fieldbus	SNET-DN	DeviceNet
	SNET-PR	Profibus
	SNET-CC	CC-Link
	SNET-CCV2	CC-Link Ver.2
	SNET-EHIP	Ethernet/IP
Data Communication	SNET-EH	Ethernet
Expansion Unit	SHD-EX	-

User Interface Terminal (UIT)

UIT has the basic version that can be used only for fastening setting and fastening result, and the full support version that can be used for every function. It is possible to choose a USB, RS232C and Ethernet for the communication between PC and controller.

UIT CD

USB Cable

RS232C Cable

UIT and Communication Cable Model List

Type	Model	Specification
UIT	SHD-UITB	Basic Version
	SHD-UITF	Full Support Version
USB Cable	USB-AB-02	A-B Type, 2m
RS232C Cable	RS-N09F09F-02A	PC Side D-Sub9Pin, 2m

Reaction Force Reduction Arm

Reaction force reduction arm has two types. Position arm that has function which can switch fastening sequence and fastening program. And elastic telescopic arm that can reduce a reaction force. (*About the specifications of these arms, please contact us.)

Telescopic arm (SAT - * * *)

Position arm (SAH - * * *)

Other Option

Many other options are available. (*About specifications of these options, please contact us.)

Support arm

Angle tool / Straight tool Long trigger switch

RS232C cable for PLC

Tool

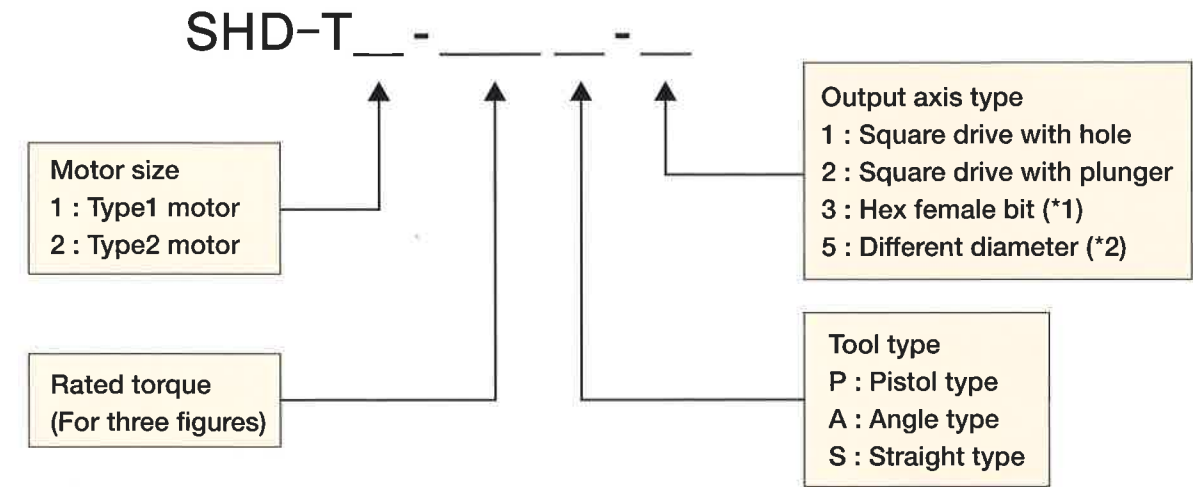| Type	Model	Rated Torque (N·m)	Maximum Torque (N·m)	Free Speed (rpm)	Weight (kg)	Fastening Accuracy (%)
High-Speed Pistol	SHD-T2-010P	10	14	3750	1.10	
	SHD-T2-012P	12	16	3000		
	SHD-T2-020P	20	32 (Impact Mode)	1730	1.30	
High-Speed Impact Pistol	SHD-T2-016P	16	16	3000	0.95	
	SHD-T2-050P	50	50	2600	(*)	
Pistol	SHD-T1-012P	12	16	1125	0.89	±5 (3σ/Rated Torque) (Nutrunner Mode)
	SHD-T1-020P	20	32 (Impact Mode)	635	0.93	
Angle	SHD-T1-020A	20	20	675	1.35	
	SHD-T2-050A	50	50	740	1.85	
	SHD-T2-100A	100	100	525	2.55	
	SHD-T2-150A	150	150	335	3.25	
Straight	SHD-T1-005S	5	5	1125	1.20	
	SHD-T1-010S	10	10			
	SHD-T2-030S	30	30	1230	1.72	
	SHD-T2-050S	50	50	900	2.36	
	SHD-T2-085S	85	85	555	2.60	
	SHD-T2-150S	150	150	320	3.95	

*Square 9.52mm type : 1.72 / Square 12.7mm type :1.83

Controller

Model	Imput Power (V)	Average Power Consumption (W)	Instant Peak Current (A)	Weight (kg)	Operating Temperature (℃)
SHD-DT2-1	AC 90 ~ 127	160	42.4	2.8	0 ~ 50 (Do not condense dew)
SHD-DT2-2	AC 180 ~ 253				

Tool type

$$SHD\text{-}T\_\_\text{-}\_\_\_\_\_\text{-}\_$$

Motor size
1 : Type1 motor
2 : Type2 motor

Rated torque
(For three figures)

Tool type
P : Pistol type
A : Angle type
S : Straight type

Output axis type
1 : Square drive with hole
2 : Square drive with plunger
3 : Hex female bit (*1)
5 : Different diameter (*2)

*1 SHD-T1-012P, SHD-T2-010P, SHD-T2-012P and SHD-T2-016P four model only.
*2 SHD-T2-050P model only

Pistol tool

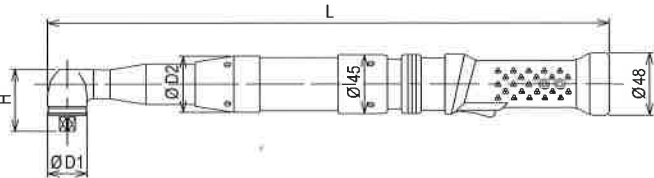| Type	Model	Size (mm)			Output Axis (mm)
		D	H	L (*1)	
High-Speed Pistol	SHD-T2-010P	43	198	242.5	(*2)
	SHD-T2-012P				
	SHD-T2-020P			269	Square 9.52
High-Speed Impact Pistol	SHD-T2-016P	43	198	213	(*2)
	SHD-T2-050P	49	202.5	270	(*3)
Pistol	SHD-T1-012P	40	194	226	(*2)
	SHD-T1-020P			230	Square9.52
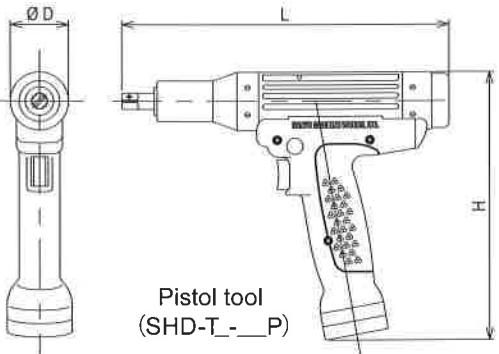
*1 The length depends on output axis. (The upper table shows the size of the square type.) *2 Square 9.52 or hex female 6.35
*3 Square 9.52 or square 12.7. In case of over 45N·m, it is recommended to use square12.7 type.
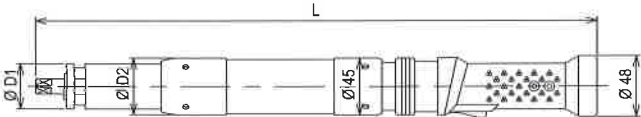

Pistol tool (SHD-T_-__P)

Angle tool

Type	Model	Size (mm)				Output Axis (mm)
		D1	D2	H	L	
Angle	SHD-T1-020A	30	43	48	434	Square9.52
	SHD-T2-050A	36	45	52	477	
	SHD-T2-100A	46	54	65.5	498	Square12.7
	SHD-T2-150A	54	56	75	505	Square15.88

Angle tool (SHD-T_-__A)

Straight tool

Type	Model	Size (mm)			Output Axis (mm)
		D1	D2	L	
Straight	SHD-T1-005S	31	43	390	Square9.52
	SHD-T1-010S				
	SHD-T2-030S	36	45	446	
	SHD-T2-050S	44	54	456	Square12.7
	SHD-T2-085S	47	56	469	
	SHD-T2-150S	64	73	489.5	Square15.88

Straight tool (SHD-T_-__S)

Controller

Controller (SHD-DT2-__)

Controller with expansion unit (Rear side)