

# NSK

Cordless Prosthodontic Screwdriver  
with Torque Calibration System

# iSD900

## OPERATION MANUAL

Please read this Operation Manual carefully  
before use, and file for future reference.



**NAKANISHI INC.**   
[www.nsk-inc.com](http://www.nsk-inc.com)

700 Shimohinata Kanuma-shi  
Tochigi 322-8666,  
Japan

**NSK Europe GmbH**    
[www.nsk-europe.de](http://www.nsk-europe.de)

Elly-Beinhorn-Strasse 8  
65760 Eschborn,  
Germany

**NSK United Kingdom Ltd**  
[www.nsk-uk.com](http://www.nsk-uk.com)

Office 5, Gateway 1000,  
Arlington Business Park, Whittle Way,  
Stevenage, SG1 2FP, UK

**NSK America Corp**  
[www.nsk-inc.com](http://www.nsk-inc.com)

700 Cooper Court  
Schaumburg, IL 60173,  
USA

**NSK France SAS**  
[www.nsk.fr](http://www.nsk.fr)

19 avenue de Villiers  
75017 Paris,  
France

**NSK Dental Spain SA**  
[www.nsk-spain.es](http://www.nsk-spain.es)

C/ Modena, 43 El Soho - Európolis  
28232 Las Rozas, Madrid,  
Spain

**NSK Oceania Pty Ltd**  
[www.nsk-inc.com](http://www.nsk-inc.com)

Unit 22, 198-222 Young St.  
Waterloo, Sydney,  
NSW 2017, Australia

**NSK Middle East**  
[www.nsk-inc.com](http://www.nsk-inc.com)

Room 6EA-701, 7th Floor, East Wing No.6  
Dubai Airport Free Zone,  
PO Box 54316 Dubai, UAE

**NSK Asia**  
[www.nsk-inc.com](http://www.nsk-inc.com)

1 Maritime Square,  
#09-33 HarbourFront Centre,  
Singapore 099253

Specifications are subject to change without notice.

©10.00.00 

OM-E0503E

MADE IN JAPAN



0197

# iSD900

Thank you for purchasing the iSD900. Read this Operation Manual carefully before use for operation instructions and care and maintenance guidelines. Keep this Operation Manual for future reference.

## Application

This product is a cordless motor handpiece system intended for fixing an abutment onto a dental implant in endodontic treatment

## User


Only qualified personal is allowed to use the unit only in dentistry.

## Prohibition


Do not use this motor handpiece other than above.

### ■ Classification of Devices

Classification by type of protection against electric shock:

— Class II devices 

Classification by degree of protection against electric shock:

— Applied part type B 

Classification by sterilization or disinfection method allowed by the manufacturer:





— Refer to Sterilization.

Classification by safety level of use in air, flammable anesthetic gas or dinitrogen monoxide (laughing gas), flammable anesthetic gas:

— Not suitable for use in the presence of a flammable anesthetic mixture with air or oxygen or nitrous dioxide

## Cautions for handling and operation

- Read these safety cautions thoroughly before use and operate the product properly.
- These indicators are to allow you to use the product safely and prevent danger and harm to you and others. These are classified by degree of danger, damage and seriousness. All indicators concern safety, therefore always follow them.

Classification	Degree of danger or damage and seriousness
 <b>DANGER</b>	Explains an instruction where death or serious injury may occur
 <b>WARNING</b>	Explains an instruction where bodily injury or damage to device may occur
 <b>CAUTION</b>	Explain an instructions where possibility for minor to medium bodily injury or damage to deceive may exist
 <b>NOTICE</b>	Explains an instruction that should be observed for safety reasons

## **DANGER**

- This product is Ni-MH battery use only. Do not use other battery.
- Do not use non-charging type batteries such as alkaline batteries and manganese batteries. Charging with these batteries may cause fluid leaks, explosion or chlorine gas generation.
- Always replace two batteries of the same type by the same manufacturer at the same time. Using batteries of different-types, an exhausted battery with a fully charged one, or a new battery with an old one may cause a fluid leak or explosion.

 **WARNING**

- Keep away from patients with cardiac pacemakers.
- As for the contra angle head, use only the product model specified by our company (Model: iSD-HP). Do not connect the contra angle head with other products which are not recommended by us.
- Prior to use, always calibrate the handpiece. If no calibration is made before use, the actual torque may deviate from the preset torque limit.
- Check for vibration, noise and overheating outside the patient's mouth before use. And if any abnormalities are found in use, stop using immediately and contact dealer.
- Should the motor handpiece function abnormally, cease operation immediately and return the motor handpiece to the dealer for repair.
- Do not handle the power cord with wet hands. Failure to do so may result in an electric shock.
- Do not spill water or a chemical solution onto or into the motor handpiece or battery charger. Failure to do so may result in fire or electric shock due to short-circuit or breakage due to rust formation.
- Keep away from explosive substances and flammable materials. Do not use for patients anesthetized under laughter gas. (Nitrous Oxide)
- When operating the motor handpiece always consider the safety of the patient.
- Do not disassemble or alter the motor handpiece.
- Do not drop this product. Place the Motor Handpiece, Contra Angle head, Charger and Torque Calibrator on a flat and stable surface.
- If you notice a battery fluid leak within the motor handpiece, deformation of the motor handpiece casing or partial discoloring, immediately stop use and contact your dealer.
- Do not apply excessive load to the products when operating it.
- If the motor handpiece has not been used for long period of time, check it before use to perform correctly.
- This product is Medical Electrical equipment. EMC (Electromagnetic compatibility) is described in the accompanying documentation.
- Portable and mobile RF communications equipment can affect Medical Electrical equipment. Do not use RF equipment outskirts for the product.
- iSD900 needs special precautions regarding EMC and needs put into service according to the EMC information.
- Portable and mobile RF communications equipment can affect iSD900.
- The use of ACCESSORIES, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of iSD900 as replacement parts for internal components, May result in increased EMISSIONS or decreased IMMUNITY of iSD900 .
- iSD900 should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, iSD900 should be observed to verify normal operation in the configuration in which it will be used.

**Motor Handpiece**

- Do not use this product for manual wrench. Overscrewdriverden product may cause a malfunction or injure.
- If you will not use the product for a long period of time, remove the batteries to avoid a fluid leak.

**Battery Charger**

- Since the power cord of the battery charger works as a breaker, set up the unit so that the power cord can be quickly disconnected from the power outlet in emergencies.
- Do not charge the motor handpiece without battery.
- To charge the motor handpiece, only use a dedicated genuine NSK charger. Never charge this motor handpiece with a charger other than the genuine NSK charger.

 **WARNING**

- When inserting the motor handpiece into the charger, check that the alarm sounds and the LCD indicate charging (animation for remaining battery symbol). Unless charging is indicated, this function is not performed and screwdrivers may result by heat generation or liquid leakage may result, therefore, stop use and contact your dealer.
  - Do not put anything (metal or other devices such as wire, safety pin, or coin, plastic) other than the motor handpiece on the charger. Otherwise, screwdriver or failure may result due to heat generation.
- iSD-HP**  
Make sure not to push the push button to prevent a chuck from causing a malfunction during rotation.

 **CAUTION**

- Use commercially available batteries recommended by us. Read carefully the instruction manual by the battery manufacturer before use.
- Do not use or leave the product in a high-temperature environment such as under strong direct sunlight, in a car under a blazing sun, by a fire, or near a stove.
- Before changing the Contra Angle Head/screwdriver/ON/OFF Switch Lever, turn off the power of the Motor Handpiece. Changing with the power on may cause unintended rotation by accidental touch of the ON/OFF Key.
- When the motor handpiece is used wrapped in a vinyl sheet or the like, it may malfunction. Since this kind of use might lead to failure, refrain from this kind of use.
- When mounting a screwdriver, mount it along the thread of the implant. If the screwdriver is mounted aslant to the thread, the thread might get damaged or loosened.
- When the battery has been consumed, the available torque will not reach the preset limit value, and the auto stop function will not work any longer. So, prior to use, always charge the battery.
- Whenever chemicals, solvents or disinfectants have adhered onto the unit, quickly wipe them off. If they are left unremoved, discoloration and/or deformation might occur.
- This equipment is for indoor use only.

 **NOTICE**

- The motor handpiece is designed with the commercially available AAA Ni-MH batteries (rechargeable).
- The motor handpiece consumes electricity very slightly even when the power is off. In addition, fully-charged rechargeable batteries, in general, discharge gradually over time even though it is not used. It is recommended to recharge the batteries just before use.
- When the motor handpiece automatically stops by detecting a low battery voltage, leaving it for a while and turning on the power again may not detect the low voltage immediately. This is not a failure, but due to battery characteristics. Since the voltage drop does not coincide with the remaining battery capacity, consider it only as a yardstick.
- Recharge rechargeable batteries after they deplete as much as possible. Repeating short-time use and subsequent recharging may shorten their operating time due to a "memory effect." Batteries may recover after repeating complete discharge and full charge a few times.
- Since completely discharged batteries cannot be charged, replace with new ones.
- Wear protection glass and dust mask for your health and safety.
- No special training is required for this device.
- This product does not consider patient's age (except infants), gender, weight or nationality.
- Users are responsible for operational control, maintenance and inspection.

## 1. Features

- Operates continuously for approx. 1.2 hour at rated load. (Dependent upon use conditions.)
- When loaded excessively, auto stop will take place. The load limit can be set at any value between 10 and 40 N · cm.
- Through the calibration function, torque difference of the motor handpiece or the contra-angle head can be minimized.
- Non-contact charger prevents improper charging due to deterioration of metallic terminal.
- Thanks to the ON/OFF switch lever, operation is very easy.

## 2. Specification

### Quick Charger for iSD900

Model	NE281
Input Voltage	AC 120-240 V ± 10 % 50/60Hz
Input Power	15 VA
Charging Time	Around 90 min.

### iSD-HP

Model	iSD-HP
Torque	10 - 40N · cm
Screwdriver	Screwdriver Shank Ø2.35mm ISO1797-1 Type1
Chuck Type	Push Button Chuck

### Use environment

Temperature	10 - 40 °C
Humidity	10 - 75 % (Non Condensing)
Atmospheric pressure	700 - 1060hPa

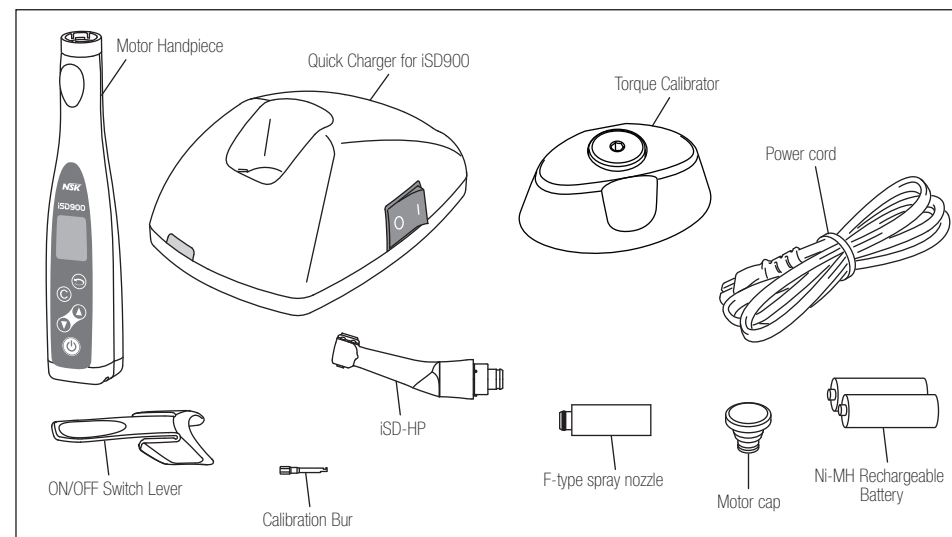
### Motor Handpiece

Model	EM10M3
Input Voltage	DC 2.4V ± 20 %
Input Power	0.3 VA
Speed	15/20/25 min <sup>-1</sup> (With Contra Angle Head)

### Store environment

Temperature	-10 - 50 °C
Humidity	10 - 80 % (Non Condensing)
Atmospheric pressure	500 - 1060hPa

## 3. Name of each part

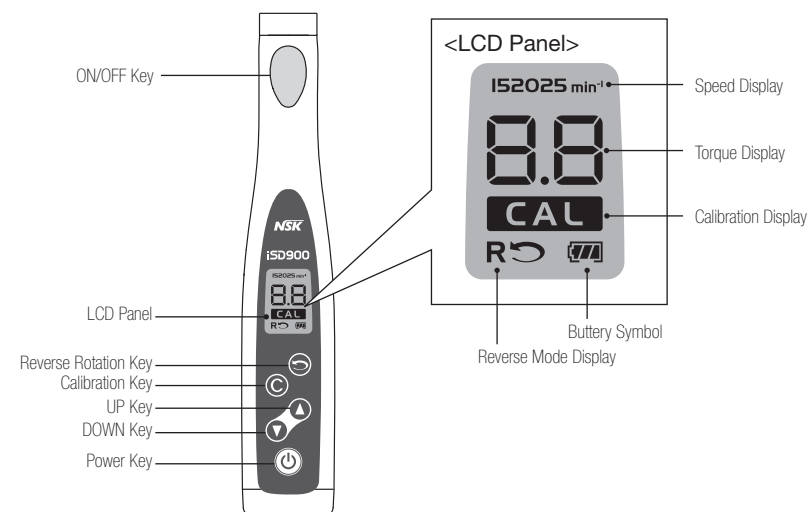


iSD Motor
ON/OFF Switch Lever
iSD HP
Quick Charger for iSD900
Torque Calibrator

Calibration Bar
Power Cord
F-Type Spray Nozzle
Motor Cap
Ni-MH Rechargeable Battery

## 4. Parts and its function

### <Operation Panel Details>



## <Operation Panel Details>

### • POWER Key

Holding the Power Key more than 2 seconds.....

- When Power is OFF : Power ON and LCD Panel on
- When Power is ON : Power OFF and LCD Panel off

### • ON/OFF Key

It rotates only while pushing. If it detaches, rotation will stop.

### • Calibration Key

Holding this key more than 2 seconds and it will change to the Calibration Mode. Performing this mode will reduce the torque difference. (Refer to 5-5-1 Calibration Method)




#### NOTICE

Calibration can only perform by Full charged battery or nearly full charge. If it can not perform this mode, motor handpiece will beep to inform.

### • Reverse Key

Switch rotation mode (Forward Rotation/Reverse Rotation)

When Key is pushed during rotation, it will stop the rotation then begin reverse rotation.

- No Display : Forward Rotation
-  : Reverse Rotation



#### NOTICE

During reverse rotation, regardless of the torque value at that moment, the display shows "--" and the rotation takes place with maximum torque.

### • UP/DOWN Key

Use this key when adjusting the set value for each parameter. Alarm sounds if the set value exceeds the upper limit or lower limit. Unit to be set is  $\text{min}^{-1}$  for speed and  $\text{N} \cdot \text{cm}$  for torque.




#### NOTICE

- Torque can change while the motor handpiece is stopped. You can not change it during the reverse rotation or calibration.
- Speed can only change in Speed Setting Mode.(5-6-4 Changing the Speed)

### • Battery Symbol

The symbol indicating the battery status is displayed. The symbol will be animated when the batteries are being charged.

 : Full charge or nearly full charge

 : About 30-80% remains

 : Less than about 30% remains

 : Batteries are drained or in a remarkably low voltage. Charge the batteries.



#### NOTICE

The symbol indicating the remaining amount of the batteries indicates a voltage. When load is applied to the motor handpiece, the symbol indicating the remaining amount of the battery charge appears to become lower.

## 5. Operations

### 5-1 Charging Batteries

- 1) Insert the Power Cord Jack into the Inlet at the back of the Charger.
- 2) Insert the Power Cord and Plug in. Make sure you have the correct model/voltage.
- 3) Turn on the Power Switch. At this time, check that the Power Lamp lights on.
- 4) Insert the motor handpiece into the Charger. Charging starts with the charge mark flashing on LCD.
- 5) When the buzzer sounds tells you end of charging.

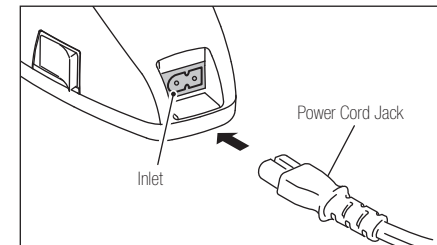


Fig. 1

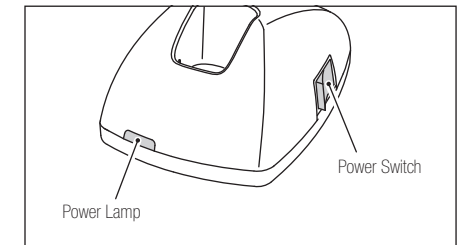


Fig. 2



#### WARNING

When the alarm does not sound and the charging animation is not displayed despite batteries being replaced with new ones, immediately stop using and contact your dealer. (Refer to 10-1 Changing Batteries)

## ⚠ CAUTION

- When the power lamp for the charger does not light up, the internal fuse may be faulty. In this case please contact your dealer.
- Be careful of handling when placing the motor handpiece in to the charger. Do not force the motor handpiece into the charger. Otherwise, failure may be occurring.
- If the power cord is inserted into the jack or the power switch is pressed with unnecessary force, the cord or switch may be broken or a short-circuit may occur.
- Never use the battery charger for anything other than the motor handpiece of this product.
- The charging normally takes approx. 90 minutes, but it depends on battery use conditions, battery freshness, ambient temperature, etc. Older batteries are especially prone to significantly shorter charging and operating times.
- Batteries may slightly warm up during charging, but this is not a failure. If the motor handpiece is inserted or removed into/from the charger at short intervals, (approx. 5 minutes) charging cannot be properly completed and the battery compartment may feel hot. We recommend that you charge batteries for as longer periods as possible.
- The power of the motor handpiece should not be turned on immediately after it has been removed from the charger, wait at least approx. 2 seconds before you switch on the power.
- Completely discharged batteries cannot be charged. Replace them with new ones.
- Do not put anything (metal or other devices such as wire, safety pin, or coin, plastic) other than the motor handpiece on the charger. Otherwise, burn or failure may result due to heat generation.
- The temperature of the batteries is measured during charging. Proper charging cannot be performed if the charger is placed in an environment which is subject to sharp temperature change (next to window, subject to direct sunlight, near air outlet of fan heater). Place it in a place where temperature change is minimal.
- Charging may not be started in the following case.
  - The temperature of the batteries is excessively high or low. (Lower than approx. 0°C or higher than approx. 40°C)
  - Battery voltage is sufficient
  - Battery voltage is abnormal

## 5-2 Changing iSD-HP Contra Angle Head

The contra angle head can be connected with the motor handpiece at 6 adjustable head positions. Align the positioning pins of the contra angle head with the positioning slots of the motor handpiece and insert the head until they click.

When removing the contra angle head, pull it out axially.

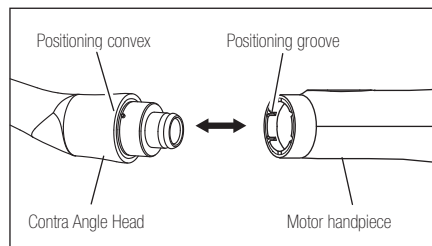


Fig. 3

## ⚠ WARNING

Use only our Contra-Angle head (Model: iSD-HP). Never mount this head to other products.

## ⚠ CAUTION

- Turn OFF the power to remove or mount the Contra Angle Head.
- Check that the Contra Angle Head is securely connected to the Motor Handpiece.

## 5-3 Mounting the screwdriver (Attachment)

- 1) Insert screwdriver to contra angle head, lightly turn the screwdriver until it engages with the latch mechanism.
- 2) Push it inward to click.

Screwdriver Removal, depress the push-Button and pull out the screwdriver.

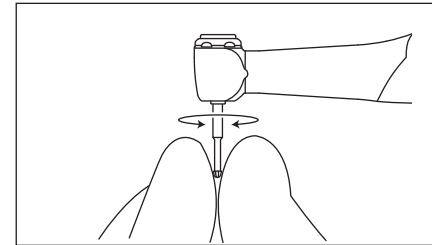


Fig. 4

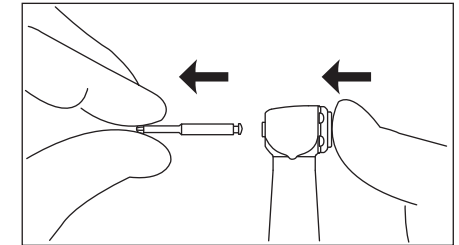


Fig. 5

## ⚠ CAUTION

- When mounting and removing the screwdriver, turn off the power beforehand.
- Use screwdriver for abutment fixing.
- When mounting the screwdriver, ensure the screwdriver is appropriately placed.
- Always clean the shank of the Screwdriver to be installed before use. Allowing dirt to enter the chuck could cause loss of concentricity and deterioration of chucking force.
- Do not use a bent, damaged or deformed screwdriver or one with a shank which does not meet the specifications. When using such a screwdriver, it might suddenly break or axial wobbling might occur, which could cause injuries.
- Do not exceed the rotation speed recommended by the screwdriver manufacturers.

## 5-4 Mounting and Removing the ON/OFF Switch Lever

## ⚠ CAUTION

When mounting and removing the ON/OFF Switch Lever, turn off the power beforehand.

- 1) Mount the ON/OFF Switch lever shown as Fig. 6.

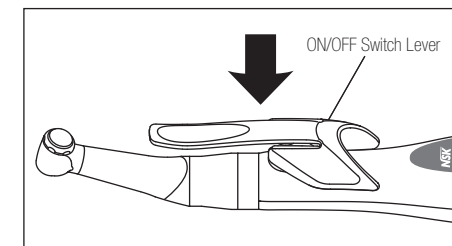


Fig. 6

- 2) Adjust the mounting location so that the convex portion beneath the lever (see circle in Fig. 7) comes into contact with the ON/OFF Key.

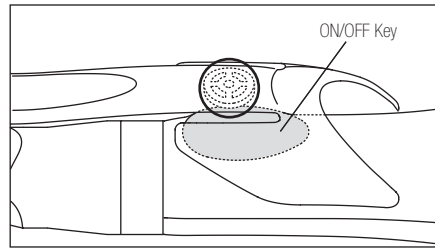


Fig. 7

- 3) Press the POWER Key for more than two seconds to turn on the power, push the portion marked with an arrow as shown in Fig. 8, and confirm that the motor handpiece rotates properly.

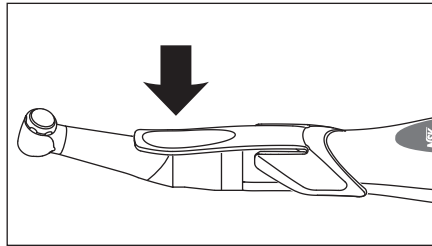


Fig. 8

### CAUTION

- Never attaches ON/OFF Switch Lever for other product.
- Before using the ON/OFF Switch Lever, check that there are no exogenous material or crack.
- If the motor handpiece does not rotate after the ON/OFF Switch Lever has been pressed, this means that the location of the lever is not appropriate. Adjust the location.
- The ON/OFF Switch Lever sometimes comes off during use. In such a case, re-mount the switch lever.
- Motor Handpiece should be observed to verify normal operation in the configuration in which it will be used.

To remove the ON/OFF Switch Lever, pull it up by finger shown on Fig.9.

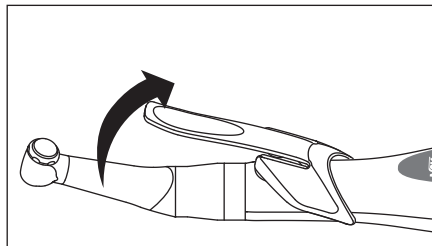


Fig. 9

## 5-5 Preparation Before Use

### WARNING

Prior to use, always calibrate the handpiece. If no calibration is made before use, the actual torque may deviate from the preset torque limit.

- 1) Keep pressing POWER Key more than 2 second to Power on the Motor handpiece.
- 2) When the preset torque limit must be changed, changes can be done through the UP/DOWN Key. The torque limit can be set to any value between 10 - 40 N·cm. If attempting to set a value beyond the lower or upper limit, an alarm will sound.

### CAUTION

While pressing the UP/DOWN Key, the torque value increases/decreases at intervals of 5 N·cm.

- 3) Perform the torque calibration.

### 5-5-1 Calibration Method

- 1) Attach the calibration bur to the contra-angle head.
- 2) Press the calibration key for more than two seconds.
- 3) An alarm sounds and the torque field on the LCD panel displays "L". Also, "CAL" turns on.



- 4) When pressing the ON/OFF Key, a counting-down takes place and then no-load calibration starts. The motor handpiece will start to rotate: let it stop on its own. During the calibration, "CAL" blinks on and off.

- 5) When the rotation has stopped, the alarm has sounded and "H" is displayed in the torque field on the LCD panel, insert the calibration bur straight into the torque calibrator.



- 6) When pushing the ON/OFF Key, a count-down takes place, and then loaded calibration starts. The motor handpiece will rotate: keep holding the motor handpiece in a vertical position until the rotation stops, while firmly holding the torque calibrator (see Fig. 10). During the calibration, "CAL" blinks on and off.

- 7) When the rotation has stopped, the alarm has sounded and the display on the LCD panel has returned to the previous value, the calibration is completed.

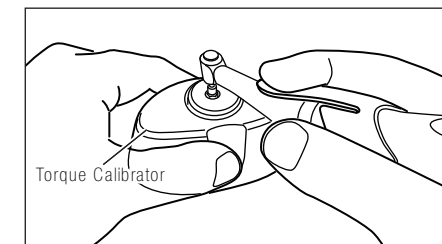


Fig. 10

### CAUTION for Calibration

- Conduct the calibration with the torque calibrator placed on a flat and stable surface. Under the following circumstances, calibration cannot be done properly:
  - When foreign materials or fluids (such as chemicals) have entered the torque calibrator;
  - When the Calibration Bur has been touched or a load has been applied during the no-load calibration;
  - When the Calibration Bur has been attached in an oblique direction, or pushed down, or excessive load has been applied during the loaded calibration.
- Do not allow the torque calibrator to be dropped or turned over. Otherwise, failure might occur.

### NOTICE

- Calibration can only perform by Full charged battery or nearly full charge. If it can not perform this mode, motor handpiece will beep to inform.
- To cancel the calibration, keep pressing POWER Key more than 2 seconds to power off the motor handpiece.
- Perform calibration after cleaning the contra angle head. Residual contamination on the rotating shaft will impair correct measurement.
- This function cannot completely absorb the individual difference of the actual motor handpiece and contra angle head.

### 5-5-2 Calibration Error

If calibration has not been done properly due to failure or handling errors, an error code, C0 - C4, is displayed on the LCD panel.

When the same error still appears even after the relevant measures shown below have been taken, please bring the unit to dealer.

Error code	Error	Cause	Check/Remedy
C0	Beyond the upper limit(No load)	· The calibration bur is loaded	· Confirm whether or not the calibration bur is loaded. (Is it connected to the torque calibrator?) · Replace the contra-angle head with a new one
C1	Below the lower limit (No load)	· The motor handpiece or contra-angle head has reached its life limit	
C2	Beyond the upper limit(Loaded)	· Poor connection with the torque calibrator.	· Confirm whether or not the calibration bur is loaded excessively. (Is the connection with the torque calibrator made properly? Refer to 5-5-1 Calibration Method) · Replace the contra-angle head with a new one
C3	Below the lower limit (Loaded)	· The motor handpiece or contra-angle head has reached its life limit	
C4	Low voltage pressure	The battery is not charged sufficiently or has reached its life limit	Turn off the power source of the motor handpiece, and charge the battery. If the same error recurs even after repeatedly charging the battery, replace the batteries with a new one. (Refer to 10 Changing Batteries)

### 5-6 Operation

If you hold done the ON/OFF key, the motor handpiece starts while the key is pressed. If you release the key, it stops.

#### 5-6-1 Reverse Rotation

You can change the rotation by pressing Reverse Rotation Key.

- When selecting reverse rotation while the motor handpiece is stopping, **R↻** is displayed on the LCD panel and the alarm sounds continuously. As long as the ON/OFF Key is pressed, the motor handpiece holds its reverse rotation, **R↻** blinks on and off on the LCD panel, and an alarm different from the one given while stopping will continue to sound.
- When selecting reverse rotation while the motor handpiece is rotating, the rotation stops and then it shifts to reverse rotation. On the LCD panel, **R↻** blinks on and off, and an alarm different from the one given while stopping will continue to sound.

When the Reverse Key is pushed again, the rotation stops and then shifts to normal rotation.

#### 5-6-2 Auto Stop Function

When the motor handpiece reaches the torque limit during its rotation, an alarm sounds. (Load alarm) When the torque limit is exceeded, the rotation automatically stops. If further rotation is desired, push the ON/OFF key.

### WARNING

Do not use the motor handpiece as a manual wrench. Such improper use might cause failure due to excessive load and eventually cause injury.

### CAUTION

- Prior to use, charge the battery without fail. When the battery voltage is too low, the torque might not reach the preset torque limit. In such a case, the auto-stop function will not work.
- Do not force the motor handpiece.
- When the motor handpiece is subjected to excessive load for a prolonged period, auto stop takes place in order to prevent it from overheating. In such a case, leave the motor handpiece to cool.
- When the ambient temperature is low, an alarm might sound while the motor handpiece is rotating. This does not signify a failure. If the alarm does not stop even after the handpiece has warmed up, clean the contra-angle head and calibrate.(Refer to 5-5-1 Calibration Method)

#### 5-6-3 Auto Power OFF

If the key is not operated or approximately 10 minutes passes during rotation with no-load, the power is automatically turned OFF to save energy and prevent improper operation. However, if load is applied during rotation of the motor handpiece, the power is not turned OFF even during any operation.



### 5-6-4 Changing the Speed

You can select the Rotation Speed (15/20/25min<sup>-1</sup>)

- 1) Turn on the power while pressing the Calibration Key, and select the speed setup mode.
- 2) Current speed shown at the top of the LCD display, change the setup value using the UP/DOWN Key and enter the speed using the ON/OFF Key.
- 3) The product will shift to Calibration Mode automatically. Complete the calibration. (Refer to 5-5-1 Calibration Method)
- 4) When the calibration has been completed, the change is in effect.



#### CAUTION

- Until the calibration has been completed, no setup change is stored.
- To cancel the calibration, keep pressing POWER Key more than 2 seconds to power off the motor handpiece.

## 6. Cleaning



This Contra Angle can be washed via Thermo-Disinfector.

### 6-1 Lubricating Contra Angle Head

- Lubricate the iSD-HP only.
- Apply PANA SPRAY/PANA SPRAY Plus after each use and/or before each autoclaving.

#### Manual: Lubricate by hand

- 1) Lubricate with PANA-SPRAY/PANA-SPRAY Plus. Screw the F-Type Spray Nozzle onto the Spray Nozzle by approx. 10 turns.
- 2) Insert the F type Spray Nozzle into the rear part of the Contra Angle Head and lubricate it for 2-3 seconds. If the contra angle head does not push into nozzle enough, oil may not go around into the Contra Angle Handpiece and it may flows backward.

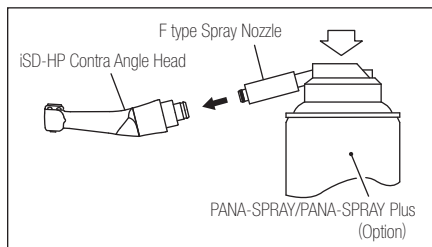


Fig. 11

#### Auto: Lubricate by Care3 Plus

NSK Care3 Plus automatic Contra angle head cleaning and lubrication system after connecting the Contra angle head to the correct adaptor (Z280042), activate the Care3 System per the Care3 System instructions.

### 6-2 Cleaning for Motor handpiece, Charger, Torque Calibrator

When the Motor, Charger and Torque Calibrator becomes dirty, wipe it off with a cotton cloth moistened with rubbing alcohol.

#### CAUTION

- Do not lubricate the Motor Handpiece.
- Do not use solvent like benzene or thinner for motor handpiece cleaning.
- Before mounting the lubricated contra angle head to the motor handpiece, wipe off excess oil. Stand it on its end or lean it in the proper position for gravity draining. Mount it after excess oil has been completely drained.
- Hold the contra angle head securely to prevent it from flying off by the pressure of the spray.
- Supply lubricant until it comes out of the Contra angle head (for approx. 2-3 seconds).
- Hold the spray can (Option) upright.
- Do not use aldehyde for plastic cleaning.

## 7. Sterilization

Steam autoclave is recommended. Sterilization is required first time you use and after each patient as noted below.

The following items are autoclavable: Contra Angle Head, ON/OFF Switch Lever, and Calibration Bur.

#### CAUTION

Never Autoclave Motor Handpiece, Torque Calibrator, Charger, Power Cord and Motor Cap.

#### Autoclave Procedure:

- 1) Brush the dirt off the surface of the Contra Angle Head, ON/OFF Switch Lever, Calibration Bur, and wipe it off with a cotton cloth moistened with surgical spirit. Do not use a metal brush.
- 2) Lubricate the Contra Angle Head with Lubricant Spray. (Refer to the "6-1 Lubricating Contra Angle Head.")
- 3) Insert the Contra Angle Head into an autoclave pouch and seal it.
- 4) Autoclavable up to a max. 135°C (275°F).  
ex.) Autoclave for 20 min. at 121°C (250°F), or 15 min. at 132°C (270°F).
- 5) Keep product in the autoclave pouch to keep it clean until you use it.  
\*Sterilization at 121°C for more than 15 minutes is recommended by EN13060 or EN ISO17665-1.

#### CAUTION

- Do not wipe with, or clean or immerse in, high acid water or sterilizing solutions.
- When these items are sterilized in the autoclave together with other instruments/materials to which chemicals have adhered, their plating might peel off or their inside parts might become affected. Be careful so as not to allow any chemicals to enter the autoclave sterilizer.
- Store them in a place protected from the adverse effects caused by atmospheric pressure, temperature, moisture, ventilation, sunshine, dust, saline materials, phosphorus-containing air, etc.
- Do not touch the items immediately after they have been sterilized. They are hot!

## 8. Motor Cap

When the Contra Angle Head is removed from the Motor Handpiece for battery charging, lubrication, or sterilization, mount the Motor Cap onto the Motor Handpiece to prevent debris from entering.

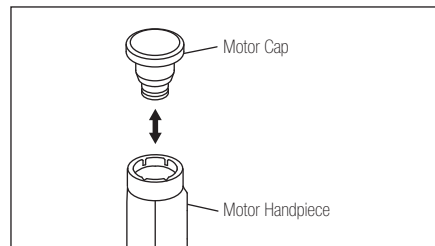


Fig. 12

## 9. Safety System

The motor handpiece monitors temperature of the batteries. If the batteries can potentially become abnormally hot, this system functions and the motor handpiece automatically stops. In such a case, wait until the motor handpiece cools down sufficiently. If this safety system functions repeatedly, either the batteries or motor handpiece is not in the normal operating condition and you should contact your dealer.

## 10. Changing Batteries

The motor handpiece uses rechargeable batteries. They can be recharged 300-500 times, depending on the use conditions of the motor handpiece. If the operating time becomes shorter or the rotation speed becomes slower, although the "MEMORY EFFECT" described in "⚠ NOTICE" is not applicable, the batteries may be at the end of their life expectancy. In such a case, ask your dealer to replace the batteries or replace them with new ones yourself. (Refer to 10-1 Changing Batteries.) When replacing them by yourself, be sure to observe the following "⚠ CAUTIONS on CHANGING BATTERIES." Please note that NSK shall not be liable for any malfunction or failure resulting from you changing the batteries yourself and not following the "⚠ CAUTIONS on CHANGING BATTERIES."

### ⚠ CAUTIONS on CHANGING BATTERIES

- Do not open any part other than the battery cover.
- Use only batteries as specified by NSK.
  - Recommended Batteries: AAA (Marking may be different) Nickel Metal Hydride batteries.
- Depending on the batteries used, the period of continuous use and/or the charging time may vary.
- Use batteries supplied by reliable manufacturers.
- Do not use non-charging type batteries such as alkaline batteries and manganese batteries. Charging with these batteries may cause fluid leaks, explosion or chlorine gas generation.
- Always replace two batteries of the same type by the same manufacturer at the same time. Using batteries of different-types, an exhausted battery with a fully charged one, or a new battery with an old one may cause a fluid leak or explosion.
- Do not work with wet hands. Failure to do so may result in rust formation on battery terminals or moisture intrusion inside, and could cause failure of the product.
- Do not reverse positive (+) and negative (–) when fitting the batteries.

### ⚠ CAUTIONS on CHANGING BATTERIES

- Do not charge the motor handpiece without battery load.
- Should the battery fluid leak and get into your eyes, immediately wash thoroughly with clean water and seek medical attention.
- Should the battery fluid leak and adhere to skin or clothing, immediately wash the exposed skin thoroughly with clean water and completely wash away the fluid. Failure to do so may result in a skin irritation.

## 10-1 Changing Batteries

Prepare small screwdrivers (Phillips, flatblade).

- 1) Turn off the power of the motor handpiece.
- 2) Remove the Rubber Cover from the Battery Cover with a thin flatblade screwdriver. (Fig. 13)
- 3) Remove the screw fixing the Battery Cover with a Phillips screwdriver. (Fig. 14)
- 4) Remove the Battery Cover by sliding it toward the charging terminal. (Fig. 15)
- 5) Remove old batteries.
- 6) Insert new batteries according to the polarity marking in the battery box. A mix-up between the positive and negative sides will not allow operation of the handpiece.
- 7) Attach the battery cover.
- 8) Tighten the screw with a Phillips screwdriver. Do not overtighten it.
- 9) Insert the Rubber Cover back into the screw hole of the Battery Cover in the originally inserted direction.

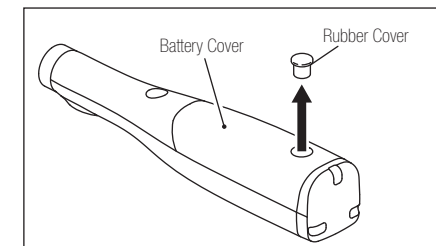


Fig. 13

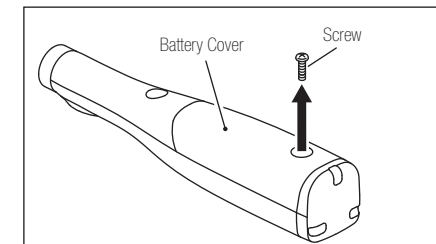


Fig. 14

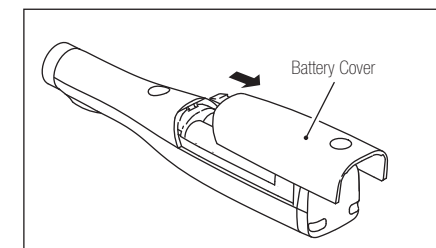


Fig. 15

Changing of batteries is now completed. Charge them fully before use.

### ⚠ CAUTION

- Do not misplace the Rubber Cover and screw.
- The used Nickel Metal Hydride Batteries are recyclable, but their disposal may sometimes not be permitted by the respective country. Return them to dealer.

## 11. Error Code

If the motor handpiece stops due to an abnormality such as a malfunction, overload, break or wrong use, it automatically checks the state of the control unit and detects the cause of the abnormality and displays an error code on the LCD panel. If an error code is displayed, turn on the power again and check whether the same error code is displayed. If the same error code is displayed, take action by referring to the instructions provided in the “Check/Remedy” column in the following table.

Item	Error code	Error	Cause	Check/Remedy
During rotation of Motor handpiece	E0	Self-Check error.	Malfunction of circuit.	Contact dealer.
	E1	Overcorrect.	Motor handpiece is locked.	Remove load.
	E2	Overvoltage.	Used as a manual wrench. Malfunction of circuit.	Do not use it as a manual wrench. If an error code is still displayed due to other reasons, bring the unit to your dealer.
	E4	Overheating of motor.	High load was continuously applied to the motor handpiece for a relatively long time.	Leave it as it is until it cools down.
At the time of charging	E9	Charger failure.	Malfunction of charger.	Contact dealer.
	Ec	Low voltage of batteries.	The voltage of batteries is too low. (The life of batteries)	Change the batteries.
	Ed	High voltage of batteries.	The voltages of batteries are too high. Malfunction of circuit.	Contact dealer.
	EE	Outside the range of working temperature.	Outstanding the generate abnormal heat.	Use within the range of working temperature.
Other	EF	Abnormal heat generation from batteries.	The batteries generate abnormal heat.	Replace the batteries. If the heat generates from the new set of batteries, malfunction of the circuit may be suspected. Contact dealer.
At the time of Calibration	C0	Refer to 5-5-2 Calibration.		
	C1			
	C2			
	C3			
	C4			

## 12. Troubleshooting

When trouble is found, please check the following again before consulting your dealer. If none of these is applicable or the trouble is not remedied even after action has been taken, a failure of this product is suspected. Contact your dealer.

Problem	Check/Cause	Solution
Power is not turned on	Batteries have fully discharged. Motor handpiece been left with batteries inserted for a long time.	Recharge the batteries. If battery does not fully discharge, charge will start. If the battery fully discharge? If so, change that.
	No batteries are inserted.	Insert the batteries.
	The internal fuse has burnt.	Contact dealer.
The battery charger does not work (The charge animation does not display)	The temperature of batteries are low.	If the temperature of batteries is less than 0°C (32°F), the batteries are not rechargeable. Charge the batteries in a warm room. (Be careful about moisture condensation)
	The temperature of batteries is high.	If the temperature of batteries is more than 40°C, the batteries are not rechargeable. Charge within the range of working temperature. It is normal that the batteries become a little bit warm right after charging. If the batteries are hot under normal operating conditions, not right after charging, there may be an abnormality. Contact your dealer.
	The voltage of a battery is too high.	Use only Ni-MH batterie. Do not use other than that.
	The motor handpiece is not correctly set to the charger.	Set correctly.
	Metal such as wire or safety pin is placed on the charger.	Remove metal on the charger.
	An error code is displayed.	Refer to 11 Error Code.
	The battery charger does not work. (the power for the charger is not turned ON)	The power cord plug is not inserted into the outlet.
The power cord jack is not inserted into the inlet on the charger.		Insert the power cord jack into the inlet on the charger.
The power for the charger is OFF.		Turn ON the power for the charger.
The fuse has burnt.		Contact dealer.
The motor handpiece set to the charger abnormally gets hot	If nothing is displayed on the liquid crystal panel of the motor handpiece even when it is set to the charger, failure in the circuit is predicted.	Contact dealer.
The motor handpiece does not rotate	The contra angle head has jammed up.	Clean or replace the contra angle head.
	It can not mount correctly to the ON/OFF switch.	Mount the ON/OFF Switch appropriately.
	Motor life is end.	Contact dealer.

Problem	Check/Cause	Solution
Rotation speed of the motor handpiece is lower.	Low voltage of batteries.	Charge the batteries.
Torque from the motor handpiece is weaker than usual.		
The Auto Stop does not work.		
The alarm sounds when the motor handpiece is rotated.	Low temperature.	Use in a warm room.
	There is some residual contamination on the rotating shaft of the contra angle head.	Clean the contra angle head.
Can not perform the Calibration.	Batteries are weakened. (lower remaining battery capacity)	Charge the batteries.
	Display an error code.	Refer to 5-5-2 Calibration Error. If Calibration perform normally but it happened again, contact dealer.

### 13. Warranty

Manufacturer warrants its products to the original purchaser against defects in material and workmanship under normal practices of installation, use and servicing. Batteries etc., are disposable components, and are not covered by this warranty.

### 14. Disposing Product



- Please consult with the dealer from whom you purchased regarding waste disposal.
- The used nickel metal hydride batteries are recyclable, but their disposal may sometimes not be permitted by the respective country. Return them to your dealer.

### Symbols



TUV Rhineland of North America is a Nationally Recognized Testing Laboratory (NRTL) in the United States and is accredited by the Standards Council of Canada to certify electro-medical products with Canadian National Standards.



Follow the waste of electric and electronic equipment (WEEE) Directive (2002/96/CE) to dispose of the product and accessories.



Consult operation instructions.



Manufacturer.



Class II equipment.



This conforms to CE European Directive of "Medical equipment directive 93/42/EEC."



Type B conforming component



Authorized representative in the European community.



Autoclavable up to Max. 135°C.




This product can be cleaned and disinfected with a Thermo-Disinfector.



Marking on the outside of Equipment or Equipment parts that include RF transmitters or that apply RF electromagnetic energy for diagnosis or treatment.

Guidance and manufacturer's declaration - electromagnetic emissions		
The ISD900 is intended for use in the electromagnetic environment specified below. The customer or the user of the ISD900 should assure that it is used in such an environment.		
Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR11	Group 1	The ISD900 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR11	class B	The ISD900 is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC61000-3-2	Class A	
Voltage fluctuations/flicker emissions IEC61000-3-3	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity			
The ISD900 is intended for use in the electromagnetic environment specified below. The customer or the user of the ISD900 should assure that it is used in such an environment.			
Immunity test	IEC60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC61000-4-2	±(2,4)6 kV contact ±(2,4) 8kV air	±(2,4)6 kV contact ±(2,4) 8kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC61000-4-4	±2kV for power supply lines ±1kV for input/output	±2kV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC61000-4-5	±1kV line(s) to line(s) ±2kV line(s) to earth	±1kV line(s) to line(s) ±2kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC61000-4-11	<5% Ut (>95% dip in Ut) for 0.5 cycle 40% Ut (60% dip in Ut) for 5 cycles 70% Ut (30% dip in Ut) for 25 cycles <5% Ut (>95% dip in Ut) for 5 sec	<5% Ut (>95% dip in Ut) for 0.5 cycle 40% Ut (60% dip in Ut) for 5 cycles 70% Ut (30% dip in Ut) for 25 cycles <5% Ut (>95% dip in Ut) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the ISD900 requires continued operation during power mains interruptions, it is recommended that the ISD900 be powered from an uninterruptible power supply or a battery.
Power frequency (50/60Hz) magnetic field IEC61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
<b>NOTE:</b> Ut is the a.c. mains voltage prior to application of the test level.			

Guidance and manufacturer's declaration - electromagnetic immunity			
The iSD900 is intended for use in the electromagnetic environment specified below. The customer or the user of the iSD900 should assure that it is used in such an environment.			
Immunity test	IEC60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC61000-4-6	3Vrms 150 kHz to 80MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the iSD900, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.  <b>Recommended separation distance</b>  $d = 1.2\sqrt{P}$  $d = 1.2\sqrt{P}$ 80MHz to 800MHz $d = 2.3\sqrt{P}$ 800MHz to 2.5GHz  Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m).  Field strengths from fixed RF transmitters as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range.  Interference may occur in the vicinity of equipment marked with the following symbol: 
Radiated RF IEC61000-4-3	3V/m 80MHz to 2.5 GHz	3 V/m	
<b>NOTE 1</b> At 80MHz and 800MHz, the higher frequency range applies.			
<b>NOTE 2</b> These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobiles radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the iSD900 is used exceeds the applicable RF compliance level above, the iSD900 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the iSD900.			
b Over the frequency range 150kHz to 80MHz, field strengths should be less than 3 V/m.			

Cables and accessories	Maximum length	Shield	Connector	Complies with
Power Cord	2 m	Unshielded	Plastic	Harmonic emissions, IEC61000-3-2, Class A Voltage fluctuations/ flicker emission IEC61000-3-3 Electrostatic discharge (ESD) IEC61000-4-2 Surge IEC61000-4-5 Voltage dips, short interruptions and voltage variations on power supply input lines IEC61000-4-11 Power frequency (50/60Hz) magnetic field IEC61000-4-8 Conducted RF IEC61000-4-6 Radiated RF IEC61000-4-3

Recommended separation distances between portable and mobile RF communications equipment and the iSD900			
The iSD900 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the iSD900 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the iSD900 as recommended below, according to the maximum output power of the communications equipment.			
Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150kHz to 80MHz $d = 1.2\sqrt{P}$	80MHz to 800MHz $d = 1.2\sqrt{P}$	800MHz to 2.5GHz $d = 2.3\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23
For transmitters rated at a maximum output power not listed above, the recommended separation distance $d$ in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where $P$ is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.			
<b>NOTE 1</b> At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.			
<b>NOTE 2</b> These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			