

# VDW.SILVER® RECIPROC®



Gebrauchsanweisung  
Operating Manual  
Mode d'emploi  
Manuale d'uso  
Manual de instrucciones



Endo Easy Efficient®



Congratulations on your purchase of the VDW.SILVER® RECIPROC® endo motor.

Please do not hesitate to contact VDW GmbH for help with any doubt or problem that may arise during consultation of this manual. Kindly keep this manual for further reference.

VDW GmbH reserves the right to change the information and data contained in these instructions for use at anytime and without prior notice.

These instructions for use are available in other languages upon request. This booklet has been compiled with the greatest care, but even with all our efforts, mistakes can never be entirely excluded. Suggestions for improvements are welcome at any time. In this case, kindly contact VDW GmbH directly.

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## Table of Contents




















1.	Identification of Symbols	24	8.	Technical Data	38
1.1.	Symbols used in these instructions for Use	24	9.	Troubleshooting	39
1.2.	Symbols used on packaging, device and parts	24	10.	Warranty	40
2.	Indications for Use	25	11.	Dr's Choice Individual Rotary Program	41
3.	Contraindications	25	Appendix		
4.	Warnings	25	Electromagnetic Emissions and Immunity (English)		103
5.	Precautions	27			
6.	Adverse Reactions	27			
7.	Step-by-Step Instructions	27			
7.1.	Standard Components	28			
7.2.	Preparation	28			
7.3.	Installation	29			
7.3.1.	Power Supply	29			
7.3.2.	Micromotor	29			
7.3.3.	Battery	30			
7.4.	Description of User Interface	31			
7.4.1.	Keypad	31			
7.4.2.	Display	31			
7.4.3.	Foot Pedal	32			
7.4.4.	Audible Signals	32			
7.4.5.	File Library	32			
7.5.	Operation	33			
7.5.1.	Switch-On, Standby Mode and Switch-Off	33			
7.5.2.	Calibration	33			
7.5.3.	ASR: Automatic Stop Reverse	34			
7.6.	Selecting a File System	34			
7.6.1.	Reciprocation	34			
7.6.2.	Rotary	35			
7.6.3.	Dr's Choice (Rotary Only)	35			
7.6.4.	Changing Torque and Speed (Rotary Only)	35			
7.7.	Factory Default Parameters	36			
7.8.	Maintenance	36			
7.9.	Cleaning, Disinfection, Sterilization	37			

# 1. Identification of Symbols

## 1.1. Symbols used in these instructions for Use

 WARNING	If the instructions are not being followed properly, operation may result in hazards for the product or the user/patient.	 NOTE	Additional information, explanation on operation and performance.
----------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------	-------------------------------------------------------------------

## 1.2. Symbols used on packaging, device and parts

	Serial number		Refer to instruction manual/booklet
	Manufacturer		Special disposal of waste electrical and electronic equipment (Directive 2002/96/EEC)
	Date of manufacture		Connection for foot pedal
	Class II product		Direct current (connection for power supply)
	Type BF applied part		Autoclavable (please consider the temperature indicated on the symbol)
	Caution		Gost symbol, product is in conformity with Russian safety standards (GOST-R).
	CE marking		Catalogue number (reorder number)
	Temperature limitation		Only run the device with the respective charger.
	Humidity limitation		Fragile
	Keep dry!		

# 2. Indications for Use

## FOR DENTAL USE ONLY!

The VDW.SILVER® RECIPROC® is a medical device according to the Medical Device Directive 93/42/EEC, revised by the Directive 2007/47/EC. It is designed for use by dentists for use with dental root canal instruments in continuous rotation and in reciprocating movement.

This device has to be used only in hospital environments, clinics or dental offices by qualified dental personnel.

## 3. Contraindications

Do not use the device for implants or any other dental procedure outside endodontics.

## 4. Warnings

In this chapter a description of serious adverse reactions and potential safety hazards for the product or the user/patient is included. Please read the following warnings before use.

### ⚠ WARNINGS

- The device may be used only in suitable locations and only by specialized physicians licensed to practice dentistry.
- Should any liquid exit from the device that may be attributed to battery leaks, discontinue use of the device immediately and ship it to an authorized service center for battery replacement.
- Do not expose the device to direct or indirect sources of heat. Operate and store the device in a safe environment.
- Do not alter or modify the device; VDW GmbH declines any responsibility in case of alteration or modification of the device.
- The VDW.SILVER® RECIPROC® requires special precautions as regards electromagnetic compatibility (EMC) and must be installed and commissioned in strict conformity with the EMC information provided in this user manual. Specifically, do not use the device close to fluorescent lamps, radio transmitters and remote controls.

• In order to avoid possible risks due to electromagnetic interference, do not use any electrical medical device or electrical device of any other kind in proximity to the VDW.SILVER® RECIPROC®. The electromagnetic radiation emitted by the device is below the recommended limits set forth in pertinent regulations in force (EN 60601-1-2:2007).

• Do not use the device in the presence of free oxygen or anesthetic substances or flammable products. Operate and store the device in a safe environment.

• None of the VDW.SILVER® RECIPROC® components are delivered disinfected or sterilized: components such as central unit, micromotor and micromotor cable need to be disinfected, the contra-angle needs to be sterilized prior to first use and in between each case!

• Never place the micromotor or any other device accessories in an autoclave unit or ultrasonic tank. None of the components of the VDW.SILVER® RECIPROC® may be sterilized (contra-angle excepted, see separate contra-angle operating instructions).

• Do not immerse the device in ultrasonic cleaners.

• The plastic enclosure is not sealed, do not use any liquid or spray directly on the console, especially on the monitor or near the electrical sockets.

• Do not crimp the cables exiting the micromotor, foot pedal and battery charger.

• Do not open the device to replace the battery for any reason, as there is the risk of a short-circuit. Opening the device will invalidate the warranty. The battery can be replaced only by an authorized service center.

• Follow the file manufacturer's instructions for use of the endodontic files.

• The file system shown on the display must always match the file in use. This is of the utmost importance in order to avoid misusing reciprocating files and continuously rotating files.

- Do not use files designed for continuous rotation in reciprocating mode. Check the mode indicated on the display before use.
- Do not use files designed for reciprocation in continuously rotating mode. Check the mode indicated on the display before use.
- Torque and speed values are subject to change by the file manufacturers without notice. Therefore, the preset values in the library must be checked prior to use. Torque values shown on the display are accurate and reliable only with VDW Endo 6:1 contra-angles properly maintained and lubricated.
- The accuracy of movement provided by the motor is guaranteed only if the original VDW Endo 6:1 contra-angle is used, properly maintained and lubricated (for more details see separate contra-angle operating instructions).
- Do not use any other contra-angle or other reduction rate than the original one.
- During calibration, the micromotor will vary its speed from the minimum value (1500 rpm on the micromotor shaft) to the maximum value (6000 rpm on the micromotor shaft). Do not insert any file during calibration.
- Calibrate every time the contra-angle is lubricated or replaced after sterilizing, or at least once a week (see separate contra-angle operating instructions).
- Refer to the separate operating instructions of the VDW Endo 6:1 contra-angle and the MAINTENANCE chapter under 7.8 of this manual before lubricating it.
- When lubricating the contra-angle, carefully check that no lubricant penetrates the micromotor.
- Do not lubricate the micromotor for any reason, as lubricant contamination of the micromotor might damage it and might have a strong negative effect on its safe operation.
- Never introduce any foreign objects into the micromotor shaft.

- The micromotor may overheat if excessive force is applied. If the micromotor overheats too often or overheating persists, contact your service center.
- Before starting the micromotor, verify the correctness of the motor settings.
- The battery charger must be supplied at a voltage ranging between: 100-240 V (+/- 10%), 47-63 Hz. Use only original parts.
- If the BATTERY LED starts flashing red during use, connect the device immediately to the battery charger, as the device might switch off.
- In order to ensure good battery life, it is recommended to always work on battery power and recharging the battery only when it is fully discharged.
- Should any anomalies arise during operation, suspend work and contact your service center.
- Do not connect an external PC storage unit (hard disk) to the VDW.SILVER® RECIPROC® USB socket. Never use a commercial male-male USB cable to connect the VDW.SILVER® RECIPROC® to a PC.

## 5. Precautions

Read these safety precautions thoroughly prior to use. These precautions allow you to use the product safely, preventing harm to you and others.

It is of the utmost importance that this manual is preserved for future consultation. The manual must accompany the system in all cases of sale or other transfer in order that the new owner can observe the precautions and warnings.

Gloves and a rubber dam are mandatory during the use of VDW.SILVER® RECIPROC®.

Refer to the WARNINGS chapter (see chapter 4) to verify any special care to exercise before starting to use the complete device.

The manufacturer declines any responsibility in

the case of:

- Use of the device for applications other than those specified in the instructions for use and maintenance.
- Modifications or repairs performed by persons not authorized by the manufacturer.
- Connection of the motor to an electrical supply not in conformity with the provisions of the IEC 364 standard.
- Use of non-original components or components other than those specified in the STANDARD COMPONENTS chapter (see chapter 7.1).
- File breakage due to misuse.
- Accessories or device breakages due to the sterilization: none of the VDW.SILVER® RECIPROC® components are sterilizable (except for the contra-angle, see separate contra-angle operating instructions).

## 6. Adverse Reactions

There are no known adverse reactions.

## 7. Step-by-Step Instructions


Refer to the WARNINGS chapter (see chapter 4) to verify any special care to exercise before starting to use the complete device.

When opening the package and prior to installation, check the device for damage and completeness. Report any damage sustained during shipping or any missing parts to your retailer within 24 hours of receipt of the device.

### Ambient Conditions for Operation

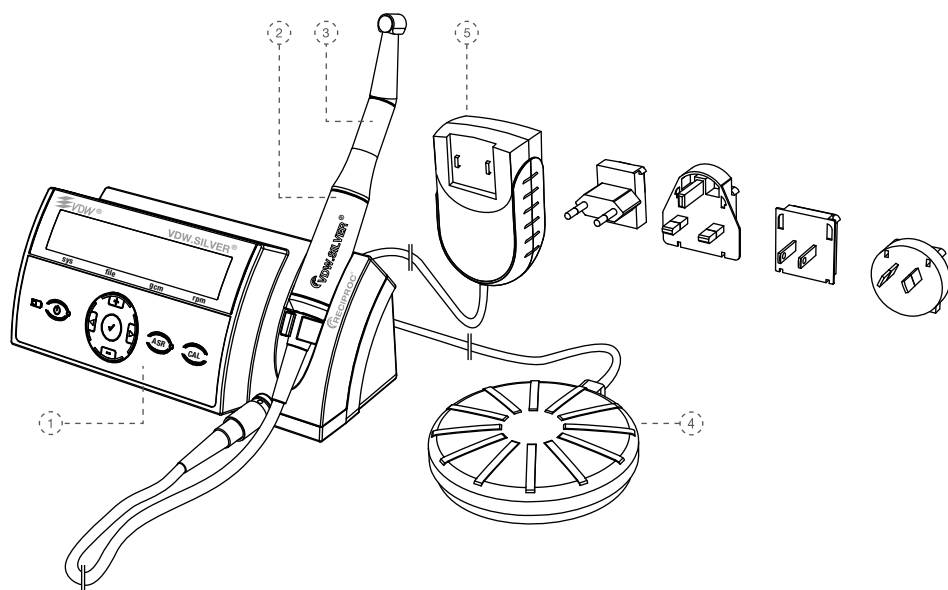
- Use: indoor
- Ambient temperature: 15 °C - 42 °C (59 °F - 108 °F)
- Relative humidity: < 80 %
- The original packing materials may be stored and shipped in ambient conditions of -20 °C to + 50 °C (from -4 °F to +122 °F) with relative humidity in the range 20 % - 90 %.

### WARNING

 Do not install the device in damp places or in places where it will come into constant contact with liquids of any kind.

## 7.1. Standard Components

The VDW.SILVER® RECIPROC® is supplied with the components listed below:



1) Central unit
2) Micromotor with cable and connector
3) Reduction gear contra-angle: VDW Endo 6:1 contra-angle with accompanying operating instructions
4) Foot pedal with cable
5) External battery charger, model Cincon Electronics Co. Ltd, TR30RAM120 with EU, UK, USA, AUS exchangeable plugs
Instructions for use of the endomotor are enclosed.

The contra-angle is wrapped separately and packed with the VDW.SILVER® RECIPROC®. Refer to the separate contra-angle operating instructions.

2. Check that all the components listed in the STANDARD COMPONENTS chapter 7.1 are present.

3. Check that the device serial number as read on the bottom label of the central unit, the serial number on the outer carton and the number reported in the shipping documents are the same.

## 7.2. Preparation

1. Carefully remove the device and the accessories from their packing and place them on a flat surface.

### ⚠ WARNING

Should any liquid exit from the device, interrupt the installation immediately and send the machine to an authorized service center.

## 7.3. Installation

### 7.3.1. Power Supply

1. Select the plug adapter that matches your electric power outlet for the power supply.

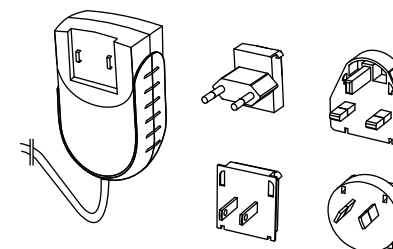


Fig. 1 Plug adapters for power supply

Place the required plug adapter on the two contacts on the power supply and push it toward the locking button until it snaps into place. You must press the locking button to change the adapter (Fig. 1).

### 🔑 NOTE

The connectors are coded. Therefore, make sure that the connectors are correctly oriented when plugging them together.

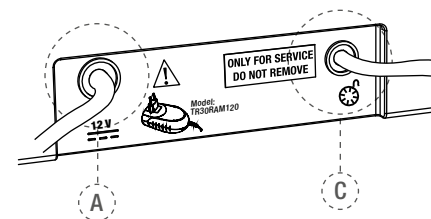


Fig. 2 Back of central unit

The VDW.SILVER® RECIPROC® is provided with an USB socket for exclusive use by an authorized service center for maintenance purposes or software updates. This USB socket is covered by an "ONLY FOR SERVICE DO NOT REMOVE" label upon delivery.

2. Charge the battery before the first use (see chapter 7.3.3):

- Connect the battery charger to the mains.
- Insert the connector of the battery charger in jack connector (A – see Fig. 2) at the back of the device (for details see chapter 7.3.3).
- Completely charge the battery prior to first use.
- Plug the foot pedal cable into the jack, located on the back of the device (C – see Fig. 2).

### ⚠ WARNING

To disconnect the cables, always hold at the central part of the connector and pull out. Do not pull the cable.

### 7.3.2. Micromotor

3. Insert the micromotor connector into the 9-pin metal socket (B - see Fig. 3) at the front of the device.

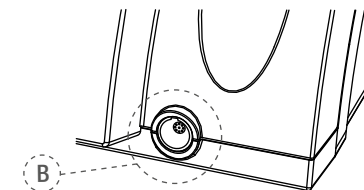


Fig. 3 Metal socket

### 🔑 NOTE

The connector B is a push-pull connector. Align the red dot on top of the male connector to the upright position to fit the guide on the female connector. Do not screw into the connector. To disconnect, pull out using the metal end of the cable. Do not twist in any direction.

4. Attach the VDW Endo 6:1 contra-angle to the micromotor (see separate contra-angle operation instructions).

5. Disinfect the keypad and micromotor before first use and before each use on a new patient (for details see chapter 7.8)

### 7.3.3. Battery

The VDW.SILVER® RECIPROC® is powered by a rechargeable Nickel Metal Hydride (NiMH) battery.

#### ⚠ WARNINGS

- Do not open the device to replace the battery for any reason, as there is the risk of a short-circuit. Opening the device will invalidate the warranty.
- The battery can be replaced only by an authorized service center.

#### 👉 NOTE

- Fully charge the battery prior to first use.



The battery LED appears in 3 colors indicating the current battery condition:

**Green:** Indicates a battery capacity of 20% - 100%

**Flashing red:** Battery needs to be charged. Battery power will run out in a few minutes. Before the motor switches off, there is an audible warning signal and the display will read:

**BATTERY!**

#### ⚠ WARNING

If the BATTERY LED starts flashing red during use, connect the device immediately to the battery charger, as the device might switch off.

It is possible to use the VDW.SILVER® RECIPROC® while it is charging. If the battery is low and the device powers off, the device must be connected to the AC power supply to continue the procedure.

**Flashing orange:** Battery charger is correctly connected to socket (A – see Fig. 2) at the back of the device and battery is charging.

If the device powers off and the battery charger is connected, the unit will switch back on and the following display reading will appear:

VDW.SILVER RECIPROC  
BATTERY CHARGING

When charging is complete, the battery LED switches to green.

#### ⚠ WARNINGS

- Should any liquid exit the device that may be attributed to battery leaks, interrupt work immediately and send the device to an authorized service center for battery replacement.
- It is dangerous to open the device for battery replacement. Opening the device will invalidate the warranty.

#### 👉 NOTES

- In order to ensure good battery life, it is recommended to always work on battery power and recharging the battery only when it is fully discharged.
- If the battery is charged correctly, the operating time between two charges is a minimum of approx. 2 hours.
- Charging the battery completely may require up to 3 hours.
- For optimal battery performance, the battery should be replaced every 2 years by an authorized service center.
- Upon charging, the device can be used normally and without appreciable increase in charging time as the VDW.SILVER® RECIPROC® battery charger is sufficiently powerful to directly power the micromotor while charging the battery.

## 7.4. Description of User Interface

### 7.4.1. Keypad

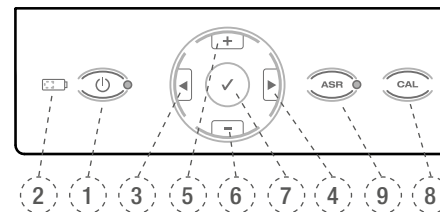


Fig. 4 Keypad

#### 1) POWER

Switches the device on (LED on) and off (LED off).

#### 2) LED BATTERY

Shows battery status; signals that the battery requires recharging (for details see chapter 7.3.3).

#### 3+4) |◀|▶|

Scrolls right/left in the bottom row of the display through the file system, file, torque and speed fields. The active field is indicated by an arrow (possible only in rotary mode).

#### 5+6) + / -

The + and - keys allow to scroll through the file systems and files and to individually change the torque or speed values in all rotary file systems.

#### 7) ✓ CONFIRM

Confirms modifications to the torque and speed settings in each system where modifications are possible. Also reloads the default parameters when used together with the power key. The Confirm key ✓ may also be used to start the micro-motor without the foot pedal.

#### 8) CAL

Calibrates the contra-angle to ensure torque accuracy each time the contra-angle is replaced or lubricated.

#### 9) ASR – In rotary mode

**Green LED:** In continuous rotation, auto-stop-reverse motion when preset torque is reached.

**Red LED:** In continuous rotation, reverse motion without torque limitation, controlled by foot pedal.

**LED off:** In continuous rotation, when the preset torque is reached, micromotor will stop.

ASR is disabled in reciprocating mode (LED off).

### 7.4.2. Display

After being switched on, all LEDs will light up and a welcome screen will be displayed. On following uses, it will display the first file in the system last used before switching the device off or the last file used before switching into standby mode.

**Top row:** shows which mode is selected - either rotary or reciprocation mode by writing ROTARY or RECIPROCATION.

**Bottom row:**

1. In rotary mode 4 columns show system, file size, preset torque and speed values.

2. In reciprocation the display will show the respective reciprocating system in use.

ROTARY  
> MTWO 10/04 120 280  
sys file gcm rpm

RECIPROCATION  
> RECIPROC ALL

#### sys

Displays the selected file system (e.g. RECIPROC for RECIPROC®, FM for FlexMaster®, DR'S for DR'S CHOICE etc.)

#### file

Displays the selected file. ALL indicates that all files of the system will be used with the same settings.

#### gcm

Displays the preset torque limit (disabled in reciprocation). Torque is shown in g/cm (grams-force per centimeter: 1 gcm = 0.0981 Nmm)

#### rpm

Displays the instrument rotation speed in rpm (revolutions per minute) (disabled in reciprocating).

- Press the |◀ and ▶| keys to move to the right and left (rotary mode only).

- Press the + and - keys to scroll through the file systems and files and to individually change the torque or speed values in all rotary file systems.

- Motor settings cannot be changed for reciproc systems.

- When torque or speed values are changed from the default settings, the display will show a ⚡-symbol in front of the torque or speed value.

### 7.4.3. Foot Pedal

The micromotor can be started in 2 alternative ways:

- Either the foot pedal can be pressed and the micromotor operates as long as the foot pedal remains pressed,
- or the micromotor may also be operated by holding down the CONFIRM key ✓ (7), Fig. 4 for 1.5 seconds. The micromotor can be stopped again by pressing any key or the foot pedal. To conserve battery power, when operated with the CONFIRM key ✓, the micromotor will stop automatically after 5 minutes of non-use.

### 7.4.4. Audible Signals

When pressing the keys on the keypad, a series of audible tones and signals demonstrate that the device is in use. All audible signals are active (unless changed manually).

All audible signals are activated upon delivery of the device:

- Warning signal when torque exceeds approximately 75 % of preset value in rotary mode.
- Warning signal when torque exceeds a critical value in reciprocating mode.
- Intermittent signal when in continuous counter-clockwise rotation.
- Warning signal before the device switches off when the battery is empty.

#### Deactivating and activating the audible signals

To deactivate the audible signals press the ►| and |◀ keys simultaneously: a beep will sound and the following message will be displayed:

SOUND  
OFF

To reactivate the audible signals, press the ►| and |◀ keys simultaneously: a beep will sound and the following message will be displayed:

SOUND  
ON

### 7.4.5. File Library

The device contains a file library with the following preset NiTi systems:

#### A) Reciprocating Systems

- RECIPROC®
- WaveOne™

#### B) Rotary Systems

- Mtwo® (MTWO)
- FlexMaster® (FM)
- Gates Glidden (GATE)
- DR'S CHOICE (DR'S) individual program
- ProTaper® (PTU)
- K3™

The manufacturer reserves the right to update the file library and the systems contained in it.



#### WARNINGS

- Follow the file manufacturer's instructions for use of endodontic files.
- The file system shown on the display must always match the file in use. This is of the utmost importance in order to avoid misusing reciprocating files and continuously rotating files.
- Torque and speed values are subject to change by the file manufacturers without notice. Therefore, the preset values in the library must be checked prior to use. Torque values shown on the display are accurate and reliable only with VDW Endo 6:1 contra-angles properly maintained and lubricated.

## 7.5. Operation

### 7.5.1. Switch-On, Standby Mode and Switch-Off

#### Switch-On

Press the POWER key. All LEDs will light up. A welcome screen displays the current software version:

VDW.SILVER RECIPROC  
SOFTWARE X.X

On following uses, it will display the first file in the system last used before switching the device off or the last file used before switching into standby mode.

ROTARY  
> MTWO 10/04 120 280

#### Standby Mode

After the device has not been used for 10 minutes, the device will automatically enter the standby mode to conserve battery power. The display will switch off and the green LED on the power key will flash. To exit the standby mode, press any key or the foot pedal: the device will switch on and resume functionality from the last screen displayed prior to entry in standby. After 30 minutes in standby mode, the device will switch off to conserve battery power. It can be switched on again by pressing the POWER key.

#### Switch-Off

Press the POWER key to switch off the device. The battery LED (2), Fig. 4 will not light up unless the battery is charging.

### 7.5.2. Calibration

Calibrating CAL (8), Fig. 4 the micromotor automatically adjusts the torque measurement to ensure torque accuracy each time the micromotor has been changed, the contra-angle is replaced, autoclaved and/or lubricated.

- Connect the VDW Endo 6:1 contra-angle to the micromotor (without a file).
- Hold down the CAL (8) key.
- The micromotor will turn from the minimum to the maximum speed to measure the contra-angle inertia automatically.



#### WARNINGS

- Never press the calibration button during treatment.
- During calibration, the micromotor will vary its speed from the minimum value to the maximum value. Do not insert any file. The calibration process can be aborted by pressing any key or foot pedal.
- Calibrate every time the contra-angle is lubricated or replaced after sterilizing, or at least once a week.
- Do not use any other contra-angle or other reduction rate than the original one.
- Refer to the separate operating instructions of the VDW Endo 6:1 contra-angle before lubricating it.



#### NOTE

The VDW Endo 6:1 contra-angle reduces the speed so that the instrument will rotate at the speed shown in the display.

During the calibration process the display will read:

CALIBRATION  
■■■

The process automatically stops as soon as calibration has been completed, showing all black bars on the display.



#### NOTE

Should you at any time wish to stop the calibration process, press any key or the foot pedal. The display will read:

CALIBRATION  
ABORTED

Possible Error Warnings

The display then will read for example:

CALIBRATION  
ERROR 1

Error 1: The micromotor is not properly connected to the device or it is damaged. Check the connection first.

Error 2: The contra-angle has a high resistance during rotation. Check the contra-angle. Lubricate if necessary.

## 7.6. Selecting a File System

The following chapters might also be helpful when selecting a file system: description of keypad (chapter 7.4.1) and display (chapter 7.4.2).

To choose a file system different from the one currently displayed, the file system field ("sys") in the lower row must be active (indicated by an arrow). If "sys" is not active, move the arrow to the "sys" field by pressing the **◀** and **▶** keys until it is active.

By pressing the **+** and **-** keys, you can scroll through all systems until the display selects the desired system. It is not necessary to confirm the selection. The file system shown in the display is the selected system. The display then reads, for example:

```

ROTARY
> MTWO 10/04 120 280
  
```

### 7.6.1. Reciprocation

RECIPROC® and WaveOne™ instruments are designed specifically for use in reciprocation, whereby the instrument is driven first in a cutting direction and then reverses to release the instrument. The angles of reciprocation are precise and specific to the design of the instrument and to the VDW.SILVER® RECIPROC® endo motor, so that the instrument cannot block in the canal and be rotated past its individual elastic limit, which would cause irreversible changes to the structure of the alloy.

If one of the abovementioned reciprocating files has been chosen, the display reading the first row will show RECIPROCATION.

```

RECIPROCATION
> RECIPROC ALL
  
```

Select the specific reciprocating system RECIPROC or WAVEONE by selecting the "system" in the second row of the display via the **+** and **-** keys. Contrary to the rotary mode, individual files not have to be selected in the reciprocating mode, as all motor settings are true for the entire system, indicated by the word "ALL".

### 7.5.3. ASR: Automatic Stop Reverse

#### NOTE

ASR function only works in rotary mode. In reciprocating mode, ASR is disabled (LED is off). Upon delivery the ASR function is active (green LED). Select different functions by pressing the ASR button.



In rotary mode, the ASR function can be changed by pressing the ASR button: and the LED color will change according to the selected function:

**Green:** In rotary mode, when the preset torque is reached, the micromotor will turn automatically in reverse direction (counter-clockwise) until the file no longer encounters resistance, at which point it will automatically revert to forward rotation (clockwise).

**Red:** In rotary mode, the micromotor will turn automatically in reverse direction (counter-clockwise) with no torque control.

**OFF:** In rotary mode, when the preset torque is reached, the micromotor will stop automatically. By pressing the foot pedal again, the motor will start in reverse direction (counter-clockwise) until the file no longer encounters resistance, at which point it will automatically revert to forward rotation (clockwise).

Acoustic warning signals are given when:

- Torque exceeds approx. 75% of preset value.
- In reverse rotation of the micromotor.

ASR function can be modified for each file, but the setting will return to the default setting when the file used will change.

#### ⚠ WARNINGS

- Do not use files designed for continuous rotation in reciprocating mode. Check the mode indicated on the display before use!
- Do not use files designed for reciprocation in continuously rotating mode. Check the mode indicated on the display before use!

#### NOTE

- The settings in reciprocation including speed and torque cannot be adjusted.
- Reciprocating files can be distinguished from rotary files by their special design: the spiral is inverted and the shaft is equipped with a colored plastic ring.

In reciprocation, an acoustic feedback (beep) appears when the torque limit is exceeded. If this occurs, remove the file from the root canal and clean the flutes. Do not press the file in the root canal.

If the maximum torque is achieved, the motor will stop. If this occurs, remove the file from the root canal, clean the flutes and restart again.

#### NOTE

In reciprocation, the ASR function is disabled.

### 7.6.2. Rotary

When a file system has been selected in rotary mode, the first file in the sequence will automatically be shown in the display.

Press the **▶** key to move the arrow to the field "file". There is no need to confirm this selection. Simply press the foot pedal to drive the file.

```

ROTARY
> MTWO 10/04 120 280
  
```

Press the **+** key to select the next file in the sequence.

Press the **-** key to select the previous file in the sequence.

### 7.6.3. Dr's Choice (Rotary Only)

For convenience, the device is delivered with 15 default values of torque and speed as well (for details see the default values' table for torque and speed in back of the English user manual). To individually change these settings simply "overwrite" them as described below. This allows you to compile your own instrument sequence independently from file manufacturer or recommended sequences. To return to default settings see chapter 7.7.

The settings can be changed in the same way as for the other rotary file systems.

For recording your individual settings, see table in back of this user manual.

### 7.6.4. Changing Torque and Speed (Rotary Only)

#### NOTE

Speed and torque cannot be changed in reciprocation mode.

When the desired rotary file is selected (indicated by an arrow), press the **▶** key to move to the torque field, then indicated by an arrow. Use the **+** and **-** keys to select the desired torque setting. When the torque value is changed, it will flash. The available torque range is 20 to 410 gcm (40 steps of 10 gcm each).

After selecting the desired torque, save the setting by pressing the **CONFIRM** key **✓** once. The torque field will then stop flashing and will be marked with the **⚡** symbol. If the **CONFIRM** key **✓** is not pressed to save the setting, the setting cannot be used and will be lost once a different file setting is selected.

Press the **▶** key to move to the speed field, then indicated by an arrow. Use the **+** and **-** keys to select the desired speed setting. When the speed value is changed, it will flash. The available speed range is 250 to 1000 rpm in steps of 10 rpm (with the provided VDW Endo 6:1 contra-angle only).

The preset torque and speed values of all file systems can be altered individually in rotary mode.

**WARNING**

Before using the micromotor, verify the correctness of the changed parameters.

## 7.7. Factory Default Parameters

To return to the original default parameters, follow the general reset instructions:

- Make sure that the battery charger is disconnected.
- Switch off the device.
- Keep holding down the **CONFIRM** key ✓ and the **POWER** key simultaneously. The device will switch on and the display will read:

**DEFAULT PARAMETERS  
LOADING**

**NOTE**

Be aware that all individual settings, including the settings in Dr's Choice program, will be deleted when "reset to default parameters" has been carried out. The audible signals settings are not affected: they remain with the last setting used before the device was switched off. ASR function can be modified for each file, but the setting will return to the default settings as soon as a different file is selected.

## 7.8. Maintenance

### Routine Maintenance

- Inspect the micromotor cable at least once every six months. If any deterioration of the sheathing is noticed, have the cable replaced by an authorized service center.
- Check for liquids or smoke exiting the device. In this case, remove the power supply from the device immediately and contact an authorized service center.
- For optimal battery performance, replace the battery every 2 years.

- For the maintenance, e.g. lubrication of the VDW Endo 6:1 contra-angle, refer to the separate contra-angle operating instructions and check the additional warnings below.

**WARNINGS**

- The contra-angle should be lubricated after cleaning and disinfecting, but prior to sterilization.
- When lubricating the contra-angle, check that no lubricant penetrates the micromotor.
- If the contra-angle is lubricated manually, please ensure excess oil is removed by compressed air (blow for approx. 5 sec.) before contra-angle is being put back on the micromotor. Calibrate after lubrication.
- If the contra-angle is lubricated automatically in a maintenance or lubrication device, please follow the instructions for use of the device manufacturer carefully and ensure no excess oil is left in the processed contra-angle.
- Do not lubricate the micromotor for any reason. Lubricant may contaminate the micromotor causing damage and result in unsafe operation. This will invalidate the warranty.
- Do not introduce any foreign objects into the micromotor shaft.

### Special Maintenance

Contact VDW GmbH for any special maintenance that may be required.

**NOTE**

Some operations carried out during repair could lead to deletion of personal settings such as changed torque, speed or Dr's Choice settings.

## 7.9. Cleaning, Disinfection, Sterilization

**WARNINGS**

- The components need to be disinfected and/or sterilized (only for contra-angle) prior to first use and in between each case!
- Do not place the micromotor or any other accessories in an autoclave unit or ultrasonic tank. Only the contra-angle may be sterilized (see separate contra-angle operating instructions).
- Do not immerse the device in ultrasonic cleaners.
- The plastic enclosure is not sealed, do not use any liquid or spray directly on the console, especially on the monitor or near the electrical sockets.

### Exterior Surfaces

Wipe the surface of the device (panel interface and the housing), the micromotor and its cable with a clean cloth moistened lightly with a non-aggressive disinfectant.

Use only disinfectants with antibacterial, fungicide and viricide power and which comply with the valid requirements of the national regulatory body. It is recommended to use aldehyde-free disinfectants, for example the "Minuten Spray Classic" of ALPRO® MEDICAL GmbH and the "Mikrozid AF liquid" of Schülke&Mayr.

### Contra-Angle

To sterilize the VDW Endo 6:1 contra-angle, refer to the separate contra-angle operating instructions.

### Endodontic Files

To sterilize the endodontic files, refer to the manufacturer's instructions for use.

## 8. Technical Data

MANUFACTURER	VDW GmbH, Bayerwaldstr. 15, 81737 Munich, Germany
MODEL	VDW.SILVER® RECIPROC®
DIMENSIONS	206 x 90 x 85 mm
MATERIAL	Housing console: PC/ABS Micromotor: aluminum
WEIGHT	1.1 kg
POWER TYPE	battery-powered, 2000 mAh, 6 V
BATTERY CHARGER VOLTAGE SUPPLY	100-240 V
VOLTAGE FLUCTUATIONS	max. ± 10 %
FREQUENCY	47 - 63 Hz
BATTERY CHARGER POWER RATING	2.5 A
TORQUE VARIATION	20-410 gcm (0.2-4.1 Ncm) in rotary mode
SPEED VARIATION TO MICROMOTOR SHAFT	1500 - 6000 rpm in rotary mode
ELECTRIC SAFETY	CLASS II
APPLIED PART	BF (contra-angle)
LEVEL OF SAFETY IN PRESENCE OF INFLAMMABLE	NOT SUITABLE FOR USE IN PRESENCE OF INFLAMMABLE ANAESTHETIC MIXTURE OR OXYGEN
OPERATING MODE	CONTINUOUS ROTARY AND RECIPROCATION
ENVIRONMENT CONDITIONS FOR USE	+15 °C /+42 °C; RH: < 80 %
CLASSIFICATION AS MEDICAL DEVICE	Class IIa, Annex IX, Rule IX, 93/42/EEC
CENTRAL UNIT AND MICROMOTOR	IP20
FOOT PEDAL	IPX1
TRANSPORT AND STORING CONDITIONS	-20 °C/+50 °C; RH: 20-90 %

## 9. Troubleshooting

If the VDW.SILVER® RECIPROC® does not seem to work properly, review the checklist below. If the problem persists, contact either your local dealer or VDW GmbH.

Problem	Possible cause	Solution
<b>THE DEVICE DOES NOT OPERATE PROPERLY</b>	<ul style="list-style-type: none"> <li>The battery is not charged.</li> <li>The battery charger is not plugged into the power socket properly.</li> <li>Network voltage does not correspond to the voltage indicated on the battery charger label when battery is being recharged.</li> </ul>	<ul style="list-style-type: none"> <li>Charge the battery.</li> <li>Check that the battery charger is plugged in properly.</li> <li>Check that the original battery charger is used.</li> <li>Reload the factory default parameters.</li> </ul>
<b>THE DISPLAY DOES NOT OPERATE PROPERLY</b>	The display may be unstable or tends to dim as the battery charge is low.	<ul style="list-style-type: none"> <li>Charge the battery.</li> </ul>
<b>THE MICROMOTOR DOES NOT START</b>	Either the micromotor is improperly connected to the housing or the contra-angle is malfunctioning.	<ul style="list-style-type: none"> <li>Check that the micromotor connector is properly inserted in the micromotor housing.</li> <li>Check that the contra-angle operates correctly.</li> <li>Remove the contra-angle and set maximum speed, then start the micromotor again.</li> <li>Calibrate without the contra-angle, then reconnect the contra-angle and run calibration again.</li> </ul>
<b>THE FOOT PEDAL DOES NOT START THE MICROMOTOR</b>	Either the foot pedal is damaged or it is not plugged in properly.	<ul style="list-style-type: none"> <li>Start the micromotor by pressing the <b>CONFIRM</b> key ✓ (7), Fig. 4 for 1.5 seconds. If the micromotor starts, first check if the foot pedal is connected properly to the device if yes, contact your service center for foot pedal replacement.</li> </ul>
<b>THE BATTERY DOES NOT OPERATE CORRECTLY</b>	Battery discharges too rapidly even though all precautions have been observed. The device only operates when the battery charger is connected to the mains supply, but does not operate with battery power.	<ul style="list-style-type: none"> <li>Battery might be damaged. Send the device to your service center.</li> </ul>
<b>CALIBRATION ERROR 1</b>	An improperly connected micromotor might disturb the calibration process.	<ul style="list-style-type: none"> <li>Check that the micromotor is correctly connected.</li> </ul>

Problem	Possible cause	Solution
<b>CALIBRATION ERROR 2</b>	The calibration process could be disrupted by an excessively resistant contra-angle.	<ul style="list-style-type: none"> <li>• Check the contra-angle for any malfunction.</li> <li>• Lubricate the contra-angle carefully.</li> </ul>
<b>ROTARY FILE BLOCKS IN CANAL</b>	Wrong file setting. Too much pressure on the instrument.	<ul style="list-style-type: none"> <li>• Switch to ASR mode "Reverse" (LED red), start the motor and pull out the file carefully.</li> </ul>
<b>RECIPROCATING FILE BLOCKS IN CANAL</b>	Too much pressure on the instrument. File not frequently cleaned.	<ul style="list-style-type: none"> <li>• Try to remove the file with a pair of pliers by pulling out and rotating the file gently clockwise.</li> </ul>

## 10. Warranty

Warranty booklet enclosed.

## 11. Dr's Choice Individual Rotary Program

For your individual settings of torque and speed values, please write file sizes and the corresponding values in the following table (for details see chapter 7.6.3):

File Position	File type	gcm	rpm
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			
11			
12			
13			
14			
15			

Dr's Choice default settings:

File Position	gcm	rpm
01	30	300
02	50	300
03	70	300
04	100	300
05	120	300
06	150	300
07	170	300
08	200	300
09	220	300
10	250	300
11	270	300
12	300	300
13	320	300
14	350	300
15	400	300


To restore default parameters, see chapter 7.7.

## Electromagnetic Emissions and Immunity

The device is intended for use in the electromagnetic environment specified below. The user of the device should assure that it is used in such an environment.

Emission		
Emission test	Conformity	Electromagnetic environment - guidance
RF Emissions Cispr 11	Group 1	The device 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 Cispr 11	Class A	It is possible to use the device in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A Conforms	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Conforms	

Immunity aspects			
The device is intended for use in the electromagnetic environment specified below. The customer or the user of the device should assure that it is used in such an environment.			
Immunity test	Test level EN 60601-1-2	Compliance Level	Electromagnetic environment - guide
Electrostatic discharge (ESD) EN 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Burst/Fast Transient EN 61000-4-4	±2 kV power supply lines	±2 kV power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge EN 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply	< 5 % UT (> 95 % dip in UT) for 0.5 cycles	< 5 % UT (> 95 % dip in UT) for 0.5 cycles	Mains power quality should be that of a typical commercial or hospital environment.
	40 % UT	40 % UT	
input lines EN 61000-4-11	(60 % dip in UT) for 5 cycles	(60 % dip in UT) for 5 cycles	If the user of the device requires continued operation during power mains interruptions, it is recommended that the device be powered from an uninterruptible power supply or a battery.
	70 % UT (30 % dip in UT) for 25 cycles	70 % UT (30 % dip in UT) for 25 cycles	
	< 5 % UT (> 95 % dip in UT) for 5 seconds	< 5 % UT (> 95 % dip in UT) for 5 seconds	
Power frequency magnetic field EN 61000-4-8	3 A/m	3 A/m	Magnetic power frequency fields should be that of a typical commercial or hospital environment.

Immunity aspects at r.f.			
The devices is intended for use in the electromagnetic environment specified below. The customer or the user of the navigator should assure that it is used in such an electromagnetic environment.			
Immunity test	Test level EN 60601-1-2	Compliance Level	Electromagnetic environment - guide
RF conducted EN 61000-4-6	3 Veff from 150 kHz to 80 MHz	3 Veff from 150 kHz to 80 MHz	Portable and mobile RF communications equipment should be used no closer to any part of the device, including cables, than the recommended separation distance calculated from that equation applicable to the frequency of the transmitter. Recommended separation distance $d = 1.2 \sqrt{P}$ from 150 kHz to 80 MHz $d = 1.2 \sqrt{P}$ from 80 MHz to 800 MHz $d = 2.3 \sqrt{P}$ from 800 MHz to 2.5 GHz 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 meters (m)
RF radiated EN 61000-4-3	3 Veff from 80 MHz to 2.5 GHz	3 Veff from 80 MHz to 2.5 GHz	
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:			
			

**Recommended working clearances between portable and mobile HF communication devices and the UNIT**

The device is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the device 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 the transmitter (m)	
	From 150 kHz to 80 MHz $d = 1.2 \sqrt{P}$	From 80 MHz to 800 MHz $d = 1.2 \sqrt{P}$	From 800 MHz to 2 GHz $d = 2.3 \sqrt{P}$
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 determined 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.

**Notes:**

- (1) At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
- (2) These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.



 **VDW.SILVER® RECIPROC®**

**CE**  
0123

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