

MEND Professional™ (IS02PROS)

User's Manual



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1 Introduction

Congratulations on your purchase of the MEND Professional™ (IS02PROS) device. The MEND Professional™ is an advanced two channel programmable transcutaneous electrical nerve stimulator or "TENS" device currently available. MEND Technology is a leading distributor of state-of-the-art medical devices.

The MEND Professional™ is a high-end precision medical device used for the relief of pain. This device generates low intensity current pulses at microampere levels and frequency of pulses. This unit can hold multiple therapy protocols. Each protocol includes multiple frequency pairs. Health practitioners can program each frequency pairs with a variety of parameters including current intensity, frequencies, time, modulated wave period, wave slope, and polarity. The microampere level current is applied by electrodes.

The MEND Professional™ is a small, portable device that is designed for use in a doctor's office, clinic or hospital as well as self-administered treatment at home under a practitioner's supervision.



Please read this entire manual thoroughly before using it.

1.1 Indications

The MEND Professional™ is intended for the symptomatic relief of chronic intractable pain. The degree of efficacy will vary with patient selection.

1.2 Warnings and Contraindications

- Microcurrent stimulation should not be used on patients whose pain syndromes are not diagnosed and etiology is not established. If another electrode is used as a dispersive electrode, placement of the dispersive electrode should ensure transthoracic stimulation is not possible.
- Safety of microcurrent stimulation has not been established during pregnancy or birth. Microcurrent stimulation is not effective for pain of central origin including headache.
- Microcurrent stimulation should be used only under the continued supervision of a licensed physician. Microcurrent stimulation has no curative value. Microcurrent stimulation is a symptomatic treatment and as such suppresses the sensation of pain which would otherwise serve as a protective mechanism.
- The stimulation and electrodes should not be applied across or through the head, directly on the eyes, covering the mouth, on the front of the neck, especially over the carotid sinus (upper side of neck), or from electrodes placed on the chest and the upper back or crossing over the heart. Application of electrodes near the thorax may increase the risk of cardiac fibrillation.
- Don't use microcurrent stimulation on patients who have a demand type pacemaker. A patient with an implanted electronic device (for example a cardiac pacemaker) should not be subjected to stimulation unless specialist medical opinion has first been obtained.
- Do not allow children to use or handle this device. Keep the device and lead wires away from children when not in use. Strangulation could result from baby or child entanglement in the wire leads.
- Do not operate vehicles or potentially dangerous machinery during periods of stimulation.

- Electronic monitoring equipment such as ECG monitors and ECG alarms may not operate properly when the MEND IS02PROS is in use.
- Simultaneous connection of a patient to a high frequency surgical medical equipment may result in burns at the site of the MEND IS02PROS electrodes and possible damage to the unit.
- Operation in close proximity (e.g. 1 m) to a shortwave or microwave therapy medical equipment may produce instability in the MEND IS02PROS output.

1.3 Adverse Effects

Please consult your doctor about possible adverse effects which may arise from the therapy protocols your doctor is using. A common issue is about skin reaction at the electrode sites. Skin irritation and electrode burns are potential adverse reactions. Cleaning and hydrating the skin are usually valid methods to reduce skin irritation or electrode burns. If gloves or cloths or garments are used as electrodes, they should be wet or damp. If electrode pads are used, sometimes conductive gel on pads can be helpful to increase the conduction and reduce the skin reaction.

1.4 Precautions and Safety Notices

Isolated cases of skin irritation may occur at the site of conductive materials following long-term application. The effectiveness of the MEND Professional™ device is highly dependent upon patient selection by a practitioner qualified in the management of pain. Electrode placement and stimulation settings should be based on the guidance of the prescribing practitioner. Patients should not use the device while under the influence of alcohol, controlled substances or narcotic drugs, directly on the eyeball, or over a vessel that may contain a blood clot.

Caution should be used for persons with suspected or diagnosed epilepsy.



CAUTION

Federal Law (USA) restricts this device to sale by or on the order of a licensed health care practitioner.



The following are precautions for the safety of the users and the device.

- The device is to be applied with electrodes to the skin of the human body.
- The device has micro amperage current output. The plugs must be inserted completely into the jacks. The patient may experience prickling sensation if the skin contact is too dry. Moisten the skin with water before use.
- Only use the recommended accessories. It can be unsafe to use accessories not in the instructions for use.
- Use alkaline batteries only. It cannot be connected to external power source. Any attempt to do so would cause damage to the device and possibly cause harm to the patient.
- Water into the device could affect safety and performance. Do not use the device when the device has got water inside. Do not let water flow on the surface of the device. Do not immerse the device into water. Do not use the device close to flammable mixtures or concentrated flammable fumes such as gasoline.
- The device can only be opened and repaired by the manufacturer or licensed service personnel. Do not modify the device as it can be unsafe.
- The device is for indoor use where a patient would comfortably stay. Consult your physician for use in unusual environmental conditions e.g. strong magnetic fields or electromagnetic fields, external electrical influences, electrostatic discharge. Do not exposure the device in a high dust environment for a long period of time.

1.5 Warranty and Service

The MEND Professional™ has a one-year limited warranty. MEND Technology warrants that the Product is manufactured by Inspirstar Inc in accordance with the specifications. There is no warranty of merchantability nor of fitness for a particular use. The Product is marketed under section 510(K) of the Federal

Food, Drug and Cosmetic Act as a device substantially equivalent to a device in commerce. Inspirstar Inc. and MEND Technology expressly disclaim any claim that the Product can treat or cure any medical condition or illness. The user must consult with his or her health care practitioner as to the recommended use. The Product may only be used under the direct supervision of a licensed health care provider. There are no other warranties, expressed or implied. MEND Technology sole liability hereunder is to repair or replace the Product with the same or a substitute product. In no event shall Inspirstar Inc. and/or MEND Technology be liable for personal injury or death of any person using or misusing the Product.

The MEND Professional™ unit may be repaired or replaced with the same or a substitute product within one year of purchase based on the determination of the manufacturer. Lead wires have a limited warranty for 3 months. The lead wires may need to be returned to the manufacturer for replacement. To replace products or obtain service, first call your doctor or MEND Technology. If necessary, send the entire unit with the carrying case and accessories, insured, postage prepaid, and well-packaged, along with the Return Merchandise Authorization (RMA) number obtained from MEND Technology. Please remove the batteries before returning your device. The shipping cost to return the item(s) to the manufacturer is the responsibility of the purchaser.

Contact support@mendtechnology.com for RMA and shipping information.

2 MEND Professional Device and Accessories

2.1 Top Panel and Keypad

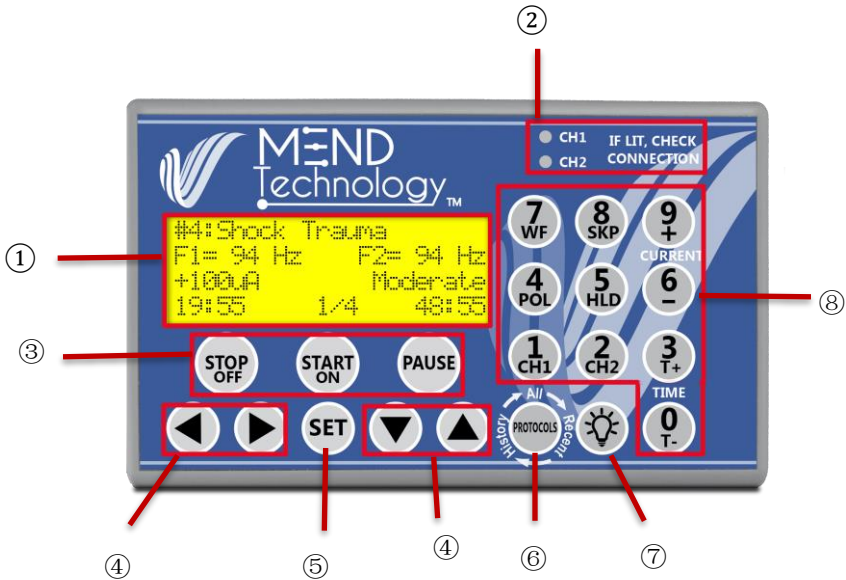


Figure 1 Top Panel

① Display Area: Menu selection, protocol information, running information and status, etc. are displayed on LCD screen.

② LED Channel Status Indication: LED CH1 and CH2 indicate if the output current can reach their peak current value in the protocol for channel 1 and channel 2, respectively. If the LED is flashing or ON, check the connection of the electrode to the body.

③ Protocol Running Control:

- Key START/ON to turn on the unit, or to start the selected protocol.
- Key PAUSE to pause the running of the current protocol. Use key START to resume the treatment.

- Key STOP to stop the protocol in running, or to turn off MEND IS02PROS.
- ④ Arrow Keys:
- Left Arrow: Back to previous menu level; or move cursor to left.
 - Right Arrow: Enter menu selection; or move cursor to right.
 - Up Arrow: Move cursor up; or increase number
 - Down Arrow: Move cursor down; or decrease number
- ⑤ “SET” key: Press this key to go into and finish the number entering mode. In SET mode, use arrow keys or numeric keys to change the digits of the number. Press this key again to move to next number or to finish entering numbers.
- ⑥ Protocols: Press this key to cycle between “All Protocols” , “Recent Protocols” , “History Protocols” and “Batch Protocols” .
- ⑦ Back Light: turn on or off the back light of the LCD display.
- ⑧ Function and Number Keypad
- 0~9: Number Keypad to input number or select a numbered menu item.
 - Channel 1 “CH1”, Channel 2 “CH2”, Current “+”, Current “-“, Time “T+”, Time “T-“, Waveform “WF”, Polarity “POL”: During manual operation or run time control, use these keys to change respective parameters.
 - HOLD “HLD”, SKIP “SKP”: During protocol running, use HOLD to hold/release the timer and use SKIP to advance to next frequency pair.

2.2 Rear Panel

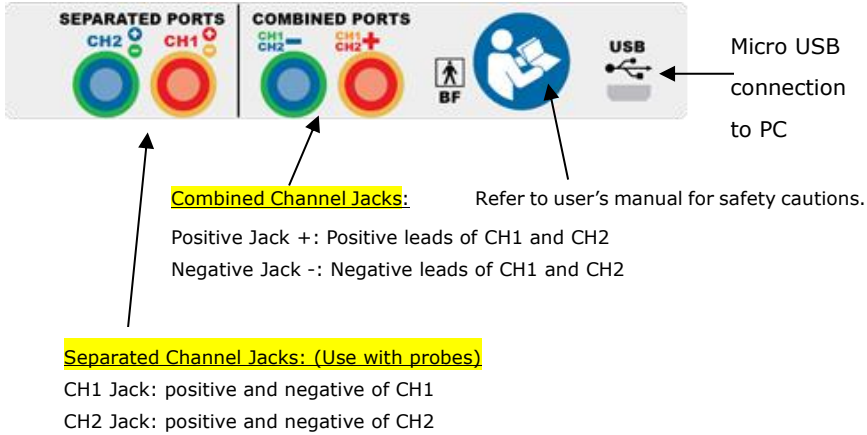


Figure 2 MEND Professional™ Output Jacks and USB port

USB Port

The micro-USB port is for communication with the computer only, not to supply power to the MEND IS02 main device. The MEND device only operates with battery power supply.



Equipment that is connected to the Micro USB port interfaces must be certified according to the respective EN/IEC/UL standards. Certified computer has one or more of the following markings on the power supply unit:

IEC 60950-1

IEC 60950-22

CAN/CSA-C22.2 No. 60950-1

CAN/CSA-C22.2 No. 60950-22

UL 60950-1

UL 60950-22

Information Technology

Equipment Power Supply

I.T.E. Power Supply

I.T.E. Power Supply

QQGQ7 Power Supply

Microcurrent Output Ports



Output Ports		Plugs	Connection	Connector
Combined Channel Output Ports 	Positive	Tip	CH2+	Red
	Jack (+)	Ring	CH1+	Yellow
	Negative	Tip	CH2-	Blue
	Jack (-)	Ring	CH1-	Green
Separated Channel Output Jacks 	CH1 Jack	Tip	CH1+	Red
		Ring	CH1-	Yellow
	CH2 Jack	Tip	CH2+	Blue
		Ring	CH2-	Green

Table 1 Color Mapping of Output Ports to Wire Connectors



Plugging into POS and/or NEG jacks will not cut off signals on CH1 and CH2 jacks. Signals will always present on all jacks. Consult with your treatment protocol for special wiring.

2.3 Accessories

The MEND device can be used with various accessories that can be purchased individually. To purchase additional accessories visit www.mendtechnology.com

Combinable Leadwires



Carrying Case



Sticky pads



Conductive Strip



Silver mesh gloves



Alligator Clips



Use the combineable leads with the snap lead.
(combineable leads not included with gloves)



3 Operations

3.1 Prepare for Running

The MEND Professional™ device can be used inside or outside the soft back carrying case. There are two Velcro strips attached inside the soft back carrying case.

Install Batteries

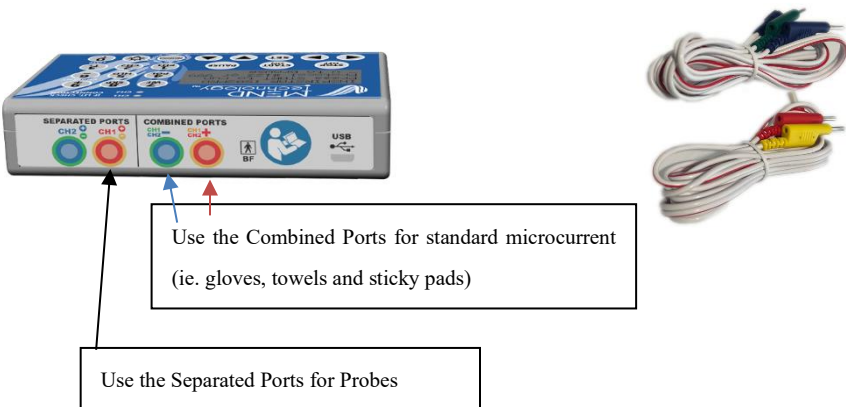


Insert batteries here

The MEND Professional™ device uses two alkaline batteries in size “AA”. Remove the batteries when the device is not going to be used for more than one month.

Connect Wires to the MEND Professional™ device

Insert the plugs into the jacks on the rear panel of the MEND Professional™ device. Match the color of the plug with the color on the rear panel.



Connect Wires to Gloves, Strips or Electrodes



Insert the push pins on gloves, strips, alligator clips or electrodes.

Refer to your Frequency Specific Microcurrent (FSM) training instructions on where to place the electrodes, gloves, towels or strips on the body. Gloves, towels, and strips need to be wet to provide conduction.

It is recommended to leave the snap pigtail connected to the gloves. Also leave the leadwires in the MEND ProfessionalTM after use. If you want to unbutton the electrode wires from the gloves, hold the button base on the gloves instead of holding the fiber part of the gloves to avoid damage to the gloves.



DO NOT WEAR THE GLOVES ON BARE HANDS UNLESS YOU ARE TREATING YOUR OWN HANDS.

To isolate the conductive gloves from bare hands, wear latex or nitrile gloves first then put on the conductive Electrode Gloves. The gloves must be wet during treatment.



The electrodes and leadwires may wear and lose conductivity over time. Check to ensure the Ch1/Ch2 LEDs are not flashing for any connectivity issue when a protocol is running.

3.2 Basic Operations

Power ON

Press START/ON to power on the unit. The Power-On Initial Screen displays the protocol number of last run protocol. Press START to run this last used protocol.



All, Recent, History or Batch Protocols

All Protocols lists all protocols in user programmed profile.

Recent Protocols lists the protocols that were recently used. Use Recent Protocols to quickly select your most frequently used protocols.

History Protocols lists the actual protocol running history. The latest used protocol is displayed on the top of the list. Use History Protocols to check the therapy history and also select a protocol to run again. Note: the history will show the exact usage, so you may see the same protocol multiple times in the history.

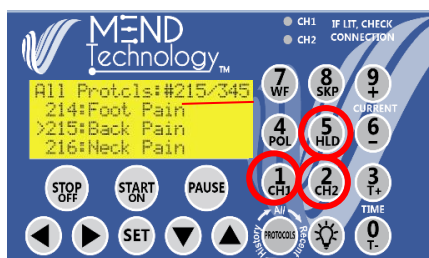
Batch Protocols allows you to daisy-chain up to 9 protocols. To run a set of frequently used protocols, simply put them in the Batch list and run.

To switch between All Protocols, Recent Protocols, History and Batch Protocols: press the Protocols key to cycle between the four protocol list screens.

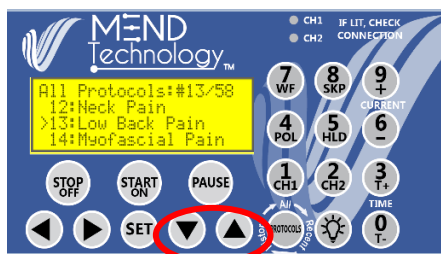
Select a Protocol

There are a number of preloaded therapy protocols in the MEND Professional™ device and various ways to reach them.

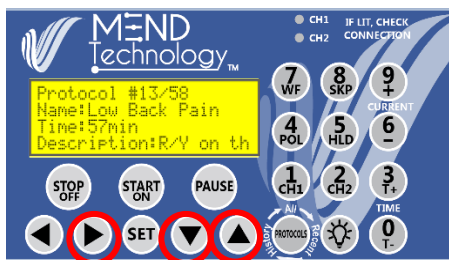
Select by protocol number: from All Protocols screen, press the protocol number with the numeric keys. For example, if you had 345 protocols on your device, to select protocol number #215 of the 345 protocols, press key 2, key 1 and key 5, protocol 215 will be selected.



Browse to select protocol: Use arrow UP/DOWN keys to browse through the protocol list. You can hold the up/down arrows to scroll continuously.



Protocol details: Press the RIGHT arrow key to see the details of the protocol. Use the UP/DOWN keys to scroll the screen to view the full details



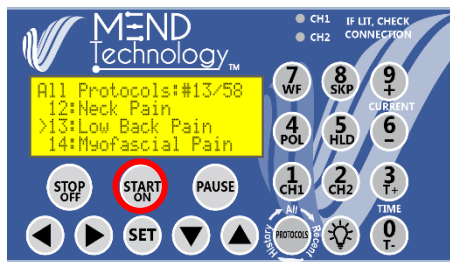
of the protocol.

Protocol details include:

- Name
- Description
- Time
- # of frequency pairs
- Frequency combinations
- Microamperage

Run a Therapy Protocol

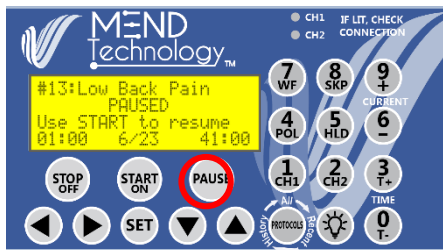
Press the START key to run a protocol. The protocol will start and microcurrent will flow from the output jacks. The protocol will stop after the programmed run time. The CH1/CH2 LEDs will flash to indicate poor connection from the device to the body.



If you do not start another protocol, the unit will automatically turn off.

Pause the Therapy Protocol

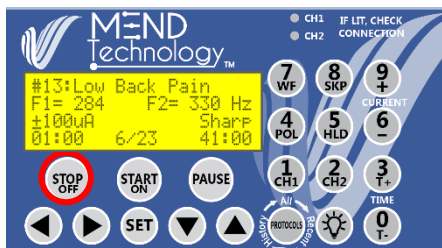
While a protocol is running, press the PAUSE key if you need to temporarily pause a protocol. Press START to resume treatment.



The maximum time for a PAUSE is 30 minutes.

Stop the Therapy Protocol

You can press the STOP key to stop running a protocol at any time.



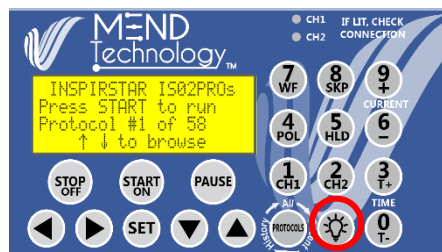
If you accidentally press STOP, you can restart the protocol and skip to the last frequency pair you were running.

Turn on the Back Light

To turn on the back light: press the lightbulb key to turn on the LCD back light. The back light will turn off when there is no keypad activity after 10 seconds.

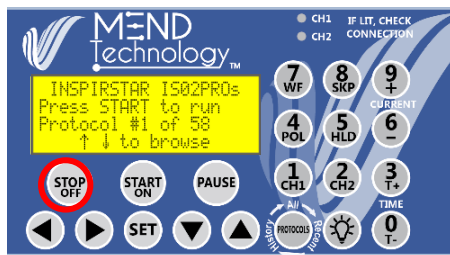
To turn off the LCD back light: press the back light key to turn off the back light immediately.

To turn on the LCD back light for 30 seconds: press and hold the back light key for 3 seconds, the light will stay on for 30 seconds. To keep the



backlight on for 8 hours, press and hold the Back Light key again until the LCD backlight flashes once.

Turn power off

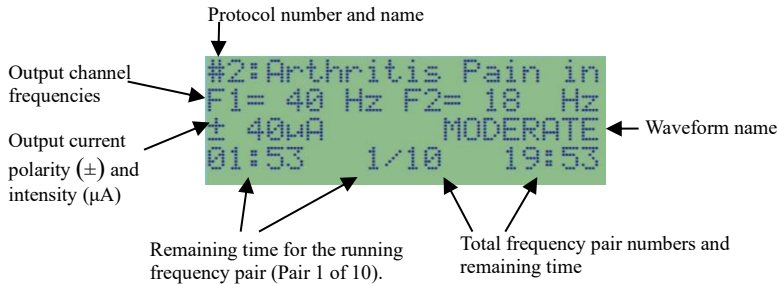


Press the STOP/OFF key to turn off the MEND Pro. The unit will power off automatically if the unit is not in use for 60 seconds.

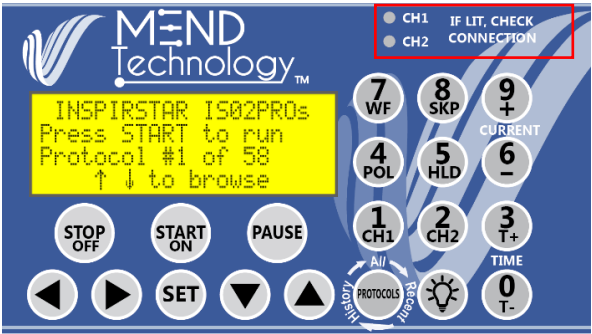
3.3 Advanced Operations and Display Information

Protocol Running Information and Status

When a protocol is running, the screen will display the protocol information and status.



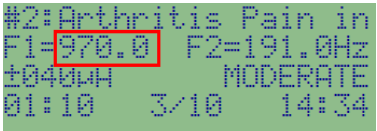
During the running of the protocol, the MEND Professional™ uses two LED lights and beeping sound to indicate the output connection. If the channel status LED CH1 or CH2 turns on or flashes, check that your leads are inserted firmly into the jacks and your pins are plugged into the conductive material. The common problems are loose plugs, plugs are not inserted, the button or push pin is not inserted into gloves or electrodes, dry skin contact needs moisture or broken lead wires.



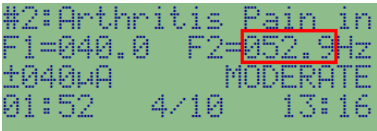
Note: During treatment you may experience a mild tingling sensation as a result of the stimulating current flow.

Make Run Time Changes

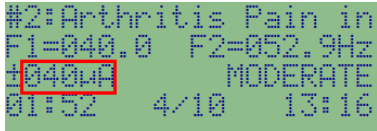
To change CH1 frequency: Press CH1, the edit cursor will jump to CH1 frequency value. Then enter the digits of the new frequency value. For example, to enter frequency 970 Hz, press CH1, 9, 7, 0 and SET.



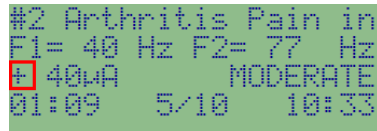
To change CH2 frequency: Press CH2, the edit cursor will jump to CH2 frequency value. Then enter the digits of the new frequency value. For example, to enter 52.9Hz, press CH2, 0, 5, 2, 9 and SET.



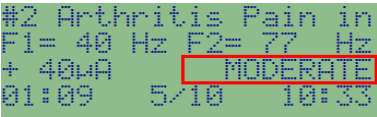
To change output current intensity +/- : Press + key to increase current intensity value or press - key to decrease current intensity value. Or press SET key until the edit cursor has moved to the output current position, then use number keys or arrow keys to change the value.



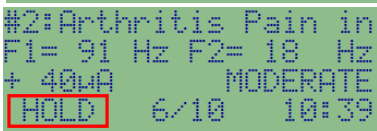
To change polarity: Press POL key to rotate the output polarity between ± (alternating), + (polarized positive) and – (polarized negative).



To change waveform: Press WF key to rotate the list of predefined waveforms. Use UP and DOWN arrows to scroll forward or backward the waveforms.



To change run time: The run time of each frequency pair is programmed in the protocol. Press T+ and T– keys to increase or decrease by 1 minute the run time. Pressing key HLD will hold the timer and there will still be microcurrent at outputs.



To HOLD the current frequency pair: Press HLD key to hold the timer of current

frequency pair. Press **HLD** again to resume the timer.

To SKIP current frequency pair:
press SKP key to skip the current frequency pair and move to next frequency pair.



```
#1 Body Pain
F1= 40 Hz F2= 45 Hz
+ 40uA MODERATE
00:40 2/8 12:40
```

To LOCK the keypad when running a protocol to avoid accidental change or stop of the protocol, press both the LEFT and RIGHT keys, a lock sign will appear that indicates the keypad is locked. Press LEFT and RIGHT keys again to unlock.

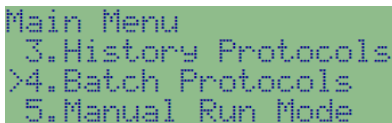
To stop running: press **STOP** at any time.

The new values will be applied onto the microcurrent output in 3 seconds after SET. The change of CH1 and CH2 is only valid for current frequency pair. The change of Current Intensity and Waveform will be carried into next frequency pair in the protocol if the next frequency pair has the same parameters as the current frequency pair. All Run Time changes become invalid when this protocol is finished or stopped.

Batch Protocols

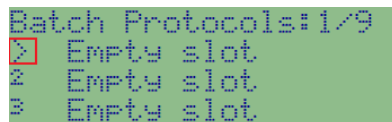
Batch Protocols allows you to add up to 9 protocols and run as a batch. Protocols will run in order.

To go into Batch Protocols: press LEFT arrow key to Main Menu and use UP/DOWN to select Batch Protocols and press RIGHT arrow to enter; Or press Key 4 to select and enter Batch Protocols from Main Menu.



```
Main Menu
3. History Protocols
>4. Batch Protocols
5. Manual Run Mode
```

Select a slot: There are 9 protocol slots in the batch. Each slot can be assigned to any protocol in the IS02. Use UP/DOWN keys to move the selection symbol ">" up and down.



```
Batch Protocols: 1/9
> Empty slot
Empty slot
Empty slot
```

Select a protocol for the slot: Press RIGHT key to enter to the protocol selection menu.



```
Batch <- All: #1/5
>1: Body Pain
2: Arthritis Pain in
3: Overall Activitie
```

Select from other protocols: Press **Protocols** key to rotate between All Protocols, Recent Protocols and History Protocols. Enter a protocol number using number keys or use UP/DOWN arrows to select a protocol. See *Select a Protocol* on page 18.

```
Batch <- Recent: 0
```

Assign a protocol to the slot: press **START** key to assign the protocol to the slot. The assigned protocol will be shown in the slot in the batch.

```
Batch Protocols:1/9
>1:Body Pain
2 Empty slot
3 Empty slot
```

Select protocols for other slots: repeat the above steps for other slots.

```
Batch Protocols:2/9
>1:Body Pain
>4:Pain with Inflamm
3 Empty slot
```

Remove a protocol from batch: select the batch slot and press and hold **STOP** key for 2 seconds until the slot is changed to empty. You can have empty slots between protocols in the batch. The empty slot will be skipped during runtime.

```
Batch Protocols:1/9
>1:Body Pain
24:Pain with Inflamm
35:Tension
```

Run a batch of protocols: move the selection cursor “>” to the protocol to start within the batch, and press **START** key to start running the protocols. The slot number in the batch is shown in front of protocol number.

```
Batch Protocols:1/9
> Empty slot
24:Pain with Inflamm
35:Tension
```

Skip a protocol in batch: press **STOP** key to skip the current protocol. The next protocol in the batch will start.

```
2#4:Pain with Inflamm
F1= 40 Hz F2=103 Hz
± 40µA MODERATE
01:48 1/16 31:48
```

Stop the batch: press and hold **STOP** key for 2 seconds to stop running the batch of protocols.

Manual Run Mode

Manual Run Mode is the mode to run a frequency pair with any parameters programmed directly from keypad. The new value will be applied on the microcurrent output in 3 seconds after SET.

To go into Manual Run Mode: press Back key to Main Menu and use UP/DOWN to select Manual Run Mode and press RIGHT arrow to enter into manual run mode; Or press Key 5 to select manual run mode from Main Menu.

To prepare running parameters: You will be first in Manual Run Prepare screen. You can run immediately by pressing START, or change those values first, and then press START to run.

To change CH1 frequency: Press CH1, the edit cursor will jump to CH1 frequency value. Then enter the digits of the new frequency value. For example, to enter frequency 970Hz, press CH1, 9, 7, 0 and SET.

To change CH2 frequency: Press CH2, the edit cursor will jump to CH2 frequency value. Then enter the digits of the new frequency value. For example, to enter 52.9Hz, press CH2, 0, 5, 2, 9 and SET.

To change output current intensity +/-: Press + key to increase current intensity value or press - key to decrease current intensity value. Or press SET key until the edit cursor has moved to the output current position, then use number keys or arrow keys to change the value.

To change polarity: Press POL key to rotate the output polarity between ± (alternating), + (polarized positive) and – (polarized negative).

```
Main Menu
4.Batch Protocols
>5.Manual Run Mode
6.Settings
```

```
Press START to run:
F1=100 Hz F2=200 Hz
±100µA GENTLE
2500ms 00:00 HOLD
```

```
Press START to run:
F1=100.0 F2=200.0Hz
±100µA GENTLE
02500ms 00:00 HOLD
```

```
Press START to run:
F1=100.0 F2=200.0Hz
±100µA GENTLE
02500ms 00:00 HOLD
```

```
Press START to run:
F1=100 Hz F2=200 Hz
±120µA GENTLE
2500ms 00:00 HOLD
```

```
Manual Running Mode:
F1=100 Hz F2=200 Hz
+120µA GENTLE
2500ms 00:12 29:48
```

To change waveform: Press WF key to rotate the list of predefined waveforms. Use UP and DOWN arrow to scroll forward or backward the waveforms.

```
Manual Running Mode
F1=100 Hz F2=200 Hz
±120µA SHARP
2500ms 00:54 29:06
```

To change period: Press SET key multiple times until the edit cursor has moved to the digits for period, then enter the numbers or UP and DOWN to change the digits of number.

```
Manual Running Mode
F1=100.0 F2=200.0Hz
±120µA SHARP
02500ms 01:28 28:32
```

To change run time: The default run time is 30 minutes. Press T+ and T- keys to increase and decrease by 1 minute to the run time.

```
Press START to run:
F1=100 Hz F2=200 Hz
±120µA SHARP
2500ms 00:00 32:00
```

To HOLD the timer: press HOLD key to hold the timer, the elapsed timer will continue counting, the remaining run time timer is on hold. Press HOLD again to resume the timer.

```
Manual Running Mode
F1=100 Hz F2=200 Hz
±120µA SHARP
2500ms 00:03 HOLD
```

To stop running: press STOP key at any time. The elapsed time and remaining time will stay in the manual run prepare screen.

```
Manual Running Mode:
F1=100 Hz F2=200 Hz
±120µA SHARP
2500ms 01:41 28:19
```

To exit Manual Run Mode: press STOP again to go back to Main Menu.

Settings

To change Settings: press Back key to go to Main Menu and use the DOWN arrow to go Settings, then press the RIGHT arrow to

```
Main Menu
5.Manual Run Mode
>6.Settings
7.About
```

enter into Settings screen. Scroll the list using the UP/DOWN arrows. Press the SET key to go into edit mode. When the cursor is flashing, use the UP/DOWN arrow to change the value. Press SET key again to save and exit edit mode.

Key beeping: Turn *On* or turn *OFF* the beeping sound when a key is pressed.

```
Settings: 1/6
>1.OFF=>Key beeping
2.OFF=>Protocol end
3.MEDIUM=>Output Dr
```

Protocol end beeping: Turn *ON* or turn *OFF* the beeping sound when a protocol is finished running

```
Settings: 2/6
1.OFF=>Key beeping
>2.OFF=>Protocol end
3.MEDIUM=>Output Dr
```

Output Drive Voltage: Change the output drive voltage between HIGH, MEDIUM and LOW.

```
Settings: 3/6
2.OFF=>Protocol end
>3.MEDIUM=>Output Dr
4.OFF=>Alert on los
```

If the user is sensitive to current, use “Low”. If the user has high skin resistance, use “High”. The recommendation is to hydrate the patient and especially the skin.

```
Settings: 4/6
3.MEDIUM=>Output Dr
>4.OFF=>Alert on los
5.F1 =>CH1 Output
```

Alert on loss of connection: Turn *ON* or turn *OFF* the alert sound when the output connection is lost.

Channel 1 (F1) or Channel 2 (F2)

Output Frequency: Change the out put of the F1 or F2 frequency to port CH1 or CH2. Each port can output either single frequency F1/F2, or both frequencies F1+F2, or OFF for no output.

```
Settings: 5/6
4.OFF=>Alert on los
>5.F1+F2=>CH1 Output
6.F2 =>CH2 Output
```

This is the global setting for all protocols. The new settings will take effect after you press the Back key to return to the Main Menu. Press STOP to cancel the changes.

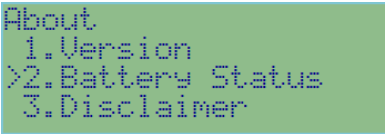
About

To go to About: press Back key to go to Main Menu and use UP/DOWN to select About, and press RIGHT arrow to enter into About screen;

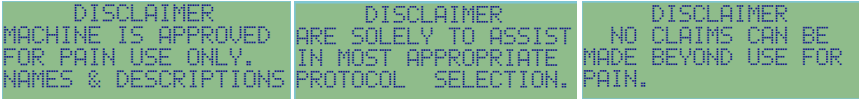
```
Main Menu
5.Manual Run Mode
6.Settings
>7.About
```

Version: shows the hardware and firmware information.

Battery Status: shows the battery voltage and estimated time that the batteries could run for protocols. The battery run time varies on the output current levels of the protocols.



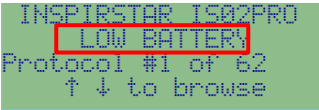
Disclaimer: shows the disclaimer to users who use this product. Use UP/DOWN key to scroll between screens. Use BACK key to exit. You can also use STOP key or START to skip the screens when the disclaimer is shown upon power up. The three screens are captured below.



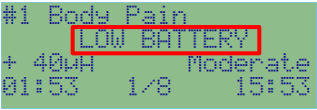
Low Battery Indication

Low battery will be indicated on startup screen and on protocol running screen. You can continue to use the unit, but may shut down unexpectedly any time.

On startup screen:



On protocol running screen



4 Maintenance & Troubleshooting



There are no serviceable parts inside the IS02 main unit. Do not open the unit.

Pre-Use Inspection

To ensure the IS02PROS device and leadwires are in good working order, perform the following steps.

- Power on the unit, check the display and keypad are working normally.
- Plug the lead wires without electrodes into the Combined Output Ports on the rear of the IS02PROS unit.
- Press START key to run a protocol. There should be no error on running.
- Test the continuity for CH1. Use the YELLOW pin to touch the GREEN pin. The CH1 LED on the unit should not flash or not be continuously on. This is the indication of good continuity through the lead wires. Separate the touch of the two pins. The CH1 LED should start to flash or be continuously on to indicate that the continuity is broken.
- Repeat to test the continuity for CH2. Use the RED pin to touch the BLUE pin. The CH2 LED on the unit should not flash or not be continuously on. This is the indication of good continuity through the leadwires. Separate the touch of the two pins. The CH2 LED should start to flash or be continuously on to indicate that the continuity is broken.



Stop using the IS02PROS device if the leadwires or unit failed the above inspection and contact MEND Technology for recommendations.

Sanitizing

Clean and disinfect the IS02PROS main device, the leadwires and reusable accessories and electrodes at least once a week or between uses.

To sanitize the IS02PROS main device, wipe the device with non-dripping cotton balls or sanitizing wipes with germicide or alcohol. It would be safe to wipe the faceplate (keypad), display (LCD screen) and the whole enclosure if the wipe does not drip. Wipe off extra liquid on unit surface immediately.



The IS02PROS main device is not waterproof. Excessive liquid could leak into the device especially through the edge of the LCD screen to cause the device to malfunction.

To sanitize **lead wires**, wipe the leads with cotton balls or sanitizing wipes with germicide or alcohol.

To sanitize the **electrodes** or **gloves**: Electrodes and gloves are single patient use and not to be shared between people.

Life of Service

All IS02 devices have been tested and calibrated at manufacturing. The device does not need re-calibration for general use in 10 years. The IS02PROS device can be re-calibrated within or after 10 years of manufacturing for assurance of the accuracy or to comply with certain requirements from user's application. Our manufacturer provides such calibration service for a fee.

Disposal



Do not throw the device into trash bin for regular waste. Follow local law or regulation for the collection, recycling and recovery of electronic waste.



Troubleshooting

Problem	Possible Reasons and Solutions
No LCD display when pressing ON.	Check whether the batteries are positioned correctly or change to new batteries.
No LCD display and CH1/CH2 keeps flashing.	Check whether the batteries are positioned correctly. Or change to new batteries.
No LCD display and 3 short beeping sounds.	Internal failure. Change with new batteries and try again. If problem persists, contact MEND Technology for services.
LCD displays “Low Battery”	Change to new batteries.
CH1/CH2 LEDs flashing or continuous on and/or beeping sound when running a protocol	The output connection is lost. This is commonly from loosened or disconnected wire plugs, worn-out electrodes, or dry skin. Check the wire connection and moisturize the skin, or perform the Inspection Before Use.
No sensation of current	This is normal for low current intensity.
Treatment is not effective.	Please consult your health care practitioner.
An error code appears on the screen.	Write down or take a photo of the screen. Turn the unit off and try again. If the problem persists, contact support@mendtechnology.com for servicing.

If a problem is not resolved, please check

<https://mendtechnology.com/troubleshooting/>

5 Technical Manual

5.1 Technical Specifications

Carrier Frequency

Frequency Range:	0.1 Hz to 999.9 Hz programmable	
Frequency Accuracy:	0.1 Hz to 99.9 Hz:	+/-0.1%
	100.0 Hz to 499.9 Hz:	+/-0.3%
	500.0 Hz to 999.9 Hz:	+/-0.5%
Frequency Waveform:	Square pulses	
Frequency Duty Cycle:	0.1 Hz to 99.9 Hz	49% ~ 51%
	100 Hz to 499.9 Hz	45% ~ 55%
	500 Hz to 999.9 Hz	40% ~ 60%

Modulation Envelope

Period:	Programmable from 4 ms to 60000 ms	
Modulation Waveform	Programmable ramp up/down slopes	
	Programmable duty cycles	
Current Intensity:	20 μ A to 400 μ A programmable,	
	In 10 μ A step	
Current Accuracy:	20 μ A ~ 200 μ A : +/- 5 μ A	
	200 μ A ~ 400 μ A : +/- 10 μ A	

Outputs

Output Polarity:	Programmable alternating, always +, or always –	
Output Load Resistance:	0 to 100K ohm	
Output Indication:	LED for poor connection	
Output Channels:	Two	
Output Channel Dependency:	Fully independent, or correlative with programmable phase between two channels for the modulation envelopes. Either one can be turned off by programming.	

Output Connector: 2x 2.35mm jacks for combined ports
2x 2.35mm jacks for separated ports

Timer

Timer: Up to 18 hours for each frequency pair
Timer Accuracy: +/- 0.2%

Protocols

Number of Protocols: Up to 999 programmable
Frequency Pairs: Up to 28000 frequency pairs, limited by memory size and complexity of the protocols

General

Power Supply: 2x 1.5V Alkaline batteries (AA size)
Battery Life: 30 to 70 hours, depends on the protocols and backlight usage
Power Consumption: < 0.25 Watts
Communication Port: micro-USB
Dimensions: 5.12 x 3.15 x 1.1 inches
Weight: 6 ounces (without batteries)
Safety class: Type BF
The device is classified as type BF (Body Floating) device. For example, the device has conductive contact with the patient and the device is electrically separated from earth.

Environmental Conditions

Ingress Protection rating: IP41

Protected against foreign objects larger than 1mm, ingress of dust is not totally prevented. Protected against vertically falling water drops.

Condition	Operating	Non-Operating (Storage and transportation)
Temperature	+5°C to +40°C*	-30°C to +80°C
Relative Humidity	10% to 80%, non-condensing	0% to 90%, non-condensing
Maximum Altitude	3,048 meters (20,000 feet)	12,000 meters (40,000 feet)
Atmospheric Pressure	>69 kPa & <132 kPa	>23 kPa & <132 kPa

* Wait for at least 10 minutes before use from the extreme non-operating temperature.

5.2 Protocols and Frequency pairs

MEND IS02PROS provides preloaded protocols and can store up to 999 customer protocols. Long descriptions for each protocol can impact the number of protocols the customer can load. Each protocol can be programmed to have one or multiple frequency pairs. Each frequency pair includes output parameters of frequencies for two channels, current intensity, time, and all other parameters for one therapy sub-session.

Microcurrent practitioners or medical doctors usually program the unit with customized protocols for patients according to their therapy needs. The following table is an example of a protocol including 10 frequency pairs. Each frequency pair includes parameters Frequency 1 “CH1”, Frequency 2 “CH2”, Current Intensity “I”, Time “T”, Waveform “WF”, etc. Please refer to “Waveform Description” of this document for detailed explanation of all parameters CH1, CH2, Current Intensity, Period, K0~K3, Polarity, and Phase of a frequency pair. The multiple frequency pairs will run in sequence when a protocol is started.

Pair #	F1(Hz)	F2(Hz)	I(μA)	T(min'sec'')	Waveform	Period(ms)	K0	K1	K2	K3	Phase	Polarity	Description
1	40	18	40	2'	Moderate	2,500	3	17	80	0	0	Alternating	inflammation, joint lower
2	40	14	40	2'	Moderate	2,500	3	17	80	0	0	Alternating	inflammation, joint upper
3	40	191	40	2'	Moderate	2,500	3	17	80	0	0	Alternating	inflammation, tendons
4	40	46	40	2'	Moderate	2,500	3	17	80	0	0	Alternating	inflammation, muscles
5	40	77	40	2'	Moderate	2,500	3	17	80	0	0	Alternating	inflammation, muscles
6	91	18	40	2'	Moderate	2,500	3	17	80	0	0	Alternating	pain, joint lower
7	91	14	40	2'	Moderate	2,500	3	17	80	0	0	Alternating	pain, joint upper
8	91	191	40	2'	Moderate	2,500	3	17	80	0	0	Alternating	pain, tendons
9	91	46	40	2'	Moderate	2,500	3	17	80	0	0	Alternating	pain, muscles
10	91	77	40	2'	Moderate	2,500	3	17	80	0	0	Alternating	pain, muscles

(Note that the values in this table are to demo the concept and may not be for actual therapy.)

5.3 Waveform Description

The output from MEND unit is current pulses. The waveform and parameters are illustrated in Figure 3. Both channels have the parameters marked on the CH1 waveform (at the top).

F: Frequency of the carrier, also called chopper frequency.

T: Therapy time in minutes, programmable from 1 minute to 60 minutes for each frequency pair. The waveform will be repeated during the therapy time.

I: Peak current intensity of the pulse, expressed in μA .

Polarity: The polarity of the pulse is programmable to be alternative, always positive, or always negative. In alternative mode, the output polarity will change the polarity.

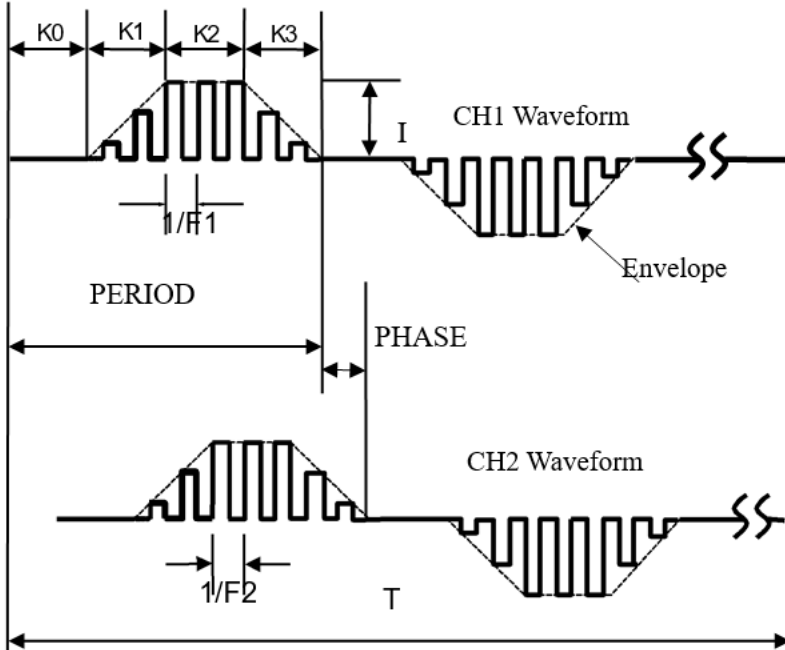


Figure 3 Waveform and Parameters

K: Duty cycle of the waveform. The pulse is composed of four segments for their nature in the waveform. Each segment is programmable from 0% to

100% of the period of the envelope. When a period has 0% duty, the period will be eliminated.

K0: Off period, there is no output current at this period, or $i=0$.

K1: current ramp up period, current ramps up to the peak current intensity I from $0 \mu\text{A}$.

K2: peak current plateau period, the output current reaches the programmed peak value and maintains at the peak value for the period.

K3: current ramp down period, current ramps down from the peak current intensity I to $0 \mu\text{A}$.

Period: Period of the modulated pulse. The pulse can be modulated by the carrier frequency F . The period is programmable from 4 ms to 60000 ms. The outline of the waveform is often referred to as the envelope of the waveform, when the pulse is modulated, as shown in dotted lines in the figure.

Phase: is the relationship of the waveforms of the two channels. Channel 1 is used as the reference. A phase of 180 degrees equals to one period of channel 1. The phase of Channel 2 determines the time of the start point of the period of Channel 2. When phase is 0 degree, the waveform of Channel 2 is aligned with the waveform of Channel 1. When the phase is 180 degrees, the waveform of channel 2 one period later than CH1.



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