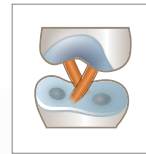


# ACTIVE-K

On-Board Therapy Protocols



## CHATTANOOGA™ ACTIVE-K

On-board therapy protocols for active rehabilitation!

### DEVELOPMENT OF THE THERAPY PROTOCOLS

The therapy protocols are based on more than 25 post-surgery treatment schemes for each indication from different therapy centers. They were analyzed and evaluated by the physiotherapy team of the Mooswaldklinik Freiburg (Germany). They were successfully tested in practice in cooperation with the St. Elisabeth hospital in Leipzig (Germany) and with the Charité in Berlin (Germany).

## QUICK REFERENCE GUIDE TO PROGRAMMING THERAPY PROTOCOLS

### HAND CONTROLLER OPERATION

#### Patient chip card

#### MENU button

Selects the different menu levels for configuration

#### OK button

Confirms a selection or setting

#### START button

Starts a treatment from the current setup menu or when treatment has been suspended



#### RETURN button

Back to the previous screen

#### 4 arrow buttons


- Used to move the focus (blue field)
- Used to change values while programming

#### STOP button

Stops the treatment

## SCREEN DISPLAYS

### PASSIVE mode




Remaining therapy time: 10 min

Current position: 23°

Set ROM (blue range): 5° to 80°

### ACTIVE mode




Direction in which the force is to be exerted: Indicated by a green arrow pointing right.

Indication of the exerted force: 15 kg (red bar), 12 kg (green bar)

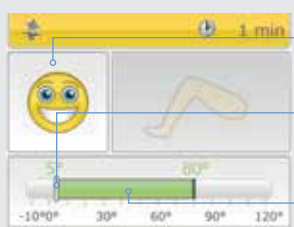
The carriage continues moving only when the force indicator reaches the green range.

### MAINTAIN FORCE



Progress bar: The force must be maintained until the bar is solid (= 4 seconds).

### FREE TRAINING

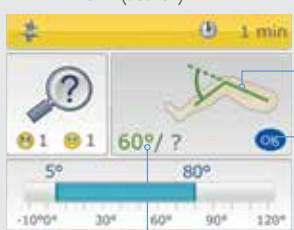


Feedback when ROM was extended: Indicated by a smiley face.

Current position: Indicated by a diagram of the joint.

ROM attained (green range): 5° to 60°

### FIND ANGLE (search)




Graphic representation of the angle: Indicated by a green line on the joint diagram.

Prompt "Press OK button" (when angle was "found")

Angle to find: 60°/?

### FIND ANGLE (result)



Rating: Indicated by a smiley face and a bar chart.

Indication of requested and attained angles and deviation: -10° (deviation), 60°/50° (requested/attained)

Prompt "Press OK button" (continue treatment)

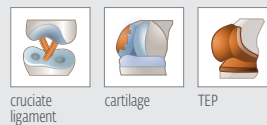
## PROGRAMMING

### Start/stop therapy

- 1 Connect the **power plug**
- 2 Switch the CHATTANOOGA™ ACTIVE-K on with the **power switch**
- 3 Insert the **patient chip card** in the controller
- 4 **To start:** press **START**
- 5 **To stop:** press **STOP**

### Programming therapy protocols

- 1 Press **MENU** until the 3 available therapy protocols are shown on the display:



- 2 Press **←** **→** to select the appropriate therapy protocol
- 3 Press **OK** to confirm the selected protocol

### Programming parameters

- 1 Press **MENU** until the available parameters are displayed

- 2 Press **←** **→** to select the **parameter**:



- 3 Press **OK** to confirm the selection
- 4 Press **↑** **↓** to change the setting
- 5 Press **OK** to confirm the setting
- 6 Press **START** to start the therapy session

### Programming DEMO function

- 1 Press **MENU** until the available parameters are displayed

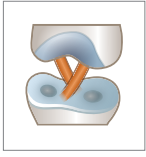
- 2 Press **←** **→** to select the **Demo function**:



- 3 Press **OK** to confirm the selection
- 4 Press **↑** to activate
- 5 Press **OK** to confirm the setting
- 6 Press **START** to start the demonstration
- 7 During the demonstration you can press **→** to advance to the next function

After the demonstration, start actual therapy session with **START**

## CHATTANOOGA™ ACTIVE-K



### THERAPY PROTOCOL: CRUCIATE LIGAMENT

#### Level 1

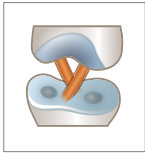
Duration 20 min	Function/sequence	Default parameters	Description
5	PASSIVE WARM-UP		Passive ROM extension until the set values are attained.
15	PASSIVE		Passive movements within the set values.

#### Level 2

Duration 20 min	Function/sequence	Default parameters	Description
5	PASSIVE WARM-UP		Passive ROM extension until the set values are attained.
5	ACTIVE	ACTIVE ZONE: 0°/10°/60° Extension direction: Push – 5 kg Flexion direction: Passive	Push to achieve extension and keep the force bar in the green range. Otherwise the carriage will not continue.  Flexion is passive and controlled by the carriage.
3	PASSIVE		Passive movements within the set values.
5	ACTIVE	see above	see above
2	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.

#### Level 3

Duration 20 min	Function/sequence	Default parameters	Description
3	PASSIVE WARM-UP		Passive ROM extension until the set values are attained.
5	ACTIVE	ACTIVE ZONE: 0°/0°/60° Extension direction: Push – 7 kg Flexion direction: Pull – 7 kg	Push to achieve extension and pull to achieve flexion, keeping the force bar in the green range each time. Otherwise the carriage will not continue.
5	PASSIVE		Passive movements within the set values.
5	MAINTAIN FORCE, STATIC	Extension direction: Push – 5 kg to 8 kg Flexion direction: Pull – 5 kg to 8 kg	Passive movements within the set values. The carriage stops periodically. The force bar must be held in the green range for 4 seconds. Otherwise the carriage will not continue. The direction of the force is indicated on the display (green arrow).
2	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.



## THERAPY PROTOCOL: CRUCIATE LIGAMENT

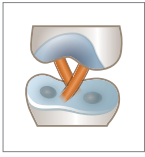
### Level 4

Duration 20 min	Function/sequence	Default parameters	Description
2	FREE TRAINING	Extension direction: Push – 3 kg Flexion direction: Pull – 3 kg	Active flexion and extension of the leg against resistance. ROM: as wide as possible. The values attained at completion automatically become the new ROM.
5	ACTIVE	Extension direction: Push – 10 kg Flexion direction: Passive	Push to achieve extension and keep the force bar in the green range. Otherwise the carriage will not continue. Flexion is passive and controlled by the carriage.
5	MAINTAIN FORCE, STATIC	Extension direction: Push – 5 kg to 10 kg Flexion direction: Pull – 5 kg to 10 kg	Passive movements within the set values. The carriage stops periodically. The force bar must be held in the green range for 4 seconds. Otherwise the carriage will not continue. The direction of the force is indicated on the display (green arrow).
5	ACTIVE	Extension direction: Push – 7 kg Flexion direction: Pull – 7 kg	Push to achieve extension and pull to achieve flexion, keeping the force bar in the green range each time. Otherwise the carriage will not continue.
3	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.

### Level 5

Duration 20 min	Function/sequence	Default parameters	Description
2	FREE TRAINING	Extension direction: Push – 3 kg Flexion direction: Pull – 3 kg	Active flexion and extension of the leg against resistance ROM: as wide as possible. The values attained at completion automatically become the new ROM.
5	ACTIVE	Extension direction: Push – 10 kg Flexion direction: Push – 8 kg	Push to achieve extension and flexion, keeping the force bar in the green range each time. Otherwise the carriage will not continue.
3	MAINTAIN FORCE, STATIC	Extension direction: Push – 10 to 14 kg Flexion direction: Pull – 10 kg to 14 kg	Passive movements within the set values. The carriage stops periodically. The force bar must be held in the green range for 4 seconds. Otherwise the carriage will not continue. The direction of the force is indicated on the display (green arrow).
5	ACTIVE	see above	see above
2	FIND ANGLE, ACTIVE	Extension direction: Push – 3 kg Flexion direction: Pull – 3 kg	To improve coordination. Active movements within the set values. - At each cycle, the task is to actively "find" an angle. - The angle to find is indicated on the display. - Bend and stretch the leg. - Press the OK button when you assume having found the angle. - Indication of set and found angles. - Continue therapy with the OK button.
3	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.

## CHATTANOOGA™ ACTIVE-K



### THERAPY PROTOCOL: CRUCIATE LIGAMENT

#### Level 6



Duration 20 min	Function/sequence	Default parameters	Description
5	FREE TRAINING	Extension direction: Push – 8 kg Flexion direction: Pull – 5 kg	Active flexion and extension of the leg against resistance. ROM: as wide as possible. The values attained at completion automatically become the new ROM.
3	PASSIVE		Passive movement of your joint within the set values.
5	FREE TRAINING	Extension direction: Push – 12 kg Flexion direction: Pull – 8 kg	see above
2	FIND ANGLE, ACTIVE	Extension direction: Push – 3 kg Flexion direction: Pull – 3 kg	To improve coordination. Active movements within the set values. - At each cycle, the task is to actively "find" an angle. - The angle to find is indicated on the display. - Bend and stretch the leg. - Press the OK button when you assume having found the angle. - Indication of set and found angles. - Continue therapy with the OK button.
3	ACTIVE	Extension direction: Push – 15 kg Flexion direction: Passive	Push to achieve extension and keep the force bar in the green range. Otherwise the carriage will not continue. Flexion is passive and controlled by the carriage.
2	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.



## THERAPY PROTOCOL: CARTILAGE

### Level 1



Duration 20 min	Function/sequence	Default parameters	Description
5	PASSIVE WARM-UP		Passive ROM extension until the set values are attained.
15	PASSIVE		Passive movements within the set values.

### Level 2



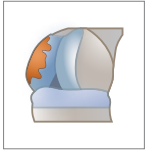
Duration 20 min	Function/sequence	Default parameters	Description
5	PASSIVE WARM-UP		Passive ROM extension until the set values are attained.
5	ACTIVE	ACTIVE ZONE: 0°/10°/60° Extension direction: Push – 5 kg Flexion direction: Passive	Push to achieve extension and keep the force bar in the green range. Otherwise the carriage will not continue. Flexion is passive and controlled by the carriage.
3	PASSIVE		Passive movements within the set values.
5	ACTIVE	ACTIVE ZONE limited: 0°/10°/60° Extension direction: Passive Flexion direction: Pull – 5 kg	Extension is passive and controlled by the carriage.  Pull to achieve flexion and keep the force bar in the green range. Otherwise the carriage will not continue.
2	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.

### Level 3



Duration 20 min	Function/sequence	Default parameters	Description
3	PASSIVE WARM-UP		Passive ROM extension until the set values are attained.
5	ACTIVE	Extension direction: Push – 5 kg Flexion direction: Pull – 4 kg	Push to achieve extension and pull to achieve flexion, keeping the force bar in the green range each time. Otherwise the carriage will not continue.
5	PASSIVE		Passive movements within the set values.
5	ACTIVE	Extension direction: Push – 8 kg Flexion direction: Pull – 4 kg	see above
2	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.

## CHATTANOOGA™ ACTIVE-K



### THERAPY PROTOCOL: CARTILAGE

#### Level 4



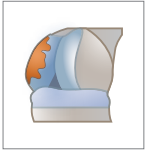
Duration 20 min	Function/sequence	Default parameters	Description
3	PASSIVE WARM-UP		Passive ROM extension until the set values are attained.
5	ACTIVE	Extension direction: Push – 6 kg Flexion direction: Pull – 4 kg	Push to achieve extension and pull to achieve flexion, keeping the force bar in the green range each time. Otherwise the carriage will not continue.
5	MAINTAIN FORCE, STATIC	Extension direction: Push – 5 kg to 8 kg Flexion direction: Passive	Passive movements within the set values. While moving towards extension, the carriage stops periodically. By pushing, the force bar must be held in the green range for 4 seconds. Otherwise the carriage will not continue.
5	ACTIVE	Extension direction: Push – 8 kg Flexion direction: Pull – 8 kg	see above
2	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.

#### Level 5



Duration 20 min	Function/sequence	Default parameters	Description
3	PASSIVE WARM-UP		Passive ROM extension until the set values are attained.
5	ACTIVE	Extension direction: Push – 7 kg Flexion direction: Pull – 7 kg	Push to achieve extension and pull to achieve flexion, keeping the force bar in the green range each time. Otherwise the carriage will not continue.
5	MAINTAIN FORCE, STATIC	Extension direction: Push – 7 kg to 10 kg Flexion direction: Pull – 7 kg to 10 kg	Passive movements within the set values. The carriage stops periodically. The force bar must be held in the green range for 4 seconds. Otherwise the carriage will not continue. The direction of the force is indicated on the display (green arrow).
5	ACTIVE	Extension direction: Push - 10 kg Flexion direction: Pull - 10 kg	see above
2	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.





## THERAPY PROTOCOL: CARTILAGE

### Level 6



Duration 20 min	Function/sequence	Default parameters	Description
3	FREE TRAINING	Extension direction: Push – 3 kg Flexion direction: Pull – 3 kg	Active flexion and extension of the leg against resistance. ROM: as wide as possible. The values attained at completion automatically become the new ROM.
2	FIND ANGLE, ACTIVE	Extension direction: Push – 5 kg Flexion direction: Pull – 5 kg	To improve coordination. Active movements within the set values. - At each cycle, the task is to actively "find" an angle. - The angle to find is indicated on the display. - Bend and stretch the leg. - Press the OK button when you assume having found the angle. - Indication of set and found angles. - Continue therapy with the OK button.
5	ACTIVE	Extension direction: Push – 10 kg Flexion direction: Pull – 10 kg	Push to achieve extension and pull to achieve flexion, keeping the force bar in the green range each time. Otherwise the carriage will not continue.
3	PASSIVE		Passive movements within the set values.
5	ACTIVE	see above	see above
2	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.

# CHATTANOOGA™ ACTIVE-K



## THERAPY PROTOCOL: TEP

### Level 1

Duration 20 min	Function/sequence	Default parameters	Description
5	PASSIVE WARM-UP		Passive ROM extension until the set values are attained.
15	PASSIVE		Passive movements within the set values.

### Level 2

Duration 20 min	Function/sequence	Default parameters	Description
5	PASSIVE WARM-UP		Passive ROM extension until the set values are attained.
5	ACTIVE	Extension direction: Push - 4 kg Flexion direction: Pull - 4 kg	Push to achieve extension and pull to achieve flexion, keeping the force bar in the green range each time. Otherwise the carriage will not continue.
3	PASSIVE		see above
5	ACTIVE	see above	see above
2	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.

### Level 3

Duration 20 min	Function/sequence	Default parameters	Description
3	PASSIVE WARM-UP		Passive ROM extension until the set values are attained.
5	ACTIVE	Extension direction: Push - 6 kg Flexion direction: Pull - 6 kg	Push to achieve extension and pull to achieve flexion, keeping the force bar in the green range each time. Otherwise the carriage will not continue.
5	MAINTAIN FORCE, STATIC	Extension direction: Push - 4 kg to 7 kg Flexion direction: Passive	Passive movements within the set values. While moving towards extension, the carriage stops periodically. By pushing, the force bar must be held in the green range for 4 seconds. Otherwise the carriage will not continue.
5	ACTIVE	see above	see above
2	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.

### Level 4

Duration 20 min	Function/sequence	Default parameters	Description
3	PASSIVE WARM-UP		Passive ROM extension until the set values are attained.
5	ACTIVE	Extension direction: Push - 8 kg Flexion direction: Pull - 8 kg	Push to achieve extension and pull to achieve flexion, keeping the force bar in the green range each time. Otherwise the carriage will not continue.
5	MAINTAIN FORCE, STATIC	Extension direction: Push - 6 kg to 10 kg Flexion direction: Pull - 5 kg to 8 kg	Passive movements within the set values. The carriage stops periodically. The force bar must be held in the green range for 4 seconds. Otherwise the carriage will not continue. The direction of the force is indicated on the display (green arrow).
5	ACTIVE	see above	see above
2	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.



## THErapy PROTOCOL: TEP

### Level 5



Duration 20 min	Function/sequence	Default parameters	Description
2	FREE TRAINING	Extension direction: Push - 3 kg Flexion direction: Pull - 3 kg	Active flexion and extension of the leg against resistance. ROM: as wide as possible. The values attained at completion automatically become the new ROM.
5	ACTIVE	Extension direction: Push - 10 kg Flexion direction: Pull - 8 kg	Push to achieve extension and pull to achieve flexion, keeping the force bar in the green range each time. Otherwise the carriage will not continue.
5	MAINTAIN FORCE, STATIC	Extension direction: Push - 6 kg to 10 kg Flexion direction: Pull - 6 kg to 10 kg	Passive movements within the set values. The carriage stops periodically. The force bar must be held in the green range for 4 seconds. Otherwise the carriage will not continue. The direction of the force is indicated on the display (green arrow).
5	ACTIVE	see above	see above
3	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.

### Level 6



Duration 20 min	Function/sequence	Default parameters	Description
5	FREE TRAINING	Extension direction: Push - 5 kg Flexion direction: Pull - 5 kg	Active flexion and extension of the leg against resistance. ROM: as wide as possible. The values attained at completion automatically become the new ROM.
5	ACTIVE	Extension direction: Push - 10 kg Flexion direction: Pull - 8 kg	Push to achieve extension and pull to achieve flexion, keeping the force bar in the green range each time. Otherwise the carriage will not continue.
2	FIND ANGLE, ACTIVE	Extension direction: Push - 5 kg Flexion direction: Pull - 5 kg	To improve coordination. Active movements within the set values. - At each cycle, the task is to actively "find" an angle. - The angle to find is indicated on the display. - Bend and stretch the leg. - Press the OK button when you assume having found the angle. - Indication of set and found angles. - Continue therapy with the OK button.
5	ACTIVE	see above	see above
3	PASSIVE COOL-DOWN		Passive, gradual reduction of ROM until the start setting is reached.

## NOTES

- Preset "ACTIVE ZONE": for all ACTIVE functions (unless otherwise stated):  
0° / 0° / 90° (= maximum setting)
- The COOL DOWN mode is the opposite of the WARM-UP mode.  
After the session, the carriage stops in the position equivalent to the set extension value +10°.
- Session length: 20 minutes minimum, 2 hours maximum, the duration of the individual sequences adapts automatically.  
The duration of the PASSIVE WARM-UP sequence, however, is fixed, as indicated in the table.
- The indicated durations in minutes are approximate values.  
They depend on the programmed range of motion and on the set femur length.
- Normally the range of motion is defined through the extension and flexion settings, outside the therapy plans.
- If a session starts with the FREE TRAINING function, the final extension and flexion values of this phase automatically become the range of motion (ROM) for the rest of the session.