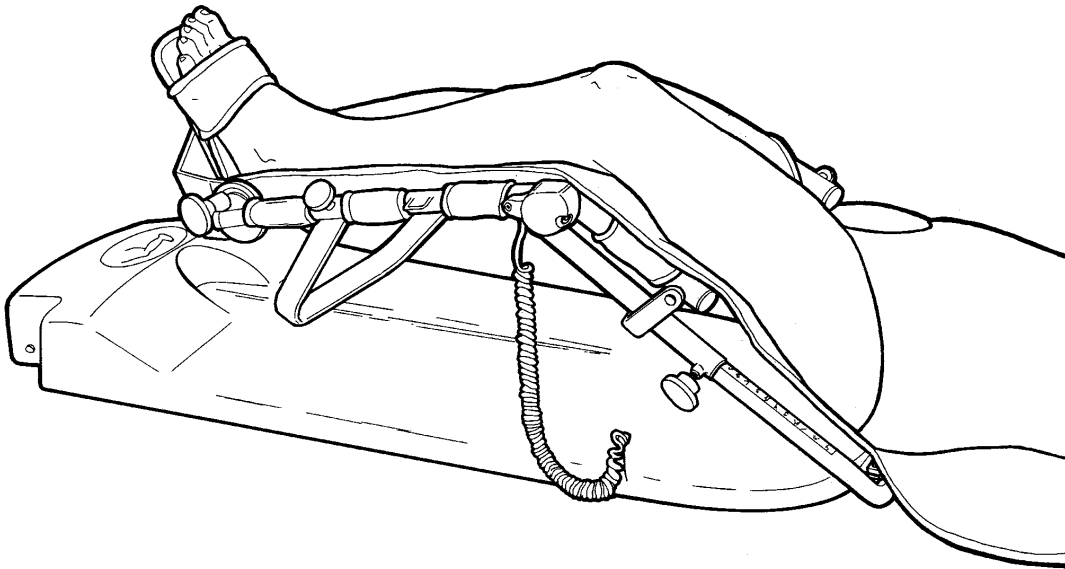


# SERVICE MANUAL



Optima s3



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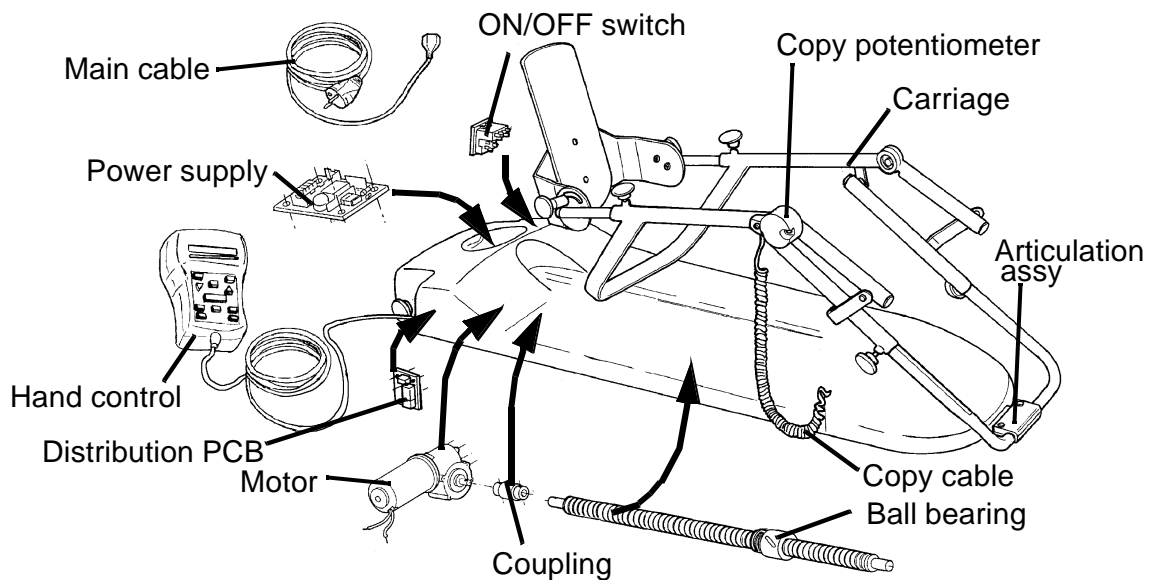


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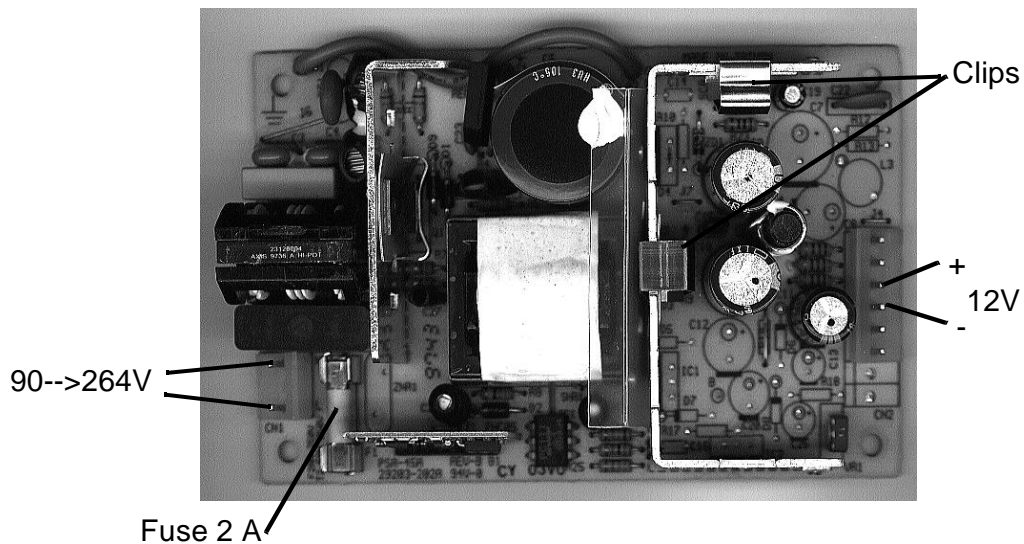
# CONTENTS

	Page
I • MAINS COMPONENTS ON OPTIMA .....	4-5
II • DIFFERENT FAILURE SITUATIONS ON OPTIMA	
1 • Nothing on the display .....	6
A - Procedure for opening the upper cover .....	7
B - Electrical check .....	8
2 • The angulare value on the LCD are not stable .....	9
3 • The display shows a value but the unit does not work .....	9
4 • The unit does not continue its programmed cycle .....	9
5 • Replacing the motor.....	9
6 • The unit works but the display does not change and the unit exceeds the programmed values .....	9
7 • The LCD is not clear .....	9
III • DIFFERENT MESSAGES	
SERVICE D1.....	10
Replacing the copy potentiometer.....	10-11
SERVICE D2.....	12
SERVICE D3.....	12
MESSAGE SERVICE.....	12
LOW BAT .....	12
LOCK.....	12
IV • LOAD ADJUSTMENT PROCEDURE	
Load adjustment.....	13
V • SPARE PARTS TO BE KEPT IN STOCK FOR ABOUT 10 MACHINES .....	14
VI • REQUIRED TOOLS .....	14
VII • RETURNING THE UNIT TO OUR WORKSHOPS ....	14
VIII • REPAIR INFORMATIONS.....	14
IX • APPENDICES	
- Technical data sheet No. 467870009	
- Spare parts list	
- User manual	

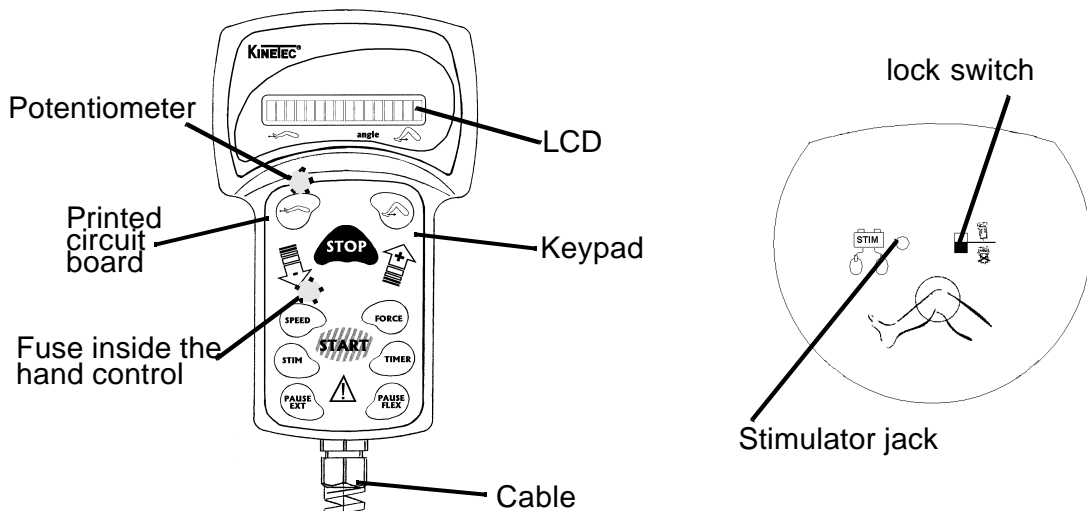
# I • MAINS COMPONENTS ON OPTIMA



- **Main cable**  
Can be delivered with UL, UK, European plug.
- **ON / OFF switch**  
Composed by: ON/OFF switch - Fuses for the primary - Filter  
Be careful when you change the fuses: there is 2 sizes for the fuses length 20mm or 32mm  
Important: Time delay fuse: 500mA 5x20mm or 6,3x32mm. Replaced now by 500mA
- **Power supply**  
Can be supplied between 90 and 264 Volts, 47 at 63Hz.



- Hand control



- LCD:** one line 16 characters
- Keypad:** keypad with 11 keys
- Printed circuit board:** inside the hand control
- Potentiometer:** use to adjust the 115° in flexion
- Fuse:** Replace now by time delay fuse 1,5A (reference: 4610007210)
- Cable:** cable equipped with 2 connectors (reference: 4610006907)
- Lock switch:** to lock the programmed values.
- Stimulator jack:** used when a stimulator is connected to the hand control.

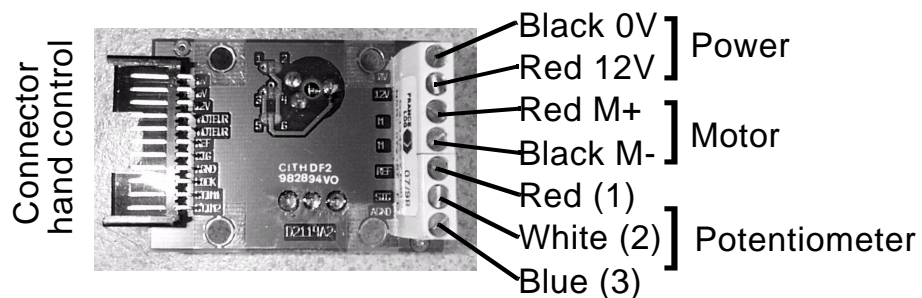
- Motor

This motor can work between 2,7 at 12 volts.  
It's has been tested 5.000 hours and it's equipped with a worm gear.

- Coupling

It's the relay between the motor and the ball bearing screw.

- Distribution PCB



- Carriage

Manufactured on steel tube and chromed with different articulation.

- Articulation assy

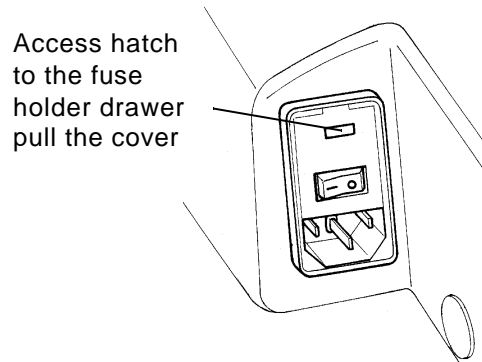
Manufactured on Polyamid PA Arlomb F18.



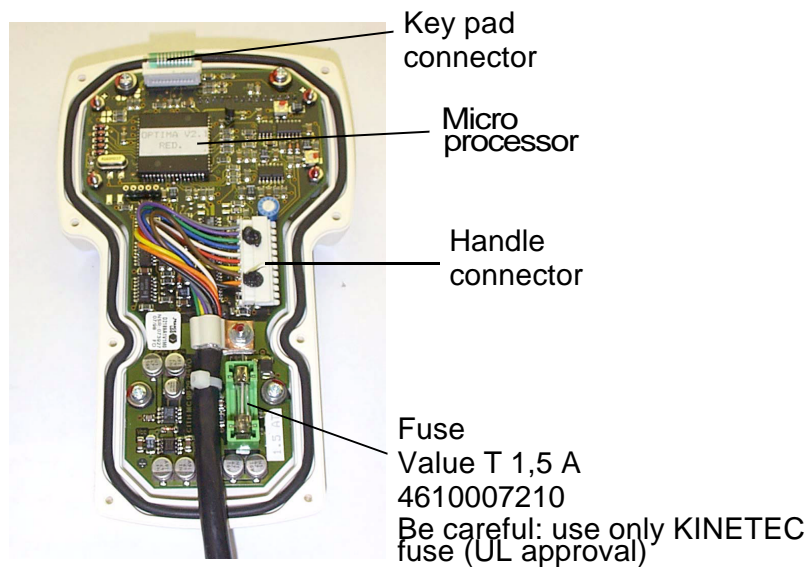
## II • DIFFERENT FAILURE SITUATIONS ON OPTIMA

### 1 • Nothing on the display

- a)- Check the main power supply, at 230V~ or 120 V~.
- d)- Check that the main cable is correctly plugged in
- c)- Check the condition of the two fuses in the main handset: 6.3 x 32 mm, 0.5A 220V time delay fuse reference 4610002400.  
Be careful: use only KINETEC fuse (UL approval).



- d)- Check the fuse on the hand control (open the handle, 5 screws)



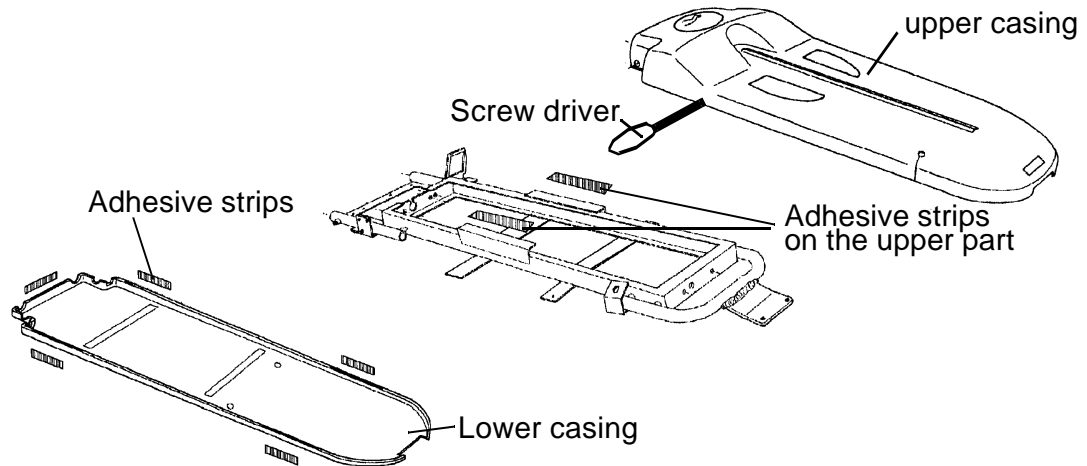
- e)- Check that the handle cable is correctly connected in the handle (connector locked).
- f)- Check if the micro processor is correctly seated on its support.  
Solder the micro processor.

Open the machine after making these various checks.

## A - Procedure to open the upper casing reference

### GLUING COVERS

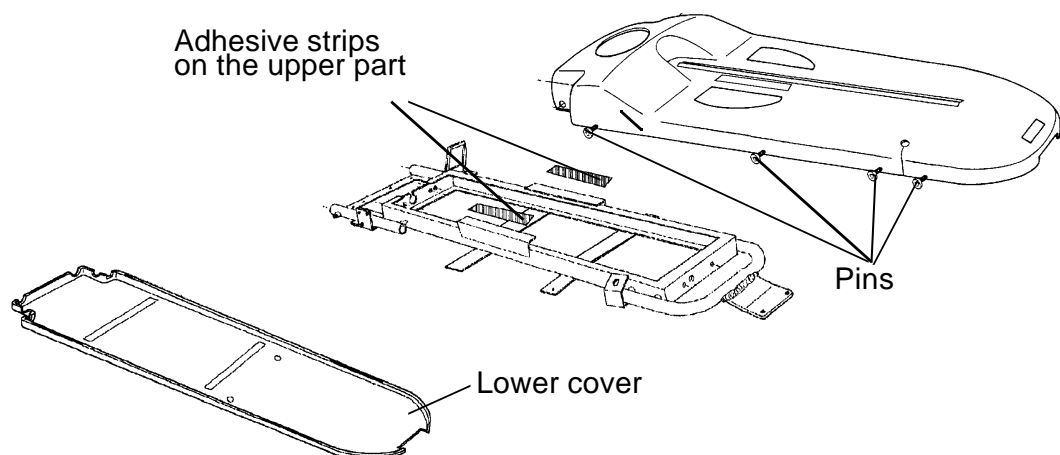
- Stop the unit at 70° before opening the upper casing.
- Remove the 2 screws reference : 4620002325 which hold lower leg support on the the nut support reference : 4670015336 (be careful these screws are glued).
- Cut or unglued the adhesive strips fixing the lower casing to the upper casing and the two adhesive strips on the upper part (be careful, don't break the upper plastic cover when you unglue the adhesive strips, use a large screw driver).



- Remove the wire crossing plate.
- Disconnect the control handle.
- Remove the upper casing, by tilting it around the roller support.

### PERCING COVERS

- Stop the unit at 70° before opening the upper casing.
- Remove the 2 screws reference : 4620002325 which hold lower leg support on the the nut support reference : 4670015336.
- Take out the plastic pins reference: 4626000852 (push on the axe inside rhe pin) collect the plastic axes from the pins inside the unit, be carreful the superior cover is glued on the frame by 2 adhesive strips.



- Remove the wire crossing plate.
- Disconnect the control handle.
- Remove the upper casing, by tilting it around the roller support.



## **B - Electrical check**

- Check if the two clips which hold the regulators on the power supply are not unclipped (see the power supply schema).
- Refer to the attached electrical diagram 467810083 A
- Check the fuse on the power supply card :  
5 x 20 mm 2 amperes fast fuse reference 4610006866
- Check the 220V or 110V voltage at the input to the power supply board  
reference 4610008543: between the white and black wires
- Check the power supply board output: 12 V between the red and black wires  
or change it
- Check the distribution board input: 12 V between the red and black wires
- Check the distribution board output pins black and orange.
- Check the control board input: 12 V between the black and orange wires in the cable  
(see diagram). Replace the cable if it is defective.

**The hand control still does not work after all these checks, please return the hand control assembly for repair or replacement after to have check the point 3, 4, 5, 6 and 7.**

Be careful: when you change the hand control, you have to adjust the 0° extension and 115° flexion (same procedure to adjust the copy potentiometer) and you have to adjust the load (procedure included)

2 • The angular value on the LCD are not stable.

Check if the small potentiometer to adjust the flexion value is not broken or damaged.

3 • The display shows a value but the unit does not work  
(e.g. : 0 RUN 55 115)

- Check the condition of coupling reference 4670015328
- Check the voltage motor (see diagram No. 467810083A); there should be a voltage between 2.7 volts at minimum speed and 10.4 volts at maximum speed.
- If there is no voltage to the motor, check the cable continuity and insulation (7 conductor cables leading to the motor).
- Replace the motor if it is powered but it does not work.

4 • The unit does not continue its programmed cycle

Let the unit running during 10 minutes. If it's always the same, check the motor consumption. It should be between 0.4A and 1A.

If the motor consumption exceeds 1 ampere, replace the motor.

If the consumption is within the values mentioned above but the unit does not continue its cycle, check if the load are correctly adjusted (see the procedure load adjustment).

5 • Replacing the motor

The motor is running in our workshops, but you will need to run it again before making all the force adjustments.

After replacing the motor, allow the unit to work for 12 hours with an amplitude of 10° extension at 90° flexion, and then make the force adjustment.

6 • The unit works but the display does not change and the unit exceeds the programmed values.

Check that key reference 4670015360 is correctly tight on the copy potentiometer spindle.

7 • The LCD is not clear or it miss some digit's.

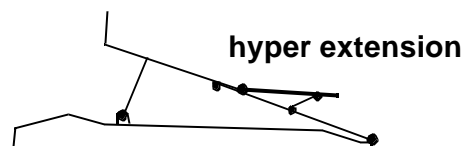
Change the LCD Ref: 4610006585



### III • DIFFERENT MESSAGES

#### SERVICE D1

- Check if the the unit is not on hyper extension over malus 10°.



If yes, its means the mechanical stop pin inside the articulation has been bended. The software limit is malus 12 and if the unit is for example: -15° you will have SERVICE D1. You have to change the adjustment of the femoral, moving the sliding half upper leg support and the upper leg support to set up the unit over malus 5°.

Change the pins inside the articulation use pin ref: 4635006263

- Check the continuity of the spiral copy potentiometer cable reference 4610006676, and if it is correct, replace the copy potentiometer.

#### Replacing the copy potentiometer

**WARNING:** adjust the femur to 36 cm before making the various adjustments to the unit.

- Change the potentiometer and tighten all its attachment screws
- Switch the unit on: there are two possible cases

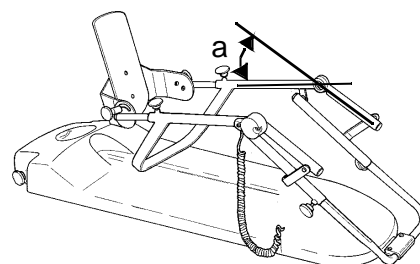
#### Case 1 : the unit displays an angle between -5° and 115°.

Use a goniometer to measure the real mechanical angle (a) of the unit at the knee hinge.

Loosen the copy potentiometer attachment screws and rotate the copy potentiometer until the angle shown on the handle is equal to the measured angle.

Tighten the attachment screws.

Operate the unit, stop it at 0° and check if the control handle shows 0°.



If necessary, adjust the 0° on the control handle by rotating the copy potentiometer again and retighten the attachment screws.

Operate the unit and stop it at 114° mechanical (angle at the knee hinge (a)). Compare the angle displayed on the control handle and the recorded mechanical angle; if the angle displayed on the control handle is different, rotate the adjustment potentiometer by small hole at the bottom of the handle control until you obtain 115° on the display. (This potentiometer is accessible in the control handle by screwdriver through a hole).

- Clockwise: increase the angle
- Anti-clockwise: reduce the angle

Check the 0° again, and repeat the operation if necessary.



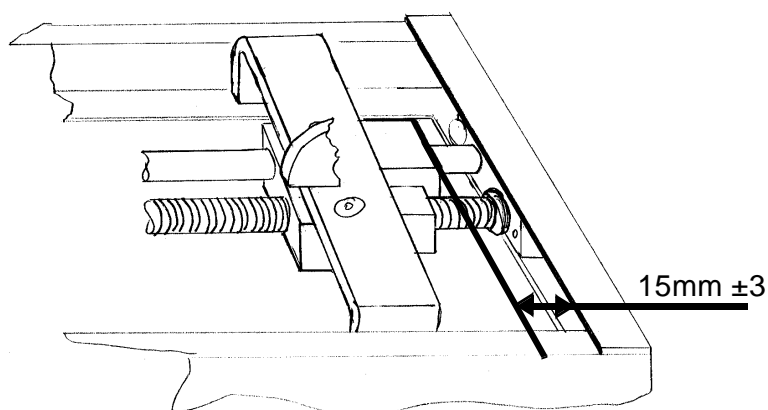
## Case 2 : the unit displays "service D1"

Loosen the copy potentiometer screws and rotate the potentiometer until obtaining an angle of between  $-5^{\circ}$  and  $115^{\circ}$ .

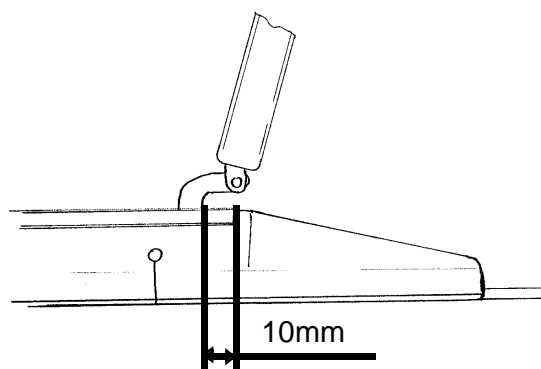
Repeat the adjustment starting from case 1;

### WARNING

- If the upper casing is removed, adjust the unit in flexion to  $114^{\circ}$  or 15 mm from the edge of the frame, in order to avoid damaging it.



- the upper casing is not removed, adjust the unit in bending to  $114^{\circ}$  or 10 mm from the end of the slot in the upper casing, in order to avoid to damaging it..



## SERVICE D2

- Check if the two knobs which fixed the sliding half upper leg support are tightened.
- Check if the micro processor is correctly seated on its support
- The motor is supplied but there is no angular variation (motor blocked) SERVICE D2 and SERVICE D3.
- Before replacing the motor, make sure that the handle is working. Make a cross connection with another control handle or replace the hand control.
- Check if the potentiometer feeding fore (reference: 4670015518) is correctly tightened.

Replace the motor if the problem persists.

## SERVICE D3

- a) The motor is connected backwards.  
If you have replaced it, check the wiring: red wire on M+, black wire on M-.
- b) The control handle is not configured in Performa.  
Check the configuration of the control handle (see load adjustments section for the configuration of the control handle).
- c) The motor is blocked and it consumes more 2A.
- d) The unit has been supplied with a big leg between malus 5 and 10° using the ON/OFF switch. Switch OFF the unit to erase the message. Switch ON the unit without the leg and let the unit working during two or 3 cycles. Stop the unit before the hyperextension with the hand control, instal the patient and start.

Please return the machine to our workshops for repair if the problem persists.

## MESSAGE SERVICE

Refer to the attached technical data sheet 467870009.

## LOW BAT

Change the micro processor Ref.: 4610007559 or change the hand control.

## LOCK

Unlock the unit with the lock switch knob or if the unit has been locked with the special code switch ON/OFF the main power



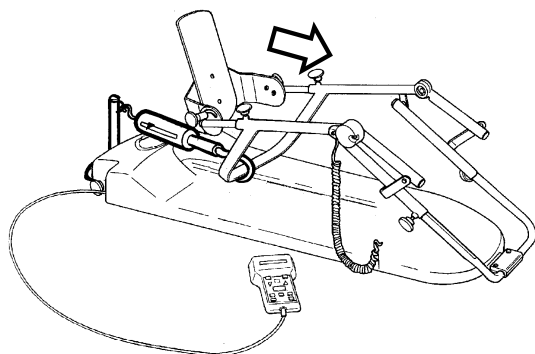
## IV • LOAD ADJUSTMENT PROCEDURE

Loads are adjusted by recorded parameters.

If you want to modify these forces, you will need to modify these parameters and measure these forces as shown in the following diagrams.

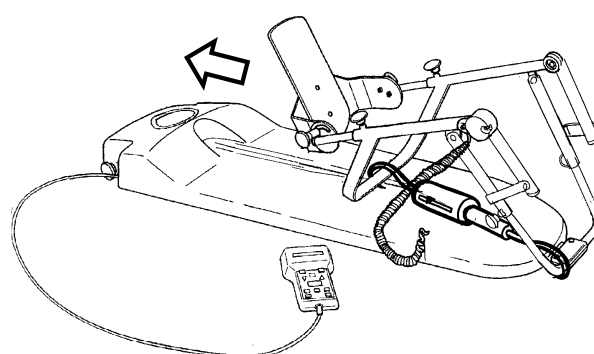
### FLEXION

Adjust the load in flexion after  
**10 minutes** of working  
(adjust load to the maximum)  
**value :  $42 \pm 3$  daN.**



### EXTENSION

Adjust the load in extension after  
**10 minutes** of working  
**valueur :  $21 \pm 2$  daN**



Load adjustment

### Procedure A :

- 1) Press on EXT, FLEX, - and + simultaneously; the display shows "CODE"
- 2) Then press on EXT, FLEX, - and + in sequence; the display shows "CONFIRM"
- 3) Then press on +, -, Flex, Ext in sequence; for example the display will show "TT=102.4H"  
Wait 5 seconds.  
Press on EXT and FLEX simultaneously; for example the display will show "85 110 195"  
85 = extension parameter, 195 = flexion parameter
- 5) Press on EXT, extension parameter active
- 6) Press on + or - if you want to increase or reduce the force in extension
- 7) Press on FLEX, flexion parameter active
- 8) Press on + or - if you want to increase or reduce the force in flexion

### Procedure B :

- 1) Press on EXT, FLEX simultaneously; the display shows VERSION
- 2) Press immediately on FORCE when the VERSION message appears
- 3) Continue with procedure A starting from item 5.



## V • SPARE PARTS TO BE KEPT IN STOCK FOR ABOUT 10 MACHINES

- 2 - 4650001058: complet pad
- 1 - 4670016897: complete hand control for Optima s3
- 1 - 4670015328: elastic coupling
- 1 - 4670015378: motor
- 1 - 4670016821: upper casing for sticking
- 1 - 4670016764: upper casing for percing
- 1 - 4670016756: lower casing for percing
- 10 - 4626000852: nylon pin 93-10
- 1 - 4610004539: copy potentiometer
- 10 - 4625000697: male button
- 4 - 4625000720: female button
- 10 - 4610002400: 500 mA 6.3x32mm timed fuse
- 5 - 4610007210 : T1,5 A hand control fuse
- 10 - 461006866: 2 amperes 5x20mm fast fuse
- 1 - 4610006907: handle cable
- 1 - 4610006626: VDE mains cable
- 1 - 4635005611: upper leg hinge assembly
- 1 - 4610006915: keypad for rectangular hand control
- 1 - 461000247: keypad for ergonomic hand control
- 1 - 4635005562: 1 roller of 33 meters of double side adhesive tape (for sticking the casing).

Please refer to the series of your unit for part references, for example 431 Series 2 and then refer to the Series 2 spare parts catalogue.

## VI • REQUIRED TOOLS

- 0-30V 2.5 ampere stabilized power supply
- Ampermeter, ohmmeter, voltmeter
- 2 - 2.5 - 3 - 4 Alene spanners
- Philips screwdriver
- 2.5 pin drift
- Flat screwdrivers
- Goniometer (amplitude adjustment)
- 0 - 50 daN dynamometer (load adjustments)
- Dynamometer attachment tools.

## VII • RETURNING THE UNIT TO OUR WORKSHOPS

Please do not include pads when returning the knee CPM unit to our workshops, due to health and safety standards within our company. This pads will be systematically incinerated.

## VIII • REPAIR INFORMATIONS

If you want repair information you must have the serial number of the unit.

