Biofeedback and		Russia Taganrog		
equipment	C E 0086	Innovative wireless technologies		
<section-header></section-header>	Provide a start of records the	chophysiological metric system acor-T set of ding hels 5 mal set 10 basic device ABP-4 chalograph-recorder ABP-4		
 non-medicated reactivation of impaired functions 	maximal set over 30 basic device A	BP-10		
 overcoming phobias and pathological addictions adjuvant therapy for attention deficit hyperactivity disorder in children and teenagers correction of psychophysiological 	Electroencephalograph-recorder "ENCEPHALAN-EEGR-19/26" (main modification) basic set of recording channels up to 26			
 state in athlets and people of stress- ful and responsible professions, forming state management for optimal functioning multi-channel record of wide para- meters range and multiparametric 	maximal set over 45 basic			
state control in the process of biofeedback and neurobiofeedback	device ABP-26	Taganrog		

Research & Development Limited Company

FM 538691

MD 540857

Biofeedback and neurofeedback procedures are realized on the basis of the "physiological mirror" principle, thereby the patient has a literal opportunity to see and hear nuances of his state change, manifested in change of various physiological processes.

Functional biocontrol based on biofeedback provides training the skills of psychic self-regulation. Supplied set of biofeedback procedures is meant to normalize the functional status of the various body systems (CNS, ANS, cardiovascular system, respiratory system, locomotor apparatus) by developing skills of relaxation, reducing muscle tension, normalization of heart rate and its variability, reducing the tone of vessels of different caliber, normalizing blood pressure and parameters of cerebral and central hemodynamics, changes in the ratio of EEG rhythms and their topical characteristics, etc.

Procedures can be used to manage current psychoemotional state of sportsmen, employees engaged in stresses professions, students to reduce the pre-launch (preexamination) stress and anxiety, to mobilize and form required attitude for goal achievement, to eliminate negative emotions in case of nervous breakdown, and to restore a positive psychophysiological state.



Ansdall, w8'w8|Ansdall, N

Various biofeedback training screens



Visual:

trends, scales, diagrams, geometric figures (1), graphic arts, images, slides, videos;

animation and various game plots (2)

linear, three-dimensional and noise-like distortions and conversions of images, slides and videos (3),

morphing of images,

information screensavers and instructions during biofeedback training (4).

Audio:

various music fragments, sounds of nature, MIDI-splitter, voiced information, noise-like distortions depended on the successful execution of biofeedback training;

information messages and instructions during biofeedback training.



Diversity of visual forms of BFB signals presentation and flexible settings make each procedure attractive and stimulate the patient's motivation to targeted state change.

Main features of "Rehacor" Software for Functional Biocontrol and Biofeedback Trainig *

Multichannel record of various physiological parameters – EEG, EMG, skin conductance, ECG, Rheo, GSR, PPG, respiration, temperature and some other in required combinations (depending on the used equipment)

■ Library of biofeedback training procedures uses multimedia features of modern PCs and includes most of common types of biofeedback and neurobiofeedback by different parameters and their combinations: rhythms of EEG signals (alpha, beta, theta) and their correlation, slow cortical potential, heart parameters (HR, pulse transit time, systolic wave amplitude), blood circulation (central hemodynamics and cerebral circulation), autonomic nerve system (temperature, GSR), muscle (EMG and envelope EMG) and motility (range of motion, tremor, steadiness) and others.



Creation of biofeedback procedure scenario.

Selection of physiological signals for a procedure (1), forming the structure of scenario stages (2), scenario stage parameters settings (3) and selection of representation forms and content of audiovisual stimuli and biofeedback signals (4).

Flexible and convenient scenario editor allows modifying and adapting library procedures (or creating new ones) considering esthetic, intellectual, age and other preferences, which allows a doctor to realize various trainings for professional advancement and creative approach to biocontrol use with BFB.

Stress-testing of body functional systems with use of various combinations of audio-visual and somatosensory stimuli and with analysis of various functional systems responses of the patient allows optimizing psychophysio-logical rehabilitation process.



Monitoring and control the process of biofeedback training.

The application controls recorded physiological signals (1), calculated parameters in trends form (2), which displays the dynamics of patient's state and control of scenario embodiment (3) from procedure library.



Multiparameter monitoring during neurofeedback training (by example of optimization of alpha-rhythm and zonal differences).

Allows a specialist to evaluate efficiency of regulatory mechanisms involving of various levels. Montage and electrode attachment scheme (1) — 11 channels EEG, ECG, PPG, EEMG, parameters of blood circulation, respiration, skin conductance. Presentation of native physiological signals (2), calculated parameters trends (3) and 3D presentation of compressed spectral array (CSA) by left and right hemispheres as training screen (4).

Stepwise control of physiological characteristics change during biofeedback training procedures and mathematical analysis of their change dynamics during the whole procedures course increase evaluation objectivity of efficiency of functional biocontrol methods used.

* Using electroencephalograph-recorder "Encephalan-EEGR-19/26" (main modification and "Mini" modification) as biofeedback and neurofeedback equipment, the sales package contains **software for EEG-studies "Encephalan-EEGR"**, which provides multiparametric signal recording, quantitative EEG analysis methods: spectral and amplitude topographic mapping (2D, 3D), coherence function, autocorrelation function, cross-spectrum function, forming a protocol, **and "Cardfile" software** (patients database).

Procedures library. "Basic" suite.

"Basic" software suit contains biofeedback procedures for wide application by various parameters and their combinations including the following:

- heart rate
- respiration
- temperature
- electromyogram
- galvanic skin response
- photoplethysmogram
- envelope electromyogram
- electroencephalogram
- (2 derivations)
- electrocardiogram (1 derivation)
- brain blood circulation

(a special sensor and impedance adapter are required)

central hemodynamics

(a special sensor and impedance adapter are required)

Along with biofeedback procedure, there are options of psychophysiological state and psychoemotional stress evaluation – stress testing.

Examples of biofeedback procedures

Heart rate

HR training is a basic one for mastering the skills of relaxation, self-regulation and consentration.

Procedures on heart rate increase allows eliminating the deficit of parasympathetic affect of ANS and increasing organism resistance to disorders of cardiovascular system work in response to psychoemotional stress.

Procedures of HR variability increasing are recommended for arterial tension normalization, for physical efficiency increase and overall health improvement.

HR training also increases body defenses level and neutralizes stress responses and psychoemotional overexertion, accompanied with vegetative balance disorder.



Temperature



Skin temperature increase training allows lowering the excessive tone of arteriola vascular walls by means of lowering the activity of sympatic section of ANS, and is applied for zonal thermoregulation improving (the increase of temperature of legs and arms peripheral zones) under the conditions of diseases manifested in reduced blood supply of these zones.

This training is a basic one for Shultz auto training mastering.

Blood circulation parameters

Procedures of blood circulation parameters regulation – tone of arteries of different caliber (by PPG systolic wave amplitude and pulse transit time) and cardio-cycles periods (by RR-interval of ECG signal) are used for autonomic nervous system functional state normalization, for correction of arterial tension indices, blood filling and etc., mainly during rehabilitation after excessive loads.



Procedures library. "Basic" suite.

Examples of biofeedback procedures



Is used to treat chronical obstructive involvement of respiratory system, bronchial asthma, some circulatory disorders, vegetative-vascular dystonia syndrome, neurosal and neurosis-like syndromes.

The purpose of respiratory biofeedback training is to form adequate respiratory stereotype with simultaneous switch to diaphragmal respiration type, which provides not only improvement of lungs work, but also influence on other, particularly psychic, functions and increase of functional reserve of the organism.

Electroencephalogram

Alpha training is oriented to improve stress resistance, to achieve profound psychological relaxation, and also to activate creativity

Alpha-theta training is used to form skills of quick and effective attention concentration

Beta- and beta-theta trainings are used to correct attention deficit hyperactivity disorder.

EEG-EMG-training is used to achieve the state, combined maximumal attention concentration against the background of profound muscular relaxation.



Electromyogram



Is indicated to decrease general and psychoemotional stress by means of decreasing excessive muscle activity (muscle relaxation skill), to form stereotype of optimal correlation of various muscle groups (to improve voluntary control of movement activity), to correct movement disorders of central and peripheral character of various geneses by means of decreasing spasticity and hyperkinetic activity.

Evaluation of psychophysiological state and psychoemotional stress – stress testing

During stress-testing different stress stimuli can be applied: audio, visual, somatosensory.

The training detects specific organism responses to various irritants for identification of the most labile parameters and their most effective use in BFB-training.

The picture shows trends, which demonstrate pronounced change in some values (mainly the ones reflecting the tone of cardio-vascular system resistive vessels) in response to a stress stimulus.



"Professional" software suit includes additional to the "Basic" software suit multiparametric biofeedback- and neurofeedback-procedures, which use multichannel record of EEG and other parameters, including the following:

- slow cortical potentials
- functional brain asymmetry
- rhythmical brain activity
- zonal differences
- motility
- tremor
- EMG, Skin conductance, ECG, GSR, PPG, temperature, breathing, brain circulation and central hemodynamics

Examples of multi-purpose procedures

Alpha rhythm and EEG zone differences optimization

Used for skills training - relaxation and EEG structure normalisation, cortex and corticosubcortical optimum relationship tonus recovery by means of alpha rhythm increase in the occipital area in relation mammannam mmm

to the central-frontal area.

At zone differences index increase, a videoclip "waterflooding" decreases, digital indicator value increases, figure enlarges.

An alpha rhythm optimisation is connected with a graphic curve increase.

Brain functional asymmetry increase with multiparametric control

Training to achieve a special functional state required for solving different tasks involving concentration and motor actions accuracy, for example, shooting or managing manipulators and controlled mechanisms.

Training forms a skill of the arbitrary reconstruction of the brain functional asymmetry spectral power increase of an EEG activity in a frequency range 10-14 Hz in the left temporal lobe at preparation for action and at the moment of its execution.

Multiparametric control trends display increase of spectral power values within 10-14 Hz in derivation T3-A1 (left frontal) as compared to values of T4-A2 derivations at the background (blue) and working (red) training stages, and change of functional asymmetry in derivations T3-A1 (left temporal lobe) at the background (blue) and working (red) training stages and change of HR and Skin conductance during training.



Tremor decrease with the muscle and emotional tension control



Pathologic hand tremor control training contributes to mastering a skill of arbitrary muscle and emotional tension decrease

Possible indications: Hand tremor (essential tremor, secondary tremor, etc.), bradykinesia, caused by neurological diseases, for example Parkinson disease.

Additional procedures to "Basic" and "Professional" suits.

Training the skills of stress resistance using somatosensory stimulator

Used to form the skill of stress resistance in healthy people (sportsmen, students, security agencies employees, etc.), and for therapy of patients with neuroses with symptoms of phobia and anxiety.

The skill is formed by means of training on suppression of excessive autonomic activation (galvanic-skin response change) in response to stress stimulus presentation (moderate pain stimulation).



Balance training maintaining erect position on the wobble platform



Used to train the skill of steadiness and movement co-ordination in sport and in order to decrease the ataxic syndrome symptoms, the orthopedic trauma consequences and other neurological disorders, which prevent from maintaining erect posture.

Wireless movement activity sensor can be attached onto the wobble platform, which is often used during fitness classes in sportclubs.



The picture shows an example of change of movement sensor signal, parameters trends in time and changes on training screen.

Operator performance training simultaneously with tracing and logic task solving

Used to study various aspects of operator performance with relation analysis of physiological signals patterns and indicators of operator activity efficiency.

Can be used to select individuals of definite professions, with exclusive standards for psychophysiological characteristics connected with monotonous work and necessity of maintaining attention concentration.



There is an additional software * with wide capabilities for accurate and objective evaluation of performed studies efficiency, study of character and mechanism of self-regulation, and system connection of various functioning parameters of human organism:

"Encephalan-FBA" Software for functional brain asymmetry analysis

"Encephalan-VLFA" Software for analysis of very low frequency activity with synchronous EEG record

HRV Heart rate variability analysis

* **Note** For additional equipment selection, consult the manufacturer or its distributor

"Encephalan-CFM" Software for Cerebral Functions Monitoring

Encephalan-CA" software for signals analysis by polygraphic channels combined with EEG signals

"Encephalan-NM" software for neuromonitoring

Detailed information on additional software see in dedicated brochure **"Electroencephalograph-recorder "Encephalan-EEGR-19/26"** or on the web-site **www.medicom-mtd.com/eng**

Biofeeback and neurofeedback equipment sales package

Basic devices Additional wireless devices*	Provide individual telemetric parameters record, devices with integrated Bluetooth [®] interface for wireless connection to PC and additional devices Provide record of various parameters and their transmission via Bluetooth [®] interface into a basic device	ABP-4	ABP-10	ABP-26
	Wireless module Poly-4. Provides signals registration (electrodes and sensors according to software "Rehacor" or at customer's selection) by 4 polygraphic channels simultaneously with signals recording from a basic device.	Available	Available	Available
	Wireless movement activity sensor. Provides registration of movement activity (depending on place of attachment) by three axis simultaneously with signals recording from a basic device.	N/A	Available (up to 2 pcs)	Available (up to 2 pcs)
	Wireless module Poly-10 (special mode of ABP-10 transceiver-recorder as an additional device). Provides registration of signals (electrodes and sensors according to software "Rehacor" or at customer's selection) by 10 polygraphic channels simultaneously with signals recording from a basic device.	N/A	Available (up to 2 pcs)	Available (up to 2 pcs)
* Note: the Forming a	re are limitation on total number of additional wireless devices working sales package, consult the manufacturer or its distributor.	with basic devices.		

Depending on the availability of additional wireless devices, modules and sensors, the device may record over 45 signals in different combinations, depending on selected basic device and software:



All rights reserved. Information on the products given in this catalogue is of an informative character and can be changed without preliminary notice. To get correct specification for the equipment and additional ads, address the manufacturer directly.