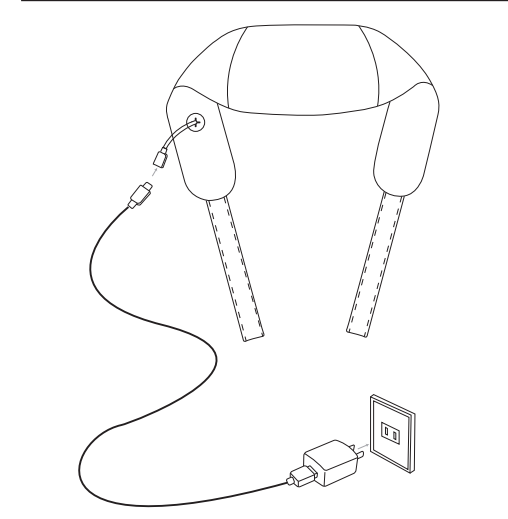


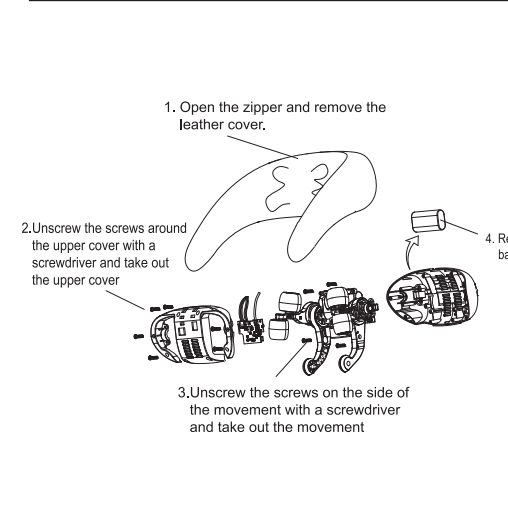
Charging



Charging

1. Please do not use the product while charging, and make sure keeping the charging cable loose.
2. Insert the plug of the charging cable into the charging interface.
3. Charging status: the red light flashes while charging, and turns on when it is fully charged.

Battery disassembly



• The best judging criteria (tasting and assessment) of the product have been established as to which brand is best, or otherwise, needs adjustment to the programme. Before the product, the labels must be removed from the product. Before assessing the labels, product must be assessed. The labels should be fully displayed when assessed.

Troubleshooting

Trademarks:
If you encounter problems after using the product, please refer to the following tips and what if the product is still a dissatisfaction, please contact the local power of attorney for the product, we should be responsible for the product. **Trademark: Trademark is a registered trademark.**

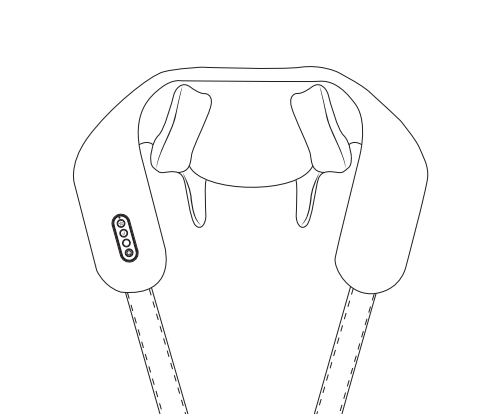
Conditions	Prevalence measurement methods
Unstable start/stoppage	Please confirm whether the battery is not placed on the floor (the 30 min battery has been placed)
Unstable charging or charging voltage light	Please check whether the PPS Charging cabinet connection (check the charging port of the machine)
Unstable battery stop	Check the battery is not (Check the battery status, has been OK)

Troubleshooting

SHOULDER AND NECK

MASSAGER

User's manual



Please read this Manual fully and keep it for future reference.
This information is supplied by Reproduction Systems Ltd.

1. **Definition:** A function $f: X \rightarrow Y$ is called a **linear map** if it satisfies the following properties:

- $f(x + y) = f(x) + f(y)$ for all $x, y \in X$.
- $f(\alpha x) = \alpha f(x)$ for all $x \in X$ and $\alpha \in \mathbb{R}$ (or \mathbb{C}).

The set of all linear maps from X to Y is denoted by $\mathcal{L}(X, Y)$.

2. **Example:** Let $X = \mathbb{R}^n$ and $Y = \mathbb{R}^m$. A linear map $f: \mathbb{R}^n \rightarrow \mathbb{R}^m$ can be represented by a matrix $A \in \mathbb{R}^{m \times n}$ such that $f(x) = Ax$ for all $x \in \mathbb{R}^n$.

3. **Properties:**

- The zero map $f(x) = 0$ is a linear map.
- The identity map $f(x) = x$ is a linear map.
- The sum of two linear maps is a linear map.
- The scalar multiple of a linear map is a linear map.

4. **Kernel and Image:**

- The **kernel** of a linear map f is the set of all $x \in X$ such that $f(x) = 0$.
- The **image** of a linear map f is the set of all $y \in Y$ such that $y = f(x)$ for some $x \in X$.

5. **Rank-Nullity Theorem:** For a linear map $f: \mathbb{R}^n \rightarrow \mathbb{R}^m$, the following equation holds:

$$\dim(\ker f) + \dim(\operatorname{Im} f) = n$$

where \dim denotes the dimension of a vector space.

6. **Isomorphism:** A linear map $f: X \rightarrow Y$ is called an **isomorphism** if it is bijective (one-to-one and onto). In this case, f has an inverse map $f^{-1}: Y \rightarrow X$ which is also a linear map.

7. **Inner Product Spaces:**

- An **inner product space** is a vector space V equipped with an inner product $\langle \cdot, \cdot \rangle$ which satisfies the following properties:
 - $\langle x, x \rangle \geq 0$ and $\langle x, x \rangle = 0$ if and only if $x = 0$.
 - $\langle x, y \rangle = \overline{\langle y, x \rangle}$ (conjugate symmetry).
 - $\langle \alpha x + \beta y, z \rangle = \alpha \langle x, z \rangle + \beta \langle y, z \rangle$ (linearity in the first argument).
- The norm of a vector x is defined as $\|x\| = \sqrt{\langle x, x \rangle}$.
- The distance between two vectors x and y is defined as $\|x - y\|$.

8. **Orthogonal Bases:**

- A set of vectors $\{e_1, e_2, \dots, e_n\}$ in an inner product space is called an **orthogonal basis** if they are mutually orthogonal and form a basis for the space.
- The norm of each vector in an orthogonal basis is 1.

9. **Gram-Schmidt Process:**

- This process allows us to construct an orthogonal basis from a given basis.
- It involves iteratively orthogonalizing the vectors in the basis.

10. **Self-Adjoint Operators:**

- An operator T on an inner product space is called **self-adjoint** if $\langle Tx, y \rangle = \langle x, Ty \rangle$ for all x, y .
- Self-adjoint operators have real eigenvalues and orthogonal eigenvectors.

11. **Normal Operators:**

- An operator T is called **normal** if $TT^* = T^*T$, where T^* is the adjoint of T .
- Normal operators have orthogonal eigenvectors.

12. **Unitary Operators:**

- An operator U is called **unitary** if $U^*U = UU^* = I$, where I is the identity operator.
- Unitary operators preserve the inner product and the norm.

13. **Hermitian Matrices:**

- A matrix A is called **Hermitian** if $A = A^*$, where A^* is the conjugate transpose of A .
- Hermitian matrices have real eigenvalues.

14. **Skew-Hermitian Matrices:**

- A matrix A is called **skew-Hermitian** if $A = -A^*$.
- Skew-Hermitian matrices have purely imaginary eigenvalues.

15. **Diagonalization:**

- A matrix A is said to be **diagonalizable** if there exists an invertible matrix P such that $P^{-1}AP$ is a diagonal matrix.
- For a self-adjoint operator, the columns of P are the orthonormal eigenvectors, and the diagonal entries of $P^{-1}AP$ are the eigenvalues.

16. **Quadratic Forms:**

- A **quadratic form** is a homogeneous polynomial of degree 2 in several variables.
- It can be represented as $Q(x) = x^T Ax$, where A is a symmetric matrix.
- The **Sylvester's Law of Inertia** states that the number of positive, negative, and zero eigenvalues of A is invariant under congruence transformations.

17. **Optimization:**

- In an inner product space, the **orthogonal projection** of a vector x onto a subspace W is the unique vector $w \in W$ such that $x - w$ is orthogonal to W .
- This concept is used in finding the minimum distance from a point to a subspace.

18. **Least Squares:**

- This method is used to find the best fit line or plane through a set of data points.
- It involves minimizing the sum of the squares of the residuals.

19. **Fourier Series:**

- Any periodic function can be represented as a sum of sine and cosine functions.
- This is a special case of the Fourier transform.

20. **Fourier Transform:**

- The **Fourier transform** maps a function of time or space into a function of frequency.
- It is used in signal processing, image analysis, and many other fields.

21. **Wave Equations:**

- Wave equations describe the propagation of waves in various media.
- They are solved using techniques from functional analysis.

22. **Heat Equations:**

- Heat equations describe the distribution of heat in a solid over time.
- They are solved using separation of variables and Fourier series.

23. **Schrodinger Equation:**

- The **Schrodinger equation** is a partial differential equation that describes the wave function of a quantum system.
- It is a fundamental equation in quantum mechanics.

24. **Relativity:**

- The theory of relativity, both special and general, has deep connections with functional analysis.
- It involves the study of spacetime as a manifold and the use of tensor calculus.

25. **Quantum Field Theory:**

- Quantum field theory is a framework for describing the behavior of particles and fields.
- It combines quantum mechanics with special relativity.

26. **String Theory:**

- String theory is a theoretical framework in which the point particles of particle physics are replaced by one-dimensional objects called strings.
- It is a candidate for a theory of quantum gravity.

27. **AdS/CFT Correspondence:**

- The **AdS/CFT correspondence** is a conjectured duality between a gravity theory in Anti-de Sitter space and a conformal field theory.
- It has profound implications for our understanding of quantum gravity and black holes.

28. **Black Holes:**

- The study of black holes involves general relativity and quantum field theory in curved spacetime.
- Functional analysis is used to study the properties of black hole horizons and singularities.

29. **Cosmology:**

- Functional analysis is used in cosmology to study the evolution of the universe and the behavior of cosmic fields.
- It helps in understanding the large-scale structure of the universe.

30. **Particle Physics:**

- Functional analysis is essential in particle physics for the study of scattering amplitudes and the renormalization of quantum field theories.
- It provides the mathematical tools to handle the infinities that arise in calculations.

31. **Mathematical Physics:**

- Functional analysis is a central tool in mathematical physics, providing a rigorous foundation for many physical theories.
- It bridges the gap between abstract mathematics and physical intuition.

32. **Operator Algebras:**

- The study of operator algebras, such as C^* -algebras and von Neumann algebras, is a branch of functional analysis.
- These algebras are used to describe the observables in quantum mechanics and the states of a system.

33. **Nonlinear Functional Analysis:**

- Nonlinear functional analysis deals with problems that cannot be solved using linear methods.
- It includes the study of fixed point theorems, bifurcation theory, and variational methods.

34. **Topological Vector Spaces:**

- Topological vector spaces generalize the concept of normed spaces by replacing the norm with a topology.
- They are used in the study of distributions and in quantum field theory.

35. **Locally Convex Spaces:**

- Locally convex spaces are a type of topological vector space where the topology is defined by a family of seminorms.
- They are important in the study of function spaces and in the theory of partial differential equations.

36. **Distributions:**

- Distributions** are a generalization of functions that allow for the treatment of singularities and point sources.
- They are widely used in physics, particularly in the study of electromagnetic fields and quantum field theory.

37. **Sobolev Spaces:**

- Sobolev spaces** are function spaces that incorporate information about the derivatives of functions.
- They are fundamental in the study of partial differential equations and in the calculus of variations.

38. **Elliptic PDEs:**

- The study of **elliptic partial differential equations** involves functional analysis techniques to establish existence, uniqueness, and regularity results.
- These equations are central in many areas of physics and engineering.

39. **Parabolic PDEs:**

- The study of **parabolic partial differential equations** (like the heat equation) uses functional analysis to analyze the long-time behavior and smoothing properties of solutions.

40. **Hyperbolic PDEs:**

- The study of **hyperbolic partial differential equations** (like the wave equation) involves functional analysis to understand the propagation of waves and the well-posedness of the initial value problem.

41. **Boundary Value Problems:**

- Functional analysis is used to study the solvability and properties of **boundary value problems** for various types of partial differential equations.

42. **Integral Equations:**

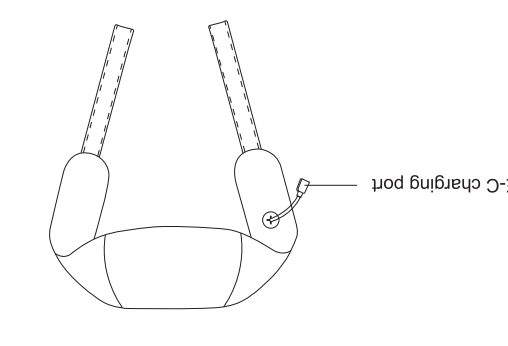
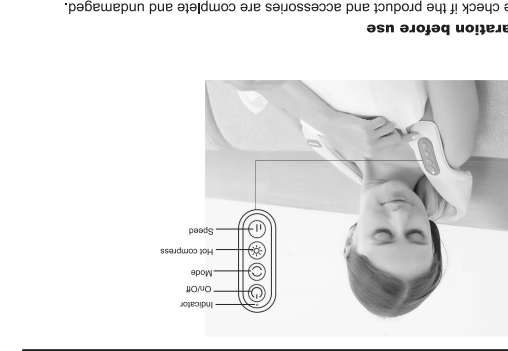
- The study of **integral equations** often employs functional analysis to transform them into operator equations and to analyze their solutions.

43. **Discrete Functional Analysis:**

- Discrete functional analysis** deals with function spaces and operators defined on discrete sets, such as sequences and spaces of functions on a lattice.
- It has applications in numerical analysis and quantum mechanics.

44. **Harmonic Analysis:**

- Harmonic analysis** is a branch of functional analysis that studies the representation of

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