

USER MANUAL

Dip Coater

Document version: YLW.21.07.25

IDC-20



1. Overview

The **IDC-20** lab-scale dip coater is a precisely engineered and ergonomically designed instrument, ideal for producing high-quality thin films on various substrates through a controlled and user-friendly coating process. Specifically developed for research and development environments, the **IDC-20** serves a wide range of applications in materials science, nanotechnology, biomedical engineering, and surface treatment technologies.

With a membrane capacity of up to 5 samples, the system is equipped with integrated software that supports both automatic and manual programming modes. Users can independently control parameters such as immersion speeds and process times, ensuring accurate thickness and uniform coating results.

The device features the ability to store and recall up to **20 custom recipes, with each program capable of running up to 1000 cycles, enhancing both efficiency and repeatability.** Control is managed through a separate user interface unit, designed for safe and intuitive operation.

Constructed from highly durable, chemically resistant materials, the **IDC-20** is suitable for use with a variety of coating solutions, ensuring long-term reliability and versatility in demanding laboratory environments.



2. Declaration of Conformity



EC DECLARATION OF CONFORMITY

Name of Manufacturer : Inovenso Teknoloji Ltd.

Address of Manufacturer : YTU Ikitelli Teknopark. Office: 2B-02 Istanbul/TURKEY

Name of Series : Dip Coater

Model of Device : IDC-20 Dip Coater

We hereby declare that the product mentioned above is in conformity with the following EU directives and harmonized standards:

Safety

Low Voltage Directive (2014/35/EU)

Harmonized Standards:

- EN 61010-1:2010 - Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

EMC

Electromagnetic Compatibility Directive (2014/30/EU)

Harmonized Standards:

- EN IEC 61000-3-2:2019 - Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions
- EN 61000-4-2:2009 - Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test

RoHS

Restriction of the use of certain hazardous substances directive (2011/65/EU)

Harmonized Standards:

- EN IEC 63000:2018 - Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

MD

Machinery Directive (2006/42/CE)

Harmonized Standards:

- ISO 12100:2010 - Safety of machinery — General principles for design — Risk assessment and risk reduction
- EN 60204-1:2018 - Safety of machinery - Electrical equipment of machines - Part 1: General requirements

Place and Date: Inovenso Teknoloji, Istanbul – 06.01.2025

Signatory : FAIK MIDIK (Chief Executive Officer)

3. Unpacking

1. Packing list

The following packing list outlines the standard items included with your dip coater system. It is essential to cross-check these items upon delivery to ensure a complete and undamaged shipment.

- IDC-20 Dip coater unit.
- Sample Holder unit.
- Beaker.
- Power adapter and electrical input cord (suitable for each country of operation).

2. Visual control and inspection

Please unpack the equipment carefully and inspect each item for signs of damage during transit. We recommend documenting the unpacking process for warranty and support purposes. It is essential to verify that all standard components and accessories have been received in full and in good condition. The items listed above constitute the complete packing list for this system. If any item is missing, defective, or does not match your order, do not proceed with installation. Instead, contact our Technical Support Team -Mail- immediately with your order number and a description of the issue before proceeding with an installation or operation.

4. Aim of the documentation

This User's Manual is attached to the packing of the Dip Coater IDC-20

5. Technical Specifications

Model: IDC-20

Origin: Turkey

4.3" Resistive Touch LCD screen

Microcontroller software

User friendly interface

Controllable Speed and adjustable parameters

IDC-20 Technical specifications:

- **Actuator:** DC stepping motor
- **Drive Mechanism:** Lead screw
- **Speed Control:** Available
- **Power Inputs:** 110-220V, 50/60Hz, Output 24VDC, 1,5A power adapter.
- **PC Connectivity:** Available
- **Stroke Length Max:** 200 mm
- **Drawing Speed Min:** 0,0015 mm/min
- **Drawing Speed Max:** 600 mm/min
- **Dimensions:** 440 x 330 mm x 446 mm(h)
- **User Interface:** 4.3-inch LCD colour screen
- **Power Consumption Max:** 36W (3A- 220V)
- **Maximum Load Capacity:** 2 kg
- **Weight:** 9 Kg



IDC-20 Environmental Specifications:

- **Operating Temperature:** Between -10 and 50 (°C)
- **Storage Temperature:** Between -30 and 85 (°C)
- **Operating Humidity:** RH 10% - RH 90% (not condensed)
- **Storage Humidity:** RH 10% - RH 90% (not condensed)

IDC-20 Software Specifications

- **Program Memory:** 20 saveable programs * 999 cycles
- **Setting and Presetting mode:** Coating end, Substrate position, solution Height, Units, Drying gap and container offsets
- **Unit:** mm/sec or mm/min
- **Manual mode:** visualize accurately and time by time sample position, dipping speed and withdrawal speed
- **Program Mode:** Set the number of cycles, dipping speed, dipping time, withdrawal final speed and drying time with saving it and home position in case of need.

6. Safety

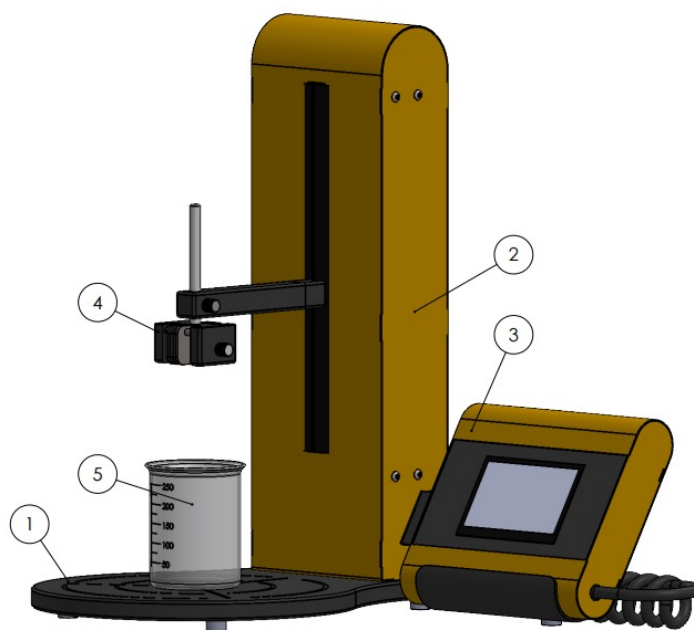
The IDC-20 Dip coater is for use in laboratory environments and must be operated with strict adherence to safety protocols to ensure the protection of both the user and the equipment. Please review and follow the safety guidelines below before each use.

- **Personal Protective Equipment (PPE)**
 - o Always wear appropriate laboratory gloves, safety goggles, and a lab coat during operation.
 - o Use chemical-resistant gloves if handling corrosive or volatile solvents.
- **Chemical safety:**
 - o Always make sure to operate in accordance with laboratory procedures safety in a ventilated area or fume hood if volatile, inflammable or toxic solvent is used.
 - o Dispose of used solutions and contaminated materials following local hazardous waste regulations.
- **Electrical safety:**
 - o Confirm that the power supply matches the device's specifications before connecting. The use of any other electrical power cables, adaptors, or transformers is not recommended.
 - o Disconnect the power source before performing any maintenance or cleaning.
- **Operational Safety**
 - o In the event of abnormal noise, vibration, or malfunction, stop the process immediately and contact technical support.
 - o Report any chemical spills, electric shocks, or injuries and keep clear of the machine while it is in operation.

7. Operation

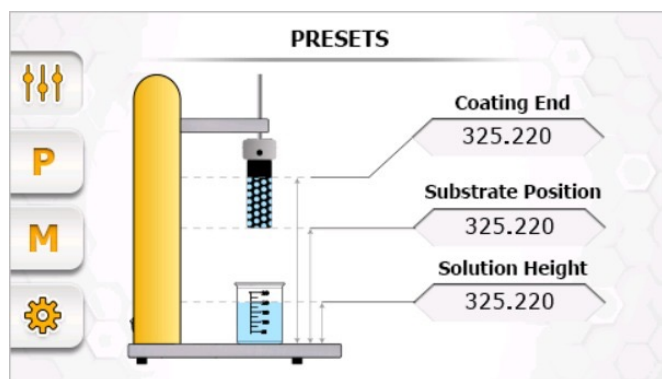
1. Dip Coater Diagram

1. Base Plate
2. Dip Arm Track
3. LCD Display Control Interface
4. Substrate Clamp
5. Beaker



2. Dip Coater User Interface

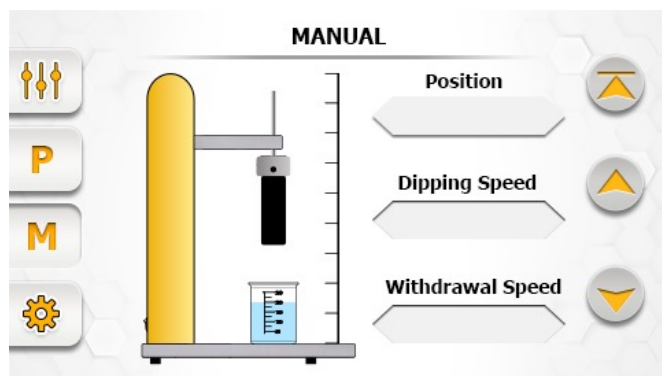
SCREEN 1: Main Page



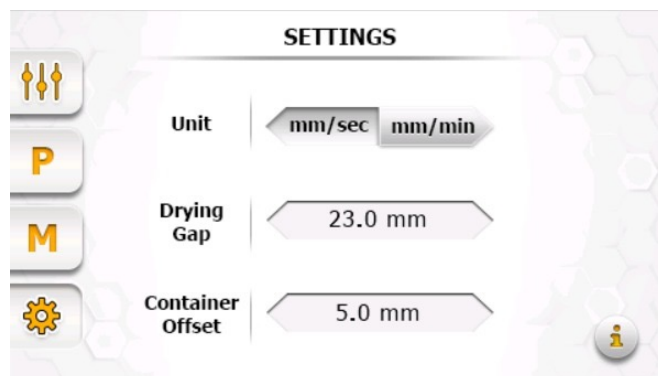
SCREEN 2: Program Page



SCREEN 3 : Manual Page



SCREEN 4: Setting Page



2. 1 Buttons and Functions



Presets Button: Before Starting the process of dip coating, it is important to fill this page related to coating end, substrate position and Solution Height



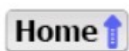
In this section a programming mode in which 20 different programmes can be saved and edited and up to 1000 cycles can be ran. The program can also be stopped any time, and a home position can be activated if needed.



By selecting a manual mode, a dipping and withdrawal speed can be monitored manually and take the arm to the home position if needed



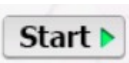
The setting section: selecting the unit of speed, drying gap and container offset is flexibly adjustable



Home button allows to move the arm anytime needed to the start position



By clicking on this button, all the parameters selected will be saved in the named program



The Start Button is used to initiate the operation of the dip coater. Pressing this button activates the configured process based on the parameters



The Up is used for a manual adjustment of the arm position to up, the current position can be visualized in real-time.



The Down button is used for a manual adjustment of the arm to the dipping position.



The button is used in case the user wants directly to go the home position



IDC-12 Model details

3. Installation: Step by step procedure

1. Dip Coating process preparation

- Ensure the dip coater is placed on a stable, level surface.
- Turn on the device.
- Secure the substrate (e.g., glass slide, membrane, metal piece) on the sample holder using the clamps (Unscrew it to make it flexible to fix the sample) (up to 5 substrates in the same operation).
- Fill the coating solution into a clean, appropriately sized beaker and place it on the designated platform.
- If a toxic solvent or materials are used, make sure that the dip coater is placed in a fume hood for a safe use.

2. Parameter Setting

- o Set the presets values: **coating end, substrate position and solution height.**
- o Select **manual** or **automatic mode** from the control panel.
- o Set the container offset and drying gap from the setting section.
- o Load or create a recipe if operating under stored programs.
- o Save a recipe under the program page if needed.

3. Start the Coating Process

- o Press the **Start button** to begin the cycle.
- o The dip coater lowers the substrate into the solution at the programmed dipping speed.
- o After the dwell time, the substrate is withdrawn vertically at a selected speed (max 10 mm/sec).
- o A uniform film forms as the coating liquid drains and dries on the substrate surface.

4. Drying and Repetition

- o Allow the coated substrate to dry according to material requirements
- o Repeat the process as needed for multiple layers or samples.

5. Shutdown and Cleaning

- o Turn off the device and safely remove the coated substrates.
- o Store any remaining solution according to laboratory safety guidelines.
- o Clean the sample holder, beaker platform, and base plate.

Key Notes:

- The thickness of the applied coating is primarily determined by parameters such as withdrawal speed, solution viscosity, and solute concentration. Adjusting these variables allows for precise control over film uniformity and thickness.
- Appropriate safety measures must be always observed, particularly when handling volatile or hazardous chemicals. This includes the use of protective gloves, laboratory coats, and working within a ventilated fume hood to minimize exposure risks.
- To ensure process reproducibility and consistent coating quality, it is essential to maintain stable environmental conditions, particularly regarding temperature and relative humidity throughout the coating procedure.

7. Troubleshooting and errors

NO	ERROR	CAUSE
1	Error: Coating length exceeds solution height	$\text{CoatingEnd} - \text{SubstratePos} > \text{SolutionHeight} - \text{ContainerOffset}$
2	Error: Insufficient drying area	$\text{SubstratePos} - \text{SolutionHeight} < \text{DryingGap}$
3	Error: Coating end position exceeds maximum stroke.	$\text{CoatingEnd} > \text{max Strok}$
4	Error: Substrate position exceeds maximum stroke.	$\text{SubstratePos} > \text{max Strok}$
5	Error: Invalid value entered.	$\text{Coating End} - \text{SubstratePos} < 0$
6	Error: Invalid value entered.	$\text{SolutionHeight} - \text{ContainerOffset} < 0$
7	Error: Invalid value entered.	$\text{SubstratePos} - \text{SolutionHeight} < 0$



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