edibon

Technical Teaching Equipment

Heat Transfer Series

TSTCB

www.edibon.com
Products
Products range
Units
9.-Thermodynamics & Thermotechnics

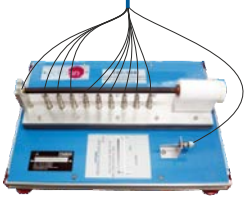
(2) Electronic console

(1) Modules

(1.1) TXC/CLB. Linear Heat Conduction Module

(1.4) TXC/CCB. Combined Free and Forced Convection and Radiation Module

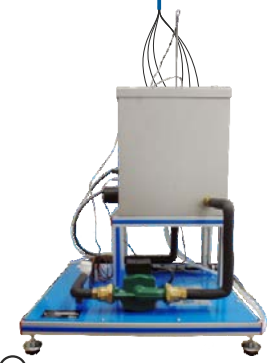
(1.2) TXC/CRB. Radial Heat Conduction Module



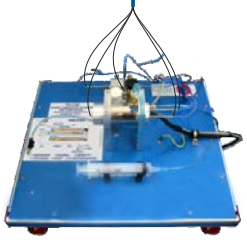
(1.5) TXC/SEB. Extended Surface Heat Transfer Module

(1.3) TXC/RCB. Radiation Heat Transfer Module

(1.6) TXC/ERB. Radiation Errors in Temperature Measurement Module

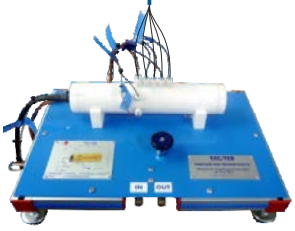


(1.7) TXC/EIB. Unsteady State Heat Transfer Module

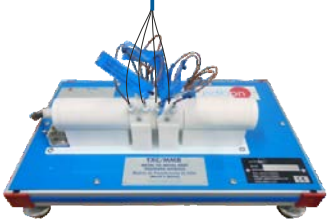


(1.8) TXC/LGB. Thermal Conductivity of Liquids and Gases Module

(1.9) TXC/FFB. Free and Forced Convection Heat Transfer Module



(1.10) TXC/TEB. Three Axes Heat Transfer Module



(1.11) TXC/MMB. Metal to Metal Heat Transfer Module

(1.12) TXC/TCB. Ceramic Heat Transfer Module

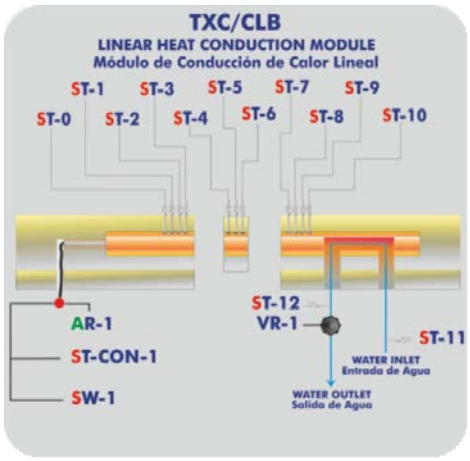
(1.13) TXC/TIB. Insulating Material Heat Transfer Module

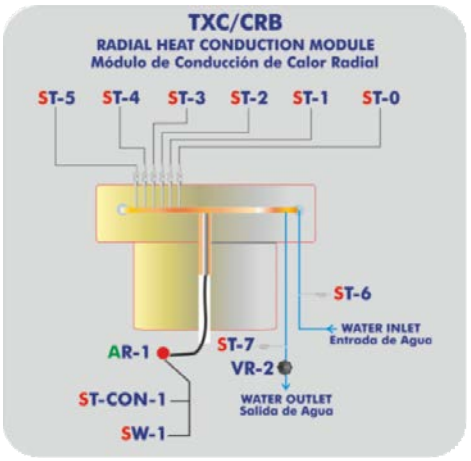
ISO 9000: Quality Management
(for Design, Manufacturing, Commercialization and After-sales service)

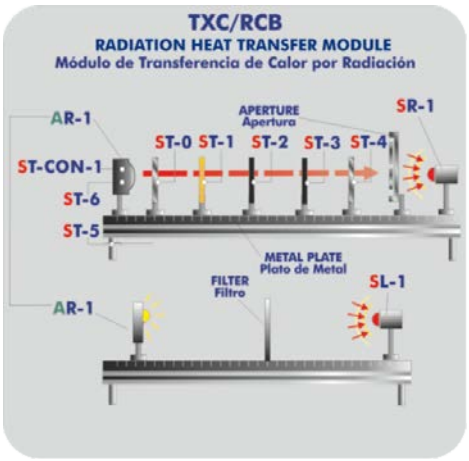
European Union Certificate
(total safety)

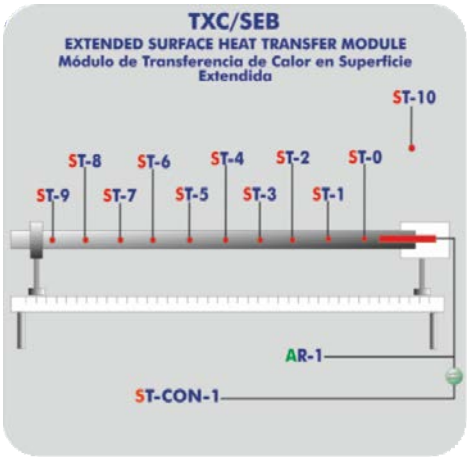
Certificates ISO 14000 and
ECO-Management and Audit Scheme
(environmental management)

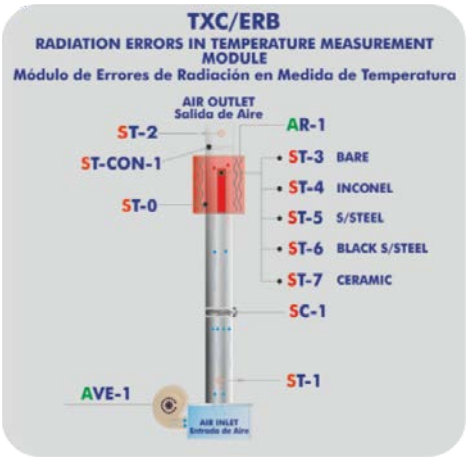
Worlddidac Quality Charter Certificate and
Worlddidac Member

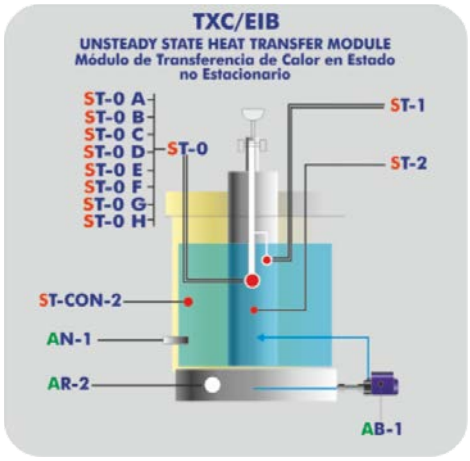


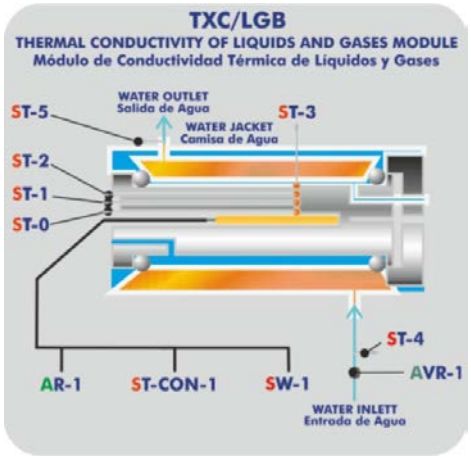


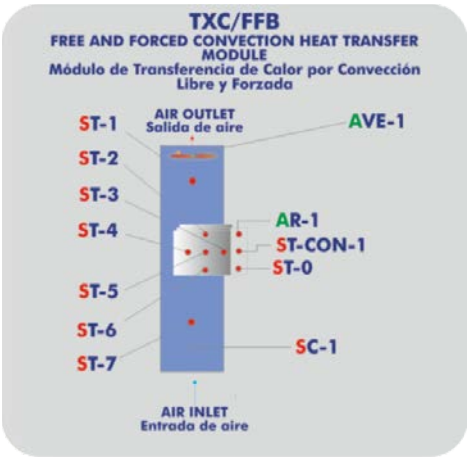


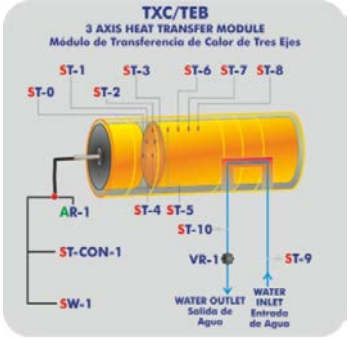


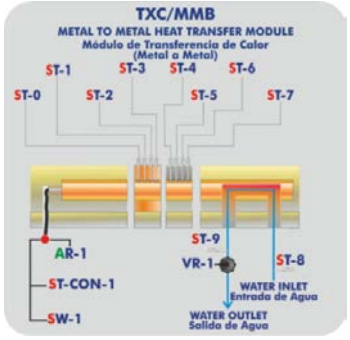


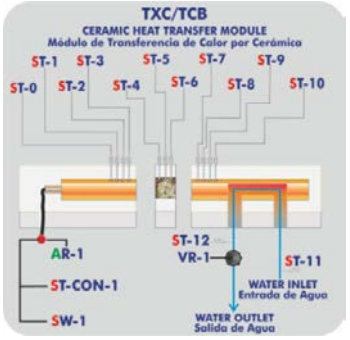


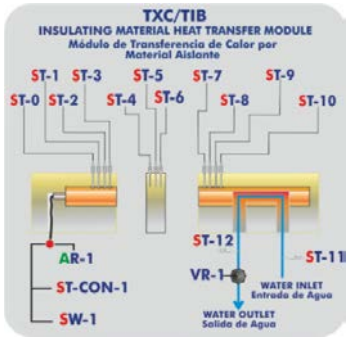












Note: ST= Temperature sensor. SC= Flow sensor. AR= Heating element. SR= Radiometer. SL= Luxmeter. AVE= Fan. AB=Pump. AN= Level switch.

① Modules

①.① TXC/CLB. Linear Heat Conduction Module:

Bench-top unit to study the principles of linear heat conduction and to allow the conductivity of various solid conductors and insulators to be measured.

It is given with interchangeable samples of different materials, different diameters and different insulating materials that allow to demonstrate the area effects, the conductivity and the combinations in series in the heat transfer process.

Anodized aluminum structure and panel of painted steel.

Diagram in the panel with similar distribution to the elements in the real unit.

TXC/CLB

Input heat section.

Electric heater.

Refrigeration section with a surface cooled by water.

Interchangeable central sections:

- With brass of 25 mm of diameter.
- With brass of 10 mm of diameter.
- With stainless steel of 25 mm of diameter.

Water flow regulation valve.

Thermal paste is supplied to demonstrate the difference between poor and good thermal contact between the sections.

19 Temperature sensors, "T" type (high precision):

- 17 Temperature sensors distributed in the heating section (4 sensors), refrigeration section (4 sensors) and central sections (3 sensors in each central section).
- 1 Temperature sensor at the water inlet of the unit.
- 1 Temperature sensor at the water outlet of the unit.

The power of the heating element is regulated from the electronic console (0-100%).

Power measurement (Wattmeter) from the electronic console.

Cables and Accessories, for normal operation.

This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

①.② TXC/CRB. Radial Heat Conduction Module:

Bench-top unit to study the principles of radial heat conduction, and to allow the conductivity of solid brass disk to be measured.

Anodized aluminum structure and panel of painted steel.

Diagram in the panel with similar distribution to the elements in the real unit.

TXC/CRB

Brass disk of 110 mm of diameter and 3 mm of thickness.

Electric heater.

Peripherical cooling tube.

Water flow regulation valve.

8 Temperature sensors, "T" type (high precision):

- 6 Temperature sensors distributed in the unit.
- 1 Temperature sensor at the water inlet of the unit.
- 1 Temperature sensor at the water outlet of the unit.

The power of heating element is regulated from the electronic console (0-100%).

Power measurement (Wattmeter) from the electronic console.

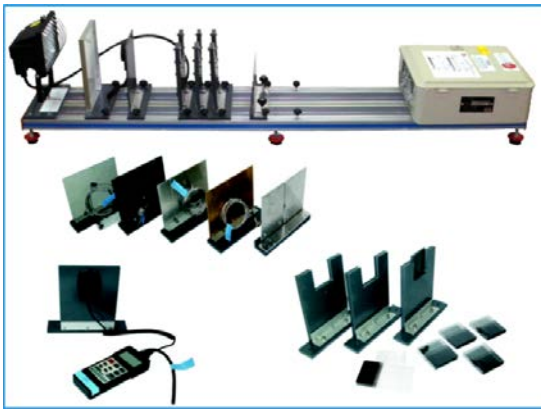
Cables and Accessories, for normal operation.

This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

Continue...

①.③ TXC/RCB. Radiation Heat Transfer Module:

Bench-top unit designed to demonstrate the laws of radiant heat transfer and radiant heat exchange.



TXC/RCB

It basically consists of two independent parts. One of the parts is for the light radiation experiments and another part is for the thermal radiation experiments.

The elements provided with the unit allow making the measuring of the temperature, radiation, intensity light and the power in the heating element or bulb.

Anodized aluminum structure and panels of painted steel.

Diagram in the panel with similar distribution to the elements in the real unit.

This unit consists of a metal plate with a heating element at one side and a lamp in the another side. Lengthwise of the metal plate you can place the elements supplied with the unit.

Heating element (ceramic).

Lamp 150 W, with diffuser.

The unit is provided with accessories for light experiments and radiation experiments.

Light accessories:

Luxmeter that allows to measure the intensity of the light:

Scale:	Resolution:	Accuracy:
0 to 1999 lux	1 lux	
2000 to 19990	10 lux	
20000 to 50000	100 lux	8%
Selection of light	Day, Tungsten, fluorescence or mercury	
Sensor	Photodiode with filter of adjustment of filter	
Sample frequency:	0.4 s	
Work temperature:	0 to 50°C	

Filters:

They allow to filtrate the light in the experiments.

There are:

3 Grey Neutral Density A153 filters.

1 Grey Neutral Density A152 filter.

1 Grey Neutral Density A154 filter.

3 Filter portholes.

Radiation accessories:

Radiometer (50 x 50 mm, 5 v (w/m^2)). It allows to measure the intensity of the radiation.

Planes surfaces. They are elements for studying the radiation and each one contains one temperature sensor:

Polished aluminum.

Anodized aluminum.

Brass.

2 Black bodies.

Variable slit or aperture. It allows to regulate the area of the radiation.

7 Temperature sensors, "T" type (high precision).

The power of the heating element is regulated from the electronic console (0-100%).

Power measurement (Wattmeter) from the electronic console.

Radiation measurement from the electronic console.

Lux measurement from the luxmeter.

Cables and Accessories, for normal operation.

This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

Continue...

1.4 TXC/CCB. Combined Free and Forced Convection and Radiation Module:

Bench-top unit to study to the principles of combined free and forced convection with radiation from a horizontal heater cylinder.

It studies the variation experimented by the local heat transfer coefficient around of a horizontal cylinder. It is subject to a forced and a free convection.

Anodized aluminum structure and panel of painted steel.

Diagram in the front panel with similar distribution to the elements in the real unit.

Variable speed fan, which generates air flux through the duct, range: 0-1200 l./min., regulated from the electronic console (0-100%).

Stainless steel duct with interior cover, including:

- Temperature sensor, "T" type (high precision), in order to measure the temperature of inlet air.
- Flow sensor for measuring the air flow generated in the duct.
- Temperature sensor, "T" type (high precision), in order to measure the temperature of outlet air.

Heater:

- Copper cylinder with exterior cover: Interior heating element.

Temperature sensor, "T" type (high precision).

The power of the heating element is regulated from the electronic console (0-100%).

Power measurement (Wattmeter) from the electronic console.

Cables and Accessories, for normal operation.

This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

TXC/CCB

1.5 TXC/SEB. Extended Surface Heat Transfer Module:

Bench-top unit designed to demonstrate the temperature profiles and heat transfer characteristics for an extended surface.

It studies the effect of adding fins to a body in order to extend its surface for a change in the cooling rate. Fins of different materials and cross section shapes are used to analyse the effect of cooling.

Anodized aluminum structure and panel of painted steel.

Diagram in the panel with similar distribution to the elements in the real unit.

Heating element, embedded in a copper capsule to permit a good contact with the interchangeable fins. The copper capsule is isolated by a coat of Teflon.

The fins are interchangeable, providing two different materials: brass and stainless steel and three different cross section shapes: square, circular and hexagonal.

11 Temperature sensors, "T" type (high precision).

The power of the heating element is regulated from the electronic console (0-100%).

Power measurement (Wattmeter) from the electronic console.

Cables and Accessories, for normal operation.

This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

TXC/SEB

Continue...

①.6 TXC/ERB. Radiation Errors in Temperature Measurement Module:

Bench-top unit to demonstrate how temperature measurements can be influenced by sources of thermal radiation.
The objective of this module is to measure the error in a black thermocouple due the radiation with respect with another normal thermocouple where there are not radiative shielding in comparison when there are radiative shielding, error in function of material of the thermocouple's capsule, size of the thermocouple, etc.
Anodized aluminum structure and panel of painted steel.
Diagram in the front panel with similar distribution to the elements in the real unit.
Variable speed fan, which generates air flux through the duct, range: 0-1200 l./min., regulated from the electronic console (0-100%).
Stainless steel duct with interior cover, including:
- Temperature sensor, "T" type (high precision), in order to measure the temperature of inlet air.
- Flow sensor for measuring the air flow generated in the duct.
- Temperature sensor, "T" type (high precision), in order to measure the temperature of outlet air.

Copper cylinder with exterior cover:
- Interior heating element.
- Temperature sensor, for measuring the temperature of the cylinder.

5 Temperature sensors, "T" type (high precision), with different styles and sizes installed in the duct to demonstrate the differences in readings obtained:
- Temperature sensor of bare.
- Temperature sensor of inconel.
- Temperature sensor of s/steel.
- Temperature sensor of black s/steel.
- Temperature sensor of ceramic.

The power of the heating element is regulated from the electronic console (0-100%).
Power measurement (Wattmeter) from the electronic console.
Cables and Accessories, for normal operation.
This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

TXC/ERB

①.7 TXC/EIB. Unsteady State Heat Transfer Module:

Bench-top unit designed to allow practices and exercises to be performed in unsteady state heat transfer.
It studies the transient conduction with convection. Using different shapes (rectangular slabs, spheres and cylinders) of different materials, the temperature of other shapes and materials can be predicted.
Anodized aluminum structure and panel of painted steel.
Diagram in the panel with similar distribution to the elements in the real unit.
Dual concentric open top tanks filled with water, total tank capacity: 40 l., 300 x 350 x 400 mm. concentric tank: 1.2 l. , diameter: 70 mm.
Different shapes of different size and material are studied:
- Brass sphere (diameter: 40 mm).
- Brass sphere (diameter: 25 mm).
- Stainless steel sphere (diameter: 40 mm).
- Stainless steel sphere (diameter: 25 mm).
- Brass cylinder (diameter: 15 mm, length: 150 mm).
- Stainless steel cylinder (diameter: 15 mm, length: 150 mm).
- Aluminum rectangular slab (40 x 10 x 150 mm).
- Stainless steel rectangular slab (40 x 10 x 150 mm).

Each shape is fitted with a temperature sensor at the centre of the object. The shapes are installed in special holder at the centre of the top cover of the large tank. The holder also has a temperature sensor that enters in the water bath at the same time as the shape.
Heating element (immersion heater). The high power allows reaching the steady state faster. It is controlled from the electronic console.
Water pump with variable speed. It allows to reach a maximum flow of 4 l. /min.
2 Temperature sensors, "T" type (high precision), allow to control the stability of the temperature of the water bath.
2 Temperature sensors, "T" type (high precision):
- The first one permits to record the evolution of the temperature of the shape at its center.
- The second one, works as a stopwatch, it will indicate the precise moment in which the shape is submerged.

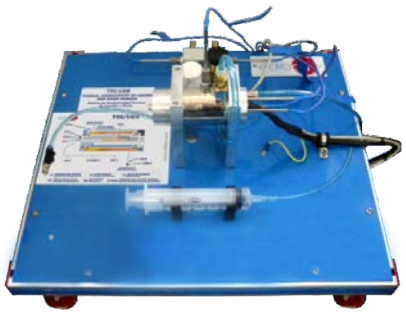
Level switch.
The power of the heating element is controlled and measured from the electronic console (control display).
Cables and Accessories, for normal operation.
This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

TXC/EIB

Detail of the different shapes

Continue...

①.8 TXC/LGB. Thermal Conductivity of Liquids and Gases Module:



TXC/LGB

This unit has been designed to enable students to easily determine the thermal conductivity of liquids and gases.

By the realization of the practices the student can determine the thermal conductivity of any suitable gas or compatible liquid with materials on construction.

Anodized aluminum structure and panel of painted steel.

Diagram in the panel with similar distribution to the elements in the real unit.

Aluminum body (cylinder) with brass jacket that contains the test fluid and the refrigeration water.

Variable heating element (in the cylinder).

6 Temperature sensors, "T" type (high precision).

Water flow regulation valve.

Valves.

Syringe.

The power of the heating element is regulated from the electronic console (0-100%).

Power measurement (Wattmeter) from the electronic console.

Cables and Accessories, for normal operation.

This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

①.9 TXC/FFB. Free and Forced Convection Heat Transfer Module:

Sight of the different heat exchangers used

TXC/FFB

This unit allows to study the efficiency of different exchangers, analyzing the heat transfer coefficients of each of the exchangers exposed to different airflows. A fan placed in the upper part of the tunnel allows controlling the airflow that goes through the tunnel.

Anodized aluminum structure and panels of painted steel.

Diagram in the front panel with similar distribution to the elements in the real unit.

Stainless steel tunnel of rectangular section, 700 mm long, painted and resistant to corrosion. In the tunnel three type of different heat exchangers can be set.

Methacrylate viewer that allows a good visualization of the exchanger that is in use.

Stabilizers to guarantee an uniform air flux.

8 Temperature sensors, "T" type (high precision):

- 2 Temperature sensors measure the air temperature at the inlet and outlet of the area of heat exchange.
- Temperature measurements, at different distances of the base of the pins and fins exchangers, are made by other 5 temperature sensors that are introduced by one side of the tunnel.
- 1 Temperature sensor in the exchangers.

Maximum working temperature: 120°C.

Flow sensor for measuring the air flow generated in the tunnel.

3 Aluminum exchangers:

- Flat heat exchanger (100 x 100 mm).
- Pins heat exchanger. 17 pins, each one of 10 mm diameter and 125 mm longitude.
- Fins heat exchanger. 9 fins, each one of 100 x 125 mm.

Heating element for each exchanger.

The power of the heating element is regulated from the electronic console (0-100%).

Variable speed fan, which generates air flux through the tunnel, range: 0-1200 l./min., regulated from the electronic console (0-100%).

Cables and Accessories, for normal operation.

This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

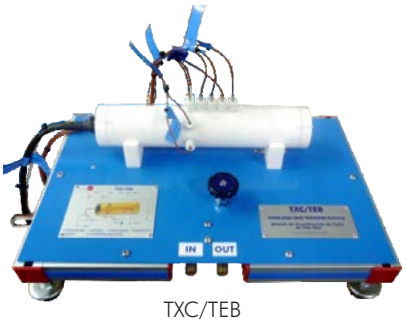
Continue...

① Modules (continuation)

1.10 TXC/TEB. Three Axes Heat Transfer Module:

Bench-top unit designed to carry out heat transfer experiments and exercises studying the direction in three axes.
Anodized aluminum structure and panel of painted steel.
Diagram in the panel with similar distribution to the elements in the real unit.
Brass cylinder to study heat transfer.
Electric heater.
Refrigeration section with a surface cooled by water.
Water flow regulation valve
11 Temperature sensors, "T" type (high precision):
- 1 temperature sensor at the water inlet of the unit.
- 1 temperature sensor at the water outlet of the unit.
- 5 Temperature sensors at different depth in a specific cross section.
- 4 temperature sensors longitudinally distributed.

The power of the heating element is regulated from the electronic console (0-100%).
Power measurement (Wattmeter) from the electronic console.
Cables and Accessories, for normal operation.
This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.



TXC/TEB

1.11 TXC/MMB. Metal to Metal Heat Transfer Module:

Bench-top unit designed to study of the heat transfer of different metallic materials situated in series.
Anodized aluminum structure and panel of painted steel.
Diagram in the panel with similar distribution to the elements in the real unit.
Input heat section. It includes:
- Electric heater.

Interchangeable central sections. They are formed by two different cylinders chosen from the four cylinders supplied:
- A copper cylinder of 25mm of diameter.
- A brass cylinder of 25mm of diameter.
- A stainless steel cylinder of 25mm of diameter.
- An aluminum cylinder of 25mm of diameter.
- 4 temperature sensors, "T" type (high precision) for each cylinder.

Refrigeration section with surface cooled by water. It includes 4 temperature sensors, type "T" (high precision).
Water flow regulation valve.
Thermal paste is supplied to demonstrate the difference between poor and good thermal contact between the sections.
Two temperature sensors, "J" type, for the cooling water inlet and outlet.
The power of the heating element is regulated from the electronic console (0-100%).
Power measurement (Wattmeter) from the electronic console.
Cables and Accessories, for normal operation.
This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.


TXC/MMB

1.12 TXC/TCB. Ceramic Heat Transfer Module:

Bench-top unit designed to study of the heat transfer of different ceramic materials.
Anodized aluminum structure and panel of painted steel.
Diagram in the panel with similar distribution to the elements in the real unit.
Input heat section. It includes:
- Electric heater.
- 4 temperature sensors, "T" type (high precision).

Interchangeable central sections. There are two types:
- A ceramic cylinder with a thermal conductivity of 1.46 W/m·°C.
- A ceramic cylinder with a thermal conductivity of 0.49 W/m·°C.
- 3 temperature sensors, "T" type (high precision), for each cylinder.

Refrigeration section with surface cooled by water. It includes 4 temperature sensors, type "T" (high precision).
Water flow regulation valve.
Thermal paste is supplied to demonstrate the difference between poor and good thermal contact between the sections.
Two temperature sensors, "J" type, for the cooling water inlet and outlet.
The power of the heating element is regulated from the electronic console (0-100%).
Power measurement (Wattmeter) from the electronic console.
Cables and Accessories, for normal operation.
This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.


TXC/TCB

Continue...

① **Modules** (continuation)

①.13 TXC/TIB. Insulating Material Heat Transfer Module:

Bench-top unit to study the thermal conduction resistance of different thermal insulating materials.

Anodized aluminum structure and panel of painted steel.

Diagram in the panel with similar distribution to the elements in the real unit.

Input heat section.

Electric heater.

Refrigeration section with a surface cooled by water.

Interchangeable central sections:

- With nylon of 50 mm of diameter.
- With Teflon of 50 mm of diameter.
- With Bakelite of 50 mm of diameter.

Water flow regulation valve.

Thermal paste is supplied to demonstrate the difference between poor and good thermal contact between the sections.

19 Temperature sensors, "T" type (high precision):

- 17 Temperature sensors distributed in the heating section (4 sensors), refrigeration section (4 sensors) and central sections (3 sensors in each central section).
- 1 Temperature sensor at the water inlet of the unit.
- 1 Temperature sensor at the water outlet of the unit.

The power of the heating element is regulated from the electronic console (0-100%).

Power measurement (Wattmeter) from the electronic console.

Cables and Accessories, for normal operation.

This unit is supplied with the following manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

TXC/TIB

Items Commons for Modules type "TXC/..B"

② Electronic console:

Common for the modules type "TXC/..B" and can work with one or several modules.

Metallic box.

Temperature sensors connections.

Digital display for temperature sensors.

Selector for temperature sensors.

Level switch connection.

Air flow sensor connection.

Digital display for the air flow sensor.

Radiation sensor connection.

Digital display for the thermal radiation.

Switch and regulator for the heating element power (AR-1) (0-100%).

Heating element (AR-2) controller. It is a programmer to fix a setpoint and prevent the heating element temperature from exceeding that setpoint. The maximum safety temperature can never be exceeded.

Switch and regulator for the fan flow rate (0-100%).

Pump switch.

Digital display (wattmeter) for the power of the resistance AR-1, it is shown in watts.

Electronic console

③ Cables and Accessories, for normal operation.

④ Manuals:

This system is **supplied with the following manuals for each Module**: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.

Some Practical Possibilities of the System:

Practices to be done with the Linear Heat Conduction Module (TXC/CLB):

1.- Conduction through a simple bar.
2.- Conduction through a compound bar.
3.- Determination of the thermal conductivity "k" of different materials (conductors and insulators).
4.- The thermal conductivity properties of insulators may be found by inserting paper or other elements between the heating and cooling sections.
5.- Insulation effect.
6.- Determination of the thermal contact resistance R_{tc}.
7.- Effect of the crossing sectional area.
8.- Understanding the use of the Fourier equation in determining rate of heat flow through solid materials.

Practices to be done with the Radial Heat Conduction Module (TXC/CRB):

9.- Radial conduction.
10.- Determination of the thermal conductivity "k".
11.- Determination of the thermal contact resistance R_{tc}.
12.- Insulation effect.
13.- Understanding the use of the Fourier equation in determining rate of heat flow through solid materials.

Practices to be done with the Radiation Heat Transfer Module (TXC/RCB):

14.- Inverse of the distant square law for the radiation.
15.- Stefan Boltzmann Law.
16.- Emission power I.
17.- Emission power II.
18.- Kirchorff Law.
19.- Area factors.
20.- Inverse of the distant square law for the light.
21.- Lambert´s Cosine Law.
22.- Lamberts Law of Absorption.

Practices to be done with the Combined Free and Forced Convection and Radiation Module (TXC/CCB):

23.- Demonstration of the combined heat transfer effect by radiation and convection on the surface of the cylinder. Determination of the combined heat transfer effect by forced convection and radiation.
24.- Demonstration of the influence of air flow in the heat transfer. Determination of the combined heat transfer effect by forced convection and radiation.
25.- Demonstration of the influence of input power in the heat transfer. Determination of the combined heat transfer effect by forced convection and radiation.
26.- Demonstration of the combined heat transfer effect by radiation and convection on the surface of the cylinder. Determination of the combined heat transfer effect by free convection and radiation.
27.- Determination of the airflow.

Practices to be done with the Extended Surface Heat Transfer Module (TXC/SEB):

28.- Heat transfer from a Fin.
29.- Effect of cross section shape in heat transfer from a Fin.
30.- Heat transfer from Fins of two different materials.
31.- Measuring the temperature distribution along an extended surface.

Practices to be done with the Radiation Errors in Temperature Measurement Module (TXC/ERB):

32.- Radiation errors in temperature measurement.
33.- Measurement the errors in thermocouples in function of the painting, material of its capsule, size.
34.- Effect of air velocity on measurement error.

Practices to be done with the Unsteady State Heat Transfer Module (TXC/EIB):

35.- Predicting temperature at the center of a cylinder using transient conduction with convection.
36.- Predicting the conductivity of a similar shape constructed from a different material.
37.- Conductivity and temperature dependence on volume.
38.- Conductivity and temperature dependence on surrounding temperature T .

Practices to be done with the Thermal Conductivity of Liquids and Gases Module (TXC/LGB):

39.- Obtaining of the curve of thermal conductivity of the air.
40.- Thermal conductivity in vacuum.
41.- Water thermal conductivity determination.
42.- Thermal conductivity determination of a mineral oil.
43.- Dry air thermal conductivity under atmospheric pressure.

Practices to be done with the Free and Forced Convection Heat Transfer Module (TXC/FFB):

44.- Demonstration of the basic principles of free and forced convection.
45.- Comparison between free and forced convection.
46.- Free convection in flat surfaces.
47.- Forced convection in flat surfaces.
48.- Dependence of the heat transfer with the temperature.
49.- Dependence of the heat transfer with the speed of the fluid.
50.- Dependence of the heat transfer with the exchanger geometry (finned or pinned surface).
51.- Temperature distribution in the additional surfaces.
52.- Study of the advantage of using pinned and finned surfaces in heat transfer in free convection.
53.- Study of the advantage of using pinned and finned surfaces in heat transfer in forced convection.
54.- Comparative study between the free convection of a horizontal surface and vertical surface.

Practices to be done with the Three Axes Heat Transfer Module (TXC/TEB):

55.- Determination of the thermal conductivity "k".
56.- Conduction through a simple bar.
57.- Conduction through three axes.

Practices to be done with the Metal to Metal Heat Transfer Module (TXC/MMB):

58.- Conduction in a simple bar.
59.- Determination of the thermal conductivity "k".
60.- Determination of the thermal contact resistance.

Practices to be done with the Ceramic Heat Transfer Module (TXC/TCB):

61.- Conduction in a simple bar
62.- Determination of the thermal conductivity "k".
63.- Conduction through a compound bar.
64.- Determination of the thermal contact resistances.

Practices to be done with the Insulating Material Heat Transfer Module (TXC/TIB):

65.- Determination of the thermal conductivity "k".
66.- Calculation of the heat transfer properties of different specimens.
67.- Conduction through a compound bar.
68.- Insulation effect.

ORDER INFORMATION

Items always supplied as minimum configuration

① Modules:

- 1.1 TXC/CLB. **Linear Heat Conduction Module**, and/or
- 1.2 TXC/CRB. **Radial Heat Conduction Module**, and/or
- 1.3 TXC/RCB. **Radiation Heat Transfer Module**, and/or
- 1.4 TXC/CCB. **Combined Free and Forced Convection and Radiation Module,** and/or
- 1.5 TXC/SEB. **Extended Surface Heat Transfer Module**, and/or
- 1.6 TXC/ERB. **Radiation Errors in Temperature Measurement Module**, and/or
- 1.7 TXC/EIB. **Unsteady State Heat Transfer Module,** and/or
- 1.8 TXC/LGB. **Thermal Conductivity of Liquids and Gases Module,** and/or
- 1.9 TXC/FFB. **Free and Forced Convection Heat Transfer Module**, and/or
- 1.10 TXC/TEB. **Three Axes Heat Transfer Module**, and/or
- 1.11 TXC/MMB. **Metal to Metal Heat Transfer Module**, and/or
- 1.12 TXC/TCB. **Ceramic Heat Transfer Module**, and/or
- 1.13 TXC/TIB. **Insulating Material Heat Transfer Module.**

② **Electronic console** (common for the modules type "TXC/..B" and can work with one or several modules).

③ **Cables and Accessories**, for normal operation.

④ **Manuals.**

REQUIRED SERVICES

-Electrical supply: single-phase, 220V./50 Hz or 110V./60 Hz.

-Water supply and drainage.

DIMENSIONS & WEIGHTS

TXC/CLB Module:	-Dimensions:	400 x 300 x 300 mm. approx. (15.74 x 11.81 x 11.81 inches approx.).
	-Weight:	20 Kg. approx. (44 pounds approx.).
TXC/CRB Module:	-Dimensions:	400 x 300 x 300 mm. approx. (15.74 x 11.81 x 11.81 inches approx.).
	-Weight:	20 Kg. approx. (44 pounds approx.).
TXC/RCB Module:	-Dimensions:	1400 x 500 x 500 mm. approx. (55.11 x 19.68 x 19.68 inches approx.).
	-Weight:	40 Kg. approx. (88 pounds approx.).
TXC/CCB Module:	-Dimensions:	430 x 350 x 1300 mm. approx. (16.93 x 13.78 x 51.18 inches approx.).
	-Weight:	50 Kg. approx. (110 pounds approx.).
TXC/SEB Module:	-Dimensions:	600 x 300 x 175 mm. approx. (23.62 x 11.81 x 6.89 inches approx.).
	-Weight:	20 Kg. approx. (44 pounds approx.).
TXC/ERB Module:	-Dimensions:	430 x 350 x 1300 mm. approx. (16.93 x 13.78 x 51.18 inches approx.).
	-Weight:	50 Kg. approx. (110 pounds approx.).
TXC/EIB Module:	-Dimensions:	600 x 600 x 750 mm. approx. (23.62 x 23.62 x 29.52 inches approx.).
	-Weight:	60 Kg. approx. (132 pounds approx.).
TXC/LGB Module:	-Dimensions:	500 x 400 x 300 mm. approx. (19.68 x 15.74 x 11.81 inches approx.).
	-Weight:	40 Kg. approx. (88 pounds approx.).
TXC/FFB Module:	-Dimensions:	370 x 610 x 920 mm. approx. (14.56 x 24.01 x 36.22 inches approx.).
	-Weight:	25 Kg. approx. (55 pounds approx.).
TXC/TEB Module:	-Dimensions:	400 x 300 x 300 mm. approx. (15.74 x 11.81 x 11.81 inches approx.).
	-Weight:	20 Kg. approx. (44 pounds approx.).
TXC/MMB Module:	-Dimensions:	400 x 300 x 300 mm. approx. (15.74 x 11.81 x 11.81 inches approx.).
	-Weight:	20 Kg. approx. (44 pounds approx.).
TXC/TCB Module:	-Dimensions:	400 x 300 x 300 mm. approx. (15.74 x 11.81 x 11.81 inches approx.).
	-Weight:	20 Kg. approx. (44 pounds approx.).
TXC/TIB Module:	-Dimensions:	400 x 300 x 300 mm. approx. (15.74 x 11.81 x 11.81 inches approx.).
	-Weight:	20 Kg. approx. (44 pounds approx.).
Electronic console:	-Dimensions:	490 x 330 x 310 mm. approx. (19.29 x 12.99 x 12.20 inches approx.).
	-Weight:	20 Kg. approx. (44 pounds approx.).

AVAILABLE VERSIONS

Offered in this catalogue:

-TSTCB. Heat Transfer Series.

Offered in other catalogue:

-TSTCC. Computer Controlled Heat Transfer Series.

✱Specifications subject to change without previous notice, due to the convenience of improvements of the product.

edibon INTERNATIONAL

C/ Del Agua, 14. Polígono Industrial San José de Valderas.
28918 LEGANÉS. (Madrid). SPAIN.
Phone: 34-91-6199363 FAX: 34-91-6198647
E-mail: edibon@edibon.com WEB site: **www.edibon.com**

Issue: ED02/15
Date: November/2015

REPRESENTATIVE: