



CEAST 9300 Series

Droptower Impact Systems

CEAST 9340

INSTRUCTIONS for USE and MAINTENANCE

7510.000MN1r
ed. 1 rev. 1



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REVISION TOPIC:

- Changed the legal name of the firm from "Instron" to "ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division" where necessary.
- Appendix G: changed "Instron Service" with "Authorized Service" in the tables of Error Codes Lists, pages 168, 172, 173 and 174.

LEGEND

These symbols are used to focus the attention of the operator on the most important or critical points provided in this document.



Perform the operations indicated by this symbol.



Additional information, observations, explanations and recommendations.



Potential danger of extremely risky situation for life or health .



Beware of potential danger to the operator and/or risk of equipment damage.

1. GENERAL INFORMATION

Identification

Description: CEAST 9340

Manufacturer: ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division

Type: Droptower Impact System

Code: the code number of the instrument can be found on the ID plate (on the rear panel)


Registration: the registration number of the equipment can be found on the ID plate (on the rear panel)

Conformity


Electric Service: 230 V / 50 Hz - single phase
See the "Conformity Declaration" attached

Field of application

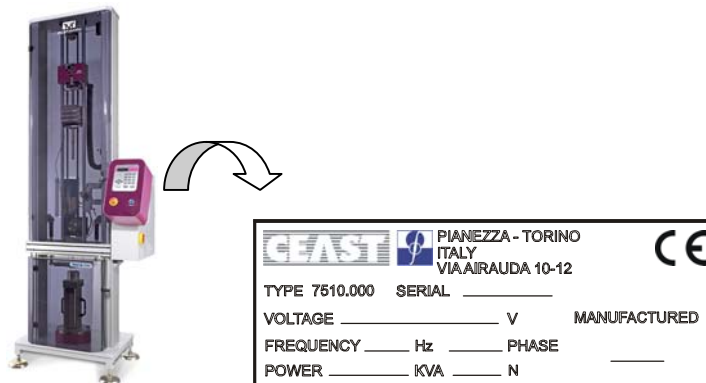
The equipment is used for instrumented and not instrumented impact tests on plates, films specimens and tridimensional parts of thermoplastic materials.


 **Authorized Service Centers**

Contact your nearest Instron CEAST Division Sales and Service office or contact your local distributor: a list of Instron CEAST Division offices is available on our websites: www.ceast.com and www.instron.com.

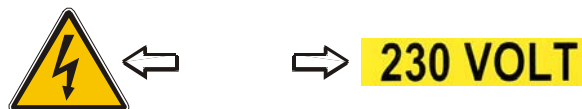
 **Markings**

The plate with the CE marking and the identification information is located on the rear panel of the instrument (see the figure below).



 **Indication of danger due to electric shock**

On the instrument there are plates with various danger signals. These plates act to advise the user and the maintenance personnel of the type of danger that exists in the local area next to the plate.



Physical contact with parts of the equipment that have electrical current can cause immediate death or permanent wounds. Safety protection, fixed panels, flaps or doors that have this signal can be removed or opened only and exclusively by "Maintenance Personnel, qualified or trained" after disconnecting the instrument from the electrical service and removing the plug from the electrical socket.



Emissions

Acoustic emission level:

without Additional Energy System < 70 dB (A)

with Additional Energy System < 110 dB (A) (for less than 1 second)



Indication of danger due to low temperature

The liquid nitrogen tank (option) is supplied on request and it must be used only for low temperature tests with the Resilvis instruments code 7526.000.



WARNING !

The liquid nitrogen tank must be handled with extreme care.

Nitrogen in the liquid state has a temperature of $-196\text{ }^{\circ}\text{C}$ and it is therefore very dangerous.

The user must not stand in front of the discharge valves of tank when regulating the pressure or touch with his bare hands the top central part of the tank as there could be a risk of burns.

During the tank filling and handling operations it is compulsory to wear thermally insulated gloves and other protective clothes.

The room in which the nitrogen is used must be well ventilated to avoid environment saturation problems (lowering of the oxygen percentage) with a risk of suffocation.

HAZARD IDENTIFICATION

Nitrogen is colourless, odourless, non-flammable, non-irritating and non-toxic gas.

It is classified as a Simple Asphyxiant under OSHA regulations.

Can cause suffocation by reducing oxygen available for breathing.

Breathing very high concentration of vapour can cause dizziness, shortness of breath, unconsciousness, or even death.

There are no currently Occupational Exposure Limit Values for this component but it is recommended to maintain oxygen levels at or above 19,5%.

Avoid direct inhalation of undiluted gas.

Use only in a well ventilated place.

**Local exhaust system of 1200 m³/hour is recommended
to prevent high nitrogen concentration when use the CEAST 9340
equipped with the environmental chamber.**

1.1 EQUIPMENT DESCRIPTION

1.1.1 INTRODUCTION

CEAST 9340 is a droptower impact system used for instrumented and not instrumented test on plates, films specimens and tridimensional parts, according to the requirements prescribed in the standards: ISO 179-2, ISO 180, ISO 3127, ISO 6603-1, ISO 6603-2, ISO 7765-2, ASTM D 256, ASTM D 2444, ASTM D 3763, ASTM D 5628, ASTM D 6110, ASTM D 7136, ASTM D 7192, ASTM E 23, PR-EN 6038, AIRBUS AITM 1.0010 and other equivalent standards.

1.1.2 MODULARITY

CEAST 9340 has been designed and manufactured with a concept of modularity. In fact the instruments is pre-arranged for an easy and quick addition and connection of all options at a later date.

1.1.3 DIFFERENCE BETWEEN INSTRUMENTS

- **CEAST 9340 code 7515.000:** it is equipped with a standard chamber for tests at ambient temperature;
- **CEAST 9340 code 7516.000:** it is equipped with an environmental chamber for specimens conditioning at temperatures: - 50 °C to 100 °C.

The environmental chamber is cooled through the expansion of liquid nitrogen taken from an external tank or from the laboratory's nitrogen line (N₂) if available. The nitrogen flows inside the chamber through pipes endowed with capillary holes.

The chamber is heated by means of heating resistances.

The uniformity of the temperature is assured through an electric fan which recirculates air and nitrogen inside the chamber.

The temperature sets by the operator is automatically controlled by a temperature regulator. This device receives the signal from a temperature probe located inside the chamber and, depending on whether the requirement is for cold or hot, it enable a solenoid valve to open the nitrogen inlet or the electric heating resistance.

1.1.4 MAIN PARTS OF INSTRUMENT

Instrument consists of the following parts:

- **Turret:** it is the upper part of the instrument, secured to the test chamber by screws. Inside the turret is housed:
 - **Automatic striker recovery/releasing system:** it is used to moves the striker at the correct height and to release it for impact test on the specimen.
 - **Striker holder:** it joints mechanically the striker to the recovery/releasing system. Moreover it can contains one or more weights used to increase the impact mass.
The striker holder can be of two different types: light (for masses 1 to 3.5 kg, striker included) or standard (for masses: 3 to 37 kg, striker included).

- **Striker:** it is used to strike the specimen surface when the impact test is carried out. Striker can be of two different types:

Non-instrumented: it is used for a simple statistical check of the material impact strength (visual check of the specimen: broken/not broken).

Instrumented: it provides full details of the impact event from initial contact to final breaking of the specimen by recording the force/time curve of the entire impact event through a data acquisition system connected to a PC.

Data acquisition system (option) at which the instrumented striker is connected can be of two different types: CEAST DAS 8000 Junior or CEAST DAS 16000. The number identifies the max. number of points acquired during the impact event.

For further details about strikers see the Appendix B attached to this manual.

- **Striker antirebound system** (option): it stops the striker after impact to avoid its rebound on the specimen. This system intervenes only in case of striker rebound.

- **Residual energy absorbers:** they are used to damp the striker residual energy after impact and they are placed on the turret base at the left and right sides.

- **Impact and rebound velocity optical detector:** it is used to measure the velocity of the striker just *before* the impact and to activate the striker antirebound system in case of striker rebound.

It consists of a photocell fixed with a bracket to the turret structure and a flag fixed to the striker holder. When the striker holder is released for test, the flag passes through the photocell interrupting the light-ray two times consecutively.

- **Test chamber:** see para. 1.1.3.

Both chambers (standard and environmental) can be equipped with different stands, such as:

- **Fixed Height Stand;**

- **Adjustable Height Stand;**

Many other stands are available according to the Client needs.

- **Automatic clamping device:** it clamps the specimen on the support before the striker impact.

- **Control box:** it is the box attached to the right side of turret and it is provided of the following parts:

- **Power ON:** it is a push-button to energize the instrument;

- **Emergency:** it is used only when an emergency condition arises.

When this button is pressed it cuts off the electrical power to the instrument.

To re-energize the instrument, disengage the Emergency button (half a turn in clockwise direction) and re-press the Power ON push-button.

- **Alphanumeric keypad with LCD display:** it is used to program and manage the tests.

It allows to enter all the test parameters required to carry out the automatic impact cycle and to recall the results on display at the cycle end.

The instrument memory is able to store up to 25 sets of test parameters.

1.1.5 OPTIONS

Options	code
Environmental chamber, temperature range: -50 to 100 (already included in the instrument code 7516.000)	7510.011
Striker antirebound device	7510.002
Standard striker holder (3 to 37 kg) with combinable weights	7510.021
Light striker holder (1 to 3.5 kg) with combinable weights	7510.022
Set of additional weights for standard striker holder (no. 3 masses, 5 kg each)	7510.026
Fixed height stand for specimen support (single impact). Max. specimen thickness 25 mm	7520.031
Adjustable height stand for specimen support (single impact). Max. specimen thickness 195 mm	7520.035



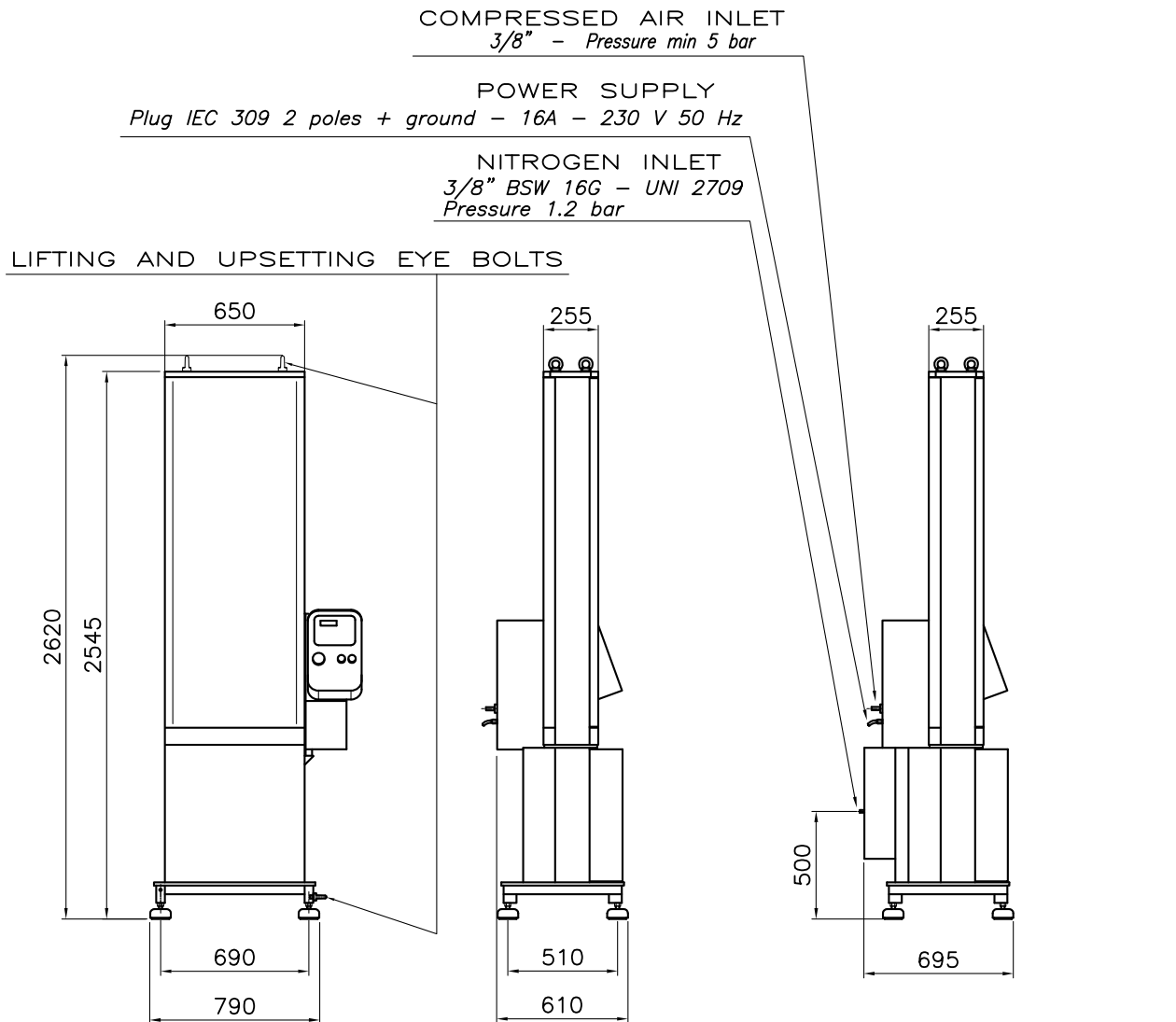
Note: the table above summarises only the main options. Many other options are available such as: strikers, specimens supports, adapters, etc..

1.2 TECHNICAL CHARACTERISTICS

Instrument Code	7515.000	7516.000
Functional Characteristics		
Drop height range [mm]	30 to 1100	
Mass range [kg]	light striker holder	1 to 3.5
	standard striker holder	3 to 22
	standard striker holder and additional masses	3 to 37
Speed range [m/s]	0.77 to 4.64	
Energy range [J]	light striker holder	0.3 to 37
	standard striker holder	0.89 to 237
	standard striker holder and additional masses	0.89 to 400
Test temperature [°C]	ambient	- 50 to 100, selectable by increments of 1 °C
Temperature control	-	by Pt 100 sensor and PID thermoregulator
Over temperature control	-	by safety thermostat
Heating system	-	by electric resistances
Cooling system	-	by liquid nitrogen
Average heating speed	-	1 °C / minute
Average cooling speed	-	4 °C / minute
Impact and rebound velocity	measured by optical detector	
Striker position	measured by digital encoder	
Specimen clamping on support	by clamping device, pneumatically actuated	

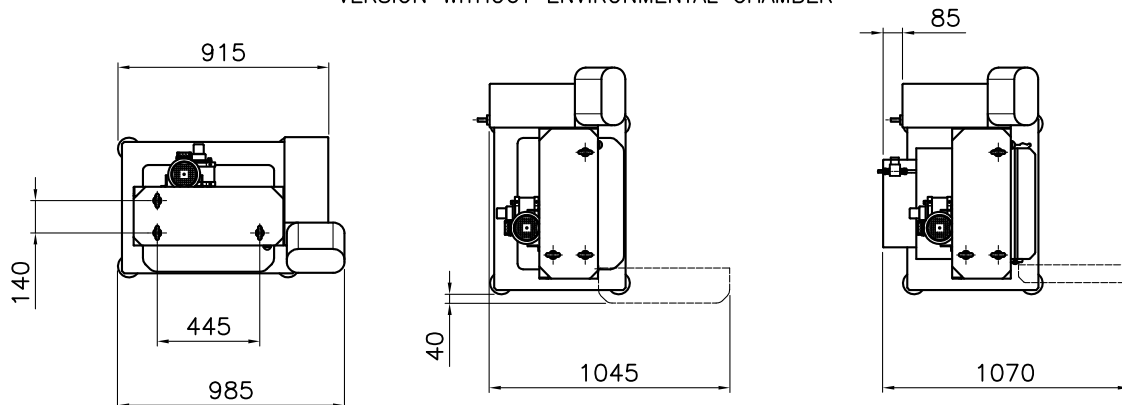
Instrument Code	7515.000	7516.000
Technical Data		
Electric Power Supply		
Voltage [V] - Phases - Frequency [Hz]	230 - Single phase - 50/60	
Total installed power [W]	600	3200
Fuses	see attached wiring diagrams	
Earth path	in accordance with local regulations	
Pneumatic Air Supply (compressed air)		
Pressure at instrument inlet [bar]	10 max.	
Working pressure [bar]	5	
Liquid Nitrogen Supply		
Pressure at instrument inlet [bar]	-	7 max.
Working pressure [bar]	-	1.2
Consumption at - 40 °C [kg/h]	-	4
Consumption to cool from 23 to - 40 °C [kg]	-	6
Overall Dimensions		
Instrument (W x D x H) [mm]	see 1.2.1 Layout drawing	
Inner Dimensions		
Test chamber (W x D x H) [mm]	490 x 450 x 565	370 x 300 x 495
Connection		
see 1.2.1 Layout drawing		
Weight		
Instrument [kg]	340	400
Paint		
Grey RAL 7035 - Fuchsia RAL 4006		

1.2.1 LAYOUT



VERSION WITH ENVIRONMENTAL CHAMBER

VERSION WITHOUT ENVIRONMENTAL CHAMBER



WEIGHT: 340 kg (WITHOUT ENVIRONMENTAL CHAMBER)

WEIGHT: 400 kg (WITH ENVIRONMENTAL CHAMBER)

1.3 SAFETY

- The instrument is supplied with fixed and movable shields.
The fixed ones (fastened with screws) are located to the sides and rear of the turret and rear of the environmental chamber (option) to prevent anyone accessing the interior.

The hinge-mounted movable shields (hinge-mounted) are provided with safety microswitches and are located at the front of turret and test chamber and allow the operator to access the work areas for routine operations. When these shields are opened, the safety microswitches disable operation of movable parts and heating/cooling systems.

- The instrument is controlled by keys located on the keypad of the control box or by the PC.



- *The instrument can only be used by trained, qualified and authorized personnel.*

- The responsibility for the various activities, for the operation of the instrument, must be clearly established as indicated in the following chapter and therefore respected.



- **If the electric cable is damaged or cut, it must be replaced.**

- For all of the work to be done regarding: installation, start-up, tooling, use, modification conditions of use, and work instructions, the procedures indicated in this manual must be followed.



- *This manual must always be accessible, so that it can be consulted in case of doubts about the correct conditions of use of the instrument.*

2. CONDITIONS OF USE

2.1 AUTHORIZED PERSONNEL

After receiving all necessary instructions contained within this manual, only the following professionals may work on this instrument:

OPERATOR

The Operator of the CEAST 9340 must have a specific qualification from a recognized school for analogous apparatus, or under the guidance of expert personnel. The operator can perform only the operations indicated and specified in this manual, following the instructions herein. The instrument should not be used by un-expert personnel.

MECHANIC

The Mechanic must have general experience on test equipment and specific experience with the CEAST 9340 or analogous instrument. The mechanic can perform only the operations indicated and specified in this manual, following the instructions herein.

ELECTRICIAN

The Electrician must have general experience with switch boxes and electronic components and have specific experience on the CEAST 9340 control box or similar instruments. The electrician can perform only the operations indicated and specified in this manual, following the instructions herein.

SAFETY MANAGER

The Safety Manager is responsible for the protection and prevention of corporate risks, according to the indications of the International Standards. The Safety Manager must ensure that all personnel who operate the instrument have received the instructions contained in this manual for their position including installation and start-up.

MANUFACTURER

For all operations not expressly foreseen in this manual and assigned to one of the above professional figures, it is necessary to contact **ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division**. The aforementioned operations can only be performed by **ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division**, or under authorization and according to the instructions provided by **ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division**, by specialized personnel at the user's location, who are qualified Mechanics or Electricians.

2.2 NORMAL USE CONDITIONS

The instrument, subject of this manual, must be used only and exclusively to carry out impact tests on plates, films and tridimensional parts of thermoplastic materials.

All of the operations for preparation of the instrument for carry out tests, and those performed at the end of the tests (e.g.: specimen replacement, chamber cleaning, etc.), must be manually performed by the operator.

Maintenance and instrument regulation (e.g.: replace fuses, installation of additional modules, etc.) must be performed by persons who are qualified mechanics or electricians (see the chapter on maintenance).

The instrument is sent to the customer in two separate parts: turret and test chamber; the USER must provide for the positioning and assembling of these parts in the laboratory, and their connection to the electric/pneumatic facilities.



After 20,000 hours of work, and in any case not longer than 10 years, a complete overhaul of the apparatus by ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division is necessary in order to continue to use it safely. The cost of overhaul are the responsibility of the CUSTOMER.

2.3 ABNORMAL SITUATIONS

- ! It is absolutely necessary that the instrument be used in the conditions prescribed in this instruction manual; no modifications to the instrument or its safeties are permitted, nor is its use in abnormal conditions.
- ! Below the USER is advised of a few of the recommendations to avoid abnormal conditions of use; in any case any other condition of use that is not expressly foreseen by this manual must be avoided.
 - ⇒ Run the instrument only if it is installed in the prescribed position (vertical).
 - ⇒ Avoid that people other than the operator can use the instrument while it is functioning.
 - ⇒ Do not put objects between the striker and the base plate of the turret and on the specimen support when the instrument is running.
 - ⇒ Do not touch the materials inside the environmental chamber during testing at high or low temperature. Always wear thermally insulated gloves.
 - ⇒ Do not operate the instrument if the protections are removed or not properly fitted.
 - ⇒ Do not remove or alter the position of the safety microswitches or the temperature sensors (with environmental chamber only) installed on the instrument.
 - ⇒ Do not climb on or get on top of the instrument.
 - ⇒ Do not put material in the test chamber that differs from that prescribed (use only plates, films and tridimensional parts of thermoplastic materials).
 - ⇒ Do not operate the instrument with the fixed shields dismantled or incorrectly mounted.
 - ⇒ Should the CUSTOMER install a tool or spare part on the instrument that has not been supplied by ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division, he must verify that the safety measures are maintained. Regardless, in this case ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division does not assume the responsibility for any eventual damages derived from the use of the aforementioned part.
 - ⇒ The instrument must not be installed or operated in a corrosive or explosive environment.
 - ⇒ Do not wash the instrument with water jets or flammable materials (e.g.: diesel fuel, gasoline, solvents, etc.).

2.4 SHIELDS



It is absolutely necessary that the instrument operates with all of the shields always closed. The fixed shields must always be mounted and permanently blocked.



2.5 RESIDUAL RISKS



The operators pay particular attention to the points indicated in the figures.



Risk of fingers crushing during the weights replacement

DANGER OF CRUSHING



Risk of weights falling during the weights replacement

DANGER OF INJURY



Do not put hands or objects where indicated by the arrows

DANGER OF CRUSHING

Pneumatic cylinders of clamping plate remain pressurized also in case of power cut off avoiding the clamping plate lowering



Do not touch the materials inside the environmental chamber during tests at high/low temperature. Use thermally insulated gloves

DANGER OF BURNS



3. OPERATOR WORK STATION



The operator must always work in such a manner to have easy access to the commands, and at the same time have complete visibility of the instrument.

Operator at work station



4. TRANSPORT AND MOVEMENT

4.1 LIFTING AND HANDLING

Transportation may be done with the instrument “visible” or enclosed in special packaging (e.g.: wooden crates).



Transportation is normally performed by TRANSPORTERS, who are the CUSTOMER'S responsibility.

The instrument is normally transported in a crate and packed in horizontal position. During transport the crate, containing the instrument, must be firmly held down with cables or straps in order to impede movement.

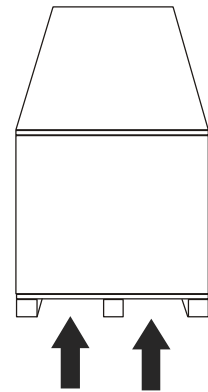
The means of transport and lifting must always be done according to the given indications by trained personnel (e.g.: warehouse personnel, forklift workers, or crane workers).

4.1.1 MOVEMENT IN PACKAGING

When the instrument is moved in crates, it is necessary to use a forklift or pallet-mover. The lifting points for the forks of the forklift are indicated in the figure to the right.



The weight of the crate containing the instrument is approximately 550 kg. Lifting machinery must therefore be able to lift these loads.



4.1.2 MOVEMENT OF THE INSTRUMENT

The instrument is equipped with six eyebolts (four on the upper part of the turret and two on the lower right side of the test chamber) that are used to lift it by ropes and a forklifts.

- ▶ Leaves the pallet on the floor of the laboratory. Move and place the instrument in vertical position following the procedure described in chapter 6.2.3 Installation Procedure.
- ▶ When the instrument is in vertical position, use always the four eyebolts (on the upper part of the turret) to lift and move it in the laboratory.



During movement of the instrument, proceed slowly

4.1.3 WEIGHT OF THE MAIN PARTS

The table below indicates the approximate weight of the CEAST 9340 instruments and they can help the warehouse personnel or forklift workers in the choice of the hoister or forklift appropriate.

Instrument	Weight [kg]
9340 code 7515.000 (with standard test chamber)	340
9340 code 7516.000 (with environmental test chamber)	400

4.2 CHECK FOR POSSIBLE DAMAGE

- ▶ On reception of the goods, it is necessary to perform a visual inspection of the packaging and instrument in order to identify any damage sustained during transport and movement.
- ▶ If the packaging is damaged, immediately send by fax to ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division the details of the damage sustained; or, indicate the damages directly on the transport document and send this via fax to ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division.
- ▶ If the instrument or accessories should be damaged or missing, it is imperative to not continue with the installation, but to notify ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division immediately via fax of the anomaly found, and to agree with the former the action to be taken.

4.3 STORAGE


Should the instrument need to be stored until a later date, the environment must be the same as that for work.


If there are any storage requirements that should require special packaging, they must be requested from ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division.

5. MOUNTING AND DISMANTLING

The instrument is handled completely assembled.

Therefore there are no assembly and/or disassembly operations to carry out before handling.

 *Should the USER need to dismantle one or more parts for which the procedure is not included in this manual, it is imperative that ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division be contacted for authorization and the procedure.*

 *Every operation of mounting/dismantling done by the USER, not foreseen in this manual nor authorized by ITW Test and Instrument Italia S.r.l. - INSTRON CEAST Division, will be considered altering and will result in the compromise of the safety functions and guarantee of the instrument.*

5.1 DISMANTLING THE PACKAGING CASE

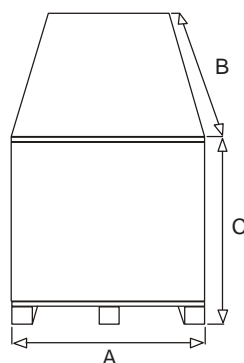
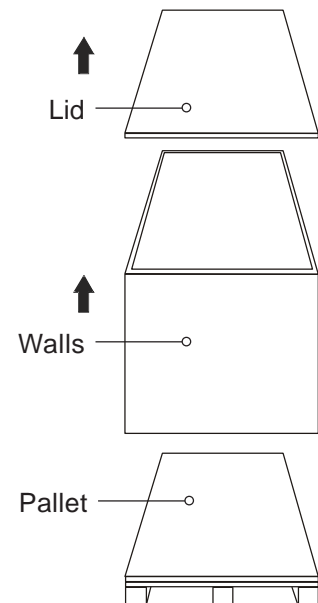
Should the instrument be transported packaged in a crate, it is necessary to:

- ▶ a) Transport the crate to the place of installation. The floor must be perfectly flat and capable of support a weight of 1000 kg/m² (see para. 6.2.2).



Note: put on protective glasses before removing straps.

- ▶ b) Cut the straps.
- ▶ c) Remove the screws or nails of the lid and remove it.
- ▶ d) Remove the screws or nails of the walls and remove them.
- ▶ e) Remove the packing material.
- ▶ f) Unscrew the screws and nuts and remove the brackets that fastening the instrument to the pallet (see figures on para. 6.2.3).
- ▶ g) Continue with the handling of the instrument according to the instructions in chapter 4.1.2.



**Crate overall dimensions [mm]
and gross weight [kg]**

A = 130;

B = 277;

C = 87;

Weight = 550 kg approx.

6. INSTALLATION

Installation of the instrument must be performed according to the instructions, by trained qualified personnel, Mechanics or Electricians as specified according to the needs.

The instrument will work according to the technical parameters foreseen if it is correctly placed, stably, in a laboratory on the floor that is able to hold the instrument weight.

Before installing the instrument, determine the correct place to position it. Remember that it is necessary to consider the following requirements: space restraints, absence of vibrations, temperature, humidity and atmosphere (not corrosive, not polluted, not explosive).

6.1 SPACE AND ENVIRONMENT REQUIREMENTS

6.1.1 SPACE

The spatial dimensions of the instrument are indicated in paragraph 1.2.1. Remember to leave adequate space all around the instrument (about 1 meter) and on top of it (about 1 meter) to allow the access of maintenance personnell.

6.1.2 ENVIRONMENT

The instrument must be installed in a controlled temperature and humidity laboratory. If this is not possible, it should be located in a clean environment where the temperature range is between 15°C and 35°C with relative humidity (RH%) $\leq 85\%$ (without condensation).

6.1.3 SERVICES

The location determined for the installation of the instrument must have an electrical socket according to the information on the ID plate of the instrument (see chapter 1) and a pneumatic air supply line (see paragraph 1.2) able to delivery compressed air with pressure 7 to 10 bar.

6.2 POSITIONING

The instrument will function according to the technical parameters foreseen if it is correctly positioned vertically on a planar surface.



Suggestions: place the instrument on the ground floor of reinforced-concrete and far from other instruments for vibration problem.



Note: the calculation of the surface load of each foot is performed in the most conservative manner for an instrument with all options.

An instrument (with environmental chamber) weighs approximately 400 kg, when it is equipped with a full set of additional weights (37 kg) and with a specimens support (20 kg), the total weight becomes 457 kg approx. (4483 N).

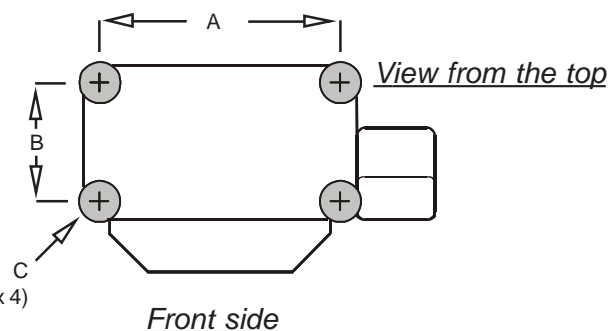
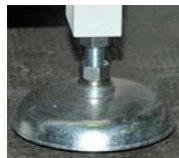
6.2.1 SURFACE LOAD IN STATIC CONDITION

Weight of instrument equipped with thermostatic chamber, additional weights set and fixed height stand [kg]	457
Distance between feet: A; B [cm]	69; 51
No. of rest feet	4
Diameter of each rest foot: C [cm]	10
Surface of one rest foot [square cm]	78.5
Weight exerted on one rest foot [kg] (considering uniform weight distribution)	115
Weight-to-Surface Ratio on one rest foot [kg/square cm]	1.5



The surface on which the instrument is placed must be able to hold a minimum weight of 1.5 kg/cm² (15 N/cm²) at the location of each foot.

Standard foot (x 4)





6.2.2 LOAD ON SLAB



The slab on which the instrument is placed must be able to hold at least 1000 kg/m² (10000 N/m²)

LOAD ON SLAB IN STATIC CONDITION
(for storage)



The slab on which the instrument is placed must be able to hold at least 2000 kg/m² (20000 N/m²)

LOAD ON SLAB IN DYNAMIC CONDITION
(load calculated for tests in the worse condition using materials very tough)

6.2.3 INSTALLATION PROCEDURE

Should the instrument be transported packaged in a crate, it is necessary to:

- ▶ a) Transport the crate to the place of installation. The floor must be perfectly flat and capable of support a weight of 1000 kg/m² (see para. 6.2.2).
- ▶ b) Dismantling the packaging case following the instructions of para. 5.1.
- ▶ c) Remove the screws (x 6) and brackets (x 6) fastening the instrument to the pallet (Fig. 1 and detail).

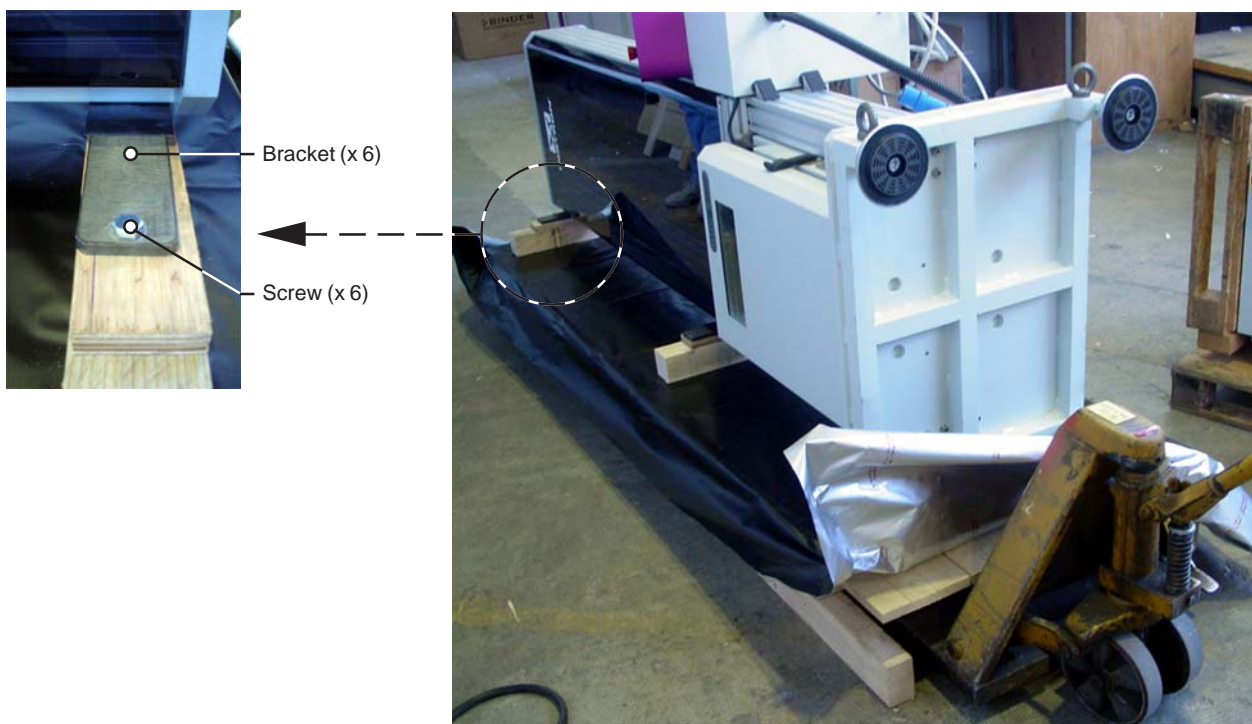


Fig. 1

- ▶ d) Reeve the ropes through the four eyebolts as shown (arrows) in the details of Fig. 2.
- ▶ e) Place the ropes on the forks of two forklifts or bridge cranes.



Fig. 2

- ▶ f) Lift the instrument and remove the pallet below (Fig. 3).
- ▶ g) Continue to lift the instrument to the (Fig. 4) driving it opportunely until it touches the floor with two feet (take care do not damage the feet during this operation) and then with all four feet (vertical position).



Fig. 3

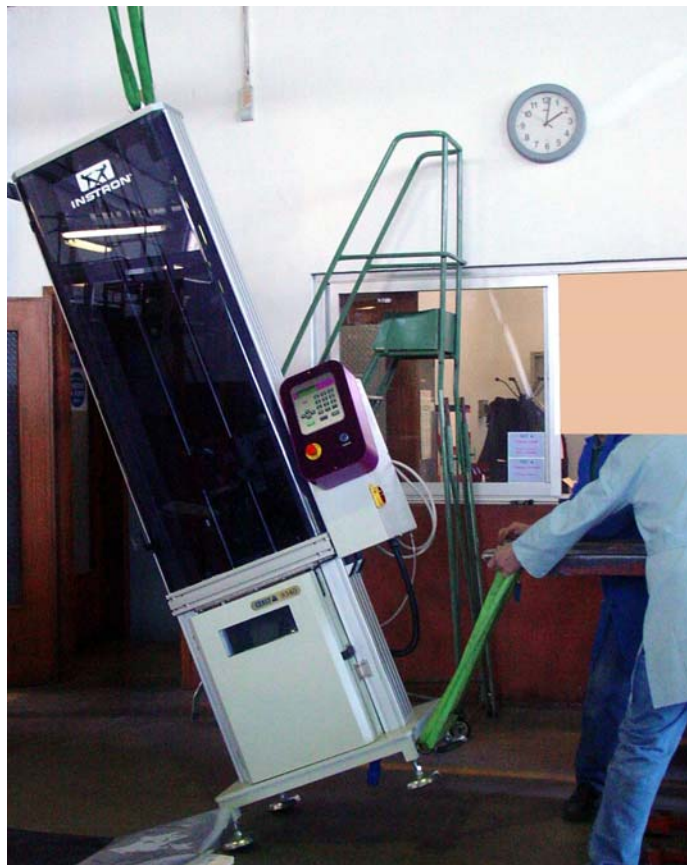


Fig. 4

- ▶ h) Lower the forks of the forklifts and remove the ropes from the eyebolts (Fig. 5).
- ▶ i) Remove the two eyebolts on the right side of the instrument.
- ▶ j) Remove the two support brackets from the sides of the instrument (Fig. 6).
- ▶ k) When the instrument is in vertical position, use always the four eyebolts (on the upper part of the turret) to lift and move it in the laboratory.



Fig. 5



Fig. 6

6.3 LEVELLING

The instrument is provided for with four adjustable support feet (see figures) for levelling. To perform this operation, follow instructions in the paragraphs below:



Notes:

- Figs. 1 and 2 show the spirit level placed against the guide column to visually inspect the verticality of the instrument on the longitudinal and transversal positions.
- Fig. 3 shows a forklift under the instrument base. It must be used to lift (only 2 or 3 cm) the instrument before turn the feet for levelling. When the feet are adjusted, lower the instrument and check again the level. If necessary, lift and lower the instrument and adjust the feet height more times until the instrument is levelled.
- Fig. 3 detail A, shows the adjustable foot in normal position (exagonal lock nut tighten against the instrument frame).
- Fig. 3 detail B, shows the adjustable foot in levelling position (exagonal lock nut tighten against the foot exagonal nut).

- ▶ a) Open the turret door.
- ▶ b) Place the spirit level against a guide column (Fig 1). Visually inspect the verticality of the instrument.
- ▶ c) If it is not correct, turn the feet on instrument right side using the adjustable wrench.
- ▶ d) Change the position of the spirit level (Fig 2). Visually inspect the verticality of the instrument.
- ▶ e) If it is not correct, turn the feet on instrument front using the adjustable wrench.
- ▶ f) Repeat instructions from paragraph b) to f) included, up to reach the level required.
- ▶ g) Once levelled, check that the four feet are in contact with the floor.

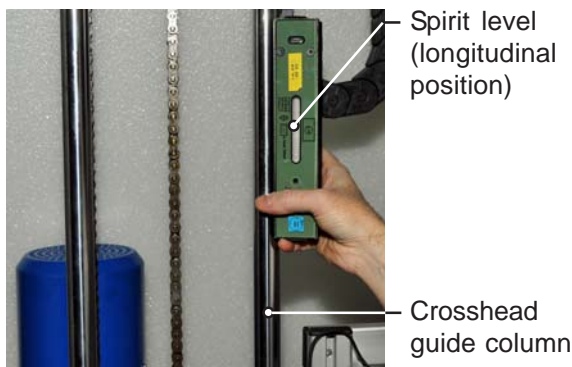


Fig. 1

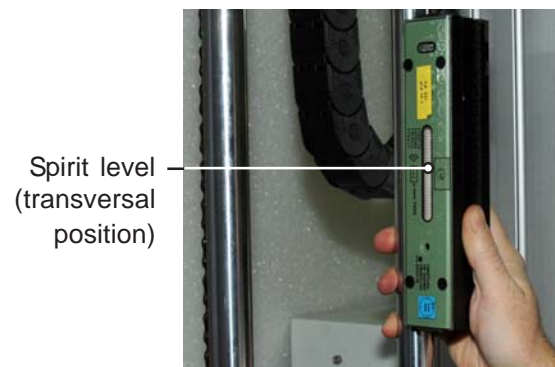
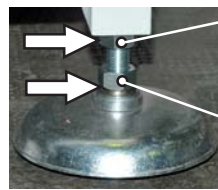


Fig. 2



Fig. 3

Forklift



Exagonal lock nut

Foot exagonal nut

Fig. 3
(detail A)



Adjustable wrench

Fig. 3
(detail B)

6.4 STABILITY

The instrument is stable if placed with all four feet touching a planar surface.



It is the responsibility of the CUSTOMER to verify that the floor is able to carry the weight of the instrument (see paragraph 6.2.1).

6.5 CLEANING

The instrument does not require cleaning with protective substances (e.g.: grease or oil on the surfaces). In any case, should it become dirty during installation, clean the surfaces with a soft cloth and non-corrosive and not dangerous detergent that will not damage the painted surfaces. In any case all safety indications provided by the manufacturer of the cleaning solutions must be followed.

6.6 MATERIALS AND PRODUCTS

The instrument is primarily constructed from: iron, steel, aluminium, copper, light alloys and thermal insulation (for environmental chamber only) not containing asbestos.

External parts of the environmental chamber are painted. The maximum external temperature that can be reached by these parts is approximately 40°C, a temperature at which the paint does not emit toxic vapors or fumes.

Cables and electric components meet the international standards.

The disposal of the materials must be done by the CUSTOMER, according to the local environmental laws of the COUNTRY in which the instrument is located.



Don't Litter. Recycle.



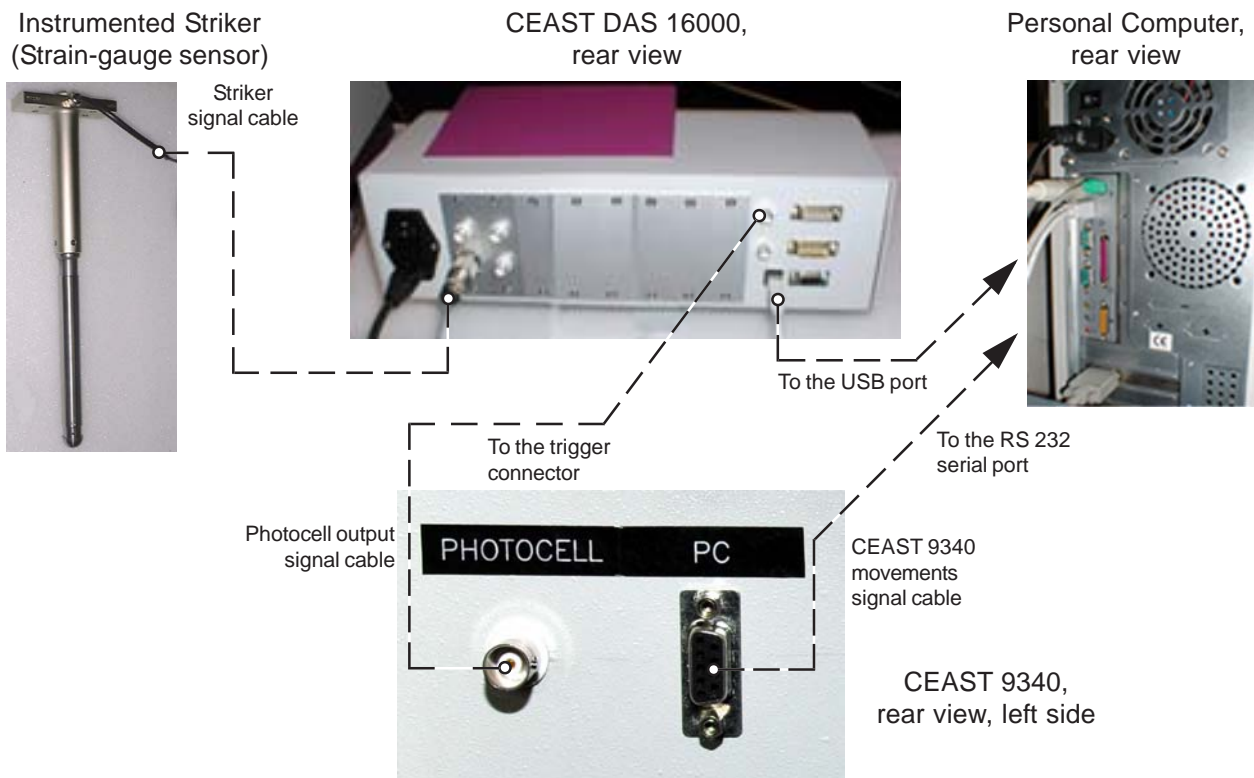
7. START-UP

This chapter provides the instructions that must be followed to make the instrument operative before starting any testing.

7.1 INSTRUMENT, CEAST DAS 8000 JUNIOR/CEAST 16000 AND PC CONNECTION

Authorized Personnel: **Operator**

- ▶ Connect the cables as shown in the figures below.



7.2 ELECTRICAL SERVICE CONNECTION

Authorized Personnel: **Electricians**

- ▶ a) Verify that the voltage and frequency of the line conform to those indicated on the instrument tag (see chapter 1).
- ▶ b) Verify that the main switch of the instrument is in the "O" position (OFF).
- ▶ c) Insert plug of power cord into the laboratory mains outlet and close mains safety switch (wall mounted).



7.3 PNEUMATIC SERVICE CONNECTION

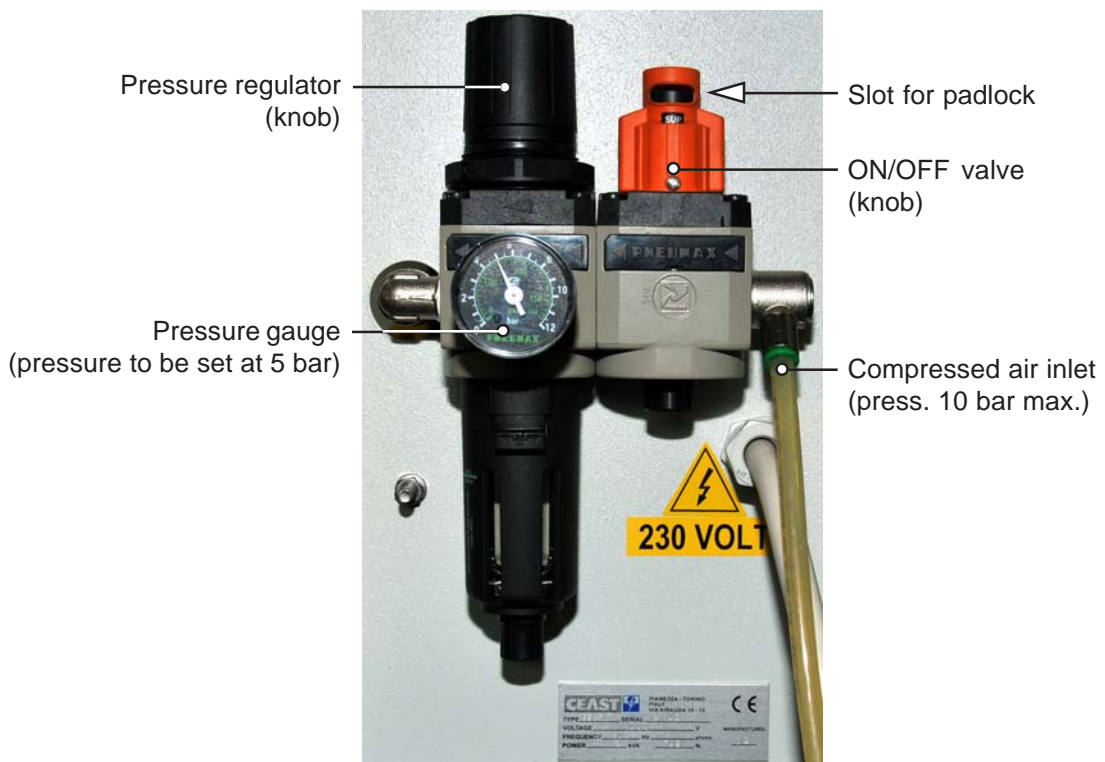
Authorized Personnel: **Operator**

- ▶ a) Connect the air filtering group of the instrument (see figure below) to a compressed air line, with a pressure not greater than 10 bar.
For the connection, use flexible plastic hose provided with a standard fitting (for pneumatic line) to the end.
- ▶ b) Lift the knob of the pressure regulator to release the safety.
- ▶ c) Turn the knob and adjust the pressure to 5 bar on the pressure gauge.
- ▶ d) Lower the knob to insert the safety.



Note: the on-off valve can be used to close the compressed air inlet to the instrument and in the mean time to discharge the pneumatic circuit of the instrument without disconnect the air delivery pipe.

When the on-off valve is in “Closed” position the knob can be padlocked. This solution ensures the maximum safety of the personnel during the maintenance interventions.



7.4 CRYOGENIC SERVICE CONNECTION

Authorized Personnel: **Operator**



Note: *the liquid nitrogen tank (optional) is supplied on request and must be used only for low temperature tests on instruments equipped with the environmental chamber.*



WARNING !

The liquid nitrogen tank must be handled with extreme care.

Nitrogen in the liquid state has a temperature of $-196\text{ }^{\circ}\text{C}$ and it is therefore very dangerous.

The user must not stand in front of the discharge valves of tank when regulating the pressure or touch with his bare hands the top central part of the tank as there could be a risk of burns.

During the tank filling and handling operations it is compulsory to wear thermally insulated gloves and other protective clothes.

The room in which the nitrogen is used must be well ventilated to avoid environment saturation problems (lowering of the oxygen percentage) with a risk of suffocation.




Avoid direct inhalation of undiluted gas.



Use only in a well ventilated place.

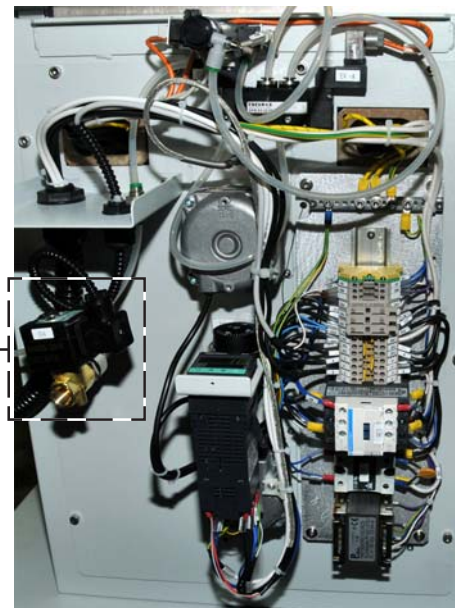
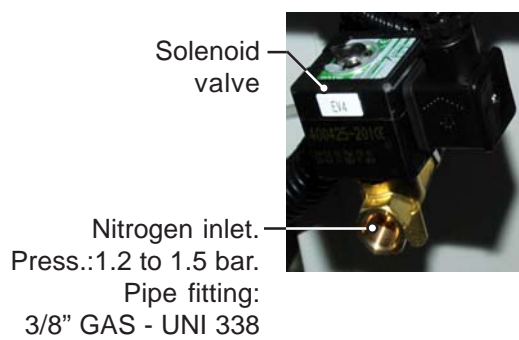
Local exhaust system of $1200\text{ m}^3/\text{hour}$ is recommended to prevent high nitrogen concentration when use the CEAST 9340 equipped with the environmental chamber.

- ▶ Connect the nitrogen tank to the pipe fitting of the CEAST 9340 using the flexible hose provided with the tank or connect the CEAST 9340 to the nitrogen line of the laboratory. The delivery pressure must be set between 1.2 and 1.5 bar.

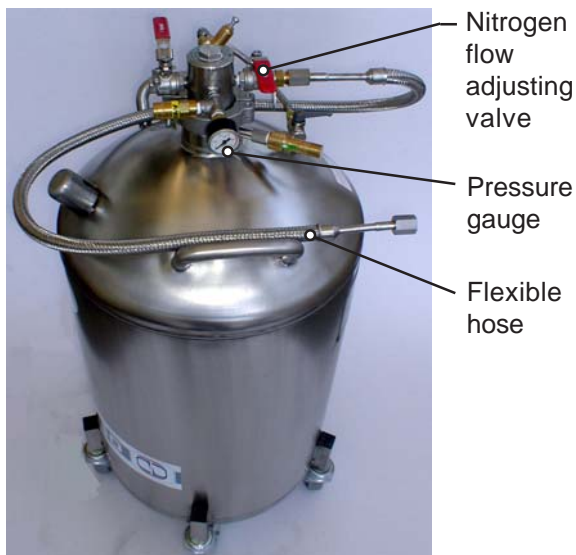
 **Note:** the tank is provided with its own User's Instructions, which contain all the information needed to operate it.

Liquid Nitrogen Supply:

- Pressure: 1.2 bar to 1.5 bar;
- Consumption at - 40 °C: 4 [kg/h];
- Consumption to cool the chamber from 23 to - 40 °C: 6 [kg].



Rear view of environmental chamber



Insulated liquid nitrogen tank, 60 Lt (option)

8. USE

8.1 SAFETY STANDARDS

- ! The general safety norms outlined in the introduction pages of this manual are valid.
- ! All work procedures that would compromise the safety of the instrument must be avoided.

- ! The OPERATOR must ensure that no unauthorized personnel work on the instrument.
- ! The OPERATOR is obliged to check the instrument at least once per work shift to ensure that there is no visible external damage. Any eventual secondary modifications (including work methods) that compromise the safety must be immediately reported.
- ! The instrument can be used only if it is in perfect condition.
- ! The user must follow all instructions and checks in order to guarantee the cleanliness and visibility of the work station where the instrument is located.
- ! The protections may not be removed or altered.
- ! Should there be damage or breakdown of a component, the instrument must be removed from use until it is once again in perfect working order. If during installation, repair or maintenance it is necessary to dismantle the instrument, for safety reasons it must be removed from service, following with precision the relative instructions. At the end of the intervention, the instrument must be immediately re-assembled and checked for correct functioning .

!

**For safety reasons, it is forbidden to change
or modify any part or portion of the instrument**

8.2 COMPONENT IDENTIFICATION

In the following pages, a number of figures of the instrument can be found with identification of the main parts.

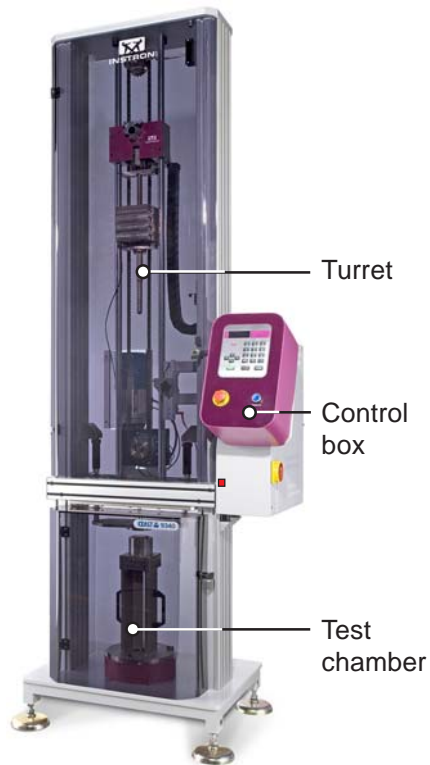


Fig. 1 - CEAST 9340 7515.000.
General view



Fig. 2 - CEAST 9340 7516.000.
General view

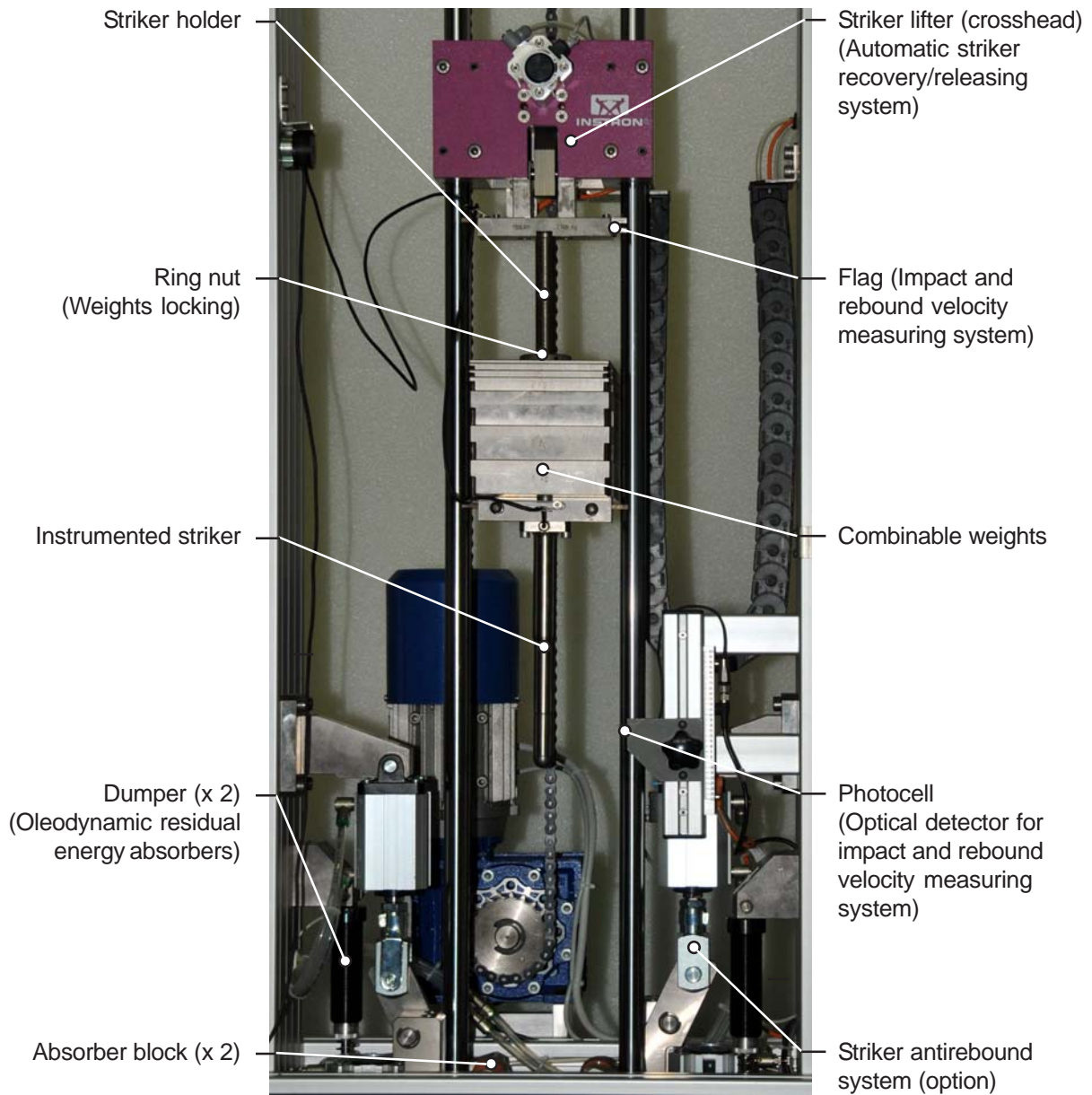


Fig. 3 - View inside turret

8.2.1 SAFETIES AND THEIR LOCATIONS

The instrument is equipped with the following safety devices:

1) - **Safety thermostat**: it intervenes should the temperature of the environmental chamber go over the maximum allowable temperature (over 100°C), cutting the electric service to the heating resistances. This component is located in the electric box rear the environmental test chamber.

2) - **Safety switch on turret door**: this switch is located in the turret near the door lock. Normal operating condition (Power ON push-button already pressed).

When you open the door:

- Power ON push-button remains switched on.
- All systems inside the turret are disabled.
- All systems inside the environmental chamber remains enabled.

When you close the door:

- After a few seconds all systems inside the turret are enabled.

3) - **Safety switch on standard chamber door** (for instruments without environmental chamber): this switch is located in the chamber near the door lock.

Normal operating condition (Power ON push-button already pressed).

When you open the door:

- Power ON push-button remains switched on.
- All systems inside the turret are disabled.

When you close the door:

- After a few seconds all systems inside the turret are enabled.

4) - **Safety switch on environmental chamber door**: this switch is located in the chamber near the door lock.

Normal operating condition (Power ON push-button already pressed).

When you open the door:

- Power ON push-button remains switched on.
- All systems inside the turret are disabled.
- All systems inside the environmental chamber are disabled.

When you close the door:

- After a few seconds all systems inside the turret and the environmental chamber are enabled and the previous operating conditions are restored.

- 5) - **Upper and lower limit switches for the automatic striker recovery system:** they intervene and stop the stroke of the striker lifter in the two directions of motion. These components are located in the turret.

- 6) - **ON-OFF valve:** is used to close the compressed air inlet to the instrument and in the mean time to discharge the pneumatic circuit of the instrument without disconnect the air delivery pipe.
When the on-off valve is in “Closed” position the knob can be padlocked. This solution ensures the maximum safety of the personnel during the maintenance interventions. This component is located rear the instrument.

- 7) - **Pressure switch:** it intervene and cut off the power to the instrument when the pressure of the compressed air goes down below 5 bar.

8.3 COMMANDS

Main Switch

Located underneath of the control box, it turns ON (I) or OFF (O) the voltage to the instrument.



Control box

- Power **ON** push-button: enable the auxiliary circuits of the instrument and switch on the light inside the button.

- **Emergency-Stop** push-button: under emergency conditions, it allows immediately to shut off the power to the auxiliary circuits of instrument.

To restore the controls, rotate the button about half a turn clockwise, in order to disengage it from the locked position.

The instrument stays off until the Power ON push-button is pressed again.



- "**Keypad and Display**": the man/machine interface occurs through the use of the keyboard and the display. These two components are closely connected and they are used to program the tests, to command the motorized devices of instrument, to show the results of the test performed and the messages for the operator in case of problems or errors.













The large liquid crystal display allows up to 80 characters to be shown on 4 rows.



8.4 OPERATIONS

8.4.1 KEY FUNCTIONS

Here you will find the list of the single keys and next to each one a brief description of the function it performs.

KEY	DESCRIPTION OF FUNCTION		
	<i>During Data Input</i>	<i>In the Menus</i>	<i>During Test</i>
	Type the alphanumeric characters indicated on the key.	Not activated	Not activated
	Type the alphanumeric characters indicated on the key	Open and close the specimen clamping device	Not activated
	Type the alphanumeric characters indicated on the key	Bring the instrument at HOME	Not activated
	Type the alphanumeric characters indicated on the key	Move UP the striker holder cross lifter	Not activated
	Type the alphanumeric characters indicated on the key	Move DOWN the striker holder lifter	Not activated
	Type the decimal point and the following character: _	Not activated	Not activated
	Not activated	Page through the data lists on the display (with autoscroll)	Not activated
	Page through the default inputs on the display (e.g.: Y/N)	Not activated	Not activated
	Delete the last character typed	Not activated	Interrupt the test
	Not activated	Start a test or a function	Not activated
	Not activated	Return to the previous page / return to the first page if it is hold pushed. Skip a function	Not activated
	Confirm the Data Input	Select the function where the cursor is located	Not activated



Note: in order to enter a numeral on the display, you must only press the key with the corresponding number. To enter a letter of the alphabet you must continue to press the key with the corresponding letter until it is shown in the display (the same method used by mobile phones).

8.4.2 PROGRAM

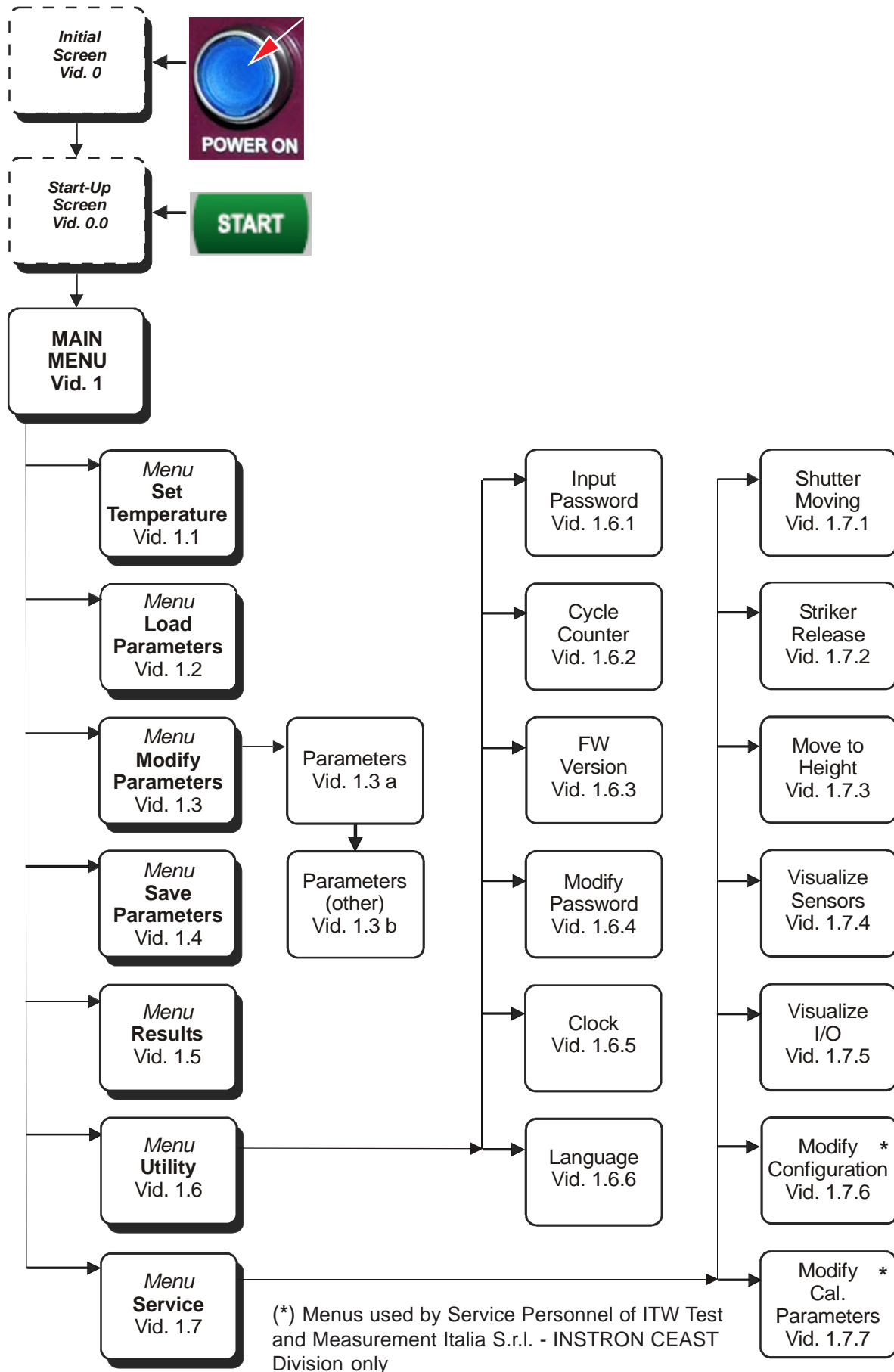
The programming of the tests is done by typing in the parameters using the keyboard in the order that they are shown on the display.

After the test cycle is started, the program performs the measurements requested, acquires the data, elaborates it, and automatically supplies the results.

The results obtained can be seen in real time on display.



Note: *to facilitate the understanding of the program structure there follows a flowchart showing its functions in hierarchical order. Each block is identified with the writing Vid. (Screen) and a progressive number, XXX, that follows the order of appearance on the screen of the display. This order is followed in order to present the figures during the description of the program.*



Representation of the program structure (firmware) in hierarchical order

8.5 PROGRAM START - UP

The program is automatically started when the Main switch is “ON” and it performs the following operations:

- Shows, temporarily, on the display the introduction of the program (see Vid. 0) where the following information are indicated: (1) name of the instrument, (2) the firmware version resident in memory and (3) the serial number.
- After few seconds the screen changes from vid. 0 to vid. 00 visualizing the message “press START for CEAST 9340 startup”.

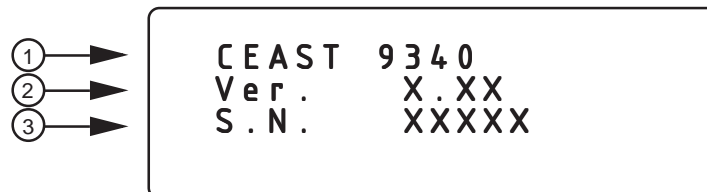


Note: before pressing the START key check that the POWER ON button is lit.

- When the operator press the START key the program performs the following operations and at the end it loads the parameters relative to the last test performed (only if it has been previously stored on the instrument memory) and it visualizes the main menu (see Vid. 1).
 - Check of safety thermostat operation (for instrument equipped with environmental chamber only);
 - Check of temperature sensor operation (Pt100 ohm type) that measure the temperature in the chamber (for instrument equipped with environmental chamber only);
 - Initialization of specimen clamping system;
 - Initialization of environmental chamber shutter (optional).



Note: at the start the instrument the “Password” is set to the previous access level (before switching it off).



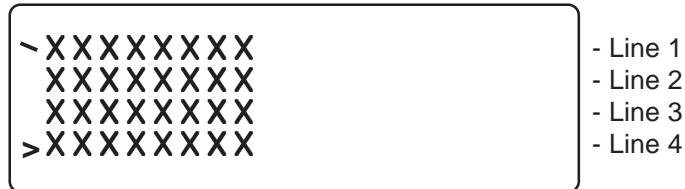
Vid. 0 - Initial Screen



Vid. 00 - CEAST 9340 Startup Screen

8.5.1 NAVIGATION THROUGH THE PROGRAM MENUS

Below the method of navigation inside the various program menus using the keyboard is described.






Sample Screen

When the instrument is switched-on, the firmware performs a number of preliminary checks on the status of the instrument; the results of this checks can be visualized selecting the “View Results” option in the “Autocheck” menu, see para. 8.5.21.






After the preliminary check the firmware waits that the operator presses the “Start” key for starting the automatic zero-set. At the end of the zero-set, the firmware visualizes the “Main menu” on display.



 **Note:** *the zero-set involves the automatic movement of striker holder lifter.*




1) Choosing a sub-menu or a function:



- Move the cursor “>” to the desired row using the   keys.
- Press the  key to open the menu or to perform a function.


2) Modify a parameter:


- Move the cursor “>” to the row of the parameter you wish to change using the   keys.
 - a) Modify the alphanumeric parameter using the keys on the keyboard.
 - b) Modify the parameters of choice (Y / N) using the  or  keys.
- Confirm using the  key.

 **Note:** > *cursor positioned on a function or parameter that can be chosen or modified;*
 ~ *cursor positioned on a function, or a parameter, or a comment, that can not be chosen or modified;*
 * *parameter being modified. Disappears after the confirmation with the  key is given.*

 **Note:** *rapid, continuous movement of the cursor is available (maintaining pressed the   keys).*

The display can visualize only four rows at the same time. If the available list has a larger number of rows, it is possible to move back and forth using the   keys in order to see all of the functions or options available.

 **Note:** - *In the figures shown in the following pages, all of the rows that make up each complete data or function list are shown, even if in many cases there are more than four rows visualized.*

 **Note:** - *The numbers shown next to the figures are used as explicit references in order to facilitate the comprehension of the text, but do not appear on the display.*

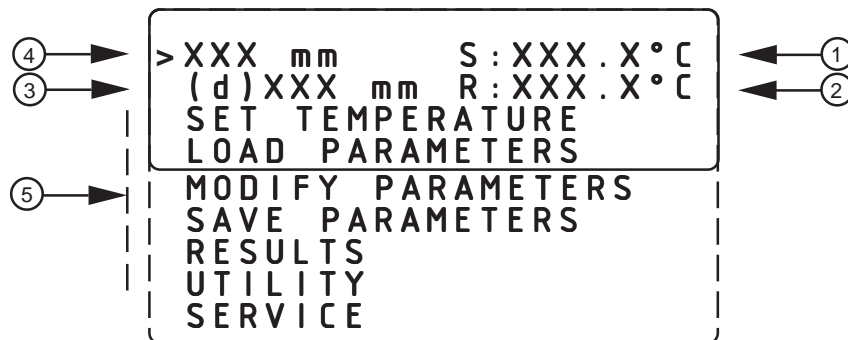
The “Canc” function can be used in two different ways:

- In case of error during the editing of the parameters, it deletes the last character typed.
- During the test stops the execution.

The “Back” key can be used in two different ways

- Press the key and release it: to exit from the active screen and return to the preceding one;
- Press the key and maintain it pressed: to exit from the active screen and return to the first screen (main menu).

8.5.2 MAIN MENU






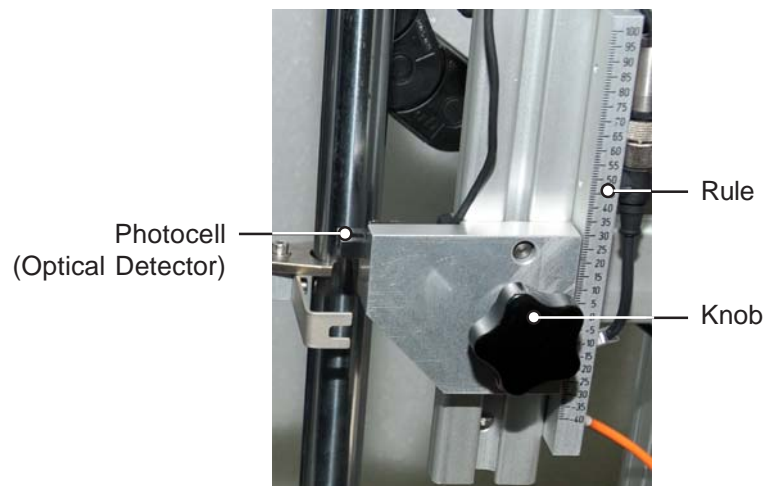
Vid. 1 - Main menu of the program

- 1) Temperature set (Celsius degree) in the parameters file currently used.
- 2) Actual temperature (Celsius degree) measured from the temperature sensor in the environmental chamber.
When the conditioning is disabled (or when there is an error, e.g.: thermoregulator cable detached) the temperature value is visualized as ??????.
- 3) Position in millimeter to which the pointer of the optical detector (part of the striker velocity measuring device) must be set on the rule located in the turret right side (see Fig. below).
The position is automatically calculated from the program according to the striker length and the specimen thickness.
- 4) Height set of (striker) release.



Note: functions of steps 1, 2, 3 and 4 are not selectable with the cursor.

- 5) Menu through which it is possible to recall all the functions of the instrument shown on display. Each function is selectable with the cursor ">" using the   keys and confirmed with the  key.



Photocell height adjusting device (ref. step 3)

8.5.3 SET TEMPERATURE




Vid. 1.1 - Menu "Set Temperature"

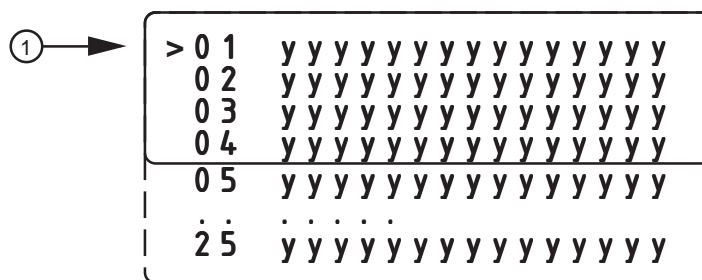
The menu "Set Temperature" allows to switch ON or OFF the environmental chamber and to set the temperature for the specimens conditioning and chamber drying.

- 1) Switches ON/OFF the environmental chamber. Select using the ◀ ▶ keys.
- 2) Allows to set the temperature value for the chamber. The program accepts values from -50 to 100 °C. Values out of this range are shown as error message.
- 3) Pressing the START key:
 - if Chamber = OFF: disables the chamber.
 - if Chamber = ON: enables the chamber and start the conditioning to the set temperature (step 2).

Pressing the BACK key the program returns automatically to the main menu without to do anything at all.



 **Note:** available only with the environmental chamber configured. If the conditioning is on, whenever the chamber door is closed, a three-beep acoustic signal can be heard if the the conditioning is properly restarted. If a long fourth beep is heard, it means that the restart of the conditioning was not performed: try to open and close again the chamber door or restart the conditioning by means of the command Set temperature.

8.5.4 LOAD PARAMETERS

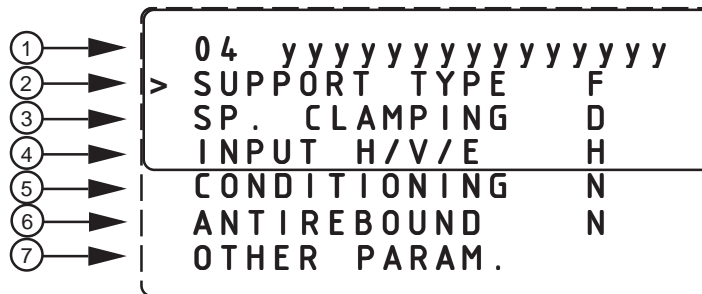


Vid. 1.2 - "Load Parameters"

The menu "Load Parameters" allows to load a group of parameters that has been previously saved. The program is able to memorize up to 25 groups of parameters.

- 1) The group is selected by the user through the cursor ">" and confirmed with the  key. Pressing the  key the selected parameters group is loaded in memory as "Current Parameters" and the program returns automatically to the main menu (Vid. 1).

8.5.5 MODIFY PARAMETERS



Vid. 1.3 a - "Parameters"

Allows the input and modification of the current parameters group. The access is allowed for the user level or higher.

Description of the parameters from (1) to (8):

1) Identify the parameters group last loaded from the menu "Load Parameters" (Vid. 1.2). The field is modifiable: the name entered will be that visualized in the "Parameters groups" list, if the current file will be saved.

2) "**Support Type**": it select the type of specimen support (F or V) installed in the test chamber.

F: fixed height (see para. 8.6.1 Fig. 1);

V: adjustable height (see para. 8.6.2 Fig. 2).

3) "**Sp. Clamping**": enable or disables the operation of specimen clamping plate in three different ways.

D: clamping plate disabled (the specimen is not clamped during the test);



Note: *if the clamping plate has been manually operated by the "Clamp" key before starting the test, the specimen remains clamped until the test is done. The clamping plate goes up when the test ends and it remains disabled.*

C: clamping plate enabled during the test (the specimen is clamped before test and unclamped after test).

When the environmental chamber door is open for the specimen replacement, the systems inside the chamber are switched-off.

When the door is closed again, the systems inside the environmental chamber will be switched-on after a few seconds.

I: clamping plate enabled during the test (the specimen is clamped before test and unclamped after test).

This is the ***suggested condition*** for tests at low temperature on ***films***.

When the environmental chamber door is open for the specimen replacement, the systems inside the chamber are switched-off.

When the door is closed again, the systems inside the environmental chamber will be switched-on after a few seconds.

The clamping plate goes down and clamp the films just before that the fan is switched-on. This condition avoids the expulsion of film from the specimen support due to the air flow of the fan.



Note: The “I” option is available only with environmental chamber configured.

- 4) “**Input H/V/E**”: select the input type (H, V or E):
 - H: drop height;
 - V: impact velocity;
 - E: energy at the impact.
- 5) “**Conditioning**”: it enables (Y) or disables (N) the temperature control of environmental chamber (if installed and configured in the program). Function not used for standard chamber.
 - Conditioning N: the test starts when the operator runs it.
 - Conditioning Y: the test can be run only if the temperature is at the set point (± 1 °C).
- 6) “**Antirebound**”: it enables (Y) or disables (N) the striker antirebound system (if installed and configured in the program).
- 7) “**Other param.**”: it goes to the next menu of parameters (see Vid. 1.3 b).

9	→	TEMPERATURE	
		[° C]	+XXX . XX
10	→	MASS	
		[K g]	XX . X
11	→	DROP HEIGHT	
		[m m]	XXX
12	→	VELOCITY	
		[m / s]	XX . XX
13	→	ENERGY	
		[J]	XX . X
14	→	STRIKER LENGTH	
		[m m]	XXX
15	→	SPECIMEN OFFSET	
		[m m]	XX . X
16	→	IMPACT OFFSET	
		[m m]	XXX

Vid. 1.3 b - "Parameters (other)"

9) **"Temperature"**: is the test temperature to which the environmental chamber is cooled (negative value) or heated (positive value).

Parameter shown only if the **"Conditioning"** parameter (see Vid. 1.3 a) is selected **"Y"**.

10) **"Mass"**: is the total mass used for the impact test. It is equal to the sum of the following weights: striker, striker holder, striker extension (if installed) and additional weights (if installed).

11) **"Drop Height"**: is the height from which the striker is released for the impact test. Parameter shown only if the **"Input H/V/E"** parameter (see Vid. 1.3 a) is selected **"H"**.

12) **"Velocity"**: is the velocity at which the striker strikes the specimen. Parameter shown only if the **"Input H/V/E"** parameter (see Vid. 1.3 a) is selected **"V"**.

13) **"Energy"**: is the energy at the impact. Parameter shown only if the **"Input H/V/E"** parameter (see Vid. 1.3 a) is selected **"E"**.

14) **"Striker Length"**: is the length of the striker used for the tests plus the striker extension (if installed).



Note: if the entered striker length value is wrong, it can cause a wrong striker positioning with a consequent error when carry out test. Moreover it can cause a collision between the striker and lubricating system (if this last one is installed).

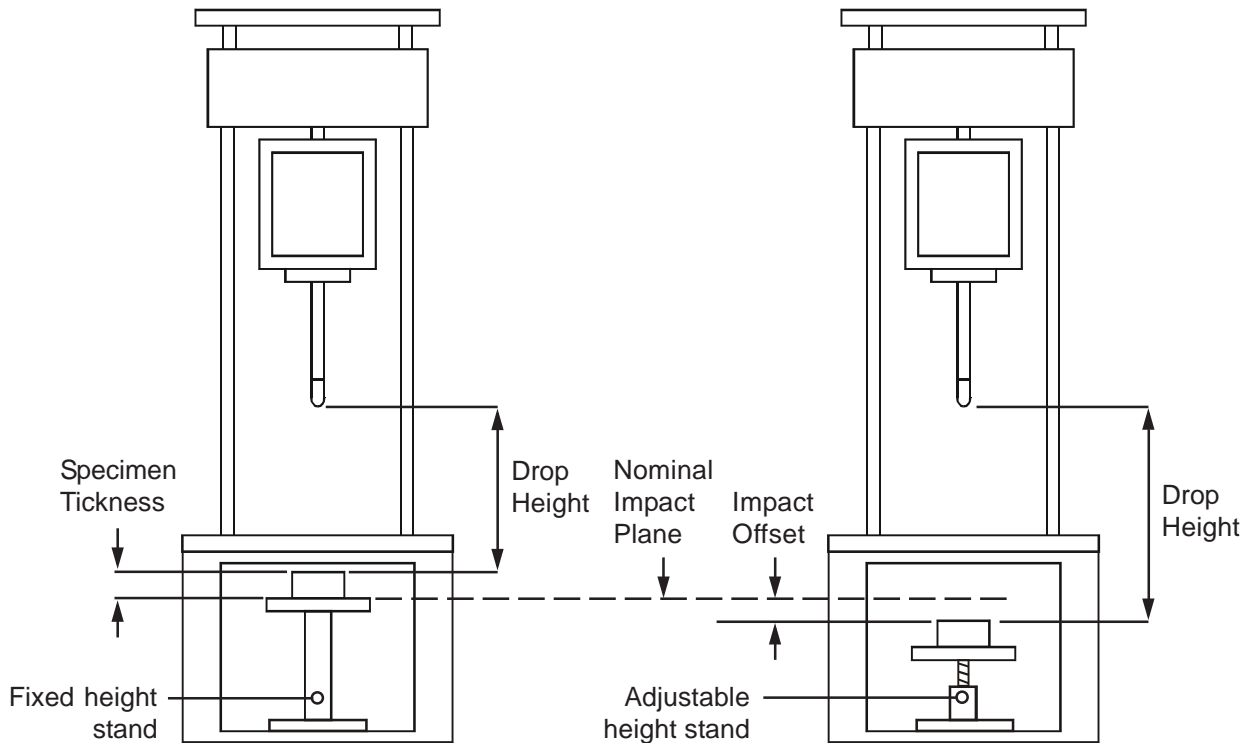
15) **"Specimen Offset"**: is the thickness of the specimen under test. Parameter shown only if the **"Support Type"** parameter (see Vid. 1.3 a) is selected **"F"**.

16) **"Impact Offset"**: is the distance between the nominal impact plane and the specimen surface.

Parameter shown only if the **"Support Type"** parameter (see Vid. 1.3 a) is selected **"V"**.

- Note:** all the parameters are shown on two rows:

 - First row: name of the parameter.
 - Second row: value (modifiable) and unit of measure (not modifiable).
- Note:** the “minimum and maximum limits” of the parameters attributes and the “unit of measure” of each parameter are indicated in the table “Test Parameters” on the next page.
- Note:** the instructions for typing the parameters are shown in chapters 8.4.2.

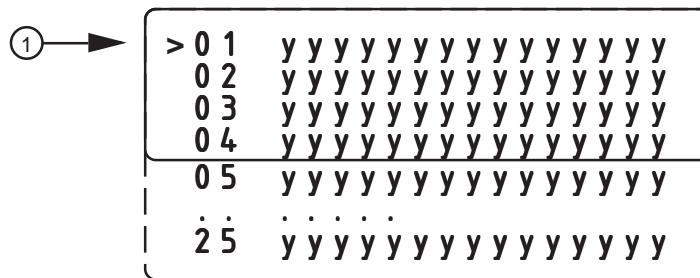


Sketches referred to the steps: 11) Drop Height, 14) Specimen Thickness and 15) Impact Offset

Test Parameters	Measure Units	Input Format	Limits	
			Min.	Max.
Temperature	[°C]	+/-xx	-50	100
Mass	[kg]	xx.xx	0.9	40
Drop Height	[mm]	xxxxxx	30	1100
Velocity	[m/s]	xx.xx	0,77	4.64
Striker Length	[mm]	xxx	239	370
Specimen Thickness	[mm]	xx.x	0	25
Impact Offset	[mm]	+/-xx	- 120	+ 100


- Note:** for further technical data related to the “striker antirebound system” make reference to the “Appendix H”.


8.5.6 SAVE PARAMETERS



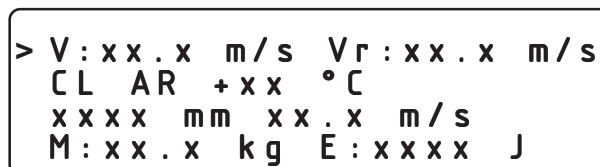
Vid. 1.4 - "Save Parameters"

The menu "Save Parameters" allows to save a group of parameters that has been previously modified.

- 1) The group position is selected by the user through the cursor ">" and saved with the  key.

 **Note:** the program overwrites the current set to the selected group. After the save the program return to the "Main menu".

8.5.7 RESULTS

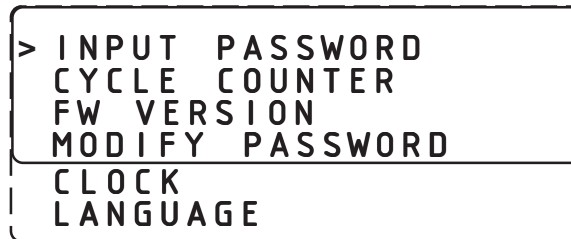


Vid. 1.5 - Menu "Results"

This menu visualizes the values related to the last performed test (if performed)

- 1) "V": velocity of the striker impact measured from the optical detector.
- 2) "Vr": velocity of the striker rebound measured from the optical detector
- 3) "CL": it is visualized only if the "clamping" option is configured and activated.
- 4) "AR": it is visualized only if the "antirebound" option is configured and activated.
- 4) "+xx °C": this field shows the test temperature (only if the environmental chamber is configured and the conditioning is activated).
- 5) "xxxx mm": it is the drop height value (parameter "H", see Vid. 1.3 a).
- 6) "xx.x m/s": it is the expected velocity.
- 7) "M: xx.x kg": it is the dropping mass.
- 8) "E: xxxx J": it is the potential energy.

8.5.8 UTILITY



Vid. 1.6 - Menu "Utility"

- 1) **"Input Password"**: insert the password to access the "User" or "Service" function level.
- 2) **"Cycle Counter"**: shows the number of test cycles performed by the instrument with the possibility to zero it for a partial indication.
- 3) **"FW Version"**: indication of the firmware installed and the configuration of the instrument.
- 4) **"Modify Password"**: to modify the password set for the "User" level.
- 5) **"Clock"**: function for setting the time and date.
- 6) **"Language"**: select the language preferred by the user.

8.5.9 INPUT PASSWORD



```
> Password      * * * * * * * *
```

Vid. 1.6.1 - "Input Password"

"Password": allows to type-in the password for different access to the program. After the input, the program shows the message with the access level.

Press the  key to return to the "Main Menu" (Vid. 1).

Letters and numbers can be used up to a maximum of 8 characters.

The instrument can work at three different access levels:

- Operator (without Password): can perform tests on the instrument using existing parameter groups but cannot modify them (the groups can be loaded using the proper function).
- User (with Password): can perform tests on the instrument using the existing parameter groups, can access the parameter groups for modification and can modify the Password using the "Modify Password" function (Vid. 1.6.4).
- Service (with Password): can access to all the menus and functions.

To return to the "Operator" level from the "User" or "Service" levels, type 0 (zero) in the "Password" field.



Note: *the program maintains in memory the current password level.*

If you switches the instrument off from the "User" level, on the next restart the firmware remains on the "User" level.


If you want to restart as "Operator" level instead the "User" one, you must change it before to switch the instrument off.

8.5.10 CYCLE COUNTER

```

> ENTER to Reset
PAR. CYCLES   XXX
TOT. CYCLES   XXX
    Press BACK
  
```

Vid. 1.6.2 - "Cycle Counter"

- 1) "ENTER to Reset": message for the user, pushing the  key the partial cycle (or tests) counter is zeroed.
- 2) "Par. Cycles": shows the number of cycles (or tests) run by the instrument prior to zeroing.
- 3) "Tot. Cycles": indicates the total number of cycles (or tests) performed by the instrument.
- 4) "Press BACK": return to the previous page.

8.5.11 FW VERSION

```

FW REV.   XX.XX
LD REV.   XX.XX
CONF. 16 - 9  00000000
> CONF. 8 - 1  00000011
                | |
                B A
  
```

Vid. 1.6.3 - "Firmware Version"

- 1) "FW REV. X.XX": number of the program version installed on the instrument.
- 2) "LD REV. X.XX": number of the boot loader version.
- 3) "CONF. 16 - 9": configuration of the instrument.
- 4) "CONF. 8 - 1": configuration of the instrument:
 - "A" Environmental Chamber
 - "B" Striker Antirebound System



Note: bit value: 1 installed; 0 not installed.

8.5.12 MODIFY PASSWORD

```
> PASSWORD      * * * * *
  REPEAT        * * * * *
```


Vid. 1.6.4 - "Modify Password"

Function used to modify the password for the "User" level.

1) "**Password**": type a new password.

Letters and numbers, up to 8 characters maximum, can be used.

2) "**Repeat**": re-type the same new password as a check.

The new password will be activated after confirmation with the  key.



Note: the default password installed is: USER.

8.5.13 CLOCK

```
> YEAR          XXXX
  MONTH         XX
  DAY           XX
  HOUR          XX
  MIN.          XX
  SEC.          XX
  APPLY
```

Vid. 1.6.5 - "Clock"

Function used to see the actual clock value and to modify the time and date.

After the modification select the function "**Apply**" and confirm it using the  key to make the change operative.

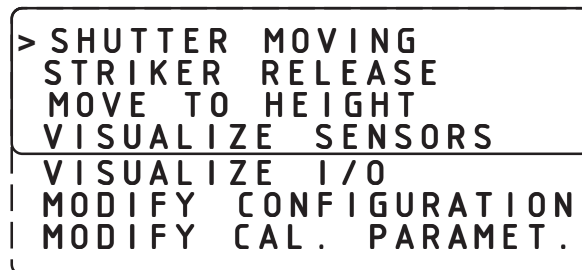
8.5.14 LANGUAGE



Vid. 1.6.6 - "Language"

Function used to change the language that is used for the information on the display. The modification is performed immediately upon confirmation.

8.5.15 SERVICE



Vid. 1.7 - Menu "Service"

This menu allows the access to various Service functions. Some of these are protected by a Password and cannot be accessed by the user. They are exclusively used by ITW Test and Measurement Italia S.r.l. - INSTRON CEAST Division personnel for setup and Service.

Press the  key to return to the previous screen.

8.5.16 SHUTTER MOVING



Note: *function visualized only with environmental chamber configured.*

- SHUTTER -
Press UP to OPEN
Press DOWN to CLOSE

Vid. 1.7.1 - "Shutter moving"

The shutter is located only in the environmental chamber and open or close the passage for the striker.

Press the "UP" key to open the shutter or press the "DOWN" key to close it.



Note: *the shutter must be open during the drying of the chamber.*

8.5.17 STRIKER RELEASE

STRIKER RELEASE
Press START or BACK

Vid. 1.7.2 - "Striker Release"

Press the "START" key to release the striker or the "BACK" key to return to the previous screen without release the striker.

8.5.18 MOVE TO HEIGHT

```
> OFP = X . X          LP = XXX
  TYPE  Zt / Hc        Z
  HEIGHT                XXX
  Press START or BACK
```

Vid. 1.7.3 - "Move to Height"

OFP/OFQi: show the specimen offset or impact offset set in the current parameters set.

LP: show the length of the striker used for the tests, plus the striker extension (if installed) set in the current parameters set.

Note: if the entered striker length value is wrong, it can cause a wrong striker positioning with a consequent error when carry out test. Moreover it can cause a collision between the striker and lubricating system (if this last one is installed).

Type Zt/Hc and Height: select and enter the chosen position of the crosshead (Zt selected) or the striker edge (Hc selected).

Zt is referred to the distance between the lower end of the striker holder and the upper surface of the turret base.

Hc is referred to the distance between the lower end of the striker and the impact point, and it depends from the test parameters.

Press the key to start the positioning or the key to go back without carry out the positioning.

8.5.19 VISUALIZE SENSORS

```
> CROSSHEAD HE XXXX.X
  SET. P. TEMP. XX.X
  MEASURED TEMP. XXX
```

Vid. 1.7.4 - "Visualize Sensors"

Visualize in real time the values measured by sensors.

- 1) Absolute crosshead height [mm];
- 2) Temperature set [°C] (*);
- 3) Temperature measured [°C] in the environmental chamber (*).

(*): only with environmental chamber.

8.5.20 VISUALIZE I/O

```

> IN 16-9-*****--
  IN 8-1**--*--*
  OUT 16-9--**--
  OUT 8-1*-*-*-*
  
```

Vid. 1.7.5 - "Visualize I/O"

Visualize in real time the input/output status: * active; - inactive, see also the Input and Output lists in the Appendix E and F.

8.5.21 EMERGENCIES SYNOPTIC

```

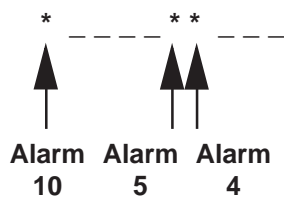
***ERROR N. 205***
EM. STAT. -----**
PRESS STOP TO ABORT
ENTER TO IGNORE
  
```



Vid. 1.7.6 - Example of "alarm visualization"

The alarm conditions are visualized as 10 screen fonts consisting of asterisks and underscore lines.

Example: ----- 10 underscore lines means no one alarm;



3 asterisks means 3 different active alarms. The alarms are numbered in increasing order starting from right to left.

The table below describes the alarm conditions which can be visualized on display.

Emergencies Synoptic					
6	5	4	3	2	1
Temperature too high/low	Safety thermostat alarm	Upper door open	Lower door open	Power cut off	Lifter motor overload

8.5.22 ERROR CODES IN THE PROGRAM

Error codes are shown on display and advise the user when an error occurs, see the Error Codes List in the Appendix G.

8.6 PREPARING THE INSTRUMENT FOR TESTING

8.6.1 REPLACEMENT OF THE STANDS

Authorized Personnel: **Operator**



Note: stands for CEAST 9340 are mainly of two different types as shown in the figures below. The stands (Fig. 1 and 2) can be installed indifferently both in the standard (ambient temperature) chamber and in the environmental one.

Both stands have the same base to facilitate the replacement operations.

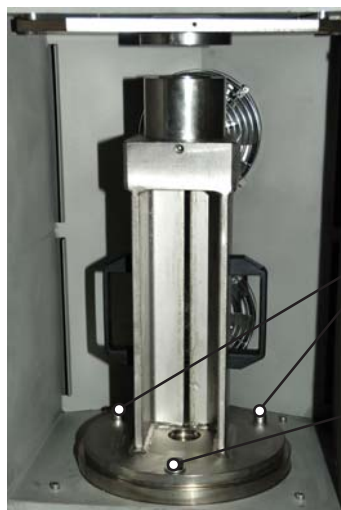


Fig. 1 - Fixed height stand

Allen screws
and
flat washers

Shoulder
screw



Fig. 2 - Adjustable height stand

! CAUTION ! (for environmental chamber only): before replace the stands make sure that the environmental chamber is at room temperature.

DISASSEMBLY

- ▶ a) Open the door of the chamber.
- ▶ b) Loosen and remove the Allen screws.
- ▶ c) Loosen and remove the shoulder screw.
- ▶ d) Lift manually the stand for about 2 cm just to disengage it from the centering hub and then remove (with precaution) the stand from the chamber.

ASSEMBLY

- ▶ a) Open the door of the chamber.
- ▶ b) Place (with precaution) the stand in the chamber. Lift it manually of about 2 cm and engage it on the centering hub.
- ▶ c) Turn the stand (if necessary) and visually align the hole for the shoulder screw.
- ▶ d) Tighten the shoulder screw.
- ▶ e) Tighten the Allen screws.

8.6.2 REPLACEMENT OF THE SPECIMEN FIXTURES

Authorized Personnel: **Operator**

 **Note:** for the specimen fixtures list refer to the **Appendix A** at the end of this document.

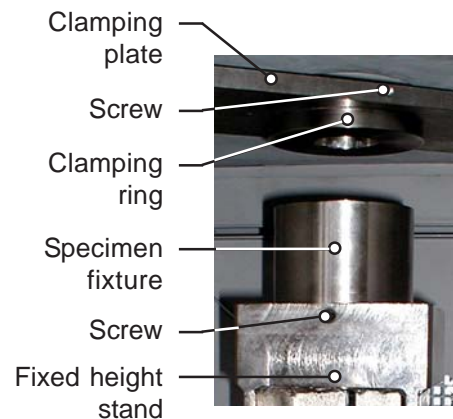
! **CAUTION ! (for environmental chamber only):** before replace the fixtures make sure that the environmental chamber is at room temperature.
When this is not possible, use a pair of thermally insulating gloves.

8.6.2.1 SPECIMEN FIXTURES FOR FIXED HEIGHT STAND

8.6.2.1.1 FIXTURES FOR PLATES AND FILMS

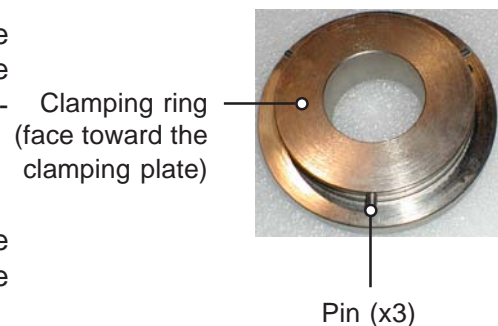
DISASSEMBLY

- ▶ a) Open the door of the chamber.
- ▶ b) Loosen the screw on the fixed height stands.
- ▶ c) Lift and remove the specimen fixture.
- ▶ d) Loosen the screw on the clamping plate.
- ▶ e) Turn the clamping ring until the pins are aligned with the slots and remove it from its seat.



ASSEMBLY

- ▶ a) Choose the correct specimen fixture and clamping ring according to the specimen shape, dimension and standard of reference (see Appendix A).
- ▶ b) Open the door of the chamber.
- ▶ c) Place the clamping ring against the clamping plate inserting the pins in the slots.
- ▶ d) Turn the clamping ring of a quarter of turn approx..
- ▶ e) Fasten the clamping ring with screw.
- ▶ f) Place the specimen fixture on top of the fixed height stand and fasten it with the screw.
- ▶ g) Place and visually center the specimen onto the specimen fixture on top of the fixed height stand.



8.6.2.1.2 FIXTURE FOR CHARPY TEST

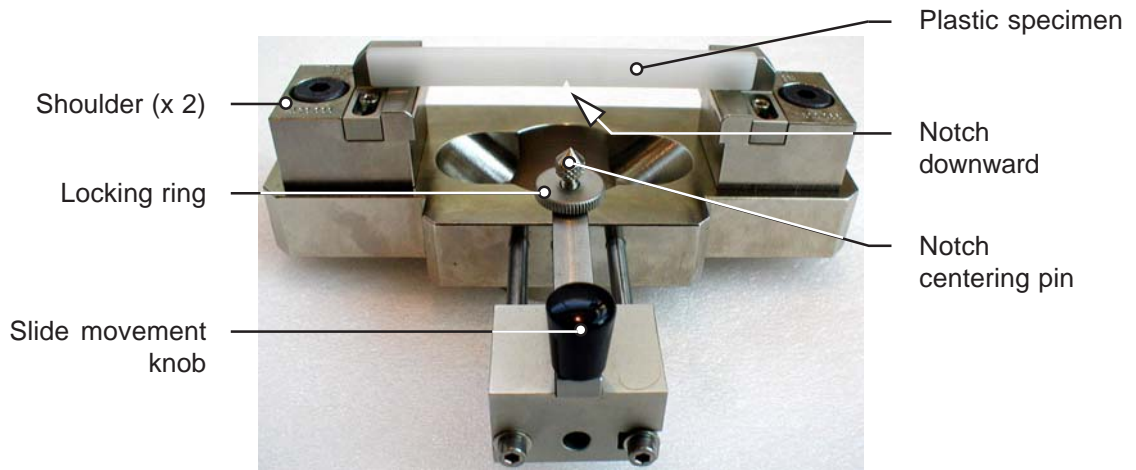


Fig. 1 A - Fixture configured for test

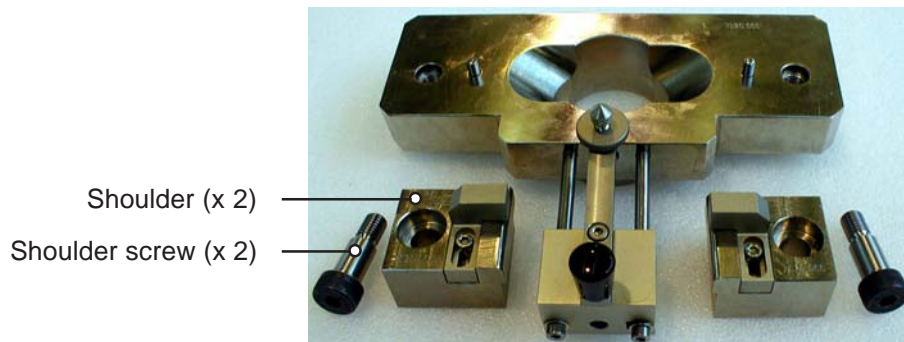


Fig. 1 B - Fixture with shoulders separate

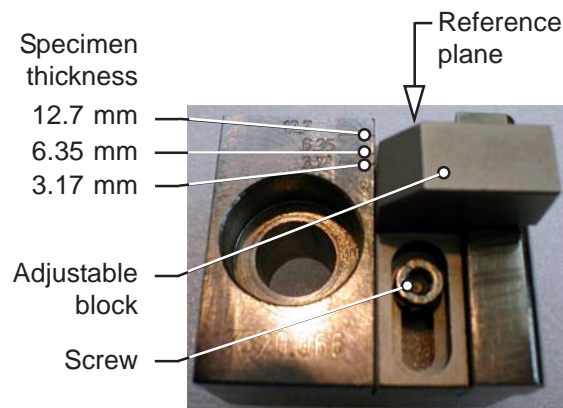


Fig. 1 C - Shoulder

Fig. 1 - Fixture for Charpy test with shoulders according to ASTM standards (notched plastic specimen)

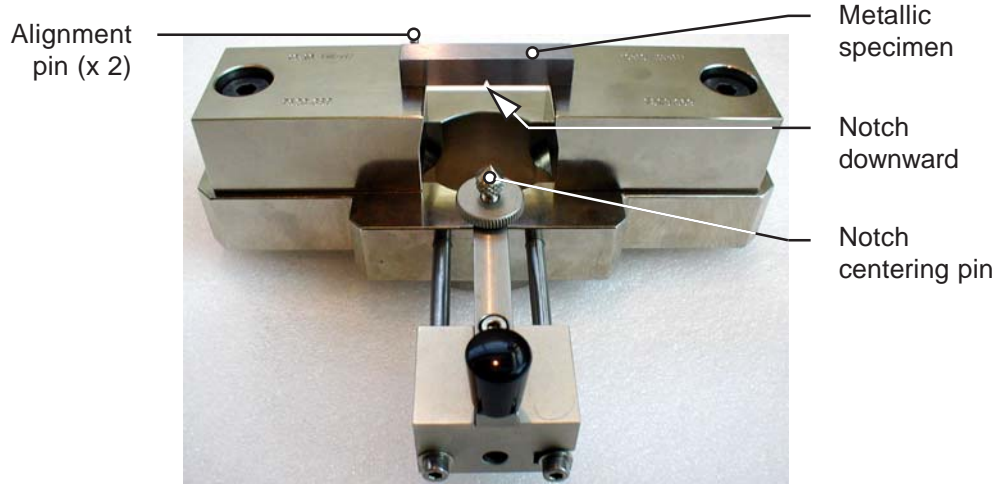


Fig. 2 - Fixture for Charpy test with shoulders according to ASTM E-23 standard (notched metallic specimen)

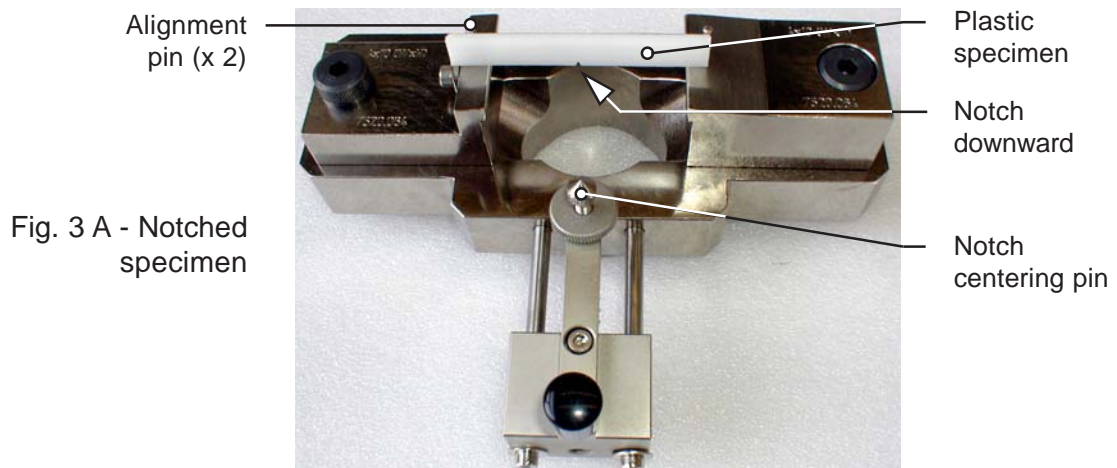


Fig. 3 A - Notched specimen

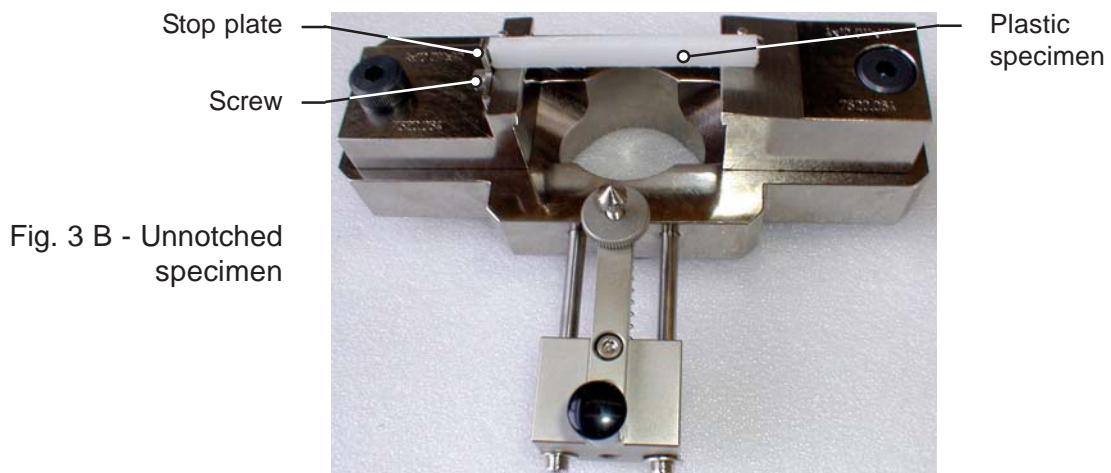


Fig. 3 B - Unnotched specimen

Fig. 3 - Fixture for Charpy test with shoulders according to ISO standards (notched and unnotched plastic specimens)

DISASSEMBLY


- ▶ a) Open the door of the chamber.
- ▶ b) Loosen the screw on the fixed height stands (see fig. below).
- ▶ c) Lift and remove the Charpy test fixture.

ASSEMBLY

Specimen shoulders

- ▶ a) Choose the correct pair of shoulders according to the specimen dimensions and standard of reference (see Appendix I and previous Fig. 1, 2 and 3).
- ▶ b) Remove the two shoulder screws fastening the shoulders (see fig. 1 B).
- ▶ c) Lift and remove the shoulders from the fixture and replace them with the chosen ones.
- ▶ d) Fasten the specimen shoulders with shoulder screws.
- ▶ e) For shoulders according to ASTM standards (notched plastic specimen) only:
 - Loosen the screws fastening the adjustable blocks (see fig. 1 C);
 - Align the reference plane of blocks with the line of the specimen thickness: 3.17, 6.35, 12.7 [mm];
 - Tighten the screws fastening the adjustable blocks.
- ▶ f) For shoulders according to ISO standards (notched plastic specimen) only:
 - Check that the stop plate is turned downward (see fig. 3 A).
- ▶ g) For shoulders according to ISO standards (unnotched plastic specimen) only:
 - Check that the stop plate is turned upward and secured with screw (see fig. 3 B).

Charpy Test Fixture

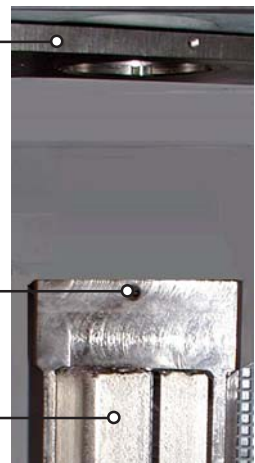
 **Note:** verify that the clamping plate is without clamping ring (see fig. to the right).

- ▶ h) Place the Charpy test fixture on top of the fixed height stand.
- ▶ i) Turn the Charpy test fixture until the pin enter in the slot of the stand. This pin allow to find quickly the correct position of the fixture.
- ▶ j) Fasten the Charpy test fixture with screw.

Clamping plate
without clamp-
ing ring

Screw

Fixed height
stand



Specimen

- ▶ k) Place the specimen (notched specimen with notch downward) against the adjustable blocks (fig. 1 A) or against the alignment pins (fig. 2 or 3 A). Push the notch centering pin forward and center the notch. For unnotched specimen use the stop plate.

8.6.2.1.3 FIXTURE FOR IZOD TEST

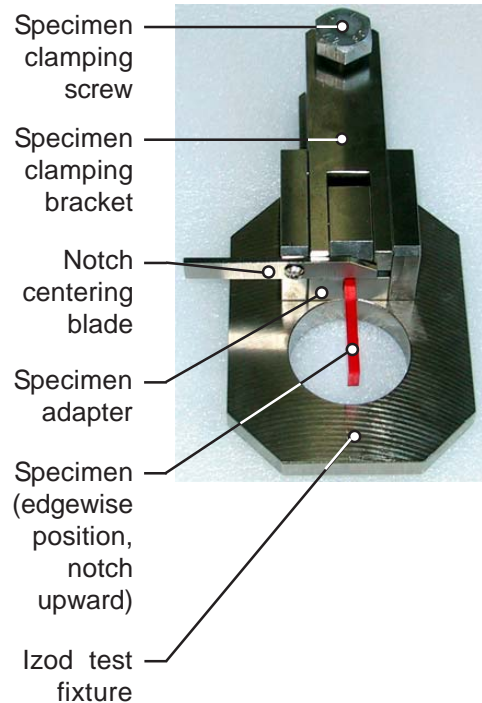
DISASSEMBLY

- ▶ a) Open the door of the chamber.
- ▶ b) Loosen the screw on the fixed height stands.
- ▶ c) Lift and remove the Izod test fixture.


ASSEMBLY

Specimen Adapter

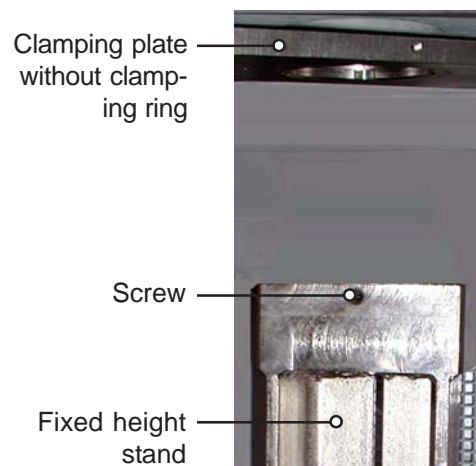
- ▶ a) Choose the correct specimen adapter according to the specimen dimensions and standard of reference (see Appendix A).
- ▶ b) Place the Izod test fixture on a table, loosen the specimen clamping screw until the bracket can be lifted allowing to remove the specimen adapter.
- ▶ c) Remove the two screws fastening the specimen adapter. They are located under the Izod test fixture.
- ▶ d) Lift and remove the specimen adapter from its seat and replace it with the chosen one.
- ▶ e) Fasten the specimen adapter with screws.



Izod Test Fixture

 **Note:** verify that the clamping plate is without clamping ring.




- ▶ f) Place the Izod test fixture on top of the fixed height stand.
- ▶ g) Turn the Izod test fixture until the pin enter in the slot of the stand. This pin allow to find quickly the correct position of the fixture.
- ▶ h) Fasten the Izod test fixture with screw.



Specimen

- ▶ i) Lift the specimen clamping bracket, insert the specimen (notch upward) in the slot of the specimen adapter and center the notch using the notch centering blade.
- ▶ j) Clamp the specimen with the clamping screw.

8.6.2.2 SPECIMEN FIXTURES FOR ADJUSTABLE HEIGHT STAND

-  **Note:** for the specimen fixtures list refer to the **Appendix A** at the end of this document.
-  **Note:** before to install any specimen fixtures on the adjustable height stand make sure that the fixtures adapter is already installed on it.
-  **Note:** before to install the “thousand holes plate” remove the fixtures adapter from the adjustable height stand.

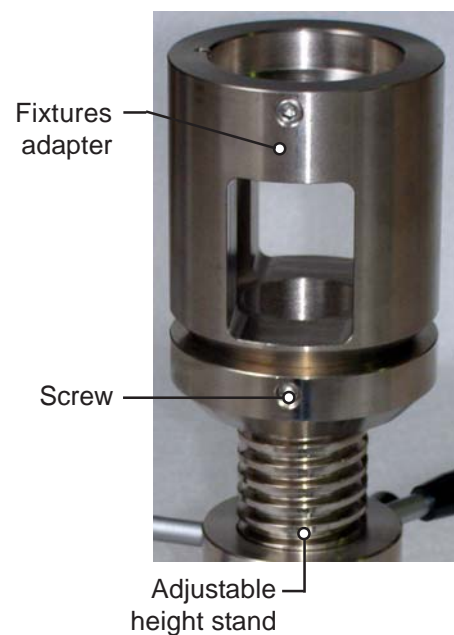
8.6.2.2.1 FIXTURES ADAPTER

DISASSEMBLY

- ▶ a) Open the door of the chamber.
- ▶ b) Loosen the screw.
- ▶ c) Lift and remove the fixture adapter from the adjustable height stand.

ASSEMBLY

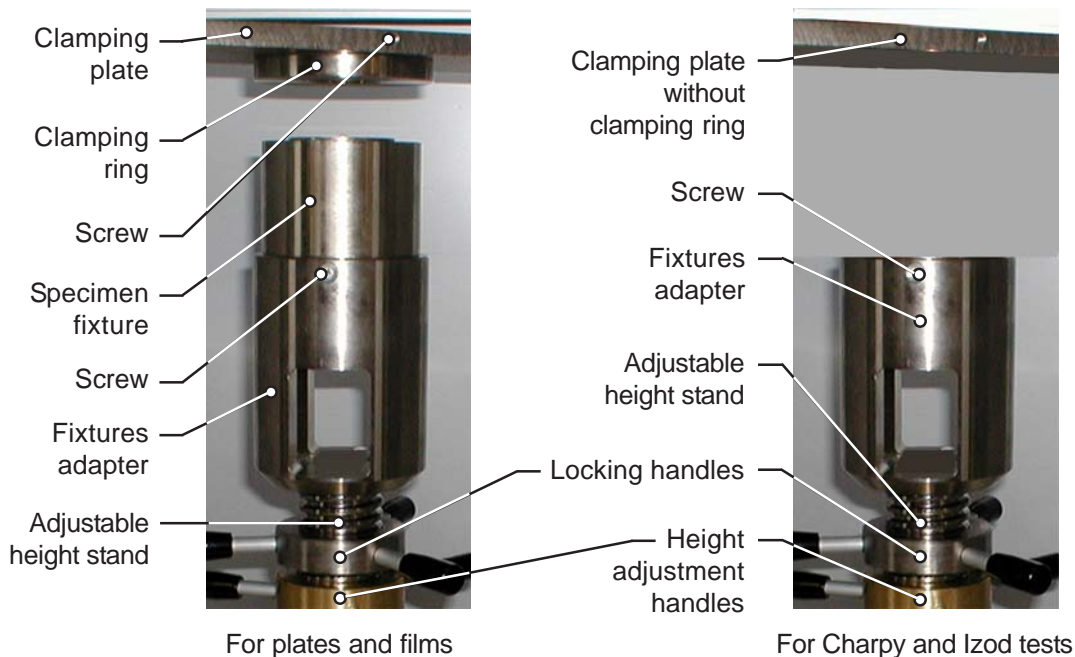
- ▶ a) Open the door of the chamber.
- ▶ b) Place the fixtures adapter on top of the adjustable height stand and engage the pin in the underlying hole.
- ▶ c) Tighten the screw.



8.6.2.2.2 FIXTURES FOR PLATES, FILMS, CHARPY AND IZOD TESTS

DISASSEMBLY

- ☞ **Note:** for the disassembly procedures follow the instructions of paras. 8.6.2.1.1 or 8.6.2.1.2 or 8.6.2.1.3.
- ☞ **Note:** the handles of the adjustable height stand are used to adjust the height (upward or downward) of the specimen fixture and to lock it in the chosen position.



ASSEMBLY

- ☞ **Note:** for the assembly procedures follow the instructions of paras. 8.6.2.1.1 or 8.6.2.1.2 or 8.6.2.1.3.
- ▶ a) At the end of the assembly operation (fixtures for plates, films, Charpy or Izod tests) and with the test specimen already installed on the fixture, proceed to determine the height between the upper surface of the specimen and the end of the striker.
- ▶ b) Unlock the locking handles.
- ▶ c) Completely lower the adjustable height stand using the height adjustment handles.
- ▶ d) Go to the “Service” menu (para. 8.5.14).
- ▶ e) Select the “Move to height” function (para. 8.5.17).
- ▶ f) Carry out the following calculation:

$$X = \text{Striker height [mm]} - 134 \text{ [mm]} + \text{Impact offset [mm]};$$
 where:
 - “Striker height” = 239 to 370 [mm];
 - “Impact offset” = -120 to 100 [mm].

- ▶ g) Enter the calculated value “X” as “Crosshead Position (z)” parameter in the “Move to height” function (see para. 8.5.17).
- ▶ h) *Alternative mode to paras. f) plus g):* enter “0” (zero) as “Striker Position” (**Hc** parameter, see para. 8.5.17).
- ▶ i) Press the “Start” key to positioning the striker.
- ▶ j) Adjust the height of the stand until the specimen surface touches the striker end.
- ▶ k) Lock the stand using the locking handles.
- ▶ l) Press the “Home” key to move the striker at the rest position.

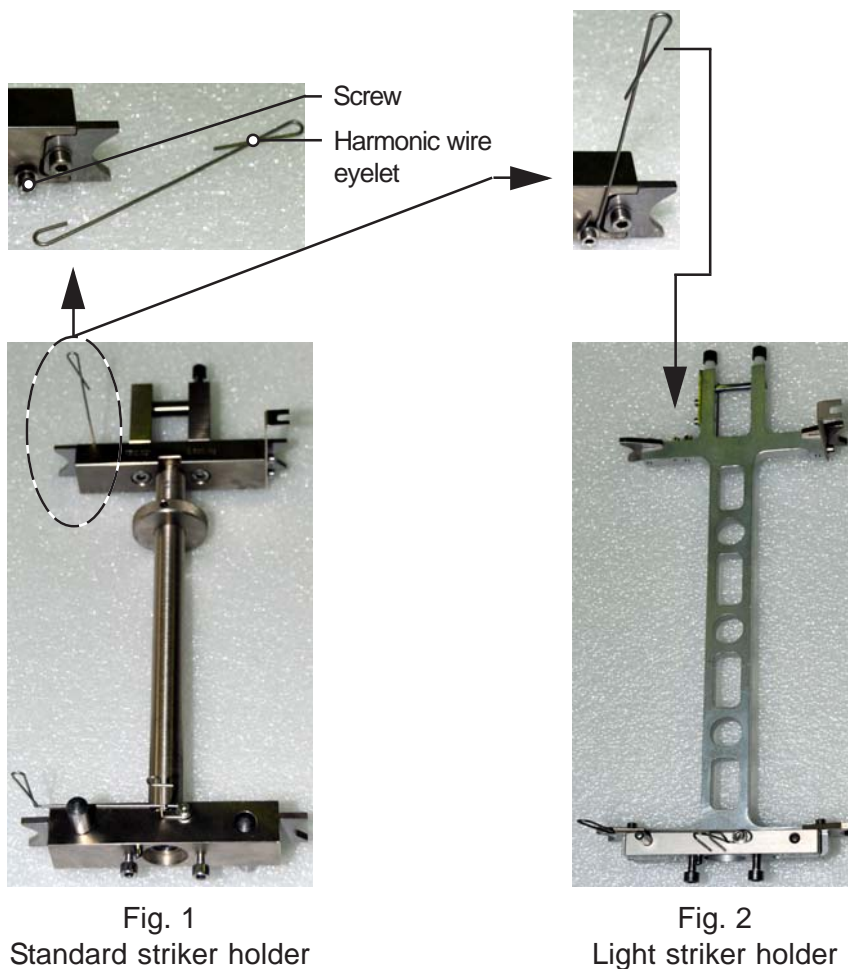
8.6.3 REPLACEMENT OF THE STRIKER HOLDER

Authorized Personnel: **Operator**



Note: for the striker holders weights refer to the tables of para. 8.6.4.

- ▶ - Check that the striker holder is free from weights and striker.
- ▶ - Fasten the harmonic wire eyelet to the striker holder using the screw and washer shown in the details below. The eyelet is normally removed when change the striker holder with the light one or when store the striker holder inside the wooden box (option).



DISASSEMBLY

- ▶ a) Release the striker using the proper command under “Service Menu”.
- ▶ b) Open the front door of the turret accessing to the lifting system, using the special key provided.
- ▶ c) Remove the screw fastening the guide plate on the upper left side of the striker holder and remove manually the guide plate moving the striker holder.
- ▶ d) Remove the striker holder from the guide columns of the instrument and place it on a table.

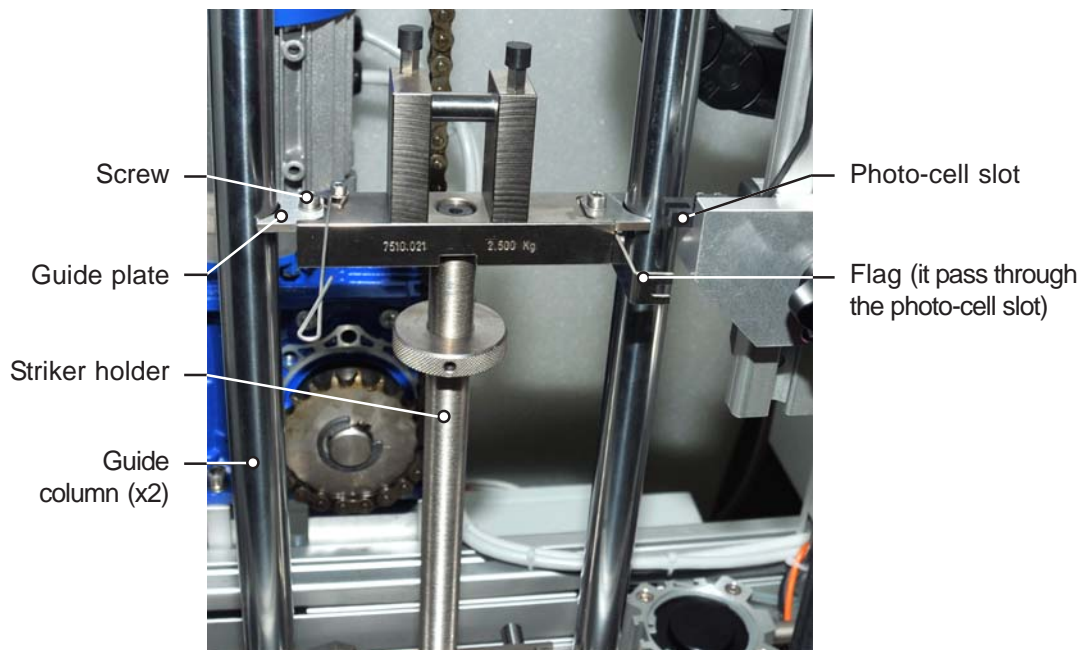


Fig. 3
Standard striker holder installed on the instrument

ASSEMBLY

- ▶ a) Open the front door of the turret accessing to the lifting system, using the special key provided.
- ▶ b) Choose the correct striker holder according to the specimen type, dimension and standard of reference. Striker holder can be of two different types: light (Fig. 2) or standard (Fig. 1).
- ▶ c) Check that the striker holder is free from combinable weights and striker.
- ▶ d) Place the striker holder on a table.
- ▶ e) Remove the screw and guide plate from the upper left side of the striker holder.
- ▶ f) Place the striker holder between the two guide columns of the instrument, ensuring that the flag is positioned on the right side.
- ▶ g) Fit the guide plate in the slots of the striker holder and fasten it with screw.
- ▶ h) Check that the striker holder travels freely between the guides and the flag passes freely through the photocell slot.
- ▶ i) Engage the striker holder in the hole of the striker lifter in automatic way following the instructions below:
 - Close the door of the turret;
 - Press the “Power ON” button;
 - Press the “Home” key and wait the automatic recovery and repositioning of the striker holder.

8.6.4 REPLACEMENT OF THE WEIGHTS

Authorized Personnel: **Operator**

DISASSEMBLY

- ▶ a) Open the front door of the turret accessing to the lifting system, using the special key provided.
- ▶ b) Remove the combinable weights from the striker holder:

- *Standard striker holder:*

- Unscrew the ring nut by hand (Fig. 1);
- Lift and remove one weight (Fig. 3) at a time until the striker holder is unloaded. Each weight is connected to the underneath one by two pins.



Note: avoid unbalancing movements toward the operator during the removal operation that can cause the accidental drop of the weights.

- *Light striker holder:*

- Remove the screw (Fig. 2);
- Remove the weight (Fig. 4, each weight is separable in two parts).
- Remove all the weights until the striker holder is unloaded



Fig. 1

Standard striker holder
with combinable weights

(for masses 3 to 37 kg, striker not included)

Striker holder
Screw (x3)
Ring nut
Combinable weights

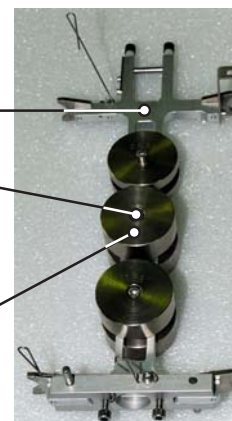


Fig. 2

Light striker holder
with combinable weights

(for masses 1 to 3.5 kg, striker not included)



Fig. 3

Combinable weight for
standard striker holder



Fig. 4

Combinable weight for
light striker holder

STRIKER HOLDER (STANDARD TYPE) CONFIGURATION			
Nr	Description	Weight [kg]	Q.ty
1	Striker Holder	2.5	1
2	Striker	see Appendix B	1
3	Mass	0.5	1
4	Mass	1 (each)	2
5	Mass	2	1
6	Mass	5 (each)	3
7	Mass (option)	5 (each)	3

STRIKER HOLDER (LIGHT TYPE) CONFIGURATION			
Nr	Description	Weight [kg]	Q.ty
1	Striker Holder	0.5	1
2	Striker	see Appendix B	1
3	Mass	0.5	1
4	Mass	1 (each)	2

ASSEMBLY

- ▶ a) Open the front door granting access to the lifting system, using the special key provided.
- ▶ b) Install the combinable weights on the striker holder:
 - *Standard striker holder:*
 - Unscrew the ring nut by hand (Fig. 1);
 - Lift and install one weight (Fig. 3) at a time on the striker holder until to obtain the mass needed. The first weight must be engaged on the two pins located on the striker holder. Each weight added subsequently must be engaged on the pins of the underneath one;
 - ☞ **Note:** avoid unbalancing movements toward the operator during the weights installation operation that can cause the accidental drop of the weights.
 - Tighten strongly the ring nut against the upper weight by hand.
 - *Light striker holder:*
 - Separate each weight (Fig. 4) in two parts after removing the screw;
 - Insert one part of the weight from the back of the striker holder through one of the existing holes (Fig. 2).
Place the second part of the weight on the first one and fasten it with screw;
 - Install the remaining two weights if necessary.

8.6.5 REPLACEMENT OF STRIKER

Authorized Personnel: **Operator**

 **Note:** for the Strikers Technical Features refer to the **Appendix B** at the end of this document.

DISASSEMBLY

- ▶ a) Open the front door of the turret accessing to the lifting system, using the special key provided.
- ▶ b) If the striker is of instrumented type (Fig. 1) unscrew the connector of the striker signal cable from the panel of the DAS (Data Acquisition System).
- ▶ c) Disengage the clamp (Fig. 2, detail D) and remove the cable from the slot.
- ▶ d) Disengage the signal cable holder from the clamp, pulling it downward (Fig. 2, detail B).
- ▶ e) Disengage the striker signal cable from the three harmonic wire eyelets (Fig. 2) (these parts are attached to the striker holder).
- ▶ f) Remove the two screws fastening the striker
- ▶ g) Remove the striker from the striker holder.



Fig. 1 - Instrumented striker
(usable with both striker holder)

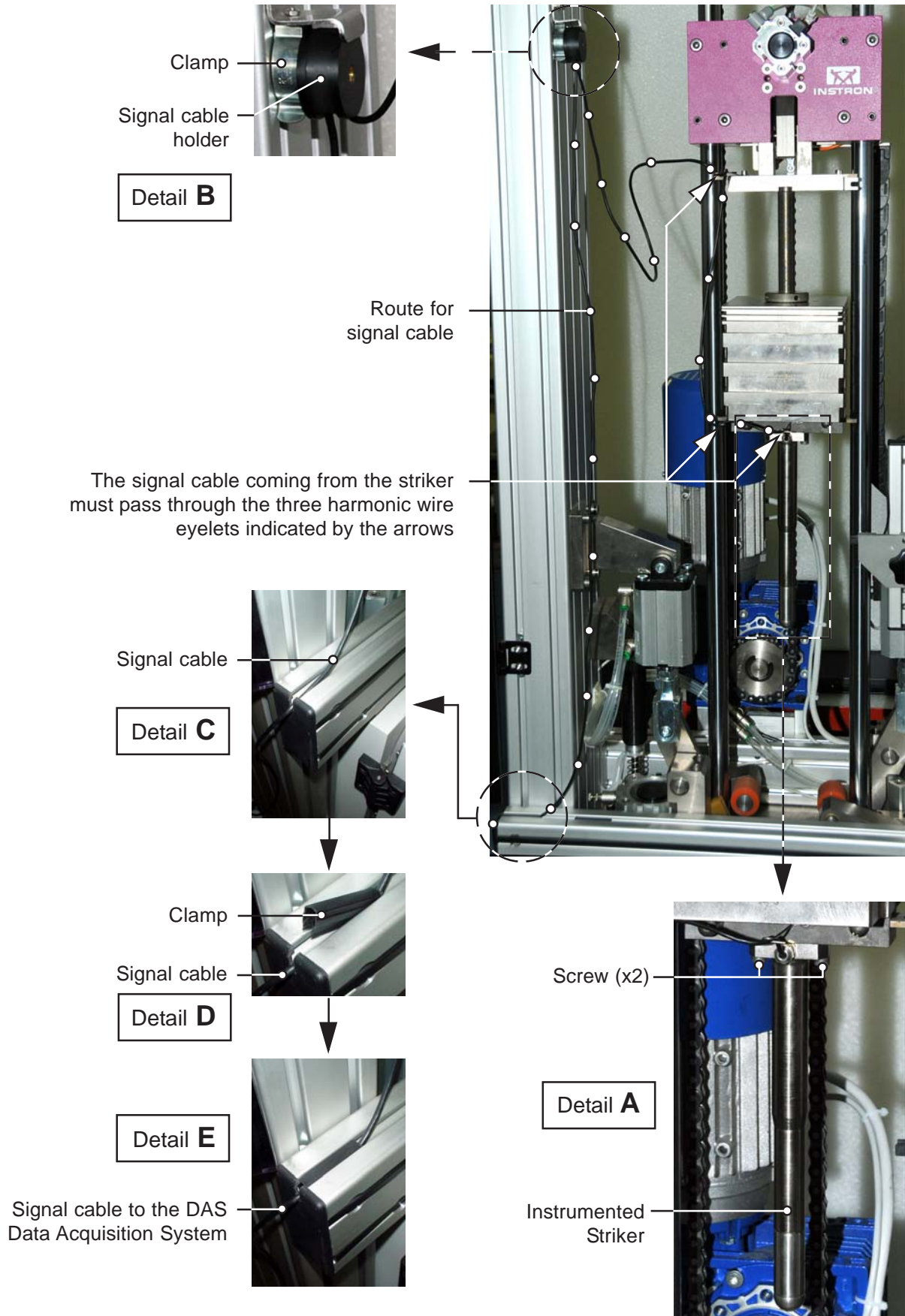


Fig. 2 - Instrumented striker installed on the instrument

ASSEMBLY

- ▶ a) Open the front door of the turret accessing to the lifting system, using the special key provided.
- ▶ b) Place the instrumented striker against the striker holder (Fig. 2, detail A) centering the existing pins and making sure that the signal cable is facing to the front of the instrument (check not required when install a striker not instrumented).
- ▶ c) Fasten the striker with screws.
- ▶ d) Insert the signal cable in the three harmonic wire eyelets (Fig. 2).
- ▶ e) Extend the signal cable following the route shown in Fig. 2 and fasten the cable holder with the clamp (Fig. 2, detail B) pushing it upward.
- ▶ f) Continue with the signal cable downward and insert it in the slot outside (Fig. 2, detail C) on the left side of the turret.
- ▶ g) Fasten the signal cable to the structure using the clamp (Fig. 2, detail D).
- ▶ h) Screw the connector of the signal cable on the rear panel of the DAS (Data Acquisition System, see para. 7.1 for connection).



- Notes:**
- *Make sure that the signal cable of the striker is long enough to guarantee the striker stroke up to the maximum height.*
 - *Check that the striker signal cable is far enough from the cylinder (on the left side of turret) of antirebound system avoiding to cut the cable during the movement of the antirebound crosshead or during the striker repositioning.*

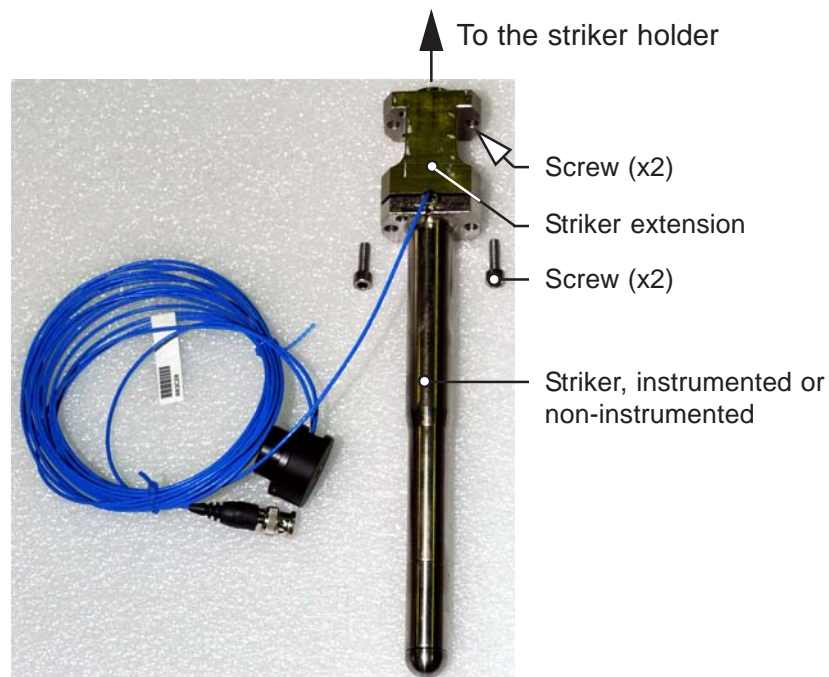
8.6.6 REPLACEMENT OF THE STRIKER EXTENSION

Authorized Personnel: **Operator**

The striker extension code 7510.028 (weight 0.5 kg) allows to increase of 60 mm the penetration of the striker in the test specimen. It is normally used for tests on films and it can be used with all strikers.

DISASSEMBLY

- ▶ a) Open the front door of the turret accessing to the lifting system, using the special key provided.
- ▶ b) Remove the two screws fastening the striker extension.
- ▶ c) Remove the striker extension from the striker holder.
- ▶ d) Remove the two screws fastening the striker.
- ▶ e) Remove the striker from the striker extension.



ASSEMBLY

- ▶ a) Open the front door of the turret accessing to the lifting system, using the special key provided.
- ▶ b) Place the striker against the striker extension making sure that the signal cable is turned up as shown in the previous figure (check not required when install a non-instrumented striker).
- ▶ c) Fasten the striker to the striker extension with screws.
- ▶ e) Place the striker extension against the striker holder.
- ▶ f) Fasten the striker extension with screws.



Note:- The addition of the striker extension can cause interference between the striker head and the special-purpose tooling installed on the adjustable height stand.

8.6.7 REPLACEMENT OF THE STRIKER'S HEADS (interchangeable head type)

Authorized Personnel: **Operator**

 **Note:** for the Strikers Technical Features refer to the **Appendix B** at the end of this document.

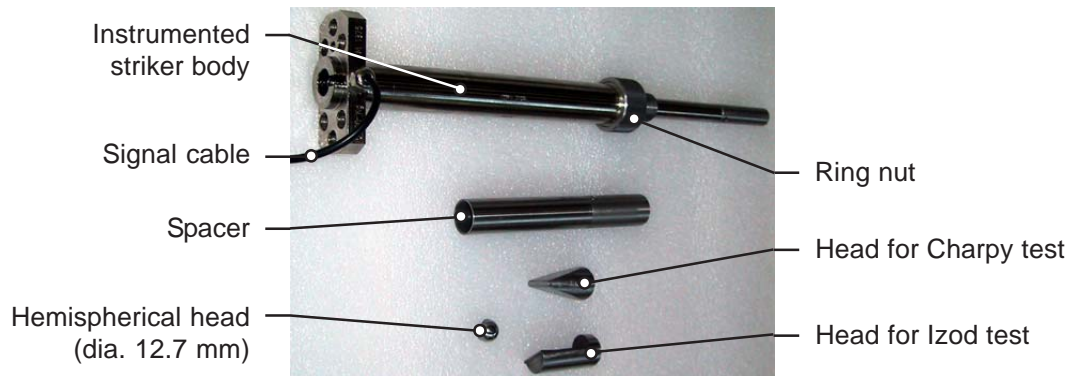


Fig. 1 - Instrumented striker with interchangeable heads

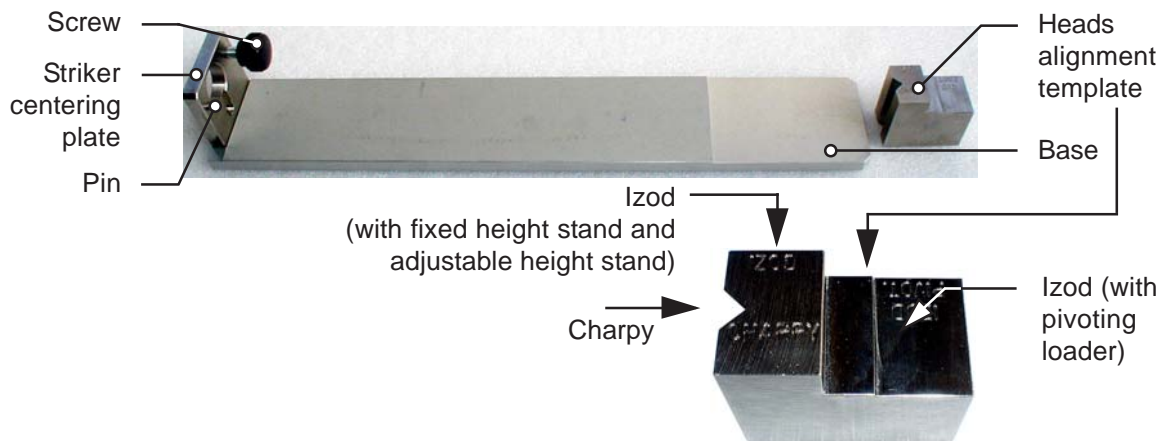


Fig. 2 - Fixture to align the Charpy and Izod heads to the striker body (optional device)

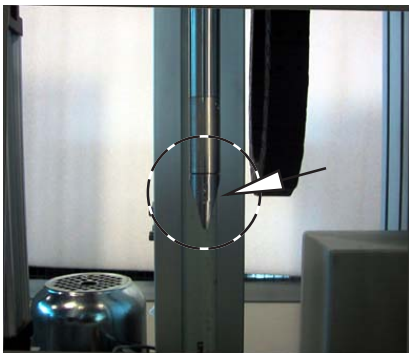


Fig. 3 - Striker with Charpy head installed on CEAST 9340

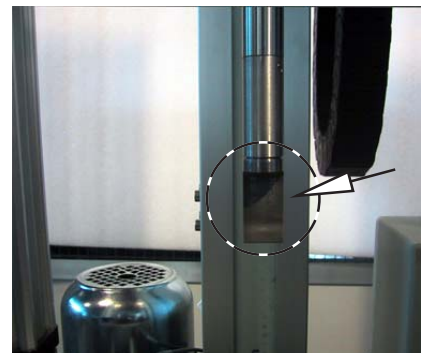


Fig. 4 - Striker with Izod head installed on CEAST 9340

DISASSEMBLY

Disassembly of the interchangeable heads (Charpy, Izod or hemispherical)

- ▶ a) Place the striker against the centering plate centering the existing pin (Fig. 5) and fasten it with screws.
- ▶ b) Unscrew the head by hand and remove it from the striker body (Fig. 6). Alternatively, loosen the head using the pins (Fig. 6a).

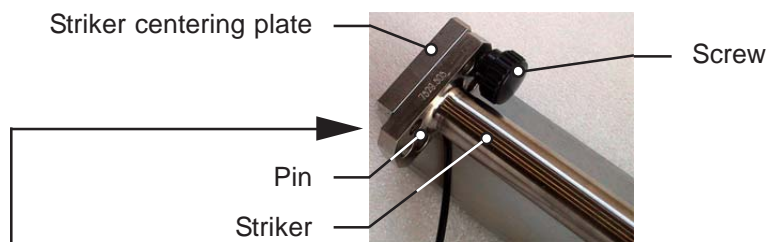


Fig. 5 - Detail of the striker fastened to the centering plate

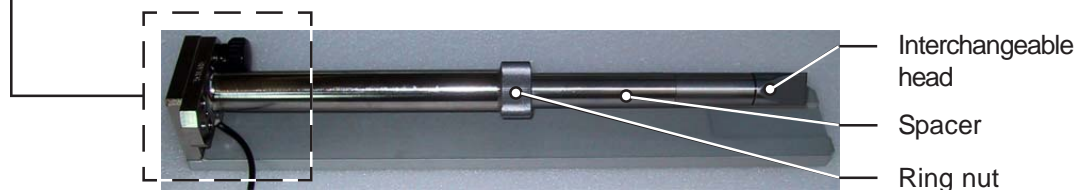



Fig. 6 - Striker fastened to the fixture



Fig. 6a - Hemispherical head

ASSEMBLY

Assembly the interchangeable head (Charpy, Izod or hemispherical)

- ▶ a) Place the striker against the centering plate centering the existing pin (Fig. 5) and fasten it with screw. Skip this step if the striker is already installed on the fixture.
-  **Note:** after the above operation make sure that the ring nut is strongly tighten.
- ▶ b) **Hemispherical head**
 - 1) Before to install the 12.7 mm O.D. head, unscrew and remove the spacer from the striker body (Fig. 7). On the contrary, leave it in place for 20 mm O.D. head.
 - 2) Screw the head to the striker body end by hand.

3) Alternatively, fasten the head to the striker body end using the pins (Fig. 7a).



Fig. 7 - Striker body fastened to the fixture without head and spacer

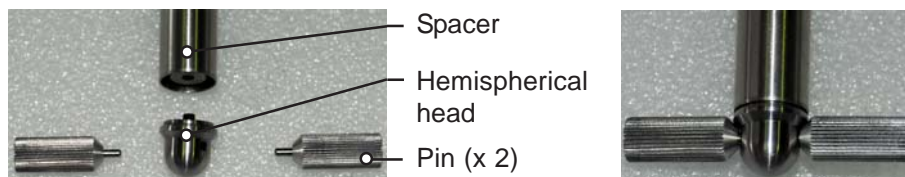


Fig. 7a - Hemispherical head

► **c) Charpy head**

- 1) Insert and screw the spacer to the striker body (Fig. 8) by hand. Skip this step if it is already installed.
- 2) Screw and tighten the Charpy head to the striker body by hand.
- 3) Loosen and unscrew the ring nut until the spacer is very near to the Charpy head (not in contact).
- 4) Place the head alignment template with the notch toward the Charpy head.
- 5) Turn the Charpy head until the cisel end is aligned with the notch of the template.
- 6) Hold the Charpy head in position and tighten the ring nut.

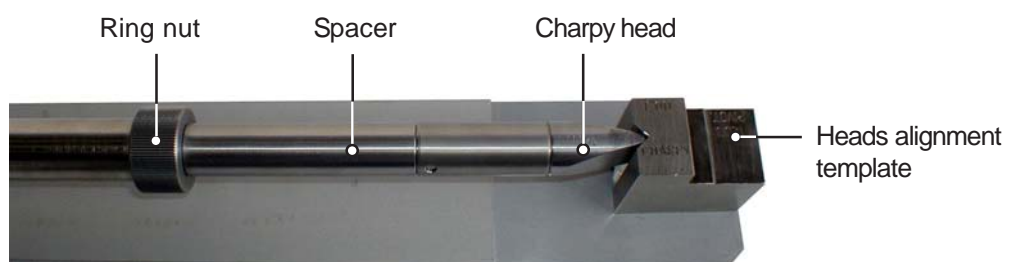


Fig. 8 - Striker with the Charpy head aligned


► d) Izod head

- 1) Insert and screw the spacer to the striker body (Fig. 9) by hand. Skip this step if it is already installed.
- 2) Screw and tighten the Izod head to the striker body by hand.
- 3) Loosen and unscrew the ring nut until the spacer is very near to the Izod head (not in contact).
- 4) Place the template against the Izod head as shown in the Fig. 10. Turn the edge of the Izod head until it is in contact with the flat surface of the template (marked Izod).
- 5) Hold the Izod head in position and tighten the ring nut.



Fig. 9 - Striker with the Izod head aligned

8.7 PREPARING THE INSTRUMENT FOR TENSILE-IMPACT TEST ONLY

 **Note:** the stand (Fig. 1) can be installed indifferently both in the standard (ambient temperature) chamber and in the environmental one.

! CAUTION ! (for instrument equipped with environmental chamber only):

- Before replace the stand, force sensor, vice and specimen clamping, make sure that the environmental chamber is at room temperature.
- When the chamber is at low or high temperature, change the specimens using thermally insulated gloves to avoid burning your hands.
- The temperature range used for Tensile-Impact tests must be: - 50 to 120 °C.


8.7.1 PROGRAM SETTING

Authorized Personnel: **Operator**

Before installing the equipment for the “Tensile Impact tests” on the instrument, perform the following “Parameters setting” in the program.

- ▶ a) **“Support Type”** parameter: select **“V”** (see para. 8.5.5, vid. 1a and step 2).
- ▶ b) **“Impact Offset”** parameter: enter the value shown in the table below according to the specimen type (see para. 8.5.5, vid. 1b and step 15).

Standard	Specimen Type	"Impact Offset" parameter [mm]
ISO 8525 Method A	1 and 3	- 67
	2 and 4	- 54
	5	- 77

 **Note:** before installing the equipment for the “Tensile-Impact tests”, remove the clamping plate from the chamber as shown in the figure below.



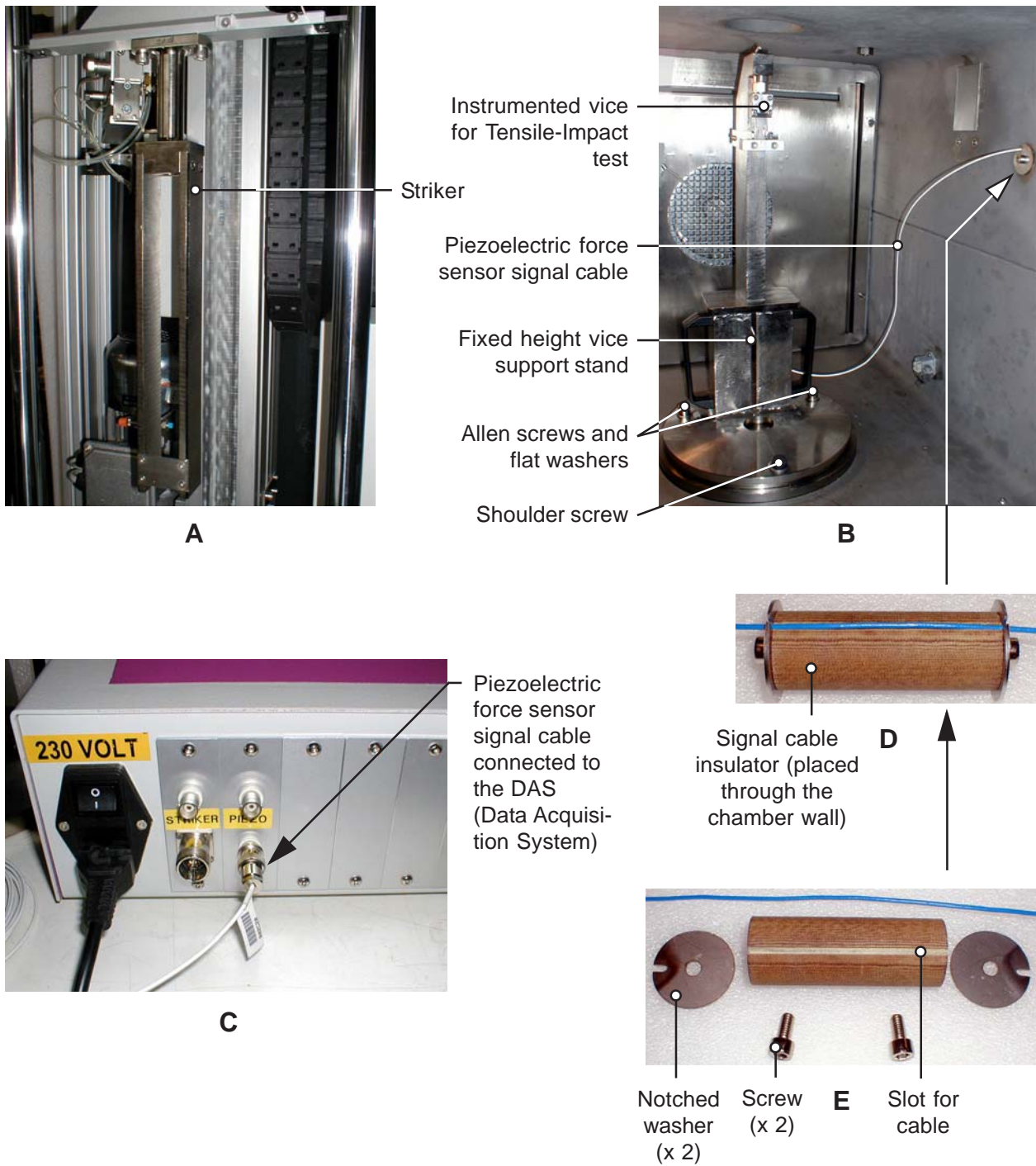


Fig. 1 - Instrument configured for Tensile-Impact test.

8.7.2 REPLACEMENT OF THE FIXED HEIGHT VICE SUPPORT STAND

Authorized Personnel: **Operator**

DISASSEMBLY

- ▶ a) Disconnect the signal cable of the piezoelectric force sensor from the DAS (Fig. 1C).
- ▶ b) Open the chamber door.
- ▶ c) Remove the collecting box from the chamber (Fig. 2).
- ▶ d) Remove the screws and notched washers fastening the insulator (Fig. 1B, D and E). It passes through the wall of the chamber. One screw is placed inside the chamber while the other is outside.
- ▶ e) Remove the signal cable insulator (Fig. 1D) together with the cable from the wall of the chamber and remove the cable from the insulator slot. The cable with connector must be placed on the chamber floor.
- ▶ f) Loosen and remove the Allen screws and flat washers (Fig. 1B).
- ▶ g) Loosen and remove the shoulder screw (Fig. 1B).
- ▶ h) Lift manually the stand for about 2 cm just to disengage it from the centering hub and then remove (with precaution) the stand from the chamber using the handles.

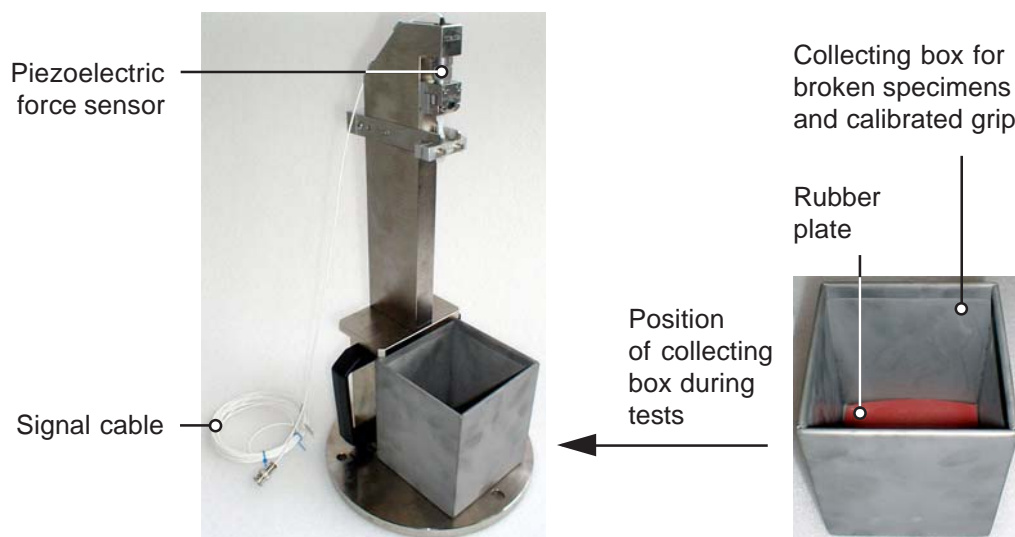



Fig. 2 - Fixed height vice support stand

ASSEMBLY

- ▶ a) Open the chamber door.
- ▶ b) Place (with precaution) the stand in the chamber. Lift it manually of about 2 cm and engage it on the centering hub. During this operation be careful do not damage the signal cable of the piezoelectric force sensor.
- ▶ c) Turn the stand (if necessary) and visually align the hole for the shoulder screw (Fig. 1B).
- ▶ d) Tighten the shoulder screw.
- ▶ e) Tighten the Allen screws.
- ▶ f) Pass the signal cable with connector through the hole of the chamber (see arrow of Fig. 1B). Verify that the cable which remain in the chamber is not stretched.
- ▶ g) Fasten a screw with a notched washer on the signal cable insulator (Fig. 1 D and E) making sure that the notch of the washer is aligned with the slot of the insulator.
- ▶ h) Place the signal cable in the slot of the insulator and then insert the insulator free end through the chamber wall.
- ▶ i) Fasten the insulator to the chamber using the remaining screw and notched washer (Fig. 1B, D and E) making sure that the notch of the washer is aligned with the slot of the insulator and it does not turn from this position when you tighten the screw, otherwise there is a risk to cut the signal cable.
- ▶ j) Place the collecting box onto the base of the vice support stand (Fig. 2).

8.7.3 REPLACEMENT OF THE PIEZOELECTRIC FORCE SENSOR

Authorized Personnel: **Operator**

 **Note:** the replacement of a piezoelectric force sensor with another one having different force range (e.g.: from 2.2 N to 0.45 N or vice versa) can be done without removing the signal cable from the chamber.

DISASSEMBLY

- ▶ a) Push the sliding stop plate backward as shown in the Fig. 2A.
- ▶ b) Loosen the screws, turn the clamps and free the signal cable (Fig. 3).
- ▶ c) Loosen the piezoelectric force sensor using the open wrench (Fig. 2B).
- ▶ d) Unscrew the force sensor by hand and in the mean time turn the signal cable together with the sensor, avoiding to damage it.
- ▶ e) Unscrew and disconnect the force sensor from the signal cable (Fig. 2A). The cable must remain in place as shown in the Fig. 2A.

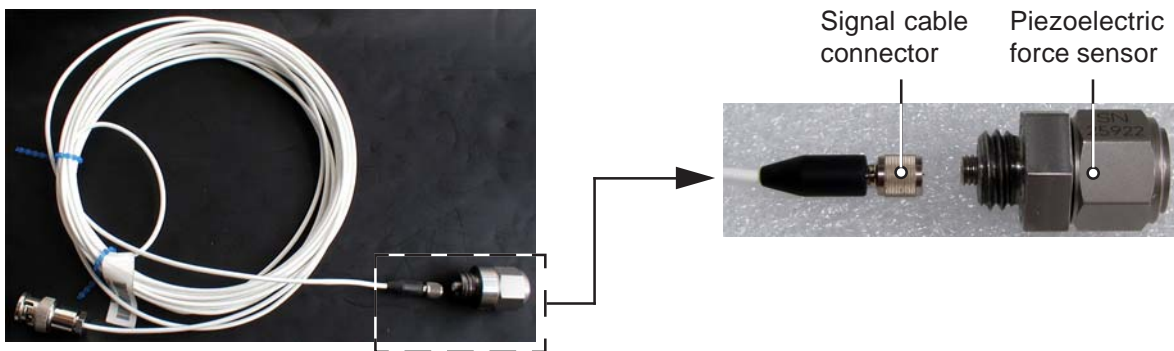


Fig. 1 - Piezoelectric force sensor with signal cable

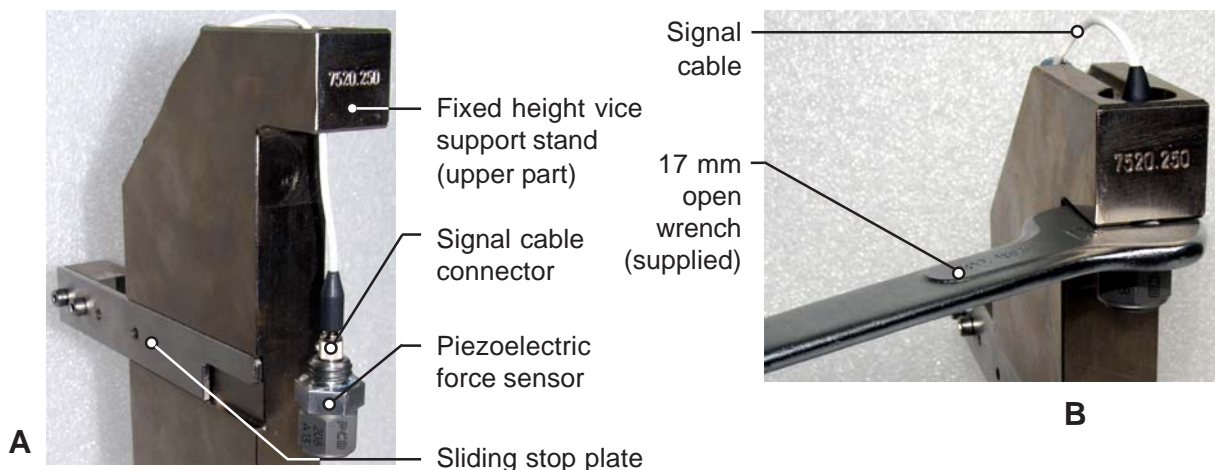


Fig. 2 - Piezoelectric force sensor assembly

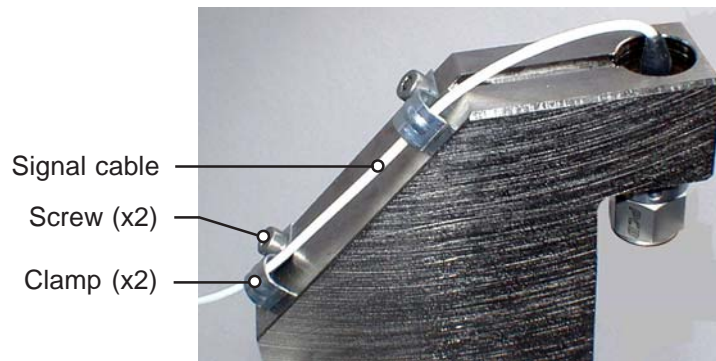


Fig. 3 - Signal cable clamping

ASSEMBLY

- ▶ a) Choose the correct range of the force sensor (2.2 kN or 0.45 kN) to be installed.
- ▶ b) Push the sliding stop plate backward as shown in the Fig. 2A.
- ▶ c) Screw the force sensor to the sensor cable (Fig. 2 A).
- ▶ d) Put some drops of sealing compound (type Loctite 243, medium-strong) on the thread of the force sensor (Fig. 2A).
- ▶ e) Screw the force sensor by hand and in the mean time turn the signal cable together with the sensor, avoiding to damage it. (Fig. 2B).
- ▶ f) Tighten the force sensor using the open wrench (Fig. 2B).
- ▶ g) Pass the signal cable inside the clamps and fasten them with screws.

8.7.4 REPLACEMENT OF THE INSTRUMENTED VICE FOR TENSILE-IMPACT

Authorized Personnel: **Operator**



Note: for the identification codes of parts shown in fig. 1 below refer to the **Appendix F** at the end of this document.

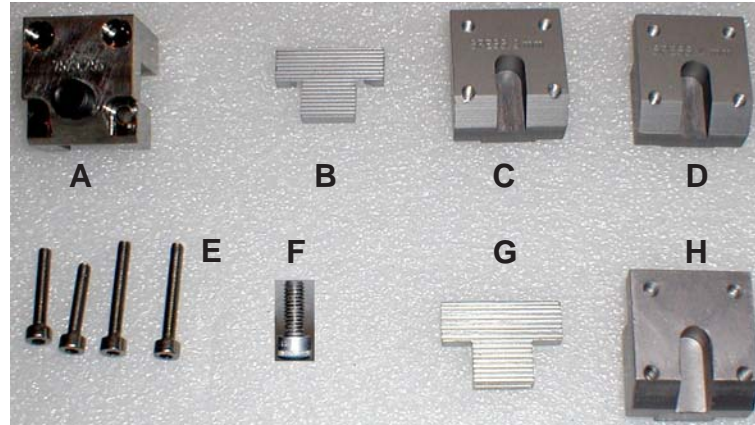
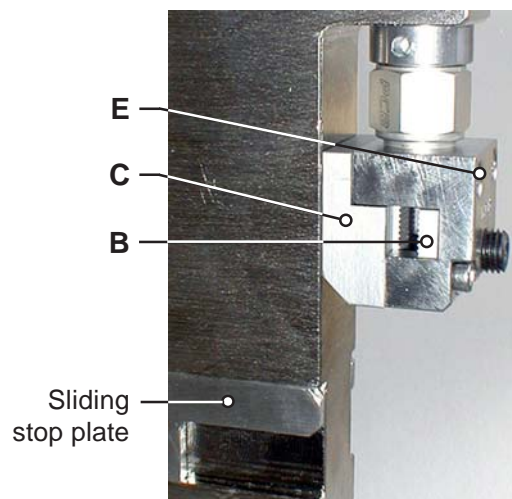


Fig. 1 - Example of clamping for rigid specimens according to ISO 8256 standard, method A, type 1 and 3 for tensile impact vice complete with 3 sets of gripping adapters:

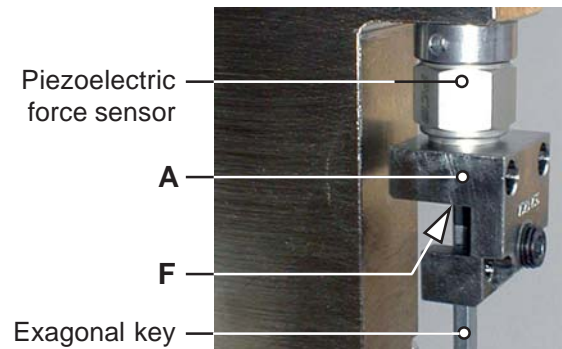
- A, B, C, E, F: for rigid specimens, thickness 3 mm;
- A, B, D, E, F: for rigid specimens, thickness 4 mm;
- A, E, F, G, H: for films only.

DISASSEMBLY

- ▶ a) Push the sliding stop plate backward as shown in the figure to the right side.
- ▶ b) Remove the screws **E** (x4) and remove the adapter **C** from downward.
- ▶ c) Remove the plate **B**.

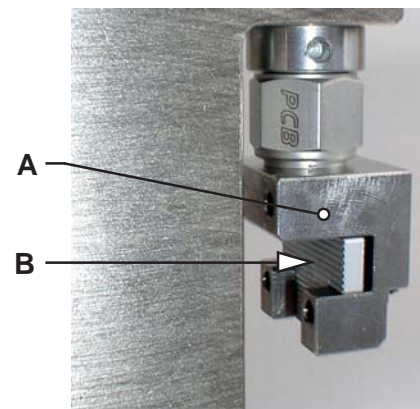
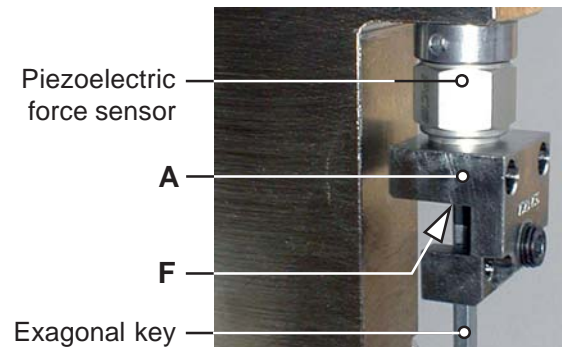


- ▶ d) Remove the screw **F** and remove the adapter **A** from the force sensor.

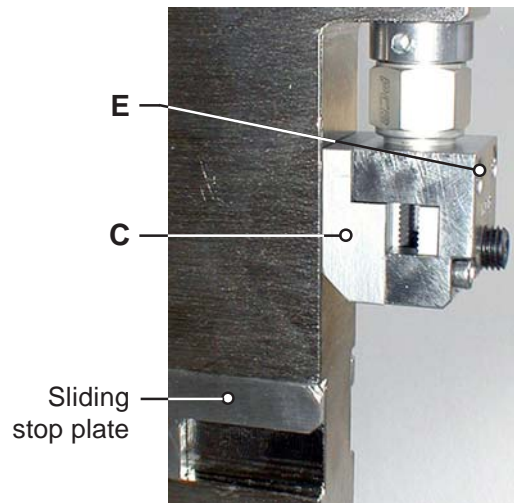


ASSEMBLY

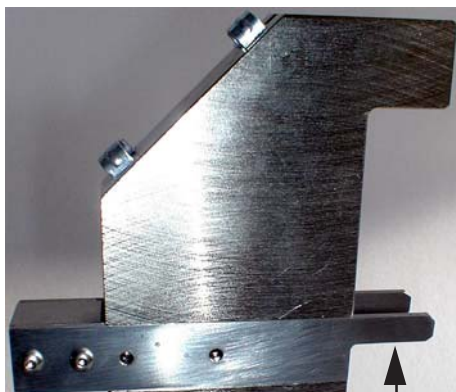
- ▶ a) Choose the set of gripping adapters to be installed on the vice according to the specimen type and thickness (see Fig. 1, para. 8.7.4 and Appendix G).
- ▶ b) Fasten the adapter **A** to the force sensor using the screw **F**. The adapter surface must be visually aligned with the upper part of the fixed height vice support stand.
- ▶ c) Insert the plate **B** in the adapter **A** checking that the knurled surface is turned toward the arrow.



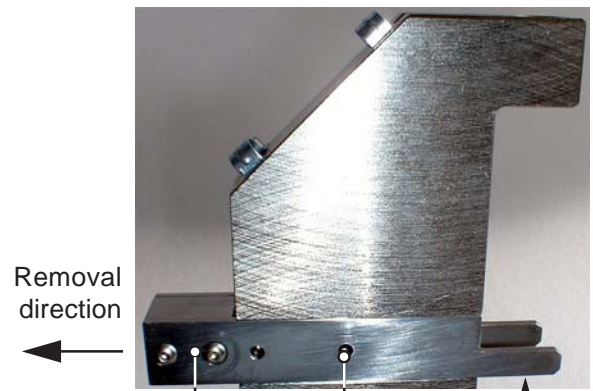
- ▶ d) Insert the adapter **C** from downward and fasten it with screws **E**.
- ▶ e) Tighten the screws of the stop plates.



- ▶ f) Place the sliding stop plate in the correct position according to the chosen specimens type.
To change the plate position: remove the plate from the guide, overturn it and place it in the new position.



Position for specimens type 2 and 4



Removal direction

Sliding stop plate Springing ball (2 for each side) Position for specimens type 1, 3 and 5

8.7.5 REPLACEMENT OF THE TENSILE-IMPACT SPECIMEN

Authorized Personnel: **Operator**

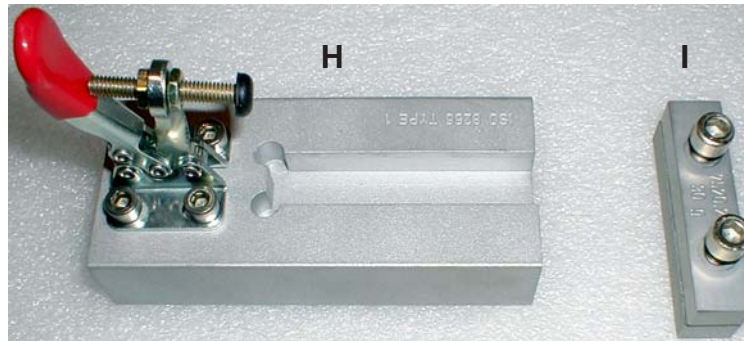
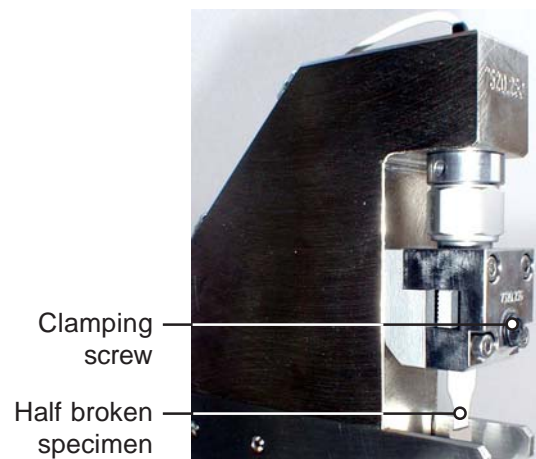


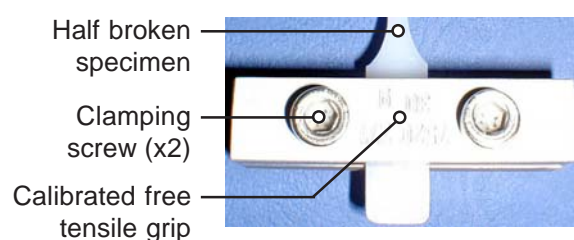
Fig. 1 - H: Specimen holding fixtures: one for specimens type 1, one for specimens type 2 and 4 and one for specimens type 4.
 - I: Calibrated free tensile grips, 30 g, for rigid specimens according to ISO 8256 standard, method A, type 1, 2, 3 and 4. Specimen thickness from 3 to 4 mm.

DISASSEMBLY

- ▶ a) After test, loosen the clamping screw and remove the broken specimen from downward.

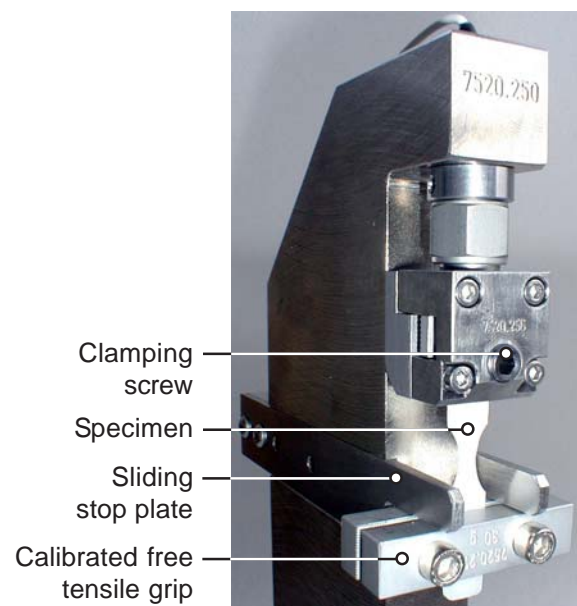
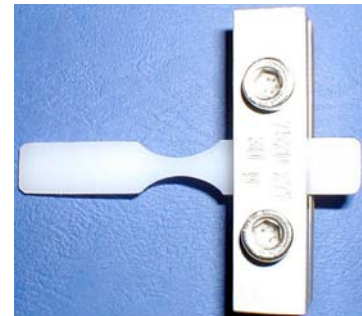
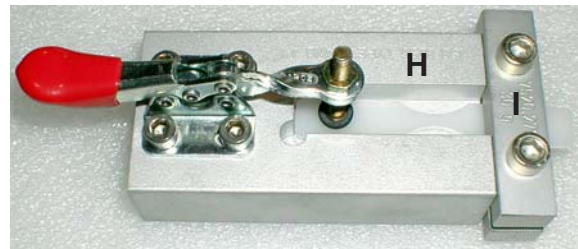
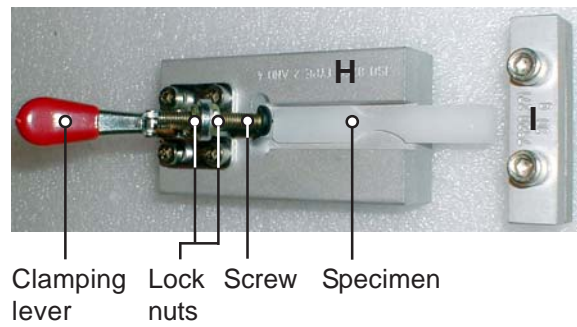


- ▶ b) After test, pick up the calibrated free tensile grip from the collecting box (see Fig. 2, para 8.7.2).
- ▶ c) Loosen the screws and remove the broken specimen.



ASSEMBLY

- ▶ a) Choose the specimen holding fixture **H** and the calibrated free tensile grip **I** according to the specimen type and thickness (see Appendix G).
- ▶ b) Open the clamping lever.
- ▶ c) Place the specimen in the proper seat of the fixture and push it to the left until it stops against the fixture.
- ▶ d) Close the clamping lever and check that the specimen is clamped. If the specimen is not clamped, unlock the lock nuts, adjust the screw and lock the nuts again. Make sure that the clamping pressure does not damage the specimen surface.
- ▶ e) Loosen the screws of the calibrated free tensile grip **I**.
- ▶ f) Insert the specimen end through the calibrated free tensile grip **I**.
- ▶ g) Move the calibrated free tensile grip **I** against the specimen holding fixture **H** and check that it is visually centered with the fixture.
- ▶ h) Tighten the screws of the calibrated free tensile grip **I** fastening the specimen.
- ▶ i) Open the clamping lever and remove the specimen from the fixture **H**.
- ▶ j) Loosen the clamping screw without remove it.
- ▶ k) Insert the free specimen end from the bottom between the adapter and the knurled plate until the calibrated free tensile grip stops against the sliding stop plate.
- ▶ l) Check that the calibrated free tensile grip is visually centered with the stop plates.
- ▶ m) Tighten the clamping screw.

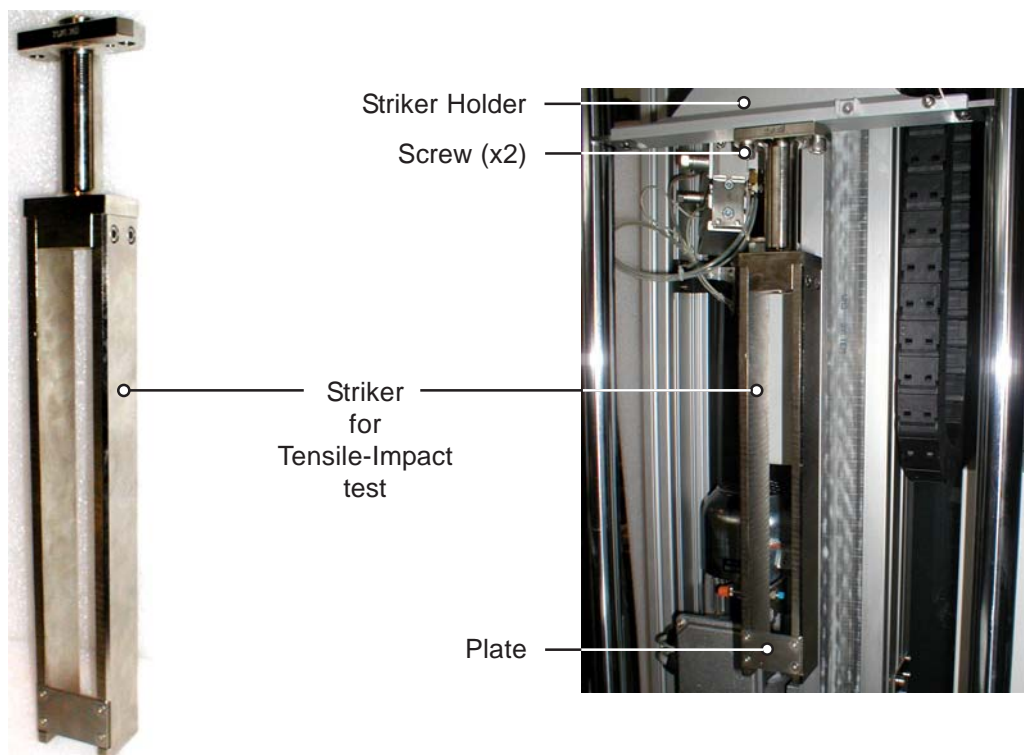


8.7.6 REPLACEMENT OF STRIKER FOR TENSILE-IMPACT TESTS

Authorized Personnel: **Operator**

DISASSEMBLY

- ▶ a) Open the front door of the turret using the special key provided and access to the lifting system.
- ▶ b) Remove the two screws fastening the striker
- ▶ c) Remove the striker from the striker holder.



ASSEMBLY

- ▶ a) Open the front door of the turret using the special key provided and access to the lifting system.
- ▶ b) Place the striker against the striker holder centering the existing pins and making sure that the plate is turned toward the front of instrument.
- ▶ c) Fasten the striker with screws.

8.8 SUPPORT STANDS CODES 7520.350 AND 7520.351 FOR PLATES OF FIBER REINFORCED POLYMERS

8.8.1 INTRODUCTION

The Support Stands code 7520.350 and 7520.351 are used for impact tests on plates of fiber reinforced polymers according to the following standards:

- ASTM D 7136M, AIRBUS AITM 1.0010 (for code 7520.350).
- ASTM D 7136, BOEING BBS 7260, SACMA SRM2R-94 (for code 7520.351).



Notes:

- *The range of temperature endured by the clamps during the impact tests is -20 to 80 °C.*
- *For non-instrumented tests (test controlled directly from the control box of the instrument): the stands must be configured as “Adjustable height stand”;*
- *For instrumented tests (test controlled through the software on PC): the stands must be configured on the “Visual Impact” program as “Fixed height stand” and with CAI/Rebound method.*

8.8.2 COMPONENTS IDENTIFICATION

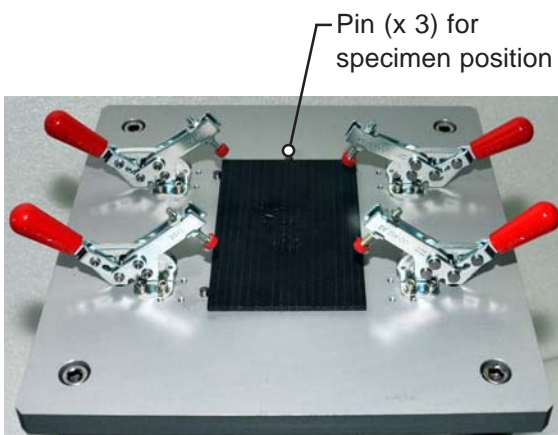


Clamp (x 4), manually operated.
Adjust the clamp height through the exagonal nuts using two 8 mm open wrenches contemporarily.

Plate:
size 300 x 300 mm, thickness 20 mm (for code 7520.350);
size 12 x 12", thickness 0.75" (for code 7520.351)

Fixture window:
75 x 125 mm (for code 7520.350);
3 x 5" (for code 7520.351)

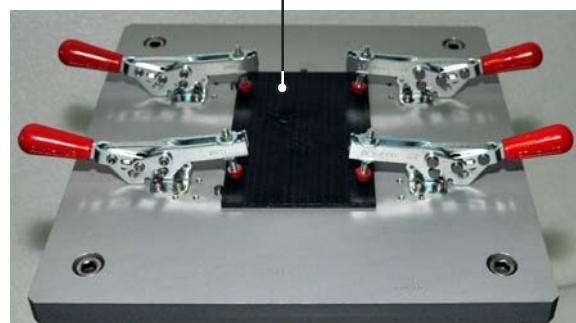
Support Stands codes 7520.350 and 7520.351

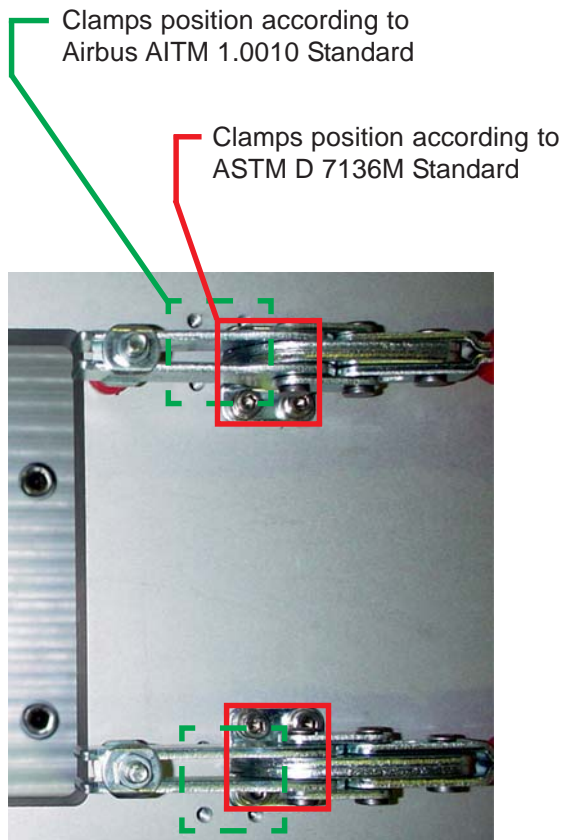


Pin (x 3) for
specimen position

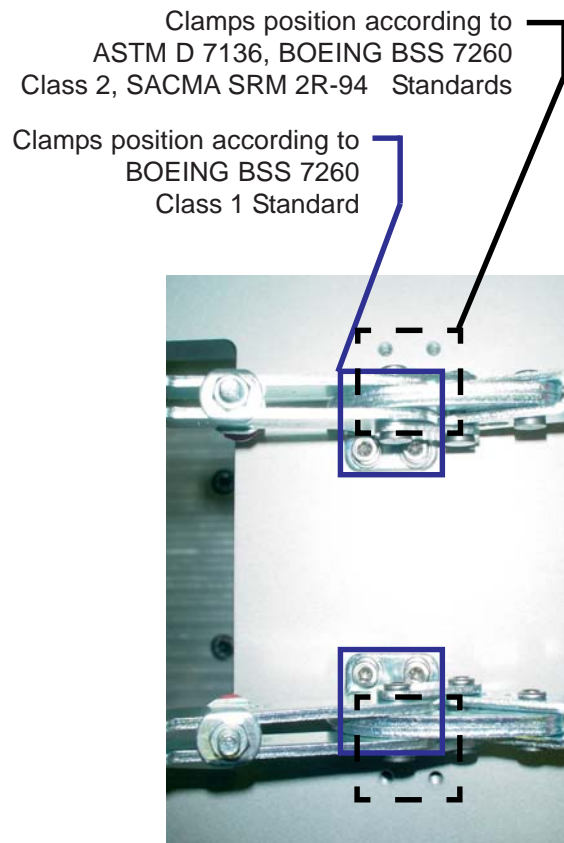
Specimen size for
code 7520.350
(plate 100 x 150 mm)

Specimen size for
code 7520.351
(plate 4 x 6")

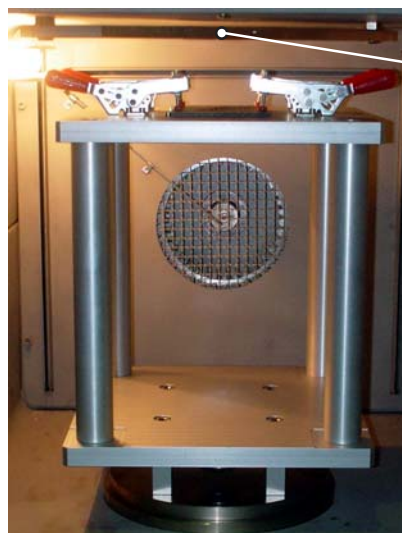




Detail of Support Stand
code 7520.350



Detail of Support Stand
code 7520.351



Clamping plate.
(do not use it when
the support stand is
installed inside the
chamber)

Support Stand code 7520.350 / 7520.351 installed in the test chamber of CEAST 9340

8.8.3 DISASSEMBLY AND ASSEMBLY OF THE SUPPORT STANDS

For disassembly/assembly of the support stands see the instructions of para. 8.6.1 "Replacement of the Stand".

8.9 SPECIAL-PURPOSE TOOLING FOR IMPACT TESTS ON PIPES

8.9.1 INTRODUCTION

This tooling allows to carry out impact tests on pipes of thermoplastic materials according to the ASTM D-2444 standard.

8.9.2 SUPPORTS



Fig. 1 - Pipe Support 90° code 7520.212 according to ASTM D-2444 standard for pipes diameter 80 to 160 mm (to be used together with the adjustable height support code 7520.035)




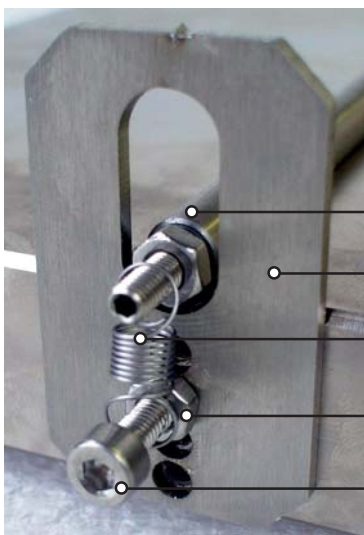
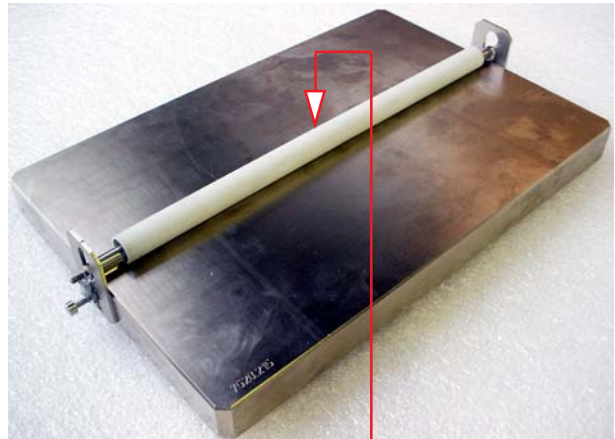
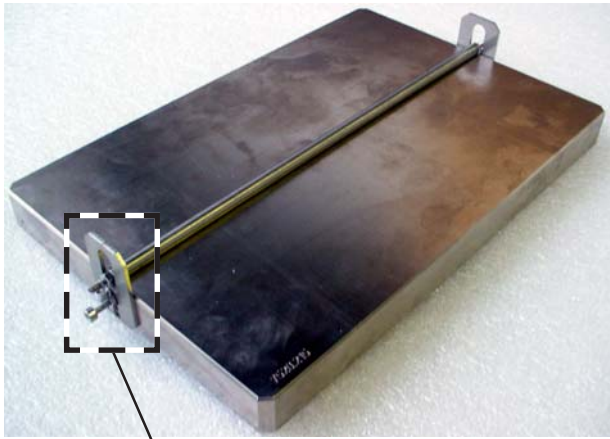
WARNING !

The support is unprovided of the through hole for the striker passage therefore avoid the impact of the striker against the support surface during the tests.



Fig. 2 - Pipe Support 90° code 7520.210 according to ASTM D-2444 standard for pipes diameter 25 to 65 mm (to be used together with the adjustable height support code 7520.035)

 **Note:-** To assemble the supports (Fig. 1, 2 and 3) follow the instructions of the **Chapter. 8.6.2.2 Specimen fixtures for adjustable height stand.**



- Lock bar
- Bracket (x 2)
- Spring (x 2)
- Lock nut (x 2)
- Screw (x 2)


 **WARNING!**
Avoid the striker impact against the locking bar during the tests.

Fig. 3 - Support Plate code 7520.215 according to ASTM D-2444, type B standard for fittings and small tubes (to be used together with the adjustable height support code 7520.035 and the adapter code 7520.039)

PIPE REMOVAL (REF. FIG. 3)

- ▶ a) Open the door of the chamber.
- ▶ b) Lift manually the spring eyelet, disengage the lock bar from the bracket slot and disengage the tube or the fitting from the lock bar.

PIPE POSITIONING (REF. FIG. 3)

- ▶ a) Open the door of the chamber.
 - ▶ b) Insert the tube or the fitting in the end of lock bar.
- ☞ **Note:- Bracket position adjustment:** according to the dimensions of tube or fitting to be tested it is possible to adjust the height of the two brackets so that to maintain a correct springs tension on the lock bar.
- To adjust the brackets height:
- Loosen the lock nut and remove the screw.
 - Move the bracket up or down until to find the bracket hole correspondent to the desired height.
 - Tighten the screw and fasten the bracket in position with the lock nut.
- ▶ c) Lift manually the spring eyelet, insert the lock bar in the bracket slot and engage the spring eyelet on the end of the lock bar.

8.9.3 SPECIAL HEADS FOR STRIKER



Interchangeable head (body diameter 50.8 mm, tip radius 12.7 mm) code 7529.841 for test on pipes according to ASTM D-2444, Type A standard (to be used together with the 50.8 mm diameter adapter, code 7529.898)

Interchangeable head (body diameter 50.8 mm, tip radius 50.8 mm) code 7529.842 for test on pipes according to ASTM D-2444, Type B standard (to be used together with the 50.8 mm diameter adapter, code 7529.898)

Interchangeable head (body diameter 50.8 mm, tip radius 6.3 mm) code 7529.843 for test on pipes according to ASTM D-2444, Type C standard (to be used together with the 50.8 mm diameter adapter, code 7529.898)

Adapter (diameter 50.8 mm) code 7529.898 for interchangeable heads

Fig. 4 - Special heads to be installed on striker for impact tests on pipes according to the ASTM D-2444 Type A, B e C standard.


- ☞ **Note:-** For the heads assembling refer to the **Appendix B- Assembly flow chart for interchangeable head strikers** and to the **Chapter 8.6.7 Replacement of the striker's heads.**

8.10 CARRY OUT TEST

Authorized Personnel: **Operator**

8.10.1 OPERATING SEQUENCE OF AN INSTRUMENTED TEST

- ▶ a) Open the door of the test chamber;
- ▶ b) Place a specimen on the support.
- ▶ c) Close the door of the test chamber;
- ▶ d) Run an instrumented test from the software of the PC. When the trigger bar starts to move, press two times the “Start” key on the keypad of the instrument.

 **Note:** *the instructions on how to run the test are described in the “CeastVIEW VisualIMPACT Instruction Manual” supplied with the software.*

- ▶ e) The instrument carries out test and the DAS (data acquisition system) acquires the signal coming from the instrumented striker during the impact;
- ▶ f) At the end of test press the “Back” key on the keypad of the instrument to return to the “Main menu” (Vid. 1) ready to start a next test.

 **Note:** *to adjust the height of the adjustable height stand follow these instructions:*

- 1) *Enter the test parameters set through the keypad of the instrument control box or sending it to the instrument through the VisualIMPACT software;*
- 2) *Without placing a specimen on the specimen fixture, move the striker to the impact height $H = 0$ (for the movement use the proper keys on the keypad of the instrument control box or sending the command to the instrument through the VisualIMPACT software);*
- 3) *Place a specimen on the specimen fixture and adjust the height of the adjustable height stand until the upper surface of the specimen skims the striker head;*
- 4) *Bring the instrument at HOME position using the proper key.*
- 5) *Carry out test.*

8.11 SCREENS SHOWN DURING TEST

8.11.1 TEST START



Vid. A - "Start of the test"

The Vid. A visualizes the parameters previously set.

- 1) The abbreviation: CL and AR are visualized only if the respective options are configured and activated:
 CL = Clamping; AR = Antirebound.
 The field "+ xx C" shows the test temperature (only if the environmental chamber is configured and the conditioning is activated).
- 2) The field "xxxx mm" corresponds to the parameter "H" (see Vid. 1.3 a) and it is the drop height value (equivalent height in case of high velocity option).
 The field "xx.x m/s" is the expected velocity.
- 3) The field "M: xx.x kg" is the dropping mass.
 The field "E: xxxx J" is the potential energy.
- 4) Press the START key to carry out the test or the BACK to exit from this screen.

8.11.2 TEST IN PROGRESS



Vid. B - "Test in progress"

The Vid. B visualizes in real time the status of the instrument.

- 1) The field "xxxx mm" corresponds to the parameter "H" (see Vid. 1.3 a) and it is the drop height value (same height in case of high velocity).
 The field "xx C" shows the temperature (only if the environmental chamber is configured and the conditioning is activated).

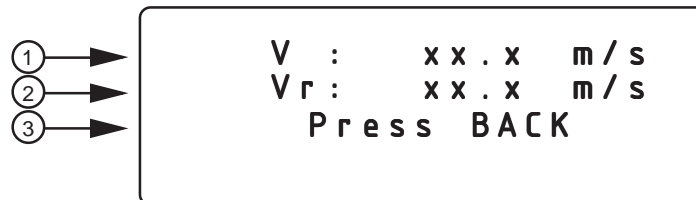
2) Visualize the test phases of the instrument in real time according to the list below.

Phase	Message
A	Initial Check
B	Clamping
C	Positioning
D	Impact
E	Striker Recovery
F	Unclamping

3) This row is shown if an error occur during the test cycle.

4) The STOP key stops the phase of the cycle in any moment and quit the test.

8.11.3 TEST END



Vid. C - "End of the test"

The Vid. C visualizes the results of the test.

1) Velocity of the striker impact measured from the optical detector (first photocell).

2) Velocity of the striker rebound measured from the optical detector (first photocell).

3) Press the BACK key to exit from this screen.



Note:- Values related to the last test performed can be recalled with the "Results" function (see para. 8.5.7).

9. MAINTENANCE

9.1 SAFETY STANDARDS, GENERAL PROCEDURE

- ! The general safety norms found in the introduction of this manual are valid.
- ! Maintenance interventions on the instrument must only be performed by **MECHANICS** or **ELECTRICIANS**, who have been specifically trained and authorized by the **SAFETY MANAGER**.
- ! Should an anomaly should be found or if operations not expressly described in this manual are to be performed, it is necessary to contact **ITW Test and Measurement Italia S.r.l. - INSTRON CEAST Division**.
- ! Any maintenance operation on the instrument must be performed according to the following procedure:
 - ▶ a) Turn off the instrument by moving the main switch to "O".
 - ▶ b) Open the safety switch to the mains line and remove the instrument's electrical plug from the wall socket.
 - ▶ c) Perform the maintenance operation on the instrument.
 - ▶ d) Visually check that the operation has been correctly performed and that the safety shields removed have been correctly reinstalled.
 - ▶ e) Insert electrical plug into the wall socket and shut the safety switch on the mains line.
 - ▶ f) Turn on the instrument, taking care to check for any anomalies that could occur due to errors or involuntary mistakes made during the maintenance operation.
- ! After every maintenance, the **SAFETY MANAGER** is obligated to assure that the safety conditions of the instrument and its safety shields are met.
- ! Any work method that compromises the safety of the apparatus must be avoided.

!

For safety reasons, arbitrary changes or adaptations of the instrument are prohibited

9.2 FUSES REPLACEMENT

Authorized Personnel: **ELECTRICIAN**

In the figures that follow are indicated the points of the instrument where the fuses are located.

Try to identify which fuse has to be replaced referring to the wiring diagrams shown in the section 12.

- ▶ a) Remove the panel that close the electric board (Fig. 1 or 2).
- ▶ b) Working with your fingers open the fuse holder and remove the fuse.
- ▶ c) Verify the electric continuity between the ends of the fuse using a tester.
- ▶ d) If the fuse is shorted, replace it with a new one of the same type and same electrical specifications.
- ▶ e) Place the new fuse in the fuse holder and close the fuse holder.
- ▶ f) Fit the panel back and fasten it with screws.

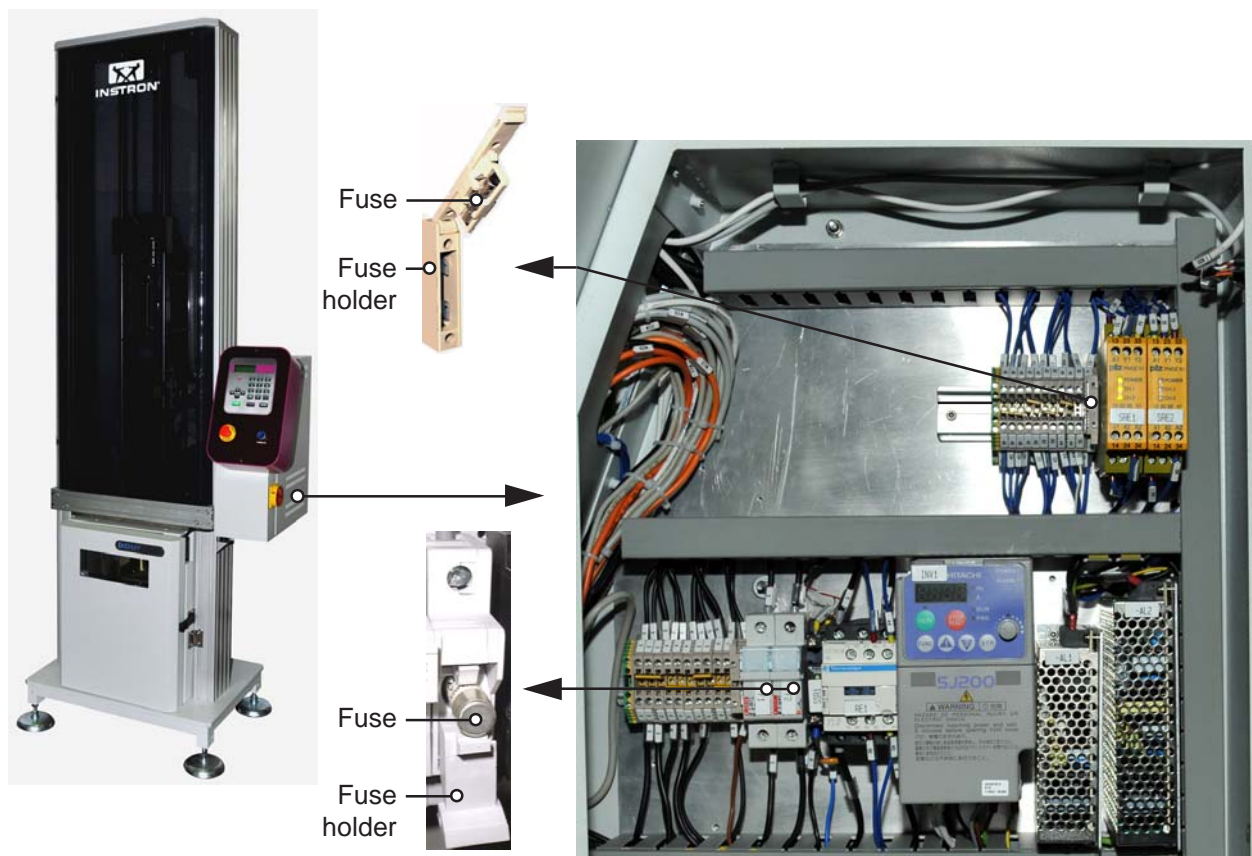


Fig. 1 - CEAST 9340 electric board (right side of instrument)

CEAST 9340 electric board

Fuses to be used as spare parts:

CEAST code 0201.183 Quick Fuse 10A Code ITW1421010 (x2)

CEAST code 0201.184 Quick Fuse Omega 16A Code GL138316 (x2)

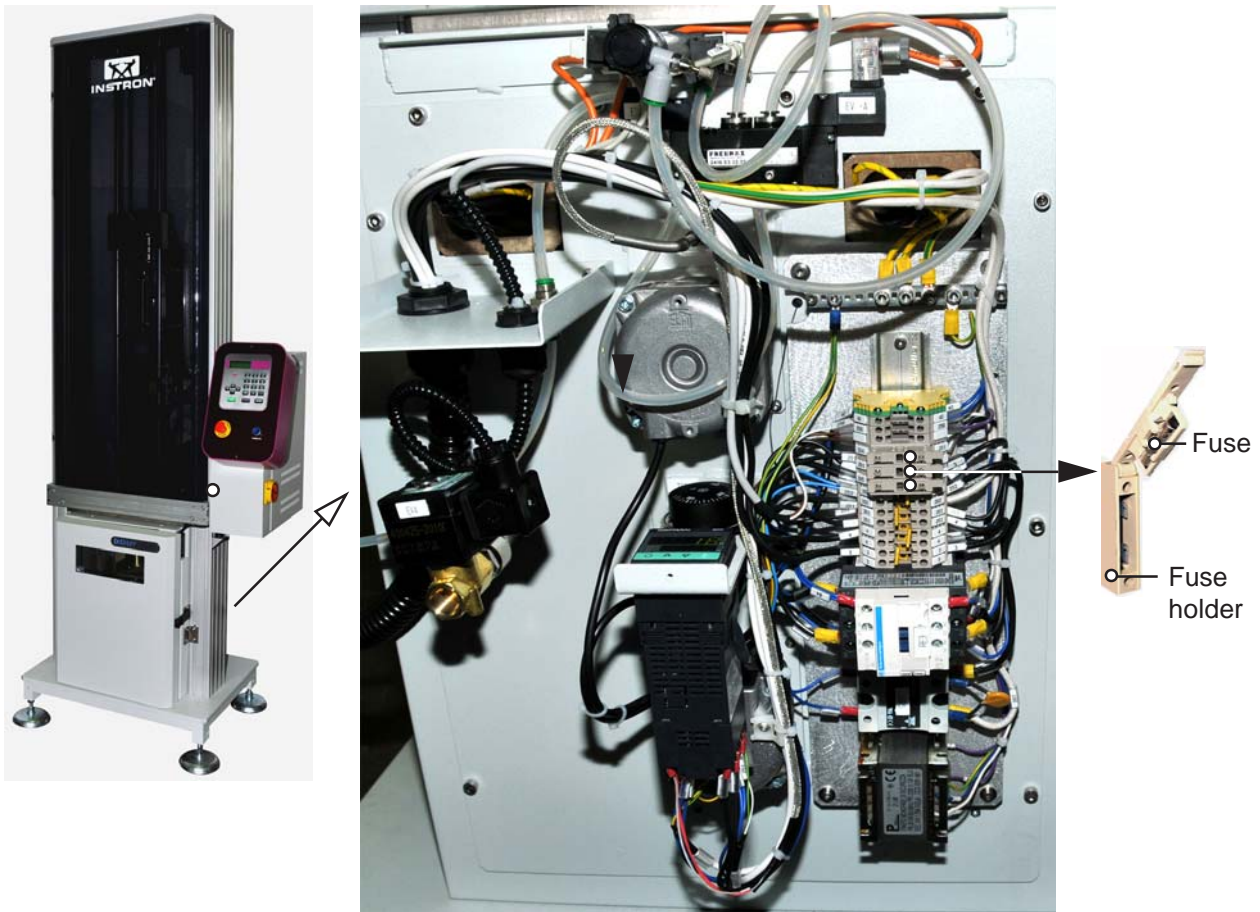


Fig. 2 - Environmental Chamber Electric Board (rear side of instrument)

Environmental Chamber Electric Board

Fuses to be used as spare parts:

CEAST code 0200.850 Quick Fuse 5 x 20 1.5A

CEAST code 0200.855 Fuse 5 x 20 0.5A

CEAST code 0201.184 Quick Fuse Omega 16A Code GL138316

9.3 CLEANING AND DRYING METHODS

Authorized Personnel: **OPERATOR**

- ▶ - Remove the fragments of the specimens from the chamber using an industrial type vacuum cleaner.
- ▶ - Clean the outer painted surfaces of the instrument with soft rags and non corrosive, harmless detergents. In any case the safety rules foreseen by the manufacturer of the cleaning substances must absolutely be adhered to.

- ▶

Every day, at the end of low temperature tests, heat the environmental chamber to approx. 70 °C for at least two hours, leaving the door open.

Dry the surfaces of the stand installed in the chamber (i.e.: adjustable height stand, fixed height stand, pivoting loader, automatic specimens feeder and related clamping ring) with a soft, dry rags. After drying, lubricate the surfaces of these parts with silicone oil spray or normal lube oil.

The purpose of above-mentioned operations is to eliminate condensate from the environmental chamber and to avoid the formation of rust.

9.4 PROCEDURE FOR LOADING FIRMWARE UPDATES

Authorized Personnel: **OPERATOR**



Note: *make sure that the instrument and PC are both switched off.*

9.4.1 CONNECTION

- ▶ a) Find the RS232 serial port of the PC to be connected with the instrument.



Note: *make sure that the serial port is not shared with other applications during the firmware updating (FW) of the instrument.*

- ▶ b) Connect the PC with the instrument through a serial cable.

9.4.2 PREPARATION OF THE LOADING PROGRAM

- ▶ a) Turn on the PC.



Note: - *before start the loading program operation it is necessary to note on a notebook all calibration parameters of the instrument, copying them from the sub-menu <\Service\Modify Configuration> and <\Service\Modify Cal. Par.>.*

The access to the sub-menu <\Service\Modify Configuration> and <\Service\Modify Cal. Par.> is protected by "Password".

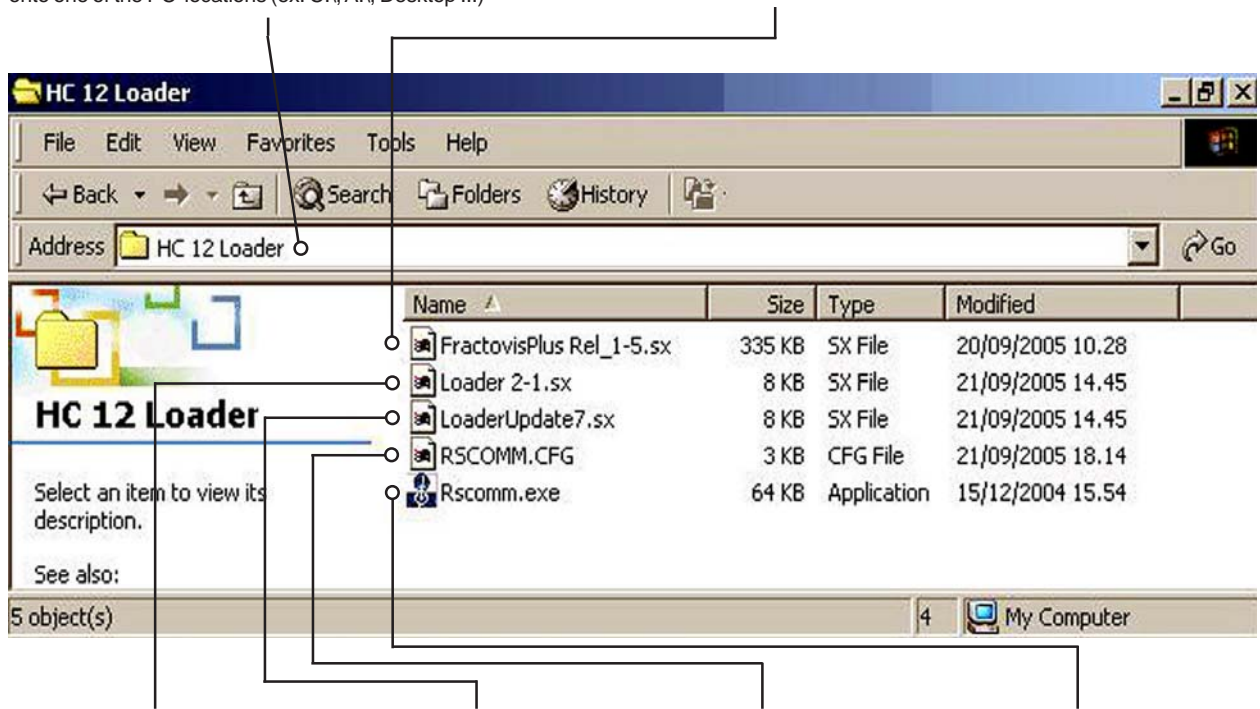
Require the "Password" to the ITW Test and Measurement Italia S.r.l. - INSTRON CEAST Division.

The calibration parameters backup copy can be used in case the parameters are canceled.

- ▶ b) Copy the folder **HC 12 Loader** (sent by e-mail from *ITW Test and Measurement Italia S.r.l. - INSTRON CEAST Division*) on the PC (C:\, Desktop ...) or on a floppy disk.
- ▶ c) Open the folder and verify the completeness of the folder content:
 - five files (complete updating, Loader and FW) see Fig. 1
 - or
 - three files (FW updating only)

Folder sent by e-mail from ITW Test and Measurement Italia S.r.l. - INSTRON CEAST Division and copied by the user onto one of the PC locations (ex. C:\, A:\, Desktop ...)

Version of FW contained in the update file (e.g.: 1-5 corresponds to 1.5)



Loader version contained in the update file (e.g.: 2-1 corresponds to 2.1)

Temporary file to be loaded for carry out the new Loader.

Configuration file used from the loading program.

Updated program (start with double click on the left mouse button).

Fig. 1

- ▶ d) Start the application **RSCOMM.EXE** with a double click on the name of file.

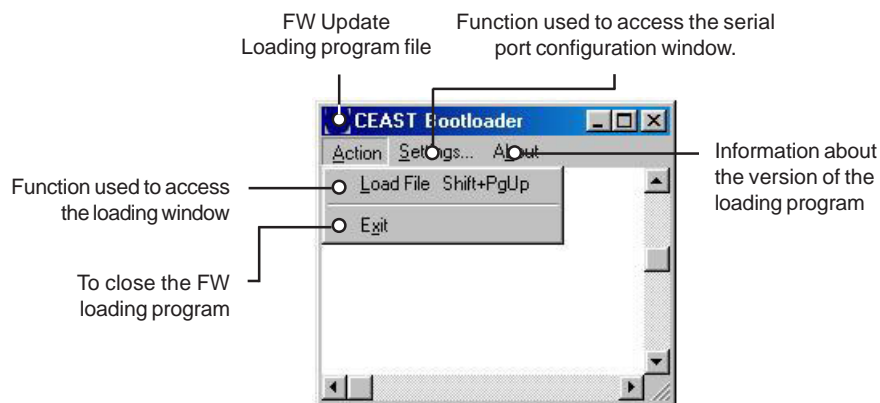


Fig. 2

- ▶ e) Activate the **Setting** configuration menu (Fig. 2).

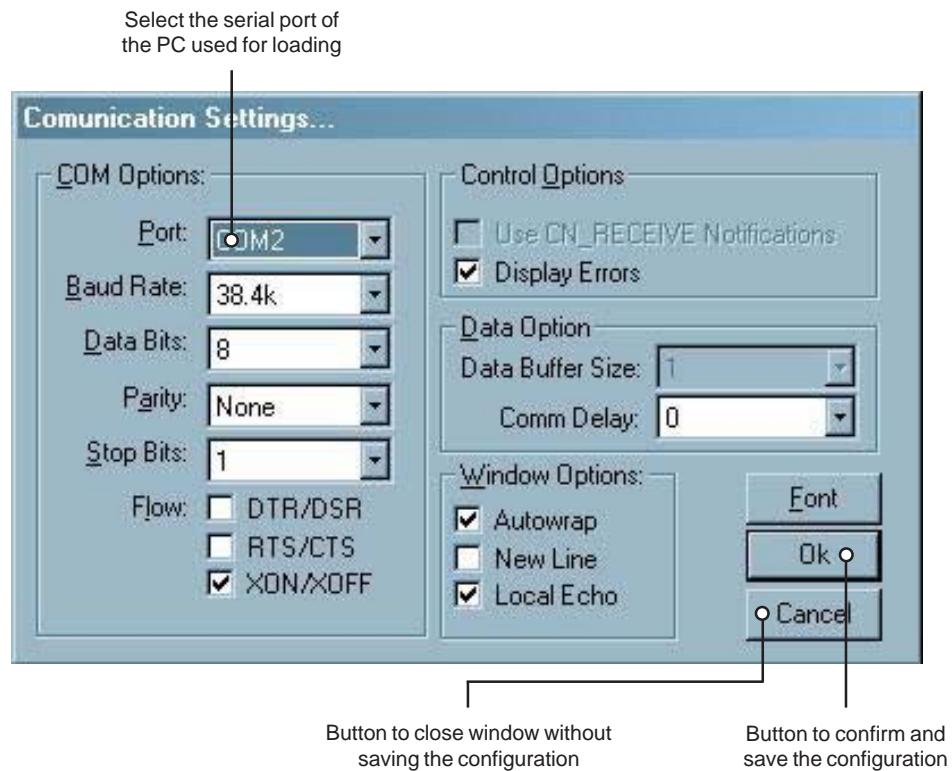


Fig. 3

 **Note:** do not modify any other fields shown in the window of Fig. 3

- ▶ f) Select the serial port chosen for transfer. Confirm the configuration using the **OK** button.

9.4.3 LOADING

- ▶ a) Activate the **Load file** operation from the **Action** menu (see Fig. 2).

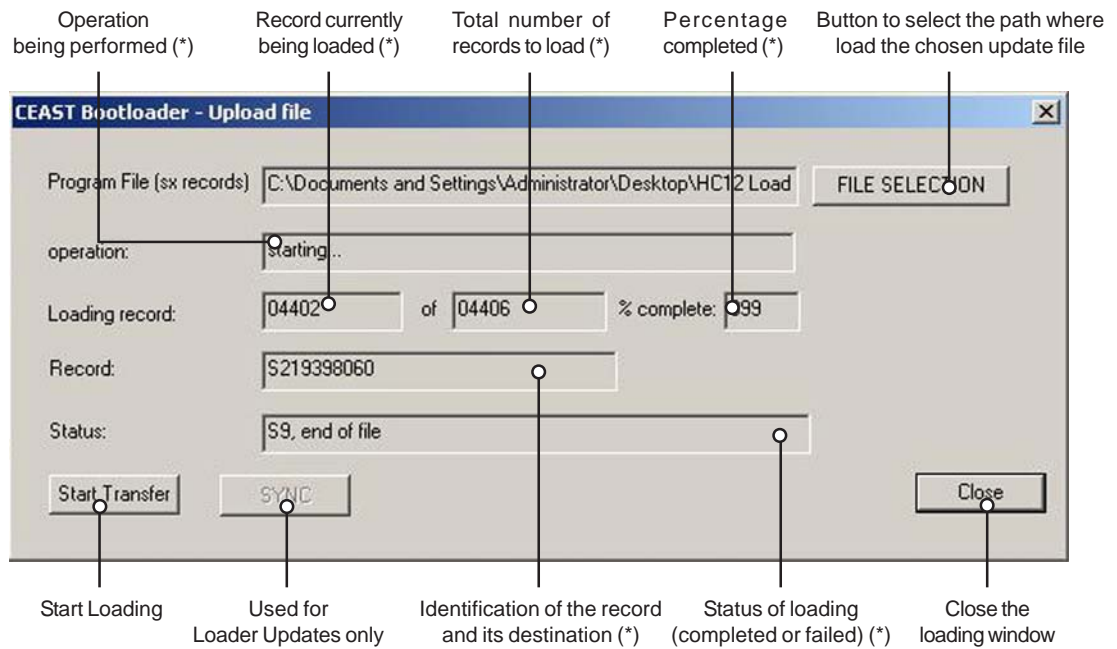


Fig. 4

☞ (*) *These fields cannot be edited, they are automatically updated during program execution.*

☞ **Note:** *Order to be followed for the complete update operations:*

1. *Loading of the Loader Update (file LoaderUpdateX.SX) (**)*
2. *Loading of the Loader version (file Loader X_X.SX) (**)*
3. *Loading of the FW update (file FW X-XX.SX)*

☞ (**) *In case of the firmware update only, do not perform these operations.*

9.4.3.1 LOADER UPGRADE



WARNING ! - This procedure must be carried out only after explicit authorization of ITW Test and Measurement Italia S.r.l. - INSTRON CEAST Division.



Note: before starting the loader upgrade procedure check that the instrument is switched-off.

- ▶ a) Click on **“File Selection”** button and select from the list the file containing the loader update.
- ▶ b) Click on **“Start Transfer”** button and wait until the message **“Waiting ...”** appears in the **“Operation”** field.
- ▶ c) Switch-on the instrument and wait until the loading procedure ends. When the operation ends the program visualizes the transfer results in the **“Operation”** field and **“Status”** field:

Operation: starting ...	—>	Operation: completed
Status: seq err ...	—>	Status: flash programmed OK



Note: to avoid problems during the loader upgrade procedure it is essential to maintain the instrument switched-on.

- ▶ d) Click on **“File Selection”** button and select from the list the file containing the loader.
- ▶ e) Click on **“Start Transfer”** button and wait until the **“Sync”** button becomes highlighted (function enabled).
- ▶ f) Click on **“Sync”** button and wait until the loading procedure ends. When the operation ends the program visualizes the transfer result in the **“Operation”** field (completed).
- ▶ - If the loading fails, leave the instrument on and contact immediately the ITW Test and Measurement Italia S.r.l. - INSTRON CEAST Division Service.
- ▶ - If the loading is completed switch-off the instrument and click on **“Close”** button to close the window (Fig. 4).

9.4.3.2 FIRMWARE UPGRADE



Note: before starting the loader upgrade procedure check that the instrument is switched-off.

- ▶ a) Click on **“File Selection”** button and select from the list the file containing the firmware update.
- ▶ b) Click on **“Start Transfer”** button and wait until the message **“Waiting ...”** appears into the **“Operation”** field.
- ▶ c) Switch-on the instrument and wait until the loading procedure ends. When the operation ends the program visualizes the transfer results in the **“Status”** field: (Transfer Failed / End of File).

9.4.4 DISCONNECTION


- ▶ a) Close the window (CLOSE button) and the loading program (EXIT option).
- ▶ b) Turn off the PC and the instrument.
- ▶ c) Disconnect the serial cable from the instrument and PC.

9.4.5 INSTRUMENT FIRMWARE CHECK

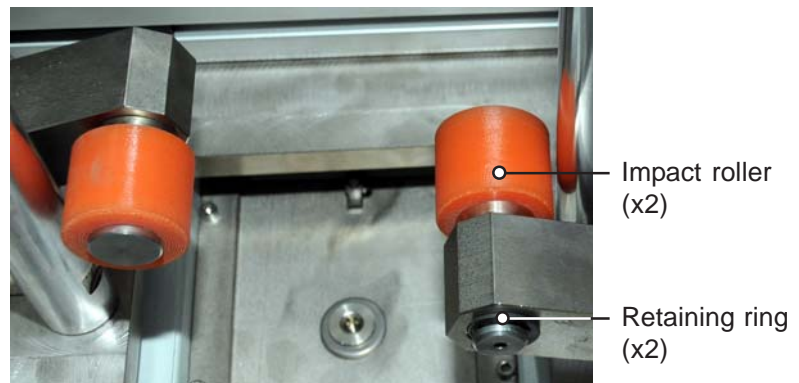
- ▶ a) Turn on the instrument and wait that it performs the firmware autocheck.
- ▶ b) If the display visualizes an error status:
 - Press the “Enter” key. This command allows to repair the error condition of firmware.
 - Verify the loader and firmware version from the menu <*Utility\FW Version*>.
 - Go in the sub-menu <*ServiceModify Configuration*> and <*ServiceModify Cal. Par.*> and compare all the calibration parameters with those previously noted in the notebook (see Note, para. 9.4.2).
- ▶ c) If the display do not visualizes an error status, proceed with the use of the instrument.

9.5 REPLACEMENT OF THE IMPACT ROLLERS

Authorized Personnel: **MECHANICS**

 **Note:** - The impact rollers are used as residual energy absorbers for the striker after the impact on the specimen.
The impact rollers are located in the center of to the turret plate.

- ▶ a) Open the turret door.
- ▶ b) Remove the two retaining rings (Fig. A and B) using a special pliers or a small screw-driver.
- ▶ c) Remove the impact rollers (Fig. C).
- ▶ d) Replace the impact rollers with a new ones, code 7510.AF.07.
- ▶ e) Position the new rollers and fasten them with the retaining rings.



A



B


Retaining ring



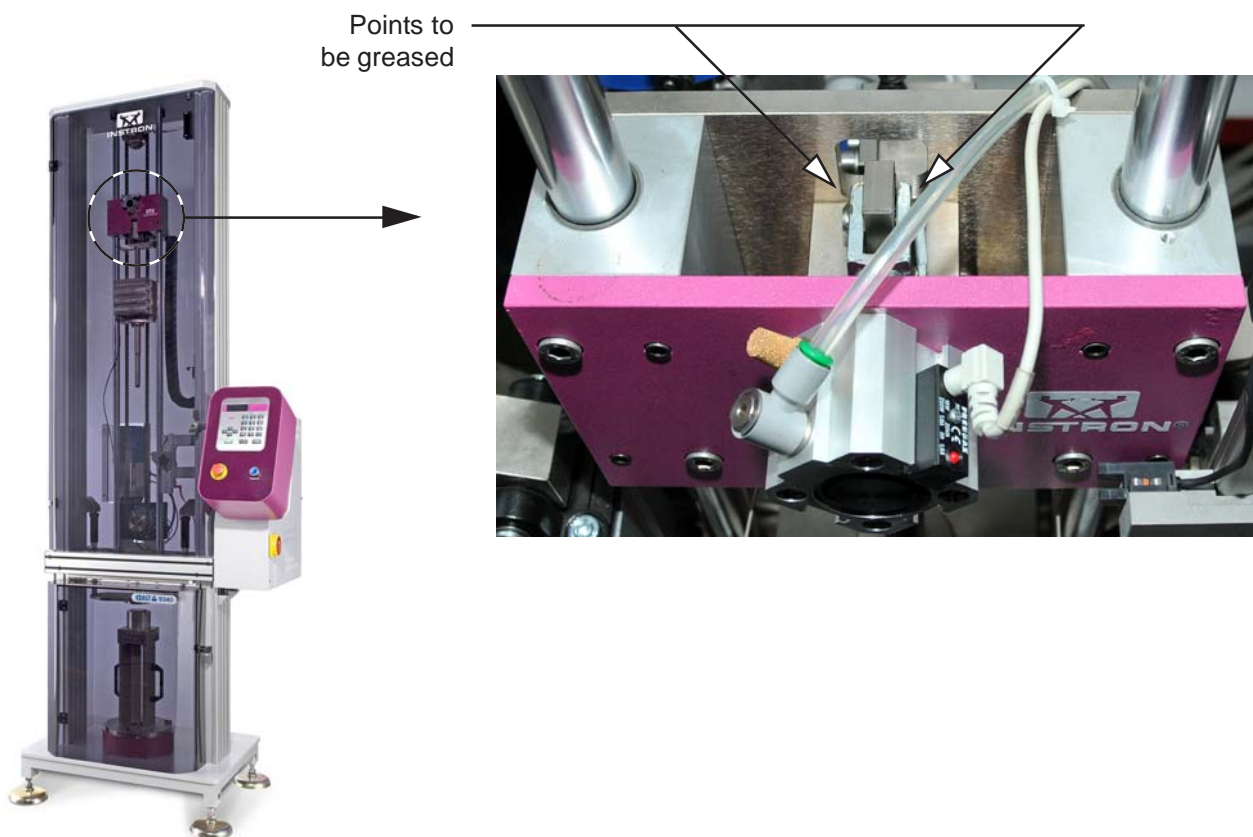
C

9.6 GREASING THE STRIKER RELEASING MECHANISM

Authorized Personnel: **MECHANICS**


 **Note:** - The grease on the striker releasing mechanism needs to be checked every 500 releasing cycles.
- Use grease for revolving machine parts, type AREXONS GC 300.

- ▶ a) Open the turret door.
- ▶ b) Visually check the lubrication condition of the striker releasing mechanism.
If necessary smear the mechanism (see the arrows) with grease type AREXONS GC 300.
- ▶ c) Close the turret door.



9.7 LUBRICATING THE GEARING CHAIN

Authorized Personnel: **MECHANICS**


-  **Note:-** *The grease on the gearing chain needs to be checked monthly, under normal operating conditions of the striker lifter.*
- Use protective oil, type AREXONS TO 236.

- a) Open the turret door.
- b) Visually check the lubrication condition of the gearing chain.
If necessary smear the chain with protective oil, type AREXONS TO 236.
- c) Close the turret door.

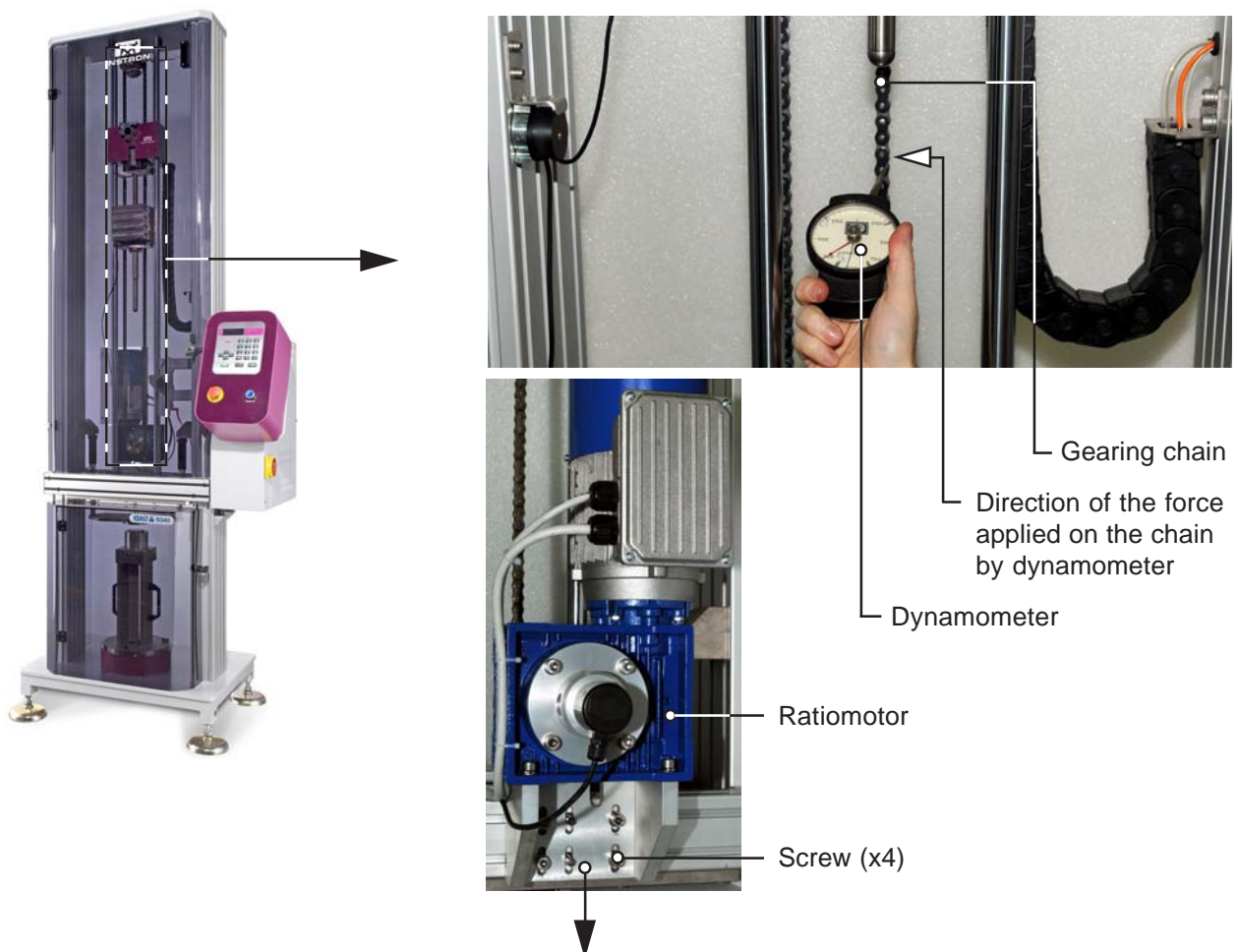


9.8 VERIFYING THE GEARING CHAIN TIGHTENING

Authorized Personnel: **MECHANICS**

 **Note:** - *The gearing chain needs to be checked every 5000 releasing cycles and/or after repeated tests in which the striker is jammed in the specimen and the lifter motor subjected to a traction effort stops repeatedly.*

- a) Open the turret door.
- b) Install the standard striker holder without combinable weights or the light striker holder with all combinable weights on the instrument.
- c) Move the striker holder to quota $Z=1200$ mm using the command "Move to height" from the "Service" menu.
- d) Place the end of a dynamometer (see figure) in the middle of the chain (right side) and stress it applying a load of 1 kgf (9.81 N).
- e) The deflection of the chain must be less than 8-10 mm, otherwise extend the chain.
- f) Loosen the screws of the ratiomotor support (see figure) push downward the ratiomotor and tighten the screws.
If the screws are in contact with the slot ends and it is not possible to adjust the chain, shorten the chain by removing a link.
- g) Proceed with the instructions of steps d), e) and f) until to measure the correct deflection.



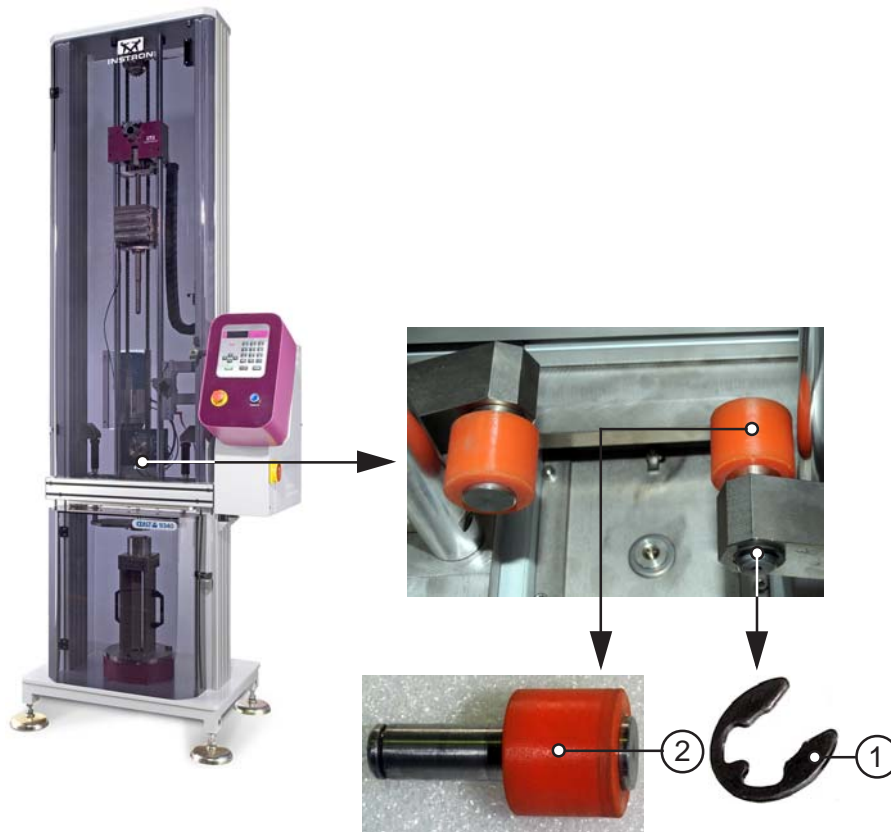
10. SPARE PARTS

10.1 LIST OF RECOMMENDED SPARE PARTS

In order to meet the most frequent needs and to guarantee the use of the instrument for at least two years, it is recommended to keep in stock a set of spare parts as shown below:

10.1.1 CEAST 9340 7515.000 AND 7516.000

Nr	Code	Description	Q.ty
1	0303.028	External retaining ring 12 UNI 7434-75	2
2	7510.AF.07	Impact Roller	2

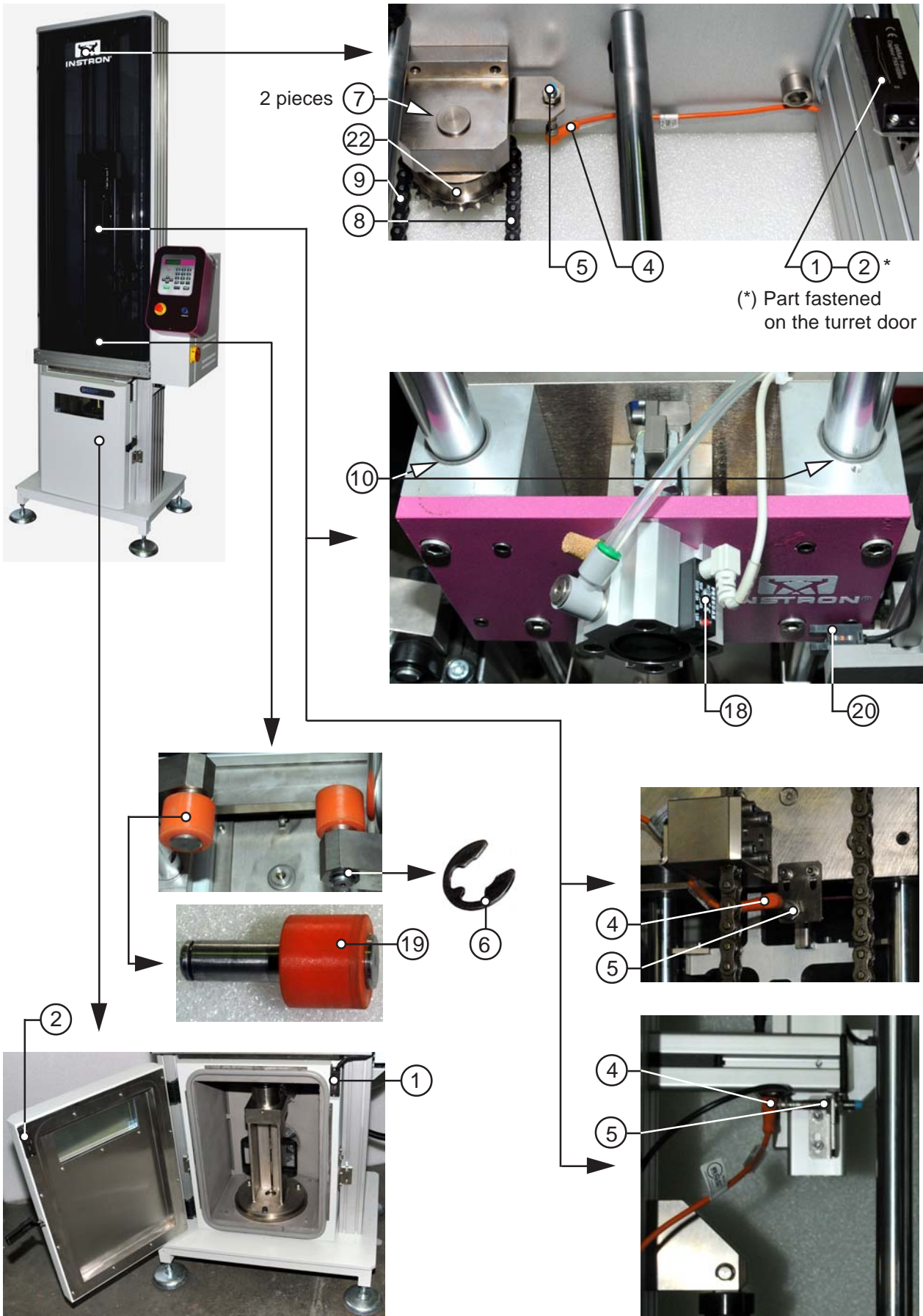


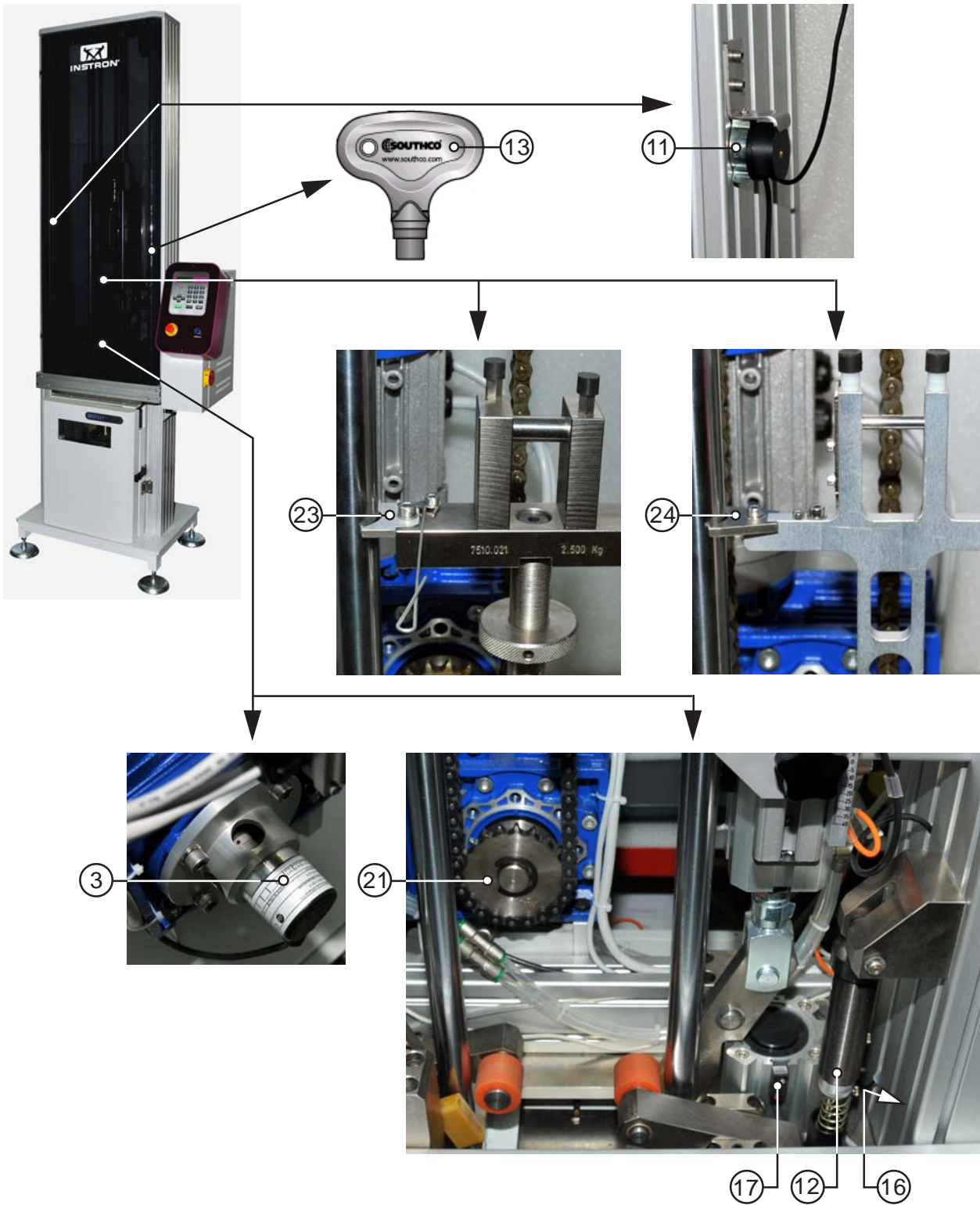
10.2 LIST OF SPARE PARTS FOR TECHNICAL ASSISTANCE

In order to meet any need and to guarantee the possibility of continuous use for a long time period, it is recommended to keep the following spare parts in stock:

10.2.1 CEAST 9340 CODE 7515.000 AND 7516.000

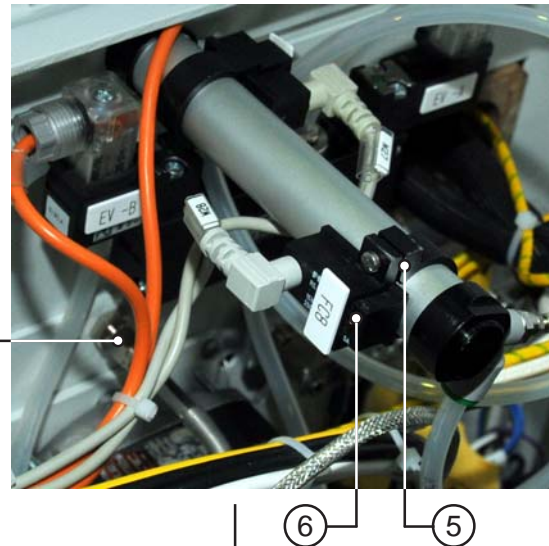
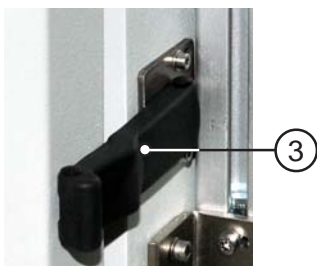
Nr	Code	Description
1	0200.764	Limit switch
2	0200.765	Actuator for limit switch
3	0201.897	Encoder
4	0206.233	Connector, female, for proximity switch
5	0206.236	Proximity switch
6	0303.028	External retaining ring 12 UNI 7434-75
7	0400.515	Bearing
8	0400.751	Chain, type 206/S1/2" X5/16" L=3213,1M
9	0400.752	Joint with spring for chain 206/S
10	0400.754	Bush GSM-7528-30 IGUS
11	0500.196	Clip, type 81.125 zinc plated spec
12	0500.310	Decelerator
13	0500.906	Wrench with doublenotch 3 mm SOUTHCO
14	0801.332	Small block for slot 0.0.026.18 ITEM (not shown in the figures)
15	0801.357	Small block for slot 0.0.428.76 ITEM (not shown in the figures)
16	0801.358	Section for coverage
17	0801.620	Sensor 1500.U PNEUMAX with LED and cable
18	0801.679	Sensor RS.UAC2 PNEUMAX (connector and cable)
19	7510.AF.07	Impact roller
20	7510.AG.20	Photocell with connector
21	7510.AH.05	Motor pinion gear
22	7510.AH.06	Upper pinion gear
23	7510.CA.04	Guiding plate for standard striker holder
24	7510.CB.03	Guiding plate for light striker holder





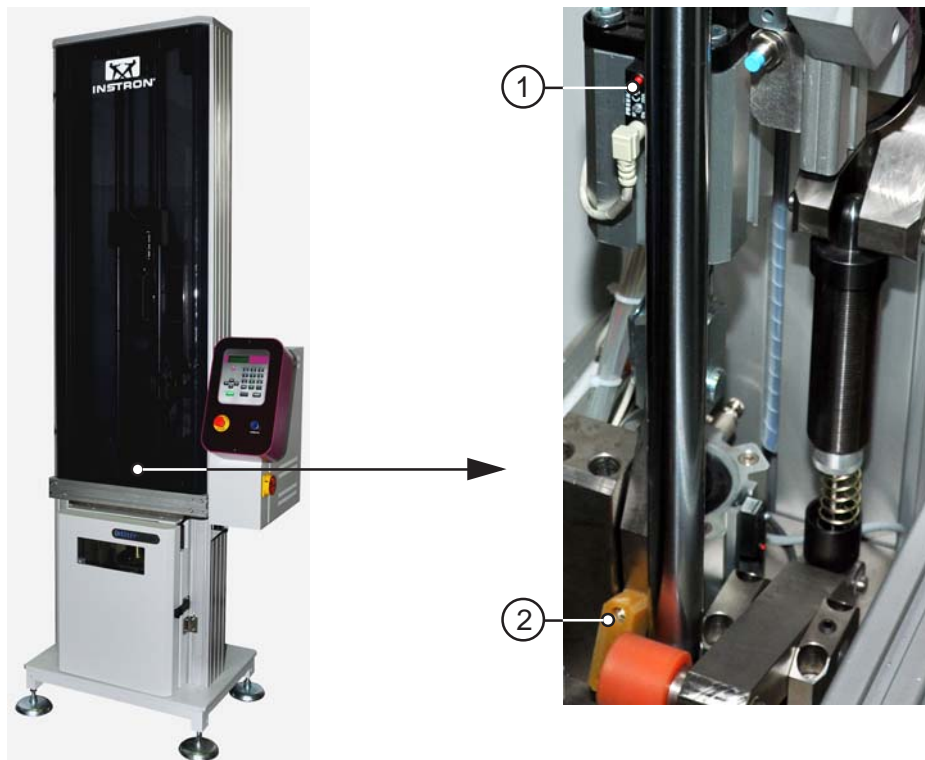
10.2.2 ENVIRONMENTAL CHAMBER 7510.011
CODE (OPTIONAL EXTRA FOR CEAST 9340 7515.000)
(ALREADY INSTALLED ON CEAST 9340 7516.000)

Nr	Code	Description
1	0201.075	Thermostat TC-RC DV +50 +350°C switch
2	0204.193	Temperature sensor, Pt 100 GEFTRAN
3	0400.799	Clamp with rubber lever SOU C7-10
4	0500.666	Solenoid valve SCE 263 B206 LT 24V/50H
5	0800.808	Sensor clamp 1260.16.F
6	0800.957	Sensor RS.UAC.1 PNEUMAX



10.2.3 STRIKER ANTIREBOUND SYSTEM CODE 7510.002 (OPTIONAL EXTRA FOR CEAST 9340 7515.000 AND 7516.000)

Nr	Code	Description
1	0801.620	Sensor 1500.U PNEUMAX with LED and cable
2	7520.EB.04	Shock absorber



11. TRAINING

11.1 GENERAL INFORMATION

The use and maintenance of the instrument do not require particular training by ITW Test and Measurement Italia S.r.l. - INSTRON CEAST Division.

For operations other than those described in this manual specific training is required at ITW Test and Measurement Italia S.r.l. - INSTRON CEAST Division offices.



The Safety Manager must ensure that the safety norms foreseen in this manual are respected, and that the personnel that will interact with the instrument are exclusively those indicated.

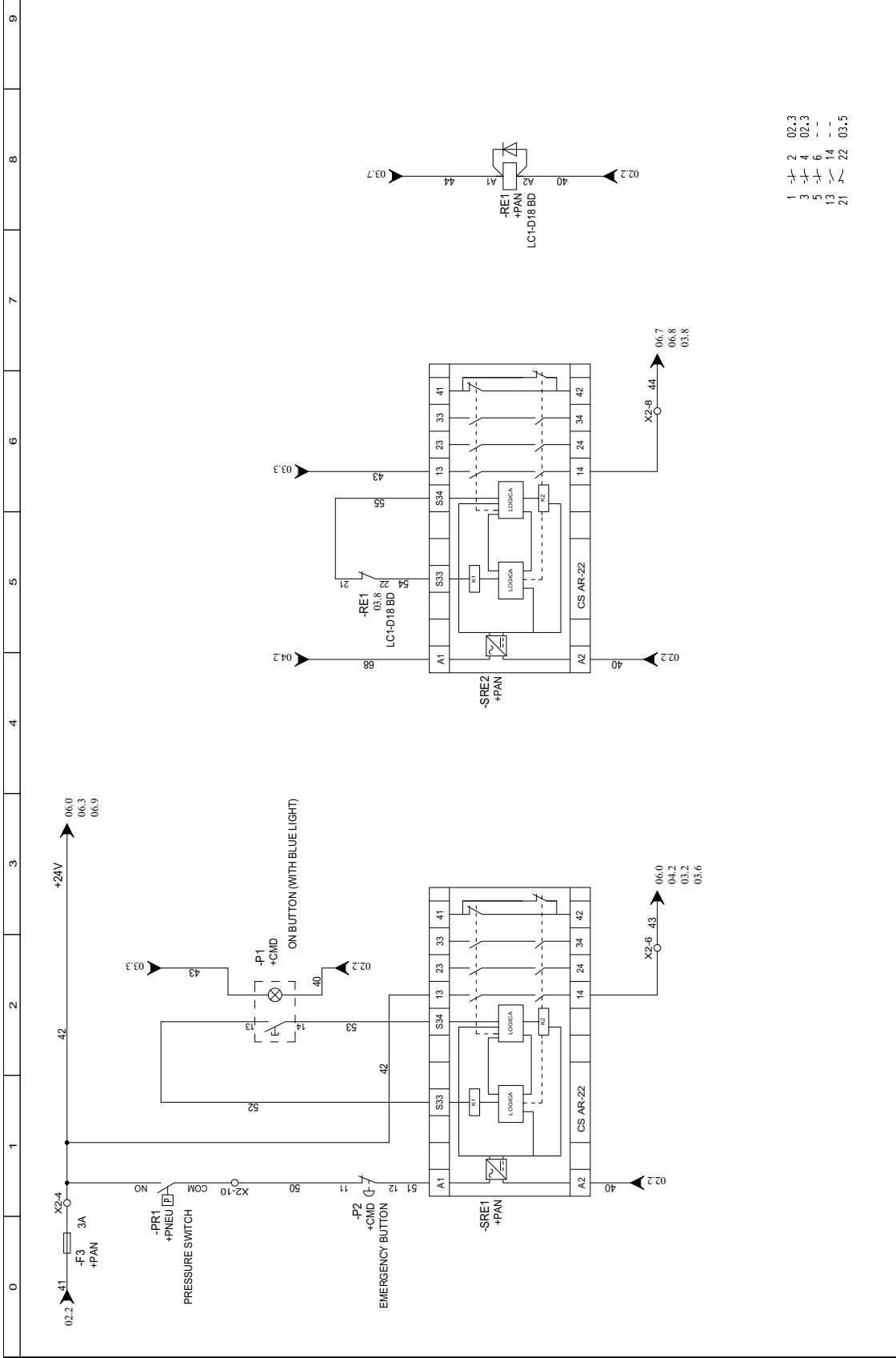


Every person who will operate with the instrument must be authorized by the Safety Manager and must read the contents of this manual.

12. WIRING DIAGRAMS

This section of the manual includes a complete copy of the wiring diagrams of "CEAST 9340" instrument as indicated in the list below:

<i>Nr</i>	<i>Diagram Nr</i>	<i>Title</i>	<i>Rev.</i>	<i>Page</i>
1	9340	Light Drop Tower	01	1 of 20
2	9340	Power Supply and Safety - 7510 AK	01	2 of 20
3	9340	Low Voltage - 7510 AK	01	3 of 20
4	9340	On Board - 7510 AK	01	4 of 20
5	9340	CPU Board - 7510 AK	01	5 of 20
6	9340	Power I/O Board - 7510 AK	01	6 of 20
7	9340	Other Options	01	7 of 20
8	9340	Thermostatic Cell	01	8 of 20
9	9340	Main Electrical Panel	01	9 of 20
10	9340	Thermostatic Cell Electrical Panel	01	10 of 20
11	9340	Terminal Block: X0 X0 - 1/1	01	11 of 20
12	9340	Terminal Block: X1 X1 - 1/1	01	12 of 20
13	9340	Terminal Block: X2 X2 - 1/1	01	13 of 20
14	9340	Terminal Block: X3 X3 - 1/1	01	14 of 20
15	9340	Terminal Block: X4 X4 - 1/1	01	15 of 20
16	9340	@Terminal Block: X5 @X5 - 1/1	01	16 of 20
17	9340	Lista Localizzazioni (Location List)	01	17 of 20
18	9340	Wire List	01	18 of 20
19	9340	Wire List	01	19 of 20
20	9340	Wire List	01	20 of 20



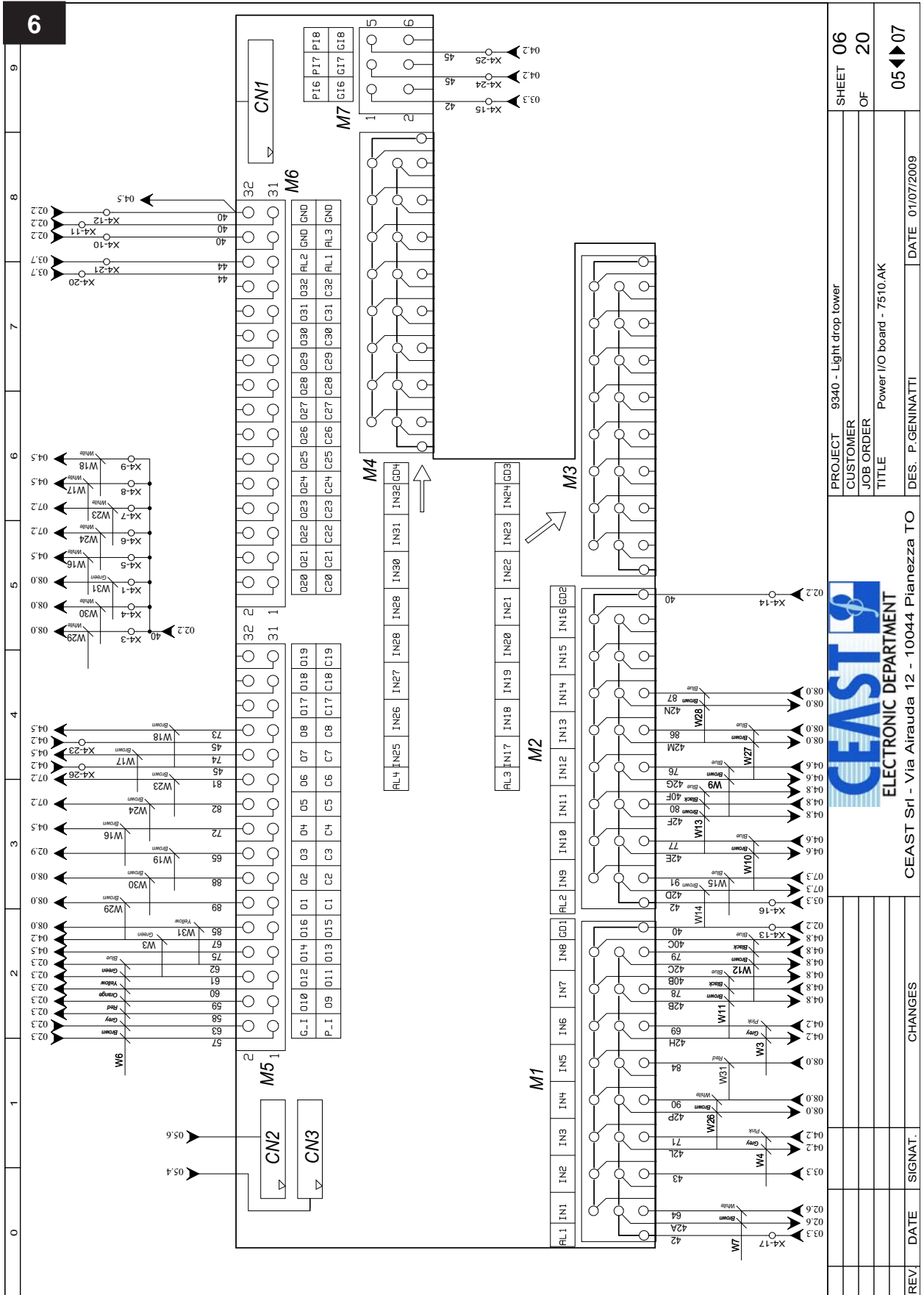
- 1 -> 2 02.3
- 3 -> 4 02.3
- 5 -> 6 - -
- 13 -> 14 - -
- 21 -> 22 03.5

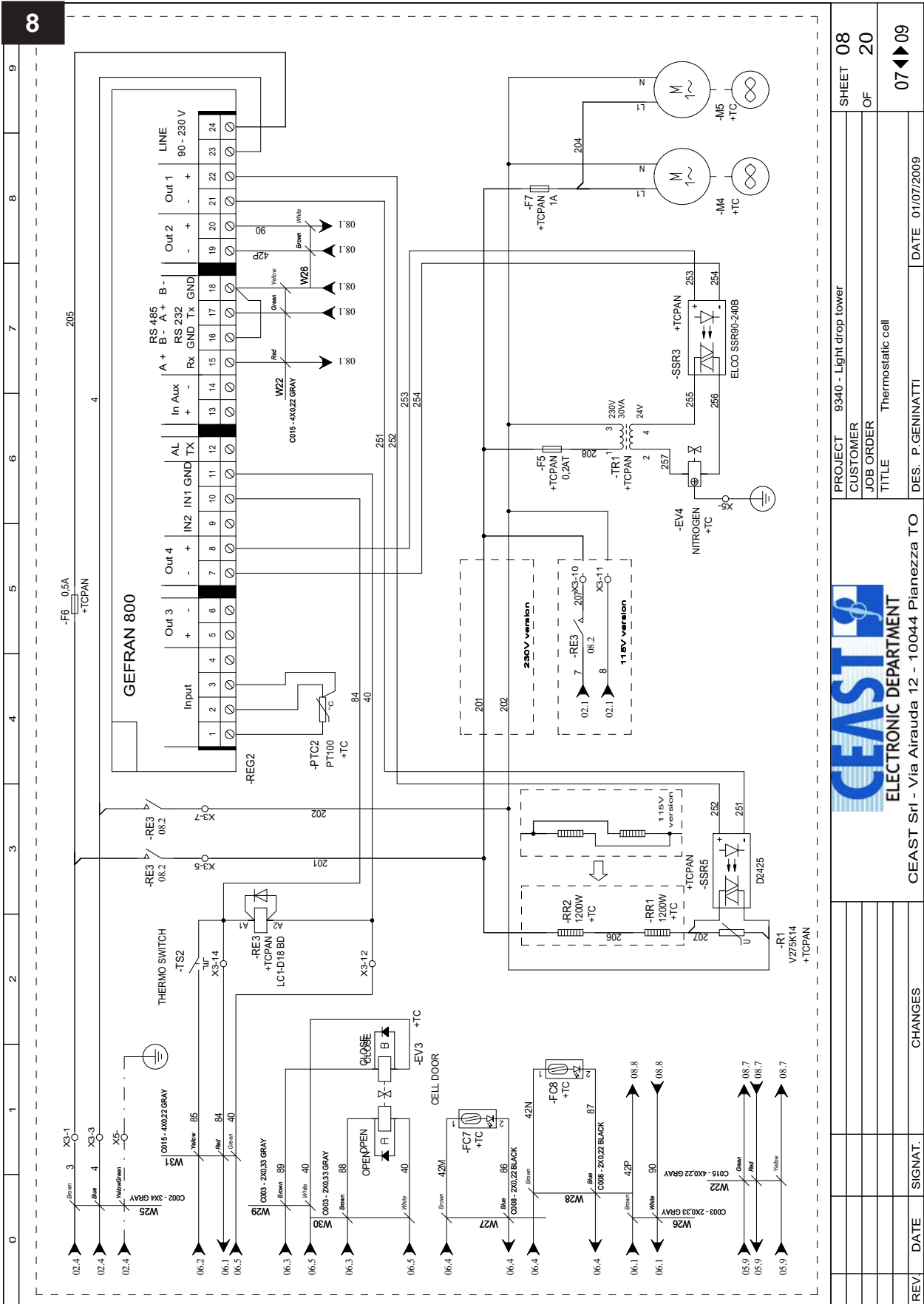
REV	DATE	SIGNAT.	CHANGES

PROJECT	9340 - Light drop tower
CUSTOMER	
JOB ORDER	
TITLE	Low voltage - 7510.AK
DES. P.GENINATTI	DATE 01/07/2009

CEAST Sr1 - Via Airauda 12 - 10044 Pianezza TO
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SHEET 03
OF 20
02 ◀ ▶ 04





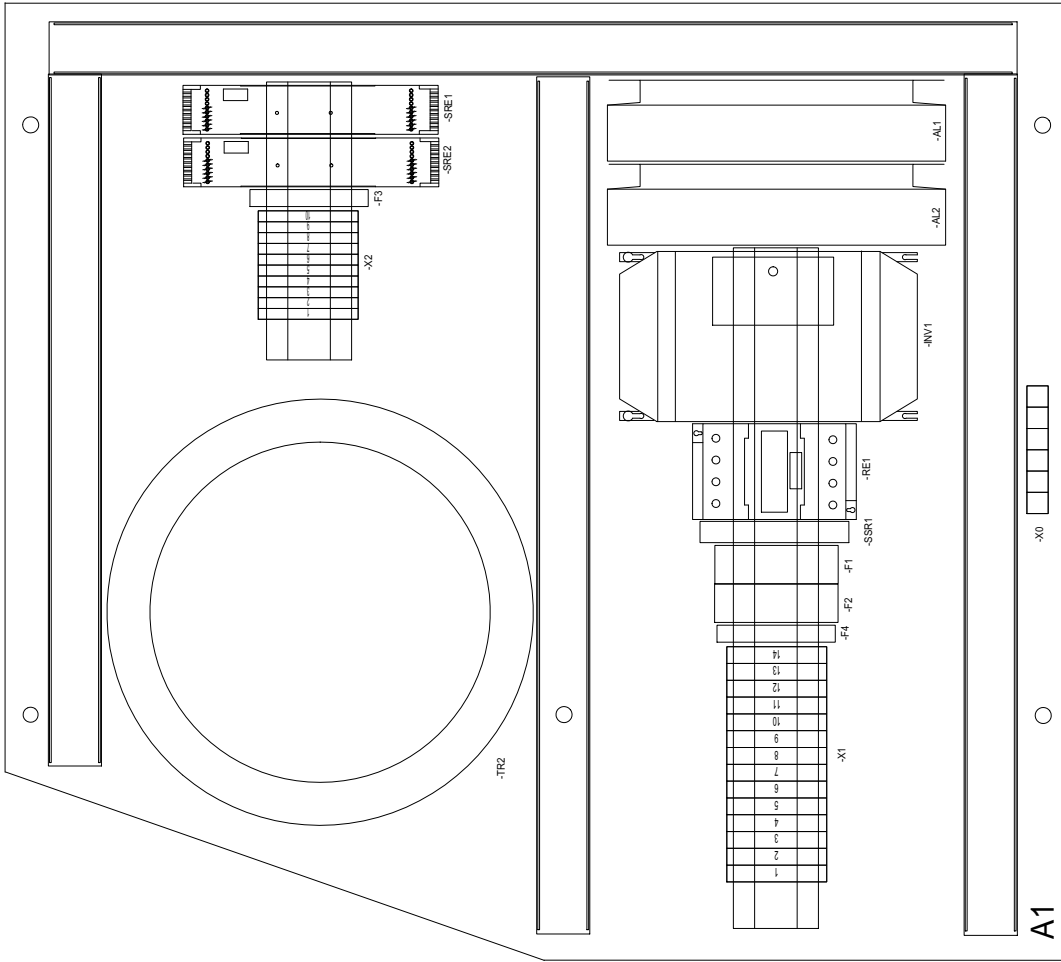
PROJECT 9340 - Light drop tower
 CUSTOMER
 JOB ORDER
 TITLE Thermostatic cell

CEAST Srl - Via Airauda 12 - 10044 Pianezza TO

REV	DATE	SIGNAT.	CHANGES

DES. P. GENINATTI DATE 01/07/2009

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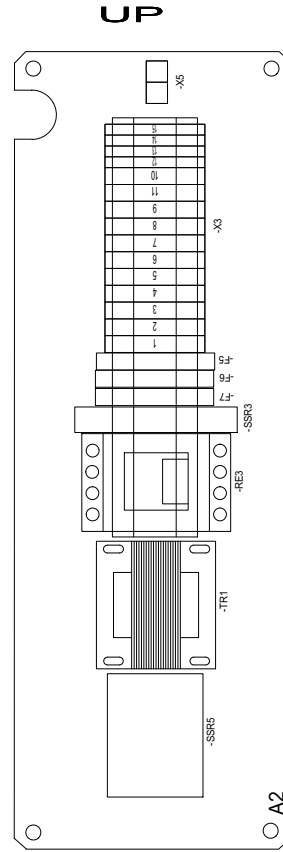
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REV.	DATE	SIGNAT.	CHANGES

PROJECT	9340 - Light drop tower
CUSTOMER	
JOB ORDER	
TITLE	Main electrical panel
DES. P. GENINATTI	DATE 01/07/2009

PROJECT	9340 - Light drop tower	SHEET	09
CUSTOMER		OF	20
TITLE	Main electrical panel		
DES. P. GENINATTI	DATE 01/07/2009		

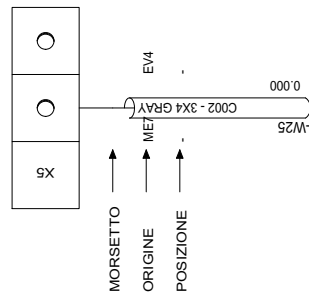
CEAST	ELECTRONIC DEPARTMENT	CEAST Srl - Via Airauda 12 - 10044 Pianezza TO
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ELECTRONIC DEPARTMENT
CEAST Srl - Via Airauda 12 - 10044 Pianezza TO

PROJECT	9340 - Light drop tower	SHEET	10
CUSTOMER		OF	20
JOB ORDER			
TITLE	Thermostatic cell electrical panel		
DES. P.GENINATTI		DATE	01/07/2009

REV	DATE	SIGNAT.	CHANGES



ELECTRONIC DEPARTMENT
CEAST Srl - Via Airauda 12 - 10044 Pianezza TO

PROJECT	9340 - Light drop tower	SHEET	16
CUSTOMER		OF	20
JOB ORDER			
TITLE	@Morsettiera: X5 @X5 - 1/1		
DES. P. GENINATTI			
DATE	01/07/2009		

REV	DATE	SIGNAT.	CHANGES

LISTA CAVI

CAVO		COMPONENTE ORIGINE				COMPONENTE DESTINAZIONE			
Sigla	N° Filo	Codice	Sez. (mm ²)	Colore/Num.	Lung. (m)	Sigla	Ubicazione	Sigla	Ubicazione
W1	N1	C002 - 3X4 GRAY	4	Blue	0,00	IG1	CMD	SJ1	CMD
	L1	C002 - 3X4 GRAY	4	Brown	0,00	IG1	CMD	SJ1	CMD
		C002 - 3X4 GRAY	4	Yellow/Green	0,00	SJ1		X0	PAN
W10	77	C008 - 2X0,22 BLACK	0,22	Blue	0,00	FC1	TOW	SK2	CMD
	42E	C008 - 2X0,22 BLACK	0,22	Brown	0,00	FC1	TOW	SK2	CMD
W11	78	C001 - 3X0,33 ORANGE	0,33	Black	0,00	PX1	TOW	SK2	CMD
	40B	C001 - 3X0,33 ORANGE	0,33	Blue	0,00	PX1	TOW	SK2	CMD
	42B	C001 - 3X0,33 ORANGE	0,33	Brown	0,00	PX1	TOW	SK2	CMD
W12	79	C001 - 3X0,33 ORANGE	0,33	Black	0,00	PX2	TOW	SK2	CMD
	40C	C001 - 3X0,33 ORANGE	0,33	Blue	0,00	PX2	TOW	SK2	CMD
	42C	C001 - 3X0,33 ORANGE	0,33	Brown	0,00	PX2	TOW	SK2	CMD
W13	80	C001 - 3X0,33 ORANGE	0,33	Black	0,00	PX3	TOW	SK2	CMD
	40F	C001 - 3X0,33 ORANGE	0,33	Blue	0,00	PX3	TOW	SK2	CMD
	42F	C001 - 3X0,33 ORANGE	0,33	Brown	0,00	PX3	TOW	SK2	CMD
W14	42D	C008 - 2X0,22 BLACK	0,22	Brown	0,00	SK2	CMD	FC6	TOW
W15	91	C008 - 2X0,22 BLACK	0,22	Blue	0,00	SK2	CMD	FC5	TOW
	83	C008 - 2X0,22 BLACK	0,22	Brown	0,00	X4	CMD	FC5	TOW
W16	72	C003 - 2X0,33 GRAY	0,33	Brown	0,00	EV1	PNEU	SK2	CMD
	40	C003 - 2X0,33 GRAY	0,33	White	0,00	EV1	PNEU	X4	CMD
W17	74	C003 - 2X0,33 GRAY	0,33	Brown	0,00	EV2	PNEU	SK2	CMD
	40	C003 - 2X0,33 GRAY	0,33	White	0,00	EV2	PNEU	X4	CMD
W18	73	C003 - 2X0,33 GRAY	0,33	Brown	0,00	EV2	PNEU	SK2	CMD
	40	C003 - 2X0,33 GRAY	0,33	White	0,00	EV2	PNEU	X4	CMD
W19	65	C003 - 2X0,33 GRAY	0,33	Brown	0,00	SSR1	PAN	SK2	CMD
	40	C003 - 2X0,33 GRAY	0,33	White	0,00	SSR1	PAN	X4	CMD
W20	12	C005 - 3X1,5 +-S GRAY	1,5	Black	0,00	INV1	PAN		TOW
	13	C005 - 3X1,5 +-S GRAY	1,5	Blue	0,00	INV1	PAN		TOW
	14	C005 - 3X1,5 +-S GRAY	1,5	Brown	0,00	INV1	PAN		TOW
W20		C015 - 4X0,22 GRAY	0,22	Green	0,00	SJ4	PANFOS	SK4	CMD
		C015 - 4X0,22 GRAY	0,22	Red	0,00	SJ4	PANFOS	SK4	CMD
		C015 - 4X0,22 GRAY	0,22	Yellow	0,00	SJ4	PANFOS	SK4	CMD

PROJECT	9340 - Light drop tower	SHEET	18
CUSTOMER		OF	20
JOB ORDER			
TITLE	LISTA CAVI		
DES. P. GENINATTI	DATE 01/07/2009		
CEAST Srl - Via Airauda 12 - 10044 Pianezza TO			
CEAST			
ELECTRONIC DEPARTMENT			
REV	DATE	SIGNAT.	CHANGES

LISTA CAVI

CAVO		COMPONENTE ORIGINE				COMPONENTE DESTINAZIONE			
Sigla	N° Filo	Codice	Sez. (mm ²)	Colore/Num.	Lung. (m)	Sigla	Ubicazione	Sigla	Ubicazione
W21		C010- 5X0.22 + S BLACK	0.22	Black	0.00	ENC1	TOW	SK4	CMD
		C010- 5X0.22 + S BLACK	0.22	Blue	0.00	ENC1	TOW	SK4	CMD
		C010- 5X0.22 + S BLACK	0.22	Green	0.00	ENC1	TOW	SK4	CMD
		C010- 5X0.22 + S BLACK	0.22	Red	0.00	ENC1	TOW	SK4	CMD
		C010- 5X0.22 + S BLACK	0.22	Yellow	0.00	ENC1	TOW	SK4	CMD
W22		C015- 4X0.22 GRAY	0.22	Green	0.00	REG2	TC	SK4	CMD
		C015- 4X0.22 GRAY	0.22	Red	0.00	SK4	CMD	REG2	TC
		C015- 4X0.22 GRAY	0.22	Yellow	0.00	REG2	TC	SK4	CMD
W23	81	C003- 2X0.33 GRAY	0.33	Brown	0.00	SK2	CMD	EV6	TOW
	40	C003- 2X0.33 GRAY	0.33	White	0.00	X4	CMD	EV6	TOW
W24	82	C003- 2X0.33 GRAY	0.33	Brown	0.00	SK2	CMD	EV6	TOW
	40	C003- 2X0.33 GRAY	0.33	White	0.00	X4	CMD	EV6	TOW
W25	4	C002- 3X4 GRAY	4	Blue	0.00	X1	PAN	X3	TCPAN
	3	C002- 3X4 GRAY	4	Brown	0.00	X1	PAN	X3	TCPAN
		C002- 3X4 GRAY	4	YellowGreen	0.00	X5	TCPAN	X0	PAN
W26	42P	C003- 2X0.33 GRAY	0.33	Brown	0.00	SK2	CMD	REG2	TC
	90	C003- 2X0.33 GRAY	0.33	White	0.00	SK2	CMD	REG2	TC
W27	86	C008- 2X0.22 BLACK	0.22	Blue	0.00	SK2	CMD	FC7	TC
	42M	C008- 2X0.22 BLACK	0.22	Brown	0.00	SK2	CMD	FC7	TC
W28	87	C008- 2X0.22 BLACK	0.22	Blue	0.00	SK2	CMD	FC8	TC
	42N	C008- 2X0.22 BLACK	0.22	Brown	0.00	SK2	CMD	FC8	TC
W29	89	C003- 2X0.33 GRAY	0.33	Brown	0.00	SK2	CMD	EV3	TC
	40	C003- 2X0.33 GRAY	0.33	White	0.00	X4	CMD	EV3	TC
W3	66	C006- 6X0.22 GRAY	0.22	Brown	0.00	X4	CMD	MSW4	TOW
	67	C006- 6X0.22 GRAY	0.22	Green	0.00	SK2	CMD	MSW4	TOW
	42H	C006- 6X0.22 GRAY	0.22	Grey	0.00	SK2	CMD	MSW4	TOW
	69	C006- 6X0.22 GRAY	0.22	Pink	0.00	SK2	CMD	MSW4	TOW
W30	88	C003- 2X0.33 GRAY	0.33	Brown	0.00	SK2	CMD	EV3	TC
	40	C003- 2X0.33 GRAY	0.33	White	0.00	X4	CMD	EV3	TC
W31	84	C015- 4X0.22 GRAY	0.22	Red	0.00	SK2	CMD	X3	TCPAN
	40	C015- 4X0.22 GRAY	0.22	Yellow	0.00	X4	CMD	X3	TCPAN

REV	DATE	SIGNAT.	CHANGES

PROJECT 9340 - Light drop tower		SHEET 19
CUSTOMER		OF 20
JOB ORDER		
TITLE LISTA CAVI		
DES. P.GENINATTI		DATE 01/07/2009
		18 ◀ ▶ 20

LISTA CAVI

CAVO		COMPONENTE ORIGINE				COMPONENTE DESTINAZIONE			
Sigla	N° Filo	Codice	Sez. (mm ²)	Colore/Num.	Lung. (m)	Ubicazione	Ubicazione	Sigla	Ubicazione
W32		C003 - 2X0,33 GRAY	0,33	Brown	0,00	SK4	CMD	SJ5	PANPOS
		C003 - 2X0,33 GRAY	0,33	White	0,00	SK4	CMD	SJ5	PANPOS
W4	70	C006 - 6X0,22 GRAY	0,22	Brown	0,00	X4	CMD	MSW2	TOW
	43	C006 - 6X0,22 GRAY	0,22	Green	0,00	X4	CMD	MSW2	TOW
	42L	C006 - 6X0,22 GRAY	0,22	Grey	0,00	SK2	CMD	MSW2	TOW
	71	C006 - 6X0,22 GRAY	0,22	Pink	0,00	SK2	CMD	MSW2	TOW
	45	C006 - 6X0,22 GRAY	0,22	White	0,00	X4	CMD	MSW2	TOW
W5		C007 - 4X0,22 BLACK	0,22	Black	0,00	PHOT1	TOW	SJ2	TOW
		C007 - 4X0,22 BLACK	0,22	Blue	0,00	PHOT1	TOW	SJ2	TOW
		C007 - 4X0,22 BLACK	0,22	Brown	0,00	SJ2	TOW	PHOT1	TOW
		C007 - 4X0,22 BLACK	0,22	White	0,00	PHOT1	TOW	SJ2	TOW
W6	62	C004 - 8X0,22 GRAY	0,22	Blue	0,00	INV1	PAN	SK2	CMD
	57	C004 - 8X0,22 GRAY	0,22	Brown	0,00	INV1	PAN	SK2	CMD
	61	C004 - 8X0,22 GRAY	0,22	Green	0,00	INV1	PAN	SK2	CMD
	63	C004 - 8X0,22 GRAY	0,22	Grey	0,00	INV1	PAN	SK2	CMD
	59	C004 - 8X0,22 GRAY	0,22	Orange	0,00	INV1	PAN	SK2	CMD
	58	C004 - 8X0,22 GRAY	0,22	Red	0,00	INV1	PAN	SK2	CMD
	60	C004 - 8X0,22 GRAY	0,22	Yellow	0,00	INV1	PAN	SK2	CMD
W7	42A	C003 - 2X0,33 GRAY	0,33	Brown	0,00	INV1	PAN	SK2	CMD
	64	C003 - 2X0,33 GRAY	0,33	White	0,00	INV1	PAN	SK2	CMD
W8		C007 - 4X0,22 BLACK	0,22	Black	0,00	SJ3	TOW	SK4	CMD
		C007 - 4X0,22 BLACK	0,22	Blue	0,00	SJ3	TOW	SK4	CMD
		C007 - 4X0,22 BLACK	0,22	Brown	0,00	SJ3	TOW	SK4	CMD
		C007 - 4X0,22 BLACK	0,22	White	0,00	SJ3	TOW	SK4	CMD
W9	76	C008 - 2X0,22 BLACK	0,22	Blue	0,00	FC2	TOW	SK2	CMD
	42G	C008 - 2X0,22 BLACK	0,22	Brown	0,00	FC2	TOW	SK2	CMD

PROJECT	9340 - Light drop tower	SHEET	20
CUSTOMER		OF	20
JOB ORDER			
TITLE	LISTA CAVI		
DES. P. GENINATTI	DATE 01/07/2009		

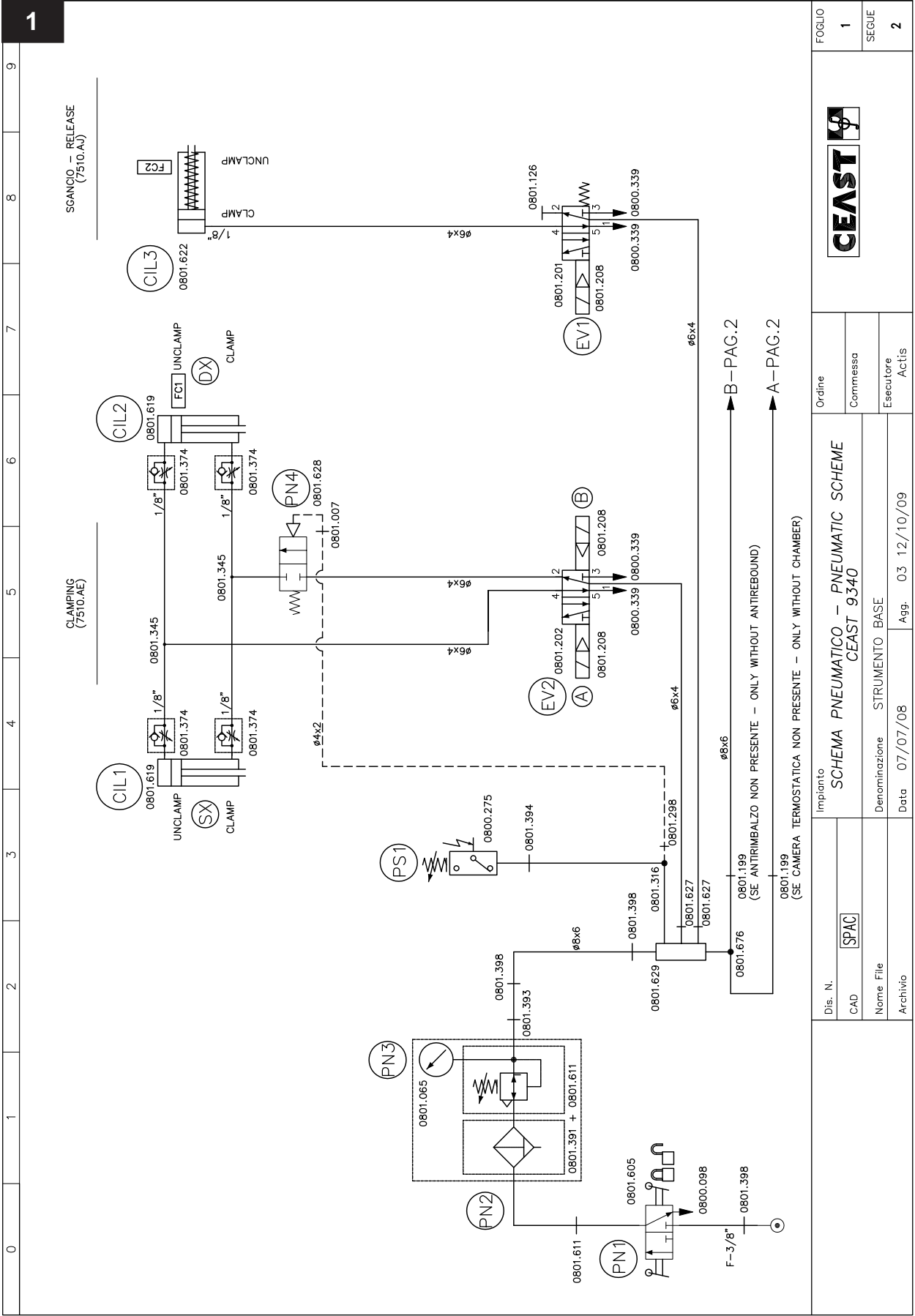

ELECTRONIC DEPARTMENT
 CEAST Srl - Via Airauda 12 - 10044 Pianezza TO

REV	DATE	SIGNAT.	CHANGES

13. PNEUMATIC DIAGRAMS

This section of the manual includes the pneumatic diagrams of “CEAST 9340” instrument as indicated in the table below:

<i>Title</i>	<i>Rev.</i>	<i>Page</i>
Strumento base (Basic Instrument)	03	1 of 2
Opzione antirimbalzo e cella (Antirebound Option and Chamber)	03	2 of 2

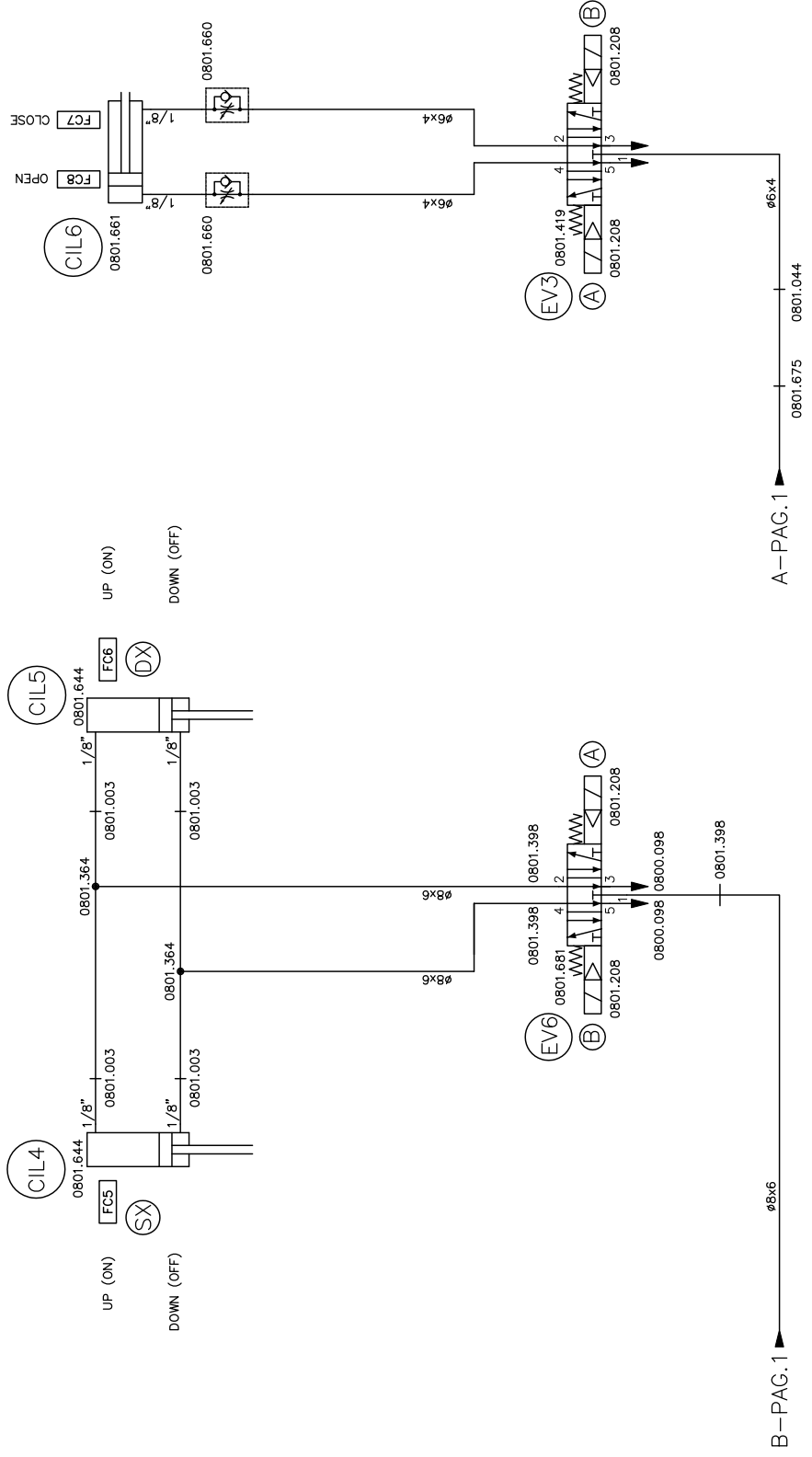


Dis. N.	SPAC	Impianto	SCHEMA PNEUMATICO - PNEUMATIC SCHEME	Ordine	CEAST	FOLIO	1
CAD			CEAST 9340	Commissa		SEGUE	2
Nome File	STRUMENTO BASE	Denominazione		Esecutore			
Archivio	07/07/08	Data	03 12/10/09	Actis			

0 1 2 3 4 5 6 7 8 9

CAMERA TERMOSTATICA - ENVIRONMENTAL CHAMBER
7510.PN (7516.000)
OPEN-CLOSE SHUTTER

ANTRIMBALZO - ANTIREBOUND
(7510.002)



Dis. N.	SPAC	Impianto	Schema Pneumatico - Pneumatic Scheme	Ordine		Foglio	2
CAD		Denominazione	Schema Pneumatico - Pneumatic Scheme CEAST 9340	Commissa		Segue	/
Nome File		Data	OPZIONE ANTRIMBALZO E CELLA	Esecutore			
Archivio		Agg.	07/07/08	Actis			



APPENDIX A - CEAST 9340 PART LIST

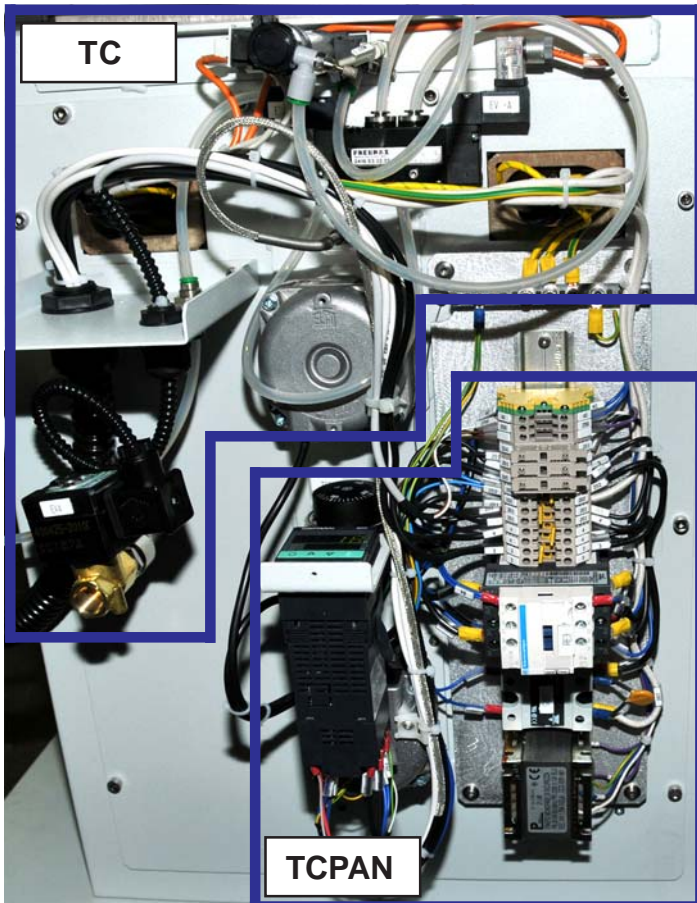
<i>Description</i>	<i>Location</i>
CMD	Control Panel
PAN	Instrument Electrical Panel
PANPOS	Rear Panel
PNEU	Pneumatic Box
TC	Thermostatic Cell
TCPAN	Thermostatic Cell Electrical
TOW	Instrument Tower




CMD
TOW

Note:

- It is referred to the structure including door sensors and crosshead upper and lower limit microswitches. The other parts installed on the structure are not considered.


TOW

TC
TCPAN

<i>Pneumatic Diagram, page 1</i>			
Label	Code	Description	Location
PN1	0801.605	On-Off valve (Off lockable)	PANPOS
PN2	0801.391	Pressure reducer with filter	PANPOS
PN3	0801.065	Pressure gauge	PANPOS
PN4	0801.628	On-Off valve	PNEU
CIL1	0801.619	Specimen clamping left cylinder	TOW
CIL2	0801.619	Specimen clamping left cylinder	TOW
CIL3	0801.622	Striker releasing device cylinder	TOW
<i>Pneumatic Diagram, page 2</i>			
Label	Code	Description	Location
CIL4	0801.644	Antirebound option left cylinder	TOW
CIL5	0801.644	Antirebound option right cylinder	TOW
CIL6	0801.661	Chamber shutter cylinder (Environmental chamber option)	TOW



Note: - For the electric/electronic parts pls. refer to the location list (chapter 12. Wiring diagram, sheet 17).

APPENDIX B - TOOLING

CHARPY IMPACT TESTING

STANDARD	SPECIMEN DIMENSIONS	SPAN	VICE	SHOULDERS	INTERCHANGEABLE HEAD STRIKER		
					STRIKER HEAD	HEAD ADAPTER	STRIKER BODY
ISO 179	4x10x80 mm	62 mm	7520.060	Flatwise impact 7520.063	7529.812	7529.894	7519.001 – non instrumented 7519.504 – strain gauge 5 kN (Ø12.7 mm) 7519.505 – strain gauge 10 kN (Ø12.7 mm)
				Edgewise impact 7520.064			
ASTM D 6110	3.17x12.7x127 mm	101.6 mm	7520.060	7520.066	7529.811	7529.894	7519.506 – strain gauge 20 kN 7519.507 – strain gauge 40 kN 7519.694 – piezo 4.5 kN (Ø12.7 mm) 7519.606 – piezo 22 kN 7519.696 – piezo 22 kN (Ø12.7 mm)
	6.35x12.7x127 mm						
	12.7x12.7x127 mm						
ASTM E23	10x10x55 mm	40 mm		7520.069	7529.821		

IZOD IMPACT TESTING

STANDARD	SPECIMEN DIMENSIONS	VICE	SPECIMEN ADAPTER	INTERCHANGEABLE HEAD STRIKER		
				STRIKER HEAD	HEAD ADAPTER	STRIKER BODY
ISO 180	4x10x80 mm	7520.080	6545.250	7529.810	7529.894	7519.001 – non instrumented 7519.504 – strain gauge 5 kN (Ø12.7 mm) 7519.505 – strain gauge 10 kN (Ø12.7 mm) 7519.506 – strain gauge 20 kN 7519.507 – strain gauge 40 kN 7519.694 – piezo 4.5 kN (Ø12.7 mm) 7519.606 – piezo 22 kN 7519.696 – piezo 22 kN (Ø12.7 mm)
			6545.051			
			6545.050			
			6545.124			
ASTM D256	10x10x55 mm	7520.081	7520.089	7529.820	7529.894	

IMPACT TESTING ON PIPES

STANDARD	SPECIMEN DIMENSIONS [mm]	SPECIMEN HOLDER	HEAD DIAMETER [mm]	INTERCHANGEABLE HEAD STRIKER		
				STRIKER HEAD	HEAD ADAPTER	STRIKER BODY
ASTMD D2444 type A	Lenght equal to outside pipe diameter, at least 152 mm	7520.210 V-block 90° for diameter 25-65 mm 7520.212 V-block 90° for diameter 80-160 mm 7520.215 flat plate for type B	25.4	7529.841	7529.898	7519.001 - non instrumented
ASTMD D2444 type B				7529.842		7519.504 - strain gauge 5 kN (Ø 12.7 mm)
ASTMD D2444 type C				7529.843		7519.505 - strain gauge 10 kN (Ø 12.7 mm)
						7519.506 - strain gauge 20 kN
						7519.507 - strain gauge 40 kN
						7519.694 - piezo 4.5 kN (Ø 12.7 mm)
						7519.606 - piezo 22 kN
						7519.696 - piezo 22 kN (Ø 12.7 mm)

BIAXIAL IMPACT TESTING - RIGID SPECIMENS

STANDARD	SPECIMEN DIMENSIONS [mm]		HEAD DIA. [mm]	CLAMP INNER HOLE [mm]	CLAMPING SET	FIXED HEAD STRIKER	INTERCHANGEABLE HEAD STRIKER		
							STRIKER HEAD	HEAD ADAPT.	STRIKER BODY
ISO 6603-1	Square 140±2	Thickness 4.0±0.1	10	100	7520.044	7519.010 non instrumented 7519.115 strain gauge 10kN	-	-	-
ISO 6603-2	Disc Ø140±2								
ASTM D 3763									
ASTM D 5628 method FD	≥ 89	-	12.7	76	7520.043	7519.020 non instrumented 7519.125 strain gauge 10kN 7519.221 piezo 0.45 kN	7529.801(a) 7529.802	-	7519.001 non instrumented 7519.504 strain gauge 5 kN (Ø12.7 mm) 7519.505 strain gauge 10 kN (Ø12.7 mm) 7519.694 piezo 4.5 kN (b) (Ø12.7 mm) 7519.696 piezo 22 kN (c) (Ø12.7 mm)
ASTM D 5628 method FA			15.86 (5/8")			-	7529.803	-	
ISO 6603-1	Square 60±2	Thickness 2.0±0.1	20	40	7520.042	7519.040 non instrumented 7519.146 strain gauge 20kN 7519.241 piezo 0.45 kN 7519.246 piezo 22 kN	7529.804	7529.894	7519.001 non instrumented 7519.504 strain gauge 5 kN (Ø12.7 mm) 7519.505 strain gauge 10 kN (Ø12.7 mm) 7519.506 strain gauge 20 kN 7519.507 strain gauge 40 kN 7519.694 piezo 4.5 kN (Ø12.7 mm) 7519.606 piezo 22 kN 7519.696 piezo 22 kN (Ø12.7 mm)
ISO 6603-2	Disc Ø60±2								
ASTM D 5628 method FE									
ASTM D 5628 method FB	≥ 51	-	12.7 conical	38.1	7520.041	-	7529.840	7529.896	
ASTM D 5628 method FC	≥140	-	38.1	127	7520.046	-	7529.807	7529.897	

- a) for striker code 7519.694 only;
b) one head dia. 12,7 mm, code 7529.801 included;
c) one head dia. 12,7 mm, code 7529.802 included.

BIAXIAL IMPACT TESTING - FILMS

STANDARD	SPECIMEN DIMENSIONS [mm]		HEAD DIA. [mm]	CLAMPING INNER DIAMETER [mm]	CLAMPING SET	FIXED HEAD STRIKER	INTERCHANGEABLE HEAD STRIKER		
							STRIKER HEAD	HEAD ADAPT.	STRIKER BODY
ISO 7765-2	Ø80±2	Thickness max. 1	10	40	7520.050	7519.010 non instrumented 7519.115 strain gauge 10kN	-	-	-
ASTM D 3763 ASTM D 7192	≥ 89	-	12.7	76	7520.051	7519.020 non instrumented 7519.125 strain gauge 10kN 7519.221 piezo 0.45 kN	7529.801(a) 7529.802	-	7519.001 non instrumented. 7519.504 strain gauge 5 kN (Ø12.7 mm) 7519.505 strain gauge 10 kN (Ø12.7 mm) 7519.694 piezo 4.5 kN (b) (Ø12.7 mm) 7519.696 piezo 22 kN (c) (Ø12.7 mm)
ISO 7765-2	Ø80±2	Thickness max. 1	20	40	7520.050	7519.040 non instrumented 7519.146 strain gauge 20kN 7519.241 piezo 0.45 kN 7519.246 piezo 22 kN	7529.804	7529.894	7519.001 non instrumented 7519.504 strain gauge 5 kN (Ø12.7 mm) 7519.505 strain gauge 10 kN (Ø12.7 mm) 7519.506 strain gauge 20 kN 7519.507 strain gauge 40 kN 7519.694 piezo 4.5 kN (Ø12.7 mm) 7519.606 piezo 22 kN 7519.696 piezo 22 kN (Ø12.7 mm)

a) for striker code 7519.694 only;

b) one head dia. 12,7 mm, code 7529.801 included;







c) one head dia. 12,7 mm, code 7529.802 included.

CAI / REBOUND IMPACT TESTING

STANDARD	SPECIMEN DIMENSIONS	HEAD DIAMETER	FIXTURE WINDOW	SUPPORT STAND	INTERCHANGEABLE HEAD STRIKER		
					STRIKER HEAD	HEAD ADAPTER	STRIKER BODY
Airbus AITM 1.0010 ASTM D7136 M AECMA EN6038	150x100 mm	16 mm	125x75 mm	7520.350	7529.825	-	7519.001 non instrumented 7519.504 strain gauge 5 kN (∅12.7 mm) 7519.505 strain gauge 10 kN (∅12.7 mm) 7519.694 piezo 4.5 kN (b) (∅12.7 mm) 7519.696 piezo 22 kN (c) (∅12.7 mm)
					7529.826*	7529.894	7519.001 non instrumented 7519.504 strain gauge 5 kN (∅12.7 mm) 7519.505 strain gauge 10 kN (∅12.7 mm) 7519.506 strain gauge 20 kN 7519.507 strain gauge 40 kN 7519.694 piezo 4.5 kN (∅12.7 mm) 7519.606 piezo 22 kN 7519.696 piezo 22 kN (∅12.7 mm)
ASTM D7136 Boeing BSS 7260 SACMA SRM 2R-94	6x4" (152.4x101.6 mm)	5/8" (15.875 mm)	5x3" (127x76.2 mm)	7520.351	7529.803	-	7519.001 non instrumented 7519.504 strain gauge 5 kN (∅12.7 mm) 7519.505 strain gauge 10 kN (∅12.7 mm) 7519.694 piezo 4.5 kN (b) (∅12.7 mm) 7519.696 piezo 22 kN (c) (∅12.7 mm)

(*) The Striker head 7529.826 diameter (15.95 +/-0.03 mm) is suitable to perform CAI/Rebound tests according to all the standards

APPENDIX C - TOOLING FOR TENSILE IMPACT TEST ONLY

TENSILE - IMPACT TESTING										
STANDARD	SPECIMEN TYPE	CLAMPING FOR RIGID SPECIMENS AND FILMS				CALIBRATED FREE TENSILE GRIP	PIEZO-ELECTRIC FORCE SENSOR	STRIKER		
		Adapter	Knurled Plate	Gripping Adapter	Specimen Holding Fixture					
ISO 8256 Method A	1 and 3	7520.255	X	X for spec. thickness 3 mm	X for films	For rigid spec. from 7520.271 to 7520.278	7520.251 or 7520.252	7510.260		
				X for spec. thickness 4 mm						
				X						
	2 and 4	7520.256	X	X for spec. thickness 3 mm	X	For rigid spec. from 7520.271 to 7520.278				
				X for spec. thickness 4 mm						
				X for films						
	5	7520.257	-	-	-	For rigid spec. from 7520.271 to 7520.278.				

APPENDIX D - STRIKERS TECHNICAL FEATURES

FIXED HEAD STRIKERS - HEMISPHERICAL HEAD

NON-INSTRUMENTED				
CODE	HEAD	MAX. FORCE	LENGTH	MASS
7519.010	Ø 10 mm	-	240 mm	500 g
7519.020	Ø 12.7 mm	-	240 mm	500 g
7519.040	Ø 20 mm	-	240 mm	500 g

INSTRUMENTED - STRAIN GAUGE				
CODE	HEAD	MAX. FORCE	LENGTH	MASS
7519.115	Ø 10 mm	10 KN	240 mm	400 g
7519.125	Ø 12.7 mm	10 KN	240 mm	400 g
7519.146	Ø 20 mm	20 KN	240 mm	500 g

INSTRUMENTED - PIEZO				
CODE	HEAD	MAX. FORCE	LENGTH	MASS
7519.221	Ø 12.7 mm	0.45 KN	240 mm	400 g
7519.241	Ø 20 mm	0.45 KN	240 mm	500 g
7519.246	Ø 20 mm	22 KN	240 mm	500 g

INTERCHANGEABLE HEAD STRIKERS (Table 1 of 2)

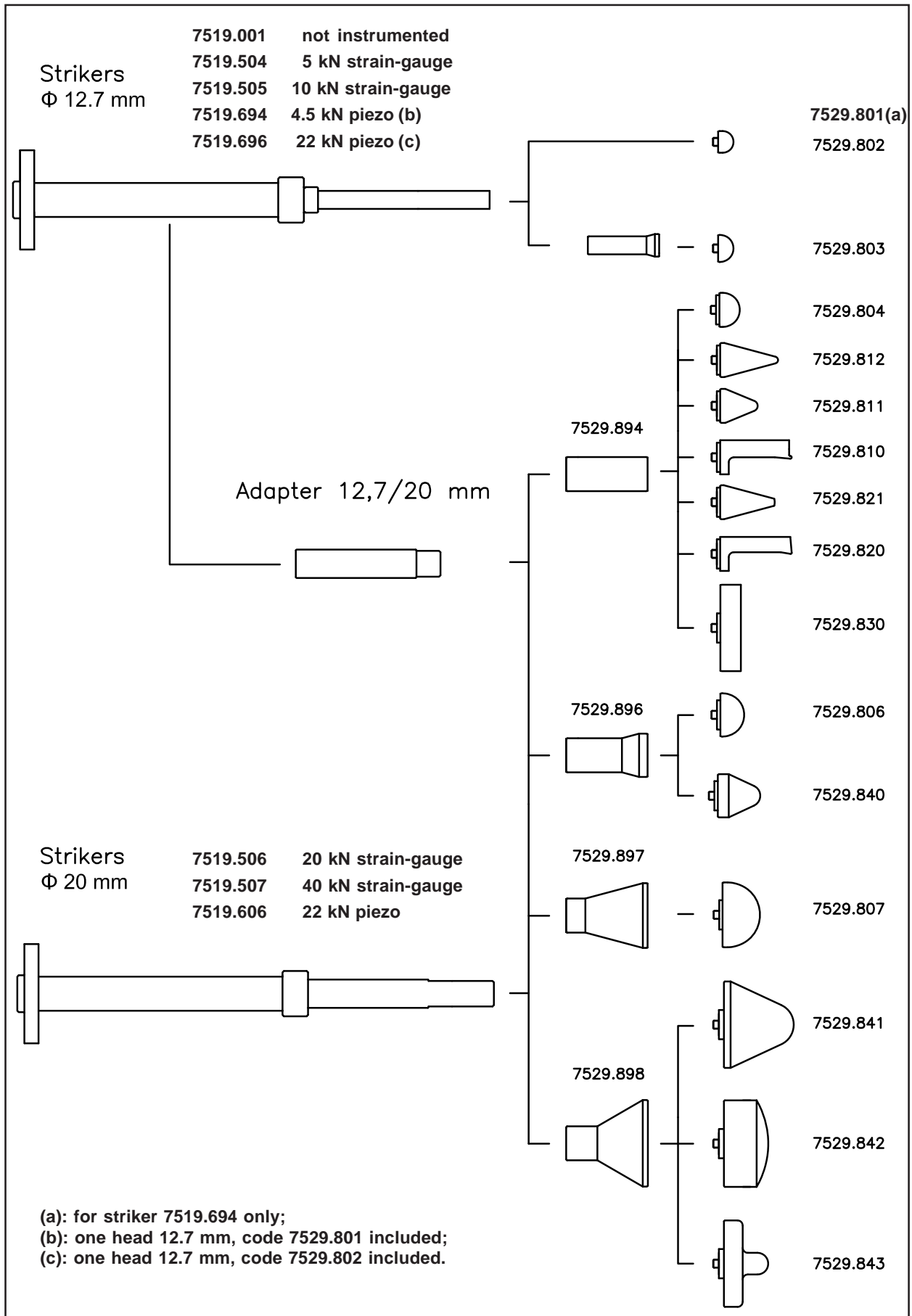
HEADS \ STRIKERS		7519.001	7519.694	7519.696	7519.504	7519.505	7519.506	7519.507	7519.606
		non-instrum.	piezo 4.5 kN	piezo 22 kN	strain gauge 5 kN	strain gauge 10 kN	strain gauge 20 kN	strain gauge 40 kN	piezo 22 kN
7529.802 7529.801 (a)	Ø 12.7 mm ASTM D 3763 ASTM D 7192	L 240 mm P 487 g	L 239 mm P 486 g	Length 240 mm; Mass 487 g					
7529.803	Ø 15.86 (5/8") ASTM D 5628 FA ASTM D7136, Boeing BSS 7260 SACMA SRM 2R-94	Length 240 mm; Mass 566 g							
7529.825	Ø 16 mm AECMA EN6038, ASTM D7136 M, Airbus AITM 1.0010	Length 240 mm; Mass 568 g							
7529.826	Ø 16 mm Airbus AITM 1.0010, ASTM D7136, ASTM D7136 M, AECMA EN6038, SACMA SRM 2R-94, Boeing BSS 7260	Length 250 mm; Mass 608 g							
7529.804	Ø 20 mm ISO 6603 - ISO 7765 ASTM D5628 met. FE	Length 245 mm; Mass 605 g							
7529.806	Ø 25.4 mm	Length 247 mm; Mass 635 g							
7529.807	Ø 38.1 mm ASTM D5628 met. FC	Length 241 mm; Mass 648 g							

a) for striker code 7519.694 only.

INTERCHANGEABLE HEAD STRIKERS (Table 2 of 2)

HEADS	STRIKERS		7519.001	7519.694	7519.696	7519.504	7519.505	7519.506	7519.507	7519.606
			non- instrum.	piezo 4.5 kN	piezo 22 kN	strain gauge 5 kN	strain gauge 10 kN	strain gauge 20 kN	strain gauge 40 kN	piezo 22 kN
7529.840	Ø 12.7 mm conical ASTM D6628 met. FB					Length 255 mm; Mass 650 g				
7529.841	for pipes D 2444 type A					Length 262 mm; Mass 770 g				
7529.842	for pipes D 2444 type B					Length 247 mm; Mass 768 g				
7529.843	for pipes D 2444 type C					Length 253 mm; Mass 739 g				
7529.830	flat Ø 50 mm					Length 245 mm; Mass 704 g				
7529.810	Izod ASTM D256 - ISO 180					Length 275 mm; Mass 641 g				
7529.811	Charpy ASTM D6110					Length 255 mm; Mass 623 g				
7529.812	Charpy ISO 179					Length 267 mm; Mass 640 g				
7529.820	Izod ASTM E 23					Length 275 mm; Mass 641 g				
7529.821	Charpy ASTM E 23					Length 265 mm; Mass 639 g				

ASSEMBLY FLOW CHART FOR INTERCHANGEABLE HEAD STRIKERS



APPENDIX E - INPUT LIST

INPUT LIST (1 of 2)				
Input on I/O board		Meaning when: input open or to GND; LED on board OFF; State physics/ logic "1" (readed from CPU/shown on display)	Sensor type or contact /Sensor position	Notes
1	EIN1	Motor overload	Inverter contact NA/Terminal AL1 inverter SJ 200 Hitachi	The contact closes when the inverter is powered ON. Terminal AL0 a +24V
2	EIN2	Emergency active	Electric connection / +24V ON	
3	EIN3	Chamber door closed	Contact NC/section 3 (NC) chamber door	The contact is open when the chamber door is closed
4	EIN4	Temperature regulator NOT in alarm	Contact NA/Exit Out 2 Temperature regulator Gefran 800	Other side at +24V
5	EIN5	Safety thermostat (alarm)	Electric connection /Thermostat contact (NC)	Entry always open when the chamber is not activated (alarm disguised when the chamber is inactive)
6	EIN6	Upper door closed	Contact NC/section 3 (NC) upper door	The contact is open when the upper door is closed
7	EIN7	Reached the crosshead upper limit stop	Proximity PNP NC / on upper limit stop	
8	EIN8	Reached the crosshead lower limit stop	Proximity PNP NC / on lower limit stop	

INPUT LIST (2 of 2)				
Input on I/O board		Meaning when: input open or to GND; LED on board OFF; State physics/ logic "1" (readed from CPU/shown on display)	Sensor type or contact /Sensor position	Notes
9	EIN9	Antirebound system in working position (out of limit)	2 reed NA (one per each pneumatic cylinder) /on upper side of cylinder (in rest position)	With Antirebound option , the contact is closed with antirebound to the rest (out of limit)
10	EIN10	Specimen jammed	Reed NA/on the upper side of the pneumatic cylinder (jammed specimen position)	The contact is closed with clamping plate aloft (specimen NOT clamped)
11	EIN11	Presence of striker	Proximity PNP NC / on the crosshead in front of carriage	
12	EIN12	Striker NOT hooked	Reed NA/on the outside surface of pneumatic cylinder (in hooked position)	The contact is closed with hook closed (hooked carriage)
13	EIN13	Shutter of chamber NOT closed	Reed NA/on the inside surface of pneumatic cylinder (closing)	The contact is closed with shutter completely closed
14	EIN14	Shutter of chamber NOT open	Reed NA/on the outside surface of pneumatic cylinder (opening)	The contact is closed with shutter completely open
15	EIN15	--	--	--
16	EIN16	--	--	--

APPENDIX F - OUTPUT LIST

OUTPUT LIST (1 of 2)					
Output	Meaning IF ACTIVE (logic state "1" written by CPU -- LED on board ON-- Output driven toward positive reference)	Power Supply	Actuator	Notes	
1	POW_OUT_1 (M5-12 LED D 36)	ALIM_1 24V_ MOVE	EV chamber shutter (bistable) Opening command	Controllable on CPU through GPIO PP4 deactivating the PWM4 (Port P -- bit4)	
2	POW_OUT_2 (M5-14 LED D 37)	ALIM_1 24V_ MOVE	EV chamber shutter (bistable) Closing command	Controllable on CPU through GPIO PP5 deactivating the PWM5 (Port P -- bit5)	
3	POW_OUT_3 (M5-16 LED D 38)	ALIM_1 24V_ MOVE	Triac	The motor is of self-braking type: brake command absent --> brake active	
4	POW_OUT_4 (M5-18 LED D 42)	ALIM_1 24V_ MOVE	EV Releasing (monostable)	When powered it releases; normally hokeed	
5	POW_OUT_5 (M5-20 LED D 43)	ALIM_1 24V_ MOVE	EV Antirebound (bistable) Up command		
6	POW_OUT_6 (M5-22 LED D 44)	ALIM_1 24V_ MOVE	EV Antirebound (bistable) Down command		
7	POW_OUT_7 (M5-24 LED D 47)	POW_COM_7 24V_DOOR	EV Clamp (bistable) Up command		
8	POW_OUT_8 (M5-26 LED D 48)	POW_COM_8 24V_DOOR	EV Clamp (bistable) Down command		

OUTPUT LIST (2 of 2)					
Output		<u>Meaning IF ACTIVE</u> (logic state "1" written by CPU -- LED on board ON-- Output driven toward positive reference)	Power Supply	Actuator	Notes
9	INV_OUT_1 (M5-3 LED D 52)	Start Movement Crosshead go down (encoder decrement)	P24_INV P24 (generated by inverter)	MI1 Terminal (FWD) inverter	
10	INV_OUT_2 (M5-4 LED D 53)	Start Movement Crosshead go up	P24_INV P24 (generated by inverter)	MI2 Terminal (REV) inverter	
11	INV_OUT_3 (M5-5 LED D 54)	Crosshead speed selection (bit1)	P24_INV P24 (generated by inverter)	MI3 Terminal, inverter	
12	INV_OUT_4 (M5-6 LED D 58)	Crosshead speed selection (bit2)	P24_INV P24 (generated by inverter)	MI4 Terminal, inverter	
13	INV_OUT_5 (M5-7 LED D 59)	Crosshead motor DC braking	P24_INV P24 (generated by inverter)	MI5 Terminal, inverter	
14	INV_OUT_6 (M5-8 LED D 60)	Buzzer active	P24_INV_6 P24	Buzzer	
15	INV_OUT_7 (M5-9 LED D 63)	Activate the power reinstatement	P24_INV_7 P24_DOOR	Power the NA section of the two door sensors series connected	Restore the power after door shutting (both doors: turret and chamber)
16	INV_OUT_8 (M5-10 LED D 64)	Thermostatic chamber ON	P24_INV_8 P24_DOOR	Chamber power relay	Activate the power for heating, fan and EV nitrogen

APPENDIX G - ERROR CODES LIST

List of Error Codes (Various)			
Code	Error	Cause	Remedy
0	No errors	-	-
1	Unknown error	Error in the firmware code	Contact Authorized Service
10	RX message too long	Message too long received on the serial line	Reduce the length of the message
11	Inconsistent status	Error on the serial line status	Contact Authorized Service
12	Error during attempt to transmit via serial	Transmission error on the serial line	Contact Authorized Service
20	Error in Real Time Clock	CPU do not communicate with the RTC chip	Contact Authorized Service
50	EEPROM Fault	-	Contact Authorized Service
1000	Unknown command	Firmware error	Contact Authorized Service
1001	Unknown status	Firmware error	Contact Authorized Service
1002	Invalid status	Firmware error	Contact Authorized Service

List of Error Codes (Input Parameters) 1 of 2

Code	Error	Cause	Remedy
100	Wrong parameter	Parameter input error	Type-in the correct parameter
101	Insufficient impact speed	Parameter input error. Velocity value too low	Increase the velocity value
102	Excessive drop height	Parameter input error. Drop height value too high	Decrease the drop height value
103	Insufficient drop height	Parameter input error. Drop height value too low with the antirebound enabled	Increase the drop height value
104	Excessive impact speed	Parameter input error. Velocity too high	Decrease the velocity value
105	Temperature range set between 0 and 40 °C	Parameter input error. Temperature value out of range	Type-in the temperature value within ranges: - 70 to 0°C and 40 to 150 °C
106	Set temperature is lower than limit	Parameter input error	Increase the temperature value. Lower limit is - 70 °C
107	Set temperature is higher than limit	Parameter input error	Decrease the temperature parameter. Upper limit is 150 °C
108	Temperature input error	Parameter input error	Type-in the correct value
109	Date input error	Parameter input error. Date and hour setting error	Type-in the correct date and hour
110	Incorrect input of identifying bit of the base	Parameter input error: wrong instrument configuration	Type-in the bit that identify the correct base
111	ParError: lot number not correct	Parameter input error: wrong lot number	Type-in the correct number
112	ParError: new password not correct	Parameter input error: wrong password	Type-in a correct password (use letters and numbers only, 8 characters max.)
113	ParError: password level not correct	Parameter input error: wrong password level	Type-in the correct level
114	ParError: language code not correct	Parameter input error: wrong language or not existing one	Select another language

List of Error Codes (Input Parameters) 2 of 2			
Code	Error	Cause	Remedy
115	ParError: test index not correct	Parameter input error	Type-in the correct parameters set index
116	ParError: HW - (Input Setting) disagreement	Parameter input error. Parameters not compatible with the installed options	Type-in the correct parameters in agreement with the installed options
117	Wrong code parameter	Parameter input error (from shell)	Type-in the correct code
118	OFQI out of range	Parameter input error. Offset impact distance out of range	Type-in the correct value. Range: - 120 to + 40
119	OFP out of range	Parameter input error. Offset (tickness) specimen out of range	Type-in the correct value. Range: 0 to 25
120	M out of range	Parameter input error. Mass out of range	Type-in the correct value. Range: 2 to 71
121	LP out of range	Parameter input error. Striker length out of range	Type-in the correct value. Range: 340 to 440
123	Insufficient impact energy	Parameter input error. Impact energy too low	Type-in an higher value
124	Excessive impact energy	Parameter input error. Impact energy too high	Type-in a lower value
130	CPAR: wrong Offset of fixed support	Calibration parameter input error. Instrument base offset value out of limits	(OFZ = OFF. ENC. TV) (Zag = PICK-UP HEIGHT) Range: $0 < (OFZ - Zag) < 25$
133	CPAR: wrong Offset of striker proximity	Calibration parameter input error. Wrong value of the striker proximity offset	Type-in the correct value. Range: 0 to 50
136	CPAR: wrong Temperature Offset	Calibration parameter input error. Temperature offset value error	Type-in the correct value. Range: - 99 to + 99
142	CPAR: wrong K encoder TV	Calibration parameter input error.	

List of Error Codes (Emergency Warnings) 1 of 2

Code	Error	Cause	Remedy
200	Upper door open	Door of the turret leaved open	Close the door
202	Current overload on crosshead motor	Safety intervention for current overload on striker lifting crosshead motor. It can also appear if the tup is stuck after penetration of a specimen, try to move up and down the lifter or to remove by hand or other tool the specimen from the tup	if the tup is stuck after penetration of a specimen, try to move up and down the lifter or to remove by hand or other tool the specimen from the tup. otherwise contact Instron Service
203	Emergency button or power off	Safety intervention. Emergency button leaved pressed or power off	Restore the correct operating condition
205	Chamber door open	Safety intervention. Test chamber door open	Close the door
207	Thermoregulator error (T out of range)	Temperature regulator of the environmental chamber. Temperature value higher than the upper limit	Contact Authorized Service
209	Thermoregulator emergency	Safety thermostat intervention. Temperature regulator fault	Contact Authorized Service
210	Error handler due an emergency status	Actuator emergency	Check emergency condition: door open, power off, low air pressure, emergency button pressed,
211	Error handler due an emergency status (Striker)	Emergency condition occurred during the striker movement	Check emergency condition: door open, power off, low air pressure, emergency button pressed,

List of Error Codes (Emergency Warnings) 2 of 2			
Code	Error	Cause	Remedy
213	Error handler due an emergency status (Shock absorbers)	Emergency condition occurred during the antirebound movement	Check emergency condition: door open, power off, air pressure,
214	Error handler due an emergency status (Specimen)	Emergency condition occurred during the specimen movement	Check emergency condition: door open, power off, air pressure,
215	Error handler due an emergency status (Shutter)	Emergency condition occurred during the striker releasing command in the test cycle. Shutter remains closed	Check emergency condition: door open, power off, air pressure,
217	Error handler due an emergency status (Crosshead)	Emergency condition occurred during the striker lifting crosshead movement	To reset the inverter leave open the turret door for 5 seconds. Check emergency condition: door open, power off, air pressure,
219	Error handler due an emergency status (Restart T.)		

List of Error Codes (Test Starting Condition) 1 of 1			
Code	Error	Cause	Remedy
301	Temperature not ok	Environmental chamber temperature out of tolerance at the test start	Wait until the temperature value is reached before start the test
310	Photocell not ready	Impact and rebound velocity optical detector fault	Contact Authorized Service
311	Photocell not reset		Contact Authorized Service

List of Error Codes (Movements/Process Errors. They cause the test to stop) 1 of 4			
Code	Error	Cause	Remedy
404	TV: crosshead target movement over upper limit		
405	TV: crosshead target movement under lower limit		
408	TV: shutter closed		
412	Specimen not clamped in time	Specimen clamping plate do not descend	
413	Specimen not removed in time	Specimen clamping plate do not ascend	Contact Authorized Service
415	Timeout striker: no picking		Contact Authorized Service
416	Timeout striker: release did not occur		Contact Authorized Service
418	Shock absorbers out of position		Contact Instron Service
419	No striker release: shutter closed		Contact Instron Service
420	No striker picking		Contact Instron Service
421	Striker releasing system closed without striker inside	Emergency button pressed before the lifter picks up the striker	Perform an "Home" cycle (press the "Home" key)

List of Error Codes (Movements/Process Errors. They cause the test to stop) 2 of 4			
Code	Error	Cause	Remedy
445	Striker on shutter position		
446	Shutter open after closing		
447	Shutter closed after opening		
448	Set temperature with shutter open		
450	Shock absorbers not in position after reset		
451	Shock absorbers not in position after set		
461	Thermoregulator is busy		
462	Thermoregulator not connected or broken		
463	Thermoregulator parameters out of range		
480	Striker released but appears present		
481	TV error: fc lower reached before striker prox.		
482	TV error: error in striker finding		
490	Aborted during cycle		
496	Hardware not found		
497	Main task busy		
498	Fatal error: home busy		
499	Handler busy		

List of Error Codes (Movements/Process Errors. They cause the test to stop) 3 of 4

Code	Error	Cause	Remedy
500	TV error: emergency stop		
502	TV: crosshead encoder zeroing not performed		
504	TV: crosshead calibration height too low		
505	TV: crosshead calibration height too high		
524	TV: instable TV positioning		
525	TV: instable TV stop position		
531	TV error: fc upper		
532	TV error: fc lower		
533	TV error: fc lower (SW)		
534	TV error: fc upper (SW)		
535	TV error: on upp. FC up is requested		
536	TV error: on low. FC down is requested		
550	TV: crosshead target movement under limit with Shutter closed		
551	TV: down command with striker yet found		
552	TV: crosshead target movement under limit with Antirebound set		
581	TV: encoder disconnected, motor blocked or direction of rot. conflict		
582	TV: wrong encoder direction		

List of Error Codes (Movements/Process Errors. They cause the test to stop) 4 of 4			
Code	Error	Cause	Remedy
800	Home timeout expired before actuators Ready		
801	Home timeout expired before crosshead Ready		
802	Home timeout expired before option Ready		
803	Home timeout expired before striker ready in hold		
804	Home timeout expired before striker ready in release		
806	Home: autocheck routine failed		
850	Specimen position not correct		
851	Error during cycle - Striker not present		

APPENDIX H - STRIKER ANTIREBOUND SYSTEM

TECHNICAL CHARACTERISTICS

The remarkable characteristics for the effective intervention of the striker antirebound system are the followings:

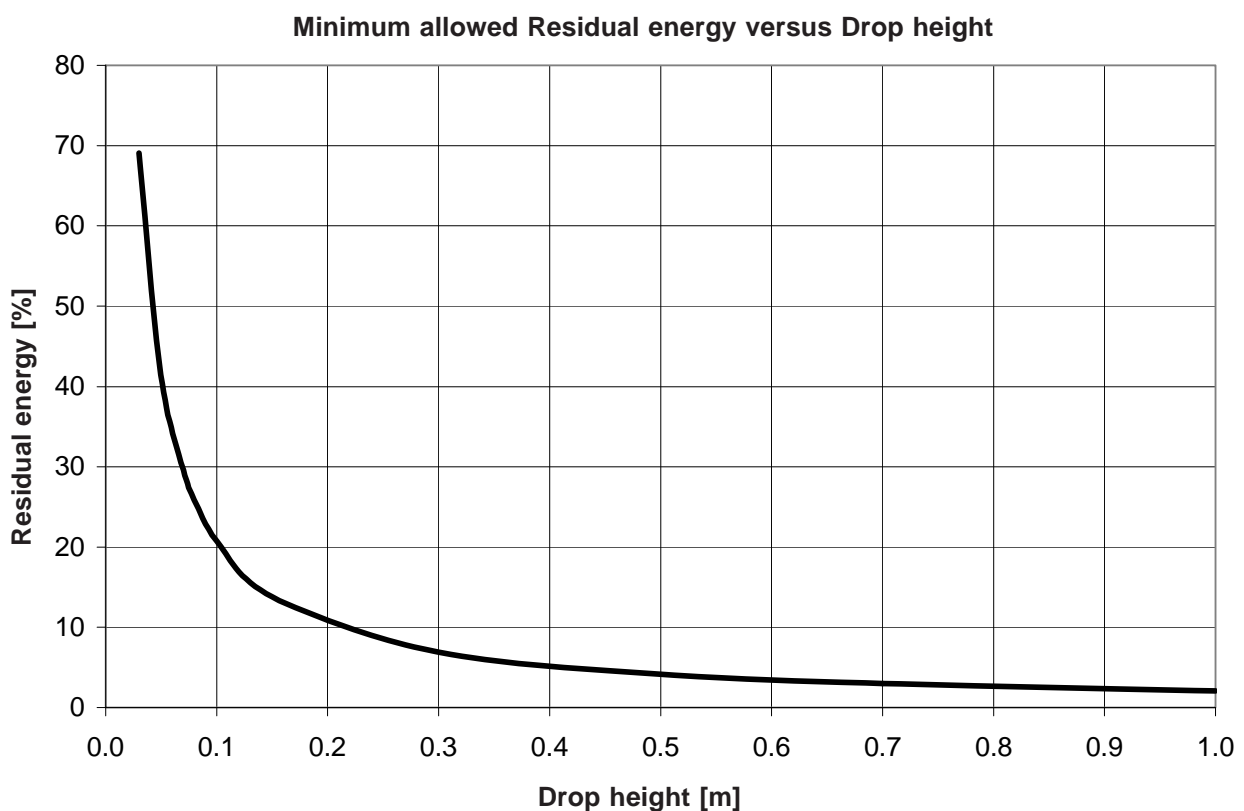
- System intervention time: 130 ms.
- Minimum rebound height: 21 mm.

On the base of the characteristics above-mentioned, on the graph 1 is visualized the minimum “Residual Energy [%]” of the striker after impact, versus the striker “Drop Height [m]”, so that the system is able to avoid the rebound (second impact on the specimen).

The curve represented is independent from the mass of the striker.

Example: striker released from 150 mm:

- If the residual energy after impact is 15 %, the antirebound system stops the striker avoiding the rebound;
- If the residual energy after impact is 10 %, the antirebound system does not stop the striker.



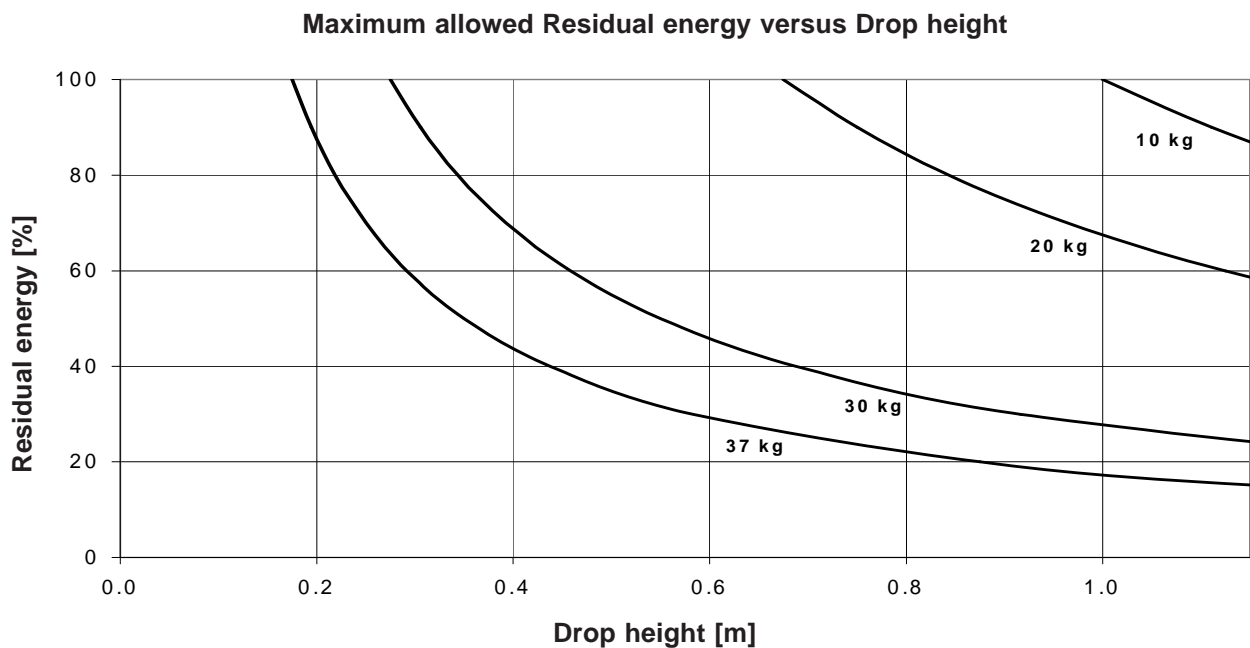
Graph 1

On the graph 2 is visualized the maximum “Residual Energy [%]” of the striker after impact, versus the striker “Drop Height [m]”, so that the system is able to avoid the rebound (second impact on the specimen).

The curve represented is dependent from the mass of the striker.

Example: mass of the striker 30 kg released from 1 m:

- If the residual energy after impact is $< 20\%$, the antirebound system stops the striker avoiding the rebound;
- If the residual energy after impact is $> 30\%$, the antirebound system do not stop the striker.



Graph 2