INSTRUCTIONS
for
MODEL NO. HT-300/500
HARDNESS TESTER
# VERSION 1.0

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General Description

Introduction

The PTB 300 is a high performance hardness tester, which can accurately measure the tensile strength of tablets, ampoules, food and other articles, either in single or in series operation. The tensile strength can be printed out in Kilopond (Kp), Newton (N) or Strong Cobb (SC) units, according to the operator's specifications.

Specifications

Sample Diameter	4 - 40 mm
Jaw Stroke	4 - 40 mm (externally adjustable)
Chart Speed	3 mm/second
Force Increase	2 Kp/second
Measuring Range	HT-300: 0.5 - 30 Kp HT-500: 0.8 - 50 Kp , (convertable to Newtons (N), Kilo Ponds (Kp), or Strong Cobbs (Sc))
Measured Value	Printed on the built in printer
Resolution	0.1 Kp
Accuracy	+/- 1% Full Scale
Measuring Jaws	Interchangable for different sample forms (tablets, ampoules, etc...)
Dimensions	(W) 530 mm x (D) 240 mm x (H) 180 mm
Power Supply	Switch Selectable, 110/220 volt, 50/60 Hz., Single Phase
Input	External Start Switch (optional)
Output	RS-232 or BCD Parallel

Method of Operation
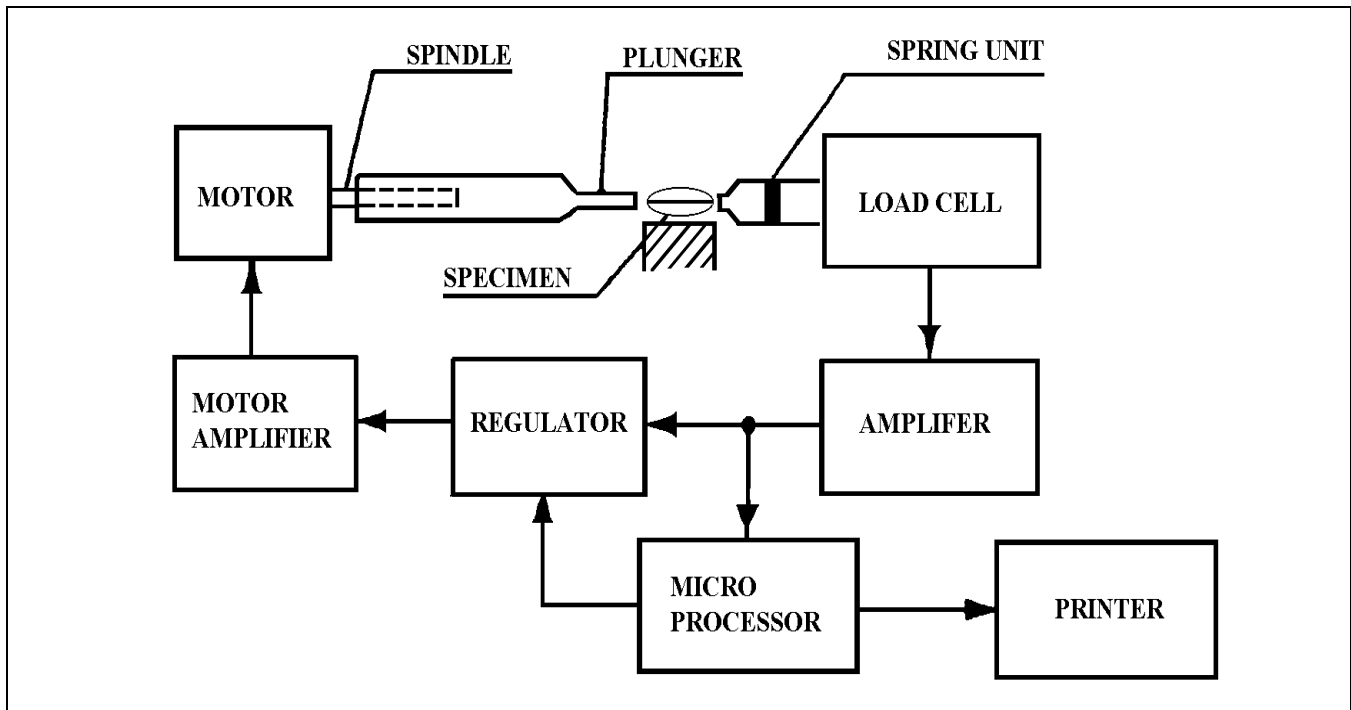
Figure 1: Method of Operation

After pressing the START-key, the zero-value of the load cell is teterminet ant aeoret in the microprocessor. If the value is within the permittet range, the motor, controllet by the regulator-unit ant the motor-amplifier, causes the plunger to move at a constant speed towarta the apecimen. As aeon aa the plunger touches the specimen and protuces a force on the loat cell, the microprocessor switches the regulator on 80 that a lineirly increasing force is producet via the control circuit (loaf cell-regulator-motor-specimen) until the specimen breaks. The decreasing signal from the loat cell indicates to the microprocessor, which subtracts from this value the zero-value (automatic zeropoint correction) and prints out the calculated value in the desired units (N, kp, SC).

The spring-unit in front of the loat cell provites a smooth transition from the constant velocity phase of the plunger to the linear power increase phase.

# Putting into Operation

NOTE: Before putting the HT-300 into operation, check the voltage setting switch on the back of the unit (220 V resp. 115 V) and make sure that the operating voltage corresponds to the local power supply.

Wiring

- connect the signal cables to any additonal units

- connect the signal cable from the external start-key (if fitted)

- connect power supply line.
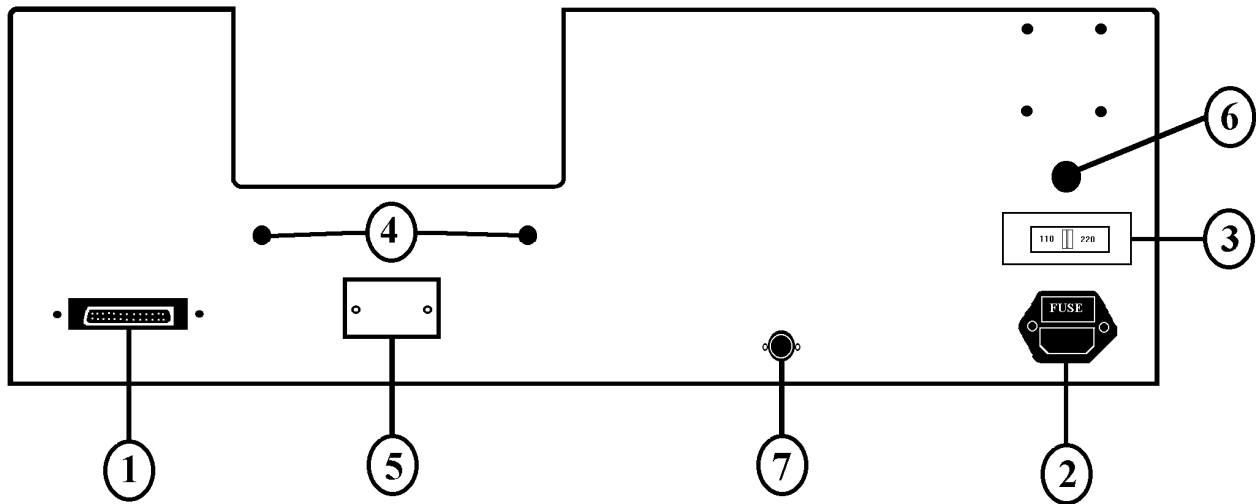
Figure 2: Back of Unit

1. Output 25-pin, plug female type D (parallel-interface)

2. Power input with fuse (250 mA at 220 Volt, 500 mA at 115 Volt)

3. Voltage selector switch 220 V / 115 V

4. Waste Container: Under the container is the switch for units selection, the potentiometer for zero adjustment and the potentiometer for balancing the load cell

5. Under the Waste container and behind the access door is the switch for units selection, the potentiometer for zero adjustment and the potentiometer for balancing the load cell

6. Motor fuse 400 mA

7. Input socket plug (optional external start switch)

Inserting the Chart Paper

The instrument should never be operated without paper.

To insert the paper open the cover (1). Slide in a roll of paper (2), with the dim side up, onto the spindle (3).

Then feed the paper into the printer (4) and while turning the paper transport wheel (5) lead the paper through the printer.

Operating Keyboard

Operating controls

Power Button

Switch on the instrument by pressing the POWER button (1). When pressed the switch should iluminate to indicate that the power has been switched on.

Restart Switch

Using the thumb wheel selector switch (4) the operator can set the machine to automatically start a series of tests. When set to position 0 the automatice testing option is turned off. Selecting positions from 1 to 9 will activate the automatic operation mode. In the automatic mode the operator places a sample for testing between the jaws and presses the start button. After the test is completed the jaws will move away and automaticaly start the next test after the number of seconds as set by the restart switch. If any errors occur, see errors section in this manual, the automatic operation will stop and can be restarted by pressing the start button. After all the samples have been tested press the stop button or set the restart switch to 0 and the automatic operation will be stopped.

Stop Button

By pressing the STOP button the testing procedure can be interruptet at any time.

Start Button

a) By pressing the start button (6) the single measuring procedure can be started (RESTART switch (4) must be set to O). The START button is only operative when the movable plunger is in neutral position.

b) With the START button a series of measurements can be started (RESTART switch (4) must not be set to O).

Printer

When a printout is terminated and the printing paper has stopped moving, or when the paper is torn, move the release-lever (2) in direction of the arrow and remove the paper from the printer. The release lever must not be touched during operation.

The printer (3) should never be operated without paper, otherwiae a clean printout can not be guaranteed.

Adjustments

Limit Switch

By means of the limit switch the jaw stroke can be adjusted from approximately 4 - 40 mm.

Unit

Using this switch following units can be selected as required: Kp, N, SC.

Switch for units

Units Selection Switch

Potentiometer "GAIN"

Potentiometer "ZERO"

Adjustment

A test program is incorporated in the PTB 300 which allows to check and if necessary to adjuat the zero-point- and amplification adjustment without the neet of special measuring equipment.

Starting the test program

The movable plunger must be in neutral position. If you are calibrating the unit it is best to turn the stroke adjustment knob so the jaws are open the widest.

Set restart switch to 0.

Press STOP key and hold down while START key is pressed.

Release both keys at the aame time.

The message "HT 300 xx.xx" is printed out. (The number xx.xx is important for service, requests etc.).

Zero balance

After starting the test program set the RESTART switch to 1. Presa STOP key.

The message "yyyy" is printed out. V

The value "yyyy" must lie between 20 and 60. Is this not the case, adjust the potentiometer "ZERO" so that the value does reach this range. By pressing the STOP-key the zero point can be printed out as often as required. Differencea of less than 7 between the single printouts are normal and do not influence the accuracy of the instrument.

Calibration

a) Turn instrument to the side b) Set RESTART-switch on position 2 c) Press STOP-key d) Set RESTART-switch on position 3 e) Place calibration weight

f) Press STOP-key

The message "zzzz N" is printed out (printout always in N, re

gardless of the setting of the units-switch)

g) Remove calibration weight

h) If necessary adjust potentiometer "GAIN"

1) Repeat operations b) to h) until the balance is satisfactory.

Explanation of error information

NO SAMPLE: No specimen has been insertet.

STOP:

> MAX: T.~.e specimen withstood 300 N.

ZERO: - when pressing the START-key:

The specimen ia already pressing on the loat cell,

or: zero point adjustment is incorrect (see test prog

gram: zero point adjustment)

- during pre-run:

When pressing the START-key the specimen has

pressed stronger on the load cell than during the

pre-run.

The STOP-key interrupts the run of the program.

CONNECTION POSSIBILITIES

Connection of an external start-keY

It ia possible to connect an external atart-key (e.g. footswitch) to the 5-pin aecket; the function of an external atart-key ia identical to that of the internal one.

When starting, the sockets 1 ant 3 muat be short-circuited (30 Y, 30 mA).

Socket 5 i8 earthed when the movable plunger is in ita neutral position. (Open-collector-output NPN, allowable load 30 V, 50 mA).

Connection to arallel-interface (94-00442) (OPTION)

. .   P

Data from the PTB300 are only given out, if the lead FO i8 held on OV.

- If the lead]7S ia held on OV, the PTB300 keeps the data output until the lead 13[alao indicates OV.

- The data are valid when the "LOAD"-impulse haa atarted and remain unchanged until the break of the next specimen haa occured.

Plug connections

a) 5-pin socket:

Pin 1: START-signal (input)

2: no connection

3: earth

4: no connection

5: neutral position of plunger (output)

b) 25-pin socket on parallel interface (TRW-Cinch DBC-25S)

      50-pin aocket on connecting cable   (A~phenol 57-30500)

The program version 8245 of the aTB300 gives following additional possibilities.

- Self test

- printout of result with average value

- equipment optionally with connection for:

- parallel-interface (PCB 94-00422), qualified for HP 97S

- serial-interface RS 232-C (PCB 94-00423)

SELF TEST

The memory and the electronics are automatically tested when the power is turned on. "ERROR" will be printed when a fault is detected. The unit may still be partly operational. Please inform the service-office.

PRINTOUT OF RESULT

With adequate operation the ?TB300 can print out the following information additionally to a measuring series:

- no of samples (batch sizes max. 99 samples or max. 4800 N, 700 SC, 489 kP)

- average value

lowest value

- highest value

OPERATION

Selection of the additional printout

The instrument is ready for measurement

- set RESTART-switch to position 9

- press STOP-key and keep it pressed

- press START-key shortly

- release STOP-key

sum of breaking-value batch size

MEASUREMENT is executed normally (with or without RESTART)

CALLING

the additional information after thc last measurement

- set RESTART-switch to position 9

- press STOP-key and keep it pressed

- press START-key shortly

- release STOP-key

With the call of the additional information the selection for the following measuring series is executed at the same time. This means that the measurement for the following series can be done directly, without additional selection.

DATA-PRINTOUT

NR	17	
XM	4.1 KP	
XMIN	3.7 KP	
XMAX		4.8 KP
17	3.8 KP	
16	4.3 KP	
15	4.1 KP	
14	3.7 KP	
13	3.9 KP	
12	4.3 KP	
11	4.0 KP	
^10	4.0 KP	
9	4.1 KP	
8	4.0 KP	
7	3.7 KP	

6	4.5 KP
5	3.7 KP
4	3.9 KP
3	4.3 KP
2	4.8 KP
1	4.0 KP

- no. of samples

- average value

- lowest value

- **highest value**

- last measurement

The additional printout ensues automatically if the extreme values are reached in a measuring series:

- after 99 samples

- the sum of the measuring values exceeds 4800 N, 700 SC, 489 kp

INTERFACE RS 232-C

Control switch on the PC/board (switch only when instrument is switched off)

BAUD Rate

STOP BITS

Parity

Parity

Data-Bits

DATA OUTPUT

Ż

110, 150, 300. 600, 1~00, 2400, 4800, 9600

1

OFF (aus)

ODD (ungerade)

.

7

1

ON (e~n;

EVEN (gerade)

8

The same information which is output to the printer, is also available on th~ **connector.**

DATA INPUT

CT0.N

M

?

1

ACCEPTANCE TIMING

As START-Switch

As STOP-Switch

Continuously

Continuously

Continuously

1 Continuously (except tool is moving fore)

MEAN VALUE

REPEAT OUTPUT

FUNCTION

KEYBOARD

     START   ,   START switch

     STOP   STOP switch

1

Printer ON

_

i Printer OFF

Printer of. PTB300 ON

Printer of PTfi 300 OFF (Except for ERRORmessage)

Sequence of:

RESTART = 9, STOP,START

The previous data output is repeated

Other signs are ignored

If a sign is accepted it is sent back, except the "?", it

directly gives the data output

Is a parity error detected or an overflow of the input

register, then a "?" is sent back.

Spare Parts List

Part Number	Description
15-156-	Power Button
15-156-	Start/Stop Button
15-156-	Button Lamp
15-156-	Button Lens
15-156-	Button Cover Top
15-156-	Button Cover Bottom
15-156-	Restart Switch (Digit Switch)
15-156-	Standard Jaw Set
15-156-0053	Printer Paper