GENERAL PROCESS AND OPERATION SPECIFICATION

4Dimensions 4-point Probe

I. SCOPE

This document provides the procedure for measuring and calculating sheet resistance and resistivity with the 4 point probe.

II. SAFETY

Always keep your hands out of the working area while the system is in operation/measurement mode. Follow all AFNF safety procedures.

III. APPLICABLE DOCUMENTS, MATERIALS AND REQUIREMENTS

The probe attached to system is recommended for Metal films, ITO, amorphous Si, poly silicon, SOI and bulk substrates ONLY. Do not place any soft material under the probe.

IV. OPERATION

1. Open the top enclosure.
2. Place the sample in the middle of the chuck. Moreover, in case of mapping a full wafer, place wafer on chuck with flat to the left. Use circles on chuck as visual guide for centering your wafer.
3. If you are testing on a piece, place the piece at the center of the chuck.

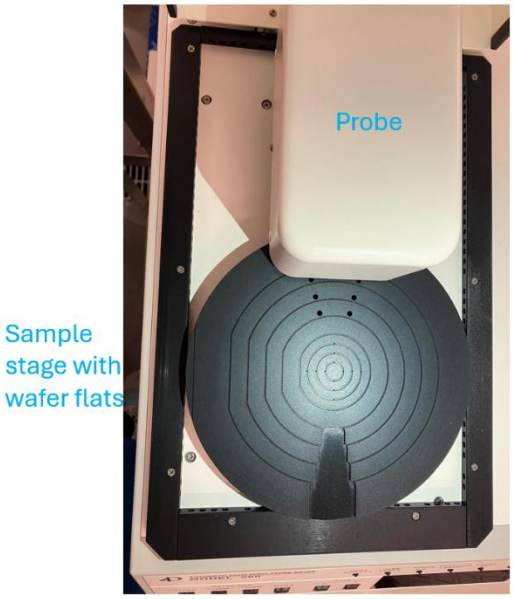

Figure 1

4. Press the power switch to turn on the system. Turn the **vacuum switch** on.
5. Select the wafer **P/N TYPE** switch to indicate the surface layer type of the wafer. The doping needs to be <1E18 cm^3 for accessing the type of the wafer.
6. Select the right **GAIN (LOW/HIGH)**. The GAIN switches are the WAFER SIZE buttons 150MM and 200MM. To select LOW GAIN or HIGH GAIN, press the button under 150MM or 200MM of the WAFER SIZE (See Selection Guide below).
7. Go to **MEASUREMENT CONTROL** then Press **PAUSE,** then **RESET,** and then press **PAUSE** again (LED Off).

Table 1: High/Low Selection guide

LOW/HIGH selection guidelines:

(Ohms/sq)	(Best Gain)	(Ohms/sq)	(Best Gain)
0 to .175	LOW	175 TO 700	HIGH
.175 TO .70	HIGH	700 TO 1750	LOW
.70 TO 1.75	LOW	1750 TO 7000	HIGH
1.75 TO 7.0	HIGH	7000 TO 17.5K	LOW
7.0 TO 17.5	LOW	17.5K TO 70K	HIGH
17.5 TO 70	HIGH	70K TO 175K	LOW
70 TO 175	LOW	175K TO 800K	HIGH

8. Select wafer size **(100MM, 125MM, 150MM, or 200MM).** For pieces or only 1PT center measurements, any wafer diameter doesn't matter, and any diameter can be chosen.
9. Select **1PT** (center of chuck for piece) or **5PT** testing of a wafer
10. Double check that your desired "special function" options, doping type, wafer size, and number of points are selected before pressing start
11. Press **Start** .
12. For measuring 5 PT site map
    a) Stage will automatically move to unload position and turns off vacuum
    b) Press buttons on **5 PT DISPL SELECT** to display site by site data on LCD readout (bottom button is flat location)
13. For measuring 1 PT site map
    a) Result is displayed on LCD screen
14. Press the 5PT button to drive stage out to unload position. **SEE FIGURE 2 for steps**
15. **See Figure 2 for steps from 5 to 12.**
16. When finished using the tool, turn off the power switch of the main unit and vacuum pump before ending your reservation.

Figure 2

17. **For measurement on Computer ---** Launch the software
18. Input username and password as **user**.
19. The users can **make their own recipes in *master menu*** by selecting **3. Edit Recipes -- > Add new Process -- > select the appropriate test type** (1PT, 5PT, etc.). The software will ask for wafer parameters and user need to provide inputs as per their requirements and then press **OK.**
20. To do the measurement with software, go to appropriate **testing menu, i.e., 6** (1, 5, 9 pts, ASTM, Dia Scan) **or 7** (Cartesian, circular and custom site map)**, on *master menu*** and perform the measurement.
21. The system can also measure n/p types of the wafer.

See **Figure 3** for Master Menu and Available Options.

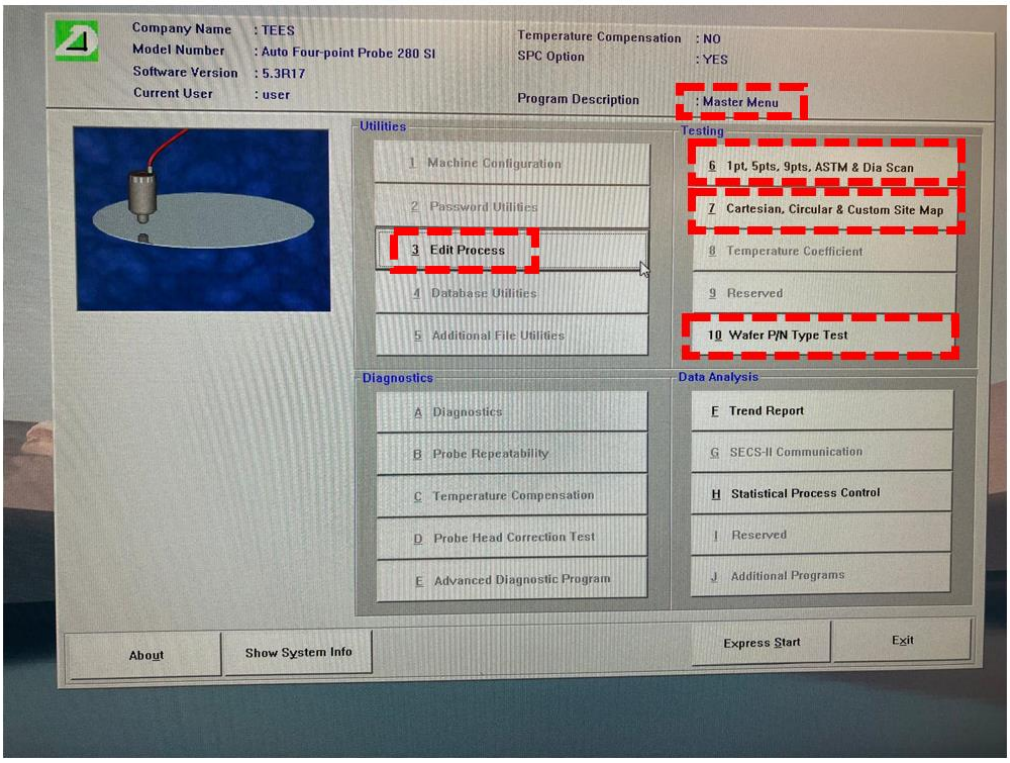
Company Name : TEES
Model Number : Auto Four-point Probe 280 SI
Software Version : 5.3R17
Current User : user
Temperature Compensation : NO
SPC Option : YES
Program Description : Master Menu
Utilities
1 Machine Configuration
2 Password Utilities
3 Edit Process
4 Database Utilities
5 Additional File Utilities
Testing
6 1pt, 5pts, 9pts, ASTM & Dia Scan
7 Cartesian, Circular & Custom Site Map
8 Temperature Coefficient
9 Reserved
10 Wafer P/N Type Test
Diagnostics
A Diagnostics
B Probe Repeatability
C Temperature Compensation
D Probe Head Correction Test
E Advanced Diagnostic Program
Data Analysis
F Trend Report
G SECS-II Communication
H Statistical Process Control
I Reserved
J Additional Programs
About
Show System Info
Express Start
Exit

Figure 3

SIGNATURES AND REVISION HISTORY

Technical Manager: Sandra G Malhotra Date: 2/18/2025

Revision	Author	Date	Revision Notes
A	Dr. Vibhor Kumar	02/14/2025	First version for new 4-point probe