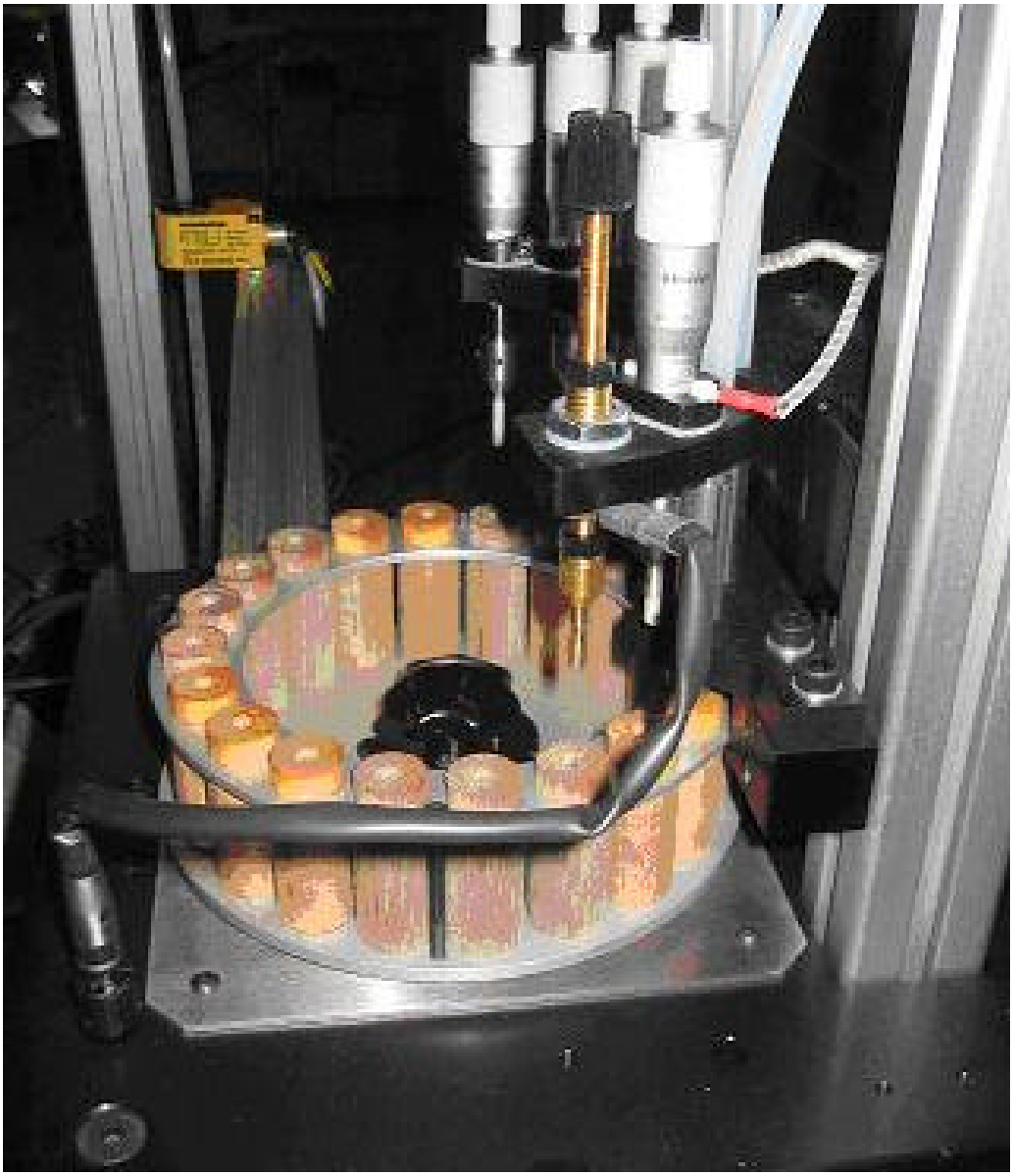
Tekno-Detaljer AB

colombi

User Manual

COLOMBI ORBIT



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1 MACHINE DESCRIPTION

This manual describes the COLOMBI ORBIT with length test feedback, heater and load testing.
The PLC controller is an Allen Bradley SLC500 with a 1000 color panel display as an operator interface.

1.1 System Operator

The ORBIT test system is easy to use and requires no special user training to make minor adjustments, such as modifying ejection times or changing probes. For making basic adjustments, some commands are available directly from the control panel display, such as for adjustment of length control and calibration of load cells.

2 ORBIT

ORBIT is an option for spring coiling machines or spring separators.
ORBIT is a platform that can be complemented with options such as heat treatment, length controlling, load test and rejection of faulty springs, and the distribution of springs to one or more delivery points.

2.1 ORBIT consists of:

1. Basic unit: Double-ORBIT featuring a round feed-table with a revolver, which has one input and two outputs for springs.
2. Option: UP and DOWN action head.

2.1.1 Options for position 1, basic unit:

a) Cool-down blasting after heat treatment
b) Extra inputs
c) Extra outputs

2.1.2 Options for position 2, action head:

a) Heat treatment station
b) Length controlling station (faulty springs rejected)
c) Length testing station with feedback
d) Load testing station (faulty springs rejected)

3 UNPACKING and INSTALLATION

- Connect air pressure: min. 5.5 bar–max. 7 bar
- Connect electrical power feed to system.

3.1 Interface for Spring Coiling Machine

ORBIT is started with an external signal from the line. ORBIT signals the coiling machine to produce one spring and deliver it to the ORBIT.
The coiling machine is then set to the ready mode and awaits new signals from ORBIT (the line).

4 SAFETY

To fulfill the safety requirements of the European directive 89/392/EEC and OSHA, these machines are equipped with protective safety hoods and emergency stop buttons.

4.1 Emergency Stops and Safety Protection

4.1.1 Emergency Stop

If the emergency stop button is pressed or if the covering safety hoods are opened, the air pressure is expelled and the servomotors stop.

4.1.2 Resetting After an Emergency Stop

The emergency stop button is reset by pulling it straight out. To reset the machine, press the RESET button. Correct the problem in accordance with any error messages and then acknowledge the error messages. Close the protective hoods and restart the machine.

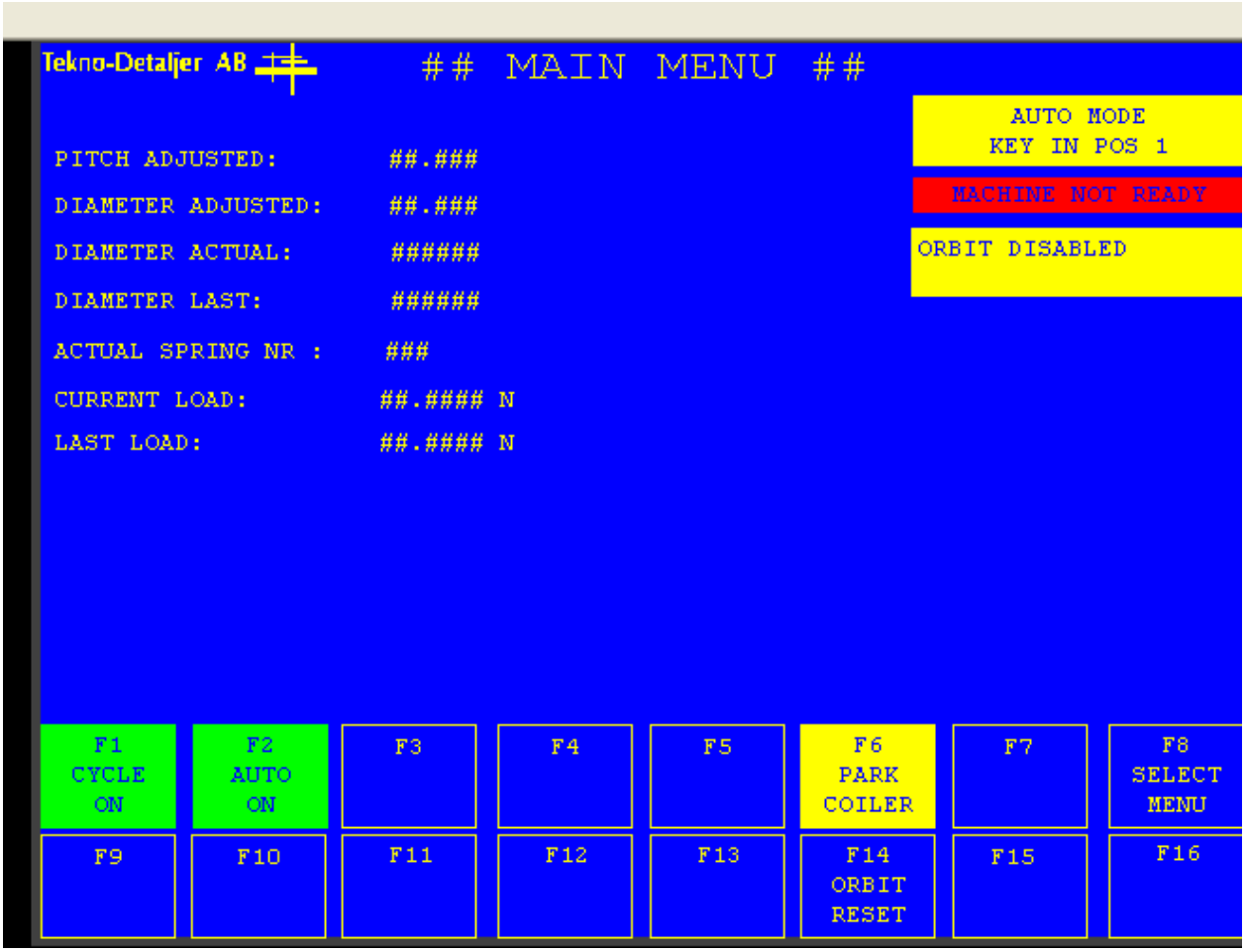
It is possible to run the machine without the protective hoods if the key is turned to the SERVICE position.
The machine will then be able to be run in the manual mode only (external signals are blocked).

A machine that is delivered without safety equipment many not be put into service until it has been built in to system that fulfils the applicable regulations.

5 STARTING THE SYSTEM

5.1 Power up and prepare for production

Refer to section 1.1 in system manual for startup procedure.



6 ADJUSTMENTS

6.1 Adjustments by Trained Personnel

Because the adjustments below require a certain amount of skill and experience, we recommend that they be performed by personnel who know the machine.

6.1.1 Password

To gain access to the menu ORBIT TEST, the correct password must be entered. After entering the 4-digit password, press ENTER to open the ORBIT TEST menu.

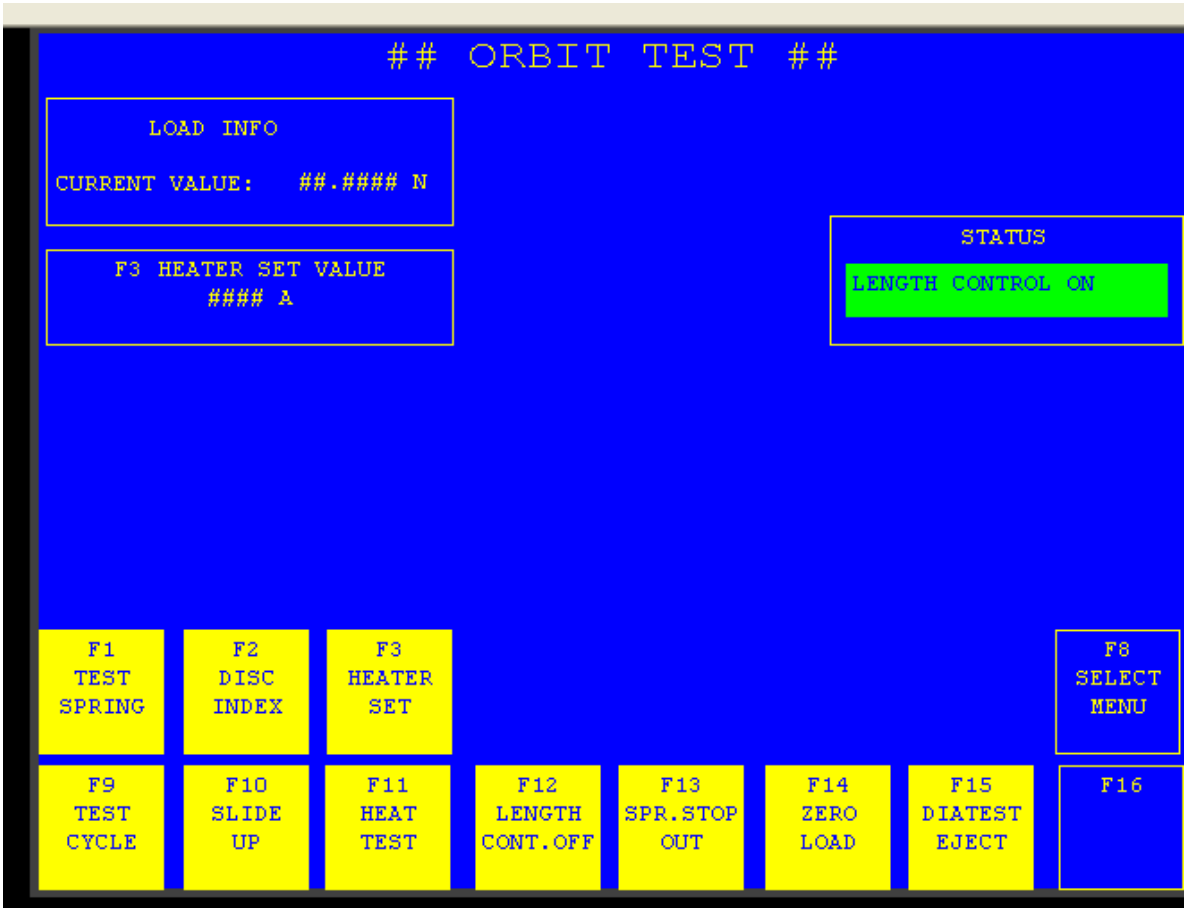
The menu for entering the four-digit password.
Adjustments on ORBIT are made when the system is not in production.
Turn the key to the SERVICE position.

6.2 ORBIT—Related menus

LOAD CALIBRATION
CALIBRATION TEST (describes procedures for calibration)
LOAD SETUP
DIAMETER TEST

6.2.1 ORBIT TEST

The ORBIT TEST menu is used to adjust the load and length control, and for setting the compression to OFF or ON. This mode permits manual operation of up and down movements by the ORBIT head and indexing of the revolver.



Accessing this menu puts machine in cycle off mode.
Key must be in **SERV** position to enable use of some functions.

NOTE: After having returned to the menu **MAIN MENU** from **ORBIT TEST** and pressing the button **F1 CYCLE ON**, ORBIT resets itself by emptying all of the revolver test sockets of springs through the outlet for faulty springs. The revolver is then filled until two approved springs are in the delivery position.

6.2.2 Heater info

HEATER
F3: Sets current for the heater.

6.2.3 Load info

LOAD
CURRENT VALUE: Actual load on load.

6.2.4 Status indicators

6.2.5 Function buttons in Orbit test menu

F1: Makes one test spring.
F2: Moves Orbit nest one position.
F3: Sets current for the heater.
F4:
F5:
F6:
F8: Select menu.
F9:
F10: Slides Orbit head up/down.
F11:.Heats spring in nest, if Orbit head is down.
F13: Opens diatest for spring eject.
F14: Resets load value.
F15: Eject spring in diatest.
F16: Resets alarms if present.

7 LOAD CALIBRATION

Choose the menu LOAD CALIBRATION.

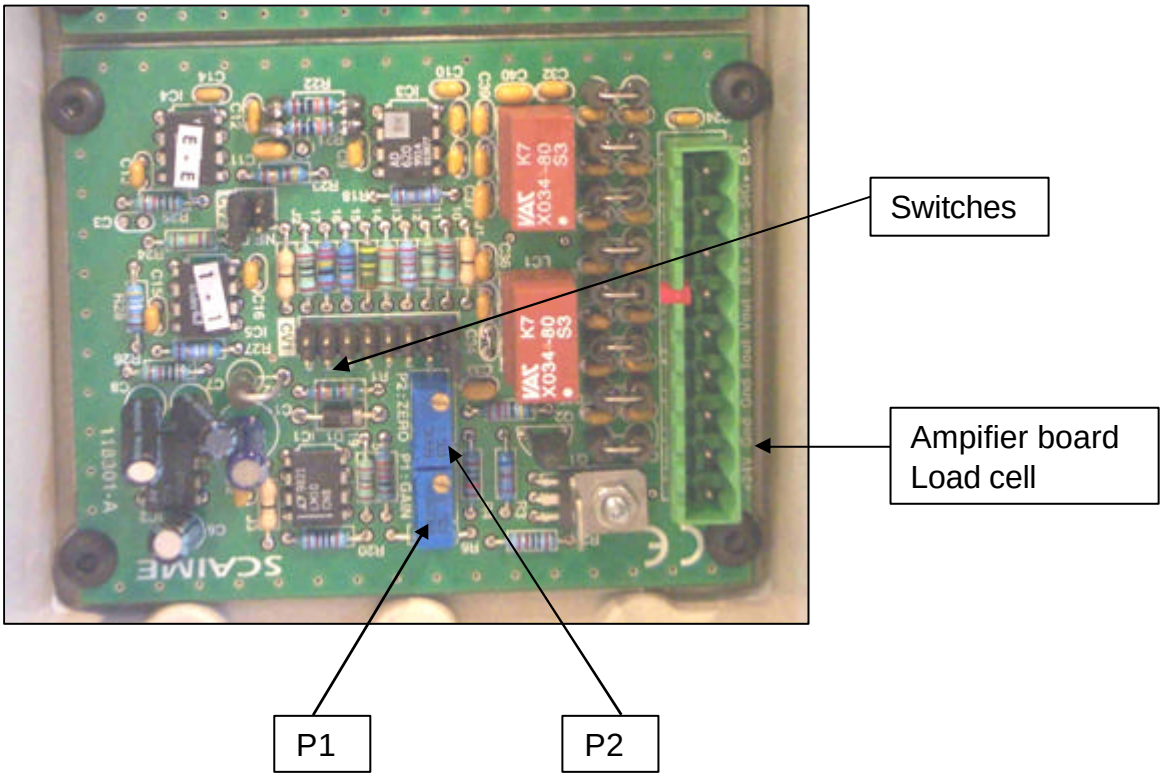
When calibrating the load cell, the revolver shall be removed from ORBIT.

Removing the ORBIT revolver: Unscrew the revolver's center screw, lift up the lock washer that is under the center screw and pull the revolver out from the side.

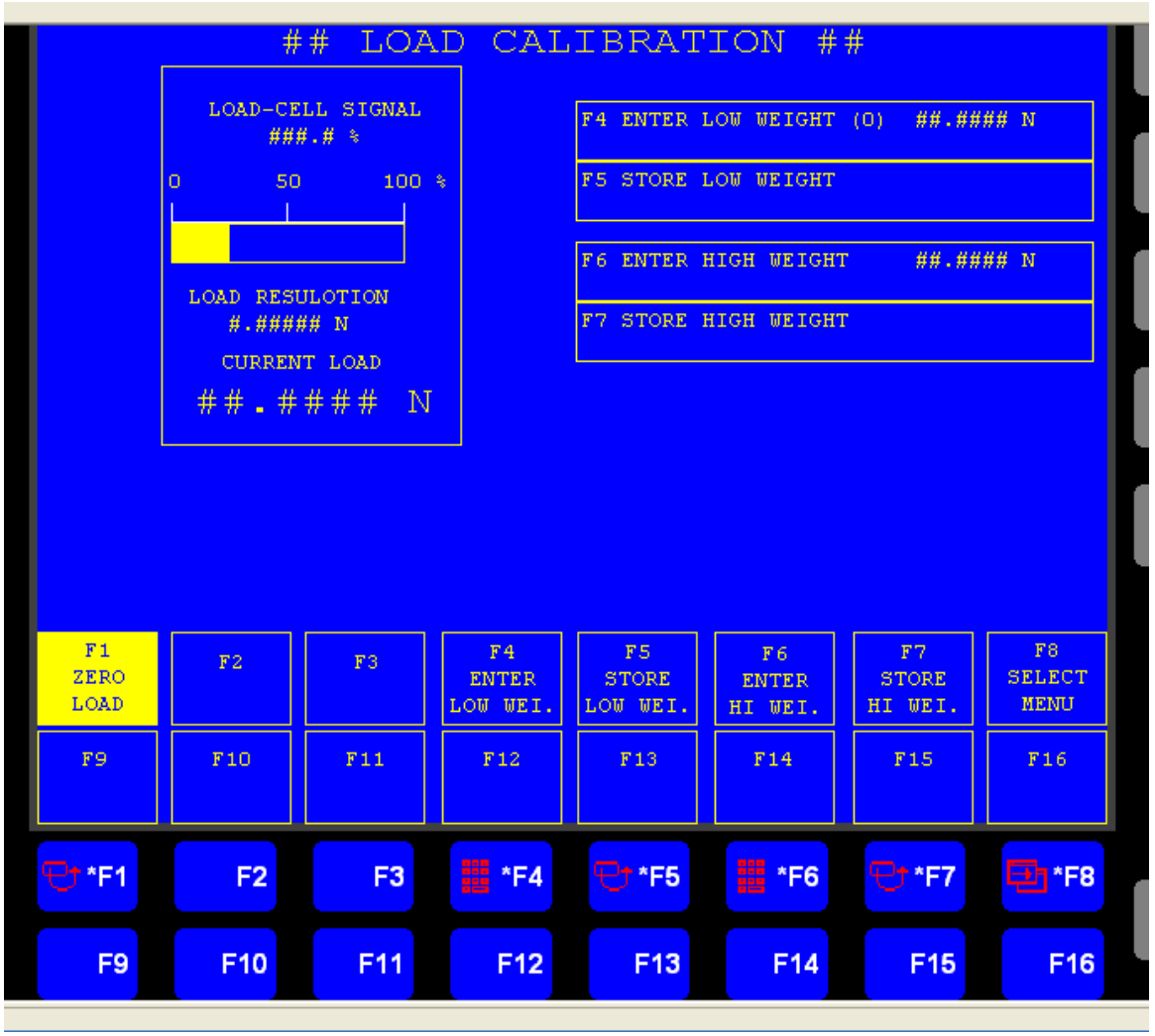
7.1 Check of Load Cell Installation

Check that the load cell is correctly installed and that it does not touch the hole in which it is mounted. Check, using shims of about 0.1 mm, that there is space between the detector and the hole in the plate. Check that no debris or other foreign matter has fallen into the space between the load cell and the hole. If necessary, remove the detector and clean the hole.

Figure 1. Amplifier



7.2 LOAD CALIBRATION



LOAD CALIBRATION

To calibrate the load cell, two known weights are required. The heaviest should be 30% more than the spring load to be tested. The lighter weight should weigh half as much as the heavier weight.

During calibration, the load tester is adjusted for no-load and two known loads. If you choose a heavier load of about 250 grams, the lighter load should be half as much, meaning 100-150 grams.

7.2.1 Calibration of Load Cell.

Calibration begins with the load cell unloaded. Check that the signal from the load cell has the correct amplification at zero-load. The signal shall be about 10% and can be read on the scale in the menu window. Any necessary adjustments to 10% are made with the potentiometer P2. Sensitivity is adjusted with the potentiometer P1 on the amplifier panel (see Figure 1).
Press **F4** and enter the value "0" grams.

Store the zero-load by pressing **F5**.

Place the heavier load (~250 grams) on the load cell.

Press **F6** and enter the known value of the heavier load.

Store the heavier load by pressing **F7**.

When calibrating with the maximum load, you should try to attain as large a load signal as possible, although not over 80%, at maximum load plus the tolerance. To make a rough adjustment of the signal, use the switches (see Figure 1) on the amplifier panel. The lower the number of the switch, the higher load signal attained for a given load. NOTE: If a switch position is changed, zero-load calibration must be repeated. (See Section 7.2)

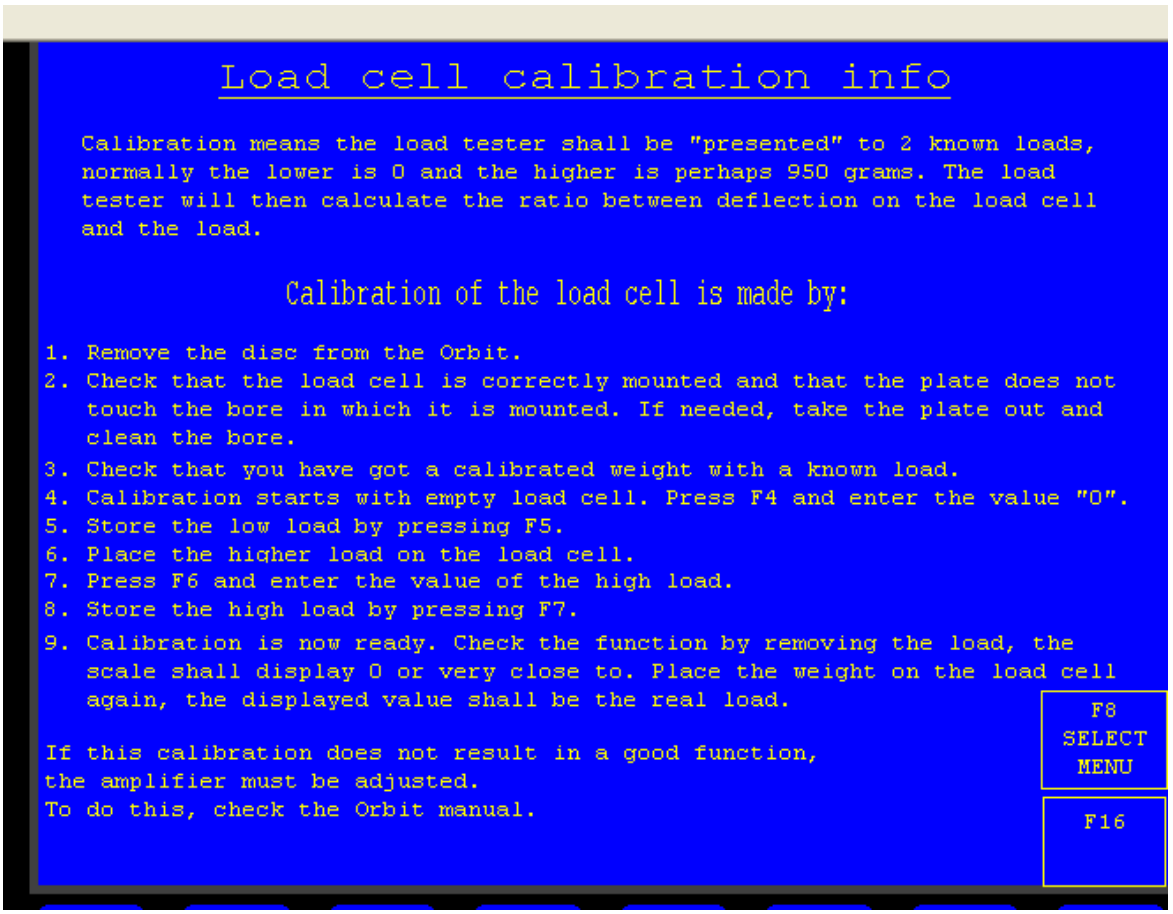
Check the function by removing the load; the scale should show 0 or very close to 0. Place the weight on the load cell again. The indicated value should be close to the actual load value. Remove the heavier load, place the lighter load (100-150 grams) on the load cell and check that the display shows the correct value. (If an incorrect value is shown, check that the load cell is not touching the plate on which the load cell is mounted.)

Calibration of load cell is now complete.

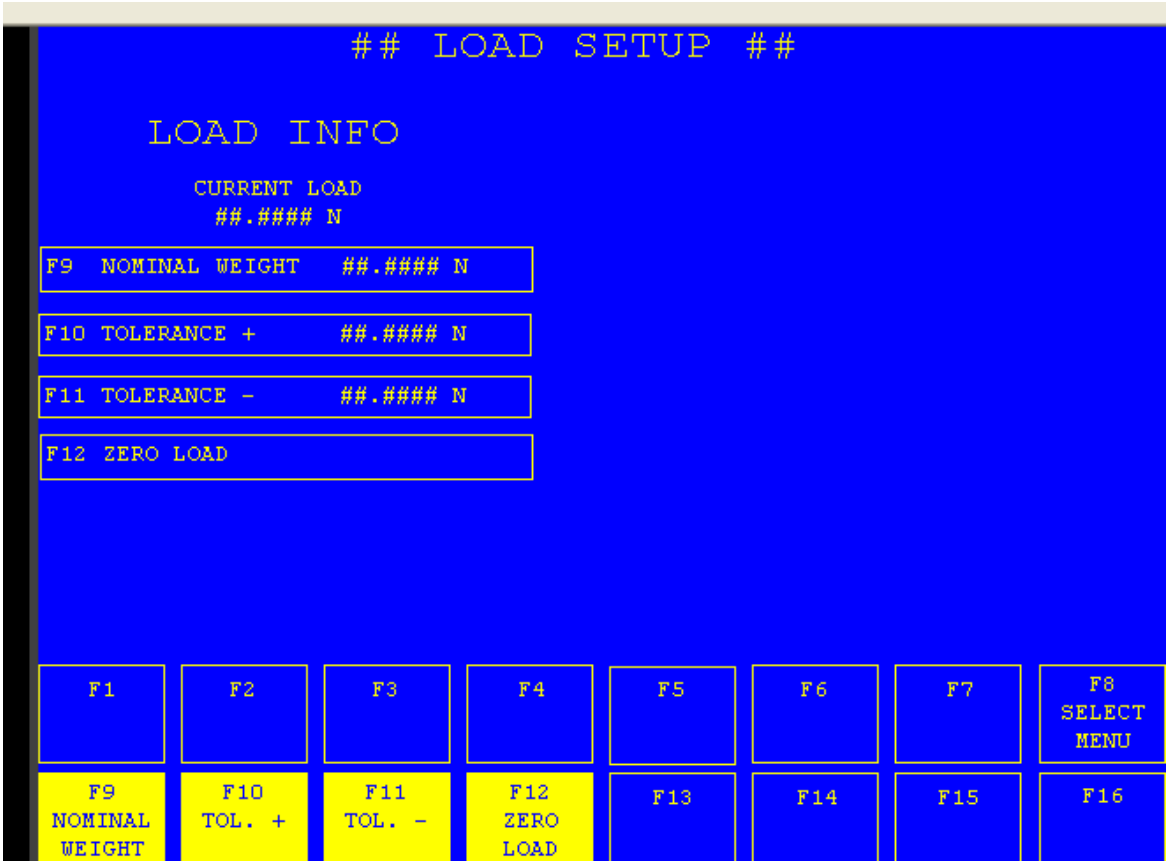
The load cell values are shown in the info box diagram both as percentages of the maximum value and in grams.

F1 resets load cell.

7.3 LOAD CELL CALIBRATION INFORMATION



7.4 LOAD SETUP



7.4.1 Load info

CURRENT LOAD: Actual load on load cell.

F9 NOMINAL WEIGHT: Desired spring force for spring.

F10 TOLERANCE +: Maximum force tolerance for spring, force outside this value rejects measured spring.

F11 TOLERANCE -: Minimum force tolerance for spring, force outside this value rejects measured spring.

F12 ZERO LOAD: Tares load cell if pressed with a spring in position over load cell.

7.4.2 Function buttons in Load setup menu

F8: Select menu
F9: Load 1 nominal weight
F10: Load 1 +tolerance
F11: Load 1 –tolerance
F12: Tare or zero load

8 LENGTH CONTROL

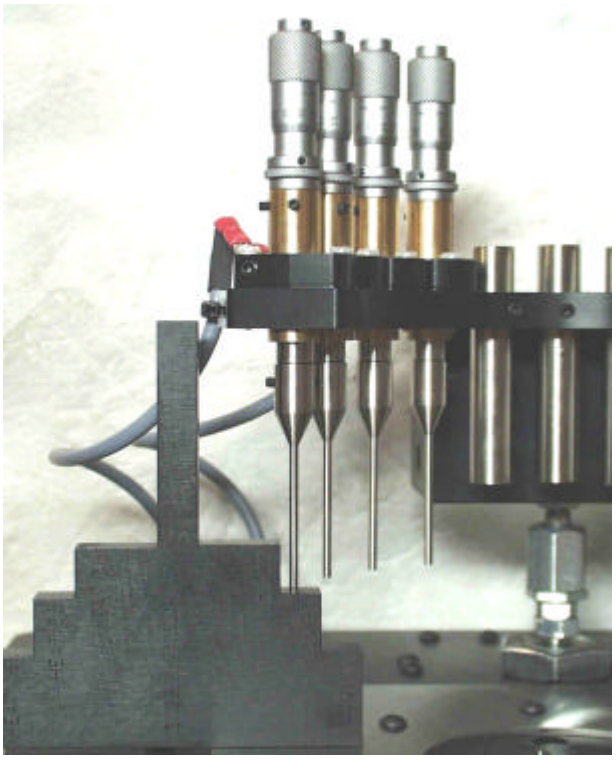
8.1 Automatic offset information

ACTUAL SPRING: Spring configuration selected in **SPRING CONFIG** menu.

PITCH ADJUSTED: Offset position of pitch tool when coiling spring in, adjusted by feedback from length control.

8.2 CALIBRATION Length Control and LOAD Test

Figure 8. ORBIT with step gauge.

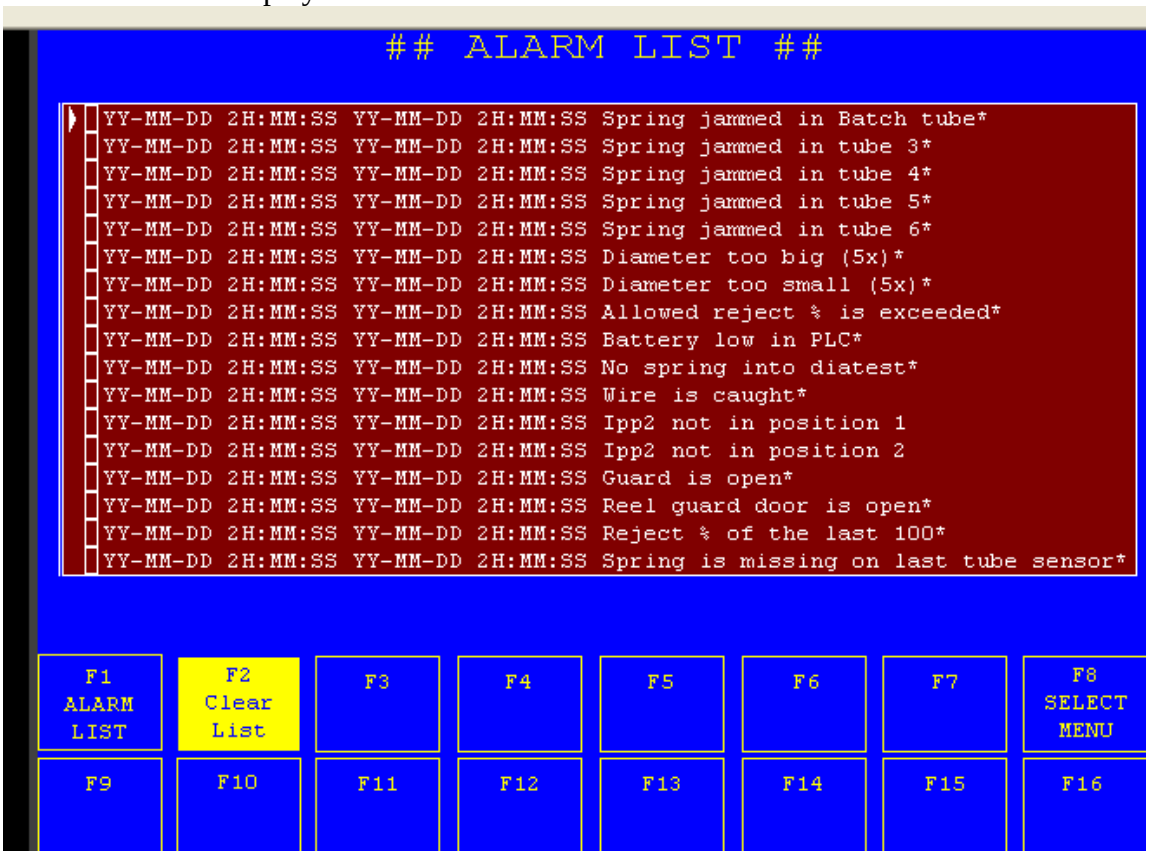


Remove the revolver; see Chapter 7. Choose the menu ORBIT TEST.
Run the ORBIT slide down, button F10.
Using block gauges or a step gauge, if supplied, adjust the positions of the micrometer screws.

9 TROUBLESHOOTING

9.1 Error Messages

If problems arise, the system stops the machine and an error message is shown on the control panel screen. After the problem has been corrected, the error message is acknowledged by pressing the F16 button.
Possible cause is displayed when alarm occurs.



9.1.1 Spring is too short.

	This message is displayed when five consecutive springs do not reach the lower of the two micrometers.	a) Check that the spring length is correct. b) Check the electrode distance. c) Check that the electrodes are clean. d) Check the electrical system.

9.1.2 Spring is too long.

	This message is displayed when five consecutive springs reach the upper of the two micrometers.	a) Check that the spring length is correct. b) Check the electrode distance. c) Check that the electrodes are clean. d) Check the electrical system.

9.1.3 The ORBIT revolver does not stop at the correct position.

	The ORBIT revolver does not stop at its positions.	Check the sensor-distance at the sensor for the revolver's position indication.

9.1.4 Spring coiling machine is not ready.

	This message indicates that no springs have passed through the ring sensor within three seconds of send ing the start signal.	The sensor does not detect the springs. The sensitivity of the sensor can be adjusted with a small screwdriver. No springs are delivered. Check the spring coiler and spring- feed tube.

10 MAINTENANCE

10.1 The pneumatic system:

The system requires no lubrication.

10.2 Electro-mechanical system

Check and clean the electrodes every 400 hours.
Check that the electrodes and air cylinders are securely mounted every 400 hours.