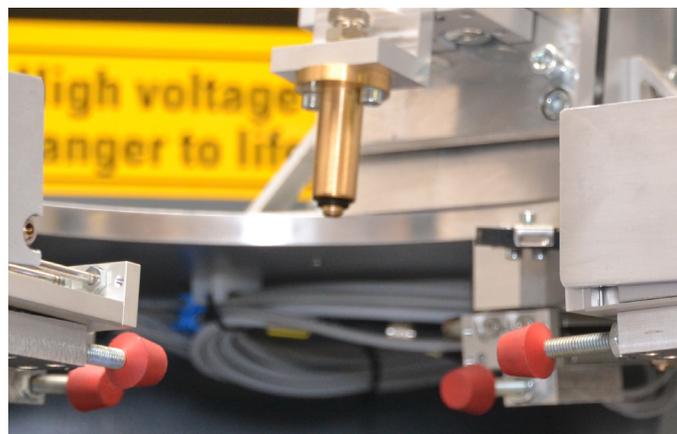
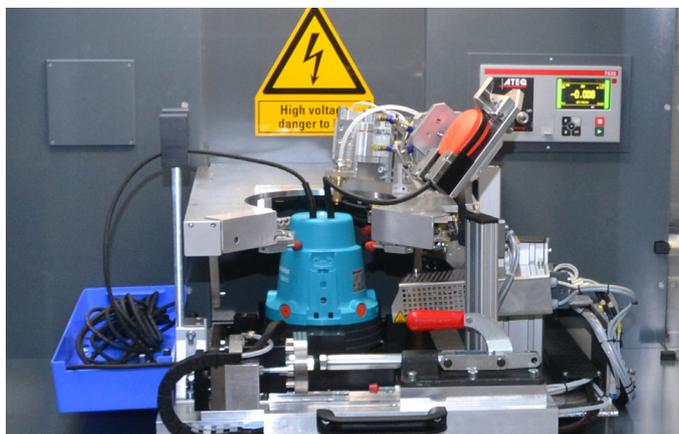


CUSTOMIZED

Industry: Gardening devices

Safety, function and leak test for electric submersible pumps



Task

The development based on a short test duration, so that the testing system can operate concurrently with the production line. Moreover, operation should be automatic and as simple as possible, so as to allow semi-skilled assistants to carry out the test. It should be possible to place the various types of pumps in the device without modifying the DUT support. It should be noted in the leak test that the Schuko plug must also be sealed in addition to the terminal directly to the motor compartment; otherwise, air will be drawn by this plug. The motor compartment had to be closed after the leak test with a screw and then checked whether this screw is actually present. Finally, the pumps must be marked by hot stamping after successful testing.

Solution

Several recesses were provided in the support for the pump base so that several types of pumps can be tested without modification of the testing system. In the process it is ensured that the actual pump body is at the same height for all types of pumps, thus allowing automatic fixing and contacting. The Schuko plug is clamped in a clamping device, in which it is simultaneously sealed and electrically contacted. The entire test device is set up in a drawer, so that the pump can be easily placed and then, slid into the testing area secured with light curtains. Following placement of a pump, it is automatically scanned by the integrated scanner and the appropriate test program is selected on the list of products, so as to avoid selection of the wrong test program.

The tests were carried out in parallel to achieve a short testing duration despite the relatively long time for the leak test (approximately 25 seconds). Once the leak test is started, the protective conductor earth test, the high voltage test, the insulation test and the functional test, including the float switch test are executed in parallel. Following this, the result of the leak test is checked after waiting for a short while. At the end of the test, the screw for sealing the motor compartment is screwed in by the testing personnel and subsequently checked by a sensor, whether it is also actually present. Finally, the pumps will be automatically marked as tested with a hot stamping punch. Thus, a cycle time of around 70 seconds, including handling and contacting could be achieved.

An arbitrary number of test programs can be stored in the testing system PC. This allows the customer to independently write new test programs when developing new types of pumps with identical housing shapes (for example, other output). However, for pumps with identical data, it is also possible to use the same test program, which is then allocated to the respective DUT over the product list. The test results are stored automatically in XML or Access format on an arbitrary place on the network.

A separate test dummy is used to check the functionality of the testing system fully automatically. During the daily start of the testing system, the testing personnel is asked to include this dummy and start the corresponding program. The testing system does not allow further testing without a passed dummy test

Advantages

- + Turnkey solution including DUT support, adaptation and workplace design
- + Simple, intuitive operation for semiskilled personnel
- + The DUT needs to be connected only once, then the whole test process occurs automatically
- + In network operation, all test data is automatically saved at the specified location / database
- + Long service life and service-friendly design
- + All values and settings can be made using software
- + Automatic dummy test
- + Workplace safety according to EN 50191
- + Automatic test program selection
- + Short test duration by simultaneous execution of different tests
- + No retooling for different versions

Specifications

- Protective earth conductor test 10 – 30 A
- High voltage test 5.5 kV AC / 6.0 kV DC / 4 mA (safety-current-limited)
- Insulation test 6.0 kV DC / 4 mA
- Function test single-phase (measurement range 2.5 A) with measurement of voltage, current and power
- Leak test