Microprocessor PH-5 Tester is a broadband digital device, simultaneously supporting up to 10 sensors. It supports all 5-wire commercially available optical and pneumatic sensors manufactured by the following companies: NIEHUSER, LIBERTY, DIXON, SCULLY, OPW, CIVACON, ALFONS HAAR and so on.

Among the devices available on the market, PH-5 stands out with:

- ✓ 100% measurement repeatability.
- ✓ Tester's possibility of working with all optical and pneumatic sensors according to all standards.
- ✓ The possibility of detecting and determining sensor parameters' instability.
- ✓ The possibility of detecting the sensor's susceptibility to external factors, such as temperature and shocks.
- ✓ The possibility of detecting deviations of sensor parameters from its factory parameters.
- ✓ The possibility of detecting sensor operating parameters at the lower limit of the parameters set out in the EN13922 standard.
- ✓ Automatic operation self-test and accurate calibration.
- ✓ Automatic control of battery level.
- ✓ A great number of the supported sensors, up to 10.
- ✓ Visualization of indications on two digital displays with simultaneous pleasant-to-the-ear acoustic signal.
- ✓ Small size and low weight. Housing with rubber fit to the hand.
- ✓ Long duration of the Tester operation on internal Li-ION batteries, 2 x 3.7V 1250mAh, current consumption from 125mA batteries while measurements done using 9 optical sensors.
- ✓ Low price against the possibility tester.

The greatest advantage of the presented tester is its broadband operation with a continuous reading of parameters, even at exceeded thresholds of operation, that does not exist in other devices. Correct measurement is accompanied by a further-modulated acoustic alarm. If the allowed range of the **EN 13922** standard is exceeded, the value displayed on the lower display will flash repeatedly and the acoustic alarm will not be heard.

Due to precise measurements, we can define: the sensor type, the stability of parameters, the sensor parameters divergence from the factory parameters, susceptibility to external factors, such as temperature and shocks. ***No other tester on the market can do it***. In order to precisely check the sensor, immerse the sensor in hot water when the tester is on. The heated sensor should be subjected to gentle heating by a not-too-hard object while observing the measurement results. The measurement by cannot be changed due to shocks. The parameters cannot change more than 0,1-0,2ms due to heating.

The thresholds of operations programmed in testers cause users' confusion. We will never know if the checked sensor is within its technical parameters, whether its parameters are stable and whether its parameters are not too close to the threshold parameters of the standard. ***Installing the device at loading terminals with parameters deviating from the ones imposed by the standard should be noted*. We thus experience a situation in which such factory testers as N17-SKG by NIEHUSER show correct operation of sensors rejected as failing by devices on terminals.** In addition, supply voltage has a large impact on the performance of sensors. The pulse width can vary by as much as more than 0.5ms when changing the supply voltage of sensors only by 3V (9V-12V). We have to assume that supply voltages of sensors on terminals and testers are very different. ***So indications of testers without measurement display should be taken as indicative.***

The parameters of sensors from different manufacturers are very different from each other. Techincal parameters of sensors of the same type must be the same, +/- 0.1ms. For example, a measurement of a new optical sensor by NIEHUSER is 1,0ms. Using other sensors of the same type, the measurement is 1,1ms and 0,9ms. In the case of larger differences, despite the fact that the parameters are within the accepted standard, it should be seen as a fault of the sensors. NIEHUSER pneumatic sensors measure with the pulse width of 1,6ms. CIVACON sensors measure with the pulse width of 1,7ms, SCULLY 1,3ms, DIXON 1,1ms a ALFONS HAAR 2,0ms. Such testers as the N17-SKG do not verify it.

Description of the PH-5 tester operation.

After switching on the device on the lower display shows for a moment the name of the tester „PH5" Figure 1. then tester does self-test. Self-test is indicated lighting the lower blue LED. On the upper display should appear digit „3" informing the number of efficient sensors connected to the tester. On the lower three-digit display Figure 2. appear for three seconds pulse width output from the tester 0.30ms. **These values must always be the same!**

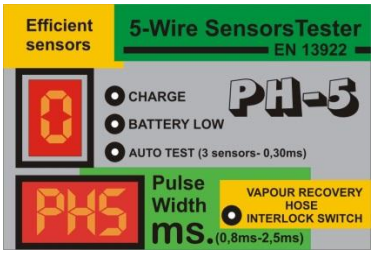
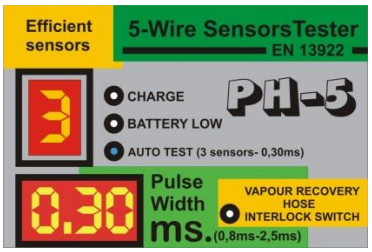
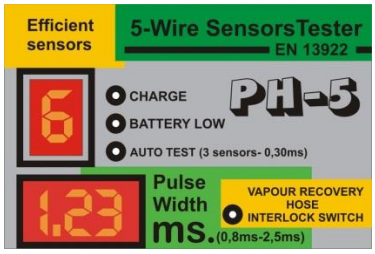
Figure 1. 

Figure 2. 

If the upper display shows a digit and the lower display shows no measurement „0.”, and there is no accompanying modulated sound, it informs that the sensor is faulty or immersed in the liquid. Exception is when tester is not connected to sensors. With no connection of the tester on the lowwer and upper display will display digit „0” Figure 11. **The last efficient sensor in the system will always be displayed on the upper display. In the case of efficient sensor / sensors, the lower display will always continuously display a measurement and a modulated sound will be heard. NOTE. If any of the sensors is immersed in the liquid during normal measurement, the lower display displays "0" and there is no accompanying modulated sound.**

Examples:

In Figure 3. example: 6 efficient sensors.

Figure 3. 

The following examples (Figure 4,5,6) show damage to the 6-th, last sensor, in the system. Figure 4. The sixth sensor can be immersed in the liquid. The sensors immersed in the liquid will not generate pulses, as a result, there will be no measurement on the lower display "0". No acoustic signal. Figure 5 and Figure 6 show exceeding the allowable range on the lower display, Figure 5 shows exceeding the lower limit, Figure 6 shows exceeding the upper limit. The lower displays flashes in both cases, there is no modulated acoustic signal.

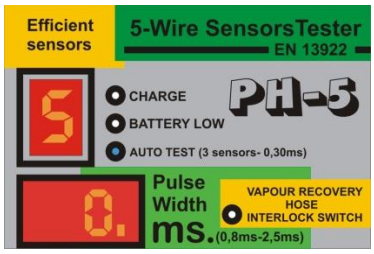


Figure 4.

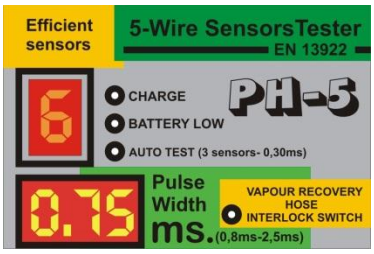


Figure 5.

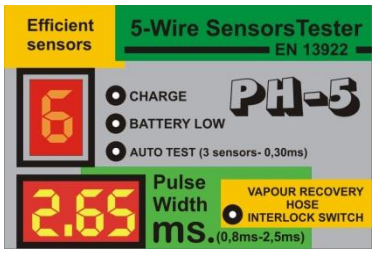


Figure 6.

With efficient sensors, operating according to EN 13922, the measurement on the lower display should be within the range of 0,8ms to 2.5ms.

Measurements outside the permitted range <0,8ms and >2.5ms will be accompanied by flashing of the lower display and there will be no characteristic modulated acoustic signal. Upon request, we can set any response threshold of the display or mute it. The factory threshold is set according to EN13922 standard.

The modulated signal in this device indicates the efficiency of the tested sensor. It enables carrying out work without the need for observing the display.

If the measurement on the lower display is incorrect (<0,8ms, >2.5ms), it will always be caused by faulty operation of the last sensor in the system. Other sensors, irrespective of their number, never affect the width of the measured pulse output. In such a case, replace the last sensor with another efficient sensor or replace it with a new one.

Below, there is an example of a measurement of 10 pieces of interconnected sensors. The example in Figure 7, all sensors are efficient, modulated acoustic signal can be heard. Figures 8 – 10, the sensor is damaged or immersed in the liquid. Figure 9, the upper permitted range of measurement in the lower display is exceeded. No acoustic signal can be heard in both cases, and the lower display flashes in Figures 8 and 9.

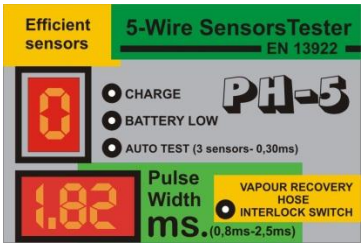


Figure 7.

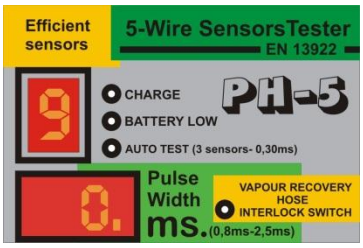


Figure 8.

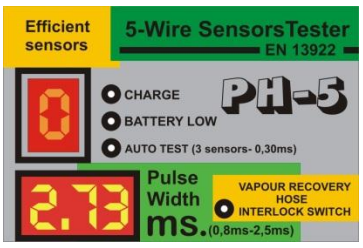
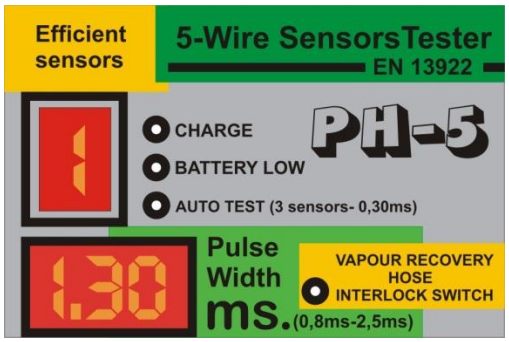


Figure 9.

The following Figure 10 shows one efficient sensor. The measurement is accompanied by a modulated acoustic signal. In addition we can conclude that the manufacturer of the measured sensor is company SCULLY.

Figure 10.



The following two examples, Figure 11 and Figure 12, show a measurement of a single damaged sensor.

In the example in Figure 11, the sensor can be efficient, but immersed in the liquid. Figure 12 shows exceeding the upper threshold of the permitted range on the lower display. The lower display flashes, there is no accompanying acoustic signal in both cases.

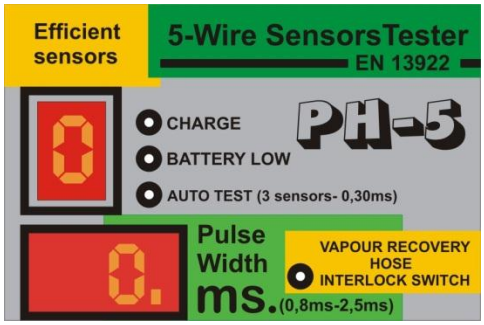


Figure 11.

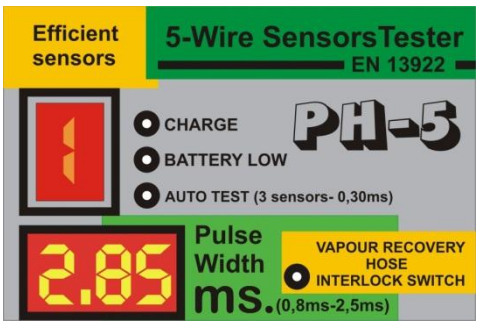


Figure 12.

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Tester is equipped with a monitoring supply voltage . Battery discharge status is signaled by illumination of the central yellow LED.

The tester has an automatic control charging. After connect the charger to device, red LED will flashes. After reaching full charge, LED will turn off and device automatically will be disconnected from the charger.

The fourth flashing LED in white, indicating proper operation of the VAPOUR RECOVERY HOSE INTERLOCK SWITCH with a PIN 9 output of a diagnostic socket. This LED will be flashing only in the case of using the diagnostic plug.

The PH-5 device is equipped with colored wires terminated with colored alligator clips at one end. The colors correspond to the colors of the cables from the sensors. On the other end of the wires, there is a popular Dsub-9PIN plug by CANON with embossed, gold-plated contacts.

The tester is equipped with a power charger (100-240V) 5V, 2A.

Each tester is controlled on a specially created position with nine sensors of different types. The sensors are connected in the same manner as on the tanker, there are randomly immersed in the liquid to be verified. In addition, the testers are checked using precise control and measurement apparatus. Their compliance with the **EN13922** standard is checked within the limits of all parameters controlled by the tester.

NOTE. If other parameter values, not listed in the description, such as: offset signal voltage, waveform voltage, frequency, are incorrect, measurements on the lower display will be impossible. There is also no modulated sound signal.

Using the PH-5 tester enables controlling the output pulses from other testers. In order to do that, connect the blue wire of our tester with the yellow wire of the checked tester and the white wires with each other (earth cable).

Due to the acoustic signals emitted by the PH-5 Tester, going to the top of the tank, where the sensors are installed, there is no need for taking the tester every time. There is no need for continuous observing the reaction of the device, as it is in the case of the N17-SKG device by NIEHUSER.

The whole is subject to full 24 month warranty. We provide express warranty and post-warranty service

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