

**Key<sup>i</sup>ninspect**

**Workstation 5302**

# Keyspect-5302

## Keypad Inspection System

### Features of Keyspect

- Artificial intelligence based , trainable machine vision software .
- Customizable software – capable of handling most keypad designs.
- Easy to learn graphical programming.
- Metrology check : size of artworks, position of artworks, size of defects.
- Color check.
- Language check : Latin , Arabic, Kanji, Thai, etc.
- Print quality check : Thinning or thickening of artworks , Stretched or compressed artwork , breaks in artwork.
- Foreign material check.
- Compact design
- Integrated IO controller
- Sliding camera mount
- Back light LED illumination with jig bed
- Integrated light and sound alarm

### Keypad inspection of:

- Cellular phones
- Handheld devices
- Automotive dashboards
- Computer keypads
- Industrial control interfaces



### Benefits of Keyspect

- Exceeds highest quality standard requirements.
- Overall operational cost reduction; return on investment within one year.
- Operational and administrative efficiency, flexibility, and stability.
- High rate of repeatability and consistency of inspection.
- SPC data for Total Quality initiatives

### Overview :

**Keyspect-5302** is a semi-automatic visual inspection system for the quality testing of keypads manufactured for cellular phones and other handheld devices. Leveraging upon its core competency of harnessing technology to meet industry specific needs, Neurotech has developed **Keyspect-5302** to provide strategic and operational advantages for the keypad manufacturer. Neurotech's accumulated experience in specifically serving keypad manufactures has weighed significantly into the design of **Keyspect-5302**

### Riding The Industry Trend

Keypad manufacturing is at a crossroads in which the demands of Original Equipment Manufacturers (OEMs) are shaping the sector. In the automotive and mobile phone industries alike, the mounting costs of developing and marketing newer value-added products have stiffened competition among OEMs. Especially as the mobile phone industry consolidates, the cost saving squeeze will be increasingly applied on component manufacturers. In such an environment, the component manufacturer's ability to meet higher quality standards will be crucial for the OEM's company-wide implementation of "six sigma" and "just-in-time-delivery" systems that increase productivity and reduce costs. The keypad manufacturer in tune with the OEMs' demand for higher quality assurance will find its products more marketable. As OEMs further divest from component design and manufacture to strengthen cash-flow, the opportunities

## The Keyspect Advantage

**Keyspect 5302** system is a semi-automatic visual inspection system for examining cellular phone keypads on the production line. The system was developed based on the latest technologies of digital image processing, artificial intelligence trainable neural network software, advanced optics and illumination, and a powerful vision processor. Here, a digital camera can replace hundred pairs of eyes and will not tire in three shifts a day, seven days a week. It can see minimal defects hidden from human eyes and measure the size of defects immediately, report the size of defect, and make a decision to accept or reject the product. Operational and administrative flexibility is also enhanced by the dramatic reduction of human resource considerations in the quality inspection process. The system can be integrated with production conveyor systems and is able to perform multiple inspection tasks on different sizes of keypads.

In the era of high design turnover that is driven by a new breed of sophisticated and style conscious consumers, the keypad manufacturer's reputation for quality will be of utmost importance. Appropriately, Neurotech's **Keyspect 5302** strengthens the business model of the keypad manufacturer. While meeting the most stringent quality standards, Neurotech's keypad inspection solutions provide overall operational cost reduction and return on investment within a year. These are the methodological dimensions of the **Keyspect 5302** quality assurance:

### Metrology

- **Artwork size** : length, width, diameter can be checked automatically.
- **Artwork Positioning** can be checked against the key to see if it falls within the designated printable area.

### Language

- **Language check** is used to make sure keypads of different languages are not mixed together.

### Color inspection

- **Designated Color** of artwork is verified by check routines.
- **Color intensity** is checked.

### Defect inspection

- **Orientation** of artwork can be checked and verified.
- **Print Quality** inspection for gauging the quality of the artwork printed, with focus on recognizing noticeable artwork distortions. Distortion can be due to:
  - Thinning or thickening of artwork.
  - Stretched or compressed artwork.
  - Breaks in artwork.

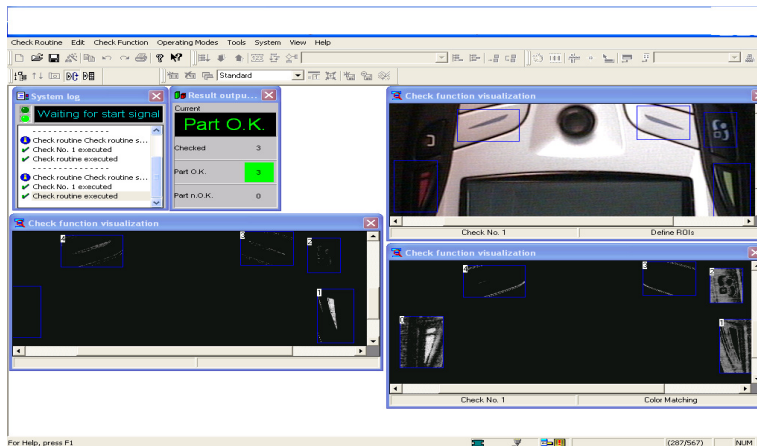


Figure-2 Color check

**No programming skills required: Use drag and drop functions to create your desired check routines within a minute.**

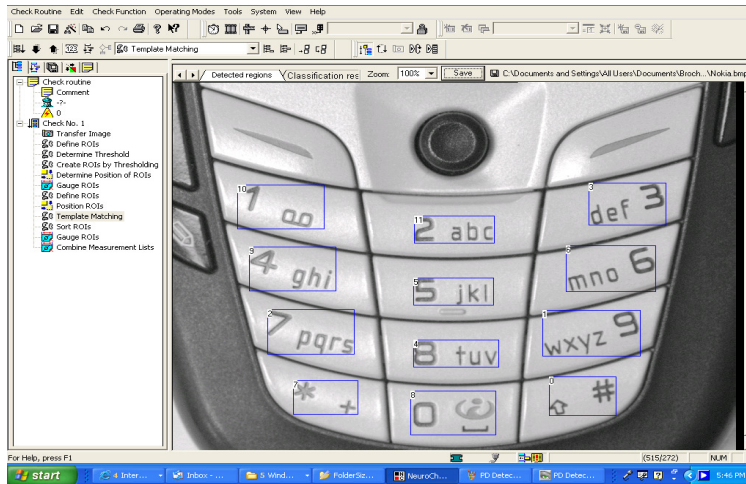


Figure-3 Create your check routines by drag and drop functions

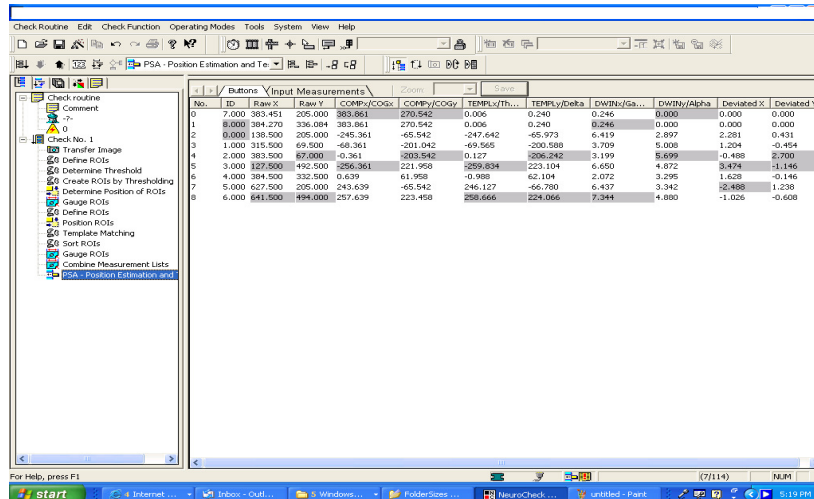


Figure-4 Execute the program and get detailed parameters of the objects

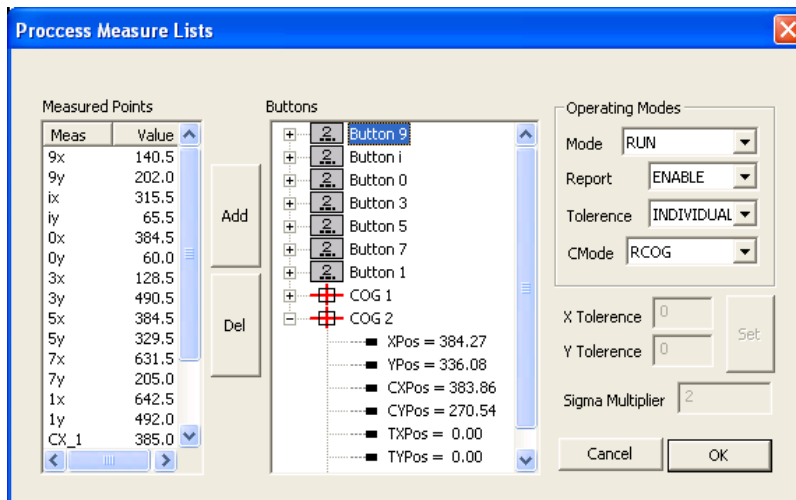


Figure-5 Run the program in automatic mode and get precise positions of keys

## **Keyspect-5302 system components**

- Keyspect Workstation
- Neurode 5302 Vision Processor module.
- Neurode 5228 , I/O module with 28 optically isolated input and/or relay output .
- Neurode 8310 coaxial wide spectrum LEM illumination providing even light .
- Neurocheck-FWX20c: 2 mega pixel ( 1624x1236) , color digital area scan camera.
- Neurocheck Industrial Image processing software.
- Structure for mounting the vision system, camera and back and front illumination.
- Pedal and switch for operator interaction with the system
- Light and sound signals for reject/accept decisions and alarm.

Design and architecture of the system is based on advanced vision engineering technologies, complemented by Neurotech's accumulated expertise in tailoring automation solutions for manufacturing clients. The main technological features of the system architecture is based on a very high resolution digital camera, and an integrated illumination sub-system, mounted in an ergonomic workstation.

## **Neurode-5302 Vision Processor**

The Neurode 5302 is a highly integrated industrial grade vision processor with high data bandwidth to manipulate and process large amounts of vision data in real time. It provides seamless interface to the 2-Mega pixel camera. Furthermore, its companion digital I/O module is capable of controlling the camera, the illuminations, peripherals and handling system. The processing engine is an Intel Pentium-4 running under Windows XP, with 1 GB memory and 40 GB hard drive. The processor system comes with a small footprint of 400x276x88.5 mm. It works from the main 110-230 V AC , 50/60 Hz. It can be mounted in a 19" rack with a pair of optional L brackets.

## **Neurode-5228 I/O module**

The Neurode-5228 is companion module interfacing the vision processor to peripherals like foot pedals, switches, alarms and production line conveyors. It has 8 optically isolated input channels , and 8 solid state relays . Input and output channels can be expanded to 32 lines , simply by inserting I/O modules . The physical dimensions of Neurode-5228 is 400x276x70 mm. It can be mounted in a 19" rack with a pair optional L bracket.

## **Neurocheck-FW20c**

Neurocheck –FW20c camera is a 2 million pixel (1624x1236) color digital camera , with outstanding image quality. It has a progressive scan with external synchronization. The camera has 8 MB built in memory for temporary image data buffering. Interface of the camera to vision processor is through a FireWire port. FireWire is a high serial bus originally developed by Apple computer which is now an official industry standard. It has a bandwidth of 400 Mb/s. The cable consists of six wires: two for data, two for synchronization, and two for power.

## **Neurode-8310**

Neurode-8310 is a large 4"x4" LED coaxial illumination sub-system . It is an important and necessary device to capture clear images of keypads with reflective surfaces. It provides evenly spread light across the entire field of view with controllable intensity. The emission of a full spectrum of visible light makes it a critical tool for color inspection.

## ***Specifications***

<b>Part Number</b>	<b>Function</b>	<b>Specification</b>
Neurode-5302	Vision processor	Intel Pentium 4 , running at 3 GHz Memory , 1 GB 40 GB HDD 3 ports of FireWire digital camera interface Power : universal 100-220 V AC 50/60 Hz Mechanical Dimension 400x276x88 mm 15" LCD monitor with conveyor mounting
Neurode-5228	Input and out put module	8 optically isolated input 8 solid state relay Expandable to 32 I/O USB interface to the Vision processor Mechanical dimension 400x276x70 mm
Neurode -8310	Coaxial illumination	4'x4" white LED illumination specially designed for KeyPad inspection Seamless Camera interface 12 V DC power supply
Neurocheck -FWX20c	Camera	2 Mega pixel (1624x1236) Color digital camera Progressive scan External synchronization Integrated 8 MB Built in memory Mechanical Dimension 73x56x55 mm
Workstation	Material Color dimension Sliding camera mount Back light and Jig area Illuminated area Maximum keypad size	Aluminum Black anodized 420(W)x300(D)x600(H) mm Height 300 mm, 250x200 mm 200x150 mm 2x ( 120x80 mm)

## Picture and drawings of Sub-Systems and mechanical dimensions

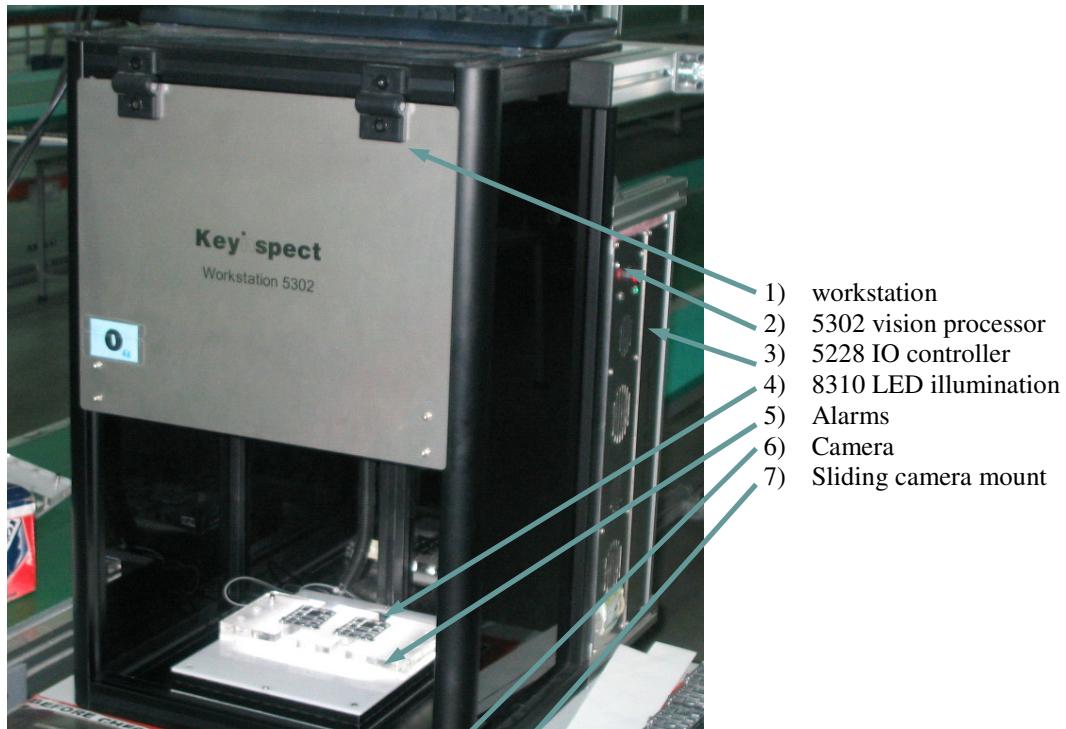


Figure-6 Sub-systems

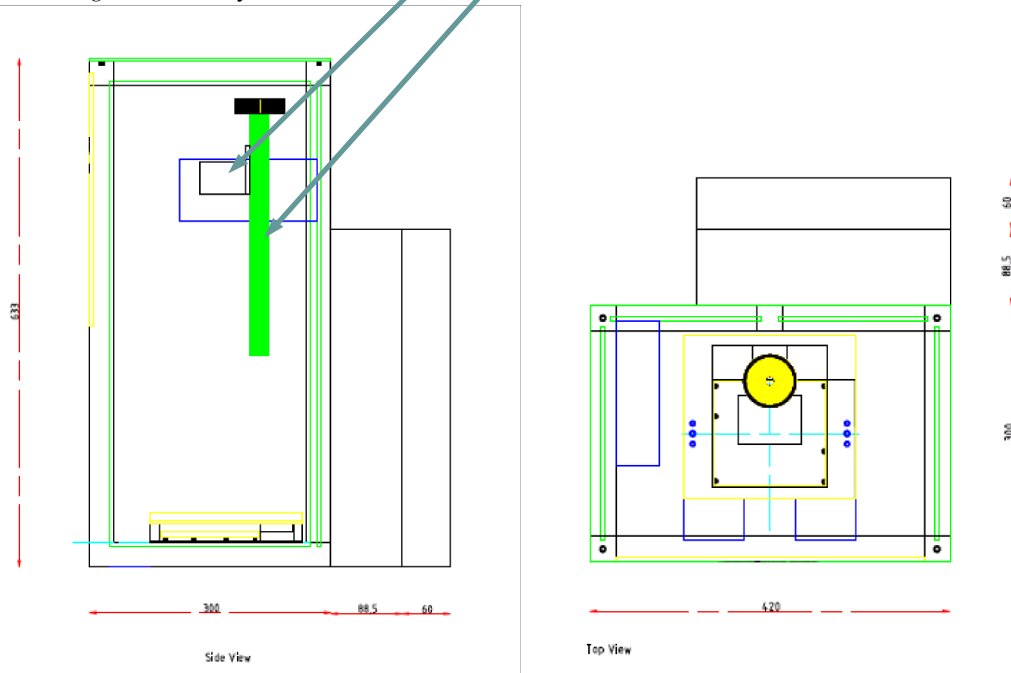


Figure-7 Mechanical dimensions