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Remote-Quality Assurance (r-QA)



Features

- Compatible to the most existing product Quality Assurance (QA) measurement systems
- Multiple input mode: automatic input, manual input, bar code scanner, RFID and others
- Support Ethernet, WiFi, and GSM/GPRS
- Easy to operate
- Divided data space, each space administrated under separate security policies (user id, user password, user groups, etc)
- Numerous powerful built-in data process capabilities with support for external data processing software.
- Highly extendable, in terms of data and functionality
- Extremely versatile in terms of application: can be used by the quality assurance departments, the manufacture shops, the product customers and the service offices of large, medium and small companies
- Various backup functions
- Flexible customization to meet requirements of r-QA customers.

1. Introduction

With the widespread of the manufacturing globalization, the competition between products has intensified and the expected service level is ever higher. As such, product Quality Assurance (QA) becomes a big concern.

In the world of manufacturing globalization, the company headquarter, the quality assurance department and the manufacture shop may be located in different cities, different countries, even on different continents. In such situation, it is very important to have a solution which can promptly inform the quality assurance department the quality information of the products that are manufactured remotely, usually at a branch manufacturing site or an outsourced site. On the other hand, it is necessary to minimize the amount intervention required on the operator when performing the quality measurements.

Under the pressure of fierce product competition, the distributors and the primary customers want to know the quality information before the products, that they ordered, are received in order to reduce the risk on their side.

In order to improve customer satisfaction, it is very important for the service centers to find a solution to feed back the quality information from the end users to the quality assurance/control department of the manufacturer.

r-QA (Remote-Quality Assurance) provides the best solution for all the problems stated above.

r-QA consists of three units: the quality measurement unit, the web-connected-database and the QA (Quality Assurance) data viewer. The system block diagram is shown in Fig. 1

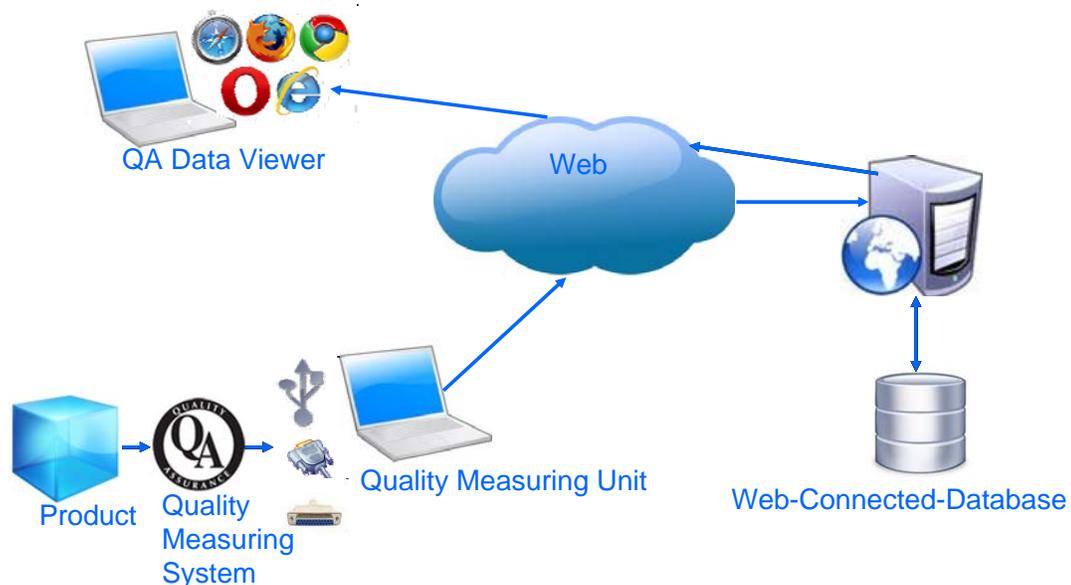


Fig.1

2. Quality Measurement Unit

The quality measurement unit is a computer which is installed the r-QA software. The computer can interface to any product quality measurement system via various communication ports/protocols (USB, serial port, parallel port) and import the quality measurement data to the r-QA software.

If a r-QA user is not familiar with internal details the quality measurement system, r-QA has the special capability to obtain the quality measurement data from the measurement system and pass the data to r-QA software regardless.

For the management information on the product, such as the product name, the series number (S/N), the product customer name and etc., those data can be manually typed into r-Q or input by bar code scanner. r-QA provides the driver of the standard bar code scanner. r-QA can interface to RFID as well. For the r-QA users with multiple manufacture sites, the r-QA software fills in the manufacture site names automatically.

r-QA doesn't recommend the manual input of the quality numerical data, but upon the r-QA user requirement, r-QA still support this function. When the manual input method is used, the operator code has to be entered to the database as the future reference to trace down the operator for potential problems. For all the manual input information, no matter if the data is a character string or numerical data, r-QA provides a "Confirmation" operation to minimize the possibility of human-error via the manual operation.

When the data are input to r-QA, they are protected by a unique password immediately. The operator is not allowed to modify or edit the data so that the credibility and the trustworthiness of the product quality information are guaranteed.

r-QA can set multiple predefined threshold values for quality parameters. The indication of the product quality pass or failure can be in different colors, for example the color of green for pass, the color of red for failure. Also different colors can be used to indicate different quality levels.

For the products that have failed in the quality examination, r-QA provides various response methods, such as discard, rework etc. The access permission to the failure product information is very restricted, only the designated managers and engineers are allowed to read them for the quality improvement purpose.

The quality measurement unit supports various approaches to send data to the web-connected database. There are three options for this operation

- a. When the network connectivity to the Internet is operational and normal, the quality measurement data are sent to the web-connected-database continuously. If the network connectivity is lost, the quality measurement data will not be sent; instead, they are saved to the folder of "date_not_sent" so that the quality measurement processing can continue. When the network connectivity is resumed, the data in the folder can be sent out manually or automatically. After the data were sent out successfully, the data are deleted from the fold automatically.

- b. Regardless if the quality measurement unit is connected to the Internet or not, the data are always saved in the computer memory. When the network connectivity is normal, after the data are sent out, the data are saved in the folder called “data_sent”. When the network is down, the quality measurement data are saved to the folder of “date_not_sent” so that the quality measurement can keep going. When the network is resumed, the data in the folder of “date_not_sent” can be sent out manually or automatically. After the data are sent out successfully, the data in the folder of “date_not_sent” are moved to the folder of “data_sent” automatically.
- c. If the computer of the quality measurement is not allowed to be connected to a network, the quality measurement data are saved in the pre created folder. The data can be moved to a computer which is allowed to link the network by a movable storage device such as USB stick.

The quality measurement unit used in the service center has the capability of sending e-mail automatically for quality problems detected in the product. When some quality measurement parameter values crosses predefined threshold, while the data are sent to the web-connected-database, at the same time an e-mail is sent to a designated technical personnel to process it as soon as possible.

3. Web-connected-database

Each r-QA system has a web-connected-database to save the quality measurement information.

The r-QA web-connected-database has very powerful data processing capabilities, especially statistical calculations.

r-QA system is very extensible. As most r-QA users would request more and more quality measurement parameters, r-QA will use a hierarchy data-structure which will organize the data into multiple levels so that old data structure will be separated from the new data items. Thus, to avoid confusion.

4. Data viewer unit

The data viewer unit is a computer which is connected to the Internet. The computer must have a web browser installed and an assigned user ID and password pair for the web-connected-database access. Based on the user ID and the password, r-QA

provides a scope for reading the quality measurement data. For example, the quality department managers and the designated engineers in the company headquarter can view all information in the database; while the managers and the engineers in a remote manufacturing site are allowed to read the only quality information related to the products manufactured at that site. An important customer is allowed to view the quality information related to the products that the customer has ordered.

Since the amount of quality data for all products will be enormous, the reader unit provides the option of selectively display quality data. Using the data display selection feature, the user can dynamically select the data of interested and display them in the web browser.

r-QA provides various “search“ functions such as search for data based on the product name, the serial number, the manufacture date.

r-QA provides the download function. The user can select the wanted data and convert them to the required format for example Microsoft excel and download them into the computer from the database.

Besides the built-in powerful data process functions, the data viewer unit can use the external data process software, for example Matlab, through the data format of CSV (Comma Separated Version)

5. Post-Sale Services for r-QA

r-QA system is very extensible, aside from extending the quality measurement data capacity. It can also extent its function to the other fields of business management. For example, for products which will be stored in storage, r-QA will record the company name and provide storage management functions.

The product quality data of a company are very important for a company. If they are lost, they are irreparable. Therefore the function of backup is necessary. r-QA provides multiple backup options: time based or data size based; such as every day backup, every two days backup, every week back, every 1Gb backup, every 5 Gb backup and so on.