

Introduction

AutoScan

As the Japanese paper market being internationalized, today we see steeper quality and price competition among domestic and overseas companies. On production floors, there are calls for "higher quality and consistent production" and "rationalization of operation and cost reduction." Auto Scan is a comprehensive examination machine designed to help achieve such objectives on production floors, including consistent production of quality products, rationalization of operation and labor saving.

The Auto Scan system covers basic measurement items for evaluating paper quality, such as whiteness, smoothness and various strengths. It incorporates ISO/JIS standard-based design for measurement methods. It can perform measurement of a large number of items that are currently done manually more accurately and quickly. Thus, it enables a greater number of tests to be conducted, bringing about consistent production and higher quality.

The Auto Scan system transmits measurement results to the operating site via the plant's LAN network as soon as they are obtained. Machine operators can promptly take action in response to the measurement results. All measurement results are checked against reference values registered for respective products and automatically determined if they are compliant or not, assisting operators in making timely judgment and contributing to rationalization of production and labor saving. Furthermore, measurement results are stored in a database for use as product information to be included in daily or monthly reports. They can also be used for sales and marketing purposes as well as for further rationalization.

Auto Scan has registries of measurement conditions already populated with values for all factory-manufactured paper products and other related information. The measurement procedure is intuitive enough for a beginner operator. Just select entries for the machine model, brand code and basis weight from the lists that are provided, and then start the machine for immediate measurement. All software applications for control and data processing are designed in a simple and intuitive style, helping easy introduction of this system.

We design, manufacture and sell Auto Scan units. Many of the mechanical parts are generic products, ensuring services that can meet your reliance and support your effort for rationalization.

Today, the Auto Scan system is working effectively for achieving higher product quality, consistent production, rationalization and labor saving at a large number of sites in manufacturing, research and management sections.

Features

1.Measurement methods based on the current measurement (ISO/JIS) standards

Each measurement module is designed to today's measurement practices (compliant with ISO/JIS standards). Measurement results are output in the same manner as data currently in use. They can be used as product test results as well as process test results.

Note: It incorporates special, non-standard measurement methods for part of the measurement items covered.

2.Easy operation for everyone

Test conditions for all specimen types (for factory-manufactured products) are registered in a database in the system. To start measurement, the operator can simply operate from a computer display by selecting values for the machine model, brand code and basis weight clicking on the measurement start button with a mouse. The Auto Scan system automatically performs measurement and outputs resulting data. Even an inexperienced operate it easily.

3.Capable of testing paper of various classes, irrespective of the basis weight, type and shape

This system is capable of testing a wide range of paper classes from tissue paper with a basis weight of 20 g to cardboard with a basis weight of 700 g. It can handle various paper types, including newspaper, wood-free paper, coated paper, liner, paperboard and specialty paper.

It can provide measurement irrespective of paper sizes or surface characteristics, being capable of examining A4 to continuous paper.

4.Higher measurement accuracy and efficiency

The Auto Scan unit makes clear-cut specimens and performs accurate measurement automatically for unified measurement. Multiple items can be processed concurrently to complete measurement in shorter time. Measurement results are checked against reference values already registered for judgment on compliance. Thus, it provides benefits of accurate measurement combined with high efficiency.

5.Connection to a LAN system to assist quick response on the production floor

By allowing connection to a company LAN, the Auto Scan system enables everyone in any department at the production site to view transferred measurement results and to take action accordingly and promptly. Transferred data can be stored and used for the quality control purpose.

6.Complete with a full range of safety measures and maintenance schemes

In order to maintain the accuracy of the measuring devices, measures are incorporated for preventing and removing paper dust. Dual systems are incorporated for secure management of the data-processing computer, software and data.

Our company undertakes the entire processes of design, manufacturing and sale of the Auto Scan units and all components and parts are manufactured/sold in Japan so that users can be reassured of full maintenance services.



AutoScan

Measurement items and specifications

Whiteness, opacity, color difference

- **Bekk smoothness** integrating sphere
Measurement range top, back
Measurement face black cup on one sheet
Measurement volume whiteness, opacity, X Y Z, Lab L*a*b*, etc.
- **Bekk smoothness** with and without UV
Measurement range reduces difference in one-sheet measurement by a special calculation method

Smoothness

- **Bekk smoothness**
Measurement range 0 to 7200 sec.
Measurement face double (simultaneous measurement)
Measurement volume 0.25cc (for rapid measurement of highly smooth specimens)
1cc, 10cc (for conventional measurement)
measurement volume automatically selected according to the volume registered for each specimen
- Others** with mechanism for reducing paper dust absorption
- **Oken smoothness**
Measurement range 0 to 50000 sec.
with three kinds of orifice
median 100, 500, 1000 sec.
orifice automatically selected according to the registration for each specimen
- Measurement face** double (simultaneous measurement)
Others with automatic calibration
- **PPS smoothness**
Measurement range 0.6 to 6.0 microns
Measurement items smoothness, compression
Clamp pressure 490, 980, 1960 kPa
Measurement face double (simultaneous measurement)
Backing hard and soft types
Others with automatic calibration
with mechanism for removing paper dust

Gloss

- Measurement range** 15 to 90%
- Measurement angle** 75°
- Measurement face** double (simultaneous measurement)
Specimen table with mechanism for sucking the specimen on the table
- Measurement orifice** with shutter for preventing intrusion of paper dust for measurement of back face with automatic calibration

Thickness

- Measurement range** 0 to 1.000 mm
- Measurement element** 16.0 mm
- Measurement accuracy** ±0.001 mm
- Measurement pressure** 50 kPa, 100 kPa
- Others** with automatic zero calibration with function for removing floating paper dust

Fiber orientation

- Measurement method** ultrasonic pulse transmission
- Measurement distance** 120 mm
- Minimum sector angle** 11.25°
- Measurement items** Orientation angle MDandCD, TSI MD/CD, TSI Max/Min

Air permeability

- Measurement method** Oken permeability
with 4 kinds of orifice
median: 50, 100, 1000, 2000 sec.
orifice automatically selected according to the registration for each specimen
- Measurement range** 0 to 50000 sec.
- Others** with automatic calibration

Basis weight

- Measurement range** 20 to 700 g/m²
- Measurement area** approx. 1/175 of square meter
- Cutting** accurate cutting with specimen punching out
- Balance** electronic balance measuring to 1/1000 g
- Others** with automatic specimen discharge



■ Burst strength

Bursting types	low pressure and high pressure
Measurement range	low: max. 2000 kPa high: max. 5000 kPa
Clamp	low: upper 30.5 mm in inner diameter lower 33.1 mm in inner diameter high: upper 31.5 mm in inner diameter, 67 mm in outer size lower 31.5 mm in inner diameter
Measurement face	top only (double face can be measured by skillful setting of specimen)
Others	with rubber diaphragm calibration mode and rubber diaphragm replacement mode

■ Tensile strength

Measurement direction	MD and CD
Cutting	accurate cutting with specimen punching out
Cut size	15 mm wide, 160 mm long
Span	100 mm
Measurement range	2.94 to 490 N
Elongation	max. 15 % (both elongations on failure and before failure can be displayed)
Chuck	two kinds (large and small initial tension on chucking)
Tensioning speed	5 to 50 mm/min (variable)
Display	in N on the main unit, in kN/m on the voucher
Values calculated	Young's modulus, tensile stiffness, breaking length, MD/CD strength ratio, tensile energy absorption
Others	with automatic calibration with specimen discharge mechanism

■ Tear strength

Measurement direction	MD and CD
Measurement range	200 to 4900 mN
Tearing position	2 points to be torn at a time
Others	with paper dust absorption with overload protection

■ Stiffness

Measurement direction	MD and CD
Bending angle	7.5° , 15° (Option 45°)
Bending direction	left and right
Bending speed	5° /sec
Span	20 mm
Specimen size	20 mm wide, 30 mm long
Cutting	accurate cutting with specimen punching out
Applicable specimen	with basis weight not more than 300 g/m ²
Measurement range	max. 999.9 mN

■ Compressive strength

Measurement direction	MD and CD
Measurement method	Short Span method compression in flat state of specimen strip
Compression speed	3mm/min
Specimen size	15 mm width 40mm length
Span	0.7mm
Measuring range	Max 300N
Cutting	accurate cutting with specimen punching out

■ Water content

Measurement method	near infrared reflection
Others	with software for drawing measurement graph

■ Water absorptiveness

Measurement method	Cobb
Measurement area	50 cm ² (half the area per JIS)
Measurement face	double
Time in contact with water	selectable between about 10 seconds to 5 minutes
Measuring section	weighing by electronic balance to 1/1000 g

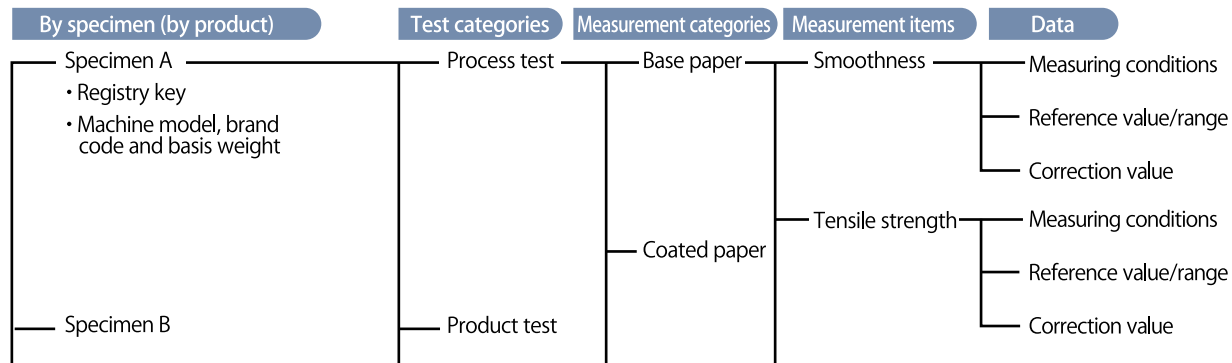


AutoScan

Report

■ Registering data and saving measurement results

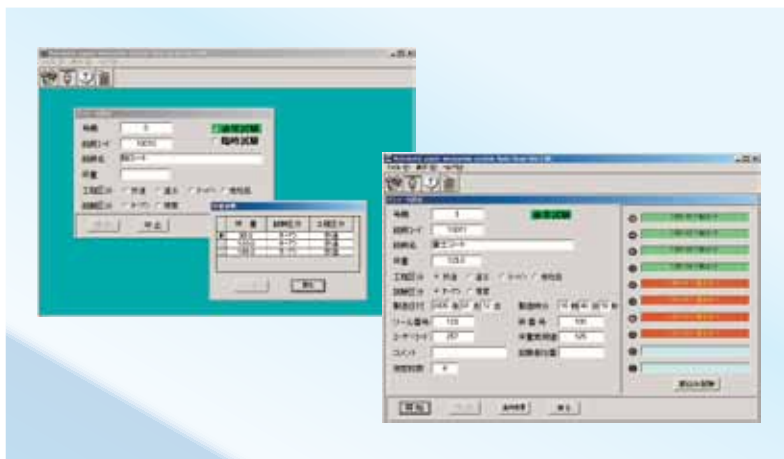
- The machine model, brand code (or brand name) and basis weight are used as registry keys for inputting various data associated with each specimen into the database.



- Measurement results are saved in the database and accumulated as quality control data.

■ Measuring procedure:

1. Set a specimen in the feeder.
2. Select a machine model, brand code, basis weight and measurement category from a list of registered data.
3. Enter the production date, reel number, etc., and then start measurement.



■ Data output after measurement

□ Data output after measurement

Measurement data are output to an upper system via the plant's LAN network.

Output data format: CSV file format

Data contents: maximum, minimum, average, deviation, range and measured values, etc. for each measurement item

□ Measurement forms output to a printer

Data contents: maximum, minimum, average, deviation, range and values for each measurement item

Each measurement result is output with compliance judgment, which is determined against the preset reference value/range.

No.	Date	Time	Name	Reel No.	Coat.	Brand	B.W	Method	Data: 2005/01/18 15:15									
1	2005/01/18	09:24					120.5	II	1	2	3	4	5	6	7	8	9	10
Thickness	um	144	74	150	121	0			142	143	144	145						
Smoothness	Sheet	478.8	0.88	878.4	878.1	1.3			878.4	878.8	878.2	878.5						
Brightness	%	891.7	0.50	891.1	891.4	4.3	81.8	89.0	89.0	89.2	89.3	89.4	89.1	89.2	89.3	89.2	89.3	89.2
Opacity	%	879.7	0.00	879.3	879.1	1.4	87.8	85.0	85.0	84.8	84.7	84.8	84.9	84.8	84.9	84.8	84.9	84.8
Color L*(d/10)		44.49	0.88	100.89	97.88	2.82	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00
Color a*(d/10)		0.90	0.28	1.999	1.88	-0.21	0.17	0.18	0.20	0.19	-0.21	0.18	-0.20	0.19				
Color b*(d/10)		-1.84	0.78	1.974	2.01	0.11	0.88	0.98	0.91	0.85	0.84	0.81	0.79	0.80				
Brightness	%	899.8	1.11	899.4	899.2	2.2	83.3	89.0	89.0	89.2	89.2	89.2	89.2	89.4	89.1			
Opacity	%	879.1	0.00	878.8	878.8	1.8	81.8	85.0	85.0	84.8	84.8	84.8	84.8	84.8	84.8			
Color L*(d/10)		-0.51	0.88	1.412	1.39	0.22	0.28	0.30	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Color a*(d/10)		0.21	0.40	0.985	1.03	-0.12	0.11	0.08	0.08	0.08	-0.18	0.10	-0.20	0.11				
Color b*(d/10)		-2.68	0.78	1.844	1.87	0.47	0.80	0.90	0.80	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Moisture	%	17.74	1.08	18.11	18.41	2.30			18.84	18.61	17.78	18.41						

Displays the difference between the reference value and the measurement average.

The reference value and the range (specified by the upper and lower limits) are used to determine if the specimen is compliant or not. If not, the letter "E" is affixed in front of the average value for the specimen.

(It is also possible to set for compliance judgment for each measurement result rather than for the average, with "E" displayed individually for the measurements if not compliant.)

Equipment specifications

Outer dimensions and installation specifications

● **Outer dimensions**

Length: 1350 to 3600 mm (including the KRK specimen feeder)

* The length may vary depending on the number of installed modules.

Depth: 800 mm

Height: 2000 mm (The Auto Scan main unit: 1550 mm)

* When delivered, the Auto Scan unit is separated from the feeder.

● **Weight:** 650 to 2000 kg

* The weight may vary depending on the number of installed modules.

● **Power source:** 100 VAC, 15 A

* Please take measured for noise prevention and install a UPS system.]

● **Air source:** Clean air of 0.5 MPa or higher

● **Installation environment:**

An environment without much dust or vibration and suited for measurement (Also, a working space is needed around the unit.)

Accessories

● **Computer for control and data processing with a suite of processing software**

● **KRK specimen feeder (improved model)**

○ **Specimen shape**

Long sheet (less than 10 m): up to 10 rolls

Sheet (A4 or A3): up to ten sheets

○ **Continuous paper feed function**

This function feeds a number of A3-sized sheets serially so that they can be treated like long-sheet paper. (This way, higher measurement accuracy is achieved more quickly.)

● **Long sheet cutter**

Driving mechanism: motorized

Cutting width: 300 mm

Cutting length: 200 - 9999 mm

Other features:

Provided with an automatic cutting length measuring function

Provided with a function to wind up specimens after cutting

A power supply of 100 V and compressed air needed

● **Other components** (optional)

Specimen cutting plate (A3 size)

Specimen cutter



KRK specimen feeder



Long Sheet Cutter

The specifications of the equipment and each tester may be changed without prior notice.