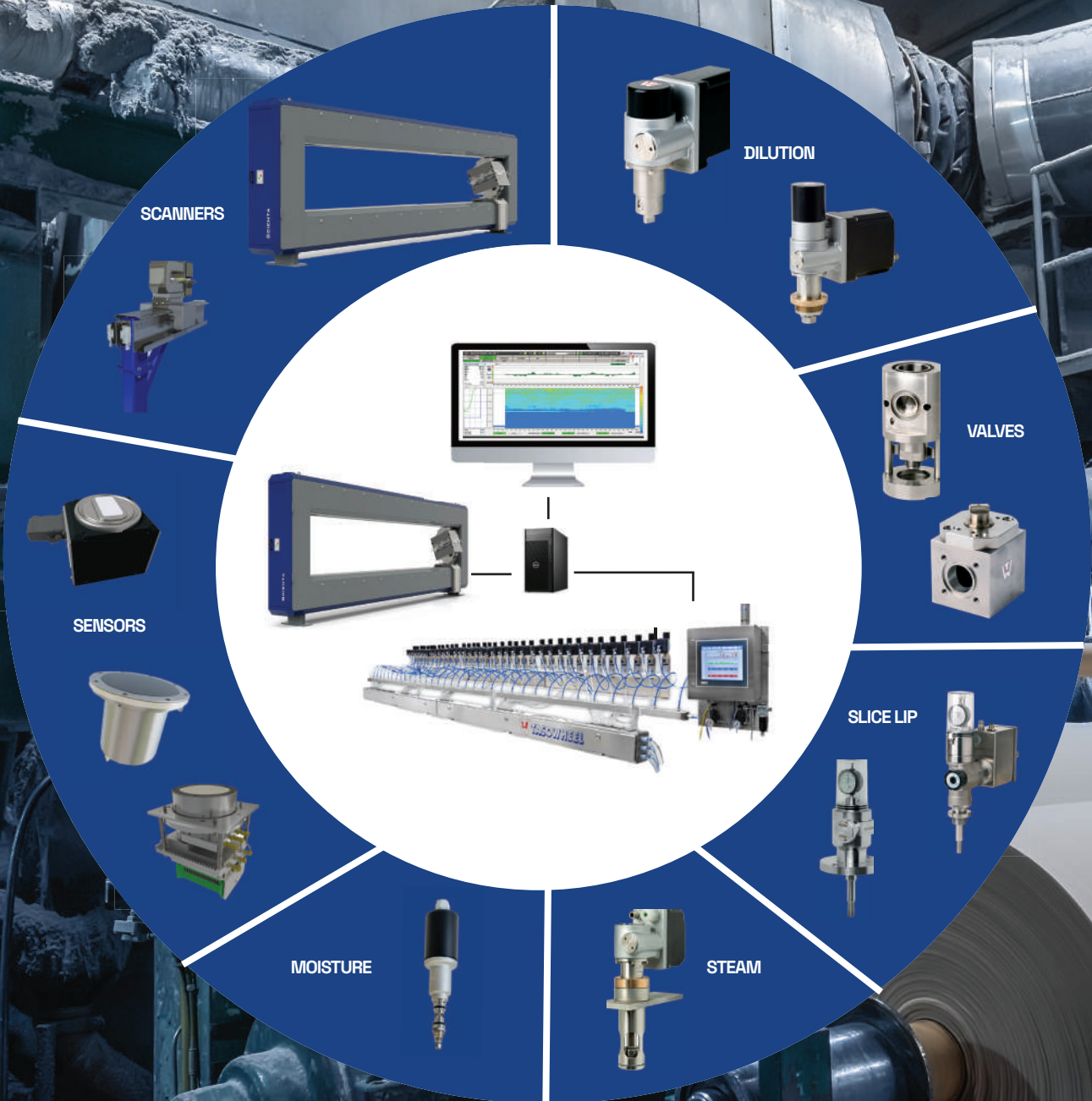


TAILORED QCS SYSTEMS

for Paper, Board and Converting

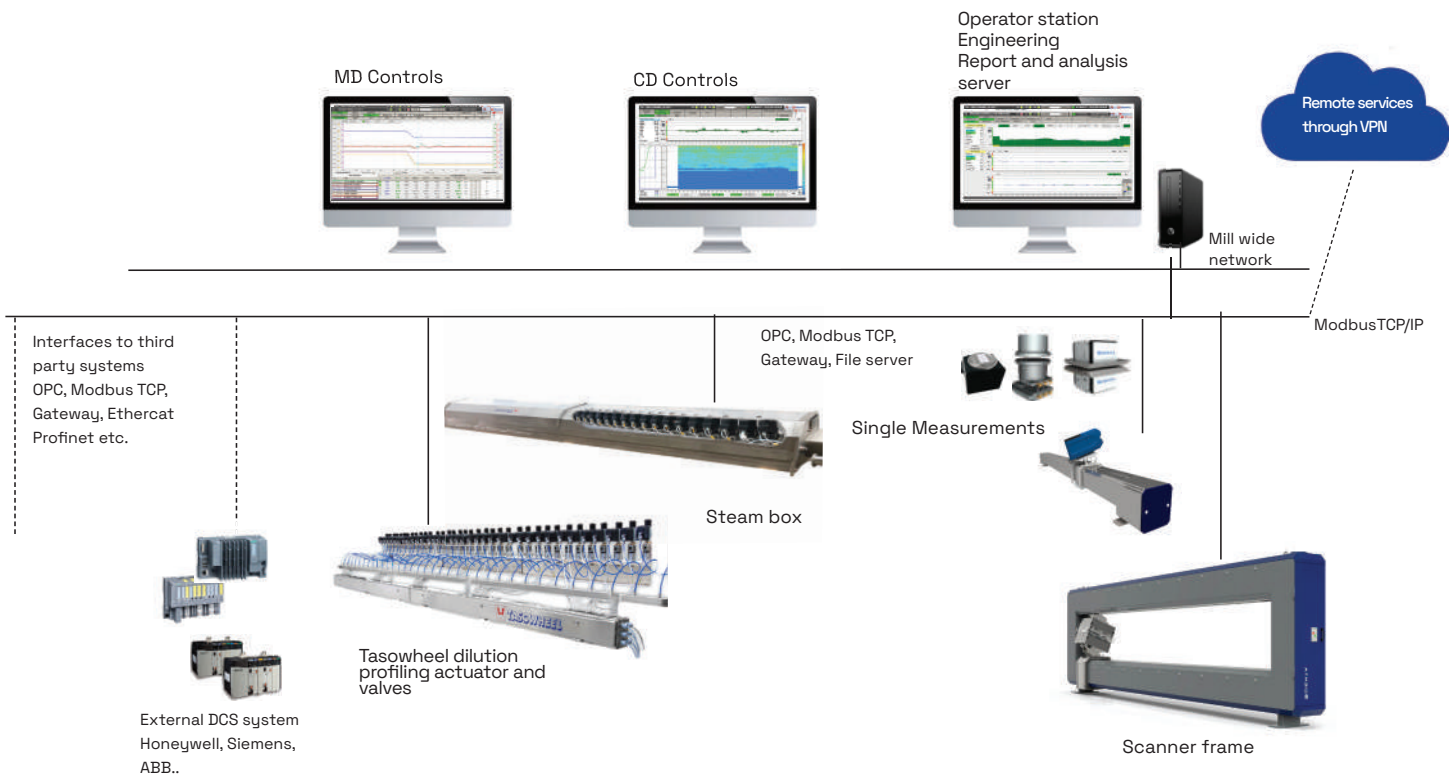


More than 40 years of industry experience.

QCS and profilers from original manufacturer.



Control system

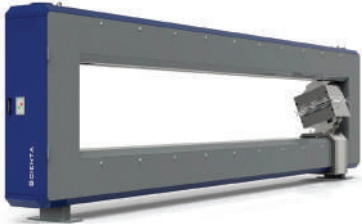


- Open network and system with commercial automation equipments
- One common industrial network with various communication protocols
- Accurate and fast CD profile control with a simple user interface
- Easy and cost efficient communication to other systems with all modern interfaces

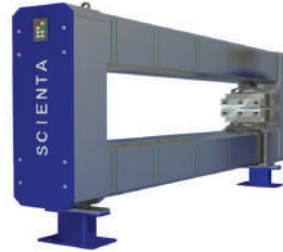
- Control system available for all profilers: Dilution headboxes, Slice controlled headboxes, Steamboxes, Moisturizers, Coating control & Caliper control
- System for all paper machines: Board, Pulp dryers, Tissue machines, Non- woven, Converting, Coating and Calanders.

Measurements by Scienta

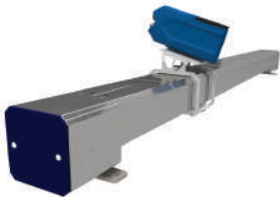
Scanner Frames



Model 1010
O-Frame, Max width 10m
Liquid cooling of heads
Sealed Frame with overpressure
For paper and pulp
Integrated PLC



Model 9110
O-Frame, Max width 4m
Electronics & Head air cooling
Sealed Frame with overpressure
Integrated PLC

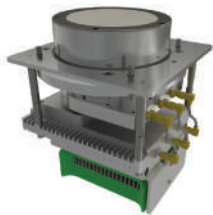


Model 9145
Single sided
Max width over 10m
External PLC Cabinet

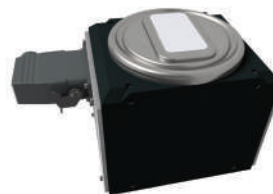


Model 9144
C Frame
Fixed point scanner
Edge Scan capability
External PLC Cabinet

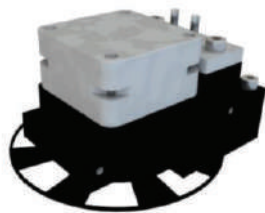
Measurements



Microwave sensors for Accurate Total Moisture
3 - 70% 40 Hz
Contact or Non-Contact
Double or Single Sided



Ash & Coat Weight sensors
Double sided X-ray
Single sided NIR
Non-Contact up to 150g/ m2



NIR sensor for Surface or Total Moisture
Up to 150g/ m2
Double or Single sided
1-30% 80 Hz

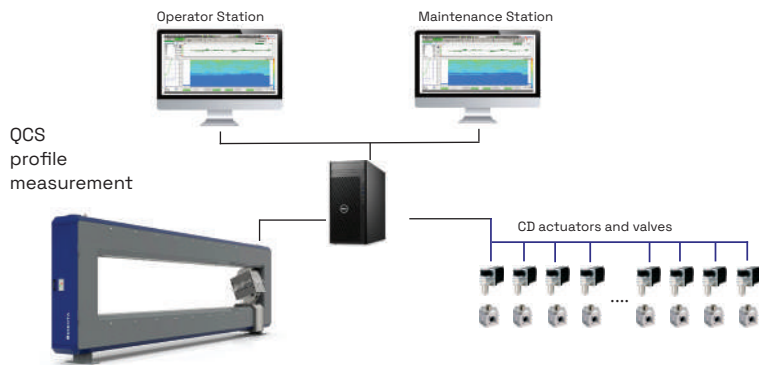


Basis Weight Sensors
Beta Source, Non-contact, Total Weight
Double Sided, 15 - 900g/m2

Caliper, Fiber orientation, Porosity and Temperature, Fiber weight (IR), Polyamid...

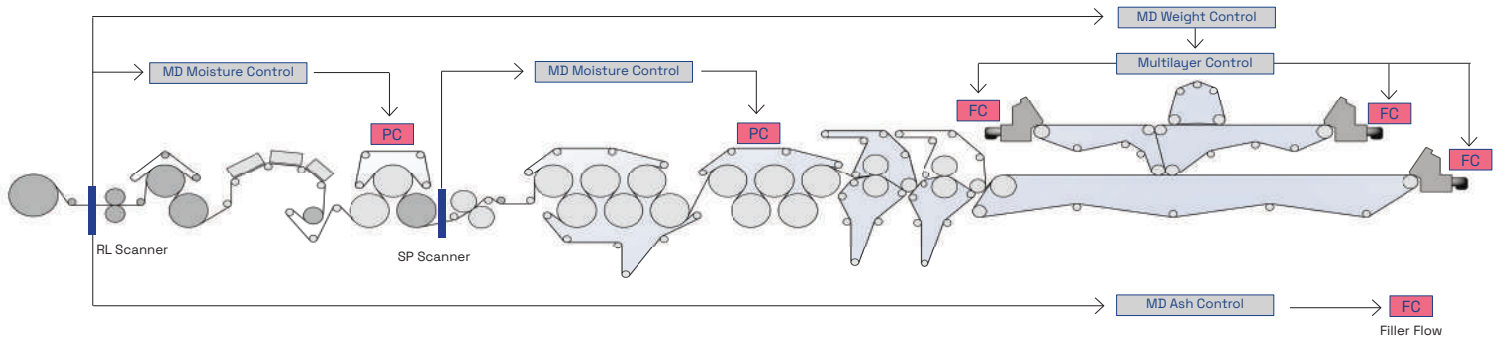
Controls

CD Control



- Controls for accurate CD profiling with a simple user interface
- Accurate mapping of actuators to control profile
- Dynamic mapping and shrinkage compensation
- Automatic mapping feature
- High resolution profile optimization
- Adaptive control with high resolution response
- Absolute position profile of actuators
- Display for diagnostics and engineering
- Excellent control performance
- Fast recovery after upsets

MD Control

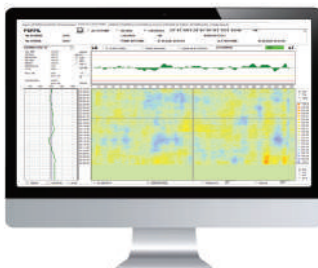


Tasowheel's Machine Direction Controls utilizes industry proven model based control technology to improve product quality and paper machine efficiency while minimizing material and energy usage.

MD Control package is fully scalable and by using dynamic process models it can be separately tuned for operation of the entire range of production. Automatic Grade Change application ensures fast and accurate grade changes.

- Owendry weight control
- Owendry feed forward control
- Moisture control with decoupling from weight
- steam reduction logic
- Coordinated speed change
- Multiformers with layer based controls
- Paper ash content control
- Coat Weight control
- Production speed optimization

Report & Analysis



- Real-time profile and reporting data from the Quality Control system at periodic intervals for long-term historization and analysis.
- All data is stored in Excel format and historical reports can be browsed by date and reel/grade/shift/day
- The data is exportable to any further software application that is able to handle CSV files.
- Easy to integrate with Mill data management like SAP

Tasowheel actuators and valves

Dilution



RDA- Rotary Dilution Actuator
Operating torque: > 20 Nm
Output: 90°
Spacing in one row: min 60 mm
Resolution < 10 µm



LDA- Linear Dilution Actuator
Operating force: up to 3500 N
Output: up to 50 mm
Spacing in one row: min 60 mm
Resolution < 10 µm



RDV- Rotary Dilution Valve
AISI 316, no plastic parts
Hard coated flow surfaces
Spacing in one row: min 60 mm
Straight through flow



RDV 90°- Rotary Dilution Valve
AISI 316, no plastic parts
Hard coated flow surfaces
Spacing in one row: min 60 mm
90 degree through flow



LDV- Linear Dilution Valve
AISI 316, no plastic parts
Hard coated flow surfaces
Spacing in one row: min 60 mm
90 degree through flow



Moisturizing

MTA- Motorized Moisturizer Actuator
Axial force 120 N
Protection class IP 67
2 valve sizes: 15 l/h and 30 l/h



Edgeflow

Tasoedge- Linear edgeflow actuator with a valve
Axial force up to 2000 N
Operating range 40 mm
Resolution < 10 µm

Slice Lip



FORTE- Motorized Linear actuator
Linear force: up to 7500 N
Output: up to 10 mm
Spacing in one row: min 65 mm
Resolution < 0,35 µm



MLL- Manual Linear actuator
Linear force: up to 6000 N
Output: up to 10 mm
Spacing in one row: min 100 mm
Resolution < 10 µm



MLL 35000- Manual Linear actuator
Linear force: up to 35000 N
Output: up to 20 mm
Spacing in one row: min 100 mm
Resolution < 10 µm

Steam



STA- Linear Steambox actuator with a valve
Linear force: up to 1000 N
Ambient temperature max 125°
Output: up to 10 mm
Spacing in one row: min 60 mm
Resolution < 5 µm

Coating



CA- Linear Coater actuator
Linear force: up to 5000 N
Output: up to 10 mm
Spacing in one row: min 60 mm
Resolution < 0.3 µm

Accessories



Slice Gap Measurement
Resolution < 10 µm
Excellent repeatability
Direct backlash indication
Measurement during actuator motion
Easy set-up without tools

Leading profiling actuator manufacturer

Tasowheel provides maintenance and repair services throughout the product's lifetime. Our actuators are well-known for their long life cycle and reliability. This ensures our customers an efficient and uninterrupted production.



Original spare parts, maintenance and repair services

Dilution actuators



IDA20



RDA-20/6



DLCP-20

Steam



EMA 15



EMA1000



STC900

Slice lip



88MAP

Coating



CWW-3000

Moisturizing



CWC-3500



EMA5000



Services for Pulp & Paper

- Process studies
- Profiler audits
- QCS rebuild
- QCS audits
- Control Tuning
- Electronic upgrades
- Profiler upgrades: Steambox, Moisturizer, Coater rebuilds



First class solutions for your needs.





1979

Established



26.0 M€

Turnover



135

Employees



10 %

Growth rate



AAA

Credit rating



90 %

Indirect exports over



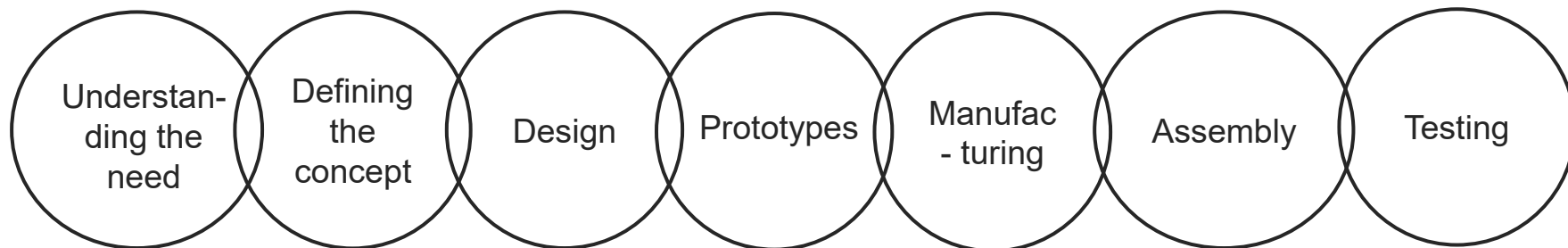
Tasowheel is a family-owned Finnish technology company specializing in the design and manufacturing of components and solutions for power transmission, machining, paper industry, controlled motion, R&D and assembly needs.

Ownership: Family Sorjonen

CEO: Jarmo Kuikka

What can we offer?

- Customer orientated approach
- State of the art production machinery
- Premier customer service
- Design know-how and support
- Efficient and flexible production control
- High quality performance to our customers
- Full product cycle



Manufacturing of Precision Parts

STATE OF-THE-ART MACHINERY FOR PRECISION MECHANICS

- 7 Turning Machines
- 5 Milling Machines
- 2 Grinding Machines
- 2 Gear Hobbing Machines
- 1 Gear Grinding Machine
- 1 Worm Grinding Machine
- 3 Inspection Machines
- 5 Assembly Test Stations



COMPETENCE

- More than 40 years of experience.
- Modern and efficient production machinery in milling turning and grinding.
- Specialised in small and medium series of complex components.
- Experience with different materials.
- High precision measuring equipment for quality control.

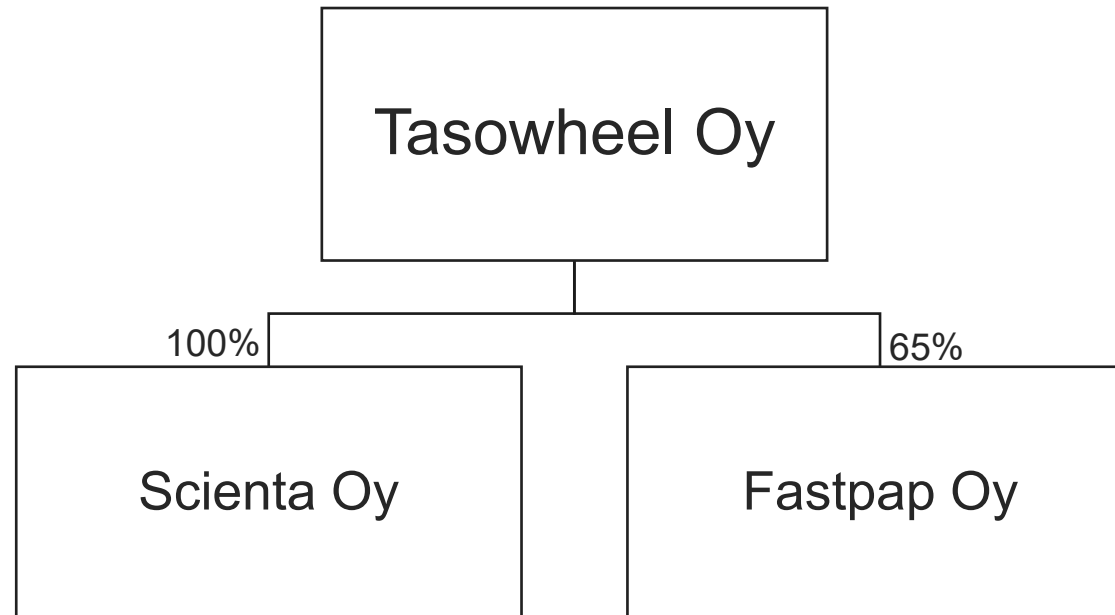


Industries

Our customers are globally operating companies in various industries



Tasowheel Oy





Tasowheel: Pulp and paper

First profiling systems developed by Valmet in the early 80's

Global leader in profiling actuator manufacturer

- Over 300,000 actuators and valves delivered for Valmet between 1984-2009. Thousands delivered to ABB and Voith

Nowadays and independent actor serving all paper machineries, paper and board mills.



Original manufacturer-Tailored solutions for:

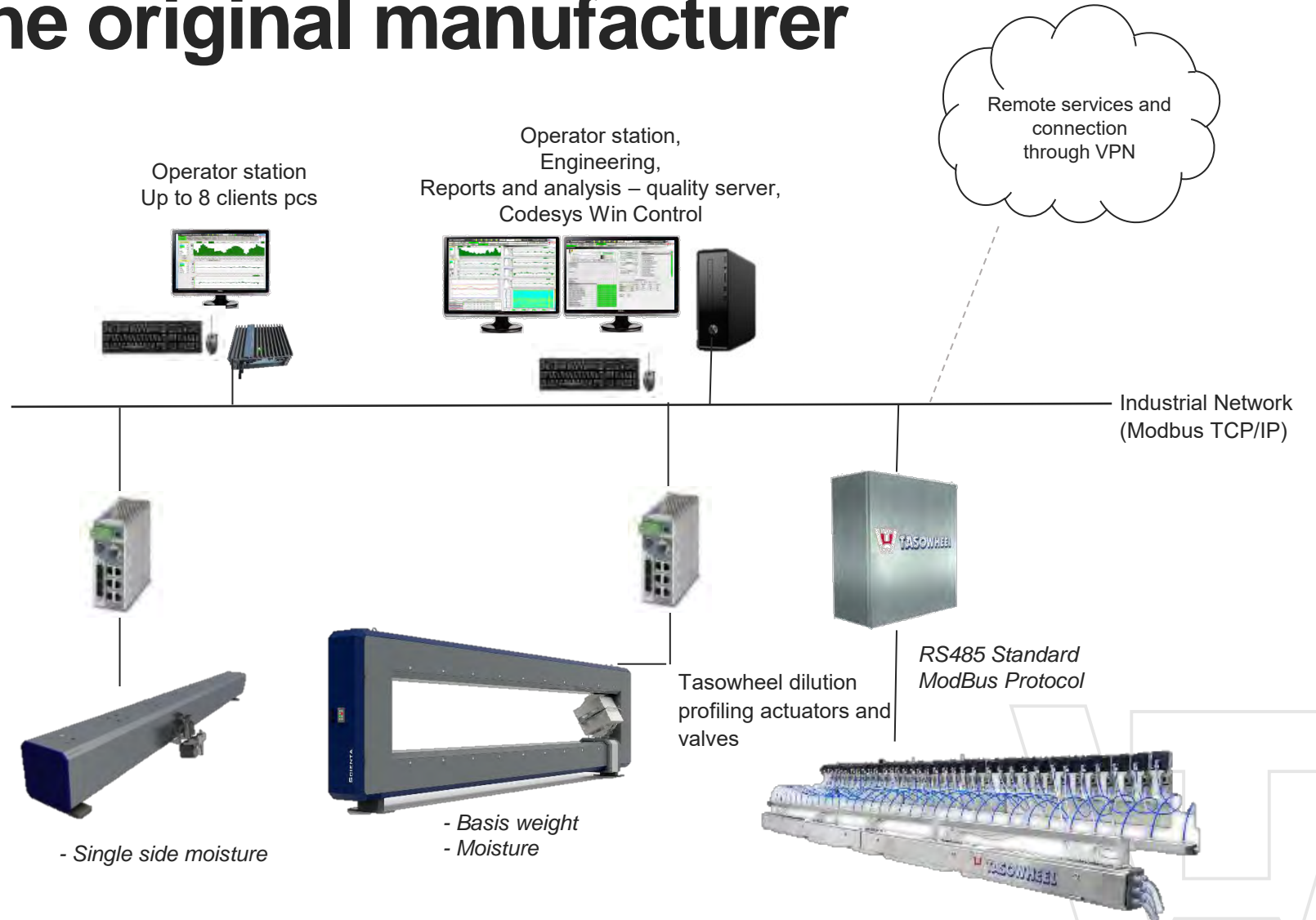
- CD Profiling systems
- Quality control systems
- Actuators
- Valves
- Spare parts and maintenance
- Services and tools

Full QCS from the original manufacturer

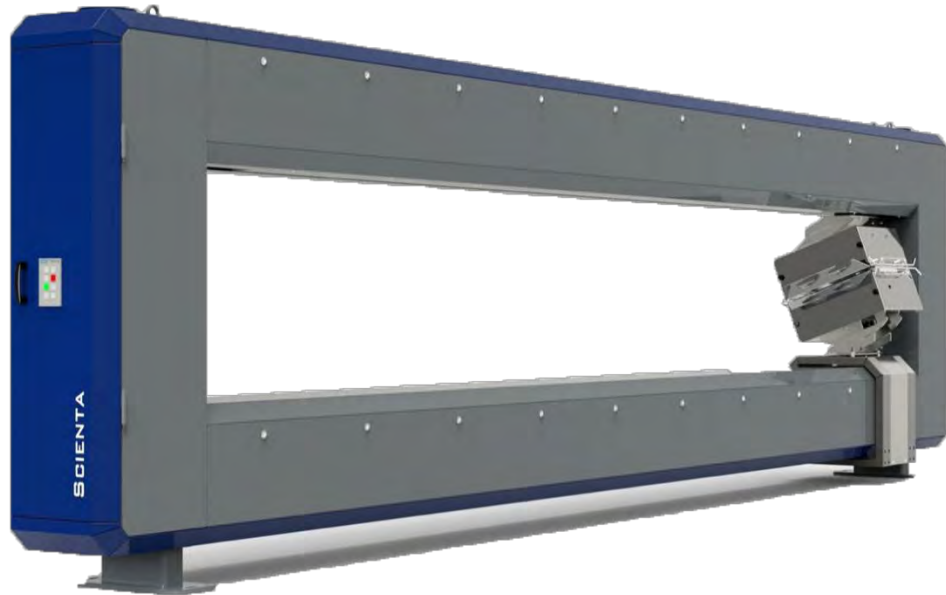
- High accuracy actuators for all profiling needs
- High performance automapping CD profile control program
- Actuators controlled using standard ModBus protocol
- One server for entire system
- Communication options Profibus, Profinet, Serial link, SQL database or OPC as an option
- Both Wet end and Dry end scanners available
- Measurements: Total Weight, Moisture....

Software

- Basis weight MD control
- Moisture MD control
- Coordinated speed change
- Automatic grade change
- CD basis weight
- Scanner and measurement applications
- Grade/Calibration handling
- MIS package (Profiles, 3D Profiles, Trends, Alarms)
- Historical reports analysis, quality server



Scienta in a nutshell



Subsidiary of TasoWheel Oy

With a large network of suppliers around the world.

Develops sensors and online measuring systems

Scienta develops sensors and online measuring systems for the Pulp & Paper, Impregnation, and Non-woven industries.

Founded 64 years ago

Own sensor production since 1954; scanner production since 1974.

673 measurement frames delivered.

Scienta Online Systems

Measurements

Total Weight, Moisture (NIR and MW), Caliper, Brightness, Coating weight, Ash content, Porosity and Temperature.

Other features

- Double and single sided scanners, fixed point and mobile units.
- Choice of control system – Siemens or Allen-Bradley.
- Profinet, OPC and/or SQL database.
- MD controls
- Remote support using TeamViewer



Measurement Products





MODEL 1010

- O-Frame, Max. Width 10m
- Liquid Cooling of Heads
- Sealed Frame with overpressure
- Integrated PLC

MODEL 9110

- O-Frame, Max. Width 4m
- Electronics & Head Air Cooling
- Sealed Frame with overpressure
- Integrated PLC



MODEL 9145

- Single Sided
- Max. Width over 10m
- External PLC Cabinet

MODEL 9144

- C-Frame
- Fixed Point Scanner
- Edge Scan capability
- External PLC Cabinet
- Stainless Steel Construction



MICROWAVE SENSORS FOR ACCURATE TOTAL MOISTURE

- 3 – 70 %, 40 Hz
- Contact or Non-Contact
- Double or Single Sided

NIR SENSORS FOR SURFACE OR TOTAL MOISTURE

- Up to 150 g/m²
- Double or Single Sided
- 1 – 30 %, 80 Hz



BW SENSORS

- Beta Source, Non-Contact, Total Weight
- Double Sided, 15 – 900 g/m²

ASH & COAT WEIGHT SENSORS

- Double Sided X-Ray
- Single Sided NIR
- Non-Contact, up to 150 g/m²



CALIPER SENSOR

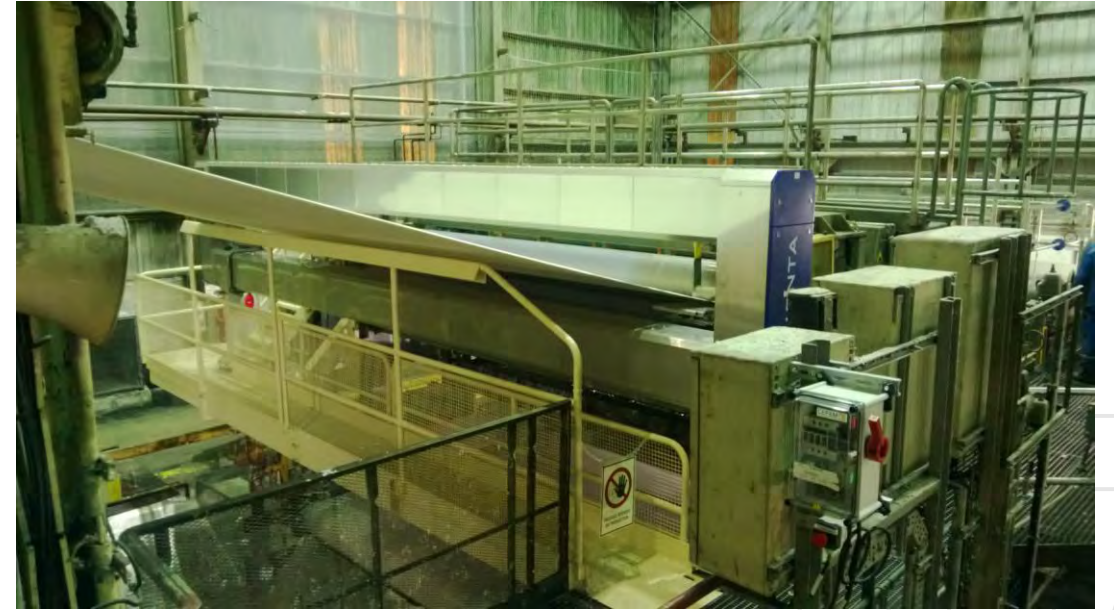
- Non-contact, double-sided online measurement
- Light touch, no marking on the sheet
- Wide measuring range
- Tolerates web vibrations

Applications

Pulp Dryer line installation before dryer
Single-sided scanner and microwave sensor



Pulp Dryer line installation after dryer
O-frame and double-sided sensors



Applications

Cardboard measurement with Basis
Weight and Moisture sensors



Online measuring system for Phenolic and
Melamine Resin Impregnation lines

Phenolic Impregnation line, dry end scanner



Applications

SINGLE SENSOR FOR TISSUE LINES

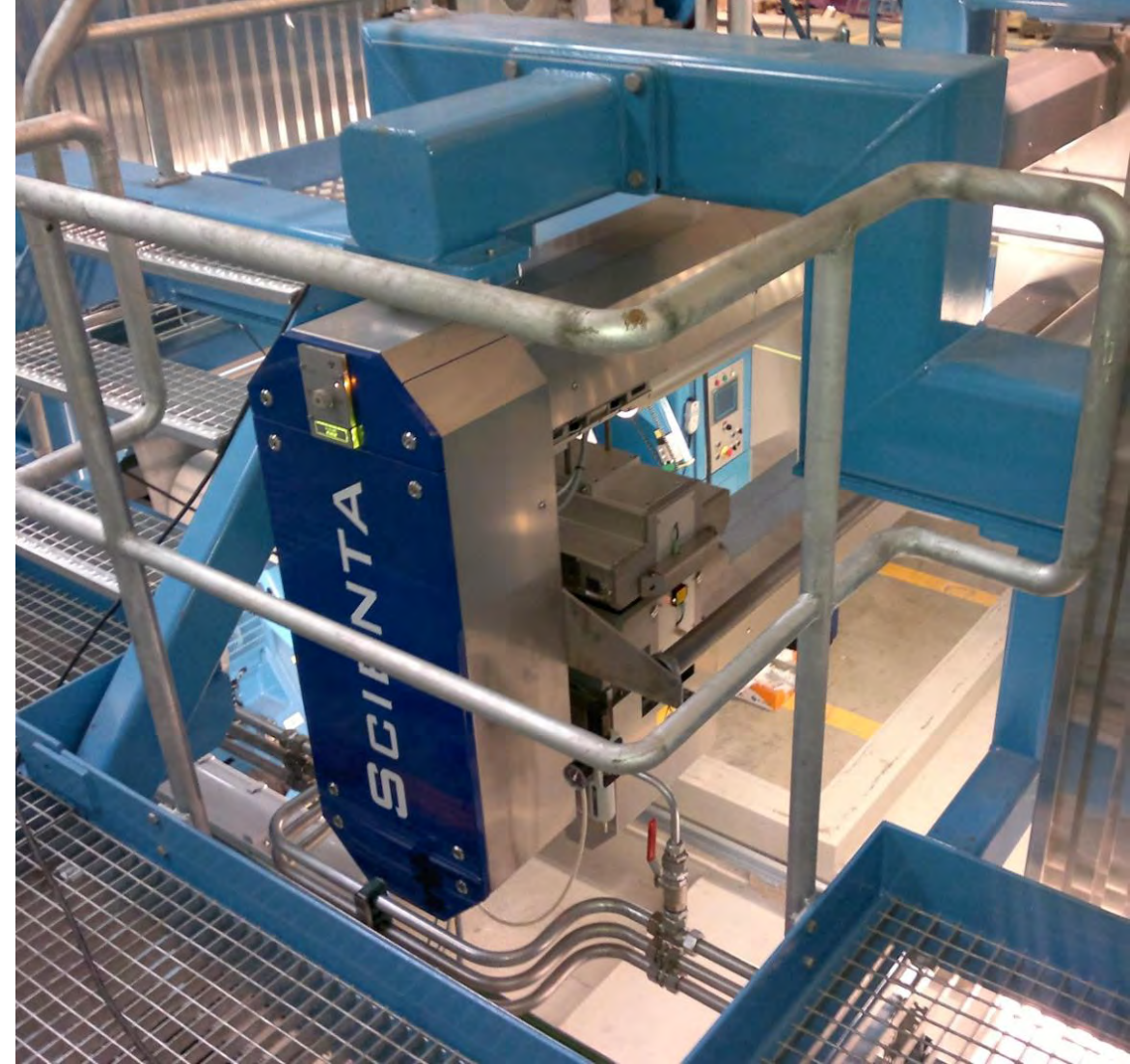
New NIR-MIR based sensor is well suited to measure Tissue fabrics. Single sensor for Basis Weight and Moisture.

Excellent response to Moisture starting from as low as 1 % even on flocky and very thin materials.

Simple 'one unit' scanner with built-in PLC ready to go. Ethernet + compressed air + 120-230VAC is all that is needed. Liquid cooling of sensor platform.

Sheet edge detection using the IR-sensors signal for web width measurement.

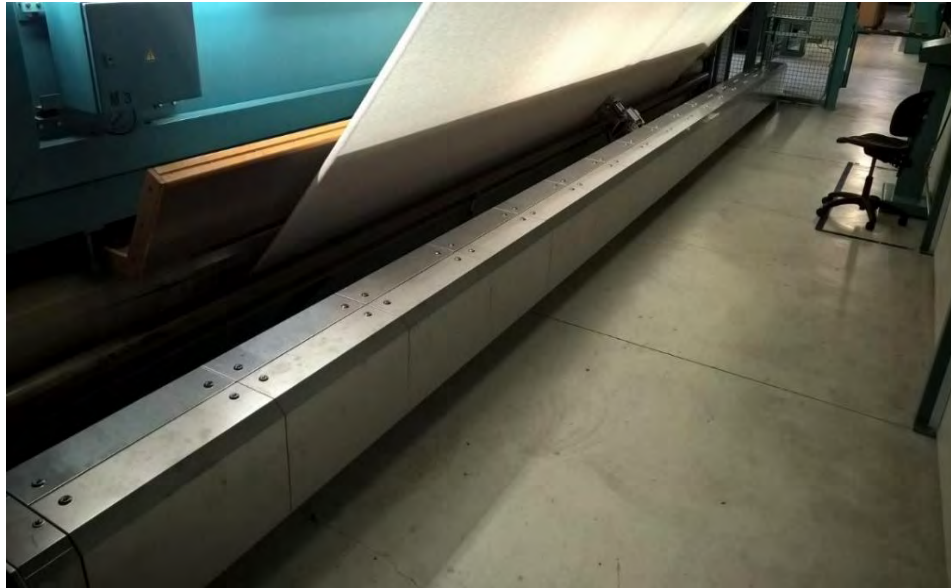
Optional SQL database to gather measurement values for reports and statistical analyses.



Airlaid tissue machine installation

Applications

Scienta online measuring system for Nonwoven lines with Total Weight, Temperature and Porosity



Scienta Specialty Applications
Hot environment – Moisture sensor

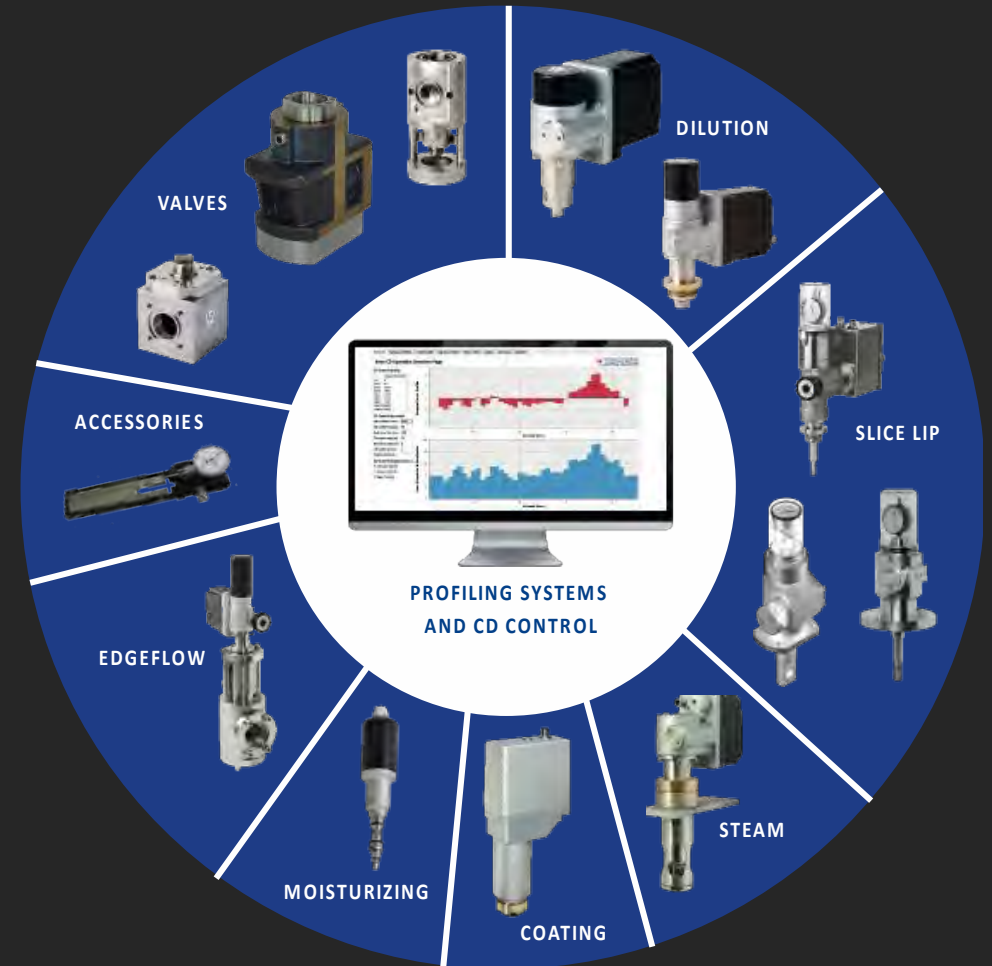
Nonwoven felt fabric installation



Profiling Systems

For the Paper and Board industry

- Original CD profiling components.
- More than 40 years of industry experience.
- Aim to have the right quality and the right price
- More than 300000 actuators and valves worldwide



Dilution control systems

Basis weight profiling for all dilution headboxes

- A tailored combination of precise actuators and dilution valves with linear flow curves
- Excellent weight profile due to narrow control zones and absolute actuator positioning
- High-resolution electromechanical actuators with rotating (RDA) and linear (LDA) movement
- Tasowheel electronics (I/O or modcom) inside the actuators
- Minimum spacing 60 mm in a single row

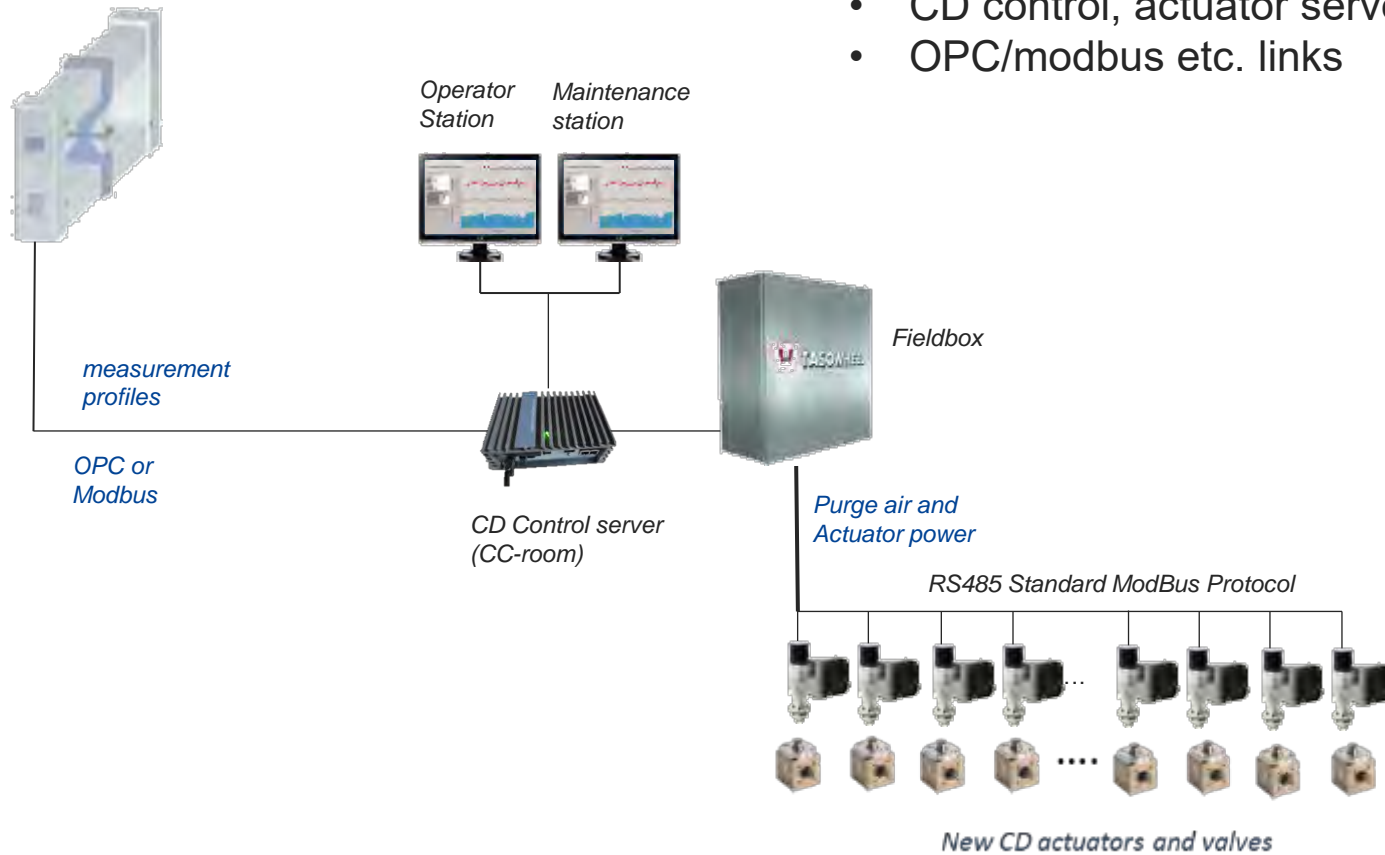
Benefits

- Small, powerful and precise actuators
- Fast and accurate positioning
- Actuators are compatible with maintenance-free stainless steel Tasowheel dilution valves without adapters
- Better runability and printing properties due to excellent CD basis weight profiles



Dilution control systems

- Full range of actuators and valves
- Several ways to integrate to existing QCS
- CD control, actuator server, direct control from 3rd party QCS,
- OPC/modbus etc. links



Automated slice actuator system

Tasowheel Slice profiler

For Slice lip head box basis weight profiling

Suitable for all headboxes – easily tailored to headbox needs (mounting, force, operating area etc.)

Relatively small investment to improve CD weight profiles.

Upgrade is a perfect option for minimizing CD variations in an old headbox.

Fast and accurate absolute position measurement

Benefits




Easy replacement

Tailored actuators (Forte) equipped with handwheel and dial gauge

Better runability and printing properties due to excellent CD basis weight profiles



Tasowheel dilution actuators against competitors

Competitor comparison			
Manufacturing	Made in Finland	Made in China	Made in Germany
Maintenance	Easy access and opening the cover - also during the run	Cant open the cover when installed	Cant open the cover without removing entire actuator. SD
Changing the actuator	Easy to change the actuator by opening one hexagonal nut	Difficult to remove the actuator	Difficult to remove the actuator
Customizing	100 % tailored	same for all	same for all
Protection class	IP67 with purge air	IP65 max	IP65 max
Cabling	One cable with purge air hose inside	One cable for power and bus	One cable for power and bus
Manual use	Handwheel for emergency situations	No handwheel	No handwheel
Fault tolerance	Single actuator failure doesn't lead to stop of entire bus	-	One faulty stops atleast 8 actuators
Position feedback	Absolute position feedback from the shaft	Absolute position feedback	No position feedback
Purge air	Purge air keeps dust away and decreases amount of condensate	No purge air	No purge air
Average sparepart availability	> 15 years	< 10 years	< 10 years

- Easier to change and maintain
- Better fault tolerance
- Better accuracy and performance
- Longer lifetime

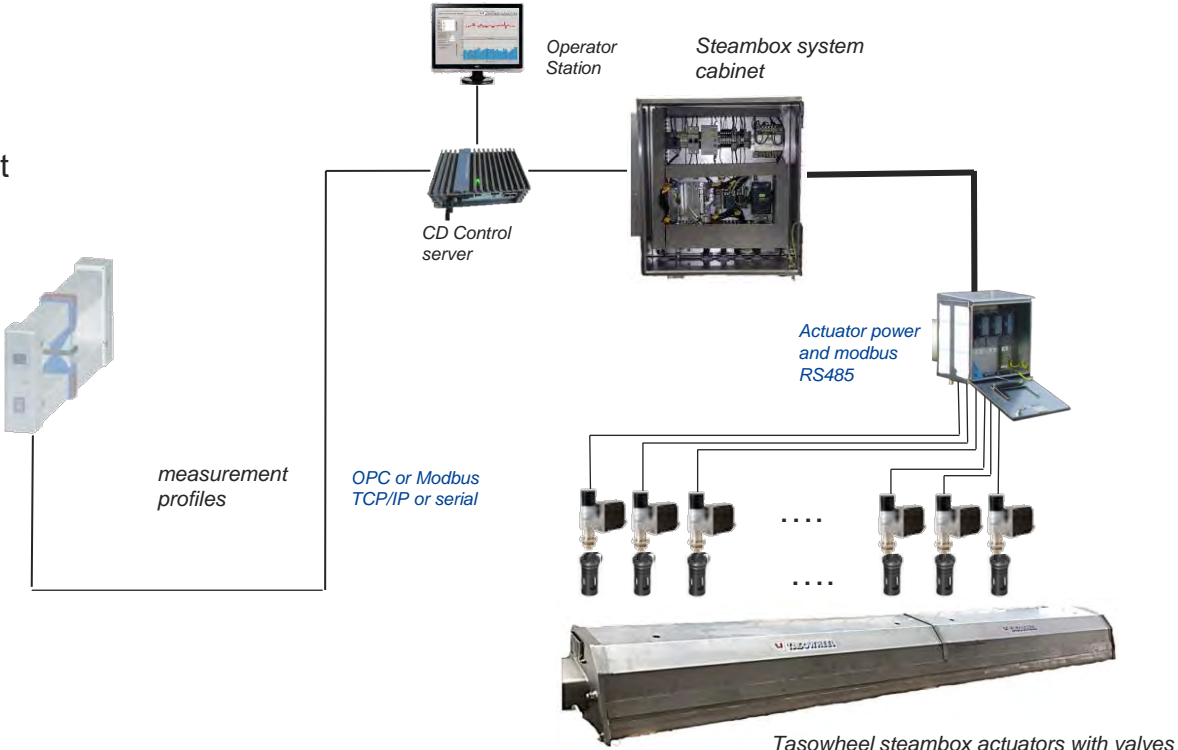
Steam profiling system for accurate CD moisture control

- Tasowheel design ensures maximized steam absorption to the web -> higher temperature increase and dryness increase
- Advanced solution with accurate actuators ensures smooth steam distribution in cross direction as well as accurate zones in moisture profile control.
- Electromechanical Steam actuator (**STA**) with position feedback measurement
- Actuators are controlled with advanced 16-channel control cards in integrated cabinet enabling easy maintenance during operation



Steam actuator

- Reliable operation under hot and harsh conditions
- Can be customized according to the process requirements
- Maintenance free
- Really long lifetime
- Replacement can be done easily in single units
- Electronic card is located away from hot surfaces

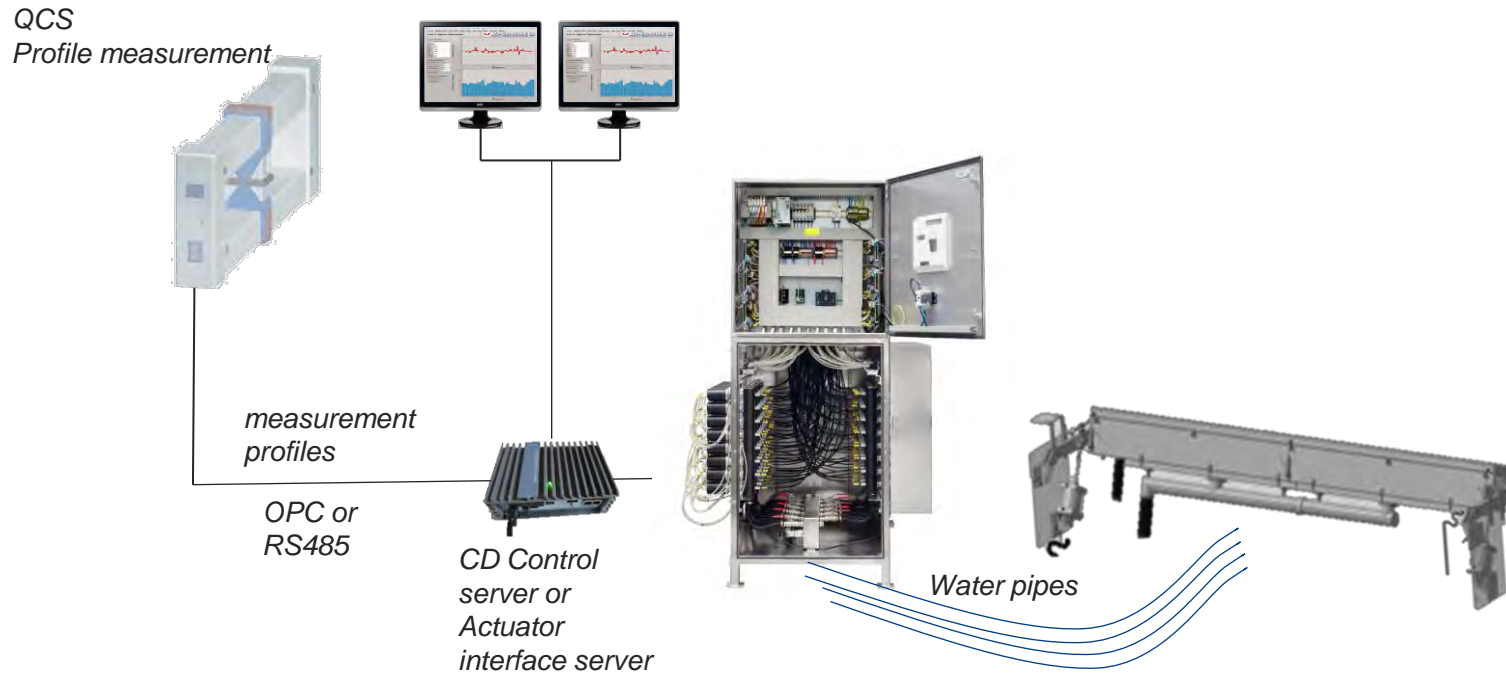


Tasowheel steambox actuators with valves

Moisturizer - Customer benefits

- Even moisture profiles
- Increased production and better runnability
- Better gloss and smoothness in calendering application

- Control and reduce curl and increase self-adhesive product flatness
- Easy integration to existing QCS

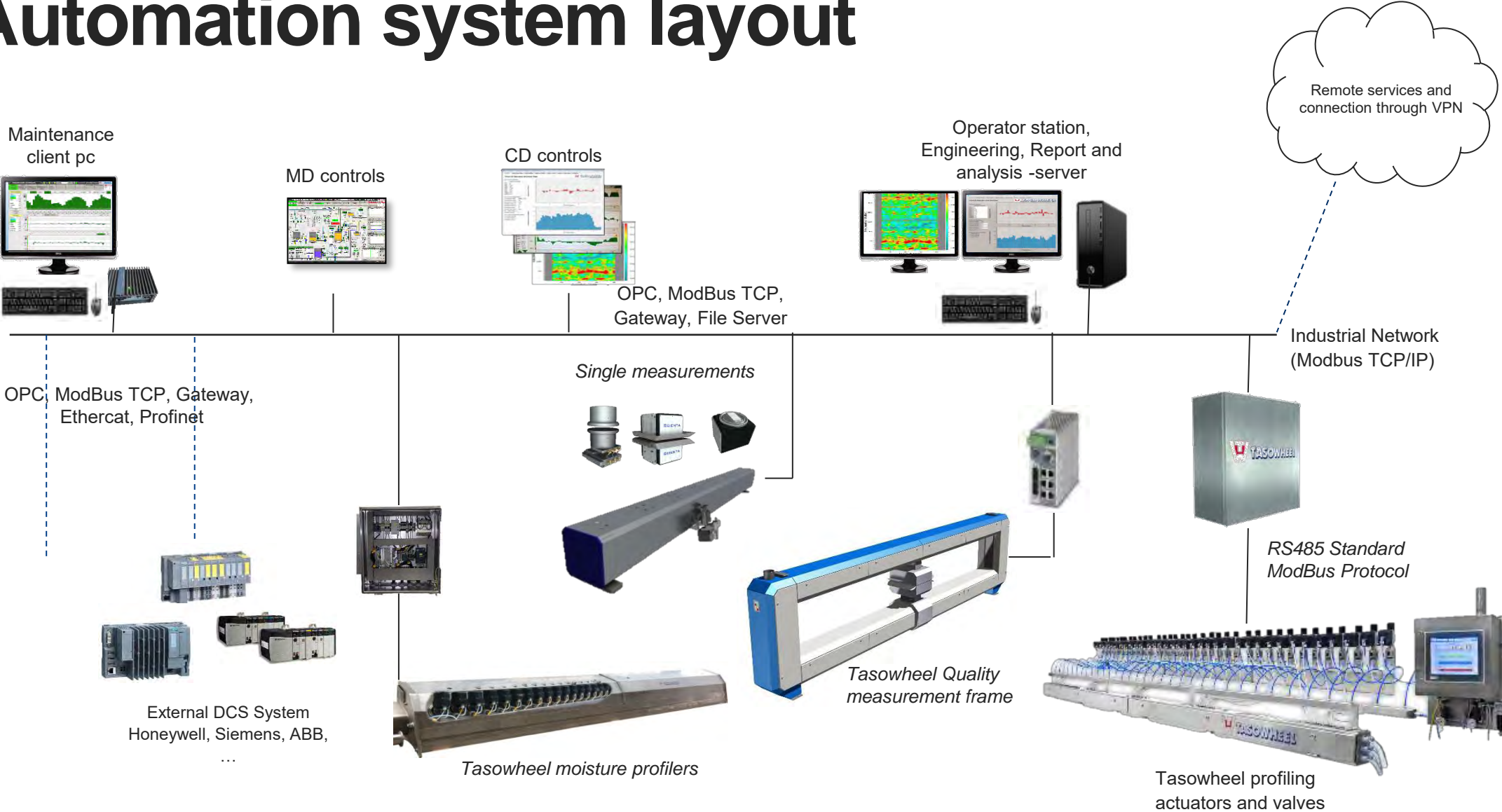


Technical specifications:

- Product type: Motorized electro-mechanical actuator
- Primary gear ratio: 1:1
- Output force: 120 N
- Weight: ~ 1.46 kg
- Axial stroke approximation: 15 mm equalling 300 pulses
- Materials: Valve AISI 316, actuator anodized aluminium, casing plastic
- Mounting: Adaptable
- Protection class: IP 67
- Rated flow: 0-15 l/h or 0-30 l/h
- Operating power: 24 V/0.05 mm. 300 pulses equal 15 mm shaft movement
- EPDM sealing
- Self cleaning linear valve
- Synchronous motor
- Air purged inside beam



Automation system layout



Tasowheel System references 2017 -

Type	Country	Project	Customer	QCS	Quantity	Actuator/valve	Start up
Server	Finland/France		Bellmer	ABB	23	Forte5010 - Slice	January 2017
CD control	Brazil	PM4	MD Papeis	MP	18	Forte25020 - Slice	January 2017
I/O	Saksa	PM3	Varel	ABB	32	LDA1520+LDV - Dilu	July 2017
CD control	India	PM1	ST.Macchine (Satia)	Jasch	37	LDA1520H - Dilu	September 2017
Server	Switzerland	PM3	Swiss Quality Paper	Honeywell	42	Forte5010- Slice	December 2017
CD control	Italy / Iran	PM1	ST. Macchine (Iran wood)	Jasch	71	LDA1520 + LDV – Dilu	2017
CD control	Italy / India	PM2	ST.Macchine (Satia)	Jasch	38	LDA1520+LDV - Dilu	2017
CD control	Brazil	PM2	Papirus	Measurex	20	Forte5010 - Slice	January 2018
CD control	Korea	PM23	Paperchine (Hansol)	ABB	164	RDA2090 - Dilu	September 2018
Valves	Norway	PM1	Norske Skog	Honeywell	100	RDV-90 - Dilu	September 2018
Remote manual	Italy	PM1	Toscotec	N/A	37	RDA2090+RDV - Dilu	September 2018
Server	France	PM1	Allimand (Norpaper)	Voith	21	Forte5010 - Slice	Autumn 2018

Tasowheel System references 2017 -

Type	Country	Project	Customer	QCS	Quantity	Actuator/valve	Start up
Server	Italy/France	PM1	ST Macchine (Rossmann)	Valmet	50	LDA1520+LDV - Dilu	November 2018
CD control	India	PM3	Satia	Jasch	22	Forte5010 - Slice	2018
CD control	Paraguay	PM1	Kartotec	MP	42	RDA2090 – Dilu	January 2019
Remote manual	Italy	PM1	Toscotec	N/A	34	RDA2090+RDV - Dilu	2019
CD control	India	PM2	KR-Paper	Jasch	77	RDA2090+RDV - Dilu	July 2019
Valves	Germany	PM1	DS Smith	QCS	130	RDV-90 - Dilu	May 2019
Valves	Canada	PM1	Irving Paper	Valmet	80	RDV-90 - Dilu	February 2019
Valves	China	PM1	MCC Yinhe	Valmet	90	RDV23 NL- Dilu	December 2019
CD control	Canada	PM1	Andritz Inc. (Whitby)	Valmet	102	RDA2090 + TCV - Dilu	Autumn 2020
Moisturizer	Ukraine	PM2	KCPM	Honeywell	88	MTA - moisturizer	April 2020
Steambox	France/India	PM4	Allimand (Satia)	Jasch	30	STA1015 - Steam	September 2020
Dilution	France/India	PM4	Allimand (Satia)	Jasch	73	RDA2090 - Dilution	September 2021
Slice	Belgium	PM6	VPK	Valmet	30	Forte - Slice	June 2020

Tasowheel System references 2017 -

Type	Country	Project	Customer	QCS	Quantity	Actuator/valve	Start up
CD Control	Austria/Finland	OCO	Andritz (Stora Enso)	Valmet	88	Dilution actuators + valves	December 2020
I/O	Sweden	HB	Iggesund AB	ABB	2 x 29	Forte - Slice	November 2020
Electronics upgrade	Finland	HB	UPM	Honeywell/Valmet	45	Existing 88MAP – Slice	Q1/2021
CD control	Turkey	Slice HB	MRS Kagit & Karton	Aquar System	17	Forte - Slice	Q4/2020
Remote manual	Korea	HB	Bellmer (Asian Paper)	Valmet	90	LDA	Q2/2021
CD Control	USA	Dilution HB	Andritz (ND)	ABB	82	RDA2090 - Dilution	Q2/2021
Actuator server	Germany	HB	UPM Hürth	Voith	136	LDA + valve - dilution	Q2/2021
CD Control	UK	HB	Toscotec (Sonoco)	Honeywell	60	Dilution actuators + valves	Q1/2022
Dilution system	Netherlands	PM2	MCS Engineering	MCS	23	RDA2090 - Dilution	Q4/2022
Dilution system	Netherlands	PM3	MCS Engineering	MCS	35	RDA2090 - Dilution	Q4/2022
Steambox	India	PM2	Satia	Jasch	24	STA1015 - Steam	Q4/2022
Steambox	India	PM1	Satia	Jasch	24	STA1015 - Steam	Q1/2023
Slice	Germany	ND	MRP	MRP	36	Forte - Slice	Q4/2022
CD-säätö	France	PM1	Bellmer (SK Avignon)	ABB/HWL	31	Forte - Slice	Q4/2022

Tasowheel System references 2017 -

Type	Country	Project	Customer	QCS	Quantity	Actuator/valve	Start up
Electronics upgrade	Indonesia	PM1	Parasindo Pratama	HWL	36	84HMAP	December 2022
Electronics upgrade	Indonesia	PM1	Pt. Dayasa Aria Prima	ABB	55	88MAP	December 2021
CD control	France	PM1	Bellmer (A&M St. Severin)	HWL	38	Dilution – LDA1520	Q2/2023
Interpacific paper	Thailand	PM1	Interpacific paper	ABB	24	Slice - Forte	Q2/2023
CD control system	India	PM1	ST.Macchine (ND)	Jasch	50	Dilution – LDA+LDV	Q3/2023
CD control system	India	PM1	ST.Macchine (ND)	Jasch	59	Dilution – LDA+LDV	Q3/2023
CD control system	India	PM1	Maruti Paper	Jasch	42	Dilution – RDA+RDV	Q3/2023

Tasowheel has delivered totally more than 300 000 actuators and valves since the 1980's.

Tasowheel - always in motion and constantly developing

Corporate changes

- Acquisition of Fastpap and Scienta 2023
- Merging of Tasowheel companies 2023

Investments

- Tikkakoski production expansion
- New machinery and robotics every year

New products

- Scienta scanners and measurements
- New software platform for entire automation system
 - integrating the actuator electronics, QCS, CD/MD controls and reporting
- Steamboxes
- Moisturizers
- Competitor profiling system replacements with tailored solutions
 - Voith, ABB, Honeywell
- Electronics upgrades to aging profiling systems.



Tasowheel - always in motion and constantly developing

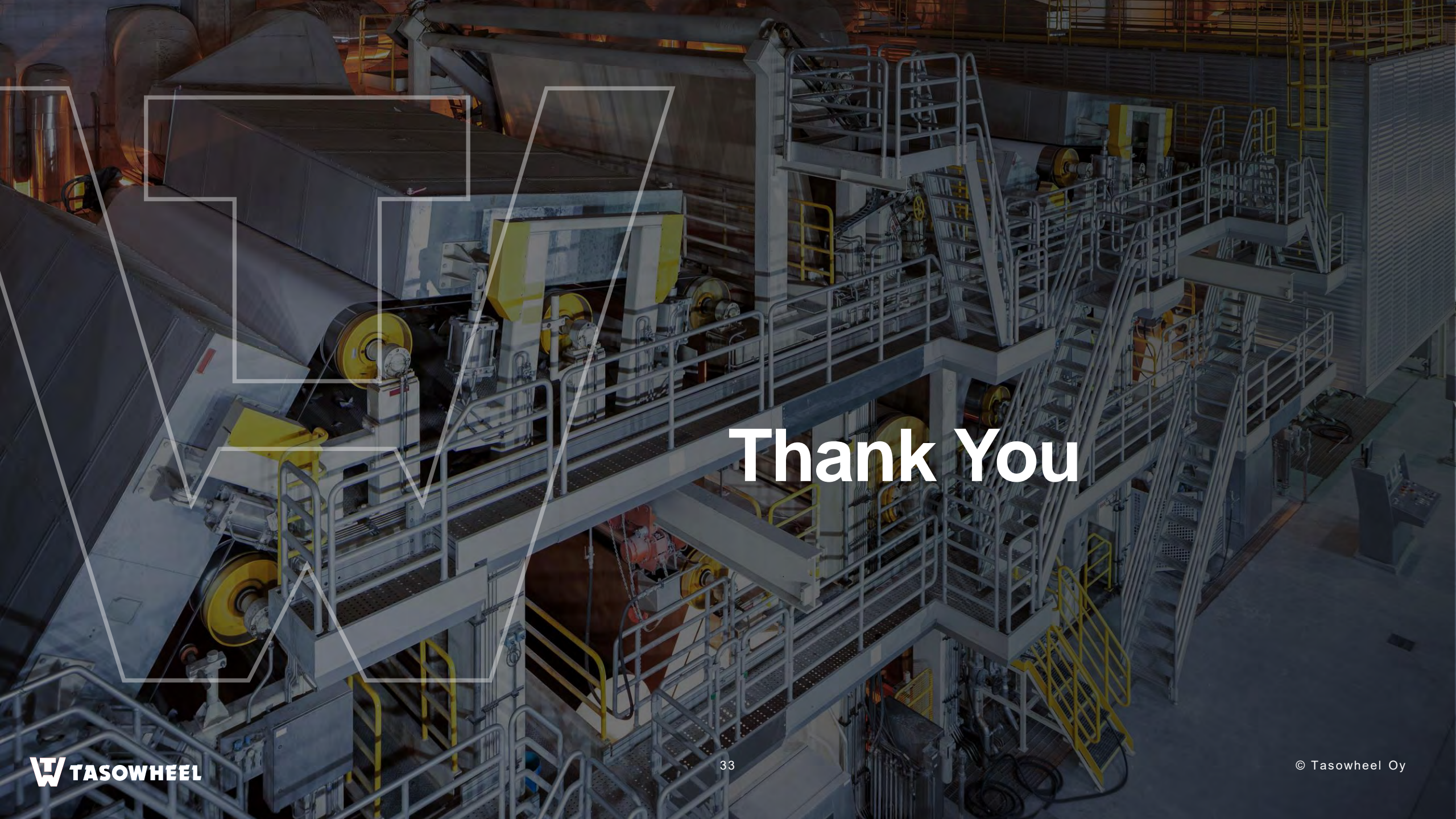
Technology

- Full QCS and profilers portfolio
- Direct controls from main QCS suppliers ABB, Valmet, Honeywell and Voith
- Link communication to all main QCS systems (ABB, Valmet, Honeywell and Voith)

Partners

- Expansion of sales and service network
- Over 40 partners around the world





Thank You