

USTER® *QUANTUM 3*

The yarn quality assurance system

Technical Data

November 2015

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USTER *Quantum 3* \ Pfad-Name

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1 Basics of USTER® QUANTUM 3

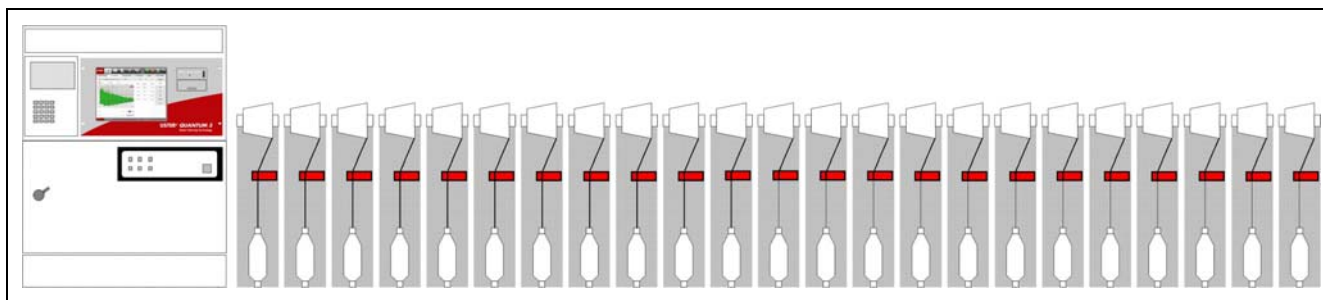


Fig. 1-1

1.1 Architecture

The USTER® QUANTUM 3 is a yarn clearing and monitoring system for winding machines consisting of:

1. Central Clearing Unit 6 (CCU6). One control unit per winder. All settings and operational check of each position are made from the Central Clearing Unit.
 - Standalone on all winders except Saurer. Schlafhorst Autoconer 6, Autoconer 5, X5
 - Integrated with winder Informator on Saurer. Schlafhorst Autoconer 6, Autoconer 5, X5, as well as Savio Polar and Savio Polar Multicone
2. Intelligent clearer measuring heads (iMH) for each winding position.
3. Interface to the winding positions and connecting cables.

1.2 Scope of application

Yarn types:	For all spun yarns consisting of natural fibers, blended fibers, synthetic fibers and ply-yarns.
Languages:	DE, EN, CN, TR, VN, FR, IT, ES, PT, RU, ID
Count range:	Ne _c 1.8 to Ne _c 354 / Nm 3 to Nm 600 / 1.7 to 333 tex
Maximum speed:	2500 m/min
General ambient conditions:	- Temperature range +5 to 50°C / 41 to 122°F - Humidity up to 95%, not condensing

1.3 Scope of supply

iMH for each position, Central Clearing Unit 6 (CCU6), Documentation, Tools, Yarn Boards, Yarn Grades.

1.4 Miscellaneous

Printer:	USB printout or via an optional portable printer
Access Rights:	Controlled through programmable passwords
Unit system:	Ne _c , New, Nm, Tex

1.5 Features of USTER® QUANTUM 3 and options

Table 1-1 shows the individual features of the options.

OPTIONS	FEATURES	COMMENTS
Basic clearing	YARN BODY™ (N, S, L, T, C, CC)	Visualization of the yarn characteristics
	Smart limits (N, S, L, T, CC)	A proposed starting point for clearing limits
	Scatter plot (N, S, L, T, C, CC, J)	Visualization of the thick and thin places, count deviations and splices.
	N, S, L, T	Elimination of the disturbing thick and thin places
	C, CC	Count deviation clearing and monitoring
	Jp, Jm	Splice clearing
	Cut forecast	A forecast of cut numbers per 100 km
	Technical alarms	Alert for technical problems
	Textile alarms	Alert for textile problems
Foreign matter Vegetable clearing (Option)	Dense area (FD, FL, VEG)	Identification of range where foreign fibers are located
	Smart limit (FD)	A proposed starting point for foreign fiber clearing limits
	Scatter plot (FD, FL)	Visualization of dark and light foreign fibers
	Dark foreign matter (FD)	Elimination of dark and light foreign fibers
	Light foreign matter (FL)	
	On-line foreign matter classification	Classification of foreign fibers
	Identification of vegetables	Separation of vegetable matter
Polypropylene fibers (Option)	On-line vegetable classification	Classification of vegetable matter
	Smart limit (PP)	A proposed starting point for polypropylene clearing limit
Q-Data (Option)	Scatter plot (PP)	Visualization of polypropylene fibers
	Evenness (CV)	Determination of the yarn evenness
	Imperfections	Determination of the frequent thick places, thin places and neps
	Basic on-line classification (NSLT, J, FD, FL and VEG)	Classification of disturbing thick and thin places, splices, foreign fibers and vegetables
	Class alarms	Triggering of alarm if the number of disturbing faults has exceed the selected number of faults
Hairiness (Option)	Periodic Faults (PF)	Detection of periodic faults
	Absolute hairiness measurement	Determination of the hairiness value
Expert (Option)	Exception spindle detection	Recognition of spindles with excessive hairiness
	Expert	Access to the data output for Expert System and centralized data collection and reporting
Advanced Classification (Option)	Extended classes	Classification of additional classes in NSLT, F, VEG
	Tailored classes	Classes for NSL, T, FD, FL can be selected by customers
Lab On-line (Option)	Software pack	Software pack consists of Hairiness, Advanced Classification and Expert

OPTIONS	FEATURES	COMMENTS
Core Yarn Clearing (Option)	MC	Missing core detection
	OC	Off-center core detection
	Smart limit (MC, OC)	A proposed starting point for clearing limit
Shade Variation (Option)	Dense Area (SV, CSV)	Identification of range where the shade is varying
	Smart limit (CSV)	A proposed starting point for clearing limit
	SV, CCSV	Shade deviation clearing and monitoring

Table 1-1 *Features of Basic Clearing and options*

1.6 Features versus measuring head types

Table 1-2 below describes what type of USTER® QUANTUM 3 sensor for each measuring head is appropriate for which kind of application.

USTER® QUANTUM 3 SENSORS							
MEASURING HEAD TYPES		Capacitive C15	Capacitive C20	Capacitive C15 F30	Capacitive C20 F30	Optical O30	Optical O30 F30
FEATURES	BASIC	X	X	X	X	X	X
	FOREIGN MATTER (Option)	---	---	X	X	---	X
	VEGETABLE (Option)	---	---	X	X	---	---
	POLYPROPYLENE (Option)	---	---	O*	O*	---	---
	Q-DATA (Option)	O	O	X	X	O	X
	HAIRINESS (Option)	---	---	O	O	---	O
	USTER® QUANTUM EXPERT 3	O	O	O	O	O	O
	ADVANCED CLASSIFICATION (Option)	O	O	O	O	O	O
	LAB ONLINE (Option)	---	---	O	O	---	O
	SHADE VARIATION (Option)	---	---	O	O	---	O
	CORE YARN CLEARING (Option)	---	---	O	O	---	O**

Table 1-2 The USTER® QUANTUM 3 sensors and options

Key:

- X** This feature is included in this version of the sensor
- O** Product Option Key (POK) is needed to have access to the feature mentioned in the header of this column
- O*** Hardware upgrade required in the Central Clearing Unit 6 (CCU6) to have access to the feature
- O**** Only Off-center core available
- Not available with this IMH type

1.7 Comparison, capacitive versus optical measuring principle for basic clearing

Table 1-3 shows the comparison capacitive versus optical measuring principle for basic clearing. In the following table there are a few remarks to the selection of the clearer type.

OPTIONS	Capacitive principle	Optical principle
Basic difference	A capacitive measuring signal is proportional to the cross-section of a yarn	An optical measuring system is proportional to the diameter of a yarn
Sensitivity	A thick place with 3 times more fibers in the cross-section than average produces a signal of +200%	A thick place with 3 times more fibers in the cross-section than average produces a signal of +73% (Exception: N, S faults)
Application range	For most of the yarns the capacitive principle can be utilized.	For all the yarns the optical principle can be utilized.
Contamination	The capacitive system needs less cleaning of the measuring zone. Particularly useful in dirty environments	The optical system needs more cleaning of the measuring zone
Exception 1: Conductive fibers	The capacitive system is affected by conductive fibers and should not be utilized for such yarns	The optical system is not affected by conductive fibers
Exception 2: Dyed yarn	The capacitive system is not affected by color variations	The optical system is affected by color variations
Exception 3: Wet splicing	The capacitive system will work in combination with the F option. It is recommended to minimize the amount of water used for splicing to protect the clearer and the machine.	The optical system is recommended. It is recommended to minimize the amount of water used for splicing to protect the clearer and the machine.
Exception 4: Wet spun linen	Not recommended	The optical system is recommended

Table 1-3 Comparison capacitive versus optical measuring principle for basic clearing

2 Count range of the USTER® QUANTUM 3

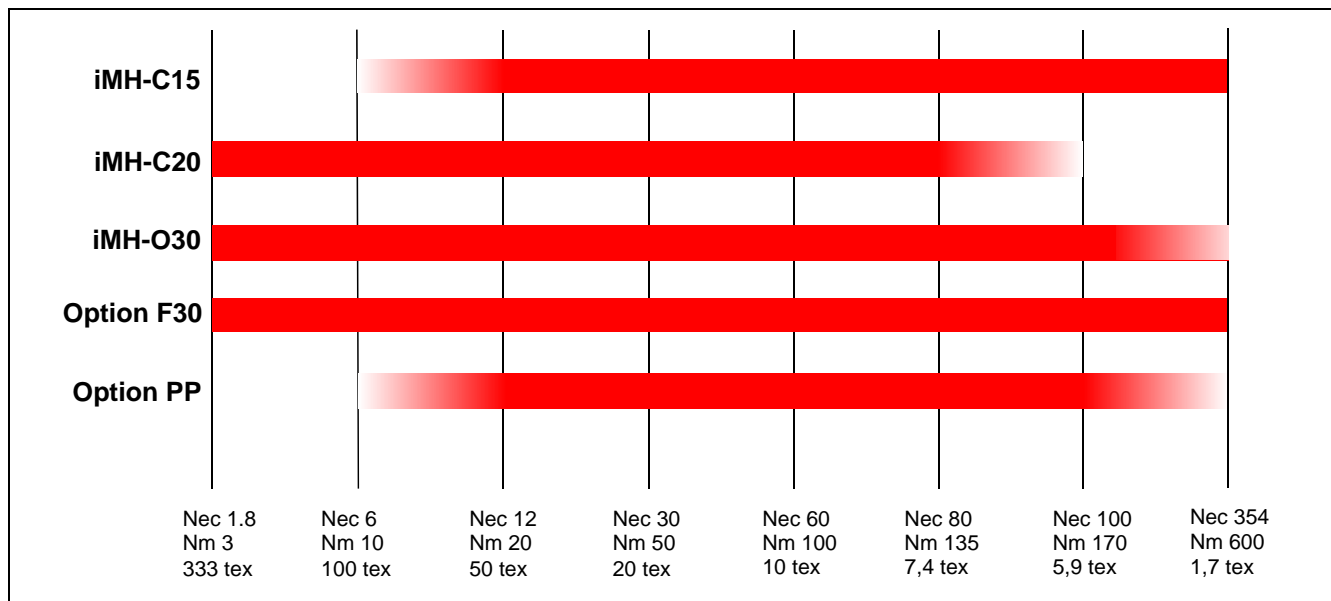


Fig. 2-1 count range for the different measuring head types

3 Winding machines

Table 3-1 shows the winding machines on which the USTER® QUANTUM 3 can be used:

Manufacturer	New machines	Retrofit
Murata	QPRO, FPRO	QPRO, FPRO, PC 21C
Saurer. Schlafhorst	Autoconer AC6, PreciFX	Autoconer AC6, PreciFX, Autoconer AC5 and AC X5, Autoconer 338
Savio	PulsarS, Polar, Polar Multicone, Orion Super	PulsarS, Polar, Polar Multicone, Orion, Orion Super, Espero
Qingdao Hongda	Spero, Smaro	Spero, Smaro
Qingdao QTM	ISPERO	ISPERO

Table 3-1 Actual winding machines which can be equipped with UQ 3

4 Cut alarms, quality alarms, special counters and logbook

Choices	Subject	Abbreviation	Settings	Reference length	Options needed	Comment
Yarn fault alarms (ALARM)	Short thick places	NSA	0*/1...20	1...10 km	Basic	Monitoring of the fault frequency
	Long thick places	LA	0*/1...20	1...10 km	Basic	
	Thin places	TA	0*/1...20	1...10 km	Basic	
	Wrong count	CA	0*/1...20	1...10 km	Basic	
	Count deviation and uneven, long thick and thin places	CCA	0*/1...20	1...10 km	Basic	
	Foreign matter	FA	0*/1...20	1...10 km	F	
	Polypropylene fibers	PPA	0*/1...20	1...10 km	PP	
	Periodic faults	PFA	0*/1...20	1...10 km	Q	
	Splice failure ratio alarm	JRA	0*/1.0...100%	---	Basic	
	Missing core alarm	MCA	0*/1...20	1...10 km	Core Yarn Clearing	
	Off-center core alarm	OCA	0*/1...20	1...10 km	Core Yarn Clearing	
	Shade variation alarm	SVA	0*/1...20	1...10 km	Shade Variation	
Continuous Shade Variation alarm	CSVA	0*/1...20	1...10 km	Shade Variation		
Q-Registration Q-Blocking Q-Cut (Ejection) Q-Blocking / Sucking	Coefficient of variation, mean of entire group	CV-MV	upper: 0*/0.1...99% lower: 0*/0.1...99%	0,05...10 km	Q	Absolute monitoring of the CV-MV per group; upper and lower limit.
	Coefficient of variation per position	CV-SP	upper: 0*/1...99% lower: 0*/1...99%	0,05...10 km	Q	Relative deviation per position of the CV-MV value
	Hairiness, mean value of the group	H-MV	upper: 0*/+0.1...+20 lower: 0*/-0.1...-20	0,05...10 km	H	Absolute monitoring of the H-MV value per group; upper and lower limit.
	Hairiness per position	H-SP	upper: 0*/+0.1...+20 lower: 0*/-0.1...-20	0,05...10 km	H	Absolute deviation per position of the H-MV value
	Class alarm	CMT	Up to 5 classes Alarm limit 0*/1...64'000	1...300 km	Q	5 individual classes for alarm monitoring can be selected
	Frequent neps	IP	0*/1...64000	0.05...10 km	Q	Monitoring of the frequency
	Frequent thick places	IP	0*/1...64000	0.05...10 km	Q	
	Frequent thin places	IP	0*/1...64000	0.05...10 km	Q	
	Tailored classes (NSL)	tNSL	0*/5...900%	0.1...200 cm	A	
	Tailored classes (T)	tT	0*/-5...-100%	0.1...200 cm	A	
	Tailored classes (FD)	tFD	0*/5...100%	0.1...10 cm	A	
	Tailored classes (FL)	tFL	0*/5...100%	0.1...10 cm	A	

Choices	Subject	Abbreviation	Settings	Reference length	Options needed	Comment
Special counters	Upper yarn cuts	U	0*/10...200%		Basic	
	Machine-associated additional cuts	A	---	---	Basic	
	Yarn jump monitoring/ registration/ alarm	JPM/ JPM reg / JPA	---	---	Basic	
	Drum wrap monitoring/ registration/ alarm	DWM/ DWM reg/ DWA	---	---	Basic	
	Drum signal monitoring	DSM	---	---	Basic	
	Special cuts	SPC	---	---	Basic	
Logbook	Recording of all changes and alarms	Logbook	---	---	Basic	Monitoring of the logbook entries

Table 4-1

Abbreviations:

Q = Q-Data

F = Foreign fibers

H = Hairiness

PP = Polypropylene

A = Advanced Classification

MC = Missing Core, iMH CxxF30 needed (capacitive with F option)

OC = Off-center Core, iMH xxxF30 needed (capacitive or optical with F option)

SV = Shade Variation

CSV = Continuous Shade variation

0* = Inactive (off)

5 Reports

Table 5-1 shows various reports. Reports can be transferred to an USB stick or to an optional printer.

Groups	Feature	Per position		Per group		Necessary options	Comment
		Display	Printout	Display	Printout		
Machine data	Winding speed	---	---	---	✓	Basic	List of reports: Per shift, per day, per article Intermediate report / present shift Last 9 shifts
	Produced yarn length	✓	✓ *	✓	✓	Basic	
Settings	Setting of the clearing- and alarm parameters	---	---	✓	✓	Basic	
Yarn Faults	Number of all yarn faults YF absolute	✓	---	✓	✓	Basic	
	Number of all yarn faults YF/100 km	✓	✓ *	✓	✓	Basic	
	Number of all yarn joints YJ absolute	✓	---	✓	✓	Basic	
	Number of all yarn joints YJ/100 km	✓	✓ *	✓	✓	Basic	
	Number of N, S, L, T, Cp, Cm, CCp, CCm absolute	✓	---	✓	✓	Basic	
	Number of N, S, L, T, Cp, Cm, CCp, CCm/100 km	✓	✓ *	✓	✓	Basic	
	Periodic Faults PF absolute	✓	---	✓	✓	Q	
	Periodic Faults PF/100 km	✓	✓ *	✓	✓	Q	
	Foreign fibers, greige or colored yarns, FL, FD absolute	✓	---	✓	✓	F	
	Foreign fibers, greige or colored yarns, FL, FD/100 km	✓	✓ *	✓	✓	F	
Polypropylene fibers PP, absolute	Polypropylene fibers PP, absolute	✓	---	✓	✓	PP	
	Polypropylene fibers PP/100 km	✓	✓ *	✓	✓	PP	
Faulty yarn joint Jp, Jm absolute	Faulty yarn joint Jp, Jm absolute	✓	---	✓	✓	Basic	
	Faulty yarn joint Jp, Jm / 100 km	✓	✓ *	✓	✓	Basic	
Special cuts	Cuts U, JPM, SPC, DSM, DWM absolute	✓	---	✓	✓	Basic	
	Cuts U, JPM, SPC, DSM, DWM/100 km	✓	✓ *	✓	✓	Basic	
Yarn fault alarms	Yarn fault alarms NS, L, T, F, C, CC absolute	✓	---	✓	✓	Basic	
	Yarn fault alarms NS, L, T, F, C, CC /100km	✓	✓ *	✓	✓	Basic	
	Yarn fault alarms MC, OC absolute	✓	---	✓	✓	Core	
	Yarn fault alarms MC, OC/100km	✓	✓ *	✓	✓	Core	
	Yarn fault alarms SV, CSV absolute	✓	---	✓	✓	Shade	

Groups	Feature	Per position		Per group		Necessary options	Comment
		Display	Printout	Display	Printout		
Yarn fault alarms	Yarn fault alarms SV, CSV/100km	✓	✓ *	✓	✓	Shade	
	Periodic faults alarm PF absolute	✓	---	✓	✓	Q	
	Periodic faults alarm PF/100 km	✓	✓ *	✓	✓	Q	
	Yarn fault alarm PP absolute	✓	---	✓	✓	PP	
	Yarn fault alarm PP/100 km	✓	✓ *	✓	✓	PP	
Q alarms	Number of CV alarms CVp, CVm absolute	✓	---	✓	✓	Q	
	Number of CV alarms CVp, CVm/100km	✓	✓ *	✓	✓	Q	
	Number of Hairiness alarms Hp, Hm absolute	✓	---	✓	✓	H	
	Number of Hairiness alarms Hp, Hm/100km	✓	✓ *	✓	✓	H	
	Number of Class-alarms absolute	✓	---	✓	✓	Q	
	Number of Class-alarms/100 km	✓	✓ *	✓	✓	Q	
	Number of Imperfection alarms absolute	✓	---	✓	✓	Q	
	Number of Imperfection alarms/100 km	✓	✓ *	✓	✓	Q	
Exceptions SP	Exceptions: yarn faults, textile alarms, J, JR, yarn length	---	✓ *	---	---	Basic	
	Exceptions: F, PP	---	✓ *	---	---	F	
	Exceptions: MC	---	✓ *	---	---	Core	
	Exceptions: OC	---	✓ *	---	---	Core	
	Exceptions: SV, CSV	---	✓ *	---	---	Shade	
	Exceptions: CV, IP, Class, (H)	---	✓ *	---	---	Q	
Q Data	Coefficient of variation per group CV-MV	---	---	✓	✓	Q	
	Coefficient of variation per position CV-SP	✓	✓ *	---	---	Q	
	Mean imperfection counts 12 in different classes/1 km	✓	✓	✓	✓	Q	
	Classification of NSLT faults/100 km, absolute	✓	---	✓	✓	Q, A	
	Classification of FD-faults/100 km, absolute	✓	---	✓	✓	Q, F	
	Classification of FL-faults/100 km, absolute	✓	---	✓	✓	Q, F	
	Classification of VEG-faults/100 km, absolute	✓	---	✓	✓	Q, F	
	Hairiness, mean value of the group H-MV	---	---	✓	✓	H	

Groups	Feature	Per position		Per group		Necessary options	Comment
		Display	Printout	Display	Printout		
	Last value of the hairiness per winding position H-SP	✓	✓ *	---	---	H	
Event reports	Yarn faults (N, S, L, T, C/CC, F, PP, PF, MC, OC, SV/CSV)	✓ **	✓ **	---	✓ **	Basic, F, PP, Core, Shade	Yarn faults are also displayed showing size, intensity and classification.
	Textile alarms NS, L, T, C/CC, F, PF, MC, OC, SV/CSV, Q-Blockings/Cuts/Registrations)	✓ **	✓ **	✓ **	✓ **	Basic, F, Q, Core, Shade, H,	
	Other	✓ **	✓ **	✓ **	✓ **	Basic	

Table 5-1

Abbreviation:

Q = Q-Data F = Foreign fibers H = Hairiness PP = Polypropylene A = Advanced Classification
 Core = Core Yarn Clearing Shade = Shade Variation

✓ Available

✓ * Available if exceptions are defined for “Spindle data” is selected in the menu “Report Configurator”, In this case limits for Exceptions need to be defined

✓ ** Available if events are defined and selected in the menu “Configuration-Event report”.

--- Not available

An event report is only printed if an optional printer is available