

Technical Specification – Band Re-Reeling and Counting Machine

1. General

All hardware, auxiliary devices and software used should be new, covered by the manufacturer's warranty and not previously applied in any other project or device.

The Ordering Party expects that it is possible to restore the machine to factory settings with the deletion of all data and configurations related to the Ordering Party.

The structure of the machine should ensure stable and long-term operation, and all elements should be made of hard steel or other material. Preferably no parts or entire elements made on 3D printers should be used.

Formal requirements:

For the guidelines below (included in the table), please specify the exact parameters of the machine for the suggested hardware and functional solution implemented to execute the specification.

2.	Required device functions:	Remarks
2.1.	100% quantitative counting of bands (every single item) wound on bobbins with min. ribbon width of 16 mm and maximum ribbon width of 100 mm, regardless of size and arrangement on the web.	
2.2.	100% efficiency when reading the code from each band (Data Matrix or QR), regardless of the size and arrangement on the web, for the given minimum machine speed and feeding the read alphanumeric information to the counting system, in accordance with the winding sequence. The quality of the codes ranges from 4 to 1.5 according to the ISO 15415 standard. The codes are made using the inkjet method.	
2.3.	The machine should be equipped with pneumatic expansion pins (winding and unwinding) with a diameter of Ø 76 mm and Ø 40 mm, 2 pcs. each, enabling work with bobbins with a diameter of up to 500 mm.	
2.4.	Operator login module ensuring identification of the user and the work performed by the user with unlimited number of operators. Possibility of adding, deleting and editing user accounts (and passwords) by the	

	System Administrator (OS and software controlling the machine's operation). In this case, it should be possible to assign to operators at least 200 accounts.	
2.5.	Bidirectional re-reeling of bands from roll to roll with the ability to indicate the number of labels after which the machine should stop. When winding, it is important that the ribbon does not break and that the resulting roll does not telescope.	
2.6.	A solution that allows for easy and error-free joining of web fragments, cutting out defective bands or cutting off a certain number of items, with a count indication of the place where the joining or cutting is to be performed and checking the correct performance of the operation.	
2.7.	Required re-reeling speed with band code reading – min. 20 m/1 min regardless of the size and the way the bands are arranged on the web.	
2.8.	Two device operating modes:	
2.8.1.	The returned bands counting mode should ensure:	
2.8.1.1.	quantitative counting of bands on the returned bobbin along with recording the information read from the 2D code, maintaining the numbering sequence,	
2.8.1.2.	stopping in the event of detection of code reading errors or defective bands (with a set value above the assumed value) with the possibility of removing errors or fragments, while indicating the place of cutting and joining the web,	
2.8.1.3.	possibility of dividing and combining bobbins with a final report containing the number of bands on the resulting bobbin and the numbering sequence read from the codes,	
2.8.1.4.	checking the correctness of numbering after cutting/joining,	
2.8.1.5.	report for each bobbin and the entire production,	
2.8.1.6.	100% quantitative production counting.	
2.8.2.	The issuing mode (counting out the bands from previously checked, correct bobbins) should ensure:	

2.8.2.1.	counting down the set amount to be unwound from a given bobbin along with recording the information read from the 2D code, while indicating the place of cutting and joining the web,	
2.8.2.2.	counting the bands should be possible in both directions, i.e. from the smallest number to the largest and from the largest number to the smallest,	
2.8.2.3.	checking the correctness of numbering after cutting/joining,	
2.8.2.4.	report for each bobbin (wound and unwound) and the entire production,	
2.8.2.5.	100% quantitative counting of production.	
2.9.	Thermal transfer printer (as per the specification included in the technical requirements, item 4.8.1) to print labels for each bobbin (counted or unwound and ready for issue) with the number of items, numbering range and fixed information read from the codes (series, reference number – year) and information about the device operator. A unique bobbin number should be assigned automatically by the device. This is the number of the next re-reeling with the P prefix. Label dimensions: 100x13 mm. A sample label template is presented below the table.	
2.10.	It is allowed to attach a leader at the beginning/end of the resulting bobbin web, but it should be as short as possible.	
3.	Operator’s application and interface functions: The operator interface should make it possible to:	
3.1.	Log in to the device and identify the user.	
3.2.	Select the device operating mode – counting returns or issuing bands.	
3.3.	Error control and indication of where they occur.	
3.4.	Machine control.	
4.	Machine software features:	
4.1.	Creating detailed work reports containing the number of items, numbering range and fixed information read from the codes (series, reference number – year) and information about the device operator.	

4.2.	It should be possible to combine production reports in terms of specific working time, a given operator or recipient to whom the return or issue applies.	
4.3.	Adding ranges with continuous numbering.	
4.4.	Creating editable reports in flat files, i.e. txt, csv or xls, containing information on the received numbering ranges for individual symbols and series of bands according to the template provided below the table.	
4.4.1.	Reports should be created for individual bobbins as well as all bobbins processed in a given time period, e.g. shift – as chosen by the operator.	
4.5.	Possibility of editing reports and adding new items manually (single items and ranges) on the operator's computer in the case of returns of web fragments that cannot be counted by machine.	
4.6.	Possibility to export and transfer data to an encrypted portable memory stick.	
4.7.	Possibility to print reports transferred to the operator's computer with a A4 printer (the report should be legible for operators).	
4.8.	Possibility of generating a report from a given time interval with set filters (column names) and reproducing it.	
5.	Additional requirements:	
5.1.	The machine's operating menu and operating system in Polish (keyboard, buttons, switches, display messages, on-screen menu, etc.).	
5.2.	The device must be equipped with an ergonomic operating panel with easy availability of USB ports to ensure the operator's comfort.	
5.3.	User manual and service manual in Polish in 2 paper and 1 digital copy, e.g. CD/DVD.	
5.4.	CE certification/markings on the device.	
5.5.	Declaration of conformity in Polish.	
5.6.	If a dedicated software/tool/service computer must be used to carry out repairs by PWPW staff, it must be delivered along with licenses. If applicable, please indicate it as a separate item in your quotation. Taking into account the components used and the warranty conditions as well as the offered response and repair time, it must be possible to	

	<p>perform service activities by remote connection according to the provided diagram.</p> <p>The mode of executing remote service is described in Ad 5.6 under the table.</p>	
5.7.	IT requirements	
	When PC class control devices are used, the delivered device should incorporate components with the following technical and functional parameters.	
5.7.1.	Technical requirements	
	<p>A computer with the necessary technical parameters, enabling efficient and stable operation, which includes a processor without identified security gaps and ensuring stable operation of the device.</p> <p>The computer must be equipped with the necessary peripheral devices, including a QWERTY keyboard, mouse, and monitor.</p> <p>A hard drive with SSD technology or newer.</p> <p>Should FLASH memory be used, it is required to provide a solution intended for industrial applications.</p> <p>Application of an operating system with an active manufacturer support and a possibility of uploading security patches to the operating system and additional software used in the solution.</p> <p>To ensure a stable operation of PCs used in the construction of the machine, it is required to use a UPS-type voltage backup solution along with the necessary software.</p>	
	If PLCs are used, it is recommended to provide a solution based on products easily available on the market and to deliver the necessary software for servicing PLCs together with a license. It is also required to deliver a copy of the control programme on an electronic carrier (USB, memory card, CD/DVD) allowing to restore the controller to initial settings.	
5.7.1.1	<p>Thermal transfer label printer:</p> <ul style="list-style-type: none"> • Type – label printing (desktop) • Printing method – thermal transfer 	

	<ul style="list-style-type: none"> • Resolution – 300 dpi • Ports – USB / LAN • Maximum printing width – 104 mm • Maximum printing length – 990 mm • Power supply – external 230V 50 Hz power unit • Supported operating system – Microsoft Windows 7, Windows 10 32/64 bit • Printed barcodes: Codabar, Code 11 (ZPL), Code 39, Code 93, Code 128, EAN- 13, EAN- 14 (ZPL), German Post Code (EPL), GS1 DataBar (RSS), Industrial 2- of - 5, ISBT-128 (ZPL), Japanese Postnet (EPL), Logmare (ZPL), MSI, Plessey, Postnet, Standard 2-of-5 (ZPL), UCC/ EAN-128 (EPL), UPC- A, UPC-A and UPC- E with 2- or 5-digit EAN extensions, UPC with 2- or 5-digit EAN extensions (ZPL), CodaBlock (ZPL), Code 49 (ZPL), Data Matrix, (ZPL), MaxiCode, MicroOPDF417, PDF417, QR Code • Additional requirements: dispenser with label sensor, cutter, adjustable black line sensor and multi-position gap sensor • Accessories: USB cable – 2.0 or higher, minimum 1.5 meters long – flexible 	
5.7.2.	Communication layer	
	Should network communication be used in the device, it is required to use a physical architecture with shielded cables, at least cat. 6, or fiber optic connections. The Ordering Party does not accept wireless communication. If network switches are used in the construction of the machine, it is required that they are industrial managed devices of renowned manufacturers, with the manufacturer’s support and allowing configuration of access to the switch by way of logging in to personal accounts.	
5.7.3.	Vision system	
	It is required to use a vision system to read QR codes and Data Matrix (square or rectangular codes). The provided solution must be based on	

	<p>generally available cameras operating in the visible or near-infrared range with appropriate adjustable LED lighting.</p> <p>Vision controller equipped with a high definition camera / cameras (at least HD-ready) allowing for easy reading of codes from bands.</p> <p>The offered system must allow for the definition of at least 1 ROI field for one product definition (band) subject to verification of QR code or Data Matrix reading from the band.</p> <p>The offered software should allow to define your own vision programme with the use of available components, such as: filters for image processing (smoothing, background blurring), recognition of object shapes, image comparisons; it should also contain basic mathematical and logical operations. Additionally, the software should allow to define your own vision programme (a separate programme for different bands with different camera settings, at least: shutter, gain and brightness).</p> <p>Main functions of the vision system software:</p> <p>The machine must recognize QR or Data Matrix codes (applied with the inkjet technology) using the camera based on the code on the band with reading efficiency of 100% (the codes can have the shape of a square or a rectangle). The vision system should allow for a free ROI setting with various parameters: shutter, gain, brightness.</p> <p>The construction of the solution should take into account the possibility of enclosing and separating the cameras from the lighting of the external environment.</p>	
5.7.4.	Back-up	
	<p>The delivered solution must allow for a cyclical back-up and restoration of the system, data, etc. using the software/solution delivered with the machine or with the Acronis or NetBackup software used by the Ordering Party. Licences for the software for the solutions used by the Ordering Party will be procured by the Ordering Party.</p>	
5.7.5.	Functional requirements	
	<p>The machine should allow to create personal user accounts with a specific level of authorization (at least administrator, user) from the</p>	

	operating system or control software level, in accordance with the guidelines set forth in sec. 2.4.	
	The hardware configuration must prevent unauthorized persons from accessing the BIOS/UEFI settings and selecting the machine in which the operating system will be launched. It must be possible to set a BIOS/UEFI security password.	
	The delivered solution must have functions that allow for logging machine, system or application events in the form of an event log (e.g. syslog). All events related to user actions, system status, configuration changes, or system warnings and errors should be logged.	
	In the case of data storage and reporting, it is required to provide a solution based on relational SQL databases.	
	The devices should be able to monitor their condition and correct operation in real time. The system should enable the generation of reports on its operation and present the current state of production in real time.	
5.7.6.	Legal requirements	
	The Ordering Party must be provided with licenses and media enabling legal use of the purchased system and software employed for the operation of the machine, unless it has been indicated that the licenses will be procured by the Ordering Party.	
5.7.7.	IT security requirements	
	The delivered solution should allow to instal the anti-virus system used by the Ordering Party with the option of offline updating or connecting to a central server and the possibility of managing updates centrally as used by the Ordering Party (currently ESET). If this is not possible due to the impact on the operation of the system, a written justification is required. The software licenses will be procured by the Ordering Party.	
	The delivered solution should allow to implement a system for controlling access to USB data exchange ports and/or to control external drives and media by using hardware solutions in the form of port blocking or dedicated Machine Control software used by the Ordering	

	Party to monitor and control access. The software licenses will be procured by the Ordering Party.	
	The delivered solution should allow to perform vulnerability scans in order to ensure the highest level of security, and if this is not possible due to the impact on the operation of the machine, a written justification is required.	
5.7.8.	Other	
	If any additional components or elements of the ICT infrastructure, including software, are required as part of the offered solution, please present them and include them in the offer.	
5.8.	Training in the operation, maintenance and repair of the device:	
5.8.1.	Machine servicing – for electricians and mechanics	
	List of all necessary media (electrics, air) and signal connections.	
5.8.2.	Machine servicing – for automation specialists	
	Electrical and logical connection diagrams.	
	Back-up of the PLC and restoration of the controller programme after possible failure and replacement (if the machine is to contain it).	
5.8.3.	Machine servicing – for the IT department	
	Back-up of the system software (controlling the machine) including its restoration.	
	Back-up of the vision system software and its settings, including its restoration.	
	Setting up the vision system to achieve 100% efficiency.	
	Replacing the battery in the UPS and changing the counter in the manufacturer’s UPS software.	
	Machine main software update.	
	Setting up user accounts and assigning roles (administrator and operator) along with resetting passwords.	
	Generating machine error logs in offline mode to send to the Manufacturer’s Service Centre.	
	Using a laptop or other service machine together with software used for servicing the machine (vision controllers, PLCs, servomotors, etc.).	

5.8.4.	Machine operation training for operators:	
	Safe launch and shutdown of the machine.	
	Report export (including its reproduction) to a file.	
6.	Assembly, launch and acceptance tests of the machine/device	
	The acceptance of the machine/device should take place on the basis of the proposed FAT/SAT acceptance test scenario. The scope of the tests is provided in an appendix to the specification. During installation and acceptance tests, the manufacturer/supplier should provide technical support at the Ordering Party' site.	

Ad 2.9. Sample label template

Ministry of Finance EC/BP 2019 National excise band on e-cig liquid KE/BP vertical format 32.5x12 mm	Bobbin no.: P000001
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Ad 4.4. Sample reports

Read bands:

Bobbin no.	Series	Manufacture date	Quantity	Number
P000001	KE/BP/R1	2019	1	0 000 002 001
P000001	KE/BP/R1	2019	1	0 000 002 002
P000001	KE/BP/R1	2019	1	0 000 002 003
P000001	KE/BP/R1	2019	1	0 000 002 004
P000001	defective	defective	defective	defective
P000001	KE/BP/R1	2019	1	0 000 005 151
P000001	KE/BP/R1	2019	1	0 000 005 152
P000001	KE/BP/R1	2019	1	0 000 005 153
P000001	KE/BP/R1	2019	1	0 000 005 154
P000001	KE/BP/R1	2019	1	0 000 005 155
P000001	defective	defective	defective	defective

P000001	KE/BP/R1	2019	1	0 000 005 157
Number of bands read	KE/BP/R1	2019	10	
Number of defective bands			2	

Numbering ranges:

Bobbin no.	Series	Manufacture date	Quantity	Number from	Number to
P000001	KE/BP/R1*	2019	4	0 000 002 001	0 000 002 004
P000001	KE/BP/R1*	2019	5	0 000 005 151	0 000 005 155
P000001	KE/BP/R1*	2019	1	0 000 005 157	0 000 005 157
P000001	KE/BP/R1**	2019	10		
P000001	Number of defective bands ***		2		
P000001	KE/BP/R1 ****	2019	12		

** number in subsequent range of good bands,*

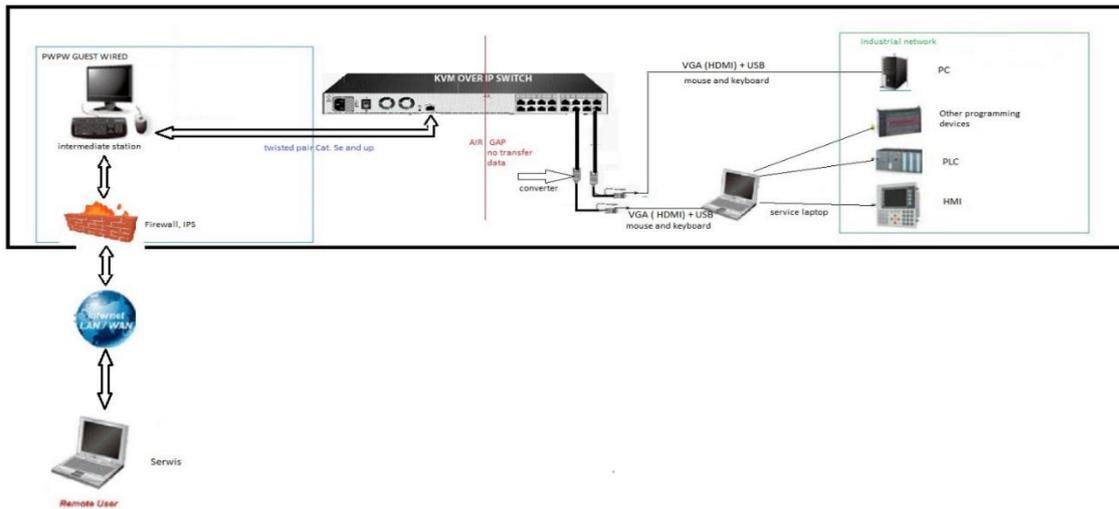
*** number of good bands*

**** number of defective bands*

***** number of all bands checked*

Ad. 5.6 Remote access

The elements of the access infrastructure to the machine described in the diagram are provided by the Ordering Party and do not constitute the subject of the offer or quotation.



The above figure depicts the method of remote connection acceptable to the Ordering Party in accordance with the IT security requirements applicable at PWPW S.A.

This method allows for remote maintenance of computers and programmable devices in the machine's network.

Service engineers connect via the Internet to a transfer station in the guest office network.

Access to the transfer station is provided by software such as Team Viewer. It is possible to use other similar software employed by the Manufacturer/Supplier.

An IP KVM session is established for servicing.

Connections to the PLC and HMI are established via the service laptop.

All remote connections are made with the active participation of PWPW's IT staff.

Under these conditions, remote access must meet the following requirements:

- the machine's production network is physically separated,
- the machine and its environment are not connected to the Internet,
- the connection is supervised and recorded.