ELEKTRONIK SYSTEM
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DUAL ENERGY X-RAY SCANNER ELEKTRON-SXRF-4080 DE-FC

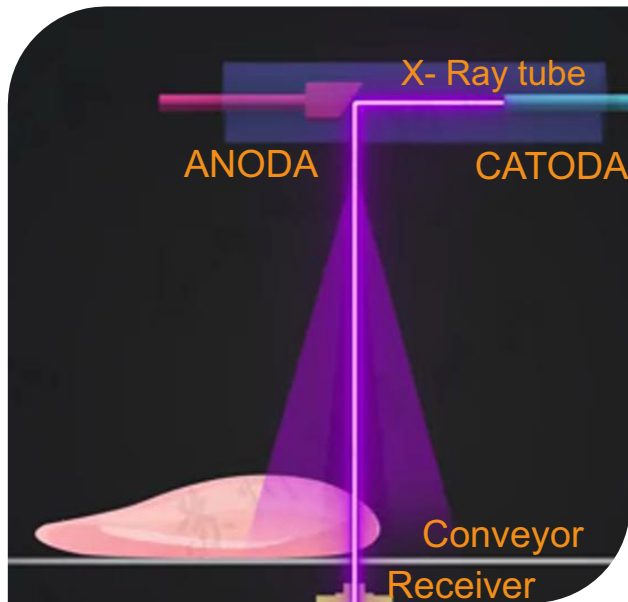### DUAL ENERGY supported by ARTIFICIAL INTELLIGENCE

► X- Ray scanner designed for the examination of bulk products such as cuts of meat, offal, fish.

► **PHOTON** X-Ray detector combined with **DUAL ENERGY** technology provides the highest level of sensitivity available on the market.

► The main purpose is to remove bones from meat and bones from fish. It is excellent at finding foreign bodies such as ceramics, glass, rubber and hard plastic.

► Designed for easy and quick cleaning.

► Highest level of safety, meeting European CE standards as well as American FDA standards, UL/CSA optional.

► Possibility of adapting the device structure to the conditions of the production line (longer conveyor, higher IP protection level, SUS316 construction, conveyor height).
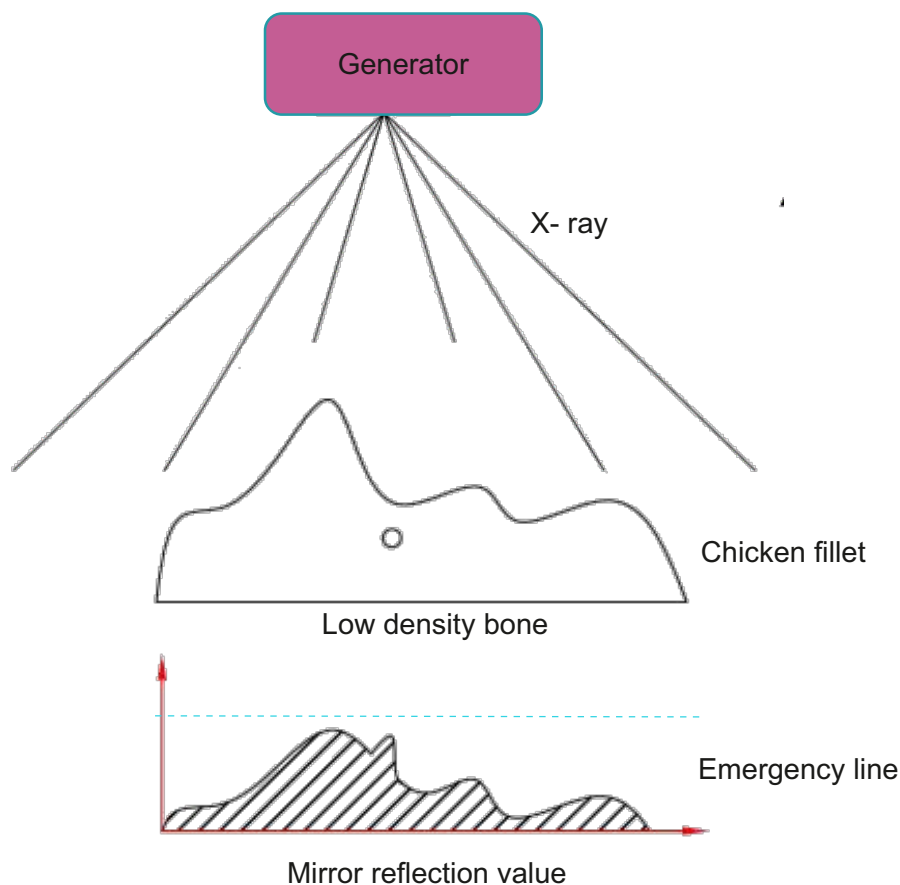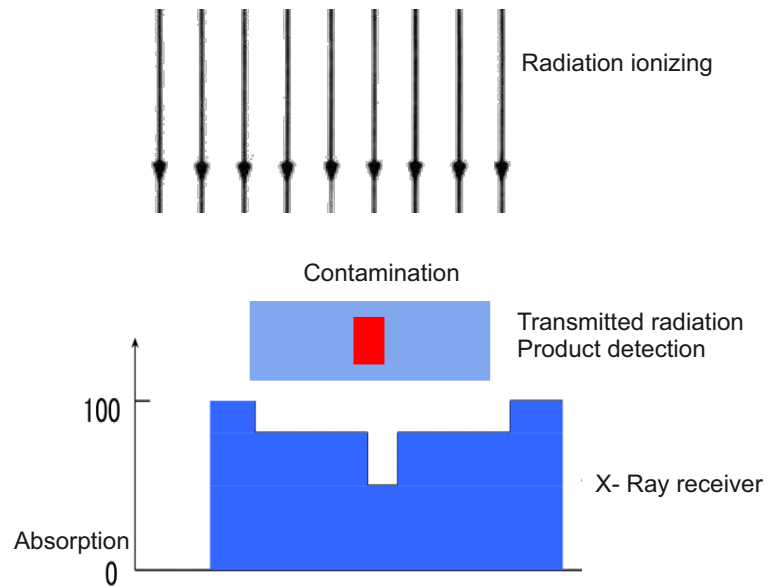
NEW
PHOTON COUNTING DETECTOR

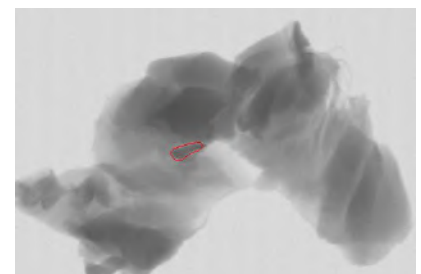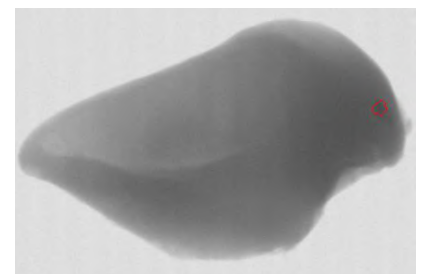| Model	**ELEKTRON -SXRF**
Specification	4080 **DE-FC**
Maximum height of the test product	100 mm
Maximum width of the test product	400 mm
X-ray lamp	MAX. 80 kV, 350W
The smallest possible detectable testers	St/st ball from 0.3 mm, wire from 0.2x2 mm Glass/Ceramic ball from 1.0 mm
Tape speed	Adjustable in the range of 0 -40 m/min
Display	17" touch screen
Cooling	Industrial air conditioner
Radiation protection	Protective tunnel and security system
External radiation	< 0.5µS v/h
Working temperature	from -10°C to 40°C
Working humidity	30-90% non -condensing water vapor
Supply voltage	230VAC
Power consumption	1200W
Tightness class	IP66
Air pressure	0.8Mpa
Housing material	Glass -blasted stainless steel

Standard single-lamp scanners have the ability to adjust the ionizing radiation beam to of a given product in one scope. Depending on the density of the product, it increases to the same extent to absorb radiation, which often makes it impossible to find very small contaminants, and in especially bones and bones. However, in other industries it works perfectly.

X- Ray tube

ANODA

CATODA

Conveyor

Receiver

Inspection theory

Radiation ionizing

Contamination

Transmitted radiation
Product detection

100

X- Ray receiver

Absorption

0

Generator

X- ray

It is easy to find contaminants metal, hard bones.

Chicken fillet

Low density bone

Emergency line
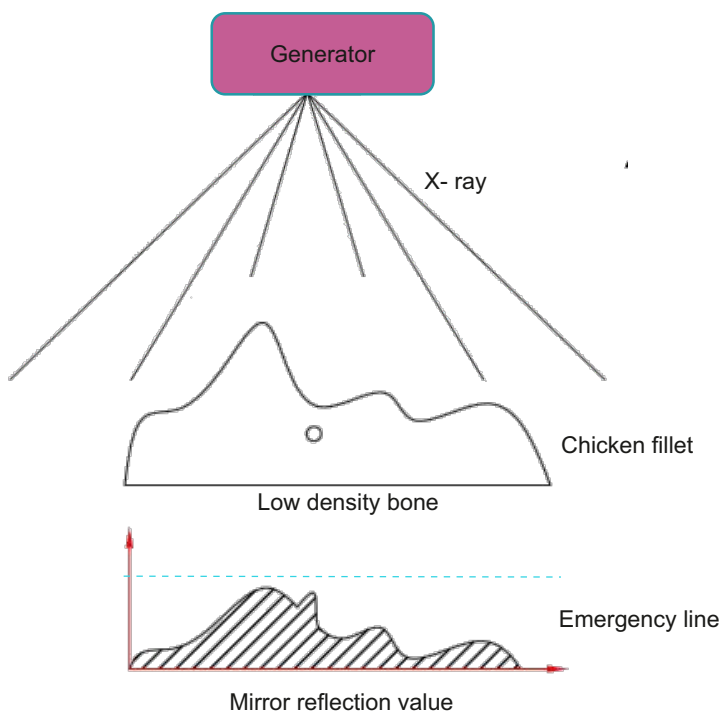
Mirror reflection value

The **ELEKTRON**-**SXRF**-4080**DE** X-Ray scanner uses dual-energy beams on two different levels. The first beam of ionizing radiation goes to the attenuating receiver. This effect occurs when the beam is filtered on part of the receiving system. Then the scanner generates a second high-energy beam to the second part of the receiver, analyzes the scanned object and image comparison. The high and low energy signals obtained by the dual energy system are sent to the computer, which are calculated based on the processed data and associated values with the equivalent atomic number of the substance. The software automatically compares images o high and low energy, analyzes whether there is a difference in the atomic number of the recorded standard and the body foreign using a hierarchical algorithm.
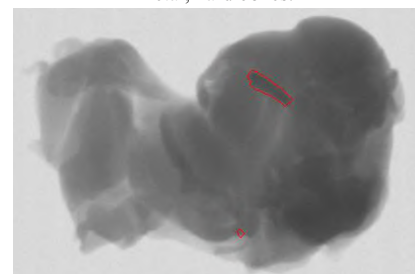
x- Ray

high energy filter

low

high

processing software

distinction

X-ray lamp

ANODA   KATODA

Transporter

Receiver 2   Receiver 1

X-Ray scanner with dual energy receiver

►slight differences between the density of contaminants and the product can be detected
►many algorithms can be used to separate contaminants

Generator

X- ray

Chicken fillet

Low density bone

Emergency line

Mirror reflection value
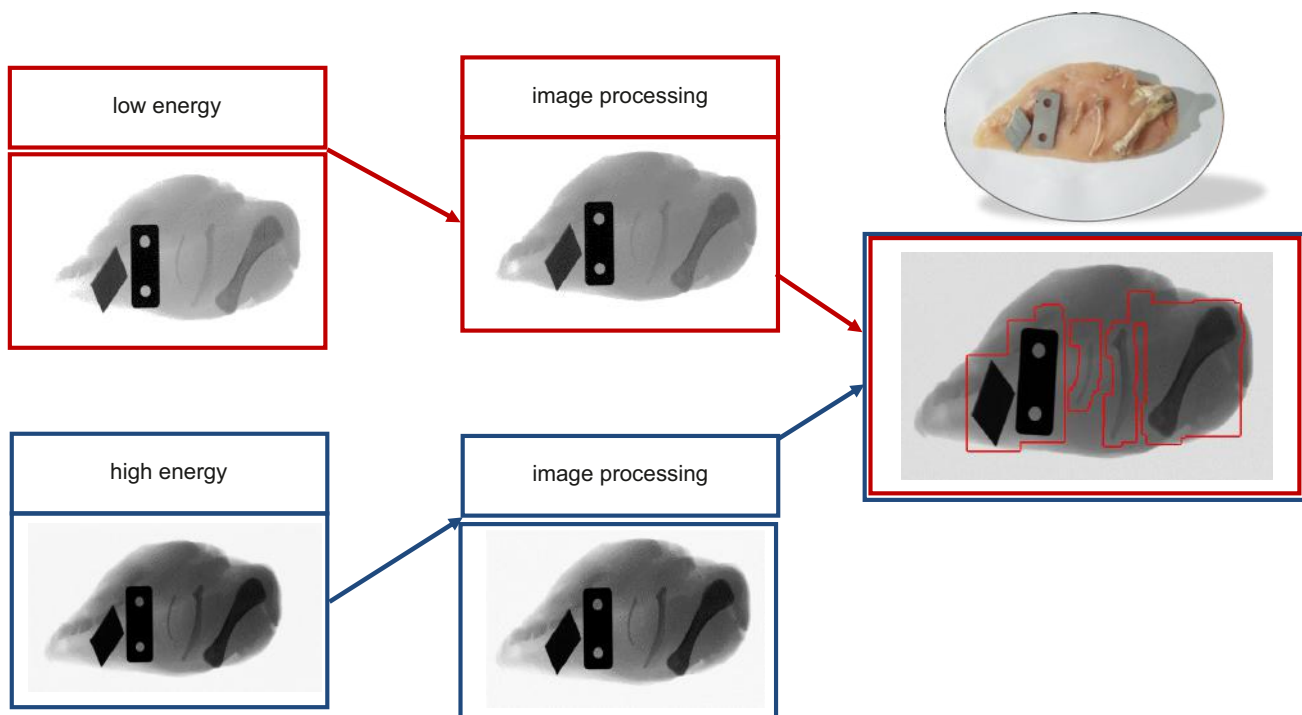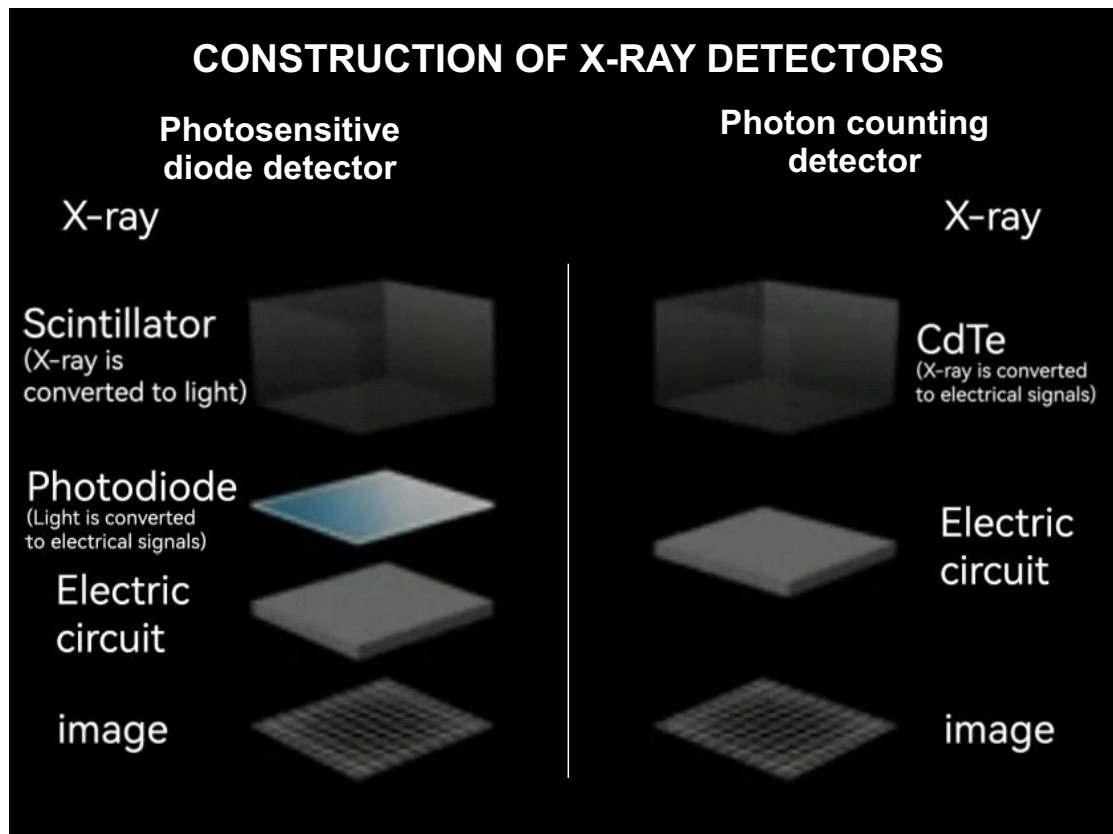
Contaminants are easy to find metal, hard bones.

The bones of the ribs and sternum are hard to see due to its very low density

X-Ray scanner with new receiver + intelligent algorithm = best performance
The dual energy system enables easier detection of low-density bone debris, e.g. in chicken fillet

low energy

image processing

high energy

image processing

CONSTRUCTION OF X-RAY DETECTORS

PHOTON COUNTING HAS FOUR ADVANTAGES OVER CONVENTIONAL DETECTOR TECHNOLOGY:

1. Better spatial resolution (100 µm resolution 64-line), Direct Conversion avoids scattering made by the scintillator.
2. Much Longer lifetime and almost zero-deterioration under X-ray exposure.
3. Better SNR of X-ray image because of Zero dark noise.
4. Multi-Energy Xray differentiation can be achieved.

ARTIFICIAL INTELLIGENCE SUPPORT

The X-Ray scanner is equipped with artificial intelligence support, which analyzes comparative data much more accurately than humans, with enormous computing speed. AI is like a virtual operator that constantly ensures the highest quality of the X-Ray scanner's work, replacing a qualified operator in this position. The AI robot learns to recognize and eliminate foreign objects, errors, damage, and deficiencies much more accurately than competing scanners. AI significantly increases the level of detection, improves the accuracy of weighing products with a fixed form and shape, and disproportionately reduces the number of false rejects.

MAIN FEATURES

➢ Easy-to-clean design (to the maximum extent devoid of nooks and crannies, which prevents the growth of bacteria),

➢ High-quality detection imaging system,

➢ High level of detection provides multi-level **DE** receiver with 0.4mm automatic filter,

➢ TDI technology (TDI transforms multiline matrix image into a single-line linear image matrix by signal accumulation, increased detector exposure level used 8-level receiver. That means on this one same dose of X-rays the TDI detector can get 8 times higher exposure than a standard array detector linear.

➢ The intelligent algorithm is responsible for:

✓ Self-organizations of all components,

✓ Self-adaptation,

✓ Automatic signal synchronization between the radiation lamp ionizing device and the receiver,

✓ Auto learning for continuous supervision over the reliability of the scanner operation.
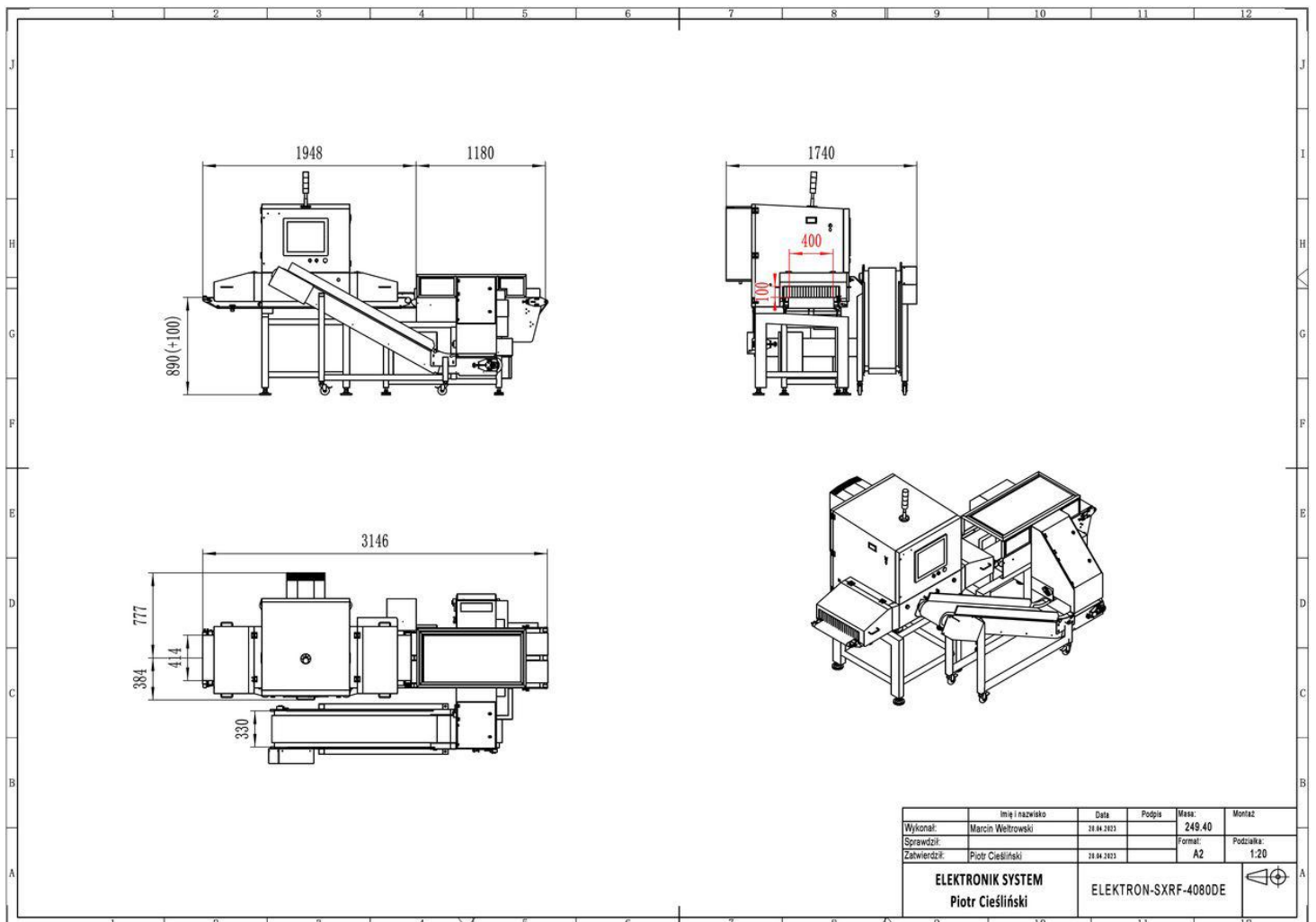
„FROST" SYSTEM

In the low temperature zone, the X-Ray scanner can be equipped with an unprecedented "FROST" system- a system for controlling the temperature and humidity inside the enclosures of the control systems. A system that protects the electronics against humidity and cold and abrupt temperature changes during cleaning. It prevents the absorption of moisture inside (e.g. a cold machine washed with hot water).

LIST OF COMPONENTS

FUNCTION	NAME	PRODUCER
X-Ray source	X-Ray generator	VJ USA
X-Ray receiver	X-Ray detector	DT FINLANDIA
Device management	17" touch monitor	ADVANTECH
Data processing	Industrial computer	ADVANTECH
Temperature and wetness control	Air conditioner	RITTAL
Conveyor belt drive	Engine wiht gear	ORIENTAL MOTOR
Speed regulation	Engine controller	ORIENTAL MOTOR
Electric protection	Miniature circuit breakers	SCHNEIDER ELECTRIC /ABB
Connection between devices	Military connectors	PLT
Safety management	Limit switches	OMRON
Automation management	PLC driver	SCHNEIDER ELECTRIC
Warning information	Optical-acoustic signaller	WERMA

	Imię i nazwisko	Data	Podpis	Masa:	Montaż
Wykonał:	Marcin Weltrowski	28.04.2023		249.40	
Sprawdził:				Format:	Podziałka:
Zatwierdził:	Piotr Cieśliński	28.04.2023		A2	1:20

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Piotr Cieśliński

ELEKTRON-SXRF-4080DE

	Imię i nazwisko	Data	Podpis	Masa:	Montaż
Wykonał:	Marcin Weltrowski	24.01.2024		-	
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