

Brush Cleaner

DTBC_2600

Spray Sectorial Lubrication System

SAGOMA_2600

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1. GENERAL DESCRIPTION

The scope of supply for this quotation consists in the detailed design, procurement, fabrication and assembly of auxiliary elements related to the below description of material and in-house testing.

The machine is suitable for the installation in the FOL-area in front of a press line. The blanks are fed by means of an infeed conveyor unit, they pass through the brush cleaner by upper and lower wheels and are taken to the oiler by lower wheels. This system is designed to precisely know (using an encoder on the motorization) the exact position of the lubrication area, in feed direction. When leaving the spray box, the blanks are picked up by a driven conveyor belt/centering table, without drifting, and transported further. The superior control provides the signal for the belt speed.

While running through the cleaner, the blanks are cleaned on both sides by linear brushes. The dirt is stripped out from the brushes transported into a filter by suction system. These results are possible thanks to:

- mechanical brush effect by the linear brush
- capillary adhesive forces between micro- moistened filament and particle
- reduction of electrostatic charges brought about by the DTBR_Cleaner_300 liquid.

While the blank is running through the spray box the upper and lower side can be sprayed with deep drawing oil media with adjustable quantities. The special design of the suction system will prevent contaminated air from escaping through infeed and outfeed slot and the oil collected return back into the oil reservoir. The special design of the suction system also prevents the spray oil mist drops accumulation on the inside walls of the spray chamber from dropping on the passing coil.

1.1. CUSTOMER TECHNICAL DATA

Type of materials	automotive steel, high strenght steel, dual phase steel,laser welded and Alluminum
Thickness	0,5-2,3 mm
Max Thickness delta	2 mm
Material length (front to back) single blanks	min 500 mm - max 2000 mm
Material length (front to back) double blanks	min 500 mm - max 2000 mm
Material width (left to right) single blanks	min 500 mm - max 2600 mm
Material width (left to right) double blanks	min 500 mm - max 1100 mm
Material shape	rectangular, trapezoidal, tailored blanks (max. delta 2 mm), irregular, double unattached blanks
Double blanks	Yes
Distance between double stack	100 mm
Internal trasnport conveyor speed	60 - 200 m/min
Standard passing height	1500 mm
Working speed	Max 200 m/min
Total installed power supply brush cleaner	10 kW
Total installed power supply reoiler	12 kw
Electrical equipment	380V, 50 Hz, 3 phases, N, PE (different voltage available)
Safety interface	Safety relè
Labelling	Standard Dietronic
Number of oil media	Only 1
Oil media details	TBD
Application	Only blanks

1.2 MACHINES TECHNICAL DATA

Drive linear brushes-motor output	2,2 Kw
Drive conveyor rolls-motor output	1,5 Kw
Oil valve voltage	24 V DC
General valve voltage	24 V DC
Control voltage	24 V DC
Brush cleaner air consumption	2500 NI/min at 6 bar
Reoiler air consumption	4200 NI/min at 6 bar
Air Supply (brush cleaner and reoiler)	5 bar min
Communication	TBD

2. MAIN HOUSING

Frame

The machine's substructure is a solid and waterproof welded steel construction, brusher and the oiler are contained in one frame.

Blank Transportation

Smart Conveyor ensures 100% of sheet movement without slitting by motorized removable pinch rolls transport conveyor and lifting pneumatic system for the IN and OUT of the dry-cleaner.

Upper round crushless wheels anti-slipping used for small parts gives correct movement of sheet metal, the solution to transfer short blank through the machine with min size 500x500 mm.

Cable and Pipe Channels

All channels to connect the connection box to the refilling units must be provided from a customer (Dietronic will provide a document for details).

All cables and pipe from Dietronic side until the connection box are scope of supply.

Electrical control

The machine operating panel is placed separately according to the line layout.

The communication is Profinet.

The control cabinets will be placed on the structure of the machine. The machine operating panel HMI is placed separately according to the line layout. The control is equipped by Siemens, Point I/O, which is placed in the control cabinet with air conditioning unit.

All the motors are SEW

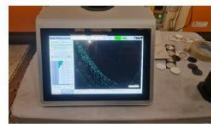
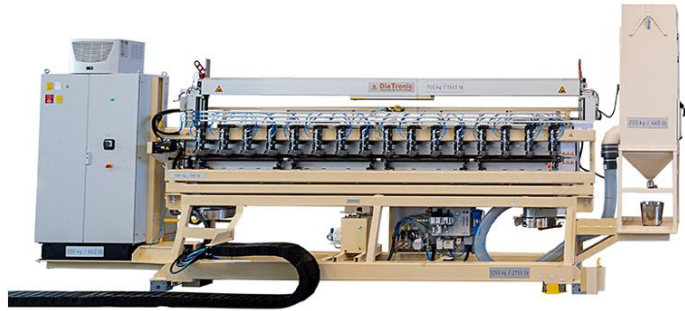
Armor Block Remote I/O Murr

2.1 GENERAL DESCRIPTION BRUSH CLEANER

The linear brush wipes transversally across the product surface. Particles will cling to the micro-moistened filaments which will thus remove them effectively and transport them to the suction connection.

These results are possible thanks to:

- mechanical brush effect by the linear brush
- capillary adhesive forces between micro-moistened filament and particle
- reduction of electrostatic charges brought about by the DTBR_Cleaner_300 liquid.



Test n°	Speed	Spot n°	Cleaning Result
1	100m/min	1	88,89%
		2	34,20%
2	100 m/min	1	98,28
		2	99,57%
3	150 m/min	1	82,82
		2	97,6
		3	97,26
		4	97,26
		5	23,37
		6	75,95



Linear Brushes

Two Sword Brushes, wipe transversally across the material surfaces. The micro-moistened brush filaments (DTBR_Cleaner_300® system) remove even the most minute particles from the subject surface. The integrated pressure buffer provides for a constant wiping pressure and a premium cleaning result. The adjustment frame VE 25. allows a vertical adjustment of the Sword Brushes e.g. to adapt them to the material's thickness or to remove them from the material surface for maintenance purposes.

Pneumatic Height Adjustment

The cleaning module may be mounted on an adjustment frame to integrate a height adjustment:

1. Manual adjustment via crank (HVM)
2. Pneumatic adjustment via pneumatic cylinder (HVP).

Quick removal of module from material surface, e.g. in crash situations. The mechanical and the electrical height adjustment may be combined with the pneumatic adjustment.

The brushes are supported by pneumatic pistons for fast opening.

A safety device before on the entrance of the machine is connected to the signal to open fast the brushes. The upper brush can be open for 50 mm and the lower for 25 mm.

Self Cleaning of the Brushes

At the deviation, the linear brushes widen, so that particles may be detached more easily. Rotating steel elements (racks) remove the particles mechanically from the filaments. Additionally, there are compressed air driven nozzles, that blow into the brush filaments to cancel the capillary adhesive forces between the particles and the filaments. The suction system will absorb the particles.

Benefit: Improved self-cleaning and automatic cleaning process

Aluminum:

The cyclone has a level sensor to indicate when the tank is full

Steel:

only cyclone

The patented DTBR_Cleaner_300 system permits effective removal of even very fine particles.

DTBR_Cleaner_300 Cleaning Liquid Applicator (40 lt. included)

DTBR_Cleaner_300 is an antistatic cleaning agent. The brush filaments are micro-moistened with DTBR_Cleaner_300, thus providing an effective removal of even very fine dust particles.

1. Micro-moistened brush filament with DTBR_Cleaner_300
2. DTBR_Cleaner_300 sprayer SQL 51.
3. Distributor block VTB 100.
4. DTBR_Cleaner_300 regulator and filter unit IR 100. DTBR_Cleaner_300 filter, dosage and display of inner pressure of pressure buffer
5. DTBR_Cleaner_300 central supply pump, e.g. IS 102

The DTBR_Cleaner_300 liquid is supplied by a pneumatic from on frame tank of 20 lt tank with electric filling level control as well as pump and connections for refilling the reservoir.

Automatic refilling unit for the DTBR_Cleaner_300 tank from barrel or IBC Container 1000 lt.

The unit is provided with level sensor switch displayed on the HMI of the machine.

Calibrated nozzles control the amount of liquid applied on the single brush.

The consumption of the DTBR_Cleaner_300 is estimate in about 2L for hour.

Automatic refilling units for the Oil media tanks from barrel or IBC Container 1000 lt.

Extraction System Control

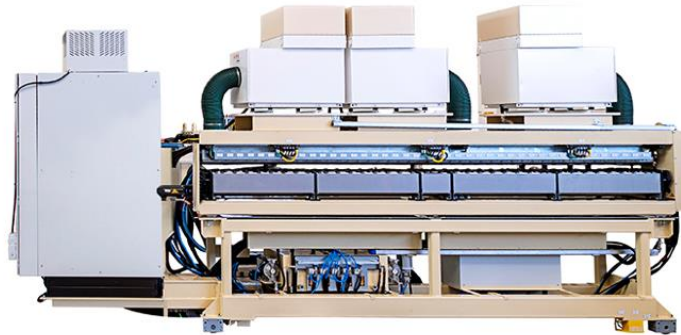
The brushes are connected to an extraction system for the collection of the particular removed from the material.

An additional device "Cyclone" between the brushes and the extraction system allow the improvement of the filters life.

BRUSHES SPECIFICATION	
NUMBER OF BRUSHES	8: 4 above, 4 below
FILAMENTS	black filaments in polyamide, length of filaments 19mm, diameter 0,2 mm
CYCLONE SYSTEM	for pre-separation of oil removed (SZY 400)
SUCTION FILTER	OEL-DS 1-0.28
BRUSH CLEANILESS LEVEL	< 0,5 mm particle size
DTBR_CLEANER_300 RESERVOIR	40 litres
UPPER BRUSH HEIGHT ADJUSTMENT	automatic positioning of the upper brush
SAFEY BRUSH DEVICE	laser sensor for anti blank collision control for upper and lower brush (Dietronic will provide sensor and support, THE CUSTOMER will install on the infeed conveyor and THE CUSTOMER will manage it according to our specification)

2.2 GENERAL DESCRIPTION SECTORIAL OILER FOR 1 TYPE OF OIL MEDIA

The machine is created to apply very accurate oil media on coil with adjustable quantities (from 0,3 up to 5 g/m2).



Spray Heads Composition

The inside of the spray box is designed to prevent spray-oil mist drops depositing on the inside walls of the spray box from dropping onto the passing blank. Inside the spray box there are an upper and a lower extractable and isolated spray head that contains the Modular Manifolds. The extraction of the spray heads is from the front of the machine and the bottom one is also routable for very easy maintenance.



The Modular Manifold is Patent Module with 4 nozzles where each nozzle covers 50 mm, with a perfect quality of spray application and minimum overspray, due to the minimum distance from the blank (just 50 mm). Instead of a conventional spray machine that uses 100 or 125 mm distance, there is a substantial reduction of spray-oil mist area to control. Each Manifold covers 200 mm surface so the number of manifold depends of the size of the machine.

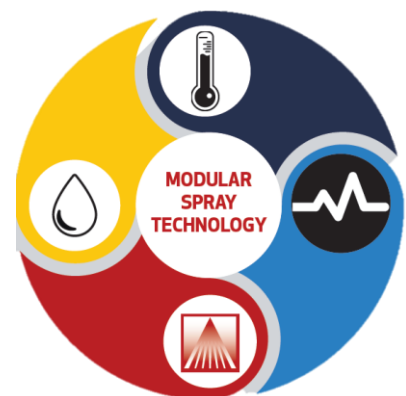
For example:

A machine of 3000 mm size has 30 Modular Manifolds equipped with 4 nozzles each for a total of 120 nozzles (15 manifolds with 60 nozzles upper and 15 manifolds with 60 nozzles lower side).

The Modular manifold is also equipped with HFV (High frequency Valve) for each nozzle to control the intensity for each nozzle, Heating system to control the temperature and the viscosity of the oil media and sensors to detect, in TEST MODE any clogging of the flow through the nozzles.

The "Patent Registered" functions of the Dietronic Manifold

- DT SENSOR® CONTROL Test function to ensure the performance of each nozzle
- DT AIR® CONTROL Air spray control valve integrated in each manifold with electronic adjustment
- DT TEMP® CONTROL Heating System integrated with temperature control for each manifold
- DT HFV® CONTROL High Frequency valves to control the volume of lubricant for the single nozzle



Blank Teaching System

The machine is provided with a system of autolearning of the blank shape and visualization on the operator panel. There is a sensor for each nozzle that detects the front end of the blank and recognizes the sheet shape to facilitate the operator with the choice of the areas that need lubrication. The oiling is carried out either on the full surface or on individual streak segments or patterns. No special programming knowledge is required to draw up the spray programs on a touch panel. The spraying process to be released for every first, second or X- blank is programmable.

After the first blank moves through the oiler automatically we display the size and the shape of the blank/s.

Oil Mist Extraction System

According to the size of the machine a variable number of suction systems are mounted on the top of the machine. Air is extracted from the machine housing by means of a fan. This will prevent contaminated air from escaping through infeed and outfeed slots. Oil-mist separators clean the extracted air and return the oil back into the reservoir.

The inside of the spray box is designed to prevent spray-oil mist drops depositing on the inside walls of the spray box from dropping onto the passing blank.

A high efficiency filter (the combination of polyester fabric and Teflon), also allows the removal of smokes and vapors, providing filtration efficiencies reaching the remarkable value of 99,9%, IFA-BGIA Certification. All models are equipped with a differential pressure gauge to monitor the filter life.

Internal Cleaning Wiper

Automatic device to clean the inside walls of the spray chamber. The wiper is activated from the operator panel and moves along the edge of the walls preventing the accumulation of oil drops.

Oil Quantity Programmability and Spray Intensity

The usual intensity application of deep drawing oil in the automotive press shop is approx. $< 0.3 - 5\text{g/m}^2$. This variation is connected to oil pressure that allows, for each single 100x100 mm area, to apply up to 8 different quantities.

Oil Media Reservoirs and Oil Media Pressure Control

The machine is equipped with 40 lt oil tanks and by a pneumatic pump an accumulator of 2 litres is automatically refilled and maintained at constant fix level. With air pressure on this accumulator automatically controlled from the HMI is possible to set a very constant oil pressure to the spray heads.

An additional recovery tank of 40 lt permits to collect the oil from the tray of the machine and with a pneumatic pump this oil is filtered 10 μ and automatically refilled to the main tank.

Automatic refilling units for the Oil media tanks from barrel or IBC Container 1000 lt.

The unit is provided with level sensor switch displayed on the HMI of the machine.

Air Pressure Control

The air pressure is completely automatic, no manual action is needed, adjustable from the operator panel.

SECTORIAL OILER SPECIFICATION	
NUMBER OF SPRAY NOZZLES	52 upper side, 52 bottom side (total 104 pcs.)
SMALLEST SINGLE SPRAY GRID	100 x 100 mm
OIL QUANTITY APPLICATION RANGE	0,3 - 5 g/m ²
OIL RESERVOIR	40 lt
WASTE OIL RECOVERY TANK	40 lt
SPRAY NOZZLE BARS HEATING SYSTEM	adjustable temperature from 20 up to 60°C
OIL FILTER	filter 10 micron
HIGH EFFICIENCY SUCTION FILTER	Included (number 1) – 0.35 kW each; 2500 m ³ /h each with analogic pressure gauge
EASY MAINTENANCE SOLUTION	extraction of the complete spray head from the side of the machine.
ANTI DROP SYSTEM	internal pneumatic wiper for the collection of the small drops accumulation
EASY PROGRAMMING SOLUTION	automatic displaying system on the HMI of the position and shape of the blank
BLANK TRANSPORTATION	motorized conveyor equipped with steel wheels
IN-OUT OF THE LINE SOLUTION	Yes

Amount of oil tested	Amount of oil collected on the blank
1,5 g/m ²	1,46 g/m ²
Final Result in percentage %	
$(1,46 / 1,5) * 100 = 97,33 \%$	
Result of FAT: 97,33 %	



3. GENERAL SPECIFICATION INCLUDED IN THE QUOTE

Certification:	QUASI MACHINE 2006/42/CE Machine Directive
Labelling:	DIETRONIC Standard
Electrical schemes and drawings:	PDF
Notes:	
Cables Standard Length	

Electrical BOM Part List	
PLC	Siemens series 1500
HMI	Siemens Comfort Panel TP 1900
DC Power Supply	Cabur/Murr
Cabinet Carpentry	Rittal
Protection	Siemens/Murr
Plugs	Harting
Sensors	Ifm / Electrotech
Encoder	Leine Linde or AB
Motor	SEW- Motovario (Brushes)
Armor block I/O	Murr
Pneumatic BOM Part List	SMC
Oil devices BOM Part List	Dietronic/Omal/Debem/Ufi Filter

4. WARRANTY CONDITIONS

The Warranty goes into effect after maximum 60 days from when the new Dietronic unit has been delivered to the customer premises and expires at the end of the Warranty Period specified above.

The Warranty covers repairs to correct any unit defects related to materials or workmanship existing at the time of purchase. All requests must be approved by Dietronic prior to any work being performed during the Warranty Period. Specific exceptions to the Warranty are listed in the Exclusions section.

Dietronic will provide repairs to the unit during the Warranty Period in accordance with the Terms, Limitations, and Conditions. This is the sole Warranty provided by Dietronic.

Exclusions

Unit components subject to normal wear during the Warranty Period are not covered by Warranty and include the following items:

Filters (Oil tank and oiler suction systems filters)

Brushes

Component failure caused by customer misuse/abuse of the unit (e.g. incorrect modification of machine parameters that cause damages or the usage of incompatible materials), voids the Warranty.

Machine rupture caused by part handling/misuse or damages due to exposure to elements or incorrect storage of the equipment, voids the Warranty.

Standard Equipment Warranty Coverage

All unit components are warranted for 1-Year, except the items listed in the Exclusions section.

Dietronic will supply new or remanufactured component of equal or better quality to replace the failed component. It is the sole discretion of Dietronic to determine best method of replacement. The replaced component will be covered for the remainder of the Warranty Period or 90 days, whichever is longer.

5. COMMISSIONING CONDITIONS

Date after agreement with Mrs. Elisa Beccaria (service@dietronic.eu)

The following preconditions need to be met for a successful commissioning:

- 1) The Machine has to be mounted and aligned
- 2) The electrical, pneumatic and liquid connections must have been installed
- 3) Electricity and compressed air should be available according to Dietronic specification
- 4) Free access to 230 V.
- 5) Customer must provide necessary safety training and access cards
- 6) Customer must guarantee working time without interruptions for Dietronic technicians
- 7) Commissioning will take place only once in Customer Plant
- 8) Working time 7 am to 5 pm, if technicians need to work extra hours we will charge surpluses for night shifts or work during the weekends.

Scope of commissioning:

- 1) Functional control of the installation
- 2) Initial start-up of the system

Not included in the above price are the following items:

- 1) All sorts of mounting and installations works
- 2) Correcting mounting errors or deviations from Dietronic specifications

Positioning on existing line of the machine.

DieTronic is not responsible about installation condition and alignment:

- 1) Re-assembling of parts dismantled for transportation
- 2) All the activities that require to fix on the concrete
- 3) Communication devices and cable for software interface between our machine and the line including cable channels
- 4) Software integration to the line
- 5) Positioning of IBS or Barrel holder (when it's included in a scope of supply)
- 6) Channels and installation for cables to connect the machine to the tank unit and HMI pulpit (cables included)
- 7) Power supply
- 8) Piping for air supply
- 9) Piping for water (when the machine has the automatic mixing system)

All waiting periods that go back to external factors or to non-compliance with the preconditions for a successful commissioning will be invoiced according to the Dietronic pricelist for technicians. An authorised person of the customer will have to confirm that the above services have been rendered directly after the end of the commissioning.

This must be done on the Dietronic form "confirmation commissioning". This confirmation ends the commissioning, the risk for running the machine will pass on to the customer.

A separate trip of the technicians to receive the customer's or end-customer's final acceptance is not included in this quotation/order confirmation. All additional services or items, that are not included in this quotation/order confirmation will be charged according to the Dietronic pricelist for technicians.