

APPLICATION CATALOGUE

POLISHING MACHINE FOR MARBLE AND GRANITE

Version 1.0

06/08/2013



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9001:2008



Versioning Information

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Polishing Machine for Marble and Granite



The machine is made up of 5 different parts

1. **Belt.** Is a treadmill of rubbery material where the slabs of marble or granite are loaded and then transported. The size in width is about 2 meters and in length is more than 8 meters. The length of the tape along which the sheets are transported is divided into 3 areas:
 - a. loading
 - b. polishing
 - c. unloading
2. **Bridge.** Is a steel structure in the form of a bridge that moves in an oscillatory manner in a transverse direction with respect to the movement of the belt. The size of the long part is over 8 m.
3. **Heads.** Are small plates whose dimension is around 0.3 meters below which are hosted the tools that are used to polish. The plates are rotated by motors.



4. **Shape detector.** Is a device able to detect the contour of a slab while it is transported on the belt. It is placed in the loading area of the tape.

5. Material loading and unloading

The normal working cycle is articulated in the following phases:

1. Loading of the raw slab and measurement of its thickness;
2. Detection of slab shape and mapping on the belt (as if you take a dynamic picture of the slab on the belt while it moves);
3. Slab polishing;
4. Unloading of the polished slab.

All these phases are executed in continuous, therefore, after slab loading starts, the process is fully operative with as much slabs on the belt as can be contained on it.

The machining cycle is interrupted and restarts for the following ordinary events:

1. Excessive wear of sanding tools;
2. Suspension of the cycle for different ordinary causes

The machining cycle is interrupted and restarts for the following extraordinary events:

1. Slab breaking during polishing;
2. Interruption in power supply or other energy sources.

The machining cycle is controlled, with the aim of obtaining the best polishing depending on the type of material and its shape, with the following parameters:

1. Pressure of the head on the material;
2. Precision of heads falling and lifting on/from the material;
3. Synchronization between the oscillating movement of the bridge and the feed speed of the belt.

The machining cycle is controlled with the aim of obtaining the best performance of the polishing tools taking into account their type (diamond, or common abrasive). Moreover, it is controlled to obtain the maximum productivity of the machine with the minimum consumption.

Calibration unit



In some polishing machines some calibration heads are added that anticipate those for polishing in the machining cycle.

These must ensure a constant and precise thickness of the slabs.

Depending on slab material and on the quantity to be removed, it must be possible to perform the calibration cycle in more passes and therefore it must be possible to properly move the slab under the heads. The slab must be subject to repeated measurements of the thickness reached at the end of each pass.

Technical characteristics of the ISAC product

Hardware:

PAC  **ACHILLE** allows the PLC, HMI, Motion Control and Communication functionalities

Configuration

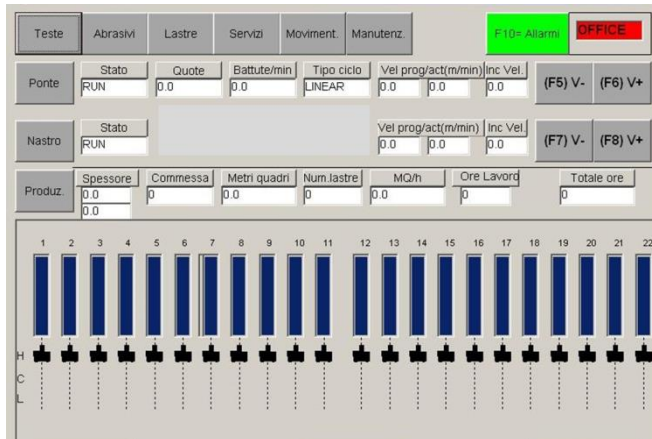
1. Axes Interface with: Inverter / Servo driver
2. I-O terminals linked in filed Buses, therefore distributable on the machine to reduce cabling costs and to increase reliability;
3. Operator interface: 15" Touch connecte through VGA cable up to 40 meters long.



Operator Interface

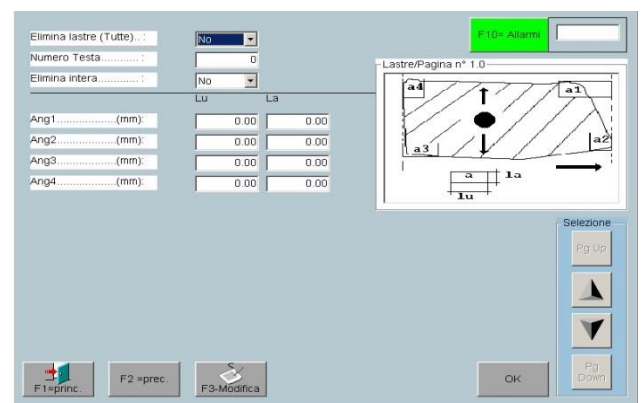
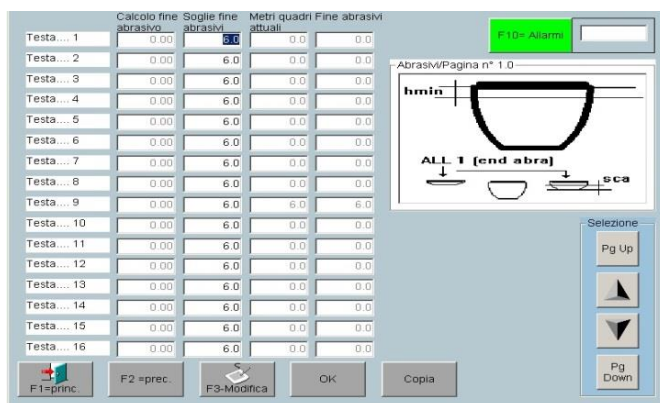
Applicative Software

HMI



The applicative software is complete for the functioning of standard machine with the requirements described above.

It is divided into software PLC and software HMI



Function block PLC

To ease PLC code drafting, ISAC provides several function blocks and libraries to implement the typical functionalities of the numeric control machines

S O F T W A R E P L C

- Management of the GsNastro tape ()
- Management of the GsNastro bridge ()
- Survey data management of the plates contour and placement of the figure on the virtual tape + modification and deletion of the GesMemtap plates()
- Management of the lubrication and GesLubri greasing ()
- Managing the CNC keyboard, the external buttons and the start / stop phase of the GesTasticnc cycle ()
- Emergency management (safety devices), and the management of alarm attention and operator messages GesEme ()
- Management of the machine initialization (power on) Gespon ()
- Managing power on / off PLC GesOnOf()
- Derived and Timed management
- Module name: templc ()
- In this module (standard PLC SW base) is centralized the management of derivatives and timed
- Managing comands in queue with operator interfaces (HMI GesPipeComa ())
- Management of the heads in falling and in lifting, interfacing with pneumatic controls GesTeste ()
- Head lifting management in Clamp modality in the conveyor belt sense GesClampDirNas ()
- Control Manager collision between heads and carpet
- Head lifting management in Clamp vertical modality (bridge direction, or orthogonal to the belt direction) GesClampDirPnt ()
- Management of the heads rotation with asynchronous motors or indirectly through an inverter and then with the individual speed control for each head GesMandrini () + GesInvRotMan ()
- Adaptive management to ensure the accuracy of the head in falling and in lifting on the material as a function of the shape and the speed of the belt and the GesAdaTes bridge ()
- Management of the change abrasive tools BesCabra ()
- Managing the position of each individual transducer heads using tensiometric GesPotenzio ()
- Management of the shape of the plate GesMicrorilevatori ()
- Managing the opening and closing doors GesRipari ()
- Managing the thickness of the slab with potentiometer and encoder translate GesLettore ()
- Managing brush for finishing GesSpazzolone ()
- Managing attention and alarm history
- Managing the machine productivity
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Calibration Unit

- Management of the calibrators Ges Calibra
 - Management of the position of the axis calibrated from PLC
 - Managing the thickness of the plate in input calibrator
- Managing the repeated movement