

PIETRO CARNAGHI

**HEAVY DUTY VTC FOR HIGH
DEMANDING APPLICATIONS**

COMPANY PROFILE

- Pietro Carnaghi specializes in machine tools with high demanding performances and today is a world leader in the production of:
 - vertical lathes
 - movable portals milling machines (GANTRY type)
 - FMS (Flexible Manufacturing Systems), cells.
- Production 35-40 machines per year
- Exports 85% of production
- Solid financial situation – Class 1 D&B



APPLICATION

- **Energy:** machining of gas, steam and hydro electrical turbines; nuclear energy; wind energy
- **Bearings**
- **Aeronautics, jet engines**
- **Aerospace**
- **Mining equipment and earthmoving**
- **General mechanics**



MACHINE TECHNOLOGICAL FEATURES

- FEA for machine structural components,
- Hydrostatic bearing for linear and rotating axes,
- Direct Drive solution,
- Industry 4.0,
- Full turn-key solution

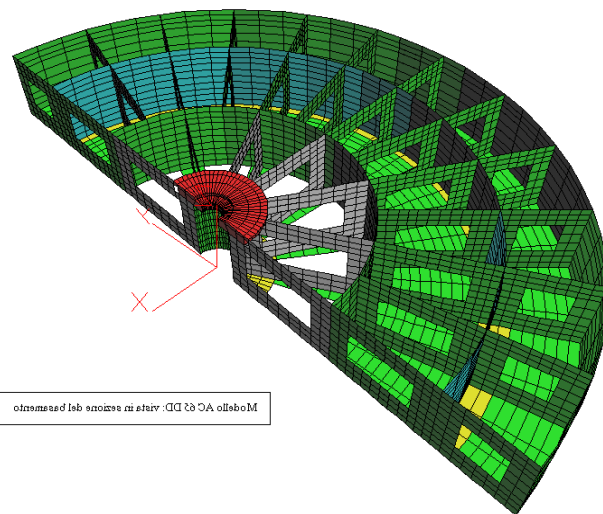


FEA Analysis for structural components

All machine frame structure are dimensioned by a FEM analysis, in order to give the best quality to clients needs.

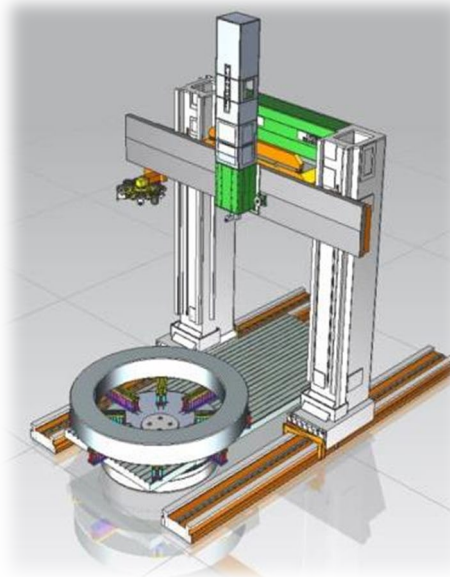
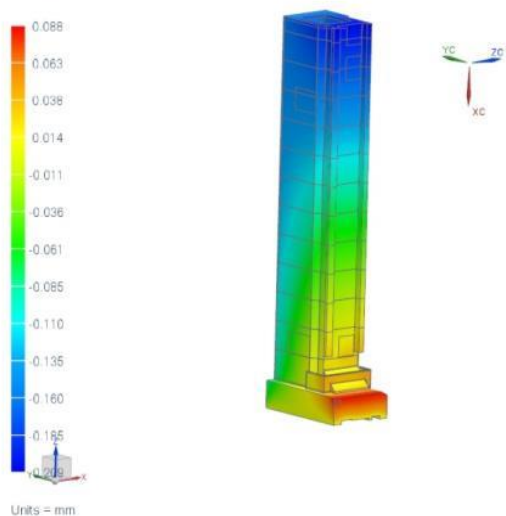
Pietro Carnaghi cooperate with:

- Milan University – Politecnico
- Aachen University – Germany



Modello A3000. Vista in sezione di assemblaggio

axis_sim1 : Solution 1 Result
Subcase - Static Loads 2, Static Step 1
Displacement - Nodal, Y
Min : -0.209, Max : 0.088, Units = mm
Deformation : Displacement - Nodal Magnitude



HYDROSTATIC SYSTEM ADVANTAGES

- **INFINITE BEARING LIFE**

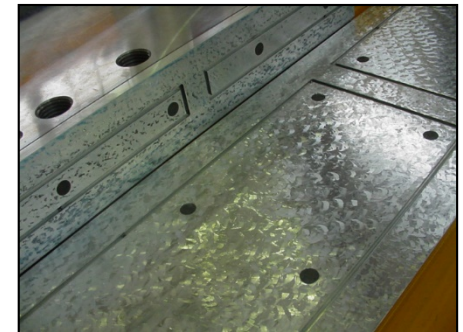
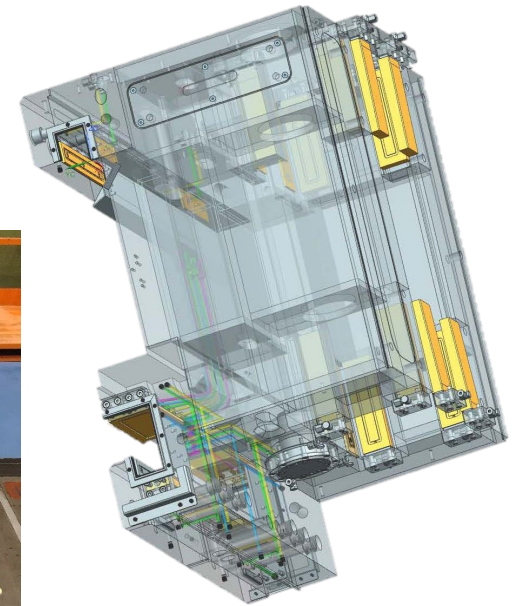
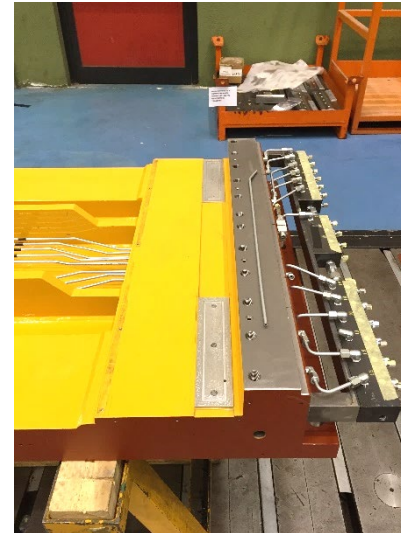
- Zero bearing wear
 - Longer machine life
 - Extended rigidity and precision

- **IMPROVED CRASH PROTECTION**

- Oil pressure increases as load is applied, creating a restoring force

- **SUPERIOR DAMPING**

- Longer tool life
 - Improvements in part surface finish and roundness 10 times better damping compared to conventional linear ball guideways



Direct Drive Technology

- **Turning and milling in one solution**

Direct drive system allow to pass from turning to milling operation directly :

- no trasmission
- no gear box
- no mechalicahal dispersion.

- **Stable and High performance**

The direct drive system is not subject to the typical problems of coupling motor - reducer, such as friction, wear, defects cyclic motion. This makes the DD system extremely **performance and stable over time**.

- **Quality of motion**

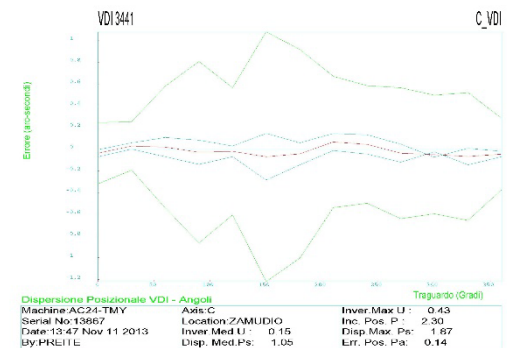
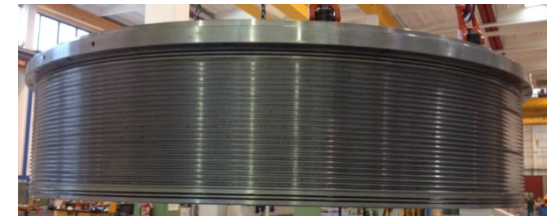
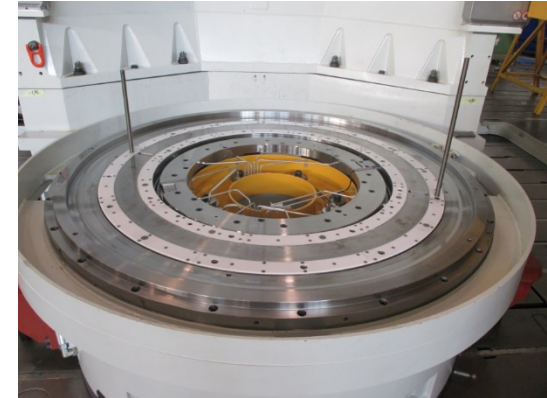
In the direct drive system, the **engine is in axis with the rotation of the table**, this ensures **less vibration, lower noise and maximum quality of machining**.

- **Efficiency**

The direct drive system is virtually **free of load losses** and consequently the performance of variable power cycles is much higher compared to conventional drives.

- **Reliability**

The direct drive system replaces a complex kinematic chain with two solid-state components (**rotor and stator**) **operating without contact**, are not subject to mechanical wear and are maintenance free.



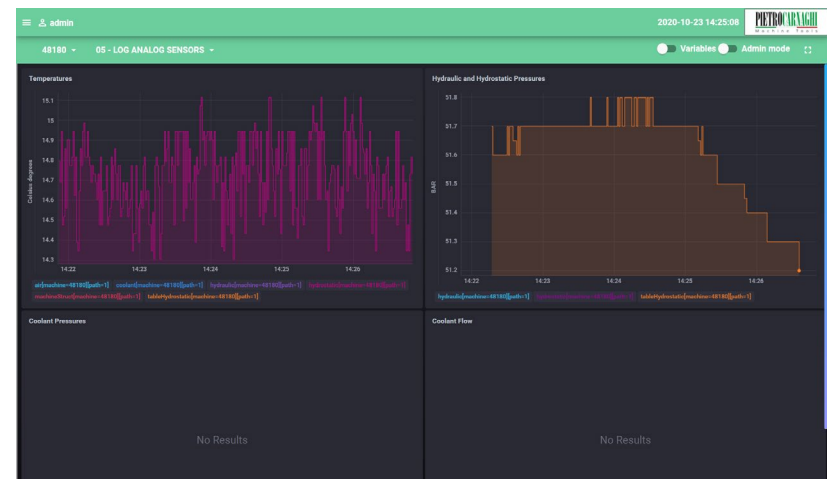
INDUSTRY 4.0 CMS SOFTWARE

The C.M.S solution represents a control and monitoring distributed system, ideal for optimize and integrate the diagnostic and maintenance functions of Pietro Carnaghi machines. Having a high degree of flexibility and modularity, the C.M.S. software meets the needs of both simple and complex system.

Through a service-oriented architecture (SOA) and integrating the latest software technologies, the CMS software is able to perform a series of complex monitoring and "data processing" activities.

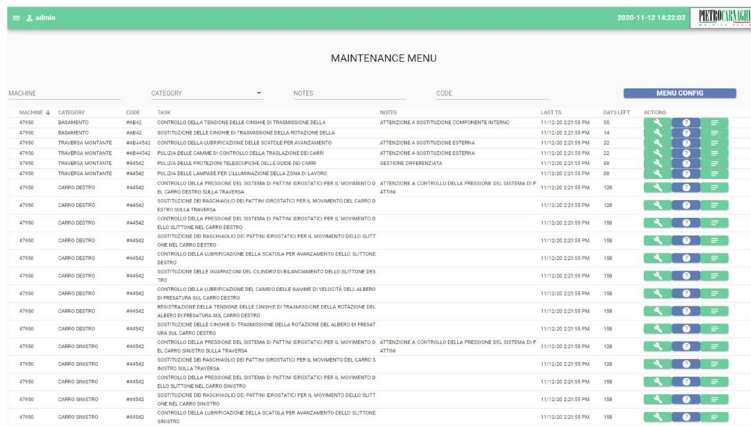
The main core modules that compose CMS are:

- Communication drivers (PLC, numerical control, sensors,);
- Database;
- Dashboard-based web server GUI;
- Pre and post data-elaboration unit;
- Alerting management module;
- Custom integration framework;

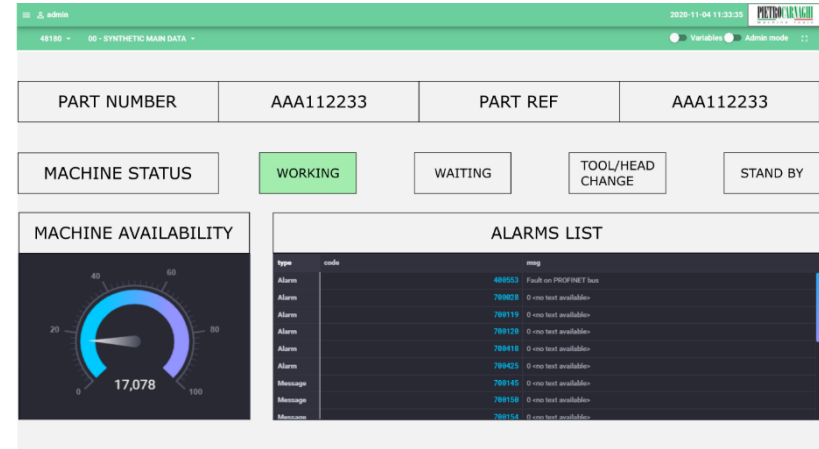


INDUSTRY 4.0 CMS SOFTWARE

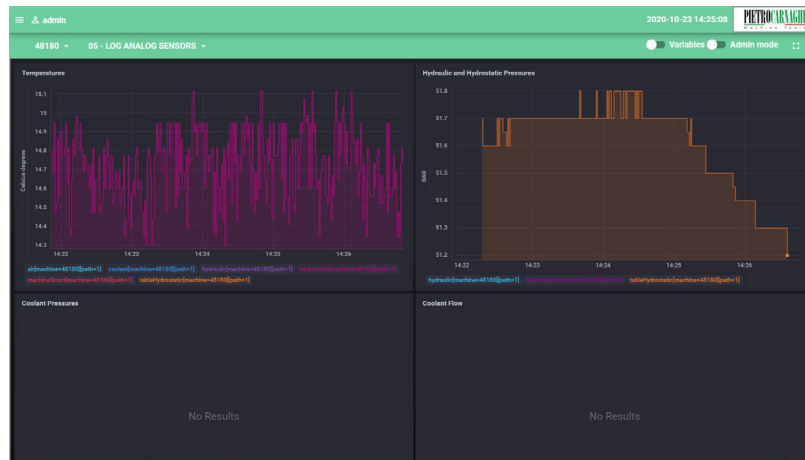
Maintenance Activities



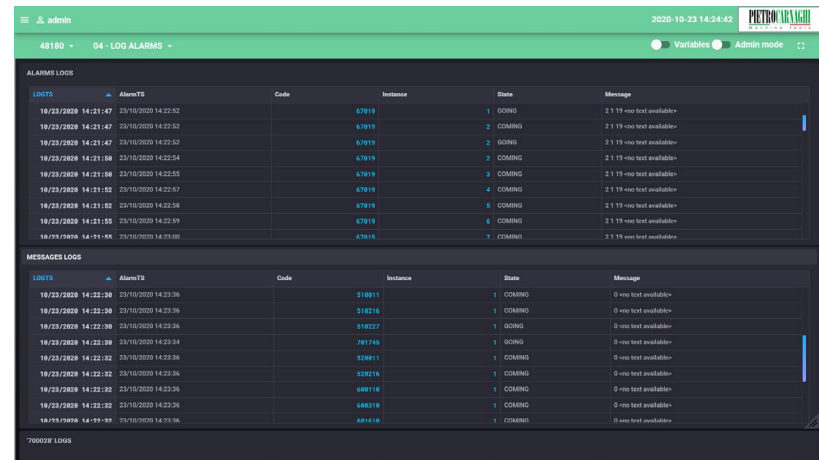
Machine status



Analog Sensor(temp - flow – pressures)



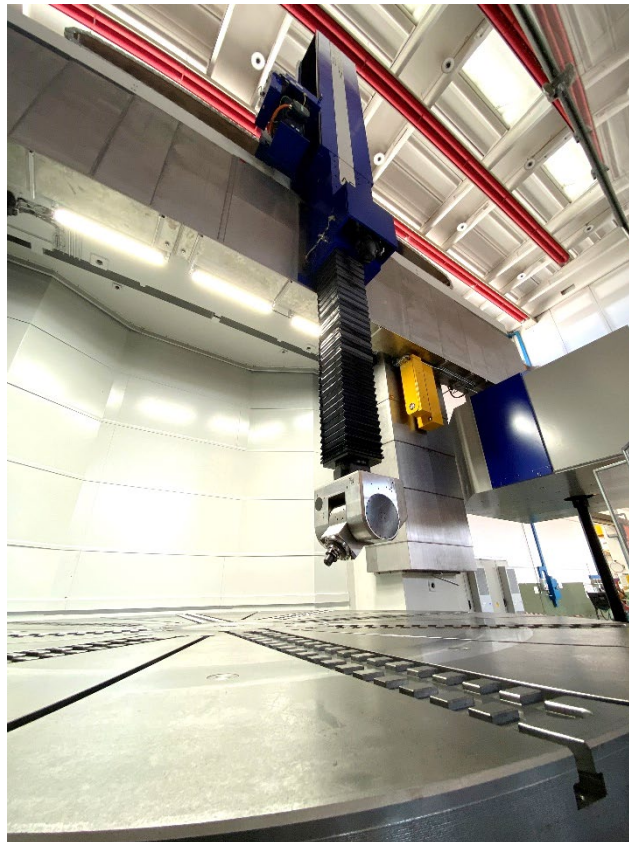
Alarm log



TURNKEY SOLUTION

Pietro Carnaghi offer support to all clients to define the best system configuration not limited to the machine but also to:

- Fixtures study and manufacturing
- Cutting process
- Tooling
- Subroutines
- Post-processor
- On-site support



INDIA MARKET INSTALLATION

V.S.S.C. AC46TM3500 AEROSPACE



KIRLOSKAR AC20TM1800 PUMP



INDIA MARKET INSTALLATION

BHEL AP 100 TM 8000 POWER GENERATOR



INDIA MARKET INSTALLATION

ELECON AC20TM1800 WINDMILL GEARBOXES



BHEL AP80TM6500 Power Generator





THANK YOU !