



CEMB presents CUBE



Vibration equipment division

CEMB



ADVANCED 3-AXIS Vibration Sensor:



Vibration equipment division

CEMB



CUBE: 3 axis Protection + Condition Monitoring all in one



CUBE measures continuously the vibration over 3 axis + the temperature of machine support.

CUBE is the first heavy duty industrial sensor that provides, in a single device, the following functions:

- **Machine protection:** 4-20mA & ON/OFF output
- **Condition Monitoring:** FFT & Raw data via ethernet
- **Predictive maintenance:** Configurable filters & advanced algos

CUBE is designed for heavy duty IP 68 environment, with stainless steel body, rugged integrated cable or connector.

CUBE is native IoT & 4.0 Industry



COMPRESSOR



INDUSTRIAL FAN



MOTOR



FEED WATER PUMP



GEAR BOX



TURBINE



MACHINE TOOL





CUBE: Protection + Condition Monitoring all in one



CUBE 3 Axis Vibration + Temperature

Body material:	Stainless steel AISI 316
Body size:	32x32x37mm
Power supply:	24Vdc (10 ÷ 35 Vdc)
Binary output (PNP/NPN) load:	50mA
Temperature measure:	-20 ÷ +110°C @ ±5%
Frequency:	1Hz ÷ 5KHz on each axis
Operating conditions:	-55 ÷ 110°C IP68
Communication:	Ethernet SPE (10base-T1L)
Communication speed:	10Mbit/s @ 1 Km (on twisted pair)
Communication protocols:	ModBUS TCP/IP; MQTT; HTTP
IoT & configurability:	100% configurable



	CUBE 0	CUBE 1	CUBE 2	CUBE 3
COMMUNICATION PORT	Ethernet SPE	Ethernet SPE	Ethernet SPE	Ethernet SPE
OUTPUT 1	-	4-20 mA	4-20 mA	4-20 mA
OUTPUT 2	-	-	4-20 mA	PNP/NPN Contact





CUBE: Configurable Bands, Units, Ranges, Setpoint & Delay

**MEASURE CAPABILITY
(3 AXIS + TEMPERATURE)**



Overall vibration FFT - Raw data - Temperature
Acceleration - Velocity
RMS value - Peak value

OUTPUT FEATURES



Dual output fully mappable
Selectable processing bands
Configurable Range, threshold and delay

SIMPLE AND EASY



Measure + Communication in a single device
It installs like any accelerometer
Configurable even at commissioning or remotely

CONNECTIVITY

Each **CUBE**
is available with 3 types
of connection





Usage scenarios of CUBE:

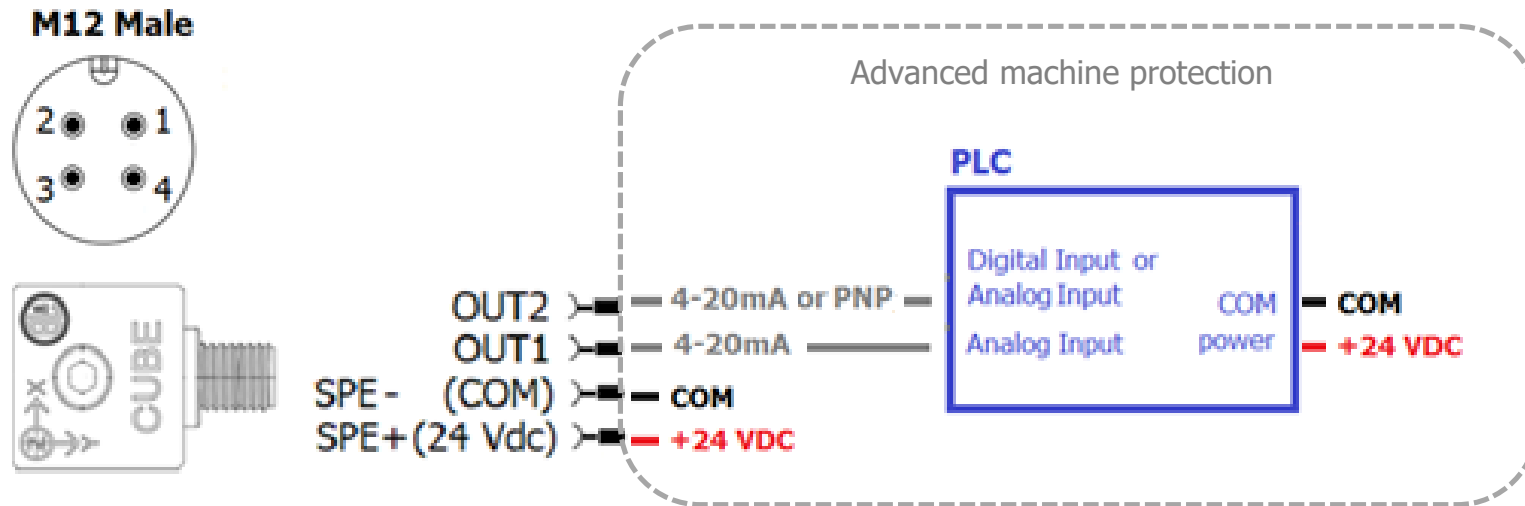
**...illimited solutions for
machine protection...
&
Condition Monitoring**





CUBE: scenario 1. advanced machine protection

The outputs of Cube are connected to a PLC that takes care of machine protection



Custom configuration can implement multiple schemes of protection: e.g.

Low speed machines

Vibration & Temperature

- OUT1 - MAX VIB (X,Y,Z) mm/s RMS – low band
- OUT2 - Temperature

High speed machines

Vibration & Bearing

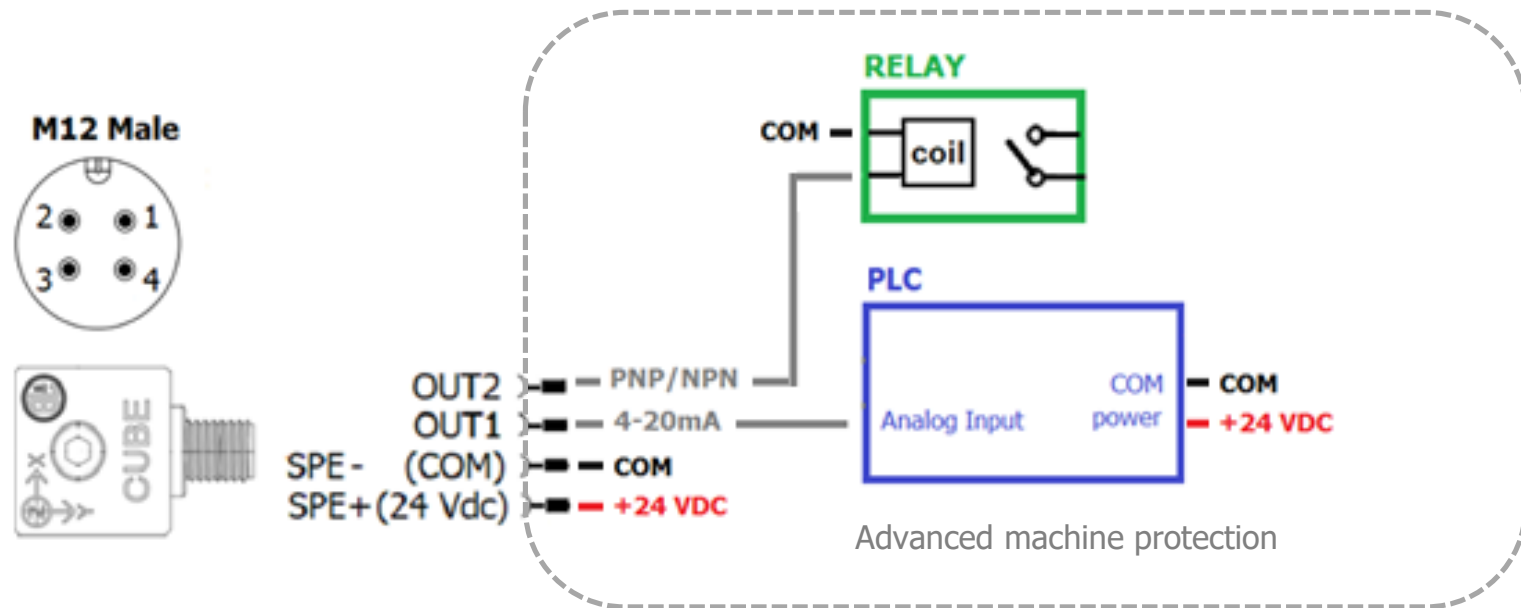
- OUT1 - MAX VIB (X,Y,Z) mm/s RMS – low band
- OUT2 - MAX VIB (X,Y,Z) g Pk – high band





CUBE: scenario 2. protection with redundant loop

The 4-20mA output can be connected to PLC as standard transmitter
The ON-OFF Binary output can be connected to a separate safety relay for redundancy and fast intervention



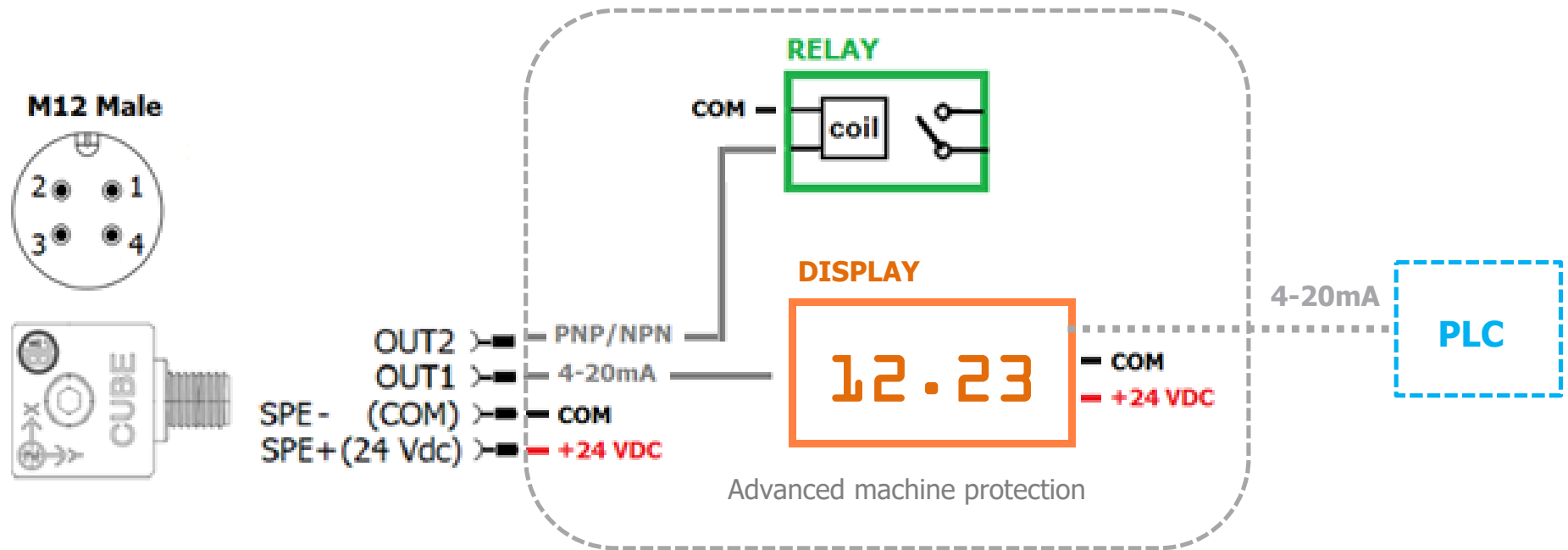
You can configure each output to maximize the protection (e.g. take the maximum of vibration on each axis X,Y,Z, or select the specific direction...)





CUBE: scenario 3. protection without PLC: Rele + Display

The ON-OFF Binary output is connected to a relay for machine protection
The 4-20mA output is connected to a panel PC to display the vibration



You can choose a panel display with 4-20mA repeater, to allow the connection with a PLC too





IoT SOLUTION: Condition Monitoring overview



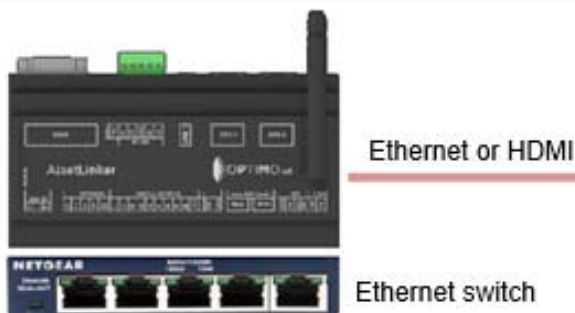


Condition monitoring: CUBE + PROVIB Local Monitoring

GATEWAY AL300

Sistema di acquisizione locale

- Data acquisition from field
- Local data storage (FIFO)
- Local User Interface
- Secure cloud communication (GSM, WiFi, Ethernet)

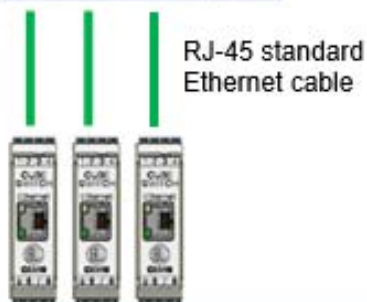


Nota: funzionalita' comuni (Trend, FFT, Alarms...) hanno la stessa interfaccia sia accedendo da locale o dal cloud

CUBE Bridge

Physical layer data converter

- Ethernet RJ-45 (Gateway) vs Ethernet SPE (CUBE)



FIELD level

4 wire shielded cable

CUBE

3-Axis Vibration + Temperature

- Machine protection & Condition monitoring





Condition monitoring: CUBE + PROVIB + CLOUD

CLOUD is OPTIONAL...

- Deep data storage
- Multidevice User Interface
- Statistic analysis
- Alarm Notification: SMS, Mail



REMOTE predictive analysis over Cloud (optional)

LOCAL predictive analysis

GATEWAY AL300

- Sistema di acquisizione locale
- Data acquisition from field
- Local data storage (FIFO)
- Local User Interface
- Secure cloud communication (GSM, WiFi, Ethernet)



Ethernet or HDMI



Ethernet switch

RJ-45 standard Ethernet cable

Nota: funzionalita' comuni (Trend, FFT, Alarms...) hanno la stessa interfaccia sia accedendo da locale o dal cloud

CUBE Bridge

- Physical layer data converter
- Ethernet RJ-45 (Gateway) vs Ethernet SPE (CUBE)



FIELD level

4 wire shielded cable

CUBE

- 3-Axis Vibration + Temperature
- Machine protection & Condition monitoring



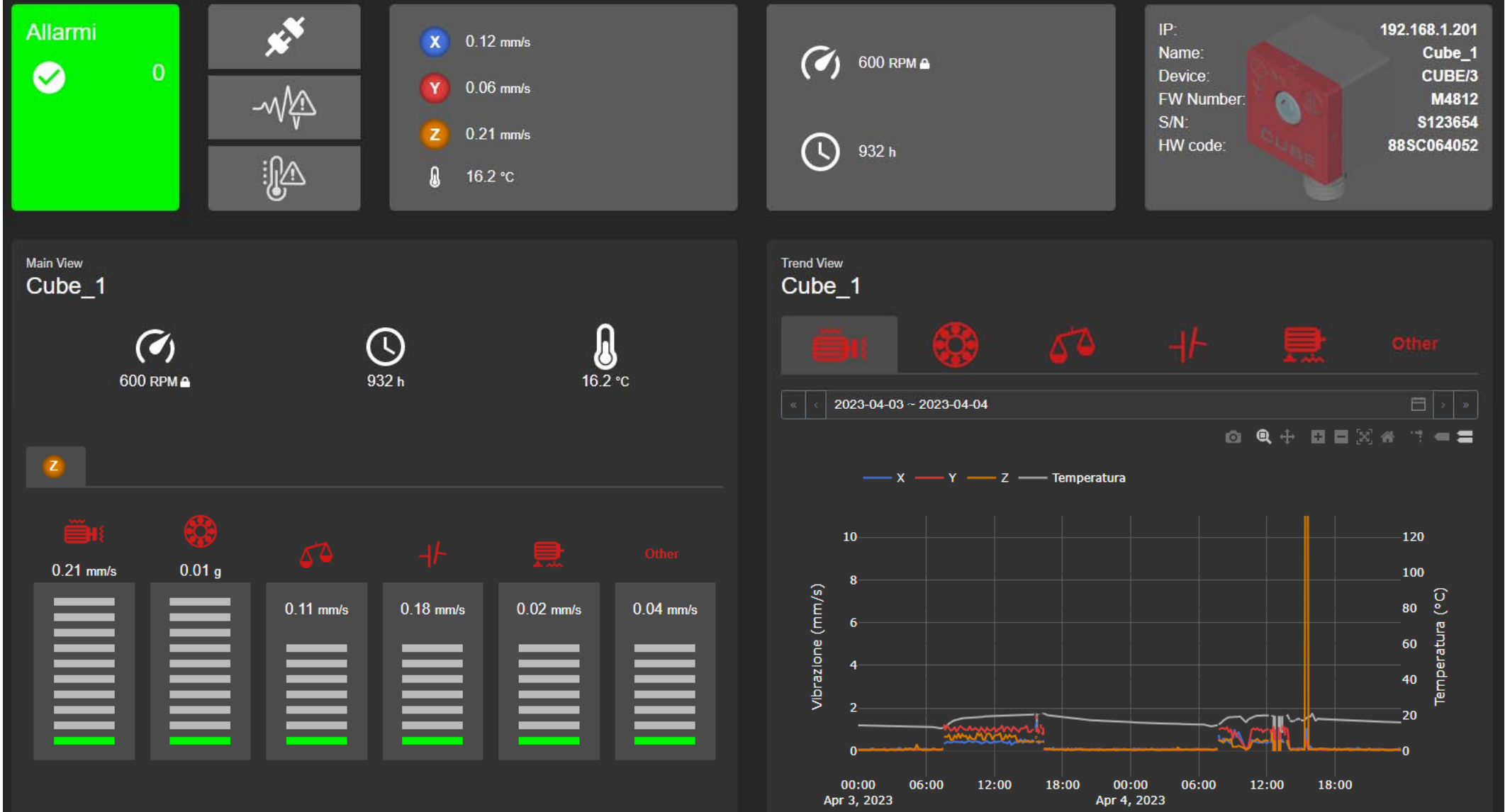


IoT SOLUTION: Condition Monitoring User Interface



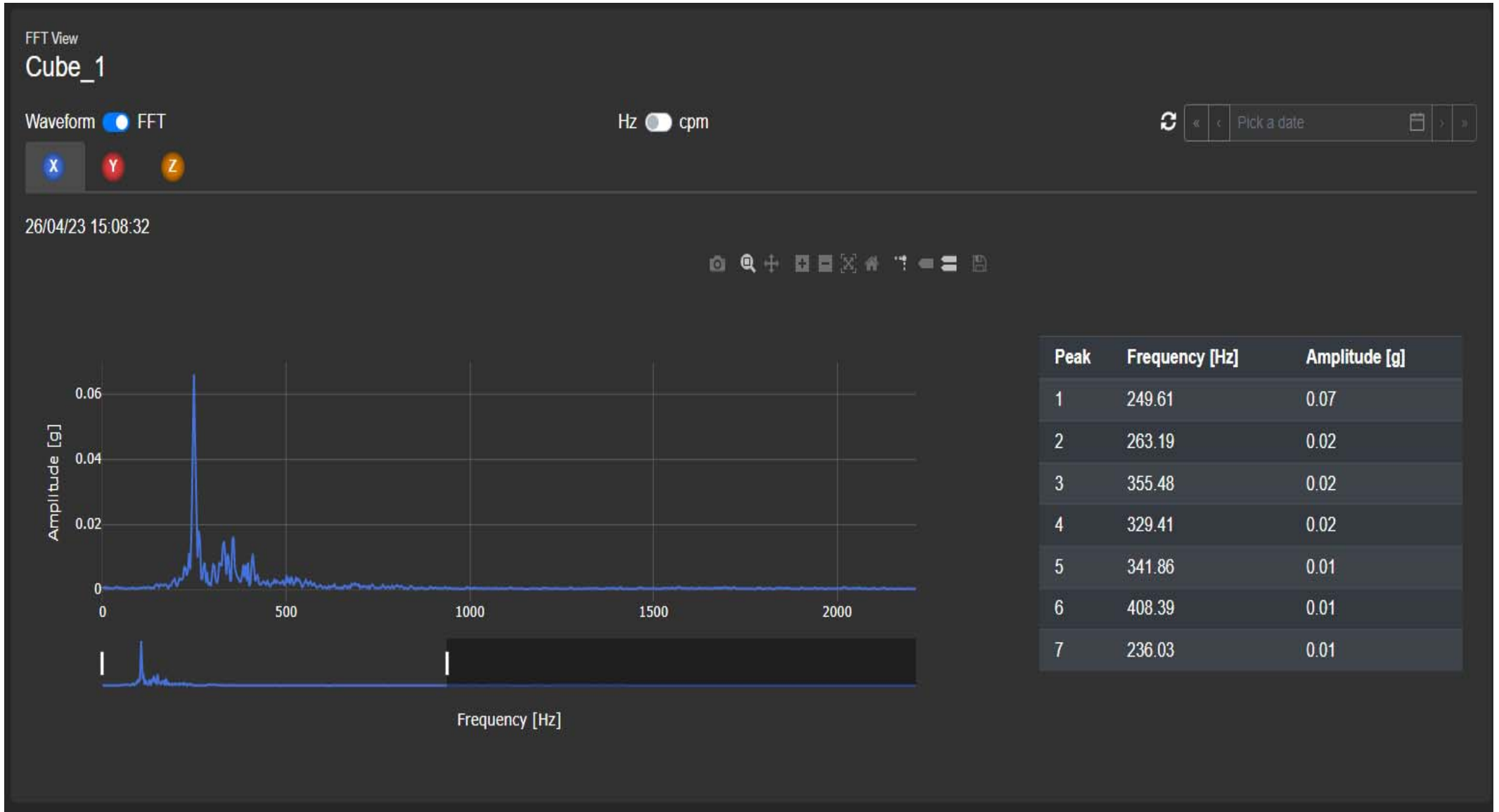


CUBE: Condition Monitor UI - 1





CUBE: Condition Monitor UI - 2





CUBE: Condition Monitor UI - 3

Setting View
Cube_1

Basic **Advanced**

600 RPM

	X	Y	Z
	10.00 mm/s RMS	10.00 mm/s RMS	10.00 mm/s RMS
	5.00 g PkPk	5.00 g PkPk	5.00 g PkPk

Setting View
Cube_1

Basic **Advanced**

Ritardo trip: 3.0 s

Unità forma d'onda: Acceleration

