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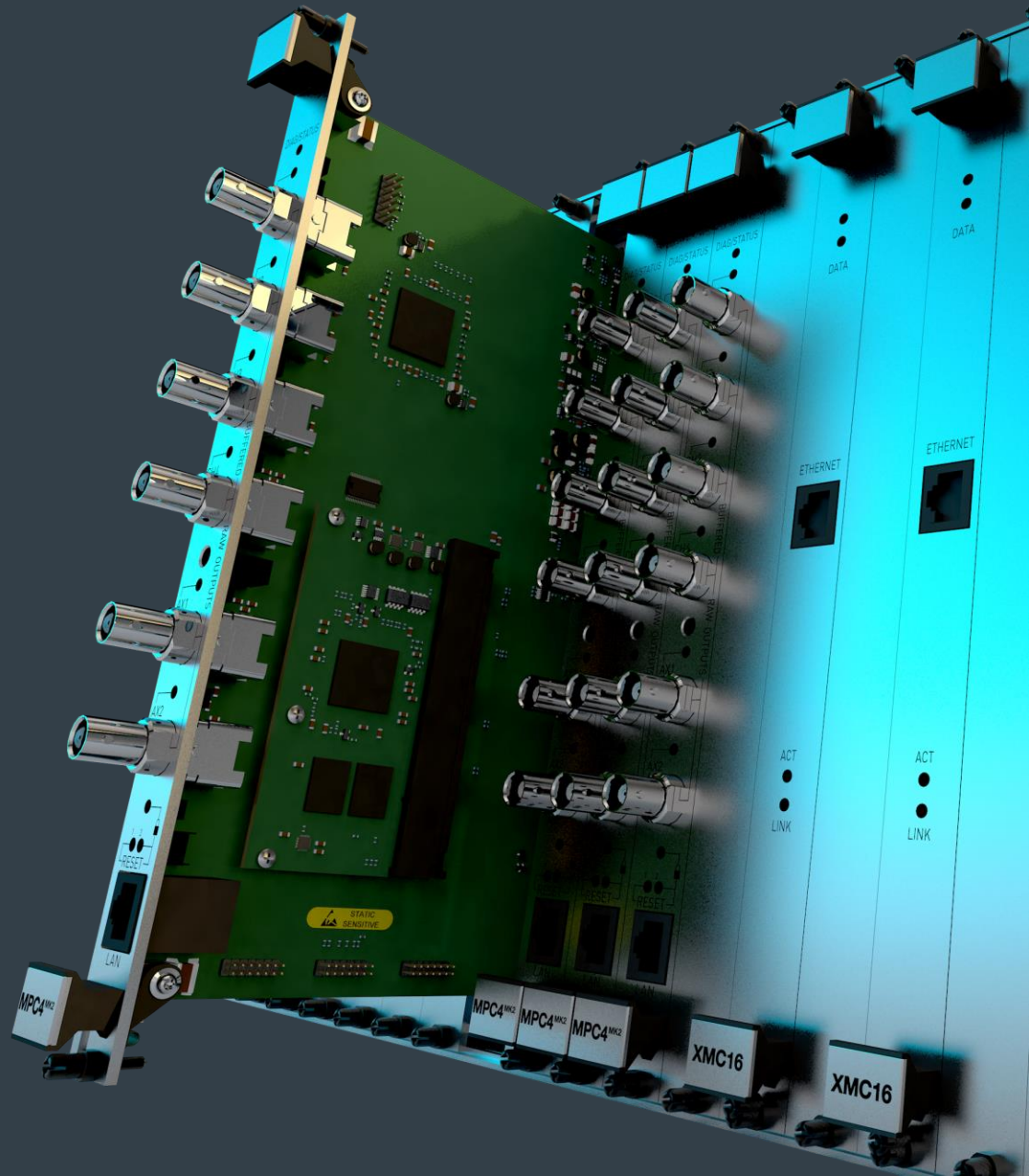
Enabling the Extraordinary
To Fly To Power To Live

vibro-meter

INTRODUCTION TO THE NEW VIBROSIGHT RULEBOX



Product presentation
presented by Alfonso Fernandez,
April 2023

Introduction to the new VibroSight Rulebox

Agenda

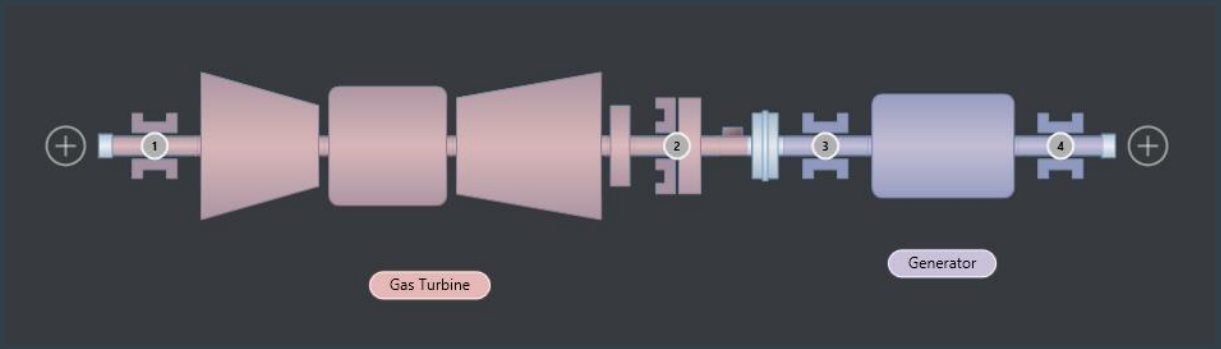
- Introduction
- Typical rules for turbomachinery
- VibroSight Rulebox interface
- Final comments
- Q&A

INTRODUCTION

Introduction

Why the diagnostic rulebox?

- Turbomachines are complex machines with hundreds of measurable parameters
- Challenges
  - Huge amount of data
  - Data usually has a complex nature (multiple parameters must be analyzed to get to conclusion)
  - Limited human resources for data analysis



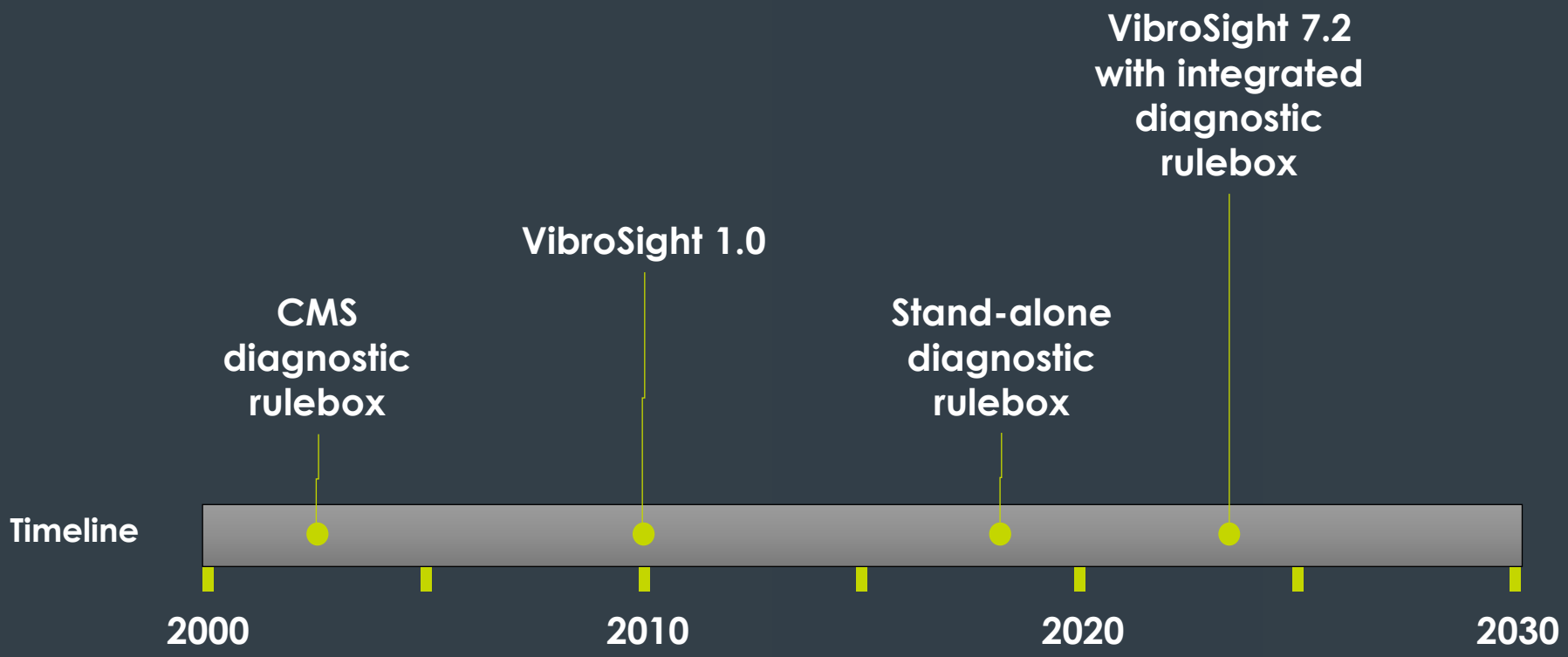
Introduction

Why the diagnostic rulebox?

- Diagnostic Rulebox may help to **find** fault related **signal patterns** in an **automated way**
- Enables **early fault detection**
- **Saves time and effort** related to vibration signal analysis
- Diagnostic rules can be configured with in different levels of complexity

Introduction

Vibro-meter diagnostic rulebox history



TYPICAL RULES FOR TURBOMACHINERY

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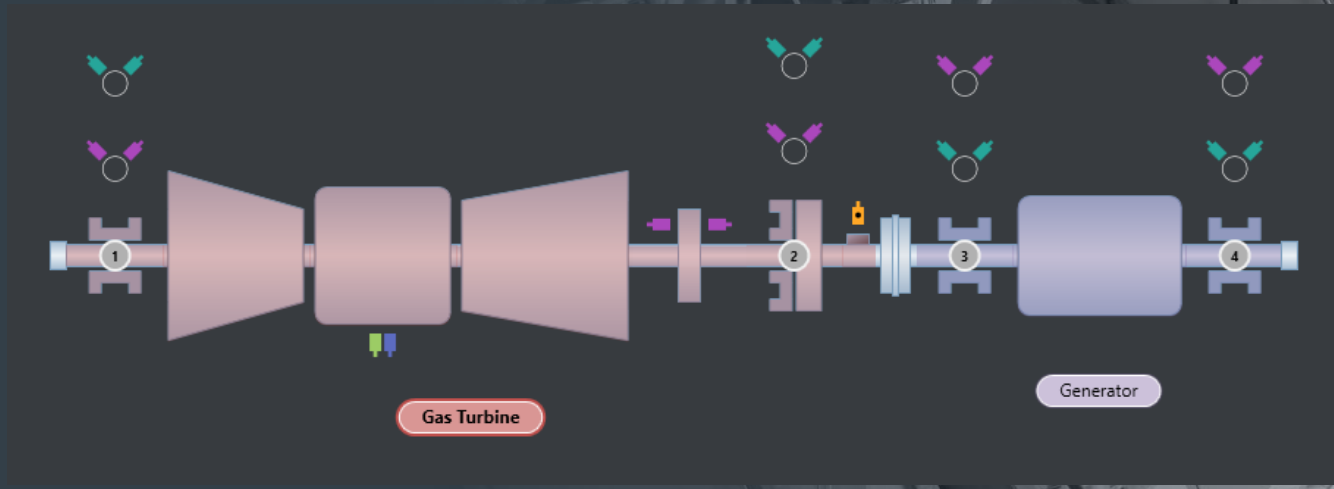
VibroSight diagnostic rulebox

Typical rules for turbomachinery

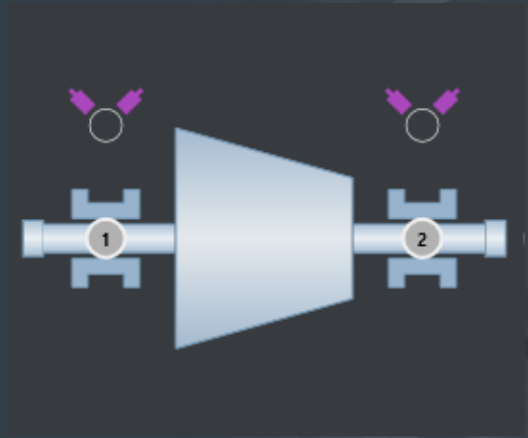
- Imbalance
- Misalignment
- Rub
- Looseness
- Oil whirl
- Steam instability

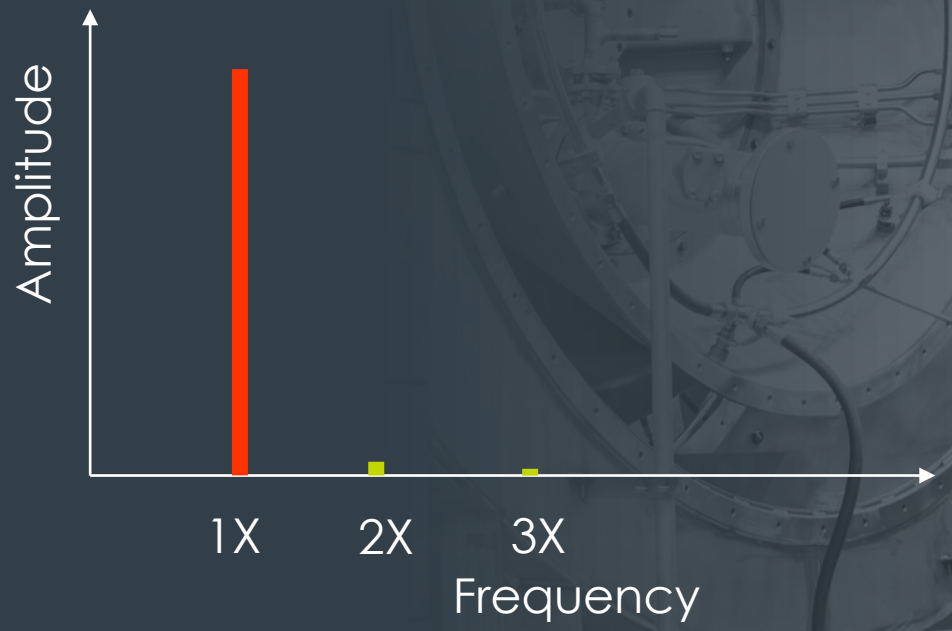


VibroSight diagnostic rulebox

Rotor imbalance

Appears in a rotor as a result of uneven distribution of mass around the shaft rotation axis



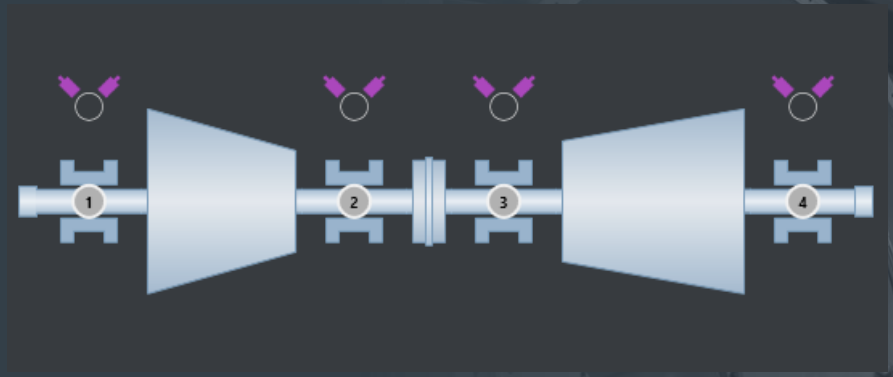


Symptoms

- High 1X amplitude
- 1X dominates the OVR vibration

VibroSight diagnostic rulebox

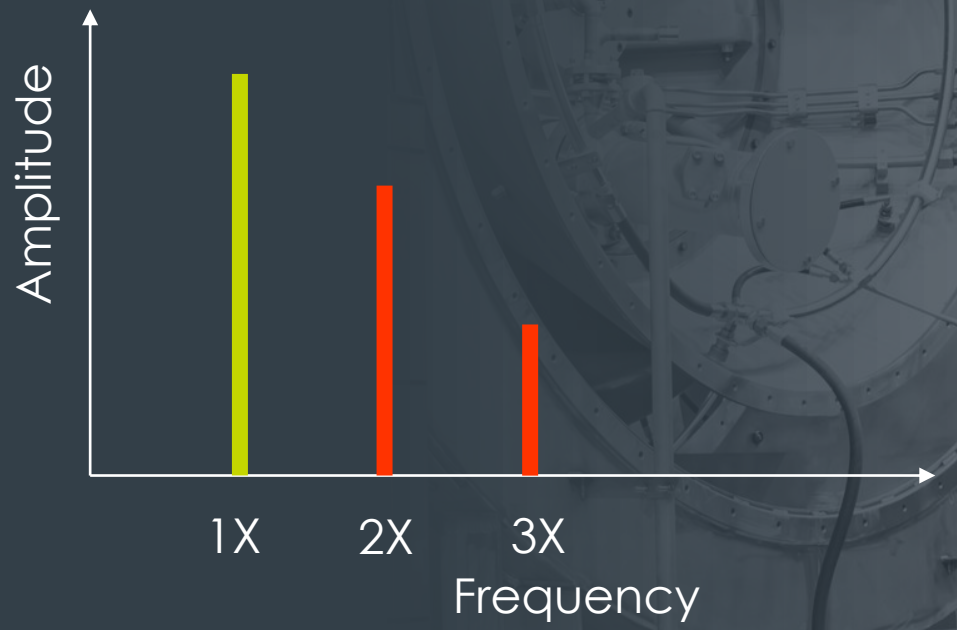
Rotor misalignment



Condition where the shafts of 2 rotors are not properly aligned

Symptoms

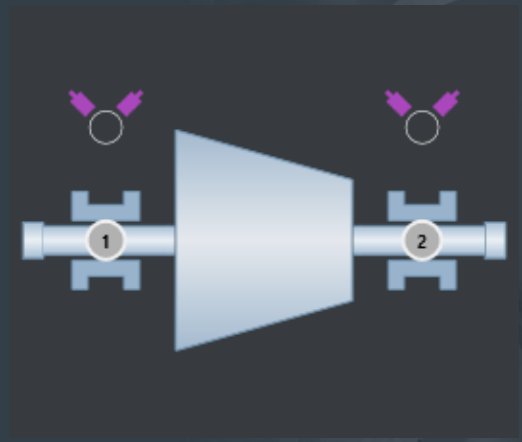
- High 2X or 3X amplitude
- 2X+3X dominates the 1X vibration



VibroSight diagnostic rulebox

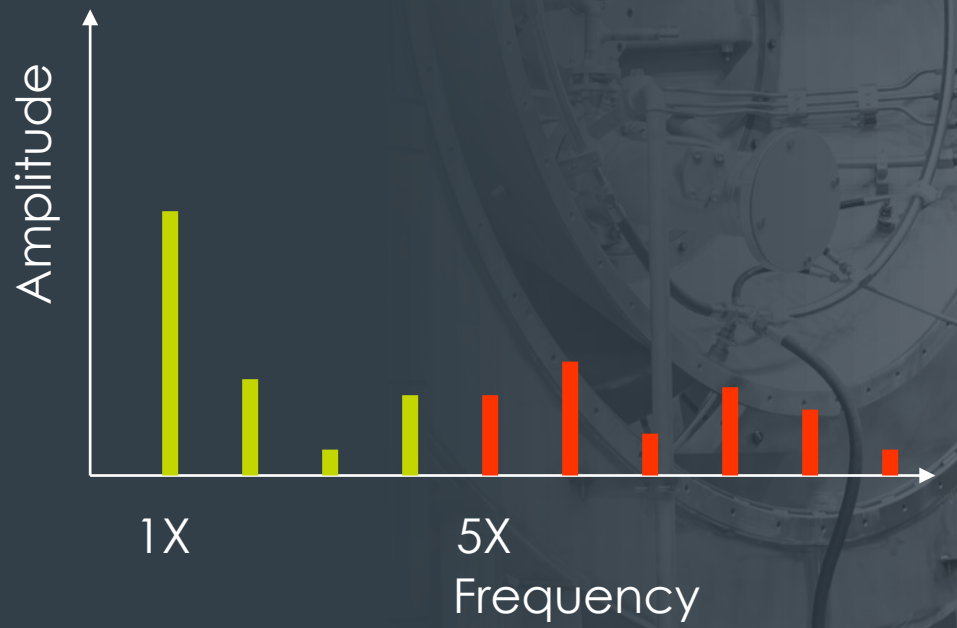
Rotor rub

Occurs when the rotor comes into contact with a stationary component



Symptoms

- The HIGH vibration (from 5X upwards) is high in amplitude
- The HIGH vibration (from 5X upwards) dominates the OVR vibration



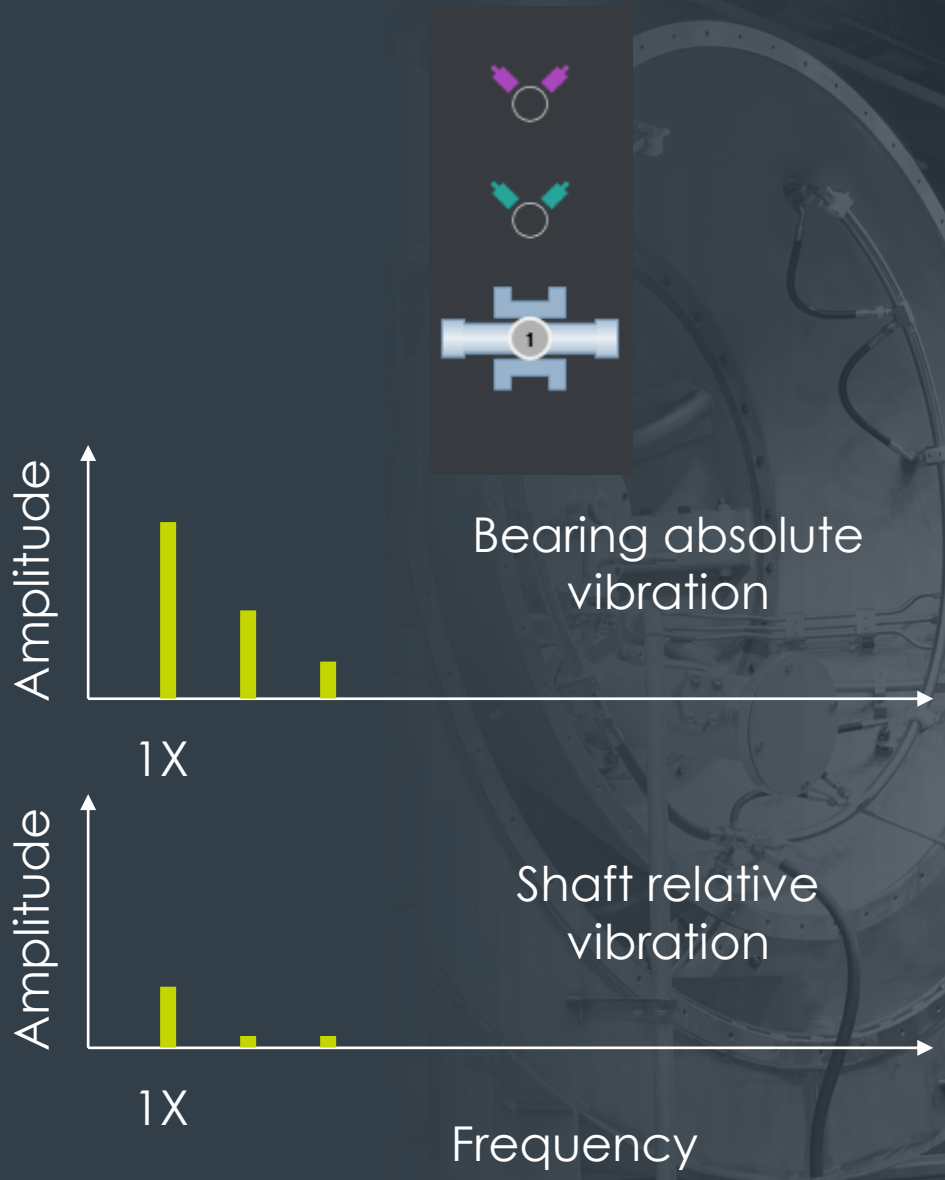
VibroSight diagnostic rulebox

Bearing looseness

Is a state where the bearing is not firmly attached to the machine foundation

Symptoms

- The bearing absolute vibration is higher than the shaft relative vibration?



VibroSight diagnostic rulebox

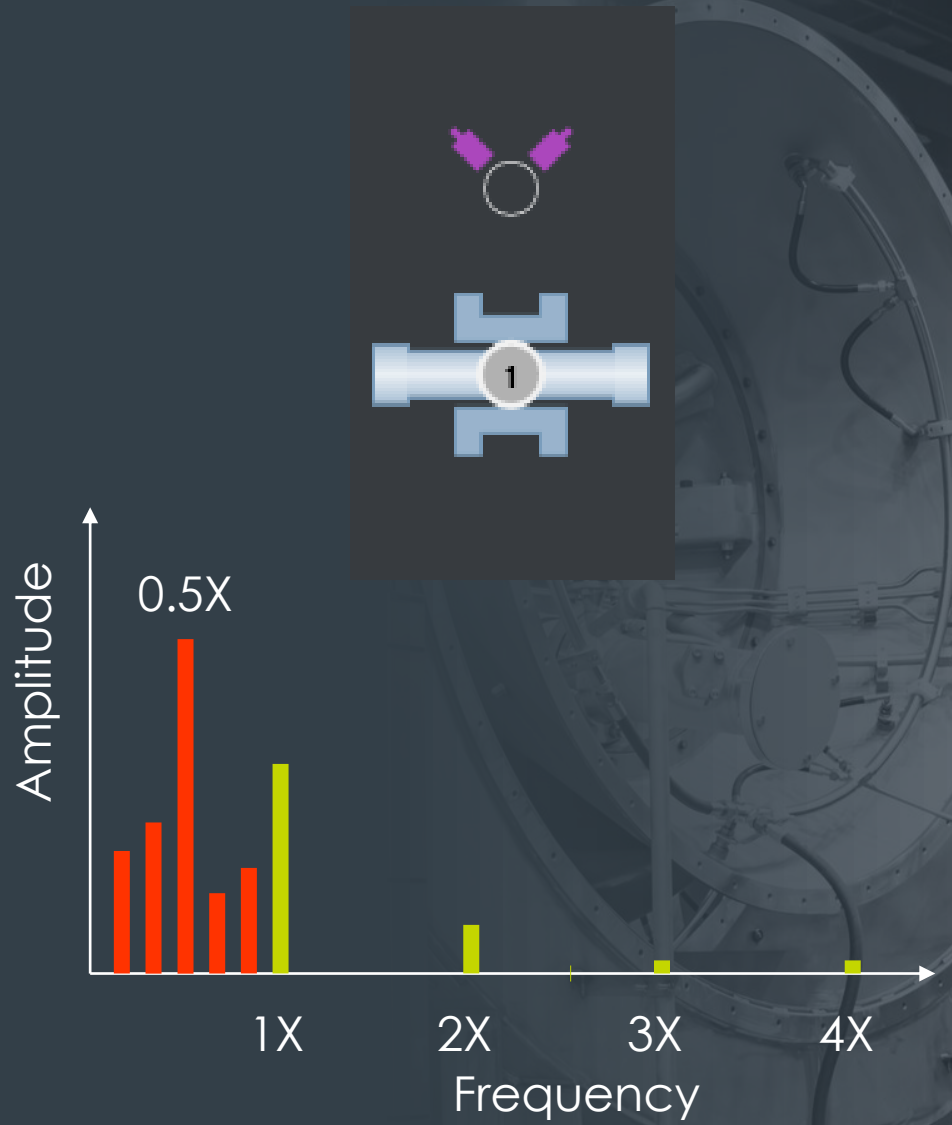
Bearing oil whirl

Type of instability in fluid-film bearings caused by oil film forces

Appears in the turbine as a result of bad bearing design improper setup of shafts and bearings

Symptoms

- High subharmonic vibration
- The subharmonic vibration dominated the overall vibration
- The 0.5X vibration dominates the subharmonic vibration



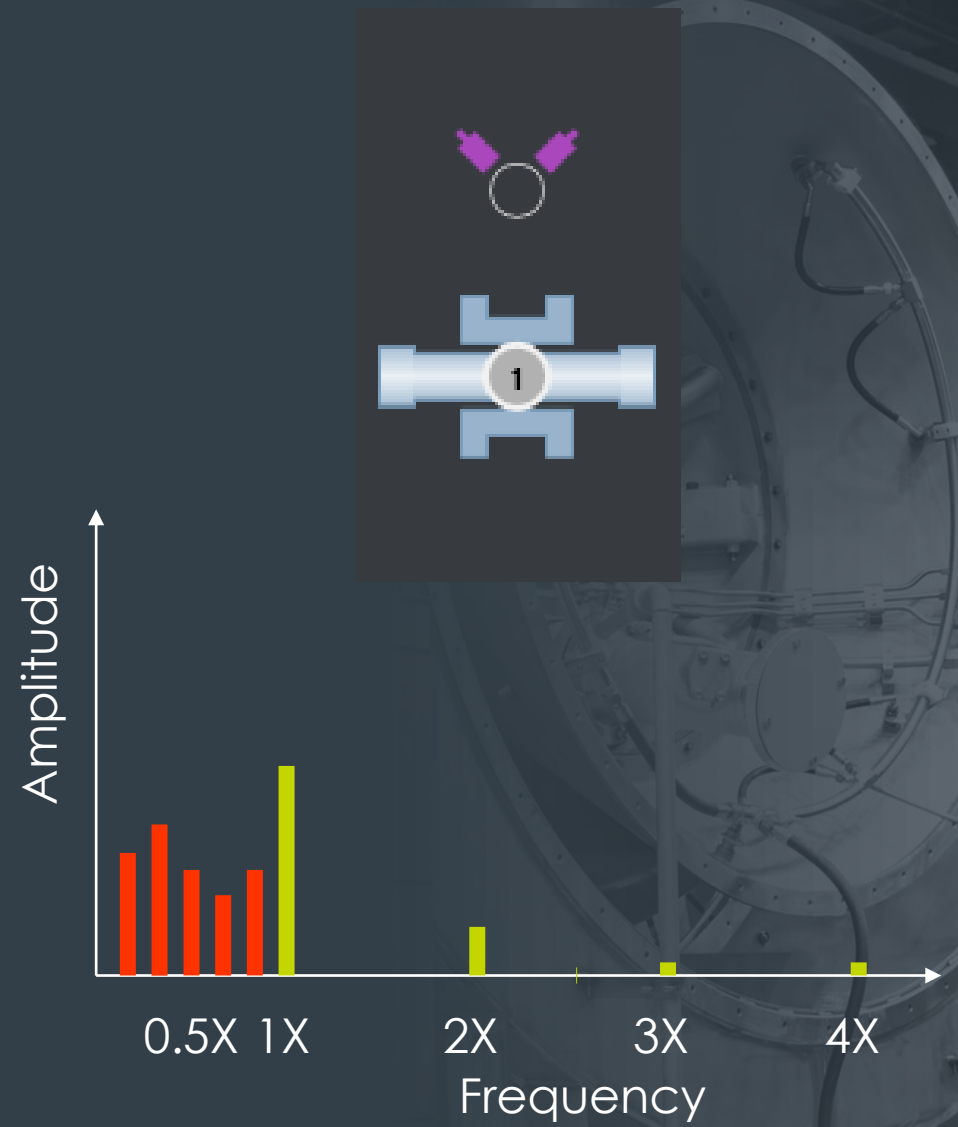
VibroSight diagnostic rulebox

Bearing steam instability

Is a condition in which the fluid forces cause excessive vibration in a steam turbine

Symptoms

- High subharmonic vibration
- The subharmonic vibration dominates the overall vibration
- The 0.5X vibration does not dominate the subharmonic vibration



VibroSight diagnostic rulebox

Typical rules for turbomachinery

Context	Fault	2x prox. probes	2x accels	Inputs	Parameters
Rotor	Imbalance	Yes	No	1X, OVR	1X dominance limit
	Misalignment			1X, 2X, 3X	2X+3X dominance limit
	Rub			OVR, HIGH	HIGH dominance limit
Bearing	Looseness		Yes	Relative OVR, Absolute OVR	Absolute OVR dominance limit
	Oil whirl		No	OVR, 0.5X, SUB	SUB severity limits SUB dominance limit 0.5X dominance limit
	Steam instability				

VIBROSIGHT RULEBOX INTERFACE

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VibroSight Rulebox interface

Overall picture

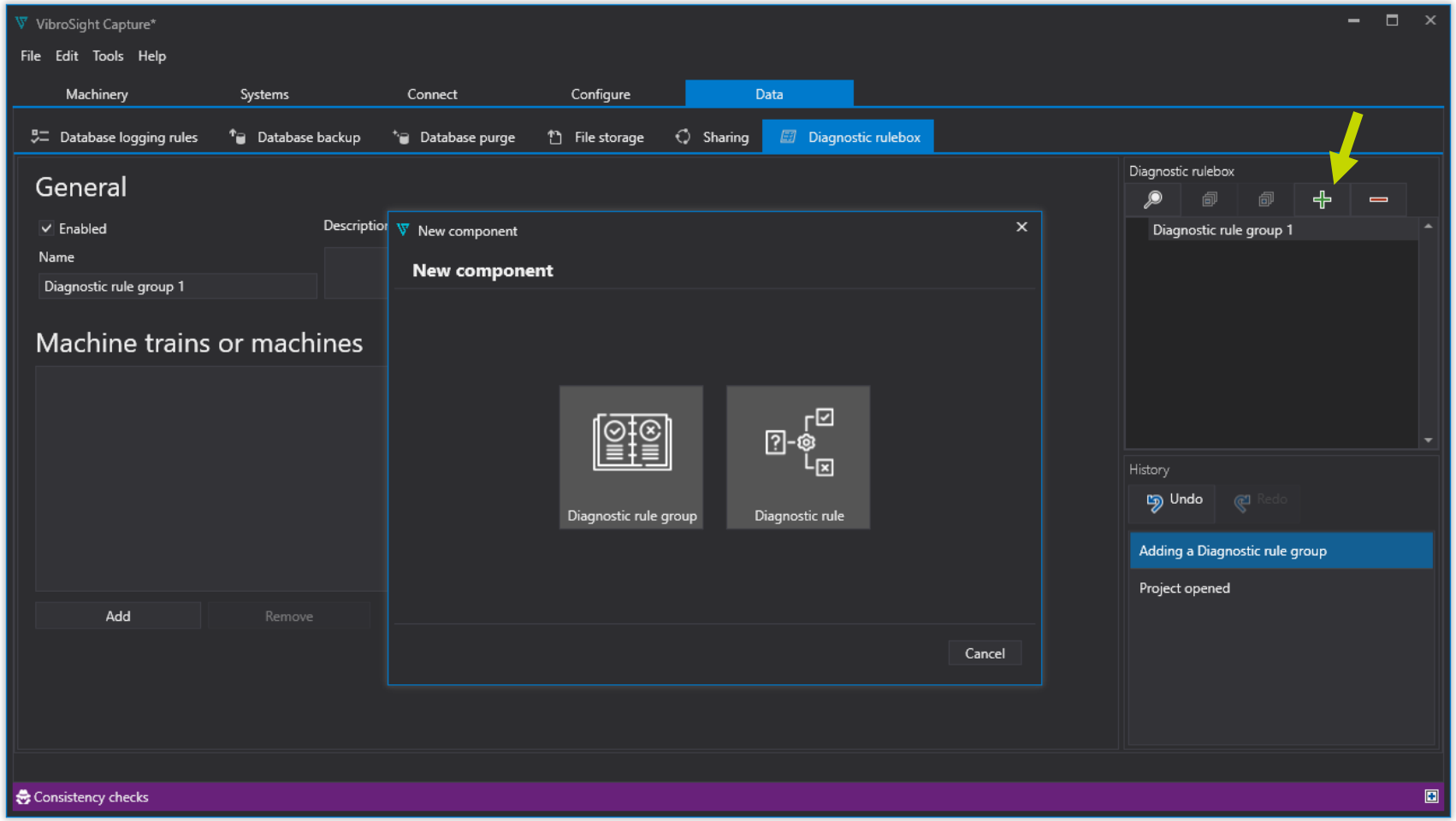
The Rulebox is configured in VibroSight Capture and run within of the VibroSight Server

Rules can use protection and/or condition monitoring data

If the rules use data from VM600 Mk2 systems then their protection configuration must be done via Protect and then imported into Capture

VibroSight Rulebox interface

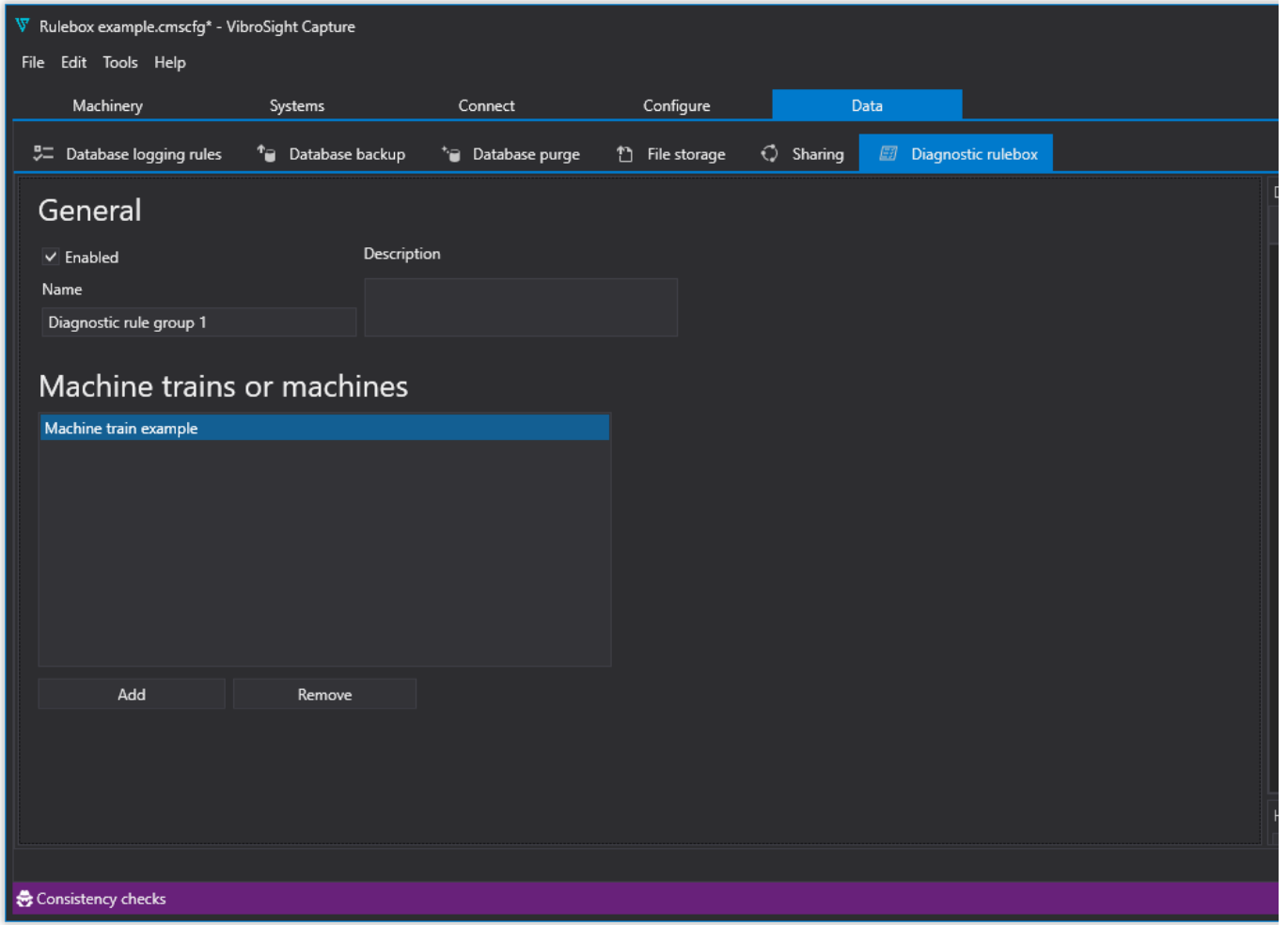
Creation of rules and rule groups



VibroSight Rulebox interface

Rule groups

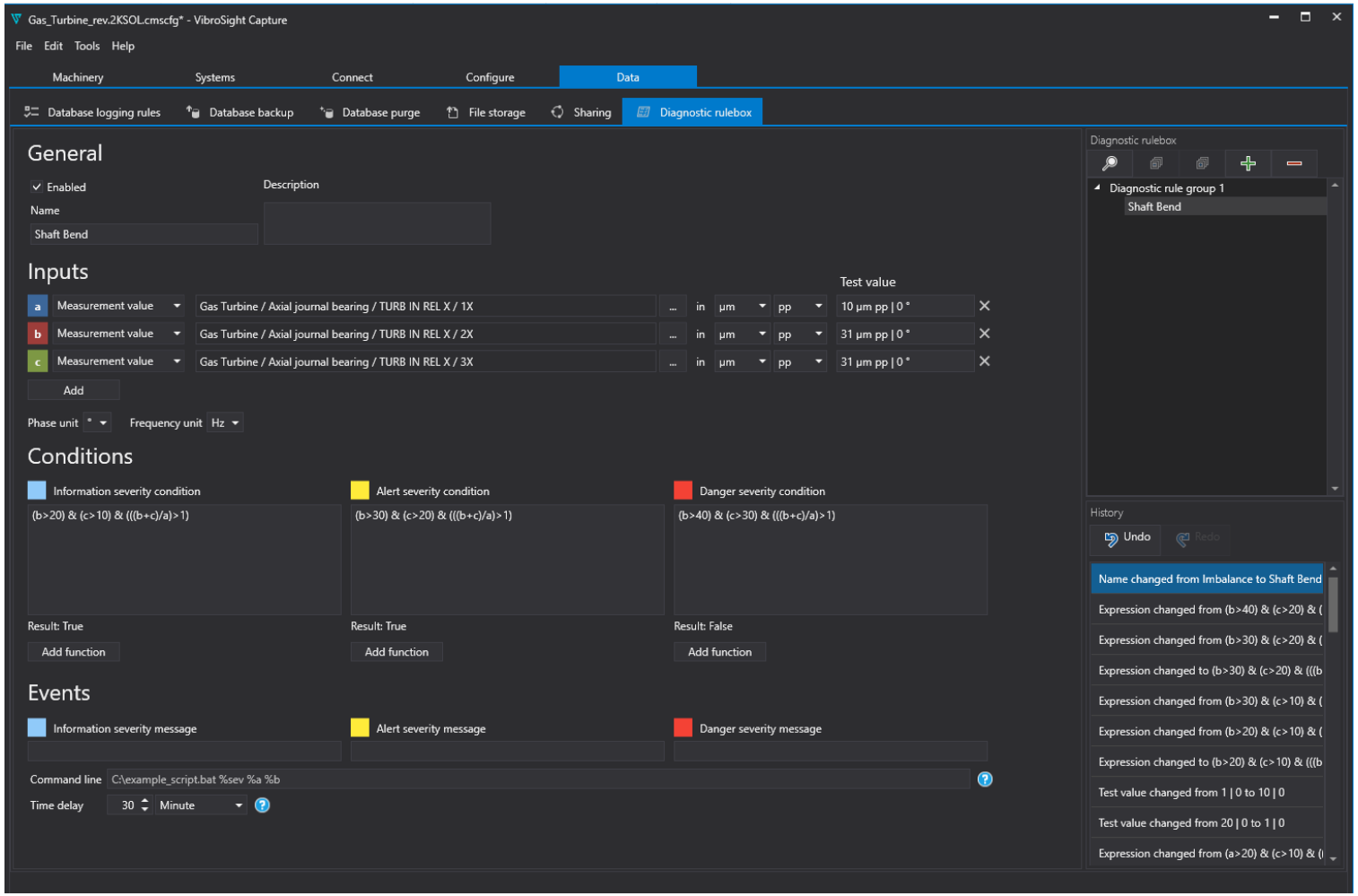
- A rule group contains a set of rules applicable to several machines of the same type with the same instrumentation
- Avoids the need to configure the same rule on each machine of the same type



VibroSight Rulebox interface

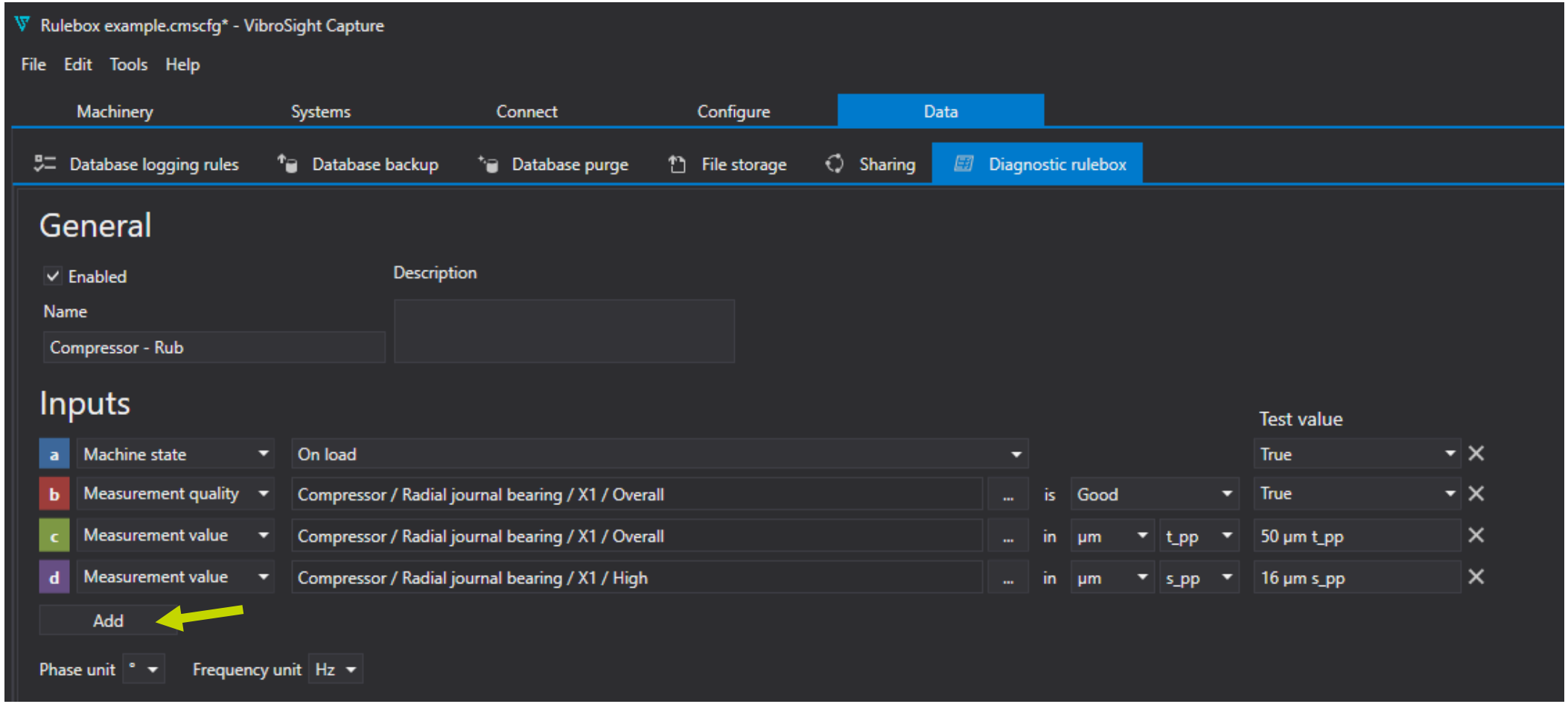
Rule configuration

1. Create the diagnostic rule
2. Define the input variables
3. Set up the logical conditions
4. Set the events parameters



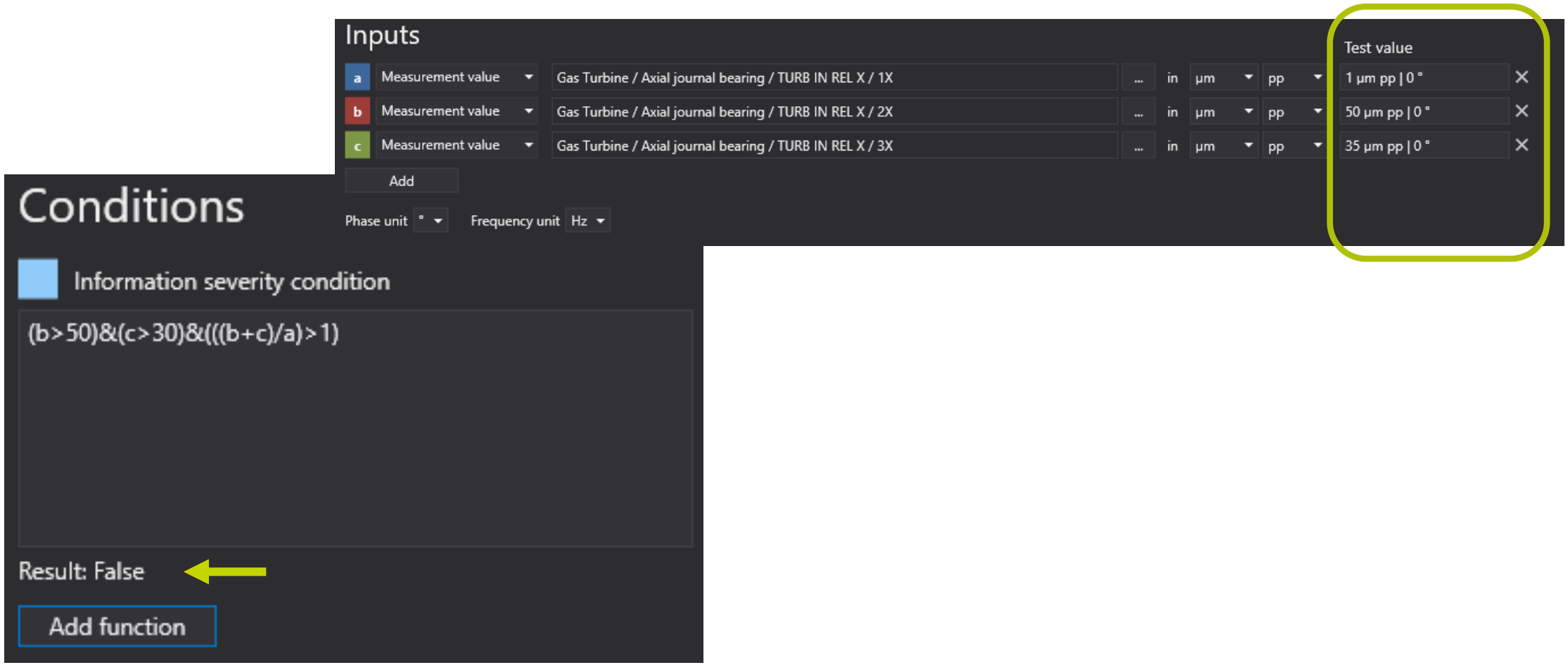
VibroSight Rulebox interface

Rule inputs configuration



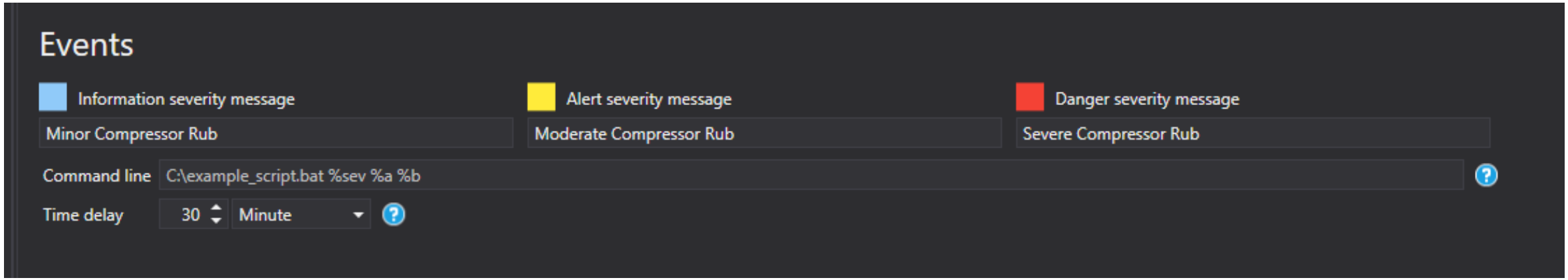
VibroSight Rulebox interface

Rule condition configuration and testing



VibroSight Rulebox interface

Rule events configuration



FINAL COMMENTS

Final comments

VibroSight diagnostic rulebox

- A new generation of Diagnostic Rulebox is now an integral part of the VibroSight software.
- The Rulebox enables an early detection of fault signal patterns in an automated way.
- There are 6 rule templates available to help you to set up and configure the new Rulebox.
- The VibroSight Diagnostic Rulebox price remains unchanged.
- There is a new optional code E in the VibroSight software PNR to order the new Rulebox.

THANK YOU

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