CEMB

BALANCING MACHINES

Instrumentation Division

TDSP vibration monitoring system

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TDSP SYSTEM

The instrumentation for monitoring vibrations and diagnostics of machinery using the TDSP system is based on CEMB's many years experience in the field of vibro-technics and the diagnosis of rotating machinery.

Thousands of CEMB systems have been installed to protect steam / gas / hydraulic turbines, pumps, compressors and fans.

In addition to all the principal functions required for monitoring, the TDSP system is designed with particular care to the operator interface, in order to simplify all the operations necessary for managing the equipment correctly.

The new TDSP system is designed using modern DSP based architecture to meet the demands for maximum flexibility and modularity, providing a high performance solution to a wide range of needs. The TDSP system can be used either for protecting a single machine that calls for just a few measuring points, monitoring, acquiring and storing typical data for intelligent supervision or as a sophisticated diagnostic system used for machinery in a complete plant.

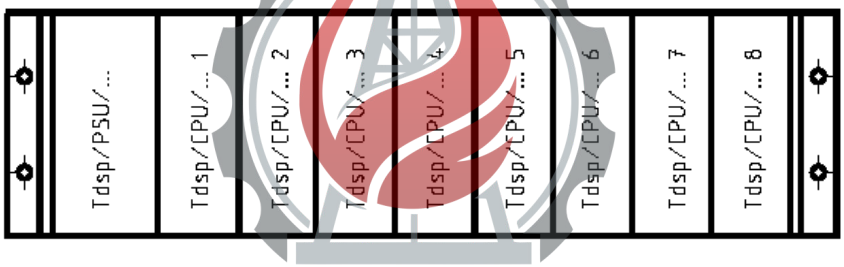
The system is based on the TDSP processing module, which is dual-channel and can operate on a stand-alone basis. Its terminal board makes it possible to connect to measuring transducers with analogue and digital inputs/outputs. The ethernet port on the front is used for configuring the board and makes it possible to connect to a dedicated PC that can be used for presenting data and for connecting to external diagnostic systems and/or DCS.

1. Basic structure of the TDSP system

The basic composition is the most simple in the system and is normally used for controlling a relatively low number (6-10) of measuring points spread over one or more machines.

This solution guarantees the basic protection functions:
- Acquisition of sensor signals (accelerometers, velocity sensors and proximity probes)
- Availability of an analogue signal (0 – 10 V or 4 – 20 mA) proportional to the magnitude measured
- Availability of alarm contacts when prepoints are exceeded

Depending on the number of channels, the instrumentation's structure comprises:
- A standard 19" rack
- Power supply (possibly redundant)
- Up to 8 TDSP modules



Software for setting all the operating parameters for the processing module simplifies this operation and makes it possible to save all the settings selected in a PC.

2. Intermediate structure

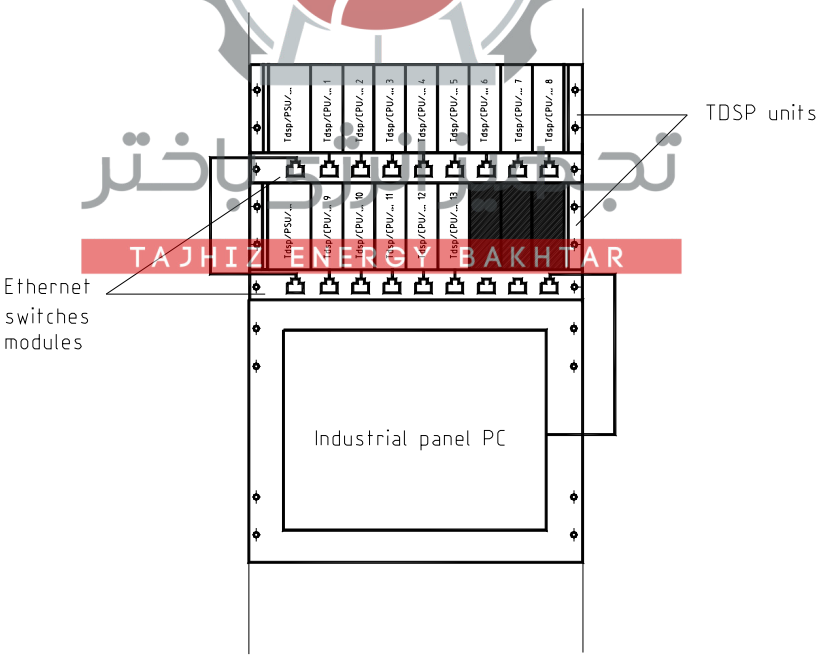
This solution extends the basic composition by using the ethernet link to interface all the TDSP modules with an industrial PC for acquiring, displaying and saving data.

The composition for the basic structure has the following devices added:
- 1 switch for the ethernet connection of the various modules to the PC
- 1 industrial PC with suitable characteristics

This configuration is combined with a specific software package for managing and presenting data in online mode and can display:
- ⇒ The values for the various magnitudes
- ⇒ The measurement trend
- ⇒ The status of the various measurements
- ⇒ Alarm indication

Measurement information is made available in real-time for third party applications as well, using an OPC Server/Client type interface.

Where required, a further software package can be supplied for saving data (in a database or for subsequent analysis).

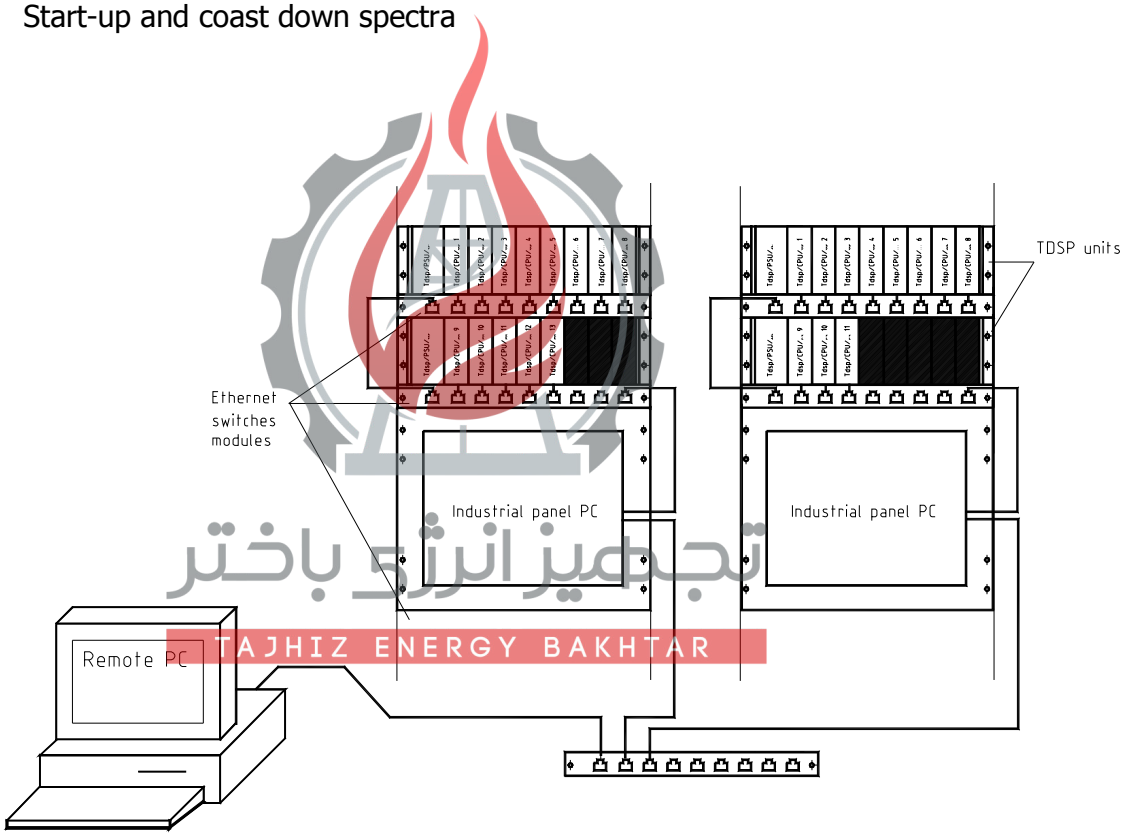


3. Complete structure

The industrial PC for the intermediate configuration can be inserted in the end user area network (LAN).

All the historical data acquired can be accessed using specific software for the purposes of advanced analysis and diagnosis of the machinery.
This dedicated software is able to display:

- ⇒ Vibration spectrum
- ⇒ Wave form
- ⇒ Orbit
- ⇒ Spectral bands
- ⇒ Start-up and coast down spectra



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TDSP power supply module

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PSU TDSP power supply module

Description

The PSU TDSP power supply module is able to provide power to all modules fitted on a TDSP rack in order to guarantee correct operations safely and reliably.
In addition to converting the DC or AC voltage into the DC, stabilised voltage required for correct functioning of the various TDSP modules, the power supply module is fitted with 3 independent phase reference detection channels.

Characteristics / applications

The PSU TDSP power supply module is designed to be fitted on a standard 19" rack and is set up to allow for multiple use for applications that call for redundancy to guarantee more reliable working of the protection system. The correctness of the incoming and outgoing supplies is indicated by 4 LEDs on the panel and 2 relays.

Specifications

Electrical

- Inputs : 90 ÷ 264 VAC 50/60 HZ
  : 19 ÷ 32 VDC
  : 85 ÷ 140 VDC
  : 120 ÷ 370 VDC
- Power 100 W
- Output 24 VDC, 4A
- N° 3 phase reference channels
- N° 3 phase signal BNCs
- The entire TDSP unit conforms to the (EN 61010-1) electrical safety and (EN 61326-1) EMC standards
- Connection as shown in dwg 94875-P2 attached

Ambient conditions

- Temperature range 0 °C to + 70 °C
- Humidity 95% non condensing

Mechanical conditions

- Dimensions as per DIN 41494 (12TE, 3HE, P220)
- Weight 400 g

Order information

PSU TDSP/ **A** / **B** / **C**

A ***Power supply***

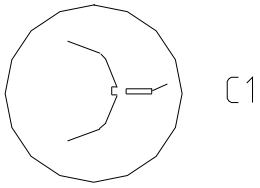
- A1 90 ÷ 264 VAC 50/60 HZ
- A2 19 ÷ 32 VDC
- A3 85 ÷ 140 VDC
- A4 120 ÷ 370 VDC

B ***Type of tachometric sensor***

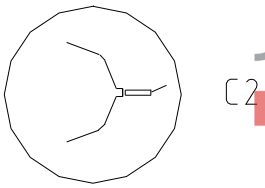
- B1 no-contact T-NC/API
- B2 no-contact T-NC/S
- B3 Hall effect T6-H
- B4 Electromagnetic T6-R

C ***Type of tachometric sensor mechanical reference***

- C1 hollow



- C2 sensor

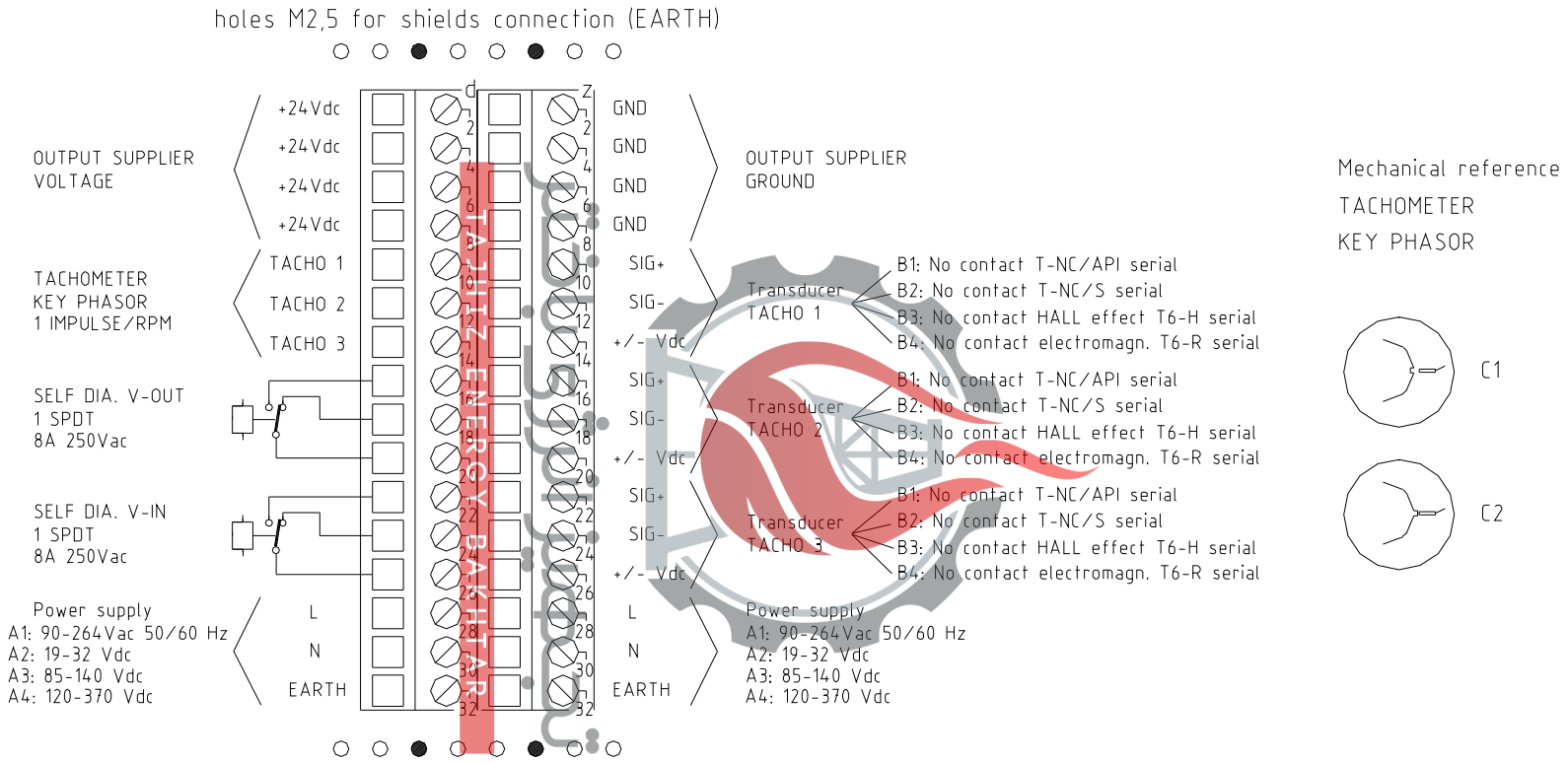


Order example

PSU TDSP/A3/B1/C1

Power supply with input voltage of 85 – 140 VDC, T-NC8/API type tachometric sensor, hollow phase reference

UTS 110826



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a	Agg.alim.A4	26/08/11	Passoni	Normativa:					Disegno: 94875-P2 — Foglio N — N Fg.
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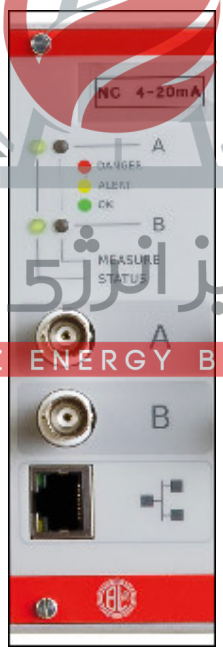
TDSP processing module



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TDSP processing module

Description

The TDSP processing module is equipped with a modern, high-performance digital processor. This guarantees great reliability as it is able to operate fully autonomously, running a series of functions simultaneously.

- Suitably conditioning and acquiring the signal from two measuring transducers for continuous monitoring of mechanical parameters
- Converting these signals into digital format and processing them adequately using a powerful DSP
- Measuring vibrations – differential and absolute expansion – axial displacement – eccentricity – rotor speed
- Checking exceeding of preset thresholds
- Suitably driving a series of relays in order to be able to protect rotating machines in the best manner
- Making available two analogic outputs proportional to the magnitudes measured
- Providing information on the status and level of measurement by means of multi-colour LEDs on the front panel

The dual channel TDSP module can transfer data to a dedicated PC via a 100 Mbps ethernet link that guarantees the proper transfer speed for the system's needs.
By means of the dedicated PC the data can be made available to an external DCS or used by adequate display, saving and post-analysis programs.

The TDSP processing module is specifically designed to form the basis of a modular system that is able to cover the most different needs:

- From just a few measuring points to an entire plant
- From a protection function to in-depth advanced diagnostic analysis of any rotating machine

The processing module's basic functions include:

- Protection against short-circuits on inputs and outputs
- Self-diagnosis function for anomalous conditions (board faults, sensor malfunctions, no phase reference)
- Conditioning and acquisition of a signal from two transducers (accelerometers, velocimeters and proximity sensors)
- Sampling and digital conversion of signals
- LED measurement status indication
- LED indication when preset thresholds are exceeded
- N° 2 analogic outputs 0 – 10 V or 4 – 20 mA opto-insulated
- N° 4 digital Bypass and Trip-Multiplier inputs
- N° 6 fully configurable relays with NO and NC contacts
- Replica of inputs on the front BNCs
- Possibility of hot insertion and extraction (hot-plug / hot-swap) without disconnecting the power supply to the box and without interfering with the other boards

Characteristics / applications

The main characteristics of the TDSP processing module are that it guarantees maximum flexibility, speed and calculating power, keeping up the high degree of reliability required by the protection function.

The processing module's structure makes it able to work autonomously as a stand alone board, without requiring any further external components. This characteristic, together with the whole range of functionality provided, means that it can be used for monitoring just one or two measuring points as well.

The TDSP processing module can be used for continuously monitoring vibrations on the widest range machines like fans, pumps, motors, compressors, steam / gas / hydraulic turbines.

تجهیز انرژی باختر

TAJHIZ ENERGY BAKHTAR

Specifications

Electrical

- 2 sensor inputs (including power supply where applicable)
- 1 phase reference input
- 2 analogic outputs 0 – 10 V or 4 – 20 mA insulated
- 2 digital inputs per channel (bypass and trip multiplier)
- 6 relays with SPDT contacts
- 2 BNC connectors for analysis with external instruments
- 1 x 100 Mbps ethernet port
- 4 multi-colour LEDs
- Power supply 24 Vdc / 400 mA max
- The entire TDSP unit conforms to the (EN 61010-1) electrical safety and (EN 61326-1) EMC standards
- Connections as shown in dwg 91995

Ambient conditions

- Temperature range 0 °C to + 70 °C
- Humidity 95% non condensing

Mechanical conditions

- Dimensions as per DIN 41494 (9TE, 3HE, P220)
- Weight 250 g

Order information

TDSP/ **A** / **B** / **C**

A ***Type of measurement***

- A1 vibrations
- A2 differential expansion
  absolute expansion
  axial displacement
  valve position
- A4 eccentricity
- A5 velocity
  zero speed
  reverse rotation
  key phasor
- A9 temperature
  pression
  flow
  generic processing variable

B ***Type of sensor***

- B1 Electrodynamic velocimeter
- B2 IEPE (accelerometer / velocimeter) sensors
- B3 Proximity sensor (T-NC/API)
- B4 Electromagnetic sensor (T6-R)
- B5 Hall effect sensor (T6-H)
- B6 General 4 – 20 mA
- B7 General 0 – 10 V

C ***Type of output***

- C1 4 – 20 mA
- C2 0 - 10 Vdc

Order example

TDSP/A1/B3/C1

Module for detecting vibration with a proximity sensor, 4 – 20 mA output.