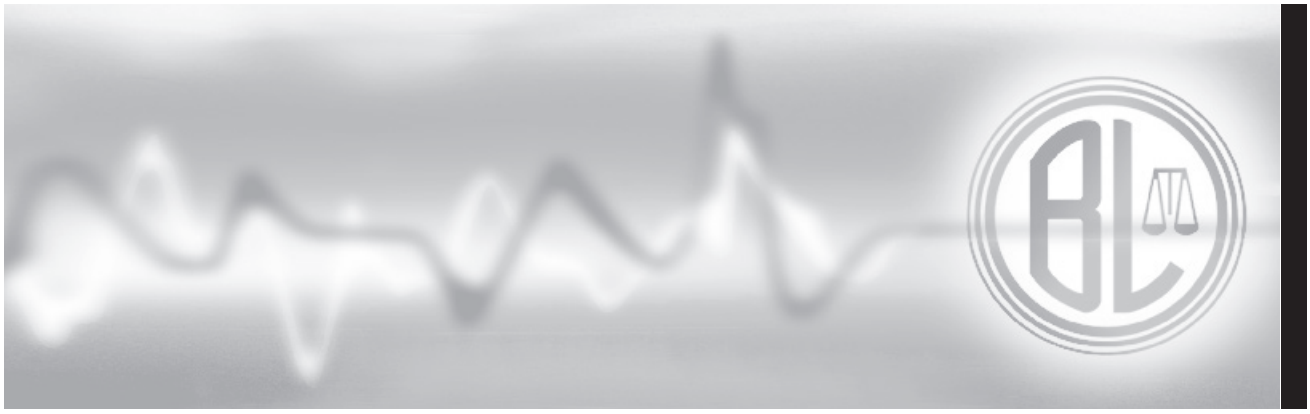
Vibration equipment division

TDSP MONITORING SYSTEM



CEMB
BALANCING MACHINES

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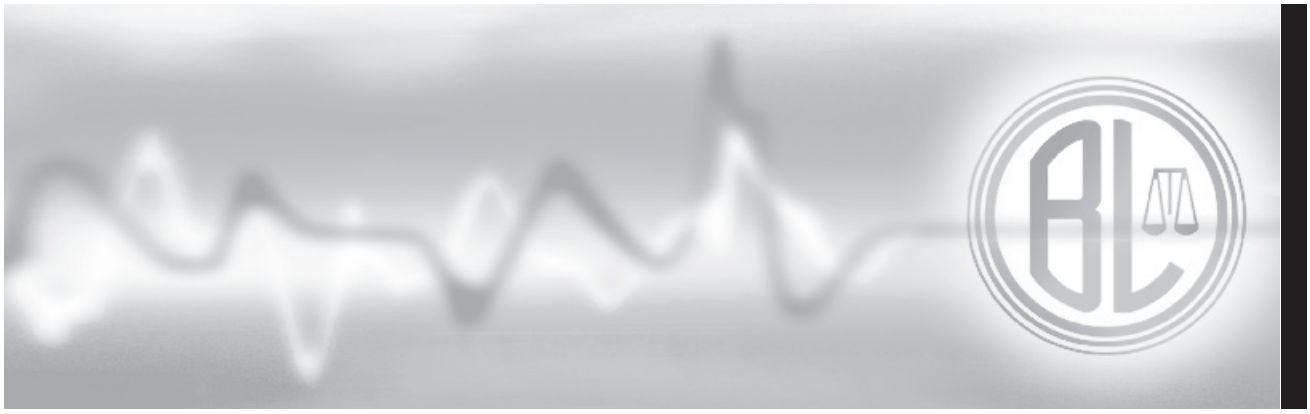
Vibration equipment division

INSTALLATION MANUAL



CEMB
BALANCING MACHINES

1. INTRODUCTION

The control system (consisting of a transducer installed in the field, a signal processing board and possibly an analogue signal acquisition system) is a low voltage circuit which can coexist with the power and drive circuit of the machine.
For this reason, the following installation rules need to be observed in order to prevent disturbance of and interference with the signals.

1.1 GENERAL RECOMMENDATIONS

ALL the system connections MUST be made on the terminal boards or the connectors provided on each device following the instructions indicated in the relative paragraph and/or diagram.

Use cables resistant to the agents in the workplace (oils, corrosive acids, temperature, etc.).

Where indicated, a shielded cable MUST be used and the shield must be connected to the frame ground (GND) at only one of the two cable ends (instrument side advisable).

It is advisable to protect the cables with a metal sheath in the sections outside the protection ducts in order to prevent mechanical damage to the connection.

1.2 ELECTRIC CABINET RECOMMENDATIONS

- The system should have a dedicated cabinet for the power devices and a dedicated cabinet for the control devices.
- If sharing the same cabinet, it is recommended to use a shielding wall connected to ground because of the strong radiation emitted by the power devices.
- If an inverter is installed, it is advisable to use disturbance suppression filters or a separate power circuit dedicated only to the control devices.

1.3 EXTERNAL ELECTRIC CABINET WIRING

- The power and control cables must be laid in separate cable ducts at least 15 cm apart.
- If using common ducts, fit metal separating walls connected to ground.
- Should the power and control cables need to run through common points, they must be perpendicular to each other at the point where they cross.
- All the connections must be as short as possible, as the floating lines function as active and passive antennas.
- If using a cable with a larger number of conductors than necessary, all the unused conductors must be connected to ground together with the shield.

1.4 ELECTRIC CABINET GROUNDING

- In order to prevent disturbances, a system should have a dedicated ground cable for the power and a dedicated ground cable for the control and they should come together only upstream of the ground stake. Otherwise, slight leakage to ground of a power device might shift the zero reference of the control device.
- The ground cable must have an as large as possible cross-section (minimum 4 mm²) in order to ensure low impedance.
- All the device ground references (boards, acquisition system, cable shields) must refer to a single ground point.

1.5 POWER SUPPLY

The power supply must be stable and free of disturbances. It is preferable to have a power supply dedicated only to the control devices in order to prevent:

- Disturbances resulting from too long cables
- Fluctuations due to other loads on the same line
- Disturbances deriving from other devices with power supply in common.

Power supply fluctuations imply fluctuations of the zero volt reference and, consequently, of the analogue signal processed by the board.

1.6 Transducer connection

The connections must be made on the movable connector or on the terminal board provided on each device following the instructions indicated in the relative paragraph and/or diagrams.
The connection must be made using a shielded cable with the number of conductors indicated on the wiring diagram; for connection of the shields, refer to the dedicated paragraph below. The conductor cross-section must be proportional to the cable length.
The conductor cross-sections must approximately meet the following criterion:

- 1 mm² for lengths up to 100m.
- 1.5 mm² for lengths from 100 to 500m.
- 2.5 mm² for lengths from 500 to 800m.

WARNING

The CEMB transducers installed in the field are constructed with environmental protection according to EN 60529/10.91. In order to maintain the degree of protection of the transducer, check that the outer casing of the transducer and the component parts of the connector have not been altered during fitting and connection.

1.7 TDSP device connection

The connections must be made on the Mnn terminal board of each CPU or PSU board following the instructions indicated in the relative paragraph and/or diagrams.
Where indicated, the connection must be made using a shielded cable with the number of conductors indicated on the wiring diagram; for the conductor cross-section, the same as said for the transducers is valid. For connection of the shields, refer to the dedicated paragraph below.
In order to identify the Mnn terminal boards (on the rear of the TDSP device) and the terminals, refer to the attached wiring diagram relative to each terminal board and follow the instructions indicated in this section.

For the analogue outputs: should the inputs of the acquisition system downstream of the TDSP device not be connected to ground, the TDSP output signal cables marked –SIG must be connected to a ground reference on the acquisition system side.

The ground connection of each drawer of the device must be made as described above using the special bolt provided in the rear lower part of the 19” rack drawer; the transducer and utility cable shields, where applicable, must be connected to the M2.5 threaded holes of the rear cross-pieces of the drawer (as indicated in the attached wiring diagrams).

1.8 Cable shielding

As already mentioned, a shielded cable must be used for the device connections (in particular those of the transducers in the field and of the analogue outputs) connecting the shield on only one side of the cable.

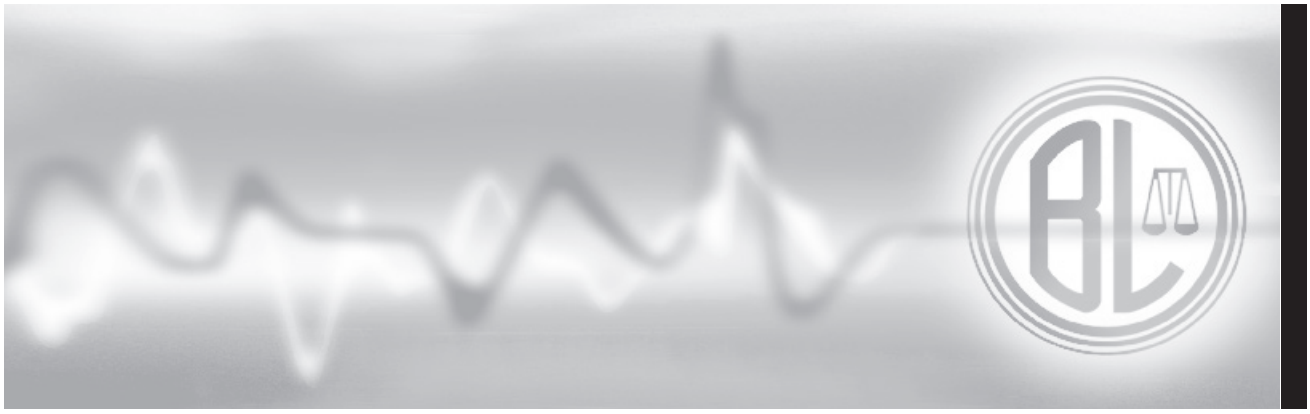
WARNING

It is recommended to work on the device side to ensure equipotentiality between the cable shields and the ground reference of the board.

The shield must cover the cable up to the device input, possibly avoiding braid interruptions, which reduce the leakage capacity.

Vibration equipment division

USE AND MAINTENANCE INSTRUCTION MANUAL



CEMB
BALANCING MACHINES

TDSP System

1. General description

The instruments for vibration monitoring and machinery diagnostics based on the TDSP system spring from CEMB's multiyear experience in the field of vibrotechnics and rotating machinery diagnostics.

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

As well as all the main functions required for monitoring, the TDSP system has been designed paying particular care to the operator interface so as to simplify all the operations necessary to properly manage the device.

The new TDSP system has been designed using a modern DSP-based architecture to meet the demands for maximum flexibility and modularity, providing a high-performance solution for the most varied needs. The TDSP system can be used for protection of a single machine requiring just a few measuring points, or for monitoring, acquisition and data logging of the typical data of a supervision system, or as a complete diagnostic system applicable to the machinery of an entire plant.

The mainstay of the system is the TDSP dual-channel processing module capable of operating stand-alone. Its terminal board allows connection to measuring transducers and analogue and digital inputs/outputs. The Ethernet port on the front panel is used for board configuration and allows connection to a dedicated PC that can be used for data presentation and connection to external diagnostic systems and/or DCS.

1.1 Basic structure of the TDSP system

The basic composition is the most simple of 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 following basic protection functions:
- acquisition of sensor signals (accelerometers, velocimeters and proximity sensors)
- availability of an analogue signal (0 – 10V or 4 – 20mA) proportional to the parameter measured
- availability of alarm contacts when preset thresholds are exceeded

Based on the number of points to be controlled, the structure is composed of:
- standard 19” rack
- power supply (possibly redundant)
- up to 8 TDSP modules

Software for setting all the operating parameters of the processing module simplifies this operation and allows storing all the settings selected on a PC.

1.2 Intermediate structure

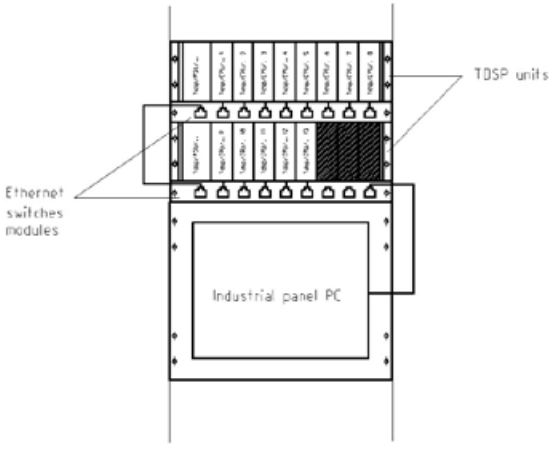
This solution expands the basic composition, interfacing all the TDSP modules with an industrial PC via Ethernet for data acquisition, display and storage.

The following devices are added to the basic structure of the composition described:
- 1 switch for Ethernet connection of the various modules to the PC
- 1 industrial PC with appropriate characteristics

This configuration is coupled to a specific software package for online data management and presentation and can display:
- the values of the various parameters
- the measurement trend
- the status of the various measurements
- alarm indications

The measurement information is also made available in real-time for third party applications through an OPC server/client interface.

Where required, an additional software package can be purchased for data logging (storage in a database accessible for subsequent analyses).

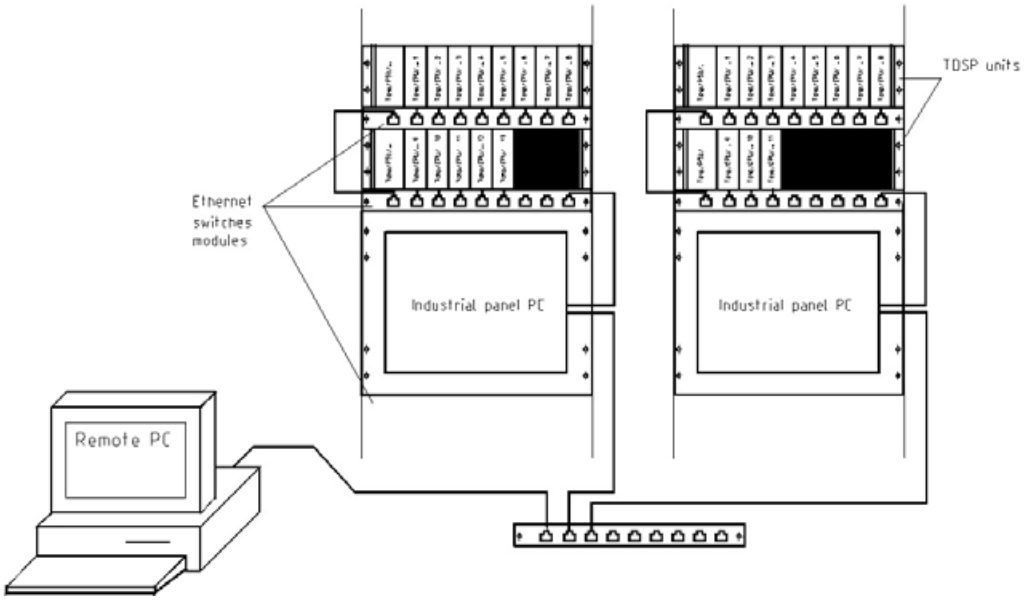


1.3 COMPLETE STRUCTURE

The industrial PC of the intermediate configuration can be inserted in a local area network (LAN) of the customer.

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

- vibration spectrum
- waveform
- orbit
- spectral bands
- starting and stopping transients



TDSP power supply

2. General description

The TDSP PSU power supply module is able to supply power to all the processor modules fitted in a TDSP rack in order to ensure proper, safe and reliable operation.
As well as converting the power supply voltage (direct or alternating) in the direct and stabilised voltage required for functioning of the various TDSP modules, the power supply module is equipped with 3 independent phase reference detection channels.

2.1 Characteristics / Applications

The TDSP PSU power supply module is designed to be fitted in a standard 19” rack and provision has been made for multiple use for applications that require a redundancy that guarantees more reliable functioning of the protection system. The correctness of the input and output voltages is indicated by 4 LEDs on the panel and 2 relays.

2.2 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
- 3 phase reference channels
- 3 phase signal BNCs
- The entire TDSP device is in compliance with the standards on electrical safety (EN 61010-1) and electromagnetic compatibility (EN 61326-1)
- Connection according to the attached drawing 94875-P2

Ambient conditions

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

Mechanical

- Dimensions according to DIN 41494 (12TE, 3HE, P220)
- Weight: 400 g

2.3 Panel

The panel has 4 functional test LEDs and two self-diagnostic relays:
- Green LED - IN OK When on, it indicates that +24VDC input voltage is present
- Green LED - OUT OK When on, it indicates that +24VDC output voltage is present
- Red LED - LO ALARM When on, it indicates that the +24VDC input voltage is below the permissible range
- Red LED - HI ALARM When on, it indicates that the +24VDC input voltage is above the permissible range
- BNC outputs - TACH 1, 2 and 3. Offer the possibility of implementing up to 3 tachometer signals measured by three different rotating shafts.

This signal can simply be available for diagnostic analysis with external devices or be coupled to rack measurement channels connected to the CEMB software for management of spectrums, waveforms, frequency bands and starting and stopping transients.

2.4 Proper operation

When all the operating parameters are correct, the configuration is as follows:
- IN OK and OUT OK LEDs on (green).
- LO ALARM and HI ALARM LEDs off (red).
- V IN and V OUT self-diagnostic relays activated.
- Tachometer outputs TACH 1, TACH 2 and TACH 3.

When the power supply is connected to a tachometer sensor, there is a pulsed output signal of 1xRPM (one pulse per revolution) with the following characteristics:
- Voltage of about 3.3 VDC with the sensor connected and working
- Pulse with 0 VDC signal at each passing by the reference (hole or notch) of about 25 microseconds (irrespective of the reference size)
- Voltage fixed at 0 VDC for an unconnected or not working tachometer.

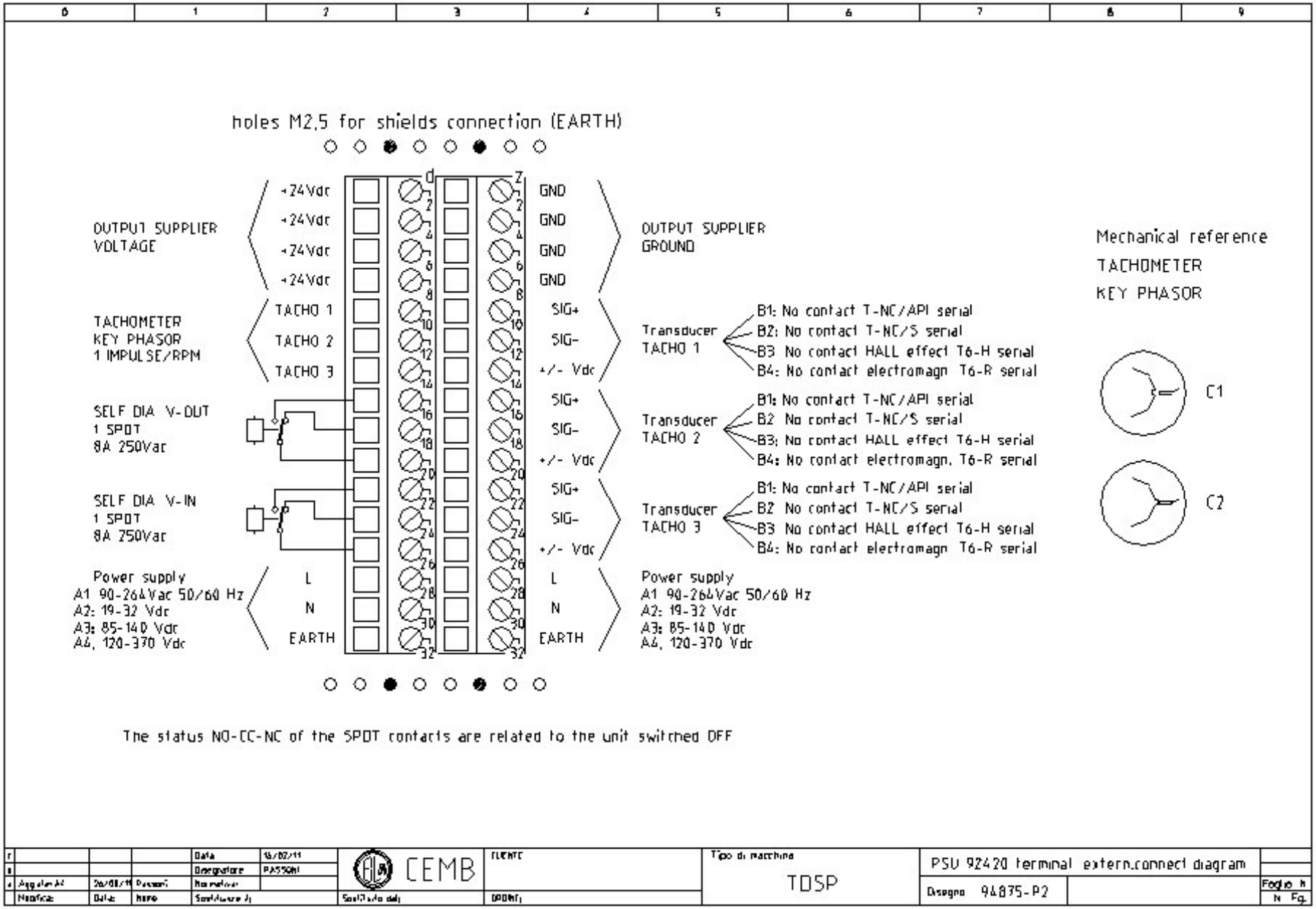
2.5 DESCRIPTION OF THE EXTERNAL TDSP PSU CONNECTIONS

REAR TERMINAL BOARD

o o o o o o o o o o M2,5 holes for screens connection			
Output +24Vdc (to TDSP CPU)	D2	Z2	Output GND (to TDSP CPU)
Output +24Vdc (to TDSP CPU)	D4	Z4	Output GND (to TDSP CPU)
Output +24Vdc (to TDSP CPU)	D6	Z6	Output GND (to TDSP CPU)
Output +24Vdc (to TDSP CPU)	D8	Z8	Output GND (to TDSP CPU)
Output tach 1 (to TDSP CPU)	D10	Z10	Input sensor tach 1 SIG+
Output tach 2 (to TDSP CPU)	D12	Z12	Input sensor tach 1 SIG-
Output tach 3 (to TDSP CPU)	D14	Z14	Input sensor tach 1 Power supply
Relay V OUT N. Open	D16	Z16	Input sensor tach 2 SIG+
Relay V OUT N. Closed	D18	Z18	Input sensor tach 2 SIG-
Relay V OUT C. Common	D20	Z20	Input sensor tach 2 Power supply
Relay V IN N. Open	D22	Z22	Input sensor tach 3 SIG+
Relay V IN N. Closed	D24	Z24	Input sensor tach 3 SIG-
Relay V IN C. Common	D26	Z26	Input sensor tach 3 Power supply
Phase L (or Vdc+) Power supply	D28	Z28	Phase L (or Vdc+) Power supply
Neutral N(or Vdc-)Power supply	D30	Z30	Neutral N (or Vdc-) Power supply
Ground Power supply	D32	Z32	Ground Power supply
o o o o o o o o o o M2,5 holes for screens connection			

The following are available on the rear terminal board:

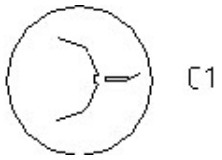
- Power supply inputs
- Power supply outputs to TDSP CPU
- 3 tachometer sensor inputs with sensor power supply
- 3 tachometer outputs to TDSP CPU
- 2 self-diagnostic relays are available:
  - > self-diagnostic relay V IN. The relay is activated when the input voltage is correct (normally activated). It is deactivated when the voltage is not within the correct range or in case of a power failure.
  - > self-diagnostic relay V OUT. The relay is activated when the output voltage (+24VDC) is correct (normally activated). It is deactivated when the voltage is not within the correct range or in case of a power failure.


holes M2,5 for shields connection (EARTH)
OUTPUT SUPPLIER
VOLTAGE
+24Vdc
+24Vdc
+24Vdc
+24Vdc
TACHOMETER
KEY PHASOR
1 IMPULSE/RPM
TACHO 1
TACHO 2
TACHO 3
SELF DIA V-OUT
1 SPDT
8A 250Vac
SELF DIA V-IN
1 SPDT
8A 250Vac
Power supply
A1 90-264Vac 50/60 Hz
A2: 19-32 Vdc
A3: 85-140 Vdc
A4, 120-370 Vdc
L
N
EARTH
GND
GND
GND
GND
SIG+
SIG-
+/- Vdc
SIG+
SIG-
+/- Vdc
SIG+
SIG-
+/- Vdc
L
N
EARTH
OUTPUT SUPPLIER
GROUND
Transducer
TACHO 1
B1: No contact T-NC/API serial
B2: No contact T-NC/S serial
B3 No contact HALL effect T6-H serial
B4: No contact electromagn T6-R serial
Transducer
TACHO 2
B1: No contact T-NC/API serial
B2 No contact T-NC/S serial
B3: No contact HALL effect T6-H serial
B4: No contact electromagn. T6-R serial
Transducer
TACHO 3
B1: No contact T-NC/API serial
B2 No contact T-NC/S serial
B3 No contact HALL effect T6-H serial
B4: No contact electromagn T6-R serial
Mechanical reference
TACHOMETER
KEY PHASOR
C1
C2
The status NO-CC-NC of the SPDT contacts are related to the unit switched OFF
CEMB
CLIENTE
Tipo di macchina
TDSP
PSU 92420 terminal extern.connect diagram
Disegno 94875-P2
Foglio N
N Fg.

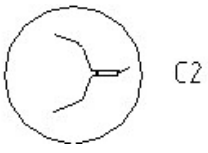
Acronyms/Identification

PSU TDSP/ A / B / C

A	***Power supply voltage***
A1	90 ÷ 264 VAC 50/60 HZ
A2	19 ÷ 32 VDC
A3	85 ÷ 110 VDC
A4	120 ÷ 370 VDC
B	***Type of tachometer sensor***
B0	no 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 mechanical reference of tachometer sensor***
C0	no sensor
C1	hollow



C2 sensor



TDSP processing module

3. General description

The TDSP processing module is equipped with a high-level processor directly on the board, which guarantees high reliability as it is able to operate fully independently, simultaneously performing a series of functions:

- conditions and acquires the signal from two measuring transducers for continuous monitoring of mechanical parameters
- converts these signals into digital format and appropriately processes them using a powerful DSP
- makes measurements: vibrations – differential and absolute expansion – axial displacement – eccentricity – speed
- checks when the preset thresholds are exceeded
- appropriately drives a series of relays in order to best protect rotating machines
- makes available two analogue outputs proportional to the parameters measured
- provides information on the status and level of measurement by means of multi-coloured LEDs on the front panel.

The dual channel TDSP module can transfer data to a dedicated PC via a 100 Mbps Ethernet port that guarantees a transfer speed sufficient for the system requirements.
By means of the dedicated PC the data can be made available to an external DCS or used by appropriate display, data logging and post-analysis programs.

The TDSP processing module has specifically been designed to form the basis of a modular system capable of covering the most varied needs:
- from just a few measuring points to an entire plant
- from the protection function to advanced in-depth diagnostic analysis of any rotating machine.

The basic functions of the processing module are:
- protection against input and output short-circuits
- self-diagnostic function for fault 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 indication of the measurement status
- LED indication when preset thresholds are exceeded
- 2 opto-isolated analogue outputs (0-10V or 4-20mA)
- 4 bypass and trip-multiplier digital inputs
- 6 fully configurable relays with NO and NC contacts
- input duplication on the front BNCs
- possibility of hot-plug/hot-swap without disconnecting the power supply to the drawer and without interfering with the other boards.

3.1 Characteristics/applications

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

The structure of the processing module is such that it can operate independently as stand-alone board without requiring any further external components. This characteristic, together with the whole range of functions provided, means that it can be used to control even only one or two measuring points.

The TDSP processing module can be used for continuous vibration monitoring on the most varied machines, such as fans, pumps, motors, compressors, steam/gas/hydraulic turbines.

3.2 Specifications

Electrical

- 2 sensor inputs (including power supply where applicable)
- 1 phase reference input
- 2 opto-isolated analogue outputs (0-10V or 4-20mA)
- 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-coloured LEDs
- 24VDC / 400mA max. power supply
- the entire TDSP device is in compliance with the standards on electrical safety (EN 61010-1) and electromagnetic compatibility (EN 61326-1)
- connections according to the attached drawing 91995

Ambient conditions

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

Mechanical

- Dimensions according to DIN 41494 (9TE, 3HE, P220)
- Weight: 250 g

3.3 PANEL

The panel has 4 channel and measurement status LEDs, 2 BNC outputs that duplicate the pure signal of the sensor and 1 Ethernet connection.

Meaning of the LEDs on the front panel:
CHANNEL A and B STATUS LEDs:
- green on fixed: normal operating condition
- green flashing fast: KEYPHASOR self-diagnostics (no KEYPHASOR signal --> impossible to execute synchronous measurements)
- yellow/green flashing slowly: Trip-multiplier active
- yellow flashing slowly with MEASURE on: BYP on (the relays of the corresponding channel are maintained in rest condition)
- yellow flashing slowly with MEASURE off: the relays are deactivated during board initialisation (at power on or exiting from self-diagnostics)

MEASUREMENT A and B STATUS LEDs:
- green on fixed: measurement below the PRE-ALERT threshold
- yellow on fixed: measurement above the PRE-ALERT threshold but below the DANGER threshold
- red on fixed: measurement above the DANGER threshold
- red flashing slowly: AC signal above the maximum board dynamics
- red flashing fast: sensor in self-diagnostic condition. Sensor not connected or not working.

Particular conditions (board not working):
- all the LEDs red flashing fast: one of the voltages required for board operation is lacking
- all the LEDs red flashing intermittently: impossible to read a valid configuration for the board --> board configuration must be repeated
- all the LEDs yellow flashing slowly: measurement suspended by command from the PC

BNC A and B outputs.
These outputs duplicate the signal of the sensor connected in the field. They allow performing diagnostic analyses with external devices using the sensor in the field.

Ethernet port
Allows connection to the CEMB software programs for board setup, recording and online monitoring of the data recorded and offline diagnostic management of all the historical acquisitions.

3.4 PROPER OPERATION

When all the operating parameters are correct, the configuration is as follows:
- CHANNEL STATUS LEDs on fixed (green)
- MEASUREMENT STATUS LEDs on fixed (green, yellow or red depending on the measurement level)

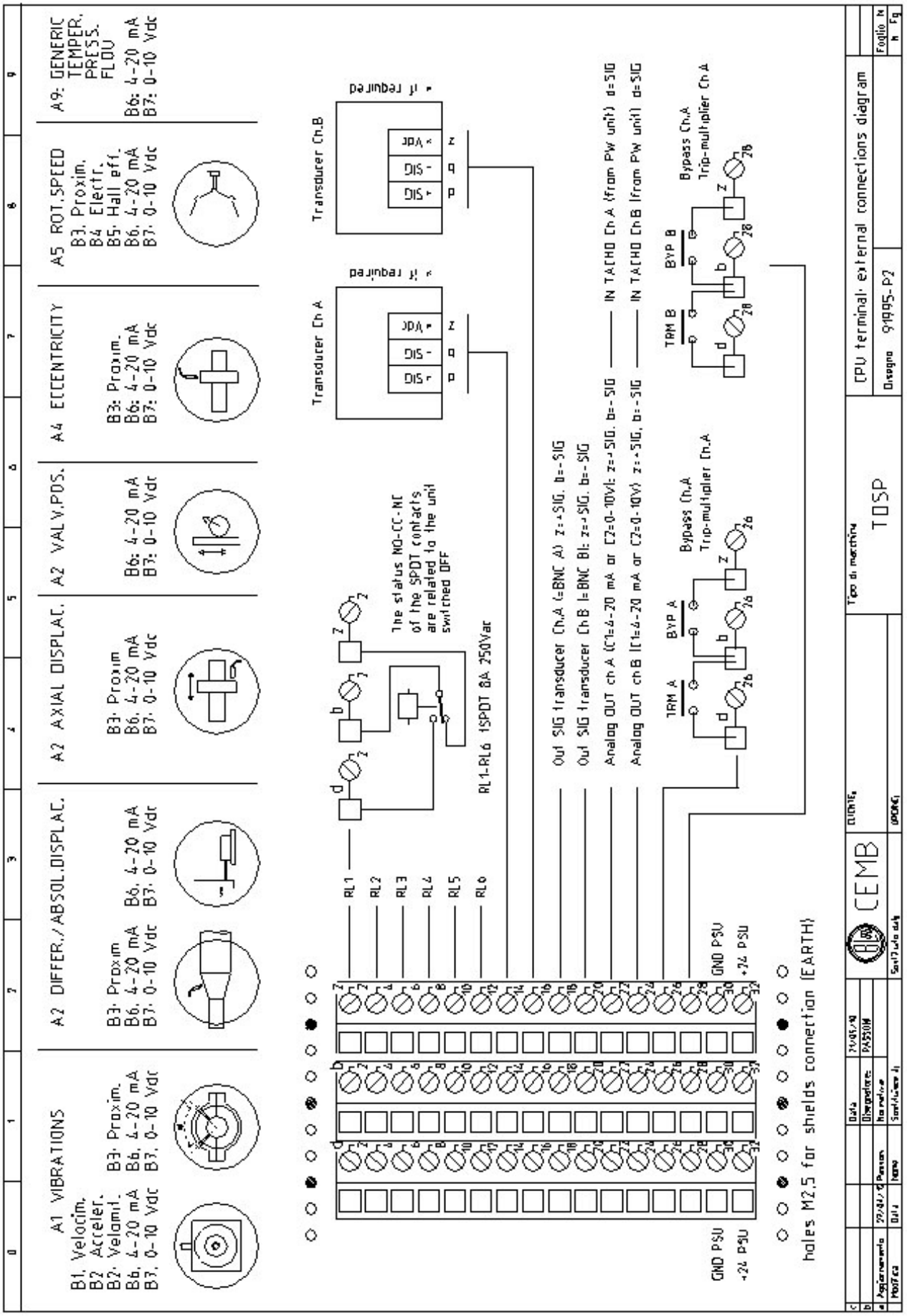
3.5 DESCRIPTION OF THE EXTERNAL TDSP CPU CONNECTIONS

REAR TERMINAL BOARD OF THE TDSP CPU

o o o o o o o o o M2,5 holes for screens connection					
D2	Relay 1 N. Open	B2	Relay 1 Common	Z2	Relay 1 N. Closed
D4	Relay 2 N. Open	B4	Relay 2 Common	Z4	Relay 2 N. Closed
D6	Relay 3 N. Open	B6	Relay 3 Common	Z6	Relay 3 N. Closed
D8	Relay 4 N. Open	B8	Relay 4 Common	Z8	Relay 4 N. Closed
D10	Relay 5 N. Open	B10	Relay 5 Common	Z10	Relay 5 N. Closed
D12	Relay 6 N. Open	B12	Relay 6 Common	Z12	Relay 6 N. Closed
D14	IN Channel A SIG +	B14	IN Channel A SIG -	Z14	IN Channel A Supply
D16	IN Channel B SIG +	B16	IN Channel B SIG -	Z16	IN Channel B Supply
D18	Do not connect	B18	Signal field A -	Z18	Signal field A +
D20	Do not connect	B20	Signal field B -	Z20	Signal field B +
D22	IN Tacho A (from PSU)	B22	Output 4-20mA A -	Z22	Output 4-20mA A +
D24	IN Tacho B (from PSU)	B24	Output 4-20mA B -	Z24	Output 4-20mA B +
D26	Activation TRM A	B26	Ground GND	Z26	Activation BYP A
D28	Activation TRM B	B28	Ground GND	Z28	Activation BYP B
D30	GND (from TDSP PSU)	B30	Ground GND	Z30	GND (AUX)
D32	+24Vdc (from TDSP PSU)	B32	Ground GND	Z32	+24 Vdc (AUX)
o o o o o o o o o M2,5 holes for screens connection					

The following are available on the rear terminal board:

- 2 sensor inputs with sensor power supply
- 2 outputs with duplication of the signal coming from the sensors
- 2 analogue outputs 4-20mA (or 0-10V)
- contacts to be closed to GND for activation of the BYPASS function (relay deactivation) and the threshold multiplier TRIM function (activation of a multiplier preset with respect to the threshold values)
- 6 relays associable with the acquired signals with different criteria
- tachometer signal inputs
- power supply connections (from the TDSP PSU board).


A1 VIBRATIONS
B1. Velocim.
B2 Acceler.
B2. Velomit. B3. Proxim.
B4. 4-20 mA B6. 4-20 mA
B7. 0-10 Vdc B7. 0-10 Vdc
A2 DIFFER./ABSOL.DISPLAC.
B3. Proxim B6. 4-20 mA
B6. 4-20 mA B7. 0-10 Vdc
B7. 0-10 Vdc
A2 AXIAL DISPLAC.
B3. Proxim
B6. 4-20 mA
B7. 0-10 Vdc
A2 VALV.POS.
B6: 4-20 mA
B7: 0-10 Vdc
A4 ECCENTRICITY
B3: Proxim.
B6: 4-20 mA
B7: 0-10 Vdc
A5 ROT.SPEED
B3. Proxim.
B4 Electr.
B5. Hall eff.
B6. 4-20 mA
B7. 0-10 Vdc
A9: GENERIC
TEMPER.
PRESS.
FLOW
B6: 4-20 mA
B7: 0-10 Vdc
Transducer Ch.A
Transducer Ch.B
if required
RL1
RL2
RL3
RL4
RL5
RL6
The status NO-CC-NC of the SPDT contacts are related to the unit switched OFF
RL1-RL6 1SPDT 8A 250Var
Out SIG transducer Ch.A (=BNC A) z=+SIG. b=-SIG
Out SIG transducer Ch.B (=BNC B) z=+SIG. b=-SIG
Analog OUT ch.A (C1=4-20 mA or C2=0-10Vdc z=+SIG. b=-SIG
Analog OUT ch.B (C1=4-20 mA or C2=0-10V) z=+SIG, b=-SIG
IN TACHO Ch.A (from PW unit) d=SIG
IN TACHO Ch.B (from PW unit) d=SIG
TRM A
BYP A
Bypass Ch.A
Trip-multiplier Ch.A
TRM B
BYP B
Bypass Ch.A
Trip-multiplier Ch.A
GND PSU
+24 PSU
holes M2.5 for shields connection (EARTH)
CEMB
TDSP
CPU terminal external connections diagram
Disegno 91995-P2

Acronyms/Identification

CPU TDSP/ A / B / C

A	Type of measurement	Acronym
A1	absolute vibration	VB/A
	relative vibration	VB/R
A2	differential expansion	DE
	absolute expansion	CE
	axial displacement	AP
A4	eccentricity	EC
A5	velocity	RS
	reverse rotation	RR
	zero speed	ZS
	key Phasor	KF
A6	valve position	VP
A9	general	TP
		PR

B	Type of sensor
B1	electrodynamic velocimeter
B2	IEPE sensors (accelerometer / velocimeter)
B3	proximity sensor (T-NC/API EPRO)
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