User Manual

DSP Remote Monitor WRM

Ver.:2.0

Content

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Version 2.0

March 2013

INTRODUCTION

The phrases DSP Machinery Control ®, DSP Remote Monitor ®, DSP Compact WRM and DSP Full Condition ® are registered trademarks of SEMAPI.
SEMAPI logo is a registered trademark. All other trademarks are property of their respective owners.

Not all versions of DSP Remote monitor system contains all the features described in this manual.

The DSP system is used to monitor Remote continuous measurement of a wide variety of rotary machines of industrial plants.
The DSP Compact WRM and DSP Full Condition are continuous and programmable and measure variables, vibration, temperature, and velocity of the rotation axis.
The DSP Machinery Control software lets you manage borne measurements connected to hardware monitoring systems on line, regardless of the family that controls the machine. All associated hardware connected to the network will be managed by the software.
The database creation and subsequent analysis of the measurements, the system will be software task.

DANGER

This module is designed for connection to hazardous voltages. Ignoring this danger can hurt people severely or lead to mechanical damage.
To avoid the risk of electric shock and fire, the safety instructions in this manual must be observed and the guidelines must be followed. The specifications must not be exceeded, and the module should be applied only as described below. Before using the module, you should review this manual thoroughly. Only qualified personnel (technicians) should install this module. If the equipment is used differently than specified by the manufacturer, the protection provided by the equipment may be impaired.

DANGER

Until the module is fixed, do not connect hazardous voltages. The following operations should be carried out in the modules disconnection and ESD safety conditions:
General Assembly, connecting and disconnecting wires.
Fault location Module.
The module and repair and changing of damaged circuits must be made only by SEMAPI.

DANGER

Do not open the front cover of the module as this will damage the display connector. This module contains no DIP switches or jumpers. To maintain a safe distance, the relay contacts module should not be connected to dangerous voltages and dangerous at the same time.

IDENTIFICATION OF SYMBOLS

Triangle with an exclamation mark: Danger / Warning.
Potentially lethal situations.
The CE mark shows that the module meets the essential requirements of the directives.
The double insulation symbol indicates that the module is protected by double or reinforced insulation.

Definitions:

Dangerous voltages have been defined as those between the ranges of 75 to 1500 V DC and 50 to 1000 V AC. Technicians are qualified persons who are educated in or have been trained to install, operate, and troubleshoot the equipment in a technically correct manner and in compliance with safety regulations.
Operators, being familiar with the contents of this manual, may adjust and operate the buttons or potentiometers during normal operation.

Receiving and unpacking:

To unwrap the module without damaging it, the envelope should always be stored with the module until it is permanently installed. Upon receiving the module, check to ensure that it corresponds to the requested module.

Environment:

Avoid direct sunlight, dust, high temperatures, mechanical vibration, and shock, as well as rain and heavy humidity. If necessary, utilize ventilation to avoid heat exceeding temperature limits.
All modules are within the categories Installation Category II, Pollution Level 1, and Class II insulation.

Mounting:

Only technicians who are familiar with the technical terms, warnings, and instructions in the manual should connect the module.

If there is any doubt about the correct connection of the module, please contact our local distributor or SEMAPI | www.semapi.com

The installation and connection of the module should comply with national regulations for mounting electrical equipment in conjunction with the section of the wire and protective fuse location. The descriptions of the connections of the input / output are shown in the block diagram and on the label side.

The following applies to modules connected to dangerous fixed voltages:
Maximum protection fuse is 10 A, and the power switch should be easily accessible and close to the module. The power switch should be marked with a label indicating the manner in which to disconnect the module.

UL Installation conditions:

Using only copper conductors	60/75 °C.
Use only Pollution Level 2 or better.	
Maximum ambient temperature.	60 °C
Max. wire size	26 to 14 AWG
UL file number	E231911

Normal Operation:

Operators are the only ones allowed to adjust and operate modules. Modules should be installed securely in boxes etc. to avoid dangers of injury and/or damage to the modules. Correct installation and maintenance can avoid dangerous electric shocks and ensure that the module is easily accessible.

Cleaning:

Disconnect the module prior to cleaning. Clean the module with a cloth dampened with distilled water.

Responsibility:

To the extent that the instructions in this manual are not strictly followed, the client cannot require dealers SEMAPI and conditions it offers normally established sales agreements.

GENERAL CHARACTERISTICS

Multichannel measurement of mechanical vibrations.
Analysis of multichannel vibration spectrums.
Measurements of AC and DC + /-5V.
Industrial vibration monitor industrial and other variables can be configured from control software and a database of measurement history can be generated.
Remote measurements of the Vibration Monitor can be transmitted via LAN
Signal measuring equipment and monitoring of industrial processes.
Protects monitors and machines.

Ideal for application in:
Critical and semi-critical machines; recurring fault monitoring for safe and dangerous areas
Complement measurement paths of installed sensors through a measurement box.
Remote monitoring across INTERNET
Moving machines
Up to the lifetime of components (bearings etc.)

Inputs:

6 (six) accelerometers 30-50-70-100-500 mV/g type IPC
4 (four) auxiliary 0-10 V AC
2 (two) auxiliary 0-10 V DC
Phase optical sensor

* The quantity of inputs depends on the version requested from the factory.

Memory:
Hardware 2 Gb type Micro SD.

Communication:

USB 2.0
Ethernet 10 Base-T / 100 Base-TX Ethernet communication port RS232.

Outputs:

2 (two) relays for channel threshold levels 1 and 2.

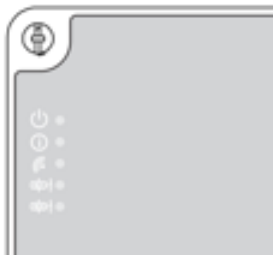
Measurements:

Wraith: Acceleration, velocity, displacement, envelope.
Spectral resolution in lines: 400, 800, 1600, 3200, 6400 and 12500, 25600.
Windows: Rectangular, Hanning, and Flat Top.
Wave form: Acceleration, velocity, displacement, envelope, and sign AC.
Resolution samples: 512, 1024, 2048, 4096, 8192 and 16384.
Scalar values: RMS, 0-Peak, Peak-Peak.
Freq. high: 10 Hz, 20 Hz, 50 Hz, 100 Hz, 200 Hz, 1 kHz, 2 kHz, 5 kHz, 10 kHz, 15 kHz, 20 kHz.

Environment:

Classification: IP65
Temperature: -10 ºC to 55 ºC
Humidity: 95 % non-condensing.

Led status:
Located on the front of the equipment, under the POWER indicator.



Led status reflects3 (three) states of operation (in order of priority):

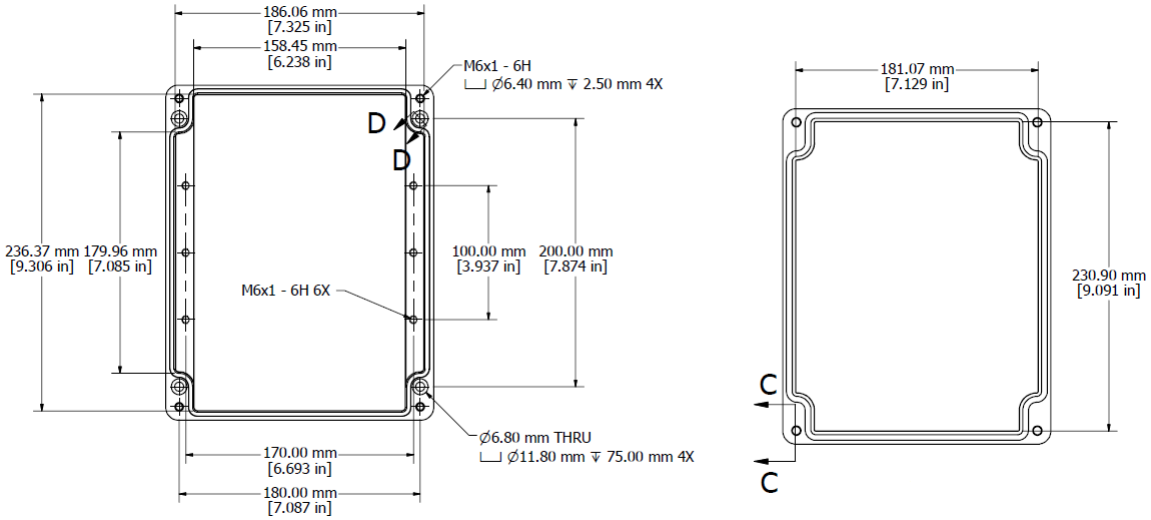
- Continued rapid flashing: indicates a communication error with the DSP.
- 3 short flashes, repeated c/4 sec.: Indicates no connection to the measurement recording service.
- 1 short blink, repeated c/2 sec.: Indicates that everything is working properly.

Serial Number Location:

The serial number is a ten-digit alphanumeric number that is unique to each product. The serial number is located on the UPC label on the input board the analogy signals. The serial number is also repeated on a label on the right side of the box.

Side of the box with the serial number:

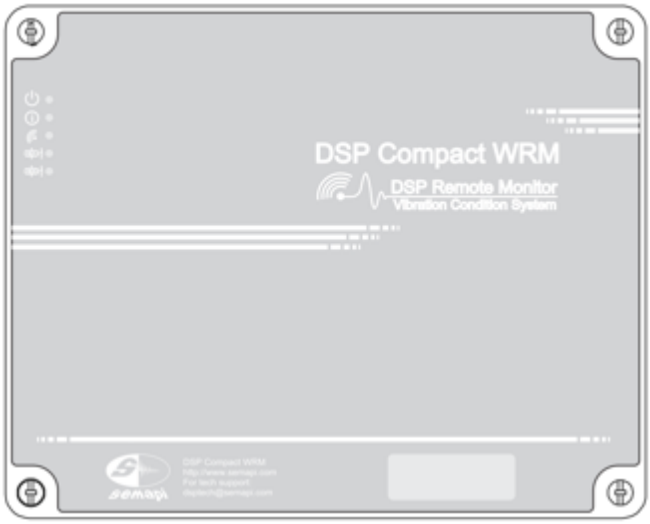
Cabinet hardware Dimensions:

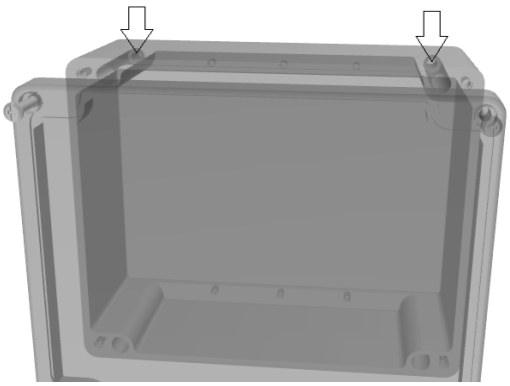


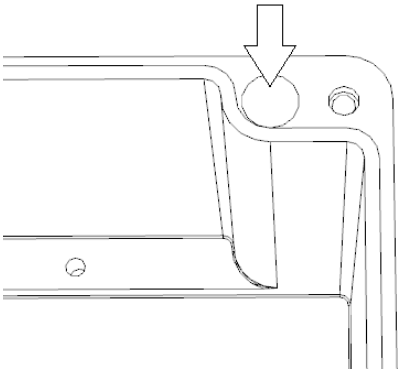
MOUNTING SYSTEM DSP COMPACT WRM

First, remember to remove the connectors from dangerous voltages, if they were connected for preliminary tests.
It is important to define the place of connection to the system, given that connect the sensors from the machine to the computer monitor and local network connection.
You should seek a place at the base of the machine or on the sled itself. This place should be easily accessible and not threatened by high temperatures or humidity.

The DSP Compact WRM box has four (4) bolt holes, which provide firm and secure mounting.
These holes do not allow changing the IP box's degree of protection, as they are behind the main lid of the box.







ELECTRICAL REQUIREMENTS

General concepts:

Take measures to protect people from the dangers that can result from contact with live parts.
Provide protection by isolating live parts or keeping them at a distance:

Parts of a plant that routinely undergo stress should be inaccessible to general human contact. Protection can be achieved by properly insulating the parts such that they can only be accessed by using tools or for technical purposes. Protect the parts by installing plates, bars, or other mechanical protection. Such protective devices should have sufficient mechanical strength to prevent electrical contact with live parts. If the protections are perforated plates or bars, you must ensure the impossibility of achieving live parts by making the size of the holes meet the conditions set by the degree IP2X of the norm IRAM 2444.

NOTE:

All mechanical obstacles must be electrically connected to the conductor to ensure grounding.

Provide complementary protection against residual current circuit breaker leakage (IRAM 2301).

The use of a differential switch is intended to complement standard measures of protection against direct contact.

The nominal operating current of the circuit breaker must not exceed 30 mA. This ensures additional protection in case of a direct contact or user negligence, which can cause a shutdown of the affected parts of a facility due to the establishment of a ground fault current.

The use of such a device is not recognized as a complete protection measure and therefore is not a substitute for other security measures specified in paragraph 3.1.2. For example, this method avoids accidents caused by contact with two conductive parts of different potentials.

It should be noted that such a solution facilitates protection against indirect contact while allowing ground conditions to be technically and economically feasible. Additionally, such a solution can protect against fire by permanently monitoring the insulation of live parts.

Protection against indirect contact:

General concepts:

Take all necessary measures to protect people from the dangers that can result from contact with metal parts (masses) accidentally placed under stress due to faulty insulation.

Definition of masses:

Masses are the metal parts of appliances, equipment, and electrical wires and accessories (boxes, cabinets, etc.), which, under normal conditions, are isolated from live parts. They can be electrically coupled with live parts as the result of a fault.

Protection by automatic disconnection of feeding:

This protection system consists of a grounding system and a protective device. In case of an insulation failure, the coordinated action of the protection device with the grounding system allows for the automatic separation of the failed part from the circuit, so that the accessible metal parts will not acquire a permanent contact voltage greater than 24 V.

Installing ground:

General provisions:

a) In all cases all installed masses should be grounded.
b) Accessible masses belonging to the same electrical system should be linked to the same grounding system.
c) The grounding system should be electrically continuous and should be capable of withstanding the maximum short circuit current coordinated with the circuit protection.
d) The conductor (View 3.2.3.4) should not be electrically severed at any point or (if included) bypass the differential switch.
e) The facility should be in accordance with the directives of the norm IRAM 2281 - Part III.

Value of the grounding resistor:

a) The appropriate installed parts should be protected by the differential switch. The maximum value of the ground resistance is 10 ohms and preferably no greater than 5 ohm (IRAM 2281 - Part III).
b) Parts of the facility eventually uncovered by differential protection.
The necessary means should be provided in order to make indirect contact voltage not exceed 24 V for dry and wet (View IRAM 2281 - Part III)

Grounding:

The ground consists of a set of devices that can connect with the ground conductor. This must be done using electrodes, dispersers, plates, or wires whose configuration and materials comply with the respective norm IRAM.

You should install the ground in a location close to the main board.

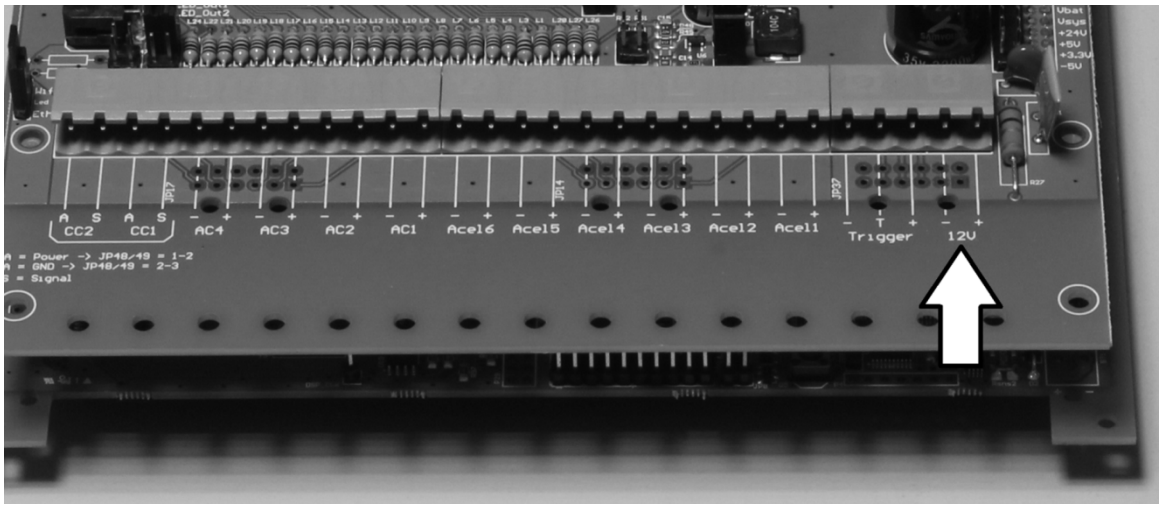
Protective conductor:

The masses are grounded through a conductor of insulated copper wire (IRAM: 2183, 2220, 2261, 2262) that will run through the facility and whose minimum established formula is specified in paragraph 2.3.2. In all cases the conductor section should be less than 2.5 mm^2.
This conductor is connected directly to the ground as described in section 3.2.3.3. and enters the plumbing system installation box main board.

FEEDING

Electrical specifications:

Input:
Voltage range 90 ~ 264 V AC
Frequency range 47 ~ 63 Hz
Power factor (typ.) pf> 0.95/115 V AC, pf> 0.9/230 V AC at full load.
AC current (typ.) 0.4 A/115 V AC 0.2 A/230 V AC
Inrush current (max.) 40 A/230 V AC
Leakage current <0.5 A / 240 V AC
Specifications range ..... -20 °C to +60 °C
S / N Ratio..... Min 60 dB (0 ... 100 kHz)
Ambient Temperature ..... 60 °C



VIBRATION SENSORS

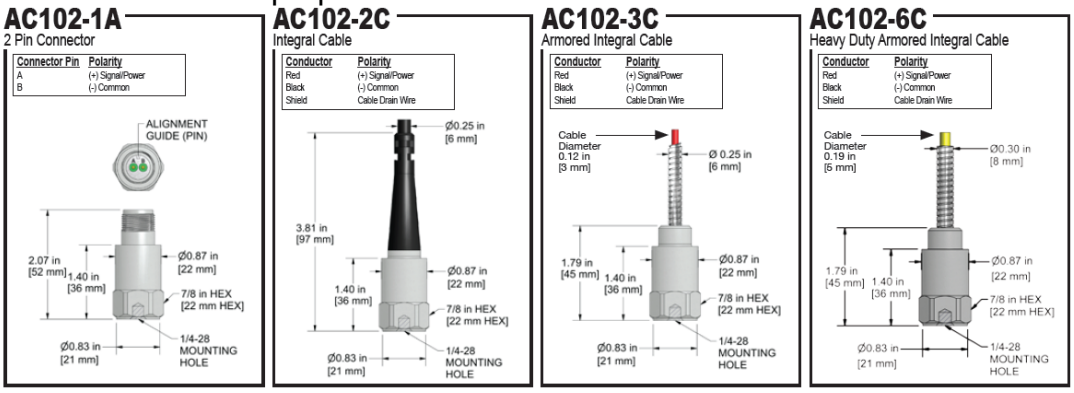
The equipment DSP Remote Monitor system can connect to input vibration sensor-activated piezoelectric accelerometers, or ICP.
ICP is a registered trademark PCB which means “Integrated Circuit – Piezoelectric” and identifies the sensors that incorporate integrated PCB and electronic signal conditioning.
The embedded electronic signal’s high impedance load is generated by the piezoelectric signal detection in a low impedance voltage, which passes easily usable on two-wire cables or coaxial cables.

The low impedance signal can be transmitted over long distances via wire used in a field or factory environment.

The electronic components within the ICP accelerometers require excitation energy of a constant current source of regulated DC voltage. Remote DSP monitor system have these sources, which are suitable for the operation of all installed sensors.

Types of sensors:

Multipurpose:
Model: AC102 multipurpose vibration sensor.



Specifications	Standard	Metric
Part Number	AC102	M/AC102
Sensitivity (±10%)	100 mV/g	
Frequency Response (±3dB)	30-900,000 CPM	0,5-15000 Hz
	120-600,000 CPM	2,0-10000 Hz
Frequency Response (±10%)		
Dynamic Range	± 50 g, peak	
Electrical		
Settling Time	<2.5 seconds	
Voltage Source	18-30 VDC	
Constant Current Excitation	2-10 mA	
Spectral Noise @ 10 Hz	14 µg/√Hz	
Spectral Noise @ 100 Hz	2.3 µg/√Hz	
Spectral Noise @ 1000 Hz	2 µg/√Hz	
Output Impedance	<100 ohm	
Bias Output Voltage	10-14 VDC	
Case Isolation	>10**8** ohm	

Specifications	Standard	Metric
Environmental		
Temperature Range	-58 to 250°F	-50 to 121°C
Maximum Shock Protection	5,000 g, peak	
Electromagnetic Sensitivity	CE	
Sealing	Welded, Hermetic	
Submersible Depth (AC102-2C/3C)	200 ft.	60 m
Physical		
Sensing Element	PZT Ceramic	
Sensing Structure	Shear Mode	
Weight	3.2 oz	90 grams
Case Material	316L Stainless Steel	
Mounting	1/4-28	
Connector (non-integral)	2 Pin MIL-C-5015	
Resonant Frequency	1,380,000 CPM	23000 Hz
Mounting Torque	2 to 5 ft. lbs.	2,7 to 6,8 Nm
Mounting Hardware	1/4-28 Stud	M6x1 Adapter Stud

Multipurpose:
Model: TA102 vibration and temperature sensor multipurpose.

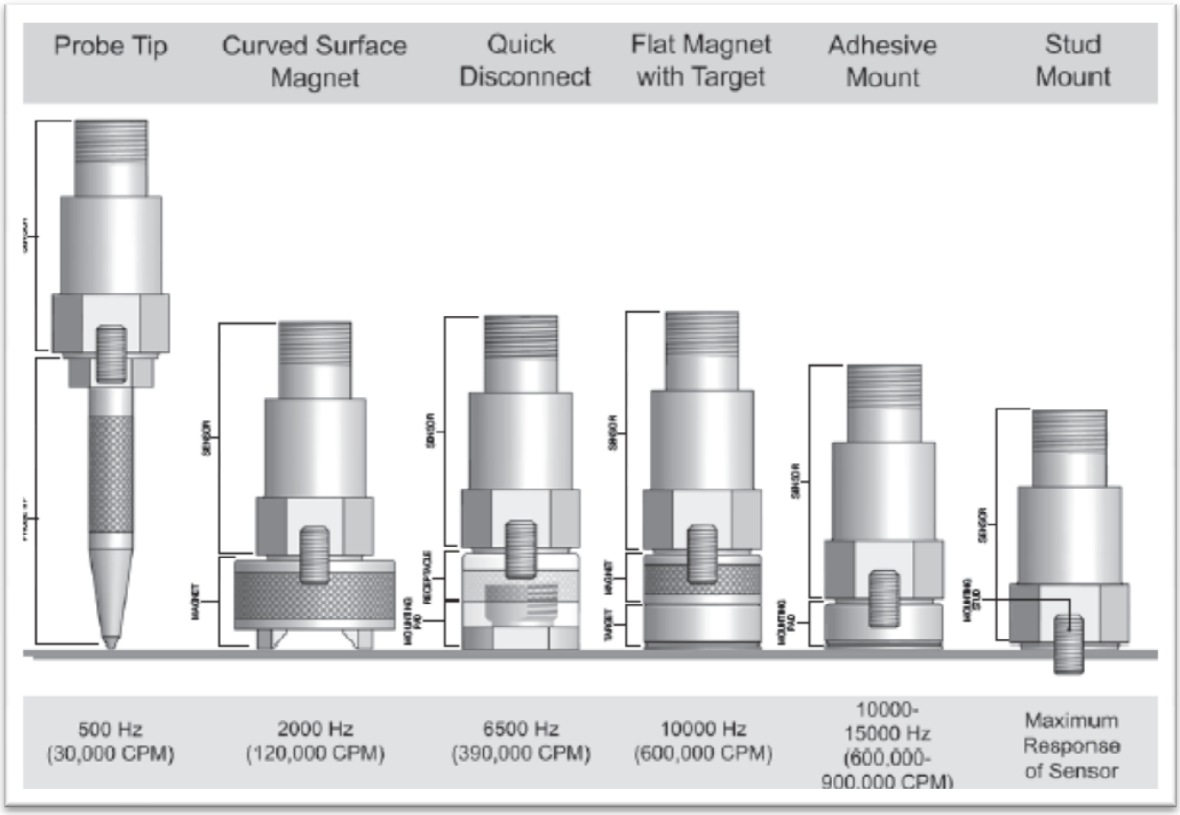
Specifications	Standard	Metric
Part Number	TA102	M/TA102
Sensitivity (±10%)	100 mV/g	
Frequency Response (±3dB)	30-900,000 CPM	0,5-15000 Hz
	120-720,000 CPM	2,0-12000 Hz
Frequency Response (±10%)		
Dynamic Range	± 80 g, peak	
Temperature Measurement Range	37º to 250º F	3º to 121º C
Temperature Output	10 mV/ºC	
Electrical		
Settling Time	<2.5 seconds	
Voltage Source	18-30 VDC	
Constant Current Excitation	2-10 mA	
Spectral Noise @ 10 Hz	8 µg/√Hz	
Spectral Noise @ 100 Hz	0.82 µg/√Hz	
Spectral Noise @ 1000 Hz	0.3 µg/√Hz	
Output Impedance	<100 ohm	
Bias Output Voltage	10-14 VDC	
Case Isolation	>108 ohm	

Specifications	Standard	Metric
Environmental		
Temperature Range	-40 to 250°F	-40 to 121°C
Maximum Shock Protection	5,000 g, peak	
Electromagnetic Sensitivity	CE	
Sealing	Welded, Hermetic	
Submersible Depth (TA102-2C/3C)	500 ft.	152 m
Physical		
Sensing Element	PZT Ceramic	
Sensing Structure	Shear Mode	
Weight	3.2 oz	90 grams
Case Material	316L Stainless Steel	
Mounting	1/4-28	
Connector (non-integral)	3 Pin MIL-C-5015	
Resonant Frequency	1,380,000 CPM	23000 Hz
Mounting Torque	2 to 5 ft. lbs.	2,7 to 6,8 Nm
Mounting Hardware	1/4-28 Stud	M6x1 Adapter Stud
Calibration Certificate	CA10	

Mounting:

A vibration sensor must be installed properly to ensure data quality. The sensor can be mounted with adhesive, magnets, permanently, etc. as long as there is an appropriate connection between the sensor and the hardware.
Frequency Response / Mounting Techniques
The accuracy of the high frequency response is directly affected by the mounting technique for the selected sensor.
In general, the greater the surface contact between the sensor and the surface of the machine, the more accurate the high frequency response will be.

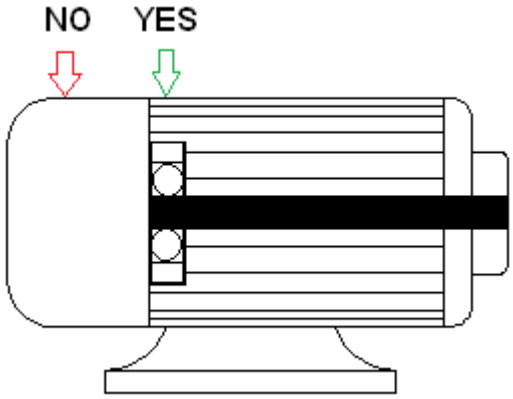
The following table provides general guidance for the full range of available assembly techniques and high expectations for frequency answers *.



Sensor location in the machine:

The sensor should be placed closest to the vibrations of the bearing, with solid metal between the bearing and the sensor. Avoid placing the sensor in thin metal bearing covers.
If possible, select a location such that there are no metal to metal seals between the bearing and the sensor.

In general it was found that one sensor is enough for engines below 50 HP, but for engines over 50 HP, each bearing should have its own vibration sensor. On machines sensitive to bearing damage or bearing problems, each bearing should also have its own sensor.



The sensor has a mounting accessory stud that must be placed at the previously-selected vibration measurement site. The sensor should support all based at the selected site.

Cleaning the sensor will provide more accurate measurements. It is also recommended to clean the flat surface that connects the sensor contacts to the measuring equipment.

The accelerometer must be held firmly in place, without the possibility of it moving. Any movement of the sensor will add noise to the signal. The accelerometer is sensitive to rapid temperature changes. If a sensor is mounted cold on a hot surface, the data will be false until the sensor reaches an equilibrium temperature. This will take the form of a low-frequency noise, with a steep upward trend in the lower range.
If an accelerometer is continuously exposed to a temperature higher than that for which it has been calibrated, internal electronics may be damaged and lead to incorrect data. The DSP Compact WRM accelerometer operates in temperatures up to 250 degrees F. Temperatures higher than 250 degrees F will damage the unit.

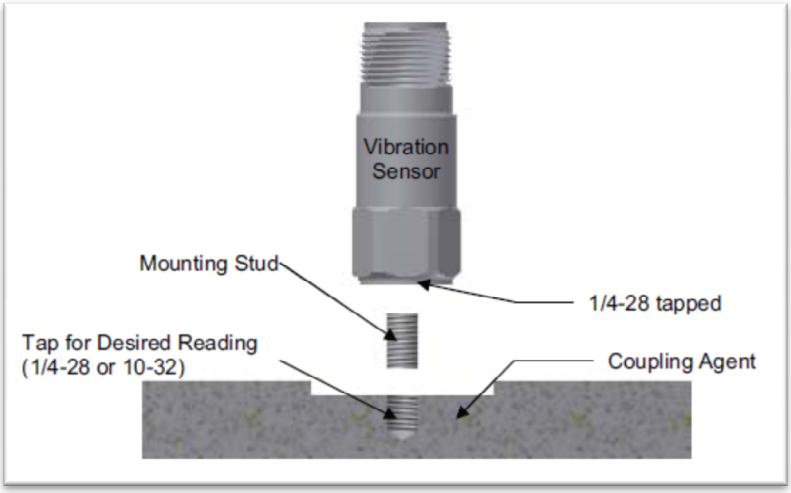
Be careful not to drop the accelerometer on a hard surface, which may damage the piezoelectric element. If the element is cracked, the internal rigidity may decrease and reduce the resonant frequency of the accelerometer. This can significantly change its sensitivity to high frequencies.

Orientation Vibration Sensors:

In any machine monitoring program, it is extremely important that data are collected in exactly the same way every time you make a measurement. This ensures that the data may be repeated and that trends can be established.
It is advisable to place the sensors in the direction of the greater vibration. If this is unknown, it is advisable to place the sensors in two radial directions perpendicular to each other and axially on the thrust bearing.

To prepare for assembly, measure a hole 6 mm deep in the middle of the measuring point defined as. Spend a male threaded ¼ x 28 threads, the three times they recommend for the full game.

Once the threaded hole, hitting the prisoner with a product type liquid thread lock.



Probe assembly for electric motor fin / Path installation:
1. Prepare the cooling fins on the engine by cleaning off any paint or dirt between the cooling fins.
2. Clean the mounting area with a spray degreaser that leaves no residue.
3. Mix adhesive.
4. Apply adhesive to the sides and bottom of the probe body.
5. Place the assembly part between the motor vanes at the desired location.
The probe should be between the fins of the engine, and the bottom of the probe should contact the motor housing as closely as possible.
6. Press firmly to mount the probe, assuring that no spaces remain.
It should be as flat against the motor housing as possible. (Figure 2)
7. Fill any remaining gaps with adhesive to ensure that the probe is fixed in place.
8. Allow complete curing of the adhesive prior to installation of the sensor.

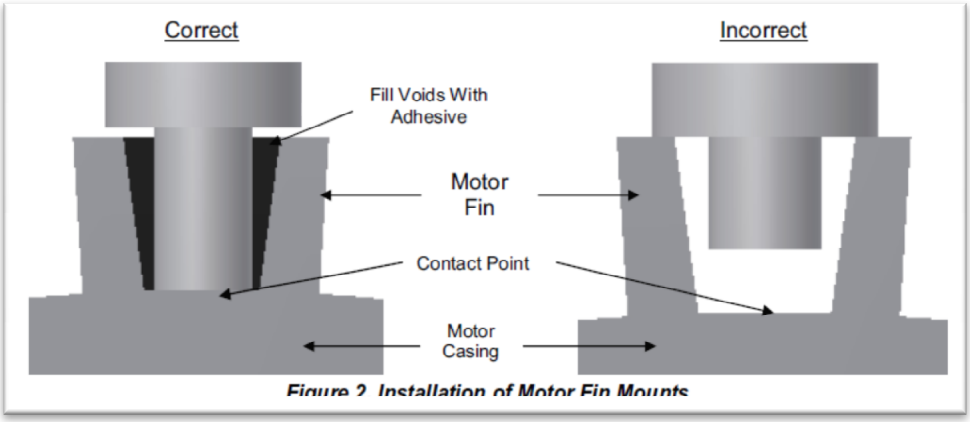
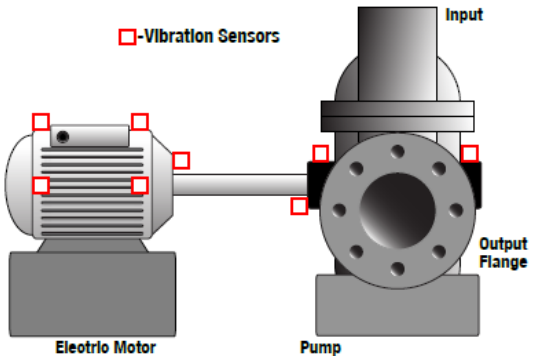
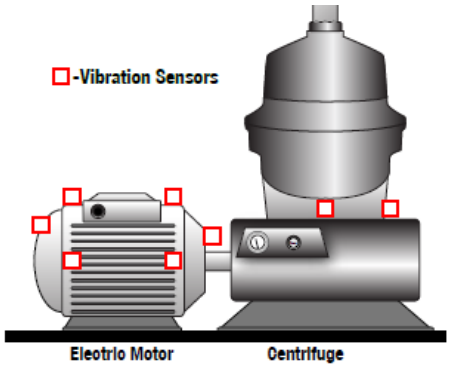


Figure 2. Installation of Motor Fin Mounts

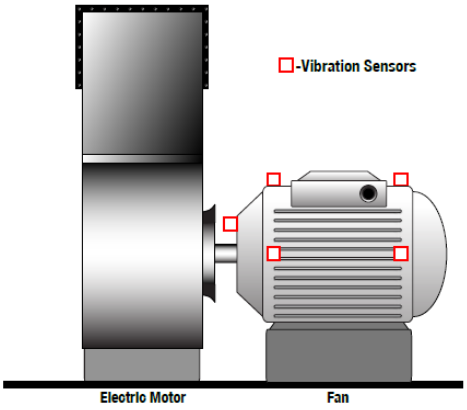
Typical machine checkpoints:

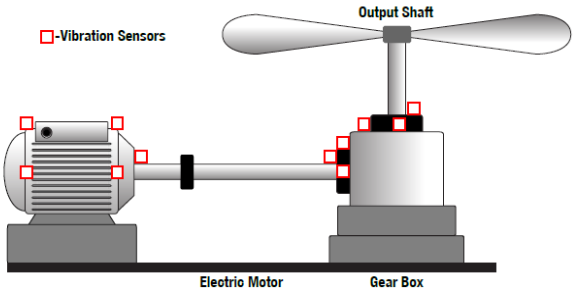
Boiler feed pumps	Industrial centrifuges



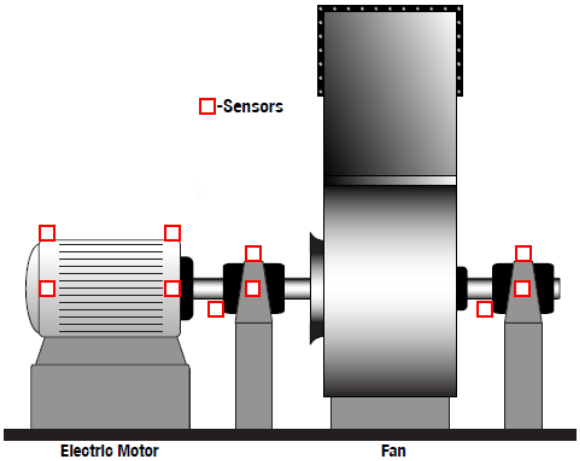


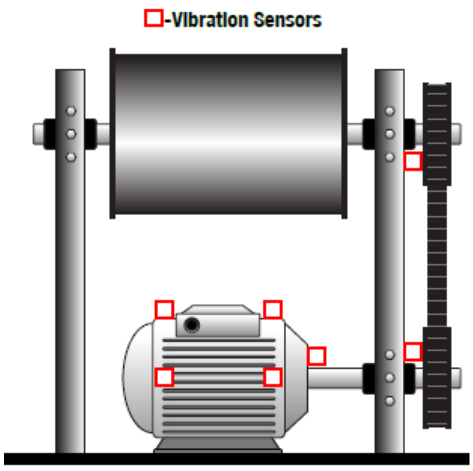
Fans direct	Cooling towers





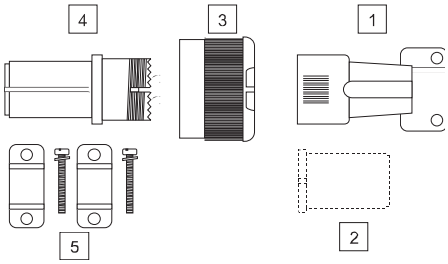
Fans	Conveyors

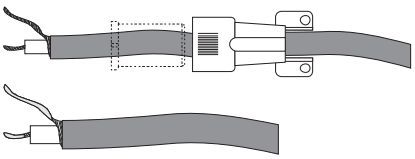




Assembling the connector:

CONNECTOR PARTS



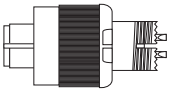


Place part 1 and 2.

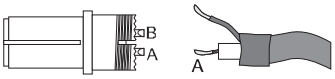
Place tin in both terminals.

Place termocontraible 4 mm wire mesh.

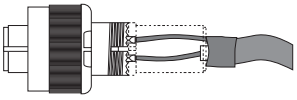
Place heat shrinks 15 mm in outer wire.



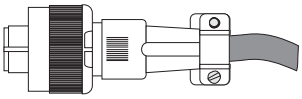
Screw parts 3 and 4 until the first turn freely.



Welding wire the polarity and indications of letters as the connector. A (+) B (-)

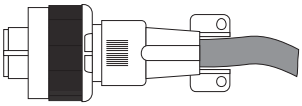


Slide part 2 as shown in Fig.



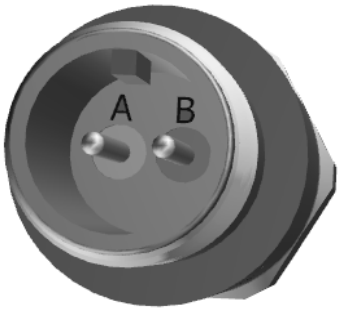
Screw part 1.

NOTE: one for adjusting work firmly secure the connector end, part 4, to avoid damaging the wire.



Place the two clamps, pieces 5.

Connector’s accelerometer sensor outputs:

Multi-purpose accelerometer	Dual accelerometer
	

Wires:

Wires length:

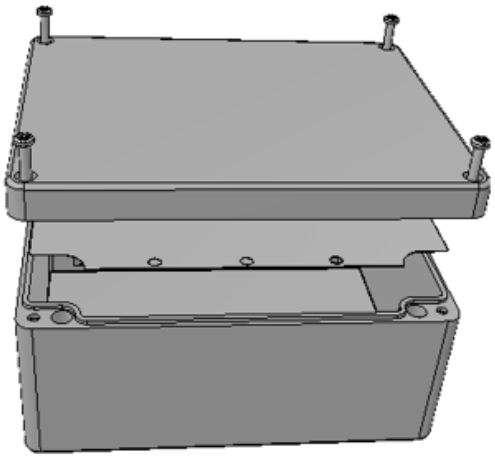
The capacity present between the two conductors, which are proportional to the length thereof, should be such that the attenuation in said charge representing the sensor output is negligible at high frequencies.
The behavior at high frequencies and large amplitudes is limited by the ability to deliver power from the source to the sensor biases, to charge the capacitance formed between conductors.

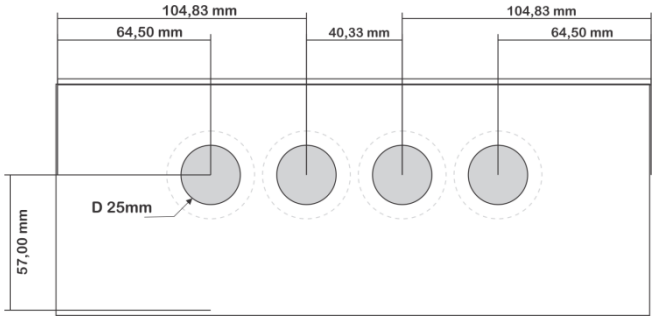
Wires routing:

Route wires as far away as possible from radio transmitters, motors, generators, transformers, and other sources of electromagnetic interference (EMI).
Avoid areas prone to electrostatic discharge (ESD).
Never route sensor wires parallel to a power line. In case you must cross a power line, do so at right angles.
Use high quality shielded wires (joints are not recommended)to preserve the screen in this region.

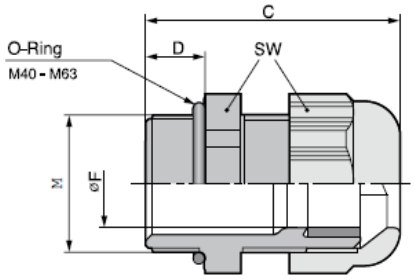
Wire grip on the computer monitor:

The equipment box vibration monitor has wire entry for standard wires. They require proper assembly for the maximum protection of the internal components of the hardware wire grip on the computer monitor:



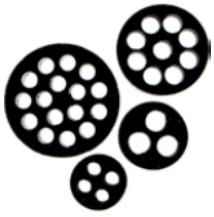


Types of gland wires and size:



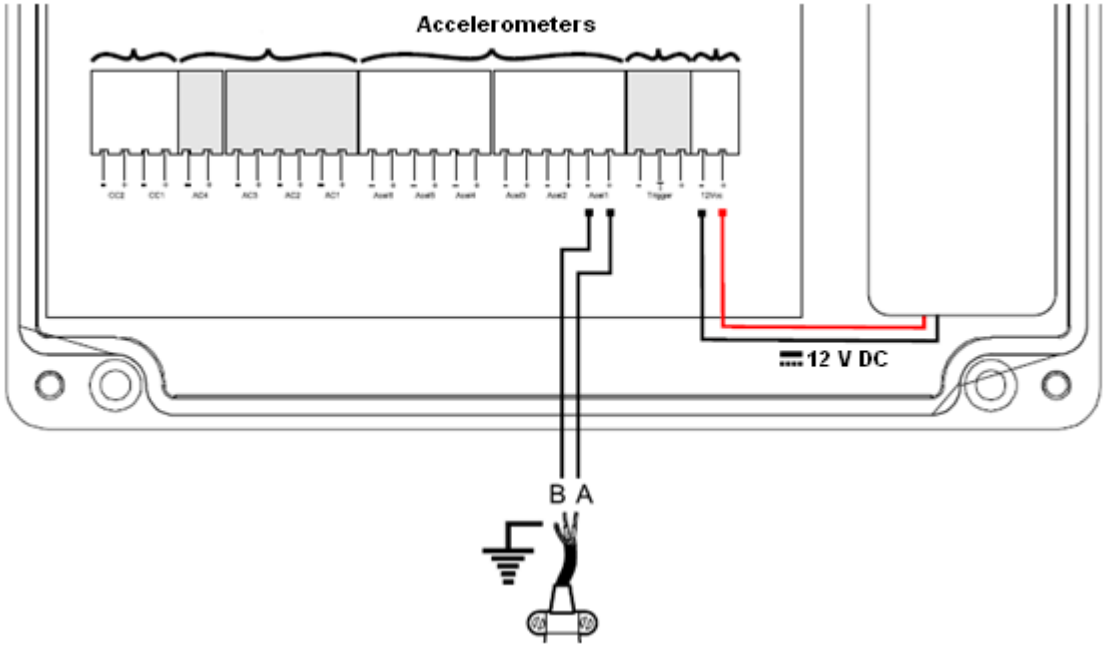
Clamping range ØF mm: 9-17
SW mm: 30
C mm: 40.0
D mm: 10.0

Each wire gland includes a set of multiple seals; these are suitable to insert different types of wires in a single ferrule. Instead of using an insert, use an internal sealing ring with several holes.
IP 68 is achieved when all the openings are closed and all the holes are optimally filled.



Input accelerometers for vibration measurements:

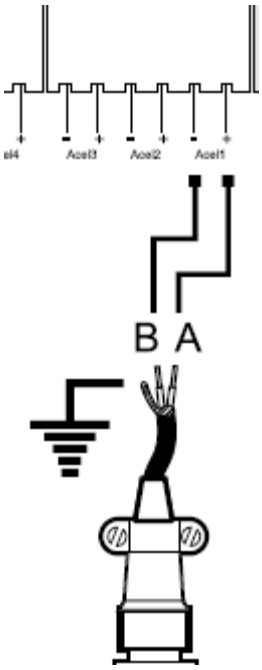
The measuring equipment has 6 channels suitable for sensor connectivity of accelerometers ICP type. These vibration acceleration input channels are suitable for displaying digital integration from the acceleration, velocity, and displacement of the vibration.



Characteristics of compatible sensors:

Excitation Voltage	18 to 28 V DC
Constant Current Excitation	2 to 20 mA
Output Impedance	<150 Ohm
Bias Output Voltage	8 to 12 V DC
Sensitivity	1-1000 mV/g

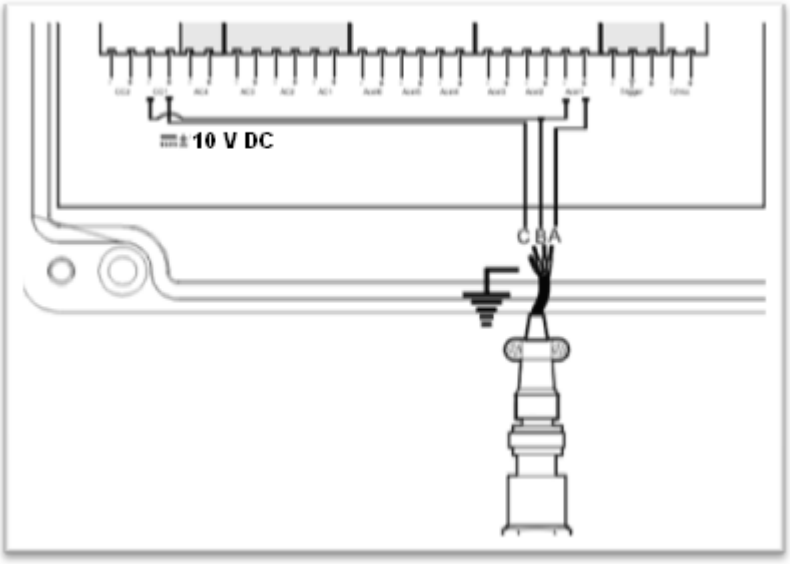
Connection Diagram accelerometer sensors:



Accelerometers for measuring vibration and temperature:

The hardware allows connection of two (2) or four (4) dual accelerometer sensors, according to the factory settings, which allow for the simultaneous measurement of vibration and temperature.
For this application, use the 2 (two) or four (4) DC inputs available, entering 10 mV/°C.

Connection diagram dual accelerometer sensors:



Wire holder:

After connecting the sensor, the wires must be attached to the surface of the machine with a clamp at the end. Avoid possible tension on the end of the wires, but still allow free movement of the accelerometer.

Shielded wire:

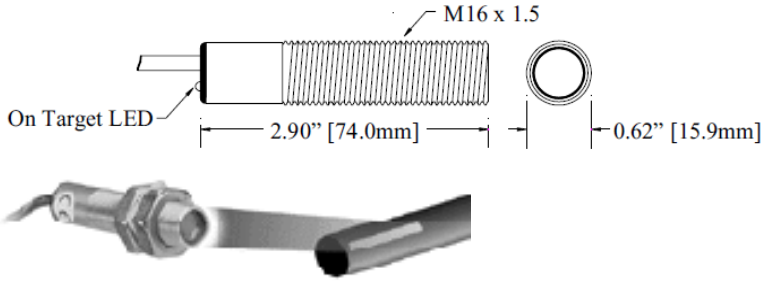
Shielded wires should be used to prevent signs of high power and high frequency. They may be fitted to the low-level analogy signals through parasitic capacitances and inductances. If the screen is properly connected, these spurious signals are absorbed by it and not by the drivers.
The screen will also reduce the input capacitance of the circuit, since undesirable capabilities are formed on the guard and the conductors.

TACHOMETER:

The measuring equipment has one (1) entry trigger, designed primarily to measure the RPM of the machine.
There are different types of sensors for measuring a machine RPM; the appropriate one must be selected, taking into account the distance of the target, the shaft material, the exposure to light received by the monitored equipment, and the environment in which the equipment is placed.

Optical sensor:

The remote optical sensor is stainless steel. It has a visible red LED and a green LED On function or target indicator. Measurements are performed in a wide range.



Operating Distance	3 feet (1 m) and 45° from reflective tape
Speed Range	1 to 250.000 RPM
Operating Temperature	-14 °F to 158 °F (-10 °C to 70 °C)
Power Required	3.3 to 15 V DC
Consumption	45 mA
Output Signal	TTL Same as Source
Standard wire	8 Feet (2.4 m)
Dimensions	2.9 "(L) x 0.625" diameter (73 x 16mm)

Connection: Tinned wires (ROS-W), 3.5 mm [1/8 inch] male stereo plug (ROS-P, ROS-P-25)
Material: 303 Stainless Steel supplied with two M16 Jam Nuts and Mounting Bracket
Lens: Acrylic Plastic
Dimensions: 2.90 in x Threaded Tube 0.62 in diameter [M16 x 1.5 x 74 mm] long

CONNECTION DETAIL for Tinned Wires (ROS-W):
Wire Colour Function
Brown Positive Power Supply (+ V)
Common Blue (Com)
Black Signal (+ V to 0 V DC Pulse) (Sig)
Housing Shield Ground (Com)

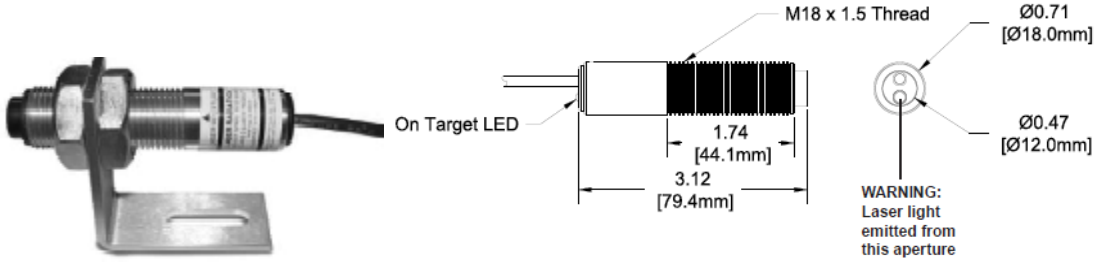
The remote optical sensor is capable of detecting the pulse reflected by a target or reflective tape at distances up to 36 inches [1 m] from the rotating object and angles up to 45 degrees.
For most applications, it is advisable to use a square piece of reflective tape ½" [12mm], which must be applied to a clean area on the rotating object.
The sensor must be mounted (nuts provided with the mounting bracket and aluminium) and optically aligned.

It is recommended that the optical sensor is placed at a slight perpendicular angle (15 degrees).
The green LED indicator On-Target will blink at rate input frequency when the sensor is properly directed.

NOTE:
The green LED indicator On-Target will blink at low speeds and stay constant at high speeds.

Laser sensor:

The laser optical remote sensor has a laser light source, a visible red light, and a green LED operation indicator or reading.
The laser acts as the aiming device during installation and can accurately measure from 1 to 250.000 RPM speeds from a distance of 7 meters, with a maximum deviation angle of 60 degrees to the rotating object.
The sensor is housed in a stainless steel threaded body and is supplied with a mounting
bracket, nuts, and an eight-foot shielded wire. ROLS24-W.



Speed Range: 1-250,000 RPM
Illumination: Visible Red Laser, Class 2
Laser Specifications: Classification: Class 2 (for IEC 60825-1 Ed 1.2 2001-8)
Complies with FDA performance standards for laser products except for deviations pursuant to Laser
Notice No. 50, dated July 26, 2001.
Maximum Laser Output: 1 mW
Pulse Duration: Continuous
Laser Wavelength: 650 nm
On-Target Indicator: Green LED on wire end cap
Operating Range: up to 25 feet [7.6 m] and 60 degrees offset from target
Power Requirement: 9 - 24 V DC, 0.13W
Output: Positive pulse when target present – Output Voltage=Supply Voltage
Optional – Open Collector or TTL pulse, Negative pulse (Contact factory)
Operating Temp.: 14 °F to 158 °F [-10 °C to 70 °C]
Humidity: Maximum relative humidity 80% for temperature up to 88 °F [31 °C] decreasing linearly to 50%
Connection: Tinned wires

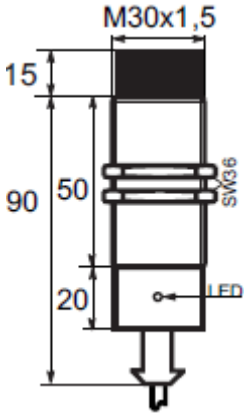
Wire Length: 8 feet [2.4 m]
Material: 303 Stainless Steel supplied with two M18 Jam Nuts and Mounting Bracket

Mode of installation:

The ROLS24-W must be mounted with nuts and aluminium mounting bracket and optically aligned to illuminate the target. It is recommended that the optical sensor be placed at a small perpendicular angle (15 degrees) so that the sensor receives only pulses from the reflective marker.

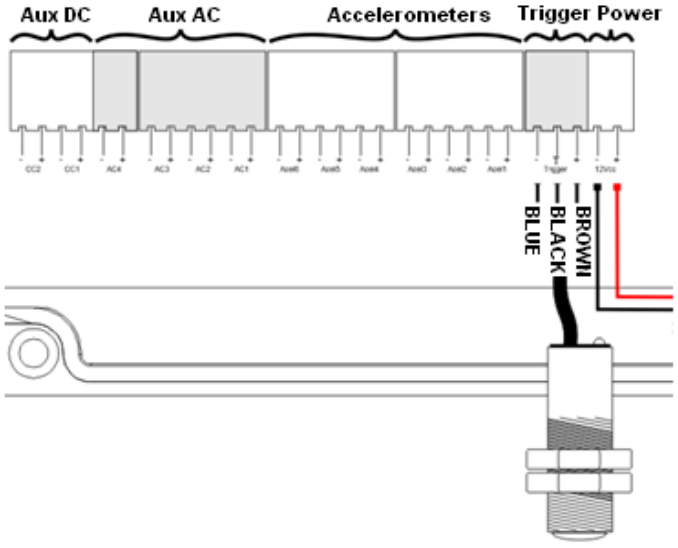
Inductive sensor:

Inductive sensors are a special class of sensors that detect ferrous metallic materials. They are of great use when sunlight and dirt in the environment do not allow for proper visual optical parts.



Power supply: 10 ÷ 30 V DC/V DC supply voltage
Maximum consumption: 200 mA maximum load
Voltage: <3 V to 200 mA
Led signalling including
Electromagnetic Compatibility: ce en60947-5-2 ce
Certification: CE certification.

Connection diagram optical sensor:



AC INPUTS:

The available inputs on systems configured as standard are:
AC1
AC2
AC3
AC4
When the standard system configuration is changed from the factory settings, there may be a greater number of inputs aimed at AC.

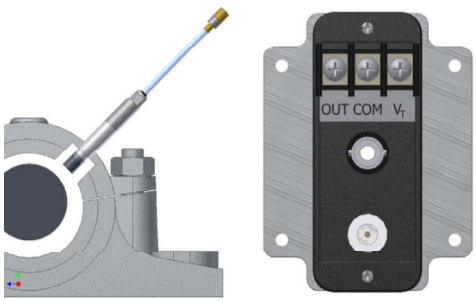
These inputs are available to find any AC signal of + / - 5V.
The signals of these entries may be recorded by the computer control software, like any other variable.
The most widely used application for these entries is the measurement of displacement or vibration sensors using contactless inductive proximity.

Proximity sensors:

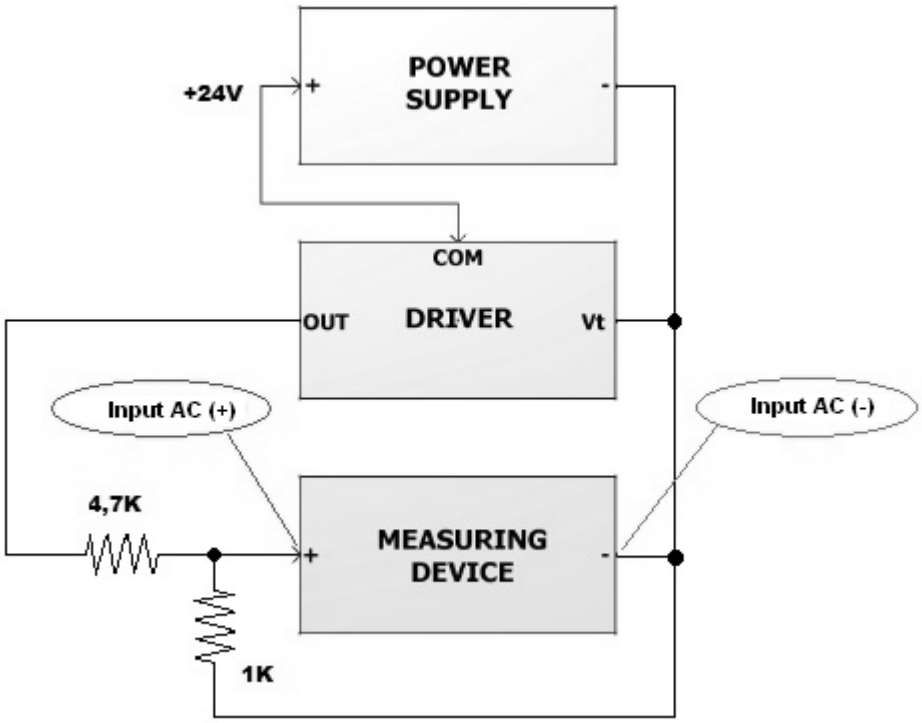
The proximity sensor or “displacement transducer” is a permanent mounting sensor and needs a signal conditioning amplifier to generate an output voltage proportional to the distance between the transducer and the shaft end.
Its operation is based on a magnetic principle and therefore it is sensitive to magnetic shaft anomalies. Care must be taken to avoid the shaft becoming magnetized a and contaminating the output signal.
Importantly, the transducer measures the relative displacement and overall vibration level of the machine.
The transducer is usually installed in large bearing machines and can be used to detect faults and stopping before catastrophic failures.

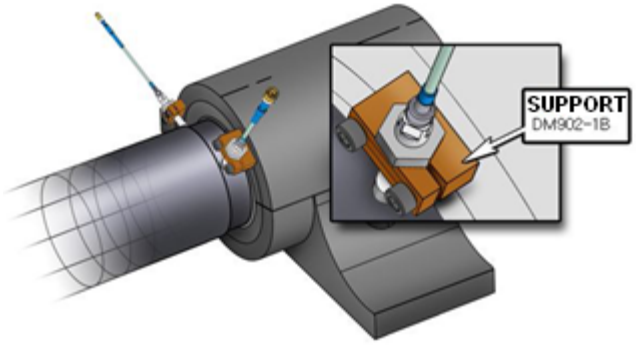
The sensor is a proximity sensor which produces a negative voltage that is directly proportional to the “gap,” or the distance between the probe and the measured surface.
The assembly consists of a proximity probe, extension wire, and driver.

The device driver is a three-wire connection of power, ground / common, and the signal output. The driver is designed for use with a negative power adapter.



Connection Diagram proximity sensors:





These transducers are generally used in pairs separated by a difference in orientation of 90 degrees.
The frequency of the transducer response ranges from DC (0 Hz) to about 1000 Hz.

Output signals:

Relays:

The hardware has 2 physical relay plates mounted on its connectivity. These dry contact relays can be Normally Open (NO) or Normally Closed (NC).
The relay is a slim, high density mounting that meets Bell core specifications and FCC part 68.

- Dielectric strength 1,500 V AC between coil and contacts
- Surge strength 2,500 V between coil and contacts (between 2 x 10 sec wave surge)

Maximum switching capacity l - 4.2 A, 700 V AC high sensitivity and low power consumption
High reliability of bifurcated contacts.

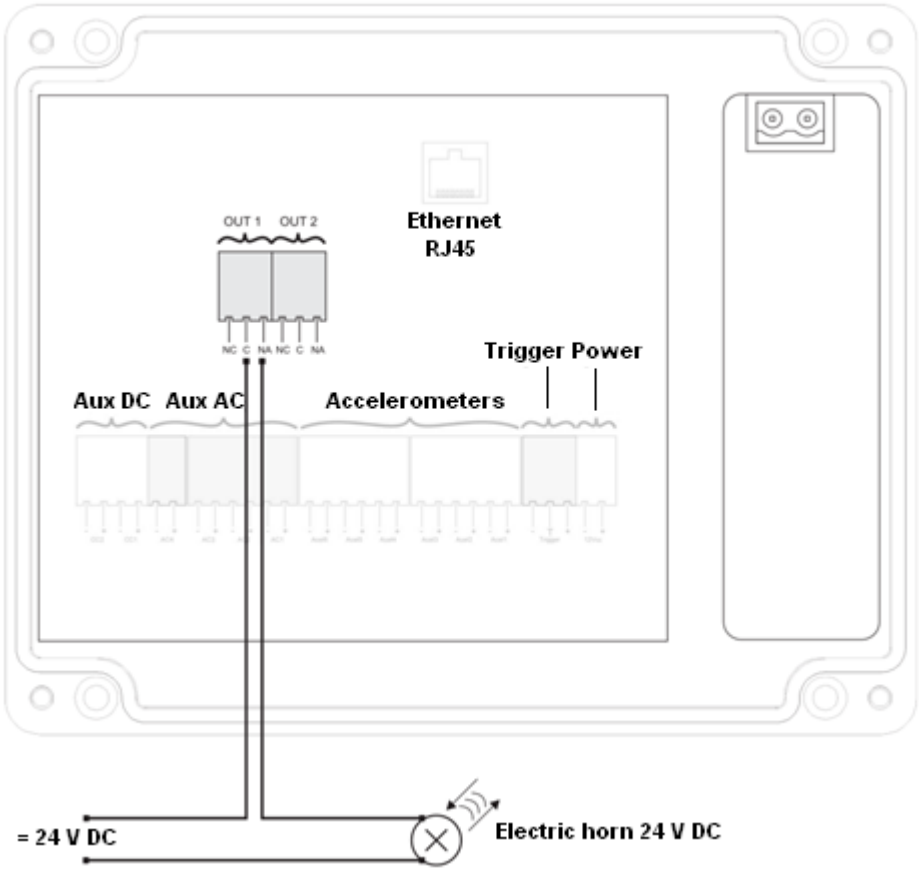
Sealed plastic type:

The versatility of the relays allows them to connect directly to an audible alarm (siren), a light command, drive, or directly to the auxiliary connection of a contactor for automatic monitoring of command equipment.

The configuration of these relays is entirely controlled by the DSP software Machinery control. From that application, the relays may act as the events found during the monitoring time.

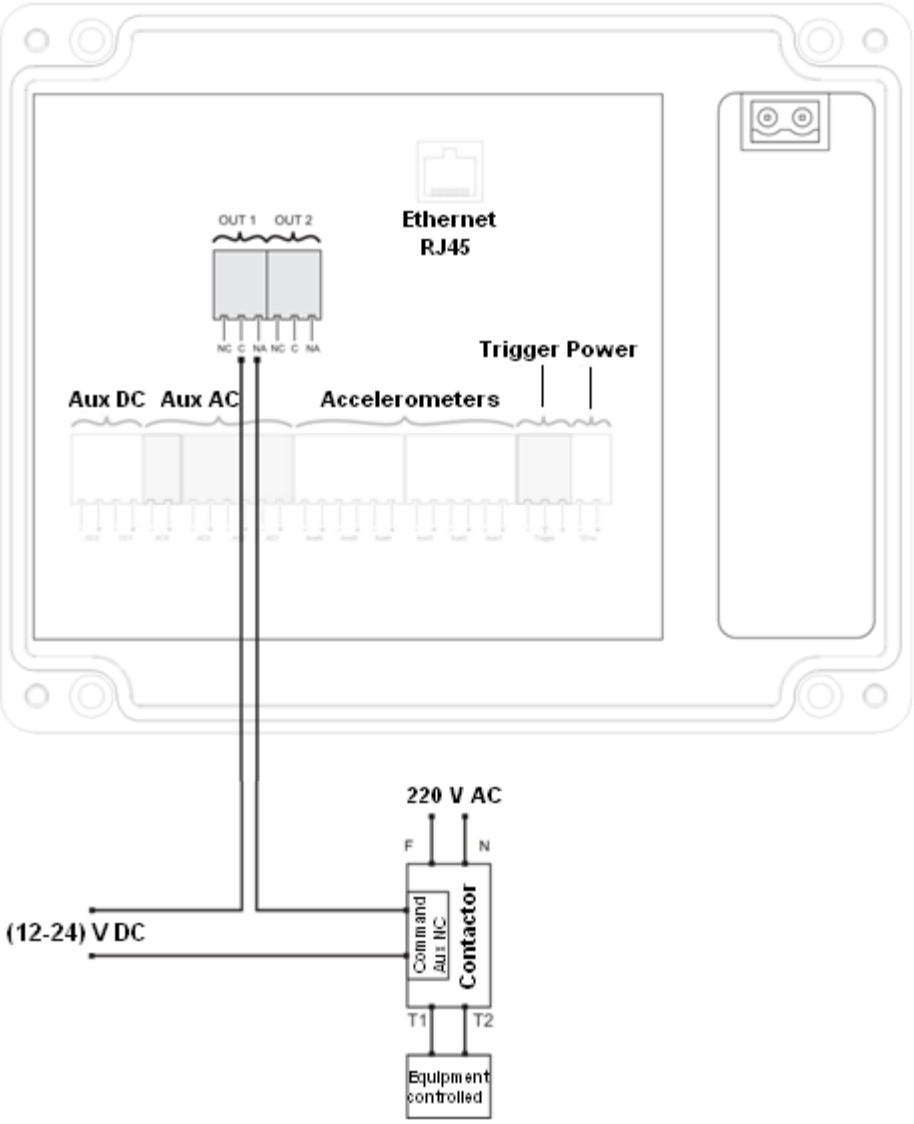
Connection diagram of the relay:

Connecting shooting Beep:



The outputs can be connected to a contact for conditions where the tripping relay should define the operation of a machine.
For this option you must define the exact parameters that will command the relay activation from the DSP Machinery control software.

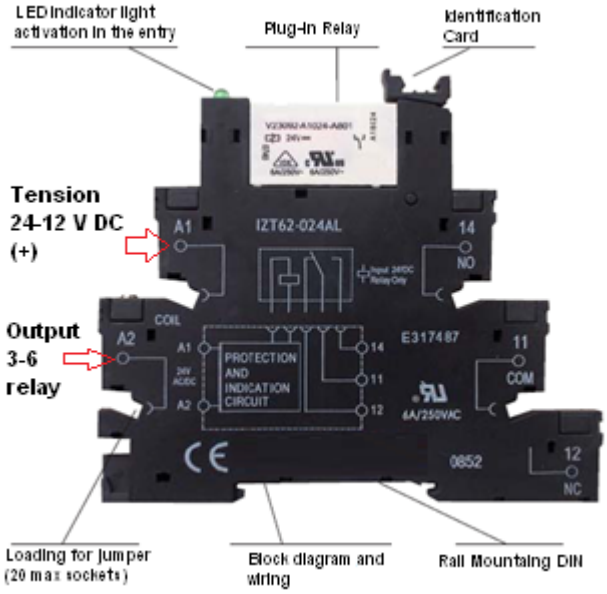
Connection of the relay for a contactor:



Additional external Relay:

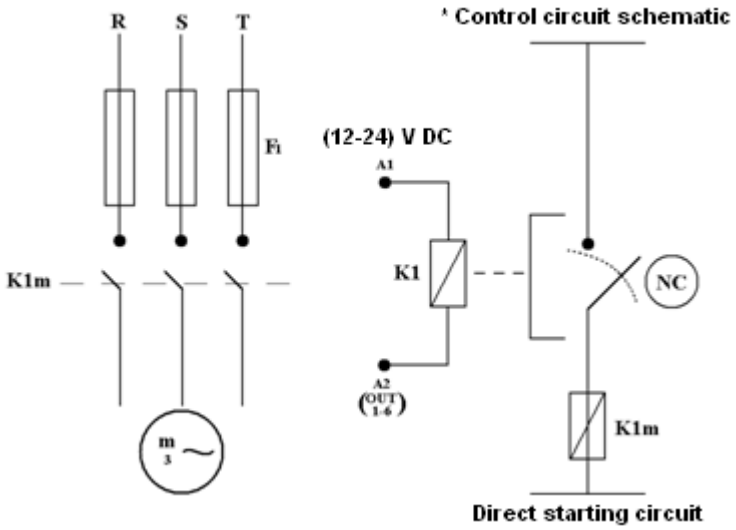
The hardware includes 4 additional outputs for external relays system. These can be used when the two relays' physical backplane is insufficient for the commands you want to activate as monitored events.

Electromechanical interfaces command:

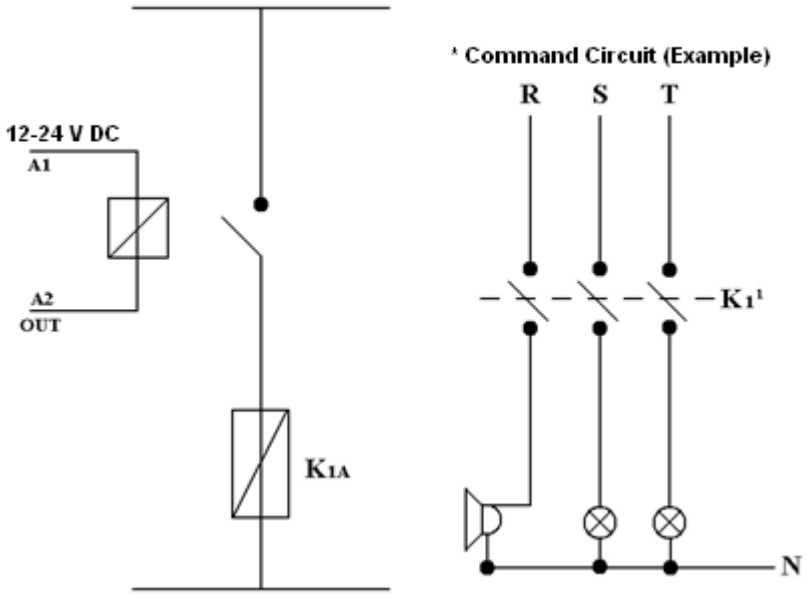


Typical configurations of connections:

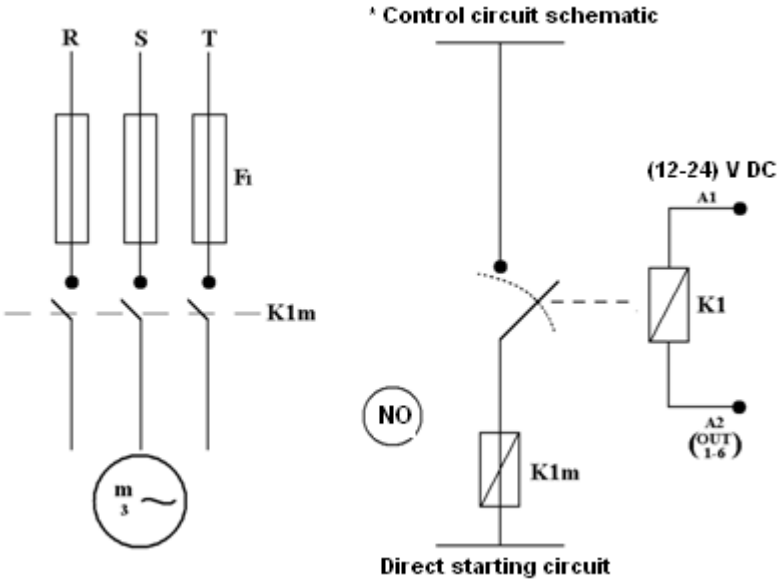
Safety Circuit Court (NC) Normally Closed:



Safety Circuit Court (NO) Normally Open:

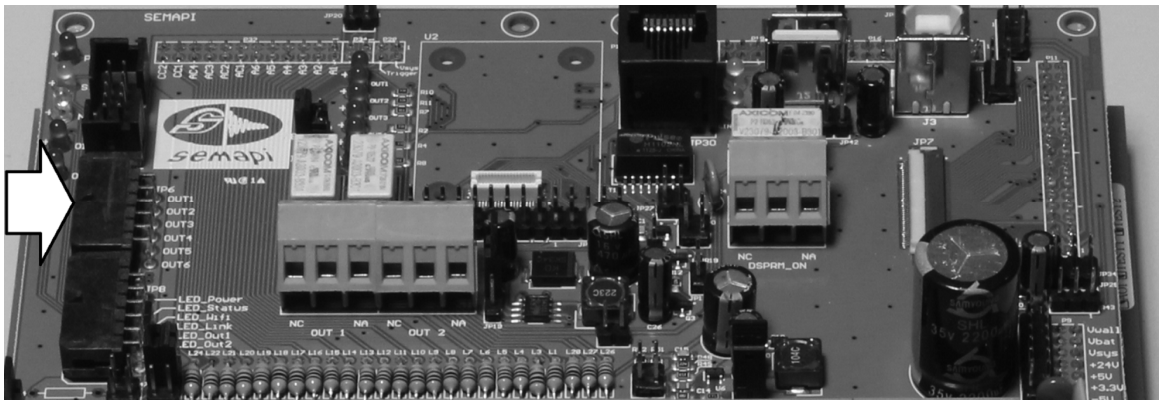


Possible alarm circuit with standard configurations (NO):

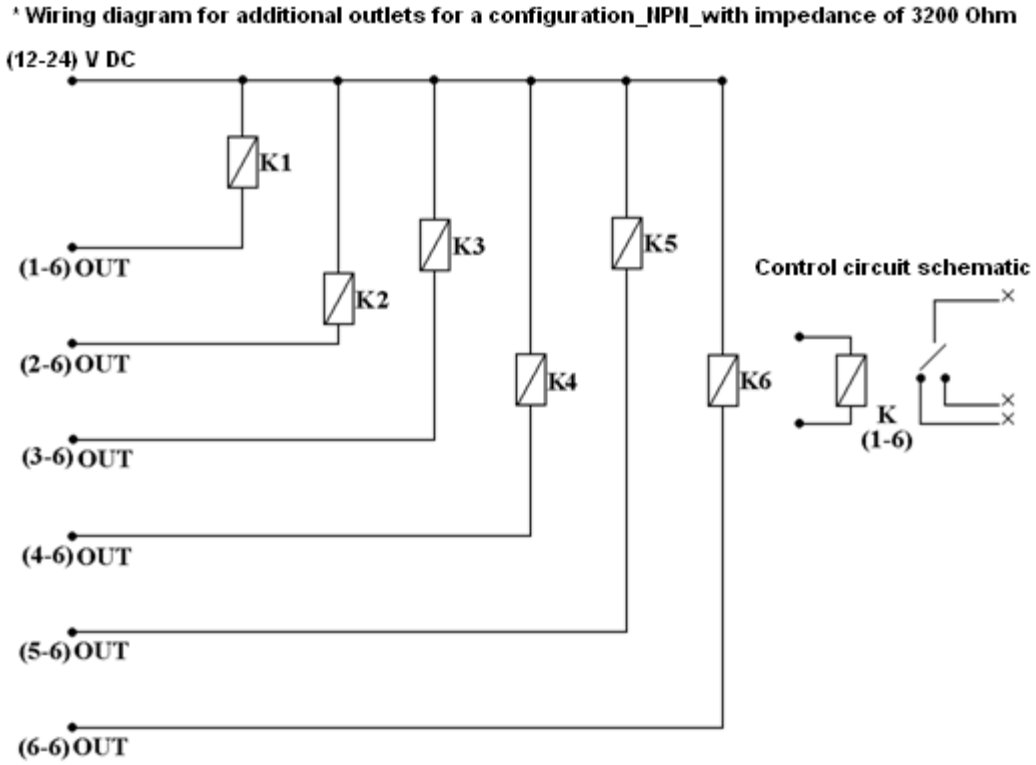


Input Circuit:

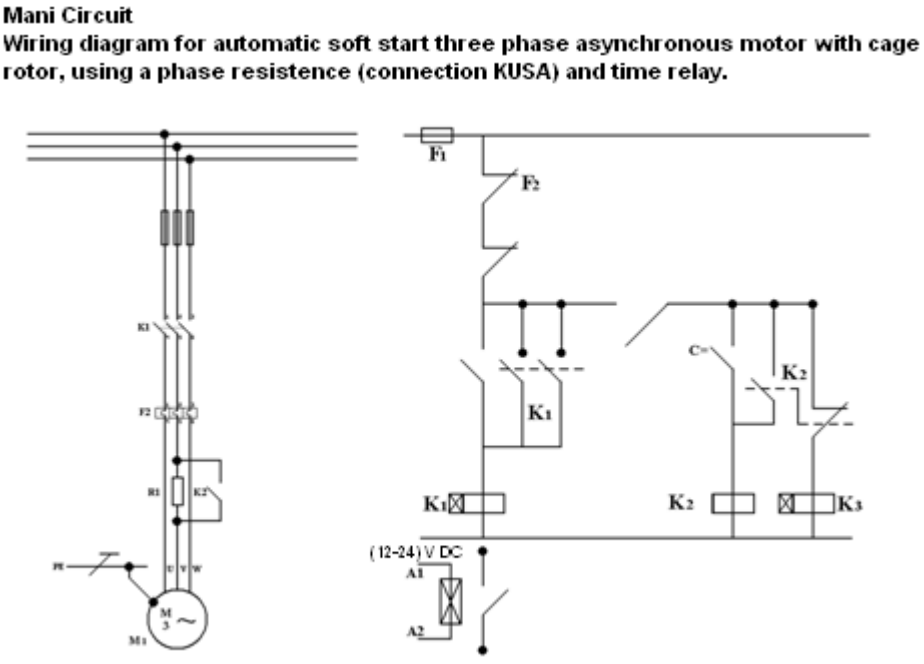
The sockets have input interfaces 12 and 24 V DC.
The output between terminals A1 and A2 and the connection terminals of the relay has an electronic circuit allowing adjustment of the values of the input voltage of the interface to the relay coil (or terminal activation if the opt coupled).
This electronic circuit may include optional components that meet protection and filtering functions.
In all instances, the interfaces are equipped with a shunt coil or excitation input terminals in the case of opt the coupled, whose rated voltage is 12 V DC.
The input impedance relays opt coupled is equivalent to that presented by the coil of the electromechanical, and is about 3200 ohms. Therefore, interchange ability between relays is straightforward.



Wiring diagram for operation:



Engine Wiring:



CONTINUOUS MONITORING ON LINE

Objectives:

The objective of predictive maintenance is to determine if the operating status of the machine changes, if incipient faults are caused by the effects of power in order to schedule repairs, and to avoid unexpected stops of production machinery. Continuous monitoring is the ideal way to achieve this goal. Continuous monitoring can be provided by the installation of fixed sensors to continuously evaluate a machine's operating status and to detect possible faults early.
Measurement of mechanical vibration provides a wealth of information about the operating status of a machine and is an indirect measurement of the stresses to which a machine is subject.

The ideal continuous monitoring system is one that meets the following conditions:

Detects any operating condition changes caused by faults from the moment they occur. As a result, this offers a wide time window in which to schedule a repair.
Verifies that the operating conditions of a machine are within normal operating ranges. This avoids conditions which may cause failures.
Notifies or decide when machine machine should be shut down to prevent catastrophic failure conditions.
System reliability is 100 %, or the system reports that it is working properly (Self Test)

Continuous monitoring of mechanical vibrations in a dynamic team both as a structure, the unit protects the appearance of excessive vibration.
There is a high correlation between vibration and the mechanical problems that generate them, so it is necessary to know the reasons for changes in vibrations.

Moreover, excessive vibrations produce various stresses which can cause material fatigue and potential breakdowns.

The continuous monitoring equipment can be a valuable tool to avoid potential breakdowns. Some points to remember:

A- The choice of the controlled variable depends on the frequency of vibration expected: for low frequency phenomena SPEED is chosen (structural shocks, mounting conditions, increased light white metal bearings, without the swaying of rotors and misalignment of equipment); for high-frequency, acceleration is chosen (bearing condition, friction, and wear gear lubrication problems.)
B. - Maximum speed of vibration: (V = W x Xo, mm/sec)

This parameter provides information about operation from the viewpoint of mounting: alignment, rolling, bent shafts, defective pulleys, etc.
In general, it is unlikely that these vibrations have a significant positive trend over time. Only recommended in cases where monitoring suspects a fouling rotor (progressive unbalancing), or in the case of white metal bearings, where the increase of light generates a growing imbalance.
C. - Maximum acceleration of vibration: ($A = W^2 \times Xo$, g)
The deterioration of the lubricant film and bearings will have a significant impact on this parameter, so it is recommended that this variable be controlled.
D. - If speed is measured, direction should be less rigid and usually horizontal.
E. - If measuring the acceleration in bearings, vertical direction is convenient. In this direction the track is most in demand. It is necessary to set the sensor in the same room where the bearing is housed in a radial direction.

Where and what to measure for acceleration and velocity?

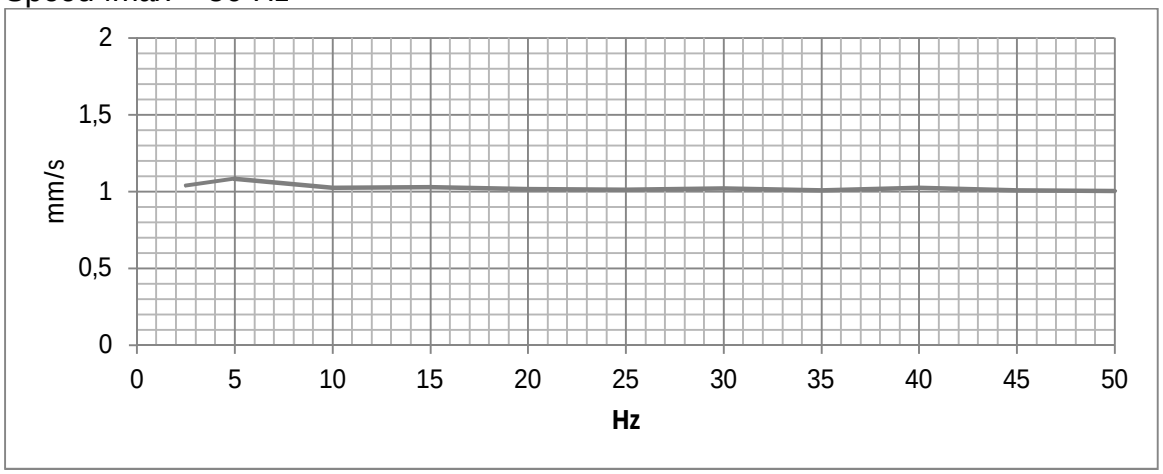
Measurement speed:
This variable can detect low-frequency phenomena (usually up to 500 Hz) or 5/6 times the RPM of the machine (harmonic).
Description of events: unbalance, misalignment, loose parts, excessive play, bent shafts, pulleys or belts problems, strokes, excessive play in bearings, etc.

Measurement acceleration:
The phenomena of low amplitude and high frequency cannot be detected in the speed measurement.
The acceleration value is the vibration frequency squared, allowing lubrication failure phenomena as (5 kHz) or bearings between 1 and 2 kHz to be easily detectable.
White metal bearings only produce low frequency phenomena, which are enough to measure speed. (The high frequency phenomena occurs during friction of two metals of similar hardness.)

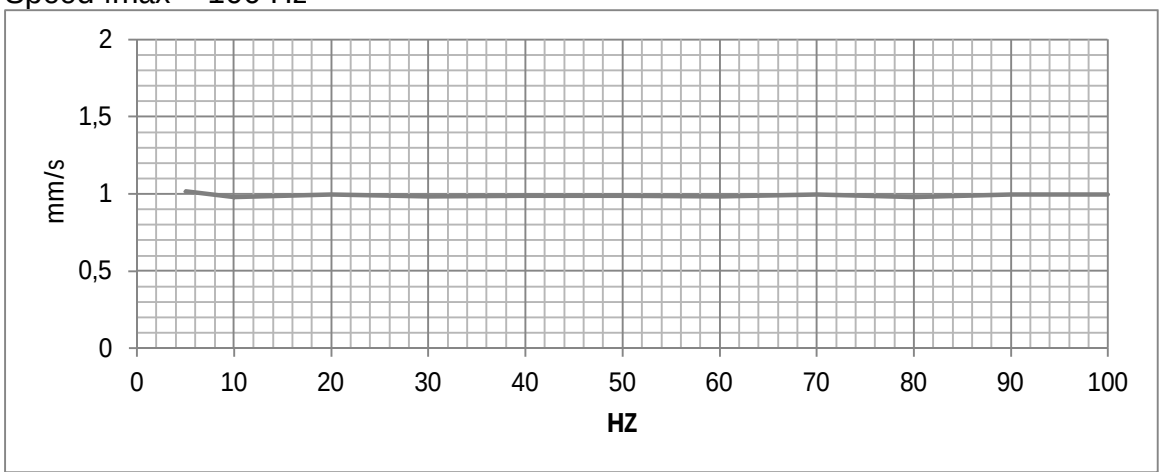
Frequency response of vibration measurement:

ICP accelerometers channels

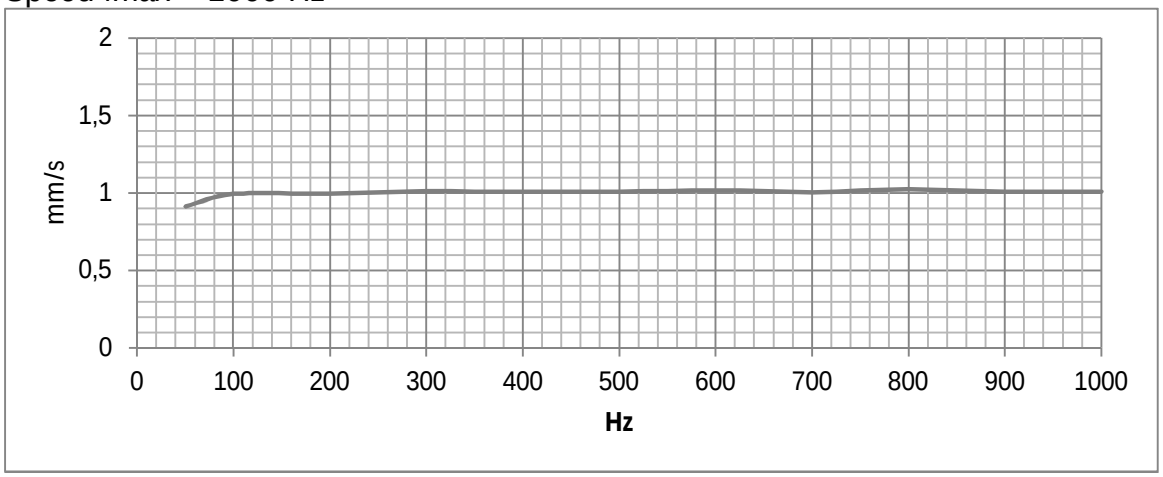
Speed fmax = 50 Hz



Speed fmax = 100 Hz

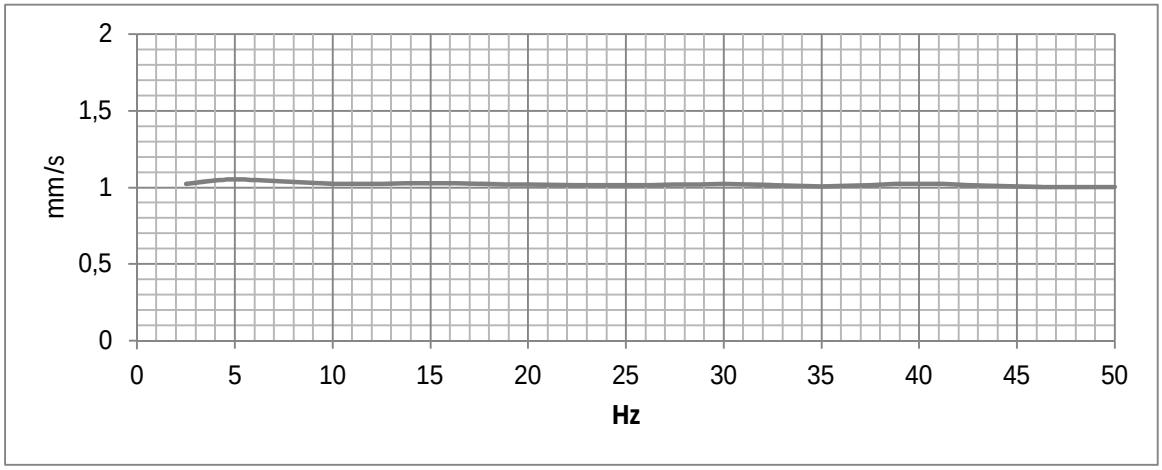


Speed fmax = 1000 Hz

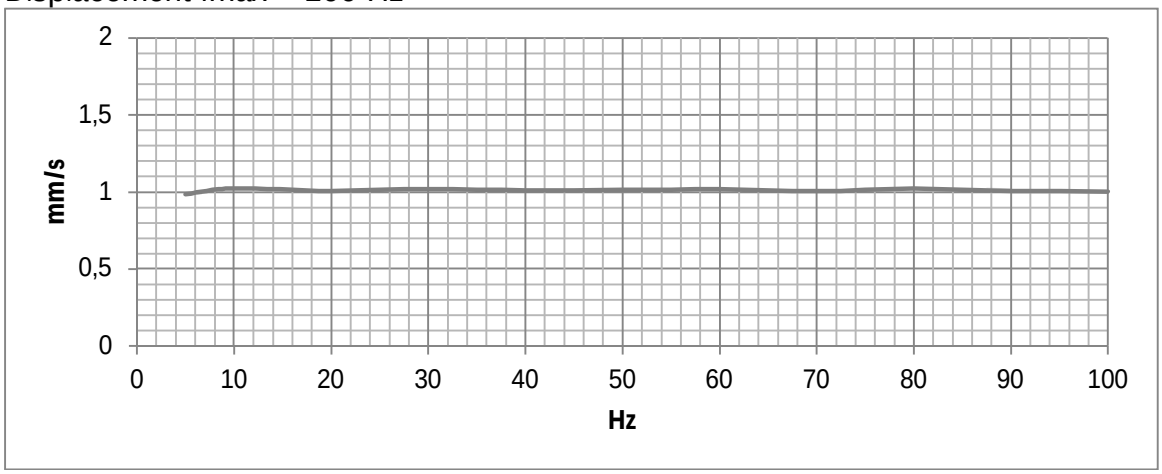


ICP Accelerometers channels

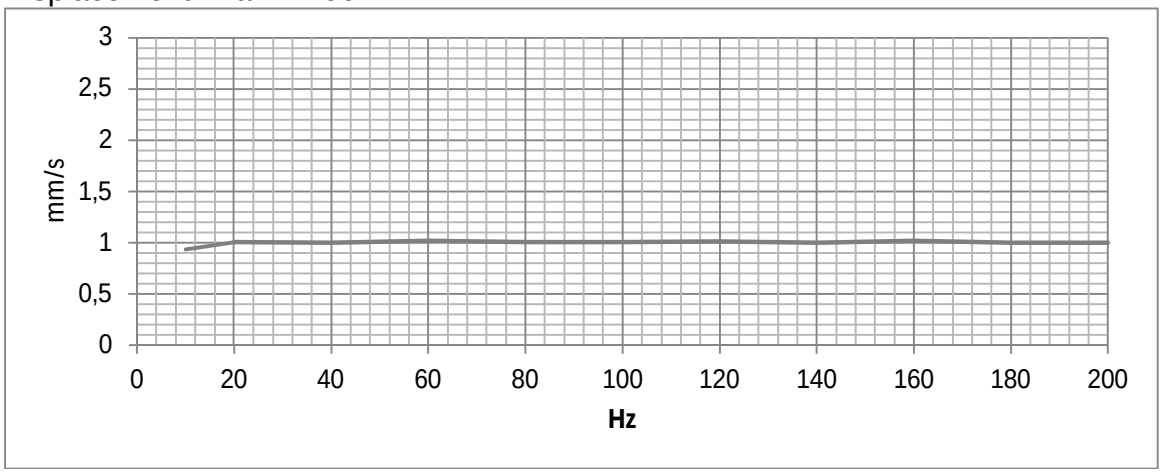
Displacement fmax = 50 Hz



Displacement fmax = 100 Hz

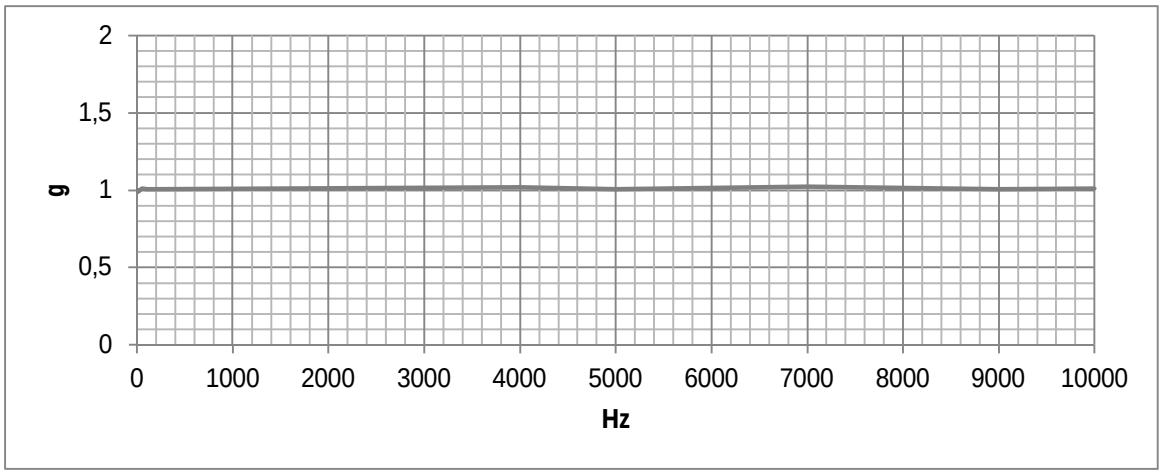


Displacement fmax = 200 Hz

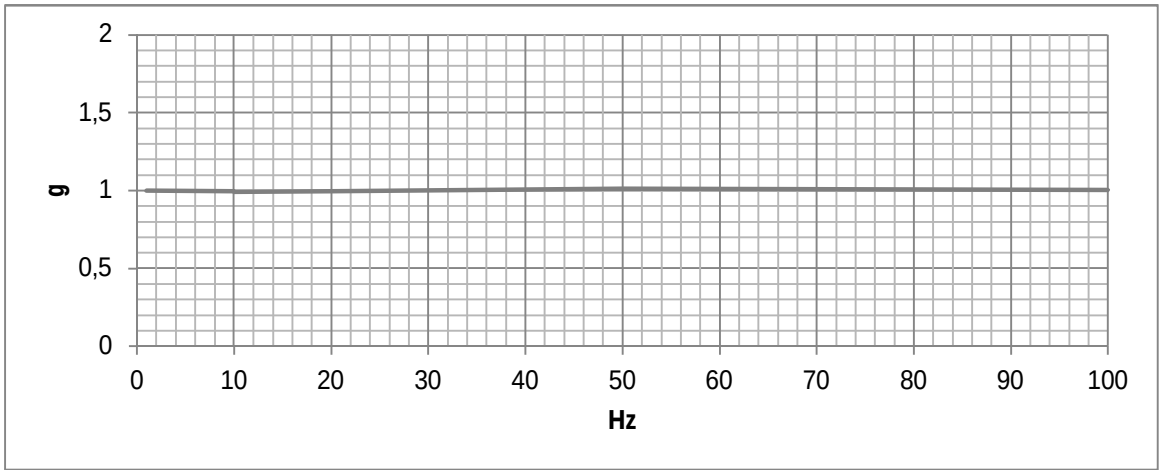


ICP Accelerometers channels

Acceleration fmax = 10000 Hz



Acceleration fmax = 100 Hz



Measuring Time Table:

Acceleration and Auxiliary AC						
fmax [Hz]	10	20	50	100	200	500
virtual fs [Hz]	25.6	51.2	128	256	512	1280
T acq of 1024 p/400l (sec)	40.00	20.00	8.00	4.00	2.00	0.80

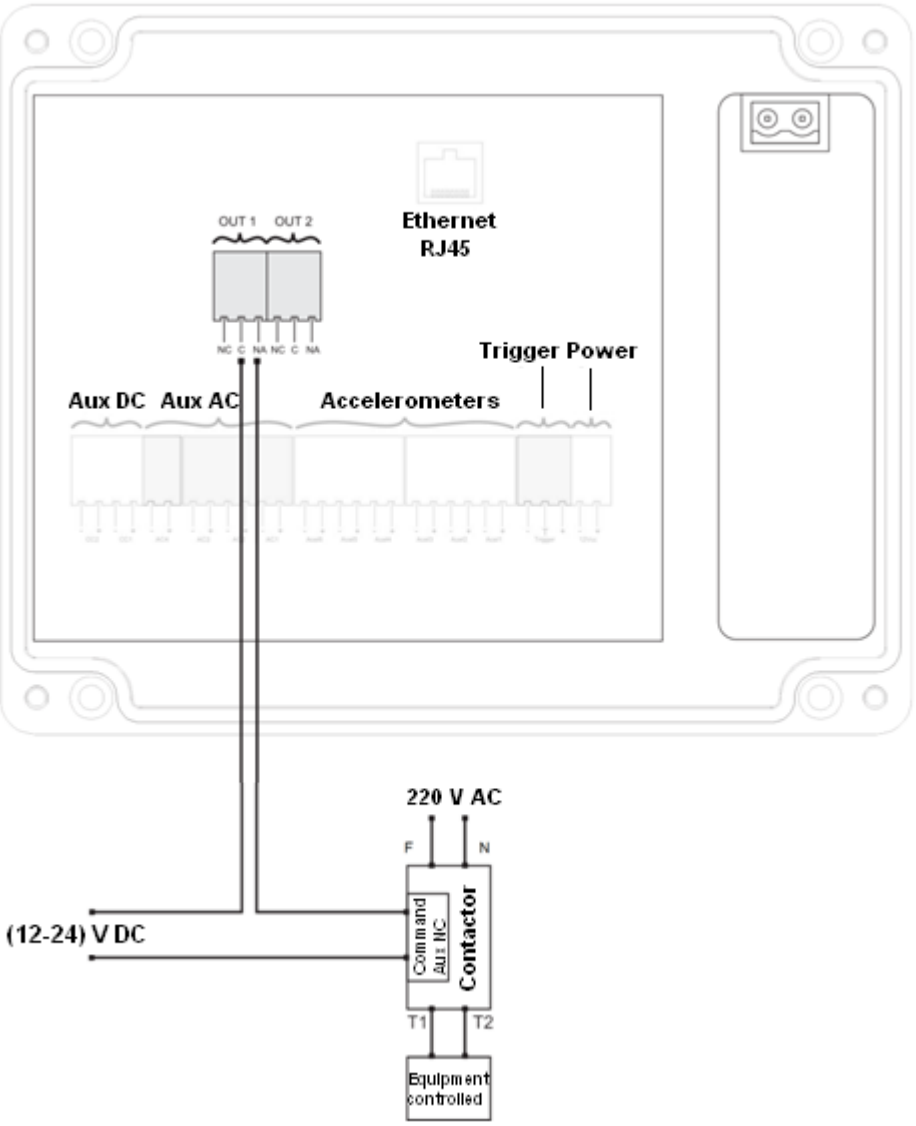
fmax [Hz]	1000	2000	5000	10000	15000	20000
virtual fs [Hz]	2560	5120	12800	25600	38400	51200
T acq of 1024 p/400l (sec)	0.40	0.20	0.08	0.04	0.03	0.02

Speed							
fmax [Hz]	10	20	50	100	200	500	1000
virtual fs [Hz]	25.6	51.2	128	256	512	1280	2560
T acq of 1024 p/400l (sec)	40	20	8	4	2	0.8	0.4
Transient T Filter 1% (sec)	40	20	8	4	2	0.8	0.4
Filter transient T 2.5% (sec)	20	10	4	2	1	0.4	0.2
Filter transient T 5% (sec)	10	5	2	1	0.5	0.2	0.1
Filter transient T 10% (sec)	5	2.5	1	0.5	0.25	0.1	0.05

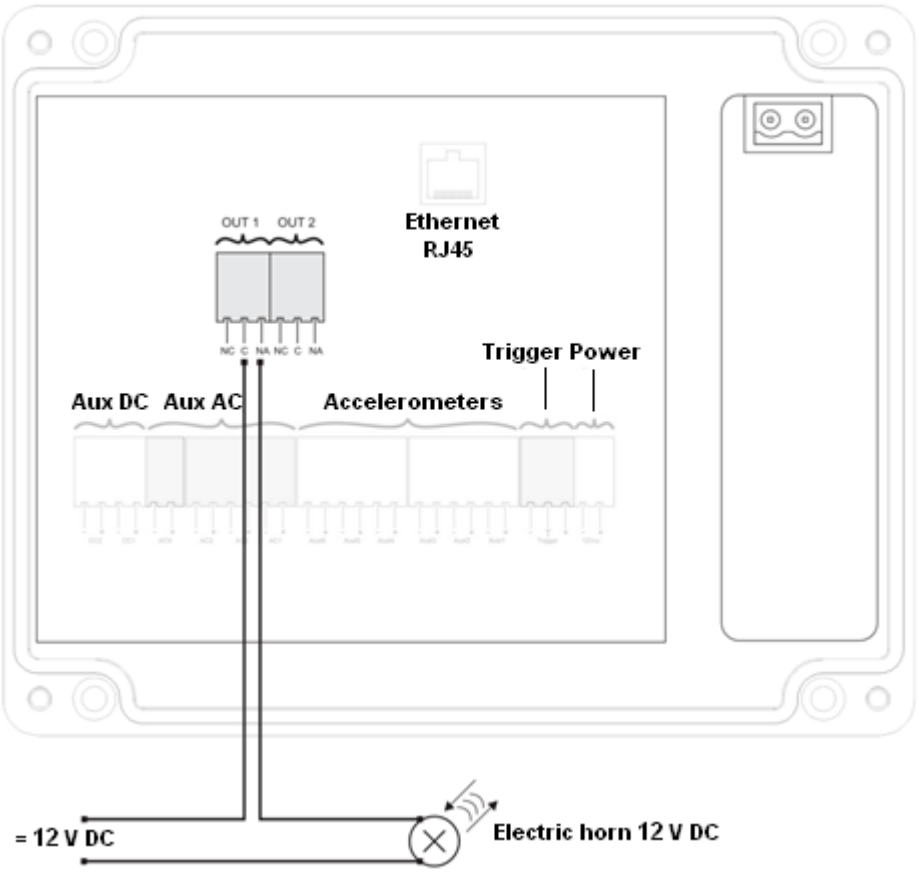
Displacement							
fmax [Hz]	10	20	50	100	200	500	1000
virtual fs [Hz]	25.6	51.2	128	256	512	1280	2560
T acq of 1024 p/400l (sec)	40	20	8	4	2	0.8	0.4
Transient T Filter 1% (sec)	80	40	16	8	4	1.6	0.8
Filter transient T 2.5% (sec)	40	20	8	4	2	0.8	0.4
Filter transient T 5% (sec)	20	10	4	2	1	0.4	0.2
Filter transient T 10% (sec)	9	4.5	1.8	0.9	0.45	0.18	0.09

Wiring Diagrams general:

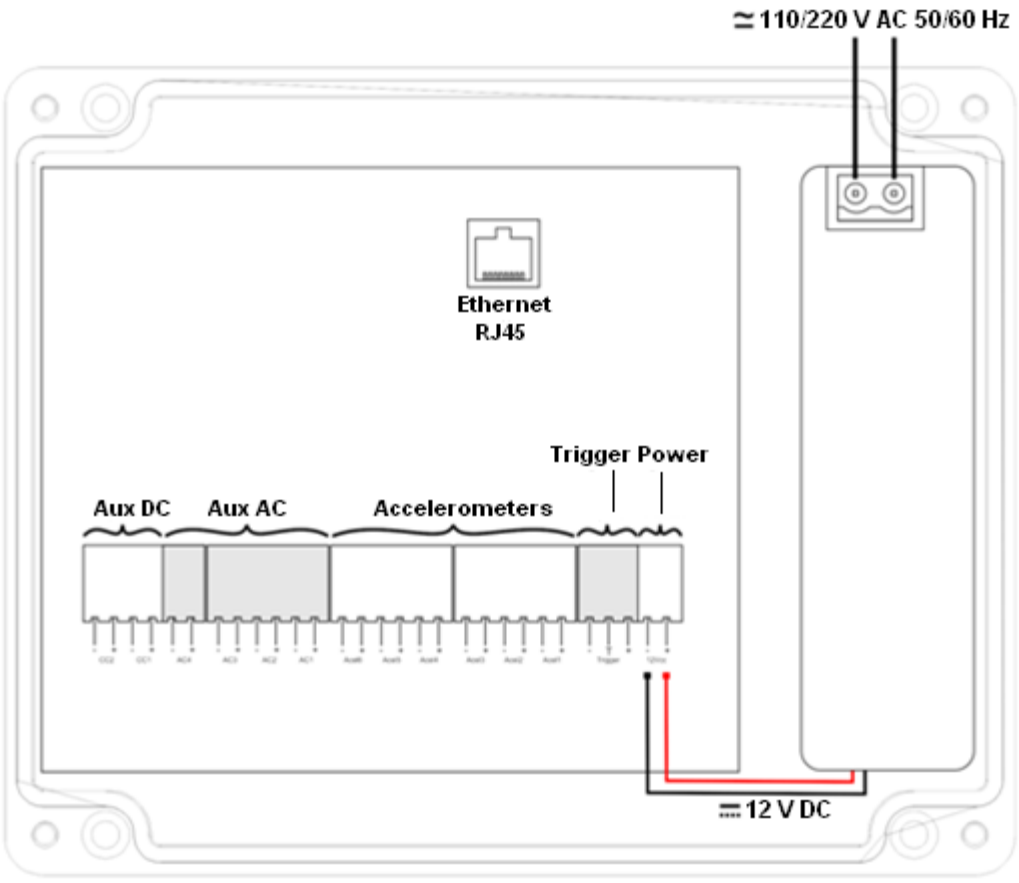
Contactor wiring diagram



Speaker connection diagram 12 V DC



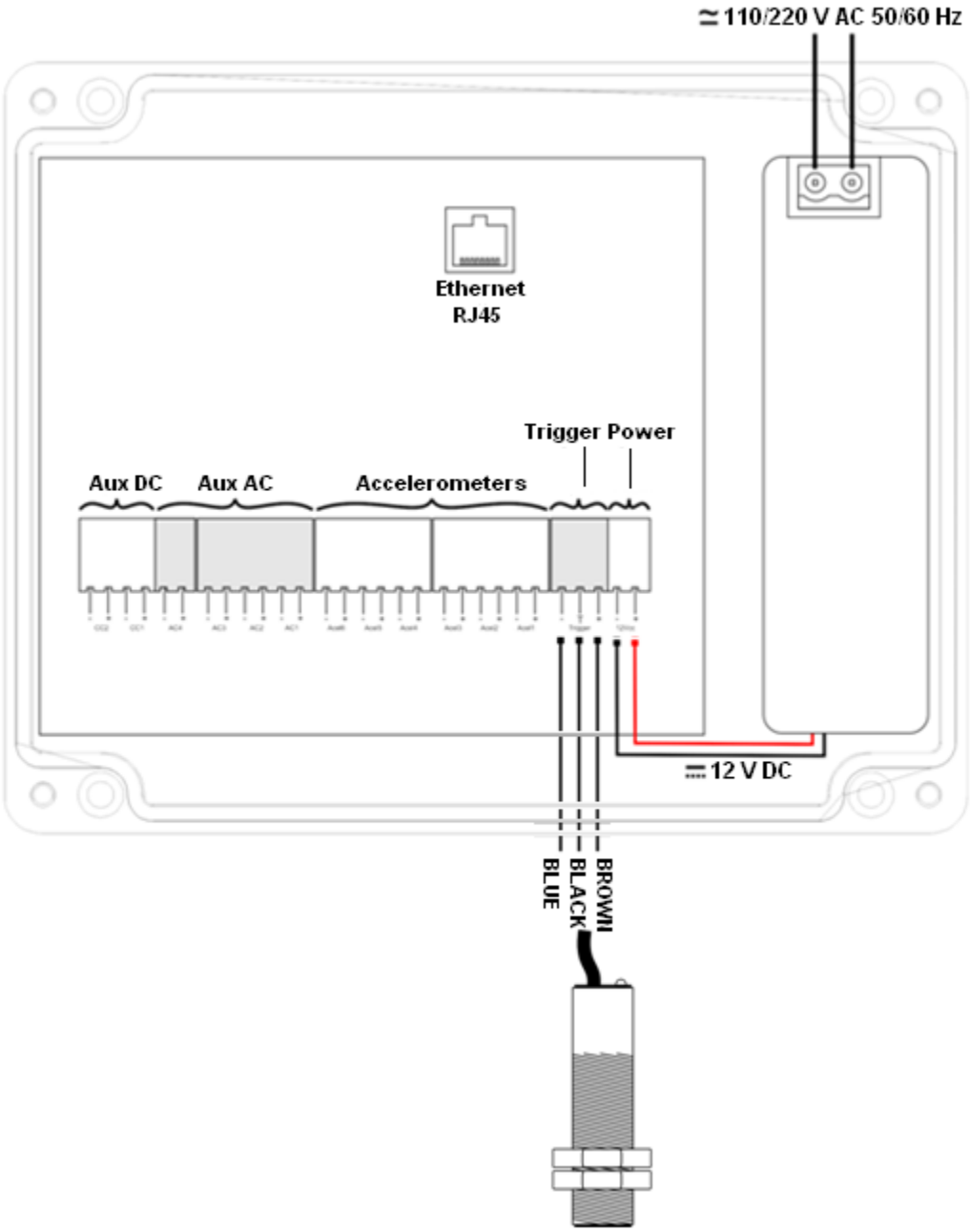
Ethernet Wire Connection Diagram



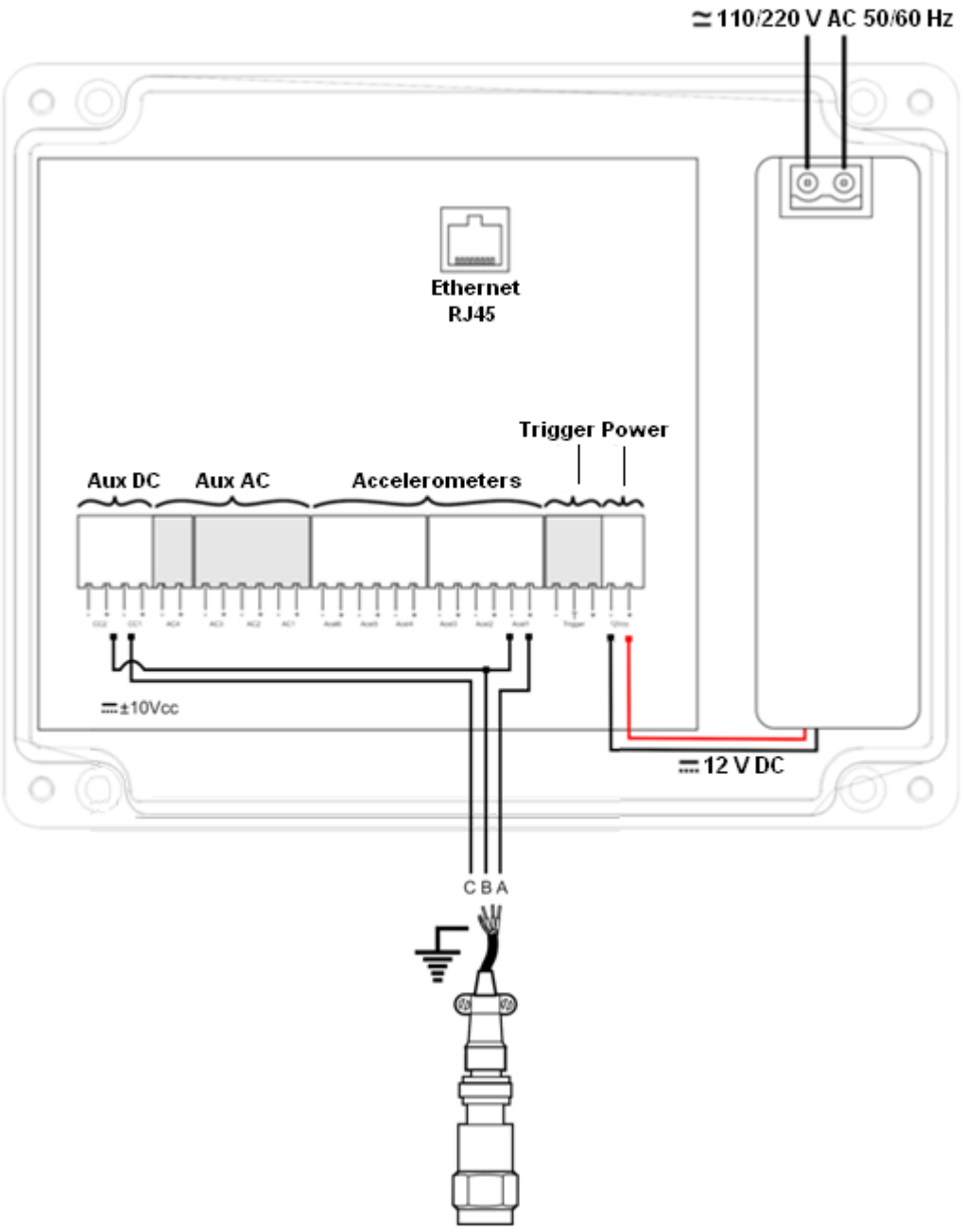
Direct Wire Norm T568A

Pin	Colour	Pin
1	White/Green (W-G)	1
2	Green (G)	2
3	White/Orange (W-O)	3
4	Blue (BL)	4
5	White/Blue (W-BL)	5
6	Orange (O)	6
7	White/Brown (W-BR)	7
8	Brown (BR)	8

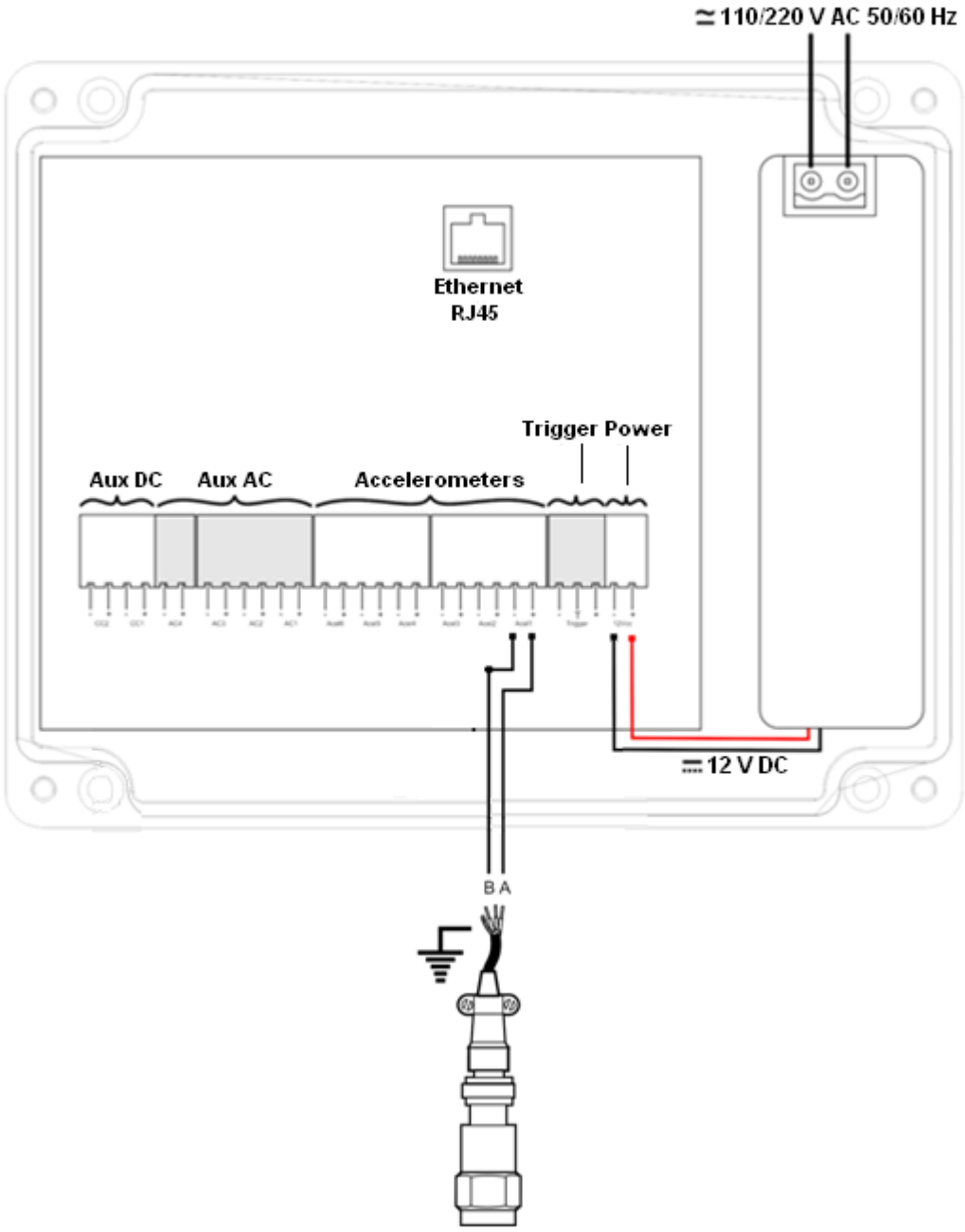
Optical Sensor Connection Diagram



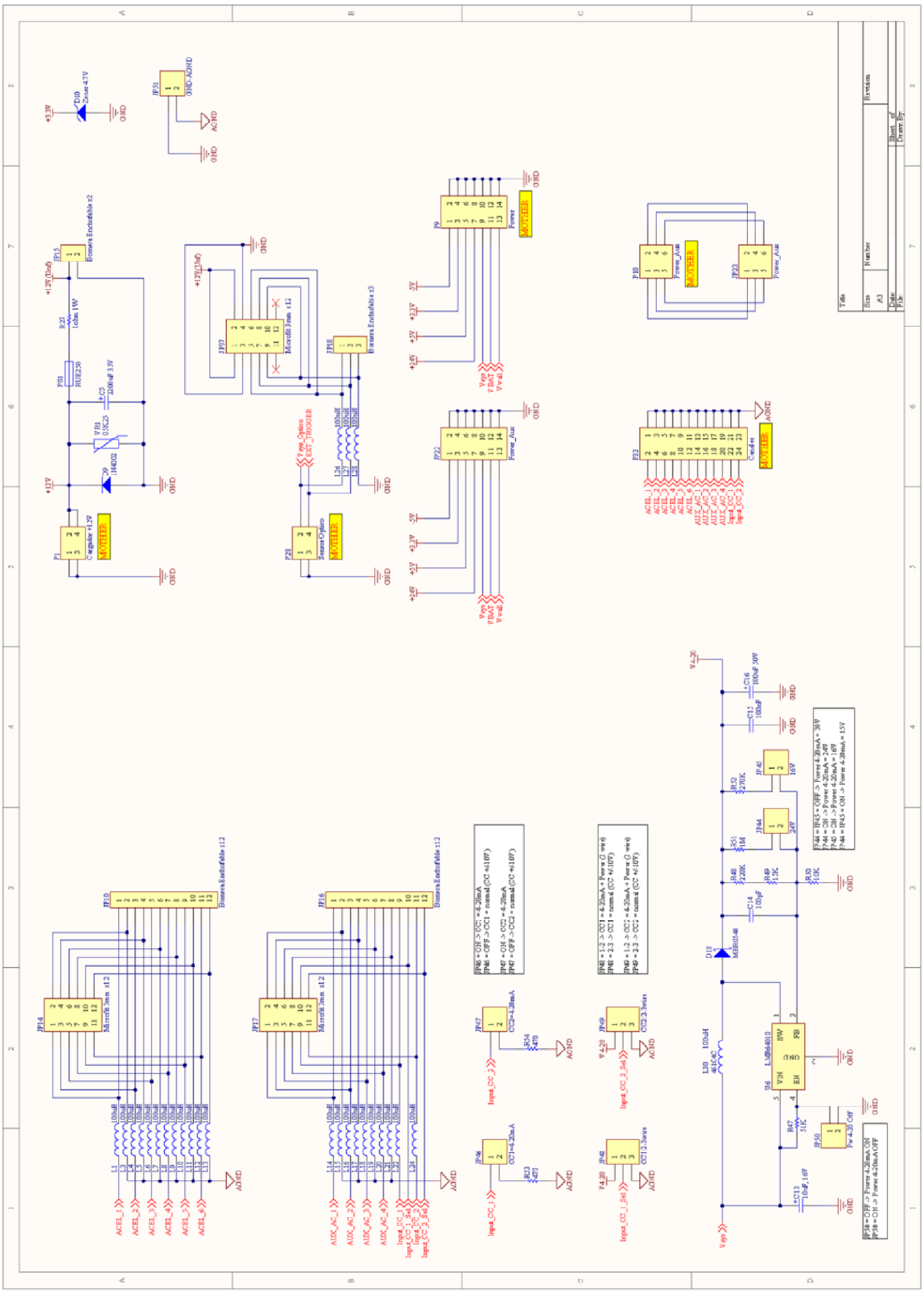
Dual Accelerometers Connection Diagram (Vib. /Temp.)

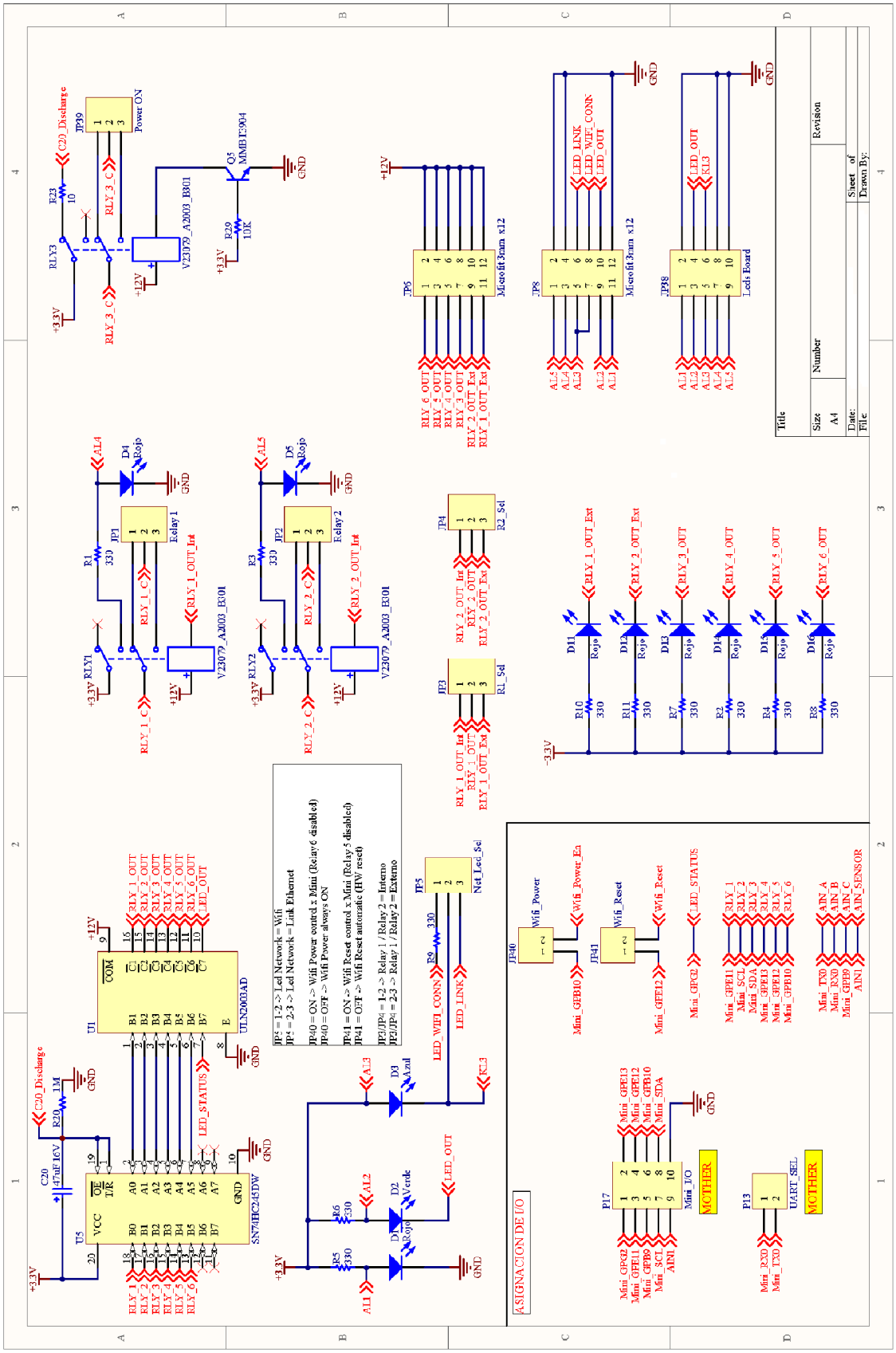


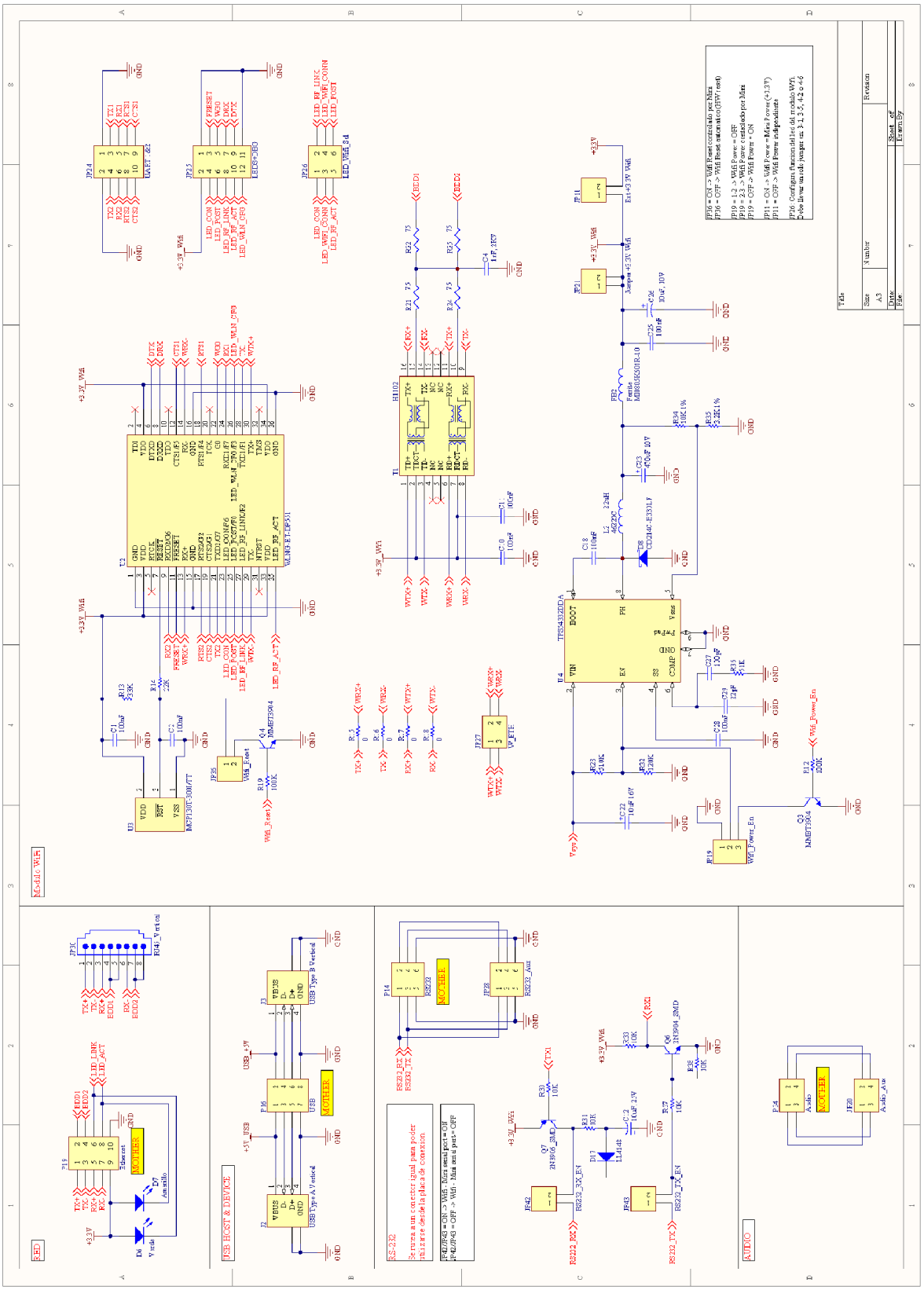
Accelerometers Connection Diagram

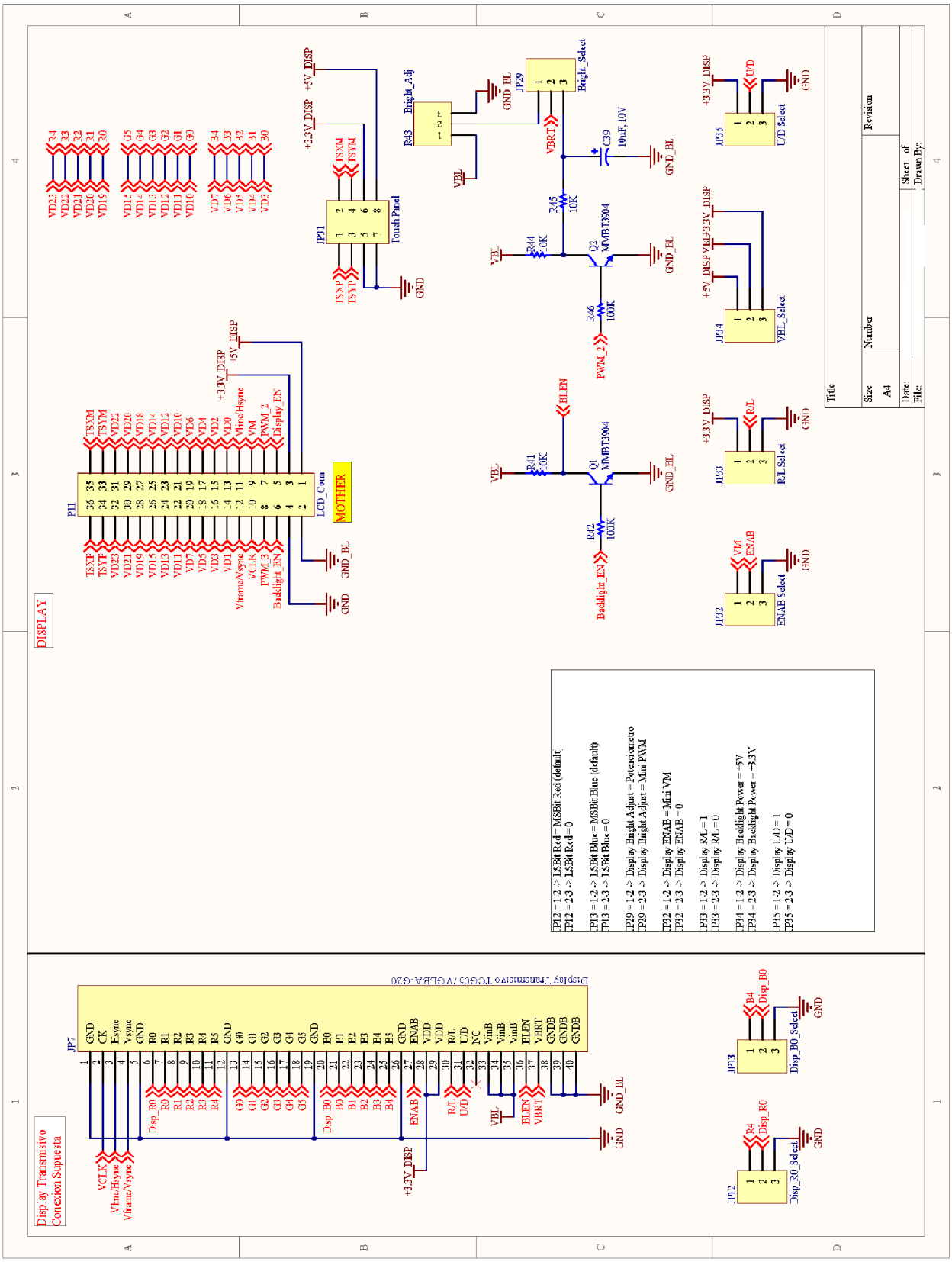


Wiring schematics, inputs, and outputs:




Title
Size: A4
Number
Revision
Date:
File:
Sheet of
Drawn By:
Relay 1
Relay 2
Power ON
Wifi_Power
Wifi_Reset
LED_STATUS
LED_LINK
LED_WIFI_CONN
LED_OUT
Micro fit 3mm x12
Leds Board
MOTHER
UART_SEL
ASIGNACION DE I/O
JP1: 1-2 -> Led Network = Wifi
JP1: 2-3 -> Led Network = Link Ethernet
JP40 = ON -> Wifi Power control x Mini (Relay6 disabled)
JP40 = OFF -> Wifi Power always ON
JP41 = ON -> Wifi Reset control x Mini (Relay5 disabled)
JP41 = OFF -> Wifi Reset automatic (HW reset)
JP3/JP4 = 1-2 -> Relay 1 / Relay 2 = Interno
JP3/JP4 = 2-3 -> Relay 1 / Relay 2 = Externo




DISPLAY
LCD_Conn
MOTHER
Touch Panel
Bright_Select
Bright_Adj
U/D Select
VBL_Select
R/L Select
ENAB Select
Disp_R0_Select
Disp_B0_Select
Display Transmisivo
Conexion Supuesta
JP7
Display Transistivo TCG057VGLBA-G20
JP12 = 1-2 -> LSBit Red = MSBit Red (default)
JP12 = 2-3 -> LSBit Red = 0
JP13 = 1-2 -> LSBit Blue = MSBit Blue (default)
JP13 = 2-3 -> LSBit Blue = 0
JP29 = 1-2 -> Display Bright Adjust = Potenciometro
JP29 = 2-3 -> Display Bright Adjust = Mini PWM
JP32 = 1-2 -> Display ENAB = Mini VM
JP32 = 2-3 -> Display ENAB = 0
JP33 = 1-2 -> Display R/L = 1
JP33 = 2-3 -> Display R/L = 0
JP34 = 1-2 -> Display Backlight Power = +5V
JP34 = 2-3 -> Display Backlight Power = +3.3V
JP35 = 1-2 -> Display U/D = 1
JP35 = 2-3 -> Display U/D = 0
Title
Size
A4
Number
Revision
Date:
File:
Sheet of
Drawn By: