



Corporate Office :
Khivraj Complex II, V Floor, 480, Anna Salai,
Nandanam, Chennai-600 035.
Tel : 044-4399 4666
Email : ptd_mhq@jkfenner.com,
www.jkfenner.com

Registered Office :
3, Madurai - Melakkal Road,
Kochadai, Madurai - 625 016.
Tel : 0452-2383801,
2383802, Fax : 0452-2383822



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BRANCHES:

Ahmedabad: 602, Wall Street Annx., Near Gujarat College Railway Crossing, Ellis Bridge, Ahmedabad - 380006. Ph: 079-26408573 / 26408572.

Bangalore: No. 109, 1st Floor, Brigade Rubix, Plot No.5, H.M.T. Main Road, Opp BFW, Bangalore - 560 013. Ph: 080-26756333, Fax: 080-26741001.

Indore: 58, New Dewas Road, Vallabh Nagar, Above SBI Branch, Malwa Mill Square, Indore - 452 003. Ph: 0731 4205048 / 4285048, 9981507191.

Jaipur: 511, Neelkanth Tower, C Scheme, Opposite Sahkar Bhawan, Jaipur - 302001. Ph: +91-141-2220410, 4160510. Mob: 9799394727.

Kanpur: 1st Floor, 13/391, Civil Lines, Kanpur-208001. U.P. Mob: 09793999997

Kochi: 48/559, B15, 3 rd Floor, Asthapan Arcade, Near Gold Souk Grande Mall, Service Road, NH-66, Vytilla, Kochi, Kerala - 682 019. Ph: 0484-6003888, 98950 71066.

Kolkata: Trinity.226/1 A J C Bose Road. 3rd Floor, Room No. 3D. Kolkata : 700 020

Ludhiana: Oberoi Towers, Building No. BXV/85, First Floor, G.T.Road, Miller Ganj, Ludhiana - 141 003. Ph: 0161-2410214. Fax: 0161-2443791.

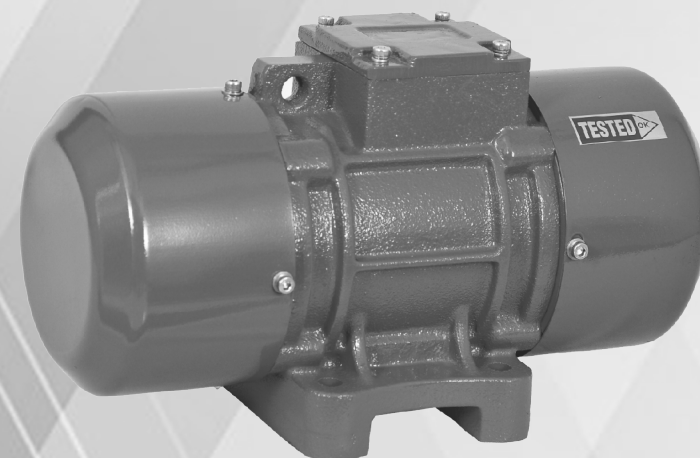
Madurai: 117/6E, Madurai - Usilampatti Road, Meenakshipuram, Madurai - 625 016. Ph: 0452-2383920, Fax: 0452-2383921.

Navi Mumbai: 105, Gauri Complex, Sector-11, CBD-Belapur, Navi Mumbai-400 614. Ph: 022-27560985, 022-27580236, Fax: 022-27563330.

Pune: 38, 4th Floor, Solitaire Business Hub, Near Ambience Hotel, Kalewadi Phata, Wakad, Pune. Maharashtra-411 057. +91 20 8605789829

New Delhi: 2nd Floor, Delite Theatre Building, Asaf Ali Road, New Delhi - 110002. Ph: 011-23243113, 23243153, 23243154, Fax: 011-23243114.

Hyderabad: Sai Nivas, D.no.10-1-214/A1 & A2, 2nd Floor, Above SBI Bank, Police Station Lane, West Marredpally, Secunderabad 500 037. Ph: +91 9989754751



INSTALLATION & MAINTENANCE MANUAL OF VIBRATOR MOTOR

1. General:

Vibrator motor is the machine which generates powerful centrifugal force vibration by rotation of Eccentric Weights attached in the rotor axis at both ends. The value of this centrifugal force can be changed by adjustment of the Eccentric Weights while the motor are at standstill. When used as a single unit, they impact circular vibration. If linear vibrations needed, two vibrators running in the opposite direction should be used.

The applications of the vibrator motor include the following. These motors are used in numerous material handling devices like conveyors, vibrating feeders, vibrating table, vibrating Screens and shake out vibrator for foundries. These are also utilized on hoppers, silos to stop blocking of the flow of material.

2. Motor arrangement and direction of rotation:

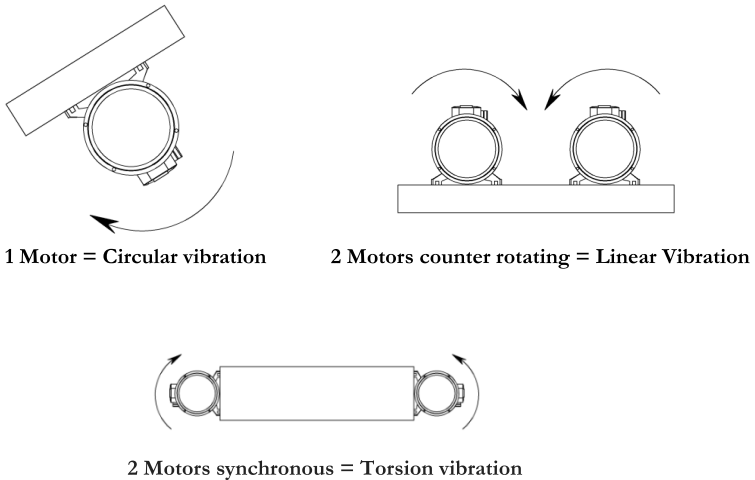


Fig-1

Intended Use:

The vibration motor is not an autonomous functioning machine; it is designed to operate only with another machine. Commissioning is prohibited until it is determined that the functional machine conforms to the provisions of the machine directive. The vibration motors are designed exclusively to drive a vibrating device. The vibrating device must be designed for the demands generated by the vibration motor. Vibration motors must not be operated without Eccentric Weight. The intended use also includes observation of the Operation Manual.

3. Installation on Site:

- ◆ Vibrator motor should be installed on flat surface, else local forces may develop breakage of legs.
- ◆ The Base plate part, to which the vibrator motor is placed, must be levelled, vibration-resistant, free from paint, corrosion, grease, oil, and machined flat surface.

- Use quality bolts & self-locking nuts. Tighten only with a torque wrench.
- Retighten bolts after 15 minutes of operation during initial installation. Check bolts and nuts after every 15 minutes, until retightening is no longer possible.
- Check the Eccentric Weights percentage on both sides, percentage setting must be same on both sides.
- The motor Electrical connection must only be connected by an authorized electrician. The voltage and frequency of the site must be in line with that of the motor rating.
- In order to attain a permanent pretension, the attachments screw require a certain minimum grip length, the minimum grip length should be 3times the nominal diameter. The grip length is the distance between the underside of the bolt head and the nut.

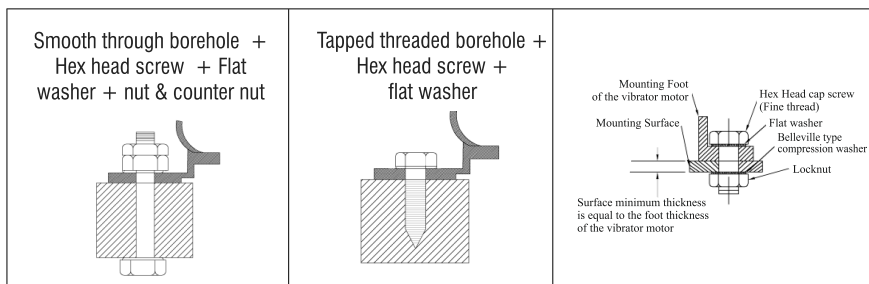


Fig-2

A. Torque Sequence:

The mounting bolts to the vibrator motor can be tightened in the following sequence

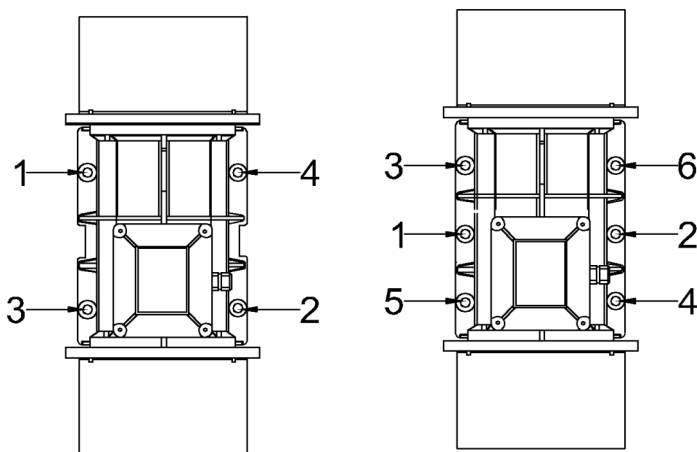


Fig-3

"All electrical wires connection shall be carried out by authorised electrician only"

The required torque values are specified in below table

Size	Grade 9.8	Grade 12.9
M6	11	19
M8	28	47
M10	55	85
M12	95	165
M14	150	260
M16	240	400
M18	330	560
M20	475	800
M22	650	1075
M24	825	1350

Table-1

Note : Bolt must be grease and oil free. Be certain that a safety cable is employed, where injury might be caused by a falling motor due to the loosening of fasteners.

4. Electrical Connection :

- ◆ Ensure IP 65 / IP 66 (depends on the type) protection by thoroughly sealing the cable connections, blanking plugs and terminal box cover.
- ◆ Below 2HP motors, for thermal protection comes with TOP (Thermal Overload protector), must be connected with suitable DOL Starter.
- ◆ Above 2HP motors, fitted with PTC (Positive Temperature Coefficient), this must be connected with suitable temperature controller unit incorporated in panel board.

Note : After Connection, the terminal box cover must be carefully closed with protective Rubber Sleeve supplied with the motor to prevent Dust and humidity entering.

A. Connection

In the terminal box, connect the terminal board as a star or delta connection as follows.

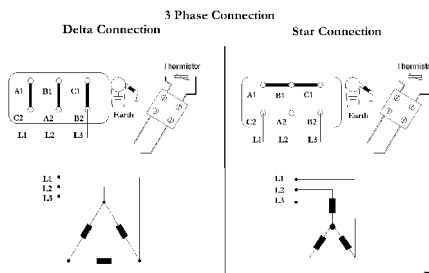


Fig-4







Fig.-6

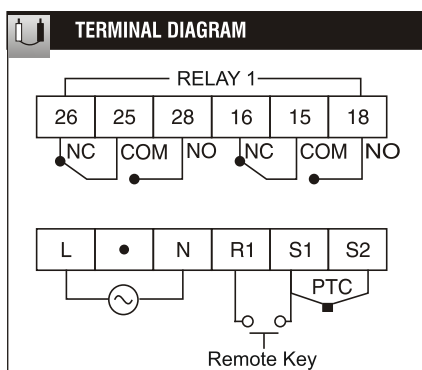


Fig.-7

PTC Thermistor Protection Relay

Before connecting, observe the following points:

- Observe the insulation resistance (IR) by using Megger.
- Connect each vibrator motor individually through a motor circuit breaker.
- If the vibration motor is exposed to high thermal loads, by frequent switching on and off or because of the ambient conditions, a PTC resistor cutout should be installed on the motor to protect it.
- When connecting two Vibrator motors, check them for contra-directional sense of rotation.
- Use appropriate measures to make sure that the maximum speed is never exceeded. Otherwise there is a risk to the machine and persons.

B. Operation at 50 Hz

The mains frequency determines the speed of the motor. The vibrator motors, designed for operation at 50 Hz, must not be operated at a frequency 60 Hz or, using a frequency converter, at a frequency of more than 50 Hz. Operation of the motor at a frequency of more than 50 Hz will result in a substantial reduction in the service life of the bearings. Premature failure of the bearings and motor could occur. Furthermore, damage to, or destruction of, the vibrating machine can occur. The centrifugal force increases by 44% for a motor operated at 60 Hz, compared to a motor operated at 50 Hz and unchanged Eccentric Weights setting.

C. Cable Connection Assembly :

Vibrator motors are provided with M16 & M20 Cable Gland.

Prior to assembly check the product for possible damages. Appropriate tools should be used for the assembly.

1. Mount the cable gland. Tighten the socket properly.
2. Remove the outer insulation of the cable. Put the cover nut and the clamping adapter on the cable.
3. Lead the cable with the mounted parts through the prepared cable gland. Tighten the cover nut with a torque corresponding to the size of the cover nut.

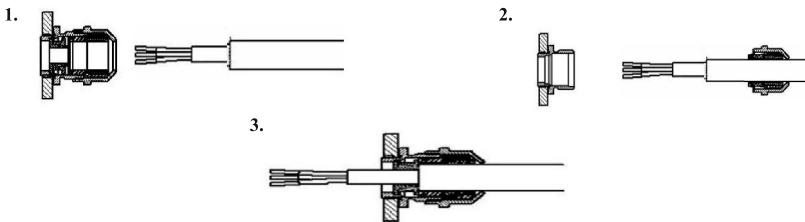


Fig-8

D. Earthing

- ◆ The motor connection at the mains must be earthed.
- ◆ The earth can be connected inside the terminal box & through an earthing terminal, on the outer surface of the vibrator motor.
- ◆ After connection, the terminal box cover must be carefully closed.

5. Adjusting the Centrifugal Force (riveted scale):

As standard, the vibrator motors are delivered ex works with the centrifugal force set at 100%.

Adjustment of eccentric mass to achieve required centrifugal force shall be done as follows:

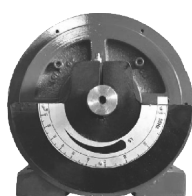
1. Disconnect/Isolate all power connections to the unit
2. Remove the protective End Cover from both sides, exposing the eccentric weights.
3. Loose the bolts of the Outer Eccentric Weights on both sides of the vibrator motor and rotate the eccentric weights in the same direction as 100 % to the desired force output percentage position at both ends of the motor.
4. Make sure adjustment should be made on both sides and also the setting percentage should be same on both sides.



Left Side – LS



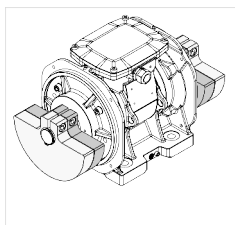
Right Side – RS



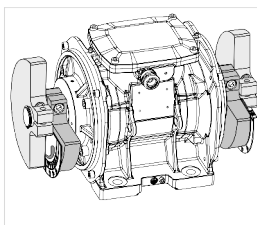
Left Side – LS



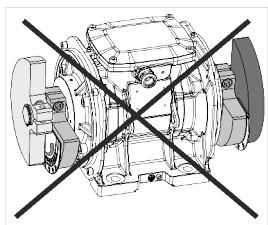
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MASSSES AT 100%



ADJUSTED MASSES



INCORRECTLY ADJUSTED MASSES

Fig.-9

A. Enlarge View of Riveted Scale:

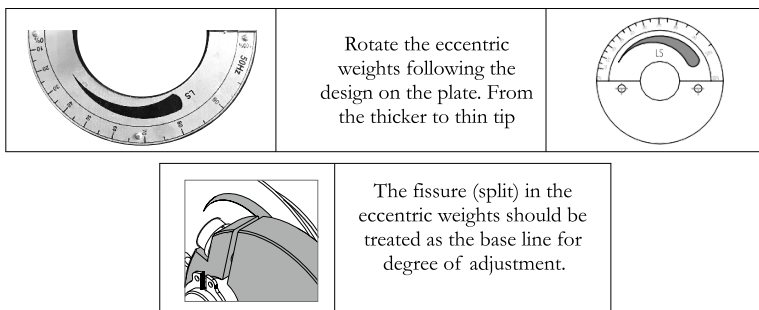


Fig.-10

Note:

- ✦ Unequal setting of the Eccentric Weights will generate excessive uncontrolled transverse forces which may result in destruction of the motor and the vibration machine.
- ✦ Make sure eccentric weights bolts have been retightened securely and replace end cover in their proper position.
- ✦ Never loosen the inside eccentric weights, closest to the motor.
- ✦ Rotate the eccentric weights in the opposite direction to the cable gland

6. Safety Precautions :



The vibration motor must only be started when it has been assembled to the relevant machine, with all safety devices



Attention: When operating, or working on the vibration motor, the flyweights of the vibration motor may rotate unexpectedly. Risk of impact or crushing

- ◆ When setting the operating torque the vibrator motor, the Eccentric masses of the vibrator motor may rotate unexpectedly. It may lead to risk of impact or crushing.
- ◆ During continuous operation of the motor, the operating temperature on the surface of the stator housing must not be higher than 80°C.
- ◆ Do Not Operate the Motor without Circlip in Shaft, End cover, Rubber seal in End cover.
- ◆ To prevent injury from falling vibrator motor, install a safety chain or cable on all installations.

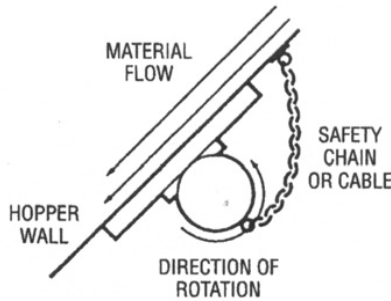


Fig.-11

Storage:

The vibration motors should be stored until final installation, in accordance with the following specification.

- ◆ In closed dry rooms.
- ◆ At a maximum ambient temperature of 40°C (104°F).
- ◆ Free from vibration, to prevent damage to the bearing.
- ◆ The motor and, particularly the terminal box, must be closed.

If the vibration motor is stored in the open, cover it with an awning, open at the bottom, to protect it from moisture. The cover must be placed so that any condensation can run off.

To prevent the influence of ground moisture, place the vibration motor on a suitable support or on a shelf.

If packed for transport by sea, the packaging of the vibration motor must not be damaged, or opened, during transportation and storage.

7. Maintenance:

We recommend the use of MOBIL Synthetic lubrication "Mobilith SHC 100 lithium Complex Synthetic Grease" as a bearing lubricant for all vibrator motors with roller bearings.

S.No	Model	Bearing	Volume Of Grease	Interval	
			in grams (approx)	Month	Hours
1	FVM 276/15	NJ 2307	15	3	1800
2	FVM 321/15	NJ 2307	15	3	1800
3	FVM 380/15	NJ 2309	20	3	1600
4	FVM 540/15	NJ 2311	30	3	1100
5	FVM 725/15	NJ 2315	50	3	800
6	FVM 116/10	NJ 2307	15	3	2500
7	FVM 143/10	NJ 2307	15	3	2500
8	FVM 180/10	NJ 2307	15	3	2500
9	FVM 240/10	NJ 2309	20	3	2300
10	FVM 306/10	NJ 2311	30	3	2200
11	FVM 400/10	NJ 2312	35	3	2000
12	FVM 506/10	NJ 2315	50	3	1100
13	FVM 636/10	NJ 2315	50	3	1100
14	FVM 874/10	NJ 2317	60	3	1200

Note : Grease Garde is Mobilith SHC 100TM (Brand Name is Mobil) or Equivalent Grade Grease

Table-2

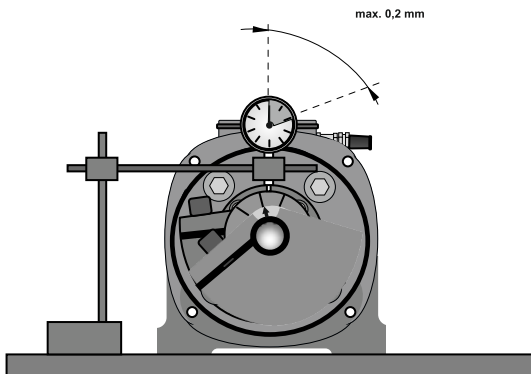
Vibrator motors with Ball bearings are sealed bearings. These bearings are factory lubricated for the life of the bearings.

The life cycle of the bearing depends on the operating conditions the vibration motor is exposed to. It is mainly influenced by ambient temperatures during operation, the mass ratios of the vibration unit, the loads due to interactions (vibration superimpositions) with other vibration motors (group operation), and rebound impacts of unaccelerated masses in the contact moment to the vibrating system. Therefore, the actual bearing life cycle can strongly deviate from the determined theoretical life cycle. The bearings have to be considered as wear parts whose life cycle depends on the operating loads.

The dimensioning of the bearings is constructed in such a way that 5000 operating hours should be achieved without problems. The theoretical life cycle is exceeded significantly in a large number of applications.

Note :

To prevent consequential damages or plant breakdown the axial and radial clearances of motor shaft have to be verified periodically after 2000 working hours (once a year min.) at both sides of motor see below figure (Verifying radial clearance).



“Figure Verifying radial clearance”

Fig.-12

Bearings have to be changed, if bearing gap is $> 0.2 \text{ mm}$.
Axial clearance is allowed to be between $0.5 - 1.5 \text{ mm}$.

8. A. Periodical Inspection:

Interval	Points to Check	Procedures and Criteria
Daily	Load Current	Load current measured with an ammeter should be less than the rated value.
	Bearing Noise	Check bearing noise with or without rod. Bearings should not generate intermittent or metallic noise.
Monthly	Loose Screws	Screws should be tightened to a specific torque.
	Cables	Visually inspect cables. They should not be damaged.
Annually	Insulation resistance of the motor winding	Insulation resistance across terminals of a stator coil, measured with a megger, should be 5 Mega ohms (minimum.)

Table-3

8. B. Troubleshooting:

Observation	Causes	Inspection Procedures	Remedies
Vibrator doesn't start	Two cables of the vibrator or two phases of the coil are broken	Measure the voltage drop across the two phases	Replace the broken cables, rewind the coil
The vibrator moans and does not accelerate	Single phasing	Same as above and check cables for looseness	Same as above or securely connect the cables
	Ambient temperature is too low or there is an excessive amount of grease	Remove the weights covers and rotate the shaft 30 to 50 turns by hand	Adjust the vibrating force to 20% to 30% of the maximum value
Abnormal bearing noise	Damaged raceway surface	Check bearing noise using rod	Replace the bearing
Temperature of the vibrator body is too high	Ambient temperature is too high	Measure ambient temperature	Decrease the ambient temperature to a maximum of 60°C
	A lot of foreign matter has adhered to the vibrator	Check the condition of the foreign matter attached to the vibrator	Carry out dust prevention measures
Thermal relay Is tripped	Short-circuit between phases of the coils	Compare the resistance between phases of the coils	If there is a large difference in resistance between the phases of coils, replace the coils
	Loose screws	Check screws for looseness	Tighten screws
	Abnormal vibration	Ensure that the vibrator rotates in the correct direction and that the vibrator body is free of defects	Correct vibrator rotation direction or repair
	Load is too large	Measure load current	Decrease vibrating force
	Damaged bearing	Rotate the shaft by hand and check that the bearings are not damaged	Replace the bearing

Table-4

9. Do's and Don'ts:

Do's	Don'ts
<ul style="list-style-type: none"> Before operating the motor ensure that proper power supply availability and Thermal overload Protector (TOP) connected with DOL starter & the Positive Temperature Coefficient thermistor (PTC) is connected with Temperature Controller Unit. When using two vibrator motors in same machine, ensure that the same centrifugal forces must be set in both the motors When using two vibrator motors, ensure that individual over load relays are Connected. For higher HP motors Using VFDs (30Hz to 50Hz)/ Soft starters are highly recommendable for smooth functioning. Before installing motors, ensure base surface is levelled & motor foot meeting points are even and aligned. For more switching ON/OFF operations use VFD /Soft starter for smooth start up 	<ul style="list-style-type: none"> Do not operate the Vibrator Motor before it has assembled to relevant machine, with all safety procedure. Do not use multiple connections in same motor circuit breaker Do not run the Motor without overload protection Relay Do not operate without protective covers over the Counter weights. Do not use inappropriate bolts and nuts, the vibration motor can become loose and cause serious damage (most of the malfunctions and failures are caused by incorrect or loose connections) ensures that.

10. Warranty :

From the date of delivery of all new vibration motors we provide a warranty period of one year.

The warranty becomes invalid if :

- The motor is used for purposes other than the intended use.
- The motor is operated on a defective machine.
- The motor is incorrectly connected, or connected to the incorrect Power supply.
- Damage to the motor occurs because of incorrect, or missing, electrical protection.
- Modifications have been made to the motor that could influence the efficiency of the motor.
- The motor was operated without Eccentric Weights.
- Damage occurred during transportation.
- The motor is operated with the terminal box cover open, unsealed protective covers, an incorrect cable or the cable connection is not sealed.
- On receiving the customer shall check that it has no faults that it has suffered no damages during shipping and the supply is complete. Damages/missing items has to communicated immediately by writing to the manufacturer, Counter signed by the transporter.