



## USER MANUAL

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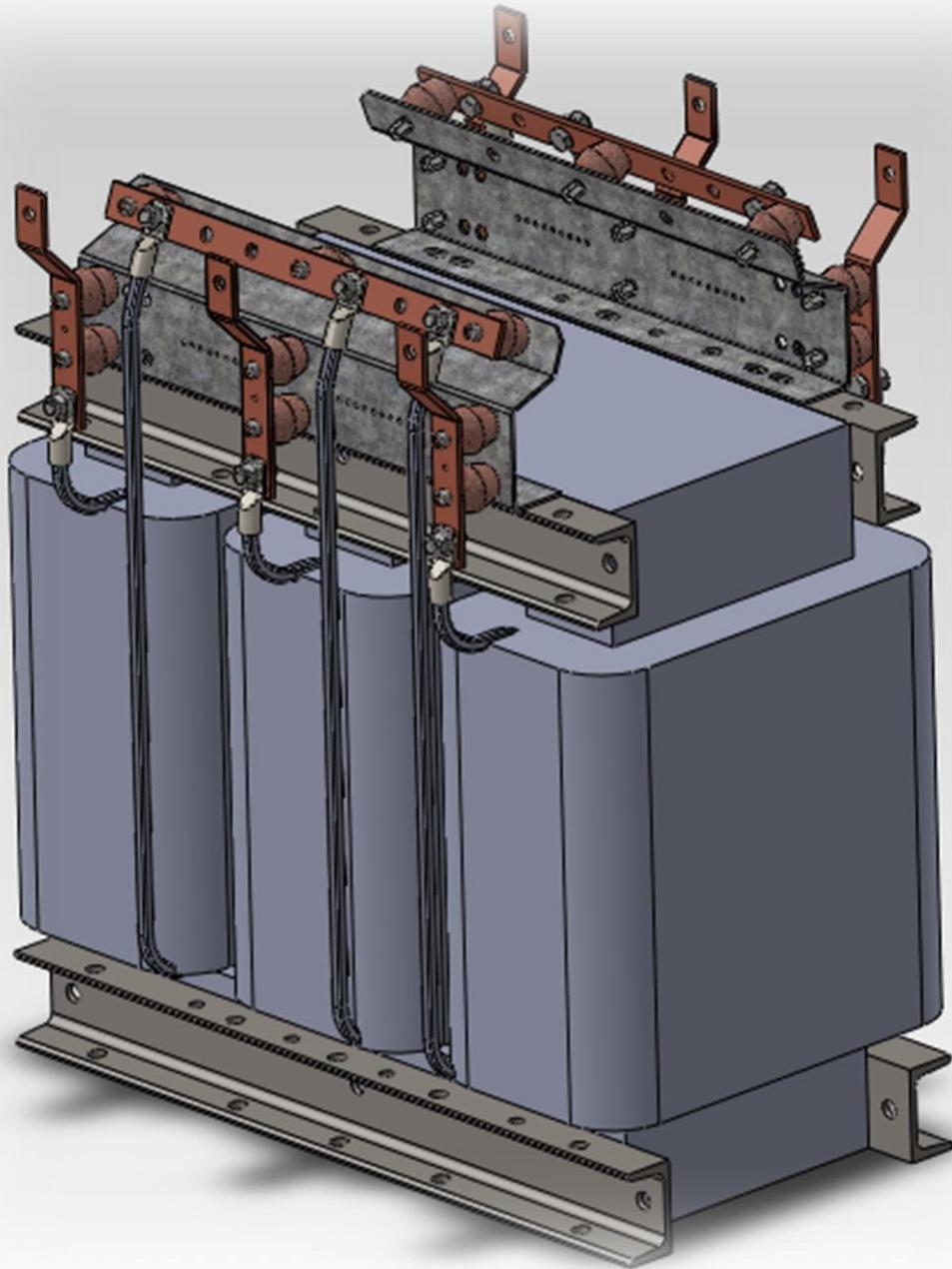
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## **DRY TYPE TRANSFORMER**

## PLATE



## REQUIREMENTS FOR TRAFO OPERATION

Observe all the conditions in the instruction manual.

The use of the transformer should be done in accordance with the information on the plate.

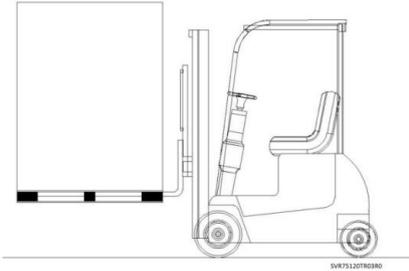
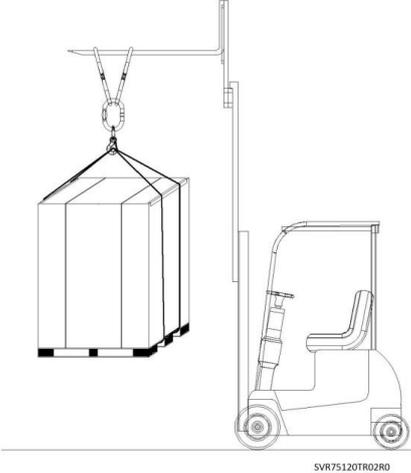
The earth connection must be selected correctly.

The transformer must be protected against chemical effects, air pollution, direct sunlight and natural conditions.

The transformer must be protected against mechanical accidents during installation and operation.

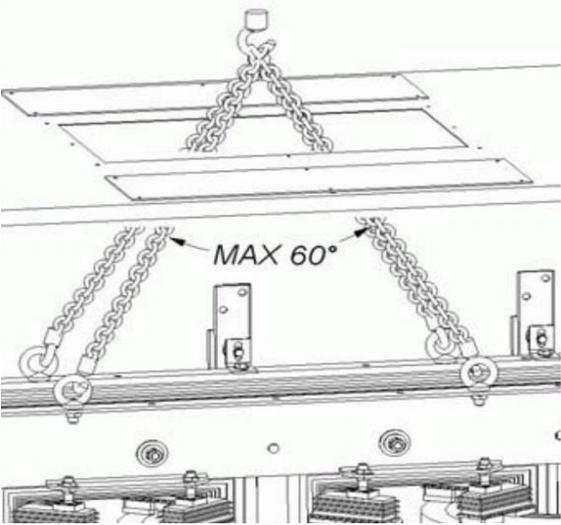
# TRANSPORTATION, PURCHASE AND STORAGE

## TRANSPOR OF THE TRAF0



\*Transformer should be fixed at the top of the frame during connection.

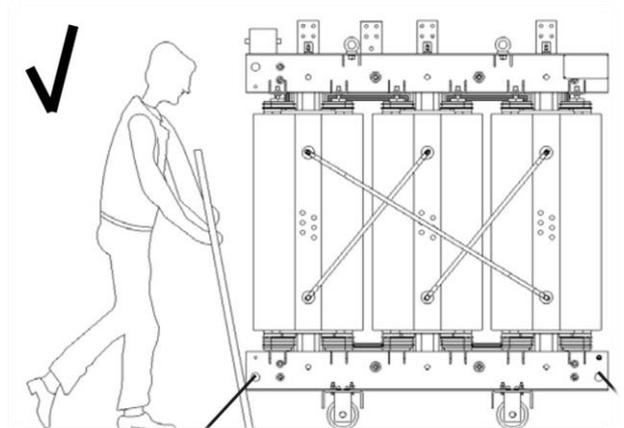
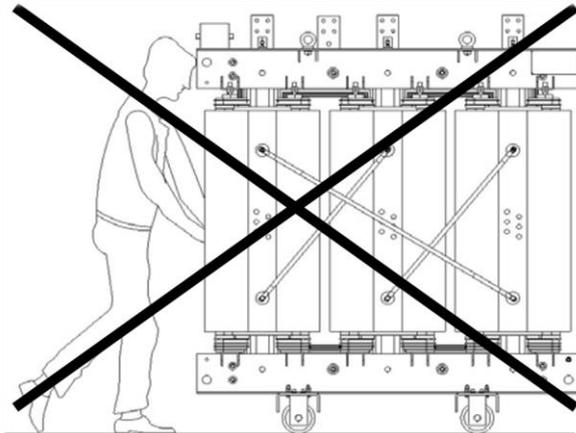
\* All detected shipping errors must be reported to MAKELSAN by fax or mail within 3 days.



\*Do not stand under flooded traction.

\*Transformer can be rolled.

## TRANSPORTATION OF THE TRANSFORMER



**Transport of the trafo ( with or without cabinet) should be done with two way wheels or with lift rails.  
The maximum carrying distance with wheels is 10 meters.**

## STORAGE

If the transformer is not to be used immediately after transport, it should be protected against weather conditions, nausea and tobacco.

The transformer is delivered in PVC packaging, and should not be removed during packaging storage.



**Ambient heat**

**Should not fall below -25 ° C**

## **INSTALLATION**

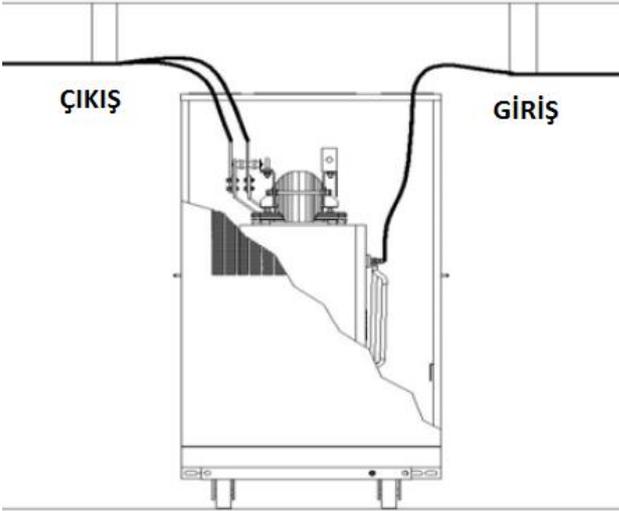
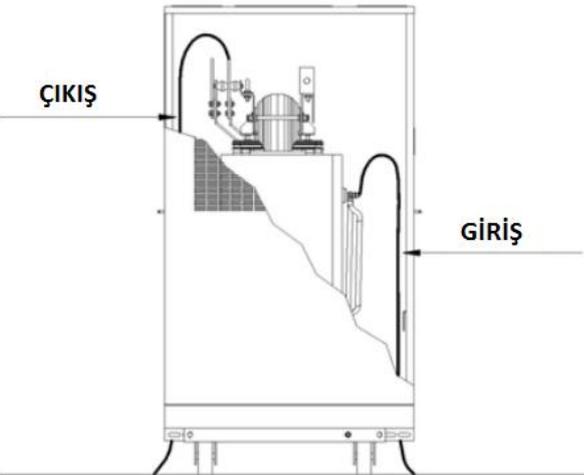
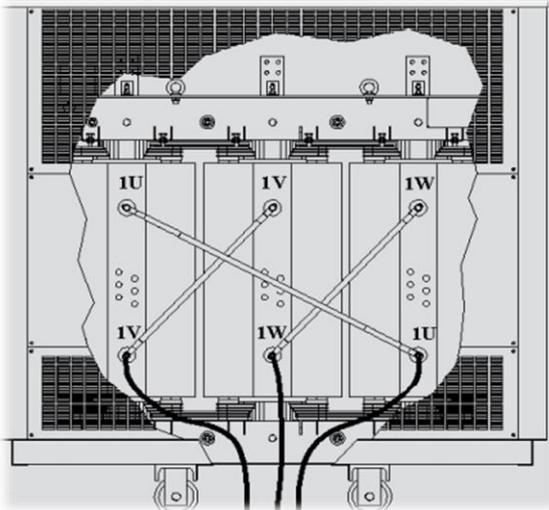
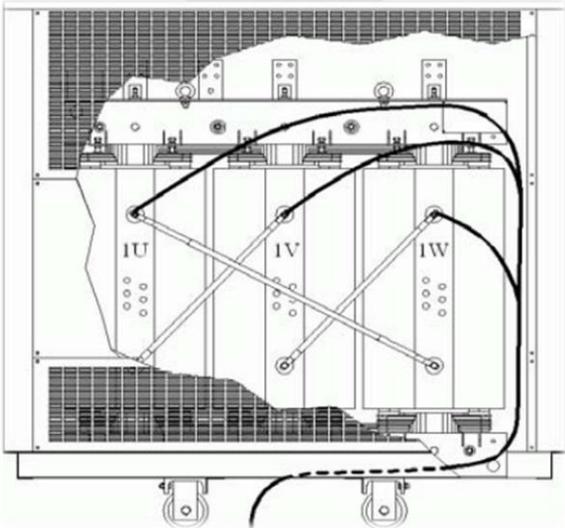
Dry type trucks are produced for enclosed spaces. It must be used away from moisture and water in the specified temperature conditions: Max. Working temperature + 40 ° C, daily average + 35 ° C, annual average + 20 ° C

On request, the transformers can be produced in special environments and in outdoor environments.

In order not to cause any accidents, it should be done according to assembly standards.

When the transformer is used in the chemical industry (oil refinery, paint factory, etc.), national standards must be observed

# CABINET MOUNTING



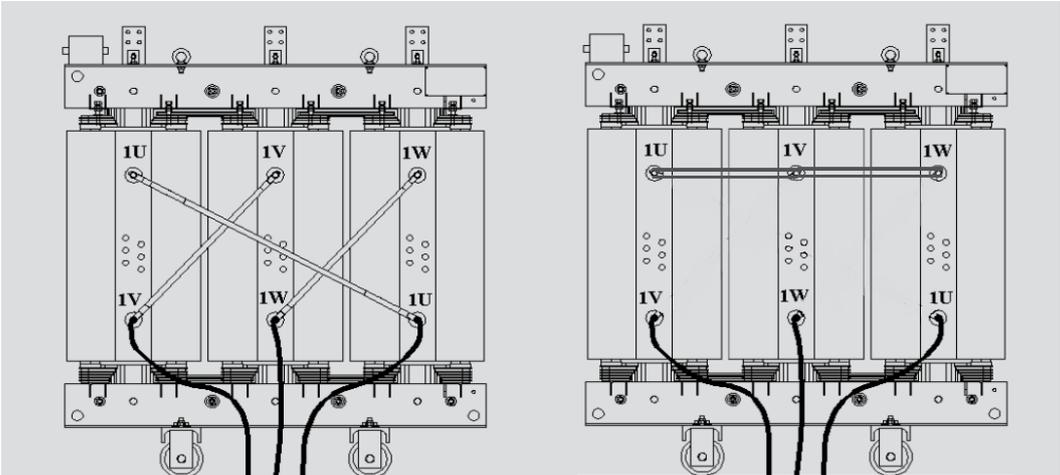
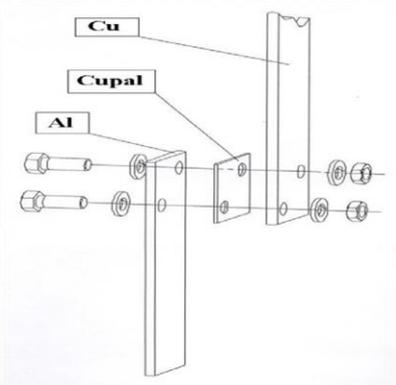
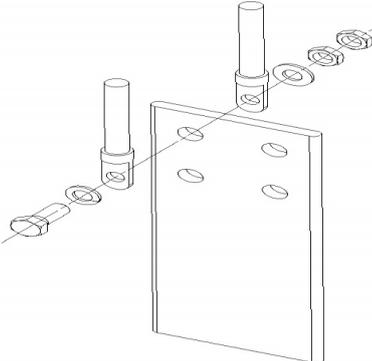
# CONNECTIONS

## OUTPUT CONNECTIONS

The inlet connections are usually made from aluminum and copper. The cable connections are made by connecting one or two cables to the holes with the cable lugs as shown below.

## INPUT CONNECTIONS

Typically, the input connections are located at the top and bottom of the input windings. This type of connection makes it possible to connect from below or above. Cross-phase connections can be made. Connection elements of various metallic structures (Aluminum, Copper, etc.) can be used together.



**Triangle Connection**

**Star Connection**

## WARNING

To avoid damaging the insulation level of the transformer during installation and installation, keep the coils closed (to prevent objects falling into the coils, such as screws, nuts, switches, cables).

### TORQUE VALUES OF ELECTRICAL MECHANICAL CONNECTIONS

The fixing values of the electrical and mechanical connections can be found on the table as follows.

Screw / Nut	Electrical Connection (Nm)		Mechanical Connection (Nm)	(mm)
	Steel	Rise		
M8	30-40	10-15	35	13
M10	50-60	20-30	45	17
M12	60-70	40-50	60	19
M14	90-100	60-70	100	22
M16	120-130	80-90	150	24
M18	-	-	200	27
M20	-	-	270	30
M22	-	-	360	32
M24	-	-	460	36

Dry type transformers are not completely insulated against the risk of touching.

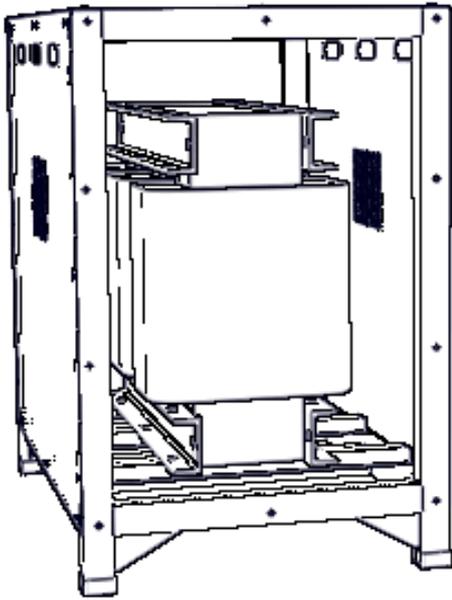


**Never touch the transformer when under power!**

For all these reasons, the transformer must only be installed in a cabin or in a lockable area in order to be accessible by authorized persons.

When the transformer is installed in a cabinet or a compartment, the prescribed distances must be observed. The distance between the trains varies according to the maximum power

## VENTILATION



In order for the heat generated during operation of the transformer to be thrown out, it must be installed in well-ventilated locations. The ventilation holes must be provided in the closed compartments in order to ensure a balanced flow of air in proportion to the size of the traction. If the ventilation is not well done, the transformer will overheat. If there is heat protection in the device in this situation, the generated heat will put the thermal protection into the circuit.



If the transformer is not equipped with a wheel, it can be raised slightly upwards to provide sub-ventilation. If the partition and the structure of the transformer are not suitable, one or more fans can be installed by calculating the air flow required for cooling.

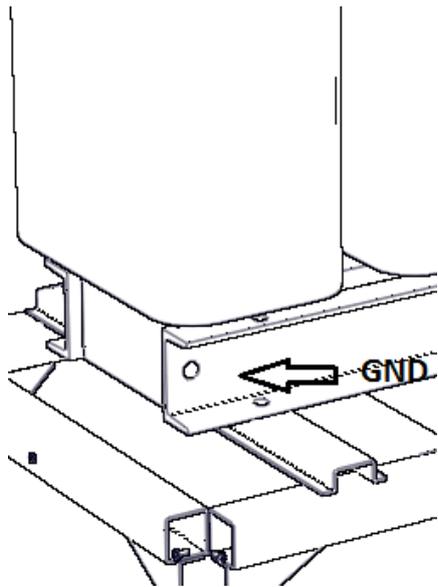
## EXCELLENT VOLTAGE

When the transformer is subjected to excessive stress, the surge arresters must be used in the required insulation level direction (such as weather conditions or switching effects).

## OPERATING

### EARTHING CONNECTION

Perform the following checks before operating the traction.



The grounding cable should be selected according to  $\geq 16 \text{ mm}^2$  or fault current calculation.

### CONNECTIONS

- \* Check whether the input or output windings and bumpers are damaged during transportation.
- \* Check the electrical connections of the input and output windings and make sure that the torque has been adjusted to the required torque.
- \* Make sure that the grounding and terminal connections are made correctly and firmly.

## **CLEANING**

If the transformer is in storage for a long time, it should be cleaned correctly.

Clean the inlet and outlet windings with the help of a vacuum cleaner to prevent dust and fur from spreading around during storage.

## **ENERGY DELIVERY**

After all checks have been performed, make sure that no instruments are left in the transformer and turn off the circuit breaker on the input side, turn off the load breaker on the output side after turning on the input side of the transformer, and the transformer will be fully operational.

## MAINTENANCE

### MAINTENANCE SUGGESTIONS

CONTROLS WHICH MUST BE DONE	PERIODIC CHECK-UP	DEVICES TO BE USED	RESULTS
Electronic temperature control unit	Monthly or after special occasions	-	Control of functions according to user's manual
Cleaning the wraps from dust, dirt and foreign matter	6 months or when the transformer is turned off	Clean with a maximum of 3 bar compressed air and a dry cloth	The ventilation ducts between the windings must be completely open and clean.
Moisture in the windings	When the transformer is not	Oven or short circuit heating	80oC drying
Star / Triangle connections	Yearly or required	Torque switch	The compression torque value is indicated on page 9
Control of the central position according to the inlet and outlet windings of the core	After special conditions (electrical shock or short circuit)	Meter	Geometrical centering of the bands
Correct position / Check of core connection screws	Yearly or Custom	Torque switch	Compression torque value 20-40Nm

## TROUBLESHOOTING

PROBLEM	REASON	SOLUTION
Warming	High Ambient Heat	Check that the ventilation holes in the cabin or room are clear and clean. Open the ventilation again.
Warm up in the core	Damage to the insulation between magnetic steel plates or plate due to the harmonic current in the core	Isolating the vertical connections of the core with insulating nut and tube insulation
Noise	Connection with standard locator or busbar	Flexible connections between busbar and transformer. Anti-vibration pads to put under the wheels.
Fault in the electronic temperature control unit (alarm or stop (fault))	Electronic temperature control unit or thermal probe	Change defective products
	Nominal current values exceeded on the plate.	Reduced nominal current values or installation of ventilation system
	Ventilation is not working.	Check the user manual.
	The thermal probe connection is not well done	Check that all connections are done correctly.
If the input cell opens when the transformer is switched on	Check the current rating of the battery	The rated current value can be very low.

# GUARANTEE

## TERMS OF GUARANTEE

- Our products are under a two-year guarantee starting from the date of delivery against malfunctions resulting from production, material and workmanship faults. Malfunctions due to such type of faults will be removed without claiming any price of workmanship or spare parts to be replaced.
- Whether aforementioned malfunctions originate from usage faults or not are determined with a report to be issued by service stations, if there exists no service stations, by one of seller, dealer, agency, representative, importer or manufacturer or producer of those products respectively.
- Repair time of defective products is twenty business days at most. This period starts from the date when products are delivered to one of seller, dealer, agency, representative, importer or one of manufacturer or producer. Provided that products break down within the period of guarantee, the time passing during the repair process is added to the guarantee time. Provided that faults of products cannot be removed within ten business days, manufacturer-producer or importer is obliged to assign another product having similar features for the use of consumers until the faulty product has been repaired.
- Even though consumers exercise their repair rights, they can claim free replacement of products, refund or price discount at the rate of fault in the events;
  - That, besides, the product, as of the date when the product is delivered to the consumer, breaks down four times a year or six times within the guarantee period to be determined by the manufacturer-producer and/or importer at least, on the condition of being in guarantee period, such malfunctions perpetuate passing over;
  - That maximum time required for the repair of products is exceeded;
  - That repair of the malfunction is determined as impossible through a report to be issued by service station, if there exists no service station, one of seller, dealer, agency, representative, importer or manufacturer or producer of the company respectively.
- The consumer is, on demand, obliged to submit guarantee certificate in terms of repairs or replacements within the scope of guarantee.
- It is essential that you definitely perform damage control over external packaging before receiving the products to be sent through freight. In the event of any damage, delivery person must be made to prepare a "damage determination record". (For example; during the delivery process, the product has been checked and seen that is damaged.)
- After the damage determination record has been issued, we request you to inform the MAKELSAN head office of the case. Products to be received from freight by signature means that products have been received completely and without no damage.
- Repairs of plug-and-play products in the places where no service point is around are performed in the factory of MAKELSAN or the nearest service point according to the direction to be made by the MAKELSAN head office. Defective product is delivered by hand to the nearest service point or to the contracted freight company in its original packaging to be sent to the factory of MAKELSAN according to the direction to be made by the MAKELSAN head office. For malfunctions in the scope of guarantee, shipment fees are under the responsibility of MAKELSAN on the condition that products are delivered to the contracted freight company.
- The device must be sent as packed in its original packaging as long as it is not desired by the service. Original packaging of devices should be preserved in order to use them for shipment of devices in terms of repairs to occur. Otherwise, no responsibility is assumed with regards to any troubles to be experienced.

- All defective products to be delivered by hand or through freight are to meet the necessary shipment requirements. (Anti-static protective, bubble wrap or box etc.)It is essential that legible barcode serial number belonging to the product be on the product. Otherwise, it is not covered in the scope of the guarantee.
- It is essential that products to be sent through freight definitely be together with delivery note, and that serial/model/malfunction details be written on delivery note to be sent (for example, breakdown report form), and that packaging content match with the products specified in the delivery note. Otherwise, freight is not accepted.
- The use of the Guarantee Certificate, submitted together with products with MAKELSAN trademark, is permitted by the T.R. Ministry of Industry and Commerce and General Directorate of Protection of Competition with no..... in accordance with the law, with no. 4077, and the notification, with no. TRKGM-95/116-117, issued basing the aforementioned law. MAKELSAN acknowledges and undertakes to obey the liabilities determined by the laws and legislations.

## **CASES NOT COVERED BY THE GUARANTEE**

- Breakdowns resulting from the use of products contrary to the issues or the environment conditions (temperature, humidity etc.) specified in the user manual are not covered in the scope of guarantee..
- Damages and breakdowns resulting from the use of software, hardware, interface, accessories or consumables apart from those used together with products or recommended ones; changing place, wrong and insufficient maintenance, calibration or use; its operation contrary to environment specifications published for products; insufficiency of air installation; use of products in ambient having excessive humid or temperature; its operation in environment harmful for electrical circuits and abrasive; and accidents, impacts, electric, shipment, natural disasters, not limited to the ones listed above, are not covered in the scope of product guarantee.
- In the general examination performed during the breakdown acceptance process, certain troubles causing products not to be covered in the scope of guarantee might not be understood. Provided that such faults come up in the detailed examination to be performed via technical service equipment, products are returned to customers.
- Products not covered in the scope of guarantee can, on demand of customer, be treated in a fee-paying way within the bounds of possibilities of the authorized service. Products out of the scope of guarantee, repairs of which are not possible are returned to customers.
- Damages and breakdowns resulting from treatments, internally or externally tampering, efforts to repair and spare part replacement of products, without approval of MAKELSAN, and those resulting from treatment of unauthorized service/dealer/person/establishment, are not covered in the scope of guarantee. Breakdown, cracks, scratches and wear, corrosion and dust to occur in time and by use in the outer surfaces of products (cabinet, cover, and front panel) are not covered in the scope of guarantee.
- In the event that original serial numbers, guarantee labels and stamps on products are removed or distorted, products are not covered in the scope of guarantee. No guarantee is issued against the use of products for any other purpose, apart from those specified in introduction or manual of products.
- It is compulsory that systems to be purchased be commissioned within 3 months.

## CONTACT INFORMATION



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