COMIND INDUSTRIES

USER MANUAL

SCREW TYPE HEATERS

COMIND INDUSTRIES

READ THE INSTRUCTIONS
BEFORE USING YOUR PRODUCT!

ZERO EMISSION

This manual prepared and distributed by Comind Industries is intended to convey recommendations, warnings and requirements regarding your purchase and use of the products described below.
Visit the Comind Industries website **(https://www.comind.cl/)** or contact Comind customer service for further product information.
To ensure proper use of the product the user should carefully review this Manual.

FAILURE TO COMPLY WITH THE INFORMATION PROVIDED IN THIS MANUAL IMPLIES THAT THE USER ASSUMES ALL RISKS AND LIABILITIES ARISING FROM SUCH FAILURE.

QUALITY REVIEW

Make sure that your product has the safety label or nameplate inserted. See the product number on the product label or nameplate.

SAFETY INSTRUCTIONS

NOTE: Flange type heaters are designed and manufactured to be used for heating liquids in tanks or vessels. However, they can also be used to heat gases and other substances.
This manual is suitable for standard flanges as specified by your assigned dealer.
NOTE: This heater is primarily designed to be mains powered and will therefore operate at a frequency of 50 or 60 hertz.
NOTE: The operating current is important for the user to calculate in order to properly size the power cable and other components for safe operation of the heater.

SECURITY STATEMENTS

The user must ensure that the installer uses all relevant PPE (personal protective equipment).

WARNING
Risk of Electrical Shock
Any installation and maintenance performed on this heater should only be performed by a qualified electrician in accordance with applicable national and local electrical codes. Do not interrupt the protective earth/ground circuit.
Any interruption or disconnection of the protective earth circuit used by this heater will create a hazardous situation and could result in electric shock which in some situations could cause serious injury.

WARNING
This product is not designed for use in classified (hazardous, ATEX) locations.

BEFORE INSTALLING

*Inspect for any damage that occurs during shipping, storage or handling.

CAUTION

Tubular elements may come in contact with each other during shipment. Minor adjustments to the elements prior to installation may be necessary to separate them. Extensive bending of the elements should be avoided, as the dielectric strength between the coil and steel sheath may be compromised.
Comind does not recommend field bending of the elements. However, if the element must be field-bent, consult your local Comind representative for assistance. It may be necessary due to atmospheric conditions / humidity to perform a dielectric test prior to start-up. Refer to the insulation resistance pre-check (megohmmeter) in the Installation section.

INSTALLATION

The following sets forth instructions and requirements related to the installation of the products.

PRE-INSULATION RESISTANCE TEST

During shipping and/or storage, moisture absorption by the insulation material inside the heater element is possible.
To determine if the proper megohm value is present, use a megohmmeter to measure the dielectric insulation resistance between the heater terminal and the heater jacket. This value should be greater than 1 megohm.
If the heater is at room temperature and a low Megohm value exists, the following options can be used to dry out the elements and return the Megohm value to an acceptable range: The preferred method is to remove the terminals and place the product in an oven at a temperature no higher than 80 degrees overnight or until an acceptable reading is reached.
The second method is to energize the unit at low voltage in air until the megohm is at an acceptable reading. Care should be taken to prevent the heater jacket from exceeding 150 degrees for steel and nickel alloy elements.

PROTECTION OF THE HEATING ELEMENTS AGAINST OVERHEATING

The use of automatic temperature controls to regulate the heating process and prevent overheating of the heater is highly recommended to ensure safe operation of the heater.
All temperature limiting devices must be approved by an appropriate third party and must be applied in the rating for which they are approved. High temperature limiting devices must operate independently from the process temperature control.

*If you do not have a panel for your heater, consult your COMIND sales representative.
NOTE: Some heaters are supplied with thermocouples or thermostats at the customer's request, however, it is still the responsibility of the user to use these devices correctly in the control or protection circuit.

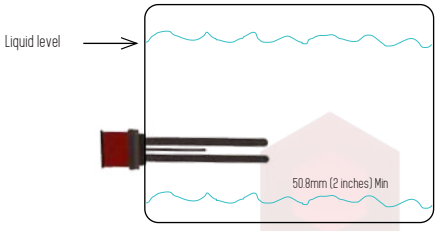
ORIENTATION AND ASSEMBLY

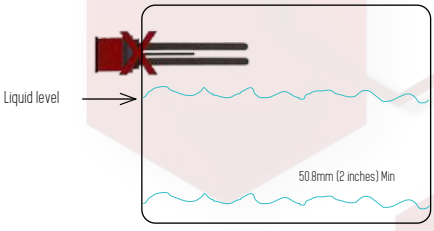
CAUTION

The orientation of the heater may be important to ensure the intended heat transfer and safe operation.

WARNING

Care should be taken when installing the heater through the pond or basin cup to avoid bending the elements.
If possible, the elements should be inspected to ensure that they do not touch.
The location of an immersion heater in a process is of primary importance. To take advantage of natural convection, the unit should be located as low as possible as shown in the figure.





WARNING

Risk of electric shock
It is the user's responsibility to properly size the ground wire for protective earth / safe ground and to ensure that the impedance is low enough to ensure the safety of a person.

PREVENTIVE MAINTENANCE AND CLEANING

RECOMMENDATIONS
The heater may remain hot for a long period of time after the power has been disconnected, so make sure that the equipment has cooled to a safe temperature before performing any preventive maintenance.

Corrosion and vibration can cause degradation of the thermal system and electrical interfaces. Follow Comind's guidelines for periodically checking the condition of the installed heater and electrical connections.
Check line connections on a regular basis (recommended every 2 months) to make sure they are tight, free of rust buildup and free of dust or dirt accumulation. Retighten as necessary.
If an enclosure is provided, check the interior for rust, dirt or dust. Remove rust if present, with steel wool (or similar) and clean thoroughly with dry, oil-free air. If the enclosure is moisture resistant, check the condition of the cover gasket.
Units immersed in liquid should be removed from the tank and checked periodically for mineral scale buildup. Clean as necessary. Scale can cause high sheath temperature and lead to inefficiency and shorter life.

HOW TO ORDER SPARE PARTS

If you do not know your Comind representative, visit our website http://comind.cl and use the tool Where to Buy tool.
To order your replacement part, please indicate the numbers indicated on the product for the seller to find the manufacturing route of your heater or indication on the heater's nameplate.

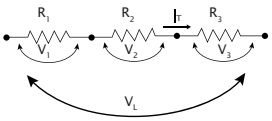
HOW TO ENFORCE YOUR WARRANTY

*If this product develops a fault within the warranty period, you must contact us.
*Have your proof of purchase (invoice or receipt), detailing the faults, your name, address and date of purchase.

CONNECTED

RESISTANCE ASSOCIATION

PARTNERSHIP SERIES



Formulas

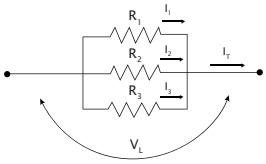
Resistor series association

$$R_{eq} = R_1 + R_2 + R_3$$
$$I_T = I_1 = I_2 = I_3 = V_T / R_{eq}$$
$$V_T = V_1 + V_2 + V_3$$
$$P_T = (V_T)^2 / R_{eq} = V_T \times I_T$$
$$P_n = (P_T / V_T)^2 \times R_n$$

Legend

P_T	= Total circuit power
$P_1 / P_2 / P_3$	= Power of each resistor
V_L	= Line voltage
$V_1 / V_2 / V_3$	= Voltage at resistance terminals

PARALLEL PARTNERSHIP



Parallel resistance association

$$(1 / R_{eq}) = (1 / R_1) + (1 / R_2) + (1 / R$$
$$I_T = I_1 + I_2 + I_3$$
$$V_T = V_1 = V_2 = V_3 = I_T x R_{eq}$$
$$P_T = (V_T)^2 / R_{eq} = V_T \times I_T$$
$$P_n = (P_T / V_T)^2 \times R_n$$

R_{eq}	= Total resistive value of the circuit
$R_1 / R_2 / R_3$	= Resistors
I_T	= Total circuit current
$I_1 / I_2 / I_3$	= Intensity across each resistor

Circuitos trifásicos (cargas equilibradas)

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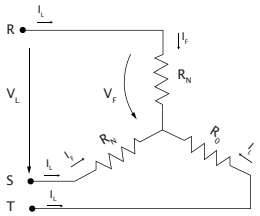

Formulas

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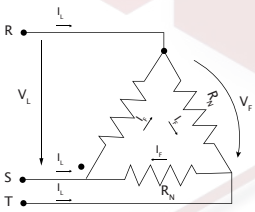
$$I_L = I_F$$
$$V_F = V_L / \sqrt{3}$$
$$P_T = (V_L)^2 / R_n = V_L \times I_L \times \sqrt{3}$$
$$P_T = (V_F)^2 / R_n$$

Legend

P_T	= Total circuit power
P_n	= Power of each branch
V_L	= Line voltage (Between phases)
V_f	= Voltage at resistance terminals

TRIANGLE



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$$I_F = I_L / \sqrt{3}$$
$$V_L = V_F$$
$$P_T = 3 \times (V_L)^2 / R_n = V_L \times I_L \times \sqrt{3}$$
$$P_n = (V_F)^2 / R_n$$

R_n	= Resistance
I_L	= Line intensity
I_F	= Intensity through each branch