



# INSTALLATION, OPERATION AND MAINTENANCE MANUAL

## Commercial Electric Water Heater

### Model : Rheem RH-EVR/S-SS Series

**Installation and service must be performed by Qualified Service Personnel Only.**

#### CHECKING EQUIPMENT

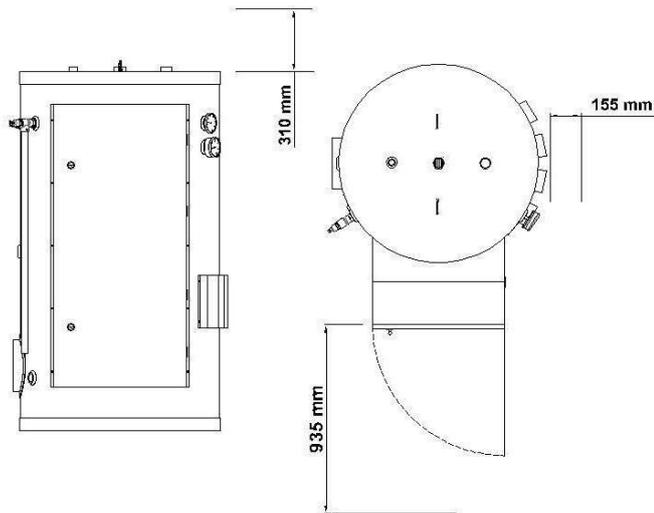
This manual supplies information for the installation, operation and servicing of the appliance. It is strongly recommended that this manual be reviewed completely before proceeding with an installation. Upon receiving equipment, check for signs of shipping damage. Pay particular attention to parts accompanying the water heater, which may show signs of being hit or otherwise being mishandled. Verify total number of pieces shown on packing slip with those actually received. In case there is damage or a shortage, immediately notify carrier.

#### INSTALLATION PROCEDURE LOCATION OF UNIT

1. Locate the appliance so that if water connections should leak, water damage will not occur. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the unit. Under no circumstances is the manufacturer to be held responsible for water damage in connection with this unit, or any of its components.
2. Insure that the appliance is located near an acceptable drain so that the vessel can be properly drained when performing service or maintenance. The drain must also provide adequate drainage in the event of leakage the tank or related piping. The drain must prevent water damage to the adjacent area and lower floors of the structure.
3. The appliance must be installed so that the electrical components are protected from water (dripping, spraying, etc.) during appliance operation and service (replacing of fuses, elements, etc.)
4. The appliance must be installed on a level floor. Shim the base as necessary if leveling is required.
5. The floor on which the appliance is installed must be capable of supporting the total weight of the water heater when completely filled with water. Combustible floor locations may be used. Maintain required clearances from combustible surfaces.
6. The appliance must not be installed on carpet.
7. The appliance must be installed indoors where it is protected from exposure to wind, rain and weather.
8. Locate the appliance as close as possible to the point of major hot water usage, the water piping and branch electrical circuit wiring.
9. Insulate water piping to control heat loss and possible condensation.
10. The appliance must be located in an area that is not subject to freezing. The ambient temperature of the space where the appliance is installed must not go below 32° F (0° C) or above 104° F (40° C).
11. The water heater is not intended for space heating applications.



### Minimum Clearances Between Water Heater and Surrounding Surfaces



Maintain minimum specified clearances for adequate operation. All installations must allow sufficient space for servicing the electrical components, water pipe connections, piping and other auxiliary equipment, as well as the appliance.

### Inlet and Outlet Connections

For ease of service, install unions on the cold water inlet and hot water outlet of the water heater. The cold water inlet connection is located on the lower right side of the water heater. A manual shutoff valve should be installed upstream on the cold water source as an isolation device. The hot water outlet connection is located on the top center of the water heater. A manual shutoff valve should be installed downstream on the hot water outlet source as an isolation device in case the water heater must be disconnected from the system.

### STORAGE TANK

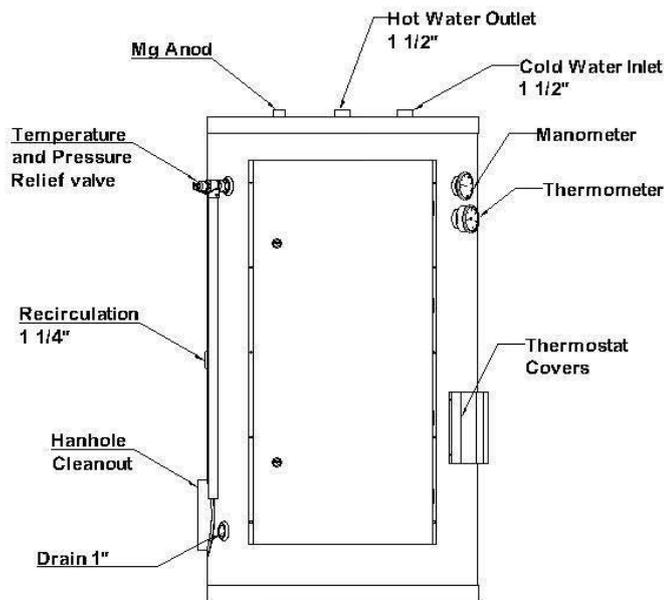
This appliance uses AISI 304L quality stainless steel tank to store the heated water for use. The storage tank is constructed in accordance with the ASME Boiler and Pressure Vessel Code requirements. The volume capacity of storage tank is approximately 1000 liters (265 gal).

Please refer to the attached mechanical general arrangement dimensional drawing of storage tank. The tank is furnished with threaded connections for cold water inlet, hot water outlet, recirculation, a relief valve and a drain connection.

The storage tank has a hand hole for ease of inspection, cleanout and service. An optional manhole may be specified for greater ease of inspection.

A magnesium anode(s) is standard to help prevent dissipation of the tank material by electrolytic action.

### WATER CONNECTIONS



### JACKET ASSEMBLY

**Outer Jacket** – The outer jacket assembly is constructed from steel, galvanized on both sides. The galvanized surface is specially prepared and phosphate coated to allow application of electrostatic paint process. This coating process insures a long life from the jacket assembly. The storage tank is insulated by rock wool material covered by outer jacket.



## RELIEF VALVE

This water heater is supplied with a temperature and pressure relief valve(s) sized in accordance with ASME Boiler and Pressure Vessel Code, Section IV. The relief valve(s) is installed in the horizontal position and mounted in the tapping provided in the storage tank. No valve is to be placed between the relief valve and the water heater. To prevent water damage, the discharge from the relief valve must be piped to a suitable floor drain for disposal when relief occurs. No reducing couplings or other restrictions shall be installed in the discharge line. The discharge line shall allow complete drainage of the valve and line. Relief valves should be manually operated at least once a year. A relief valve that fails to completely reseat and continues to discharge water must be immediately replaced with a new, properly sized, temperature and pressure relief valve.

**CAUTION:** Avoid contact with hot discharge water. Insure that no one is in front of or around the relief valve discharge line. Make sure that the extremely hot water manually discharged from the relief valve will not cause bodily injury or property damage.

## THERMAL EXPANSION OF WATER

A relief valve that discharges periodically may be due to thermal expansion in a closed system. A water heater installed in a closed system, such as one with a backflow preventer or check valve installed in the cold water supply, shall be provided with means to control expansion. Contact the water supplier or local plumbing inspector on how to correct this situation. **DO NOT plug or cap the relief valve.**

## ELECTRICAL CONNECTIONS

All installation procedures involving electric power connection should only be performed by a trained, certified electrician.

**WARNING:** WATER HEATER IS EQUIPPED FOR OPERATION ON ONE VOLTAGE ONLY. Check the rating plate on the front of the control panel access for the correct voltage and phase. **DO NOT** use this water heater with any other voltage other than the voltage specified on the rating plate. Failure to use the correct voltage can cause problems that can result in death, serious bodily injury or property damage.

**CAUTION** THE SUPPLY VOLTAGE OF THE WATER HEATER IS 415VAC, 3 PHASE, 60 HZ. **DO NOT CONNECT THE WATER HEATER TO AN IMPROPER SOURCE OF ELECTRICITY!**

1. Use copper conductors only. All wiring between the appliance and field installed devices shall be made with copper wire suitable for at least 75° C (167° F) temperature rating.
2. The factory internal wiring is attached to a terminal block inside the unit. The branch circuit is connected to the terminal block through an opening provided on the side of the water heater electrical access panel.
3. Line voltage wire exterior to the appliance must be enclosed in approved conduit or approved metal clad cable.
4. To avoid serious damage, **DO NOT energize the appliance until the system is full of water.** Ensure that all air is removed from the storage tank and piping before beginning initial operation. Operation of a water heater without a completely filled tank may result in serious damage to the appliance and heating element burn out.
5. The water heater should be connected with a separate grounded branch circuit with over current protection and disconnect switch. The water heater should be grounded in accordance with national and local codes. A ground terminal is provided for ground connection only.



6. Provide the appliance with proper overload protection in the branch circuit. It is suggested that the electrician size the branch circuit at 125 percent of the heater ampere rating and further increase wire size as necessary to compensate for voltage drop in long runs. Branch circuit voltage drop should not exceed 3% at the heater.
7. Voltage applied to the heater should not vary more than +5% to -10% of the model and rating plate marking for satisfactory operation.
8. A wiring diagram is provided with the water heater for the electrician's use.

## LOW WATER CUTOFF

This water heater is equipped with an electronic low water cut-off installed at the factory. This low water cut-off device uses a water level sensing probe located above the heating element installed in the highest point in the storage tank. If the internal water level drops below this point, the low water cut-off will shut down operation of the heating elements. The electronic low water cut-off has an LED located on its casing. This LED will be illuminated and the control circuit will be completed between the common and normally open contacts on the relay unit when the sensing probe is below the water level in the storage tank. The operation of a low water cutoff should be inspected every six months. For details refer to electrical control circuit drawing attached to this manual.

## STANDARD EQUIPMENT

Your commercial electric water heater is equipped with the following as standard equipment.

- Low watt density immersion heating elements with an stainless steel sheath. Each heating element has 18 KW power and two elements are grouped so the group power is 36 KW. There are 4 groups of elements making the total input power 144 KW.

- Internal fusing of all elements in a maximum of 48 amp increments provides additional safety.
- Electrostatic paint coated galvanized steel outer jacket and electrical control panel are provided.
- Electrical control panel is provided with a hinged door and key lock.
- An AISI 304L stainless steel tank constructed to ASME specifications and provided with magnesium anode(s).
- ASME rated temperature and pressure relief valve provided by factory to ensure safe heater operation.
- Terminal block connections are installed by the factory for safe easy wiring connection.
- Manual reset high water temperature limit control.
- Surface mounted mechanical thermostats for each heater group. Max temperature setting 162°F (72 °C)
- 3 year limited warranty provides protection against failure of tanks due to defects in material and workmanship in commercial application.
- Four groups of heating elements are controlled by four regulating thermostats as one thermostat for each group.
- Time relays are provided to turn on the heater groups in sequence with a user defined time delay between each group.
- Manual on-off switches for each heater group with pilot lights.



## MECHANICAL THERMOSTATS



Temperature regulating thermostat



High Limit thermostat with manual reset

This water heater uses mechanical surface mounted thermostats to activate magnetic contactors allowing current to flow to the immersion heating elements. The standard control system uses one immersion thermostat for each 36kW of electric heating power in a water heater.

## TEMPERATURE REGULATING THERMOSTATS

This water heater has an adjustable thermostat to control water temperature. The thermostat is factory pre-set at approximately 125° F (51.7° C) or less. Households with small children or invalids may require a 120° F (48.9° C) or lower temperature setting to reduce risk of scald injury. Remember, no water heating system will provide exact temperatures at all times. Allow a few days of operation at the setting to determine the correct temperature setting consistent with your needs.

## WATER TEMPERATURE SETTINGS

1. Turn “OFF” the electrical power to the water heater.
2. Open the thermostat cover on the tank.
3. Adjust each thermostat to the desired temperature setting by turning the adjusting knob from hot to very hot position to increase the temperature. When the knob is at very hot position the adjusted temperature is max. 72 ° C. Each thermostat will be factory pre-set to approximately 125° F (51.7° C) or less as shipped.
4. Close the thermostat cover.
5. Turn “ON” the electrical power to the water heater.

### **WARNING:**

**HAZARD OF ELECTRICAL SHOCK – Before opening the electrical access panel to adjust the thermostat make sure the electrical supply to the water heater is turned “OFF”.**

## HIGH WATER TEMPERATURE LIMIT CONTROL

The unit is equipped with a fixed setting, manual reset high water temperature limit control. The water heater temperature limit control has a fixed limit setting of 180° F (82 ° C). If water temperature exceeds the limit set point, the limit will break the control circuit and shut down the unit. The limit control can only be reset after the water temperature has cooled below the set point of the limit. The high water temperature limit control is mounted on the surface of the tank, above the heating element installed at the highest point in the tank. The high limit control is reset by pushing the red reset button on the control. Operation of the limit control usually indicates a major problem with the thermostat, contactors or heating elements. **Do not continue to push the reset multiple times.** The source of the problem



must be found and corrected to insure proper operation.

## START-UP PROCEDURE

1. Ensure that the electrical power to the water heater is in the “OFF” position. If the power disconnect point is out of sight, lock it in the open (“OFF”) position and tag to prevent unexpected application of power.
2. Close the water heater drain valve(s).
3. Open a nearby hot water faucet to allow the air in the system to escape as the tank fills.
4. Fully open the cold water inlet valve to the water heater to begin filling the heater and piping.

**NOTE:** The cold water supply must be left in the open position when the water heater is in use.

5. Check the nearby hot water faucet to verify that air is exiting the tank as it fills with water. Allow water to run until a constant flow is obtained at the faucet. This will insure that all air is purged from the system.
6. While the tank is filling, open the electrical control panel and set the thermostat(s) to the desired water temperature. There are four thermostats to control the operation of four heater groups of 36KW. All individual thermostats may be adjusted to the same temperature set point. In order to turn on the heater groups in sequence with a time delay between them the first three thermostats are connected to time relays set at 5 seconds time delay. For details refer to control circuit drawing.
7. Insure that pilot switches of heater groups are placed in the “ON” position.
8. When a constant flow is obtained at the

faucet, it may be turned off. The temperature and pressure relief valve should be manually opened to insure that there is no captive air in the storage tank. A constant stream of water must flow from the manually opened relief valve. Release the handle on the relief valve and allow it to close after water flow is observed.

9. Carefully check the tank, pipe and fittings for any sign of a water leak. Immediately repair as needed. Open the access door to the immersion heating elements and check for leaks at the element mounting flanges. If any leak is detected, tighten the screw-in element.
10. Ensure that the electrical access panel (field wiring compartment) is closed and the heating element access panel is in place before proceeding.
11. After assuring that the tank is completely filled with water and no leaks are detected, you are now ready to start operation of the water heater.
12. Turn on the electric power at the main disconnect point. The contactors should be energized as the elements start to heat the water in the tank.
13. As the water heater starts heating, check the contactors for “buzzing” or chattering” during operation. If noise is detected, turn off main power, open the control panel and clean the contact points of the magnetic contactor(s). Remove any dust, dirt or foreign matter that may have found its way into the contactor or other electrical components in the control panel during shipping, installation or service.
14. Close the electrical control panel and turn on main power.
15. The water heater is now ready for normal operation.



## SHUTDOWN PROCEDURE

### Draining the Water Heater

1. Turn off the main electrical power to the water heater. If the power disconnect point is out of sight, lock it in the open (“OFF”) position and tag to prevent unexpected application of power.
2. Turn the valve in the water heater’s cold water supply to the closed or “OFF” position.
3. Turn the valve in the water heater’s hot water outlet to the closed or “OFF” position.
4. Manually open the temperature and pressure relief valve to remove any pressure from the storage tank.
5. Allow the system to cool and then open the drain valve to empty the storage tank. It will be necessary to manually hold the temperature and pressure relief valve in the open position to break the vacuum in the tank and allow it to vent and drain. Ensure that the water heater drain is routed to a properly sized floor drain to allow the water to be removed from the tank. If a floor drain is not available, a hose may be attached to the water heater drain to take the water outdoors.
6. The water heater is now shut down and ready for service or maintenance.
7. Follow the filling and start up procedure to place the water heater back into service.

## MAINTENANCE

Listed below are items that must be checked to insure safe reliable operations. Verify proper operation after servicing.

## FLUSHING THE STORAGE TANK

1. Turn off main power at the electrical disconnect switch.

2. Open the drain valve. Allow water to flow until it runs clean.
3. Close the drain valve when finished flushing.
4. Turn on the electrical disconnect switch (after filling).

## SEDIMENT REMOVAL

Water born impurities consist of dissolved minerals which precipitate out of the heated water and fine particles of soil and sand which settle out and form a layer of sediment on the bottom of the tank. In time, if not removed, the level of sediment might reach the heating elements.

For convenience, sediment removal and element lime scale removal should be performed at the same time as follows:

### Sediment and Lime Scale Removal

Sediment and lime scale accumulation on the heating elements is a normal condition common to all immersion type elements. Factors which affect the amount of this formation are:

1. Amount of hot water used. As the volume of water increases, more scale results.
2. Water temperature. As the temperature of the water is increased, more scale is deposited on the elements.
3. Characteristics of water supply. Regardless of water treatment, the elements should be examined regularly.

Scale accumulation in the bottom of the storage tank may be removed by turning off main power and draining the tank. Once all water is removed, the hand hole access can be removed. This will allow large accumulations of scale to be cleaned from the bottom of the tank.

Water scale accumulations on the immersion heating element reduce the ability of the elements to heat water and may cause noise to occur during



operation. It is recommended that a heating element be removed at least once a year for examination. If it is scaled, all of the elements should be removed and cleaned. The element gasket must be replaced when the element is removed for cleaning.

Small accumulations of lime scale may be removed with a stiff bristle brush. Severe accumulations of lime scale should be removed by dissolving the accumulation in a commercial delimer.

1. Drain the heater following “SHUTDOWN PROCEDURE” instructions.
2. Disconnect the wires attached to the element terminals. Try not to disturb the wiring unnecessarily and reconnection will be easier.
3. Loosen the screw-in element flange with a socket and breaker bar. Do not use an impact gun (air or electric) to remove the element flanges from the tank. Mark the location of each element in the tank openings so they may be returned to their original position.
4. Remove the elements from the opening with a twisting, pulling action if the elements are scaled beyond the size of the tank flange openings. Brush loose scale from elements.
5. Place scaled ends of heating elements into a delimer solution and allow scale to dissolve. Do not permit delimer or water to contact heating element electrical terminals.
6. Flush clean ends of elements with water when deliming or cleaning is completed.
7. Clean remaining gasket recess on each screw-in element flange. Do not reuse element gaskets.
8. Install a new gasket on each element. Install element into the tank opening where it was originally installed. Tighten

the flange with the socket and breaker bar used to remove the element.

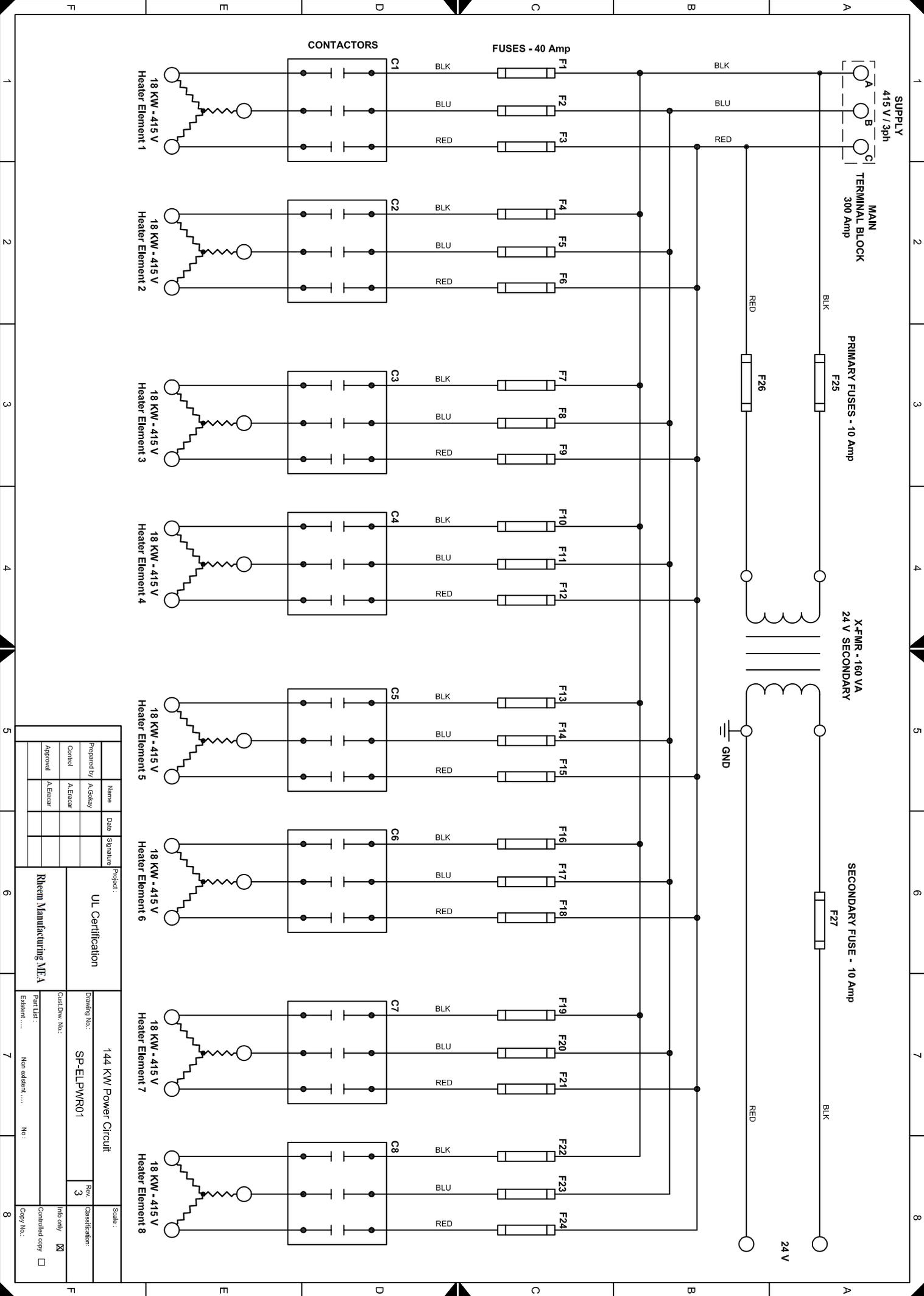
9. Attach wires to element terminals from which they were removed.
10. Follow “START UP PROCEDURE” instructions to restore hot water service. Check for water leaks around elements and proper operation when heater is filled.

Rheem Manufacturing MEA

[contact@rheem-mea.com](mailto:contact@rheem-mea.com)



The new degree of comfort.™



**CONTACTORS**

**FUSES - 40 Amp**

**SUPPLY**  
415 V / 3ph

**MAIN TERMINAL BLOCK**  
300 Amp

**PRIMARY FUSES - 10 Amp**

**X-FMR - 160 VA**  
24 V SECONDARY

**SECONDARY FUSE - 10 Amp**

C1  
18 KW - 415 V  
Heater Element 1

C2  
18 KW - 415 V  
Heater Element 2

C3  
18 KW - 415 V  
Heater Element 3

C4  
18 KW - 415 V  
Heater Element 4

C5  
18 KW - 415 V  
Heater Element 5

C6  
18 KW - 415 V  
Heater Element 6

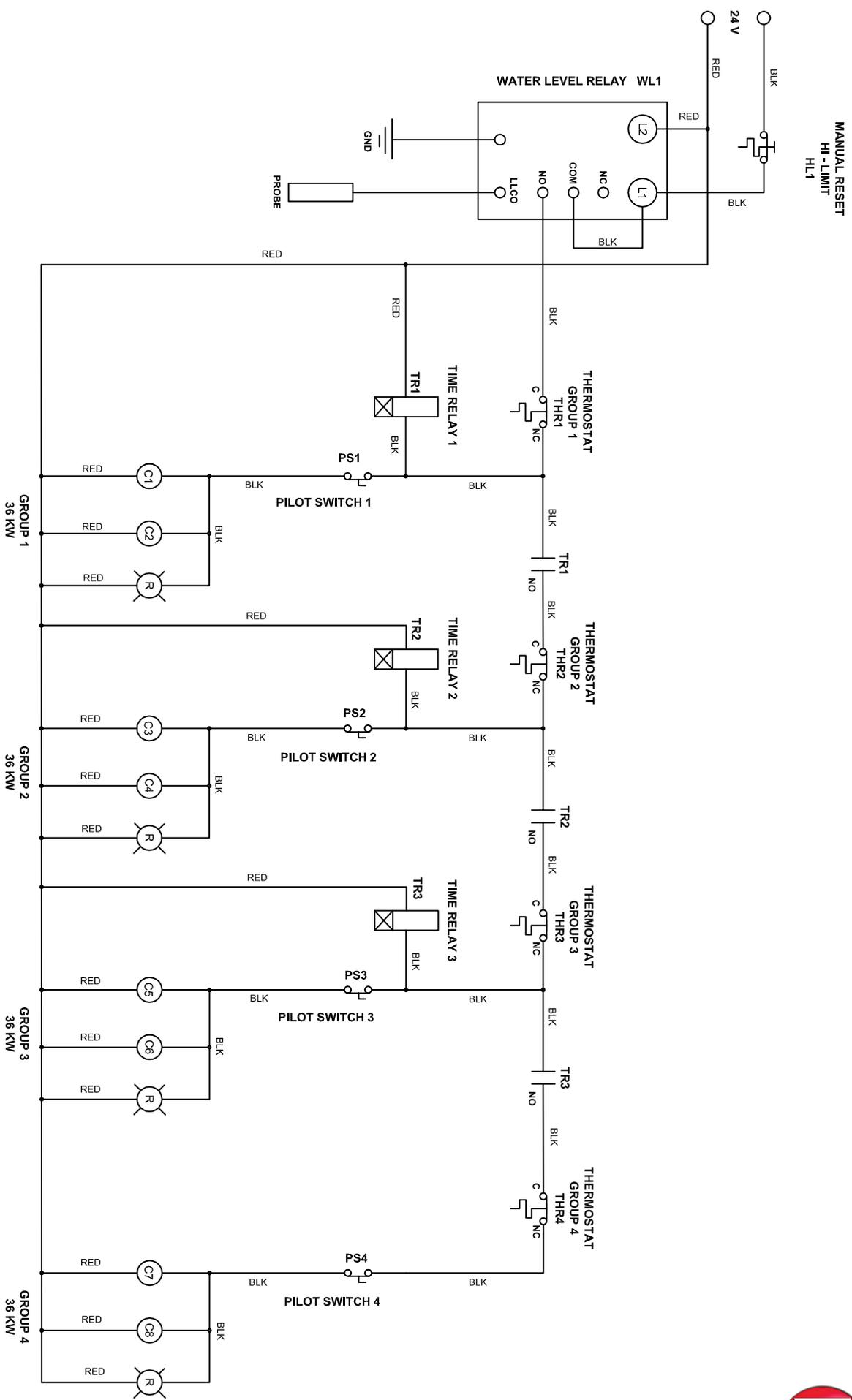
C7  
18 KW - 415 V  
Heater Element 7

C8  
18 KW - 415 V  
Heater Element 8

Name		Date		Signature	
Prepared by	A. Gokley				
Control	A. Eracar				
Approval	A. Eracar				
<b>UL Certification</b>					
Drawing No.: SP-ELPWR01			Rev: 3		
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Copy No.:			Scale:		

**144 KW Power Circuit**

**Rieem Manufacturing MEA**



MANUAL RESET  
HI - LIMIT  
HL1

WATER LEVEL RELAY WL1

THERMOSTAT  
GROUP 1  
THR1

TIME RELAY 1  
TR1

PILOT SWITCH 1  
PS1

GROUP 1  
36 KW

THERMOSTAT  
GROUP 2  
THR2

TIME RELAY 2  
TR2

PILOT SWITCH 2  
PS2

GROUP 2  
36 KW

THERMOSTAT  
GROUP 3  
THR3

TIME RELAY 3  
TR3

PILOT SWITCH 3  
PS3

GROUP 3  
36 KW

THERMOSTAT  
GROUP 4  
THR4

TIME RELAY 4  
TR4

PILOT SWITCH 4  
PS4

GROUP 4  
36 KW

Project:

UL Certification

144 KW Control Circuit

Scale:

Classifications:

Drawing No.: SP-ELCON01

Rev: 3

Info only:

Controlled copy:

Copy No.:

Name

Date

Signature

Prepared by: A. Cobley

Control: A. Ennar

Approval: A. Ennar

Rheem Manufacturing MEA

Part List:

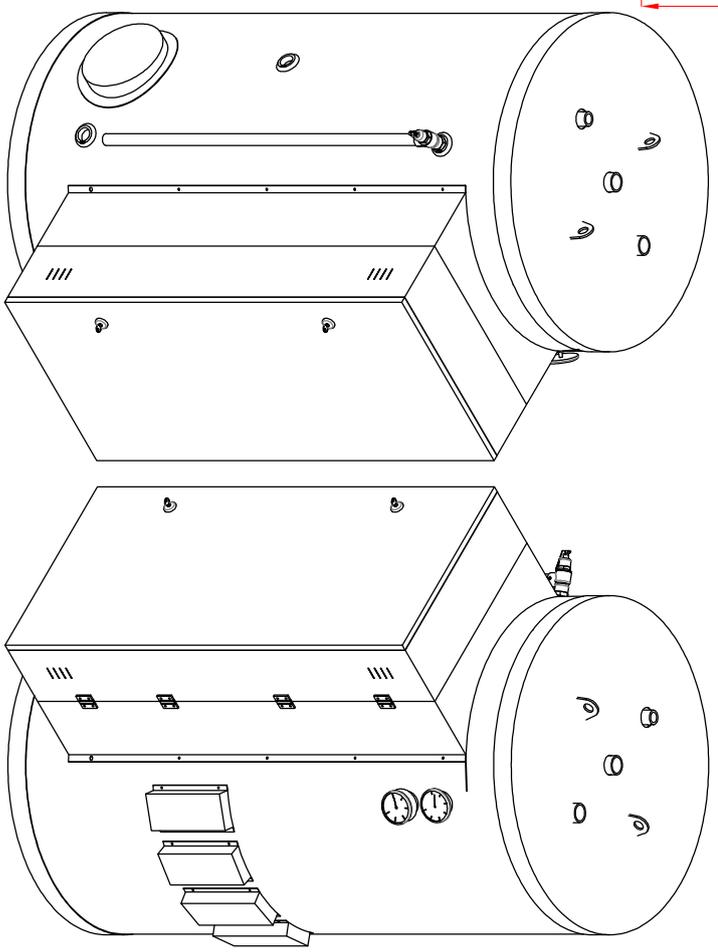
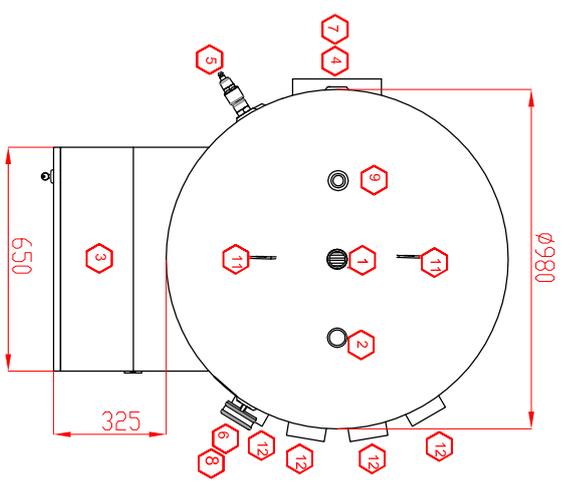
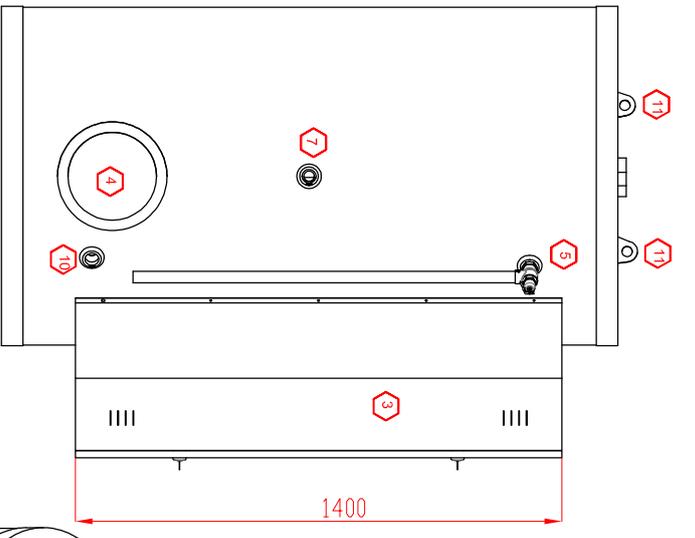
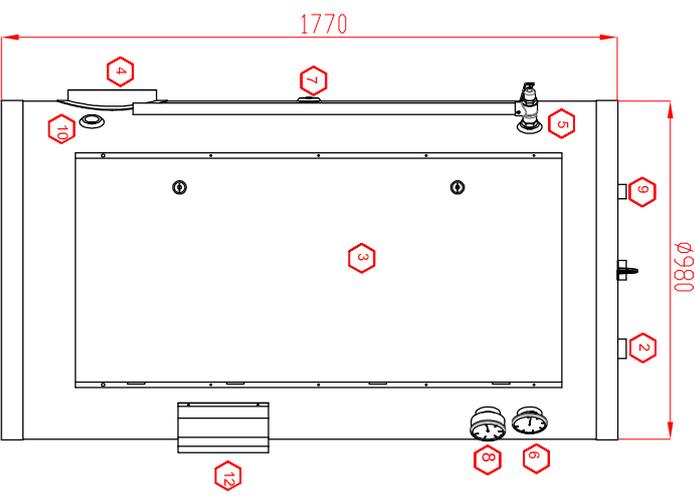
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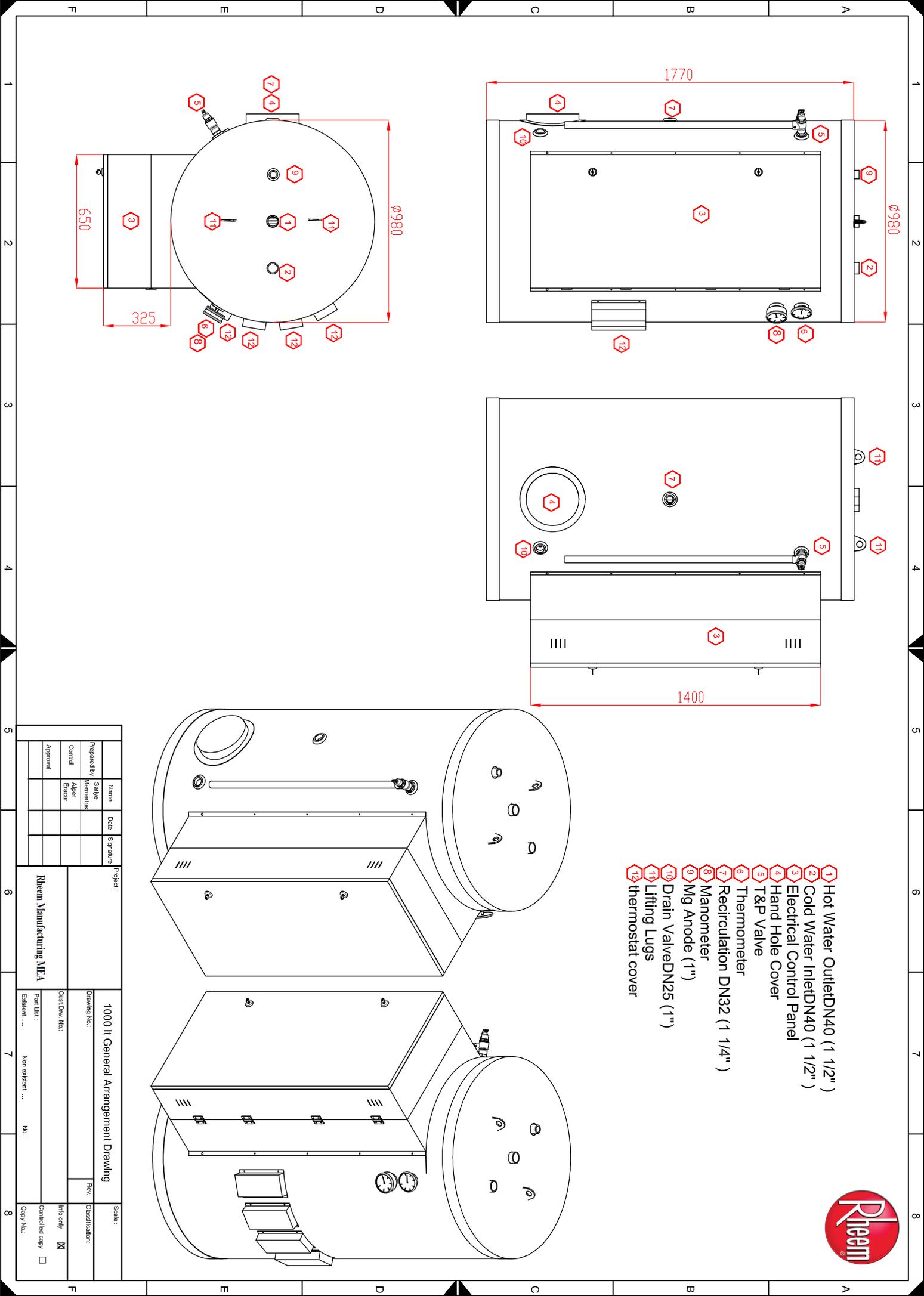


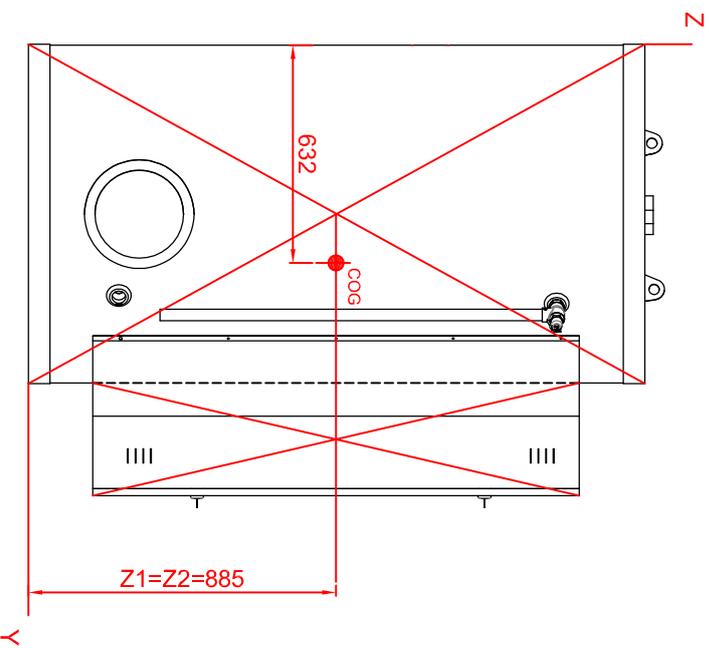
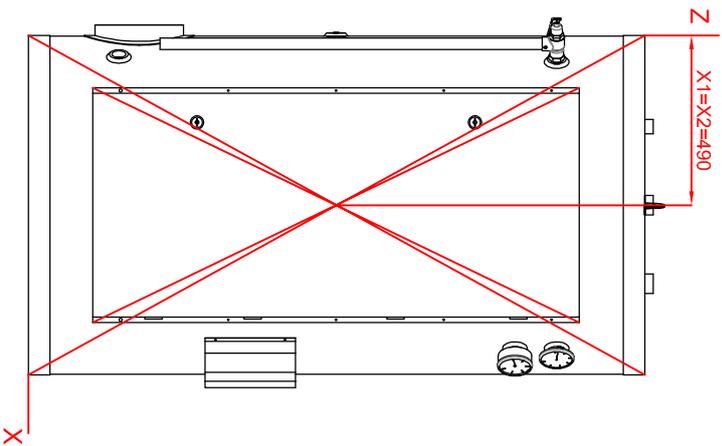
- 1 Hot Water Outlet DN40 (1 1/2" )
- 2 Cold Water Inlet DN40 (1 1/2" )
- 3 Electrical Control Panel
- 4 Hand Hole Cover
- 5 T&P Valve
- 6 Thermometer
- 7 Recirculation DN32 (1 1/4" )
- 8 Manometer
- 9 Mg Anode (1" )
- 10 Drain Valve DN25 (1" )
- 11 Lifting Lugs
- 12 thermostat cover



**1000 lt General Arrangement Drawing**

Name		Date		Signature		Project :		Scale :	
Prepared by	Sillye							Drawing No.:	Rev.
Checked	Mehmetas							Part List:	Info only
Approval	Aker							Existent	Confirmed copy
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Rheem Manufacturing M.E.A									





**Center of Gravity (COG) Calculation :**

$$X = \frac{\sum xi \cdot wi}{\sum W}$$

$$Y = \frac{\sum yi \cdot wi}{\sum W}$$

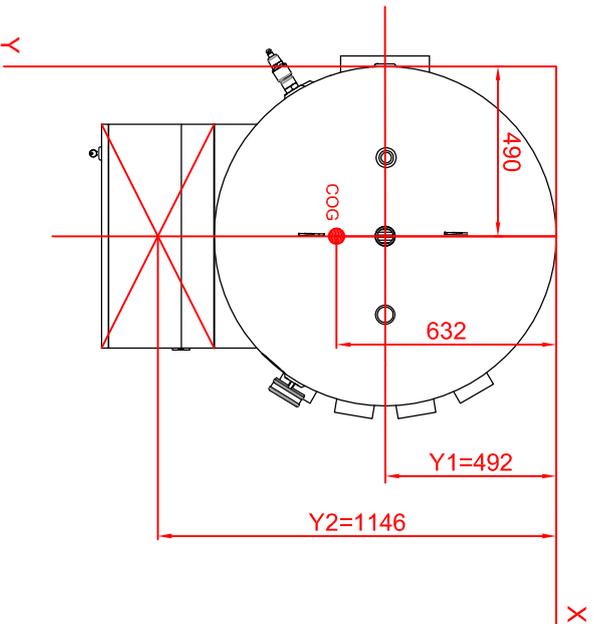
$$Z = \frac{\sum zi \cdot wi}{\sum W}$$

$$X = (490 \times 274 + 490 \times 76) / 350 = 490 \text{ mm}$$

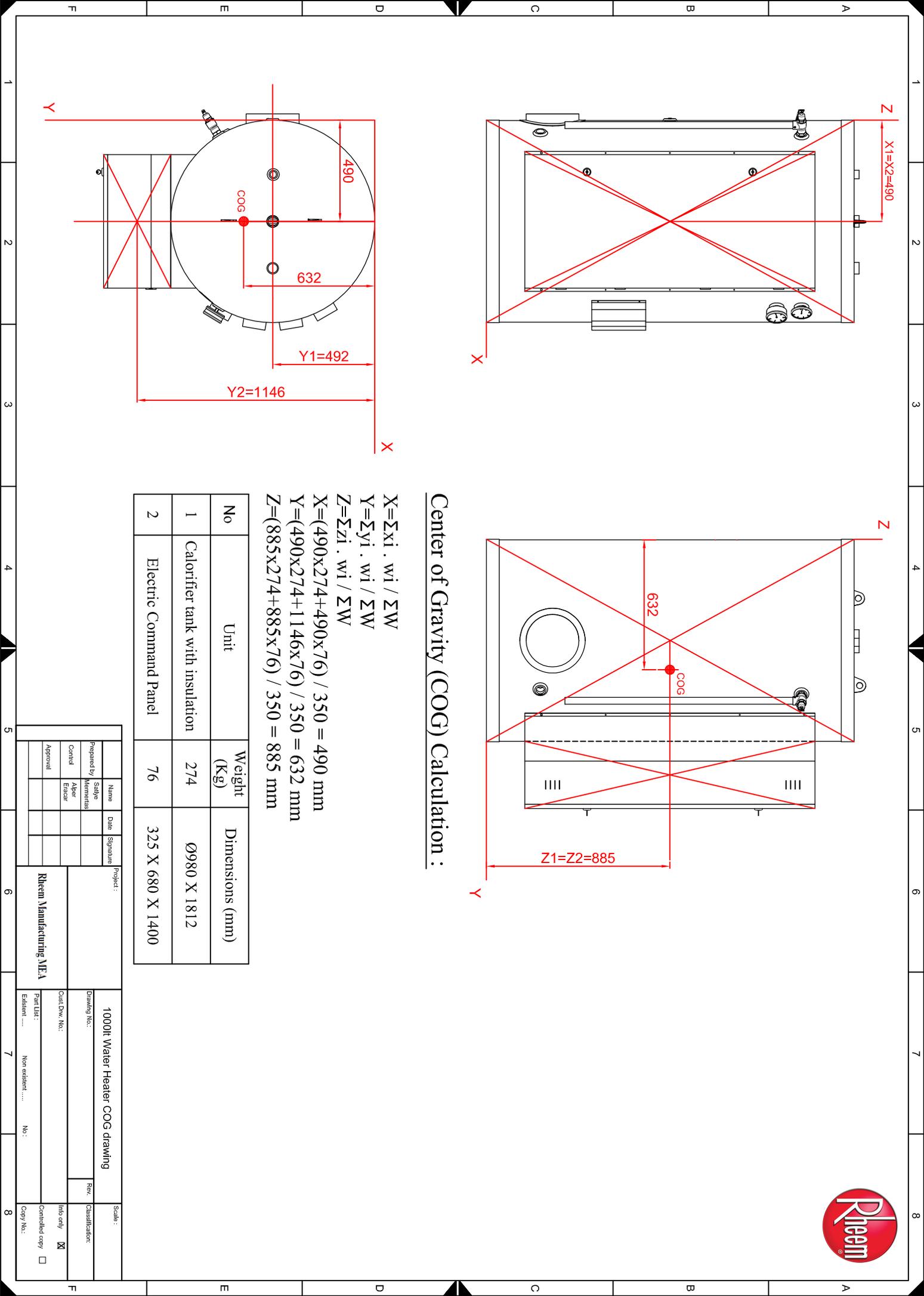
$$Y = (490 \times 274 + 1146 \times 76) / 350 = 632 \text{ mm}$$

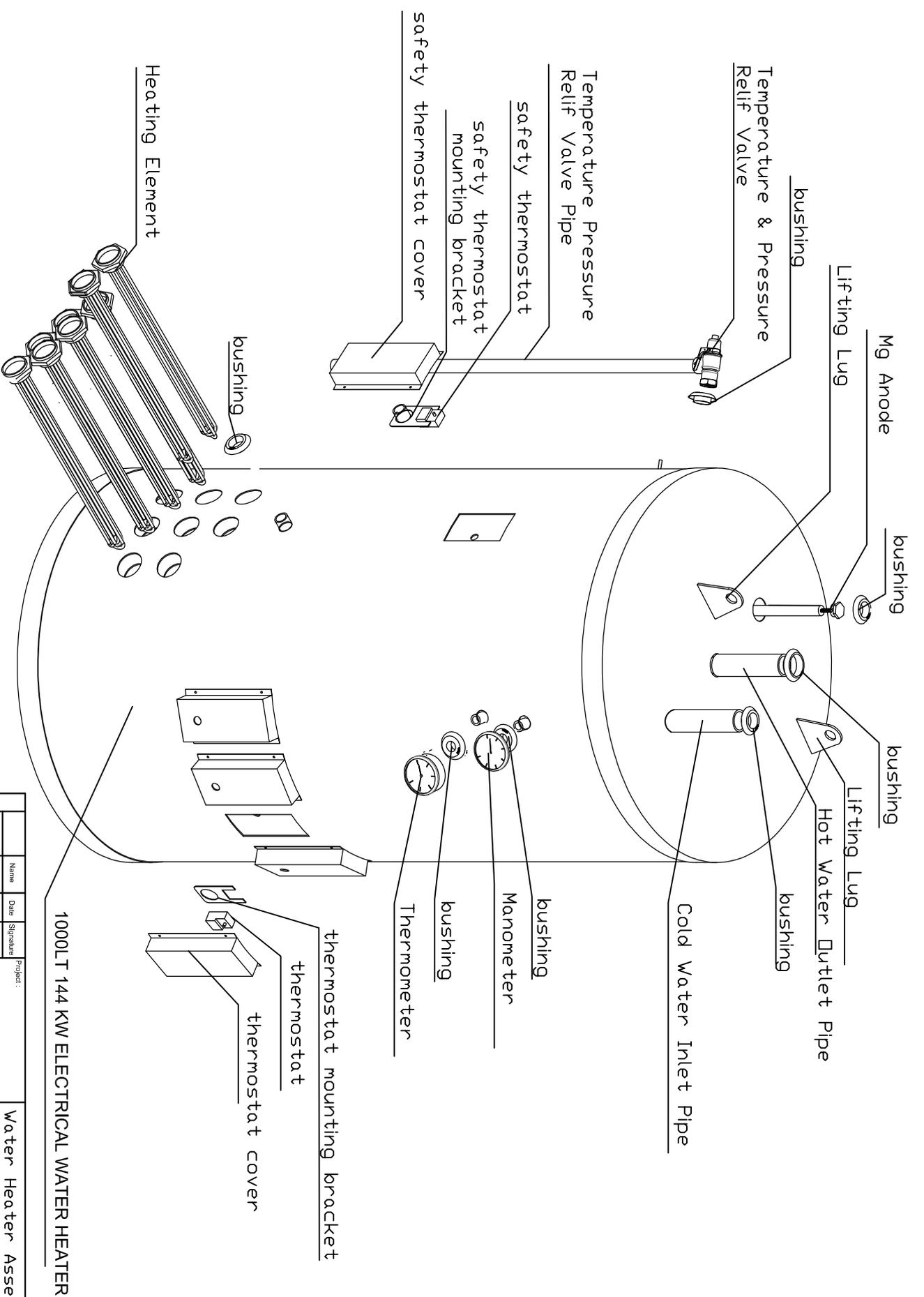
$$Z = (885 \times 274 + 885 \times 76) / 350 = 885 \text{ mm}$$

No	Unit	Weight (Kg)	Dimensions (mm)
1	Calorifier tank with insulation	274	Ø980 X 1812
2	Electric Command Panel	76	325 X 680 X 1400



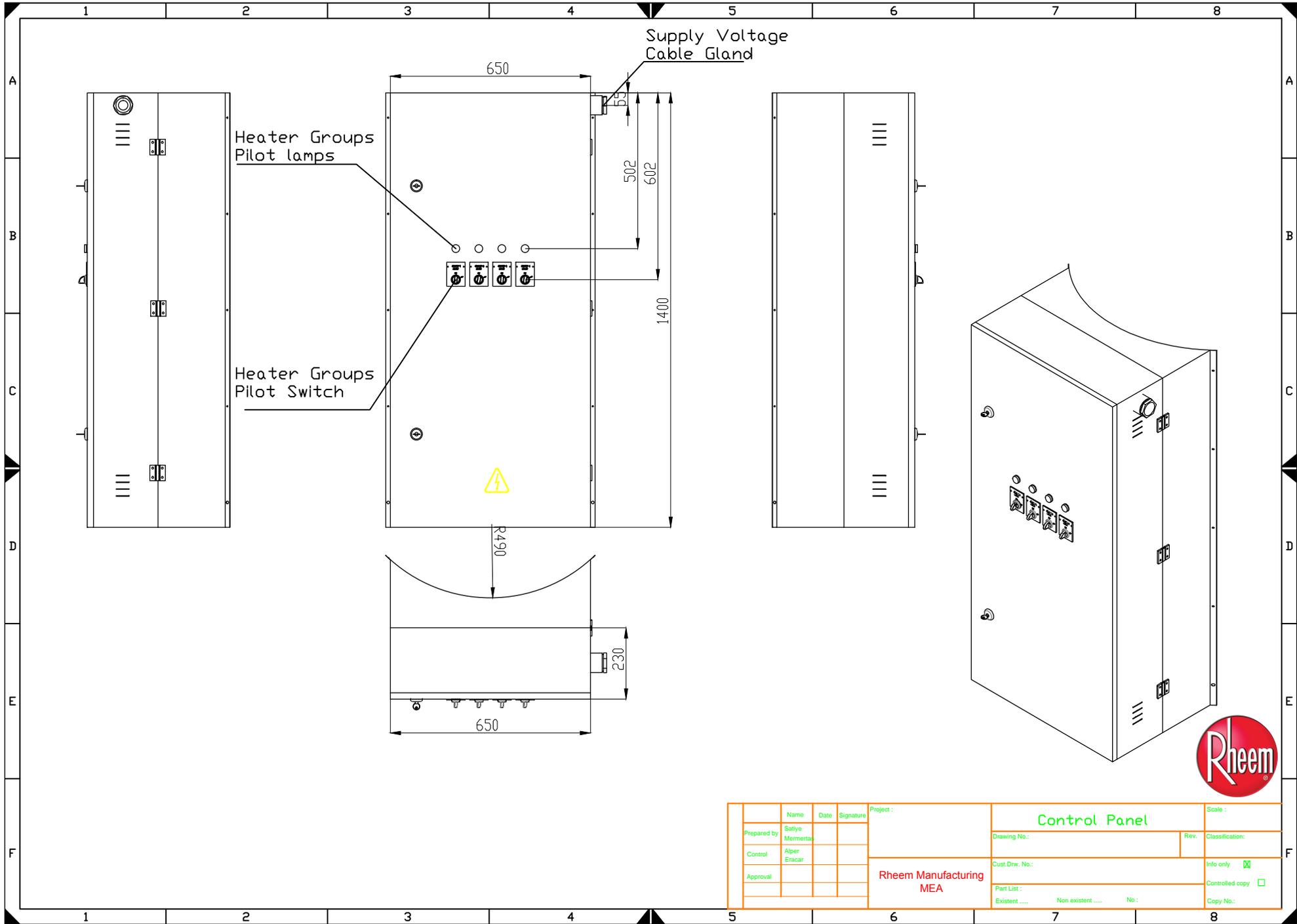
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Prepared by	Silkye					1000lt Water Heater COG drawing	
Checked	Mehmetas					Drawing No.:	Rev.
Approval	Aker					Calc. Dw. No.:	Classificatior:
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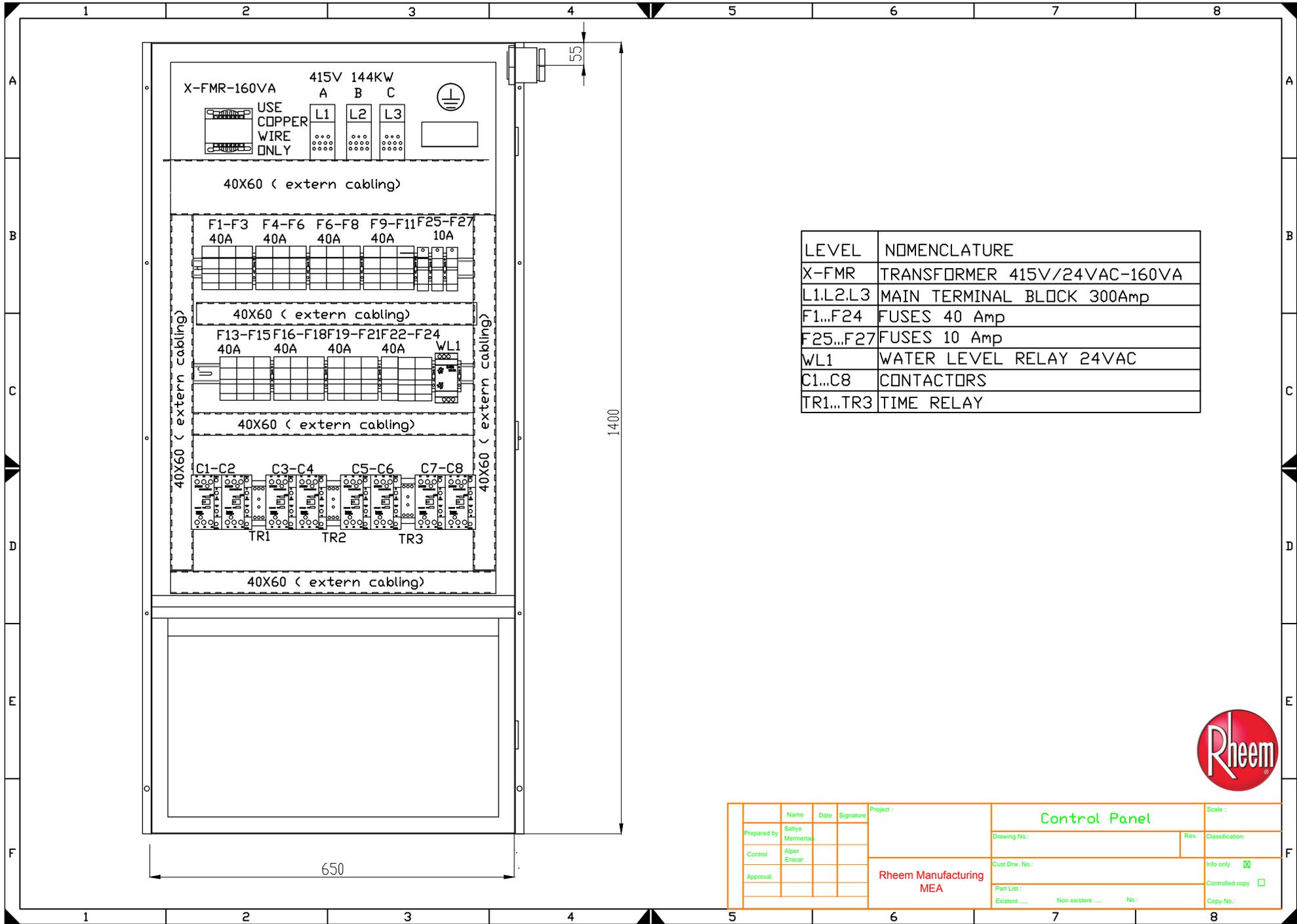


1000LT 144 KW ELECTRICAL WATER HEATER

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Checked	Ajmer							Classifications:	
Approval								Part List:	Info only <input checked="" type="checkbox"/>
								Existent .....	Non-existent.....
Rheem Manufacturing M.F.A.				No.:		No.:		Controlled copy <input type="checkbox"/>	
Water Heater Assembly		No.:		No.:		No.:		Copy No.:	



	Name	Date	Signature	Project :	<b>Control Panel</b>		Scale :
Prepared by	Satyajit Marmar				Drawing No.:	Rev.	Classification:
Control	Alper Eracar				Cust.Drw. No.:		Info only <input checked="" type="checkbox"/>
Approval				<b>Rheem Manufacturing MEA</b>	Part List:		Controlled copy <input type="checkbox"/>
					Existent .....	Non existent .....	No : Copy No.:



LEVEL	NOMENCLATURE
X-FMR	TRANSFORMER 415V/24VAC-160VA
L1.L2.L3	MAIN TERMINAL BLOCK 300Amp
F1...F24	FUSES 40 Amp
F25...F27	FUSES 10 Amp
WL1	WATER LEVEL RELAY 24VAC
C1...C8	CONTACTORS
TR1...TR3	TIME RELAY



Prepared by	Name	Date	Signature	Project :	<b>Control Panel</b>		Scale :	
Control	Satyajit Marmar						Drawing No.:	Rev.:
Approval	Alper Eracar			<b>Rheem Manufacturing MEA</b>	Cust.Drw. No.:	Info only <input checked="" type="checkbox"/>		
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