

# **navien** Condensing **98%** Tankless Water Heaters

**Specification Details for the  
Navien models:**



**CR-240  
CR-240A**

**For Indoor Installation Only**




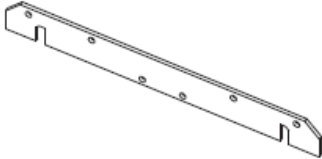




**For Potable Water Heating and Space  
Heating**



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**Accessories included with the Navien water heater:**

| Item                                    | Description  | Qty |
|---|--|-----|
| Navien<br>Condensing<br>Water Heater    |     | 1   |
| Remote Controller                       |     | 1   |
| Operating and<br>Installation<br>Manual |    | 1   |
| Wall Mounting<br>Bracket                |   | 1   |
| Condensate Drain<br>Hose                |   | 1   |
| Tapping Screws &<br>Anchors             |   | 4   |
| Vent terminators                        |  | 2   |
| Wall Flanges                            |  | 4   |

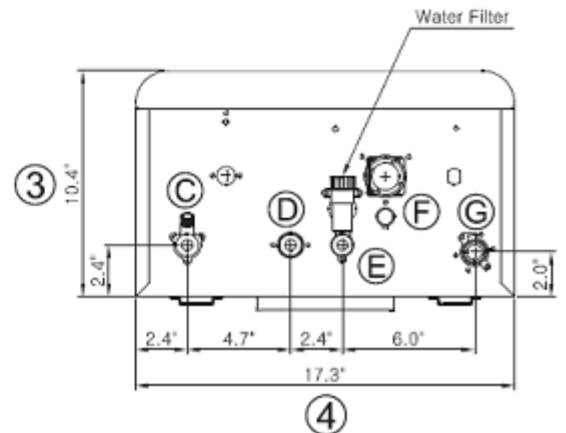
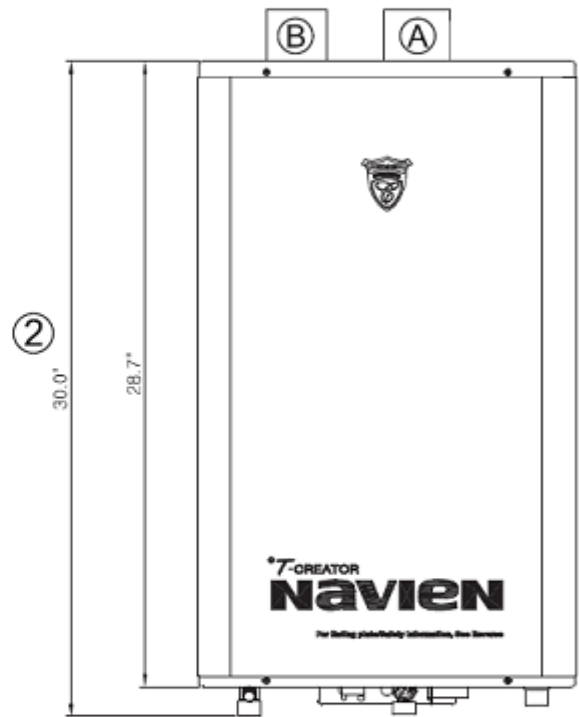
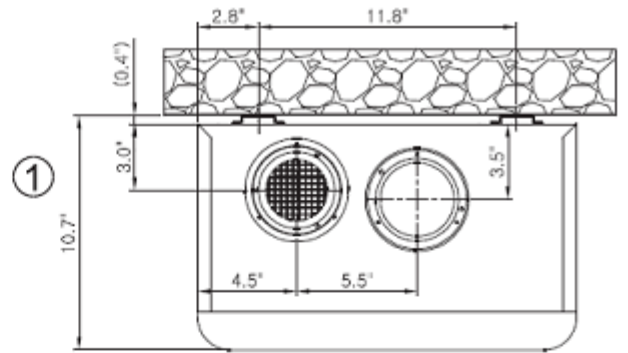
**Dimensional information: CR-A / CR-A**

**CR-A ~ CC-A**

|   | Description         | Diameter |
|---|---------------------|----------|
| A | Exhaust             | 3"       |
| B | Air Intake          | 3"       |
| C | Hot Water Outlet    | 3/4"     |
| D | Recirculation Inlet | 3/4"     |
| E | Cold Water Inlet    | 3/4"     |
| F | Condensate Drain    | 3/4"     |
| G | Gas Connection      | 3/4"     |

**CR-A ~ CC-A Type Dimensions**

| Model | ①     | ②   | ③     | ④     |
|-------|-------|-----|-------|-------|
| 180   | 10.7" | 30" | 10.4" | 17.3" |
| 210   | 12.7" | 30" | 12.4" | 17.3" |
| 240   | 12.7" | 30" | 12.4" | 17.3" |



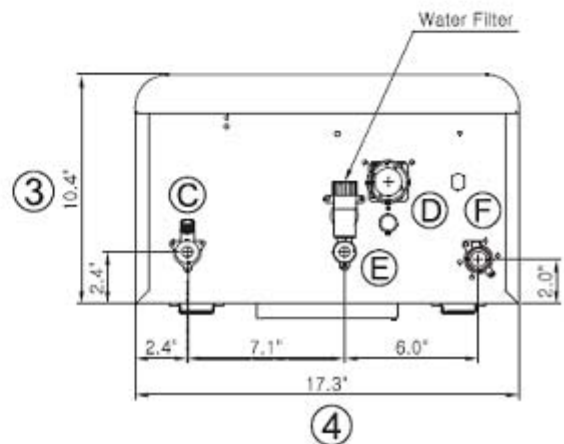
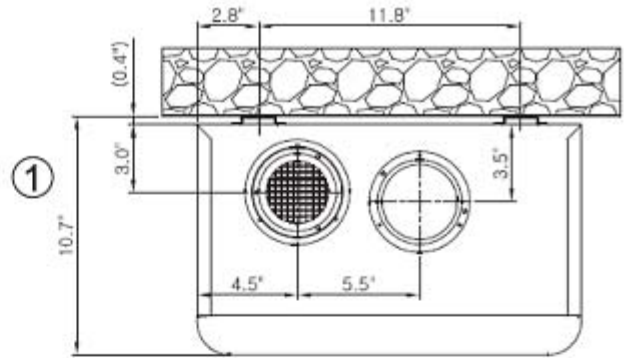
**Dimensional information: CC / CR**

**CR ~ CC**

|   | Description      | Diameter |
|---|------------------|----------|
| A | Exhaust          | 3"       |
| B | Air Intake       | 3"       |
| C | Hot Water Outlet | 3/4"     |
| D | Condensate Drain | 3/4"     |
| E | Cold Water Inlet | 3/4"     |
| F | Gas Connection   | 3/4"     |

**CR ~ CC Type Dimensions**

| Model | ①     | ②   | ③     | ④     |
|-------|-------|-----|-------|-------|
| 180   | 10.7" | 30" | 10.4" | 17.3" |
| 210   | 12.7" | 30" | 12.4" | 17.3" |
| 240   | 12.7" | 30" | 12.4" | 17.3" |



## NAVIEN CR-240(A) SPECIFICATIONS:

| Item                                       |                           | CR-240, CR-240A  |
|--|---------------------------|--|
| Heat Capacity (Input)                      | Natural Gas               | Min: 17,000 Btu/h Max: 199,000 Btu/h   |
|  | LP Gas                    | Min: 17,000 Btu/h Max: 199,000 Btu/h   |
| Hot Water Production Capacity (Output)     | 35°F Rise                 | 11 Gal/m   |
|  | 45°F Rise                 | 8.6 Gal/m  |
|  | 77°F Rise                 | 5.0 Gal/m  |
| Dimensions                                 |                           | W17" x H28" x D12"   |
| Weight CR-A                                |                           | 95 lbs   |
| Weight CR                                  |                           | 87 lbs   |
| Installation Type                          |                           | Indoor Wall-Hanging  |
| Venting Type                               |                           | Forced Draft Direct Vent   |
| Ignition                                   |                           | Electronic Ignition  |
| Water Pressure (min-max)                   |                           | 15 – 150 PSI   |
| Gas Supply Pressure (from source; min-max) |                           | NG: 3" WC ~ 10.5"WC      LP: 8" WC ~ 13.5" WC  |
| 180 Manifold Gas Pressure (min-max)        |                           | NG: 0.4" WC ~ 3.7"WC      LP: 0.8" WC ~ 8" WC  |
| 210 Manifold Gas Pressure (min-max)        |                           | NG: 0.4" WC ~ 3.0"WC      LP: 0.8" WC ~ 5.6" WC  |
| 240 Manifold Gas Pressure (min-max)        |                           | NG: 0.4" WC ~ 4.0"WC      LP: 0.8" WC ~ 7.1" WC  |
| Minimum Flow Rate                          |                           | 0 GPM for "A" models (no minimum flow rate requirement); 0.5 GPM for non-"A" models  |
| Connection Sizes                           | Cold Water Inlet          | 3/4" NPT   |
|  | Hot Water Outlet          | 3/4" NPT   |
|  | Gas Inlet                 | 3/4" NPT   |
| Power Supply                               | Main Supply               | 120VAC, 60Hz   |
|  | Maximum Power Consumption | 200W (max 2A)  |
| Materials                                  | Casing                    | Cold Rolled Carbon Steel   |
|  | Heat Exchangers           | Primary Heat Exchanger: Stainless Steel<br>Condensing Heat Exchanger: Stainless Steel  |
| Venting                                    | Exhaust (ø3" & ø4")       | ø3" PVC (or ø3" Type BH Special Gas Vent (Class IIA (PVC) in Canada), ø4" Navien Concentric Stainless Steel  |
|  | Intake (ø3")              | PVC, Galvanized Steel, Flex Aluminum, Flex Stainless Steel, ABS,   |
|  | Vent Clearances           | 0" to combustibles   |
| Safety Devices                             |                           | Flame Rod, Overheat Cut Off device<br>APFS, GPFS, Gas-Valve Operation Detector,<br>Ignition Operation Detector, Water Temperature High Limit Switch, Exhaust Temperature High Limit Switch |
| Optional Accessories                       |                           | Plumb Easy Valve Set, Venting Kit, Condensate Neutralizer, Condensate Pump,  |

- The Contractor shall supply and install 1 (or more) Navien CR-240(A) Condensing Residential instantaneous water heater(s);
- The contractor may combine multiple CR-240(A) units to operate as a fully modulating system. Please see the installation manual for detailed multiple unit installation instructions. A connection wire required to link multiple CR-240(A) units together is not included with each CR-240(A) and is an optional accessory that must be purchased separately;
- The dimensions of each CR-240(A) unit are 28" (H) x 17" (W) x 12" (D); the weight of each CR-240 unit is 87 lbs and each CR-240(A) unit is 95 lbs.
- Each CR-240(A) unit shall be a fully modulating, low mass, condensing water heater with a modulating input of between 17,000 BTU/H and 199,000 BTU/H and shall have an efficiency of 97.3% and an Energy Factor (EF) of .95;
- All Navien water heaters are available in natural gas (NG) or propane gas (LP); field conversions must be completed only by trained factory personnel; unauthorized conversions are not permitted;
- The primary heat exchanger shall be a stainless steel, fin-tube exchanger; the condensing (or secondary) heat exchanger shall be a stainless, plate type exchanger;
- All internal waterways to and from the heat exchangers shall be made of copper;
- The water heaters' combustion system shall be premixed, forced draft combustion and contain a variable speed fan (DC), an aluminum cast and stainless steel burner, an electronic spark ignition system with a flame sensing electrode and Navien's GARC control using its APS and GPS technology;
- Modulation of the input shall be controlled by an on-board microcontroller (MCU) using thermistors (to sense the input and output water temperatures) and a flow sensor (to measure the volume rate); based on those input values, the MUC and vary the gas flow (through a modulating gas valve) and the fan speed to match the BTU/H output requirements and maintain ideal combustion;
- The Contractor must allow sufficient clearances around the water heater:

|                  |                 |
|------------------|-----------------|
| Top of Heater    | Min. 9 inches   |
| Back of Heater   | Min. 0.5 inches |
| Front of Heater  | Min. 4 inches   |
| Sides of heater  | Min. 0.5 inches |
| Bottom of heater | Min. 12 inches  |

- All Navien units come with an upper mounting bracket pre-drilled at 16" on center for easy installation on standard stud walls. The Contractor shall affix the bracket to the wall securely, ensuring that it is level and that it will support the weight of the water heater. If the strength of the wall is not sufficient, reinforcements must be made to prevent unsafe situations;
- The cold water inlet and hot water outlet of each CR-240(A) are ¾" NPT connections. The allowable water pressure range is from 15psi to 150psi. The Contractor shall install manual shut-off ball valves on the cold water inlet and the hot water outlet of each CR-240(A) unit. In addition, ¾" union connections and hose bibs are recommended to be installed on the cold water inlet and the hot water outlet of each CR-240(A) unit to

facilitate future maintenance should it be required;

- Although the water fittings on the Navien water heater are  $\frac{3}{4}$ ", if the installation site has only  $\frac{1}{2}$ " plumbing throughout the building, it is **NOT** necessary to upsize the water lines to  $\frac{3}{4}$ " when installing a single unit;
- When installing multiple units to supply high volumes of hot water either in residential (multi-head shower systems for example) applications or in commercial applications, the number of Navien water heaters required and the header pipe need to be properly sized to meet the total hot water demand;
- Each Navien water heater has a temperature high limit shut off switch built in to the outlet water piping as a standard safety feature. Therefore, a "pressure only" relief valve is required to be installed. This unit does not come with a pressure relief valve. The Contractor shall supply an approved  $\frac{3}{4}$ ", maximum 150 psig pressure relief valve and must install it on the hot water outlet, as close to the unit as possible. The maximum input BTU/H rating on the pressure relief valve must be equal to or greater than the maximum 199,000 BTU/H input rating of this water heater;
- The discharge piping for the pressure relief valve must be directed so that the hot water will not splash on anyone or on nearby equipment. Attach the discharge tube to the pressure relief valve and run the end of the tube to within 6" from the floor. This discharge tube must allow free and complete drainage without any restrictions; No reducing coupling or other restriction may be installed in the discharge line.
- This Navien water heater is a high efficiency gas appliance that creates condensation when it operates. This condensation has an acidity (pH) of approximately 4. A condensate trap comes factory installed inside each water heater. A 5 foot length of  $\frac{3}{4}$ " condensate line is included with the water heater. The condensate must be drained in accordance with all local regulations;
- Navien recommends draining the condensate to a laundry tub where the soap from the washing machine will neutralize the acidic condensate. If a laundry tub is not close by, Navien recommends the install of a condensate pump to push the condensate to the nearest laundry tub or consider installing a condensate neutralizer;
- Navien recommends the water heater be the first appliance installed downstream of the gas meter to ensure it will have sufficient supply of gas;
- The gas connection fitting on all Navien water heaters is  $\frac{3}{4}$ " NPT. The Contractor must not use less than  $\frac{3}{4}$ " gas piping. The Contractor shall size the gas line appropriately to ensure a gas supply of 199,000 BTU/H per unit is delivered;
- The allowable natural gas supply pressure range is from 3" W.C. to 10.5" W.C. For optimal performance, a minimum of 7" WC is recommended. The Navien water heater will automatically reduce the hot water volume production if the gas supply pressure is insufficient to meet demand;
- When using flexible gas line, ensure the pipe's inner diameter is sufficient to supply the required BTU/Hs. Ensure the flexible line has no crimps or tight bends that will restrict gas flow. The Contractor shall install a manual gas shut-off valve between on the gas supply line close to the water heater;
- When using rigid gas pipe, the Contractor shall install a union on the gas supply pipe close to the water heater to facilitate any future maintenance and service;
- Navien recommends whenever possible, that its water heaters be used as direct vent (or sealed combustion) units which draw all of their required combustion air directly from

outside the building and where the combustion air supply is connected directly to the air intake collar of the water heater.

- If, in the room in which the unit is to be installed, there is a continuous and sufficient supply of combustion and ventilation air in accordance with all local codes, the Navien units may then communicate with that indoor air and a direct outdoor supply is not required. This non-direct vent method of venting is not recommended for residential installations in areas subject to below freezing air temperatures;
- All Navien water heaters use round 3" exhaust and round 3" air supply vent pipe. To ensure the draw and exhaust of air directly to and from the outside, the exhaust vent and air intake vent must be sealed airtight from unit collar to terminator;
- The air intake vent materials may be made of ABS, PVC, galvanized steel, corrugated aluminum or any other such materials. If using a corrugated material, ensure there is no inadvertent crimping of, or damage to, the air intake vent. Maximum allowable intake vent length, either vertically or horizontally, is 100' subtracting 5' for each 90° elbow and 2' for each 45° elbow in the venting system to a maximum of 6 elbows. Each CR-240(A) may be sidewall vented (horizontally) or vented through the roof (vertically).
- This Navien water heater may be vented with plastic or stainless steel. Plastic vent may be used in all cases **EXCEPT** when the incoming or recirculation return water temperatures exceed 160°F (70°C). **IF** you set the water heater at a temperature higher than 160°F (70°C) **AND** are running an external recirculation loop or a combination heating system, you **MUST** use the Navien 4" concentric stainless steel venting or any 3" venting system approved for use with Category IV appliances for temperatures above 65°C (typically Type BH Special Gas Vent Class II B, C or D approved to UL1738-S636).

| Navien Recommended Vent Materials |   |   |
|-----------------------------------|---|---|
| Model Type                        | USA   | CANADA  |
| CR-240, CR-240A                   | PVC Schedule 40**<br>ABS Schedule 40**<br>Navien's Stainless Steel Vent Kit | Navien's Stainless Steel Vent Kit<br>or<br>Type BH Special Gas Vent Class IIA (PVC)** |

\*\* except cellular core

- The water heaters shall be exhaust vented with 3" PVC (in Canada, Special Gas Vent - Type BH Class IIA certified to UL1738/ULC-S636 approved for use with Category IV appliances). Maximum allowable vent length, either vertically or horizontally, is 100' subtracting 5' for each 90° elbow and 2' for each 45° elbow in the venting system to a maximum of 6 elbows. Each CR-240(A) may be sidewall vented (horizontally) or vented through the roof (vertically). There shall be an upward slope of ¼" per foot (2%) from the flue collar of the unit to venting system terminator;
- When installing multiple Navien water heaters, the exhaust venting may be combined into a common vent. The multi-unit system software design is such that the fan in each individual unit will begin automatically when the burner of any unit fires creating a positive pressure in the common vent. The size of the common vent trunk line is dependent on the number of units installed. The table below identifies the inner diameter requirement of the truck line given the total number of units installed in the multi-system:



| # of Units in Multi-System | Required Minimum Diameter of Common Vent Trunk Line |
|----------------------------|---|
| 2 units                    | 4"  |
| 3 units                    | 5"  |
| 4 units                    | 6"  |
| 5 units                    | 7"  |
| 6 units                    | 8"  |
| 7 units                    | 8"  |
| 8 units                    | 9"  |
| 9 units                    | 9"  |
| 10 units                   | 10"   |

- A ventilation air opening of sufficient size shall be provided if necessary in accordance with all local codes;
- The electrical supply required by the water heater is 110~120VAC at 60 Hz with a maximum 2 A rating;
- All units come with a factory installed 3-pronged (grounded) plug end. The water heater may be plugged into any electrical outlet close to the unit. It is not necessary to run a dedicated electrical line to the water heater;
- If the local jurisdiction requires the unit to be wired directly, the Contractor may remove and discard the factory installed plug. An on/off switch controlling the main power between the breaker and the Navien water heater must be provided to facilitate end-user maintenance and servicing;
- The heater must be electrically grounded. Ensure the electrical receptacle, in which the water heater will be plugged into, is properly grounded; if wiring directly, do not attach the ground wire to either the gas or the water piping as plastic pipe or dielectric unions may isolate the water heater electrically;
- Do not plug electrical power to the unit until all plumbing and gas piping is complete and the water heater has been filled with water;
- Disconnect the power to the water heater before installing the remote control;
- The remote control connects to the computer board inside the water heater using 18 gauge wire; DO NOT connect 110~120VAC to this remote control;
- The maximum length of wire between the water heater and the remote control installation location is limited to a maximum of 300 feet;
- There is no polarity;
- The remote control is water resistant but not water proof;
- The standard parts warranty is 3 years on all components except for the heat exchanger which has a 15 year warranty.
- Navien America Inc. is continuously improving our products therefore specifications are subject to change without prior notice.
- Follow all local codes, or in the absence of local codes, follow the most recent edition of the National Fuel Gas Code (ANSI Z223.1/NFPA 54) or the CAN/CSA-B149.1-05 Natural Gas and Propane Installation Code.

Flow Rates:

| <b>Flow Rate Specifications</b>  | <b>Navien<br/>CR-240A</b> | <b>Navien<br/>CR-240</b> |
|--|---------------------------|--------------------------|
| Output BTU (NG)  | <b>195,020</b>            | <b>195,020</b>           |
| Combustion Efficiency (NG)   | <b>98%</b>                | <b>98%</b>               |
| Input BTU (NG)   | <b>199,000</b>            | <b>199,000</b>           |
| GPM @ 35°F Temperature Rise (70°F to 105°F for example)<br><small>(theoretical value based on BTUs; may be subject to manufacturer's heat exchanger flow limits)</small> | <b>11.1</b>               | <b>11.1</b>              |
| GPM @ 45°F Temperature Rise (60°F to 105°F for example)<br><small>(theoretical value based on BTUs; may be subject to manufacturer's heat exchanger flow limits)</small> | <b>8.7</b>                | <b>8.7</b>               |
| GPM @ 50°F Temperature Rise (70°F to 120°F for example)  | <b>7.8</b>                | <b>7.8</b>               |
| GPM @ 55°F Temperature Rise (65°F to 120°F for example)  | <b>7.1</b>                | <b>7.1</b>               |
| GPM @ 60°F Temperature Rise (60°F to 120°F for example)  | <b>6.5</b>                | <b>6.5</b>               |
| GPM @ 65°F Temperature Rise (55°F to 120°F for example)  | <b>6.0</b>                | <b>6.0</b>               |
| GPM @ 70°F Temperature Rise (50°F to 120°F for example)  | <b>5.6</b>                | <b>5.6</b>               |
| GPM @ 75°F Temperature Rise (45°F to 120°F for example)  | <b>5.2</b>                | <b>5.2</b>               |
| GPM @ 80°F Temperature Rise (40°F to 120°F for example)  | <b>4.9</b>                | <b>4.9</b>               |
| # of Simultaneous Showers with 40°F Ground Water (2.5 GPM Heads)   | <b>2.4</b>                | <b>2.4</b>               |
| # of Simultaneous Showers with 55°F Ground Water (2.5 GPM Heads)   | <b>3.2</b>                | <b>3.2</b>               |
| # of Simultaneous Showers with 70°F Ground Water (2.5 GPM Heads)   | <b>4.6</b>                | <b>4.6</b>               |

Pressure Drop Chart:

