

Condensing 98%

NAVIENT

Navigating Energy and Environment

Installation Manual



	MODEL
CR-180(A)	CC-180(A)
CR-210(A)	CC-210(A)
CR-240(A)	CC-240(A)

Keep this manual near the Navien Condensing Water Heater for future reference whenever maintenance or service is required.

For potable water heating and space heating

⚠ WARNING

If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.




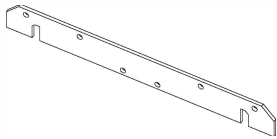
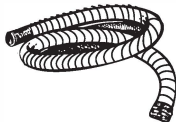

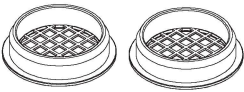
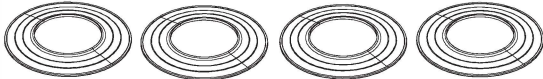
- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- **WHAT TO DO IF YOU SMELL GAS**
 - Do not try to light any appliance.
 - Do not touch any electrical switch: do not use any phone in your building.
 - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
 - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.


Installation manual - contents

Accessories	Included with the Water Heater	3
	Optional Accessories	4
Specifications	.....	5
Components & Dimensions	Key Components: CR-A	6
	Dimensions: CR-A	7
	Key Components: CR	8
	Key Components: CC	9
	Dimensions: CR,CC	10
Warnings	Installation Warnings	11
Rating Plate	Getting Started	12
	Check Rating Plate	13
Location Selection	Locating the Water Heater	14
	Mounting the Unit to the Wall	15
Plumbing	Plumbing and Water Connection Guidelines	16
	Water Piping Guidelines	17
Pressure Relief Valve	.....	18
Condensate Disposal	Disposal of Condensate	19
	Condensate Drain & Cleaning	20
Gas Piping	Gas Piping Guidelines	21
	Gas supply Line Pressures	21
	Gas Pipe Sizing Chart	22
Gas Pressure testing	Measuring Inlet Gas Pressure	23
Venting	Warning	24
	Venting Guidelines	24
	Contaminated Make-Up Air Will Damage the Unit	27
	Exhaust Vent Pipe Materials	27
	Venting Clearances	28
	Allowable Vent Lengths	29
	Vent Configuration Options	29
Electrical Connections	.....	32
Remote Control Installation	.....	33
Computer Board Settings	.....	34
Cascade Connection and Set-up Procedures	.....	35
DIP Switch Settings	.....	40
Installation Checklist	.....	43
Factory Setting of Dip Switch	.....	47
Completing the Install	.....	47
Wiring Diagram	.....	48
Ladder Diagram	.....	50
Components Diagram & Parts List	.....	52

Accessories:

I Included with the Water Heater:

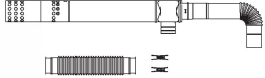
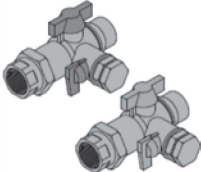


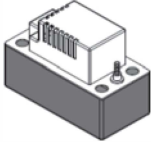

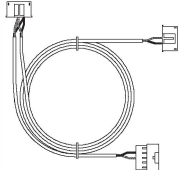
Item	Description	Qty
Navien Condensing Water Heater		1
Remote Controller		1
Operating and Installation Manual		1
Wall Mounting Bracket		1
Condensate Drain Hose		1
Tapping Screws & Anchors		4
Vent terminators		2
Wall Flanges		4

 Check that you have received all of the above parts before installing the water heater.

Optional Accessories:

2

Optional Accessories:

Item	Description
Navien Stainless Steel Concentric Vent Kit	
Navien Plumb Easy Valve Set	
Navien Pressure Relief Valve	
Navien Condensate Neutralizer	
Navien Condensate Pump	
Navien Digital Dual Port Manometer Kit	
Navien Ready-Link Communication Cable	



Contact your Navien water heater supplier for optional accessories.

Specifications:

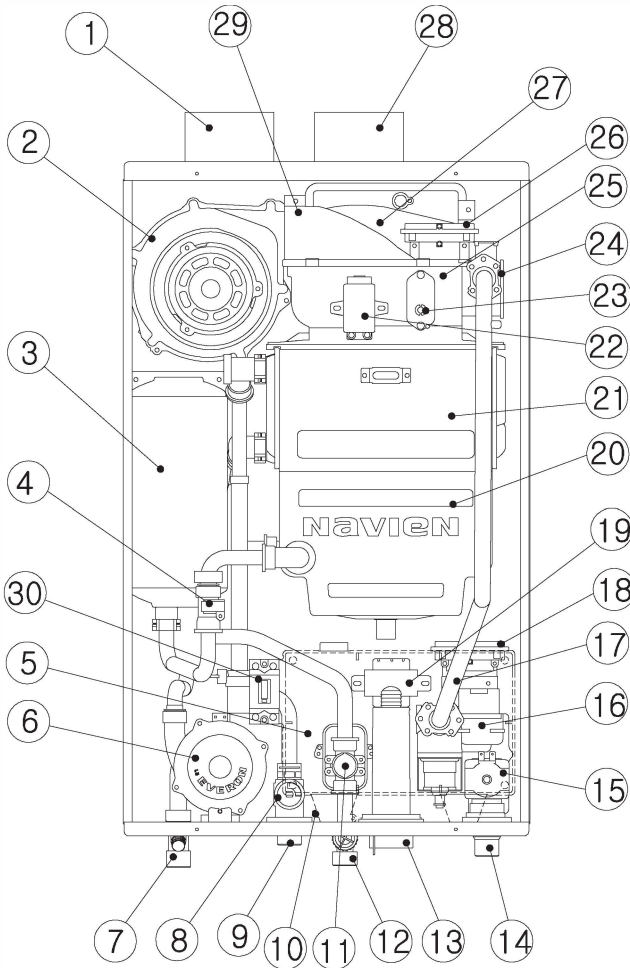
Please review these specifications before installation to confirm proper unit selection: As Navien is dedicated to continuous product improvement, Navien reserves the right to change specifications as well as re-design and/or discontinue any model or feature without prior notice and without incurring obligations.

Item		CR, CC-180(A)	CR, CC-210(A)	CR, CC-240(A)
Heat Capacity (Input)	Natural Gas	Min: 13,000 Btu/h Max: 150,000 Btu/h	Min: 17,000 Btu/h Max: 175,000 Btu/h	Min: 17,000 Btu/h Max: 199,000 Btu/h
	LP Gas	Min: 13,000 Btu/h Max: 150,000 Btu/h	Min: 17,000 Btu/h Max: 175,000 Btu/h	Min: 17,000 Btu/h Max: 199,000 Btu/h
Heat Capacity (Input)	35°F Rise	8.3 Gal/m	9.7 Gal/m	11 Gal/m
	45°F Rise	6.5 Gal/m	7.5 Gal/m	8.6 Gal/m
	77°F Rise	3.8 Gal/m	4.4 Gal/m	5.0 Gal/m
Dimensions		W17" x H28" x D10"	W17" x H28" x D12"	W17" x H28" x D12"
Weight CR-A		77 lbs	86 lbs	86 lbs
Weight CR		67 lbs	77 lbs	77 lbs
Installation Type		Indoor Wall-Hung		
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 Secondary Heat Exchanger: Stainless Steel		
Venting	Exhaust (ø3" & ø4")	ø3" PVC, ø4" Concentric Stainless Steel, ø3" Special Gas Vent Type BH (Class IIA (PVC) and Class I (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 APS, GPS, Gas-Valve Operation Detector, Ignition Operation Detector, Water Temperature High Limit Switch, Exhaust Temperature High Limit Switch		
Accessories		Room Remote Controller, Plumb Easy Valve Set, Venting Kit, Condensate Neutralizer, Condensate Pump,		

Key Components: CR-A

NAVIEN Water Heater

“CR-A” Series Models



Number	Description
1	Intake air collar
2	Fan
3	Mini buffer tank
4	Water flow sensor
5	Controller (PCB)
6	Circulation pump
7	Hot water outlet
8	3-way valve
9	Recirculation water inlet
10	Water leakage detector
11	Automatic flow adjustment valve
12	Cold water inlet
13	Condensation trap
14	Gas inlet
15	Main gas valve
16	GPS-V device
17	Gas pipe
18	Gas pressure sensor (GPS)
19	Transformer
20	Secondary heat exchanger
21	Primary heat exchanger
22	Igniter
23	APS-V device
24	Gas manifold valves
25	Burner
26	Air pressure sensor (APS)
27	Exhaust duct
28	Exhaust collar
29	Combustion air intake duct
30	Ground fault interrupter

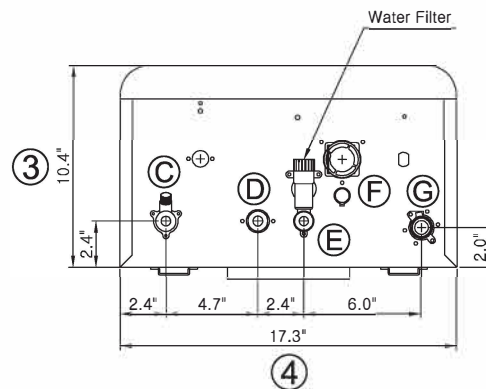
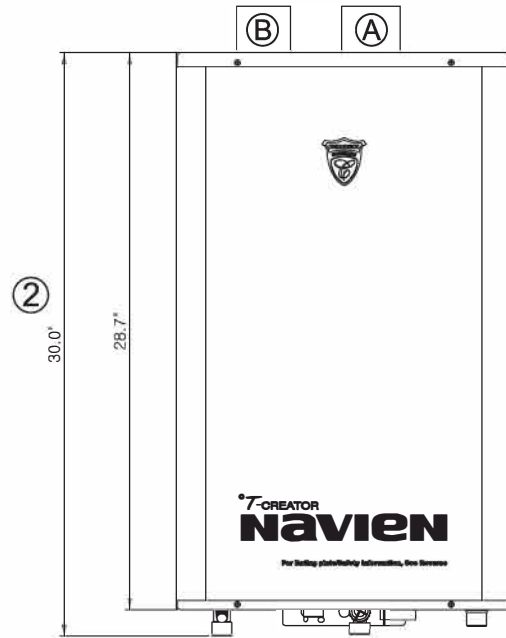
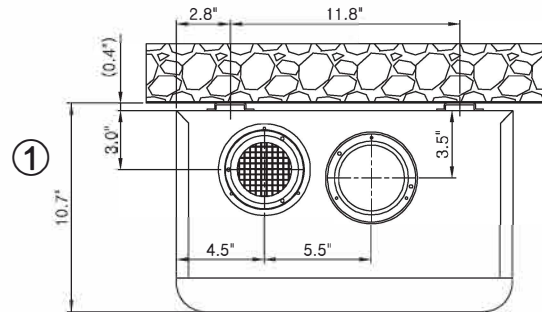
Dimensions: CR-A

CR-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 Type Dimensions

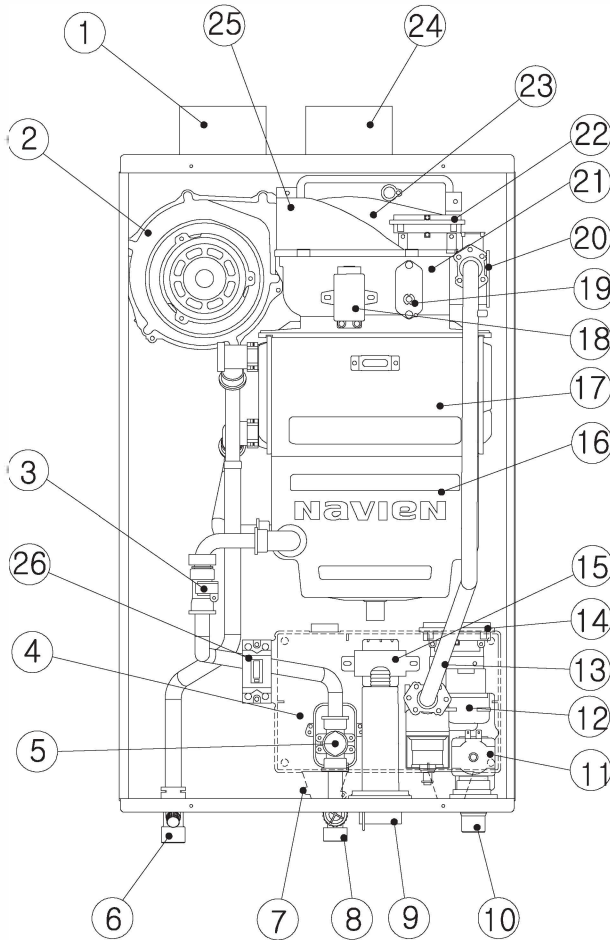
Model	①	②	③	④
180	10.7"	30"	10.4"	17.3"
210	12.7"	30"	12.4"	17.3"
240	12.7"	30"	12.4"	17.3"



Key Components: CR

NAVIEN Water Heater

“CR” Series Models

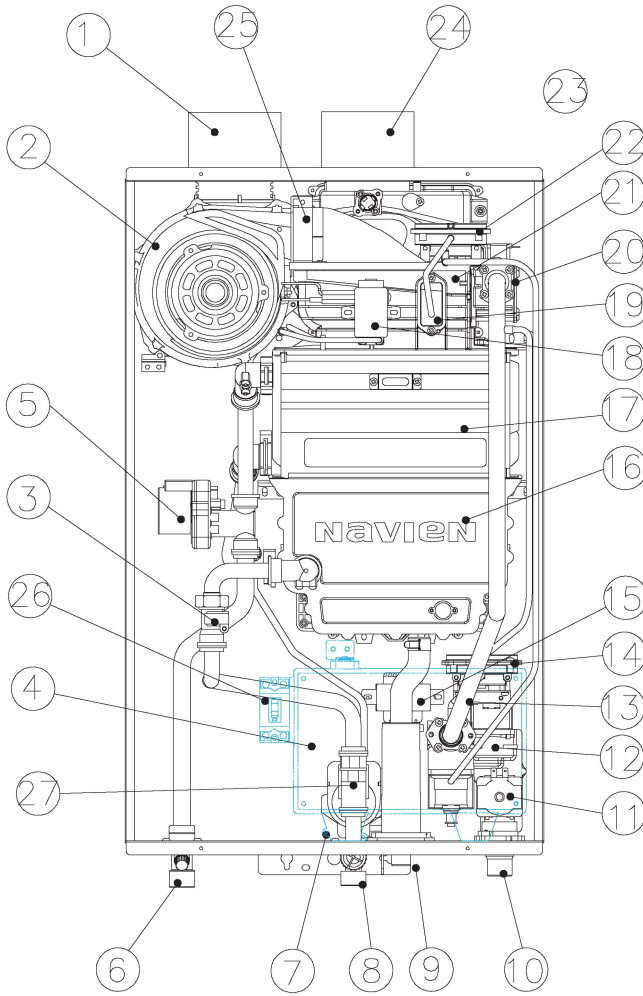


Number	Description
1	Intake air collar
2	Fan
3	Water flow sensor
4	Controller (PCB)
5	Automatic flow adjustment valve
6	Hot water outlet
7	Water leakage detector
8	Cold water inlet
9	Condensation trap
10	Gas inlet
11	Main gas valve
12	GPS-V device
13	Gas pipe
14	Gas pressure sensor (GPS)
15	Transformer
16	Secondary heat exchanger
17	Primary heat exchanger
18	Igniter
19	APS-V device
20	Gas manifold valves
21	Burner
22	Air pressure sensor (APS)
23	Exhaust duct
24	Exhaust collar
25	Combustion air intake duct
26	Ground fault interrupter

Key Components: CC Models

NAVIEN Water Heater

"CC" Series Models



Number	Description
1	Intake air collar
2	Fan
3	Water flow sensor
4	Controller (PCB)
5	Automatic flow adjustment valve
6	Hot water outlet
7	Water leakage detector
8	Cold water inlet
9	Condensation trap
10	Gas inlet
11	Main gas valve
12	GPS-V device
13	Gas pipe
14	Gas pressure sensor (GPS)
15	Transformer
16	Secondary heat exchanger
17	Primary heat exchanger
18	Igniter
19	APS-V device
20	Gas manifold valves
21	Burner
22	Air pressure sensor (APS)
23	Exhaust duct
24	Exhaust collar
25	Combustion air intake duct
26	Ground fault interrupter
27	2-Way valve

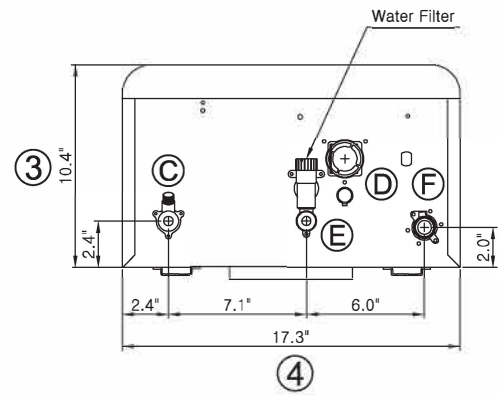
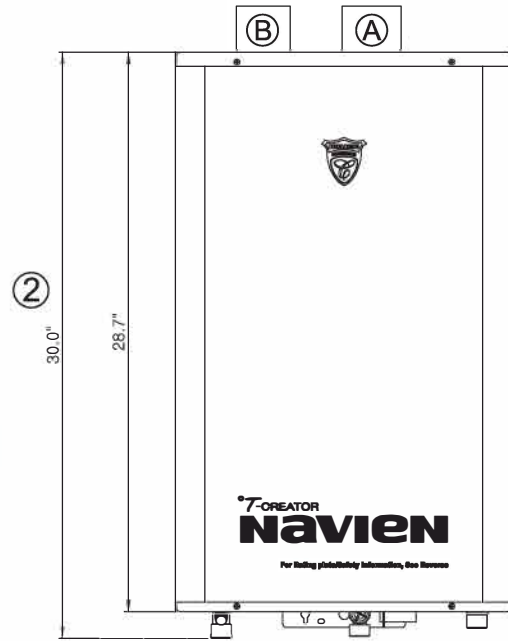
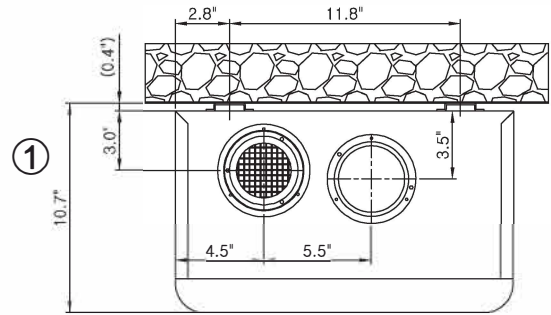
Dimensions: CR, CC

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"



Installation Warnings:



WARNING

Read all safety warnings in the “Operating Manual”. The additional safety issues outlined below must also be followed completely when installing this Navien water heater:



WARNING

Follow all local codes and/or the most recent edition of the National Fuel Gas Code (ANSI Z223.1/NFPA 54) in the USA or the Natural Gas and Propane Installation Code in Canada (CAN/CGA B149.1).

1. This unit is designed for indoor installations. DO NOT operate this unit without the vent piping connected. Exhaust gases must be completely expelled out of the building.
2. DO NOT use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and replace any part of the control system and any gas control which has been underwater.
3. Be sure not to reverse the water and gas connections as this may damage the gas valves.
4. Water temperatures over 125°F can cause severe burns instantly or death from scalds. If the proposed water heater outlet temperature is above 125°F, a thermostatically controlled mixing valve (or a temperature limiting valve) for reducing point of use water temperature is recommended to reduce the risk of scald injury. Contact a licensed plumber or the local plumbing authority for further information.
5. The appliance should be located in an area where leakage within the unit or at its connections will not result in damage to the surrounding area. Navien will not be responsible for any damage resulting from leaking if adequate drainage is not provided.
6. DO NOT use this water heater for any purpose other than water heating and space heating.
7. If the water quality is known to have high acidity and/or high hardness, water treatment is recommended to maintain full warranty. Consult the local water authority.
8. Protect against snow accumulation around the vent terminations. Ensure the exhaust vent pipe and the intake airpipe remain clear from obstructions at all times.
9. DO NOT overtighten fittings as pipe and/or fitting damage may occur causing leakage.
10. DO NOT install water heater where subject to vibrations.
11. The vent for this appliance shall not terminate over public walkways; or near soffit vents or crawl space vents or other area where condensate or vapor could create a nuisance or hazard or cause property damage; or where condensate or vapor could cause damage or could be detrimental to the operation of regulators, relief valves, or other equipment.
12. For other than a direct vent appliance, the appliance must be located as close as practicable to a chimney or gas vent.
13. Should overheating occur or the gas supply fails to shut off, turn off the manual gas control valve to the appliance.

Getting Started:



CHECK THE RATING PLATE

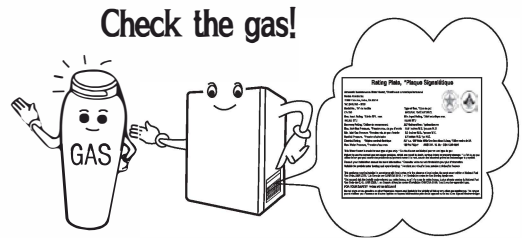
Navien units come from the factory configured for use with either Liquid Propane (LP) or Natural Gas (NG). **Before starting the installation**, check the rating plate located on backside of front cover of the water heater to ensure the unit matches gas type, gas pressure, water pressure and electrical supply. **If the unit does not match following requirements, do not install;**



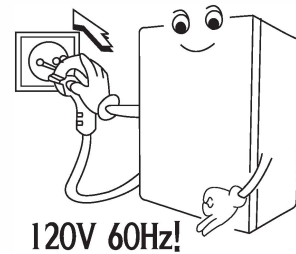
WARNING

Be sure the gas type and electricity voltage match the Rating Plate.

- ▶ Use only the gas type indicated on the rating plate of the Navien Water Heater. Using a different gas type will cause abnormal combustion and water heater malfunction.



- ▶ Be sure to use 120V AC, 60Hz, minimum 2A current. Using abnormally high or low AC voltage may cause abnormal operation, a fire and may reduce the life expectancy of the product.



If not certain, contact Navien.



WARNING

Conversion of this unit from natural gas to propane or vice versa cannot be done in the field. Please re-confirm gas type on the rating plate (backside of front cover) before installing. **DO NOT** attempt any field conversion; this will result in dangerous operating conditions and will void all warranty.

Navien America Inc. is not liable for any property damage and/or personal injury resulting from unauthorized conversions.

Check Rating Plate:

Sample Rating Plate

Rating Plate, *Plaque Signalétique

Automatic Instantaneous Water Heater,
 *Chauffe-eau automatique instantané
 Navien America Inc.
 17855 Fitch Ave, Irvine, CA 92614
 Tel: (949) 955 – 9009

Model No., *N° de modèle
 CR-180

Max. Input Rating, *Entrée GPL max.
 150,000 BTU

Recovery Rating, *Calibre de recouvrement

Max. Inlet Gas Pressure, *Pression max. de gaz d'entrée
 10.5 Inches W.C. *pouces W.C.

Min. Inlet Gas Pressure, *Pression min. de gaz d'entrée
 5.0 Inches W.C., *pouces W.C.

Manifold Pressure, *Pression d'admission
 3.7 Inches W.C. *po W.C.



Electrical Rating, *Régime nominal électrique
 AC *c.a. 120 Volts 60Hz Use less than 2 Amp, *Utilise moins de 2A

Max. Water Pressure, *Pression d'eau max.
 150 Psi *lbp2 ANSI Z21. 10.3b – CSA 4.3B-2004

Type of Gas, Type de gaz
 NATURAL GAZ NATUREL

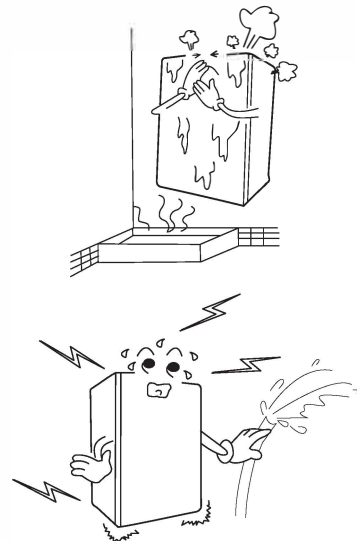
Min. Input Rating, *Désit calorifique max.
 13,000 BTU

227 Gallons/Hour, *gallons/heures

DO NOT install the Navien water heater in areas with excessive high humidity:

- ▶ DO NOT install the unit in a location where there is excessive high humidity such as bathroom, damp crawl space and other such spaces. This may cause the unit to malfunction.
- ▶ To avoid possible electrical shock, DO NOT touch the internal components of the water heater or the power cord with wet hands;
- ▶ DO NOT splash excessive water on the water heater or remote controller when cleaning; they are water resistant, not water proof;



Locating the Water Heater:



WARNING Considering the Location

Location selection may not necessarily affect the operation of the Navien water heater but it will affect the customer's experience and level of satisfaction with the product. Understanding that each building is different, the contractor will have to select the best location based on a combination of the following factors:

- 1) Locate Navien water heater close to a drain where condensed water and possible water leakage will not do damage to surrounding areas. A significant amount of condensed water will be produced each time the water heater is used. In addition, as with any water heating appliance, the potential for leakage at some time in the life of the product does exist. If there is no drain, Navien will not be responsible for any water damage that may occur;
- 2) Locate where the city water supply comes into the building;
- 3) Locate where the gas supply comes into the building;
- 4) Locate the main fixtures in the home (bathrooms, kitchen, laundry, etc.). Select a location that minimizes the water piping distance between the major fixtures. If the distances are long or an appliance needs "instant" hot water, Navien recommends using its "A" models and running a recirculation line back from the furthest fixture. Insulate as much of the hot water supply line and recirculation line as possible;
- 5) Consider Venting Options: Select a location that minimizes the amount of venting required. Consider venting restrictions from windows, doors, air intakes, gas meters, neighbor's house, etc. Check Local codes but Navien has included some general information in this install guide.
 - Maintain proper clearances from any openings in the building (see chart in venting section).
 - Navien water heater requires a minimum clearance of 12 inches above the exterior grade.
 - Do not install the water heater where moisture from the exhaust may cause discoloration or damage to walls.
 - Install the exhaust vent so that there are no obstacles around the termination and so that exhaust cannot accumulate.
 - Do not enclose the termination.
 - Do not install the water heater near vents for heating or cooling. A minimum of 4 feet(1.2m) should be maintained.
- 6) It is not recommended to install the water heater in bathroom, bedroom, any occupied rooms normally kept closed, or in in-outdoor areas without proper venting.

- 7) Select a location that ensures the water heater will have sufficient clean, combustion air; avoid installation where dust or debris will accumulate; avoid installation where chemical agents (e.g., hair spray, spray detergent, chlorine, chemicals) are used;
- 8) If installing into a very tight space or corner, please ensure there is sufficient service and maintenance access to all gas and water piping to ensure that regular maintenance (such as cleaning the water filter, the air filter and the condensate trap) will not become problematic;

Allow sufficient clearance:

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

- 9) DO NOT install in an area that contains or stores gasoline or other flammables.
- 10) Ensure that combustibles are clear of the immediate area. Ensure hanging laundry or other such items will not impede the air movement into, or out of, the water heater or its venting.
- 11) For commercial applications, avoid greasy fumes or a large amount of steam; take measures to prevent the fumes and steam from entering in the equipment;

Mounting the Unit to the Wall:

1. All Navien units come with an upper mounting bracket pre-drilled at 16" on center for easy installation on standard stud walls. Affix the bracket to the wall securely, ensuring that it is level and that it can support the weight of the water heater. If the strength of the wall is not sufficient, reinforcements must be made to prevent unsafe situations.
2. If the framing is not standard, reinforcement of the wall is required or if installing on an uneven surface, fasten 3/4" plywood to the stud wall and then attach the mounting brackets to the plywood.
3. When using the supplied mounting bracket, it creates a 5/8" clearance from the back of the unit.
4. The upper bracket is installed on the wall and the water heater is then hung on the bracket. On the back of the water heater at each of the top corners, there is a hanger bracket on the back of the water heater that interlocks with a tab on the wall mounting bracket;

Plumbing:

Plumbing and Water Connection Guidelines

Pipe Sizing

- ▶ The water fittings on the Navien water heater are ¾" NPT.
- ▶ Although Navien's water connections are ¾", if the installation site has only ½" plumbing throughout the building, it is **NOT** necessary to upsize the water lines to ¾" when installing a single unit;
- ▶ When installing multiple units to supply higher 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 sizing needs to be properly sized to meet the total hot water demand. A water pressure **above** 40 psi is recommended for each water heater for proper operation of the unit. Consult the Navien website or call for further information on sizing such applications.

Water Piping Guidelines

- ▶ All pipes, pipe fittings, valves and other components, including solder, must be approved for use in potable water systems;
- ▶ The use of unions and manual shut off valves on both the cold water inlet and hot water outlet are recommended;
- ▶ The longer the piping, the longer it takes to get hot water to the fixtures. Make the hot water piping system as short as possible;
- ▶ To conserve water and energy, insulate all water piping especially the hot and recirculation water lines. **DO NOT** cover the drain or pressure relief valve;
- ▶ After the water heater has been installed, be sure to clean the mesh filter located within the cold inlet and then test the unit. The filter is there to prevent debris from entering your water heater. This will need to be cleaned periodically to maintain optimum flow; See "draining the unit" and "cleaning the inlet filter" procedures in the maintenance section of the operating manual for instructions on these two procedures.

Space Heating

- ▶ Piping and components connected to the water heater for the space heating application shall be suitable for use with potable water.
- ▶ The effect that toxic chemicals, such as used for boiler treatment, shall not be introduced into the potable water used for space heating.
- ▶ The effect that a water heater which will be used to supply potable water shall not be connected to any heating system or component(s) previously used with a nonpotable water heating appliance.
- ▶ Instructions that when the system requires water for space heating at temperatures higher than required for other uses, a means such as a mixing valve shall be installed to temper the water for those uses in order to reduce the risk of scalding potential. These instructions shall include a piping diagram(s) for a typical installation.

CAUTION

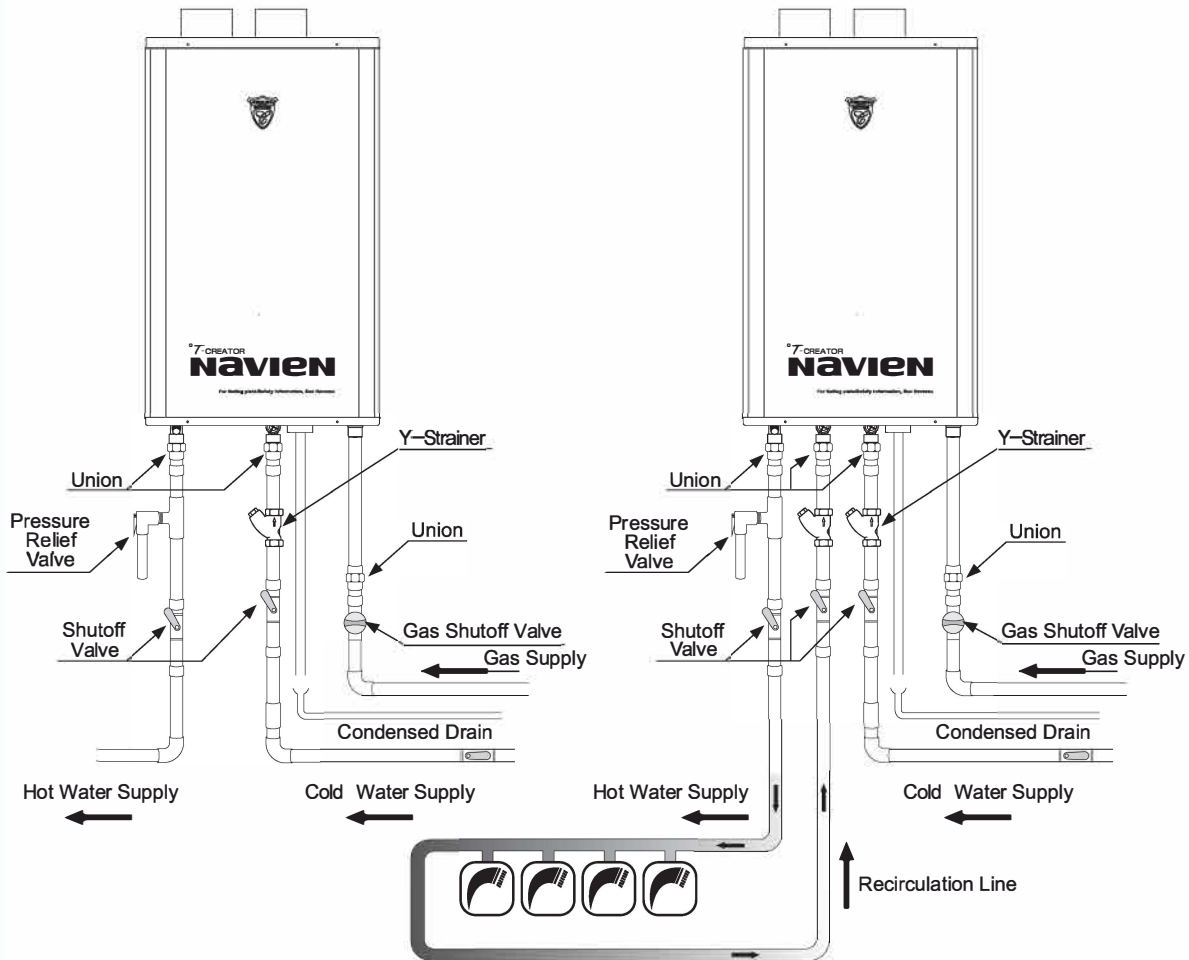
This water heater must only be used with the following water supply system conditions :

- ▶ With clean, potable water free of corrosive chemicals, sand, dirt, or other contaminants.
- ▶ With inlet water temperatures above 32°F (0°C), but not exceeding 140°F (60°C).
- ▶ Free of lime and scale deposits.

Water Piping Guidelines

CR Model:

CR-A Model:



NOTICE : If using mixing valves on the outlet, choose one which prevents cold water pressure from overcoming hot water line pressure.

The flow rate of hot water may vary when more than two faucets(appliances, fixtures, etc.) are being used simultaneously.

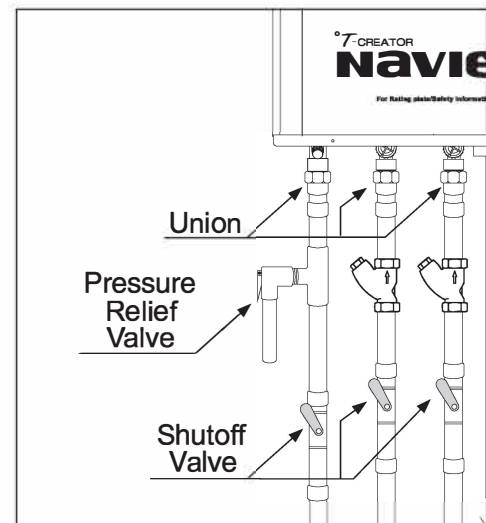
If a water heater is installed in a closed water supply system, such as one having a backflow preventer in the cold water supply line, means shall be provided to control thermal expansion **device**. Contact the water supplier or local plumbing inspector on how to control this situation.

Pressure Relief Valve:

Pressure Relief Valve

- ▶ An approved $\frac{3}{4}$ " maximum 150 psi pressure relief valve must be installed on the hot water outlet, as close to the unit as possible. Please see below for more information on approved pressure relief valves;
- ▶ Each Navien water heater has a high-temperature shut off switch built in as a standard safety feature (called a temperature high limit switch) therefore a "pressure only" relief valve is required. This unit does not come with a pressure relief valve but one must be installed on the hot water outlet;
- ▶ The discharge capacity of the pressure relief valve must be at least equal to the maximum pressure rating of the water heater;
- ▶ The maximum input BTUH rating on the valve must be equal to or greater than the maximum input BTUH rating of the water heater. For example, if installing a Navien CR-210 at 175,000 BTUH, the pressure relief valve must have a maximum input rating of not less than 175,000 BTUH;
- ▶ The discharge piping for the pressure relief valve must be directed so that the hot water cannot 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.
- ▶ The following $\frac{3}{4}$ " maximum 150 psi valves are examples of valves approved for use with all Navien products:

1. Wilkins P-1000A (Zurn Industries)
2. Conbraco 17-402-04
3. Watts Industries 3L(M7)
4. Cash Acme FWL-2 $\frac{3}{4}$ "

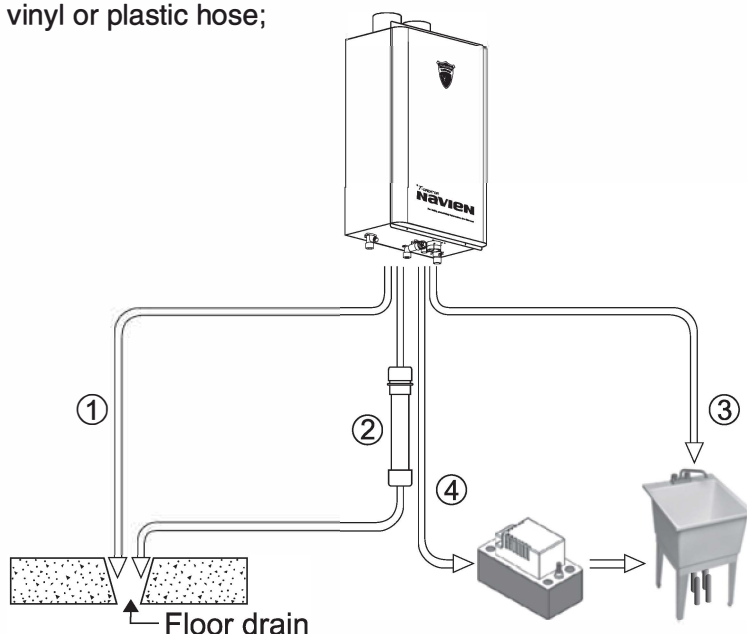


Instructions for pressure, temperature and vacuum relief valves shall specify that no valve is to be placed between the relief valve and the tank. The instructions shall specify installation in such a manner that the discharge from temperature and pressure relief valves will be conducted to a suitable place for disposal when relief occurs and that no reducing coupling or other restriction be installed in the discharge line.

Disposal of Condensate:

Disposal of Condensate

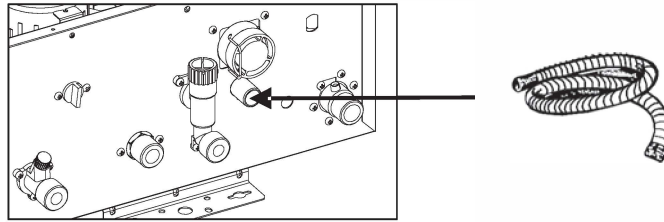
- ▶ This Navien water heater is a high efficiency gas appliance that creates condensation when it operates. Condensation has an acidic (pH) of approximately 3~4. Follow your local code with regards to the disposal of condensation. Here are several options for the Disposal of Condensate (see diagram below):
 - ① From water heater direct to drain;
 - ② From water heater to neutralizer to drain;
 - ③ From water heater to laundry tub (bottom of water heater must be above the height of laundry tub; must have a negative slope to properly drain);
 - ④ From water heater to condensate pump to laundry tub (for long distances between water heater and laundry tub or when bottom of water heater is installed below height level of laundry tub).
- ▶ All Navien's CR and CC model water heaters are condensing gas appliances. A condensate trap comes factory installed inside each water heater;
- ▶ All condensate must be drained in accordance with all local regulations. Navien recommends draining the condensate to a laundry tub as the alkalie in the detergent from the washing machine will neutralize the acid in the condensation. If a laundry tub is not close by, you may need to install a condensate pump to push the condensate to the nearest laundry tub or consider installing a condensate neutralizer so that you can release the neutralized (non-acidic) water into a regular, nearby drain;
- ▶ If a neutralizer is installed, periodic replacement of the lime stone (or neutralizing agent) will be required. The rate of depletion of the lime stone varies upon usage of the water heater. During the first year of operation, please check the neutralizer every few months for depletion. If you notice any depletion, order some replacement neutralizer lime stone.
- ▶ Use only corrosion-resistant materials for the condensate drain lines such as ¾" ID PVC pipe vinyl or plastic hose;



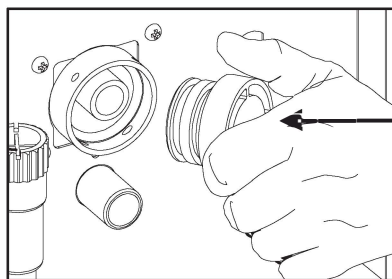
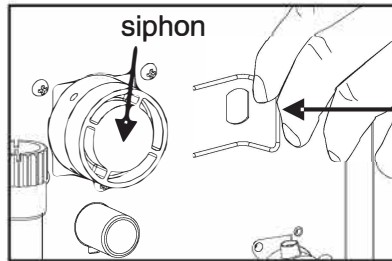
Condensate Drain & Cleaning:

Disposal of Condensate

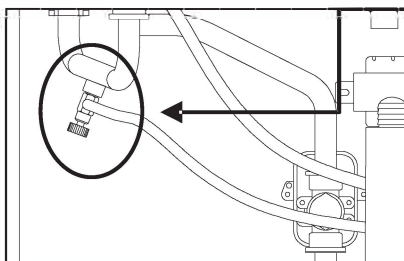
- A condensate drain tube is included with the Navien water heater. This tube must be connected to the port at the bottom of the unit (see below). The end of the tube should drain to a laundry tub or to a floor drain. If additional tubing is required, any $\frac{3}{4}$ " polyvinyl tubing should suffice;



- Over time, blockage of the siphon by debris may occur; when the condensate cannot be released, the water heater will go into error and will shut down. When this occurs, the siphon must be cleaned. To clean, you will need a bucket to collect any residual water. See figures below.



- Once the cap and clip have been re-inserted, the siphon must be re-filled. See figure below.



- ▶ Open the valve and water will begin to fill in the siphon. Fill the siphon to the top and then close the valve.
- ▶ Open a hot water faucet; examine the open end of the condensate drain line to ensure no flue gases are exiting from that pipe. If the flue gases are exiting, immediately stop the unit and call Navien for additional instructions.

Gas Piping:

Gas Piping Guidelines:

- ▶ **Navien recommends the water heater be the first appliance installed downstream of the gas meter** to ensure it will have sufficient supply of gas;
- ▶ Use the charts on the following pages to properly size the gas supply pipe;
- ▶ The gas connection fitting on all Navien units is $\frac{3}{4}$ ". **DO NOT** use less than $\frac{3}{4}$ " piping;
- ▶ When using flexible gas line, ensure the pipe's inner diameter is sufficient to supply the required BTUs; also ensure that the flexible line has no crimps or tight bends that will restrict gas flow;
- ▶ Install a manual gas shut-off valve between on the gas supply line close to the water heater;
- ▶ When using rigid pipe, Navien recommends the installation of a union on the gas supply pipe close to the water heater to facilitate any future maintenance and service;

Gas supply Line Pressures:

1. The minimum and maximum inlet gas pressures are:
Natural Gas Min. 3.0" WC - Max. 10.5" WC
Propane Gas Min. 8.0" WC - Max. 13.5" WC
2. Gas pressures outside of the above specified ranges will result in adverse performance and dangerous operating conditions; any damage resulting from improper gas supply pressures will not be covered by warranty;
3. Until pressure testing of the main gas supply line is completed, ensure the gas line to the Navien Water Heater is disconnected to avoid any damage to the water heater;
4. The appliance must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than $\frac{1}{2}$ psi (3.5 kPa);
5. The gas appliance and its gas connections must be leak tested before placing the appliance in operation. Leaks can be found by applying soapy water to all gas fittings and observing for bubbles or using a gas leak detection device ;
6. Always purge the gas line of any debris before connecting to the heater gas inlet.
7. Never use an open flame to test for gas leaks, as property damage, personal injury, or death could result.

Gas Pipe Sizing Chart:

Referenced from Uniform Plumbing Code 1997

Gas Pipe Sizing

Maximum Natural Gas Delivery Capacity

in Cubic Feet (ft³) per Hour (0.60 Specific Gravity, 0.5" WC Pressure Drop)

Pipe Size	Length in Feet											
	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	125'	
3/4"	363	249	200	171	152	138	127	118	111	104	93	
1"	684	470	377	323	286	259	239	222	208	197	174	
1 1/4"	1,404	965	775	663	588	532	490	456	428	404	358	
1 1/2"	2,103	1,445	1,161	993	880	798	734	683	641	605	536	
2"	4,050	2,784	2,235	1,913	1,696	1,536	1,413	1,315	1,234	1,165	1,033	
2 1/2"	6,455	4,437	3,563	3,049	2,703	2,449	2,253	2,096	1,966	1,857	1,646	
3"	11,412	7,843	6,299	5,391	4,778	4,329	3,983	3,705	3,476	3,284	2,910	
3 1/2"	16,709	11,484	9,222	7,893	6,995	6,338	5,831	5,425	5,090	4,808	4,261	
4"	23,277	15,998	12,847	10,995	9,745	8,830	8,123	7,557	7,091	6,698	5,936	

Contact your gas supplier for BTU/ft³ rating. Use 1000 BTU/ft³ for simplified calculation.

Maximum Liquefied Propane Delivery Capacity

in Thousands of BTU/Hour (0.5" WC Pressure Drop)

Pipe Size	Length in Feet												
	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	125'	150'	200'
3/4"	567	393	315	267	237	217	196	185	173	162	146	132	112
1"	1,071	732	577	493	436	396	363	336	312	291	267	243	213
1 1/4"	2,205	1,496	1,161	993	880	798	734	683	641	605	536	477	418
1 1/2"	3,307	2,299	1,838	1,561	1,380	1,248	1,143	1,061	996	945	833	734	646
2"	6,221	4,331	3,382	2,895	2,561	2,328	2,143	2,001	1,883	1,788	1,596	1,418	1,260

** For reference only. Please consult gas pipe manufacturer for actual pipe capacities.

Maximum Natural Gas Delivery Capacity with Corrugated Stainless Steel Pipe

in Cubic Feet (ft³) per Hour (0.60 Specific Gravity, 0.5" WC Pressure Drop)

Pipe Size	Length in Feet											
	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	150'	200'
3/4"	206	147	121	105	94	86	80	75	71	67	55	48
1"	383	269	218	188	168	153	141	132	125	118	94	82
1 1/4"	614	418	334	284	251	227	209	194	181	171	137	116
1 1/2"	1,261	888	723	625	559	509	471	440	415	393	320	277
2"	2,934	2,078	1,698	1,472	1,317	1,203	1,114	1,042	983	933	762	661

Maximum Liquefied Propane Delivery Capacity with Corrugated Stainless Steel Pipe

in Thousands of BTU/Hour (0.5" WC Pressure Drop)

Pipe Size	Length in Feet											
	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	150'	200'
3/4"	325	232	191	166	149	136	126	118	112	106	87	76
1"	605	425	344	297	265	241	222	208	197	186	143	129
1 1/4"	971	661	528	449	397	359	330	307	286	270	217	183
1 1/2"	1,993	1,404	1,143	988	884	805	745	696	656	621	506	438
2"	4,638	3,285	2,684	2,327	2,082	1,902	1,761	1,647	1,554	1,475	1,205	1,045

** For reference only. Please consult gas pipe manufacturer for actual pipe capacities.

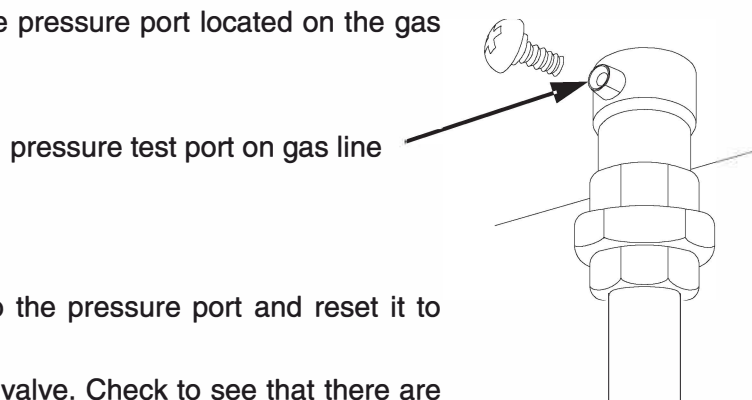
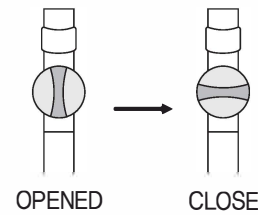
Measuring Inlet Gas Pressure:

The Navien water heater cannot operate properly without sufficient inlet gas pressure and volume. Below are instructions on how to check the inlet gas pressure.

THIS IS ONLY TO BE DONE BY A LICENSED PROFESSIONAL

Procedure to measure the inlet gas pressure:

1. Shut off the manual gas valve on the supply gas line.
2. Open a hot faucet. The unit should turn on and the gas in the gas pipe line should purge. Leave the faucet on to keep the unit running until the unit shuts down due to lack of gas supply. Then shut off the hot faucet.
3. Remove the screw for the pressure port located on the gas inlet of the water heater.;



4. Connect a manometer to the pressure port and reset it to zero.
5. Re-open the manual gas valve. Check to see that there are no gas leaks.
6. Open multiple fixtures that have high flow rates (bathtub, showers, kitchen sink) to ramp the water heater up to its maximum burn;
7. When the Navien water heater is at maximum burn, check the inlet gas pressure reading on the manometer; it should read between 3.0" and 10.5" WC for Natural gas between 8.0" to 13.5" WC for Liquid Propane.
8. The maximum inlet gas pressure must not exceed the value specified by the manufacturer and that the minimum value listed is for the purposes of input adjustment.

Venting:



WARNING

Improper venting of water heater can result in excessive levels of carbon monoxide which can result in severe personal injury or death. This water heater must be vented in accordance with the "Venting of Equipment" section of the latest edition of the ANSI Z223.1 / NFPA 54 Natural Fuel Gas Code and/or the "Venting systems and air supply for appliances" section of the latest version of the CAN/CGA B149.1 Natural Gas and Propane Installation Code in Canada and in accordance with all applicable local building codes.



WARNING

This Navien water heater can be vented with plastic or stainless steel. Plastic vent can 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 stainless steel venting or any 3" venting system approved for use with Category IV appliances (typically Type BH Special Gas Vent approved to UL1738-S636).

Venting Guidelines

- ▶ For best results, keep the vent system as short and straight as possible;
- ▶ Locate the water heater as close as possible to the vent terminator;
- ▶ The water heater vent must not be common vented with any other gas appliance or vent stack;
- ▶ Slope the vent upwards toward the vent terminal at a rate of ¼" per foot (2% slope);
- ▶ When sloping the vent using any other manufacturer's stainless steel vent, the assembly of the vent pipe must be such that it is male-to-female in the direction of the flow of condensate.
- ▶ The exhaust vent and air-intake vent pipes must be sealed air tight at each joint from flue collar to terminator;
- ▶ Make sure that the seam of the vent pipe in horizontal runs is toward the top of the installation;
- ▶ Do not downsize the vent pipe.

Venting:

- ▶ Do not store hazardous or flammable substances near the vent terminator;
- ▶ If this product will be installed in an area where snow is known to accumulate, protect the vent termination from blockage;
- ▶ Vent terminator must be a minimum of 12" above ground;
- ▶ Support the vent pipe with hangers at regular intervals or as required by local code; the weight of the vent pipe must not rest on the water heater;
- ▶ Do not common vent nor connect any other appliance to this water heater's venting system;
- ▶ Vent and air intake pipe must be supported every 5 feet.

Navien and Direct Vent:

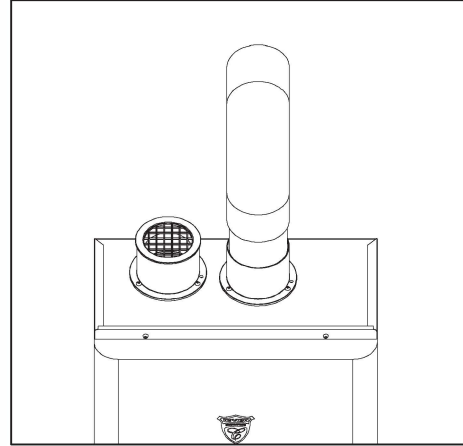
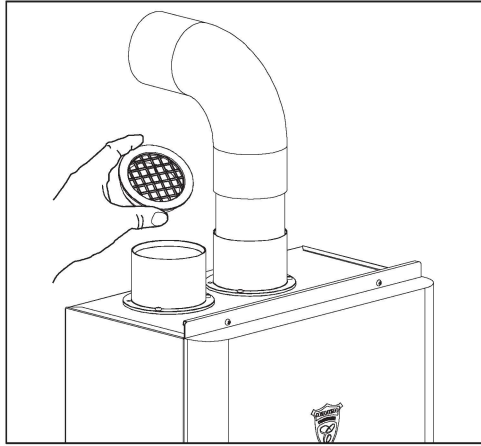
- ▶ All Navien water heaters are prepared at the factory to be direct vent (sealed combustion) units which draw all of their required combustion air directly from outside the building;
- ▶ All Navien water heaters use round 3" exhaust and round 3" air supply vent pipe. To ensure the draw and exhaust 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 can be made of ABS, PVC, galvanized steel, corrugated aluminum or any other such materials. If you are using a corrugated material, ensure there is no inadvertent crimping of, or damage to, the air intake vent.

Navien and Non-Direct Vent

- ▶ Navien recommends direct vent installations whenever possible to avoid backdrafting cold air through the unit; if you cannot use direct vent, it is essential to have an ample supply of make-up air.
- ▶ If at any time, the building experiences a negative pressure situation when using a non-Direct Vent unit, there is a possibility of back drafting cold, winter air from outside through the heat exchanger of the water heater. This situation may freeze the water heater's heat exchanger. According to the building codes in most jurisdictions, negative pressures in homes are not allowed. In a home with a well-balanced air supply, freezing of the heat exchanger will not occur.
- ▶ Since the cause of the backdrafting is insufficient make-up air within the house, this is not a Navien water heater problem. As such, any freezing damage is not covered under warranty. To avoid any such issues in colder climates, Navien insists the use of direct vent.

Venting:

- ▶ To fit the unit for non-direct vent, insert the termination end cap (provided with the water heater) into the air intake collar. Do not glue to allow for easy removal and cleaning of the cap



Combustion Air Supply Requirement for Non-Direct Vent:

- ▶ When a Navien water heater is installed without a dedicated air intake pipe (non-Direct Vent) communicating directly with the outdoors, combustion air must be supplied to the space. The opening sizes below are Navien's minimum requirements. Follow the latest version of the National Fuel Gas Code (ANSI Z223.1 / NFPA 54) or CAN/CGA B-149.1.

Model	CR, CC-180 (A)	CR, CC-210 (A)	CR, CC-240 (A)
Maximum Input (BTUH)	150,000	175,000	199,000
Outdoor make up air is provided, a <u>minimum free area</u> of 1 in ²	5.3 in ² 3" (W) x 2" (H) or 3" round	6.1 in ² 2.5" (W) x 2.5" (H) or 3" round	7 in ² 2¾" (W) x 2¾" (H) or 3" round
Indoor make up air is provided, a <u>minimum free area</u> of 1 in ²	150 in ² 12¼" (W) x 12¼" (H)	175 in ² 13¼" (W) x 13¼" (H)	199 in ² 14¼" (W) x 14¼" (H)

Venting:

Contaminated Make-Up Air Will Damage the Unit

- ▶ Do not operate the water heater in an area that is or will be under construction or renovation;
- ▶ Do not install the water heater in an area with contaminated air (containing a high level of dust, sawdust, sand, flour, aerosols or any other such airborne contaminants) as those contaminants will cause operational problems;
- ▶ The Navien warranty will not cover damage caused to the unit due to installation in a contaminated environment;
- ▶ To minimize operational problems, direct venting (sealed combustion) must be used such that contaminant free combustion air will be supplied directly from outside; Even with direct venting, regular filter cleaning and maintenance is recommended for these types of environments.

Exhaust Vent Pipe Materials

- ▶ Venting requirements in USA and Canada are different. Please consult the chart below and the most recent edition of the National Fuel Gas Code (ANSI Z223.1 / NFPA 54) or CAN/CGA B-149.1 as well as local codes for applicable venting regulations and restrictions;
- ▶ All Navien water heaters are Category IV appliances;

Navien Recommended Vent Materials		
Model Type	USA	CANADA
CR-180, CR-180A CR-210, CR-210A CR-240, CR-240A	PVC Schedule 40** ABS Schedule 40**	Type BH Special Gas Vent Class IIA (PVC)**
CC-180, CC-180A CC-210, CC-210A CC-240, CC-240A	PVC Schedule 40** ABS Schedule 40** Navien's Stainless Steel Vent Kit	Navien's Stainless Steel Vent Kit or Type BH Special Gas Vent Class IIB (PVC)**

NOTE: Plastic vent can 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** you are running an external recirculation loop or a combination heating system, you **MUST** use the Navien stainless steel venting or any 3" venting system approved for use with Category IV appliances (typically Type BH Special Gas Vent approved to UL1738-S636)**

- ▶ Navien does NOT recommend the use of cellular core ABS as venting on any of its products;
- ▶ When using stainless steel BH type gas vent, the exhaust vent system must be sealed air tight and must be male-to-female in the direction of the flow of condensate. Follow the vent pipe manufacturer's certified installation instructions.

A New requirement for Canada

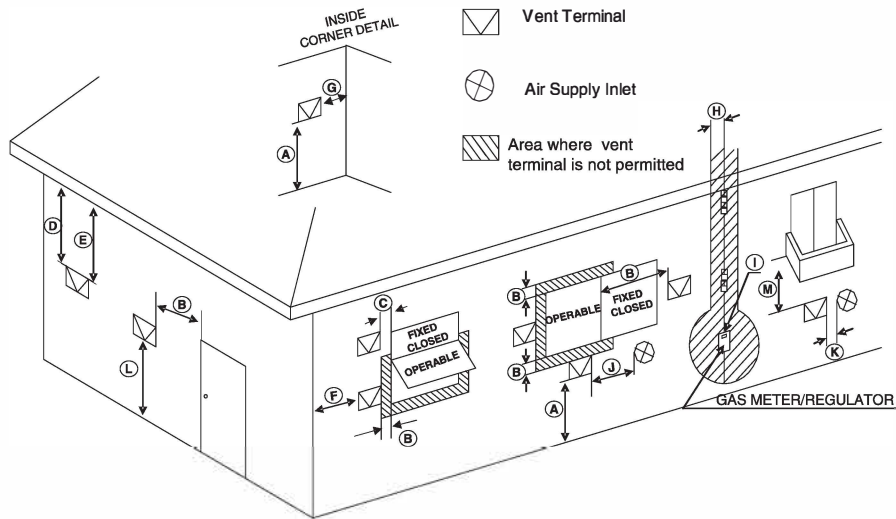
For installation in Canada, field supplied plastic vent piping must comply with CAN/CGA B149.1 (latest edition) and be certified to the Standard For Type BH Gas Venting Systems, ULC S636. Components of this listed system shall not be interchanged with other vent systems or unlisted pipe/fittings. All plastic components and specified primers and glues of the certified vent system must be from a single system manufacturer and not intermixed with other system manufacturer's vent system parts.

The supplied vent connector and vent termination are certified as part of the water heater

Venting Clearances:

All clearance requirements are in accordance with ANZI Z21.10.3 and the National Fuel Gas Code, ANSI Z223.1 / NFPA 54 and CGA B149.1 National Gas and Propane Installation Code.

ANSI Z223.1 / NFPA 54 and CSA B149.1 National Gas and Propane Installation Code.



	Clearance To:	US Direct Vent Indoor Installation	Canada Direct Vent Indoor Installation
A	Above grade, veranda, porch, deck or balcony	1'	1'
B	Window or door that may be opened	1'	3'
C	Permanently closed window	*	*
D	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet from the center of the terminal	*	*
E	Unventilated soffit	*	*
F	Outside corner	*	*
G	Inside corner	*	*
H	Each side of center line extended above meter/regulator assembly	*	3' within a height 15' above meter/regulator assembly
I	Service regulator vent outlet	*	3'
J	Non-mechanical air supply inlet or combustion air inlet to any other appliance	1'	3'
K	Mechanical air supply inlet	3' above if within 10' horizontally	6'
L	Above paved sidewalk or paved driveway located on public property	*	7'
M	Under veranda, porch, deck, or balcony	*	1'

Venting:

Allowable Vent Lengths

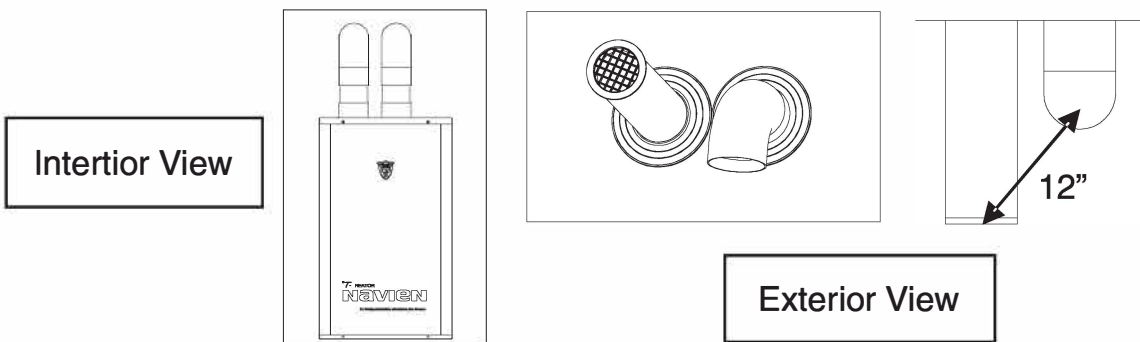
MODEL SERIES	MAX LENGTH	MAX # of ELBOWS	EQUIVALENT LENGTHS
180	70'	6	Reduce the maximum vent length accordingly for each elbow used: Each 90° elbow equates to 5 linear feet of vent. Each 45° elbow equates to 2 linear feet of vent.
210	100'	6	
240	100'	6	

NOTE: The maximum lengths listed above are for the exhaust vent section only. The intake vent length can be of equal length.

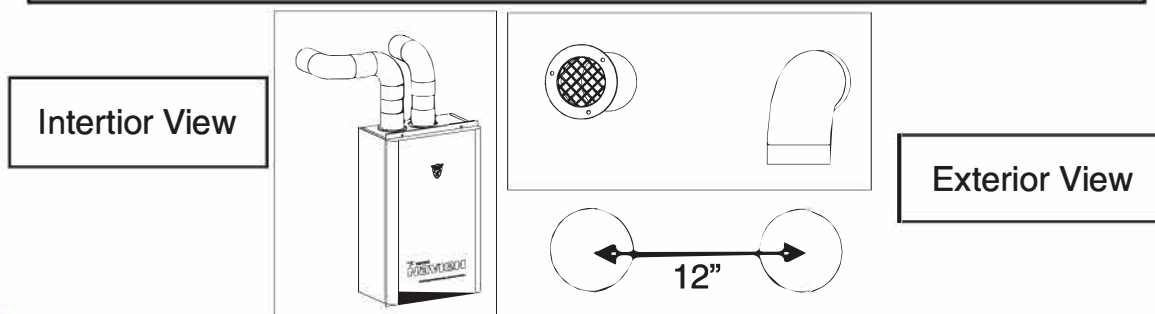
Vent Configuration Options:

The following diagrams represent some typical venting configurations and are included to assist you in your designing your vent system. Possible configurations are not limited to these diagrams.

Option #1: 3" 2-pipe side wall vent

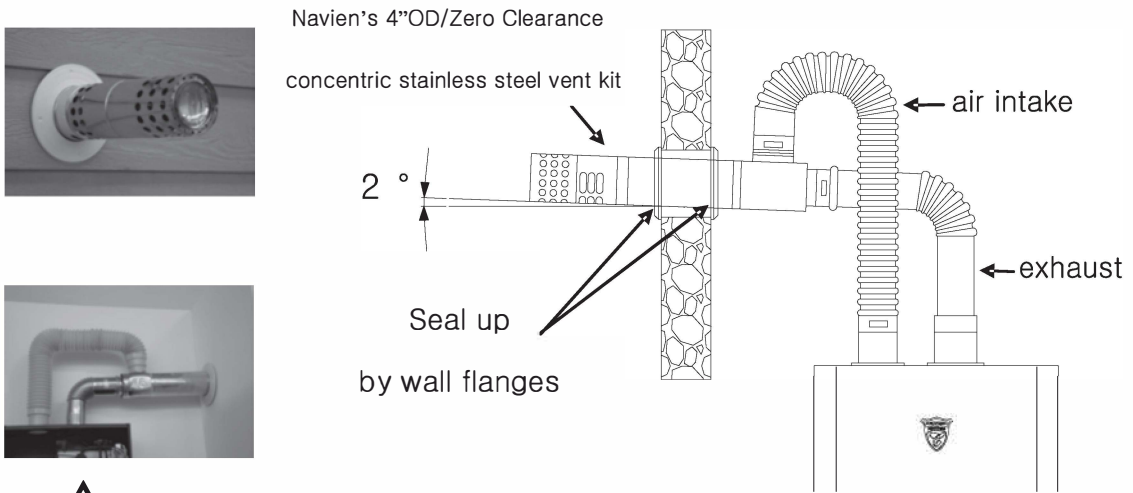


Option #2: Non-concentric venting through a side wall. Air is drawn from different location at a minimum of 12" from the termination. Please try to minimize the length of the air intake vent length.



Venting:

Option #3: Navien's 4" Outer Diameter (OD) Concentric Stainless steel venting includes a concentric pipe for penetrating through the wall cavity and then splits the exhaust and air paths into a two pipe system on the interior. There is a 0" clearance to combustibles around this pipe. It should be used when 1 large 4" hole through the exterior wall is preferred over 2 smaller holes for non-concentric side wall venting.

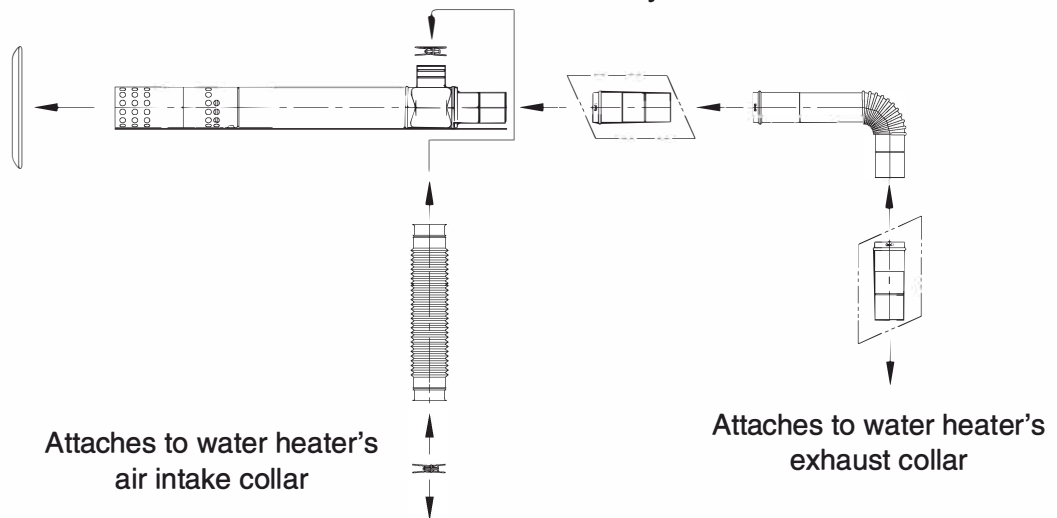


⚠ WARNING

- ▶ This vent kit is only approved for use with Navien water heaters. This vent product is not certified for use with any other manufacturer's products.
- ▶ When using any other manufacturer's venting, follow that manufacturer's installation instructions.

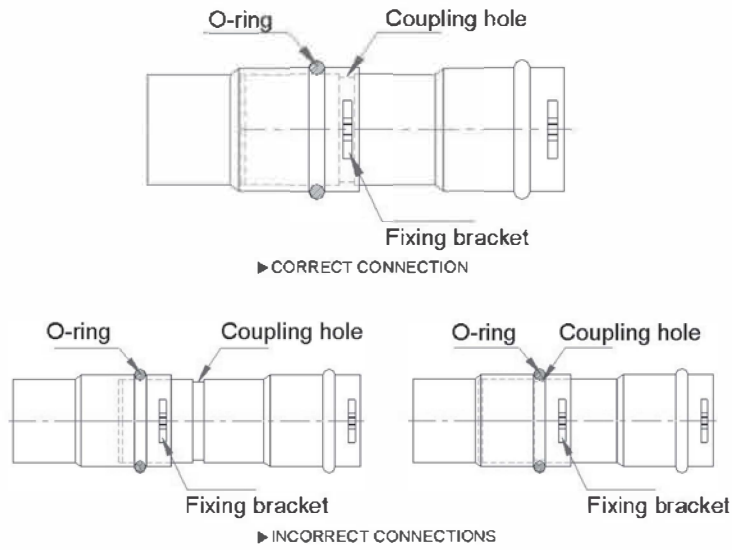
Navien's 4" OD / Zero Clearance Concentric Stainless Steel Vent Kit

****NOTE**:** there is no clearance to combustibles (0") required when using Navien's 4" OD stainless steel concentric vent system.

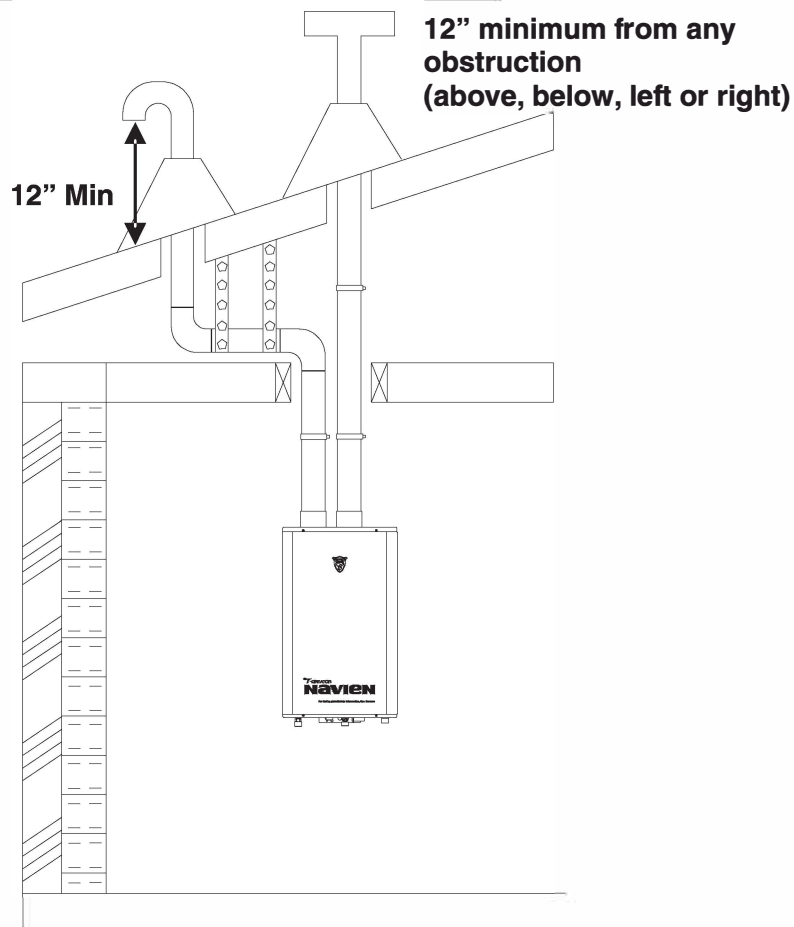


Venting:

Connecting the Venting



Option #4: 3" 2-pipe Vertical Vent Termination



Electrical Connections:



WARNING

Follow the electrical code requirements of the local authority having jurisdiction. In the absence of such requirements, follow the latest edition of the National Electrical Code (NFPA 70) in the U.S. or the latest edition of CGA C22.1 Canadian Electrical Code - Part 1 in Canada.

Electric Wiring: Grounding and Surges

- All units come with a factory installed 3-pronged (grounded) plug end. The water heater can be plugged into any electrical outlet close to the unit as it requires only 2 Amperes. 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, remove and discard the factory installed plug. An on/off switch controlling the main power between the breaker and the Navien water heater should 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;
- The use of a surge protector is recommended to protect from power surges;
- **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;**
- The electrical supply required by the water heater is 110~120VAC at 60 Hz with a maximum 2 A rating;
- **Do not connect 220~240V AC to this Navien water heater. It will damage the water heater and this damage is not covered under warranty;**
- Do not disconnect the power supply when the unit is in normal operation;
- If there is a power failure in cold weather areas, the freeze prevention system in the water heater will not operate and may result in freezing of the heat exchanger; in cold weather areas where power failures are common, you must completely drain the unit to prevent damage if the power will be off for any extended period of time;
- A battery back-up (available at most computer retailers) may be used to supply hot water during periods of power outages;
- Damage caused by freezing is not covered under warranty.

Caution : Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

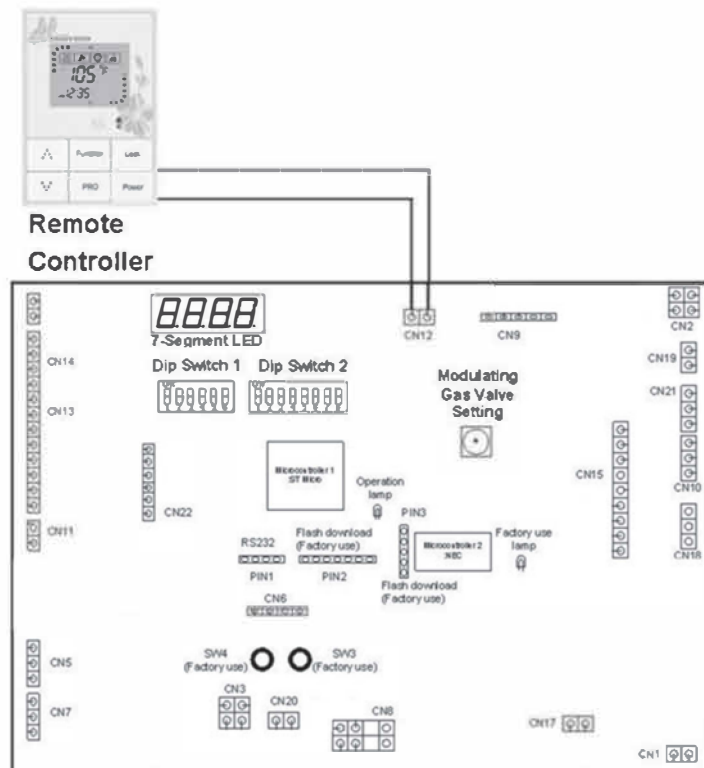
Verify proper operation after servicing.

Remote Control Installation

Remote Controller NR-10DU

The following are considerations for determining the location of the remote control:

- 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 **at least** 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;
- Do not install the remote control outdoors;
- Do not install the remote control in any area where the control will be directly exposed to water, heat, humidity or steam;
- Place remote control out of children's reach;
- Do not disassemble the remote control;
- Feed the remote controller wire through the black rubber seal at the bottom, right hand, back corner of the case through;
- The remote controller attaches to the computer board to the right of the LED (see below):



Computer Board Settings:

Water Heater Temperature Settings:



WARNING

Hot water temperatures over 125°F can cause severe burns instantly or death from scalding.

- ▶ With the Navien water heaters, the temperature has been preset at the factory to 120°F(49°C, residential), 160°F (71°C, commercial). The computer will electronically control this temperature. The output hot water temperature can be adjusted either manually using the main computer board's dipswitches or with the remote controller. Using the dipswitches, 4 hot water output temperatures can be selected. Please refer to the chart below.
- ▶ Once the remote control is connected to the water heater, it overrides the computer board dipswitch settings. If the remote controller is disconnected from the unit, the computer board will automatically revert to the temperature indicated by the dipswitches. The computer does not store the remote controller's temperature in memory. As such, the remote controller must remain connected to the water heater at all times to maintain any temperature other than the 4 presets.

Dipswitch settings for all CR models are below: the factory default setting temperature is 120°F (49°C)

TEMPERATURE SETTING			
110° F	120° F	130° F	140° F
<p>WARNING : Only Change Relevant Switches. DO Not Touch Another Switches *** Shown sample dipswitch configurations are Residential Models.</p>			

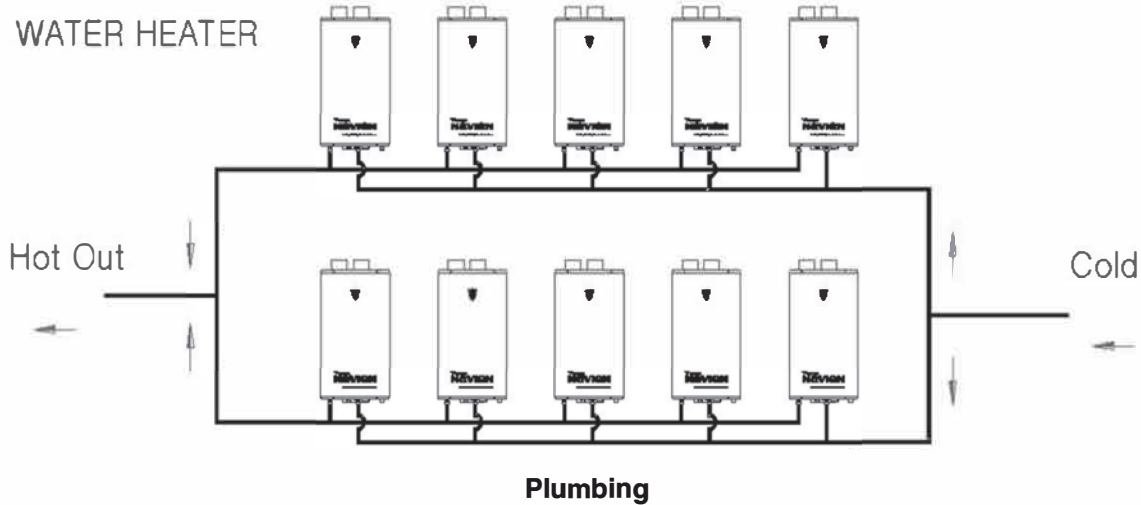
Dipswitch settings for all CC models are below: the factory default setting temperature is 160°F (71°C)

TEMPERATURE SETTING			
120° F	140° F	160° F	185° F
<p>WARNING : Only Change Relevant Switches. DO Not Touch Another Switches *** Shown sample dipswitch configurations are Commercial Models.</p>			

Cascade Connection and Set-up Procedures:

1. Step 1: Plumbing

The water heater can be connected with up to 98 units to supply as much hot water as needed.

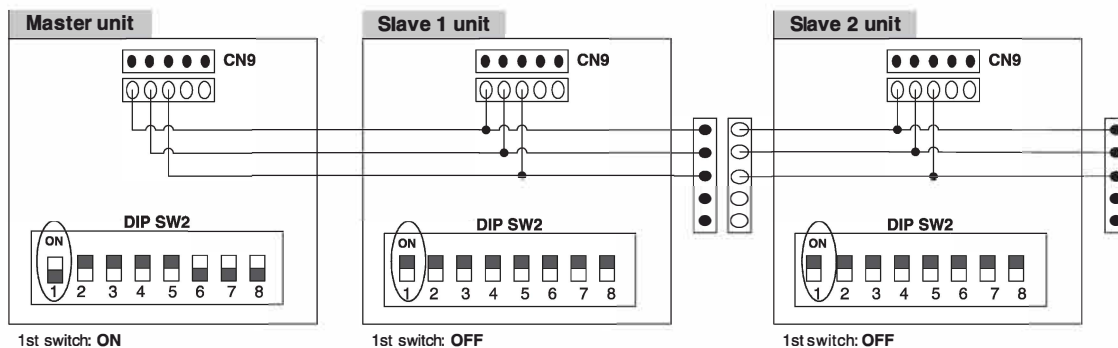


The trunk line should be sized properly to fit individual applications.

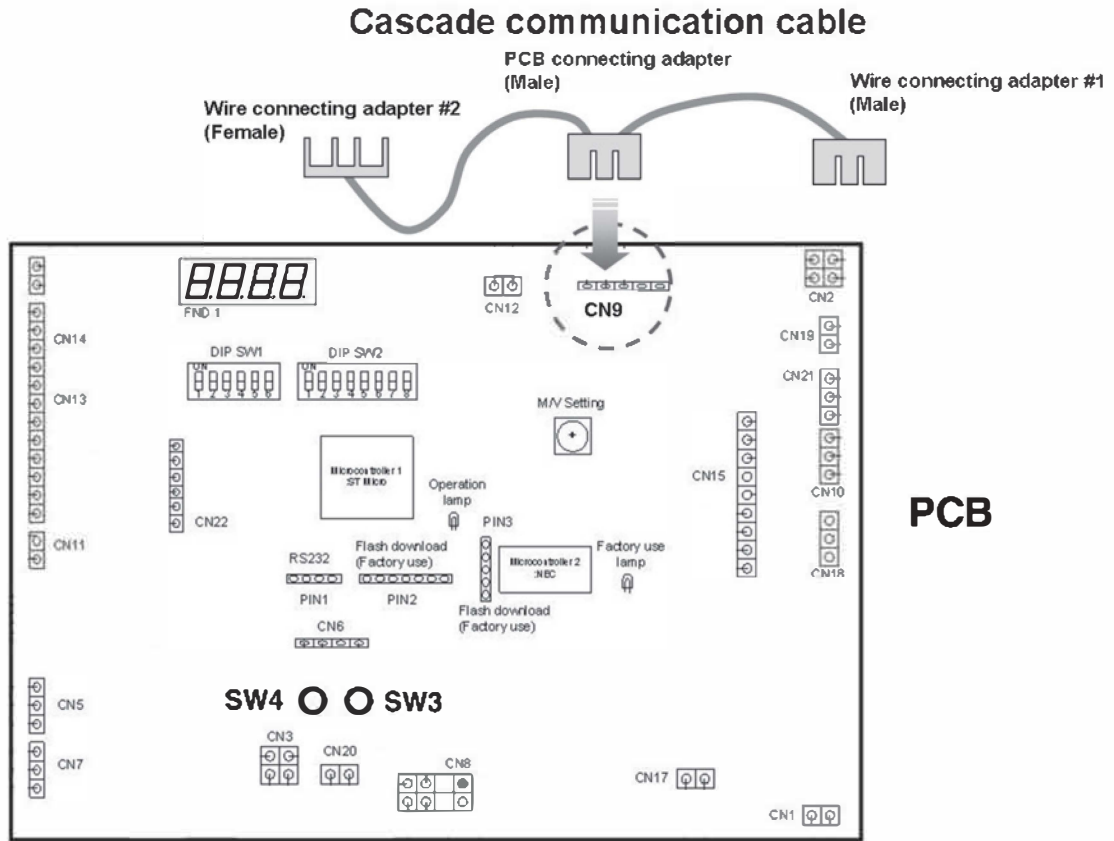
2. Step 2: Cable connection and DIP switch change

The water heater can be connected with multiple units, up to 98 units by using Navien's Multi-Link communication cables.

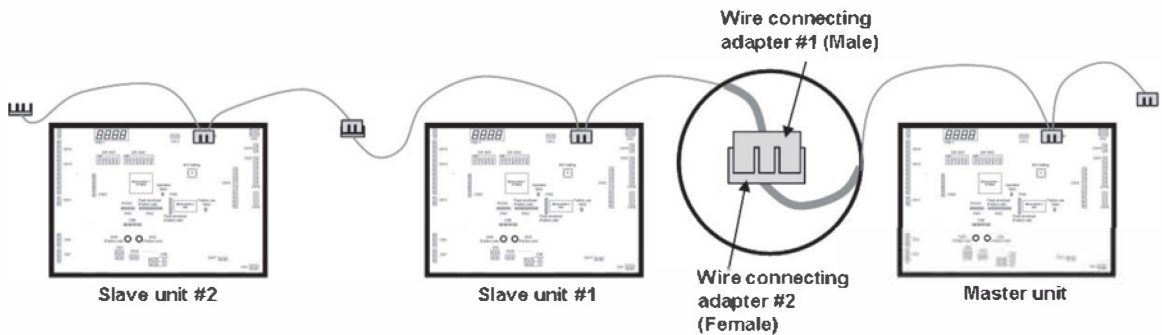
After choosing one of the units as the master unit, connect the cables and change the DIP switch 2 on the computer board as below. During step 1, the power supply should be OFF.



-cascade communication cable PCB connecting adapter PCB CN9 port.



-The diagram above displays the master unit and slave unit connected with the ready link communication cable.



-The recommended location for the master unit is in the center.

3. Step 3: Communication set-up

After the cable connections and DIP switches are set-up, the communication set-up should be done.

3.1 Master set-up

After the power ON, each FND1 will display on the PCB as below:

Unit	Master Unit	Slave 1 Unit	Slave 2 Unit
FND1	H.0.0.0.	5.0.0.0.	5.0.0.0.

FND1 display: Master set-up

3.2 Slave set-up

After the master set-up, push the SW3 and SW4 of slave 1 unit simultaneously more than 3 seconds.

FND1 of the slave 1 unit will be changed to "S001".

Slave 2 unit also can be set-up as above.

After the slave set-up, each FND1 will be changed on the PCB as below:

Unit	Master Unit	Slave 1 Unit	Slave 2 Unit
FND1	H.0.0.0.	5.0.0.1.	5.0.0.2.

FND1 display: Slave set-up

3.3 Set-up finish

After the slave set-up, push the SW3 and SW4 of the master unit simultaneously more than 3 seconds.

All the FND will be changed to the setting temperature display and set-up procedures are finished.

4. Master unit Change

It is always possible to change the master unit. After all units power off, choose one of the units as the master unit and change the DIP SW2 (#1 switch) according to master unit change.

Throughout communication set-up (Step 3) master unit change will be done.

5. Slave unit Addition/Removal

It is always possible to add or remove the slave unit. After all unit power OFF, the communication cable is added or removed on the PCB according to slave unit addition or removal.

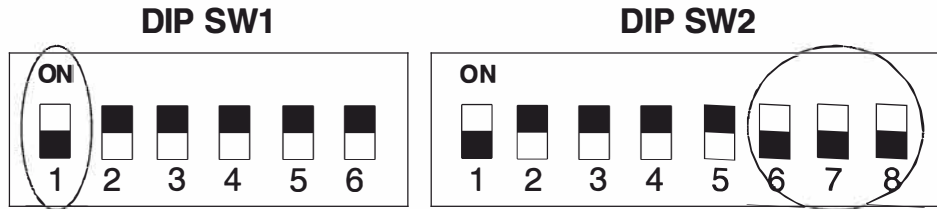
There are two cases for system set-up;

Master unit change (recommended): Repeat **Step 2** and **Step 3**

Master unit unchanged: In this case, it is necessary to change the processing mechanism of the master unit. The set-up procedures are as below: (5.1 – 5.3)

5.1 Master unit set-up

To add or remove the slave unit, DIP SW1 and SW2 of the master unit PCB are changed as below:



DIP Switch set-up of the master unit PCB: Slave unit addition/removal

#1 switch (DIP SW1) and #6-8 switch (DIP SW2) should be set to ON position.

After all unit power ON, push the SW3 and SW4 of the master unit simultaneously more than 3 seconds.

Each FND1 will display on the PCB as below:

Unit	Master Unit	Slave 1 Unit	Slave 2 Unit	Slave 3 Unit
FND1	H.0.0.0.	5.0.0.0.	5.0.0.0.	5.0.0.0.

FND1 display: Master set-up (slave unit addition)

5.2 Slave unit set-up

This procedure is same as the **3.2 Slave set-up of the Step 3: Communication set-up.**

After the slave set-up, each FND1 will be changed on the PCB as below:

Unit	Master Unit	Slave 1 Unit	Slave 2 Unit	Slave 3 Unit
FND1	H.0.0.0.	5.0.0.1.	5.0.0.2.	5.0.0.3.

5.3 Set-up finish

After the slave set-up, DIP SW1 and DIP SW2 should be set to the original position and push the SW3 and SW4 of the master unit simultaneously more than 3 seconds.

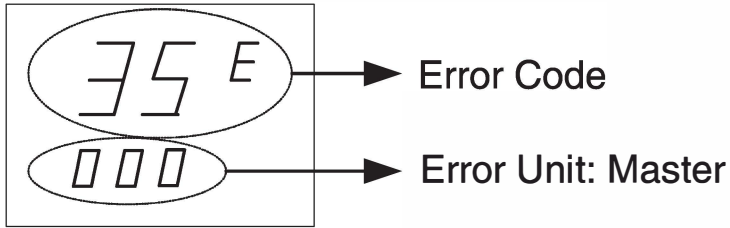
All the FND will be changed to the setting temperature display and set-up procedures are finished.

6. Error display

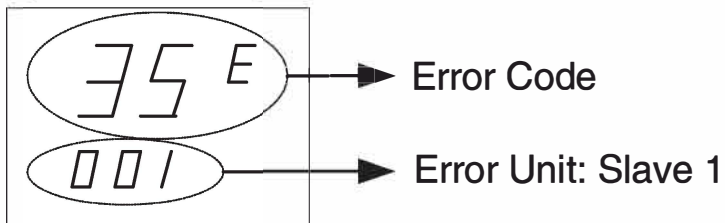
In case of the error condition in the cascade system, a relevant error and unit are displayed on the remote controller.

Error display example:

1) Error code 35 of the master unit



2) Error code 35 of the slave 1 unit



Water Heater DIP Switch Settings:

There are two sets of DIP switches; one set has 6 switches and the other has 8 switches.

Set of 6 Switches:

#	Description		
	Function	ON	OFF
1	Operation Select 1	(1) Operation Mode Select	
2	Operation Select 2		
3	Gas Type Select	LPG	LNG
4	Model Select	Standard Model	Condensing Model
5	BTU Select 1	(2) BTU Select	
6	BTU Select 2		

1 & 2: Burner Operation Mode Select

Operation Mode	DIP Switch	
	1	2
Normal Operation	OFF	OFF
Maximum Operation	ON	OFF
Minimum Operation	OFF	ON
3 Stage Minimum	ON	ON

5 & 6: Model Selection

BTU	DIP S/W	
	5	6
CR, CC-180, CR, CC-180A	OFF	OFF
CR, CC-210, CR, CC-210A	ON	OFF
CR, CC-240, CR, CC-240A	OFF	ON
-	ON	ON

Set of 8 Switches:

Operating Mode Selection:

NO.	Description		
	Function	ON	OFF
1	Ready-Link Multi-System Select	Ready-Link Multi-System Master	Single Unit Operation or Multi-System Slave
2	Location select	Korea	North America
3	Heating Box Select	Heating Box In Use	-
4	Pump & Recirculation Select	See Table in Next Page	
5			
6	Residential/ Commercial Select	Commercial	Residential
7	Temperature Select	See Table in Next Page	
8			

4 & 5: Pump and Recirculation Modes Selection

Description		DIP Switch #	
		4	5
With Pump (CR-180A, CR-210A, CR240-A, CC-180A, CC-210A, CC-240A)	Non-Recirculation	OFF	OFF
	External Recirculation	OFF	ON
	Internal Recirculation	ON	OFF
Without Pump (CR-180, CR-210, CR-240, CC-180, CC-210, CC-240)		ON	ON

7 & 8: Temperature Selection

Temperatures		DIP Switch #	
Residential Models (CR-type)	Commercial Models (CC-Type)		
°F (°C)	°F (°C)	7	8
110 (43)	120 (49)	OFF	OFF
120 (49)	140 (60)	OFF	ON
130 (54)	160 (71)	ON	OFF
140 (60)	185 (85)	ON	ON

Installation Checklist:

- **Selecting the location and installing the water heater:**
 - Are the proper clearances from windows, doors and other intake vents maintained?
 - Is the distance between the water heater and point of vent termination minimized?
 - Is distance between water heater and major fixtures within the house minimized?
 - Are the proper service clearances maintained?
 - Is the make-up air supply sufficient for proper operation of water heater?
 - Is the make-up air supply free of dust, dirt, corrosive elements and flammable vapors?
 - Is there a drain in close proximity of the water heater?
 - Are all combustible materials including clothing, cleaning materials, rags, etc. clear of the water heater and vent piping?
 - Is the water heater securely mounted to the wall?

- **Water Supply**
 - Is the water supply pressure sufficient (should be greater than 40psi)?
 - Are there shut off valves on the inlet and outlet to facilitate cold water inlet filter cleaning?
 - Has the air been bled out of each fixture?
 - Has each fixtures been checked to ensure hot water is being supplied?
 - Has the cold inlet water filter been cleaned?
 - If a recirculation line has been installed, have all of the hot water pipes and the recirculation return line been insulated?

□ **Pressure Relief Valve**

- Is there an approved pressure relief valve installed on the hot water outlet?
- Does the rating plate on the pressure relief valve indicate a BTU level equal to the maximum BTU rating of the water heater?
- Is the pressure relief valve $\frac{3}{4}$ "?
- Has the pressure relief valve been installed on the hot outlet pipe close to the exit of the water heater?
- Has a discharge drain tube been installed from the pressure relief valve to within 6~8" of the floor?

□ **Gas Supply**

- Does the gas supply match the water heater's gas type indicated on the rating plate?
- Is the gas line a minimum of $\frac{3}{4}$ "ID (inner diameter)?
- Is the gas supply line length and diameter sufficient to deliver the required BTUs?
- Has the gas supply line pressure been measured?
- Is the gas supply pressure sufficient for proper operation (within the ranges indicated in the specifications section of this manual)?
- Is the gas line is equipped with manual shut-off valve?
- Has the gas line been pressure tested and/or have all fittings been checked for leaks?
- Has the gas company inspected the installation (if required)?

□ Venting

- Has the water heater been vented with 3" ABS (except cellular core ABS), 3" PVC, Navien's 4" Stainless Steel Concentric Vent kit or Type BH Special Gas Vent (S636 PVC or stainless steel) for Category IV appliances or in accordance with this manual and/or your local code?
- Ensure that ABS cellular core or PVC cellular core pipe has not been used as venting for this water heater;
- Ensure the water heater is not common vented with any other appliance or vent stack;
- Is the vent sloped upwards toward the vent terminal at a rate of ¼" per foot (2% grade)?
- Are all vent runs properly supported?
- Has the vent terminal been properly supported?
- Have all air intake and exhaust joints from flue collar to termination been properly sealed?
- Have the vent end caps been installed on the exhaust and the intake pipes?
- Has the venting been checked for leakage?
- Is the vent terminal a minimum of 12" above the exterior grade?
- Has sufficient make-up air been supplied?
- Is the total vent length within the stated maximum vent length restriction?
- Has a condensation drain line been installed from the water heater to a floor drain or laundry tub?

□ Electrical Wiring

- Is the supplied voltage 110~120V AC?
- Is the water heater plugged into a properly grounded electrical outlet?
- If the supplied power cord has been discarded to meet local codes, has an "On/Off" switch been installed to facilitate end-user maintenance?

□ **DIP Switch Settings:**

○ **For the set of 6 DIP switches:**

- Are switch #1 and #2 in the down (off) position?
- Is switch #3 properly set for the gas supply type?
- Is switch #4 in the down (off) position?
- Are switch #5 and #6 set for the proper model number?

○ **For the set of 8 DIP switches:**

- Unless using multiple units, is switch #1 in the down (off) position?
- Are switch #2 and #3 in the down position?
- If using CR, CC models, switch #4 and #5 must be in the up (on) position; If using CR-“A”, CC-“A” models, set the switches proper for external recirculation mode(#4:off, #5:on) or internal recirculation mode(#4:on, #5:off) or non-recirculation mode(#4:off, #5:off).
- Is switch #6 properly set for residential or commercial type?
- Are switches #7 and #8 set to the customer’s desired temperature? Recommended temperature should not exceed 120°F;
- Has the homeowner been advised of the scalding potential of water temperatures set above 125°F?

□ **Final**

- Has the owner been advised of the minimum flow rate to trigger the burner (if not using the CR-“A” or CC-“A” model)?
- Has the owner been shown how to clean the cold water inlet filter?
- Has the owner been left with the operation and installation manual for future reference?
- Has the owner been shown how to shut off the gas in case of an emergency?

Factory Setting of Dip Switch :

CR 180 LNG		CC 180 LNG	
CR 180 LPG		CC 180 LPG	
CR-A 180 LNG		CC-A 180 LNG	
CR-A 180 LPG		CC-A 180 LPG	
CR 210 LNG		CC 210 LNG	
CR 210 LPG		CC 210 LPG	
CR-A 210 LNG		CC-A 210 LNG	
CR-A 210 LPG		CC-A 210 LPG	
CR 240 LNG		CC 240 LNG	
CR 240 LPG		CC 240 LPG	
CR-A 240 LNG		CC-A 240 LNG	
CR-A 240 LPG		CC-A 240 LPG	

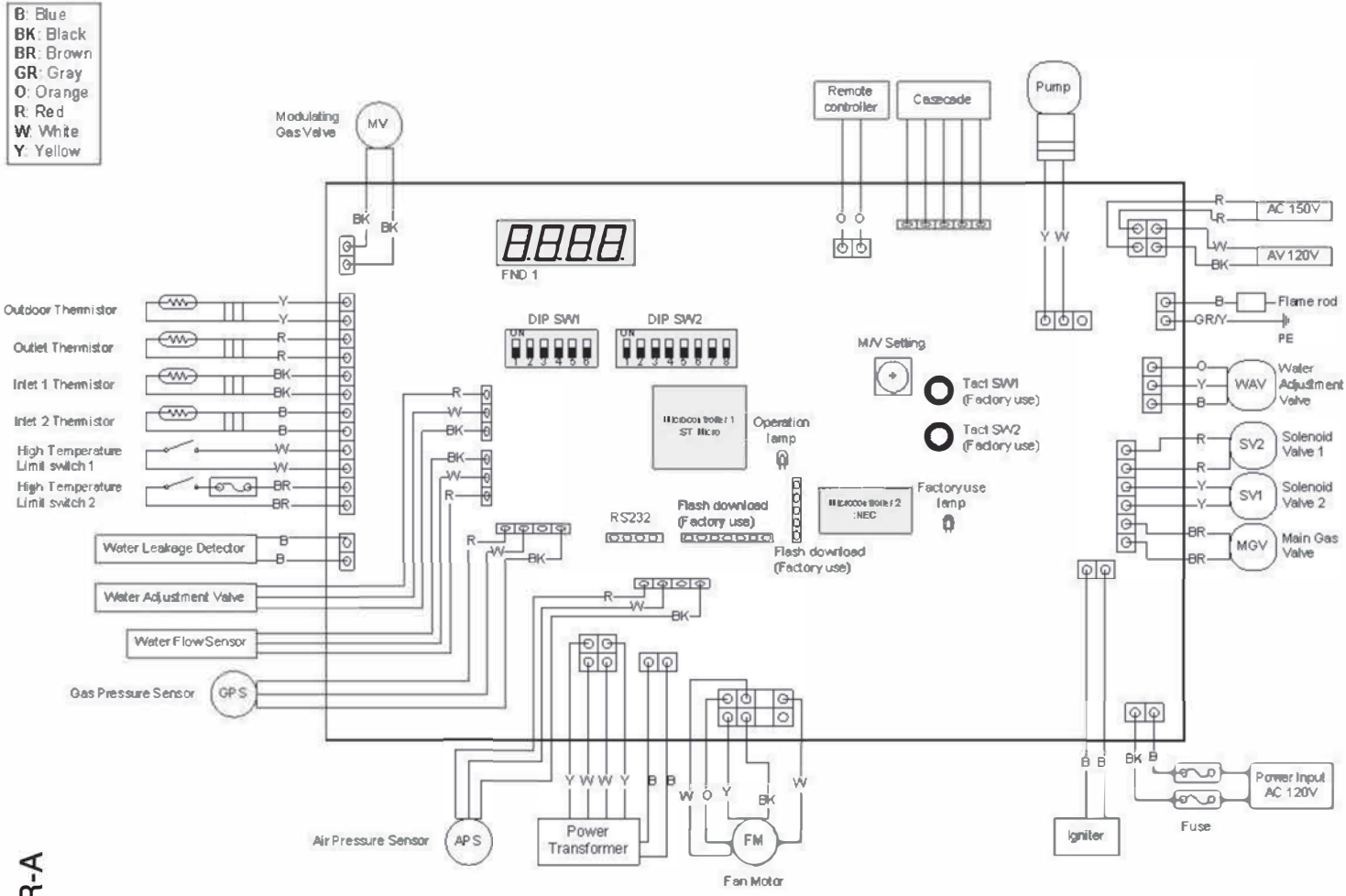
Completing the Install:

If you answered “yes” to all of the questions in the above checklist, your install is now complete. If you answered “no” to any of the points in the checklist, please review the installation and operation manuals to confirm your installation. For any troubleshooting issue, see the “Error Codes” section of the operating manual. For any questions or problems during the installation, contact Navien’s technical department toll-free at 1-800-519-8794 (949-955-9009) or visit the technical support section of the website at:

- www.navienamerica.com or www.navien.ca

Wiring Diagram

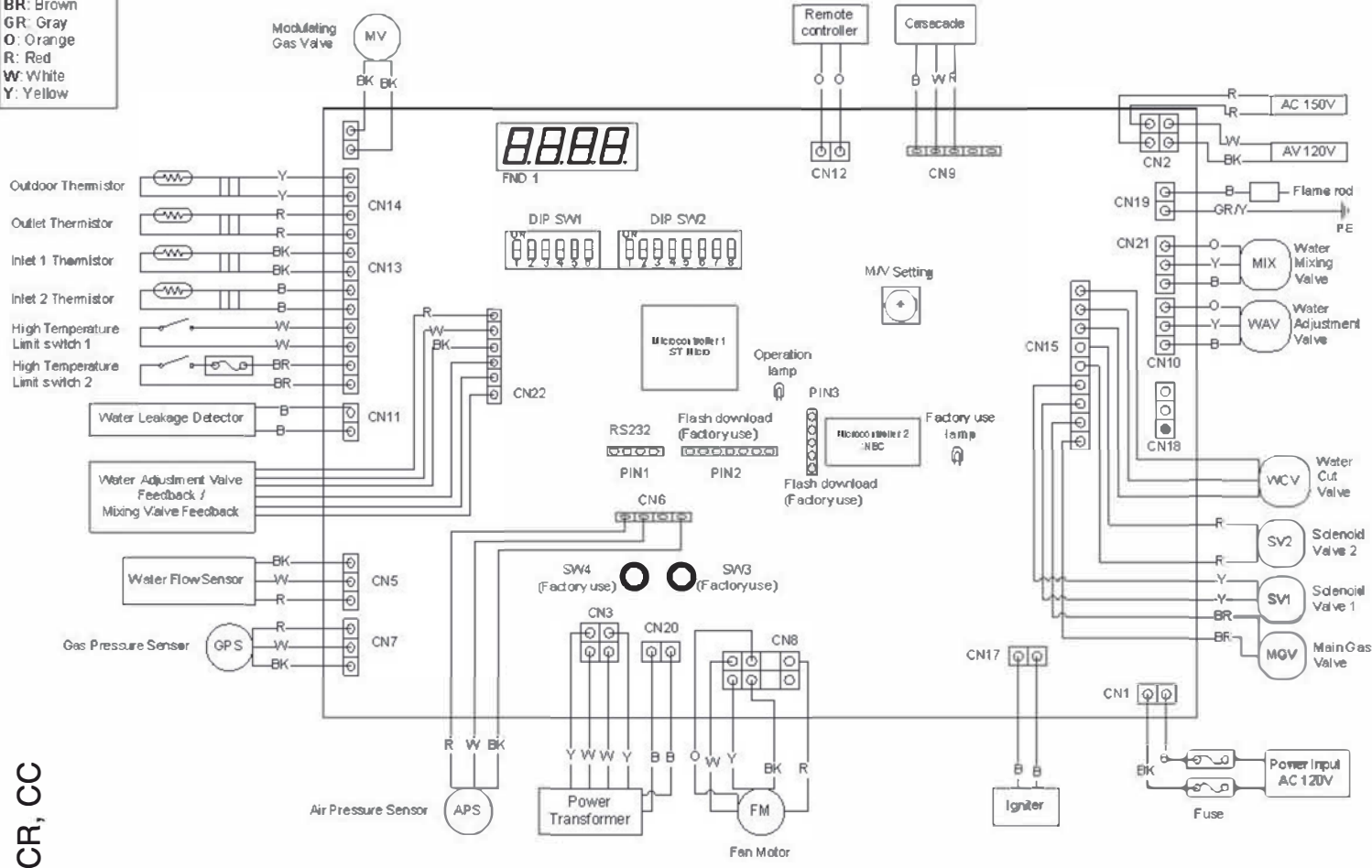
CR-A



If any of the original wire as supplied with the heater must be replaced, it must be replaced with its equivalent.

Wiring Diagram

COLOR CODE	
B:	Blue
BK:	Black
BR:	Brown
GR:	Gray
O:	Orange
R:	Red
W:	White
Y:	Yellow

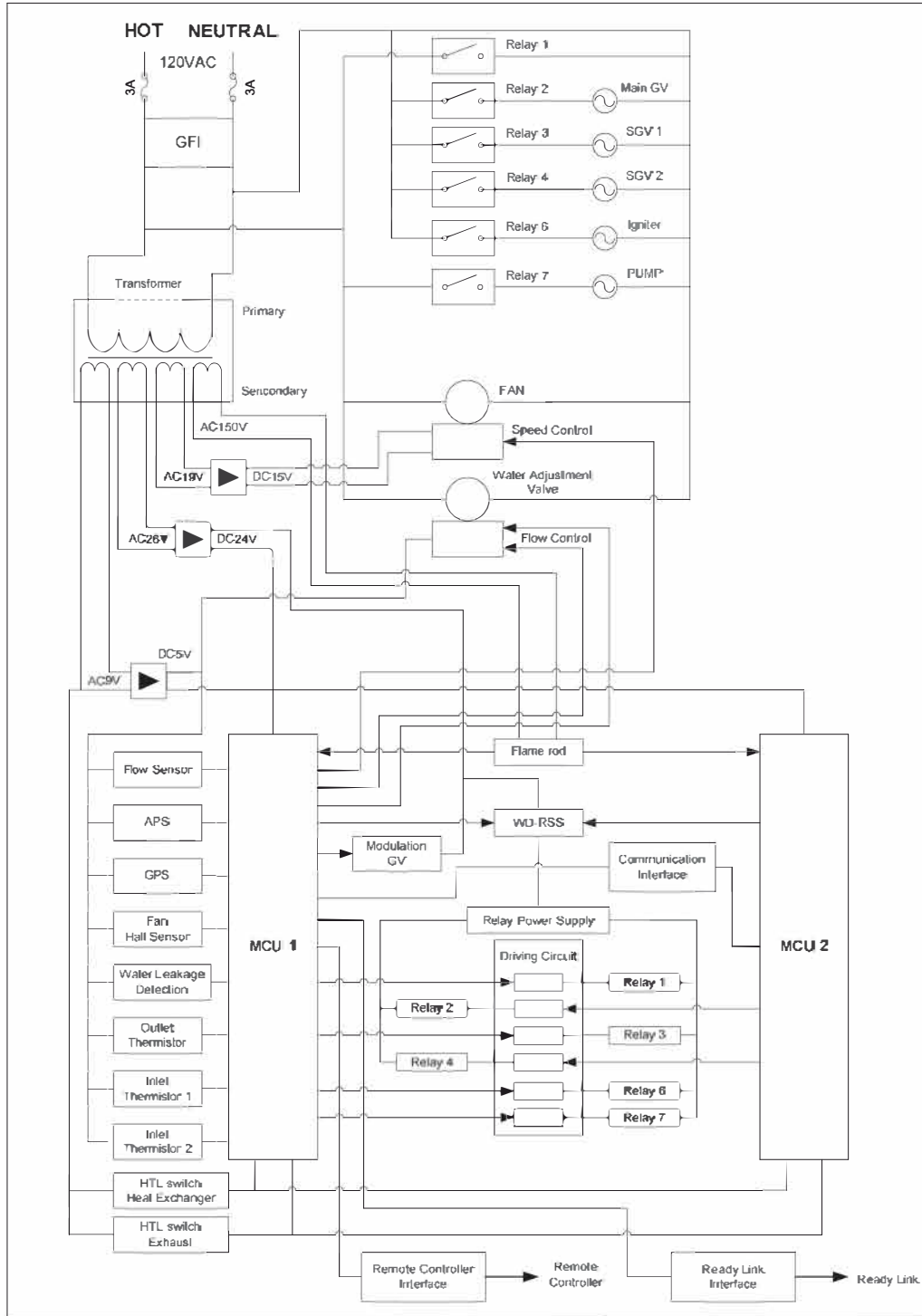


CR, CC

If any of the original wire as supplied with the heater must be replaced, it must be replaced with its equivalent.

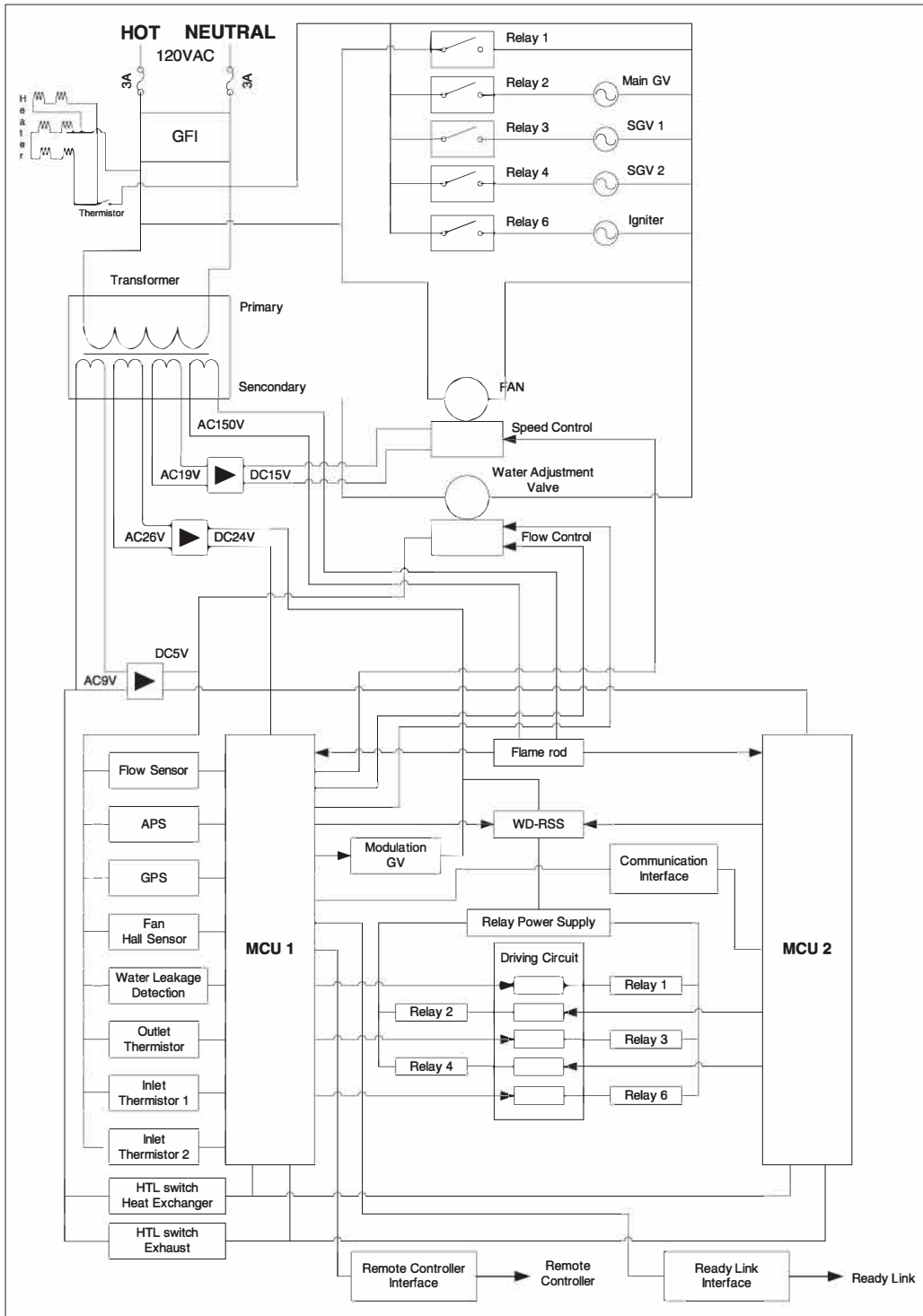
Ladder Diagram

CR-A



Ladder Diagram

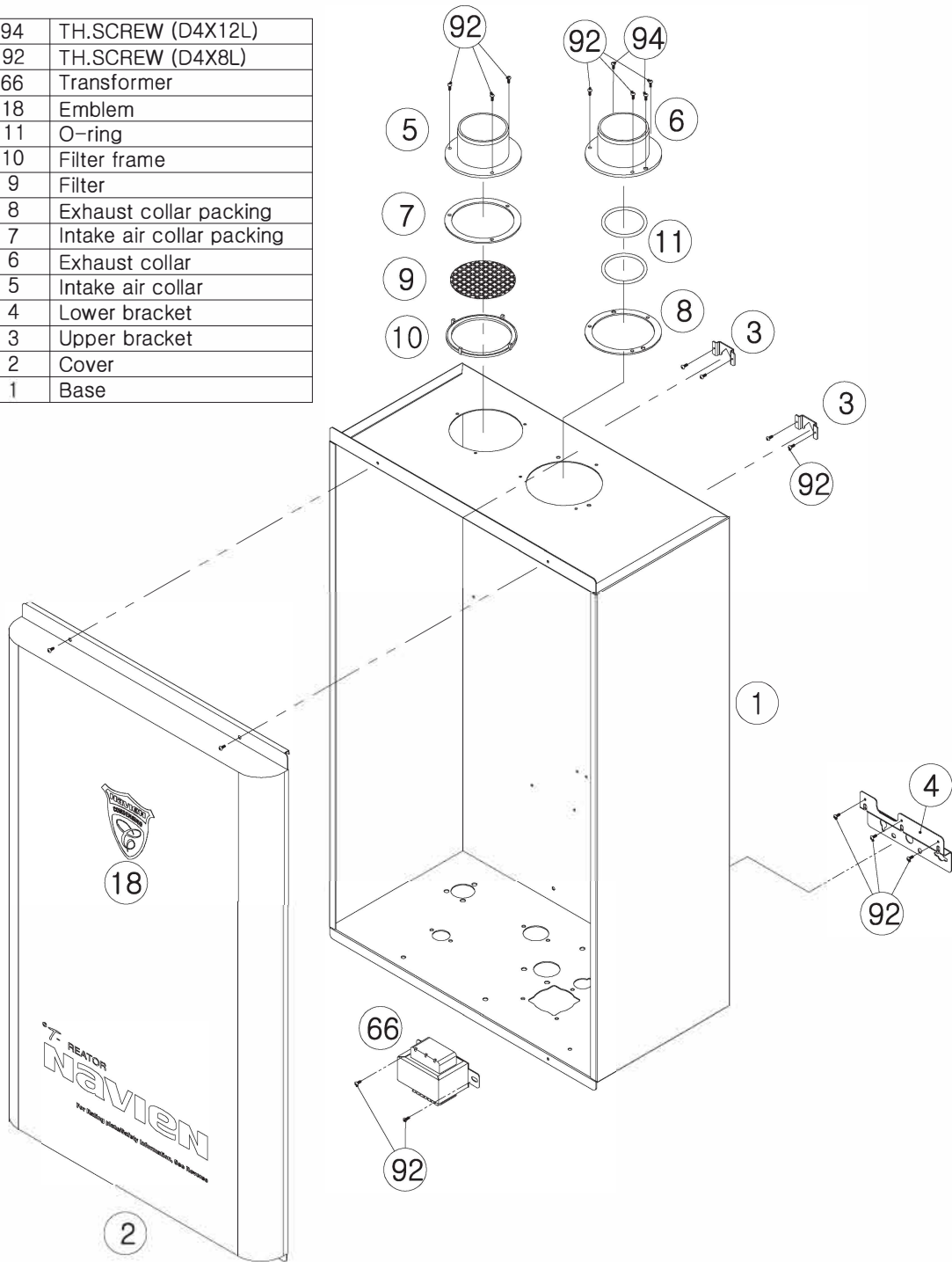
CR, CC



Components Diagram & Parts List

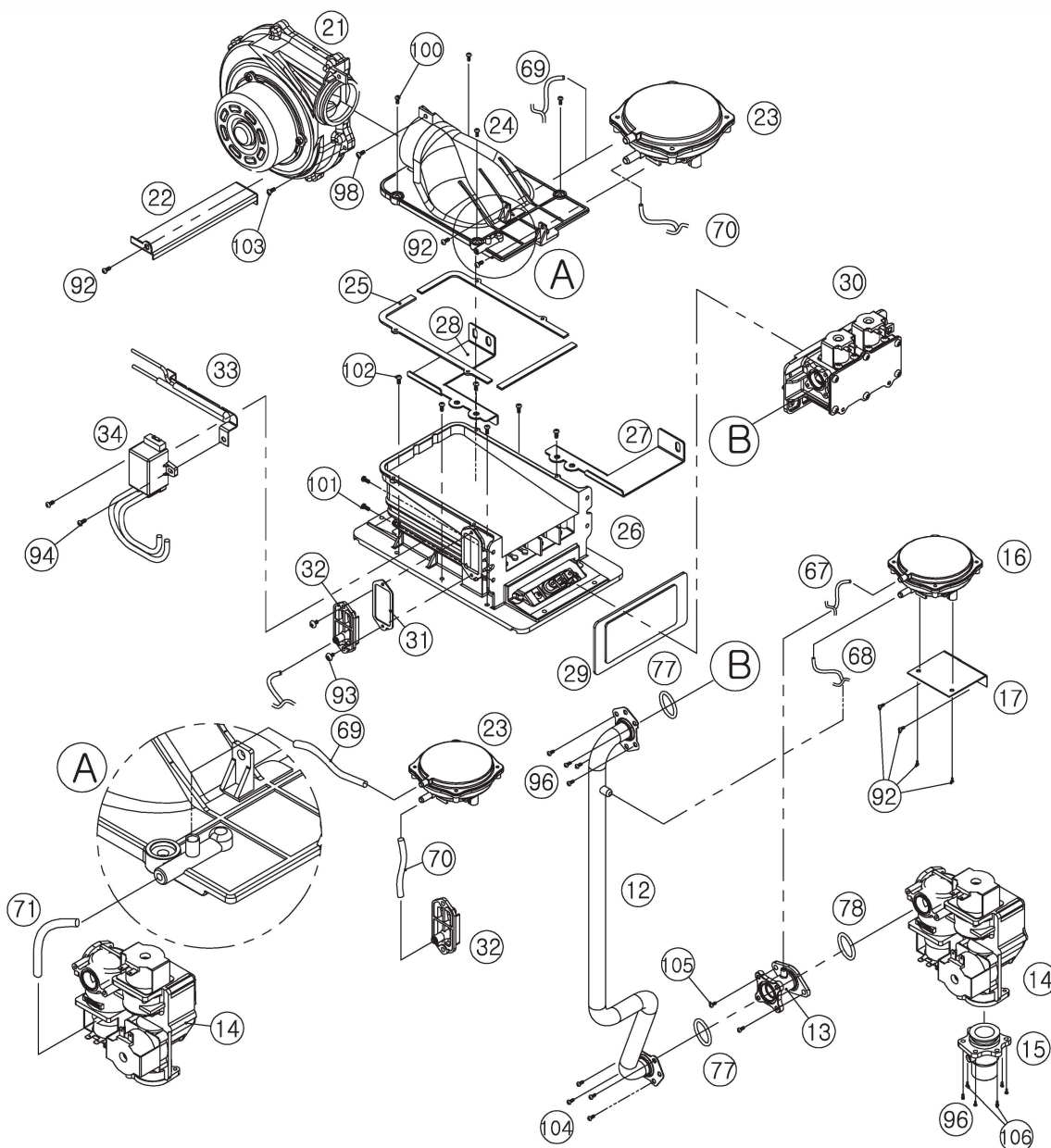
CASE ASSEMBLY : CR-A, CR, CC

94	TH.SCREW (D4X12L)
92	TH.SCREW (D4X8L)
66	Transformer
18	Emblem
11	O-ring
10	Filter frame
9	Filter
8	Exhaust collar packing
7	Intake air collar packing
6	Exhaust collar
5	Intake air collar
4	Lower bracket
3	Upper bracket
2	Cover
1	Base



Components Diagram & Parts List

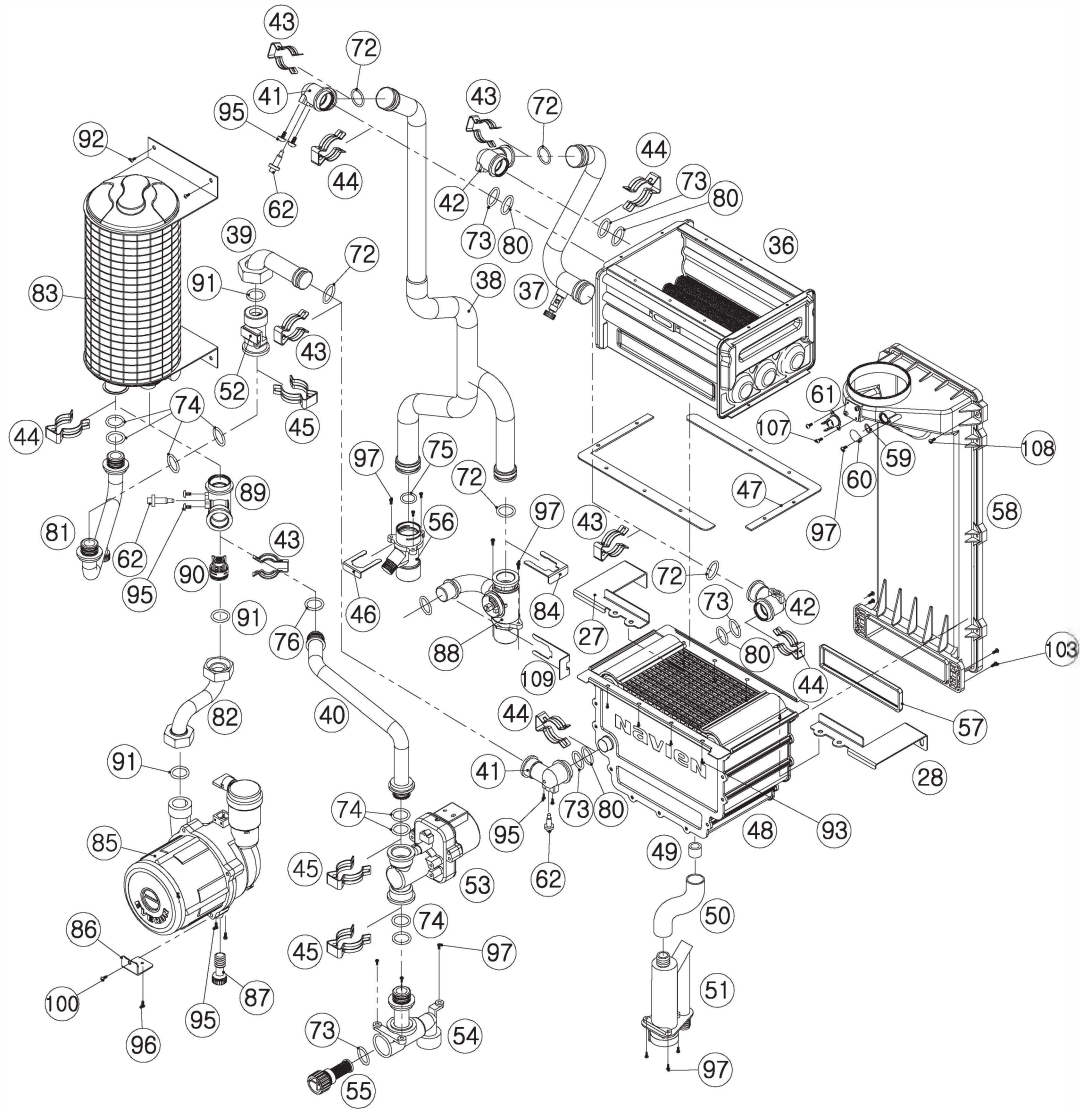
BURNER ASSEMBLY : CR-A, CR, CC



27	Burner bracket(L)	77	O-ring 19.8X2.4t	106	BOLT (M4X12L)STS
26	Burner assembly	71	Tube(black) 6X3X550L	105	BOLT (M4X10L)STS
25	CAID packing	70	Tube(black) 7X4X170L	104	BOLT (M4X6L)STS
24	Combustion air intake duct	69	Tube(black) 7X4X50L	103	SCREW (D4X16L)
23	Air pressure sensor	68	Tube 7X4X170L	102	SCREW (D4X14L)
22	Fan bracket	67	Tube 7X4X550L	101	SCREW (D4X12L)
21	Fan	34	Igniter	100	SCREW (M4X8L)
17	GPS bracket	33	Temperature fuse	98	TAP SCREW (D4X8L)
16	Gas pressure sensor	32	APS venturi	96	TH.SCREW (D4X6L)STS
15	Gas inlet	31	APS venturi packing	94	TH.SCREW (D4X12L)
14	Main gas valve	30	Manifold	93	TH.SCREW (D4X6L)
13	GPS venturi	29	Packing	92	TH.SCREW (D4X8L)
12	Gas pipe	28	Burner bracket(R)	78	O-ring 19.8X2.7t

Components Diagram & Parts List

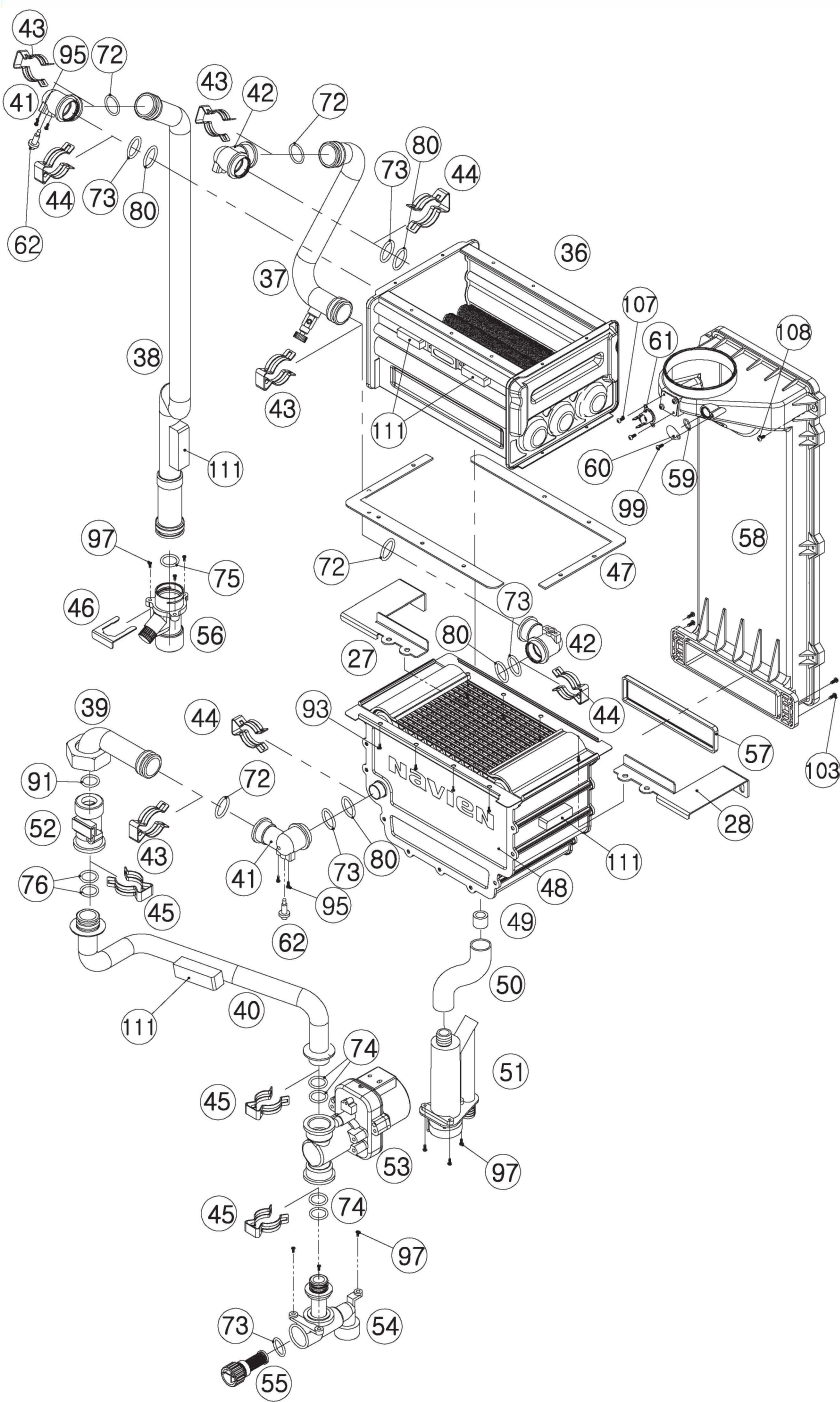
WATER WAY ASSEMBLY : CR-A



52	Water flow sence	83	Mini buffer tank	109	Circulation pump clip
51	Siphon	82	Pump outlet pipe	108	HEAD SCREW (D4X24L)
50	Siphon hose	81	Water flow secsor inlet pipe	107	BOLT (M3X5L)
49	Siphon ring	80	Back-up ring	103	SCREW (D4X16L)
48	Secondary heat exchaner	76	O-ring 17.8X2.4t	100	SCREW (M4X8L)
47	Packing	75	O-ring 17.5X2.7t	97	TH.SCREW (D4X10L)STS
46	Fastener "18A"	74	O-ring 15.8X2.4t	96	TH.SCREW (D4X6L)STS
45	Fastener "D"	73	O-ring P18	95	TH.SCREW (D4X6L)
44	Fastener "F"	72	O-ring 15.8X2.7	93	TH.SCREW (D4X10L)
43	Fastener "E"	62	Thermistor	92	TH.SCREW (D4X8L)
42	Water pipe adaptor "B"	61	High-limit switch	91	Packing 20A X 2.5t
41	Water pipe adaptor "A"	60	Gas check port plate	90	Check valve
40	Flow adjustment v/v outlet pipe	59	Gas check port packing	89	Buffer tank adaptor
39	Secondary H/E supply pipe	58	Exhaust duct	88	3-way valve
38	Hot water supply pipe	57	Exhaust duct packing	87	Pump drain plug
37	H/E connecting pipe	56	Hot water supply adaptor	86	Pump bracket
36	Primary heat exchanger	55	Water strainer	85	Circulation pump
28	Burner B/K (R)	54	Cold water inlet adaptor	84	Fastener "16A"
27	Burner B/K (L)	53	Flow adjustment valve		

Components Diagram & Parts List

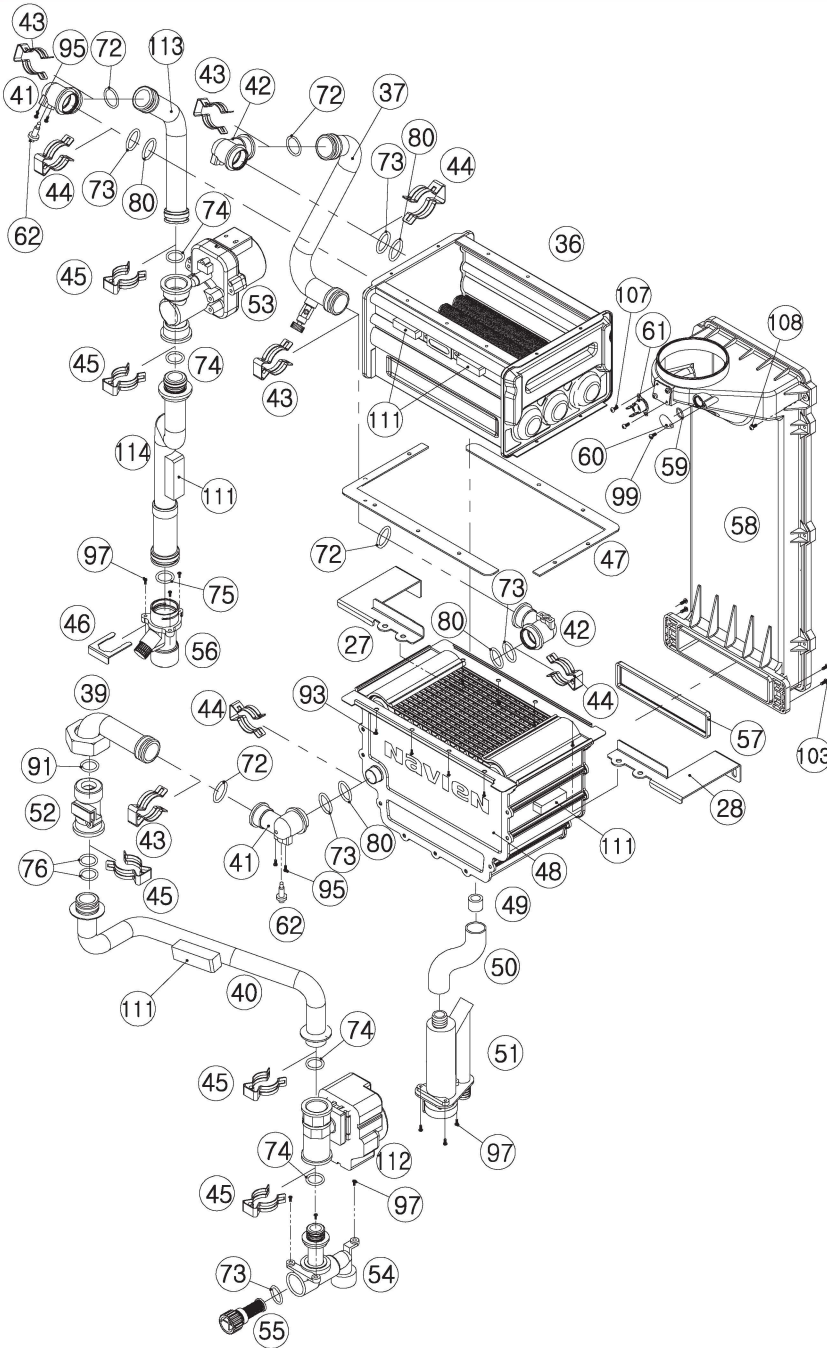
WATER WAY ASSEMBLY : CR



111	Ceramic heater
108	HEAD SCREW (D4X24L)
107	BOLT (M3X5L)
103	SCREW (D4X16L)
99	TAP SCREW (D4X14L)
97	TH.SCREW (D4X10L)
95	TH.SCREW (D4X6L)
93	TH.SCREW (D4X10L)
91	Packing (20AX2.5t)
80	Back-up ring
76	O-ring 17.8X2.4t
75	O-ring 17.5X2.7t
74	O-ring 15.8X2.4t
73	O-ring P18
72	O-ring 15.8X2.7
62	Thermistor
61	High-limit switch
60	Gas check port plate
59	Gas check port packing
58	Exhaust duct
57	Exhaust duct packing
56	Hot water supply adaptor
55	Water strainer
54	Cold water inlet adaptor
53	Flow adjustment valve
52	Water flow sence
51	Siphon
50	Siphon hose
49	Siphon ring
48	Secondary heat exchanger
47	Packing
46	Fastener "18A"
45	Fastener "D"
44	Fastener "F"
43	Fastener "E"
42	Water pipe adaptor "B"
41	Water pipe adaptor "A"
40	F/A valve outlet pipe
39	Secondary H/E supply pipe
38	Hot water supply pipe
37	H/E connecting pipe
36	Primary heat exchanger
28	Burner B/K (R)
27	Burner B/K (L)

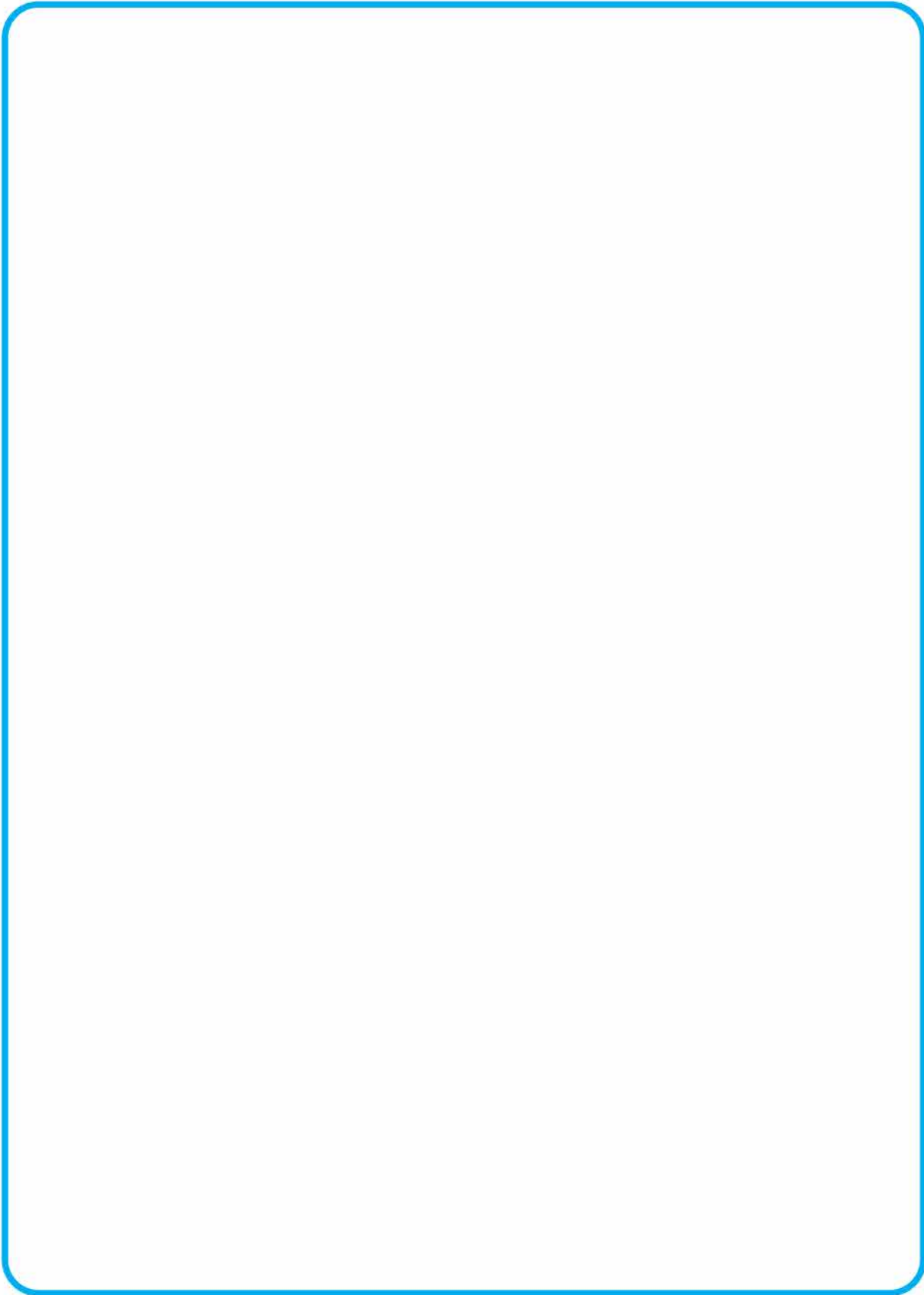
Components Diagram & Parts List

WATER WAY ASSEMBLY : CC

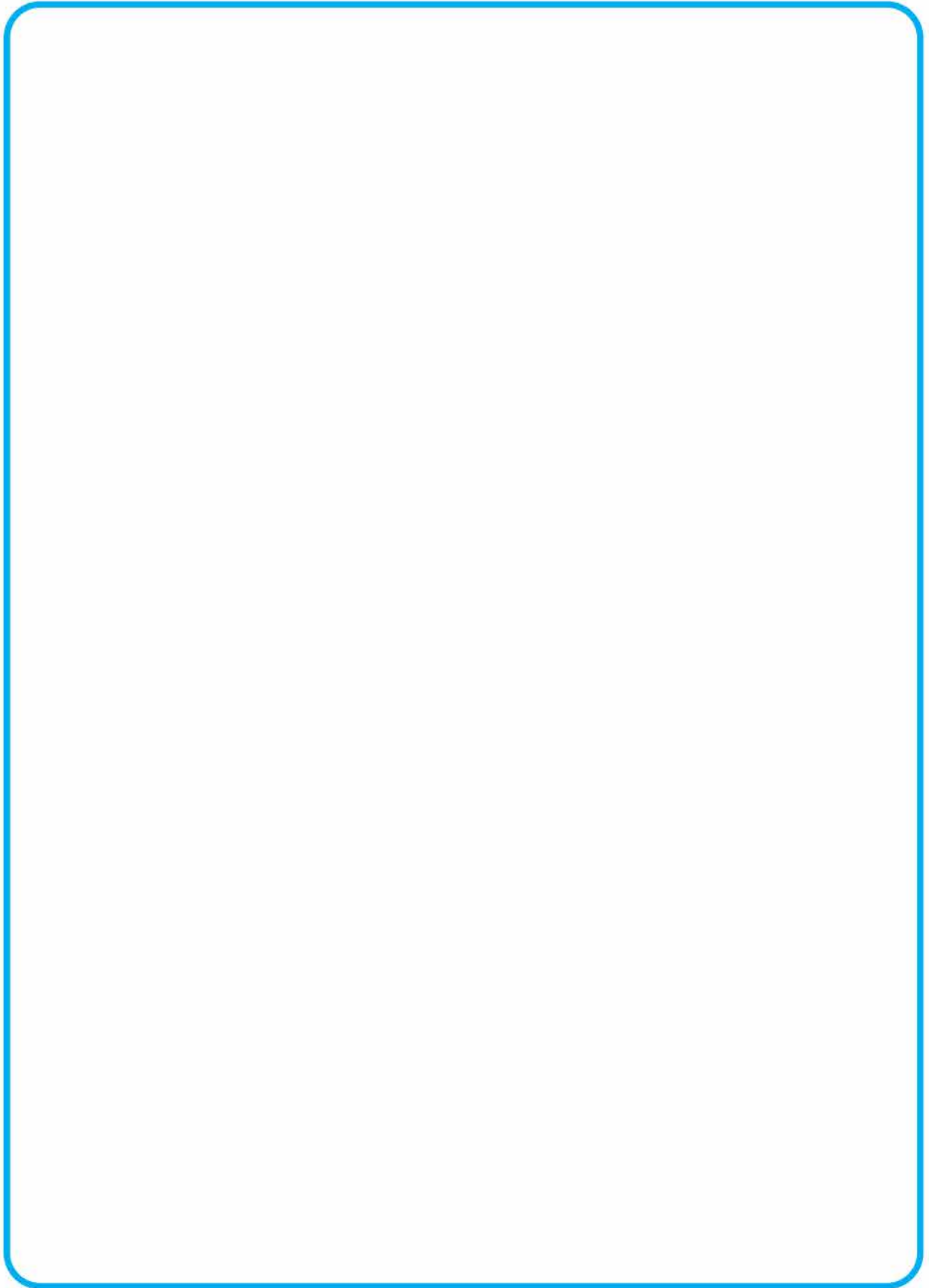


114	Hot water supply pipe B
113	Hot water supply pipe A
112	2-Way valve
111	Ceramic heater
108	HEAD SCREW (D4X24L)
107	BOLT (M3X5L)
103	SCREW (D4X16L)
99	TAP SCREW (D4X14L)
97	TH.SCREW (D4X10L)
95	TH.SCREW (D4X6L)
93	TH.SCREW (D4X10L)
91	Packing (20AX2.5t)
80	Back-up ring
76	O-ring 17.8X2.4t
75	O-ring 17.5X2.7t
74	O-ring 15.8X2.4t
73	O-ring P18
72	O-ring 15.8X2.7
62	Thermistor
61	High-limit switch
60	Gas check port plate
59	Gas check port packing
58	Exhaust duct
57	Exhaust duct packing
56	Hot water supply adaptor
55	Water strainer
54	Cold water inlet adaptor
53	Flow adjustment valve
52	Water flow sence
51	Siphon
50	Siphon hose
49	Siphon ring
48	Secondary heat exchanger
47	Packing
46	Fastener "18A"
45	Fastener "D"
44	Fastener "F"
43	Fastener "E"
42	Water pipe adaptor "B"
41	Water pipe adaptor "A"
40	F/A valve outlet pipe
39	Secondary H/E supply pipe
37	H/E connecting pipe
36	Primary heat exchanger
28	Burner B/K (R)
27	Burner B/K (L)

MEMO



MEMO



Service

GENERAL TROUBLESHOOTING PROBLEM POSSIBLE SOLUTIONS

It takes a long time to get hot water to the fixtures.

- ▶ Circulation pump is in Freeze protection mode. Circulation pump needs to change hot water circulation mode.

The water is not hot enough.

- ▶ Check ground water temperature first and system setting temperature.
- ▶ Check cross plumbing between cold water lines and hot water lines.

How? Shut off Main cold water supply valve to water heater, which means no water supply to water heater. Open any hot water faucet. If cold water comes from hot side faucet, there is cross hot and cold water lines somewhere in facility.

- ▶ Is the gas supply valve fully open?
- ▶ Is the gas line sized properly?
- ▶ Is the gas supply pressure enough?
- ▶ Is the set temperature too low?

The water is too hot.

- ▶ Is the set temperature set too high?

The hot water is not available when a fixture is opened.

- ▶ Make sure the unit gets 120V 60Hz power supply.
- ▶ Is the gas supply valve fully open?
- ▶ Is the water supply valve fully open?
- ▶ Is the filter on cold water inlet clean?
- ▶ Is the hot water fixture sufficiently open to draw at least 0.5 GPM through the water heater?
- ▶ Is the unit frozen?
- ▶ Is there enough LPG gas in the tank?

The hot water turns cold and stays cold.

- ▶ Is the flow rate enough to keep the Model 35-1 running?
- ▶ If there is a recirculation system installed, does the recirculation line have right check valves?
- ▶ Is the gas supply valve fully open?
- ▶ Is the filter on cold water inlet clean?
- ▶ Are the fixtures clean of debris and obstructions?
- ▶ Check cross plumbing between cold water lines and hot water lines.

Hot water temperature fluctuating.

- ▶ Check incoming cold water pressure whether it is too low. (needs minimum 15PSI)
- ▶ Is the filter on cold water inlet clean?
- ▶ Is the gas line sized properly?
- ▶ Is the supply gas pressure enough?
- ▶ Check for cross connection between cold water lines and hot water lines.

Condensing **98%**
navien
Navigating Energy and Environment

Navien Gas Water Heater



Navien America Inc.
17855 Fitch Ave, Irvine CA 92614
Tel: 949 955 9009, Fax: 949 955 9229, Toll Free: 1-800-519-8794
www.NavienAmerica.com