

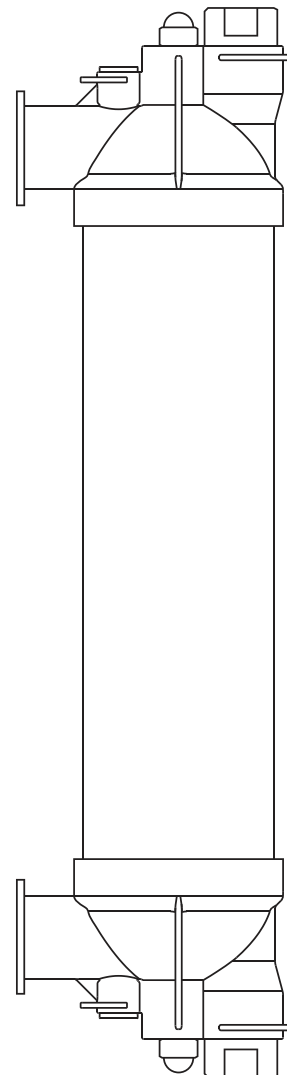
# installation and operation manual

## C-LINE

C150-S48  
C150-S50  
C250-S48  
C250-S50  
C350-S48  
C350-S50

HEAT EXCHANGERS

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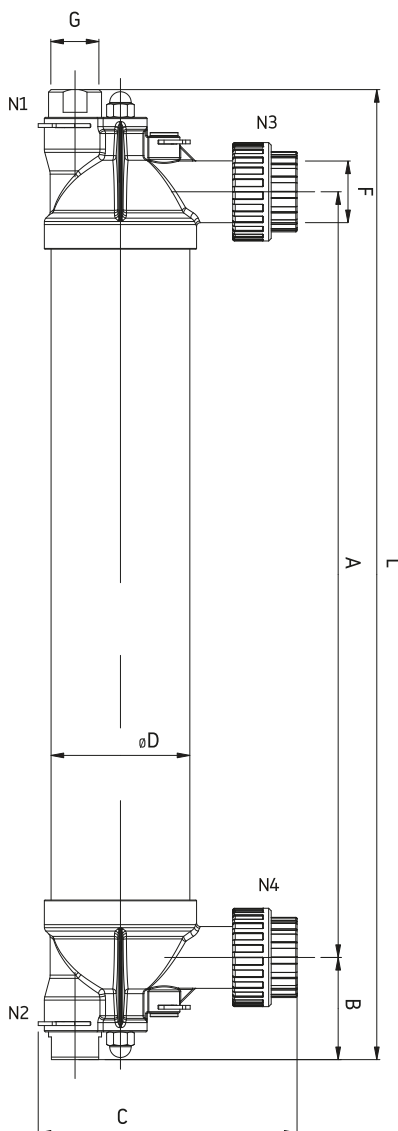
## I. APPLICATION

The C family of heat exchangers is designed to transfer heat between liquids at various temperatures, fluid flows, and pressures. They are designed (but not restricted) to swimming pool applications.

## II. CONSTRUCTION FEATURES

The C-Line heat exchangers are designed and fabricated as a single unit with nonremovable parts, except for the temperature sensor/temperature sensor socket.

The cylindrical shell encloses a helically coiled titanium tube. Both ends of the cylindrical shell are enclosed within hemispherical heads. Tube side nozzles are non separable, fixed to the head. Shell side nozzles are connected to the heads by clip and are separable. Shell side medium does not come in contact with coil side nozzles which are made of stainless steel.



	C-150		C-250		C-350	
Nominal capacity	<b>kW</b>	<b>kBTU/h</b>	<b>kW</b>	<b>kBTU/h</b>	<b>kW</b>	<b>kBTU/h</b>
	44	150	78	265	100	340
Heating water flow	<b>l/min</b>	<b>USGPM</b>	<b>l/min</b>	<b>USGPM</b>	<b>l/min</b>	<b>USGPM</b>
	53	14	58	15	61	16
Pool water Flow	<b>l/min</b>	<b>USGPM</b>	<b>l/min</b>	<b>USGPM</b>	<b>l/min</b>	<b>USGPM</b>
	300	77	300	77	300	77
<i>Nominal values are based on 60°C (140°F) temperature difference between incoming heating and heated water. For general reference only. Please consult our office for product selection verification.</i>						
Heat transfer area	<b>m<sup>2</sup></b>	<b>ft<sup>2</sup></b>	<b>m<sup>2</sup></b>	<b>ft<sup>2</sup></b>	<b>m<sup>2</sup></b>	<b>ft<sup>2</sup></b>
	0,152	1,64	0,266	2,86	0,346	3,72
Dimensions	<b>m</b>	<b>in</b>	<b>mm</b>	<b>in</b>	<b>mm</b>	<b>in</b>
L	525	20,6	770	30,3	945	37,2
A	362	14,2	607	23,9	782	30,8
B	81	3,2	81	3,2	81	3,2
C	205	8,8	205	8,0	205	8,0
øD	110	4,3	110	4,3	110	4,3
F		1½		1½		1½
G		1		1		1
Maximum allowable working pressure					<b>bar</b>	<b>PSI</b>
					5	70
Maximum allowable working temperature for heating water					<b>°C</b>	<b>°F</b>
					99	210
Maximum allowable working temperature for pool water					<b>°C</b>	<b>°F</b>
					50	122
N1	Heating Fluid IN					
N2	Heating Fluid OUT					
N3	Cold Fluid OUT					
N4	Cold Fluid IN					

### III. OPERATING PRINCIPLES

A heat exchanger is a device in which heat is transferred from one flowing fluid to another without the fluids mixing. C-line heat exchangers are intended to be used as counterflow units.

The heating medium flows through the helically coiled tube. Thermal energy is transferred through the coil wall. The total heat load is dependent on the flow parameters of the fluid.

### IV. MATERIALS

The heat exchanger is made of the following materials:

Coil:	Titanium
Tube side nozzles:	Stainless steel
Shell, heads, shell side nozzles, clips, other parts :	Thermoplastic materials

### V. OPERATING PARAMETERS OF HEAT EXCHANGER

Maximum working parameters of the heat exchangers are as follows:

Chlorine content:	15 ppm
Chloride content:	3000 ppm
pH -value:	7,2 – 7,6
Alkalinity:	60 – 120 mg/l [ppm]
Calcium hardness:	100 – 300 mg/l [ppm]
Max. temperature:	coilside 100°C/212°F, shellside 50°C/122°F
Max. pressure:	5 bar/72 PSI

### VI. OPERATING PRECAUTIONS

In order to achieve maximum performance and longevity from the heat exchanger, the following must be strictly observed:

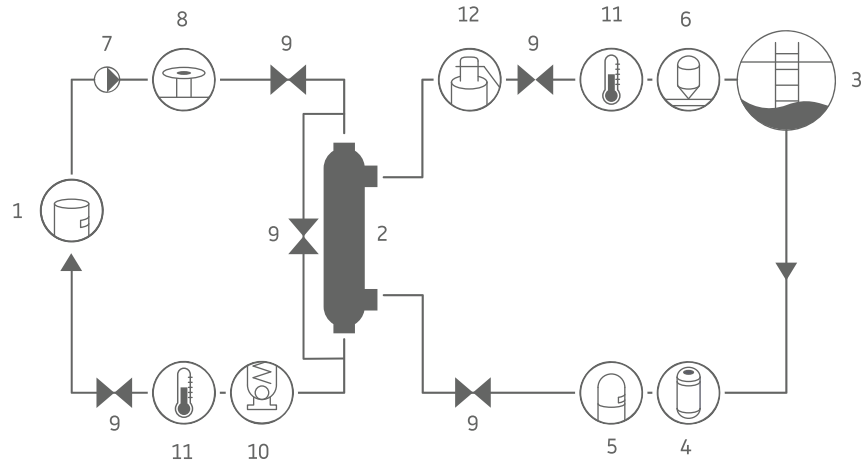
- Heat exchangers should be used according to the specification provided by AIC.
- Pressures and temperatures should not exceed limits set forth in Section V: Operating Parameters.
- Initial start up should be done according to Section X: Start Up.
- Fluids should be free of any debris.
- Clean heat exchangers according to Section XI: General Maintenance.
- The system should be designed to prevent the heat exchanger from encountering pressure shocks.
- Prevent rapid temperature increases in the heat exchangers. This would include installation of expansion tanks and safety valves in the system.
- Prevent fluids from dropping below their freezing point temperature.

## VII. INSTALATION

Install the heat exchanger according to the diagram below.

**Sample Installation Diagram**

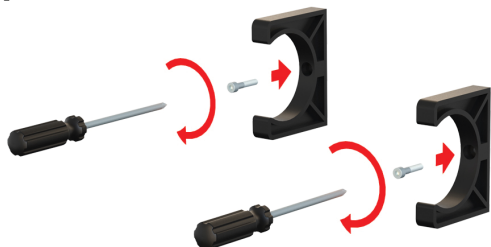
1. Boiler
2. Heat Exchanger
3. Swimming Pool
4. Pump
5. Filtration
6. Chlorine Feeder
7. Circulation Pump
8. Flow Control Valve
9. Gate Valve
10. Check Valve
11. Thermometer
12. Safety Relief Valve



- Chlorine feeder must be installed after (downstream of) the heat exchanger and be installed with an anti-siphoning valve to prevent chlorine from backing up into the heat exchanger.
- Install the heat exchanger downstream of the pumping and filtration equipment.
- This is only a conceptual drawing. A qualified installer must determine whether this system setup will work in each application. Installer must also ensure compliance with code requirements.
- Provide easy access for maintenance.
- Vent the heat exchanger properly after installation.
- Prevent self drainage of the heat exchanger during operation.
- Circulation pump on the hot side should shut off when there is no flow on the pool side to prevent overheating and damage to the unit.
- Install the heat exchanger in a frost - free area. The heat exchanger should be completely emptied if it will be exposed to temperatures below the freezing point of water or if the system will be inoperable for one month or longer.
- Protect the heat exchanger from exposure to direct sunlight.
- The heat exchanger can be installed either in vertical or horizontal position.
- The heat exchanger should be supported using mounting brackets. Piping should be supported using mounting brackets. Piping should be properly aligned and fixed. Mechanical stresses on the connections may cause the unit to leak.

To ensure proper working of heat exchanger, installation should be in accordance with following steps:

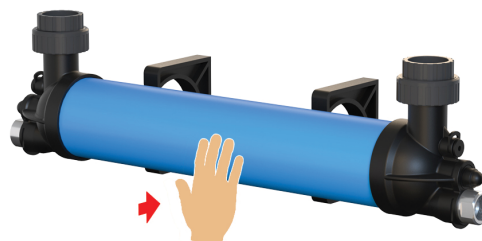
**1**



Screw the mounting brackets. Do not use hexagon head screws. Distance between mounting holes should be as follows:

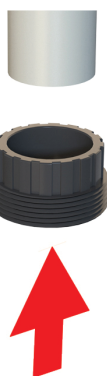
- 150 mm [5,9 in] for C150,
- 390 [15,4 in] mm for C250,
- 570 mm [22,4 in] for C350.

**2**



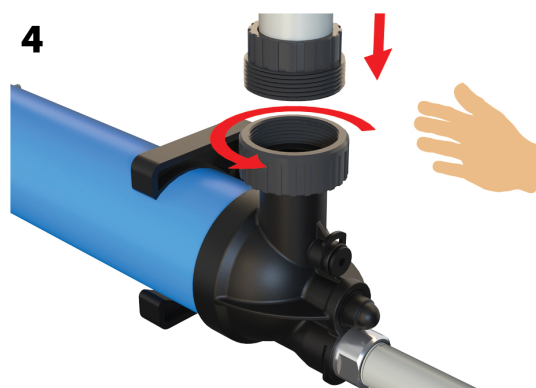
Place heat exchanger into mounting brackets. Use hands only.

**3**



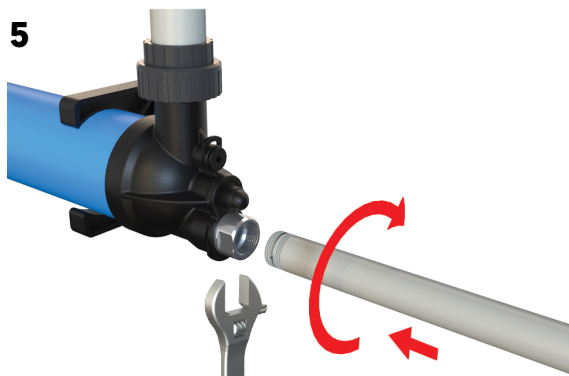
Fix coldside inlet and outlet pipes with nipple provided. Provide leakproof connection. Depending on union type, additional parts/tools may be required such as glue or sealing tape.

**4**



Wet the o-ring with tap water and screw union nut with union nipple.

**5**

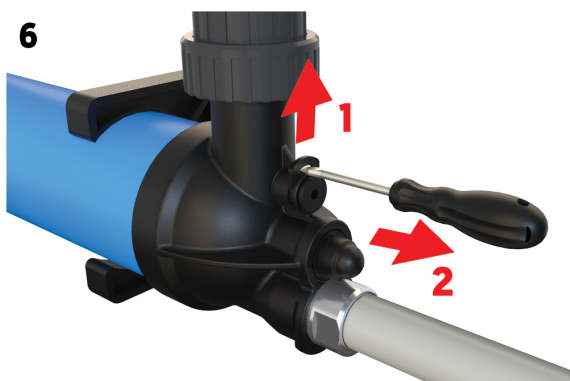


Screw hot side inlet and outlet pipes with nozzles (Maximum allowable torque is 330 Nm ). Provide leakproof connection. Use counter torque wrench to lock nozzle during tightening the connection.

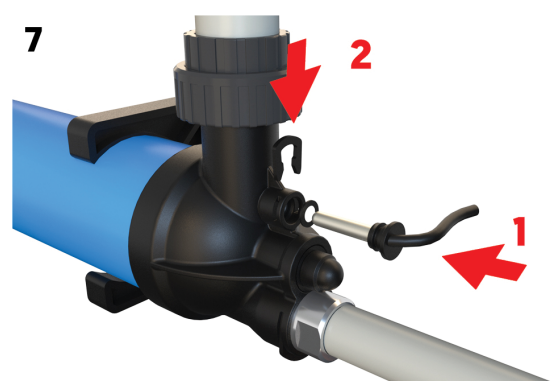
Keep in mind:

- Do not employ sharp tools
- Do not use any grease or lubricants
- Do not strain any elements of heat exchanger during installation

Optional: mounting temperature sensor/temperature sensor socket:



Remove clip and then remove socket cap with o-ring. Use screwdriver to remove the clip and socket cap. Be careful not to scratch inner surface of the socket.



Wet the o-ring with tap water, place it on the temperature sensor/temperature sensor socket, and then place them into the socket of the heat exchanger head.

## VIII. NAMEPLATE

The name plate is placed on the shell and includes the following min. data:

- type of heat exchanger
- serial number
- production year
- maximum working pressure and temperature

## IX. STORAGE & TRANSPORTATION

Heat exchangers should be stored in a clean/dry place away from corrosive environments or weather elements [e.g. rain, sun]. During transportation, ensure that they are not exposed to mechanical damages.

## X. START UP

To prepare the heat exchanger for operation, it should initially be:

- mounted properly
- filled with working fluids
- deaerated
- all connections checked for leaks

During startup, first open the valves, then start the pump of the heated medium followed by opening the cycle of the heating medium. The valves should be opening the cycle of the heating medium. The valves should be open gradually in order to achieve a steady increase in flow and pressure. The pressure increase/decrease should not exceed 0.5 MPa/min [72 psi/min.].



## **XI. GENERAL MAINTENANCE**

General maintenance includes actions that must be taken in short regular intervals of time:

1. Checking the functionality of gaskets.

Leaky connections may result in accelerated usage of flanges and other elements of the heat exchanger. It may also cause environment emage. Leak control can be performed visually

2. Carrying out systematic pressure test on the hot and coldside. To ensure that the allowable working pressure is not exceeded, the installation should have safety valves or other protection. It is advised to mount pressure gauges in the systems.

3. Defining a filter pollution in installation.

Filter clogging may cause an excessive buildup of pressure in the heat exchanger. It must be avoided.

Operating fluids should be monitored. Pool water should be maintained according to section V of the operating manual. Heating fluid should be compatible with heat exchanger materials of construction.

Special maintenance covers actions that should be taken in special circumstances or at longer intervals:

1. Cleaning of original and secondary side.

The heat exchanger should be cleaned by flushing the units with fluids which do not react with stainless steel and plastic parts.

Dirt deposited in the heat exchanger will result in an increase in pressure drop and lower heat transfer. Flushing can be done without removal of the heat exchanger from the system, although extra connections and bypasses would be required. It is recommended to clean/flush heat exchanger once every 6 months.

The cleaning solutions ae easily accessible at businesses carrying chemical cleaning agents for heat exchangers or tubing and piping applications. As a guideline to purchasing the cleaning solutions, check for the following product data:

- compatibility with titanium, stainless steel and thermoplastics
- removes scale, slag, tarnishes, and hard water deposits
- easily rinsed out of the system
- no objectionable or corrosive fumes

## **XII. WARRANTY INFORMATION**

### **LIMITED WARRANTY INFORMATION**

AIC S.A. warrants to the original purchaser that this product will be free of manufacturing defects in material and workmanship for a period of two (2) years from the original purchase date, or eighteen (30) months from AIC's original invoice, whichever expires first. The original purchase date as used herein shall mean the date stated in the vendor's original invoice.

AIC will, at its option, repair or replace this product without charge if it is found to be defective

during the limited warranty period specified above. If AIC chooses, at its discretion, to replace any product for which there is a valid warranty claim, AIC shall replace the product with the same model or, if such model is not available, with a model which is, in AIC's reasonable judgement, the nearest compatible model available at the time of replacement. Note that each purchaser is limited to one (1) product replacement during the warranty period of the original claim.

#### **NOT UNDER COVERAGE BY THIS WARRANTY**

This limited warranty covers defects encountered in normal use of the product while operating according to the specifications set forth by AIC. The warranty is void and shall not apply to the following, including, but not limited to:

1. The failure or malfunction results from improper or negligent operation, abuse, misuse or maintenance or unauthorized alternation.
2. Malfunction resulting from, or repairs necessitated by, uses of the product for purposes other than that for which it was designed, or resulting from flood, fire, wind, lightening, freezing, or any other natural disaster, an act of God, an act of destruction, theft, or accident.
3. Damages to the product that occur during shipment.
4. Damages caused by improper or faulty installation.
5. Products exposed to corrosive elements harmful to the structural integrity and durability of the product.

AIC shall not be liable for any direct, special, incidental, or consequential damages caused by the use, misuse, or inability to use this product. AIC is under no legal obligations to rectify, including but not limited to, lost profits, downtime, goodwill, damages to or replacement of equipment and property. Purchaser assumes all risk and liability for loss, damage or injury to purchaser and purchaser's property and to others and their property arising out of the use, misuse or inability to use this product. This limited warranty shall not extend to anyone other than the original purchaser of the product.

#### **MAKING A WARRANTY CLAIM**

Before returning the product to AIC for warranty service, the purchaser must contact AIC at [warranty@myaic.com](mailto:warranty@myaic.com). AIC will send the purchaser the Warranty Claims Form, which the customer should fill in and send back via email. Upon preliminary assessment of the claim, AIC will send a Return Goods Authorization (RGA) number. The RGA number must be clearly displayed and attached to the product on its return to AIC before it can be processed. Proper packing of the product in the original container, or equivalent, is the responsibility of the purchaser. This warranty does not cover expenses or labor for disassembly, removal, shipment, reassembly or reinstallation; the purchaser will be responsible for such costs.

AIC RESERVES THE RIGHT TO CHANGE SPECIFICATIONS OR DISCONTINUE MODELS WITHOUT NOTICE.

#### **XIII. SALES AND SERVICE**

AIC serves its customers through a network of distributors. For application assistance, performance specifications, pricing, or name of the nearest authorized distributor, contact us at:

##### North America:

Advanced Industrial Components (AIC) Inc.  
2899 Portland Drive | Oakville | Ontario L6H5S4 | Canada  
[info@myaic.net](mailto:info@myaic.net) | [www.aicheatexchangers.com](http://www.aicheatexchangers.com)

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