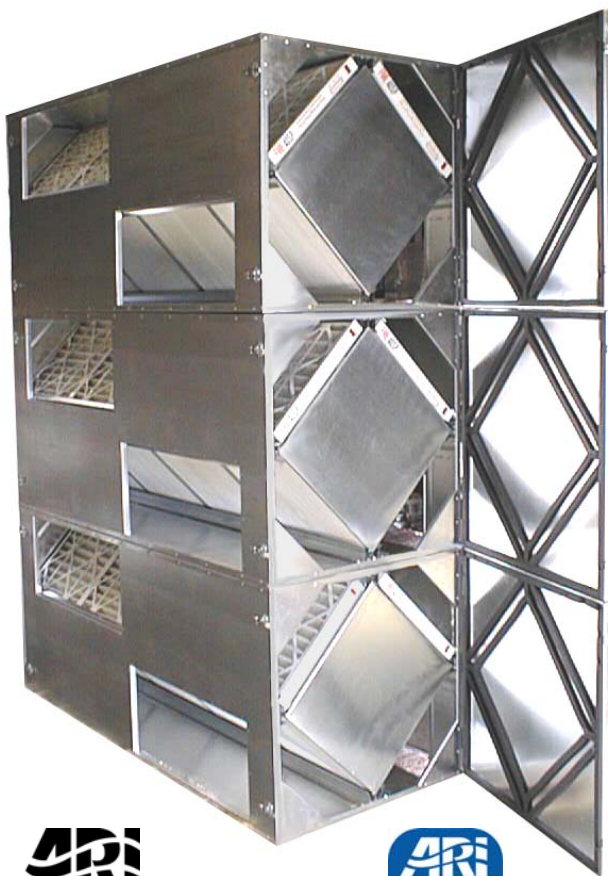


APPLICATION, INSTALLATION, AND MAINTENANCE MANUAL

CA2X, CA3X, CA4X



A Participating Company in the ARI 1060
Certification Program

⚠ WARNING

RISK OF FIRE, ELECTRIC SHOCK, OR INJURY. OBSERVE ALL CODES AND THE FOLLOWING CAUTIONS!

1. Before servicing or cleaning the unit, switch power off at disconnect switch or service panel and lock-out/tag-out to prevent power from being switched on accidentally. More than one disconnect switch may be required to de-energize the equipment for servicing.
2. This installation manual shows the suggested installation method. Additional measures may be required by local codes and standards.
3. Installation work and electrical wiring must be done by qualified professional(s) in accordance with all applicable codes, standards and licensing requirements.
4. Any structural alterations necessary for installation must comply with all applicable building, health, and safety code requirements.
5. Electrical equipment connected to this unit must be properly grounded.
6. Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment that might be installed in the area affected by this equipment. If this unit is exhausting air from a space in which chimney-vented fuel burning equipment is located, take steps to assure that combustion air supply is not affected. Follow the heating equipment manufacturer's requirements and the combustion air supply requirements of applicable codes and standards.
7. Use the unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
8. This unit is intended for general ventilating only. Do not use to exhaust hazardous or explosive materials and vapors. Do not connect this unit to range hoods, fume hoods or collection systems for toxics.
9. This unit must be properly ducted to the outdoors. Outside air inlets must not be located where air may be contaminated, for example by vehicle or appliance exhausts.
10. Use the unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer at 800-627-4499.

In this Manual you will find information on:

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Blower orientation	page 3
Air flows and pressure drops	page 3
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NOTE: Some jurisdictions may allow less separation, or may require more. Check with your local code officials!
NOTE: The exhaust outlet should not dump air into an enclosed space or any other structure. The inlets and outlets should be screened against insects and vermin and shielded from the weather to prevent the entry of rain or snow.

CAUTION

Never locate the outside air inlet inside a structure.

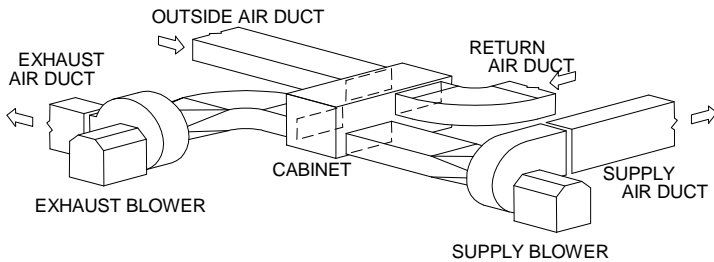
APPLICATION GUIDELINES

Purpose of CA-Series Cabinets

The CA-Series cabinets are modular cases for 2, 3, or 4 energy-recovery cores. The cabinets may be installed individually, or may be stacked and manifolded for larger-capacity installations. A variety of duct connection configurations are possible. Disposable filters are provided; they are of a common size and can easily be replaced.

General Layout

The CA-Series Cabinet(s) are used to transfer energy from exhaust air leaving a building, into fresh air being brought in from the outside for ventilation. By recovering energy from the exhaust airstream, the benefits of ventilation can be enjoyed without the full energy cost to condition the outside air. The CA-series Cabinet(s) do not contain blowers. Therefore, two blowers must be installed as part of the system. Several ducts must also be installed.



Stacked Installations

When the installation requires more airflow than a single CA-Series Cabinet can handle, up to three Cabinets can be stacked and manifolded.

Location

The CA-Series Cabinet is designed for installation in a sheltered location, out of the weather. The ideal location for the CA-Series Cabinet is central to the inside duct runs, and close to both the exhaust duct (to the outside) and the fresh air duct (from the outside).

Service Access

Install the ERV where you can remove the door for cleaning the core and filter. Although there is no electrical connection to the Cabinet(s), there should be a nearby Disconnect Switch, so service people can shut off the blowers connected to the system when changing filters.

Connection to the HVAC system

In most cases, one or two ducts connect the CA-Series Cabinet to the building's ducted HVAC system. A variety of connection approaches are possible, depending on the number of CA-series Cabinets in the installation, purpose of the system, and available space. Cabinets may be flipped and rotated to fit the job. Whatever orientation of the Cabinet is selected, the airstreams must cross, as shown below. The filters must cover the INLET FACES of the cores. Filter racks are provided at each face to handle all possible airflow configurations.

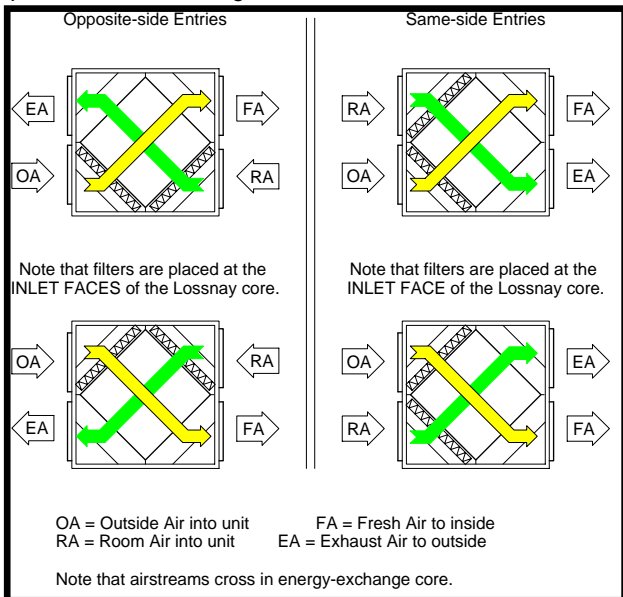
Ducts

Two ducts will connect the CA-Series Cabinet to the outside: one for exhaust air, the other for fresh air.

Ducts connecting the CA-Series Cabinet to the outside must be insulated, with a sealed vapor barrier on both inside and outside of the insulation.

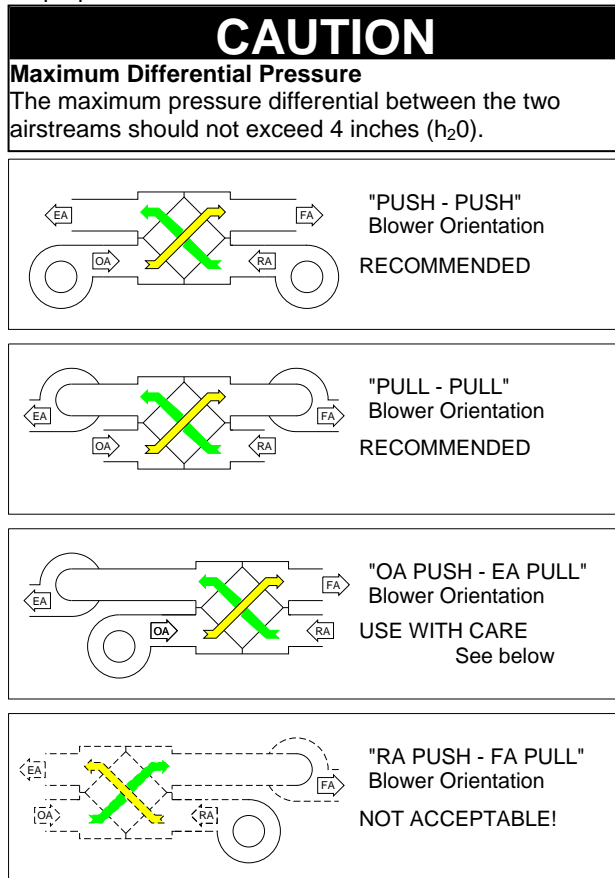
Proper location and construction of these ducts are critical to the safety and proper function of the system. The exhaust outlet and outside air inlet on the outside of the building should be separated to avoid cross-contamination.

Our general recommendation is to keep the fresh air inlet least 10' away from any exhaust, such as dryer vents, chimneys, furnace and water heater exhausts, or other sources of contamination or carbon monoxide. This meets the minimum requirements of most building codes.



Blower Orientation

Two blowers will be required: one for the air to be exhausted from the building, another for the fresh air to be brought into the building. See diagram for proper and improper blower locations.



Push-Push and Pull-Pull -- RECOMMENDED

These are the recommended blower orientations for virtually every application. In "Push-Push" applications, both blowers push into the Cabinet(s). In "Pull-Pull" applications, both pull from the Cabinet(s).

With Push-Push or Pull-Pull blower orientations, there is generally no need to review the static pressure differences between the two airstreams.

OA Push - EA Pull – USE WITH CARE

This blower orientation causes the supply airstream to be at a much higher static pressure than the exhaust airstream. This may result in bypass airflow, which must be evaluated in the design process.

CAUTION	
<p>Refer to the Installation Manual Supplement "Designing for High Static Pressure Applications" for help in designing the system to account for bypass airflow.</p>	

Advantages:

Both blowers are on the "outside" of the cabinets, taking advantage of the acoustic attenuation offered by the cabinets.

If outside airstream bypass airflow occurs, it additionally insures no exhaust contaminants leak past seals into the fresh air.

Disadvantages:

The blowers must be sized to provide the additional bypass air, which in most cases is a needless waste of energy. (Note that this bypass air volume is lower than in most competing technologies, such as heat wheels, and even some other plate-type exchangers).

The higher overall static pressures tend to increase duct leakage.

Blower Sizing

Most "low airflow" problems in the field are caused by under-sized blowers. Systems can under-perform if the designer does not make sufficient allowance for duct leakage, variations in duct layout from ideal design, less-than-ideal blower outlet conditions, dirty filters, and the like.

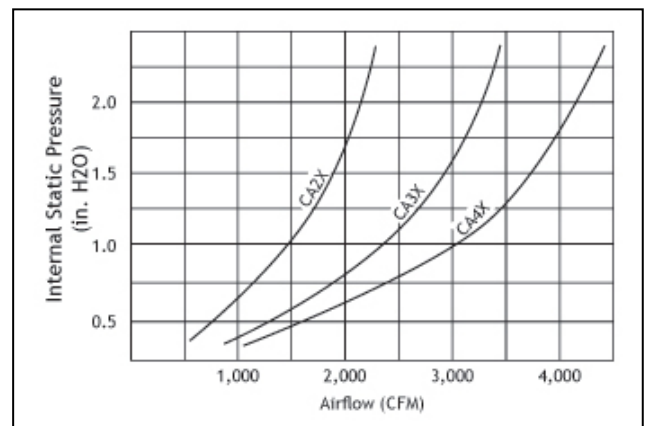
In general, ventilation systems with energy-recovery components tend to need blowers with relatively high static pressure curves. In addition, parts of the duct system may be operating at higher static pressures than usual, and greater duct leakage may result. While these effects may be small, they may consume a large portion of the "safety factor" that a designer conventionally adds in every blower selection exercise.

Given all these concerns, it is prudent to select blowers and motors that can be operated at higher RPMs than required by the nominal design.

Static Pressure Drop Through the Cabinet

The following chart is to be used when considering a Push-Push or Pull-Pull orientation of the blowers.

The chart represents clean filters. It will be necessary to add an additional drop to allow for the buildup of dirt on the filters.



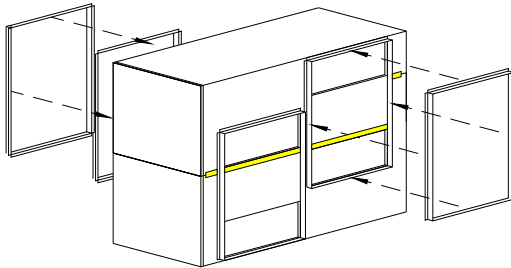
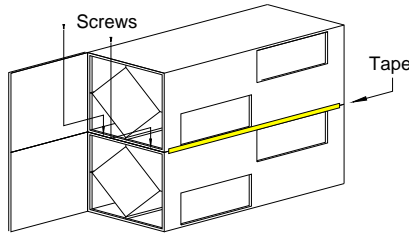
CA SERIES Installation

Stacked Installations

When the installation requires more airflow than a single CA-Series Cabinet can handle, up to three Cabinets can be stacked and manifolded.

Stack and align the Cabinets. Make sure all Inlets and Outlets are visible!

Open the doors. Drive 1½" self-drilling sheet-metal screws through the door frames of the upper Cabinet into the lower Cabinet.

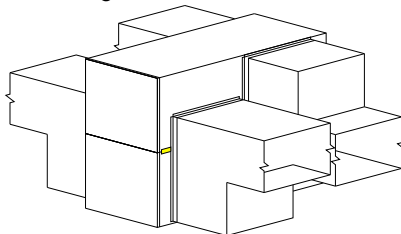


Note: Tape the long joints on the sides between the cabinets with foil tape.

Fabricate and attach four sets of flanges on the sides of the stacked Cabinets. Each flange will enclose one opening of each Cabinet.

Connect Ductwork to the flanges.

See the Chart, below, for Flange Size for various Cabinet Stacks.



FLANGE SIZES for use in Stacked Installations			
MODEL	Number of Units in Stack		
	1 Unit	2 Units	3 Units
CA-4X	32" x 14"	32" x 50"	32" x 84"
CA-3X	24" x 14"	24" x 50"	24" x 84"
CA-2X	14" x 14"	14" x 50"	14" x 84"

SPECIAL CONSIDERATIONS FOR OUTSIDE AIR AND EXHAUST AIR DUCTS

⚠ WARNING

Danger of carbon monoxide poisoning! Outside air intake should be 10' (minimum) away from sources of carbon monoxide or other toxic gasses such as chimneys, furnace and water heater exhausts.

Do not locate outside air intake where vehicles may be serviced or left idling. Do not locate the outside air intake inside an enclosed space.

NOTE: Some jurisdictions may allow less separation, or may require more. Check with your local code officials!

NOTE: The exhaust outlet should not dump air into an enclosed space or any other structure. The inlets and outlets should be screened against insects and vermin and shielded from the weather to prevent the entry of rain or snow.

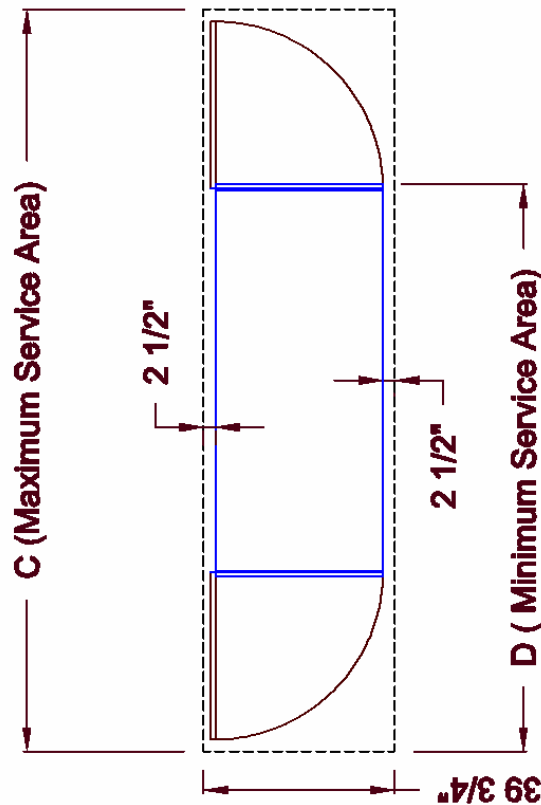
CAUTION

DANGER OF DAMAGE DUE TO CONDENSATION IN OR ON DUCTS TO OUTSIDE.

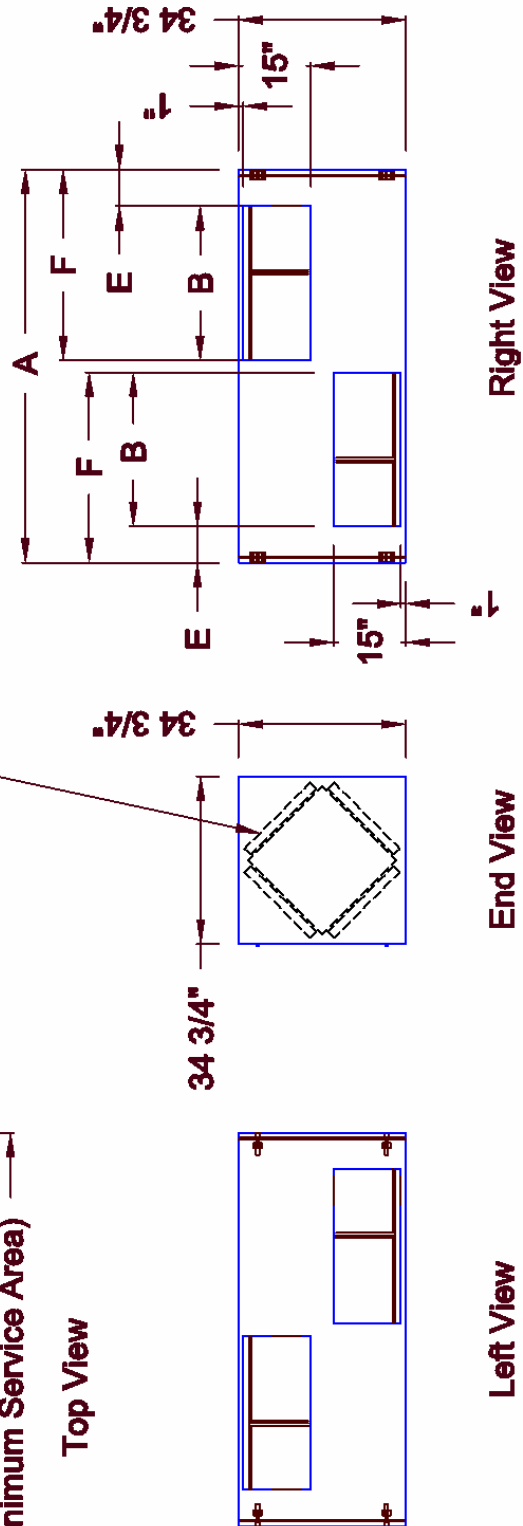
Both ducts connecting the unit to the outside must be insulated with sealed vapor barriers inside and out to prevent condensation and/or freezing inside the insulation or on the duct surface.

CA SERIES Dimensions

UNIT	A	B	C	D	E	F
CA-4X	81 5/8"	32"	149"	116"	7 5/8"	39 11/16"
CA-3X	61 13/16"	24"	130"	96"	5 5/8"	29 5/8"
CA-2X	42"	14"	111"	77"	5 5/8"	19 3/4"



Note: Filters are provided for installation in any two of the locations shown, depending on which duct connections are selected for inlets. Filters are 2" x 20" x 20" pleated disposable.



CA SERIES Operation

The CA-Series modules have one basic purpose: to transfer heating or cooling energy from an exhaust air stream to a fresh air stream.

The CA-Series modules operate with no moving parts. The cores in the modules will transfer energy between the two air streams as long as the two system blowers are moving air through the module. (These blowers are separate from the modules).

Checking the Operation of the CA-Series Modules

Air Flow – General

Airflow should be occurring in both air streams. Sometimes the easiest place to confirm that air is moving is at the weatherhoods where air is exhausted and brought in.

If exact airflow is critical, it may be desirable to permanently install flow measuring stations and manometers in the ductwork connected to the module(s). These also can be used to determine when filters should be cleaned or changed.

Energy Exchange

Precise determination of installed energy exchange effectiveness requires careful measurement of temperatures and air flows in all four air streams.

The temperature increase or decrease in each airstream is a function of:

- 1) the number of cores in the system;
- 2) the flow rates of the two airstreams;
- 3) temperature difference between the two airstreams.

See the product specification sheets to determine the energy exchange effectiveness under specific conditions.

Operating Controls

The operating controls are entirely separate from the CA-Series modules. A wide variety of control schemes may be selected by the engineer, installer, or owner to meet the ventilation needs of the facility.

Continuous Operation

Continuous operation is acceptable in virtually all conditions. With continuous operation in very cold weather, some frost may accumulate on the outside of the case. If the system is cycled off periodically, this frost will re-evaporate. Frost on the outside of the case does not necessarily indicate any frost inside the energy exchange core.

Operation in Extreme Cold Weather

Unit is capable of operating at outside temperatures down to -10°F, with indoor humidities below 40%. Unit can operate at more severe conditions occasionally with little or no impact on its performance. At lower humidities, it can operate at lower outside temperatures without freezing the energy-exchange core.

Field Measurement of Airflow Through Cores

In most cases, conventional test-and-balance methods will be used to confirm proper airflows in the entire ventilation system.

Sometimes it is desirable to estimate airflow in the CA-cabinets themselves, for example, to localize the location of duct leaks. If it is possible to obtain stable static pressure readings just upstream of the inlets and just downstream of the outlets, the static pressure drop curves on page 3 can be used to obtain the airflow through the cabinet for each airstream. In the field, this approach can be expected to be accurate to +/- 10%.

CAUTION

**Install clean filters prior to testing.
Select the static pressure test points with care --
try several locations and pick the most stable and
representative sampling point.**

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WARNING

ALWAYS DISCONNECT POWER SOURCE BEFORE SERVICING, TO ENSURE NO AIR FLOW IN THE SYSTEM.

HIGH VOLUME OF AIR IN THE CASE WHEN OPERATING! IF YOU OPEN AN ACCESS DOOR WHEN THE SYSTEM IS RUNNING, YOU MAY BE EXPOSED TO AS MUCH AS 8000 CFM! SEVERE EYE INJURY COULD RESULT!

EVERY 2 or 3 MONTHS:

Inspect and change the filters

Inspect and/or replace filters regularly when the CA-Series Module is in use. In some applications it may be necessary to replace filters more frequently.

NOTE: Filters must be used or the energy exchange core will become blocked by dust and the CA-Series module won't be able to do its job. The filters supplied in the unit are usually able to keep the energy exchange core clear for several months. Finer filters can be used but must be cleaned more often. If using finer filters, their increased resistance to flow must be allowed for in the system design.

EVERY 5000 OPERATING HOURS:

Vacuum all faces of the core.

Dust collects only on the faces of the energy exchange core. The interior of the energy exchange core stays clean even if the core faces are dust-covered.

TO CLEAN THE ENERGY EXCHANGE CORE:

- 1) SHUT OFF ENTIRE SYSTEM and remove the filters;
- 2) vacuum the exposed faces of the energy exchange core (do not scrub);
- 3) vacuum out dust from the rest of the unit case;
- 4) install new filters.

If necessary, it is possible to remove the cores. Reach in to grasp the back of each core, and pull it gently forward. If it is difficult to remove, you may want to lightly oil the four projecting lips of the core before replacing it in the unit.

IMPORTANT: make sure all four lips of the core enter the receiver channels when re-inserting the core into the unit.

The energy exchange core should not need replacement in normal use. If you think replacement is required, contact your local Lossnay representative, or the factory.

CAUTION: Do not wash the core. Always handle the core carefully. Keep it away from water or fire to avoid damaging it.