

## 1. Description

### General

The cooler is used for cooling of water, oil or other liquid by use of air. The liquid is passing in the tubes where it transfers the energy to the air via the fins on the outside of the tubes. The fins on the tubes give an increased heating surface as to compensate for low heat transfer coefficient on the air side.

The cooler is designed with multidriver units, allowing an on-off step control. Sheet steel bays isolate each fan unit.

### Technical Data

The design is reviewed and approved by TTK in Finland and SAQ Inspection Ltd, with the following design data:

Max. Working Pressure: 16 bar at 150°C  
Test Pressure: 21 bar

If the cooler is to be used for oil, which is classified as a hazardous media, this has to be noted in the order to ABB Coiltech to ensure correct NDT.

The dimensions and weight of the cooler is specified on the dimension drawing for the installation.

### Design

The coil is made of copper tubes which are mechanically expanded to the aluminum fins. The fins are made as a plate without any slots to avoid clogging by dust or fibers.

The manifold headers which distribute the liquid in to the tube circuit is made with an air vent connection on the top. Thread size G1/4".

Pipe connection DN32 to DN50 is made with pipe thread. Pipe connection DN80 to DN100 is made with open end for welding connection.

The fan motor is a totally enclosed, squirrel-cage 3-phase motor with frame of cast aluminum. The motor has integrally cast support feet.

The direct motor driven fan is made of cast aluminum blades with epoxy painted steel hub. The fan is dynamic balanced acc.to ISO 1940 class G6.3.

The cooler is furnished with a removable steel fan guard.

### EEC-declaration

An EEC-declaration of conformity with the EEC Directive of Machinery 89/392/EEC, Annex II A with supplement, will be issued on request.

### Material

Copper tubes: 12.7 x 0.40 mm  
ASTM B68 C12200  
Aluminum fins: Alloy AA8079  
Header pipe: Painted steel  
DIN17175 St 35.8/1  
Coil frame: Sheet steel thickness 2 mm  
EN 10142 DX51D Z275  
Casing and fan housing: Sheet steel thickness 2 mm  
EN 10142 DX51D Z275  
Fan: Aluminum Blade A510G  
Sheet steel hub  
Powder painted 15µm  
Safety switch: Plastic housing  
IP 54 / IEC 947-3  
Electric motor: Cast Aluminum  
IP 55 / IEC 34-1

### Specification-Air Blast Cooler

COOL-aaa-bb-cc-ddd-ee

Size (aaa)

451 452 453 454 455 456 457 458 459

Fan speed / No poles: (bb)

320 =16

445 =12

715 =08

965 =06

475/715 =20 (two-speed motors)

No of passes (cc)

02, 04, 06, 08, 10, 12

Connection size (ddd) see tabel below.

Material and design digit (ee) = 11

If a special version is required, add X in the end of the code and specify by a description.

Connection size Code ddd	Connection size Nominal Dim.	Maximum liquid flow l/s
032	1 x 32	5,6
050	1 x 50	14,0
080	1 x 80	28,0
100	1 x 100	47,0
082	2 x 80	56,0
102	2 x 100	94,0

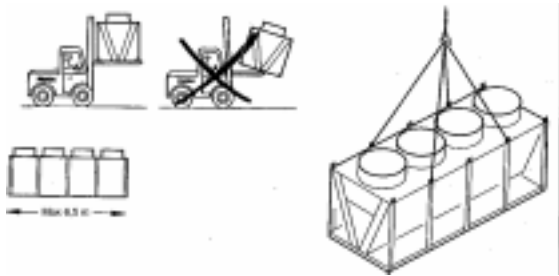
## 2. Safety

**Working Pressure**

The coil shall only be used in a system which is secured for the maximum allowable pressure and temperature as shown on the cooler rating plate as "MWP (Bar)" and MWT (°C).

**Lifting**

The coolers in size shorter than 6.5 meters may be lifted to their installation by use of a forklift, if extended forks are used. As an alternative, the units may be lifted by use of a mobile crane with the lifting wire or strap secured in the lifting lugs of the cooler as shown in the figures below. This lifting instruction is also placed as a label on the cooler. The weight of the cooler is specified on the Rating Plate located on the pipe connection end of the cooler.



**Nozzle Loads**

The connecting pipe work shall be supported as to prevent any external loads or expansion forces from being transferred to the coil body.

**Accessibility**

The cooler shall be installed prevented from public accessibility. If service personal shall be standing on top of the cooler casing, by inspection, non-slip tape shall be attached.

**Transport**

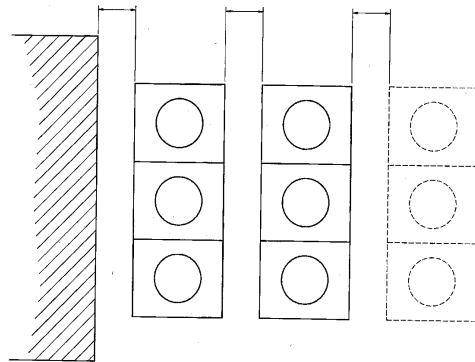
After unloading the cooler, a visual inspection should be carried out to detect whether the cooler has sustained any damages during transport or unloading. The examination of the finned surface of the heat exchanger, the headers and the tube bends at the back of the cooler is of great importance. The cooler is designed as to withstand a transportation load of 5g.

If the cooler has been damaged during transport, this must be reported to the driver of the lorry and to ABB Coiltech AB. It is also advisable to write a brief description of the damage on the consignment note.

During transport, the cooler support legs are raised in the transport position. Prior to installation, the legs must be lowered and secured at their correct position. Remove the transport wooden guard after the cooler has been lifted on to its foundation.

**Installation**

In order to ensure an unrestricted air flow supply, the recommended distance between coolers must be as shown below. For other dimensions, see the relevant dimension sketches for each size of cooler. These drawings are available on request.



**Distance between two or more coolers**

Size code aaa	Distance mm
451, 452, 454	1600
453, 455, 456	1800
457, 458, 459	2000

**3.Installation**

**Protection against bursting due to freezing**

If there is a risk of freezing, make sure that the heat exchanger is filled with a suitable anti-freeze

solution, since not all of the liquid in the heat exchanger can be completely drained. The internal volume of the cooler is specified on the rating plate, located on the pipe connection end of the cooler.

If the cooler is equipped with a spray nozzle assembly, this must be drained by opening the drain plug.

**Venting / Draining**

The headers of the cooler are equipped with plugged tappings for venting and drainage. Right performance of the cooler is dependent on the pipe system being purged of air. Since not all of the liquid in the heat exchanger can be completely drained, be aware of the use of anti-freeze solution.

**Cable racks**

If cable racks must be fitted to the unit, take necessary precautions when securing them without damage to the heat exchanger.

**Spray Nozzle Set**

The spray nozzle set is supplied in separate packaging together with the cooler. Separate assembly instructions are included with the spray nozzle set.

The following water flows are applicable. The recommended water pressure is 100 kPa. Any higher water pressure may impair the performance of the spray nozzles. All the water sprayed on the coil will not be evaporated. The surplus water must therefore be drained.

Spray cooling of the coil should be restricted to a maximum of approx. 300 hours per year.

Size Code aaa	Water flow l/s
451, 452, 454	0,30
453, 455, 456	0,41
457, 458, 459	0,51

**Sound absorber**

If the cooler is to be equipped with sound absorber, the sound absorber will be supplied separately. Separate assembly instructions are included with the sound absorber.

**Fan Motor**

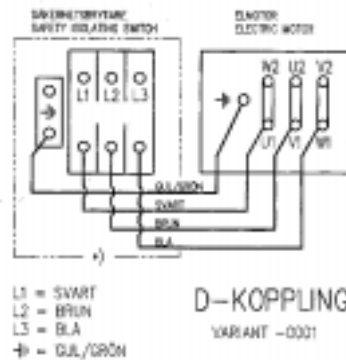
Each fan motor is connected to a lockable safety isolating switch which incorporates normally-open auxiliary contacts.

After connecting the fan motor to the main power supply, check that the fan impeller rotates in the direction indicated by the arrow tag. The arrow tag is placed on the outside of the fan ring.

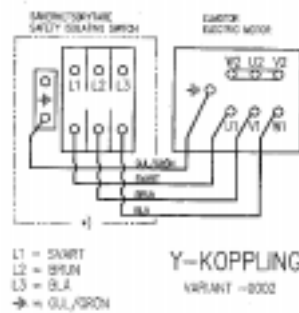
**Motor data**

Is also stated on the cooler rating plate.

Delta-connected one speed motor, wiring diagram No P440 0846 page 1



Star-connected one speed motor, wiring diagram No P440 0846 page 2



Fan speed r/min	Code bb	Rated output kW	Rated current A	Starting current A
320	16	0,7	4,6	8,2
445	12	1,5	6,3	18,3
710	08	5,5	13,4	70,0
965	06	13,0	28,0	168,0
475/715	20	2,1/6,7	8,5/18	26/96

**4. Maintenance**

The cooler shall be inspected regularly to avoid any disturbances. Following shall be inspected:

1. Noise or vibrations. This may be caused by a damaged bearing or by a damaged fan.
2. Fasteners. Check that bolts holding the drive arrangement is not defect.
3. Electric installation. Check for damages.
4. Coilbody. Check for damages or dirt.

### **Cleaning the finned Heat Exchanger**

The finned heat exchanger is best cleaned by high-pressure washing. Access to the heat exchanger can be gained from the fan outlet by removal of the fan guard.

First spray environment-compatible detergent at low pressure on to the coil body. After 10-12 minutes, spray the coil with water at high pressure. It is important to hold the spray nozzle perpendicular to the finned surface. Due to high pressure of the water, the nozzle must not be closer to the finned surface than 150 mm.

Any possible remains of detergent shall be removed by rinsing to prevent new dust from bonding the fins.

If the fins are damaged in cleaning, they may be straightened by use of a fin comb (QLAZ-20) which may be ordered from ABB Coiltech AB.



### **Fan motor**

The fan motors are permanently lubricated. Due to limited ageing resistance of the grease it is recommended to change it after about four years of operation, to ensure optimum lubrication. When changing grease, the enclosed Motor-instruction shall be followed.

If the ambient temperature of the fan motor is high, a special heat-resistant grease is used. To gain access to the motor and the fan impeller for inspection, first remove the guard. In the need to dismantle or refit the motor and/or fan impeller, the subsequent instructions for this should be followed.

### **5.Spare parts**

If high demands on availability are made on the installation, it is advisable that one motor and fan impeller be kept as spare parts. For other installations, motors and fan impellers are available from ABB:s stock.

If spare part motors shall be stored, these shall be inspected every 5:th year. The insulation resistance shall be checked and the bearings shall be replaced. The grease in the bearings has only 5 years life time by storage.

All storage shall be indoors within dry and dust-free conditions.

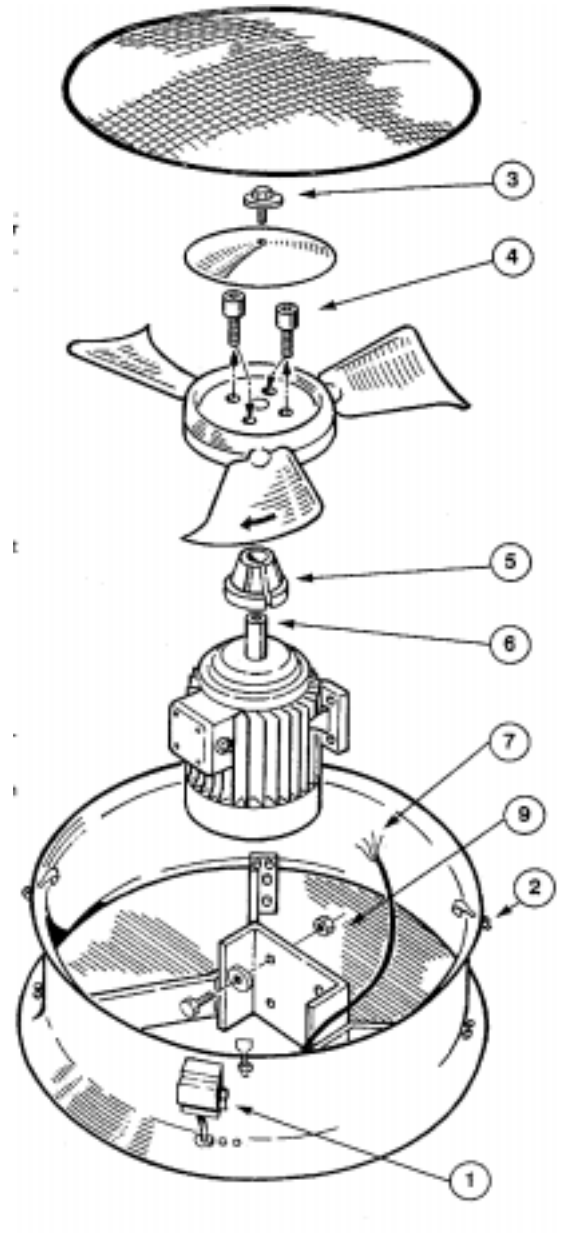
By installation of a spare part motor it is required to open the drainage plug in the lowest position of the motor. This plug is placed behind the internal cooling fan.

### Changing the Fan and Motor

- 1 Switch off the power supply of the motor at the junction box. Lock the safety isolating switch in the "off" position.
- 2 Remove the screws which secure the fan guard. Then remove the fan guard.
- 3 Remove the screw on the impeller hub cap and lift off the hub cap.
- 4 Remove the two Allen screws that are placed in the impeller hub and insert them in the adjacent holes in the hub. Then tighten the screws slowly until the fan impeller comes loose from the shrinkfit tapered hub bush. Lift off the fan impeller.
- 5 If the motor is to be changed, remove the shrink-fit tapered hub bush from the motor shaft. It may be necessary to carefully pry in the slot of the hub bush.
- 6 Secure a lifting lug in the end of the motor shaft.  
The size of the threads is specified in the table below.
- 7 Disconnect the electric cable from the terminalbox on the motor. Due to the weight of the motor, the use of a lifting device is recommended. When using a lifting device, take care to avoid damage to the fan ring.  
The motor weights are specified below.
- 8 Anchor the motor at the lifting lug in the shaft end.
- 9 Remove the screws which secure the motor to the mounting bracket. Lift the motor off the cooler.
- 10 To mount fan and/or motor, follow the items above in the reverse order.
- 11 After the fan impeller has been fitted to the motor shaft, the shaft and the screw should be sprayed or coated with a suitable anti-rust agent.
- 12 Check that the fan impeller is centred in the fan ring and that the fan rotates in the direction indicated by the arrow.

Weight of fan: 25 kg  
Torque force: M10: 47 Nm  
M12: 81 Nm

Motor size	Thread size	Max. motor weight, kg
100	M 10	25
132	M 12	60
160	M 16	100



Manufacture:  
Coiltech AB  
SE-614 81 SÖDERKÖPING  
Telephone: +46 121 191 00  
Fax: +46 121 148 50