

# Multicalor MC

## Air handlers for heating and optional cooling

Brand:	Multicalor
Base model:	MC20
Variants:	MC30 MC40
Country of destination:	UK
Electrical supply:	230V~ AC – 50Hz
Maximum supply pressure:	6 kg/cm <sup>2</sup>
Maximum supply temperature:	90°C
Manufacturer:	Multicalor Industries NV Blarenberglaan 21 B-2800 MECHELEN Tel.: +32 (0)15 29 03 03 Fax: +32 (0)15 29 03 20



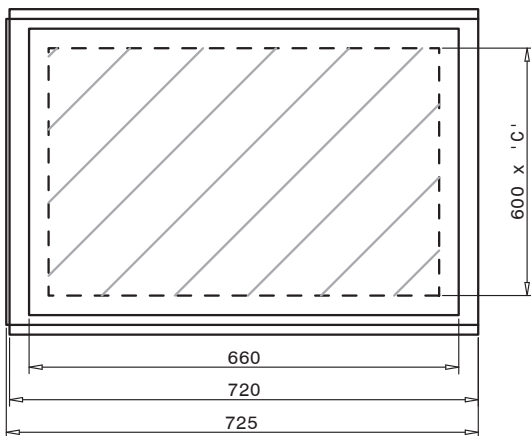
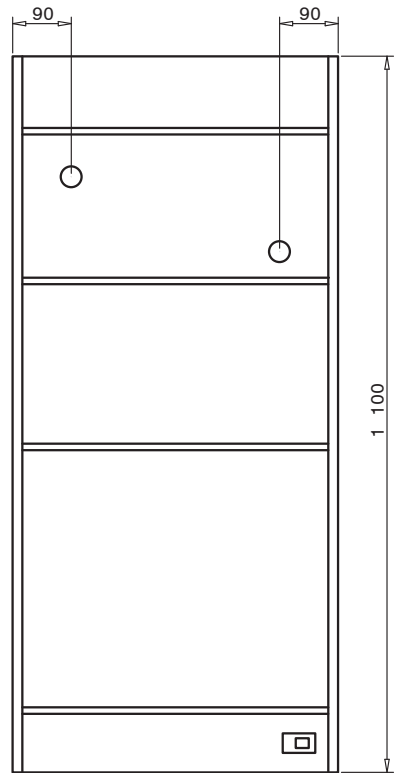
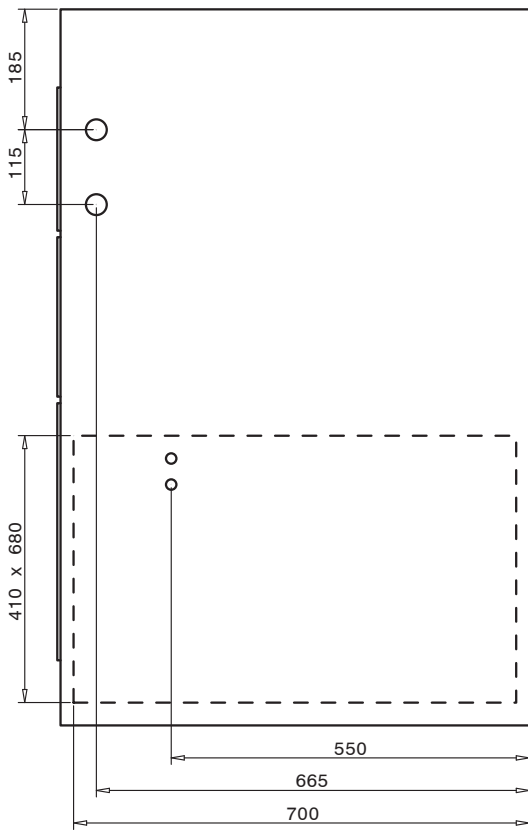
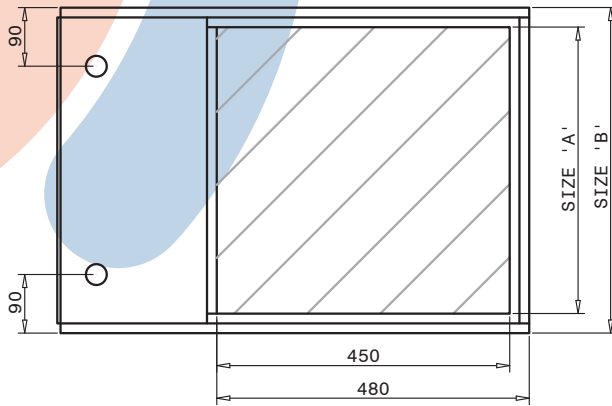
*Please keep this manual close to the apparatus for further reference*

## Table of contents

### Dimensions 3

<b>1</b>	<b>General</b>	<b>4</b>
1.1	<i>Standard version</i>	4
1.2	<i>Outside air version</i>	4
1.3	<i>Upflow and Downflow</i>	4
<b>2</b>	<b>Technical data</b>	<b>4</b>
2.1	<i>General</i>	4
2.2	<i>Airflow</i>	4
<b>3</b>	<b>Installation</b>	<b>6</b>
3.1	<i>General</i>	6
3.2	<i>Electrical installation</i>	6
3.3	<i>Installing the hot water supply lines</i>	7
3.4	<i>Installing the ducting system</i>	7
<b>4</b>	<b>Commissioning</b>	<b>7</b>
4.1	<i>Standard control</i>	7
4.2	<i>Electronic control</i>	8
4.3	<i>Setting the air volume</i>	8
4.4	<i>Outside air version</i>	8
4.5	<i>Downflow version</i>	8
4.6	<i>Installing the ducting system</i>	8
<b>5</b>	<b>Maintenance</b>	<b>8</b>
5.1	<i>End user</i>	8
5.2	<i>Installer maintenance</i>	9
<b>6</b>	<b>Problem solving</b>	<b>9</b>
6.1	<i>Standard control</i>	9
6.2	<i>Electronic control</i>	9
<b>7</b>	<b>Electrical wiring diagram</b>	<b>10</b>
7.1	<i>Standard control</i>	10
7.2	<i>Electronic control</i>	10
<b>8</b>	<b>Warranty</b>	<b>10</b>
8.1	<i>General</i>	10
8.2	<i>Scope and duration of the warranty</i>	10
8.3	<i>Damage that is not covered by the warranty</i>	10
8.4	<i>Not covered under warranty</i>	11
8.5	<i>Repairs</i>	11
8.6	<i>Service-parts</i>	11
<b>9</b>	<b>Statement of compliance</b>	<b>11</b>

# Dimensions



Type	A	B	C
MC20	340	400	280
MC30	440	500	380
MC40	540	600	480

# 1 General

The Multicalor MC (Series 2004) air handling units are compact high performance units. The units are fitted with generously sized heat exchangers featuring 6 rows. This guarantees high air temperatures even with moderate supply water temperatures. As a result, the units are very well suited to be used in conjunction with modern condensing boilers.

The fans of the MC units are installed downstream of the heat exchangers. This ensures that the fan motors are always optimally cooled and the life span of the fan bearings is increased. Special attention has been paid to the air tightness of the units, so leak losses are minimal. The heat exchanger compartments is insulated by means of a thick layer of air, so heat losses are minimal. The apparatus is supplied ready to use. It is sufficient to install on site the hot water supply lines, the air ducts and the electrical supply.

## 1.1 Standard version

In standard use the apparatus is used to distribute recycled air to which not more than 25% outside air has been added, or to distribute up to 100% outside air after heat reclaim. The unit is factory supplied in this version.

## 1.2 Outside air version

In outside air version the unit is used to distribute air to which more than 25% outside air is added. However, in the unit no special regulators are installed to keep the air temperature constant, nor is the heat exchanger protected from frost damage. If you want to use the unit as an outside air unit, we suggest that you:

- install an external regulator that keeps the minimum air temperature at a certain selectable level.
- protect the heat exchanger from frost related damage by means of addition of a suited anti-freeze solution to the heating circuit.

## 1.3 Upflow and Downflow

The Multicalor MC units are available as upflow models. If you need a downflow unit, you can turn simply around the unit and add a second minimal thermostat. More details are found in point 4.5 Downflow versions.

# 2 Technical data

## 2.1 General

The units comply to the machine directive 89/392/EEG, the low voltage directive 73/23/EEG and the EMC directive 89/336/EEG. The MC units are available in 3 sizes. Each unit can be fitted with different fans as to adapt air flow or external static pressure as suited.

## 2.2 Airflow

### 2.2.1 MC20

The width of this unit is 400 mm. The air flow depends on the selected fan motor. In the table below you can find per fan the air flow and the respective external static pressure. Per airflow the heating output (with supply 75/65-20°C entering air temperature) and the hydraulic pressure loss are stated.

Ventilator							Heating output	Hydraulic pressure loss
Dimensions	241-181 (9-7)			241-181 (9-7)				
Motor type	PSC			PSC			ECM	
Power	184 Watt			376 Watt			376 Watt	
Capacitor	6 µF			10 µF			—	
RPM	950 rpm			1450 rpm			Electronic control	
Speed	L	M	H	L	M	H	Supply 75/65-20°C (per EN442)	
Air flow [m³/h]	External static pressure [Pa]						[kW]	[kPa]
600	133	145	152	311	340	352	—	—
800	110	126	134	276	306	320	11.3	1.36
1 000	60	101	111	227	270	286	13.7	1.97
1 200	—	63	81	158	223	248	15.9	2.52
1 400		—	35	—	166	209	18.0	3.21
1 600			—		89	160	20.0	3.81
1 800					—	103	22.0	4.56
2 000						36	23.8	5.33
2 200						—	—	—

### 2.2.2 MC30

The width of this unit is 500 mm. The air flow depends on the selected fan motor. In the table below you can find per fan the air flow and the respective external static pressure. Per airflow the heating output (with supply 75/65-20°C entering air temperature) and the hydraulic pressure loss are stated.

Ventilator							Heating output	Hydraulic pressure loss			
Dimensions	270-270 (10-10)			270-270 (10-10)					270-270 (10-10)		
Type	PSC			PSC					ECM		
Power	245 Watt			376 Watt					376 Watt		
Capacitor	8 µF			10 µF							
RPM:	950 rpm			1450 rpm			Electronic control				
Speed	L	M	H	L	M	H	Supply 75/65-20°C (per EN442)				
Air flow [m³/h]	External static pressure [Pa]						[kW]	[kPa]			
800	177	191	197	306	390	426	—	—			
1 000	155	172	180	259	353	406	14.6	1.38			
1 200	128	151	162	190	314	384	17.0	1.77			
1 400	93	129	140	114	273	360	19.4	2.28			
1 600	40	100	118	35	226	329	21.6	2.73			
1 800	—	67	91	—	158	293	23.8	3.30			
2 000		23	59		47	253	25.9	3.87			
2 200		—	22		—	200	28.0	4.38			
2 400			—			138	30.0	4.99			
2 600						60	31.9	5.51			
2 800						—	—	—			

### 2.2.3 MC40

The width of this unit is 600 mm. The air flow depends on the selected fan motor. In the table below you can find per fan the air flow and the respective external static pressure.

Ventilator							Heating output	Hydraulic pressure loss			
Dimensions	270-270 (10-10)			270-270 (10-10)					270-270 (10-10)		
Type	PSC			PSC					ECM		
Power	376 Watt			550 Watt					736 Watt		
Capacitor	16 µF			20 µF							
RPM:	1450 rpm			1450 rpm			Electronic control				
Speed	L	M	H	L	M	H	Supply 75/65-20°C (per EN442)				
Air flow [m³/h]	External static pressure [Pa]						[kW]	[kPa]			
1 000	295	379	436	419	458	479	—	—			
1 200	246	352	421	387	431	460	17.8	1.40			
1 400	192	324	400	356	405	441	20.3	1.82			
1 600	112	290	380	319	374	422	22.7	2.18			
1 800	24	253	357	276	344	402	25.1	2.65			
2 000	—	201	329	221	309	380	27.4	3.13			
2 200		130	297	132	267	355	29.6	3.55			
2 400		18	262	—	211	325	31.8	4.06			
2 600		—	214		144	291	33.9	4.50			
2 800			163		58	252	36.0	5.04			
3 000			81		—	205	38.0	5.50			
3 200			—			154	40.0	6.05			
3 400						91	41.9	6.53			
3 600						—	—	—			

### 2.2.4 Correction factors for other hot water supply– or entering air temperatures.

Hot water supply	Entering air temperature				
	20	15	10	5	0
75/65	1.00	1.09	1.20	1.31	1.41
90/70	1.19	1.29	1.40	1.50	1.60
80/60	0.97	1.08	1.18	1.28	1.39
70/50	0.74	0.86	0.96	1.07	1.17
60/40	0.53	0.64	0.74	0.85	0.95

## 3 Installation

### 3.1 General

- We wish to emphasize that only qualified fitters or contractors shall install the air heater.
- The installation shall be done in accordance with the latest issue of all local standards as well as the installation manual of the device concerned.
- Ensure that the conditions of local utility provision (electrical supply) match the device settings before installing the device or making it operational.

#### 3.1.1 Transport damage

Please check the air heater for transport damage upon delivery. If damage is observed, this shall be mentioned on the waybill and you shall advise your supplier thereof in writing.

#### 3.1.2 Packaging

The air heaters are always packaged in a box made from recycled paper. We ask you not to earmark the paper for waste disposal, but for further recycling.

#### 3.1.3 Location

Adhere to the following guidelines when selecting a location for the device:

- place the unit in a central position in relation to the ducting system;
- place the unit on a flat and solid surface;
- if installation surface is wet, then raise the unit;
- Always place the device in such a way that it is insulated from the construction–building structure to avoid the transmission of noise and vibrations.

Attention:

- The unit must be installed level!
- The device must be installed in a frost free location. If impossible, please add a suitable anti-freeze to the hydraulic system as to protect the heat exchanger from frost damage.
- If a return air is inspired in the combustion compartment, then under no condition devices with an open combustion circuit may be present in the installation area!

#### 3.1.4 Minimal clearance

When installing please provide minimal clearance around the unit:

- keep 50 mm clearance around the sides of the unit;
- keep a minimum of 50 mm between hot water supply and any flammables..
- At the front of the device there shall be at least 720 mm of free service space (ensure a comfortable standing height).

#### 3.1.5 Transport on site

Never move the air heaters by tilting them on their angles, as this may irrevocably damage the device encasing. Such damage is not covered by the device's warranty.

### 3.2 Electrical installation

The electrical installation shall always be performed according to the latest issue of the relevant standards and the prescriptions of the local energy provider (utility).

- Mind your safety: always ground the unit.

#### 3.2.1 Standard control

##### 3.2.1.1 Electrical connection

In the casing different cut-outs are provided to run cables through. The PCB features a three-pole terminal for connecting the mains power 230V~AC. Connect the cable to a 230V~AC power supply with earthing. We recommend that the machine should be directly connected to a switchboard with 16A fuses.

##### 3.2.1.2 Thermostat

The device works perfectly together with the Honeywell electronic programmable thermostat Chronotherm IV. This thermostat is suited for heating, ventilation and cooling, and has been specifically designed for use with warm air systems. Connect the thermostat as per the instructions on the wiring diagram.

Mount the room thermostat at an approximate height of 1.6 m, in a central position in the living room and readily accessible to the normal air circulation in the room. Always mount the thermostat on an inner wall shielded from the effects of other heat sources including exhaust grilles, powered devices, direct sunlight, etc. Accordingly, we also do not recommend placement near windows, outer walls (<1.20 m) or in the vicinity of stairs. For additional information on assembly and programming we

refer to the thermostat manual.

### 3.2.1.3 Cooling condensing unit

The PCB features a two-pole terminal for connecting an auxiliary relay that can start an external condensing unit. Warning: never connect the cooling system relay directly to this output, but always use an auxiliary relay. For further information, please contact Multicalor.

### 3.2.2 Electronic control

The electronic control is not yet implemented.

### 3.3 Installing the hot water supply lines

The diameter of the supply lines is 28mm. Usually hot water supply is from the front, but for ease of installation the supply lines can also be brought in from the sides or the top of the unit (UP F only). The heat exchanger is installed with rubber grommets as to minimise leakage.

- Install an automatic air bleed valve in the supply circuit.
- Install ball valves and flexible tubing so the heat exchanger can be easily removed for inspection or cleaning.

#### 3.3.1 Hydraulic installation (standard regulation)

There are a number of ways to install the unit hydraulically. Standard the PCB gives out a 230V~AC signal (on terminal 1–2). This contact can be used to drive a circulator of MAXIMUM 3.00A.

#### 3.3.2 Hydraulic installation (electronic control)

The electronic control is not yet implemented.

### 3.4 Installing the ducting system

#### 3.4.1 Installing the supply ducts

For the MC units a complete range of acoustically insulated supply air plenums is available. These are installed on top of the unit (Downflow versions: under the unit) and facilitate connection of the ductwork.

#### 3.4.2 Installing the return air ducts

For the MC units a complete range of acoustically insulated supply air plenums is available. These are installed under the units (Downflow versions: on top of the units) and facilitate connection of the ductwork. It is also possible to connect the return air ductwork to the side of the units. For this purpose matching white return air filter frames are available. Multicalor does not recommend to connect the ductwork directly to the sides of the unit, as this means that a large portion of the acoustic insulation is lost.

- Never remove the air filter. The unit must always be fitted with an air filter class EU3/G3 or better. Using the unit without a filter can damage the unit.
- Change filters regularly.
- If you connect an outside air duct, always install a butterfly register as to regulate the amount of outside air.

## 4 Commissioning

### 4.1 Standard control

#### 4.1.1 Switching the apparatus on and off

Normally the machine shall permanently be supplied with mains power. At the installation or maintenance stage you may proceed as follows to switch on or off the device.

##### 4.1.1.1 Switching on

Proceed as follows to switch the machine ON:

- Connect the mains power.
- Set the room thermostat at the desired setting.

##### 4.1.1.2 Switching off

Proceed as follows to switch the machine OFF:

- Set the room thermostat 5°C lower than the actual temperature.
- Disconnect mains power.

#### 4.1.2 Setting the air temperature

##### 4.1.2.1 Minimum air temperature

In order to function properly the minimal air temperature should be selected on site. This can be done by setting the minimal air thermostat. The fan will not turn during heat request UNLESS the measured temperature is higher than the selected value.

If you install the unit as a DOWNFLOW version, you should (field) install a second thermostat in parallel to the existing one in the location as indicated in the unit.

#### 4.2 *Electronic control*

The electronic control is not yet implemented.

#### 4.3 *Setting the air volume*

##### 4.3.1 *Standard control*

The unit is fitted with a 3 speed PSC motor. The desired speed can be selected during installation by changing the selected speed on the printed circuit board.

##### 4.3.2 *Electronic control*

The electronic control is not yet implemented.

#### 4.4 *Outside air version*

In outside air version the unit is used to distribute air to which more than 25% outside air is added. However, in the unit no special regulators are installed to keep the air temperature constant, nor is the heat exchanger protected from frost damage. If you want to use the unit as an outside air unit, we suggest that you:

- install an external regulator that keeps the minimum air temperature at a certain selectable level.
- protect the heat exchanger from frost related damage by means of addition of a suited anti-freeze solution to the heating circuit.

#### 4.5 *Downflow version*

The Multicalor MC units are factory supplied in an UPFLOW version. If you need a DOWNFLOW version, you can simply turn around the unit and install a second TR2 minimal air temperature thermostat. The extra minimum air temperature is to be ordered separately.

#### 4.6 *Installing the ducting system*

##### 4.6.1 *Fitting the return air ducts*

Noise problems are often created if air heaters are used with very short and/or undersized return air ducts. These problems can be avoided by:

- insulating the return air ducts by means of an acoustic liner;
- installing a sound damper in the return air ducts;
- making sure that there are at least 2 generously sized 90° turns in the ducting system;
- Increasing both diameter and length of the return air ducts.

You can connect the return air duct to the left, right or the bottom of the unit. We strongly suggest using only the bottom return air opening (please remove the cut-out when commissioning). If possible, install the unit on an insulated plenum, on which side return ducts can be connected. If you do not have sufficient free space to use an insulated return air plenum, it is possible to install an optional side filter frame. However, in doing so, a large part of the acoustic insulation is lost. Always use a return air duct and return air from OUTSIDE of the combustion compartment. If you do wish to apply an open return, make sure that there are (will be) no other devices with open combustion circuit in the installation area.

##### 4.6.2 *Fitting the supply ducts*

Fit a matching supply air on the unit. The height of the plenum should be at least as high as the width of the unit. The supply air plenum should, like the supply ducting system, be thermally insulated. The supply air duct should be of a sufficient size to permit air displacement with normal speeds and pressure losses.

## 5 **Maintenance**

### 5.1 *End user*

#### 5.1.1 *Cleaning the air filter*

The standard air filter is a synthetic air filter with a life span of 1 year. However the filter requires monthly cleaning, to be performed as set out below:

- Set the thermostat 5°C lower than the environment temperature.
- You may wait until the apparatus has cooled down.
- Disconnect the mains.
- Remove the air filter and use a vacuum cleaner to clean it
- Put the filter back into the machine.
- Restore the mains.
- Set the room thermostat again to the required value.



Never remove the air filter from an MC unit. The machine must always be fitted with a EU3 (or better) air filter. Heating or ventilating without a filter may pollute the heat exchanger to such an extent that the machine may incur irretrievable damage, which the warranty does not cover.

### 5.1.2 Cleaning the casing

The casing may be cleaned with a soft humid cloth. Do not use aggressive media such as bleaching water, solvents or petrol, as these products are likely to damage the paint.

## 5.2 Installer maintenance

The unit is nearly free of maintenance. It is sufficient to replace the air filter and to check the unit for leakage and proper functioning.

1. Set the thermostat 5°C lower than the environment temperature;
2. You may wait until the apparatus has cooled down;
3. Disconnect the mains;
4. Remove and replace the air filter;
5. Check unit for functioning and check for leaks;
6. Verify pressure in the supply lines;
7. Switch mains power on;
8. Set the room thermostat again to the required value;

## 6 Problem solving

### 6.1 Standard control

#### 6.1.1 Fan does not start during heat request.



If the fan does not start, even though hot water is circulating in the heat exchanger, then the problem is presumably located in the TR2 minimal thermostat. Please check the setting of the minimal thermostat. Also check that the temperature sensing bulb is touching the heat exchanger in order to measure the temperature as good as possible.

If working with low water temperatures, you can increase the performance of the temperature sensing bulb by wrapping a denuded stiff copper electrical wire around the temperature sensing bulb and then inserting both leads between the fins of the heat exchanger.

#### 6.1.2 Fan turns without heat or ventilation/cool request

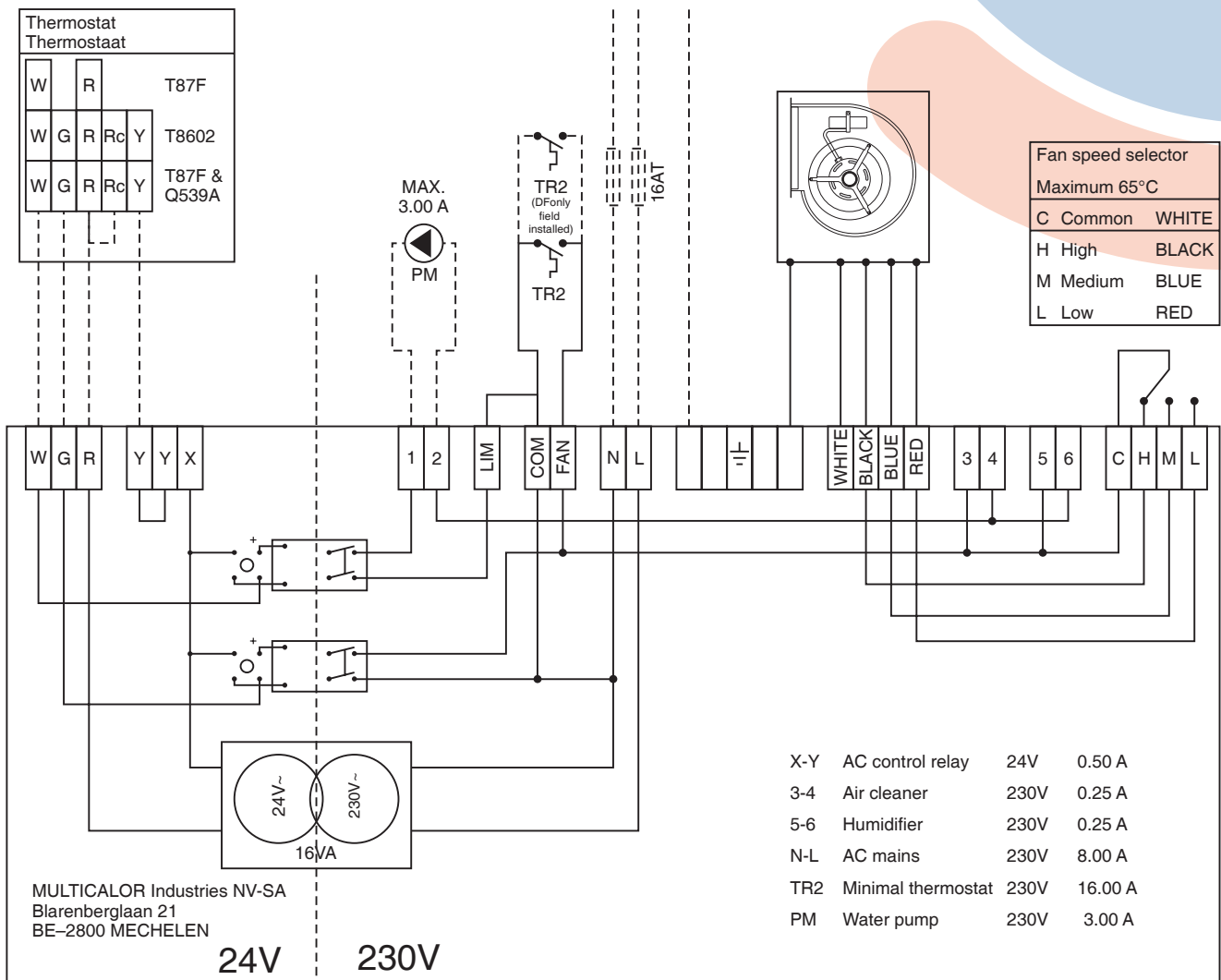
Check the setting of the TR2 thermostat. If the setting is too low, ambient temperature can cause the contact to close and, as a result, start the fan. If the thermostat is set high enough, but the fan keeps on starting, there probably is a problem in the hydraulic circuit (usually naturally occurring convection).

### 6.2 Electronic control

The electronic control is not yet implemented.

## 7 Electrical wiring diagram

### 7.1 Standard control



### 7.2 Electronic control

The electronic control is not yet implemented.

## 8 Warranty

### 8.1 General

Multicalor Industries NV guarantees the MC units against all manufacturing defects or material faults, subject to the terms and conditions described under 'Scope and duration of the warranty'. Moreover Multicalor Industries NV guarantees the machine will achieve the output indicated in normal conditions.

### 8.2 Scope and duration of the warranty

The warranty starts at the moment of purchase by the first user and entitles the beneficiary of the warranty, through the dealer or the service department of Multicalor Industries NV, to:

- One (1) year free exchange of faulty parts;
- One (1) year free labour costs, required for the replacement of the faulty parts;
- One (1) year free travel and freight expenses on the condition that the machine to be repaired is in Belgium;
- Five (5) year free exchange of the heat exchanger, but exclusive of labour costs and travel expenses.

Replacement of parts does not change the initial warranty period, i.e. the warranty is not extended by the replacement of faulty parts.

### 8.3 Damage that is not covered by the warranty

All damage resulting from:

- Machine use which does not match normal household or light commercial use;

- Failure to meet the user instructions as summed up in the user manual;
- Insufficient or wrong maintenance;
- Irretrievable fouling up of the heat exchanger caused by heating, ventilating or cooling with a highly fouled up or absent dust filter;
- Modifications or adaptations to the machine not covered by prior written approval by Multicalor Industries NV;
- Repairs carried out with non-original parts or wrong equipment or materials;
- The heat exchanger when used in an atmosphere polluted with chlorine or other chemicals;
- Causes foreign to the machine, including (but not restricted to):
  1. Damage incurred during transport, including dents, scratches, etc.;
  2. Damage caused by disasters, including fire, lightning, flooding;
  3. Damage linked to frost;
  4. Damage caused by a departure from the normal power voltage, water or gas pressure deviating widely from the nominal values suitable for the normal supply of the machine;
  5. Damage caused by a non-conformity of the installation to the local standards applicable.

#### **8.4 Not covered under warranty**

- Parts subject to normal wear, including air filters, fuel filters and other parts that have to be replaced periodically;
- Machines the serial number of which has been removed or altered;
- Travel expenses and labour costs if the matching warranty period has expired;
- Result damage caused by the faulty machine;
- Any loss of productivity attributable to the faulty machine;
- Any loss of use caused by a fault to the machine;
- When the machine proves unsuitable for the purposes for which the purchaser bought the machine.

#### **8.5 Repairs**

During the warranty period the customer may call upon the services of the dealer who sold the machine or, in Belgium, to the “after-sales” department of Multicalor Industries NV.

#### **8.6 Service-parts**

If it is necessary to replace a part, we recommend that the matching article code of the part concerned be mentioned on the order, in addition to the type of air heater, the machine’s serial number as well as the name of the part concerned. The machine type and serial number are mentioned on the registration plate placed in the machine.

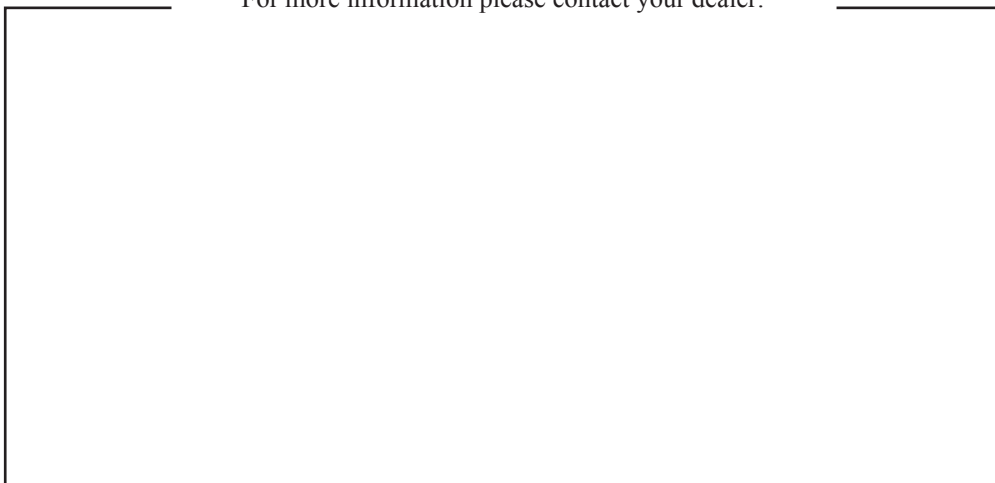
## **9 Statement of compliance**

Multicalor Industries declares that the air handlers

- Multicalor MC 20
- Multicalor MC 30
- Multicalor MC 40

meet the provisions of the machine directive 89/392/EEC, the low-voltage directive 73/23/EEC as well as the EMC directive 89/396/EEC.

For more information please contact your dealer:



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