

Electric Gas Cooler Series ECP[®]

ECP20-1 and ECP20-2 (from model nos.: 95...)

Instruction Manual
Version 1.00.01



**Dear customer,**

we have made up this operating manual in such a way that all necessary information about the product can be found and understood quickly and easily.

Should you still have any question, please do not hesitate to contact **M&C** directly or go through your appointed dealer. Respective contact addresses are to be found in the annexe to this operating manual.

Please also contact our homepage www.mc-techgroup.com for further information about our products. There, you can read or download the data sheets and operating manuals of all **M&C** products as well as further information in German, English and French.

This Operating Manual does not claim completeness and may be subject to technical modifications.

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Version: 1.00.01

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1 GENERAL INFORMATION

The product described in this operating manual has been examined before delivery and left our works in perfect condition related to safety regulations. In order to keep this condition and to guarantee a safe operation, it is important to heed the notes and prescriptions made in this operating manual. Furthermore, attention must be paid to appropriate transportation, correct storage, as well as professional installation and maintenance work.

All necessary information a skilled staff will need for appropriate use of this product are given in this operating manual.

2 DECLARATION OF CONFORMITY



The product described in this operating manual complies with the following EU directives:

EMV-Instruction

The requirements of the EU directive 2014/30/EU "Electromagnetic compatibility" are met.

Low Voltage Directive

The requirement of the EU directive 2014/35/EU "Low Voltage Directive" are met.
The compliance with this EU directive has been examined according to DIN EN 61010.

Declaration of conformity

The EU Declaration of conformity can be downloaded from the **M&C** homepage or directly requested from **M&C**.

3 SAFETY INSTRUCTIONS

Please take care of the following basic safety procedures when mounting, starting up or operating this equipment:

Read this operating manual before starting up and use of the equipment. The information and warnings given in this operating manual must be heeded.

Any work on electrical equipment is only to be carried out by trained specialists as per the regulations currently in force.

Attention must be paid to the requirements of VDE 0100 (IEC 364) when setting high-power electrical units with nominal voltages of up to 1000 V, together with the associated standards and stipulations.

Check the details on the type plate to ensure that the equipment is connected to the correct mains voltage.

Protection against touching dangerously high electrical voltages:

Before opening the equipment, it must be switched off and hold no voltages. This also applies to any external control circuits that are connected.

The device is only to be used within the permitted range of temperatures and pressures.

Check that the location is weather-protected. It should not be subject to either direct rain or moisture.

The equipment must not be used in hazardous areas.

Installation, maintenance, monitoring and any repairs may only be done by authorized personnel with respect to the relevant stipulations.

4 WARRANTY

If the equipment fails, please contact **M&C** directly or else go through your **M&C** authorised dealer. We offer a one year warranty as of the day of delivery as per our normal terms and conditions of sale, and assuming technically correct operation of the unit. Consumables are hereby excluded. The terms of the warranty cover repair at the factory at no cost or the replacement at no cost of the equipment free ex user location. Reshipments must be send in a sufficient and proper protective packaging.

5 USED TERMS AND SIGNAL INDICATIONS



DANGER!

This means that death, severe physical injuries and/or important material damages **will occur** in case the respective safety measures are not fulfilled.



WARNING!

This means that death, severe physical injuries and/or important material damages **may occur** in case the respective safety measures are not fulfilled.



CARE!

This means that minor physical injuries **may occur** in case the respective safety measures are not fulfilled.

CARE!

Without the warning triangle means that a material damage may occur in case the respective safety measures are not met.

ATTENTION!

This means that an unintentional situation or an unintentional status may occur in case the respective note is not respected.



NOTE!

These are important information about the product or parts of the operating manual which require user's attention.

SKILLED STAFF

These are persons with necessary qualification who are familiar with installation, use and maintenance of the product.

6 APPLICATION

The Peltier Gas Sample Cooler Type **ECP20** is used in analyser sample system design to reduce the dew point of wet gases to a level that is stable and low.

Sample gas cooling prevents subsequent condensation in the analyser. The stability of the dew point is also extremely important as it helps to prevent water vapour cross sensitivity and volumetric error, especially in infrared analysers.

The sample gas passes through a sampling probe to the Type **ECP20** Cooler where it is lowered to a dew point of +5°C. Solids will have been trapped in the filter of the sample probe, (If provided in the type used) or are trapped in a downstream fine filter.

The conditioned gas can now be passed to the analyser.

If the analyser has no gas flow control or indicator functions, these should be provided externally, just as with a gas delivery pump for unpressurized gases.

The condensate is discharged externally:

- For operations under pressure, an automatic condensate drain or collection vessel is used.
- For operations in partial vacuum (suction), a condensate vessel with a manual drain or a peristaltic pump for automatic condensate removal is used.

For protection against liquid breakthrough and to increase the dependability of the complete system we recommend the use of a fluid alarm sensor.



NOTE!

For protection against liquid breakthrough and to increase the dependability of the complete system we recommend the use of a fluid alarm sensor.

The Type **ECP 20...** Peltier Gas Coolers are designed for use in gas analysis whenever moisture is likely to effect results.

The following figure shows the flow sheet of an typical application of the electric gas cooler **ECP 20...**

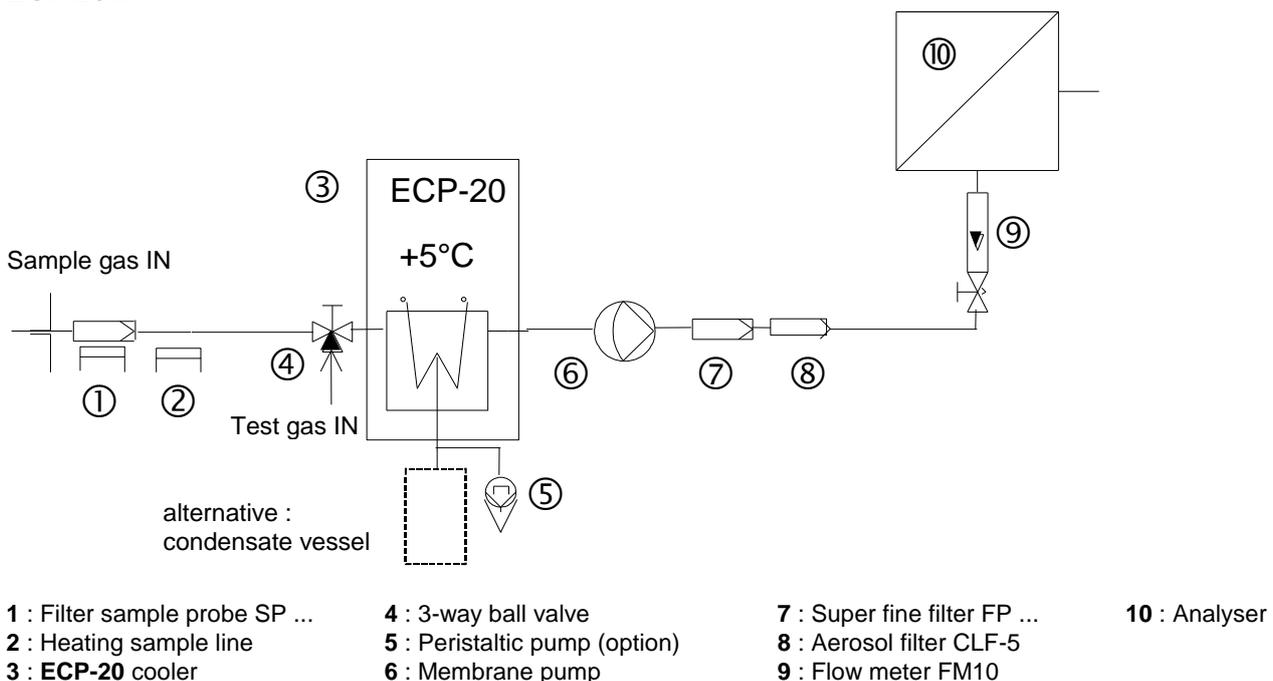


Figure 1 Application example of the ECP-20

7 FUNCTION OF THE M&C JET-STREAM HEAT EXCHANGER

The **ECP20-1** is equipped with one Jet-Stream heat exchanger for a flow rate of 250l/h while the **ECP20-2** has two heat exchangers in series for maximum flow of 500l/h.

The Jet-Stream heat exchangers made of Duran glass, optional PVDF or stainless steel are located in a heat-insulated cooling block. All the heat exchangers are easily accessible and are arranged in such a way that they can be removed very simply. Figure 2 shows a schematic diagram of the functioning of the heat exchanger.

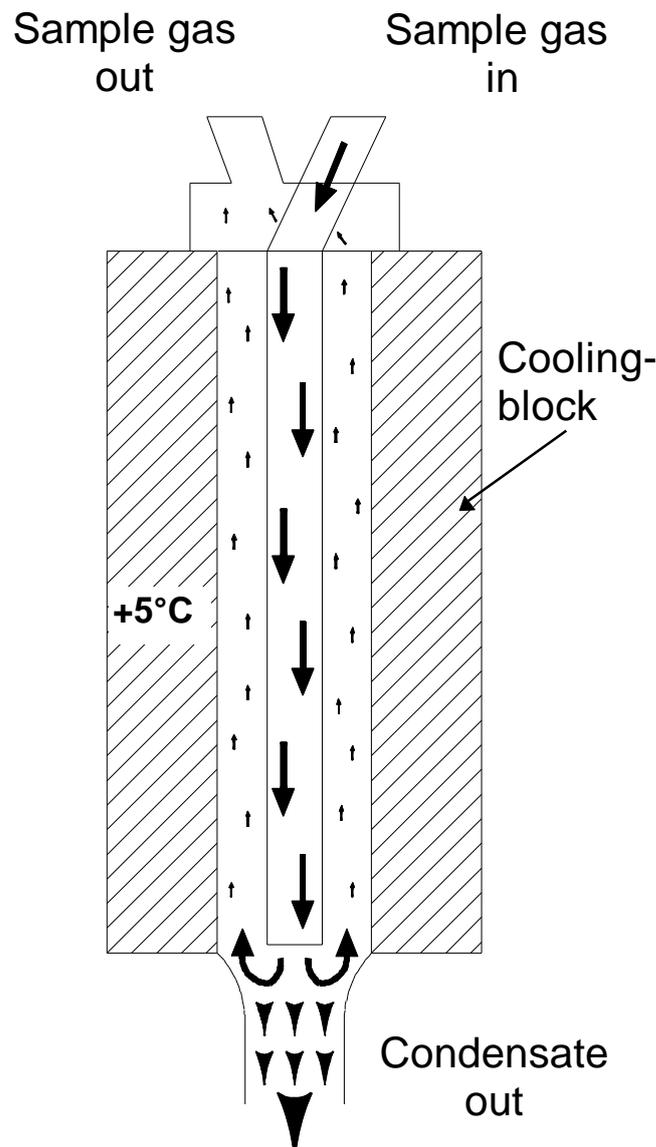


Figure 2 Functioning diagram of the heat exchanger

8 TECHNICAL DATA

Electric Gas Cooler ECP	Type ECP20-1	Type ECP20-2
Sample outlet dew point	range of adjustment: +2 °C +15 °C, factory setting: +5 °C	
Dew point stability	at const. conditions: < ±0,1°C	
Sample inlet temperature	**max. 180°C	
Sample inlet dew point	**max. 80°C	
Gas flow rate	**max.250l/h	**max.500l/h
Number of heat exchangers	1	2
Material of heat exchangers	Duran glass or PVDF or stainless steel 316	
Ambient temperature	**+5°C up to +40°C	
Stockage temperature	-20 to +60°C	
Admissible gas pressure	max. 3bar g. with glass and PVDF max. 10bar with stainless steel	
Total cooling capacity at 25°C a.t.	50KJ/h	80KJ/h
Dead volume/heat exchanger	approx. 80cm ³	
Sample gas connection	glass: for tube Ø6mm, PVDF/SS316: G1/4"i	
Condensate connection	glass: for tube Ø12mm, PVDF/SS316: G3/8"i	
Ready for operation	< 20 minutes	
Mains power supply	switch 230V 50Hz or 115V 60Hz,(±10%)	
Power consumption	150VA	250VA
Electrical connection	terminal 2,5mm ² , cable glands 2 X PG11	
Status alarm	contact rating 250V, 2A, 500VA, 50W alarm point Δ ±3°C to T _{soll}	
Electrical protection	Fuse 2 x 4A _T	
Case protection	IP 54 (EN 60529)	
Method of mounting	surface mounting	
Casing dimensions (HxWxD)	210mm X 385mm X 226mm	
Wight	10Kg	12,5Kg
Electrical equipment standard	EN 61010	

* Standard,

** Maximum values in technical datas must be rated in consideration of total cooling capacity at 25 °C ambient temperature and an outlet dew point of 5 °C.

9 DESCRIPTION

Figure 3 shows the **ECP** cooler unit.

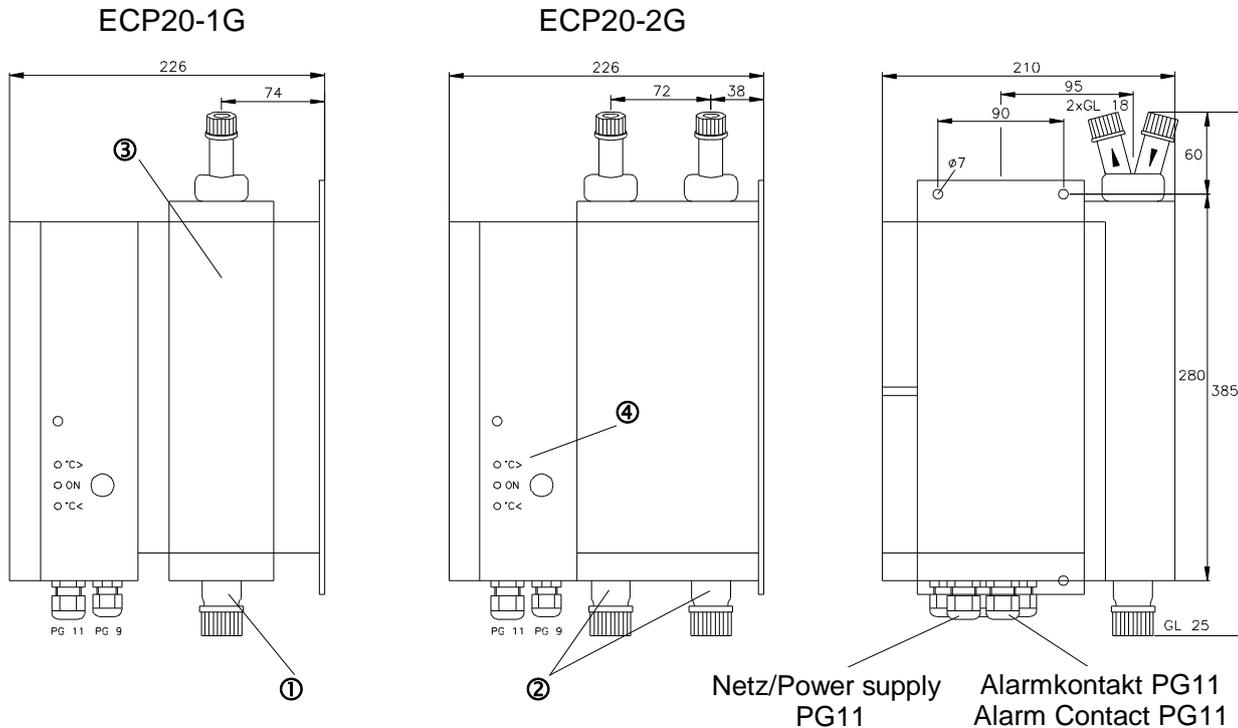


Figure 3 Electric gas cooler ECP20-1 and ECP20-2

The type **ECP20-1** Peltier Gas Sample Cooler is supplied completely with an **EC** Jet-Stream heat exchanger ① made either of Duran glass, stainless steel or PVDF for a maximum flow of 250l/h.

The exchanger is housed for ease of replacement in a thermally insulated cooling block ③ on the right hand side of the cooler. From serial nos.: 95... the temperature is measured with a PT100 temperature sensor and regulated electronically by Peltier Elements on a constant temperature of +5°C.

There are proof-plugs for checking the reference temperature and the current temperature, with an output signal at 0,1 Volt/°C. (see Temperature Setting and Control).

The type **ECP20-2** Peltier Gas Sample Cooler is supplied complete with two **EC** Jet-Stream heat exchangers ②, one non regulated as a pre-cooler and the second regulated as a main cooler for a maximum flow of 500l/h.

The system ensures optimum cooling of the sample gas and condensate separation.

The heat energy emitted by the cooling system is dissipated via a generously sized cooling fin block with forced ventilation.

From serial no.: 9008023 the **ECP20** coolers are equipped with a change-over switch on the control board for operation at 230V 50Hz or 115V 60Hz. From serial nos.: 95... the switch is mounted on the basic circuit board.

The electronic control system with status indication and the power supply unit are housed in a protective aluminium enclosure on the front panel of the cooler.

There are three LED status indicators ④:

- Upper red LED "°C >" = Temperature alarm > +8°C
- Central green LED "On", lights or pulsates = Cooler on
- Lower red LED "°C <" = Temperature alarm < +2°C

The green LED alone indicates that the specifications with regard to dew point temperature and dew point stability are achieved. The red LED lights to indicates that the control system has deviated from the setpoint by more than 3°C. The upper red LED "°C >" lights up to indicate an overload, i.e. more cooling capacity is being called for than is available. The **ECP20** Electric Gas Cooler is overload-protected. In an overload condition the dew point temperature will rise proportional to the overload.

An over and under temperature alarm as a status group alarm is available for external indication, via a relay output with a volt free relay changeover contact. The alarm thresholds are 3°C above and below the control temperature.

The gas inlet and outlet is located on the top of the cooler and is indicated by arrows on the **EC** Jet-Stream heat exchangers. On standard models with Duran glass heat exchangers the gas connections are provided with GL18-6 mm PTFE sealing rings and on stainless steel or PVDF exchangers with G1/4" female threads (or 1/4" NPT as optional).

The condensate drain of the **EC** Jet-Stream heat exchangers are located beneath the cooler and have GL25-12 mm PTFE sealing rings as standard on the Duran glass heat exchangers. And on stainless steel or PVDF exchangers with G3/8" female threads (or 3/8" NPT as optional).

The type of condensate discharge used will depend on the type of operation:

- Peristaltic Pump Type SR25.1 for automatic condensate discharge in vacuum and pressurised operations.
- Automatic Float Condensate Discharge Type **AD-** .. for pressurised operation only.
- Condensate Collection Vessel Type **TG../TK..** with manual drain.

Option: Liquid alarm sensor LA..

For protection against liquid breakthrough and to increase the dependability of the complete system we recommend the use of a liquid or condensate alarm sensor Type **LA../KS..** with correspondingly electronics mounted extern into the sample line between the cooler and the analyser.

10 RECEIPT OF GOODS AND STORAGE

The **ECP** gas cooler is a complete pre-installed unit.

- Please take the ECP gas cooler and possible special accessories carefully out of the packaging material immediately after arrival, and compare the goods with the items listed on the delivery note!
- Check the goods for any damage caused during delivery and, if necessary, notify your transport insurance company without delay of any damage discovered



NOTE!

The equipment should be stored in a protected, frost-free room!

11 INSTALLATION INSTRUCTIONS

The **ECP 20..** Peltier Gas Cooler is designed for wall mounting and panel mounting as well.



NOTE!

The Cooler is to be used in a vertical position only! The perfect functioning of the separation and drainage procedures will only be guaranteed if the equipment is used in a vertical position!

When in use, the ECP cooler should be placed in an area well away from any heat emitting sources in order to prevent damage caused by an accumulation of heat the air vents must be free at all times!

When the equipment is being used outside, ample protection against the effects of direct sunlight and dampness must be provided. In winter, the equipment must only be used in frost-free areas!

Unheated gas sample lines must be provided with slope up to the cooler. In that case pre-separation of the condensate is not required.

Connect the heated sample line with sufficient thermal decoupling to the cooler!

12 SUPPLY CONNECTIONS

12.1 HOSE CONNECTIONS

The gas inlet and outlet is located on the top of the cooler and is indicated by arrows on the **ECP** Jet-Stream heat exchangers. For possible connectors see technical data. Correspondingly tube or hose connectors are optional available by M&C.



Do not mix up the hose connections; the inlet and outlet connections of the heat exchangers are marked with arrows;

NOTE! Ensure that the connections are sealed adequately;

To ensure free removal of the condensate, ensure that the listed diameters for the condensate removal lines are not reduced!

Ensure that the connections are sealed adequately by noting the following:

Duran glass heat exchangers with connections GL 18-6 respectively GL 25-12

- Before assembly, check the GL coupling rings to see if the PTFE/silicon locking rings have been damaged.
- The sealing rings should be installed with the PTFE side facing the medium.

PVDF respectively stainless steel heat exchangers with G 1/4“i respectively G 3/8“i

- The correspondingly dimensioned tube respectively hose couplings with threaded connections have to be screwed in with PTFE thread sealing tape.
- To grant a functional and unproblematic mounting we recommend to use union pieces with taper pipe thread type R according to DIN 2999/1 in connection with suitable sealing tape.



NOTE!

When fixing the connectors in the PVDF heat exchanger hold up with a wrench at the pane of the bolt head!

Option: stainless steel heat exchanger with NPT

- The heat exchangers with NPT threaded connectors are marked with circulated notches.
- The NPT thread must be screwed in with sealant or fixed with adhesive.

In the standard configuration, the tubes for removal of condensate are connected directly to the heat exchangers, with the standard GL 25-12 tube connectors (Duran glass heat exchanger) respectively with the standard G 3/8“ thread joint (PVDF or stainless steel heat exchanger).

Condensate removal is done by customer according to the type of operation with:

- External peristaltic pump **SR25.1**;
- Automatic float type condensate traps **AD-...** only for over-pressure operation;



NOTE!

Stainless steel heat exchangers with G 3/8“ thread joint can be directly fitted up with the float-type condensate trap AD-SS by means of a thread adapter part number FF 11000 (1/2“ NPT to G 3/8“i). By this wall mounting of the AD-SS unit isn't necessary!

- Condensate collector container that is emptied manually;

12.2 ELECTRICAL CONNECTIONS



WARNING!

When connecting the equipment, please ensure that the supply voltage is identical with the information provided on the model type plate.



NOTE!

For the erection of power installations with rated voltages up to 1000V, the requirements of VDE 0100 and relevant standards and specifications must be observed!

Set the voltage selector S1 to the correct mains voltage!

The main circuit is equipped with a fuse corresponding to the nominal current (over current protection); for electrical details see technical data.

The main power supply terminals are located in the aluminium enclosure on the **ECP 20...** electronic board:

- Power On, Terminal X1: 1, 2, 3 / L, N, PE

Coolers from serial nos.: 95.. also have a mains selector (S1) on the basic board for either 230V 50Hz or 115V 60Hz operation on the basic circuit board (see circuit diagram in appendix).

Before commissioning, use a screwdriver to turn the selector to the correct position 230/115 depending on your main power input supply.

The status alarm contact for indicating and isolating the gas supply must be incorporated into the equipment control system.

The volt free contact outputs of the status group alarm is located on the **ECP 20....** control board:

- Temp. Alarm Terminal X2: 1 and 3 normal opened, 2 and 4 normal closed.

The two PG11 cable glands are located on the underside of the cooler enclosure. For further details refer to the electrical circuits and terminal drawing and cover plate.

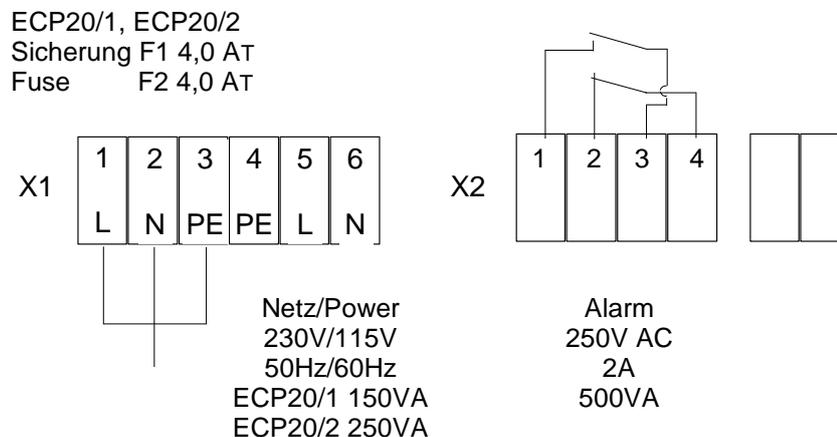


Figure 4 Terminals for mains supply and temperature alarm

13 STARTING

Before using the equipment for the first time, check that the safety measures specific to the installation and process are complied with!

The automatic control electronics of the **ECP 20** permit automatic start-up of the cooler. The error diagnostics guarantee full monitoring and reporting of possible sources of error.

The following description is valid for start-up of the gas cooler for an ambient temperature $> 8^{\circ}\text{C}$.

The following steps should be carried out before initial start-up:

- Connect the cooler unit to the mains power supply;
- Lead the status contacts for reporting of under- and over-temperature to the measuring station;



NOTE!

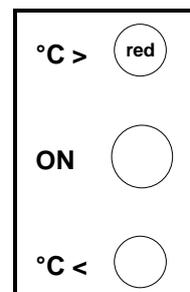
The status contacts must be connected to the external sample gas pump or to a valve in the sample gas line to protect the entire analysis system by immediately cutting off the gas supply in the event of error messages from the cooler!

13.1 FUNCTION SEQUENCE AND LED FUNCTION DISPLAY

Three function display LED's are provided to give a visualisation of the function sequence during start-up of the cooler. The top LED (red) indicates that the temperature set by the **ECP** automatic control electronics has been exceeded or has not been reached. The central green LED shows that the cooler is operating. The bottom red function display LED gives an alarm if the temperature falls too low.

Switching the cooler on

As soon as there is a mains voltage, the top red LED lights up. This indicates that the temperature of the cooler is above $+8^{\circ}\text{C}$.

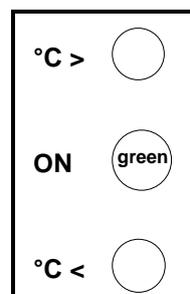


Normal operation

After around 20 minutes the cooler has been cooled down to a temperature below $+8^{\circ}\text{C}$. The top red LED goes out.

The status collector alarm contacts are deactivated and control the automatic external release for gas measurement.

The central green LED is alternately switched on and off by the **ECP** automatic control electronics in a load-dependent cycle. The cooler is ready to use.



14 CLOSING DOWN



NOTE!

The area in which the cooler is situated when not in use must be kept free of frost at all times!

If the cooler unit is putting out of action for a short time no particular measures need to be taken.

We recommended sweeping the cooler with inert gas or ambient air while the unit is putting out of action for a longer time. Condensate has to be removed completely from the cooler.



WARNING!

Aggressive condensate possible.

Wear protective glasses and proper protective clothing!



15 MAINTENANCE

Before the maintenance work is carried out, it is necessary that the specific safety procedures pertaining to the system and operational process be observed!



WARNING!

It is necessary to take the ECP electric gas cooler off the mains before any assembly, maintenance or repair work is carried out!



The **ECP 20** Gas Cooler requires no particular routine maintenance. Depending on the quality of the ambient air the cooling fin block should be blown out with compressed air from time to time.

15.1 ADDING AND REPLACING THE HEAT EXCHANGERS

Removal of the heat exchangers may be necessary to carry out maintenance or repair work.

We recommend the following procedures and in this order for replacement of the heat exchangers:

- Release the upper gas connections and lower condensate connections;



WARNING!

Aggressive condensate is possible.

Wear protective glasses and proper protective clothing!



- Pull the heat exchangers upwards with rotation out of the cooling block;

Replace the heat exchangers as follows:

- Dry and clean the push-in opening in the aluminium cooling block with a cloth;
- Smear the heat exchangers with a thin and equal layer over the whole surface with thermal conductivity paste (part no. 90K0115) to ensure good conduction of heat. It is best to close off the condensate removal of the heat exchangers tube with adhesive tape to prevent any of the thermal conductivity paste from getting into the heat exchanger;
- Lightly push the heat exchangers with rotation back into the push-in opening of the cooling block and press to the upper block;
- Remove the adhesive tape and any surplus thermal conductivity paste;
- Reconnect the hoses.
- Do not mix up the hose connections; gas outlet and gas inlet are marked with arrows!

Mounting the Duran glass heat exchangers please notice:

- Check the PTFE/Silicon locking Rings for damage. In assembly, the locking rings must have the PTFE side facing the medium, Otherwise the required degree of sealing cannot be guaranteed;
- Do up the red GL coupling rings hand-tight by turning them to the right;

16 TROUBLE SHOOTING

The following table aims to point out possible operational problems and offer solutions to such problems (not applicable during the starting procedure).

Problem/Indication	Possible cause	Action/Check
ECP20 is not cooling °C > <input type="radio"/> ON <input type="radio"/> °C < <input type="radio"/> °C > <input checked="" type="radio"/> red ON <input type="radio"/> °C < <input type="radio"/>	No mains supply Ambient temperature $+2^{\circ}\text{C} \leq T \leq +5^{\circ}\text{C}$ Temperature sensor faulty Set point at Pot 3 out of adjustment	Check for mains supply voltage at terminals L&N, X1/1+2 against nameplate. If OK, check fuses F1, F2. Check ambient temperature. Disconnect white wires from terminals X5/5+6 and measure sensor resistance: 107,79 +0,4 Ohm at +20°C ambient; if there is great deviation change the sensor. Adjust the desired temperature with the trimmer Potentiometer P3 (0,1V/°C) and control the current temperature at terminals (X7/3) with an extern voltmeter (see Temperature Setting and Control).
ECP20 cools continuously °C > <input type="radio"/> ON <input type="radio"/> °C < <input checked="" type="radio"/> red	Transistor BUZ11 faulty	Check voltage of the Peltier elements at terminal X5, 1 and 3 respectively 2 and 4 (see circuit diagram): > 12V DC = transistor faulty; Fit the new transistor V1 on the basic circuit board.

17 TEMPERATURE SETTING AND CONTROL THE ECP COOLER

The gas cooler is set by manufacturer to a control temperature of +5°C.

This temperature can be adjusted with a trimmer Potentiometer P3 within a range of 0°C to +20°C.

This Potentiometer is located on the **ECP20** control board.

Turning clockwise will increase the temperature and turning counterclock will decrease the temperature respectively. To set the temperature it is measured at the reference terminals (X7/1) using an external DC-Voltmeter (0,1Volt/°C). The current temperature can be measured at terminals (X7/3).

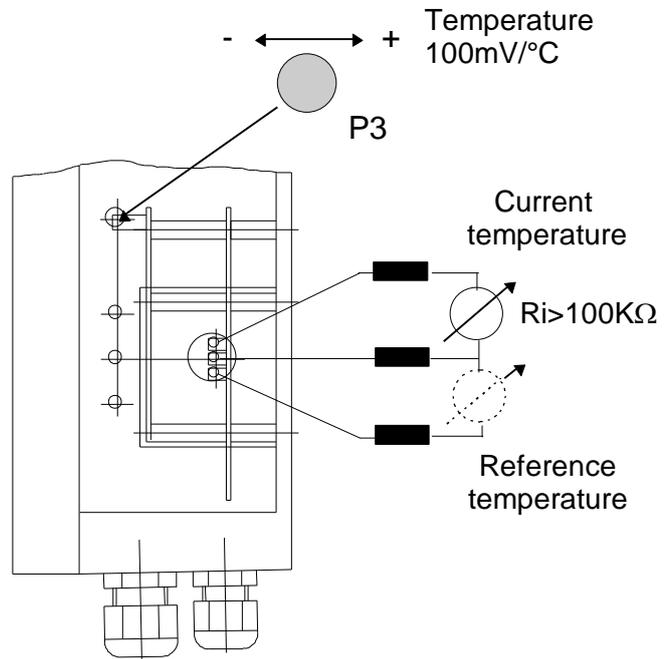


Figure 5 Temperature setting

To prevent the heat exchangers freezing up, the temperature should never be set to below +2°C.

18 CHECKING THE TEMPERATURE SENSOR

The **ECP20** cooler temperature sensor is a PT100 element as from **serial numbers 95...** . There are two methods for checking the PT100 element, as follows:

1. Voltage method

In order to check the sensor for the cooler currently in operation, the actual voltage at the corresponding measuring sockets must be measured (see 'Temperature Setting and Control'). The following figure shows the voltage characteristics in relation to temperature. If the measured voltage is inside the shaded area, the sensor is defective and must be replaced.

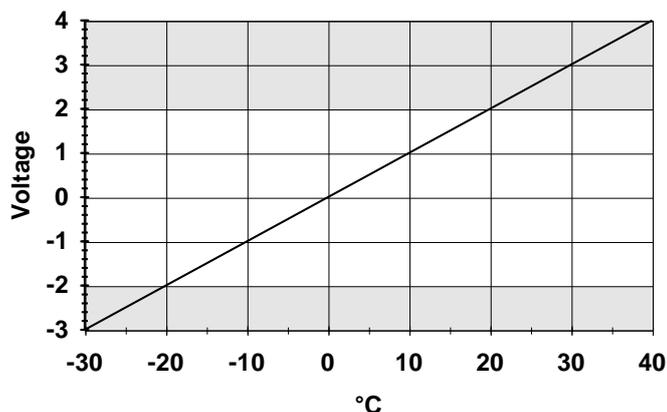


Figure 6 Voltage in relation to the temperature of the cooler

2. Resistance method

In this case the sensor must be disconnected from pins X5/5+6 at the **ECP20** automatic control board and removed from the cooling block. When measuring the resistance of the PT100 element, this must be proportional to the ambient temperature. The resistance-temperature characteristics are shown in the figure below.

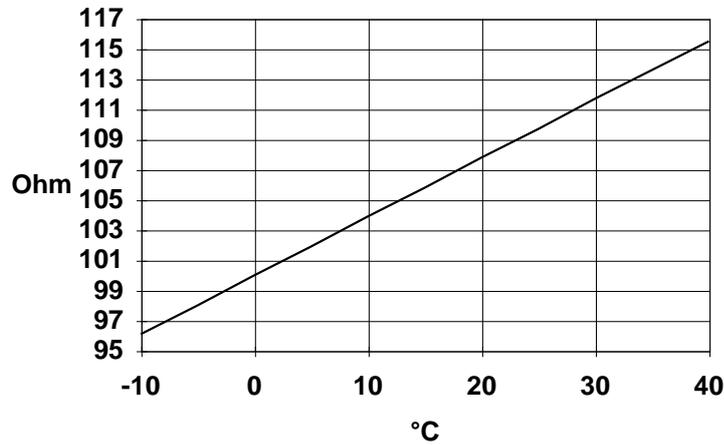


Figure 7 Resistance-temperature characteristics of the PT100 temperature sensor

19 SPARE PARTS LIST

Wear, tear and replacement part requirements depend on specific operating conditions. The recommended quantities are based on experience and are not binding.

Electric Gas Cooler ECP20-1, ECP20-2

(C) consumable parts, (R) recommended spare parts, (S) spare parts

		C/R/S	recommended quantity ECP... being in operation [years]		
			1	2	3
02 K 9100	EC-G Jet-Stream Heat Exchanger Material: Duran Glass Connections: Gas GL18-6/6mm Condensate : GL25-12mm	R	1	1	1
02 K 9150	EC-G Jet-Stream Heat Exchanger with 90° angled gas connections Material: Duran Glass Connections: Gas GL18-6/6mm Condensate: GL25-12mm	R	1	1	1
02 K 9200	EC-SS Jet-Stream Heat Exchanger Material: SS 316 Connections: Gas G 1/4" i Condensate: G 3/8" i	R	1	1	1
02 K 9300	EC-PV Jet-Stream Heat Exchanger Material: PVDF Connections: Gas G 1/4" i Condensate: G 3/8" i	R	1	1	1
90 K 0115	Heat sink compound 50g Type 80B522	R	1	1	2
93 K 0020	ECP20 Electronic Board complete from serial nos.: 95...	R	-	1	1
90 K 6030	4A fine-wire fuse 5mm x 20mm (F1/2)	R	2	4	4
90 K 0040	ECP Fan (M1/2 - 115V 60Hz)	C	-	2	2
90 K 0045	Internal cable for connection of fan, incl. plug	R	-	-	1
90 K 2010	ECP20 Rectifier	R	-	1	1
90 K 2020	ECP20 Power Transistor BUZ11	R	-	1	1
90 K 2030	ECP20-1 Toroidal core transformer 115/230 V, 120VA	R	-	-	1

Electric Gas Cooler ECP20-1, ECP20-2

(C) consumable parts, (R) recommended spare parts, (S) spare parts

		C/R/S	recommended quantity ECP... being in operation [years]		
			1	2	3
90 K 2040	ECP20-2 Toroidal core transformer 115/230 V, 220VA	R	-	-	1
90 K 0075	ECP Peltier element ECP20-1 = 2 off, ECP20-2 = 4 off	R	-	-	2/4
90 K 2090	PT100 temperature sensor for ECP complete with screw and contact spring	R	-	-	1
90 K 2050	ECP20-1 Insulation	R	-	-	1
90 K 2060	ECP20-2 Insulation	R	-	-	1
90 K 0145	ECP Alarm Relay DSP1	R	-	-	1

20 APPENDIX

- Sample output dew point (ambient temperature 20°C) depending on gas flow rate
- Circuit diagram **ECP20**,
Drawing number : **2388-5.01.1**

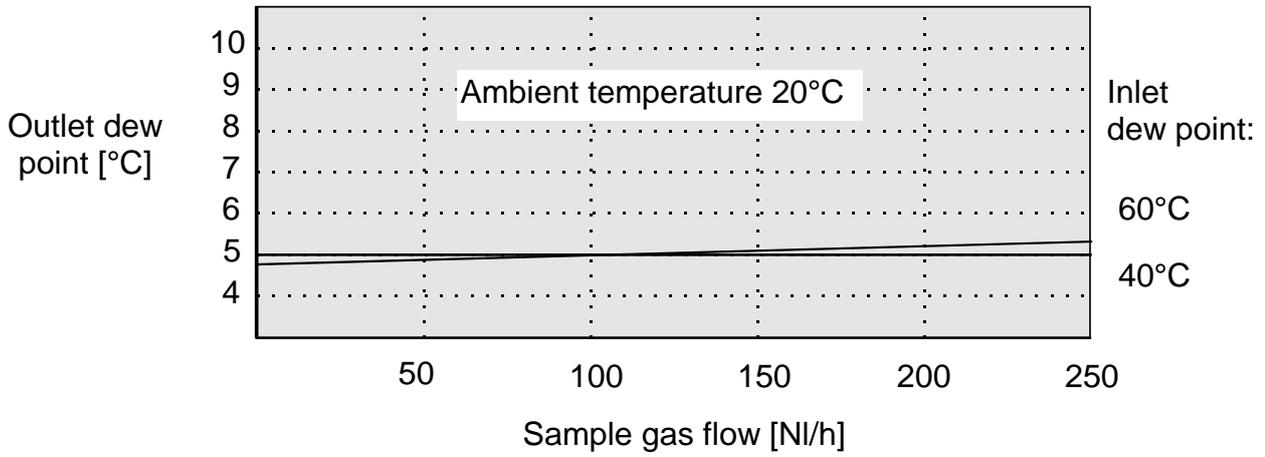


More product documentation is available on our Internet catalogue:
www.mc-techgroup.com.

- Instruction manual peristaltic pump **SR 25.1**,
Document : **3-7.1-MD**;
- Condensate vessel **TG, TK**
Document : **3-6.3.1**
- **GL**-connectors
Document : **3-5.1.1**
- Automatic liquid drain **AD-SS**
Document : **3-6.2.3**
- Automatic liquid drain **AD-P**
Document : **3-6.2.1**



Cooler **EC-G / ECP-20** with Duran Glass Heat Exchanger



Cooler **EC-G / ECP-20** with SS 316 Heat Exchanger

