



SERVICE MANUAL FOR THE CONTROLLER

# G-204-P09

# VERSION FOR REFRIGERATION EQUIPMENT

# For programme version 02

We strongly request that you carefully study the instructions before connecting and commissioning any of our devices.

If you have any problems with the operation and handling of your device, please refer to the FAQ section on our website.

www.geco.pl.

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### I. GENERAL CHARACTERISTICS

The stand-alone Control Block, hereafter referred to as G-204, is a modern, convenient and easy-to-use device. It was manufactured using microprocessor technology with automatic surface mounting.

G-204 is designed to control condenser or evaporator fans. G-204 additionally includes an oil temperature stabilising thermostat and a head overheat sensor.

Thanks to its one-piece housing, the controller can be mounted in a safe location. The controller's operating parameters are only accessible to the service technician.

G-204 is equipped with three temperature sensors and the possibility of connecting a pressure sensor. Four outputs allow direct connection of 230V devices with load capacity as per Table 1.

The controller displays the temperature or pressure on the condenser/evaporator and has an off button.

These thermostats require no special maintenance; the keypad is made of a special type of foil that is resistant to high temperatures and most chemicals. It must not be cleaned with sharp objects; it is sufficient to wipe the front panel with a damp cloth from time to time.

#### II. DESIGNATION AND TECHNICAL DATA

Model designation:	G-	2	<b>04</b> ·	– P	<b>09</b>	K	0 2	K – M XXX4	<b>X0</b>
Position:	1	2	3	4	5	6	78	<b>9 10</b>	11

1- "Geco" thermostat.

2- For refrigeration applications.

- 3- Housing type: 02 -mini panel, 03-large panel, 04-control in a module,
- 4- Beginning of panel (keyboard) markings.
- 5- Programme type 09.
- 6- Temperature setting method: K- keyboard.
- 7- Unused option
- 8- Buzzer: B there is a buzzer, 0 there is no buzzer.
- 9- Beginning of markings relating to the executive module.
- 10- Which relays are fitted.

Method of fan control: 0 - temperature, P - pressure.

Additional information on relay designation ...

Numbers indicate the presence of a relay, 0- no relay:

1 - relay,2 - relay, 3 - relay,4 - relay

-	230V +10% -15%
-	$od +5^{\circ}C do +40^{\circ}C$
-	od 20% do 80% RH
-	IP65 on the front side of the panel
	- - -

OUTPUT	TRIAK or RELAY	RECOMMENDED MAXIMUM CONTINUOUS LOAD					
P1 – Fan	16A	3A	-	600W			
P2 – Universal	16A	4A	1HP	750W			
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Table 1: Relay designations and output load capacity

P3 – Universal	16A	4A	1HP	750W
P4 – Uniwersalny	16A	4A	1HP	750W

### Attention !!!

- The currents shown in the table are the currents consumed by the individual devices during normal operation and already take into account the inrush currents of these devices !!!

- The total current drawn by the appliances at any one time must not exceed 10A !!!

# III. METHOD OF ORDERING

The following types are available:

- With temperature control: G-204-P09K0B-M1234 00

- With pressure control: G-204-P09K0B-M1234 P0

Please additionally specify in your order:

- Length of temperature sensors.

# IV. DELIVERY, INSTALLATION AND CONNECTION

- 1. The G-204 should be seated on the rail and locked with the latch..
- 2. Any metal parts through which the G-204 or its cables are passed should be filed or otherwise secured. It is not permitted to secure the G-204 allowing water to act directly on it.
- 3. After mounting the G-204, connect the power cables according to the description on the wall. Depending on the version of the G-204, some outputs may not be used they will not be described on the description sticker and zeros will be inserted in the type designation in the appropriate places no cables may be connected to these outputs !!!
- 4. The connectors used are approved for a continuous load of 16 A!!! They use fine thread and special plates to prevent the wires from being cut, so even slight tightening results in maximum good contact, while the use of greater force can lead to the thread breaking off. This can result in melting of the socket and short-circuiting !!!
- 5. Any excess cable is shortened by cutting or coiling and bundled together using special plastic ties. The cables must be securely fastened along their entire length and must not touch the compressor and its accessories.
- 6. If heaters are used, their power must be selected so that if the G-204 or contactor fails and they are switched on permanently, there is no possibility of fire or damage to the appliance.

## V. PRINCIPLE OF ASSEMBLY OF SENSORS, TYPES OF PROTECTIVE SHELLS

- 1. For each type of unit manufactured, the condenser sensor mounting location and SBR setting must be selected experimentally. It is absolutely forbidden to change in any way the location or method of fixing the sensors and the SBR setting without carrying out new tests on the condenser cooling.
- 2. Sensor cables can be shortened or lengthened as desired, but the following rules apply:
  - do not cut the sensor cable within 0.5 m. of the shell

- It is not recommended to extend the sensor cable beyond 20 m.
- THE WAY OF CONNECTING THE SENSOR CABLES TO THE TERMINALS OF THE EXECUTIVE MODULE SENSORS IS ARBITRARY!!! (analogous to the way of inserting a plug into a ~230V contact)
- for cable extensions we propose to use cable type OMY 2x0.5 mm
- The connection of the cables in the case of extensions should be made very carefully by soldering each pair of wires and placing heat shrink sleeves over them. The connection point should then be sealed with waterproof silicone and another heat shrink sleeve crimped over it.
- the ends of wires connected to the S.B.R. shall be whitened with tin

# VI. METHOD OF OPERATION

Thermostat functions:

Condenser cooling.

Temperature sensor.

The thermostat issues a fan proportional to the measured temperature within the range parameter 'd0' - parameter 'd1'. If the temperature is higher than parameter 'd1' the blowing is maximum. If the temperature is lower than parameter 'd0', the airflow is minimum (no airflow).

Pressure sensor.

The thermostat issues a blower proportional to the measured pressure within the range parameter 'd2' - parameter 'd3'. If the pressure is higher than parameter 'd3' then blowing is maximum. If the pressure is lower than parameter 'd2', blowing is minimal (no blowing). In the event of a failure of the control sensor, maximum airflow is activated.



#### 1. Evaporator blowdown

The thermostat works in the opposite way to the condenser, i.e. an increase in pressure/temperature causes a decrease in blowdown.



2. Method of blowing

A maximum of 4 fans can be connected to the thermostat, a minimum of 1. The parameters 'r1', 'r2', 'r3' are used to determine which relay the fans are connected to. Fan P1 is speed-regulated.

Airflow is realised by switching on the appropriate number of fans (P2, P3, P4) and controlling the speed of fan P1.

If no relay has been selected to control the fans, all blowing is carried out by fan speed control of fan P1.

Every 24 hours, the function of the relays selected to control the fans is switched over. This is to even out the wear and tear on all fans. When the controller is switched off or the power is switched on, the fan relays are ordered in the same way.

3. Oil heating

If one relay is selected to control the heater, the thermostat regulates the temperature set by parameter 'd5' with hysteresis 'd6' based on the temperature measurement from the MISY sensor.

In the event of failure of the SISY temperature sensor, the timer is controlled according to parameters 'c8' and 'c9'.

#### 4. Alarms

Compressor head overheating alarm

If parameter 'r5' is set to 1, the compressor head overtemperature alarm is allowed. The parameter 'd7' sets the temperature above which the alarm will occur. The alarm is signalled by the display 'A4'.

Temperature sensor failure alarms

A failure of sensor 3 (condenser) is signalled by the display 'A1'. Failure of sensor 2 (sump) is signalled by the display 'A2'. A failure of sensor 1 (head) is signalled by the display 'A3'.

If several alarms occur simultaneously, the cause of the alarm is displayed alternately. The occurrence of any alarm causes the buzzer to beep and the alarm relay to be activated (if selected by parameter).

5. Selection of relay functions.

Each relay can be configured for one of three functions. Whereby only one relay can be selected to control a heater or alarm, while several can be selected to control a fan.

- 1- fan more than one relay can be programmed with this option. The thermostat assigns each fan a position in the cascade - the lower the relay number, the lower the setting in the cascade. During operation, the function of the relays changes sequentially.
- 2- Heater this option activates the alarm from the failure of the bowl sensor, and activates the heater control
- 3- Alarm this option allows the relay to be used to switch on an alarm device such as a siren.
- 6. The thermostat displays the temperature or pressure measured by sensor 3.
- 7. Relay activation is signalled by lighting up the appropriate diode, while triac activation is signalled by a dot on the display.
- 8. Pressure sensor option:

The pressure value is not indirectly displayed. The value 0 is the minimum sensor measurement value (4 mA) and the value 81 is the maximum measurement value (20 mA). Depending on the type of sensor, this corresponds to different pressure values.

The measured pressure can be calculated from the formula:

$$Pressure = \frac{shown \ value \times 25}{81}$$

#### VII. PROGRAMMING OF SYSTEM PARAMETERS

After commissioning and checking the correct operation of the device (the factory default settings are entered), we proceed to enter the system parameters of the G-204.

To do that, turn off the device using the button O. Then press the P and I while holding them down press the button O. Keep all three buttons pressed together for a period of 3 seconds. Releasing any of the buttons during this time will exit the programming mode. Once this is done, the LEDs on the buttons and should start to blink B and P and the display will show 'c0' for one second. The last programmed value of this parameter will then appear. Now use the key R to enter the desired setting, each longer time the key is held down the display will "scroll" rapidly. Then press P, to accept the data entered and move on to entering the next parameter.

It is possible to enter settings partially; if you do not want to change a given setting, press  $\mathbb{P}$  and the G-204 will move on to the next parameter.

# Attention !!!

# The manufacturer of the refrigeration appliance can block access to some or even all of the keypad parameters using the computer programmer.

In this case, when an attempt is made to change the settings of a blocked parameter, the display will show 'bL' for approximately 1sec.

#### Notes on SBR programming.

#### 1. IT IS THE RESPONSIBILITY OF THE MANUFACTURER OF THE COOLING APPLIANCE AND THE SERVICE TECHNICIAN TO MAKE THE NEW SETTINGS NECESSARY FOR THE NORMAL OPERATION OF THE APPLIANCE !!!

Programming should be carried out carefully, preferably by writing down the values of the individual parameters on a piece of paper beforehand. It should be remembered that making any mistake any error with certain parameters will have very serious consequences, including including damage to the product and the refrigeration unit.

- 2. Once the unit has been programmed and put into operation, check the operation of the unit and once again check that the system parameters have been set correctly.
- 3. It is absolutely forbidden to pass on to the end user the service manual or information on how to program the SBR system parameters. The final user should only be provided with a copy of item IX from this manual.

 Table 2: Parameter designations

Para- meter	Description	Min	Max	Krok	Default setting
c0	minimum fan speed	5	32	1	5
c1	maximum fan speed	33	75	1	75
c8	Heater operating time when the control sensor fails	1	99	1min	20min
c9	Heater standstill time in case of control sensor failure	1	99	1min	20min
d0	Temperature at which there is minimum blowdown on the condenser or maximum blowdown on the evaporator	-40	98	1°C	1°C
d1	Temperature at which maximum blowing to the condenser or minimum blowing to the evaporator	d0+1	99	1°C	60°C
d2	Pressure at which there is minimum blowdown on the condenser or maximum blowdown on the evaporator	1	80	1	2
d3	Pressure at which maximum blowing to the condenser or minimum blowing to the evaporator	d2+1	81	1	30
d5	Sump target temperature	1	50	1°C	10°C
d6	Oil sump heating hysteresis	0	10	1°C	2°C
d7	Head temperature above which the alarm	50	99	1°C	80°C
r1	P2 relay settings 0- not used 1- fan 2- heater 3- Alarm	00	03	1	01
r2	Settings for relay P3 as above	00	03	1	01

r3	Settings for relay P4	00	03	1	01
	as above				
r5	Option - Is / is not an alarm from the compressor head	00	02	1	00
	temperature sensor				
	1- alarm is present				
	0- no alarm				
r6	Type of sensor controlling the fans	00	02	1	00
	1- temperature sensor				
	2- pressure sensor				
r7	Type of appliance to be controlled	00	02	1	02
	1- Evaporator				
	2- Condenser				
r8	Triac control when switching relays	00	01	1	01
	0- stops the fan				
	1- Does not stop the fan				

# VIII. OPERATION OF THE G-204-P09 FOR THE USER

- 1. When the unit is plugged in, two dots will light up on the display for one second then the unit's programme version and dots for another second. Two horizontal dashes will then light up on the central segments of the display to indicate the "live" status. The device is started up by pressing the button ①. The display shows the temperature value from the sensor on the condenser.
- 2. If A1, A2 or A3 appears in the display, one or more sensors are faulty and service should be contacted.

#### Doing repairs yourself will void the warranty and may lead to electric shock and burns from hot vapours. Therefore, all repairs should be carried out by trained and authorised service technicians !!!

# IX. PROBLEMS AND THEIR RESOLUTION

Signs of damage	Check
1.The display does not light up despite the G- 204 being connected to the mains	- presence of 220V at the L and N supply terminals
2. fan does not switch on in spite of switch-on indication - red light	<ul> <li>presence of 220V at the W and N terminals - if present, check the fan</li> </ul>
5. Incorrect temperature display	<ul> <li>connection of sensors to connectors</li> <li>correctness of sensor mounting</li> <li>condition of the sensor cable - the cable must not have any damage</li> <li>exact appearance of the external surface of the sensor shell, whether it has not been mechanically damaged.</li> </ul>
7. Blinking dots on the display, cannot be switched on	<ul> <li>value of supply voltage</li> <li>condition of the supply connections</li> <li>tightening of supply connections</li> </ul>
8. 'Abnormal', 'strange' behaviour of the device.	<ul> <li>presence of 230V on supply terminals L and N</li> <li>condition of the supply terminals</li> <li>neutralisation of the refrigeration appliance</li> <li>condition of the electrical installation and the number of appliances connected to one phase</li> <li>Control unit has not been exposed to water or other liquids</li> <li>that the controller is not exposed to humidity or sudden temperature fluctuations</li> </ul>

## X. RETURNS FOR REPAIR

#### <u>P.P.U.H. 'GECO' reserves the right to refuse to accept the appliance for</u> repair free of charge if the seals are found to be broken!!!

P.P.U.H. 'Geco' Sp. z o. o. shall not be liable for any loss or damage resulting from the fact that the manufacturer of the cooling appliance or its service provider has provided the final customer with information on how to make changes to the system data of the SBR, incorrect or unprofessional installation, or for losses resulting from the malfunction of the appliance.

# XI. CONNECTION BLOCK DIAGRAM





# CERTYFIKAT

Jednostka certyfikująca TÜV SÜD Management Service GmbH

zaświadcza, że przedsiębiorstwo

PPUH "GECO" sp. z o.o.

ul. Zarzecze 112 a, PL-30-134 Kraków

wdrożyło i stosuje system zarządzania jakością w zakresie

Konstruaowanie, produkcja, sprzedaz i serwis elektronicznych urzadzen sterujacych i pomiarowych w zakresie automatyki przemyslowej i sprzetu gospodarstwa domowego

Na podstawie audytu, nr sprawozdania: 70001206

potwierdza się spełnienie wymagań normy

ISO 9001: 2000

Niniejszy certyfikat jest ważny do: 2010-02-11 Numer rejestracyjny certyfikatu 12 100 22047 TMS



M. Nor

Monachium, 2007-02-13



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TÜV SÜD Management Service GmbH • Zertifizierstelle • Ridlerstraße 65 • 80339 München • Germany

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P.P.U.H. ,,Geco" Sp. z o. o. 30-134 Kraków ul. Zarzecze 112 A Polska tel. 012 6369811, 6361290 fax. 012 6362002 <u>http://www.geco.pl</u>

# Strona umyślnie pozostawiona pusta