

## Serial protocol to communicate with MG14

Device group – 0x49

### ReadMainParam 0x70

This function reads the most important data and status from device

Byte 1 – channel 1 status (gauge B-A or extractor):

```
#define EMIS_OFF      0      emission off
#define FAILURE_STAN  1      system failure – check code 0x71 for details
#define START_ANODE   2      starting anode voltage process
#define REFLECTOR_WAIT 3      starting reflector voltage process
#define START_FILAMENT 4      starting emission current process
#define EMIS_NORMAL   5      gauge in normal operate mode
#define DEGASING      6      degassing active
```

Byte 2 – channel 2 status (integrated gauge):

0 – no sensor, sensor broken or no emission (if available)  
1 – sensor ok

Byte 3,4 – mantis of pressure channel 1

Byte 5,6 – exponent of pressure channel 1

Byte 7 – units of pressure channel 1

Byte 8,9 – mantis of pressure channel 2

Byte 10,11 – exponent of pressure channel 2

Byte 12 – units of pressure channel 2

Byte 13- setpoints active state

7	6	5	4	3	2	1	0
				Setpoint 4	Setpoint 3	Setpoint 2	Setpoint 1

0 – setpoint off

1- setpoint on

Byte 14- setpoints sources

7	6	5	4	3	2	1	0
				Setpoint 4	Setpoint 3	Setpoint 2	Setpoint 1

0 – setpoint source is channel 1

1 – setpoint source is channel 2

Byte 15- Other data

7	6	5	4	3	2	1	0
				Degas Ch2	Degas Ch1	Emis Ch2	Emis Ch1

### ReadErrorsStatus 0x71

Detail information about errors

Byte 4

7	6	5	4	3	2	1	0
	degas	overpressure	Ref	Ubias	no_emission	cathode_open	anode_HV

anode\_HV – Anode high voltage error

cathode\_open – cathode error (probably burn out)

no\_emission – No emission (probably short circuit on cathode)

Ubias – Ubias voltage error

Ref – Ref voltage error

Overpressure – gauge error - too high pressure in chamber

Degas – degass error

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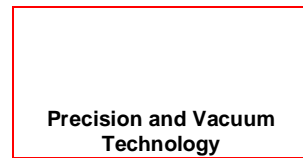
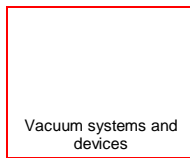
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Byte 3

7	6	5	4	3	2	1	0
			Temperature	plu_12	min_12	V24	V5

V5 – power failure +5V  
 V24- power failure +24V  
 min\_12 – power failure -12V  
 plu\_12 – power failure +12V  
 Temperature – temperature too high

### SetpointsSet 0x10

This function sets setpoints data

Byte 1 – number of setpoint to set – valid data 1 .. 4  
 Byte 2,3 – mantis of setpoint ON pressure ( LOW) (100 .. 999)  
 Byte 4,5 – exponent of setpoint ON pressure (LOW) (-12 .. - 5)  
 Byte 6,7 – mantis of setpoint OFF pressure (HIGH) (100 .. 999)  
 Byte 8,9 – exponent of setpoint OFF pressure (HIGH) (-13 .. - 5)  
 Byte 10 – setpoint source channel  
 0 – channel 1  
 1 – channel 2

Byte 11

7	6	5	4	3	2	1	0
				A1	A0	L1	L0

L1:L0 – setpoint logic  
 x0 – setpoint active above  
 x1 – setpoint active below  
 A1:A0 – setpoint ON/OFF  
 x0 – setpoint OFF (not working at all)  
 x1 – setpoint ON (working normally)

### ReadSetpoints 0x40

This function read all setting from one selected setpoint

Byte 1 – number of readed setpoint – valid data 1 .. 4 – this byte must be send to device

Respond: data format is the same as in setpointset function (0x10)

### SetDisplayMode 0x11

### ReadDisplayMode 0x41

This functions sets/reads settings of LCD display mode

Byte 4:

0 – both channels are visible  
 1 – channel 1 is visible with progress bar  
 2 – channel 2 is visible with progress bar

Byte 3:

0 – channel name is not displayed  
 1 – channel name is displayed alternate with channel pressure value

### SetUnit 0x12

This function sets units for both channels (units are readed in ReadMainParam (0x70) function)

Byte 4 – pressure units for channel 1

Byte 3 – pressure units for channel 2

0 – mbar  
 1 – Torr  
 2 – Pa

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**WriteGaugeType** **0x13**

**ReadGaugeType** **0x43**

This functions sets/reads types of gauges

Byte 2 – gauge type channel 1

- 0 - B\_A\_gauge
- 1 - IE514
- 2 - IE414

Byte 3 – gauge type channel 2

Byte 4 – FullScale parameter if gauge type is CTR90/91 or MKS870 for channel 2

//Gauges types

- 0 - CTR90
- 1 - TTR90
- 2 - TTR211
- 3 - PTR225
- 4 - ITR90
- 5 - ITR100
- 6 - MKS870
- 7 - PTR90

//FullScale parameter for CTR90/91

- 0 - Torr01
- 1 - Torr1
- 2 - Torr10
- 3 - Torr100
- 4 - Torr1000

// FullScale parameter for MKS870

- 0 - \_1000Torr
- 1 - \_60PSI
- 2 - \_100PSI
- 3 - \_250PSI
- 4 - \_500PSI
- 5 - \_1000PSI
- 6 - \_3000PSI

If respont code is 0x82 – it means that gauge type can't be changed because emission is ON

**WriteGaugeParam** **0x14**

This funtion sets gauge parameters for channel 1

Byte 1 – type of gauge for changing settings

- 0 - B\_A\_gauge
- 1 - IE514
- 2 - IE414

Byte 2,3 – emission current. Valid data: 10, 50 .. 200, 400, 1000. Data is sending as 0.01mA.

Byte 4 – sensitivity (1 .. 100). For gauge IE514 this parameters is not used.

Byte 5 – degass power 1 .. 40 (for IE514 1 .. 25). Units 1W

Byte 6,7 – calibration factor (1 .. 2000). Units 0,01.

Byte 8 – number of filament (1 or 2)

**ReadGaugeParam** **0x44**

This function readss gauge paramenters from channel 1

Byte 1 – type of gauge for reading settings

Respond: data format is the same as in WriteGaugeParam function (0x14)

**ON\_OFF\_Degas** **0x15**

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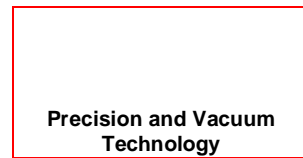
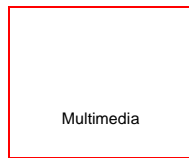
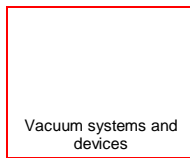
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### **ReadDegasON\_OFF** **0x45**

This function sets/reads degass active state

Byte 4 – degass channel 1  
Byte 3 – degass channel 2  
0 – degass OFF  
1 – degass ON

Respond:

0x82 – degass ON error – wrong type of gauge for degass  
0x83 – degass ON error – pressure too high

### **SetEmissControl** **0x16**

### **ReadEmissControl** **0x46**

This function sets/reads source to control gauge emission

Byte 4 – source for control emission for channel 1  
Byte 3 – source for control emission for channel 2  
0 - manual\_emis - emission is control manually  
1 - tr1\_emis - controlled by setpoint 1  
2 - tr2\_emis - controlled by setpoint 2  
3 - tr3\_emis - controlled by setpoint 3  
4 - tr4\_emis - controlled by setpoint 4

### **SetGasCorrection** **0x17**

### **ReadGasCorrection** **0x47**

This function sets/reads gas correction factor related with gas pumping

Byte 1 – gas type for channel 1

- 0 - O2
- 1 - He
- 2 - Ne
- 3 - Ar
- 4 - Kr
- 5 - Xe
- 6 - H2
- 7 - CO
- 8 - User define

Byte 2,3 – user define factor value for channel 1. Valid data 0 .. 999 in units 0,01

Byte 4 – gas type for channel 2

Byte 5,6 – user define factor value for channel 2. Valid data 0 .. 999 in units 0,01

### **WriteGroupName** **0x18**

### **ReadGroupName** **0x48**

This functions sets/reads channels names

Byte 1 – number of channel to set/read name. Valid data: 1 or 2

Byte 2..13 – channel name in ASCII code

### **SaveSettings** **0x19**

Save all settings in EEPROM memory (non volatile memory)

### **LoadSettings** **0x1A**

Load saved settings from EEPROM memory (non volatile memory)

### **LoadDefault** **0x1B**

Load factory settings

### **WriteDisplayProperties** **0x1C**

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## **ReadDisplayProperties** **0x4C**

This function set/read LCD display parameters

Byte 4 – brightness (0% .. 100%)

Byte 3 – contrast (0% .. 100%)

Byte 2 – screen saver (0- off, 1- on)

## **SetFilters** **0x1D**

### **ReadFilters** **0x4D**

This function set/read filter type for both channels

Byte 4 – filter type for channel 1

Byte 3 – filter type for channel 2

0 - low\_fl

1 - medium\_fl

2 - high\_fl

## **On Off Emission** **0x1E**

### **Read On Off Emission** **0x4E**

This function set/read emission for both channels

Byte 4 – emission channel 1

Byte 3 – emission channel 2

0 – OFF

1- ON

## **SetDegasTime** **0x1F**

This function set degass times for both channels

Byte 4 – degass time for channel 1 (0 .. 20min)

Byte 3 – degass time for channel 2 (0 .. 15min)

## **ReadDegasTime** **0x4F**

This function read degass times (sets and actual) for both channels

Byte 4 – degass time (set) for channel 1 (0 .. 20min)

Byte 3 – degass time (set) for channel 2 (0 .. 15min)

Byte 2 – actual left time of degassing for channel 1 (0 .. 20min)

Byte 1 - actual left time of degassing for channel 2 (0 .. 15min)

## **WriteCustomerName** **0x20**

### **ReadCustomerName** **0x50**

Byte1..12 – customer name in ASCII code

## **SetDeviceAddress** **0x58**

Byte 4 – new device address

## **SetLogicalGroup** **0x59**

Byte 4 – new logical group

## **Reset** **0x52**

This function make software reset of the device

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