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Compendium

MODBUS
Register Map

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TAPI MODBUS Register Map Compendium

M100E MODBUS Register Map		
MODBUS Register Address (dec., 0-based)	**Description**	**Units**
MODBUS Floating Point Input Registers (32-bit IEEE 754 format; read in high-word, low-word order; read-only)		
0	PMT detector reading	mV
2	UV lamp intensity reading	mV
4	UV lamp ratio of calibrated intensity	%
6	PMT electrical offset	mV
8	UV lamp electrical offset	mV
10	SO_2 slope for range #1	—
12	SO_2 slope for range #2	—
14	SO_2 offset for range #1	mV
16	SO_2 offset for range #2	mV
18	SO_2 concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB, PPM [2]
20	SO_2 concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
22	SO_2 concentration for range #1	PPB
24	SO_2 concentration for range #2	PPB
26	Concentration stability	PPB
28	Stray light reading	PPB
30	Reaction cell temperature	°C
32	PMT temperature	°C
34	Sample pressure	“Hg
36	Internal box temperature	°C
38	High voltage power supply output	Volts
40	Diagnostic test input (TEST_INPUT_8)	mV
42	Diagnostic temperature input (TEMP_INPUT_5)	°C
44	Diagnostic temperature input (TEMP_INPUT_6)	°C
46	Ground reference (REF_GND)	mV
48	4096 mV reference (REF_4096_MV)	mV
50	Sample flow	cc/m
52 [1]	IZS temperature	°C
54 [2]	Vacuum pressure	“Hg
56 [1]	Pre-amplified UV lamp intensity reading	mV
100 [10]	O_2 concentration	%
102 [10]	O_2 concentration during zero/span calibration, just before computing new slope and offset	%
104 [10]	O_2 slope	—
106 [10]	O_2 offset	%
108 [10]	O_2 sensor cell temperature	°C

110 [12]	SO_2 concentration for range #1, with O_2 correction	PPB
112 [12]	SO_2 concentration for range #2, with O_2 correction	PPB
200 [11]	CO_2 concentration	%
202 [11]	CO_2 concentration during zero/span calibration, just before computing new slope and offset	%
204 [11]	CO_2 slope	—
206 [11]	CO_2 offset	%
MODBUS Floating Point Holding Registers (32-bit IEEE 754 format; read/write in high-word, low-word order; read/write)		
0	Maps to *SO2_SPAN1* variable; target conc. for range #1	Conc. units
2	Maps to *SO2_SPAN2* variable; target conc. for range #2	Conc. units
100 [10]	Maps to *O2_TARG_SPAN_CONC* variable	%
200 [11]	Maps to *CO2_TARG_SPAN_CONC* variable	%
MODBUS Discrete Input Registers (single-bit; read-only)		
0	PMT detector warning	
1	UV detector warning	
2	Dark calibration warning	
3	Box temperature warning	
4	PMT temperature warning	
5	Reaction cell temperature warning	
6	Sample pressure warning	
7	HVPS warning	
8	System reset warning	
9	Rear board communication warning	
10	Relay board communication warning	
11	Front panel communication warning	
12	Analog calibration warning	
13	Dynamic zero warning	
14	Dynamic span warning	
15	Invalid concentration	
16	In zero calibration mode	
17	In span calibration mode	
18	In multi-point calibration mode	
19	System is OK (same meaning as *SYSTEM_OK* I/O signal)	
20	Sample flow warning	
21 [1]	IZS temperature warning	
22 [2]	In low span calibration mode	
23 [2]	Vacuum pressure warning	
24 [3]	SO_2 concentration alarm limit #1 exceeded	
25 [3]	SO_2 concentration alarm limit #2 exceeded	
26	In Hessen manual mode	
100 [10]	In O_2 calibration mode	
101 [10]	O_2 cell temperature warning	

102 [10+3]	O_2 concentration alarm limit #1 exceeded
103 [10+3]	O_2 concentration alarm limit #2 exceeded
200 [11]	In CO_2 calibration mode
201 [11+3]	CO_2 concentration alarm limit #1 exceeded
202 [11+3]	CO_2 concentration alarm limit #2 exceeded
MODBUS Coil Registers (single-bit; read/write)	
0	Maps to relay output signal 36 (*MB_RELAY_36* in signal I/O list)
1	Maps to relay output signal 37 (*MB_RELAY_37* in signal I/O list)
2	Maps to relay output signal 38 (*MB_RELAY_38* in signal I/O list)
3	Maps to relay output signal 39 (*MB_RELAY_39* in signal I/O list)
20 [13]	Triggers zero calibration of range #1 (on enters cal.; off exits cal.)
21 [13]	Triggers span calibration of range #1 (on enters cal.; off exits cal.)
22 [13]	Triggers zero calibration of range #2 (on enters cal.; off exits cal.)
23 [13]	Triggers span calibration of range #2 (on enters cal.; off exits cal.)

[1] M100E.
[2] M100EH.
[3] Concentration alarm option.
[10] O_2 option.
[11] CO_2 option.
[12] SO_2 with O_2 correction option.
[13] Set *DYN_ZERO* or *DYN_SPAN* variables to *ON* to enable calculating new slope or offset. Otherwise a calibration check is performed.

M101E, M102E, M108E MODBUS Register Map		
MODBUS Register Address (dec., 0-based)	**Description**	**Units**
MODBUS Floating Point Input Registers (32-bit IEEE 754 format; read in high-word, low-word order; read-only)		
0	PMT detector reading	mV
2	UV lamp intensity reading	mV
4	UV lamp ratio of calibrated intensity	%
6	PMT electrical offset	mV
8	UV lamp electrical offset	mV
10	SO_2 slope for range #1	PPB/mV
12	SO_2 slope for range #2	PPB/mV
14	H_2S/TRS slope for range #1	PPB/mV
16	H_2S/TRS slope for range #2	PPB/mV
18	SO_2 offset for range #1	mV
20	SO_2 offset for range #2	mV
22	H_2S/TRS offset for range #1	mV
24	H_2S/TRS offset for range #2	mV
26	SO_2 concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
28	SO_2 concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
30	H_2S/TRS concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
32	H_2S/TRS concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
34	SO_2 concentration for range #1	PPB
36	SO_2 concentration for range #2	PPB
38	H_2S/TRS concentration for range #1	PPB
40	H_2S/TRS concentration for range #2	PPB
42	Concentration stability #1	PPB
44	Stray light reading	PPB
46	Reaction cell temperature	°C
48	IZS temperature	°C
50	PMT temperature	°C
52	Converter efficiency factor for range #1	—
54	Converter efficiency factor for range #2	—
56	Sample flow rate	cc/m
58	Sample pressure	“Hg
60	Internal box temperature	°C
62	High voltage power supply output	Volts
64	Diagnostic test input (TEST_INPUT_8)	mV

66	Diagnostic test input (TEST_INPUT_11)	mV
68	Diagnostic temperature input (TEMP_INPUT_4)	°C
70	Diagnostic temperature input (TEMP_INPUT_5)	°C
72	Diagnostic temperature input (TEMP_INPUT_6)	°C
74	Ground reference (REF_GND)	mV
76	4096 mV reference (REF_4096_MV)	mV
78	Pre-amplified UV lamp intensity reading	mV
80 [1]	Converter temperature	°C
82 [5]	Oxygenator flow rate	cc/m
84 [6]	Concentration stability #2	PPB
86 [7]	UV lamp stability	mV
100 [4]	TRS slope for range #1	PPB/mV
102 [4]	TRS slope for range #2	PPB/mV
104 [4]	TRS offset for range #1	mV
106 [4]	TRS offset for range #2	mV
108 [4]	TRS concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
110 [4]	TRS concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
112 [4]	TRS concentration for range #1	PPB
114 [4]	TRS concentration for range #2	PPB
116 [4]	TRS converter efficiency factor for range #1	—
118 [4]	TRS converter efficiency factor for range #2	—
MODBUS Floating Point Holding Registers (32-bit IEEE 754 format; read/write in high-word, low-word order; read/write)		
0	Maps to *SO2_SPAN1* variable; target conc. for range #1	Conc. units
2	Maps to *SO2_SPAN2* variable; target conc. for range #2	Conc. units
4	Maps to *H2S_SPAN1* variable; target conc. for range #1	Conc. units
6	Maps to *H2S_SPAN2* variable; target conc. for range #2	Conc. units
100 [4]	Maps to *TRS_SPAN1* variable; target conc. for range #1	Conc. units
102 [4]	Maps to *TRS_SPAN2* variable; target conc. for range #2	Conc. units
MODBUS Discrete Input Registers (single-bit; read-only)		
0	PMT detector warning	
1	UV detector warning	
2	Dark calibration warning	
3	Box temperature warning	
4	PMT temperature warning	
5	Reaction cell temperature warning	
6	Sample pressure warning	
7	HVPS warning	
8	System reset warning	
9	Rear board communication warning	
10	Relay board communication warning	

11	Front panel communication warning
12	Analog calibration warning
13	Dynamic zero warning
14	Dynamic span warning
15	Invalid concentration
16	In zero calibration mode
17	In span calibration mode
18	In multi-point calibration mode
19	System status is OK (same meaning as *SYSTEM_OK* I/O signal)
20	Sample flow warning
21	IZS temperature warning
22 [1]	Converter temperature warning
23 [5]	Oxygenator flow warning
24 [2]	SO_2 concentration alarm limit #1 exceeded
25 [2]	SO_2 concentration alarm limit #2 exceeded
26 [2]	H_2S/TRS concentration alarm limit #1 exceeded
27 [2]	H_2S/TRS concentration alarm limit #2 exceeded
28 [2+4]	TRS concentration alarm limit #1 exceeded
29 [2+4]	TRS concentration alarm limit #2 exceeded
MODBUS Coil Registers (single-bit; read/write)	
0	Maps to relay output signal 36 (*MB_RELAY_36* in signal I/O list)
1	Maps to relay output signal 37 (*MB_RELAY_37* in signal I/O list)
2	Maps to relay output signal 38 (*MB_RELAY_38* in signal I/O list)
3	Maps to relay output signal 39 (*MB_RELAY_39* in signal I/O list)
20 [3]	Triggers zero calibration of range #1 (on enters cal.; off exits cal.)
21 [3]	Triggers span calibration of range #1 (on enters cal.; off exits cal.)
22 [3]	Triggers zero calibration of range #2 (on enters cal.; off exits cal.)
23 [3]	Triggers span calibration of range #2 (on enters cal.; off exits cal.)

[1] M101E.
[2] Concentration alarm option.
[3] Set *DYN_ZERO* or *DYN_SPAN* variables to *ON* to enable calculating new slope or offset. Otherwise a calibration check is performed.
[4] Triple-gas option.
[5] M108E.
[6] M108EU.
[7] Optional.

M200E MODBUS Register Map		
MODBUS Register Address (decimal, 0-based)	**Description [10]**	**Units**
MODBUS Floating Point Input Registers (32-bit IEEE 754 format; read in high-word, low-word order; read-only)		
0	Instantaneous PMT detector reading	mV
2	NO_X slope for range #1	—
4	NO_X slope for range #2	—
6	NO slope for range #1	—
8	NO slope for range #2	mV
10	NO_X offset for range #1	mV
12	NO_X offset for range #2	mV
14	NO offset for range #1	mV
16	NO offset for range #2	mV
18	NO_X concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
20	NO_X concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
22	NO concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
24	NO concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
26	NO_2 concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
28	NO_2 concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
30	NO_X concentration for range #1	PPB
32	NO_X concentration for range #2	PPB
34	NO concentration for range #1	PPB
36	NO concentration for range #2	PPB
38	NO_2 concentration for range #1	PPB
40	NO_2 concentration for range #2	PPB
42	Concentration stability	PPB
44	Auto zero offset (range de-normalized) Pre React [11]	mV
46	Ozone flow rate	cc/m
48	Reaction cell pressure	"Hg
50	Reaction cell temperature	°C
52	Manifold temperature	°C
54	Converter efficiency factor for range #1	—
56	Converter efficiency factor for range #2	—

58	Converter temperature	°C
60	PMT temperature	°C
62	Sample flow rate	cc/m
64	Sample pressure	“Hg
66	Internal box temperature	°C
68	High voltage power supply output	Volts
70	Ground reference (REF_GND)	mV
72	4096 mV reference (REF_4096_MV)	mV
74	Diagnostic test input (TEST_INPUT_13)	mV
76	Diagnostic temperature input (TEMP_INPUT_6)	°C
78	IZS temperature	°C
80 [9]	Sample restrictor temperature	°C
82 [9]	Remote box temperature	°C
80	Diagnostic test input (TEST_INPUT_11)	mV
82	Diagnostic temperature input (TEMP_INPUT_5)	°C
84 [1]	Raw PMT detector reading for NO_X	mV
86 [1]	Raw PMT detector reading for NO	mV
100 [3]	NO_X slope for range #3	—
102 [3]	NO slope for range #3	mV
104 [3]	NO_X offset for range #3	mV
106 [3]	NO offset for range #3	mV
108 [3]	NO_X concentration for range #3 during zero/span calibration, just before computing new slope and offset	PPB
110 [3]	NO concentration for range #3 during zero/span calibration, just before computing new slope and offset	PPB
112 [3]	NO_2 concentration for range #3 during zero/span calibration, just before computing new slope and offset	PPB
114 [3]	NO_X concentration for range #3	PPB
116 [3]	NO concentration for range #3	PPB
118 [3]	NO_2 concentration for range #3	PPB
120 [3]	Converter efficiency factor for range #3	—
200 [5]	O_2 concentration	%
202 [5]	O_2 concentration during zero/span calibration, just before computing new slope and offset	%
204 [5]	O_2 slope	—
206 [5]	O_2 offset	%
208 [5]	O_2 sensor cell temperature	°C
300 [6]	CO_2 concentration	%
302 [6]	CO_2 concentration during zero/span calibration, just before computing new slope and offset	%
304 [6]	CO_2 slope	—
306 [6]	CO_2 offset	%
308 [6]	CO_2 sensor cell temperature	°C

MODBUS Floating Point Holding Registers (32-bit IEEE 754 format; read/write in high-word, low-word order; read/write)		
0	Maps to *NOX_SPAN1* variable; target conc. for range #1	Conc. Units
2	Maps to *NO_SPAN1* variable; target conc. for range #1	Conc. Units
4	Maps to *NOX_SPAN2* variable; target conc. for range #2	Conc. Units
6	Maps to *NO_SPAN2* variable; target conc. for range #2	Conc. Units
100 [3]	Maps to *NOX_SPAN3* variable; target conc. for range #3	Conc. Units
102 [3]	Maps to *NO_SPAN3* variable; target conc. for range #3	Conc. Units
200 [5]	Maps to *O2_TARG_SPAN_CONC* variable; target conc. for range O_2 gas	%
300 [6]	Maps to *CO2_TARG_SPAN_CONC* variable; target conc. for range CO_2 gas	%
MODBUS Discrete Input Registers (single-bit; read-only)		
0	Manifold temperature warning	
1	Converter temperature warning	
2	Auto-zero warning	
3	Box temperature warning	
4	PMT detector temperature warning	
5	Reaction cell temperature warning	
6	Sample flow warning	
7	Ozone flow warning	
8	Reaction cell pressure warning	
9	HVPS warning	
10	System reset warning	
11	Rear board communication warning	
12	Relay board communication warning	
13	Front panel communication warning	
14	Analog calibration warning	
15	Dynamic zero warning	
16	Dynamic span warning	
17	Invalid concentration	
18	In zero calibration mode	
19	In span calibration mode	
20	In multi-point calibration mode	
21	System is OK (same meaning as *SYSTEM_OK* I/O signal)	
22	Ozone generator warning	
23	IZS temperature warning	
24 [8]	In low span calibration mode	
25 [7]	NO concentration alarm limit #1 exceeded	
26 [7]	NO concentration alarm limit #2 exceeded	
27 [7]	NO_2 concentration alarm limit #1 exceeded	
28 [7]	NO_2 concentration alarm limit #2 exceeded	
29 [7]	NO_X concentration alarm limit #1 exceeded	

30 [7]	NO_X concentration alarm limit #2 exceeded
200 [5]	Calibrating O_2 gas
201 [5]	O_2 sensor cell temperature warning
202 [5+7]	O_2 concentration alarm limit #1 exceeded
203 [5+7]	O_2 concentration alarm limit #2 exceeded
300 [6]	Calibrating CO_2 gas
301 [6]	CO_2 sensor cell temperature warning
302 [6+7]	CO_2 concentration alarm limit #1 exceeded
303 [6+7]	CO_2 concentration alarm limit #2 exceeded
MODBUS Coil Registers (single-bit; read/write)	
0	Maps to relay output signal 36 (*MB_RELAY_36* in signal I/O list)
1	Maps to relay output signal 37 (*MB_RELAY_37* in signal I/O list)
2	Maps to relay output signal 38 (*MB_RELAY_38* in signal I/O list)
3	Maps to relay output signal 39 (*MB_RELAY_39* in signal I/O list)
20 [2]	Triggers zero calibration of NO_X range #1 (on enters cal.; off exits cal.)
21 [2]	Triggers span calibration of NO_X range #1 (on enters cal.; off exits cal.)
22 [2]	Triggers zero calibration of NO_X range #2 (on enters cal.; off exits cal.)
23 [2]	Triggers span calibration of NO_X range #2 (on enters cal.; off exits cal.)

[1] Engineering firmware only.
[2] Set *DYN_ZERO* or *DYN_SPAN* variables to *ON* to enable calculating new slope or offset. Otherwise a calibration check is performed.
[3] Triple-range option.
[4] Optional.
[5] O_2 option.
[6] CO_2 option.
[7] Concentration alarm option.
[8] Low span option.
[9] M200EUP.
[10] All NO_X references become NO_y for M200EU_NO_y.
[11] M200EU and M200EU_NO_y.

M201E MODBUS Register Map		
MODBUS Register Address (dec., 0-based)	**Description**	**Units**
MODBUS Floating Point Input Registers (32-bit IEEE 754 format; read in high-word, low-word order; read-only)		
0	Instantaneous PMT detector reading	mV
2	TNX slope for range #1	mV
4	TNX slope for range #2	mV
6	NO_X slope for range #1	—
8	NO_X slope for range #2	—
10	NO slope for range #1	—
12	NO slope for range #2	—
14	TNX offset for range #1	mV
16	TNX offset for range #2	mV
18	NO_X offset for range #1	mV
20	NO_X offset for range #2	mV
22	NO offset for range #1	mV
24	NO offset for range #2	mV
26	TNX concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
28	TNX concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
30	NH3 concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
32	NH3 concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
34	NO_X concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
36	NO_X concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
38	NO concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
40	NO concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
42	NO_2 concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
44	NO_2 concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
46	TNX concentration for range #1	PPB
48	TNX concentration for range #2	PPB
50	NH3 concentration for range #1	PPB
52	NH3 concentration for range #2	PPB

54	NO_X concentration for range #1	PPB
56	NO_X concentration for range #2	PPB
58	NO concentration for range #1	PPB
60	NO concentration for range #2	PPB
62	NO_2 concentration for range #1	PPB
64	NO_2 concentration for range #2	PPB
66	Auto zero offset (range de-normalized)	mV
68	Ozone flow rate	cc/m
70	Reaction cell pressure	"Hg
72	Reaction cell temperature	°C
74	Bypass or dilution manifold temperature	°C
76	Orifice block temperature	°C
78	Converter efficiency factor for range #1	—
80	Converter efficiency factor for range #2	—
82	Converter temperature	°C
84	PMT temperature	°C
86	Sample flow rate	cc/m
88	Sample pressure	“Hg
90	Internal box temperature	°C
92	High voltage power supply output	Volts
94	Ground reference (REF_GND)	mV
96	4096 mV reference (REF_4096_MV)	mV
98	Diagnostic test input (TEST_INPUT_11)	mV
100	Diagnostic test input (TEST_INPUT_13)	mV
102	Diagnostic temperature input (TEMP_INPUT_5)	°C
104 [3]	TN concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
106 [3]	TN concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
108 [3]	TN concentration for range #1	PPB
110 [3]	TN concentration for range #2	PPB
112 [1]	Concentration stability	PPB
MODBUS Floating Point Holding Registers (32-bit IEEE 754 format; read/write in high-word, low-word order; read/write)		
0	Maps to *TNX_SPAN1* variable; target conc. for range #1	Conc. Units
2	Maps to *NOX_SPAN1* variable; target conc. for range #1	Conc. Units
4	Maps to *NO_SPAN1* variable; target conc. for range #1	Conc. Units
6	Maps to *TNX_SPAN2* variable; target conc. for range #2	Conc. Units
8	Maps to *NOX_SPAN2* variable; target conc. for range #2	Conc. Units
10	Maps to *NO_SPAN2* variable; target conc. for range #2	Conc. Units
MODBUS Discrete Input Registers (single-bit; read-only)		
0	Bypass or dilution manifold temperature warning	
1	Converter temperature warning	

2	Auto-zero warning
3	Orifice block temperature warning
4	Box temperature warning
5	PMT detector warning
6	Reaction cell temperature warning
7	Sample flow warning
8	Ozone flow warning
9	Reaction cell pressure warning
10	HVPS warning
11	System reset warning
12	Rear board communication warning
13	Relay board communication warning
14	Front panel communication warning
15	Analog calibration warning
16	Dynamic zero warning
17	Dynamic span warning
18	Invalid concentration
19	In zero calibration mode
20	In span calibration mode
21	In multi-point calibration mode
22	System is OK (same meaning as *SYSTEM_OK* I/O signal)
23	Ozone generator warning
24 [4]	TNX concentration alarm limit #1 exceeded
25 [4]	TNX concentration alarm limit #2 exceeded
26 [4]	NH_3 concentration alarm limit #1 exceeded
27 [4]	NH_3 concentration alarm limit #2 exceeded
28 [4]	NO_X concentration alarm limit #1 exceeded
29 [4]	NO_X concentration alarm limit #2 exceeded
30 [4]	NO concentration alarm limit #1 exceeded
31 [4]	NO concentration alarm limit #2 exceeded
32 [4]	NO_2 concentration alarm limit #1 exceeded
33 [4]	NO_2 concentration alarm limit #2 exceeded
34 [3+4]	TN concentration alarm limit #1 exceeded
35 [3+4]	TN concentration alarm limit #2 exceeded
MODBUS Coil Registers (single-bit; read/write)	
0	Maps to relay output signal 36 (*MB_RELAY_36* in signal I/O list)
1	Maps to relay output signal 37 (*MB_RELAY_37* in signal I/O list)
2	Maps to relay output signal 38 (*MB_RELAY_38* in signal I/O list)
3	Maps to relay output signal 39 (*MB_RELAY_39* in signal I/O list)
20 [2]	Triggers zero calibration of NO_X range #1 (on enters cal.; off exits cal.)
21 [2]	Triggers span calibration of NO_X range #1 (on enters cal.; off exits cal.)
22 [2]	Triggers zero calibration of NO_X range #2 (on enters cal.; off exits cal.)
23 [2]	Triggers span calibration of NO_X range #2 (on enters cal.; off exits cal.)

24 [2]	Triggers zero calibration of TNX range #1 (on enters cal.; off exits cal.)
25 [2]	Triggers span calibration of TNX range #1 (on enters cal.; off exits cal.)
26 [2]	Triggers zero calibration of TNX range #2 (on enters cal.; off exits cal.)
27 [2]	Triggers span calibration of TNX range #2 (on enters cal.; off exits cal.)

[1] Engineering firmware only.
[2] Set *DYN_ZERO* or *DYN_SPAN* variables to *ON* to enable calculating new slope or offset. Otherwise a calibration check is performed.
[3] Optional.
[4] Concentration alarm option.

M265E MODBUS Register Map		
MODBUS Register Address (decimal, 0-based)	**Description**	**Units**
MODBUS Floating Point Input Registers (32-bit IEEE 754 format; read in high-word, low-word order; read-only)		
0	Instantaneous PMT detector reading	mV
2	O_3 slope for range #1	—
4	O_3 slope for range #2	mV
6	O_3 offset for range #1	mV
8	O_3 offset for range #2	mV
10	O_3 concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
12	O_3 concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
14	O_3 concentration for range #1	PPB
16	O_3 concentration for range #2	PPB
18	Concentration stability	PPB
20	Auto zero offset (range de-normalized)	mV
22	NO flow rate	cc/m
24	NO pressure	PSIG
26	Reaction cell pressure	"Hg
28	Reaction cell temperature	°C
30	PMT temperature	°C
32	Sample flow rate	cc/m
34	Sample pressure	“Hg
36	Internal box temperature	°C
38	High voltage power supply output	Volts
40	Ground reference (REF_GND)	mV
42	4096 mV reference (REF_4096_MV)	mV
44	Diagnostic test input (TEST_INPUT_13)	mV
46	Diagnostic temperature input (TEMP_INPUT_6)	°C
54	O3 slope for range #1	—
56	O3 slope for range #2	—
58	O3 offset for range #1	mV
60	O3 offset for range #2	mV
62	O3 concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
64	O3 concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
66	O3 concentration for range #1	PPB
68	O3 concentration for range #2	PPB

78	Diagnostic test input (TEST_INPUT_11)	mV
80	Diagnostic temperature input (TEMP_INPUT_5)	°C
82 [10]	Manifold temperature	°C
86 [1]	Raw PMT detector reading for O_3	mV
100 [3]	O_3 slope for range #3	mV
102 [3]	O_3 offset for range #3	mV
104 [3]	O_3 concentration for range #3 during zero/span calibration, just before computing new slope and offset	PPB
106 [3]	O_3 concentration for range #3	PPB
200 [5]	O_2 concentration	%
202 [5]	O_2 concentration during zero/span calibration, just before computing new slope and offset	%
204 [5]	O_2 slope	—
206 [5]	O_2 offset	%
208 [5]	O_2 sensor cell temperature	°C
300 [6]	CO_2 concentration	%
302 [6]	CO_2 concentration during zero/span calibration, just before computing new slope and offset	%
304 [6]	CO_2 slope	—
306 [6]	CO_2 offset	%
308 [6]	CO_2 sensor cell temperature	°C
MODBUS Floating Point Holding Registers (32-bit IEEE 754 format; read/write in high-word, low-word order; read/write)		
0	Maps to *O3_SPAN1* variable; target conc. for range #1	Conc. units
2	Maps to *O3_SPAN2* variable; target conc. for range #2	Conc. units
8 [3]	Maps to *O3_SPAN3* variable; target conc. for range #3	Conc. units
200 [5]	Maps to *O2_TARG_SPAN_CONC* variable; target conc. for range O_2 gas	%
300 [6]	Maps to *CO2_TARG_SPAN_CONC* variable; target conc. for range CO_2 gas	%
MODBUS Discrete Input Registers (single-bit; read-only)		
0	Auto-zero warning	
1	Box temperature warning	
2	PMT detector temperature warning	
3	Reaction cell temperature warning	
4	Sample flow warning	
5	NO flow warning	
6	Reaction cell pressure warning	
7	HVPS warning	
8	System reset warning	
9	Rear board communication warning	
10	Relay board communication warning	
11	Front panel communication warning	

12	Analog calibration warning
13	Dynamic zero warning
14	Dynamic span warning
15	Invalid concentration
16	In zero calibration mode
17	In span calibration mode
18	In multi-point calibration mode
19	System is OK (same meaning as *SYSTEM_OK* I/O signal)
21 [10]	Manifold temperature warning
23 [8]	In low span calibration mode
24 [7]	O_3 concentration alarm limit #1 exceeded
25 [7]	O_3 concentration alarm limit #2 exceeded
200 [5]	Calibrating O_2 gas
201 [5]	O_2 sensor cell temperature warning
202 [5+7]	O_2 concentration alarm limit #1 exceeded
203 [5+7]	O_2 concentration alarm limit #2 exceeded
300 [6]	Calibrating CO_2 gas
301 [6]	CO_2 sensor cell temperature warning
302 [6+7]	CO_2 concentration alarm limit #1 exceeded
303 [6+7]	CO_2 concentration alarm limit #2 exceeded
MODBUS Coil Registers (single-bit; read/write)	
0	Maps to relay output signal 36 (*MB_RELAY_36* in signal I/O list)
1	Maps to relay output signal 37 (*MB_RELAY_37* in signal I/O list)
2	Maps to relay output signal 38 (*MB_RELAY_38* in signal I/O list)
3	Maps to relay output signal 39 (*MB_RELAY_39* in signal I/O list)
20 [2]	Triggers zero calibration of O_3 range #1 (on enters cal.; off exits cal.)
21 [2]	Triggers span calibration of O_3 range #1 (on enters cal.; off exits cal.)
22 [2]	Triggers zero calibration of O_3 range #2 (on enters cal.; off exits cal.)
23 [2]	Triggers span calibration of O_3 range #2 (on enters cal.; off exits cal.)

[1] Engineering firmware only.
[2] Set *DYN_ZERO* or *DYN_SPAN* variables to *ON* to enable calculating new slope or offset. Otherwise a calibration check is performed.
[3] Triple-range option.
[5] O_2 option.
[6] CO_2 option.
[7] Concentration alarm option.
[8] Low span option.
[10] Manifold temperature option.

M300E MODBUS Register Map		
MODBUS Register Address (dec., 0-based)	**Description**	**Units**
MODBUS Floating Point Input Registers (32-bit IEEE 754 format; read in high-word, low-word order; read-only)		
0	Detector measure reading	mV
2	Detector reference reading	mV
4	M/R ratio.	none
6	Slope for range #1	none
8	Slope for range #2	none
10	Offset for range #1	none
12	Offset for range #2	none
14	Concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPM
16	Concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPM
18	Concentration for range #1	PPM
20	Concentration for range #2	PPM
22	Concentration stability	PPM
24	Bench temperature	°C
26	Bench temperature control duty cycle	Fraction (0.0 = off, 1.0 = on full)
28	Wheel temperature	°C
30	Wheel temperature control duty cycle	Fraction (0.0 = off, 1.0 = on full)
32	Sample temperature	°C
34	Sample pressure	“Hg
36	Internal box temperature	°C
38	Photometer detector temperature drive	mV
40	Diagnostic test input (TEST_INPUT_7)	mV
42	Diagnostic test input (TEST_INPUT_8)	mV
44	Diagnostic temperature input (TEMP_INPUT_4)	°C
46	Diagnostic temperature input (TEMP_INPUT_5)	°C
48	Ground reference (REF_GND)	mV
50	4096 mV reference (REF_4096_MV)	mV
52 [1]	Purge pressure	PSIG
54 [1]	Sample flow	cc/m
56 [1]	Vacuum pressure	"Hg
58 [1]	Internal box temperature #2/oven	°C
60 [1]	Internal box temperature #2/oven control duty cycle	Fraction (0.0 = off,

		1.0 = on full)
62 [1]	Auto-zero reading	M/R
100 [2]	O_2 concentration	%
102 [2]	O_2 concentration during zero/span calibration, just before computing new slope and offset	%
104 [2]	O_2 slope	—
106 [2]	O_2 offset	%
108 [2]	O_2 sensor cell temperature	°C
200 [3]	CO_2 concentration	%
202 [3]	CO_2 concentration during zero/span calibration, just before computing new slope and offset	%
204 [3]	CO_2 slope	—
206 [3]	CO_2 offset	%
MODBUS Floating Point Holding Registers (32-bit IEEE 754 format; read/write in high-word, low-word order; read/write)		
0	Maps to *CO_SPAN1* variable; target conc. for range #1	Conc. units
2	Maps to *CO_SPAN2* variable; target conc. for range #2	Conc. units
100 [2]	Maps to *O2_TARG_SPAN_CONC* variable	%
200 [3]	Maps to *CO2_TARG_SPAN_CONC* variable	%
MODBUS Discrete Input Registers (single-bit; read-only)		
0	Source warning	
1	Box temperature warning	
2	Bench temperature warning	
3	Wheel temperature warning	
4	Sample temperature warning	
5	Sample pressure warning	
6	Photometer detector temperature warning	
7	System reset warning	
8	Rear board communication warning	
9	Relay board communication warning	
10	Front panel communication warning	
11	Analog calibration warning	
12	Dynamic zero warning	
13	Dynamic span warning	
14	Invalid concentration	
15	In zero calibration mode	
16	In span calibration mode	
17	In multi-point calibration mode	
18	System is OK (same meaning as *SYSTEM_OK* I/O signal)	
19 [1]	Purge pressure warning	
20 [1]	Sample flow warning	
21 [1]	Internal box temperature #2/oven warning	
22 [1]	Concentration limit 1 exceeded	

23 [1]	Concentration limit 2 exceeded
24 [1]	Auto-zero warning
25 [1]	Sync warning
26 [1]	In Hessen manual mode
100 [2]	In O_2 calibration mode
101 [2]	O_2 cell temperature warning
102 [1,2]	O_2 concentration limit 1 exceeded
103 [1,2]	O_2 concentration limit 2 exceeded
200 [3]	In CO_2 calibration mode
201 [1,3]	CO_2 concentration limit 1 exceeded
202 [1,3]	CO_2 concentration limit 2 exceeded
MODBUS Coil Registers (single-bit; read/write)	
0	Maps to relay output signal 36 (*MB_RELAY_36* in signal I/O list)
1	Maps to relay output signal 37 (*MB_RELAY_37* in signal I/O list)
2	Maps to relay output signal 38 (*MB_RELAY_38* in signal I/O list)
3	Maps to relay output signal 39 (*MB_RELAY_39* in signal I/O list)
20 [4]	Triggers zero calibration of range #1 (on enters cal.; off exits cal.)
21 [4]	Triggers span calibration of range #1 (on enters cal.; off exits cal.)
22 [4]	Triggers zero calibration of range #2 (on enters cal.; off exits cal.)
23 [4]	Triggers span calibration of range #2 (on enters cal.; off exits cal.)

[1] Optional
[2] O_2 option
[3] CO_2 option
[4] Set *DYN_ZERO* or *DYN_SPAN* variables to *ON* to enable calculating new slope or offset. Otherwise a calibration check is performed.

M400E MODBUS Register Map		
MODBUS Register Address (dec., 0-based)	**Description**	**Units**
MODBUS Floating Point Input Registers (32-bit IEEE 754 format; read in high-word, low-word order; read-only)		
0	Photometer detector measure reading	mV
2	Photometer detector reference reading	mV
4	Photometer lamp stability	%
6	Slope for range #1	—
8	Slope for range #2	—
10	Offset for range #1	PPB
12	Offset for range #2	PPB
14	Concentration for range #1 during zero/span calibration, just before computing new slope and offset	PPB
16	Concentration for range #2 during zero/span calibration, just before computing new slope and offset	PPB
18	Concentration for range #1	PPB
20	Concentration for range #2	PPB
22	Concentration stability	PPB
24	Ozone generator reference detector reading	mV
26	Ozone generator lamp drive	mV
28	Ozone generator lamp temperature	°C
30	Ozone scrubber temperature	°C
32	Ozone scrubber temperature duty cycle	Fraction (1.0 = 100%)
34	Photometer lamp temperature	°C
36	Photometer lamp temperature duty cycle	Fraction (1.0 = 100%)
38	Sample temperature	°C
40	Sample flow rate	cc/m
42	Sample pressure	Inches Hg
44	Internal box temperature	°C
46	Diagnostic test input (TEST_INPUT_7)	mV
48	Diagnostic test input (TEST_INPUT_8)	mV
50	Diagnostic temperature input (TEMP_INPUT_6)	°C
52	Diagnostic temperature input (TEMP_INPUT_7)	°C
54	Ground reference	mV
56	Precision 4.096 mV reference	mV
MODBUS Floating Point Holding Registers (32-bit IEEE 754 format; read/write in high-word, low-word order; read/write)		
0	Maps to *O3_TARG_ZERO1* variable; target zero concentration for range #1	Conc. units

2	Maps to *O3_SPAN1* variable; target span concentration for range #1	Conc. units
4	Maps to *O3_TARG_ZERO2* variable; target zero concentration for range #2	Conc. units
6	Maps to *O3_SPAN2* variable; target span concentration for range #2	Conc. units
MODBUS Discrete Input Registers (single-bit; read-only)		
0	O_3 generator reference detector warning	
1	O_3 generator lamp intensity warning	
2	O_3 generator lamp temperature warning	
3	O_3 scrubber temperature warning	
4	Photometer reference warning	
5	Photometer lamp stability warning	
6	Photometer lamp temperature warning	
7	Box temperature warning	
8	Sample temperature warning	
9	Sample flow warning	
10	Sample pressure warning	
11	System reset warning	
12	Rear board communication warning	
13	Relay board communication warning	
14	O_3 generator or photometer lamp I^2C driver chip communication warning	
15	Front panel communication warning	
16	Analog calibration warning	
17	Dynamic zero warning	
18	Dynamic span warning	
19	Invalid concentration	
20	In zero calibration mode	
21	In low span calibration mode	
22	In span calibration mode	
23	In multi-point calibration mode	
24	System is OK (same meaning as *SYSTEM_OK* I/O signal)	
25 [3]	O_3 concentration alarm limit #1 exceeded	
26 [3]	O_3 concentration alarm limit #2 exceeded	
MODBUS Coil Registers (single-bit; read/write)		
0	Maps to relay output signal 36 (*MB_RELAY_36* in signal I/O list)	
1	Maps to relay output signal 37 (*MB_RELAY_37* in signal I/O list)	
2	Maps to relay output signal 38 (*MB_RELAY_38* in signal I/O list)	
3	Maps to relay output signal 39 (*MB_RELAY_39* in signal I/O list)	
20 [1]	Triggers zero calibration of O_3 range #1 (on enters cal.; off exits cal.)	
21 [2]	Triggers low span calibration of O_3 range #1 (on enters cal.; off exits cal.)	
22 [1]	Triggers span calibration of O_3 range #1 (on enters cal.; off exits cal.)	

23 [1]	Triggers zero calibration of O_3 range #2 (on enters cal.; off exits cal.)
24 [2]	Triggers low span calibration of O_3 range #2 (on enters cal.; off exits cal.)
25 [1]	Triggers span calibration of O_3 range #2 (on enters cal.; off exits cal.)

[1] Set *DYN_ZERO* or *DYN_SPAN* variables to *ON* to enable calculating new slope or offset. Otherwise a calibration check is performed.

[2] O_3 generator or zero/span valve factory options must be enabled.

[3] Concentration alarm option.

M700E MODBUS Register Map		
MODBUS Register Address (dec., 0-based)	**Description**	**Units**
MODBUS Floating Point Input Registers (32-bit IEEE 754 format; read in high-word, low-word order; read-only)		
0	Actual cal. gas flow rate	LPM
2	Actual diluent flow rate	LPM
4	Photometer measured ozone concentration	PPB
6	Ozone generator reference detector reading	mV
8	Ozone generator flow rate	LPM
10	Ozone generator lamp drive	mV
12	Ozone generator lamp temperature	°C
14	Cal. gas pressure	PSIG
16	Diluent pressure	PSIG
18	Regulator pressure	PSIG
20	Internal box temperature	°C
22	Permeation tube #1 temperature	°C
24	Permeation tube flow rate	LPM
26	Photometer detector measure reading	mV
28	Photometer detector reference reading	mV
30	Photometer sample flow rate	LPM
32	Photometer lamp temperature	°C
34	Photometer sample pressure	Inches Hg
36	Photometer sample temperature	°C
38	Photometer slope computed during zero/span bench calibration	—
40	Photometer offset computed during zero/span bench calibration	PPB
42	Ground reference	mV
44	Precision 4.096 mV reference	mV
46	Permeation tube #2 temperature [1]	°C
48	Ozone Gen Fraction [2]	—
MODBUS Discrete Input Registers (single-bit; read-only)		
0	System reset warning	
1	Box temperature warning	
2	Photometer lamp temperature warning	
3	O_3 generator lamp temperature warning	
4	Permeation tube #1 temperature warning	
5	Photometer reference warning	
6	Photometer lamp stability warning	
7	O_3 generator reference detector warning	
8	Regulator pressure warning	

9	Any MFC pressure outside of warning limits
10	Any MFC drive less than 10% of full scale or greater than full scale
11	Any MFC sensor offset greater than allowable limit
12	Rear board communication warning
13	Relay board communication warning
14	Valve board communication warning
15	O_3 generator or photometer lamp I^2C driver chip communication warning
16	Front panel communication warning
17	Firmware is unable to communicate with any MFC
18	Analog calibration warning
19	System is OK (same meaning as *SYSTEM_OK* I/O signal)
20	O_3 generator not yet stabilized
21	Permeation tube #2 temperature warning [1]
MODBUS Coil Registers (single-bit; read/write)	
00-99	Trigger execution of sequence whose name begins with “00” - “99”. Turning a coil on executes a sequence. Turning a coil off does nothing. When reading coils, the value indicates which sequence is executing. If a coil is on, the sequence is executing; if off the sequence is not executing. Supports nested sequences, so multiple sequence coils may be on simultaneously.
100	Turning coil on turns on purge. Turning coil off does nothing. When reading coil, the value indicates whether purge is active. If on, purge is active; if off, purge is not active. Purge may be invoked within a sequence, so purge coil may be on at the same time as a sequence coil.
101	Turning coil on puts instrument in standby. Turning coil off does nothing. When reading coil, the value indicates whether instrument is in standby mode. If on, instrument is in standby; if off, instrument is not in standby.
200-211	Connected to the control outputs (CONTROL_OUT_1– CONTROL_OUT_12). These coils may be turned both on and off. Reading the coils indicates the current state.

[1] Dual permeation tube option.
[2] Low range option.

M703E MODBUS Register Map		
MODBUS Register Address (dec., 0-based)	**Description**	**Units**
MODBUS Floating Point Input Registers (32-bit IEEE 754 format; read in high-word, low-word order; read-only)		
0	Output flow rate	LPM
2	Photometer measured ozone concentration	PPB
4	Ozone generator reference detector reading	mV
6	Ozone generator lamp drive	mV
8	Ozone generator lamp temperature	°C
10	Regulator pressure	PSIG
12	Internal box temperature	°C
14	Photometer detector measure reading	mV
16	Photometer detector reference reading	mV
18	Photometer sample flow rate	LPM
20	Photometer lamp temperature	°C
22	Photometer sample pressure	Inches Hg
24	Photometer sample temperature	°C
26	Photometer slope computed during zero/span bench calibration	—
28	Photometer offset computed during zero/span bench calibration	PPB
30	Ground reference	mV
32	Precision 4.096 mV reference	mV
MODBUS Discrete Input Registers (single-bit; read-only)		
0	System reset warning	
1	Box temperature warning	
2	Photometer lamp temperature warning	
3	O_3 generator lamp temperature warning	
4	Photometer reference warning	
5	Photometer lamp stability warning	
6	O_3 generator reference detector warning	
7	Rear board communication warning	
8	Relay board communication warning	
9	O_3 generator or photometer lamp I^2C driver chip communication warning	
10	Front panel communication warning	
11	Analog calibration warning	
12	System is OK (same meaning as *SYSTEM_OK* I/O signal)	
13	O_3 generator not yet stabilized	
14	Calibration is active	
15	Sequence is active	
16	Regulator pressure warning [1]	

MODBUS Coil Registers (single-bit; read/write)	
00-99	Trigger execution of sequence whose name begins with “00” - “99”. Turning a coil on executes a sequence. Turning a coil off does nothing. When reading coils, the value indicates which sequence is executing. If a coil is on, the sequence is executing; if off the sequence is not executing. Supports nested sequences, so multiple sequence coils may be on simultaneously.
100	Turning coil on turns on purge. Turning coil off does nothing. When reading coil, the value indicates whether purge is active. If on, purge is active; if off, purge is not active. Purge may be invoked within a sequence, so purge coil may be on at the same time as a sequence coil.
101	Turning coil on puts instrument in standby. Turning coil off does nothing. When reading coil, the value indicates whether instrument is in standby mode. If on, instrument is in standby; if off, instrument is not in standby.
200-211	Connected to the control outputs (CONTROL_OUT_1– CONTROL_OUT_12). These coils may be turned both on and off. Reading the coils indicates the current state.
[1] Regulator pressure monitoring option.	

M801E, M802E, M803E MODBUS Register Map		
MODBUS Register Address (dec., 0-based)	**Description**	**Units**
MODBUS Floating Point Input Registers (32-bit IEEE 754 format; read in high-word, low-word order; read-only)		
0 [4]	O_2 slope for range 1	—
2 [6]	O_2 slope for range 2	—
4 [4]	O_2 offset for range 1	%
6 [6]	O_2 offset for range 2	%
8 [4]	O_2 concentration for range 1 during zero/span calibration, just before computing new slope and offset	%
10 [6]	O_2 concentration for range 2 during zero/span calibration, just before computing new slope and offset	%
12 [4]	O_2 concentration for range 1	%
14 [6]	O_2 concentration for range 2	%
16 [4]	O_2 sensor cell temperature	°C
18 [4]	O_2 sensor cell temperature control duty cycle	Fraction
20	Concentration stability	%
22	Sample flow	cc/m
24	Sample pressure	“Hg
26	Internal box temperature	°C
28	Ground reference (REF_GND)	mV
30	4096 mV reference (REF_4096_MV)	mV
100 [1]	CO_2 slope for range 1	—
102 [5]	CO_2 slope for range 2	—
104 [1]	CO_2 offset for range 1	%
106 [5]	CO_2 offset for range 2	%
108 [1]	CO_2 concentration for range 1 during zero/span calibration, just before computing new slope and offset	%
110 [5]	CO_2 concentration for range 2 during zero/span calibration, just before computing new slope and offset	%
112 [1]	CO_2 concentration for range 1	%
114 [5]	CO_2 concentration for range 2	%
116 [1]	CO_2 sensor cell temperature	°C
118 [1]	CO_2 sensor cell temperature control duty cycle	Fraction
MODBUS Floating Point Holding Registers (32-bit IEEE 754 format; read/write in high-word, low-word order; read/write)		
0 [4]	Maps to *O2_TARG_SPAN1* variable; target conc. for range 1	%
2 [6]	Maps to *O2_TARG_SPAN2* variable; target conc. for range 2	%
100 [1]	Maps to *CO2_TARG_SPAN1* variable; target conc. for	%

	range 1	
102 [5]	Maps to *CO2_TARG_SPAN2* variable; target conc. for range 2	%
MODBUS Discrete Input Registers (single-bit; read-only)		
0	Box temperature warning	
1 [4]	O_2 cell temperature warning	
2	Sample flow warning	
3	Sample pressure warning	
4	System reset warning	
5	Rear board communication warning	
6	Relay board communication warning	
7	Front panel communication warning	
8	Analog calibration warning	
9	Dynamic zero warning	
10	Dynamic span warning	
11	Invalid concentration	
12 [4]	In O_2 zero calibration mode	
13 [4]	In O_2 span calibration mode	
14 [4]	In O_2 multi-point calibration mode	
15	System is OK (same meaning as *SYSTEM_OK* I/O signal)	
16	O_2 concentration alarm limit #1 exceeded	
17	O_2 concentration alarm limit #2 exceeded	
18	In Hessen manual mode	
100 [1]	CO_2 cell temperature warning	
101 [1]	In CO_2 zero calibration mode	
102 [1]	In CO_2 span calibration mode	
103 [1]	In CO_2 multi-point calibration mode	
104 [1]	CO_2 concentration alarm limit #1 exceeded	
105 [1]	CO_2 concentration alarm limit #2 exceeded	
MODBUS Coil Registers (single-bit; read/write)		
0	Maps to relay output signal 36 (*MB_RELAY_36* in signal I/O list)	
1	Maps to relay output signal 37 (*MB_RELAY_37* in signal I/O list)	
2	Maps to relay output signal 38 (*MB_RELAY_38* in signal I/O list)	
3	Maps to relay output signal 39 (*MB_RELAY_39* in signal I/O list)	
20 [3,4]	Triggers O_2 zero calibration of range 1 (on enters cal.; off exits cal.)	
21 [3,4]	Triggers O_2 span calibration of range 1 (on enters cal.; off exits cal.)	
22 [6,4]	Triggers O_2 zero calibration of range 2 (on enters cal.; off exits cal.)	
23 [6,4]	Triggers O_2 span calibration of range 2 (on enters cal.; off exits cal.)	
24 [1,3]	Triggers CO_2 zero calibration of range 1 (on enters cal.; off exits cal.)	
25 [1,3]	Triggers CO_2 span calibration of range 1 (on enters cal.; off exits cal.)	
26 [5,3]	Triggers CO_2 zero calibration of range 2 (on enters cal.; off exits cal.)	
27 [5,3]	Triggers CO_2 span calibration of range 2 (on enters cal.; off exits cal.)	

[1]	M801E, M803E or M802E with CO_2 option.
[2]	future.
[3]	Set *DYN_ZERO* or *DYN_SPAN* variables to *ON* to enable calculating new slope or offset. Otherwise a calibration check is performed.
[4]	M802E or M803E.
[5]	M801E or M803E.
[6]	M802E only.