

CONTROL UNIT FICO-PRO

BMS INTEGRATION

INTEGRATION NOTES

The purpose of this document is to provide users with a quick and simple means to integrate the FICO-PRO system into a BMS system or any other integration.

NOTES OF USE

This document is intended for integrators who perform commissioning and integration of FICO system into any Modbus environment.

For operation and planning of integration of the fire damper control system, please refer to additional documents, such as:

- Consultants technical description of the site.
- Modbus Application Protocol Specification 1.1b
- RS485 installations guidelines

SYMBOLS



Section introduced by this symbol indicates a warning to help prevent incorrect operation.



Section introduced by this symbol indicates that the text must be read with special attention.



Paragraphs with this symbol provide tips.

ABBREVIATIONS

Abbreviation	Description
RTU	Remote Terminal Unit
Gateway	A device for transfer data between different kind of networks
LSB	Least Significant Bit
MSB	Most Significant Bit

REVISION HISTORY

Release	Date	Author
1	2019-01-13	Johan Nordlander



DEFAULT MODBUS RTU SLAVE SETTINGS

19200 8N1

GENERAL INFORMATION

The following section provides only a brief overview of the Modbus protocol.

For the full specification, refer to "Modicon Modbus Protocol Reference Guide PI-MBUS-300 Rev. J".

Master/slave protocol

Modbus is a master/slave protocol. By definition, this means that a Modbus network contains one, and only one, master and at least one slave.

The Modbus master starts the transactions on the network with a slave query. The slave either responds positively with the requested service (response) or transmits an "exception message". In the remainder of this document, these query/response sequences are also referred to as "Modbus telegrams".

Function codes

The type of transaction is defined by the function code transmitted in the Modbus telegrams. A function code defines the following:

- Structure of the telegram, query and response
- Direction of data transmission (master/slave or slave/master)
- Data format of data point (bit or 16-bit register)

Transmission mode

The Modbus protocol defines two alternative serial transmission modes. These modes have the following characteristics:

RTU (Remote Terminal Unit) mode

- Binary-coded data
- Start and end of telegrams marked by timed pauses (a "silent interval") between the characters transmitted.
- Check sum algorithm: CRC (Cyclic Redundancy Check)

ASCII mode

- Data in hexadecimal notation
- Beginning and end of telegrams marked by start and end characters.
- Check sum algorithm: LRC (Longitudinal Redundancy Check)

Telegrams with points

Certain types of Modbus transactions permit the transmission of a **multiple data** variable number of Modbus data points (bit or 16-bit register) in a single telegram.

Modbus TCP

A Modbus TCP/RTU gateway can be used to connect a Modbus/TCP master to one or several slaves. The Modbus TCP/RTU gateway will act as a Modbus/TCP slave on a Ethernet network, and transform the queries to the serial Modbus network and back again.

RS485 NETWORK

RS485 is a balanced line, half-duplex transmission system that meets the requirements for a truly multi-point communications network, and the standard specifies up to 32 drivers and 32 receivers on a single (2-wire) bus. Half-duplex data transmission means that data can be transmitted in both directions on a signal carrier, but not at the same time.

Abbreviation	
Mode of operation	Differential
Total number of drivers and Receivers on One Line (One driver active at a time for RS485 networks)	128 Driver 128 Receivers
Maximum Cable Length	1200 m
Maximum Data Rate (10m – 1200m)	10Mb/s-100Kb/s
Maximum Driver Output Voltage	-7V to +12V
Driver Output Signal Level (Loaded Min.)	+/- 3V
Driver Output Signal Level (Unloaded Max.)	+/-3 V
Driver Load Impedance (Ohms)	54
Max. Driver Current in High Z State, Power On	+/-100uA
Max. Driver Current in High Z State, Power Off	+/-100uA
Slew Rate (Max.)	N/A
Receiver Input Voltage Range	-7V to +12V
Receiver Input Sensitivity	+/-150mV
Receiver Input Resistance (Ohms), (1 Standard Load for RS485)	≥12k

TOOLS

Modbus slave devices can be tested with several Modbus master simulation tools, like "Modbus Poll" or "ModScan", from a computer. Modbus Poll can be downloaded from www.modbustools.com.

A RS485/RS232 converter or a Modbus RTU/TCP gateway may be needed to connect to a computer.

TROUBLESHOOTING, TIPS

- The slave address must be unique in the network, valid addresses are from 1-247.
- Only reference addresses that are generated can be read/write, see chapter 5 for more information about the specific application.
- Baud rate, Parity and stop bits must match the network and the Master.
- The 2-wire bus is NOT interchangeable and must be connected correctly.
- In case of long distance and/or high baud rate, please consider end of line resistors like 120 Ohm on both sides (according to RS485 rules)

REGISTER MAP AND FUNCTION CODES

Modbus registers are organized into reference types identified by the leading number of the reference address: The "x" following the leading character represents a four-digit reference address.

Modbus type	Reference	Description (refer to a Master device)
Coil status	0x<addr>	Read/Write Discrete Outputs or Coils. A 0x reference address is used to drive output data to a digital 1-bit output channel.
Input status	1x<addr>	Read Discrete Inputs. The 1-bit status of a 1x reference address is controlled by the corresponding digital input channel.
Input registers	3x<addr>	Read Input Registers. A 3x reference register contains a 16-bit number received from an external source - e.g. an analogue signal.
Holding registers	4x<addr>	Read/Write Output or Holding Registers. A 4x register is used to store 16-bits of numerical data (binary or decimal), or to send the data from the CPU to an output channel.

The leading character is generally implied by the function code and omitted from the address specified for a given function. The leading character also identifies the I/O data type.

FUNCTION CODES

The functions below are used to access the registers outlined in the register map of the module for sending and receiving data.

Function code	Code	Function	
01	0x<addr>	Read coil status	1)
02	1x<addr>	Read input status	1)
03	4x<addr>	Read holding registers	Implemented
04	3x<addr>	Read input registers	1)
05	0x<addr>	Force single coil	1)
06	4x<addr>	Preset single register	Implemented
15	0x<addr>	Force multiple coils	1)
16	4x<addr>	Force multiple register	Implemented

1) Implemented, but not used

When the slave device responds to the master, it uses the function code field to indicate either a normal (error-free) response, or that some kind of error has occurred (an exception response).

REGISTER VALUES

Modbus registers are normally constructed from 16-bit unsigned integers. In some cases, more information are packed into each register with the following coding.

For those registers that each bit has a specific function, each bit within the register is described with the b prefix.

Example

- b0 represents bit 0
- b1 represents bit 1
- b15 represents bit 15

For those registers where multiple information is stored in the same registers, a range of bits are used for each value.

Example

- b0..b7 represents the lowest 8 bits in the register.
value = <register value> AND 255
- b8..b15 represents the highest 8 bits in the register.
value = [<register value> DIV 256] AND 255

REFERENCE ADDRESSES

This chapter describes the reference addresses used in the application. Reference addresses marked "Not used" or not specified can be accessed freely with read or write access.



It is recommended not to read or write any addresses not mentioned in this manual. If so there will be an exception response and the communication fails with current firmware or any later update.

All address types start with 1, and due to that some Master devices start with 0 it's in that case necessary to subtract all addresses in this manual by 1.

- 16 bit real values are presented in their actual value/unit. E.g. °C, %, Pa, l/s
- 16 bit states are presented either as a number or as a bit pattern, see the reference address description
- 1 bit status are presented as 0=Off and 1=On
- 1 bit alarms are presented as 0=Normal and 1=Alarm

MODBUS REGISTERS

4x<addr> Holding registers

Group	Register	Access	Value	Description
General information	1	R	Device type	4122 = FICO-PRO
	2	R/W	Device mode	0 = Standby 1 = Online
	3	R	Device status	b0 = Device restarted b1 = All dampers open b2 = All dampers closed b3 = Fire alarm b4 = Service alarm b5 = Damper generated fire alarm b6 = Damper failure b7 = reserved, always read as 0 b8 = reserved, always read as 0 b9 = reserved, always read as 0 b10 = reserved, always read as 0 b11 = reserved, always read as 0 b12 = reserved, always read as 0 b13 = <not used> b14 = reserved, always read as 0 b15 = reserved, always read as 0
	4	R	Device configuration (auto detected)	b0 = damper 1 enabled b1 = damper 2 enabled b2 = damper 3 enabled b3 = damper 4 enabled b4 = detector 1 enabled b5 = detector 2 enabled
Damper 1	5	R	Status (Low)	b0 = Damper closing b1 = Damper closed b2 = Damper opening b3 = Damper open b4 = Damper alarm b5 = Damper failure b6 = Damper blocked b7 = Reserved
	6	R	Status (High)	reserved, always read as 0
Damper 2	7	R	Status (Low)	b0 = Damper closing b1 = Damper closed b2 = Damper opening b3 = Damper open b4 = Damper alarm b5 = Damper failure b6 = Damper blocked b7 = Reserved
	8	R	Status (High)	reserved, always read as 0
Damper 3	9	R	Status (Low)	b0 = Damper closing b1 = Damper closed b2 = Damper opening b3 = Damper open b4 = Damper alarm b5 = Damper failure b6 = Damper blocked b7 = Reserved
	10	R	Status (High)	reserved, always read as 0
Damper 4	11	R	Status (Low)	b0 = Damper closing b1 = Damper closed b2 = Damper opening b3 = Damper open b4 = Damper alarm b5 = Damper failure b6 = Damper blocked b7 = Reserved
	12	R	Status (High)	reserved, always read as 0

Detector 1	13	R	Status	b0..b3 = 0 = detector offline 1..15 = detector active b4 = service alarm b5 = fire alarm b6 = detector not installed b7 .. b15 = not used
Detector 2	14	R	Status	b0..b3 = 0 = detector offline 1..15 = detector active b4 = service alarm b5 = fire alarm b6 = detector not installed b7 .. b15 = not used
Device status	15	R	Dip settings	(always zero, reserved for compatibility)
	16	R	Digital input values	b0 = External input X1 b1 = External input X2 b2 = External input X3 b3 = External input X4
	17	R	Digital output values	b0 = External Output Rel 1 b1 = External Output Rel 2 b2 = External Output Rel 3 b3 = External Output Rel 4
	18	R	Detector 1 - Voltage	(always zero, reserved for compatibility)
	19	R	Detector 2 - Voltage	(always zero, reserved for compatibility)
Slave device information				
System information	501	R	Status	b0 = Device restarted b1 = All dampers open b2 = All dampers closed b3 = Fire alarm b4 = Service alarm b5 = Damper generated fire alarm b6 = Damper failure b7 = Testing active b8 = Testing failed b9 = External alarm b10 = External interlock b11 = Modbus alarm b12 = Modbus interlock b13 = <not used> b14 = Communication error b15 = <reserved>
	502	R	Count	Number of units connected

SLAVE DEVICE STATUS

	Address	Access	Value	Description
	504-509	R	Controller	See Object: Slave Device object
	510-515	R	Slave 1	See Object: Slave Device object
	516-521	R	Slave 2	See Object: Slave Device object
	522-527	R	Slave 3	See Object: Slave Device object
	528-533	R	Slave 4	See Object: Slave Device object
	534-539	R	Slave 5	See Object: Slave Device object
	540-545	R	Slave 6	See Object: Slave Device object
	546-551	R	Slave 7	See Object: Slave Device object
	552-557	R	Slave 8	See Object: Slave Device object
	558-563	R	Slave 9	See Object: Slave Device object
	564-569	R	Slave 10	See Object: Slave Device object
	570-575	R	Slave 11	See Object: Slave Device object
	576-581	R	Slave 12	See Object: Slave Device object
	582-587	R	Slave 13	See Object: Slave Device object
	588-593	R	Slave 14	See Object: Slave Device object
	594-599	R	Slave 15	See Object: Slave Device object
	600-605	R	Slave 16	See Object: Slave Device object
	606-611	R	Slave 17	See Object: Slave Device object
	612-617	R	Slave 18	See Object: Slave Device object
	618-623	R	Slave 19	See Object: Slave Device object
	624-629	R	Slave 20	See Object: Slave Device object
	630-635	R	Slave 21	See Object: Slave Device object
	636-641	R	Slave 22	See Object: Slave Device object
	642-647	R	Slave 23	See Object: Slave Device object
	648-653	R	Slave 24	See Object: Slave Device object
	654-659	R	Slave 25	See Object: Slave Device object
	660-665	R	Slave 26	See Object: Slave Device object
	666-671	R	Slave 27	See Object: Slave Device object
	672-677	R	Slave 28	See Object: Slave Device object
	678-683	R	Slave 29	See Object: Slave Device object
	684-689	R	Slave 30	See Object: Slave Device object
	690-695	R	Slave 31	See Object: Slave Device object
	696-701	R	Slave 32	See Object: Slave Device object
	702-707	R	Slave 33	See Object: Slave Device object
	708-713	R	Slave 34	See Object: Slave Device object
	714-719	R	Slave 35	See Object: Slave Device object
	720-725	R	Slave 36	See Object: Slave Device object
	726-731	R	Slave 37	See Object: Slave Device object
	732-737	R	Slave 38	See Object: Slave Device object
	738-743	R	Slave 39	See Object: Slave Device object
	744-749	R	Slave 40	See Object: Slave Device object
	750-755	R	Slave 41	See Object: Slave Device object
	756-761	R	Slave 42	See Object: Slave Device object
	762-767	R	Slave 43	See Object: Slave Device object
	768-773	R	Slave 44	See Object: Slave Device object
	774-779	R	Slave 45	See Object: Slave Device object

	780-785	R	Slave 46	See Object: Slave Device object
	786-791	R	Slave 47	See Object: Slave Device object
	792-797	R	Slave 48	See Object: Slave Device object
	798-803	R	Slave 49	See Object: Slave Device object
	804-809	R	Slave 50	See Object: Slave Device object
	810-815	R	Slave 51	See Object: Slave Device object
	816-821	R	Slave 52	See Object: Slave Device object
	822-827	R	Slave 53	See Object: Slave Device object
	828-833	R	Slave 54	See Object: Slave Device object
	834-839	R	Slave 55	See Object: Slave Device object
	840-845	R	Slave 56	See Object: Slave Device object
	846-851	R	Slave 57	See Object: Slave Device object
	852-857	R	Slave 58	See Object: Slave Device object
	858-863	R	Slave 59	See Object: Slave Device object
	864-869	R	Slave 60	See Object: Slave Device object
	870-875	R	Slave 61	See Object: Slave Device object
	876-881	R	Slave 62	See Object: Slave Device object
	882-887	R	Slave 63	See Object: Slave Device object

SIMPLIFIED SLAVE STATUS

	Address	Access	Value	Description
	1001-1002	R	Controller	See Object: SYSTEM status
	1003-1004	R	Slave 1	See Object: SYSTEM status
	1005-1006	R	Slave 2	See Object: SYSTEM status
	1007-1008	R	Slave 3	See Object: SYSTEM status
	1009-1010	R	Slave 4	See Object: SYSTEM status
	1011-1012	R	Slave 5	See Object: SYSTEM status
	1013-1014	R	Slave 6	See Object: SYSTEM status
	1015-1016	R	Slave 7	See Object: SYSTEM status
	1017-1018	R	Slave 8	See Object: SYSTEM status
	1019-1020	R	Slave 9	See Object: SYSTEM status
	1021-1022	R	Slave 10	See Object: SYSTEM status
	1023-1024	R	Slave 11	See Object: SYSTEM status
	1025-1026	R	Slave 12	See Object: SYSTEM status
	1027-1028	R	Slave 13	See Object: SYSTEM status
	1029-1030	R	Slave 14	See Object: SYSTEM status
	1031-1032	R	Slave 15	See Object: SYSTEM status
	1033-1034	R	Slave 16	See Object: SYSTEM status
	1035-1036	R	Slave 17	See Object: SYSTEM status
	1037-1038	R	Slave 18	See Object: SYSTEM status
	1039-1040	R	Slave 19	See Object: SYSTEM status
	1041-1042	R	Slave 20	See Object: SYSTEM status
	1043-1044	R	Slave 21	See Object: SYSTEM status
	1045-1046	R	Slave 22	See Object: SYSTEM status
	1047-1048	R	Slave 23	See Object: SYSTEM status

	1049-1050	R	Slave 24	See Object: SYSTEM status
	1051-1052	R	Slave 25	See Object: SYSTEM status
	1053-1054	R	Slave 26	See Object: SYSTEM status
	1055-1056	R	Slave 27	See Object: SYSTEM status
	1057-1058	R	Slave 28	See Object: SYSTEM status
	1059-1060	R	Slave 29	See Object: SYSTEM status
	1061-1062	R	Slave 30	See Object: SYSTEM status
	1063-1064	R	Slave 31	See Object: SYSTEM status
	1065-1066	R	Slave 32	See Object: SYSTEM status
	1067-1068	R	Slave 33	See Object: SYSTEM status
	1069-1070	R	Slave 34	See Object: SYSTEM status
	1071-1072	R	Slave 35	See Object: SYSTEM status
	1073-1074	R	Slave 36	See Object: SYSTEM status
	1075-1076	R	Slave 37	See Object: SYSTEM status
	1077-1078	R	Slave 38	See Object: SYSTEM status
	1079-1080	R	Slave 39	See Object: SYSTEM status
	1081-1082	R	Slave 40	See Object: SYSTEM status
	1083-1084	R	Slave 41	See Object: SYSTEM status
	1085-1086	R	Slave 42	See Object: SYSTEM status
	1087-1088	R	Slave 43	See Object: SYSTEM status
	1089-1090	R	Slave 44	See Object: SYSTEM status
	1091-1092	R	Slave 45	See Object: SYSTEM status
	1093-1094	R	Slave 46	See Object: SYSTEM status
	1095-1096	R	Slave 47	See Object: SYSTEM status
	1097-1098	R	Slave 48	See Object: SYSTEM status
	1099-1100	R	Slave 49	See Object: SYSTEM status
	1101-1102	R	Slave 50	See Object: SYSTEM status
	1103-1104	R	Slave 51	See Object: SYSTEM status
	1105-1106	R	Slave 52	See Object: SYSTEM status
	1107-1108	R	Slave 53	See Object: SYSTEM status
	1109-1110	R	Slave 54	See Object: SYSTEM status
	1111-1112	R	Slave 55	See Object: SYSTEM status
	1113-1114	R	Slave 56	See Object: SYSTEM status
	1115-1116	R	Slave 57	See Object: SYSTEM status
	1117-1118	R	Slave 58	See Object: SYSTEM status
	1119-1120	R	Slave 59	See Object: SYSTEM status
	1121-1122	R	Slave 60	See Object: SYSTEM status
	1123-1124	R	Slave 61	See Object: SYSTEM status
	1125-1126	R	Slave 62	See Object: SYSTEM status
	1127-1128	R	Slave 63	See Object: SYSTEM status

GROUP STATUS

	Address	Access	Value	Description
	2001-2013	R	Group 1 (Standard)	See Object: Damper group
	2014-2026	R	Group 2	See Object: Damper group
	2027-2039	R	Group 3	See Object: Damper group
	2040-2052	R	Group 4	See Object: Damper group
	2053-2065	R	Group 5	See Object: Damper group
	2066-2078	R	Group 6	See Object: Damper group
	2079-2091	R	Group 7	See Object: Damper group
	2092-2104	R	Group 8	See Object: Damper group
	2105-2117	R	Group 9	See Object: Damper group
	2118-2130	R	Group 10	See Object: Damper group
	2131-2143	R	Group 11	See Object: Damper group
	2144-2156	R	Group 12	See Object: Damper group
	2157-2169	R	Group 13	See Object: Damper group
	2170-2182	R	Group 14	See Object: Damper group
	2183-2195	R	Group 15	See Object: Damper group
	2196-2208	R	Group 16	See Object: Damper group
	2209-2221	R	Group 17	See Object: Damper group
	2222-2234	R	Group 18	See Object: Damper group
	2235-2247	R	Group 19	See Object: Damper group
	2248-2260	R	Group 20	See Object: Damper group
	2261-2273	R	Group 21	See Object: Damper group
	2274-2286	R	Group 22	See Object: Damper group
	2287-2299	R	Group 23	See Object: Damper group
	2300-2312	R	Group 24	See Object: Damper group
	2313-2325	R	Group 25	See Object: Damper group
	2326-2338	R	Group 26	See Object: Damper group
	2339-2351	R	Group 27	See Object: Damper group
	2352-2364	R	Group 28	See Object: Damper group
	2365-2377	R	Group 29	See Object: Damper group
	2378-2390	R	Group 30	See Object: Damper group
	2391-2403	R	Group 31	See Object: Damper group
	2404-2416	R	Group 32	See Object: Damper group
	2417-2429	R	Group 33	See Object: Damper group
	2430-2442	R	Group 34	See Object: Damper group
	2443-2455	R	Group 35	See Object: Damper group
	2456-2468	R	Group 36	See Object: Damper group
	2469-2481	R	Group 37	See Object: Damper group
	2482-2494	R	Group 38	See Object: Damper group
	2495-2507	R	Group 39	See Object: Damper group
	2508-2520	R	Group 40	See Object: Damper group
	2521-2533	R	Group 41	See Object: Damper group
	2534-2546	R	Group 42	See Object: Damper group
	2547-2559	R	Group 43	See Object: Damper group
	2560-2572	R	Group 44	See Object: Damper group
	2573-2585	R	Group 45	See Object: Damper group
	2586-2598	R	Group 46	See Object: Damper group

	2599-2611	R	Group 47	See Object: Damper group
	2612-2624	R	Group 48	See Object: Damper group
	2625-2637	R	Group 49	See Object: Damper group
	2638-2650	R	Group 50	See Object: Damper group
	2651-2663	R	Group 51	See Object: Damper group
	2664-2676	R	Group 52	See Object: Damper group
	2677-2689	R	Group 53	See Object: Damper group
	2690-2702	R	Group 54	See Object: Damper group
	2703-2715	R	Group 55	See Object: Damper group
	2716-2728	R	Group 56	See Object: Damper group
	2729-2741	R	Group 57	See Object: Damper group
	2742-2754	R	Group 58	See Object: Damper group
	2755-2767	R	Group 59	See Object: Damper group
	2768-2780	R	Group 60	See Object: Damper group
	2781-2793	R	Group 61	See Object: Damper group
	2794-2806	R	Group 62	See Object: Damper group
	2807-2819	R	Group 63	See Object: Damper group
	2757-2768	R	Group 64	See Object: Damper group

GROUP STATUS SUMMARY

	Address	Access	Value	Description
	3001-3002	R	Group 1 (Standard)	See Object: Damper group status
	3003-3004	R	Group 2	See Object: Damper group status
	3005-3006	R	Group 3	See Object: Damper group status
	3007-3008	R	Group 4	See Object: Damper group status
	3009-3010	R	Group 5	See Object: Damper group status
	3011-3012	R	Group 6	See Object: Damper group status
	3013-3014	R	Group 7	See Object: Damper group status
	3015-3016	R	Group 8	See Object: Damper group status
	3017-3018	R	Group 9	See Object: Damper group status
	3019-3020	R	Group 10	See Object: Damper group status
	3021-3022	R	Group 11	See Object: Damper group status
	3023-3024	R	Group 12	See Object: Damper group status
	3025-3026	R	Group 13	See Object: Damper group status
	3027-3028	R	Group 14	See Object: Damper group status
	3029-3030	R	Group 15	See Object: Damper group status
	3031-3032	R	Group 16	See Object: Damper group status
	3033-3034	R	Group 17	See Object: Damper group status
	3035-3036	R	Group 18	See Object: Damper group status
	3037-3038	R	Group 19	See Object: Damper group status
	3039-3040	R	Group 20	See Object: Damper group status
	3041-3042	R	Group 21	See Object: Damper group status
	3043-3044	R	Group 22	See Object: Damper group status
	3045-3046	R	Group 23	See Object: Damper group status
	3047-3048	R	Group 24	See Object: Damper group status
	3049-3050	R	Group 25	See Object: Damper group status
	3051-3052	R	Group 26	See Object: Damper group status
	3053-3054	R	Group 27	See Object: Damper group status
	3055-3056	R	Group 28	See Object: Damper group status
	3057-3058	R	Group 29	See Object: Damper group status
	3059-3060	R	Group 30	See Object: Damper group status
	3061-3062	R	Group 31	See Object: Damper group status
	3063-3064	R	Group 32	See Object: Damper group status
	3065-3066	R	Group 33	See Object: Damper group status
	3067-3068	R	Group 34	See Object: Damper group status
	3069-3070	R	Group 35	See Object: Damper group status
	3071-3072	R	Group 36	See Object: Damper group status
	3073-3074	R	Group 37	See Object: Damper group status
	3075-3076	R	Group 38	See Object: Damper group status
	3077-3078	R	Group 39	See Object: Damper group status
	3079-3080	R	Group 40	See Object: Damper group status
	3081-3082	R	Group 41	See Object: Damper group status
	3083-3084	R	Group 42	See Object: Damper group status
	3085-3086	R	Group 43	See Object: Damper group status
	3087-3088	R	Group 44	See Object: Damper group status
	3089-3090	R	Group 45	See Object: Damper group status
	3091-3092	R	Group 46	See Object: Damper group status

	3093-3094	R	Group 47	See Object: Damper group status
	3095-3096	R	Group 48	See Object: Damper group status
	3097-3098	R	Group 49	See Object: Damper group status
	3099-3100	R	Group 50	See Object: Damper group status
	3101-3102	R	Group 51	See Object: Damper group status
	3103-3104	R	Group 52	See Object: Damper group status
	3105-3106	R	Group 53	See Object: Damper group status
	3107-3108	R	Group 54	See Object: Damper group status
	3109-3110	R	Group 55	See Object: Damper group status
	3111-3112	R	Group 56	See Object: Damper group status
	3113-3114	R	Group 57	See Object: Damper group status
	3115-3116	R	Group 58	See Object: Damper group status
	3117-3118	R	Group 59	See Object: Damper group status
	3119-3120	R	Group 60	See Object: Damper group status
	3121-3122	R	Group 61	See Object: Damper group status
	3123-3124	R	Group 62	See Object: Damper group status
	3125-3126	R	Group 63	See Object: Damper group status
	3127-3128	R	Group 64	See Object: Damper group status

GROUP INTERLOCK

	Address	Access	Value	Description
	3201	R/W	Group 1 (Standard)	Group interlocked (0=Off, 1 = Set)
	3202	R/W	Group 2	Group interlocked (0=Off, 1 = Set)
	3203	R/W	Group 3	Group interlocked (0=Off, 1 = Set)
	3204	R/W	Group 4	Group interlocked (0=Off, 1 = Set)
	3205	R/W	Group 5	Group interlocked (0=Off, 1 = Set)
	3206	R/W	Group 6	Group interlocked (0=Off, 1 = Set)
	3207	R/W	Group 7	Group interlocked (0=Off, 1 = Set)
	3208	R/W	Group 8	Group interlocked (0=Off, 1 = Set)
	3209	R/W	Group 9	Group interlocked (0=Off, 1 = Set)
	3210	R/W	Group 10	Group interlocked (0=Off, 1 = Set)
	3211	R/W	Group 11	Group interlocked (0=Off, 1 = Set)
	3212	R/W	Group 12	Group interlocked (0=Off, 1 = Set)
	3213	R/W	Group 13	Group interlocked (0=Off, 1 = Set)
	3214	R/W	Group 14	Group interlocked (0=Off, 1 = Set)
	3215	R/W	Group 15	Group interlocked (0=Off, 1 = Set)
	3216	R/W	Group 16	Group interlocked (0=Off, 1 = Set)
	3217	R/W	Group 17	Group interlocked (0=Off, 1 = Set)
	3218	R/W	Group 18	Group interlocked (0=Off, 1 = Set)
	3219	R/W	Group 19	Group interlocked (0=Off, 1 = Set)
	3220	R/W	Group 20	Group interlocked (0=Off, 1 = Set)
	3221	R/W	Group 21	Group interlocked (0=Off, 1 = Set)
	3222	R/W	Group 22	Group interlocked (0=Off, 1 = Set)
	3223	R/W	Group 23	Group interlocked (0=Off, 1 = Set)
	3224	R/W	Group 24	Group interlocked (0=Off, 1 = Set)
	3225	R/W	Group 25	Group interlocked (0=Off, 1 = Set)
	3226	R/W	Group 26	Group interlocked (0=Off, 1 = Set)
	3227	R/W	Group 27	Group interlocked (0=Off, 1 = Set)

	3228	R/W	Group 28	Group interlocked (0=Off, 1 = Set)
	3229	R/W	Group 29	Group interlocked (0=Off, 1 = Set)
	3230	R/W	Group 30	Group interlocked (0=Off, 1 = Set)
	3231	R/W	Group 31	Group interlocked (0=Off, 1 = Set)
	3232	R/W	Group 32	Group interlocked (0=Off, 1 = Set)
	3233	R/W	Group 33	Group interlocked (0=Off, 1 = Set)
	3234	R/W	Group 34	Group interlocked (0=Off, 1 = Set)
	3235	R/W	Group 35	Group interlocked (0=Off, 1 = Set)
	3236	R/W	Group 36	Group interlocked (0=Off, 1 = Set)
	3237	R/W	Group 37	Group interlocked (0=Off, 1 = Set)
	3238	R/W	Group 38	Group interlocked (0=Off, 1 = Set)
	3239	R/W	Group 39	Group interlocked (0=Off, 1 = Set)
	3240	R/W	Group 40	Group interlocked (0=Off, 1 = Set)
	3241	R/W	Group 41	Group interlocked (0=Off, 1 = Set)
	3242	R/W	Group 42	Group interlocked (0=Off, 1 = Set)
	3243	R/W	Group 43	Group interlocked (0=Off, 1 = Set)
	3244	R/W	Group 44	Group interlocked (0=Off, 1 = Set)
	3245	R/W	Group 45	Group interlocked (0=Off, 1 = Set)
	3246	R/W	Group 46	Group interlocked (0=Off, 1 = Set)
	3247	R/W	Group 47	Group interlocked (0=Off, 1 = Set)
	3248	R/W	Group 48	Group interlocked (0=Off, 1 = Set)
	3249	R/W	Group 49	Group interlocked (0=Off, 1 = Set)
	3250	R/W	Group 50	Group interlocked (0=Off, 1 = Set)
	3251	R/W	Group 51	Group interlocked (0=Off, 1 = Set)
	3252	R/W	Group 52	Group interlocked (0=Off, 1 = Set)
	3253	R/W	Group 53	Group interlocked (0=Off, 1 = Set)
	3254	R/W	Group 54	Group interlocked (0=Off, 1 = Set)
	3255	R/W	Group 55	Group interlocked (0=Off, 1 = Set)
	3256	R/W	Group 56	Group interlocked (0=Off, 1 = Set)
	3257	R/W	Group 57	Group interlocked (0=Off, 1 = Set)
	3258	R/W	Group 58	Group interlocked (0=Off, 1 = Set)
	3259	R/W	Group 59	Group interlocked (0=Off, 1 = Set)
	3260	R/W	Group 60	Group interlocked (0=Off, 1 = Set)
	3261	R/W	Group 61	Group interlocked (0=Off, 1 = Set)
	3262	R/W	Group 62	Group interlocked (0=Off, 1 = Set)
	3263	R/W	Group 63	Group interlocked (0=Off, 1 = Set)
	3264	R/W	Group 64	Group interlocked (0=Off, 1 = Set)

OBJECT: SLAVE DEVICE STATUS

Group	Offset	Access	Value	Description
Device status	0	R	Device type	1 = FICO-PRO 2 = FICO-MINI 3 = FCBB-2 4 = FCBB-4 5 = FCIO-8 10 = FCBA-2 11 = FCFA-1
	1	R	Serial	
	2	R	Configuration	b0 = Damper 1 installed b1 = Damper 2 installed b2 = Damper 3 installed b3 = Damper 4 installed b4 = Detector 1 installed b5 = Detector 2 installed
	3	R	Unit status	b0 = Device restarted b1 = All dampers open b2 = All dampers closed b3 = Fire alarm b4 = Service alarm b5 = Damper generated fire alarm b6 = Damper failure b7 = <not used> b8 = <not used> b9 = <not used> b10 = <not used> b11 = <not used> b12 = <not used> b13 = <not used> b14 = Communication error b15 = reserved, always read as 0
	4	R	Damper status	b0.1 Damper 1 Position (0 = moving, 1=closed, 2=open) b2 Damper 1 Alarm b3 Damper 1 Failure b4.5 Damper 2 Position (0 = moving, 1=closed, 2=open) b6 Damper 2 Alarm b7 Damper 2 Failure b8.9 Damper 3 Position (0 = moving, 1=closed, 2=open) b10 Damper 3 Alarm b11 Damper 3 Failure b12.13 Damper 4 Position (0 = moving, 1=closed, 2=open) b14 Damper 4 Alarm b15 Damper 4 Failure
	5	R	Detector status	b0 = Detector 1 Not present (disconnected) b1 = Detector 1 Fire alarm b2 = Detector 1 Service alarm b3 = not used b4 = Detector 2 Not present (disconnected) b5 = Detector 2 Fire alarm b6 = Detector 2 Service alarm b7 = not used

OBJECT: SYSTEM STATUS

Group	Offset	Access	Value	Description
Slave status	0	R	Device type	1 = FICO-PRO 2 = FICO-MINI 3 = FCBB-2 4 = FCBB-4 5 = FCIO-8 10 = FCBA-2 11 = FCFA-1
	1	R	Unit status	b0 = Device restarted b1 = All dampers open b2 = All dampers closed b3 = Fire alarm b4 = Service alarm b5 = Damper generated fire alarm b6 = Damper failure b7 = <not used> b8 = <not used> b9 = <not used> b10 = <not used> b11 = <not used> b12 = <not used> b13 = <not used> b14 = Communication error b15 = reserved, always read as 0

OBJECT: DAMPER GROUP

Group	Offset	Access	Value	Description
Damper group objects	0	R	Group enabled	
	1	R	Group status	b0 = reserved b1 = All dampers open in group b2 = All dampers closed in group b3 = Fire alarm in group b4 = Service alarm in group b5 = Damper generated fire alarm in group b6 = Damper failure in group b7 = Testing active in group b8 = Testing failed in group b9 = External alarm in group b10 = External interlock in group b11 = reserved, always read as 0 b12 = reserved, always read as 0 b13 = <not used> b14 = Communication error in group b15 = reserved, always read as 0
	2	R	Alarm count	
	3	R	Damper count	
	4	R	Open damper count	
	5	R	Closed damper count	
	6	R	Moving damper count	
	7	R	Damper failure count	
	8	R	Damper alarm count	
	9	R	Detector count	
	10	R	Detector alarm count	
	11	R	Detector service count	
	12	R	Fan count	

OBJECT: DAMPER GROUP STATUS

Group	Offset	Access	Value	Description
Damper group status objects	0	R	Group enabled	
	1	R	Group status	b0 = reserved b1 = All dampers open in group b2 = All dampers closed in group b3 = Fire alarm in group b4 = Service alarm in group b5 = Damper generated fire alarm in group b6 = Damper failure in group b7 = Testing active in group b8 = Testing failed in group b9 = External alarm in group b10 = External interlock in group b11 = Modbus alarm in group b12 = Modbus interlock in group b13 = <not used> b14 = Communication error in group b15 = reserved, always read as 0