Ebm-papst Inc.

Centrifugal Fans and Blowers Series Driver

Supported version TOP Design Studio V4.9 or higher

CONTENTS

We want to thank our customers who use the Touch Operation Panel.

1. System configuration

The system configuration of TOP and "Ebm-papst - R3G400-RP45 Series" is as follows:

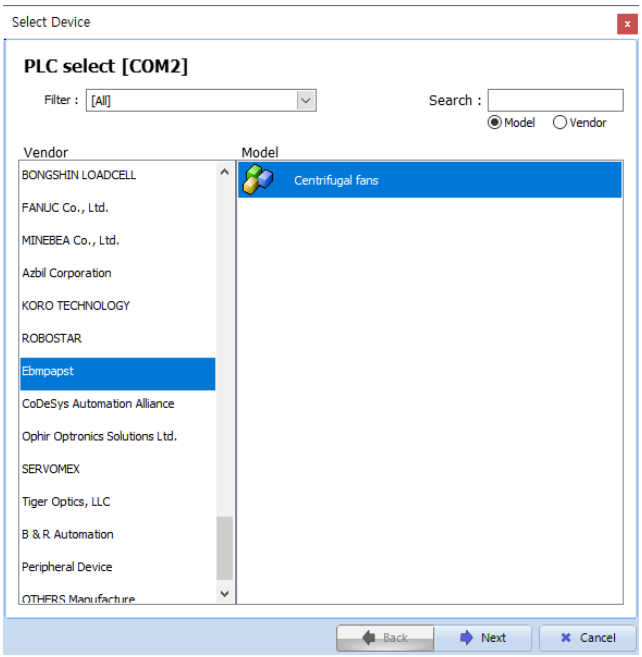
Series	CPU	Link I/F	Communication method	Communication setting	Cable
Ebm-papst	R3G400-RP45	-	RS–485	3. TOP communication setting 4. External device setting	5. Cable table

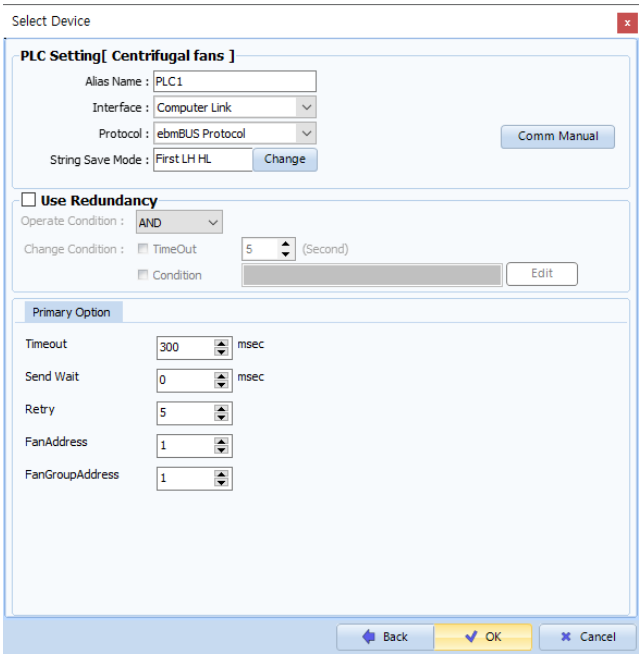
■ Connection configuration

・1:N (one TOP and multiple external devices) connection – configuration which is possible in RS485 communication.

2. External device selection

■ Select a TOP model and a port, and then select an external device.





Settings		Contents
TOP	Model	Check the TOP display and process to select the touch model.
External device	Vendor	Select the vendor of the external device to be connected to TOP. Select "Ebm-papst".
	PLC	Select an external device to connect to TOP. **Model** / **Interface** / **Protocol** R3G400-RP45 Series / Computer Link / ebmBUS Protocol Please check the system configuration in Chapter 1 to see if the external device you want to connect is a model whose system can be configured.

3. TOP communication setting

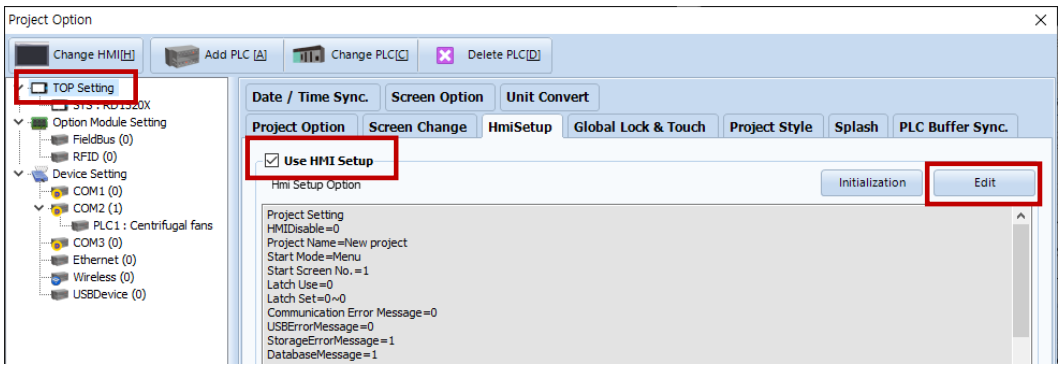
The communication can be set in TOP Design Studio or TOP main menu. The communication should be set in the same way as that of the external device.

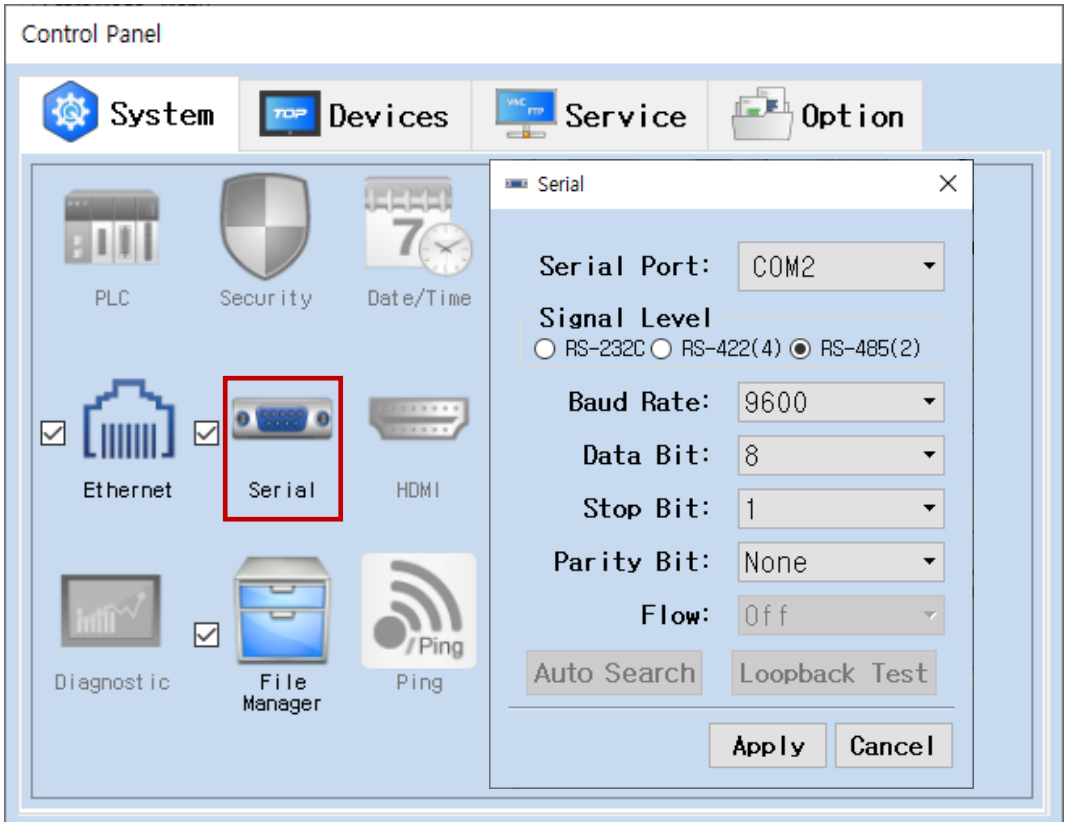
3.1 Communication setting in TOP Design Studio

(1) Communication interface setting

■ [Project > Project Property > TOP Setting] → [Project Option > "Use HMI Setup" Check > Edit > Serial]

– Set the TOP communication interface in TOP Design Studio.





Items	TOP	External device	Remarks
Signal Level (port)	RS-485	RS-485	
Baud Rate	9600		
Data Bit	8		
Stop Bit	1		
Parity Bit	NONE		

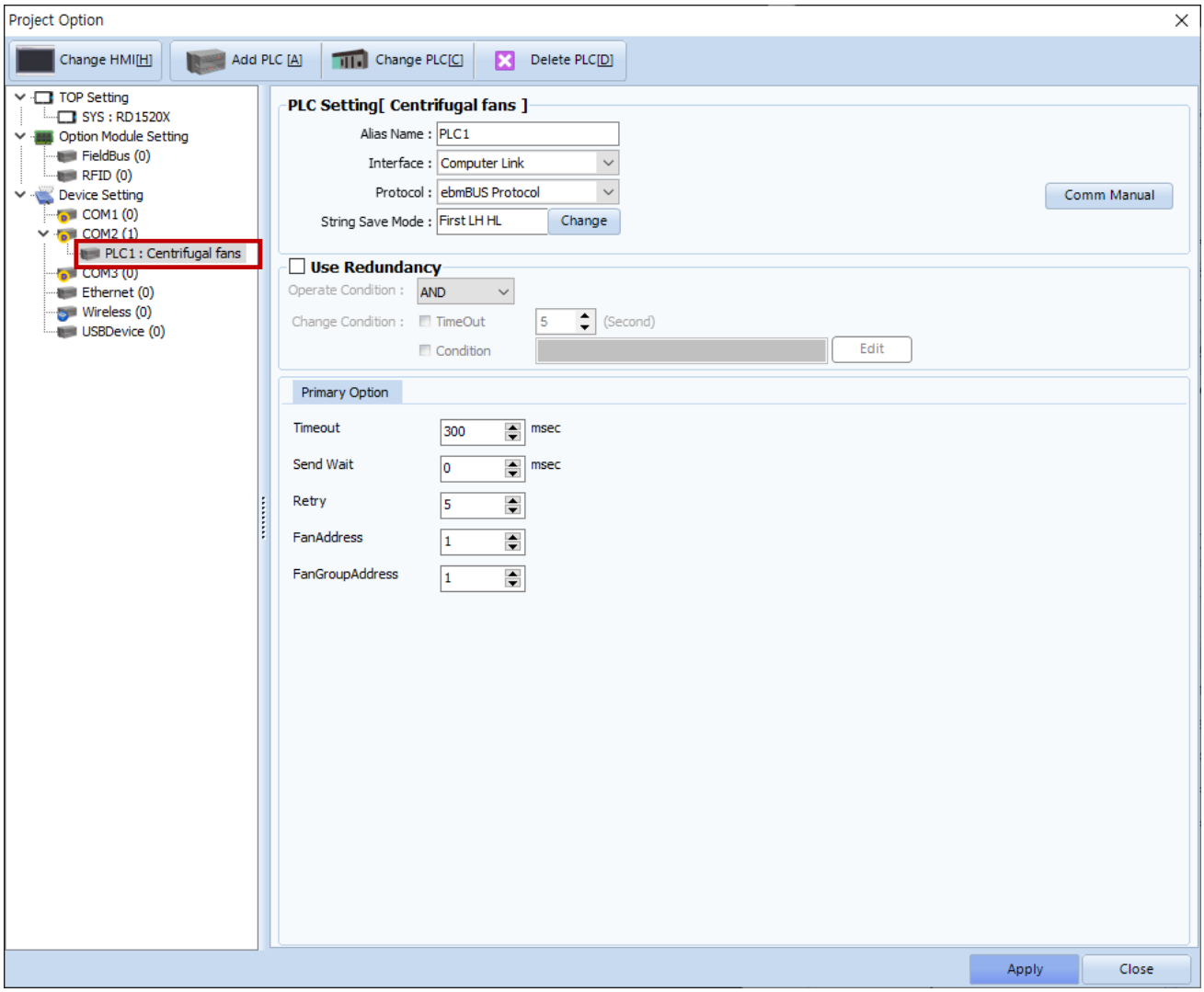
* The above settings are examples recommended by the company.

Items	Description
Signal Level	Select the serial communication method between the TOP and an external device.
Baud Rate	Select the serial communication speed between the TOP and an external device.
Data Bit	Select the serial communication data bit between the TOP and an external device.
Stop Bit	Select the serial communication stop bit between the TOP and an external device.
Parity Bit	Select the serial communication parity bit check method between the TOP and an external device.

(2) Communication option setting

■ [Project > Project Property > Device Setting > COM > "PLC1 : Ebm-papst"]

– Set the options of the R3G400-RP45 Series communication driver in TOP Design Studio.

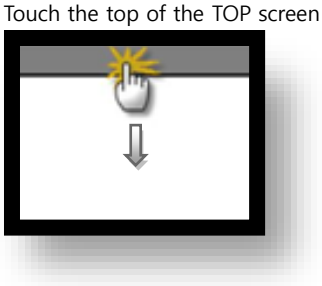


Items	Settings	Remarks
Interface	Select "Computer Link".	Refer to "2. External device selection".
Protocol	Select "ebmBUS Protocol".	
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP's receiving a response from an external device and sending the next command request.	
FanAddress	Individual Fan address (1–31)	
FanGroupAddress	Fan Group address (1–255)	

3.2. Communication setting in TOP

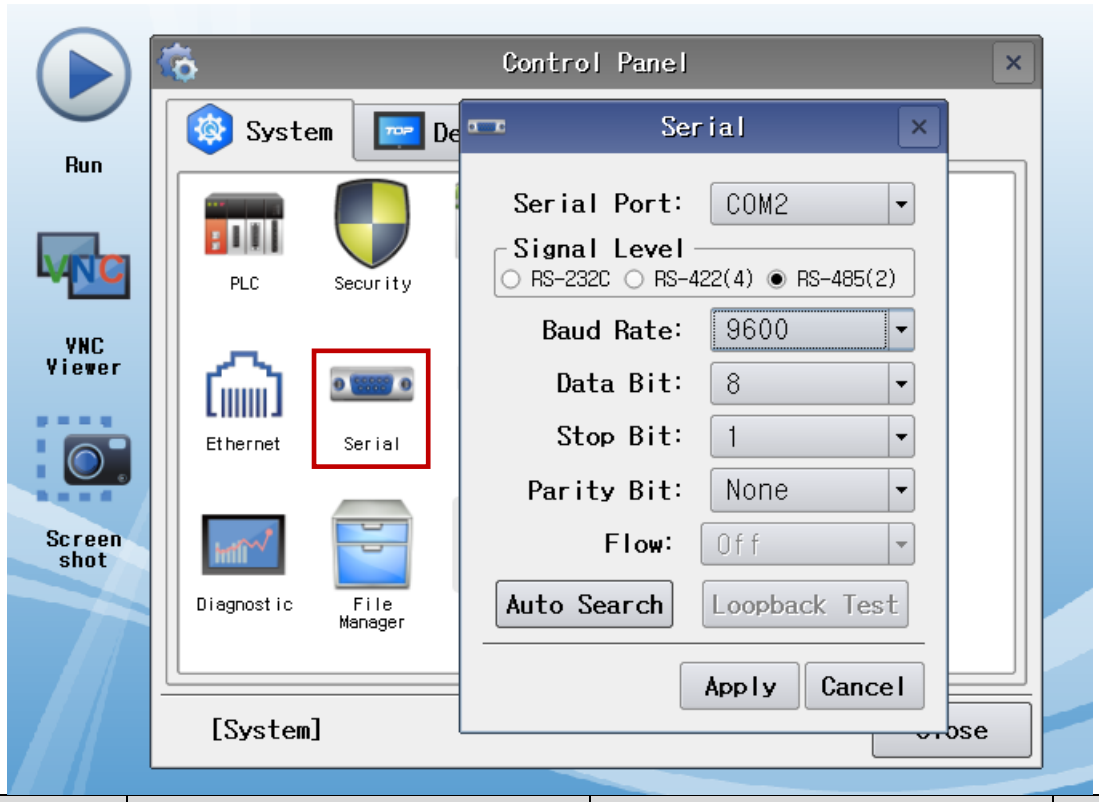
*** This is a setting method when "Use HMI Setup" in the setting items in "3.1 TOP Design Studio" is not checked.**

■ Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.



(1) Communication interface setting

■ [Main Screen > Control Panel > Serial]



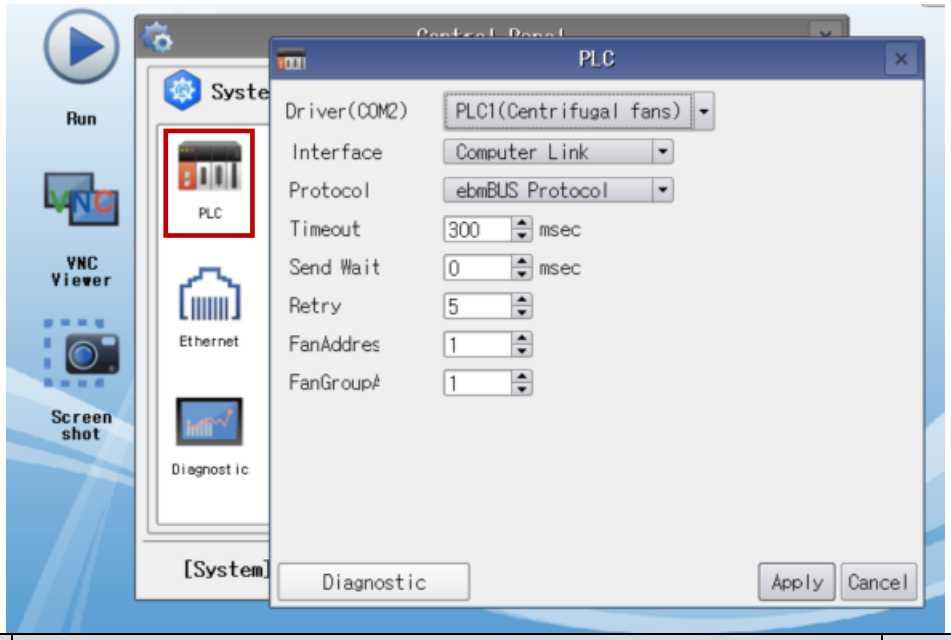
Items	TOP	External device	Remarks
Signal Level (port)	RS-485	RS-485	
Baud Rate	9600		
Data Bit	8		
Stop Bit	1		
Parity Bit	None		

* The above settings are setting examples recommended by the company.

Items	Description
Signal Level	Select the serial communication method between the TOP and an external device.
Baud Rate	Select the serial communication speed between the TOP and an external device.
Data Bit	Select the serial communication data bit between the TOP and an external device.
Stop Bit	Select the serial communication stop bit between the TOP and an external device.
Parity Bit	Select the serial communication parity bit check method between the TOP and an external device.

(2) Communication option setting

■ [Main Screen > Control Panel > PLC]



Items	Settings	Remarks
Interface	Select “Computer Link”.	Refer to “2. External device selection”.
Protocol	Select “ebmBUS Protocol”.	
TimeOut (ms)	Set the time for the TOP to wait for a response from an external device.	
SendWait (ms)	Set the waiting time between TOP’s receiving a response from an external device and sending the next command request.	
FanAddress	Individual Fan address (1–31)	
FanGroupAddress	Fan Group address (1–255)	

3.3 Communication diagnostics

■ Check the interface setting status between the TOP and an external device.

- Touch the top of the TOP screen and drag it down. Touch "EXIT" in the pop-up window to go to the main screen.
- Check if the COM port settings you want to use in [Control Panel > Serial] are the same as those of the external device.

■ Diagnosis of whether the port communication is normal or not

- Touch "Communication diagnostics" in [Control Panel > PLC].
- The Diagnostics dialog box pops up on the screen and determines the diagnostic status.

OK	**Communication setting normal**
Time Out Error	**Communication setting abnormal** - Check the cable, TOP, and external device setting status. **(Reference: Communication diagnostics sheet)**

■ Communication diagnostics sheet

- If there is a problem with the communication connection with an external terminal, please check the settings in the sheet below.

Items	Contents		Check		Remarks
System configuration	How to connect the system		OK	NG	1. System configuration
	Connection cable name		OK	NG	
TOP	Version information		OK	NG	2. External device selection 3. Communication setting
	Port in use		OK	NG	
	Driver name		OK	NG	
	Other detailed settings		OK	NG	
	Relative prefix	Project setting	OK	NG	
		Communication diagnostics	OK	NG	
	Serial Parameter	Transmission Speed	OK	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
External device	CPU name		OK	NG	4. External device setting
	Communication port name (module name)		OK	NG	
	Protocol (mode)		OK	NG	
	Setup Prefix		OK	NG	
	Other detailed settings		OK	NG	
	Serial Parameter	Transmission Speed	OK	NG	
		Data Bit	OK	NG	
		Stop Bit	OK	NG	
		Parity Bit	OK	NG	
	Check address range		OK	NG	6. Supported addresses (For details, please refer to the PLC vendor's manual.)

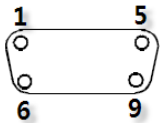
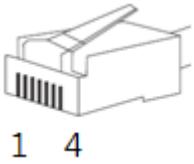
4. External device setting

For more detailed setting method than that described in this example, refer to the PLC user manual.

5. Cable table

This chapter introduces a cable diagram for normal communication between the TOP and the corresponding device.
(The cable diagram described in this section may differ from the recommendations of "MITSUBISHI Electric Corporation")

■ 1:1 connection

TOP			Cable connection	External device		
Pin arrangement*Note 1)	Signal name	Pin number		Pin number	Signal name	Pin arrangement*Note 1)
 Based on communication cable connector front, D-SUB 9 Pin male (male, convex)	RDA	1		3	(+)	 Based on communication cable connector front, 4-pin male RJ45 (Male, convex)
		2				
		3				
	RDB	4		2	(-)	
	SG	5				
	SDA	6				
		7				
		8				
	SDB	9				

*Note 1) The pin arrangement is as seen from the connecting side of the cable connection connector.

■ 1:N connection – Refer to 1:1 connection to connect in the following way.

TOP	Cable connection and signal direction	External device	Cable connection and signal direction	External device
Signal name		Signal name		Signal name
RDA		RTX(+)		RTX(+)
RDB		RTX(-)		RTX(-)
SDA		SG		SG
SDB				
SG				

6. Supported addresses

The devices available in TOP are as follows:

The device range (address) may differ depending on the CPU module series/type. The TOP series supports the maximum address range used by the external device series. Please refer to each CPU module user manual and be take caution to not deviate from the address range supported by the device you want to use.

Device	Bit Address	Word Address		Remark
STATUS	0.00 – 0FF.15	0 – 0FF	get status	Note 1)
EEPROM	0.00 – 03F.15 40.00 –0FF.15	0 – 03F 40–0FF	EEPROM READ,WRITE	
ASPD	0.00 – 0.15	0 – 0	get actual speed	Note 1)
TSPD	0.00 – 0.15	0 – 0	set target speed	Note 2)
RESET	0.00 – 0.15	0 – 0	software reset	Note 2)

*Note 1) Read-only

*Note 2) Write-only

- Status variables

Id	Status variable	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
00	motor status Low Byte	BLK	HLL	TFM	FB	SKF	TFT	-	-
01	motor status High Byte	ESD	AR	UeLow	UzLow	UzHigh	DRV	I_Erd	IzHigh
02	alarm	-	-	-	-	-	OFF	f_Err	IzLim
03	DC link voltage	X	X	X	X	X	X	X	X
04	DC link current	X	X	X	X	X	X	X	X
05	electronics temperature	X	X	X	X	X	X	X	X
06	target value	X	X	X	X	X	X	X	X
07	actual value	X	X	X	X	X	X	X	X
08	closed-loop/open-loop control	X	X	X	X	X	X	X	X
09	direction of rotation	X	X	X	X	X	X	X	X
0A	commutation frequency	X	X	X	X	X	X	X	X
0B	PWM duty cycle	X	X	X	X	X	X	X	X
0C	operation status	X	X	X	X	X	X	X	X
0D	PWM frequency	X	X	X	X	X	X	X	X
0E	operation hours MSB	X	X	X	X	X	X	X	X
0F	operation hours LSB	X	X	X	X	X	X	X	X
10	motor temperature	X	X	X	X	X	X	X	X
11	input voltage	X	X	X	X	X	X	X	X
12	restart timer	X	X	X	X	X	X	X	X
13	input current	X	X	X	X	X	X	X	X
F1	software version Byte 1	X	X	X	X	X	X	X	X
F2	software version Byte 2	X	X	X	X	X	X	X	X
F3	software version Byte 3	X	X	X	X	X	X	X	X

- EEPROM Register

Addr	Register	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
00	fan group	X	X	X	X	X	X	X	X
01	fan address	-	-	-	X	X	X	X	X
02	operation modes 1	SWV	WU	SR	EIR	SWS	SETUP	LR	RSPrio
03	target value	X	X	X	X	X	X	X	X
05	P-factor	X	X	X	X	X	X	X	X
06	I-factor	X	X	X	X	X	X	X	X
07	D-factor	X	X	X	X	X	X	X	X
08	max. speed MSB	X	X	X	X	X	X	X	X
09	max. speed	X	X	X	X	X	X	X	X
0A	max. speed LSB	X	X	X	X	X	X	X	X
0B	max. Duty Cycle	X	X	X	X	X	X	X	X
0C	min. Duty Cycle	X	X	X	X	X	X	X	X
0D	start Duty Cycle	X	X	X	X	X	X	X	X
0E	target value 0	X	X	X	X	X	X	X	X
0F	target value 1	X	X	X	X	X	X	X	X
10	operation modes 2	-	-	-	-	-	-	PMul	EE/DIP
11	rating factor	X	X	X	X	X	X	X	X
40	EEPROM status	-	-	-	-	-	INI	GÜL1	GÜL0
41	motor design number of poles	X	X	X	X	X	X	X	X
42	motor design function	-	-	-	-	Strang	KEY	LR	HW
43	max. admissible Duty Cycle	X	X	X	X	X	X	X	X
49	min. admissible Duty Cycle	X	X	X	X	X	X	X	X
4A	identification	X	X	X	X	X	X	X	X
60	counter DC link overcurrent failure	X	X	X	X	X	X	X	X
61	counter ground leakage failure	X	X	X	X	X	X	X	X
62	counter drive failure	X	X	X	X	X	X	X	X
63	counter DC link overvoltage failure	X	X	X	X	X	X	X	X
64	counter DC link undervoltage failure	X	X	X	X	X	X	X	X
65	counter mains undervoltage failure	X	X	X	X	X	X	X	X
66	counter too many auto restarts	X	X	X	X	X	X	X	X
67	counter external shut downs	X	X	X	X	X	X	X	X
68	counter excessive temp. electronics	X	X	X	X	X	X	X	X
69	counter excessive temperature motor	X	X	X	X	X	X	X	X
6A	counter Hall failure / Back EMF failure	X	X	X	X	X	X	X	X
6B	counter locked motor	X	X	X	X	X	X	X	X
6D	failure display n High Byte	ESD	AR	UeLow	UzLow	UzHigh	DRV	I_Erd	IzHigh

➔ Continue to next chapter

6E	failure display n-1 High Byte	ESD	AR	UeLow	UzLow	UzHigh	DRV	I_Erd	IzHigh
6F	failure display n-2 High Byte	ESD	AR	UeLow	UzLow	UzHigh	DRV	I_Erd	IzHigh
70	failure display n Low Byte	BLK	HLL	TFM	FB	SKF	TFT	-	-
71	failure display n-1 Low Byte	BLK	HLL	TFM	FB	SKF	TFT	-	-
72	failure display n-2 Low Byte	BLK	HLL	TFM	FB	SKF	TFT	-	-
73	operation hour counter MSB	X	X	X	X	X	X	X	X
74	operation hour counter LSB	X	X	X	X	X	X	X	X
75	reset counter MSB	X	X	X	X	X	X	X	X
76	reset counter LSB	X	X	X	X	X	X	X	X
77	software reset counter MSB	X	X	X	X	X	X	X	X
78	software reset counter LSB	X	X	X	X	X	X	X	X
80	manufacturing date code day	X	X	X	X	X	X	X	X
81	manufacturing date code month	X	X	X	X	X	X	X	X
82	manufacturing date code year	X	X	X	X	X	X	X	X
83	serial number MSB	X	X	X	X	X	X	X	X
84	serial number	X	X	X	X	X	X	X	X
85	serial number LSB	X	X	X	X	X	X	X	X
86	max. DC link current	X	X	X	X	X	X	X	X
87	max. ambient temperature	X	X	X	X	X	X	X	X
8A	time 1st commutation	X	X	X	X	X	X	X	X
8B	time 2nd commutation	X	X	X	X	X	X	X	X
8C	time 3rd commutation	X	X	X	X	X	X	X	X
8D	deceleration time	X	X	X	X	X	X	X	X
8E	commutation start time	X	X	X	X	X	X	X	X
8F	time zero-value detection disabled	X	X	X	X	X	X	X	X
90	commutation angle	X	X	X	X	X	X	X	X
91	angle zero-value detection disabled	X	X	X	X	X	X	X	X
92	PWM frequency switching point low	X	X	X	X	X	X	X	X
93	PWM frequency switching point high	X	X	X	X	X	X	X	X
94	PWM frequency for high speed	X	X	X	X	X	X	X	X
95	acceleration ramp	X	X	X	X	X	X	X	X
96	deceleration ramp	X	X	X	X	X	X	X	X
97	min. DC link voltage	X	X	X	X	X	X	X	X
98	min. input voltage	X	X	X	X	X	X	X	X
99	max. number of auto restarts	X	X	X	X	X	X	X	X
9A	auto restart DC link overcurrent	ar_ena	ar_einh	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit
9B	auto restart drive failure	ar_ena	ar_einh	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit
9C	auto restart DC link overvoltage	ar_ena	ar_einh	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit
9D	auto restart DC link undervoltage	ar_ena	ar_einh	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit
9E	auto restart mains undervoltage	ar_ena	ar_einh	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit
9F	auto restart overtemperat. electronics	ar_ena	ar_einh	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit
A0	auto restart overtemperature motor	ar_ena	ar_einh	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit
A1	auto restart locked motor	ar_ena	ar_einh	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit
A2	auto restart Hall / Back EMF failure	ar_ena	ar_einh	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit	ar_zeit
A3	gain voltage r.m.s.	X	X	X	X	X	X	X	X
FB	actual operation mode	SWV	WU	LIRE	-	JUST	EREG	STEU	DREG
FC	actual max. duty cycle	X	X	X	X	X	X	X	X
FD	actual min. duty cycle	X	X	X	X	X	X	X	X
FE	actual target value	X	X	X	X	X	X	X	X
FF	actual sensor value	X	X	X	X	X	X	X	X