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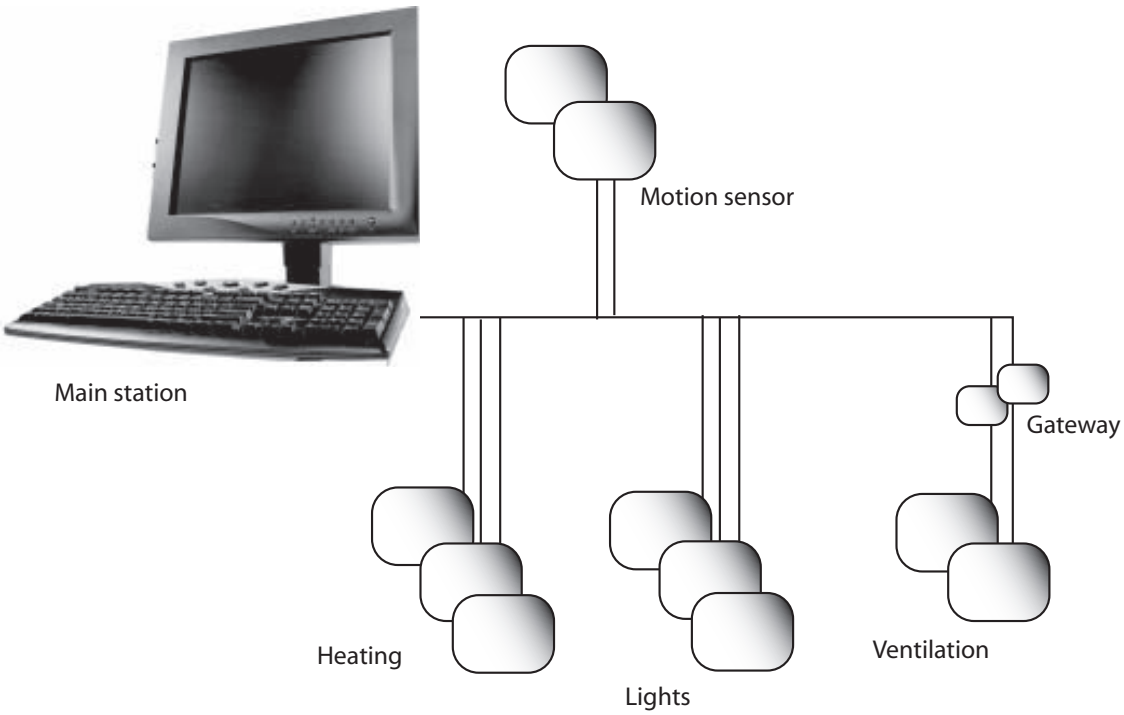

Modbus communication on EXHAUSTO fans with EC motor controls

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1. Product information

1.1 Getting started with Modbus

Getting started with Modbus

Physical interface to the inverter must adhere to these parameters:

Interface:	RS485
Baudrate:	115200
Data bits:	8
Parity:	Even
Stopbit:	1

1.1.1 Selecting Modbus/Analog controlled

The inverter automatically switches to Modbus control when receiving the first valid telegram addressed to it. To return to analog control, the device must be power cycled.

2. Operation (Modbus chapter)

2.1 Addressing the inverter

Addressing the inverter

On a single phase inverter one dip switch is available for address selection, refer to the illustration under the section ‘Connections Single phase’. When the dip switch is off, the inverter always responds to address 1 on the Modbus. When the dip switch is on, programmable Modbus address is used.

To select a software programmable address, follow these recommended steps:

Step	Action
1	Select address 1, using the dip switch.
2	Write the desired address to Modbus holding register 4Fh
3	Remove power from the device.
4	Set the address dip switch ON.
5	Re-apply power to the device.

On a 3-phase inverter the address can be freely chosen from 1-63 using the Dip switches, refer to the illustration under the section ‘Connections Three phase’. When all the dip switches are off, the inverter will use programmable Modbus address.

To select a software programmable address, follow these recommended steps:

Step	Action
1	Select an address, using the dip switches (e.g. address 1: dip1 on, all others off).
2	Write the desired address to Modbus holding register 4Fh
3	Remove power from the device.
4	Set all address dip switches OFF.
5	Re-apply power to the device.
	The programmable address is written to holding register 4Fh. If the register contains the value ‘0’ (default value for a new device) the inverter will respond to address 2. The inverter keeps whatever address was selected at power up. To select a software programmed address, follow these recommended steps:
6	Select address, using the dip switch(es).
7	Write the desired address to Modbus holding register 4Fh
8	Remove power from the device.
9	Change the address dip switch(es).
10	Re-apply power to the device.

Starting the inverter

‘

Step	Action
1	Write the desired RPM value to holding register 2. This value MUST be within MinSpeed - MaxSpeed (holding registers 308h and 303h)
2	Write the value 1 to holding register 1.

Stopping the inverter

Step	Action
1	Write the value 0 to holding register 1.

Keeping the inverter running

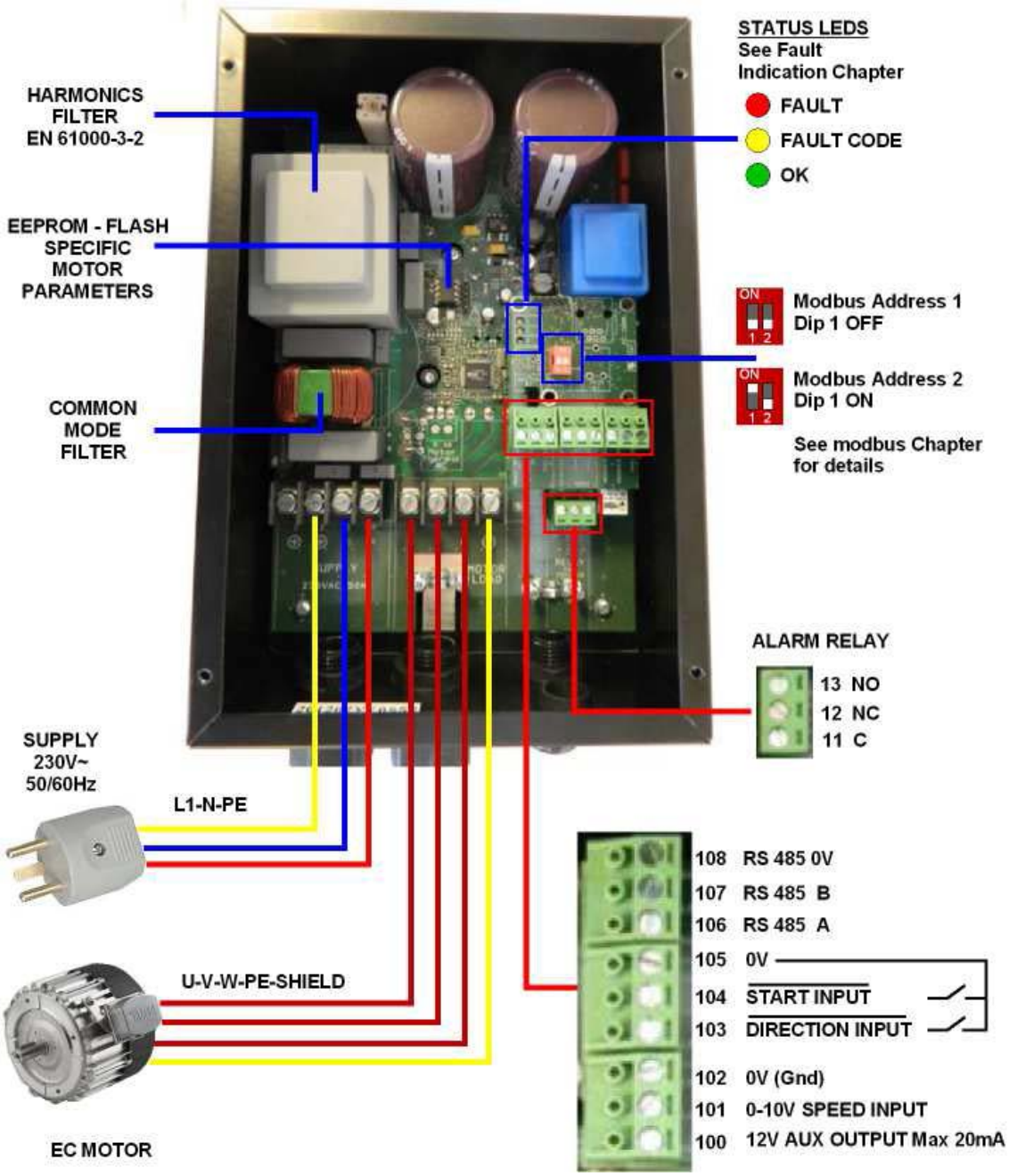
The inverter will stop, and report an error if no valid telegram is received for approximately 10 seconds. To keep the inverter running, simply perform a read from the device more often than that. Once a second is advised to allow for communication errors.

Resetting a fault

Write the value 8 to holding register 1.

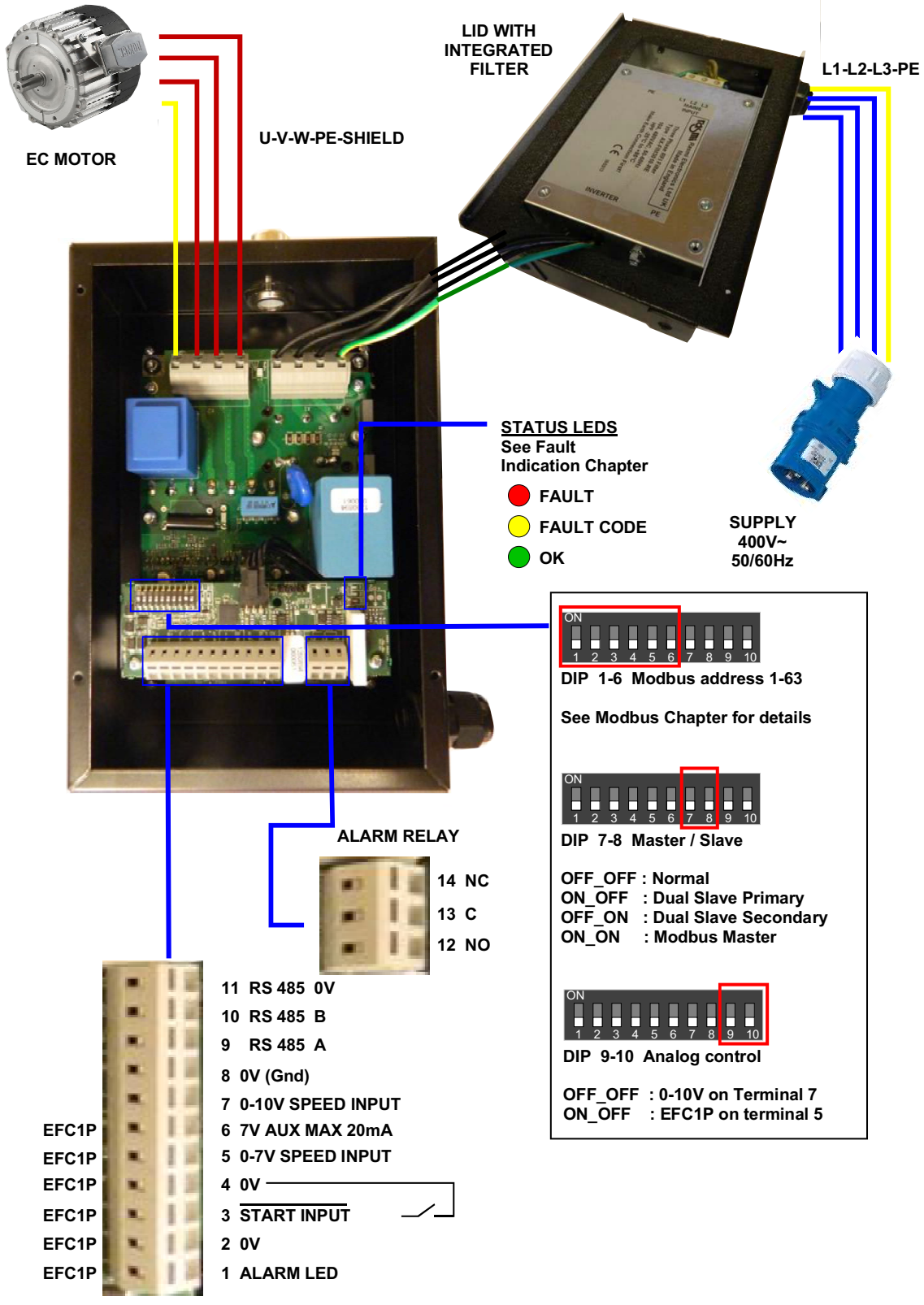
2.2 Connections Single phase

Connections
Single phase



2.3 Connections Three phase

Connections
Three phase



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3. Modbus functions

3.1 Modbus Control

Modbus control

Modbus for Eltwin A/S EC Controllers					Version 1.15			02.11.16
Modbus :	RTU	115200	8 bit	1 stop	Even parity			
								Modbus function 3 for READ of holding registers will be used
								Modbus function 16 for Write to holding registers will be used
Register Name	R/W	Register Type	Register Adress (01)	Unit	Min	Max	Scale	Remark
Operation	R/W	Holding	0x0001	Bit				Bit 0 Run Command 0=stop 1=run
								Bit 1 (Debug feature: Run reverse direction/ Stop immediately)
								Bit 2 Not used
								Bit 3 Fault reset 1=reset
								Bit 4 Not used
								Bit 5 Not used
								Bit 6 Not used
								Bit 7 Not used
								Bit 8 - 15 Special run command
								B4h = Don't stop because of errors! Combine with bit 3 to
								restart automatically as well (and bit 0 to actually run!).
								THIS MODE VOIDS WARRENTY OF ANY KIND
Speed set	R/W	Holding	0x0002	Rpm	Min	Max	1	Minimum to Maximum speed set in RPMs
Supply Volt	Read	Holding	0x0020	Volt	0	Supply		Internal DC Link voltage
Fault contents 1	Read	Holding	0x0021	Bit				Bit 0 Not implemented
								Bit 1 Below voltage 170 or 305V
								Bit 2 Above voltage 255 or 465V
								Bit 3 Not implemented
								Bit 4 Overcurrent - reduced RPM
								Bit 5 Over heat reduce RPM (from NTC in IGBT module 90°C)
								Bit 6 Over heat STOP (from NTC in IGBT module 110°C)
								Bit 7 Hardware error
								Bit 8 MCE Fault IRF Chip general fault
								Bit 9 Motor blocked
								Bit 10 Motor phase missing
								Bit 11 SLAVE fault in Master Slave mode
								Bit 12 Not implemented
								Bit 13 Not implemented
								Bit 14 Not implemented
								Bit 15 Communication Error
Output speed	Read	Holding	0x0024	Rpm	0	65535	1	Actual RPMs
Output voltage	Read	Holding	0x0025	Volt	0	Supply	1	Output modulation in volt
Output current	Read	Holding	0x0026	mA	0	65535	1	Motor current
Output power	Read	Holding	0x0027	W	0	65535	1	Motor power
Alarm log	Read	Holding	0x00C0	Bit				Bit 0-3 Oldest of 4 most recent alarms
								Bit 4-7 2. Oldest
								Bit 8-11 2. Latest
								Bit 12-15 Latest alarm
Temperature	Read	Holding	0x00C1	°C	0	150	1	Temperature measured at the power module
MCE Status flags	Read	Holding	0x00C2	Bits	0	65535	1	Status flags directly from motor control - For supplier test only!
MCE Fault flags	Read	Holding	0x00C3	Bits	0	65535	1	Fault flags directly from motor control - For supplier test only!
Acc operation tim	Read	Holding	0x004C	Hx10	0	65535	1	Accumulated operating hours (hours x 10)
SW ID	Read	Holding	0x004D	ID	0	999	1	Software version in EC controller
Special run	Read	Holding	0x004E	(count)	0	65000	1	Number of times Special run command has been activated
Modbus Address	Read	Holding	0x004F		0	255	1	Configurable modbus address WHEN :
								Dip1-Dip8 = OFF For EC 4800
								Dip1 = ON For EC 180/370/750/1000/1100
Max Speed	Read	Holding	0x0303	Rpm	0	65535	1	Max speed in Rpms as set in EC controller
Min Speed	Read	Holding	0x0308	Rpm	0	65535	1	Min speed in Rpms as set in EC controller
HW ID	Read	Holding	0x005B	ID	0	65535	1	Hardware version in EC Controller
								Bit 0 Ventilator type bit 0
1=VEX 40		22=BESB400		28=BESF250		43=DTV450		Bit 1 Ventilator type bit 1
2=VEX 50		23=BESB500-4-1		29=BESB500-4-3		44=DTH250		Bit 2 Ventilator type bit 2
3=VEX 60		24=BESF180		30=BESF280		45=DTH315		Bit 3 Ventilator type bit 3
4=VEX 70		25=BESF200		40=DTV250		46=DTH400		Bit 4 Ventilator type bit 4
5=VEX 40/1		26=BESF160		41=DTV315		47=VVR250		Bit 5 Ventilator type bit 5
6=VEX 80		27=BESF225		42=DTV400		48=VVR315		Bit 6 Ventilator type bit 6
20=BESB250						60= SKOV GAVL		Bit 7 Ventilator type bit 7
21=BESB315	1 = EC180		6 = EC2200					Bit 8 HW type bit 0
	2 = EC370		7 = EC4800					Bit 9 HW type bit 1
	3 = EC750		8 = EC1000					Bit 10 HW type bit 2
	4 = EC1100							Bit 11 HW type bit 3
	5 = EC1500							Bit 12 Not used
								Bit 13 Not used
NB VEX 80 = 2 x VEX 70 Master Slave								Bit 14 Not used
								Bit 15 Not used

3.2 Fault Indication

Fault indication

Error Code	Bit in Fault Contents 1	Green LED	Red LED	Yellow LED	Error	Relay
None		+	-	-		
1				Reserved	Not implemented	
2	1	-	+	Blinks 2 times / pause 4 sec	Below voltage 170V or 305V	+
3	2	-	+	Blinks 3 times / pause 4 sec	Above voltage 255V or 465V	+
4	4	+	-	Blinks 4 times / pause 4 sec	Overcurrent - reduced RPM	-
5				Reserved	Not implemented	
6	5	+	-	Blinks 6 times / pause 4 sec	Overheating - reduced RPM	-
7	6	-	+	Blinks 7 times / pause 4 sec	Overheating - STOP	+
8	7	-	+	Blinks 8 times / pause 4 sec	Hardware error	+
9	8	-	+	Blinks 9 times / pause 4 sec	MCE Fault IRF Chip general fault	+
10	9	-	+	Blinks 10 times / pause 4 sec	Motor blocked	+
11	10	-	+	Blinks 11 times / pause 4 sec	Motor phase missing	+
12				Reserved	Not implemented	
13				Reserved	Not implemented	
14				Reserved	Not implemented	
15				Reserved	Not implemented	
16	15	-	+	Blinks 16 times / pause 4 sec	Communication error	+

Scan code and go to addresses at
www.exhausto.com

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