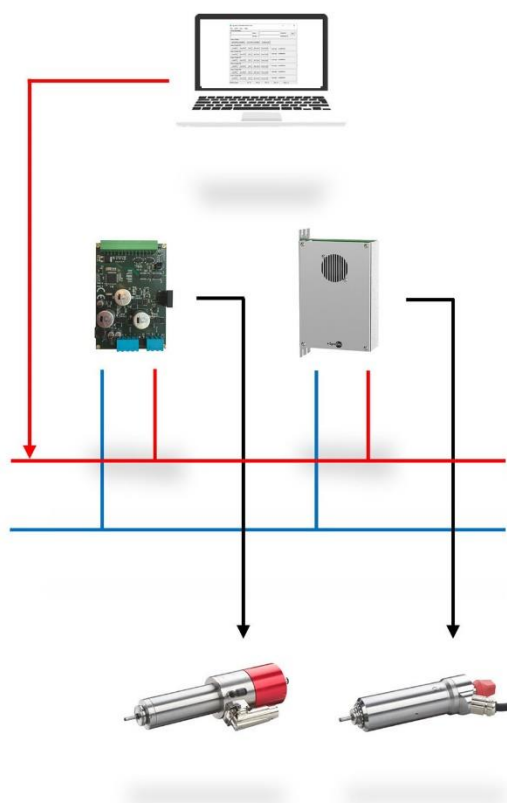


Object description UART Interface

EN

HF Inverter @syDrive® 4330 (IP00), 4330-H (IP10)



INDUSTRIAL DRIVES

**ATTENTION**

This UART Interface object description is only valid in connection with the operating manual of HF Inverter e@syDrive 4330, 4330-H (material no. 2. 003.6718)!

- *The safety information must be observed before commissioning!*



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1 User information

1.1 Symbols used


Operating manual

 ATTENTION	Indicates a hazardous situation that can cause damage to property or mild to moderate injuries.
	Important information for operator and engineer

1.2 Scope of supply


UART Interface object description

Material no.
2.003.6927

 *The current operating manuals and descriptions can be downloaded from the SycoTec website under [Downloads - SycoTec GmbH & Co. KG](#).*

1.3 Important information

Target group: This document is intended for machine manufacturers and persons responsible for putting into service and operating the frequency inverter e@syDrive 4330, 4330-H.

 **ATTENTION**
The operating manual must be read by the user/operator before starting up the unit for the first time in order to avoid incorrect operation and other damage. Duplication and distribution of the operating manual require SycoTec's prior consent.


All specifications, information and properties of the product described in the operating manual correspond to the status on going to press.

Modifications and improvements to the product as a result of new technical developments are possible.

This does not imply any right to retrofitting of existing units.

SycoTec assumes no responsibility for damage arising through:

- Use of incorrect information
- Improper use

 *The safety and application instructions in the hardware description and in the software description of the frequency inverter must be observed!*

 *The software and firmware version must be compatible with each other.*

1.4 Intended use

The UART Interface is used for commissioning and operating of following SycoTec frequency inverters:

	Material no.
HF inverter e@syDrive 4330 (IP00)*	2.003.3952
HF inverter e@syDrive 4330 (IP00) - C** (customized parameter-setting)	2.003.6383
HF inverter e@syDrive 4330-H (IP10)*	2.003.5721
HF inverter e@syDrive 4330-H (IP10) - C** (customized parameter-setting)	2.003.6378

* Preset with default list of parameter settings. No spindle-profile activated. Profile have to be activated via Software.

** Customer specific parameter installed and activated.

This document is valid for all hardware versions.

This document is valid for all following firmware versions:

Firmware version	Remarks
From V1.0 to the latest version	All in this document mentioned commands are possible

2 Interface settings

Baud Rate	115200
Data Bits	8
Parity	None
Stop Bits	1

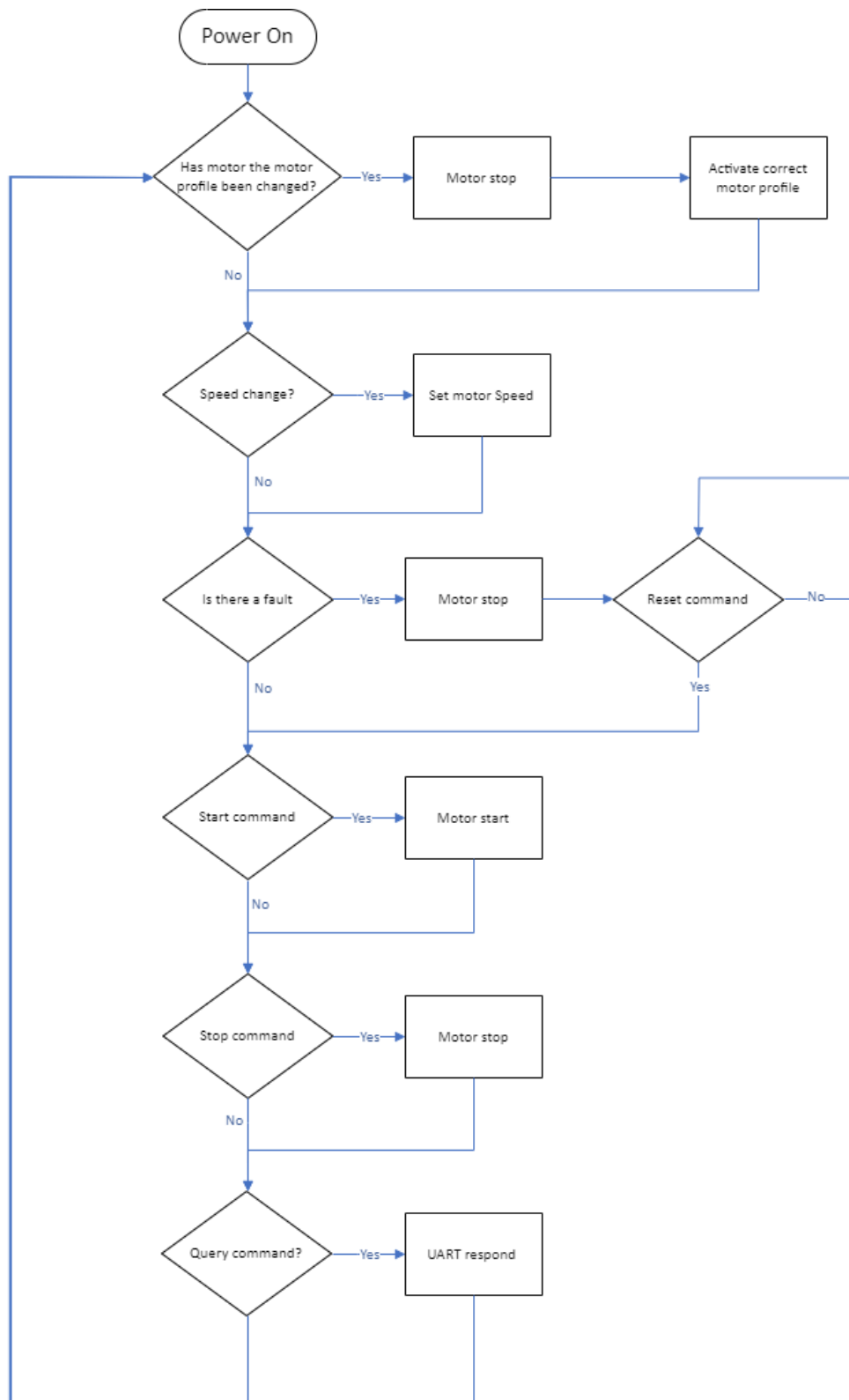
3 UART ZDC Commands

Command	Description
0x0D	Query firmware/hardware version
0x10	Query hardware identifier
0x24	Start motor
0x25	Stop motor
0x01	Set speed
0x90	Change motor profile
0x39	Reset inverter
0x42	Query Speed
0x60	Query status
0xF1	Query internal status
0x70	Query power
0x72	Query bus voltage
0x74	Query current
0x75	Query motor temperature
0x76	Query inverter temperature
0x77	Query name

4 General information

A response of a command is only an acknowledgement of receipt and is not a confirmation that the command was executed successfully. For the confirmation the status of each command sent is required. E.g. if you wanted to set the speed, you should send the "Query Speed" command and compare the values set against the values received.

5 State machine



All commands such as the Query commands can be done at any time.

i The motor will stop if the motor profile is changed.

6 Query firmware/hardware version

SEND:

HEX CODE	Description
0x0D	Query firmware/hardware version

RECEIVE:

HEX CODE	Description
0xDD	Successful reception of the command
SVL	Low byte of the software ident number
SVH	High byte of the software ident number
SVC	Software version
HVL	Low byte of the hardware ident number
HVH	High byte of the hardware ident number
HVC	Hardware version

Detailed information and example which information will be received:

Send:	0x0D						
Receive:	0xDD	0x7B	0x00	0x01	0x01	0x00	0x00
		DL	DH	SW Version	HWID DL	HWID DH	HW ID
Result in HEX:	0x00	0x7B	0x01	0x00	0x01	0x00	
	DH	DL	D	DH	DL	HW ID	
Result in DEC:	123 = Software ID		1 = SW Version	1 = Hardware Version		Hardware ID	

7 Query hardware identifier

Each hardware manufacturer responds to the 0x10 command with its own code:

SEND:

HEX CODE	Description
0x10	Query the board
0x00	Always zero
0x00	Always zero

RECEIVE:

HEX CODE	Description
0xC0	Successful reception of the command
0x02	Low byte of the hardware identifier
0x00	High byte of the hardware identifier

Response is always 0x02

0x02 = Inverter SySyC2-D/E

8 Start motor

SEND:

HEX CODE	Description
0x24	Start Motor

RECEIVE:

HEX CODE	Description
0xE4	Successful reception of the command
DL	Low byte of the set speed
DH	High byte of the set speed

Received value $\text{RPM} \times 10$ is set speed.



ATTENTION

After the command "Start" 0x24h, please make sure that the status word is continuously queried. Otherwise, a spindle stop is automatically triggered after 2sec to ensure that the spindle does not continue to run uncontrolled in the event of a loss of communication with the inverter.

9 Stop motor

SEND:

HEX CODE	Description
0x25	Stop Motor

RECEIVE:

HEX CODE	Description
0xE5	Successful reception of the command
0x00	Low byte of the speed = 0
0x00	High byte of the speed = 0

10 Set speed

SEND:

HEX CODE	Description
0x01	Set speed
DL	Low byte of the desired speed
DH	High byte of the desired speed

RECEIVE:

HEX CODE	Description
0xC1	Successful reception of the command
DL	Low byte of the set speed
DH	High byte of the set speed

The device interprets the sent speed as $\text{RPM} \times 10$

Example:

Send:	0x01	0xA0	0x0F
Receive:	0xC1	0xA0	0x0F
		DL	DH
Result in HEX:	0x0F	0xA0	
	DH	DL	
Result in DEC:	4,000 -> $4,000 \times 10 \text{ RPM} = 40,000 \text{ RPM}$		

E.g.: For a speed of 40,000 rpm 0x01 0xA0 0x0F (4000d) must be sent.

11 Change motor profile

SEND:

HEX CODE	Description
0x90	Motor profile change
0xXY	Spindle code (See spindle table)

RECEIVE:

HEX CODE	Description
0x09	Successful reception of the command
0xXY	Set spindle motor (spindle table)

SPINDLE TABLE:

Spindle Name	Spindle Code
Motor 1 Position	0x00
Motor 2 Position	0x01
Motor 3 Position	0x02
Motor 4 Position	0x03
Motor 5 Position	0x04
Motor 6 Position	0x05

12 Reset inverter

SEND:

HEX CODE	Description
0x39	Reset inverter
0x07	Low Byte
0x77	High Byte

RECEIVE:

HEX CODE	Description
0x93	Successful reception of the command
0x77	Low Byte
0x07	High Byte

Used to reset the inverter and the set values.

13 Query speed

SEND:

HEX CODE	Description
0x42	Query speed

RECEIVE:

HEX CODE	Description
0xC2	Successful reception of the command
DL	Low Byte of the speed
DH	High Byte of the speed

Received value rpm*10 is the current speed.

Send:	0x42		
Receive:	0xC2	0xA0	0x0F
		DL	DH
Result in HEX:	0x0F	0xA0	
	DH	DL	
Result in DEC:	4000 -> 4000*10 RPM = 40,000 RPM		

14 Query status

SEND:

HEX CODE	Description
0x60	Query Status

RECEIVE:

HEX CODE	Description
0xE0	Successful reception of the command
DL	Low byte of the status code
DH	High byte of the status code

Status word description

Bit Position	Name	Description
1	Start Stop	Status Start/Stop
2	Motor Connected	No motor connected
5	At Speed Description	Status Set speed reached after running, high =at speed, low = not at speed
6	Stopped	Spindle stop status, states if the motor has fully stopped spinning
7	Undervoltage	Undervoltage from the 48V power supply
8	Overvoltage	Overvoltage from the 48V power supply
12	Inverter	Error signal from inverter. The inverter fault goes "high" for any fault, but includes faults not stated such as a start fault or a motor stalled fault.
13	Overload	Status overload (over current or overpower)

If a critical status (e.g. undervoltage, overvoltage, overload or overtemperature) occurs, then the control is stopped and the red LED is activated.

To ensure that the motor starts after a fault, send a reset command.

A reset command will also reset the status.

Example:

The status code when the motor is stopped is 0x2040 = 8256 in Decimal (Overload and stopped).

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Level	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
hex	2	0	4	0												

15 Query internal status

SEND:

HEX CODE	Description
0xF1	Query internal status
0x00	Query internal status
0xFF	Query internal status

RECEIVE:

HEX CODE	Description
0xFA	Successful reception of the command
DL	Low byte of the internal status code
DH	High byte of the internal status code

If the response is 0x0000, the status is OK.

Otherwise: see description of the internal status code in the following table

Bit Position	Name	Description
0	Undervoltage status	Undervoltage from the 48V power supply
1	Status overvoltage	Overvoltage from the 48V power supply
2	Status overload	Over current or overpower fault
8	Status reserved	Status reserved
9	Status reserved	Status reserved
10	Status reserved	Status reserved
11	Status reserved	Status reserved

Example:

The internal status code in case of overvoltage is 0x0002

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Level	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
hex	0	0	0	2												

16 Query power

SEND:

HEX CODE	Description
0x70	Query power in W

RECEIVE:

HEX CODE	Description
0x07	Successful reception of the command
DL	Low byte of the power
DH	High byte of the power

Calculates the power using the phase current and the phase voltage.
This is calculated every 5th step of the motor.

Example:

Send:	0x70		
Receive:	0x07	0x1B	0x00
		DL	DH
Result in HEX:	0x00	0x1B	
	DH	DL	
Result in DEC:	27 = 27 W		

17 Query BUS voltage

SEND:

HEX CODE	Description
0x72	Query BUS voltage

RECEIVE:

HEX CODE	Description
0x27	Successful reception of the command
DL	Low byte of the BUS voltage
DH	High byte of the BUS voltage

Received value $V \cdot 0.1$ is the current BUS-voltage.

Example

Send:	0x72		
Receive:	0x27	0xE0	0x01
		DL	DH
Result in HEX:	0x01	0xE	
	DH	DL	
Result in DEC:	480 \rightarrow 480 * 0.1 V = 48.0 V		

18 Query current

This command displays the actual output current Ph-Ph of the motor.

SEND:

HEX CODE	Description
0x74	Query motor current (in 0,1A)

RECEIVE:

HEX CODE	Description
0x47	Successful reception of the command
DL	Low Byte of current
DH	High Byte of current

Received value $A \cdot 0.1$ is the current.

Example:

A current of 2.6 A is measured and is to be read out.

Send:	0x74		
Receive:	0x47	0x1A	0x00
		DL	DH
Result in HEX:	0x00	0x1A	
	DH	DL	
Result in DEC:	26 -> $26 \cdot 0.1A = 2.6 A$		

19 Query motor temperature

SEND:

HEX CODE	Description
0x75	Query motor temperature
DL	Low Byte of the motor temperature value
DH	High Byte of the motor temperature value

RECEIVE:

HEX CODE	Description
0x57	Successful reception of command
DL	Low Byte of the motor temperature value
DH	High Byte of the motor temperature value

This will display the resistor of the temperature sensor (motor) in Ohms.

The motor temperature will only be read if the motor profile states that it should.

If the motor temperature sensor is not connected, and the motor profile dictates that there should be a value, the inverter will flag a fault.

If the motor profile dictates that there shouldn't be a temperature sensor and there is a temperature sensor connected, the temperature will not be read.

Example:

Send:	0x75		
Receive:	0x57	0x81	0x02
		DL	DH
Result in HEX:	0x02	0x81	
	DH	DL	
Result in DEC:	641 = 641 Ohm		

20 Query inverter temperature

SEND:

HEX CODE	Description
0x76	Query inverter temperature
DL	Low Byte of the inverter temperature value
DH	High Byte of the inverter temperature value

RECEIVE:

HEX CODE	Description
0x67	Successful reception of the command
DL	Low Byte of the inverter temperature value
DH	High Byte of the inverter temperature value

This will display temperature in degrees Celsius (°C).

Example

Send:	0x76		
Receive:	0x67	0x19	0x00
		DL	DH
Result in HEX:	0x00	0x19	
	DH	DL	
Result in DEC:	25 = 25 degrees Celsius		

21 Query name

SEND:

HEX CODE	Description
0x77	Query name

RECEIVE:

HEX CODE	Description
0x77	Successful reception of the command
0x53	Byte 0 of the name 'S'
0x59	Byte 1 of the name 'Y'
0x43	Byte 2 of the name 'C'
0x34	Byte 3 of the name '4'
0x33	Byte 4 of the name '3'
0x33	Byte 5 of the name '3'
0x30	Byte 6 of the name '0'
0x2D	Byte 7 of the name '-'
0x44	Byte 8 of the name 'D'
0xXX	Random number
0xXX	Random number
0xXX	Random number
0xXX	Random number
0xXX	Random number
0xXX	Random number
0xXX	Random number

This displays the inverters name, it could be useful for confirming the hard ware.

Warranty Conditions

Under current SycoTec delivery and payment conditions, SycoTec undertakes warranty for satisfactory function and freedom from faults in material and manufacture for a period of 12 months from the date of sale certified by the vendor.

In the event of justifiable complaints, SycoTec shall supply spare parts or carry out repairs free of charge under warranty. SycoTec accepts no liability for defects and their consequences which have arisen or could have arisen as a result of natural wear and tear, improper handling, cleaning or maintenance, non-compliance with the maintenance, operating or connecting instructions, corrosion, impurities in the air supply or chemical or electrical influences which are unusual or not admissible in accordance with SycoTec's standards. The warranty claims shall become null and void if defects or their consequences can be attributed to interventions in or modifications to the product. Warranty claims can only be validated if they are notified immediately in writing to SycoTec.

A copy invoice or delivery note clearly showing the manufacture number shall be attached if products are returned.

2.003.6927 – 2023-09

(EN = original)

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