



SpeedControl E 1045

SpeedControl E 1047

Modbus over RS485

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Version History

Version 1. 20/9-2017. Started the document. For use with software version ?????????????? and up.

General Description

With Modbus it is possible to adjust parameters and export data. It is also possible to control the motor via Modbus by deactivating the 0-10V control signal. The Modbus communication is by default set up for:

Baud Rate = 19200. Parity = Even. Data bits = 8. Stop bits = 1. Modbus ID = 1.

Baud rate and Modbus ID can be changed in holding register 04x0100 and 04x0101.

Holding Register

In the holding registers, it is possible to adjust registers inside the control (with Modbus function 6).

Holding Register Overview

Reg. Add.	Data description	R/W	Length	Min.	Max.	Remark
04x0000	Speed setpoint	R/W	16 bit	0	10000	RPM / 0 -100%
04x0001	Speed setpoint Type	R/W	16 bit	0	1	0 = RPM / 1 = 0 - 100%
04x0002	Set direction	R/W	16 bit	0	1	0 = CCW / 1 = CW
04x0003	Minimum speed	R/W	16 bit	100	10000	RPM
04x0004	Maximum speed	R/W	16 bit	100	10000	RPM
04x0005	Ramp up time	R/W	16 bit	10	1000	Seconds.
04x0006	Ramp down time	R/W	16 bit	10	1000	Seconds.
04x0007	Stop or run at min speed	R/W	16 bit	0	1	0 = stop / 1 = run min.
04x0008	External Speed and RUN signal	R/W	16 bit	0	1	0 = not active / 1 = active
04x0009	External min. speed voltage	R/W	16 bit	0	100	Volt. 10 = 1,0V
04x0010	External max. speed voltage	R/W	16 bit	0	100	Volt. 90 = 9,0V
04x0011	External stop voltage.	R/W	16 bit	0	100	Volt. 5 = 0,5V
04x0012	External direction input enabled	R/W	16 bit	0	1	0=Disabled / 1=Enabled (DIR)
04x0013	Relay output function	R/W	16 bit	0	4	See description of holding registers
04x0014	Auto restart at error times.	R/W	16 bit	0	50	0 = OFF.
04x0015	Auto restart delay time	R/W	16 bit	10	1000	Seconds.
04x0016	Current limit. Running current.	R/W	16 bit	0	2000	Ampere. 200 = 2,00A
04x0017	Current limit. Starting current.	R/W	16 bit	0	2000	Ampere. 200 = 2,00A (only PMSM)
04x0018	Current limit. Breaking current.	R/W	16 bit	0	2000	Ampere. 200 = 2,00A (only PMSM)
04x0019	Auto speed reduce before current limit	R/W	16 bit	0	1	0 = OFF / 1=ON
04x0020	VHZ_Gain	R/W	16 bit	0	65535	Not in use
04x0021	VHZ_Boost	R/W	16 bit	0	65535	Not in use
04x0022	VHZ_modlim	R/W	16 bit	0	65535	Not in use
04x0023	TempReduceLimit	R/W	16 bit	30	87	*C.
04x0024	Start stop times pr hour	R/W	16 bit	0	20	0 = OFF => no effect
04x0025	Minimum Running Time	R/W	16 bit	0	1000	Seconds. 0 = OFF => no effect
04x0026	Minimum Stopping Time	R/W	16 bit	0	1000	Seconds. 0 = OFF => no effect
04x0027	Maximum Start Speed	R/W	16 bit	0	10000	RPM. 0 = OFF => no effect
04x0028	Minimum Start Speed	R/W	16 bit	0	10000	RPM. 0 = OFF => no effect
04x0029	Skip Area 1	R/W	16 bit	0	10000	RPM
04x0030	Skip Area 2	R/W	16 bit	0	10000	RPM
04x0031	Skip Area 3	R/W	16 bit	0	10000	RPM
04x0032	Skip Area 4	R/W	16 bit	0	10000	RPM
04x0033	Skip Area 5	R/W	16 bit	0	10000	RPM
04x0034	Skip Area hysteresis	R/W	16 bit	0	1000	RPM
04x0035	LSC Input Type	R/W	16 bit	0	1	0 = Digital / 1 = Analog
04x0036	LSC Analog Cutoff Value	R/W	16 bit	0	1000	Value
04x0037	LSC Analog Hysteresis Value	R/W	16 bit	0	500	Value
04x0038	LSC Analog Cutoff Area	R/W	16 bit	0	1	0 = Over / 1 = Under
04x0100	Modbus ID (address)	R/W	16 bit	1	247	Address
04x0101	Modbus Baud Rate	R/W	16 bit	1	2	1=9600 and 2=19200
04x0102	Reset Pic and EEPROM	R/W	16 bit	0	65536	54321 => Reset PIC + EEPROM
04x0103	Reset only PIC or EEPROM	R/W	16 bit	0	65536	12345 => Reset EEPROM 23456 => Restart Pic
04x0104	Modbus Heartbeat	R/W	16 bit	0	2000	0=disabled, 1-2000 sec.
04x0105	Save Speed Setpoint in EEPROM on change	R/W	16 bit	0	1	0 = Disabled, 1 = Enabled

Holding register default values

Values for specific motors are listed in the “ES1045_Motor_Selection_for_HitachiHighly group 1 - Ver4.docx” of the specific frequency converter in question.

Reg. Add.	Data description	Motor 1	Motor 2	Motor 3	Motor 4	Motor 5	Motor 6	Motor 7	Motor 8	Motor 9	Motor 10	Motor 11
04x0000	Speed setpoint	0	0	0	0	0	0	0	0	0	0	0
04x0001	Speed setpoint Type	0	0	0	0	0	0	0	0	0	0	0
04x0002	Set direction. Not for compressor	1	1	1	1	1	1	1	1	1	1	1
04x0003	Minimum speed	2400	1600	1600	1600	1600	1600	1600	1600	2000	1400	1200
04x0004	Maximum speed	6000	6000	6000	6000	6000	6000	6000	6000	6000	7400	7000
04x0005	Ramp up time	30	30	30	30	30	30	30	30	30	30	30
04x0006	Ramp down time	30	30	30	30	30	30	30	30	30	30	30
04x0007	Stop or run at min speed	0	0	0	0	0	0	0	0	0	0	0
04x0008	External Speed and RUN signal	1	1	1	1	1	1	1	1	1	1	1
04x0009	External min. speed voltage	10	10	10	10	10	10	10	10	10	10	10
04x0010	External max. speed voltage	100	100	100	100	100	100	100	100	100	100	100
04x0011	External stop voltage.	5	5	5	5	5	5	5	5	5	5	5
04x0012	External direction input enabled	0	0	0	0	0	0	0	0	0	0	0
04x0013	Relay output function	3	3	3	3	3	3	3	3	3	3	3
04x0014	Auto restart at error times.	5	5	5	5	5	5	5	5	5	5	5
04x0015	Auto restart delay time	20	20	20	20	20	20	20	20	20	20	20
04x0016	Current limit. Running current. *2	450	500	700	700	700	700	700	700	500	700	700
04x0017	Current limit. Starting current.	500	800	800	800	800	800	800	800	500	800	700
04x0018	Current limit. Breaking current.	0	0	0	0	0	0	0	0	0	0	0
04x0019	Auto speed reduce before current limit	1	1	1	1	1	1	1	1	1	1	1
04x0020	VHZ Gain	0	0	0	0	0	0	0	0	0	0	0
04x0021	VHZ Boost	0	0	0	0	0	0	0	0	0	0	0
04x0022	VHZ_modlim	0	0	0	0	0	0	0	0	0	0	0
04x0023	TempReduceLimit	87	87	87	87	87	87	87	87	87	87	87
04x0024	Start stop times per hour	6	6	10	6	6	10	10	10	10	10	10
04x0025	Minimum Running Time	180	180	180	180	180	180	180	180	180	180	180
04x0026	Minimum Stopping Time	180	180	180	180	180	180	180	180	240	240	240
04x0027	Maximum Start Speed	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
04x0028	Minimum Start Speed	2200	2200	2200	2200	2200	2200	2200	2200	2200	2400	2200
04x0029	Skip Area 1	0	0	0	0	0	0	0	0	0	0	0
04x0030	Skip Area 2	0	0	0	0	0	0	0	0	0	0	0
04x0031	Skip Area 3	0	0	0	0	0	0	0	0	0	0	0
04x0032	Skip Area 4	0	0	0	0	0	0	0	0	0	0	0
04x0033	Skip Area 5	0	0	0	0	0	0	0	0	0	0	0
04x0034	Skip Area hysteresis	50	50	50	50	50	50	50	50	50	50	50
04x0035	LSC Input Type	0	0	0	0	0	0	0	0	0	0	0
04x0036	LSC Analog Cutoff Value	225	225	225	225	225	225	225	225	225	225	225
04x0037	LSC Analog Hysteresis Value	80	80	80	80	80	80	80	80	80	80	80
04x0038	LSC Analog Cutoff Area	1	1	1	1	1	1	1	1	1	1	1
04x0100	Modbus ID (address)	1	1	1	1	1	1	1	1	1	1	1
04x0101	Modbus Baud Rate	2	2	2	2	2	2	2	2	2	2	2
04x0102	Reset Pic and EEPROM	0	0	0	0	0	0	0	0	0	0	0
04x0103	Reset only PIC or EEPROM	0	0	0	0	0	0	0	0	0	0	0
04x0104	Modbus Heartbeat	0	0	0	0	0	0	0	0	0	0	0
04x0105	Save Speed Setpoint in EEPROM on change	0	0	0	0	0	0	0	0	0	0	0

*2 Note that the maximum current for 1500W version is 5.5A and for the 2000W it is 6.5A, regardless of what value is written in holding register 04x0016.

Holding Register Description

04x0000: "Speed setpoint"

The register is used to set the motor speed.

The motor is always stopped if "Speed setpoint" is lower than minimum speed (see 04x0003).

Note: This register is only active if register 04x0008 is set to 0.

If 04x0001 is set to 0, the speed is set in rpm.

If 04x0001 is set to 1, the speed is set in %. (0%=min. rpm and 100%=max. rpm)

04x0001: "Speed setpoint Type"

This register is used to choose whether "Speed setpoint" (04x0000) is specified in rpm or %.

If set to 0, the rpm has been chosen.

If set to 1, the % has been chosen.

04x0002: "Set direction"

This register is used to choose whether the motor is to run CCW or CW.

If set to 0, CCW has been chosen.

If set to 1, CW has been chosen.

Note: The register is only active if register 04x0012 is set to 0.

The register only alters the direction when the motor is at a still stand.

04x0003: "Minimum speed"

This register is used to choose the minimum speed for the motor in rpm.

If a speed lower than the absolute minimum speed of the motor is chosen, the speed will never be regulated lower than the absolute minimum speed.

For further information on minimum speed of the motor, please consult the specifications of the motor in question.

04x0004: "Maximum speed"

This register is used to choose the maximum speed for the motor in rpm.

If a speed higher than the absolute maximum speed of the motor is chosen, the speed will never be regulated higher than the absolute maximum speed.

For further information on maximum speed of the motor, please consult the specifications of the motor in question.

04x0005: "Ramp up time"

This register is used to choose how fast the speed accelerates from min to max in seconds.

However, it is not possible to regulate faster than the internal ramp up time (eg. max 100rpm/second).

04x0006: "Ramp down time"

This register is used to choose how fast the speed is turned down from max to min in seconds.

However, it is not possible to regulate faster than the internal ramp time (eg. max 100rpm/second).

04x0007: "Run or stop at min speed"

This register is used to choose whether the motor should stop or run at minimum speed if asked to run below minimum speed. This is only valid if the control signal is a 0 – 10V signal.

If set to 0, stop is chosen.

If set to 1, minimum speed is chosen.

04x0008: "External Speed and RUN signal"

This register is used to choose that the motor is controlled by the external 0 - 10V signal and the RUN signal.

If set to 0, the control is according to Modbus settings.

If set to 1, the control is according to the external 0 – 10V signal and RUN signal.

04x0009: "External min. speed voltage"

This register is used to set the voltage of the minimum speed by means of the 0 – 10 V signal. Note that 10 correspond to 1,0V.

Note: The register is only active if register 04x0008 is set to 1.

04x00010: "External max. speed voltage"

This register is used to set the voltage of the maximum speed by means of the 0 – 10 V signal. Note that 90 correspond to 9,0V.

Note: The register is only active if register 04x0008 is set to 1.

04x00011: "External stop voltage"

This register is used to set the voltage level at which the motor should stop by means of the 0 – 10 V signal. If the control voltage decreases to this level or a lower level, the motor will stop. Note that 5 corresponds to 0,5V.

Note: The register is only active if register 04x0007 is set to 0 and 04x0008 is set to 1.

04x00012: "External direction input enabled"

This register is used to set the frequency converter to be controlled via the external DIR signal.

If set to 0, the control is according to Modbus settings.

If set to 1, the control is according to the external DIR signal.

04x00013: "Relay output function"

This register is used to choose how the alarm relay is to function.

If set to 0: Relay is OFF all the time.

If set to 1: Relay is ON in ready state.

If set to 2: Relay is ON when motor is running.

If set to 3: Relay is ON in case of error.

If set to 4: Relay is ON, no error.

04x00014: "Auto restart at error times"

This register is used to set how many times within 24 hours the frequency converter is allowed to try to restart after an error.

If set to 0: OFF. The frequency converter will not attempt automatic restart.

If set to 1-50: Number of times automatic restart may be attempted within 24 hours before the alarm is activated.

04x00015: "Auto restart delay time"

This register is used to choose how long the frequency converter should wait before attempt-ting to restart after having registered an error. The time is set in seconds.

Note: If the value in register 04x0026 is higher than 0, 04x0015 must always be higher than the value in 04x0026.

If the value in 04x0015 is set to a lower value than the one in 04x0026, the controller automatic sets the value equal to the value in 04x0026.

04x00016: "Current limit. Running current"

This register is used to set the maximum current which the motor should not exceed in operation. Limit will automatic be adjusted down to 550 if set higher than 550 in a 1500W model. Limit will automatic be adjusted down to 650 if set higher than 650 in a 2000W model.

At PMSM/BLDC motors the speed will be regulated to a lower speed when the limit is reached, but never lower than the minimum speed.

At ACIM motors the down regulation function can be deactivated (Register 04x0019) and the motor will stop if the current exceeds the limit. The time until the motor stops depends on the current and the excess time. Otherwise the speed is regulated to a lower speed in ACIM.

Note 200 correspond to 2,00A.

04x00017: "Current limit. Starting current"

This register is used to set the current at which the motor will start. This register is only used for PMSM / BLDC motors. For ACIM motors, this feature has no function.

Note 200 correspond to 2,00A.

04x00018: "Current limit. Breaking current"

This register is used to set the current which the motor is allowed to receive during braking. This register is only active for PMSM / BLDC motors and if the chosen motor profile supports the use of a special brake function. For ACIM motors, this feature has no function.

Note 200 correspond to 2,00A.

- 04x00019: "Auto speed reduces before current limit"
This register is used to set whether the ACIM motor should be reduced in speed or stopped if the limit for running current is exceeded.
Not used for PM motors.
If set to 0: The motor is stopped when the limit is exceeded.
If set to 1: The motor speed is lowered as long as the limit is exceeded.
- 04x00020: "VHZ_Gain"
This register has no function.
- 04x00021: "VHZ_Boost"
This register has no function.
- 04x00022: "VHZ_ModLim"
This register has no function.
- 04x00023: "TempReduceLimit"
This register is used to set at which temperature (on the power module surface) the speed should be down regulated to protect the frequency converter.
- 04x00024: "Start stop times per hour"
This register is used to set how often the motor is allowed to start and stop within an hour.
If set to 0: This register will be ignored.
If set to 1 - 20: It is only possible to start and stop the motor the set number of times within an hour.
- 04x00025: "Minimum Running Time"
This register is used to set the minimum time period (in seconds), the motor must run before it can be stopped. Used for e.g. compressor operation.
If set to 0: This register will be ignored.
If set to 1 - 1000: The motor will at minimum run the set number of seconds.
- 04x00026: "Minimum Stopping Time"
This register is used to set the minimum time period (in seconds), the motor must be at a still stand before it can be started again. Used for e.g. compressor operation.
If set to 0: This register will be ignored.
If set to 1 - 60: The motor will be stopped for 60 seconds.
If set to 61 - 1000: The motor will be stopped for the given number of seconds.
- 04x00027: "Maximum Start RPM"
This register is used to set the maximum speed the motor can run at startup in the given time "Minimum Running Time" (register 04x00025). Used especially for compressor operation.
If set to 0: This register will be ignored.
If set to 1 - 10000: The maximum speed at which the motor can start.
- 04x00028: "Minimum Start RPM"
This register is used to set the minimum speed the motor can run at startup in the given time "Minimum Running Time" (register 04x00025). Used especially for compressor operation.
If set to 0: This register will be ignored.
If set to 1 - 10000: The maximum speed at which the motor can start.
- 04x00029: "Skip area 1"
This register is used to set the 1. skip area. Enter the center of the area in RPM.
If set to 0 - 10000: Center of Area 1 to skip in RPM.
- 04x00030: "Skip area 2"
This register is used to set the 2. skip area. Enter the center of the area in RPM.
If set to 0 - 10000: Center of Area 2 to skip in RPM.

- 04x00031: "Skip area 3"
This register is used to set the 3. skip area. Enter the center of the area in RPM.
If set to 0 - 10000: Center of Area 3 to skip in RPM.
- 04x00032: "Skip area 4"
This register is used to set the 4. skip area. Enter the center of the area in RPM.
If set to 0 - 10000: Center of Area 4 to skip in RPM.
- 04x00033: "Skip area 5"
This register is used to set the 5. skip area. Enter the center of the area in RPM.
If set to 0 - 10000: Center of Area 5 to skip in RPM.
- 04x00034: "Skip area hysteresis"
This register is used to set the hysteresis of all the skip areas. Enter the hysteresis of the the skip areas in RPM. This indicates how far over or under center of the area the RPM is adjusted.
If set to 0 – 1000: Hysteresis for all the skip areas in RPM.
- 04x00035: "LSC Input Type"
This register is used to set the input type of the LSC input.
If set to 0: The LSC input is setup for use with a thermal switch (digital input).
If set to 1: The LSC input is setup for use with a thermistor (analog input).
- 04x00036: "LSC Analog Cutoff Value"
This register is used to set at which value the thermistor is indicating a fault.
If set to 0 - 1000: Analog value at where thermistor is indicating fault.
- 04x00037: "LSC Analog Hysteresis Value"
This register is used to set at how far away the analog value must be from cutoff value to indicate that there no longer is a fault .
If set to 0 - 1000: Analog hysteresis value at where thermistor is not indicating fault.
- 04x00038: "LSC Analog Cutoff Area"
This register is used to set if a fault is detected over or under "04x00036"
If set to 0: Fault is detected over value (PTC).
If set to 1: Fault is detected under value (NTC).
- 04x00100: "Modbus ID"
This register is used to set Modbus ID (address).
If set to 0 - 247: Modbus ID (address).
- 04x00101: "Modbus Baud Rate"
This register is used to set Modbus Baud Rate..
If set to 1: 9600 Baud.
If set to 2: 19200 Baud
- 04x00102: "Reset Pic and EEPROM"
This register is used to set Reset Pic and EEPROM. Inverter will restart.
If set to 54321: Reset of Pic og EEPROM is initialized (Also register: Modbus ID).
- 04x00103: "Reset only Pic or EEPROM"
This register is used to set Reset Pic or EEPROM
If set to 12345: Reset EEPROM to default (But not register: Modbus ID).
If set to 23456: Reset of Pic is initialized.
- 04x00104: "Modbus Heartbeat"
This register is used to set how often Modbus Heartbeat must be registered.
If set to 0: Disabled.
If set to 1 – 2000: Seconds between heartbeats.

04x00105: "Save Speed setpoint i EEPROM on change"

This register is used to set if Speed Setpoint is stored in EEPROM.

If set to 0: Disabled.

Input Register

Using Modbus makes it possible to obtain a wide range of information on the status of the entire system. The values below are exported from the Modbus registers.

Input Register Overview

Reg. Add.	Data description	R/W	Length	Min.	Max.	Remark
03x0000	Speed target	R	16 bit	0	10000	RPM
03x0001	Speed measured	R	16 bit	0	10000	RPM
03x0002	External speed signal	R	16 bit	0	100	Volt. 10 correspond to 1,0V.
03x0003	External LSC signal	R	16 bit	0	1	0 = open / 1 = closed
03x0004	External DIR signal	R	16 bit	0	1	0 = open / 1 = closed
03x0005	External RUN signal	R	16 bit	0	1	0 = open / 1 = closed
03x0006	External ALARM Relay	R	16 bit	0	1	0 = open / 1 = closed
03x0007	Temperature power module	R	16 bit	0	120	*C. Cannot show less than 28.
03x0008	Temperature cabinet	R	16 bit	0	120	*C.
03x0009	Error Code	R	16 bit	0	65535	
03x0010	Error Code2	R	16 bit	0	65535	
03x0011	Fatal FOF error	R	16 bit	0	1	
03x0012	Status Code	R	16 bit	0	65535	
03x0013	Hour counter	R	16 bit	0	65535	Hour.
03x0014	DC voltage	R	16 bit	0	1000	Volt.
03x0015	Motor current	R	16 bit	0	2000	Ampere. 200 = 2,00A.
03x0016	Model number	R	16 bit	0	1000	
03x0017	Rated Motor Current	R	16 bit	0	2000	Ampere. 200 = 2,00A
03x0018	VoltageMotorAC	R	16 bit	0	1000	Volt.
03x0019	Number of restarts	R	16 bit	0	65535	
03x0020	Dip switch position	R	16 bit	0	65535	Only shows a number from 0 to 15.
03x0020	LSC Analog Value	R	16 bit	0	1000	

Reg. Add.	Data description	R/W	Length	Min.	Max.	Remark
03x0100	Hours at temperature 0 to 10	R	16 bit	0	65535	Hours
03x0101	Hours at temperature 10 to 20	R	16 bit	0	65535	Hours
03x0102	Hours at temperature 20 to 30	R	16 bit	0	65535	Hours
03x0103	Hours at temperature 30 to 40	R	16 bit	0	65535	Hours
03x0104	Hours at temperature 40 to 50	R	16 bit	0	65535	Hours
03x0105	Hours at temperature 50 to 60	R	16 bit	0	65535	Hours
03x0106	Hours at temperature 60 to 70	R	16 bit	0	65535	Hours
03x0107	Hours at temperature 70 to 80	R	16 bit	0	65535	Hours
03x0108	Hours at temperature 80 to 90	R	16 bit	0	65535	Hours
03x0109	Hours at temperature 90 to 100	R	16 bit	0	65535	Hours
03x0110	Hours at temperature 100 to 110	R	16 bit	0	65535	Hours

Reg. Add.	Data description	R/W	Length	Min.	Max.	Remark
03x0120	Hour count current 0 – 1A	R	16 bit	0	65535	Hours
03x0121	Hour count current 1 – 2A	R	16 bit	0	65535	Hours
03x0122	Hour count current 2 – 3A	R	16 bit	0	65535	Hours
03x0123	Hour count current 3 – 4A	R	16 bit	0	65535	Hours
03x0124	Hour count current 4 – 5A	R	16 bit	0	65535	Hours
03x0125	Hour count current 5 – 6A	R	16 bit	0	65535	Hours
03x0126	Hour count current 6 – 7A	R	16 bit	0	65535	Hours
03x0127	Hour count current 7 – 8A	R	16 bit	0	65535	Hours
03x0128	Hour count current 8 – 9A	R	16 bit	0	65535	Hours
03x0129	Hour count current 9 – 10A	R	16 bit	0	65535	Hours

Reg. Add.	Data description	R/W	Length	Min.	Max.	Remark
03x0200	Pic Contoller Version	R	16 bit	0	1000	
03x0201	Pic Contoller Subversion	R	16 bit	97	122	
03x0202	Modbus Version	R	16 bit	0	1000	
03x0203	Modbus Subversion	R	16 bit	97	122	
03x0204	IR MCE Software Version	R	16 bit	0	1000	1xx = ACIM V.xx, / 2xx = PMSM V.xx,
03x0205	IR LSC Software Version	R	16 bit	0	1000	10 = 1,0
03x0206	IR LSC SUB software Version	R	16 bit	0	1000	

Reg. Add.	Data description	R/W	Length	Min.	Max.	Remark
03x0300	Debug Value 1	R	16 bit	0	65535	Not in use
03x0301	Debug Value 2	R	16 bit	0	65535	Not in use
03x0302	Debug Value 3	R	16 bit	0	65535	Not in use
03x0303	Debug Value 4	R	16 bit	0	65535	Not in use
03x0304	Debug Value 5	R	16 bit	0	65535	Not in use
03x0305	Debug Value 6	R	16 bit	0	65535	Not in use
03x0306	Debug Value 7	R	16 bit	0	65535	Not in use
03x0307	Debug Value 8	R	16 bit	0	65535	Not in use
03x0308	Debug Value 9	R	16 bit	0	65535	Not in use
03x0309	Debug Value 10	R	16 bit	0	65535	Not in use
03x0310	Debug Value 11	R	16 bit	0	65535	Not in use
03x0311	Debug Value 12	R	16 bit	0	65535	Not in use
03x0312	Debug Value 13	R	16 bit	0	65535	Not in use
03x0313	Debug Value 14	R	16 bit	0	65535	Not in use
03x0314	Debug Value 15	R	16 bit	0	65535	Not in use
03x0315	Debug Value 16	R	16 bit	0	65535	Not in use

Input Register Description

- 03x0000: "Speed target"
This register shows the target speed according to which the speed is regulated.
- 03x0001: "Speed measured"
The register is used to monitor the current motor speed.
- 03x0002: "External speed signal"
This register is used to monitor the voltage on the 0-10V input.
Note that 70 corresponds to 7,0V
- 03x0003: "External LSC signal"
This register is used to monitor the LSC input. Note that LSC is active in low.
Show 0: The LSC input is not active. (not connected at all)
Show 1: The LSC input is active. (connected to GND)
- 03x0004: "External DIR signal"
This register is used to monitor the DIR input. Note DIR is active in low.
Show 0: The DIR input is not active. (not connected at all)
Show 1: The DIR input is active. (connected to GND)
- 03x0005: "External RUN signal"
This register is used to monitor the RUN input. Note RUN is active in low.
Show 0: The RUN input is not active. (not connected at all)
Show 1: The RUN input is active. (connected to GND)
- 03x0006: "External ALARM Relay"
This register is used to monitor the status of the alarm relay.
Show 0: The alarm relay is off.
Show 1: The alarm relay is on.
Note: The function of the alarm relay is set in register 04x00113.
- 03x0007: "Temperature power module"
This register shows the surface temperature on the power module.
- 03x0008: "Temperature cabinet"
This register shows the temperature on the PCB.
- 03x0009: "Error Code"
This register is used for registration of errors.
See chapter " error Codes" for description of error types.

- 03x0010: "Error Code2"
This register is used for registration of errors.
See chapter "Error Flags for description of error types.
- 03x0011: "Fatal FOF error"
This register is used for monitoring of fatal errors.
Show 0: No fatal error has occurred.
Show 1: A fatal error has occurred the control must be restarted manually.
- 03x0012: "Status code"
This register shows the status of the controller.
Show 0: Corresponds to "Idle". The motor is not running. Everything is OK.
Awaiting start.
Show 1: Corresponds to "Run". The motor is running. Everything is OK.
Show 2: Corresponds to "Fault". The motor is not running. An error has been detected.
- 03x0013: "Hour counter"
This register is used for accumulation of the number of hours the controller has been in operation – hours where the motor has been running.
- 03x0014: "DC Voltage"
This register is used for monitoring of the intermediate circuit voltage. 300 = 300VDC.
- 03x0015: "Motor current"
This register is used for monitoring of the running current of the motor.
This value is directly read for PMSM/BLDC motors. 200 = 2,00A.
For ACIM motors it can also be directly read, but only at higher currents.
- 03x0016: "Model number"
This register holds information on selected motors.
See documentation for motors for information of selection of motor.
- 03x0017: "Rated Motor Current"
This register shows the rated current of the selected motor. 200 = 2,00A.
- 03x0018: "VoltageMotorAC"
This register used for monitoring of the voltage supplied to the motor (approximately).
- 03x0019: "Number of restarts"
This register shows the accumulated number of restarts.
- 03x0020: "Dip switch position"
This register shows the positions of the Dip switches. Value from 0 to 15.
- 03x0021: "LSC Analog Value"
This register shows an analog value representing a thermistor on LSC input.
Value from 0 to 1000.
- 03x0100: " Hours at temperature 0 to 10"
This register shows the number of hours the power module has been exposed to temperatures between 0°C to 10°C.
- 03x0101: " Hours at temperature 10 to 20"
The register shows the hours where the power module has been from 10°C to 20°C.
- 03x0102: " Hours at temperature 20 to 30"
The register shows the hours where the power module has been from 20°C to 30°C.
- 03x0103: " Hours at temperature 30 to 40"
This register shows the number of hours the power module has been exposed to temperatures from 30°C to 40°C.

03x0104:	" Hours at temperature 40 to 50" This register shows the number of hours the power module has been exposed to temperatures from 40°C to 50°C.
03x0105:	" Hours at temperature 50 to 60" This register shows the number of hours the power module has been exposed to temperatures from 50°C to 60°C.
03x0106:	" Hours at temperature 60 to 70" This register show the number of hours the power module has been exposed to temperatures from 60°C to 70°C.
03x0107:	" Hours at temperature 70 to 80" This register shows the hours where the power module has been from 70°C to 80°C.
03x0108:	" Hours at temperature 80 to 90" This register shows the number of hours the power module has been exposed to temperatures from 80°C to 90°C.
03x0109:	" Hours at temperature 90 to 100" This register shows the number of hours the power module has been exposed to temperatures from 90°C to 100°C.
03x0110:	" Hours at temperature 100 to 110" This register shows the number of hours the power module has been exposed to temperatures from 100°C to 110°C.
03x0120:	" Hour count current 0 – 1A" This register shows the number of hours the motor has pulled 0 – 1A.
03x0121:	" Hour count current 1 – 2A" This register shows the number of hours the motor has pulled 1 – 2A.
03x0122:	" Hour count current 2 – 3A" This register shows the number of hours the motor has pulled 2 – 3A.
03x0123:	" Hour count current 3 – 4A" This register shows the number of hours the motor has pulled 3 – 4A.
03x0124:	" Hour count current 4 – 5A" This register shows the number of hours the motor has pulled 4 – 5A.
03x0125:	" Hour count current 5 – 6A" This register shows the number of hours the motor has pulled 5 – 6A.
03x0126:	" Hour count current 6 – 7A" This register shows the number of hours the motor has pulled 6 – 7A.
03x0127:	" Hour count current 7 – 8A" This register shows the number of hours the motor has pulled 7 – 8A.
03x0128:	" Hour count current 8 – 9A" This register shows the number of hours the motor has pulled 8 – 9A.
03x0129:	" Hour count current 9 – 10A" This register shows the number of hours the motor has pulled 9 – 10A.
03x0200:	"Pic Controller Version" This register holds information on the software version of the controller circuit.
03x0201:	"Pic controller Subversion" This register holds the software subversion of the controller circuit.
03x0202:	"Modbus Version" This register holds the software version of the Modbus circuit.

- 03x0203: "Modbus Subversion"
This register holds information on the software subversion of the Modbus circuit.
- 03x0204: "IR MCE Software Version"
This register holds information on the software version of the MCE core.
1xx = ACIM Version xx.
2xx = PMSM/BLDC Version xx.
- 03x0205: "IR LSC Software Version"
This register holds information on the software version of the power circuit.
- 03x0206: "IR LSC SUB Software Version"
This register holds information on the Sub software version of the power circuit.
- 03x0300 – 03x0315 "Debug Value 1" up to "Debug Value 16"
These registers are only used for debugging and are of no importance to the user.

Appendix

Error Codes

0	No errors

Error Flags

Error Flag	Description

Running Status

LSC Running Status	Description