VONSCH VQfrem 400

VONSCH VQfrem 400 protocol

Supported device types and versions

The protocol is used for communication with vector control frequency converters VQfrem 400 (for 3 x 400 V motors) from VONSCH. Reading values from inverters is supported. Commanding or writing values is not supported.

Communication line configuration

- Communication line category: Serial, SerialOverUDP Device Redundant (serial communication).
- **Note**: serial communication has been tested with a VQfrem 400 with 609h firmware.
  Serial line setting: 19200 baud, 8 bits, no parity, 1 stop bit, RS-485 interface.
  The serial line speed is configurable on the drive (2400 - 19200 baud).

Communication station configuration

- Communication protocol: **VONSCH VQfrem 400**.
- The station address is a 16-bit number (1-32767). It can be entered decimally (e.g. 1 or 1234) or hexadecimally using a hash (e.g. #0001 or #4D2).
  Address 32768 (#8000) serves as a broadcast for commanding - all devices receive it, but none respond to it.

Station protocol parameters

Communication station - configuration dialog box - tab **Protocol parameters**.
They influence some of the optional parameters. You can set the following station protocol parameters:

Table 1

Parameter	Meaning	Unit	Default value
Full Debug	Logging of detailed debug information about communication in the line log.	-	NO
Retry Count	Maximum count of request retries. If no response returns after a request had been sent, the station's status will change to a communication error.	-	2
Retry Timeout	Timeout before resending a request if no response has been received.	ss.ms	0.1
Wait First Timeout	The delay after sending the request and before reading the response.	ss.ms	0.1
Wait Timeout	The delay between the response readings.	ss.ms	0.1
Max Wait Retry	The maximum number of retries of the response reading.	-	6

I/O tag configuration

I/O tags: **Ai, Ci**

I/O tag address

The address of the I/O tag is a 16-bit number (1-65535). It can be entered decimally (e.g. 1 or 1234) or hexadecimally using a hash (e.g. #0001 or #4D2).

Table 2 - quantities available for reading according to the documentation

Address	Description	Meaning
#0001	Software version	609h for ver. 6.09, (402h for ver. 4.02, 304h for ver. 3.04)

#0004	Voltage range	190h for 400V, 191h for 400 ...M, 2b2h for 690V
#0025	Freq. INV - the frequency of voltage on converter's output (stator frequency)	+/- XXX,XX Hz
#0026	Revolves - output revolutions of the motor	+/- XXXX rev/min
#0027	Revol/i - evolutions behind gear/transmission	+/- XXXX,X rev/min
#0028	Freq.RT - rotor frequency (evaluated from speed encoder – IRC)	+/- XX,XX Hz
#0029	Freq.RF - required converter frequency	+/- XX,XX Hz
#002A	MT Curr. - effective current value into the motor	XXX,X A
#002B	R.torque - required mechanical motor torque	+/- XXX,X Nm
#002C	Torque - mechanical motor torque	+/- XXX,X Nm
#002D	Mag. flux - rotor magnetic flux	X,XXX Wb
#002E	Volt. MT - momentary motor supply voltage (100.0% responds to 400 V)	XXX,X %
#002F	Volt. DC - real voltage of converter's unidirectional DC bus	XXX V
#0030	Inp.pow. - momentary input power into the motor	XXX,X kW
#0031	MT power - motor power	XXX,X kW
#0032	kW hours - motor energy consumption in kWh	XXXX kWh
#0033	MW hours - motor energy consumption in MWh	XXXX MWh
#0034	Teplota chladia menia	XX,X °C
#0035	Temp.INV. - air temperature in the converter	XX,X °C
#0036	PR ref. - required value of process regulator	XX,X %
#0037	PR real - feedback of process regulator (real value)	XX,X %
#0038	Inp. AIN1 - the value of analogue input AIN1 in % range	XX,X %
#0039	Inp. AIN2 - the value of analogue input AIN2 in % range	XX,X %
#003A	Hodnota analógového vstupu 3 v % rozsahu	XX,X %
#003B	BIN 1-6 - status of binary inputs BIN 1 - BIN 6 (bits 0-5 from the received value - bit numbering is from 0 to 15).	0=input is open 1=input is closed
#003C	RELAY 1-2,3 - the status of relay inputs RELAY 1 - RELAY 4 (bits 8-10 from the received value - bit numbering is from 0 to 15).	0=relay is open 1=relay is closed
#003D	Hours INV - converter operating time counter	XXXX h
#003E	Hours MT - motor operating time counter	XXXX h
#003F	Pos.ref. - required position in a case of „position" variable	+/- XXXX,X cm
#0040	Position - real position	+/- XXXX,X cm
#0041	Pos. TSW2 - the trajectory for running down when Terminal switch TSW2 is on	+/- XXXX cm
#0042	Deviation from zero position when calibrating the ARC position sensor	XXXX d
#0043	cos(fi) - momentary value of motor power factor	+/- X,XX
#0044	See Warnings register 2	-
#0045	See Warnings register 1	-
#0046	See Faults register	-
#0048	Overload - a momentary value of overload	XXX.X %
#0049	Service SL - service displayed variable Slave	+/- XXXX d
#004a	Service MS - service displayed variable Master	+/- XXXX d

All values are transmitted as 16-bit numbers. The KOM process interprets them as signed or positive by address (signed are #0025-#0027, #002B, #002C, #003F-#0041, #0043, #0049-#004a).

If the number is fractional, the corresponding linear conversion must be entered in the I/O tag configuration in the Conversion tab (e.g. coefficient A=0.1 for #0030, A=0.01 for #0028).

Table 3 - Faults register (values of the I/O tag with address #0045). If an arbitrary bit is set to logical 1, the corresponding fault/failure has arisen in the converter.

Bit	Meaning
0	Converter Overcurrent
1	Converter Overload
2	Converter Undervoltage
3	Converter Overvoltage
4	Motor Overheat
5	Heatsink Temperature
6	Incorrect parameters of currents, motor constants, or speed
7	Regulation error
8	Identification error
9	Output short circuit
10	IRC failure (ARC), RM-ARC
11	Input or Output phase loss
12	External failure
13	Temperature in inverter
14	AIN1, AIN2, or AIN3 disconnected
15	*reserved*

Table 4 - Warnings register 1 (values of the I/O tag with address #0045). If an arbitrary bit is set to logical 1, the converter generates a corresponding warning.

Bit	Meaning
0	some warnings W1-W5: W1 - The converter reduces motor magnetic flux in order to achieve over-synchronous revolutions. W2 - Magnetic flux has decreased to the minimal value at field suppression. W3 - Regulator of magnetic flux is saturated (only in vector mode). W4 - Regulator of motor torque is saturated (only in vector mode). W5 - Speed regulator is saturated (only in vector mode).
1	W6 - Motor cooler has reached an increased temperature (over 75 °C). For VQFREM 400 005, 007, and 011 types, the module temperature is over 90 °C
2	W7 - The converter switches itself into scalar mode due to IRC/ARC failure.
3	W8 - Signalisation of reverse direction of IRC/ARC.
4	F7 - The time needed for motor field suppression has not expired yet (before subsequent start).
5	W12 - Process regulator is saturated. Converter frequency has reached its maximum value.
6	F9 - Position calibration initiated by 9.4.3 command, or calibration of IRC encoder on the synchronous motor. F10 - IRC zero pulse is being searched on the synchronous motor after the converter was connected to the power network and the START command was selected.
7	F11 - The speed decreased to zero by activating a software terminal switch.
8	F8 - Dynamic deceleration was activated as a result of a sharp decrease in speed.

9	W16 - Sensored motor temperature has achieved nonpermissible value.
10	W17 - If EWCP,(M),(I) panel is active (2.4.1)and the connection with the converter has failed.
11	F2 - Maximal current regulator (par.13.3.1) is active. It limits the current to the value of parameter 9.10.1
12	F3 - The converter is in kinetic backup mode after input power failure.
13	F4 - The converter is processing the frequency for the spinning motor.
14	F5 - Sleep function of process regulator.
15	F6 - Braking unit is active.

Table 5 - Warnings register 2 (values of the I/O tag with address #0044). If an arbitrary bit is set to logical 1, the converter generates a corresponding warning.

Bit	Meaning
0	W23 - The converter recognized no load at output terminals U, V, W at START command.
1	F12 - Terminal switch 1 or terminal switch 2 is switched on.
2	F13 - The function „flux braking" (8.3.1) increases motor excitation proportionally to U_{DC}-U_{DCnom}
3	W9 - Converter input phase was interrupted
4	*reserved*
5	F14 - OFF-LINE identification of some motor parameters (Rs, Ls+Lm, Uinit).
6	W25 - The air temperature in the converter is more than 70 °C.
7	*reserved*
8	W18 - Serial communication error has occurred - RS232 (RS485)
9	F16 - It signalizes, that relay with the function „shut-down, overload" has just been released.

Literature

www.vonsch.sk - A web site of vector frequency converter manufacturer

Manuál for VQfrem 400 vector frequency converter

Changes and modifications

- 21.1.2000 – Testing the communication

Document revisions

- Ver. 1.0 – March 16, 2018 - the creation of a document

ⓘ **Related pages:**

Communication protocols