FAQ information

product support

FAQ-E3AC9B40
SINAMICS G120 CU240S DP

SIEMENS

Read and write individual parameters using SFC58 & SFC 59

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1 Description of project “Read_Parameters_G120_en”

1.1 Components that have been used

- CPU 315-2 DP
- SINAMICS G120:
  - Control Unit CU240S DP
  - Power Module PM240

1.2 Prerequisites

1. The PROFIBUS master has been commissioned and is fully operational.
2. The PROFIBUS connection between the master and slave is operating.
3. The master can appropriately read and write the datasets corresponding to PROFIBUS DPV1.

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1.3 Description of the project

Individual parameters of the SINAMICS G120 are read-out using the standard S7 functions - SFC58 and SFC59 - in the S7 project "Read_Parameters_G120".

The possibility of controlling the drive is implemented in network 1 of this project.

The parameters, that are read-out (uploaded) of the drive, are listed in the following table.

Table 1-1 Parameters that are read-out

Parameter:	**Significance:**
r0018	Firmware version
r0020	Freq. setpoint before RFG
r0021	Act. frequency
r0022	Act. filtered rotor speed
r0024	Act. output frequency
r0025	Act. output voltage
r0027	Act. output current
r0203	Act. inverter type
r0304[0]	Rated motor voltage
r0030	Torque gen. current
r0031	Act. filtered torque
r0032	Act. filtered power
r0035[0…2]	Act. motor temperature (DDS0…DDS2)
r0037[0]	Inverter temperature [°C], Measured heat sink temperature
r0037[1]	Inverter temperature [°C], Total Chip Junction Temperature

r1024	Act. fixed frequency
r1050	Act. Output freq. of the MOP
r1078	Total frequency setpoint
r1079	Selected frequency setpoint
r1242	Switch-on level of Vdc-max
r1246[0]	Switch-on level kin buffering
r1538	Upper torque limit (total)
r1539	Lower torque limit (total)
r1801	Act. pulse frequency

1.4 Adapting the project

The S7 project must be adapted before it can be used. The following steps must be undertaken:

- Set the DP address at the SINAMICS G120 (the DP address used in the project is 3).
- Adapt the PLC (HW Config).
- HW Config "Save and compile" and "Download to module".
- Download the program into the PLC and start the PLC.

1.5 Controlling the drive (network 1)

Control word 1 (STW1) and the main setpoint (HSW) are sent to the drive via the PROFIBUS interface. Status word 1 (ZSW1) and the main actual value (HIW) are received from the drive.

The drive is started by sending the typical control word 047E, followed by 047F (edge of bit 0: ON). Word 047E should be sent to the drive to stop it (edge of bit 0: OFF). The control word is sent with process data word 1 (PZD1) that should be entered in the variable table VAT_1 (upper part) (flag word MW0, refer to Fig. 1).

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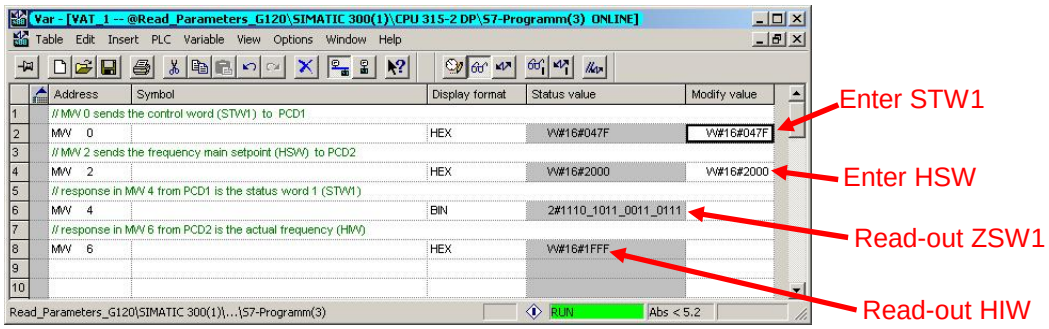


Fig. 1-1

Status word 1 (ZSW1) is received from the drive (PZD1) and transferred in flag word MW4. MW4 can then be taken from the variable table VAT_1 (refer to Fig. 1).

The main setpoint is sent to the drive with the PZD2 and the main actual value is received from the drive in PZD2. The main setpoint should be entered in the variable table VAT_1 (flag word MW2, refer to Fig. 1). The response - the main actual value - is saved in MW6 and can also be taken from the variable table (refer to Fig. 1).

The frequency setpoint and actual value are normalized so that 4000(hex) corresponds to 50Hz. The highest value that should be sent is 7FFF. The normalization frequency (reference frequency) can be changed in P2000 (default 50Hz).

1.5.1 Text and comments to network 1

```
Network 1: Title:
Comment:

      L     MW     0              // MW 0 includes the control word 1 which comes from VAT_1
      T     PQW  256              // transfer into the PCD1 word (see the STEP7 HW Config)

      L     MW     2              // MW 2 includes the main frequency setpoint which comes from VAT_1
      T     PQW  258              // transfers into the PCD2 word (see the STEP7 HW Config)

      L     PIW  256              // reads the status word (ZSW1) from PCD1
      T     MW     4              // transfers into the MW 4 to the VAT_1

      L     PIW  258              // reads the actual frequency (HIW) from PCD2
      T     MW     6              // transfers into the MW 6 to the VAT_1
```

Fig. 1-2 Text and comments to network 1

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1.6 Reading parameters (networks 2, 3)

Reading parameters should be implemented using a request and a response data set.

1.6.1 Generating a request data set (DB1) to read parameters

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	Request_reference	BYTE	B#16#1	request number
+1.0	Request_ID	BYTE	B#16#1	request parameter = 1; change parameter = 2
+2.0	DO_ID	BYTE	B#16#0	DO_ID
+3.0	No_of_parameters	BYTE	B#16#17	read out 23 parameters
+4.0	Attribute_parameter_01	BYTE	B#16#10	value
+5.0	No_of_elements_01	BYTE	B#16#0	number of elements 1
+6.0	parameter_number_01	WORD	W#16#12	parameter r0018 (firmware version)
+8.0	Subindex_01	WORD	W#16#0	subindex
+10.0	Attribute_parameter_02	BYTE	B#16#10	value
+11.0	No_of_elements_02	BYTE	B#16#0	number of elements 1
+12.0	parameter_number_02	WORD	W#16#14	parameter r0020 (Freq. setpoint before RFG)
+14.0	Subindex_02	WORD	W#16#0	subindex
+16.0	Attribute_parameter_03	BYTE	B#16#10	value
+17.0	No_of_elements_03	BYTE	B#16#0	number of elements 1
+18.0	parameter_number_03	WORD	W#16#15	parameter r0021 (Act. frequency)
+20.0	Subindex_03	WORD	W#16#0	subindex
+22.0	Attribute_parameter_04	BYTE	B#16#10	value
+23.0	No_of_elements_04	BYTE	B#16#0	number of elements 1
+24.0	parameter_number_04	WORD	W#16#16	parameter r0022 (Act. rotor speed)
+26.0	Subindex_04	WORD	W#16#0	subindex
+28.0	Attribute_parameter_05	BYTE	B#16#10	value
+29.0	No_of_elements_05	BYTE	B#16#0	number of elements 1
+30.0	parameter_number_05	WORD	W#16#18	parameter r0024 (Act.output frequency)
+32.0	Subindex_05	WORD	W#16#0	subindex
+34.0	Attribute_parameter_06	BYTE	B#16#10	value
+35.0	No_of_elements_06	BYTE	B#16#0	number of elements 1
+36.0	parameter_number_06	WORD	W#16#19	parameter r0025 (Act. output voltage)
+38.0	Subindex_06	WORD	W#16#0	subindex
+40.0	Attribute_parameter_07	BYTE	B#16#10	value
+41.0	No_of_elements_07	BYTE	B#16#0	number of elements 1
+42.0	parameter_number_07	WORD	W#16#1B	parameter r0027 (Act. output current)
+44.0	Subindex_07	WORD	W#16#0	subindex
+46.0	Attribute_parameter_08	BYTE	B#16#10	value
+47.0	No_of_elements_08	BYTE	B#16#0	number of elements 1
+48.0	parameter_number_08	WORD	W#16#CB	parameter r0203 (Drive type)
+50.0	Subindex_08	WORD	W#16#0	subindex
+52.0	Attribute_parameter_09	BYTE	B#16#10	value
+53.0	No_of_elements_09	BYTE	B#16#1	number or indicies 1
+54.0	parameter_number_09	WORD	W#16#130	parameter P0304 (rated motor voltage)
+56.0	Subindex_09	WORD	W#16#0	subindex
+58.0	Attribute_parameter_10	BYTE	B#16#10	value
+59.0	No_of_elements_10	BYTE	B#16#0	number of elements 1
+60.0	parameter_number_10	WORD	W#16#1E	parameter P0030 (Torque gen. current)
+62.0	Subindex_10	WORD	W#16#0	subindex
...	...	...	...	...
+136.0	Attribute_parameter_23	BYTE	B#16#10	value
+137.0	No_of_elements_23	BYTE	B#16#0	number of elements 1
+138.0	parameter_number_23	WORD	W#16#709	parameter P1801 (Act. pulse frequency)
+140.0	Subindex_23	WORD	W#16#0	subindex
=142.0		END_STRUCT		

Fig. 1-3 Request data set (DB1) to read parameters

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NOTE On SINAMICS G120C and G120/G120D/G120P frequency inverters with Control Units with “-2” in the product name the variable “Drive_ID/Axis” must be written to value “1” in the order data block.

Table 1-2 Parameter request

Request Header	**Request Reference = 01** *The value is randomly selected from the valid value range. The request reference defines the relationship between the request and response.*	**Request ID = 01** *This identification is required for a read request.*
	Axis = 0 *Addresses the single-axis drive with 0*	**No. of Parameters = 23** *23 parameters are read*
Parameter Address 01	**Attribute 01 = 10** *The parameter values are read*	**No. of Elements 01 = 00** *Recommended for non-indexed parameters*
	Parameter Number 01 (PNU) = 0012 hex *(=18 dec, r0018 Firmware version is read)*	
	Subindex 01 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 02	**Attribute 02 = 10** *The parameter values are read*	**No. of Elements 02 = 00** *Recommended for non-indexed parameters*
	Parameter Number 02 (PNU) = 0014 hex *(=20 dec, r0020 Freq. setpoint before RFG is read)*	
	Subindex 02 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 03	**Attribute 03 = 10** *The parameter values are read*	**No. of Elements 03 = 00** *Recommended for non-indexed parameters*
	Parameter Number 03 (PNU) = 0015 hex *(=21 dec, r0021 Act. frequency is read)*	
	Subindex 03 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 04	**Attribute 04 = 10** *The parameter values are read*	**No. of Elements 04 = 00** *Recommended for non-indexed parameters*
	Parameter Number 04 (PNU) = 0016 hex *(=22 dec, r0022 Act. filtered rotor speed is read)*	
	Subindex 04 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 05	**Attribute 05 = 10** *The parameter values are read*	**No. of Elements 05 = 00** *Recommended for non-indexed parameters*

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	Parameter Number 05 (PNU) = 0018 hex *(=24 dec, r0024 Act. output frequency is read)*	
	Subindex 05 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 06	**Attribute 06 = 10** *The parameter values are read*	**No. of Elements 06 = 00** *Recommended for non-indexed parameters*
	Parameter Number 06 (PNU) = 0019 hex *(=25 dec, r0025 Act. output voltage is read)*	
	Subindex 06 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 07	**Attribute 07 = 10** *The parameter values are read*	**No. of Elements 07 = 00** *Recommended for non-indexed parameters*
	Parameter Number 07 (PNU) = 001B hex *(=27 dec, r0027 Act. output current is read)*	
	Subindex 07 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 08	**Attribute 08 = 10** *The parameter values are read*	**No. of Elements 08 = 00** *Recommended for non-indexed parameters*
	Parameter Number 08 (PNU) = 00CB hex *(=203 dec, r0203 Act. inverter type is read)*	
	Subindex 08 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 09	**Attribute 09 = 10** *The parameter values are read*	**No. of Elements 09 = 01** *One element (index 0) should be read*
	Parameter Number 09 (PNU) = 0130 hex *(=304 dec, r0304[0] Rated motor voltage is read)*	
	Subindex 09 = 0 *read access starts at index 0*	
Parameter Address 10	**Attribute 10 = 10** *The parameter values are read*	**No. of Elements 10 = 00** *Recommended for non-indexed parameters*
	Parameter Number 10 (PNU) = 001E hex *(=30 dec, r0030 Torque gen. current is read)*	
	Subindex 10 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 11	**Attribute 11 = 10** *The parameter values are read*	**No. of Elements 11 = 00** *Recommended for non-indexed parameters*
	Parameter Number 11 (PNU) = 001F hex *(=31 dec, r0031 Act. filtered torque is read)*	
	Subindex 11 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 12	**Attribute 12 = 10** *The parameter values are read*	**No. of Elements 12 = 00** *Recommended for non-indexed parameters*

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	Parameter Number 12 (PNU) = 0020 hex *(=32 dec, r0032 Act. filtered power is read)*	
	Subindex 12 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 13	**Attribute 13 = 10** *The parameter values are read*	**No. of Elements 13 = 03** *Three elements (indices 0…2) should be read*
	Parameter Number 13 (PNU) = 0023 hex *(=35 dec, r0035[0…2] Act. motor temperature DDS0…DDS2 are read)*	
	Subindex 13 = 0 *read access starts at index 0*	
Parameter Address 14	**Attribute 14 = 10** *The parameter values are read*	**No. of Elements 14 = 02** *Two elements (indices 0 and 1) should be read*
	Parameter Number 14 (PNU) = 0025 hex *(=37 dec, r0037[0…1] Inverter temperature [°C], Measured heat sink temperature and Total Chip Junction Temperature are read)*	
	Subindex 14 = 0 *read access starts at index 0*	
Parameter Address 15	**Attribute 15 = 10** *The parameter values are read*	**No. of Elements 15 = 00** *Recommended for non-indexed parameters*
	Parameter Number 15 (PNU) = 0400 hex *(=1024 dec, r1024 Act. fixed frequency is read)*	
	Subindex 15 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 16	**Attribute 16 = 10** *The parameter values are read*	**No. of Elements 16 = 00** *Recommended for non-indexed parameters*
	Parameter Number 16 (PNU) = 041A hex *(=1050 dec, r1050 Act. Output freq. of the MOP is read)*	
	Subindex 16 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 17	**Attribute 17 = 10** *The parameter values are read*	**No. of Elements 17 = 00** *Recommended for non-indexed parameters*
	Parameter Number 17 (PNU) = 0436 hex *(=1078 dec, r1078 Total frequency setpoint is read)*	
	Subindex 17 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 18	**Attribute 18 = 10** *The parameter values are read*	**No. of Elements 18 = 00** *Recommended for non-indexed parameters*
	Parameter Number 18 (PNU) = 0437 hex *(=1079 dec, r1079 Selected frequency setpoint is read)*	
	Subindex 18 = 0 *Subindex for non-indexed parameters = 0*	

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Parameter Address 19	**Attribute 19 = 10** *The parameter values are read*	**No. of Elements 19 = 00** *Recommended for non-indexed parameters*
	Parameter Number 19 (PNU) = 04DA hex *(=1242 dec, r1242 Switch-on level of Vdc-max is read)*	
	Subindex 19 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 20	**Attribute 20 = 10** *The parameter values are read*	**No. of Elements 20 = 01** *One element (index 0) should be read*
	Parameter Number 20 (PNU) = 04DE hex *(=1246 dec, r1246[0] Switch-on level kin buffering is read)*	
	Subindex 20 = 0 *read access starts at index 0*	
Parameter Address 21	**Attribute 21 = 10** *The parameter values are read*	**No. of Elements 21 = 00** *Recommended for non-indexed parameters*
	Parameter Number 21 (PNU) = 0602 hex *(=1538 dec, r1538 Upper torque limit (total) is read)*	
	Subindex 21 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 22	**Attribute 22 = 10** *The parameter values are read*	**No. of Elements 22 = 00** *Recommended for non-indexed parameters*
	Parameter Number 22 (PNU) = 0603 hex *(=1539 dec, r1539 Lower torque limit (total) is read)*	
	Subindex 22 = 0 *Subindex for non-indexed parameters = 0*	
Parameter Address 23	**Attribute 23 = 10** *The parameter values are read*	**No. of Elements 23 = 00** *Recommended for non-indexed parameters*
	Parameter Number 23 (PNU) = 0709 hex *(=1801 dec, r1801 Act. pulse frequency is read)*	
	Subindex 23 = 0 *Subindex for non-indexed parameters = 0*	

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1.6.2 Generating a response data set (DB2) for a response

Address	Name	Type	Initial value	Comment
0.0		STRUCT		
+0.0	Request_reference_mirror	BYTE	B#16#0	request number mirrored
+1.0	Response_ID	BYTE	B#16#0	request parameter
+2.0	DO_ID_mirrored	BYTE	B#16#0	DO-ID mirrored
+3.0	No_of_parameters	BYTE	B#16#0	response about number of parameter
+4.0	Format_parameter_1	BYTE	B#16#0	response about parameter 1 format
+5.0	No_of_values_parameter_1	BYTE	B#16#0	response about number of value of parameter 1
+6.0	r0018_firmware_version	REAL	0.000000e+000	parameter value r0018 (firmware-version)
+10.0	Format_parameter_2	BYTE	B#16#0	response about parameter 2 format
+11.0	No_of_values_parameter_2	BYTE	B#16#0	response about number of value of parameter 2
+12.0	r0020_Freq_setpoint_RFG	REAL	0.000000e+000	parameter value r0020 (Freq. setpoint before RFG)
+16.0	Format_parameter_3	BYTE	B#16#0	response about parameter 3 format
+17.0	No_of_values_parameter_3	BYTE	B#16#0	response about number of value of parameter 3
+18.0	r0021_Act_frequency	REAL	0.000000e+000	parameter value r0021 (Act. frequency)
+22.0	Format_parameter_4	BYTE	B#16#0	response about parameter 4 format
+23.0	No_of_values_parameter_4	BYTE	B#16#0	response about number of value of parameter 4
+24.0	r0022_Act_rotor_speed	REAL	0.000000e+000	parameter value r0022 (Act. rotor speed)
+28.0	Format_parameter_5	BYTE	B#16#0	response about parameter 5 format
+29.0	No_of_values_parameter_5	BYTE	B#16#0	response about number of value of parameter 5
+30.0	r0024_Act_output_frequen	REAL	0.000000e+000	parameter value r0024 (Act.output frequency)
+34.0	Format_parameter_6	BYTE	B#16#0	response about parameter 6 format
+35.0	No_of_values_parameter_6	BYTE	B#16#0	response about number of value of parameter 6
+36.0	r0025_Act_output_voltage	REAL	0.000000e+000	parameter value r0025 (Act. output voltage)
+40.0	Format_parameter_7	BYTE	B#16#0	response about parameter 7 format
+41.0	No_of_values_parameter_7	BYTE	B#16#0	response about number of value of parameter 7
+42.0	r0027_Act_output_current	REAL	0.000000e+000	parameter value r0027 (Act. output current)
+46.0	Format_parameter_8	BYTE	B#16#0	response about parameter 8 format
+47.0	No_of_values_parameter_8	BYTE	B#16#0	response about number of value of parameter 8
+48.0	r0203_drive_type	WORD	W#16#0	parameter value r0203 (drive type)
+50.0	Format_parameter_9	BYTE	B#16#0	response about parameter 9 format
+51.0	No_of_values_parameter_9	BYTE	B#16#0	response about number of value of parameter 9
+52.0	r304_Rated_motor_voltage	WORD	W#16#0	parameter value r0304 (rated motor voltage)
+54.0	Format_parameter_10	BYTE	B#16#0	response about parameter 10 format
+55.0	No_of_values_parameter10	BYTE	B#16#0	response about number of value of parameter 10
+56.0	r30_Torque_gen_current	REAL	0.000000e+000	parameter value r0030 (Torque gen.current)
...	...	...	...	...
+144.0	Format_parameter_23	BYTE	B#16#0	response about parameter 23 format
+145.0	No_of_values_parameter23	BYTE	B#16#0	response about number of value of parameter 23
+146.0	r1801_Act_pulse_freq	WORD	W#16#0	parameter value r1801 (Act. pulse frequency)
=148.0		END_STRUCT		

Fig. 1-4 Response data set (DB2) for response

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Table 1-3 Parameter response

Response Header	**Request Ref. mirrored = 01** *This response belongs to the request with request reference 01*	**Response ID = 01** *01 --> read request positive, values saved as first value*
	Axis mirrored = 0 *The values correspond to the values from the request*	**No. of Parameters = 23** *The values correspond to the values from the request*
Parameter value 01	**Format 01 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 01 = 01** *01 --> 1 parameter value is available*
	Value * = „DB2.DBD 6“ *r0018 Firmware version*	
Parameter value 02	**Format 02 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 02 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 12“ *r0020 Freq. setpoint before RFG*	
Parameter value 03	**Format 03 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 03 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 18“ *r0021 Act. frequency*	
Parameter value 04	**Format 04 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 04 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 24“ *r0022 Act. filtered rotor speed*	
Parameter value 05	**Format 05 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 05 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 30“ *r0024 Act. output frequency*	
Parameter value 06	**Format 06 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 06 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 36“ *r0025 Act. output voltage*	
Parameter value 07	**Format 07 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 07 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 42“ *r0027 Act. output current*	
Parameter value 08	**Format 08 = 42** *42 --> parameter value has the word format (2 bytes)*	**No. of Values 08 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 48“ *r0203 Act. inverter type*	

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Parameter value 09	**Format 09 = 42** *42 --> parameter value has the word format (2 bytes)*	**No. of Values 09 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 52“ *r0304[0] Rated motor voltage*	
Parameter value 10	**Format 10 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 10 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 56“ *r0030 Torque gen. current*	
Parameter value 11	**Format 11 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 11 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 62“ *r0031 Act. filtered torque*	
Parameter value 12	**Format 12 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 12 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 68“ *r0032 Act. filtered power*	
Parameter value 13	**Format 13 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 13 = 03** *03 --> 3 parameter values are available*
	1. Value = „DB2.DBD 74“ *r0035[0] Act. motor temperature DDS0*	
	2. Value = „DB2.DBD 78“ *r0035[1] Act. motor temperature DDS1*	
	3. Value = „DB2.DBD 82“ *r0035[2] Act. motor temperature DDS2*	
Parameter value 14	**Format 14 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 14 = 02** *02 --> 2 parameter values are available*
	1. Value = „DB2.DBD 88“ *r0037[0] Inverter temperature [°C], Measured heat sink temperature*	
	2. Value = „DB2.DBD 92“ *r0037[1] Inverter temperature [°C], Total Chip Junction Temperature*	
Parameter value 15	**Format 15 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 15 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 98“ *r1024 Act. fixed frequency*	
Parameter value 16	**Format 16 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 16 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 104“ *r1050 Act. Output freq. of the MOP*	
Parameter value 17	**Format 17 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 17 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 110“ *r1078 Total frequency setpoint*	

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Parameter value 18	**Format 18 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 18 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 116“ *r1079 Selected frequency setpoint*	
Parameter value 19	**Format 19 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 19 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 122“ *r1242 Switch-on level of Vdc-max*	
Parameter value 20	**Format 20 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 20 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 128“ *r1246[0] Switch-on level kin buffering*	
Parameter value 21	**Format 21 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 21 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 134“ *r1538 Upper torque limit (total)*	
Parameter value 22	**Format 22 = 43** *43 --> parameter value has the double word format (4 bytes)*	**No. of Values 22 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 140“ *r1539 Lower torque limit (total)*	
Parameter value 23	**Format 23 = 42** *42 --> parameter value has the word format (2 bytes)*	**No. of Values 23 = 01** *01 --> 1 parameter value is available*
	Value = „DB2.DBD 146“ *r1801 Act. pulse frequency*	

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* You can take all of the values from the variable table VAT_1 (lower section, Fig. 1-7)

1.6.3 Text and comments regarding networks 2 and 3

The request data set is sent to the drive using SFC58 (data set RECORD DB1).

The response with the parameter values – the response data set – is sent from the drive with SFC59 (response block DB2).

```
Network 2 : Title:
With SFC58 "WR_REC" (write record), you transfer the data record contained in
the RECORD (DB1) to the addressed module.

          AN    M      8.1
          AN    M      8.3
          AN    M      8.2
          S     M      8.0


          CALL  "WR_REC"
           REQ    :=M8.0                    // write request
           IOID   :=B#16#54                 // ID of the address area peripherial input (PI)
           LADDR  :=W#16#100                // logical adress of the module from the HW Config address 256(dec)
           RECNUM :=B#16#2F                 // Data record number
           RECORD :=P#DB1.DBX0.0 BYTE 142   // Data record
           RET_VAL:=MW10                    // If an error occurs while the function is active, the return value contains an error code
           BUSY   :=M8.1                    // BUSY = 1; Writing is not yet completed

          A     M      8.1                 // if writing is active
          R     M      8.0                 // no new request available

Network 3 : Title:
With SFC59 "RD_REC" (read record), you read the data record with the number
RECNUM from the addressed module. The data record read is entered in the
destination area (DB2), which is indicated by the RECORD parameter.

          AN    M      8.1
          AN    M      8.3
          AN    M      8.0
          S     M      8.2

          CALL  "RD_REC"
           REQ    :=M8.2                    // read request
           IOID   :=B#16#54                 // ID of the address area peripherial input (PI)
           LADDR  :=W#16#100                // logical adress of the module from the HW Config address 256(dec)
           RECNUM :=B#16#2F                 // Data record number
           RET_VAL:=MW12                    // If an error occurs while the function is active, the return value contains an error code
           BUSY   :=M8.3                    // BUSY = 1; Reading is not yet completed
           RECORD :=P#DB2.DBX0.0 BYTE 148   // Destination area for the data record read

          A     M      8.3                 // if reading is active
          R     M      8.2                 // no new request available
```

Fig. 1-5 Text and comments regarding networks 2 and 3

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1.6.4 Status information about the process progress

Data regarding the process progress and about errors that occur while processing the function can also be taken from the variable table VAT_1 (center section) (refer to Fig. 1-6):

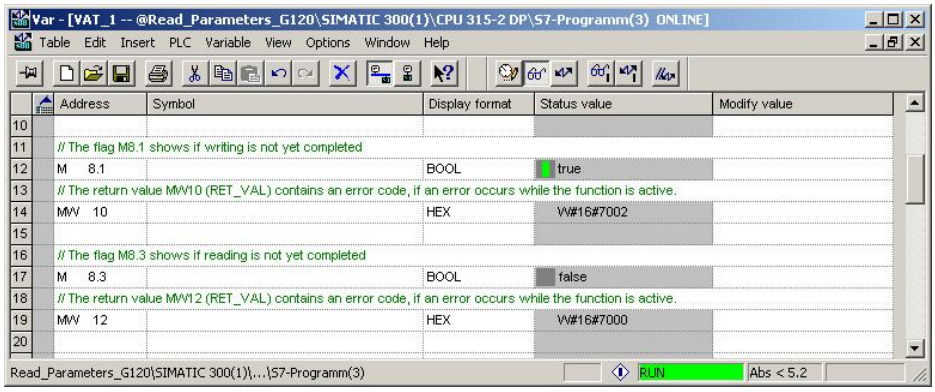


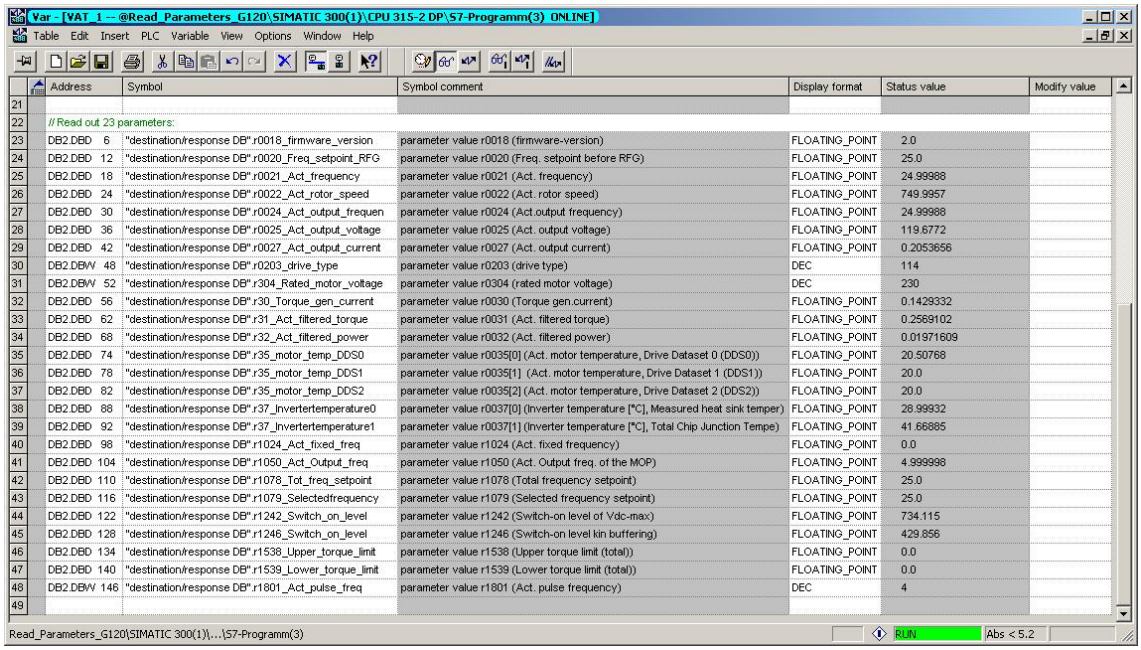
Fig. 1-6 Status information about the process progress

- Flag bit M8.1 indicates whether the write request "read parameter" is running: "true" – active, "false" – inactive.
- MW10 (RET_VAL) contains an error code for the case that an error occurs while processing the function (SFC58). Please refer to the "Help on system functions/function blocks" for a description of all of the errors".
- Flag bit M8.3 indicates whether the read request is running: "true" – active, "false" – inactive.
- MW12 (RET_VAL) contains an error code for the case that an error occurs while processing the function (SFC59).

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1.6.5 Parameters that are read-out

The 23 values that are read-out are in the lower part of the variable table VAT_1.



Var - [VAT_1 -- @Read_Parameters_G120\SIMATIC 300(1)\CPU 315-2 DP\S7-Programm(3) ONLINE]

Table Edit Insert PLC Variable View Options Window Help

	Address	Symbol	Symbol comment	Display format	Status value	Modify value
21						
22	// Read out 23 parameters:					
23	DB2.DBD 6	"destination/response DB".r0018_firmware_version	parameter value r0018 (firmware-version)	FLOATING_POINT	2.0	
24	DB2.DBD 12	"destination/response DB".r0020_Freq_setpoint_RFG	parameter value r0020 (Freq. setpoint before RFG)	FLOATING_POINT	25.0	
25	DB2.DBD 18	"destination/response DB".r0021_Act_frequency	parameter value r0021 (Act. frequency)	FLOATING_POINT	24.99988	
26	DB2.DBD 24	"destination/response DB".r0022_Act_rotor_speed	parameter value r0022 (Act. rotor speed)	FLOATING_POINT	749.9957	
27	DB2.DBD 30	"destination/response DB".r0024_Act_output_frequen	parameter value r0024 (Act.output frequency)	FLOATING_POINT	24.99988	
28	DB2.DBD 36	"destination/response DB".r0025_Act_output_voltage	parameter value r0025 (Act. output voltage)	FLOATING_POINT	119.6772	
29	DB2.DBD 42	"destination/response DB".r0027_Act_output_current	parameter value r0027 (Act. output current)	FLOATING_POINT	0.2053656	
30	DB2.DBW 48	"destination/response DB".r0203_drive_type	parameter value r0203 (drive type)	DEC	114	
31	DB2.DBW 52	"destination/response DB".r304_Rated_motor_voltage	parameter value r0304 (rated motor voltage)	DEC	230	
32	DB2.DBD 56	"destination/response DB".r30_Torque_gen_current	parameter value r0030 (Torque gen.current)	FLOATING_POINT	0.1429332	
33	DB2.DBD 62	"destination/response DB".r31_Act_filtered_torque	parameter value r0031 (Act. filtered torque)	FLOATING_POINT	0.2569102	
34	DB2.DBD 68	"destination/response DB".r32_Act_filtered_power	parameter value r0032 (Act. filtered power)	FLOATING_POINT	0.01971609	
35	DB2.DBD 74	"destination/response DB".r35_motor_temp_DDS0	parameter value r0035[0] (Act. motor temperature, Drive Dataset 0 (DDS0))	FLOATING_POINT	20.50768	
36	DB2.DBD 78	"destination/response DB".r35_motor_temp_DDS1	parameter value r0035[1] (Act. motor temperature, Drive Dataset 1 (DDS1))	FLOATING_POINT	20.0	
37	DB2.DBD 82	"destination/response DB".r35_motor_temp_DDS2	parameter value r0035[2] (Act. motor temperature, Drive Dataset 2 (DDS2))	FLOATING_POINT	20.0	
38	DB2.DBD 88	"destination/response DB".r37_Invertertemperature0	parameter value r0037[0] (Inverter temperature [°C], Measured heat sink temper)	FLOATING_POINT	28.99932	
39	DB2.DBD 92	"destination/response DB".r37_Invertertemperature1	parameter value r0037[1] (Inverter temperature [°C], Total Chip Junction Tempe)	FLOATING_POINT	41.66885	
40	DB2.DBD 98	"destination/response DB".r1024_Act_fixed_freq	parameter value r1024 (Act. fixed frequency)	FLOATING_POINT	0.0	
41	DB2.DBD 104	"destination/response DB".r1050_Act_Output_freq	parameter value r1050 (Act. Output freq. of the MOP)	FLOATING_POINT	4.999998	
42	DB2.DBD 110	"destination/response DB".r1078_Tot_freq_setpoint	parameter value r1078 (Total frequency setpoint)	FLOATING_POINT	25.0	
43	DB2.DBD 116	"destination/response DB".r1079_Selectedfrequency	parameter value r1079 (Selected frequency setpoint)	FLOATING_POINT	25.0	
44	DB2.DBD 122	"destination/response DB".r1242_Switch_on_level	parameter value r1242 (Switch-on level of Vdc-max)	FLOATING_POINT	734.115	
45	DB2.DBD 128	"destination/response DB".r1246_Switch_on_level	parameter value r1246 (Switch-on level kin buffering)	FLOATING_POINT	429.856	
46	DB2.DBD 134	"destination/response DB".r1538_Upper_torque_limit	parameter value r1538 (Upper torque limit (total))	FLOATING_POINT	0.0	
47	DB2.DBD 140	"destination/response DB".r1539_Lower_torque_limit	parameter value r1539 (Lower torque limit (total))	FLOATING_POINT	0.0	
48	DB2.DBW 146	"destination/response DB".r1801_Act_pulse_freq	parameter value r1801 (Act. pulse frequency)	DEC	4	
49						

Read_Parameters_G120\SIMATIC 300(1)\...\S7-Programm(3) RUN Abs < 5.2

Fig. 1-7 Parameter values that are read-out

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2 Description of projects “DP_P1082write_en” and “DP_r0947readindex_en”

2.1 Components that have been used

CPU 315-2 DP

SINAMICS G120:

- • Control Unit CU240S DP
- • Power Module PM240

2.2 Project description

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In the S7 project that is attached, a function is implemented to establish non-cyclic communications between a SINAMICS G120 drive and a CPU via PROFIBUS-DP with the standard S7 functions SFC58 / SFC59.

Project "DP_r0947readindex" is used to read-out the 8 indices of the two indexed parameters r0947 (last error message) and r0949 (error value). The above mentioned parameters are read in networks 2 and 3 of the project.

Parameter P1082 (max. frequency) is written into project "DP_P1082write". The parameter value is changed from the default value 50.00 Hz to 100 Hz. Parameter P1082 is written to in network 2 of the project.

The prerequisites to read / write parameters as well as the detailed description of the task profile and forming the request data blocks are provided in the documentation on the Control Unit (CU).

The prerequisites to read/write parameters and the detailed description of the task and forming the request data block is provided in the Control Unit (CU) documentation.

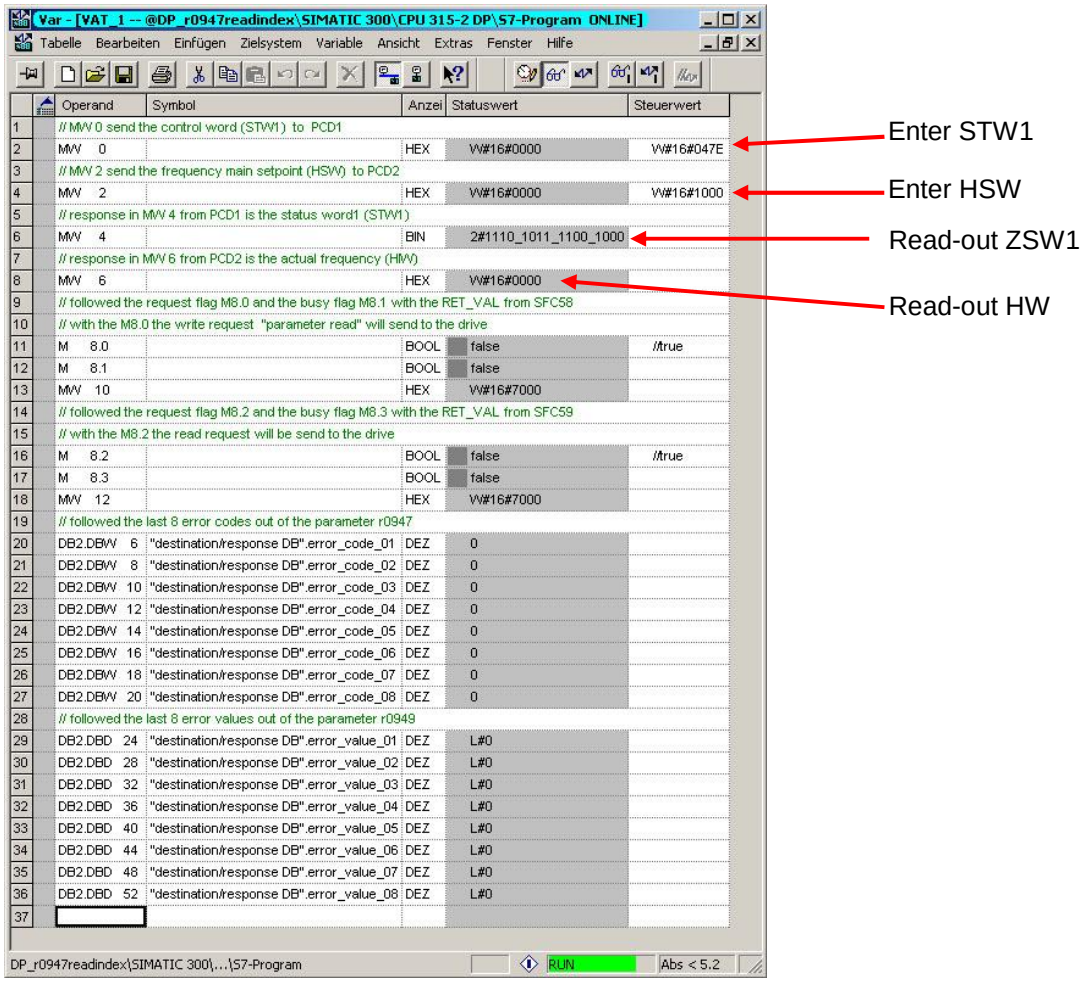
The possibility of controlling the drive is implementing in network 1 of the two projects.

2.3 Control of the drive (Network 1)

Control word 1 (STW1) and the main setpoint (HSW) are sent to the drive via the PROFIBUS interface. The drive receives status word 1 (ZSW1) and the main actual value (HIW).

The drive is started by sending the typical control word 047E, followed by 047F (signal edge of bit 0: ON). To stop the drive, word 047E should be sent to the drive (signal edge of bit 0: OFF). The control word is sent with process data word 1 (PZD1), which should be specified in the variable table VAT_1 (flag word MW0, refer to Fig.1- 1).

Figure 1-1



The drive receives (PZD1) status word 1 (ZSW1) that is then transferred into the flag word MW4. MW4 can then be taken from the variable table VAT_1 (refer to Fig. 1-1).

The main setpoint is sent to the drive with PZD2 and the main actual value is received from the drive in PZD2. The main setpoint should be specified into the variable table VAT_1 (flag word MW2, refer to Fig. 1-1). The response – the main actual value – is saved in MW6 and can be taken from the variable table (refer to Fig. 1-1).

The frequency setpoint and actual value are normalized so that 4000(hex) corresponds to 50Hz. The highest (maximum) that is to be sent is 7FFF. The normalization frequency (reference frequency) can be changed in P2000 (default 50Hz).

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2.3.1 The text of network 1 with comments:

Tabelle 1-1

L MW 0	// MW0 contains control word 1 that should be entered into variable table VAT_1
T PAW 256	// Control word 1 is sent to the drive with PZD1
L MW 2	// MW2 contains the main setpoint that should be specifies in variable table VAT_1
T PAW 258	// The main setpoint is sent to the drive with PZD2
L PEW 256	// Reads-out status word 1 (PZD1)
T MW 4	// Transfers the ZSW1 to flag word MW4 in VAT_1
L PEW 258	// Reads-out the main actual value (PZD2)
T MW 6	// Transfers the HIW into the flag word MW6 in VAT_1

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2.4 Read / Write Parameters (Networks 2,3)

Please note that to read parameters, it is necessary to use both functions SFC58 / SFC59, and for writing only SFC58 must be used. The reason for this is that when reading parameters initially, the read request must be sent to the drive (data set RECORD DB1). After this, the response with the parameter values (response block DB2) comes from the drive.

To write parameters, it is sufficient to just send the write request (DB1) to the drive.

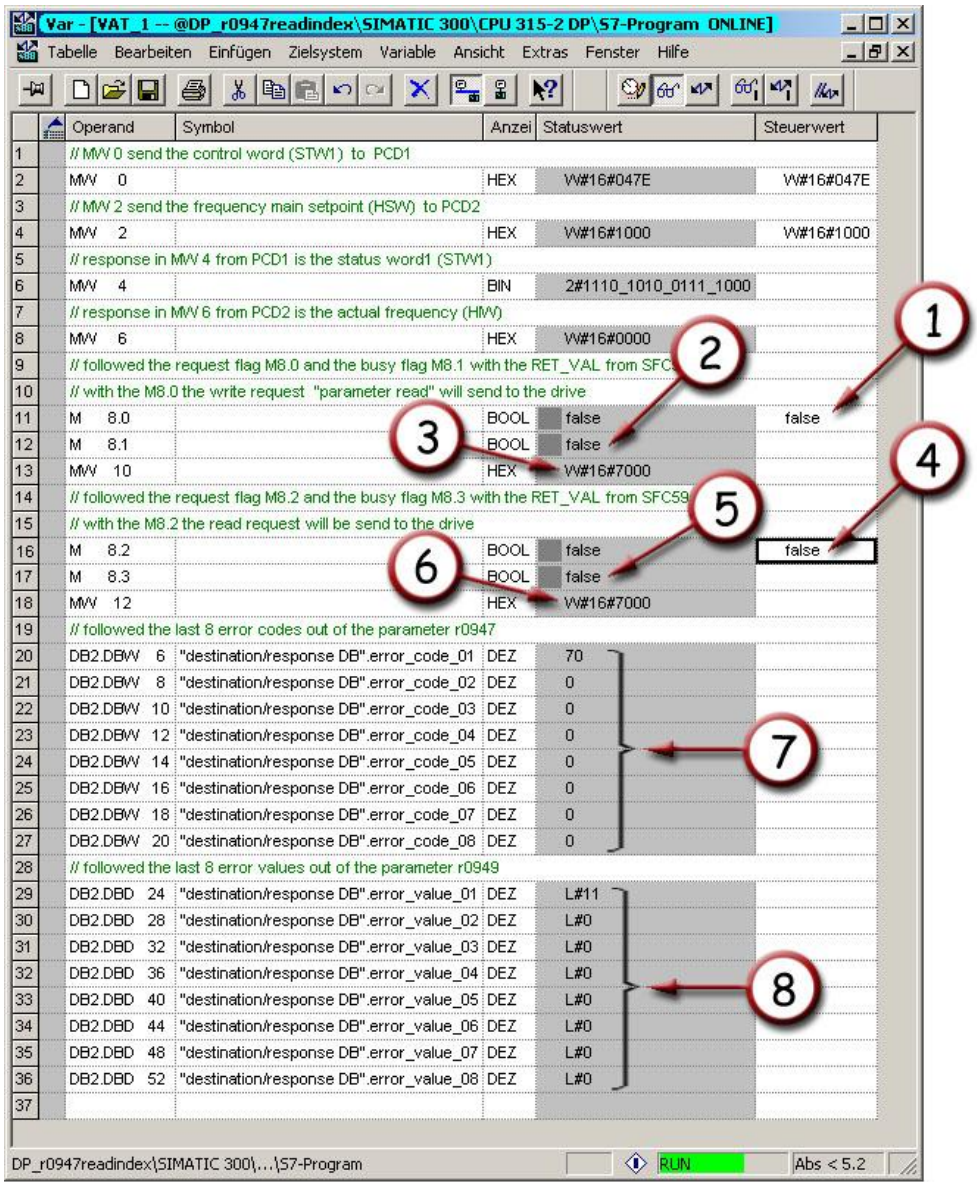
Request DB1 to read/write is sent in network 2 of the two projects. Parameters are read-out in network 3 of the project to read parameters. Network 3 does not contain the project to write to parameters.

The variable table VAT_1 controls the read/write process. Data about how the process is progressing, about the errors that occur while the function is being processed and data that have been read-out can also be taken from the variable table (refer to Figs. 2 and 3):

1. The write request ("read parameter" or "write parameter") is sent to the drive using flag bit M8.0.
   Enter the value 1 (true) to start the write request. The request should then be ended. Send the value 0 (false) to end the request.
2. Flag bit M8.1 indicates whether the write request is running: 1 active, 0 inactive.
3. MW10 (RET_VAL) includes an error code for the case that an error occurs while processing the function. Please refer to "Help for system functions/function blocks" for a description of all of the errors.
4. The read request is sent to the drive using flag bit M8.2. Enter the value 1 to start the read request. Then end the request using the value 0.
5. Flag bit M8.3 indicates whether the read request is running: 1 active, 0 inactive.
6. MW12 (RET_VAL) includes an error code for the case that an error occurs while processing the function". Please refer to "Help for system functions/function blocks" for a description of all of the errors.
7. The last 8 errors from parameter r0947 are displayed here.
8. The last 8 error values from parameter r0949 are displayed here.

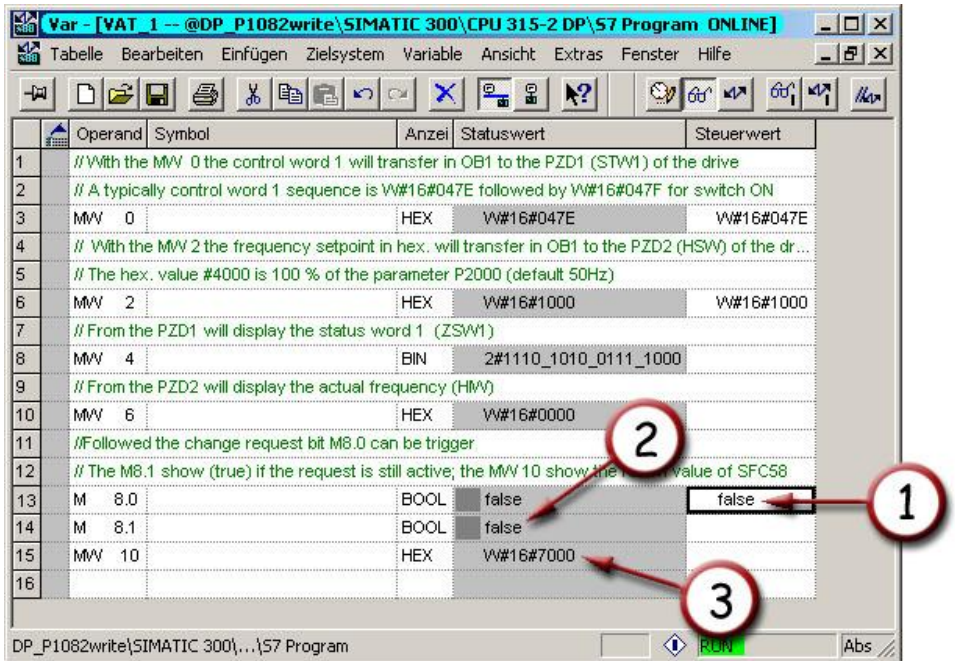
Fig. 1-2 and points 1-8 apply when reading parameters. For writing, Fig. 1-3 and Points 1-3 apply.

Figure 1-2



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Figure 1-3



Before the S7 projects can be used, they should be adapted. The following steps must be taken:

- Set the DP address at SINAMICS G120 (the DP address used in the projects is 3).
- Adapt the PLC (HW Config).
- HW Config "Save and Compile" and "Download to Module".
- Download the program into the PLC and start the PLC.

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