

Industry Online Support

NEWS

ET 200SP Motor Starter: Reading and writing data sets with HMI connection

ET 200SP / Motor starter:

https://support.industry.siemens.com/cs/ww/de/view/109750305

Siemens Industry Online Support



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1 Introduction

1.1 Overview

This application example offers you the possibility to acyclically query and, if necessary, change all available data sets and parameters of the ET200SP motor starter (3RK1308-0**00-0CP0) via a panel and during operation.

The following figure shows the setup of the components used in the application example.

Figure 1-1 setup of the application example



1.2 Mode of operation

The parameters of the ET 200SP motor starter can be read or written via data sets. These data sets are read via the RDREC function and written via the WRREC function.

More information on the setup of the different data structures can be found in the manual of the ET 200SP motor starter (see $\frac{5}{5}$).

In this application example, reading and writing the data sets is exemplary demonstrated by using two different motor starter types. The functions are executed with a direct starter 0.9-3 A (3RK1 308-0AC00-0CP0) and a reversing starter 0.3-1 A (3RK1 308-0BB00-0CP0). The functions of the application example can be executed for all types of the ET 200SP motor starter (also F starters).

To facilitate the use of the data sets, this application example uses the data types for the ET 200SP motor starter. These data types can be found in the Industry Online Support (see $\frac{6}{2}$).

For the understanding of the application example, the following knowledge is assumed and therefore not further explained in the application example:

- TIA Portal and WinCC configuration software
- Basics of STEP 7 programming
- Programming in SCL

1.3 Components used

This application example was created with the following hardware and software components:

Table 1-1	Hardware	components
-----------	----------	------------

Component	Numbe r	Article number	Note
CPU 1513-1 PN	1	6ES7513-1AL00-0AB0	FW V1.8; Alternatively, any other S7-1500 CPU as of firmware FW V1.8 can also be used.
4MB Memory Card	1	6ES7954-8LC02-0AA0	
ET 200SP IM 155-6 PN ST	1	6ES7155-6AU00-0BN0	FW V3.3
ET 200SP Base Unit, Typ A0	1	6ES7193-6BP00-0BA0	Empty Base Unit, due to system setup of the ET 200SP motor starter
ET 200SP Base Unit Cover	1	6ES7133-6CV15-1AM0	Cover for the empty Base Unit
ET 200SP Motor starter DS 0.9-3A HF	1	3RK1308-0AC00-0CP0	FW V1.0
ET 200SP Base Unit for motor starter MS1	1	3RK1908-0AP00-0AP0	Base Unit with 24V and feed-in system 400V
ET 200SP Motor starter RS 0.3-1A HF	1	3RK1308-0BB00-0CP0	FW V1.1
ET 200SP Base Unit for motor starter MS4	1	3RK1908-0AP00-0DP0	Base Unit without feed-in
ET 200SP energy bus cover	1	3RK1908-1DA00-2BP0	
ET 200SP Motor starter 3DI/LC module	2	3RK1908-1AA00-0BP0	
ET 200SP server module	1	6ES7193-6PA00-0AA0	
SIMATIC Comfort Panel TP700 Comfort	1	6AV2124-0GC01-0AX0	FW V14.0.1.0

Table 1-2 Software components

Component	Number	Article number	Note
STEP 7 PROFESSIONAL V14 SP1	1	6ES7822-104	Alternatively, a smaller package is also possible.
WinCC Engineering V14 SP1	1	6AV2104-0	Can be used with WinCC Comfort and higher.

This application example consists of the following components: Table 1-3

Component	File name	Note
Project	109750305_ET200SPMS_Rd_Wr_PROJ_V11.zip	Created with V14 SP1
Library	109750305_ET200SPMS_Rd_Wr_LIB_V11.zip	
Documentation	109750305_ET200SPMS_Rd_Wr_DOC_V11_en.pdf	This document

2 Engineering

2.1 Setup of control system

The control system setup from the network view in TIA Portal is exemplary shown in the following figure and may vary from your configuration. Figure 2Structure of control system



2.2 Configuration and settings

Trouble-free use of the ET 200SP motor starter requires that you use an empty module in front and on the left of the first motor starter.

More information about the system structure with the ET 200SP motor starter can be found in the "SIMATIC ET 200SP Distributed I/O System" system manual($\underline{17}$).

The empty module must be regarded as empty slot also in the hardware configuration.

Figure 2-1 Hardware configuration ET 200SP System



3 Block description

3.1 **Program structure**

To be able to integrate the functions of the application example into your project, the "109750305_ET200SPMS_Rd_Wr_LIB_V1.zip" block library And the "109750305_ET200SPMS_Rd_Wr_PROJ_V1.zip" project is available to you as download (\2\).

The program sequence depends on the number of the motor starters used in the system and needs to be adjusted to your setup. This example is built with two ET 200SP motor starters.



Note

The block numbers can be changed.

The "109750305_ET200SPMS_Rd_Wr_LIB_V1.zip" block library offers the following contents:

- · HMI_1: this is the complete HMI project
- PLC data types: in this folder all data types created for the project have been integrated
- PLC program blocks: this folder contains all the program blocks, FBs, FCs and DBs necessary for the creation of this application example
- · PLC tags: Contains the created tag chart for the example

To facilitate the use of the data sets, this application example uses the data types for the ET 200SP motor starter. These data types can be found in the Industry Online Support (see $\underline{(6)}$).

The "typeDataMotorStarter" data type has been newly created for the example. In this data type, all available data types for the ET 200SP motor starter have been integrated. It serves to assign the data of the ET 200SP motor starter, that are stored in "DataMotorstarter[DB10]".

The "typeFpLogbook" data type has also been newly created for the example and consists of 21 entries which represent the scope of the logbooks and are nested in the "typeDataMotorStarter" data type. The entries of the "typeFpLogbook" data type again subdivide into a "typeFpLogbookEntry" data type. It contains the information of object number, day, hours, minutes and seconds which are calculated in the "ConversionLogbook [FC1]" and stored on the "DataMotorstarter [DB10]" data block.

In the following chapters, the program blocks are explained.

3.1.1 "MstarterSelect [FB1]"

Via the "MstarterSelect [FB1]" function block, the information from the HMI, which motor starter is currently selected at the panel, is transmitted. Additionally, the process image of the inputs is read in in this block.

The following figure shows the call of the "MstarterSelect" block. Figure 3-2 Interconnected "MstarterSelect" FB1



The activation of the process image of the outputs is done separately in the OB1, so that there will not be any double accesses of the outputs in the further course of your application, see chapter 3.1.7 "Controlling the process image of the ".

The "MstarterSelect" function block has the following inputs and inputs/outputs:

Table 3-1	Inputs and in	puts/outputs of the	"MstarterSelect" FB
-----------	---------------	---------------------	---------------------

Name	Data type	Description	
selectedStarter	Int	Here, the panel reads in the information about which motor starter has been selected.	
motorStarterInput1	"LPD_type Motor StarterIn"	Input address of the respective ET 200SP motor starter. In this example, the process image of the inputs for the motor starter has been stored in the global tag chart on the "motorStarter1/2In" tags with the "LPD_typeMotorStarterIn" data type. The status of the inputs is stored on the "dataMotorstarter" output tag in the block.	
motorStarterInput2	"LPD_type Motor StarterIn"		
dataMotorstarter	Array[01] of "typeDataMo torStarter"	Contains the information of the motor starters that are stored after the RDREC or WRREC request.	

The "MstarterSelect" block has the following outputs:

Name	Data type	Description	
reqMstarter1	Bool	Serve as trigger, so that upon selecting a motor starter at	
reqMstarter2	Bool	the HMI, all data sets are read out once consecutively and the current information from the data sets are displayed on the HMI.	
dataMotorstarter IndexK	Int	Index for the HMI. This way, the data of the selected motor starter are accessed via a multiplex tag at the HMI.	

Note If you use more than two ET 200SP motor starters in your system setup, you need to extend the block with further inputs and outputs.

The following figure exemplary shows, how the program needs to be adjusted for the use of 20 ET 200SP motor starters.

Figure 3-3 Exemplary program extension "MstarterSelect" [FB1]

```
REGION //Data transfer PII of motor starter to data block
     //Motor starter 1
     //Read process image of inputs over interface #motorStarterInput1 and transfer to #DataMotorstarter
     #dataMotorstarter[0].DataMototStarterIn := #motorStarterInput1;
     //Motor starter 2
     //Read process image of inputs over interface #motorStarterInput2 and transfer to #DataMotorstarter
     #dataMotorstarter[1].DataMototStarterIn := #motorStarterInput2;
     //Motor starter 20
     //Read process image of inputs over interface #motorStarterInput20 and transfer to #DataMotorstarter
     #dataMotorstarter[19].DataMototStarterIn := #motorStarterInput20;
END REGION
REGION //Request for selected motor starter and set index k for HMI
     //Motor starter 1
     IF #selectedStarter = 0 THEN
         #reqMstarter1 := TRUE;
         #reqMstarter2 := FALSE;
         #dataMotorstarterIndexK := 0;
         //Motor starter 2
  ELSIF #selectedStarter = 1 THEN
         #reqMstarter2 := TRUE;
         #reqMstarter1 := FALSE;
         #dataMotorstarterIndexK := 1;
       ...
         //Motor starter 20
     ELSIF #selectedStarter = 19 THEN
         #reqMstarter1 := FALSE;
         #regMstarter2 := FALSE:
         #reqMstarter20 := True;
         #dataMotorstarterIndexK := 20;
     END_IF;
 END_REGION
```

3.1.2 "MotorCurrentFromPII[FC3]"

With the function "MotorCurrentFromPII[FC3]", a real motor current is calculated by the 6bit values in the process image of the motor starter's inputs, which display the current motor current in percentage. (PII stands for Process Image of Inputs)

The Figure below shows the call of the "MotorCurrentFromPII" function. Figure 3-4 Interconnected "MotorCurrentFromPII" FC3



The function has the following inputs and inputs/outputs:

Table 3-3 Inputs and inputs/outputs of the "MotorCurrentFromPII" FC

Name	Data type	Description	
inProcessValStarter1	Byte	Address of input byte that reflects the motor	
inProcessValStarter2	Byte	current from the process image of the motor starter's inputs.	
selectedStarter	Int	Here, the information from the "HMIInterface" DB is read out, which motor starter is currently active.	
dataMotorstarter	Array[01] of "typeData MotorStarter"	Contains the information of the motor starters that are stored after the RDREC or WRREC request.	

The function has the following outputs:

Table 3-4 Outputs of "MotorCurrentFromPII" FC

Name	Data type	Description
relativCurrentOf SelectedStarter%	Real	Current value of the selected motor starter in percent.
absCurrentOf SelectedStarter	Real	Absolute current value of the selected motor starter.

Note

If you use more than two ET 200SP motor starters in your system setup, you need to extend the block with further inputs and outputs.

The following figure exemplary shows, how the program needs to be adjusted for the use of 20 ET 200SP motor starters.

Figure 3-5 Exemplary program extension "MotorCurrentFromPII" [FC3]

```
EREGION read in input value (6bit) motor current value from PII of all motor starters and buffer in temp variable
    //Motor starter 1: read in input value (6bit) motor current value from PII
    IF #selectedStarter = 0 THEN
        #tempRelCurrent := #inProcessValStarter1;
        //Motor starter 2: read in input value (6bit) motor current value from PII
    ELSIF #selectedStarter = 1 THEN
        #tempRelCurrent := #inProcessValStarter2;
        //Motor starter 20: read in input value (6bit) motor current value from PII
    ELSIF #selectedStarter = 20 THEN
        #tempRelCurrent := #inProcessValStarter2;
        //Motor starter 20: read in input value (6bit) motor current value from PII
    ELSIF #selectedStarter = 20 THEN
        #tempRelCurrent := #inProcessValStarter20;
    END_IF;
    END_REGION
```

3.1.3 "MeasuredValues [FC2]"

This block serves to convert the phase current that is read from the data set 94 (reading measured values). The value of each phase is stored as byte in the data set and converted as real value in the function.

The following figure shows the call of the "Measured Values" function.

Figure 3-6 Interconnected "MeasuredValues" FC2



The function has the following inputs and inputs/outputs:

Table 3-5 Inputs and inputs/outputs of the "MeasuredValues" FC

Name	Data type	Description
dataMotorstarter	Array[01] of "typeData MotorStarter"	Contains the information of the motor starters that are stored after the RDREC or WRREC request.
selectedStarter	Int	Here, the information from the "HMIInterface" DB is read out, which motor starter is currently active.

The function has the following outputs: Table 3-6 Outputs of "MeasuredValues" FC

Name	Data type	Description
valuelL1	Real	Supplies the converted phase current of the respective
valuelL2	Real	motor phase.
valuelL3	Real	

3.1.4 "Statistic [FC4]" and "SecToTime [FB40]"

In the "Statistic [FC4]" block, the operating hours counter (which is read from the data set 95 as second value) is converted into days, hours, minutes and seconds. The conversion is done via the "SecToTime [FB40]" function block that is called up in this block. The basic function of the "SecToTime [FB40]" block was taken from the "MillisecToTime" function(\8\).

The converted values are transferred to the HMI via the "HMIInterface" DB.

The following figure shows the interconnected "Statistic" block.

Figure 3-7 Interconnected "Statistic" FC4



The block has the following inputs: Table 3-7 Inputs and inputs of "Statistic" FB

Name	Data type	Description
dataMotorstarter	Array[01] of "typeData MotorStarter"	Contains the information of the motor starters that are stored after the RDREC or WRREC request.
selectedStarter	Int	Here, the information from the "HMIInterface" DB is read out, which motor starter is currently active.

The block has the following outputs:

Table 3-8 Outputs of "Statistic" FB

Name	Data type	Description
ohDay	Int	supplies the calculated day value from the operating hours counter
ohHours	Int	supplies the calculated hour value from the operating hours counter
ohMin	Int	supplies the calculated second value from the operating hours counter
ohSec	Int	supplies the calculated minute value from the operating hours counter

3.1.5 "RdRecWrRec [FB5]"

The main function of the read/write example of the data sets is realized via the "RdRecWrRec [FB5]" function block. The data sets are read via the RDREC function and written via the WRREC function.

The following data sets are read:

- Logbooks (Data set 72, 73 and 75)
- Diagnosis (Data set 92)
- Measured values (Data set 94)
- Statistical data (Data set 95)
- Parameters (Data set 201 and 203)

This block needs to be called up separately for each motor starter in the system. The information that are read from/ written to the data sets are stored in an array in the "DataMotorstarter [DB10]" data block. For each motor starter, there is a separate field reserved in the array.

This means that in this example, an array with two fields is created in DB10. If, for example, you use 20 ET 200SP in your setup, you create an array with 20 fields ("Array [0..19] of "typeDataMotorStarter").

The following figure shows the "DataMotorstarter" DB of the application example.

Figure -3-8 Array DataMotorstarter DB10

-	•	•	arrayOfMotorStarter	Array[01] of "LPD_typeDataMotorStarter"
-		•	 arrayOfMotorStarter[0] 	"LPD_typeDataMotorStarter"
		•	 arrayOfMotorStarter[1] 	"LPD_typeDataMotorStarter"

The array consists of a compound data type with the name "typeDataMotorStarter".

The following figure shows the setup of the "typeDataMotorStarter" data type.

Figure -3-9 Setup of the array DataMotorstarter DB10

- 🗈	•	arra	ayOfMotorStarter	Array[01] of "LPD_typeDataMotorStarter"
	•	•	arrayOfMotorStarter[0]	"LPD_typeDataMotorStarter"
		•	DataDS72	"typeFpLogbook"
		•	DataDS73	"typeFpLogbook"
		•	DataDS75	"typeFpLogbook"
		•	DataDS92	"LPD_typeMotorStarterDS92"
		•	DataDS94	"LPD_typeMotorStarterDS94"
		•	DataDS95	"LPD_typeMotorStarterDS95"
-00		•	DataDS201	"LPD_typeMotorStarterDS201"
-00		•	DataDS203	"LPD_typeMotorStarterDS203"
-00		•	 DataMototStarterIn 	"LPD_typeMotorStarterIn"
-00		•	 DataMototStarterOut 	"LPD_typeMotorStarterOut"



The following figure shows the call of the "RdRecWrRec" data block. Figure 3-10 Interconnected "RdRecWrRec" FB5

The "RdRecWrRec" block has the following inputs and inputs/outputs:

Table 3-9 Inputs and inputs/outputs of the "MstarterSelect" FB

Name	Data type	Description					
dsNum	Int	Transfers the data set number for manual reading or writing from the HMI.					
hwldMstarter	HW_IO	Hardware ID of motor starter that is assigned to the corresponding motor starter in the hardware configuration.					
		PLC 1 CPU 1513-1					
reqSelectedStarter	Bool	Serves as trigger to consecutively read out all data sets of the desired motor starter and to always receive current information from the data sets.					
dataMotorstarter	"typeData Motor Starter"	Contains the information of the corresponding motor starter that are stored after the RDREC or WRREC request. Here, it is switched to the corresponding array of the created motor starter.					
reqRd	Bool	Serves as trigger for a manual read request.					
reqWr	Bool	Serves as trigger for a manual write request.					

NoteThe number of simultaneous diagnostic data calls via the "RDREC" system
function used in the function block is limited, depending on the CPU used. The
number of possible simultaneous calls can the found in the CPU's manual (\3\).
Reference value for CPU 1500: 10 simultaneous calls.

3.1.6 "ConversionLogbook [FC1]"

During the read-out of the motor starter's logbooks, the operating hours of the device and an object number for each event are read. The operating hours counter is specified as second value. To make a precise statement as to when an event took place, this second value is converted into days, hours, minutes and seconds in the "ConversionLogbook[FC1]" function. After the read-out of the logbooks DS72, DS73 and DS75, the block is called up in the "RdRecWrRec [FB5]" function block.

3.1.7 Controlling the process image of the outputs

In order to make sure that there are no simultaneous accesses to the process image of the ET 200SP motor starters' outputs from multiple points, the outputs are individually described in OB1. This way, you can integrate your additional switching conditions at this interface for your application.

In this example, the process image of the outputs for the motor starter has been stored in the global tag chart on the "motorStarter1/2Out" tags with the "LPD_typeMotorStarterOut" data type.

To be able to switch the outputs via the HMI image "motor control", the outputs of the used motor starter need to be switched in OB1. If you use more than two ET 200SP motor starters in your system setup, you need to extend the switching accordingly.

The following figure shows the interconnection of the process image of the outputs, using the example of "motorStarter1Out".

Figure 3-11 Exemplary switching of the process image of the outputs



4 Operating the application example

4.1 Overview

The following figure shows the start screen of the HMI. Figure 4-1 Start screen on HMI



The HMI project consists of 6 screens. These screens display the read information from the data sets of the used ET 200SP motor starter. Besides the system diagnostics window, a start, a system and a support screen are also integrated. In the following, it will be described in detail how to operate the individual screens.

4.2 Operation

4.2.1 Toolbar

The individual screens are selected via the toolbar on the right. It is possible to access the following screens from anywhere:

- Start screen
- Motor control
- Change parameters
- Device logbooks
- Device diagnosis
- Measured values
- Statistics
- · System
- Support

4.2.2 System diagnostics window

A diagnostics button to call up the system diagnostics window is integrated in the toolbar.

Figure 4-2 Button to call up the system diagnostics



The System diagnostics window offers you an overview of all available devices in your plant. You navigate directly to the cause of the error and to the respective device. You have access to all diagnostics-capable devices which you have configured in the "Devices & Networks" editor.

Figure 4-3 Extract from the "System diagnostics window"

System	diagnostics window				VIO Deur
Status	Name	Op	Type	Order number	Address Pla
~	IO-Device 1		IM 155-6 PN ST		262*
V	IO-Device_1	0		6ES7 155-6AU00-0BN0	264*
~	DS 0.9-3 A HF 3DI/LC_1	2	DS 0.9-3 A HF 3DI/LC	3RK1 308-0AC00-0CP0	265*
V	RS 0.3-1 A HF 3DI/LC_1	3	RS 0.3-1 A HF 3DI/LC	3RK1 308-0BB00-0CP0	267*
-					

4.2.3 Using faceplates

In this application example, the contents of the HMI screens are generated as faceplates. A faceplate is a block that makes it easier for you to connect the individual process tags to the HMI. You also get the advantage of being able to use the faceplate for several panels and to adjust it for each panel size.

Further information on faceplates can be found in the Industry Online Support(<u>\9\</u>).

To connect the process tags to the faceplate, click on the faceplate and go to "Interface". Now, all process tags to be connected are displayed.

Figure 4-4 Interface for the faceplate

fpMotorControl_1	1 [Faceplate	instanc	e] [fpMol	torControl	V 0.0.34]		Properties
Properties	Interface	Anin	nations	Events	Texts		
12 🖻 🖿							
Name			Static val	lue	Dynamization		
 Faceplate I 	nterface						
Absolut	eCurrent	N			HMI_Interface_absoluteMotorCurrent	II	
motorSt	tarterOut				motorstarter_k.DataMototStarterOut		
Relative	Current	N			HMI_Interface_RelativeCurrent		

4.2.4 Selecting the motor starter

To receive the correct values of the desired motor starter, you need to select a motor starter after selecting an HMI screen. To do this, there is a dropdown menu in the upper right corner.

Figure 4-5 Selecting motor starter 1



To expand the display and integrate further motor starters into this selection field, and to adjust the names for your application, the dropdown menu can be adjusted at "Screen templates > Template_Topic > Properties.

Figure 4-6 Editing the dropdown menu



If you now open the text list "motorselection", you can add further motor starters to the selection by adding new entries to the text list ("Add new").

Figure 4-7 Expanding the "motorselection" text list

	Name 🖌	•		Selection		Comment
1-2-	logbook	(S		Value/Range		
1-2-	motorse	election		Value/Range	-	
	<add ne<="" th=""><th>ew></th><th></th><th></th><th></th><th></th></add>	ew>				
Te	xt list e	ntries				
Te	<mark>xt list e</mark> Default	entries	Text			
Te:	xt list e	entries Value ▲ 0	Text Starter1			
Te:	xt list e	Value 🔺	Text Starter1 Starter2			

The value for "Starter1" = 0 and "Starter2" = 1 is stored in the "HMIInterface" DB in the "mStarterSelect" tags and interconnected at several program blocks.

4.2.5 Motor control

The following figure shows the HMI screen "Motor control". Figure 4-8 HMI screen "Motor control"

Motor control		8/9/2017 4:01:20 PM	
Motor current [%]	110,00 5	0.4 Starter1	7 Start
Right	Error Reset Emergency Start	otor current [A]	Hotor
Left D Qui	isable Cold ck stop Start		Change parameters
Process image of the inpu	<u>ts</u>	DI module plugged	Device
Ready auto	Input LC	EX motor protection	Davies
Motor on	Local mode	Therm. motor model over	Diagnostics
Group fault	Ready start motor on	Current limit tripping	Measured values
Group warning	Motor CW	F-DI activated	Statistic
Input 1	Motor CCW	Res. current detected	
Input 2	Quick stop active	Asymmetry detected	System
Input 3	Energy saving active	Overtemperature	Support

In the HMI screen "motor control", the process image of the motor starter's inputs as well as the process image of the outputs is shown. This provides you with the status of the selected motor starter and allows you to activate it manually, or reset an error. Additionally, the current motor current is displayed in % and as real value in [A] in the upper screen area.

Note The process image of the inputs and outputs are connected to the panel as multiplex tags (DataMotorstarter_k.DataMotorStarterIn, DataMotorstarter_k.DataMotorStarterOut). Please note that the "Symbolic multiplexing" is available only for TIA Portal version V 14 and higher.

4.2.6 Change parameters

The following figure shows the HMI screen "Change parameters". Figure 4-9 HMI screen "Change parameters"

Change parameters	8/14	/2017 2:11:06 PM	
	Modi	fy device parameter	Start
Rated op. current Ie/A	1.00	1.00	Change parameters
Response to residual current detection	Tripping	Tripping 🗸	Device Logbooks
Response to asymmetry	Tripping	Warn 🗸	Device Diagnostics
	Update	Write	Statistic
	device paramet	Only possible when motor in stop	System
			Support

In the HMI screen "Change parameters", you have the option of adjusting the rated operational current I_{e} . The entered value of the rated operational current needs to be in the value range of the selected motor starter, otherwise, the parameter will not be accepted. This means that, for an ET 200SP motor starter DS 0.9-3A (3RK1 308-0AC00-0CP0), only values between 0.9 - 3 can be entered. Parameters cannot be written during motor operation. For a parameter change, the motor needs to be stopped and the local manual operation needs to be deactivated.

Additionally, the parameters "Response to residual current detection" and "Response to asymmetry" can be changed between "Warn" and "Tripping".

Figure 4-10 Changing the parameters "Residual current detection" and "Asymmetry"

Response to residual current detection	Warn	Warn 🗸
Response to asymmetry	Warn	Warn Tripping Warn

Note Please note that after a CPU restart or after module missing, the written device parameter are written over again by the original parameterization from the hardware configuration.

You will see this note if you want to write the parameter.

Startor1	
Starter	∇
Modify device parameter	
Please note 0.00 0.90	
that after a CPU restart or after module missing, the written device parameter are written over again by the	\bigtriangledown
from the hardware configuration.	\bigtriangledown
Write device parameter Only possib motor in	rite arameter De when a stop

4.2.7 Device logbooks

The following figure shows the HMI screen "Device logbooks". Figure 4-12 HMI screen "Device logbooks - Logbook 'events'"

Log	book "ev	vents"				8/9/2017 4:12:00 PM		Ŷ.
No	days	h	min	sec	Event		_	
1	43	19	15	8	310 Emergency start active	Starter1	$\overline{\nabla}$	Start
2	43	19	14	57	310 Emergency start active			
3	43	18	57	24	310 Emergency start active	Update		Motor
4	43	18	57	21	310 Emergency start active			control
5	43	18	57	20	310 Emergency start active			
6	43	18	57	19	310 Emergency start active			Change parameters
7	43	17	51	45	357 Automatic mode			
8	43	17	51	45	454 Faulty SSC Interface			Device
9	43	14	23	20	310 Emergency start active			Logbooks
10	43	14	23	17	310 Emergency start active			
11	43	14	23	15	1542 Ie critical warning value lower limit violation			Device Diagnostics
12	43	14	23	11	1542 Ie critical warning value lower limit violation			
13	43	12	2	34	1542 Ie critical warning value lower limit violation			Measured
14	43	12	2	27	1542 Ie critical warning value lower limit violation			values
15	43	10	29	15	1542 Ie critical warning value lower limit violation			
16	43	10	28	56	1542 Ie critical warning value lower limit violation			Statistic
17	43	10	28	48	1542 Ie critical warning value lower limit violation			
18	43	10	28	39	1542 Ie critical warning value lower limit violation			Surton
19	43	10	12	57	357 Automatic mode			System
20	43	10	12	57	454 Faulty SSC interface		-	
21	42	12	37	20	1542 Ie critical warning value lower limit violation			Support

There are 3 different logbooks for the ET 200SP motor starter:

- DS72 logbook device errors
- DS73 logbook triggering operations
- · DS75 logbook events

In the HMI screen "Device logbooks", all 3 variants can be found. The logbooks can be navigated through via the arrow keys in the lower right corner. For each entered event, the time is additionally displayed in days, hours, minutes and seconds. This is the operating hours counter in the device, which means that the exact time of when an event occurred in the device will be recorded.

In the logbooks "Events" and "Triggering operations", most entries will usually be found, which is why the view starts with the logbook "Events", followed by the logbook "Triggering operations" and finally the logbook "Device errors". It may well be that there are no entries in the logbook "Device errors". Here, errors that occur in the hardware are entered.

Note The logbook entries are connected to the panel as multiplex tags. Please note that the "Symbolic multiplexing" is available only for TIA Portal version V 14 and higher.

The following figure shows the HMI screen "Device logbooks".

Figure 4-13 HMI screen "Triggering operations"

No days h min sec Event 1 43 19 15 1 1406 Cold start tripping Start 2 43 19 10 20 1406 Cold start tripping Update Plother 3 43 19 10 20 1406 Cold start tripping Update Plother 4 43 19 4 2 1406 Cold start tripping Update Plother 6 43 19 4 2 1406 Cold start tripping Update Plother 7 43 19 3 3 1046 Cold start tripping Editional start triping Editional st	No days h min see: Event 1 43 19 15 1 1406 Cold start tripping 2 43 19 10 20 1406 Cold start tripping Update Moder 4 43 19 40 106 Cold start tripping Update Update Moder 5 43 19 4 2 1406 Cold start tripping Cold start trip	No. davs h min sec Event 1 43 19 15 1 1466 Cold start tripping Start 2 43 19 10 20 1466 Cold start tripping Update Update Italian 3 43 19 10 20 1466 Cold start tripping Update Update Italian 6 43 19 4 2 1466 Cold start tripping Galage Update Update Italian 7 43 19 3 27 1466 Cold start tripping Galage Update Update Update Update Update Italian Italian	No days h min sec Event 1 44 19 15 1 146 Cold start tripping Start 2 43 19 10 20 146 Cold start tripping Update Update 3 43 19 10 20 1466 Cold start tripping Update Update Motire 6 43 19 4 2 1466 Cold start tripping Update Update Update Motire 7 43 19 3 3 31 248 Cold start tripping Update Update Update Update Motire 9 43 17 51 45 317 Electronic supply voltage too low Update Update Update Update Update Update Motire Update U	Logi	book "tr	iggeri	ing op	erati	ons"	8/9/2017 4	:29:49 PM		
1 43 19 15 1 1466 Cold start tripping Update Hator 2 43 19 11 42 1466 Cold start tripping Update Hator 4 43 19 6 43 1496 Cold start tripping Update Hator 5 43 19 42 1466 Cold start tripping Cold start tripping Change Change 7 43 19 3 37 1466 Cold start tripping Cold start tripping Change Parameters 7 43 19 3 37 1466 Cold start tripping Cold start tripping Change Parameters 10 43 10 12 57 317 Electronic supply valage too low Device Device Device 11 43 10 12 27 313 twistock not in Ready Device Device Device 12 42 18 6 149 Cold start tripping Statistic Statistic 14 42 18 6 149 Cold start tripping Statistic Statistic	1 43 19 15 1 1466 Cold start tripping 2 43 19 11 42 1466 Cold start tripping 3 43 19 10 22 1466 Cold start tripping 4 43 19 6 43 1466 Cold start tripping 5 43 19 4 50 446 Cold start tripping 7 43 19 3 37 1466 Cold start tripping 9 43 15 57 23 1466 Cold start tripping 9 43 10 12 57 317 Electronics supply voltage too low 10 43 10 12 57 317 Electronics supply voltage too low 11 43 10 12 27 333 twistock not in Ready 13 42 18 6 19 333 twistock not in Ready 13 42 18 7 48 333 twistock not in Ready 15 42 18 6 19 333 twistock not in Ready 15 42 18 6	1 43 19 15 1 1406 Cold start tipping June 1	1 43 19 15 1 1406 Cold start tripping Start 2 43 15 11 42 166 Cold start tripping Update Hubbr 4 43 19 4 2 1406 Cold start tripping Update Hubbr 5 43 19 4 2 1406 Cold start tripping Update Hubbr 6 43 19 4 2 1406 Cold start tripping Update Hubbr 7 43 19 4 2 1406 Cold start tripping Update Parameters 9 43 17 51 45 317 Electronics supply voltage too low Update Parameters 10 43 10 12 27 317 Electronics supply voltage too low Update Parameters 12 42 18 8 54 333 worktok not in Ready Update Heasured 13 42 18 6 19 333 worktok not in Ready Update Heasured 16 42 18 57 233 worktok not	No	days	h	min	sec	Event		Starter1		
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20 42 12 37 20 335 le lower limit violation				20	42	12	37	20	335 Ie lower limit violation				
21 42 12 32 49 1406 Cold start tripping	20 42 12 37 20 335 Ie lower limit violation	20 42 12 37 20 335 le lower limit violation	21 42 12 32 49 1406 Cold start tripping Support	21	42	12	32	49	1406 Cold start tripping			4 N	Support
21 42 12 32 49 1406 Cold start tripping	20 47 12 37 20 335 to lower limit violation	20 42 12 37 20 335 le lower limit violation	21 42 12 32 49 1405 Cold start tripping	21	47	12	37	49	1406 Cold start tripping				

The following figure shows the HMI screen "Device logbook during a device error". Figure 4-14 HMI screen logbook "Device errors"

Logi	oook "de	vice e	errors			8/9/2017 4:30:45 PM	
No	days	h	min	sec	Event	Etautor1 V	
1	0	0	0	0	No entry	Starter V	Start
2	0	0	0	0	No entry	Undate	
3	0	0	0	0	No entry	opunce	Motor
4	0	0	0	0	No entry		control
5	0	0	0	0	No entry		Change
6	0	0	0	0	No entry		parameters
7	0	0	0	0	No entry		
8	0	0	0	0	No entry		Device
9	0	0	0	0	No entry		Logbooks
10	0	0	0	0	No entry		Device
11	0	0	0	0	No entry		Diagnostics
12	0	0	0	0	No entry		
13	0	0	0	0	No entry		Measured
14	0	0	0	0	No entry		values
15	0	0	0	0	No entry		
16	0	0	0	0	No entry		Statistic
17	0	0	0	0	No entry		
18	0	0	0	0	No entry		System
19	0	0	0	0	No entry		
20	0	0	0	0	No entry		
21	0	0	0	0	No entry		Support

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4.2.8 Device diagnostics

The following figure shows part 1 of the HMI screen "Device diagnostics". Figure -4-15 HMI screen "Device diagnostics" 1

	8/9/2017 4:3	2:13 PM	
Device diagnostics	Update	Starter1 ▽	Start
Ready auto	Asymmetry detected		
Motor CW	Asymmetry tripping		Motor control
Motor CCW	Res. current detected		
Switching element overload	Res. current tripping		Change parameters
Switching element defective	Tripping due to motor blocking		Device
Emergency start active	Twistlock not in ready position		Logbooks
Group fault	Automatic mode		Device
Group warning	Manual mode		Diagnostics
Thermal motor model overload	Ie upper limit violation		Measured values
Overload tripping	Ie lower limit violation		
Cooling time active	le warning limit exceeded		Statistic
Switching element short circuit	le warning limit undershot		System
Bypass element defective	Cold start active		$ \rightarrow$
Current measuring range exceed	ded Cold start tripping		Support

Just like the logbooks, the HMI screen "Device diagnostics" consists of 3 individual screens. Via the arrow keys in the lower right corner, you can navigate between the screens.

In these screens, all diagnoses integrated into the ET 200SP motor starter are displayed. In the last screen of the "Device diagnostics", the diagnosis of the ET 200SP F-motor starter will be specifically addressed.

Note The process value of the device diagnosis is connected to the panel as multiplex tag (DataMotorstarter_k.DataDS92). Please note that the "Symbolic multiplexing" is available only for TIA Portal version V 14 and higher.

The following figure shows part 2 of the HMI screen "Device diagnostics". Figure -4-16 HMI screen "Device diagnostics" 2

	8/9/2017 4:40:54 PM	.
Device diagnostics	Update Starter1	▼ Start
Quick stop active	Supply voltage too low	
Quick stop1- direction. indep.	Supply voltage too high	Motor control
Quick stop1 - CW	Sensor supply overload	Change
Quick stop1 - CCW	Ready motor ON	parameters
Operational trip end position CW	process image error	Device Logbooks
Operational trip end position CCW	CPU or master STOP	
Input trip CW	No start-up data	Device Diagnostics
Input trip CCW	Change of parameter invalid during ON-state	Measured
Input1	0 Incorrect parameter nr.	
Input 2	Pause present	Statistic
Input 3	Energy saving mode active	System
Input tripping	Input control	
Input warning		Support

From the DS92, a faulty parameter number can also be read. Here, numerical values that reflect object numbers are entered. The interpretation can be done with the device manual of the ET 200SP motor starter ((5)).

Figure 4-17 Output of a faulty parameter number

2 Incorrect parameter nr.

The following figure shows the HMI screen "Device diagnostics" of the F-motor starter.

SIEMENS	SIMATIC HMI
Device diagnostics only F-starter Update Explosion protection active New safety Error during self-test F-DI active	param. received

Figure -4-18 HMI screen "Device diagnostics F-motor starter"

4.2.9 Measured values

The following figure shows the HMI screen "Measured values". Figure 4-19 HMI screen "Read measured values"

Read measured valu	es		8/10/2017 8:09:51 AM	
Measured values	Update		Starter1	∽ Start
Phase current I L1	0.40 Phase current [A]	44 Phase current [%]	40	Motor control
Phase current I L2	0.38 Phase current [A]	41 Phase current [%]	38	Change paramete Device
Phase current I L3	0.00 Phase current [A]	0 Phase current [%]	0 0 40 80 120 160 200	Logbooks Device Diagnosti
Motor heating [%]	0			Measured values
Unbalance [%]	5]		Statistic
Electronics supply voltage [V]	+22.8			System Support

In the HMI screen "Measured values", the information from the data set 94 are displayed. The different phase currents can be viewed in % as well as in [A] so that you can assess the occupancy rate of the individual subordinate actuators. The displayed data are not displayed cyclically, however, they can be updated via the "Update" button.

Note If you integrate a cyclic evaluation of the data into your project, please note that this affects the cycle time of the OB1.

4.2.10 Statistics

The following figure shows the HMI screen "Statistics". Figure 4-20 HMI screen "Read statistics"

Read statistics	8/10/2017	8:14:16 AM	
Statistic Update		Starter1 \bigtriangledown	Start
Motor current Imax [A]	1.93		Motor control
Last tripping current [A]	0.00		Change
Number of starts motor CW	332		Device
Number of starts motor CCW	0		Device
Number of motor overload trips	0		Diagnostics
Number of switching element overload trips	0		values
Operating hours motor [s]	4693		Statistic
Operating hours 44 [day]	2 [h] 52 [min] 29 [sec]		System
			Support

In the HMI screen "Statistics", the information from data set 95 are displayed. It is evaluated, how often the motor starter has been activated (in clockwise or anticlockwise rotation), how high the maximum motor current in [A] is, and different tripping conditions are also counted. The operating hours counter of the device is specified in days, hours, minutes and seconds.

The displayed data are not displayed cyclically, however, they can be updated via the "Update" button.

Note If you integrate a cyclic evaluation of the data into your project, please note that this affects the cycle time of the OB1.

4.2.11 System & support

The following figure shows the HMI screens "System" and "Support". Figure 4-21 HMI screens "System" and "Support"

SIEMENS	SIMATIC HMI	SIEMENS	SIMATIC HMI
Speint	Ended and a constraint of the second	All and a state of state All and a state of state of state of state Note: State of state o	<text></text>

The HMI screens "System" and "Support" are integrated into the project as assistance. No functions of the ET 200SP motor starter are displayed in these screens.

Under "Support" and "System", you also have the option of switching between the German and English language.

5 Other setup options

The setup shown in this application example is not mandatory. Your system may vary from this setup and can be structured individually. Two possible variants are described below:

The following figure shows a variant with an S7-1500 F-CPU as well as standard and failsafe motor starters

Figure 5-1 Example: Standard and Failsafe ET 200SP motor starters with S7-1500 F-CPU



The following figure shows a variant with an ET 200SP CPU as well as standard and failsafe motor starters

Figure 5-2 Example: Standard and failsafe ET 200SP motor starters centrally on ET 200SP CPU



ET 200 SP CPU System

6 Appendix

6.1 Service & support

Industry Online Support

Do you have any questions or need support?

Siemens Industry Online Support offers access to our entire service and support know-how as well as to our services.

Siemens Industry Online Support is the central address for information on our products, solutions and services.

Product information, manuals, downloads, FAQs and application examples – all information is accessible with just a few mouse clicks at https://support.industry.siemens.com

Technical Support

Siemens Industry's Technical Support offers quick and competent support regarding all technical queries with numerous tailor-made offers – from basic support right up to individual support contracts.

Please address your requests to the Technical Support via the web form: <u>www.siemens.com/industry/supportrequests</u>

Service offer

Our service offer comprises, among other things, the following services:

- Product Training
- Plant Data Services
- Spare Parts Services
- Repair Services
- On Site and Maintenance Services
- Retrofit and Modernization Services
- Service Programs and Agreements

Detailed information on our service offer is available in the Service Catalog: <u>https://support.industry.siemens.com/cs/sc</u>

Industry Online Support app

Thanks to the "Siemens Industry Online Support" app, you will get optimum support even when you are on the move. The app is available for Apple iOS, Android and Windows Phone. https://support.industry.siemens.com/cs/ww/en/sc/2067

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6.2 Links and literature

Table 1-6

No.	Торіс
\1\	Siemens Industry Online Support
	https://support.industry.siemens.com
\2\	Link to the entry page of the application example
	https://support.industry.siemens.com/cs/ww/de/view/109750305
\3\	Limitation for the active jobs
l	https://support.industry.siemens.com/cs/de/en/view/15364459
\4\	Application example for ET 200SP Motor starter
	Safe Shutdown of ET 200SP Motor Starters
	https://support.industry.siemens.com/cs/ww/en/view/109748128
\5\	Device Manual - SIMATIC ET 200SP Motor Starter
	https://support.industry.siemens.com/cs/ww/en/view/109479973
\6\	Libraries with PLC data types (LPD) for STEP 7 (TIA Portal) and S7-1200/S7-1500
	https://support.industry.siemens.com/cs/ww/en/view/109482396
\7\	SIMATIC ET 200SP Distributed I/O System
	https://support.industry.siemens.com/cs/ww/en/view/58649293
\8\	Description for "MillisecToTime" FB.
	https://support.industry.siemens.com/cs/ww/en/view/42637538
\9\	Using faceplates.
	https://support.industry.siemens.com/cs/ww/en/view/68014632

6.3 Change documentation

Table 6-1

Version	Date	Modifications
V1.0	09/2017	First version
V1.1	12/2017	Add note in HMI Change of Faceplate and Screen "Change parameter" and FB "RdRecWrRec" and DB "HMIInterface".