

SITOP power supply

SITOP PSU6200 Diagnostics Interface

Application Manual

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 DANGER
indicates that death or severe personal injury will result if proper precautions are not taken.
 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
indicates that minor personal injury can result if proper precautions are not taken.
NOTICE
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

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The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction

To facilitate communication in a simple and favorably priced fashion, the newly developed devices of the PSU6200 product group are equipped with a proprietary data interface. To a large extent this data interface uses already existing components and infrastructure of power supplies and control systems. This interface is described in detail in the following document.

Technical description

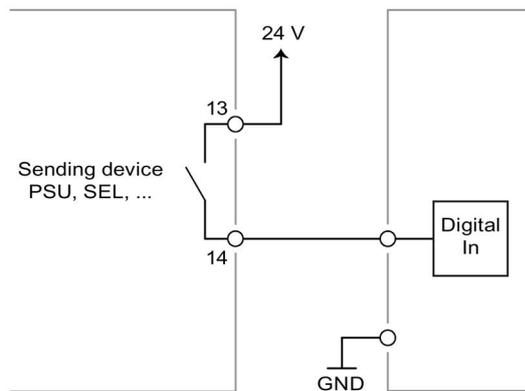
Devices of the PSU6200 product group are equipped with a data interface that can be connected with a higher-level control and evaluation system, for example, connected with a SIMATIC system via a digital input. Statuses as well as measured values - such as output voltage or output current of the specified devices - are transferred to the higher-level control and evaluation system via the interface, called the diagnostics interface DIS.

The diagnostics interface, which is unidirectional, can only send data to the higher-level control and evaluation system. Data cannot be received.

The diagnostic interface design is described in detail in the following.

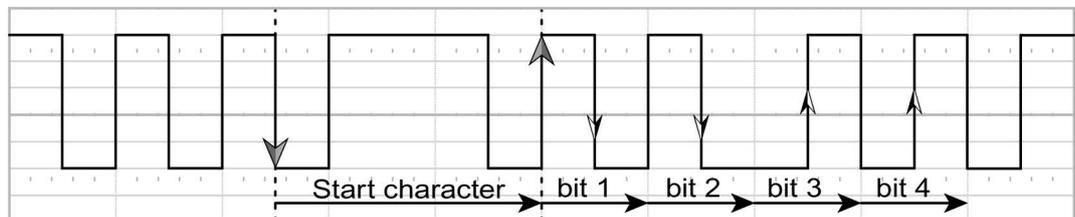
2.1 Hardware layer

A device equipped with DIS should be connected to a higher-level control and evaluation system as follows.



Contacts 13 and 14 are isolated (floating), and using DIP switches can be alternatively configured as conventional status relay. A pull-down resistor must be internally connected to the digital input.

The content of the DIS is transferred in a protocol using telegrams comprising a continuous flow of bits. The last bit of a telegram that has been transferred is immediately followed by the start character of the next telegram. The signal at the receiving input (Digital In) of the higher-level control and evaluation system looks like this:



2.1 Hardware layer

The start character comprises a low signal level with a duration of 50 ms, followed by a high signal level with a duration of 150 ms and a low signal level with a duration of 50 ms.

The individual bits are sent using the Manchester code. A bit has a duration of 100 ms; whereby, the high signal level and the low signal level are each 50 ms long. A "0" is represented by a falling signal edge - i.e. a high signal level followed by a low signal level. A "1" is represented by a rising signal edge.

The duration of a bit has a $\pm 5\%$ tolerance.

The high signal level corresponds to 24 V electrical and the low signal level to ground.

2.2 Telegrams for the diagnostics interface (DIS)

2.2.1 Overview

Every transfer telegram of the DIS has an exclusive start sequence with a length of 32 bits. Each bit has a length of 100 ms.

The first six transferred bits - the header bits - designate the device type and the content of the telegram. Bit 7 - bit 31 contain the user information (information that can be evaluated). Bit 32 contains the parity.

Bit no.	Meaning	Resolution	Value range	Comment
1 - 3	Device identification	0 - 7	001: SEL 1200 010: SEL 1400 011: PSU6200 000, 100 - 111: reserved	
4	Reserved	-	-	This bit is always "0"
5 - 6	Telegram identification	0 - 3	00: - 01: - 10: - 11: -	Marks the following user information (information that can be evaluated). Meaning dependent on the device identification. See the following chapter
7 - 31	Data	-	-	Meaning dependent on the device and telegram identification. See the following chapter
32	Parity	0 / 1	-	The parity bit (odd parity) at the end of the telegram is "1" if the sum of all of the preceding 1 bits in the telegram is even. Otherwise, the parity bit is "0". The start sequence is not taken into account when generating the parity bit.

2.2.2 Detailed meaning of the individual bits

Devices from product group PSU6200 are marked using the following header bits when data is transferred via the DIS.

Bit no.	Meaning	Resolution	Value range	Comment
1 - 3	Device identification	0 - 7	011: PSU6200	
4	Reserved	-	-	This bit is always "0"
5 - 6	Telegram identification	0 - 3	00: - 01: - 10: - 11: -	See the following chapter

Bits 7 - 31 follow the header; they contain information about the device data, measured values and status information. The rough structure of the existing telegrams is shown below.

Header	Status information	Voltage and current values
Bits 1 - 6	Bits 7 - 13	Bits 14 - 31

Header	Status information	Rated data and device information
Bits 1 - 6	Bits 7 - 13	Bits 14 - 31

Header	Status information	Device information
Bits 1 - 6	Bits 7 - 13	Bits 14 - 31

Header	Status information	Temperature and service life
Bits 1 - 6	Bits 7 - 13	Bits 14 - 31

Status information

For devices from product group PSU6200, when transferring data via DIS, information about the actual status of the sending device is transferred in all telegrams in bits 7 - 13.

Bit no.	Meaning	Resolution	Value range	Comment
1 - 3	Device identification	0 - 7	011: PSU6200	
4	Reserved		-	This bit is always "0"
5 - 6	Telegram identification	0 - 3	00: - 01: - 10: - 11: -	See the following chapter
7	DC Okay	0 / 1	0: Output voltage too low 1: Output voltage okay	This bit is an image of the OK LED at the front of the device
8	Service life	0 / 1	0: Device age < 90 % nominal value 1: Device age > 90 % nominal value	
9 - 10	Output current	0 - 3	00: Current < 30 % of I_{rated} 01: Current 30 - 60 % of I_{rated} 10: Current 60 - 90 % of I_{rated} 11: Current > 90 % of I_{rated}	These bits correspond to the LED utilization display, maximum current of the last 3 seconds
11	Overtemperature shutdown	0 / 1	0: Device in operation 1: Device shutdown with latching due to overtemperature	Device status: in operation or shutdown due to actual overtemperature or previous overtemperature condition
12	DC OK threshold	0 / 1	0: OK threshold low 1: OK threshold high	This bit specifies the position of the DIP 2 at the front of the device
13	Parallel mode	0 / 1	0: Single mode 1: Parallel mode	This bit specifies the position of the DIP 1 at the front of the device

Measured values and device data

For devices from product group PSU6200, when transferring data via DIS, information about actual measured values and specific data of the sending device is transferred in bits 14 - 31. To do this, four telegrams exist, which are identified using bits 5 and 6 of the telegram.

Bit no.	Meaning	Resolution	Value range	Comment
1 - 3	Device identification	0 - 7	011: PSU6200	
4	Reserved	-	-	This bit is always "0"
5 - 6	Telegram identification	0 - 3	00: Voltage values, current values 01: Rated data and device data 10: Device data 11: Temperature, service life	See the following chapter

Telegram, voltage and current values

Bit no.	Meaning	Resolution	Value range	Comment
1 - 3	Device identification	0 - 7	011: PSU6200	
4	Reserved	-	-	This bit is always "0"
5 - 6	Telegram identification	0 - 3	00: Voltage and current values	
7 - 13	Status information	-	-	Meaning as described under "PSU status information"
14 - 23	Actual output voltage	0.1 V	0 - 102.3 V	Represented as unsigned value, MSB is first transferred Average voltage over the past 3 seconds
24 - 30	Actual output current	0.5 A	0 - 63.5 A	Represented as unsigned value, MSB is first transferred Average current over the past 3 seconds
31	Reserved	-	-	

Telegram, rated data and device data

Bit no.	Meaning	Resolution	Value range	Comment
1 - 3	Device identification	0 - 7	011: PSU6200	
4	Reserved	-	-	This bit is always "0"
5 - 6	Telegram identification	0 - 3	01: Rated data and device data	
7 - 13	Status information	-	-	Meaning as described under "PSU status information"
14 - 15	Property of the device family	0 - 3	00: AC/DC 01: DC/DC 10: BAT 11: reserved	
16 - 18	Rated output voltage	0 - 7	000: 12 V 001: 24 V 010: reserved 011: 48 V 100 - 111: reserved	
19 - 21	Rated output current	0 - 7	000: 5 A 001: 10 A 010: 20 A 011: 40 A 100: 12 A 101 - 111: reserved	
22	Input phases	0 / 1	0: 1 phase device 1: 3 phase device	
23 - 26	Year of manufacture	1 year	0 - 15 years from 2019	Represented as unsigned value, MSB is first transferred
27 - 29	Product version	0 - 7	Product version of the device starting at 000	
30	Paint finish	0 / 1	0: Uncoated printed circuit boards 1: Coated printed circuit boards	
31	Production location	0 / 1	0: Production location, Vienna 1: Production location, Sibiu	

2.2 Telegrams for the diagnostics interface (DIS)

Telegram, device data

Bit no.	Meaning	Resolution	Value range	Comment
1 - 3	Device identification	0 - 7	011: PSU6200	
4	Reserved	-	-	This bit is always "0"
5 - 6	Telegram identification	0 - 3	10: Device data	
7 - 13	Status information	-	-	Meaning as described under "PSU status information"
14 - 17	Month of manufacture	1 month	0000: reserved 0001 - 1100: January - December 1101 - 1111: reserved	
18 - 20	SW version	0 - 7	Software version of the device starting at 000	
21 - 23	Variant position 11	0 - 7	Device variant, position 11 of the MLFB	Represented as unsigned value, MSB is first transferred
24 - 26	Innovation position 12	0 - 7	Device innovation, position 12 of the MLFB	Represented as unsigned value, MSB is first transferred
27	AC/DC - batt.	0 / 1	0: AC/DC 1: Batt.	
28 - 30	Variant position 14	0 - 7	000: A 001: B 010: C 011: D 100: X 101 - 111: reserved	Position 14 of the MLFB information, number of channels
31	Position 15	0 / 1	0: Y 1: X	Position 15 of the MLFB information, terminal type

Telegram, temperature and service life

Bit no.	Meaning	Resolution	Value range	Comment
1 - 3	Device identification	0 - 7	011: PSU6200	
4	Reserved	-	-	This bit is always "0"
5 - 6	Telegram identification	0 - 3	11: Temperature and service life	
7 - 13	Status information	-	-	Meaning as described under "PSU status information"
14 - 18	Reserved	-	-	
19 - 20	Temperature	0 - 3	00: Device temperature low 01: Device temperature high 10: The device temperature critical 11: Device temperature above shutdown threshold	Actual temperature is ...low: more than 40 °C... ...high: 10 °C to 40 °C... ...critical: less than 10 °C... lower shutdown threshold
21	Reserved	-	-	
22	Phase fault	0 / 1	0: Normal operation 1: Phase fault active	Only for devices with three-phase input
23	Glitch overvoltage	0 / 1	1: Overvoltage glitch 2 ms - 200 ms occurred at the output since previous transfer of the bit	
24	Glitch undervoltage	0 / 1	1: Undervoltage glitch 2 ms - 200 ms occurred at the output since previous transfer of the bit	
25 - 31	Operating duration	1000 hours	0 - 127,000 hours in increments of 1000 hours	Represented as unsigned value, MSB is first transferred

2.2.3 Telegram send sequence

For devices with DIS, data is transferred using a continuous stream of telegrams. The telegram send sequence is subsequently described.

Each telegram takes 3.45 seconds to be transferred.

The following telegrams described in the previous chapters are transferred from devices of product group PSU6200.

Header	Status information	Voltage and current values
Bits 1 - 6	Bits 7 - 13	Bits 14 - 31
0 1 1 0 0 0		

Header	Status information	Rated data and device information
Bits 1 - 6	Bits 7 - 13	Bits 14 - 31
0 1 1 0 0 1		

Header	Status information	Device information
Bits 1 - 6	Bits 7 - 13	Bits 14 - 31
0 1 1 0 1 0		

Header	Status information	Temperature and service life
Bits 1 - 6	Bits 7 - 13	Bits 14 - 31
0 1 1 0 1 1		

The telegrams are continuously sent in the following sequence.

Voltage and current values	Rated data and device information	Device information	Temperature and service life
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Voltage and current values	Rated data and device information	Device information	Temperature and service life
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Voltage and current values	Rated data and device information	Device information	Temperature and service life
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Deviations from the sequence can occur if certain changes occur to the content of the "voltage and current values" telegram. If changes to the actual output voltage or the actual output current occur, then this telegram is brought forward (to be sent with priority) and inserted in the sequence of telegrams described above. A telegram is only brought forward (and sent with priority) if the actual output voltage has changed by a minimum of 0.5 V or the actual output current by a minimum of 1.5 A with respect to the value that was last transferred.

To prevent the "voltage and current values" telegram from being continuously sent without any interruption as it is being continuously brought forward if loads continually and quickly change, at the latest after 10 prioritization operations, the next telegram of the sequence described above is inserted.