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Function codes

The DEHNrecord SD communicates via Modbus TCP protocol. As a Modbus slave it supports the following function codes:

- **03** – Read holding register
- **06** – Write holding register
- **16** – Write multiple holding registers

Network and ports

Communication with the Modbus TCP protocol runs via the network port 502. For the intended use, a time signal (SNTP) is also required. This is obtained externally via port 123, but can also be switched to a network-internal time server in the web server of the DEHNrecord SD.

Data types, read and write

Extended data types (larger than 2 bytes) are transferred to successive registers. The following byte sequences must be observed during reading and writing:

Data type	Read	Write
Float, UINT_32	CDAB (Middle Endian / Little Endian with byte swap)	DCBA (Little Endian)
UINT_8, Bool	AB (B=relevant byte)	BA (B=relevant byte)
String	BADC...	ABCD...

Examples of reading and writing registers with different data types

Float

The decimal number „49.2682“ of the data type “32bit float” corresponds to the HEX value 0x424512a3. The four bytes are arranged and designated as follows:

Description	A	B	C	D
HEX value	42	45	12	a3
Binary value	01000010	01000101	00010010	10100011

Read: e.g. via registers 62 and 63 with the byte sequence **CDAB**:

Register	62		63	
Description	C	D	A	B
HEX value	12	a3	42	45
Binary value	00010010	10100011	01000010	01000101

Write: e.g. via registers 62 and 63 with the byte sequence **DCBA**:

Register	62		63	
Description	D	C	B	A
HEX value	a3	12	45	42
Binary value	10100011	00010010	01000101	01000010



String

The description „smartDevice“ of the data type string serves as an example. For better readability, the ASCII character „-“ is used instead of „NUL“ for the HEX value 0x00 in this example.

Read	The byte swap (BACD...) must be considered in each individual register. The values in the registers 12...17 are as follows:					
Register	12	13	14	15	16	17
HEX value	6d73	7261	4474	7665	6369	0065
ASCII	ms	ra	Dt	ve	ci	-e
Write	When writing „smartDevice“ into registers 12...17, the byte order remains unchanged (ABCD...).					
Register	12	13	14	15	16	17
HEX value	736d	6172	7444	6576	6963	6500
ASCII	sm	ar	tD	ev	ic	e-

UINT_8, Bool:

The decimal number „1“ can represent either the integer „1“ (data type UINT_8) or „true“ (data type Bool). It is only one byte in size.

Read	When reading, the relevant byte for 1/true is at the rear position.	
Register	512	
Description	A	B
HEX value	00	01
Binary value	00000000	00000001
Write	When writing, the relevant byte for 1/true must be at the first position!	
Register	512	
Description	B	A
HEX value	01	00
Binary value	00000001	00000000

The registers listed in the following chapters can be read and/or written depending on the access right (Read/Write).

Power Quality – Measured values							Update rate						
Modbus Register	Category	Description	Name	Unit	Data type	Size (Bytes)	200 ms	3 s	10 s	5 min	10 min	2 h	at change
22528	System	Date/Time ISO 8601	Date/Time ISO 8601		STRING	25							✓ (1sec)
22542	System	Firmware Version Major	Firmware Version Major		UINT_8	1							✓
22543	System	Firmware Version Minor	Firmware Version Minor		UINT_8	1							✓
22544	System	Firmware Version Build	Firmware Version Build		UINT_8	1							✓
22545	System	Firmware Version Type	Firmware Version Type		UINT_8	1							✓
22546	Cloud	Status (online/offline)	Status		BOOL	1							✓
22784	Live data	200 ms counter	10cycles-Counter		UINT_32	4	✓						
22786	Live data	200 ms mean value	U L1	V	FLOAT	4	✓						
22788	Live data		U L2	V	FLOAT	4	✓						
22790	Live data		U L3	V	FLOAT	4	✓						
22792	Live data	10 s mean value	f ref	Hz	FLOAT	4			✓				
22794	Live data	200 ms mean value	u2	%	FLOAT	4	✓						
22796	Live data	200 ms mean value	THDu L1	%	FLOAT	4	✓						
22798	Live data		THDu L2	%	FLOAT	4	✓						
22800	Live data		THDu L3	%	FLOAT	4	✓						
22802	Live data	200 ms mean value	I L1	A	FLOAT	4	✓						
22804	Live data		I L2	A	FLOAT	4	✓						
22806	Live data		I L3	A	FLOAT	4	✓						
22808	Live data		I N	A	FLOAT	4	✓						
23040	Voltage magnitude	10 min mean value	U(PQ) L1	V	FLOAT	4						✓	
23042	Voltage magnitude		U(PQ) L2	V	FLOAT	4						✓	
23044	Voltage magnitude		U(PQ) L3	V	FLOAT	4						✓	
23046	Voltage magnitude	lowest 200 ms value within 10 Min	U(PQ),min L1	V	FLOAT	4						✓	
23048	Voltage magnitude		U(PQ),min L2	V	FLOAT	4						✓	
23050	Voltage magnitude		U(PQ),min L3	V	FLOAT	4						✓	
23052	Voltage magnitude	highest 200 ms value within 10 Min	U(PQ),max L1	V	FLOAT	4						✓	
23054	Voltage magnitude		U(PQ),max L2	V	FLOAT	4						✓	
23056	Voltage magnitude		U(PQ),max L3	V	FLOAT	4						✓	
23058	Voltage magnitude	3 s mean value	U(PQ) L1	V	FLOAT	4		✓					
23060	Voltage magnitude		U(PQ) L2	V	FLOAT	4		✓					
23062	Voltage magnitude		U(PQ) L3	V	FLOAT	4		✓					
23296	Frequency	10 min mean value	f	Hz	FLOAT	4						✓	
23298	Frequency	lowest 10 s value within 10 Min	f min	Hz	FLOAT	4						✓	
23300	Frequency	highest 10 s value within 10 Min	f max	Hz	FLOAT	4						✓	
23302	Frequency	10 s mean value	f	Hz	FLOAT	4			✓				
23552	Flicker	200 ms mean value	Pinst L1		FLOAT	4	✓						
23554	Flicker		Pinst L2		FLOAT	4	✓						
23556	Flicker		Pinst L3		FLOAT	4	✓						
23558	Flicker	10 min mean value	Pst L1		FLOAT	4						✓	
23560	Flicker		Pst L2		FLOAT	4						✓	
23562	Flicker		Pst L3		FLOAT	4						✓	
23564	Flicker	2 h mean value	Plt L1		FLOAT	4						✓	
23566	Flicker		Plt L2		FLOAT	4						✓	
23568	Flicker		Plt L3		FLOAT	4						✓	

Power Quality – Measured values							Update rate						
Modbus Register	Category	Description	Name	Unit	Data type	Size (Bytes)	200 ms	3 s	10 s	5 min	10 min	2 h	at change
23808	Unbalance	10 min mean value	u2	%	FLOAT	4					✓		
23810	Unbalance	lowest 200 ms value within 10 Min	u2,min	%	FLOAT	4					✓		
23812	Unbalance	highest 200 ms value within 10 Min	u2,max	%	FLOAT	4					✓		
23814	Unbalance	3 s mean value	u2	%	FLOAT	4		✓					
23816	Unbalance	10 min mean value	u0	%	FLOAT	4					✓		
23818	Unbalance	lowest 200 ms value within 10 Min	u0,min	%	FLOAT	4					✓		
23820	Unbalance	highest 200ms value within 10 Min	u0,max	%	FLOAT	4					✓		
23822	Unbalance	3 s mean value	u0	%	FLOAT	4		✓					
24064	Harmonics THD	10 min mean value	THDu L1	%	FLOAT	4					✓		
24066	Harmonics THD		THDu L2	%	FLOAT	4					✓		
24068	Harmonics THD		THDu L3	%	FLOAT	4					✓		
24070	Harmonics THD	highest 200 ms value within 10 Min	THDu,max L1	%	FLOAT	4					✓		
24072	Harmonics THD		THDu,max L2	%	FLOAT	4					✓		
24074	Harmonics THD		THDu,max L3	%	FLOAT	4					✓		
24076	Harmonics	200 ms mean value L1	Uh2 L1	%	FLOAT	4	✓						
24078...24170	Harmonics		Uh3 L1 ... Uh49 L1	%	FLOAT	4	✓						
24172	Harmonics		Uh50 L1	%	FLOAT	4	✓						
24174	Interharmonics	200 ms mean value L1	Uih2 L1	%	FLOAT	4	✓						
24176...24268	Interharmonics		Uih3 L1 ... Uih49 L1	%	FLOAT	4	✓						
24270	Interharmonics		Uih50 L1	%	FLOAT	4	✓						
24272	Harmonics	200 ms mean value L2	Uh2 L2	%	FLOAT	4	✓						
24274...24366	Harmonics		Uh3 L2 ... Uh49 L2	%	FLOAT	4	✓						
24368	Harmonics		Uh50 L2	%	FLOAT	4	✓						
24370	Interharmonics	200 ms mean value L2	Uih2 L2	%	FLOAT	4	✓						
24372...24464	Interharmonics		Uih3 L2 ... Uih49 L2	%	FLOAT	4	✓						
24466	Interharmonics		Uih50 L2	%	FLOAT	4	✓						
24468	Harmonics	200 ms mean value L3	Uh2 L3	%	FLOAT	4	✓						
24470...24562	Harmonics		Uh3 L3 ... Uh49 L3	%	FLOAT	4	✓						
24564	Harmonics		Uh50 L3	%	FLOAT	4	✓						
24566	Interharmonics	200 ms mean value L3	Uih2 L3	%	FLOAT	4	✓						
24568...24660	Interharmonics		Uih3 L3 ... Uih49 L3	%	FLOAT	4	✓						
24662	Interharmonics		Uih50 L3	%	FLOAT	4	✓						
24664	Harmonics	3 s mean value L1	Uh2 L1	%	FLOAT	4		✓					
24666...24758	Harmonics		Uh3 L1 ... Uh49 L1	%	FLOAT	4		✓					
24760	Harmonics		Uh50 L1	%	FLOAT	4		✓					
24762	Interharmonics	3 s mean value L1	Uih2 L1	%	FLOAT	4		✓					
24764...24856	Interharmonics		Uih3 L1 ... Uih49 L1	%	FLOAT	4		✓					
24858	Interharmonics		Uih50 L1	%	FLOAT	4		✓					
24860	Harmonics	3 s mean value L2	Uh2 L2	%	FLOAT	4		✓					
24862...24954	Harmonics		Uh3 L2 ... Uh49 L2	%	FLOAT	4		✓					
24956	Harmonics		Uh50 L2	%	FLOAT	4		✓					
24958	Interharmonics	3 s mean value L2	Uih2 L2	%	FLOAT	4		✓					
24960...25052	Interharmonics		Uih3 L2 ... Uih49 L2	%	FLOAT	4		✓					
25054	Interharmonics		Uih50 L2	%	FLOAT	4		✓					

Power Quality – Measured values							Update rate						
Modbus Register	Category	Description	Name	Unit	Data type	Size (Bytes)	200 ms	3 s	10 s	5 min	10 min	2 h	at change
25056	Harmonics	3 min mean value L3	Uh2 L3	%	FLOAT	4		✓					
25058...25150	Harmonics		Uh3 L3 ... Uh49 L3	%	FLOAT	4		✓					
25152	Harmonics		Uh50 L3	%	FLOAT	4		✓					
25154	Interharmonics	3 min mean value L3	Uih2 L3	%	FLOAT	4		✓					
25156...25248	Interharmonics		Uih3 L3 ... Uih49 L3	%	FLOAT	4		✓					
25250	Interharmonics		Uih50 L3	%	FLOAT	4		✓					
25252	Harmonics	10 min mean value L1	Uh2 L1	%	FLOAT	4					✓		
25254...22346	Harmonics		Uh3 L1 ... Uh49 L1	%	FLOAT	4					✓		
25348	Harmonics		Uh50 L1	%	FLOAT	4					✓		
25350	Interharmonics	10 min mean value L1	Uih2 L1	%	FLOAT	4					✓		
25352...25444	Interharmonics		Uih3 L1 ... Uih49 L1	%	FLOAT	4					✓		
25446	Interharmonics		Uih50 L1	%	FLOAT	4					✓		
25448	Harmonics	10 min mean value L2	Uh2 L2	%	FLOAT	4					✓		
25450...25542	Harmonics		Uh3 L2 ... Uh49 L2	%	FLOAT	4					✓		
25544	Harmonics		Uh50 L2	%	FLOAT	4					✓		
25546	Interharmonics	10 min mean value L2	Uih2 L2	%	FLOAT	4					✓		
25548...25546	Interharmonics		Uih3 L2 ... Uih49 L2	%	FLOAT	4					✓		
25642	Interharmonics		Uih50 L2	%	FLOAT	4					✓		
25644	Harmonics	10 min mean value L3	Uh2 L3	%	FLOAT	4					✓		
25646...25642	Harmonics		Uh3 L3 ... Uh49 L3	%	FLOAT	4					✓		
25740	Harmonics		Uh50 L3	%	FLOAT	4					✓		
25742	Interharmonics	10 min mean value L3	Uih2 L3	%	FLOAT	4					✓		
25744...25836	Interharmonics		Uih3 L3 ... Uih49 L3	%	FLOAT	4					✓		
25838	Interharmonics		Uih50 L3	%	FLOAT	4					✓		
25840	Harmonics	highest 200 ms value within 10 min L1	Uh2,max L1	%	FLOAT	4					✓		
25842...25934	Harmonics		Uh3,max L1 ... Uh49,max L1	%	FLOAT	4					✓		
25936	Harmonics		Uh50,max L1	%	FLOAT	4					✓		
25938	Interharmonics	highest 200 ms value within 10 Min L1	Uih2,max L1	%	FLOAT	4					✓		
25940...26032	Interharmonics		Uih3,max L1 ... Uih49,max L1	%	FLOAT	4					✓		
26034	Interharmonics		Uih50,max L1	%	FLOAT	4					✓		
26036	Harmonics	highest 200 ms value within 10 Min L2	Uh2,max L2	%	FLOAT	4					✓		
26038...26130	Harmonics		Uh3,max L2 ... Uh49,max L2	%	FLOAT	4					✓		
26132	Harmonics		Uh50,max L2	%	FLOAT	4					✓		
26134	Interharmonics	highest 200 ms value within 10 Min L2	Uih2,max L2	%	FLOAT	4					✓		
26136...26228	Interharmonics		Uih3,max L2 ... Uih49,max L2	%	FLOAT	4					✓		
26230	Interharmonics		Uih50,max L2	%	FLOAT	4					✓		
26232	Harmonics	highest 200 ms value within 10 Min L3	Uh2,max L3	%	FLOAT	4					✓		
26234...26226	Harmonics		Uh3,max L3 ... Uh49,max L3	%	FLOAT	4					✓		
26328	Harmonics		Uh50,max L3	%	FLOAT	4					✓		
26330	Interharmonics	highest 200 ms value within 10 min L3	Uih2,max L3	%	FLOAT	4					✓		
26332...26424	Interharmonics		Uih3,max L3 ... Uih49,max L3	%	FLOAT	4					✓		
26426	Interharmonics		Uih50,max L3	%	FLOAT	4					✓		

Power Quality – Measured values							Update rate						
Modbus Register	Category	Description	Name	Unit	Data type	Size (Bytes)	200 ms	3 s	10 s	5 min	10 min	2 h	at change
26624	Mains signalling voltage	3 s value	Umsv L1	V	FLOAT	4							✓
26626	Mains signalling voltage		Umsv L2	V	FLOAT	4							✓
26628	Mains signalling voltage		Umsv L3	V	FLOAT	4							✓
26630	Mains signalling voltage	Trigger active	MSV trigger = active		UINT_8	1							✓
26631	Mains signalling voltage	Counter	MSV count Umsv(3s)>GW		UINT_32	4							✓
26880	Dip/Swell/Interr/POP	20 ms value	U(1c) L1	V	FLOAT	4							✓
26882	Dip/Swell/Interr/POP		U(1c) L2	V	FLOAT	4							✓
26884	Dip/Swell/Interr/POP		U(1c) L3	V	FLOAT	4							✓
26886	Dip/Swell/Interr/POP	active = 1 Inactive = 0	Dip = active		UINT_8	1							✓
26887	Dip/Swell/Interr/POP	active = 1 Inactive = 0	Swell = active		UINT_8	1							✓
26888	Dip/Swell/Interr/POP	active = 1 Inactive = 0	Interruption = active		UINT_8	1							✓
26889	Dip/Swell/Interr/POP	active = 1 Inactive = 0	POP = active		UINT_8	1							✓
27136	Rapid voltage change	20 ms value, updated every 10 ms	U(1c2) L1	V	FLOAT	4							✓
27138	Rapid voltage change		U(1c2) L2	V	FLOAT	4							✓
27140	Rapid voltage change		U(1c2) L3	V	FLOAT	4							✓
27142	Rapid voltage change	1 s mean value floating, updated every 10 ms	Ufloat(1s) L1	V	FLOAT	4							✓
27144	Rapid voltage change		Ufloat(1s) L2	V	FLOAT	4							✓
27146	Rapid voltage change		Ufloat(1s) L3	V	FLOAT	4							✓

Energy – Measured values							Update rate						
Modbus Register	Category	Description	Name	Unit	Data type	Size (Bytes)	200 ms	3 s	10 s	5 min	10 min	2 h	at change
27392	Voltage	5 min mean value	U L1	V	FLOAT	4				✓			
27394	Voltage		U L2	V	FLOAT	4				✓			
27396	Voltage		U L3	V	FLOAT	4				✓			
27398	Voltage	3 s mean value	U L1	V	FLOAT	4		✓					
27400	Voltage		U L2	V	FLOAT	4		✓					
27402	Voltage		U L3	V	FLOAT	4		✓					
27648	Current	5 min mean value	I L1	A	FLOAT	4				✓			
27650	Current		I L2	A	FLOAT	4				✓			
27652	Current		I L3	A	FLOAT	4				✓			
27654	Current		I N	A	FLOAT	4				✓			
27656	Current	3 s mean value	I L1	A	FLOAT	4		✓					
27658	Current		I L2	A	FLOAT	4		✓					
27660	Current		I L3	A	FLOAT	4		✓					
27662	Current		I N	A	FLOAT	4		✓					
27904	Active Power	5 min mean value	P L1	W	FLOAT	4				✓			
27906	Active Power		P L2	W	FLOAT	4				✓			
27908	Active Power		P L3	W	FLOAT	4				✓			
27910	Active Power	3 s mean value	P L1	W	FLOAT	4		✓					
27912	Active Power		P L2	W	FLOAT	4		✓					
27914	Active Power		P L3	W	FLOAT	4		✓					
28160	Apparent Power	5 min mean value	S L1	VA	FLOAT	4				✓			
28162	Apparent Power		S L2	VA	FLOAT	4				✓			
28164	Apparent Power		S L3	VA	FLOAT	4				✓			
28166	Apparent Power	3 s mean value	S L1	VA	FLOAT	4		✓					
28168	Apparent Power		S L2	VA	FLOAT	4		✓					
28170	Apparent Power		S L3	VA	FLOAT	4		✓					
28416	Reactive Power	5 min mean value	Q L1	Var	FLOAT	4				✓			
28418	Reactive Power		Q L2	Var	FLOAT	4				✓			
28420	Reactive Power		Q L3	Var	FLOAT	4				✓			
28422	Reactive Power	3 s mean value	Q L1	Var	FLOAT	4		✓					
28424	Reactive Power		Q L2	Var	FLOAT	4		✓					
28426	Reactive Power		Q L3	Var	FLOAT	4		✓					
28672	Power Factor	5 min mean value	PF L1		FLOAT	4				✓			
28674	Power Factor		PF L2		FLOAT	4				✓			
28676	Power Factor		PF L3		FLOAT	4				✓			
28678	Power Factor	3 s mean value	PF L1		FLOAT	4		✓					
28680	Power Factor		PF L2		FLOAT	4		✓					
28682	Power Factor		PF L3		FLOAT	4		✓					
28928	Active Energy	5 min mean value L1+L2+L3	E total	kWh	FLOAT	4				✓			
28930	Active Energy	Active energy meter L1+L2+L3	E sum	kWh	FLOAT	4				✓			

Digital Input / Output							Update rate						
Modbus Register	Category	Description	Name	Unit	Data type	Size (Bytes)	200 ms	3 s	10 s	5 min	10 min	2 h	at change
29184	IO	Digital Input	Dig.IN 1		BOOL	1							✓
29185	IO		Dig.IN 2		BOOL	1							✓
29186	IO		Dig.IN 3		BOOL	1							✓
29440	IO	Digital Output	Dig.OUT 1		BOOL	1							✓
29441	IO		Dig.OUT 2		BOOL	1							✓

Device settings										
Modbus Register	Category	Sub category	Name	Description	Configuration	Unit	Data type	Size (Bytes)	Default	Read / Write
0	General		Serial Number				STRING	24	FHAxxxxxxx	R
12	General		Description 1	e.g. Name			STRING	32	smartDevice	R/W
28	General		Description 2	e.g. Installation location			STRING	32		R/W
44	General		Description 3	e.g. Comment			STRING	32		R/W
60	General		Longitude	WGS84 Longitude			FLOAT	4	11.46123	R/W
62	General		Latitude	WGS84 Latitude			FLOAT	4	49.26815	R/W
66	General	Firmware	Firmware-Version				STRING	64		R
98	General	Firmware	Firmware-Status	State in the firmware process: 0: Current – current firmware, default value 1: downloading – new firmware is downloaded 2: applying: firmware is flashed, including reboot 3: Error – Problems with the download/flash process			UINT_8	1	0	R
99	General	Firmware	Firmware-Progress	Value in % how much of the firmware is already downloaded (0, 30, 60, 100%)		%	UINT_8	1	0	R
100	General	Firmware	Firmware-Version-Major	Major version number			UINT_8	1	0	R
101	General	Firmware	Firmware-Version-Minor	Major version number			UINT_8	1	0	R
102	General	Firmware	Firmware-Version-Build	Build version number			UINT_8	1	0	R
103	General		Date of build	YYYY-MM-DD			STRING	16		R
111	General		Date of last calibration	YYYY-MM-DD			STRING	16		R
119	General	Power Quality	Path for PQ configuration		0: Modbus 1: Cloud		UINT_8	1	1	R/W
121	General	Device configuration	Path for device configuration		0: Cloud 1: Modbus		UINT_8	1	0	R/W
257	LED indicator		Function LED2		0: PQ-State Standard 1: PQ-State Individual 2: POP-Display 3: Input 1 4: Input 2 5: Input 3 6: Off		UINT_8	1	0	R/W
512	Digital I/O	Input 1	Event type	Transmitted per 10-minute period; Off: no event Immediate: only the first event Sum: number of events at the end	0: Off 1: Immediate event 2: Sum event		UINT_8	1	0	R/W
513	Digital I/O	Input 1	Event trigger		0: On Change 1: Rising Edge 2: Falling Edge		UINT_8	1	0	R/W
514	Digital I/O	Input 2	Event type	Transmitted per 10-minute period; Off: no event Immediate: only the first event Sum: number of events at the end	0: Off 1: Immediate event 2: Sum event		UINT_8	1	0	R/W
515	Digital I/O	Input 2	Event trigger		0: On Change 1: Rising Edge 2: Falling Edge		UINT_8	1	0	R/W
516	Digital I/O	Input 3	Event type	Transmitted per 10-minute period; Off: no event Immediate: only the first event Sum: number of events at the end	0: Off 1: Immediate event 2: Sum event		UINT_8	1	0	R/W

Device settings										
Modbus Register	Category	Sub category	Name	Description	Configuration	Unit	Data type	Size (Bytes)	Default	Read / Write
517	Digital I/O	Input 3	Event trigger		0: On Change 1: Rising Edge 2: Falling Edge		UINT_8	1	0	R/W
518	Digital I/O	Logic	Function		0: Off 1: AND 2: OR 3: XOR 4: NOR 5: NAND 6: XNOR		UINT_8	1	0	R/W
519	Digital I/O	Logic	Input 1		0: Off 1: Normal 2: Inverted		UINT_8	1	0	R/W
520	Digital I/O	Logic	Input 2		0: Off 1: Normal 2: Inverted		UINT_8	1	0	R/W
521	Digital I/O	Logic	Input 3		0: Off 1: Normal 2: Inverted		UINT_8	1	0	R/W
522	Digital I/O	Logic	Input 4 (internal) source	Selection of the event source	0: Off 1: POP function 2: PQ standard 3: PQ individual 5: Energy/Current 6: Cloud active		UINT_8	1	0	R/W
523	Digital I/O	Logic	Input 4 (internal) active time	When an event occurs, this input is active for the selected time (in seconds). Re-triggering as soon as an event occurs again within the time.	1 ... 900	s	UINT_32	4	60	R/W
525	Digital I/O	Output 1	Function		0: Normally open 1: Normally closed 2: Off		UINT_8	1	2	R/W
526	Digital I/O	Output 1	Active time	Active time in milliseconds (100...2000ms). Re-triggering as soon as an event occurs again within the time.	100 ... 2000	ms	UINT_16	2	1000	R/W
527	Digital I/O	Output 1	Source	Selection of the event source for Output 1	0: Off 1: Input 1 2: Input 2 3: Input 3 4: Pop function 5: PQ standard 6: PQ individual 8: Energy/Current 9: Device 10: Cloud2Device 11: Logic		UINT_8	1	5	R/W
528	Digital I/O	Output 2	Function		0: Normally open 1: Normally closed 2: Off		UINT_8	1	2	R/W
529	Digital I/O	Output 2	Active time	Active time in milliseconds (100...2000ms). Re-triggering as soon as an event occurs again within the time.	100 ... 2000	ms	UINT_16	2	1000	R/W

Device settings											
Modbus Register	Category	Sub category	Name	Description	Configuration	Unit	Data type	Size (Bytes)	Default	Read / Write	
530	Digital I/O	Output 2	Source	Selection of the event source for Output 2	0: Off 1: Input 1 2: Input 2 3: Input 3 4: Pop function 5: PQ standard 6: PQ individual 8: Energy/Current 9: Device 10: Cloud2Device 11: Logic		UINT_8	1	5	R/W	
1024	Network		DHCP		false: Off true: On		BOOL	1	false	R	
1025	Network		DNS Server 1	IP of DNS server for static settings			STRING	16	8.8.8.8	R	
1033	Network		DNS Server 2	IP of DNS server for static settings			STRING	16	1.1.1.1	R	
1041	Network		Static IP	Static IP when DHCP is deactivated			STRING	16	169.254.0.10	R	
1049	Network		Static IP Gateway	Satic IP gateway if DHCP is deactivated			STRING	16	0.0.0.0	R	
1057	Network		Static IP Netmask	Static IP netmask if DHCP is deactivated			STRING	16	255.255.0.0	R	
1065	Network		Time server 1 (SNTP)				STRING	128	de.pool.ntp.org	R	
1129	Network		Time server 2 (SNTP)				STRING	128	ptbtime1.ptb.de	R	
1193	Network		Time server 3 (SNTP)				STRING	128	ptbtime2.ptb.de	R	
1257	Network		Time server 4 (SNTP)				STRING	128	ptbtime3.ptb.de	R	
1323	Network		Device name	The device is visible in the network under this name (if DHCP is enabled)			STRING	128	DRC-SD-FHAxxxxxxxxx (FHAxx... = serial no.)	R	
1387	Network		MAC address	Individual MAC address, visible on device label			STRING	20		R	
1397	Network		Timeout Webserver	Timeout in seconds after the web server is disabled	120 ... 3600	s	UINT_16	2	600	R	
2560	POP	General	POP monitoring	Monitoring of POP limits according to EN 50550. (Acquisition criteria 1-4)	0: disabled 1: enabled		UINT_8	1	1	R/W	
2561	POP	EN 50550 criteria detail	Acquisition criteria 1 voltage			V	FLOAT	4	270	R	
2563	POP	EN 50550 criteria detail	Acquisition criteria 1 duration			s	FLOAT	4	9	R	
2565	POP	EN 50550 criteria detail	Acquisition criteria 2 voltage			V	FLOAT	4	300	R	
2567	POP	EN 50550 criteria detail	Acquisition criteria 2 duration			s	FLOAT	4	3	R	
2569	POP	EN 50550 criteria detail	Acquisition criteria 3 voltage			V	FLOAT	4	350	R	
2571	POP	EN 50550 criteria detail	Acquisition criteria 3 duration			s	FLOAT	4	0.5	R	
2573	POP	EN 50550 criteria detail	Acquisition criteria 4 voltage			V	FLOAT	4	400	R	
2575	POP	EN 50550 criteria detail	Acquisition criteria 4 duration			s	FLOAT	4	0.12	R	
2577	POP	General	Selectivity factor	The factor represents a time within the standardised time interval at which the switch-off signal is sent. The switch-off time reserve is already taken into account. Possible values between 0 and 2, whereas 0 = earliest, 2 = latest	0 ... 2		FLOAT	4	1	R/W	
2579	POP	Indivical criteria	Individual capture value active	Monitoring of individual POP limits.	0: disabled 1: enabled		UINT_8	1	0	R/W	
2580	POP	Indivical criteria	Voltage	Individual voltage threshold (2...440V). Attention: Exceeding or falling below threshold must be set under ‚Status/Direction‘	2 ... 440	V	FLOAT	4	325	R/W	

Device settings										
Modbus Register	Category	Sub category	Name	Description	Configuration	Unit	Data type	Size (Bytes)	Default	Read / Write
2582	POP	Individual criteria	Duration	Time in seconds after which triggering occurs when the voltage threshold is overshoot or undershot (0.04...3600 s)	0.04 ... 3600	s	FLOAT	4	1	R/W
2584	POP	Individual criteria	Status/Direction	Trigger when exceeding or falling below the voltage threshold	1: Exceeding 2: Falling below		UINT_8	1	1	R/W
2585	POP	General	Switch-off time reserve	Time required for the external main protection device to trip from the time of the shutdown signal.	0 ... 0.13	s	FLOAT	4	0.02	R/W
3072	Current measurement	General	Current Sensor Type	Please select the type of current sensors which are connected to L1, L2, L3, and N.	0: Off 1: Rogowski-Coil 2: Split core		UINT_8	1	0	R/W
3073	Current measurement	L1	L1 active		false: Deactivated true: Activated		BOOL	1	false	R/W
3074	Current measurement	L2	L2 active		false: Deactivated true: Activated		BOOL	1	false	R/W
3075	Current measurement	L3	L3 active		false: Deactivated true: Activated		BOOL	1	false	R/W
3076	Current measurement	N	N active		false: Deactivated true: Activated		BOOL	1	false	R/W
3077	Current measurement	L1	Name	Name of the current sensor connected to L1			STRING	32		R/W
3093	Current measurement	L1	Nominal current L1	Rated current in A of the current sensor connected to L1	0 ... 10000	A	FLOAT	4	0	R/W
3097	Current measurement	L1	Serial Number current sensor L1	Unique serial number of the current sensor connected to L1			STRING	32		R/W
3127	Current measurement	L2	Name	Name of the current sensor connected to L2			STRING	32		R/W
3143	Current measurement	L2	Nominal current L2	Rated current in A of the current sensor connected to L2	0 ... 10000	A	FLOAT	4	0	R/W
3147	Current measurement	L2	Serial Number current sensor L2	Unique serial number of the current sensor connected to L1			STRING	32		R/W
3177	Current measurement	L3	Name	Name of the current sensor connected to L2			STRING	32		R/W
3193	Current measurement	L3	Nominal current L3	Rated current in A of the current sensor connected to L3	0 ... 10000	A	FLOAT	4	0	R/W
3197	Current measurement	L3	Serial Number current sensor L3	Unique serial number of the current sensor connected to L1			STRING	32		R/W
3227	Current measurement	N	Name	Name of the current sensor connected to N			STRING	32		R/W
3243	Current measurement	N	Nominal current N	Rated current in A of the current sensor connected to N	0 ... 10000	A	FLOAT	4	0	R/W
3247	Current measurement	N	Serial Number current sensor N	Unique serial number of the current sensor connected to L1			STRING	32		R/W

Device settings											
Modbus Register	Category	Sub category	Name	Description	Configuration	Unit	Data type	Size (Bytes)	Default	Read / Write	
3277	Energy events	L1 Event	L1 event type		0: Off 1: Current (A) 2: Active power (W) 3: Reactive power (Var) 4: Complex power (VA) 5: Current direction change 6: Current zero detection (A)		UINT_8	1	0	R/W	
3278	Energy events	L1 Event	L1 event threshold				FLOAT	4	0	R/W	
3282	Energy events	L2 Event	L2 event type		0: Off 1: Current (A) 2: Active power (W) 3: Reactive power (Var) 4: Complex power (VA) 5: Current direction change 6: Current zero detection (A)		UINT_8	1	0	R/W	
3283	Energy events	L2 Event	L2 event threshold				FLOAT	4	0	R/W	
3287	Energy events	L3 Event	L3 event type		0: Off 1: Current (A) 2: Active power (W) 3: Reactive power (Var) 4: Complex power (VA) 5: Current direction change 6: Current zero detection (A)		UINT_8	1	0	R/W	
3288	Energy events	L3 Event	L3 event threshold				FLOAT	4	0	R/W	
3292	Energy events	N Event	N event type		0: Off 1: Current (A) 2: Active power (W) 3: Reactive power (Var) 4: Complex power (VA) 5: Current direction change 6: Current zero detection (A)		UINT_8	1	0	R/W	
3293	Energy events	N Event	N event threshold				FLOAT	4	0	R/W	
3297	Energy events	Global	Active energy event type	Select between momentary active energy (related to the current averaging period) and active energy meter.	0: Off 1: Momentary Energy 2: Energy meter		UINT_8	1	0	R/W	
3298	Energy events	Global	Momentary active energy threshold	Energy threshold in kWh (related to the current averaging period, e.g. 5 minutes) above which an event is triggered.	0 ... 999999	kWh	FLOAT	4	1000	R/W	
3300	Energy events	Global	Active energy meter threshold	Energy threshold for energy meter in kWh above which an event is triggered. Function like energy counter. The counter is automatically reset when exceeded.	0 ... 9999999 kWh	kWh	FLOAT	4	1000000	R/W	
4096	Mains signalling voltage		Carrier frequency in Hz	Carrier frequency of the mains signalling voltage, whose 3sec rms value is compared with the limit value.	100 ... 3000	Hz	FLOAT	4	175	R/W	
4098	Mains signalling voltage		Duration	Period over which the observance of the limit value is monitored.	3 ... 120	s	UINT_8	1	120	R/W	
4099	Mains signalling voltage		Threshold	If threshold is exceeded, the monitoring starts.	0.3 ... 4.9	%	FLOAT	4	4.5	R/W	

Power Quality – Configuration												
EN 50160 *read only	PQ now *read only	PQ next	Category	Limit category	Limit type	Description	Configura- tion	Unit	Data type	Size (Bytes)	Default	Read / Write
6144	14336	18432	General		ID	Identification number			STRING	32		R
6160	14352	18448	General		Description				STRING	128		R/W *
6224	14416	18512	General		Begin	Start of the individual PQ configuration			UINT_64	8		R/W *
6230	14422	18518	General		Observation period	0: One week 1: One day			UINT_8	1	0	R/W *
6231	14423	18519	General		Observation start	0: Auto 1: Fix			UINT_8	1	0	R/W *
6232	14424	18520	General		Consider flagged PQ intervals for event counter	0: disabled 1: enabled			BOOL	1	false	R/W *
6233	14425	18521	General		End				UINT_64	8	0	R/W *
6237	14429	18525	General		Observation end	0: Auto 1: Fix			UINT_8	1	0	R/W *
6400	14592	18688	Voltage magnitude	Limit 1	Period	% share of the current observation period in which the limit 1 values must be observed.	0 ... 100	%	FLOAT	4	95	R/W *
6402	14594	18690	Voltage magnitude		Max	Upper limit of the 10 min mean value of the voltage rms values. Specified as deviation in % of the nominal value.	1 ... 50	%	FLOAT	4	10	R/W *
6404	14596	18692	Voltage magnitude		Min	Lower limit of the 10 min mean value of the voltage rms values. Specified as deviation in % of the nominal value.	-50 ... -1	%	FLOAT	4	-10	R/W *
6406	14598	18694	Voltage magnitude	Limit 2	Period	% share of the current observation period in which the limit 2 values must be observed.	0 ... 100	%	FLOAT	4	100	R/W *
6408	14600	18696	Voltage magnitude		Max	Upper limit of the 10 min mean value of the voltage rms values. Specified as deviation in % of the nominal value.	1 ... 50	%	FLOAT	4	10	R/W *
6410	14602	18698	Voltage magnitude		Min	Lower limit of the 10 min mean value of the voltage rms values. Specified as deviation in % of the nominal value.	-50 ... -1	%	FLOAT	4	-15	R/W *
6656	14848	18944	Frequency	Limit 1	Period	% share of the current observation period in which the limit 1 values must be observed.	0 ... 100	%	FLOAT	4	99.5	R/W *
6658	14850	18946	Frequency		Max	Upper limit of the 10 min mean value of the frequency. Specified as deviation in % of the nominal value.	0.1 ... 25	%	FLOAT	4	1	R/W *
6660	14852	18948	Frequency		Min	Lower limit of the 10 min mean value of the frequency. Specified as deviation in % of the nominal value.	-25 ... -0.1	%	FLOAT	4	-1	R/W *
6662	14854	18950	Frequency	Limit 2	Period	% share of the current observation period in which the limit 2 values must be observed.	0 ... 100	%	FLOAT	4	100	R/W *
6664	14856	18952	Frequency		Max	Upper limit of the 10 min mean value of the frequency. Specified as deviation in % of the nominal value.	0.1 ... 25	%	FLOAT	4	4	R/W *
6666	14858	18954	Frequency		Min	Lower limit of the 10 min mean value of the frequency. Specified as deviation in % of the nominal value.	-25 ... -0.1	%	FLOAT	4	-6	R/W *
6912	15104	19200	Flicker	Long term flicker	Period	% share of the current observation period in which the limit values must be observed.	0 ... 100	%	FLOAT	4	95	R/W *
6914	15106	19202	Flicker	Long term flicker	Max	Upper limit of the 2-hour long term flicker.	0.2 ... 10		FLOAT	4	1	R/W *
6917	15109	19205	Flicker	Short term flicker	Period	% share of the current observation period in which the limit values must be observed.	0 ... 100	%	FLOAT	4	95	R/W *
6919	15111	19207	Flicker	Short term flicker	Max	Upper limit of the 10-min. short term flicker.	0.2 ... 10		FLOAT	4		R/W *

Power Quality – Configuration												
EN 50160 *read only	PQ now *read only	PQ next	Category	Limit category	Limit type	Description	Configura- tion	Unit	Data type	Size (Bytes)	Default	Read / Write
7168	15360	19456	Voltage dip	$10 \leq t \leq 200$ $90 > u \geq 80$	Max	Permissible number of voltage dips in this category	0 ... 1000		UINT16	2		R/W *
7169	15361	19457	Voltage dip	$200 < t \leq 500$ $90 > u \geq 80$	Max		0 ... 1000		UINT16	2		R/W *
7170	15362	19458	Voltage dip	$500 < t \leq 1000$ $90 > u \geq 80$	Max		0 ... 1000		UINT16	2		R/W *
7171	15363	19459	Voltage dip	$1000 < t \leq 5000$ $90 > u \geq 80$	Max		0 ... 1000		UINT16	2		R/W *
7172	15364	19460	Voltage dip	$5000 < t \leq 60000$ $90 > u \geq 80$	Max		0 ... 1000		UINT16	2		R/W *
7173	15365	19461	Voltage dip	$10 \leq t \leq 200$ $80 > u \geq 70$	Max	Permissible number of voltage dips in this category	0 ... 1000		UINT16	2		R/W *
7174	15366	19462	Voltage dip	$200 < t \leq 500$ $80 > u \geq 70$	Max		0 ... 1000		UINT16	2		R/W *
7175	15367	19463	Voltage dip	$500 < t \leq 1000$ $80 > u \geq 70$	Max		0 ... 1000		UINT16	2		R/W *
7176	15368	19464	Voltage dip	$1000 < t \leq 5000$ $80 > u \geq 70$	Max		0 ... 1000		UINT16	2		R/W *
7177	15369	19465	Voltage dip	$5000 < t \leq 60000$ $80 > u \geq 70$	Max		0 ... 1000		UINT16	2		R/W *
7178	15370	19466	Voltage dip	$10 \leq t \leq 200$ $70 > u \geq 40$	Max	Permissible number of voltage dips in this category	0 ... 1000		UINT16	2		R/W *
7179	15371	19467	Voltage dip	$200 < t \leq 500$ $70 > u \geq 40$	Max		0 ... 1000		UINT16	2		R/W *
7180	15372	19468	Voltage dip	$500 < t \leq 1000$ $70 > u \geq 40$	Max		0 ... 1000		UINT16	2		R/W *
7181	15373	19469	Voltage dip	$1000 < t \leq 5000$ $70 > u \geq 40$	Max		0 ... 1000		UINT16	2		R/W *
7182	15374	19470	Voltage dip	$5000 < t \leq 60000$ $70 > u \geq 40$	Max		0 ... 1000		UINT16	2		R/W *
7183	15375	19471	Voltage dip	$10 \leq t \leq 200$ $40 > u \geq 5$	Max	Permissible number of voltage dips in this category	0 ... 1000		UINT16	2		R/W *
7184	15376	19472	Voltage dip	$200 < t \leq 500$ $40 > u \geq 5$	Max		0 ... 1000		UINT16	2		R/W *
7185	15377	19473	Voltage dip	$500 < t \leq 1000$ $40 > u \geq 5$	Max		0 ... 1000		UINT16	2		R/W *
7186	15378	19474	Voltage dip	$1000 < t \leq 5000$ $40 > u \geq 5$	Max		0 ... 1000		UINT16	2		R/W *
7187	15379	19475	Voltage dip	$5000 < t \leq 60000$ $40 > u \geq 5$	Max		0 ... 1000		UINT16	2		R/W *
7188	15380	19476	Voltage dip	$10 \leq t \leq 200$ $5 > u$	Max	Permissible number of voltage dips in this category	0 ... 1000		UINT16	2		R/W *
7189	15381	19477	Voltage dip	$200 < t \leq 500$ $5 > u$	Max		0 ... 1000		UINT16	2		R/W *
7190	15382	19478	Voltage dip	$500 < t \leq 1000$ $5 > u$	Max		0 ... 1000		UINT16	2		R/W *

Power Quality – Configuration												
EN 50160 *read only	PQ now *read only	PQ next	Category	Limit category	Limit type	Description	Configura- tion	Unit	Data type	Size (Bytes)	Default	Read / Write
7191	15383	19479	Voltage dip	1000 < t ≤ 5000 5 > u	Max		0 ... 1000		UINT16	2		R/W *
7192	15384	19480	Voltage dip	5000 < t ≤ 60000 5 > u	Max		0 ... 1000		UINT16	2		R/W *
7193	15385	19481	Voltage dip	Miscellaneous	Max	Permissible number of voltage dips not covered by categories above.	0 ... 1000		UINT16	2	0	R/W *
7194	15386	19482	Voltage dip	Miscellaneous	Spannungseinbruchs-Level	Limit value in % of the nominal voltage. Voltages below are considered as voltage dips. Specified as deviation in % of the nominal value.	-50 ... -1	%	FLOAT	4	-10	R/W *
7196	15388	19484	Voltage dip	Miscellaneous	Hysteresese	Hysteresis of the limit value. Must be exceeded to consider voltage dip as finished.	1 ... 10	%	FLOAT	4	2	R/W *
7424	15616	19712	Voltage swell	10 ≤ t ≤ 500 110 < u < 120	Max	Permissible number of voltage swells in this category	0 ... 1000		UINT16	2		R/W *
7425	15617	19713	Voltage swell	500 < t ≤ 5000 110 < u < 120	Max		0 ... 1000		UINT16	2		R/W *
7426	15618	19714	Voltage swell	5000 < t ≤ 60000 110 < u < 120	Max		0 ... 1000		UINT16	2		R/W *
7427	15619	19715	Voltage swell	10 ≤ t ≤ 500 120 ≤ u	Max	Permissible number of voltage swells in this category	0 ... 1000		UINT16	2		R/W *
7428	15620	19716	Voltage swell	500 < t ≤ 5000 120 ≤ u	Max		0 ... 1000		UINT16	2		R/W *
7429	15621	19717	Voltage swell	5000 < t ≤ 60000 120 ≤ u	Max		0 ... 1000		UINT16	2		R/W *
7430	15622	19718	Voltage swell	Miscellaneous	Max	Permissible number of voltage swells not covered by categories above	0 ... 1000		UINT16	2		R/W *
7431	15623	19719	Voltage swell	Miscellaneous	Voltage swell threshold	Limit value in % of the nominal voltage. Voltages above are considered as voltage swells. Specified as deviation in % of the nominal value.	1 ... 50	%	FLOAT	4	10	R/W *
7433	15625	19721	Voltage swell	Miscellaneous	Hysteresese	Hysteresis of the limit value. Must be undercut to consider voltage swell as finished.	1 ... 10	%	FLOAT	4	2	R/W *
7680	15872	19968	Voltage interruption	Short interruption	Max	Permissible number of short interruptions	0 ... 1000		UINT16	2		R/W *
7681	15873	19969	Voltage interruption	Long interruption	Max	Permissible number of long interruptions	0 ... 1000		UINT16	2		R/W *
7682	15874	19970	Voltage interruption	Limit	Voltage interruption threshold	Limit value in % of the nominal voltage. Voltages below are considered as voltage interruption.	1 ... 10	%	FLOAT	4	5	R/W *
7684	15876	19972	Voltage interruption	Hysteresese	Hysteresese	Hysteresis of the limit value. Must be exceeded to consider voltage interruption as finished.	1 ... 10	%	FLOAT	4	2	R/W *
7686	15878	19974	Voltage interruption	Limit	Duration	Duration in seconds to distinguish between short and long interruptions.	1 ... 600	s	FLOAT	4	180	R/W *
7936	16128	20224	Unbalance	Limit	Period	% share of the current observation period in which the limit value must be observed.	0 ... 100	%	FLOAT	4	95	R/W *
7938	16130	20226	Unbalance	Limit	Max	Upper limit of the 10 min mean value of the unbalance u2 (ratio of the negative to the positive sequence) in %.	0.5 ... 5	%	FLOAT	4	2	R/W *
8192	16384	20480	Harmonics THD	Limit	Max	Highest order, up to which the individual harmonics are included in the calculation of the THD.	0 ... 50		UINT_8	1	40	R/W *
8193	16385	20481	Harmonics THD	Limit	Period	% share of the current observation period in which the limit value must be observed.	0 ... 100	%	FLOAT	4	100	R/W *
8195	16387	20483	Harmonics THD	Limit	THD max	Upper limit of the 10 min mean value of the unbalance (ratio of the negative to the positive sequence).	0.1 ... 20	%	FLOAT	4	8	R/W *

Power Quality – Configuration												
EN 50160 *read only	PQ now *read only	PQ next	Category	Limit category	Limit type	Description	Configura- tion	Unit	Data type	Size (Bytes)	Default	Read / Write
8197	16389	20485	Harmonics	Limit	Zeitraum	% share of the current observation period in which the limit value must be observed	0 ... 100	%	FLOAT	4	95	R/W *
8201	16393	20489	Harmonics	Limit	Order h	2	0.1 ... 20	%	FLOAT	4	2	R/W *
8203	16395	20491	Harmonics	Limit	Order h	3	0.1 ... 20	%	FLOAT	4	5	R/W *
8205	16397	20493	Harmonics	Limit	Order h	4	0.1 ... 20	%	FLOAT	4	1	R/W *
8207	16399	20495	Harmonics	Limit	Order h	5	0.1 ... 20	%	FLOAT	4	6	R/W *
8209	16401	20497	Harmonics	Limit	Order h	6	0.1 ... 20	%	FLOAT	4	0.5	R/W *
8211	16403	20499	Harmonics	Limit	Order h	7	0.1 ... 20	%	FLOAT	4	5	R/W *
8213	16405	20501	Harmonics	Limit	Order h	8	0.1 ... 20	%	FLOAT	4	0.5	R/W *
8215	16407	20503	Harmonics	Limit	Order h	9	0.1 ... 20	%	FLOAT	4	1.5	R/W *
8217	16409	20505	Harmonics	Limit	Order h	10	0.1 ... 20	%	FLOAT	4	0.5	R/W *
8219	16411	20507	Harmonics	Limit	Order h	11	0.1 ... 20	%	FLOAT	4	3.5	R/W *
8221	16413	20509	Harmonics	Limit	Order h	12	0.1 ... 20	%	FLOAT	4	0.5	R/W *
8223	16415	20511	Harmonics	Limit	Order h	13	0.1 ... 20	%	FLOAT	4	3	R/W *
8225	16417	20513	Harmonics	Limit	Order h	14	0.1 ... 20	%	FLOAT	4	0.5	R/W *
8227	16419	20515	Harmonics	Limit	Order h	15	0.1 ... 20	%	FLOAT	4	1	R/W *
8229	16421	20517	Harmonics	Limit	Order h	16	0.1 ... 20	%	FLOAT	4	0.5	R/W *
8231	16423	20519	Harmonics	Limit	Order h	17	0.1 ... 20	%	FLOAT	4	2	R/W *
8233	16425	20521	Harmonics	Limit	Order h	18	0.1 ... 20	%	FLOAT	4	0.5	R/W *
8235	16427	20523	Harmonics	Limit	Order h	19	0.1 ... 20	%	FLOAT	4	1.5	R/W *
8237	16429	20525	Harmonics	Limit	Order h	20	0.1 ... 20	%	FLOAT	4	0.5	R/W *
8239	16431	20527	Harmonics	Limit	Order h	21	0.1 ... 20	%	FLOAT	4	0.75	R/W *
8241	16433	20529	Harmonics	Limit	Order h	22	0.1 ... 20	%	FLOAT	4	0.5	R/W *
8243	16435	20531	Harmonics	Limit	Order h	23	0.1 ... 20	%	FLOAT	4	1.5	R/W *
8245	16437	20533	Harmonics	Limit	Order h	24	0.1 ... 20	%	FLOAT	4	0.5	R/W *
8247	16439	20535	Harmonics	Limit	Order h	25	0.1 ... 20	%	FLOAT	4	1.5	R/W *
8249	16441	20537	Harmonics	Limit	Order h	26	0.1 ... 20	%	FLOAT	4		R/W *
8251	16443	20539	Harmonics	Limit	Order h	27	0.1 ... 20	%	FLOAT	4		R/W *
8253	16445	20541	Harmonics	Limit	Order h	28	0.1 ... 20	%	FLOAT	4		R/W *
8255	16447	20543	Harmonics	Limit	Order h	29	0.1 ... 20	%	FLOAT	4		R/W *
8257	16449	20545	Harmonics	Limit	Order h	30	0.1 ... 20	%	FLOAT	4		R/W *
8259	16451	20547	Harmonics	Limit	Order h	31	0.1 ... 20	%	FLOAT	4		R/W *
8261	16453	20549	Harmonics	Limit	Order h	32	0.1 ... 20	%	FLOAT	4		R/W *
8263	16455	20551	Harmonics	Limit	Order h	33	0.1 ... 20	%	FLOAT	4		R/W *
8265	16457	20553	Harmonics	Limit	Order h	34	0.1 ... 20	%	FLOAT	4		R/W *
8267	16459	20555	Harmonics	Limit	Order h	35	0.1 ... 20	%	FLOAT	4		R/W *
8269	16461	20557	Harmonics	Limit	Order h	36	0.1 ... 20	%	FLOAT	4		R/W *
8271	16463	20559	Harmonics	Limit	Order h	37	0.1 ... 20	%	FLOAT	4		R/W *
8273	16465	20561	Harmonics	Limit	Order h	38	0.1 ... 20	%	FLOAT	4		R/W *
8275	16467	20563	Harmonics	Limit	Order h	39	0.1 ... 20	%	FLOAT	4		R/W *
8277	16469	20565	Harmonics	Limit	Order h	40	0.1 ... 20	%	FLOAT	4		R/W *
8279	16471	20567	Harmonics	Limit	Order h	41	0.1 ... 20	%	FLOAT	4		R/W *
8281	16473	20569	Harmonics	Limit	Order h	42	0.1 ... 20	%	FLOAT	4		R/W *

Power Quality – Configuration

EN 50160 *read only	PQ now *read only	PQ next	Category	Limit category	Limit type	Description	Configura- tion	Unit	Data type	Size (Bytes)	Default	Read / Write
8283	16475	20571	Harmonics	Limit	Order h	43	0.1 ... 20	%	FLOAT	4		R/W *
8285	16477	20573	Harmonics	Limit	Order h	44	0.1 ... 20	%	FLOAT	4		R/W *
8287	16479	20575	Harmonics	Limit	Order h	45	0.1 ... 20	%	FLOAT	4		R/W *
8289	16481	20577	Harmonics	Limit	Order h	46	0.1 ... 20	%	FLOAT	4		R/W *
8291	16483	20579	Harmonics	Limit	Order h	47	0.1 ... 20	%	FLOAT	4		R/W *
8293	16485	20581	Harmonics	Limit	Order h	48	0.1 ... 20	%	FLOAT	4		R/W *
8295	16487	20583	Harmonics	Limit	Order h	49	0.1 ... 20	%	FLOAT	4		R/W *
8297	16489	20585	Harmonics	Limit	Order h	50	0.1 ... 20	%	FLOAT	4		R/W *
8450	16642	20738	Interharmonics	Limit	Order h	2	0.1 ... 20	%	FLOAT	4		R/W *
8452	16644	20740	Interharmonics	Limit	Order h	3	0.1 ... 20	%	FLOAT	4		R/W *
8454	16646	20742	Interharmonics	Limit	Order h	4	0.1 ... 20	%	FLOAT	4		R/W *
8456	16648	20744	Interharmonics	Limit	Order h	5	0.1 ... 20	%	FLOAT	4		R/W *
8458	16650	20746	Interharmonics	Limit	Order h	6	0.1 ... 20	%	FLOAT	4		R/W *
8460	16652	20748	Interharmonics	Limit	Order h	7	0.1 ... 20	%	FLOAT	4		R/W *
8462	16654	20750	Interharmonics	Limit	Order h	8	0.1 ... 20	%	FLOAT	4		R/W *
8464	16656	20752	Interharmonics	Limit	Order h	9	0.1 ... 20	%	FLOAT	4		R/W *
8466	16658	20754	Interharmonics	Limit	Order h	10	0.1 ... 20	%	FLOAT	4		R/W *
8468	16660	20756	Interharmonics	Limit	Order h	11	0.1 ... 20	%	FLOAT	4		R/W *
8470	16662	20758	Interharmonics	Limit	Order h	12	0.1 ... 20	%	FLOAT	4		R/W *
8472	16664	20760	Interharmonics	Limit	Order h	13	0.1 ... 20	%	FLOAT	4		R/W *
8474	16666	20762	Interharmonics	Limit	Order h	14	0.1 ... 20	%	FLOAT	4		R/W *
8476	16668	20764	Interharmonics	Limit	Order h	15	0.1 ... 20	%	FLOAT	4		R/W *
8478	16670	20766	Interharmonics	Limit	Order h	16	0.1 ... 20	%	FLOAT	4		R/W *
8480	16672	20768	Interharmonics	Limit	Order h	17	0.1 ... 20	%	FLOAT	4		R/W *
8482	16674	20770	Interharmonics	Limit	Order h	18	0.1 ... 20	%	FLOAT	4		R/W *
8484	16676	20772	Interharmonics	Limit	Order h	19	0.1 ... 20	%	FLOAT	4		R/W *
8486	16678	20774	Interharmonics	Limit	Order h	20	0.1 ... 20	%	FLOAT	4		R/W *
8488	16680	20776	Interharmonics	Limit	Order h	21	0.1 ... 20	%	FLOAT	4		R/W *
8490	16682	20778	Interharmonics	Limit	Order h	22	0.1 ... 20	%	FLOAT	4		R/W *
8492	16684	20780	Interharmonics	Limit	Order h	23	0.1 ... 20	%	FLOAT	4		R/W *
8494	16686	20782	Interharmonics	Limit	Order h	24	0.1 ... 20	%	FLOAT	4		R/W *
8496	16688	20784	Interharmonics	Limit	Order h	25	0.1 ... 20	%	FLOAT	4		R/W *
8498	16690	20786	Interharmonics	Limit	Order h	26	0.1 ... 20	%	FLOAT	4		R/W *
8500	16692	20788	Interharmonics	Limit	Order h	27	0.1 ... 20	%	FLOAT	4		R/W *
8502	16694	20790	Interharmonics	Limit	Order h	28	0.1 ... 20	%	FLOAT	4		R/W *
8504	16696	20792	Interharmonics	Limit	Order h	29	0.1 ... 20	%	FLOAT	4		R/W *
8506	16698	20794	Interharmonics	Limit	Order h	30	0.1 ... 20	%	FLOAT	4		R/W *
8508	16700	20796	Interharmonics	Limit	Order h	31	0.1 ... 20	%	FLOAT	4		R/W *
8510	16702	20798	Interharmonics	Limit	Order h	32	0.1 ... 20	%	FLOAT	4		R/W *
8512	16704	20800	Interharmonics	Limit	Order h	33	0.1 ... 20	%	FLOAT	4		R/W *
8514	16706	20802	Interharmonics	Limit	Order h	34	0.1 ... 20	%	FLOAT	4		R/W *
8516	16708	20804	Interharmonics	Limit	Order h	35	0.1 ... 20	%	FLOAT	4		R/W *
8518	16710	20806	Interharmonics	Limit	Order h	36	0.1 ... 20	%	FLOAT	4		R/W *

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EN 50160 *read only	PQ now *read only	PQ next	Category	Limit category	Limit type	Description	Configura- tion	Unit	Data type	Size (Bytes)	Default	Read / Write
8520	16712	20808	Interharmonics	Limit	Order h	37	0.1 ... 20	%	FLOAT	4		R/W *
8522	16714	20810	Interharmonics	Limit	Order h	38	0.1 ... 20	%	FLOAT	4		R/W *
8524	16716	20812	Interharmonics	Limit	Order h	39	0.1 ... 20	%	FLOAT	4		R/W *
8526	16718	20814	Interharmonics	Limit	Order h	40	0.1 ... 20	%	FLOAT	4		R/W *
8528	16720	20816	Interharmonics	Limit	Order h	41	0.1 ... 20	%	FLOAT	4		R/W *
8530	16722	20818	Interharmonics	Limit	Order h	42	0.1 ... 20	%	FLOAT	4		R/W *
8532	16724	20820	Interharmonics	Limit	Order h	43	0.1 ... 20	%	FLOAT	4		R/W *
8534	16726	20822	Interharmonics	Limit	Order h	44	0.1 ... 20	%	FLOAT	4		R/W *
8536	16728	20824	Interharmonics	Limit	Order h	45	0.1 ... 20	%	FLOAT	4		R/W *
8538	16730	20826	Interharmonics	Limit	Order h	46	0.1 ... 20	%	FLOAT	4		R/W *
8540	16732	20828	Interharmonics	Limit	Order h	47	0.1 ... 20	%	FLOAT	4		R/W *
8542	16734	20830	Interharmonics	Limit	Order h	48	0.1 ... 20	%	FLOAT	4		R/W *
8544	16736	20832	Interharmonics	Limit	Order h	49	0.1 ... 20	%	FLOAT	4		R/W *
8546	16738	20834	Interharmonics	Limit	Order h	50	0.1 ... 20	%	FLOAT	4		R/W *
8704	16896	20992	Mains signalling voltage	Limit	Period	% share of a day in which the limit value must be observed.	0 ... 100	%	FLOAT	4	99	R/W *
8706	16898	20994	Mains signalling voltage	Limit	Max	Limit value in % of the nominal voltage.	0.5 ... 10	%	FLOAT	4	9	R/W *
8960	17152	21248	Rapid voltage change	Limit	Number	Permissible number of rapid voltage changes in the observation period.	0 ... 1000		UINT_16	2		R/W *
8961	17153	21249	Rapid voltage change	Limit	Voltage change threshold	Deviation in percent of the nominal voltage from which a rapid voltage change is detected.	1 ... 6	%	FLOAT	4	5	R/W *
8963	17155	21251	Rapid voltage change	Hysteresis	Hysteresis	Hysteresis of the limit value. Must be undercut to consider voltage swell as finished.	0.5 ... 3	%	FLOAT	4	2.5	R/W *
8965	17157	21253	Rapid voltage change	Acquisition limit	Min	Below this limit, a voltage dip results.	-50 ... -1	%	FLOAT	4	-10	R/W *
8967	17159	21255	Rapid voltage change	Acquisition limit	Max	If this limit is exceeded, a voltage swell results.	1 ... 50	%	FLOAT	4	10	R/W *