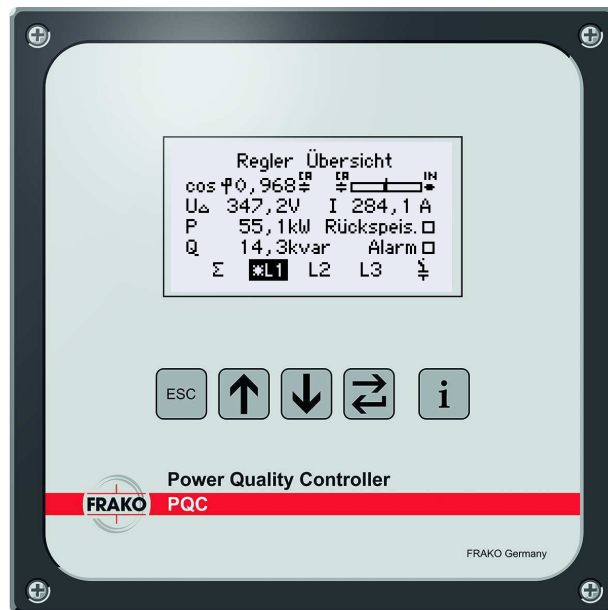


Power Quality Controller – PQC
Blindleistungsregler



Modbus Specification V1.6 for Version greater than 1.32

Frako Kondensatoren- und Anlagenbau GmbH

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1 Revision

Modified index	Version	date
xxxx	1.5	16.08.2016

2 General

This specification is based on the Modbus specification V1.1b3. See <http://www.modbus.org/> for details.

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3 Supported PQC types

This Document is valid for PQC types like PQC XXXXXXXX-2X for example PQC 1202401-20. For more informations about the PQC types see: PQC User Manual from <http://www.frako.com/service/downloads/>.

4 Modbus

4.1 Available functions

The following functions are available:

function		Description
0x03	Read holding register	Read n registers
0x10	write multiple register	Write n registers

Simultaneously writing using Modbus and the user interface at the device itself leads to undefined behavior! Before entering any configuration screen at the device itself, ensure that all changes made through the Modbus interface have been stored in the EEPROM using the appropriate command.

4.2 Data Format

As specified by the Modbus specification, a register is

- 2 Byte long
- big endian (high byte first)

Float values are single precision (32 bit) as defined by IEEE754.

4.3 Write Sequency

When values are written and stored, the following sequence must be followed:

1. Read register 2054 (Modbus lock status). If it's nonzero the PQC Modbus Interface is locked for writing. If its zero continue with point 3

2. Write the PQC serial number (Register 64008) to register 2050 (Modbus unlock password) to unlock the device for writing
3. Write one or more values you want into the PQC
4. if you want save the written values write a nonzero value to register 2056 (save changes EEPROM)
5. lock the PQC again by writing a nonzero value to register 2052 (Modbus lock)

5 Modbus Address List

Address	Format	Identifier	Unit	RW	Description
0	float	L1 cos phi	cos(phi)	R	($0 \leq \cos \varphi < 1$) system is inductive ($1 < \cos \varphi \leq 2$) system is capacitive
4	float	L1 voltage	V	R	
8	float	L1 current	A	R	
12	float	L1 active power	kW	R	
16	float	L1 reactive power	kvar	R	
20	float	L1 apparent power	kVA	R	
36	float	L2 cos phi	cos(phi)	R	($0 \leq \cos \varphi < 1$) system is inductive ($1 < \cos \varphi \leq 2$) system is capacitive
40	float	L2 voltage	V	R	
44	float	L2 current	A	R	
48	float	L2 active power	kW	R	
52	float	L2 reactive power	kvar	R	
56	float	L2 apparent power	kVA	R	
72	float	L3 cos phi	cos(phi)	R	($0 \leq \cos \varphi < 1$) system is inductive ($1 < \cos \varphi \leq 2$) system is capacitive
76	float	L3 voltage	V	R	
80	float	L3 current	A	R	
84	float	L3 active power	kW	R	
88	float	L3 reactive power	kvar	R	
92	float	L3 apparent power	kVA	R	
128	uint16	L1 V H01	%	R	
130	uint16	L1 V H02	%	R	
132	uint16	L1 V H03	%	R	
134	uint16	L1 V H04	%	R	
136	uint16	L1 V H05	%	R	
138	uint16	L1 V H06	%	R	
140	uint16	L1 V H07	%	R	
142	uint16	L1 V H08	%	R	
144	uint16	L1 V H09	%	R	

Address	Format	Identifier	Unit	RW	Description
146	uint16	L1 V H10	%	R	
148	uint16	L1 V H11	%	R	
150	uint16	L1 V H12	%	R	
152	uint16	L1 V H13	%	R	
154	uint16	L1 V H14	%	R	
156	uint16	L1 V H15	%	R	
158	uint16	L1 V H16	%	R	
160	uint16	L1 V H17	%	R	
162	uint16	L1 V H18	%	R	
164	uint16	L1 V H19	%	R	
166	float	L1 THDU	%	R	Total Harmonic Voltage Distortion
340	uint16	L2 V H01	%	R	
342	uint16	L2 V H02	%	R	
344	uint16	L2 V H03	%	R	
346	uint16	L2 V H04	%	R	
348	uint16	L2 V H05	%	R	
350	uint16	L2 V H06	%	R	
352	uint16	L2 V H07	%	R	
354	uint16	L2 V H08	%	R	
356	uint16	L2 V H09	%	R	
358	uint16	L2 V H10	%	R	
360	uint16	L2 V H11	%	R	
362	uint16	L2 V H12	%	R	
364	uint16	L2 V H13	%	R	
366	uint16	L2 V H14	%	R	
368	uint16	L2 V H15	%	R	
370	uint16	L2 V H16	%	R	
372	uint16	L2 V H17	%	R	
374	uint16	L2 V H18	%	R	
376	uint16	L2 V H19	%	R	
378	float	L2 THDU	%	R	Total Harmonic Voltage Distortion
552	uint16	L3 V H01	%	R	

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Address	Format	Identifier	Unit	RW	Description
554	uint16	L3 V H02	%	R	
556	uint16	L3 V H03	%	R	
558	uint16	L3 V H04	%	R	
560	uint16	L3 V H05	%	R	
562	uint16	L3 V H06	%	R	
564	uint16	L3 V H07	%	R	
566	uint16	L3 V H08	%	R	
568	uint16	L3 V H09	%	R	
570	uint16	L3 V H10	%	R	
572	uint16	L3 V H11	%	R	
574	uint16	L3 V H12	%	R	
576	uint16	L3 V H13	%	R	
578	uint16	L3 V H14	%	R	
580	uint16	L3 V H15	%	R	
582	uint16	L3 V H16	%	R	
584	uint16	L3 V H17	%	R	
586	uint16	L3 V H18	%	R	
588	uint16	L3 V H19	%	R	
590	float	L3 THDU	%	R	Total Harmonic Voltage Distortion
764	uint16	L1 I H01	%	R	
766	uint16	L1 I H02	%	R	
768	uint16	L1 I H03	%	R	
770	uint16	L1 I H04	%	R	
772	uint16	L1 I H05	%	R	
774	uint16	L1 I H06	%	R	
776	uint16	L1 I H07	%	R	
778	uint16	L1 I H08	%	R	
780	uint16	L1 I H09	%	R	
782	uint16	L1 I H10	%	R	
784	uint16	L1 I H11	%	R	
786	uint16	L1 I H12	%	R	
788	uint16	L1 I H13	%	R	

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Address	Format	Identifier	Unit	RW	Description
790	uint16	L1 I H14	%	R	
792	uint16	L1 I H15	%	R	
794	uint16	L1 I H16	%	R	
796	uint16	L1 I H17	%	R	
798	uint16	L1 I H18	%	R	
800	uint16	L1 I H19	%	R	
802	float	L1 THDI	%	R	Total Harmonic Current Distortion
806	float	L1 overcurrent factor	I_{eff}/I_{fu}	R	
976	uint16	L2 I H01	%	R	
978	uint16	L2 I H02	%	R	
980	uint16	L2 I H03	%	R	
982	uint16	L2 I H04	%	R	
984	uint16	L2 I H05	%	R	
986	uint16	L2 I H06	%	R	
988	uint16	L2 I H07	%	R	
990	uint16	L2 I H08	%	R	
992	uint16	L2 I H09	%	R	
994	uint16	L2 I H10	%	R	
996	uint16	L2 I H11	%	R	
998	uint16	L2 I H12	%	R	
1000	uint16	L2 I H13	%	R	
1002	uint16	L2 I H14	%	R	
1004	uint16	L2 I H15	%	R	
1006	uint16	L2 I H16	%	R	
1008	uint16	L2 I H17	%	R	
1010	uint16	L2 I H18	%	R	
1012	uint16	L2 I H19	%	R	
1014	float	L2 THDI	%	R	Total Harmonic Current Distortion
1018	float	L2 overcurrent factor	I_{eff}/I_{fu}	R	
1188	uint16	L3 I H01	%	R	
1190	uint16	L3 I H02	%	R	
1192	uint16	L3 I H03	%	R	

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Address	Format	Identifier	Unit	RW	Description
1194	uint16	L3 I H04	%	R	
1196	uint16	L3 I H05	%	R	
1198	uint16	L3 I H06	%	R	
1200	uint16	L3 I H07	%	R	
1202	uint16	L3 I H08	%	R	
1204	uint16	L3 I H09	%	R	
1206	uint16	L3 I H10	%	R	
1208	uint16	L3 I H11	%	R	
1210	uint16	L3 I H12	%	R	
1212	uint16	L3 I H13	%	R	
1214	uint16	L3 I H14	%	R	
1216	uint16	L3 I H15	%	R	
1218	uint16	L3 I H16	%	R	
1220	uint16	L3 I H17	%	R	
1222	uint16	L3 I H18	%	R	
1224	uint16	L3 I H19	%	R	
1226	float	L3 THDI	%	R	Total Harmonic Current Distortion
1230	float	L3 overcurrent factor	I_{eff}/I_{fu}	R	
1344	float	total cos phi	cos(phi)	R	($0 \leq \cos \varphi < 1$) system is inductive ($1 < \cos \varphi \leq 2$) system is capacitive
1348	float	total voltage	V	R	
1352	float	total current	A	R	
1356	float	total active power	kW	R	
1360	float	total reactive power	kvar	R	
1364	float	total apparent power	kVA	R	
1392	float	total C-Stages power	kvar	R	
1396	float	available C-Stages Power	kvar	R	
1400	float	missing reactive power (Based on control setPoint)	kvar	R	
1404	float	C-Stages power load rate	%	R	
1408	float	calculated cos phi setpoint	cos(phi)	R	($0 \leq \cos \varphi < 1$) system is inductive ($1 < \cos \varphi \leq 2$) system is capacitive
1424	uint32	voltage sag count L1	events	R	

Address	Format	Identifier	Unit	RW	Description
1428	uint32	voltage sag count L2	events	R	
1432	uint32	voltage sag count L3	events	R	
1536	uint16	relay status 01		R	0: Turned off 1: Turned on 3: Not connected 5: Disabled 6: Zero stage 7: Fixed stage
1538	uint16	relay status 02		R	
1540	uint16	relay status 03		R	
1542	uint16	relay status 04		R	
1544	uint16	relay status 05		R	
1546	uint16	relay status 06		R	
1548	uint16	relay status 07		R	
1550	uint16	relay status 08		R	
1552	uint16	relay status 09		R	
1554	uint16	relay status 10		R	
1556	uint16	relay status 11		R	
1558	uint16	relay status 12		R	
1600	uint32	switch count relay 01	operations	R	
1604	uint32	switch count relay 02	operations	R	
1608	uint32	switch count relay 03	operations	R	
1612	uint32	switch count relay 04	operations	R	
1616	uint32	switch count relay 05	operations	R	
1620	uint32	switch count relay 06	operations	R	
1624	uint32	switch count relay 07	operations	R	
1628	uint32	switch count relay 08	operations	R	
1632	uint32	switch count relay 09	operations	R	
1636	uint32	switch count relay 10	operations	R	
1640	uint32	switch count relay 11	operations	R	
1644	uint32	switch count relay 12	operations	R	
1792	float	reactive power relay bank 01	kvar	R	

Address	Format	Identifier	Unit	RW	Description
1796	float	reactive power relay bank 02	kvar	R	
1800	float	reactive power relay bank 03	kvar	R	
1804	float	reactive power relay bank 04	kvar	R	
1808	float	reactive power relay bank 05	kvar	R	
1812	float	reactive power relay bank 06	kvar	R	
1816	float	reactive power relay bank 07	kvar	R	
1820	float	reactive power relay bank 08	kvar	R	
1824	float	reactive power relay bank 09	kvar	R	
1828	float	reactive power relay bank 10	kvar	R	
1832	float	reactive power relay bank 11	kvar	R	
1836	float	reactive power relay bank 12	kvar	R	
1856	uint16	reactive power left percent relay bank 01	%	R	Percent of left stage power since stage identification. This value is used for zero stage determination.
1858	uint16	reactive power left percent relay bank 02	%	R	
1860	uint16	reactive power left percent relay bank 03	%	R	
1862	uint16	reactive power left percent relay bank 04	%	R	
1864	uint16	reactive power left percent relay bank 05	%	R	
1866	uint16	reactive power left percent relay bank 06	%	R	
1868	uint16	reactive power left percent relay bank 07	%	R	
1870	uint16	reactive power left percent relay bank 08	%	R	
1872	uint16	reactive power left percent relay bank 09	%	R	
1874	uint16	reactive power left percent relay bank 10	%	R	
1876	uint16	reactive power left percent relay bank 11	%	R	
1878	uint16	reactive power left percent relay bank 12	%	R	
2048	uint16	active control preset (1-5)		RW	
2050	uint16	Modbus unlock password		RW	
2052	uint16	Modbus lock		RW	

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Address	Format	Identifier	Unit	RW	Description
2054	uint16	Modbus lock status		R	If value is zero, write access is unlocked. Any value different from zero indicates a locked Modbus write access.
2056	uint16	save changes EEPROM		RW	
2058	uint16	EEPROM busy		R	A non-zero value indicates a still running write process. It is recommended to wait for the write process to complete before reading/writing any register.
2304	uint32	alarm register		R	Bit 0: Undervoltage (any phase) Bit 1: Undercurrent (any phase) Bit 2: THDI (controlled phase) Bit 5: cos(phi) (controlled phase) Bit 6: Zero stage (any stage) Bit 7: Stage counter (any stage) Bit 8: Impossible Connection Bit 9: Impossible Stage detection Bit 10: Voltage harmonic Bit 11: Current harmonic Bit 12: Overcurrent Bit 13: Voltage Sag Bit 14: PT100 temperature Bit 15: NTC1 temperature Bit 16: NTC2 temperature Bit 17: Input1 Bit 18: Input2 Bit 19: Input3 Bit 20: Input4 Bit 21: Input5

Address	Format	Identifier	Unit	RW	Description
2308	uint32	alarm details zero stage		R	Bit 0: Zerostage 1 detected Bit 1: Zerostage 2 detected ... Bit 11 : Zerostage 12 detected
2312	uint32	alarm details stagecounter		R	Bit 0: Stagecounter 1 reached Bit 1: Stagecounter 2 reached ... Bit 11 : Stagecounter 12 reached
2316	uint32	alarm details harmonic current		R	Bit 0: harmonic 1 detected Bit 1: harmonic 2 detected ... Bit 18 : harmonic 19 detected
2320	uint32	alarm details harmonic voltage		R	Bit 0: harmonic 1 detected Bit 1: harmonic 2 detected ... Bit 18 : harmonic 19 detected

Address	Format	Identifier	Unit	RW	Description
2324	uint32	alarm details measured Data		R	Bit 0: Undervoltage (L1) Bit 1: Undercurrent (L1) Bit 2: THDI (L1) Bit 3: Underfrequency detected (L1) Bit 4: Overfrequency detected (L1) Bit 5: Overcurrent detected (L1) Bit 10: Undervoltage (L2) Bit 11: Undercurrent (L2) Bit 12: THDI (L2) Bit 13: Underfrequency detected (L2) Bit 14: Overfrequency detected (L2) Bit 15: Overcurrent detected (L2) Bit 20: Undervoltage (L3) Bit 21: Undercurrent (L3) Bit 22: THDI (L3) Bit 23: Underfrequency detected (L3) Bit 24: Overfrequency detected (L3) Bit 25: Overcurrent detected (L3)
2384	uint16	Software Version Major		R	
2386	uint16	Software Version Minor		R	
2388	uint32	Software Version Revision		R	First 32 Bit of git commit hash
2392	uint32	Hardware Serial Number		R	
2396	uint32	Hardware Relay Voltage		R	
2400	uint32	Hardware Date Code		R	
2404	uint16	Hardware Phase Count		R	
2406	uint16	Hardware Stage Count		R	
64000	uint16	Manufacturer		R	
64002	uint16	Type		R	
64004	uint32	Version		R	First 32 Bit of git commit hash
64008	uint32	Serial No		R	
64012	uint32	Feature		R	

Address	Format	Identifier	Unit	RW	Description
65500	float	Hardbeat		RW	Range: $0 \leq x \leq 65535$ Resolution: 1 Multiplier: 1
2560	float	Profile 1 cos phi target	cos(phi)	RW	Range: $0.5 \leq x \leq 1.5$ Resolution: 0.001 Multiplier: 1
2564	float	Profile 1 Limitation T		RW	
2568	float	Profile 1 Parallel Shift PS		RW	Range: $-2 \leq x \leq 4$ Resolution: 0.5 Multiplier: 1
2572	float	Profile 1 Switching delay time	s	RW	Range: $5 \leq x \leq 500$ Resolution: 1 Multiplier: 1
2576	uint16	Profile 1 controlled Phase		RW	
2578	float	Profile 2 cos phi target	cos(phi)	RW	Range: $0.5 \leq x \leq 1.5$ Resolution: 0.001 Multiplier: 1
2582	float	Profile 2 Limitation T		RW	
2586	float	Profile 3 Parallel Shift		RW	Range: $-2 \leq x \leq 4$ Resolution: 0.5 Multiplier: 1
2590	float	Profile 4 Switching delay time	s	RW	Range: $5 \leq x \leq 500$ Resolution: 1 Multiplier: 1
2594	uint16	Profile 5 controlled Phase		RW	
2596	float	Profile 3 cos phi target		RW	Range: $0.5 \leq x \leq 1.5$ Resolution: 0.001 Multiplier: 1
2600	float	Profile 3 Limitation T		RW	
2604	float	Profile 3 Parallel Shift		RW	Range: $-2 \leq x \leq 4$ Resolution: 0.5 Multiplier: 1

Address	Format	Identifier	Unit	RW	Description
2608	float	Profile 3 Switching delay time	s	RW	Range: $5 \leq x \leq 500$ Resolution: 1 Multiplier: 1
2612	uint16	Profile 3 controlled Phase		RW	
2614	float	Profile 4 cos phi target	cos(phi)	RW	Range: $0.5 \leq x \leq 1.5$ Resolution: 0.001 Multiplier: 1
2618	float	Profile 4 Limitation T		RW	
2622	float	Profile 4 Parallel Shift		RW	Range: $-2 \leq x \leq 4$ Resolution: 0.5 Multiplier: 1
2626	float	Profile 4 Switching delay time	s	RW	Range: $5 \leq x \leq 500$ Resolution: 1 Multiplier: 1
2630	uint16	Profile 4 controlled Phase		RW	
2632	float	Profile 5 cos phi target	cos(phi)	RW	Range: $0.5 \leq x \leq 1.5$ Resolution: 0.001 Multiplier: 1
2636	float	Profile 5 Limitation T		RW	
2640	float	Profile 5 Parallel Shift		RW	Range: $-2 \leq x \leq 4$ Resolution: 0.5 Multiplier: 1
2644	float	Profile 5 Switching delay time	s	RW	Range: $5 \leq x \leq 500$ Resolution: 1 Multiplier: 1
2648	uint16	Profile 5 controlled Phase		RW	
2650	float	Profile active cos phi target	cos(phi)	RW	Range: $0.5 \leq x \leq 1.5$ Resolution: 0.001 Multiplier: 1
2654	float	Profile active Limitation T		RW	
2658	float	Profile active Parallel Shift		RW	Range: $-2 \leq x \leq 4$ Resolution: 0.5 Multiplier: 1

Address	Format	Identifier	Unit	RW	Description
2662	float	Profile active Switching delay time	s	RW	Range: $5 \leq x \leq 500$ Resolution: 1 Multiplier: 1
2666	uint16	Profile active controlled Phase		RW	
3840	float	THDI Trip Value	%	RW	Range: $5 \leq x \leq 500$ Resolution: 1 Multiplier: 1
3848	uint16	Uharmonic trip value 02	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3850	uint16	Uharmonic trip value 03	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3852	uint16	Uharmonic trip value 04	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3854	uint16	Uharmonic trip value 05	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3856	uint16	Uharmonic trip value 06	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3858	uint16	Uharmonic trip value 07	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3860	uint16	Uharmonic trip value 08	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3862	uint16	Uharmonic trip value 09	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100

Address	Format	Identifier	Unit	RW	Description
3864	uint16	Uharmonic trip value 10	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3866	uint16	Uharmonic trip value 11	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3868	uint16	Uharmonic trip value 12	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3870	uint16	Uharmonic trip value 13	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3872	uint16	Uharmonic trip value 14	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3874	uint16	Uharmonic trip value 15	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3876	uint16	Uharmonic trip value 16	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3878	uint16	Uharmonic trip value 17	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3880	uint16	Uharmonic trip value 18	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3882	uint16	Uharmonic trip value 19	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3952	uint16	Iharmonic trip value 02	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100

Address	Format	Identifier	Unit	RW	Description
3954	uint16	Iharmonic trip value 03	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3956	uint16	Iharmonic trip value 04	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3958	uint16	Iharmonic trip value 05	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3960	uint16	Iharmonic trip value 06	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3962	uint16	Iharmonic trip value 07	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3964	uint16	Iharmonic trip value 08	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3966	uint16	Iharmonic trip value 09	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3968	uint16	Iharmonic trip value 10	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3970	uint16	Iharmonic trip value 11	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3972	uint16	Iharmonic trip value 12	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3974	uint16	Iharmonic trip value 13	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100

Address	Format	Identifier	Unit	RW	Description
3976	uint16	Iharmonic trip value 14	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3978	uint16	Iharmonic trip value 15	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3980	uint16	Iharmonic trip value 16	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3982	uint16	Iharmonic trip value 17	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3984	uint16	Iharmonic trip value 18	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3986	uint16	Iharmonic trip value 19	%	RW	Range: $0 \leq x \leq 10000$ Resolution: 1 Multiplier: 100
3988	uint16	overcurrent factor trip value	I_{eff}/I_{fu}	RW	Range: $100 \leq x \leq 200$ Resolution: 1 Multiplier: 100
3990	uint16	blackout voltage percent of nominal voltage	%	RW	Range: $50 \leq x \leq 93$ Resolution: 1 Multiplier: 1
3992	uint16	voltage blackout no of quarter periods		RW	Range: $1 \leq x \leq 4$ Resolution: 1 Multiplier: 1
3994	uint16	voltage sag phase		RW	
4096	uint16	automatic c/k identification		R	
4098	uint16	c/k value	mA	R	
4100	uint16	switching sequence value relay 01		R	
4102	uint16	switching sequence value relay 02		R	
4104	uint16	switching sequence value relay 03		R	

Address	Format	Identifier	Unit	RW	Description
4106	uint16	switching sequence value relay 04		R	
4108	uint16	switching sequence value relay 05		R	
4110	uint16	switching sequence value relay 06		R	
4112	uint16	switching sequence value relay 07		R	
4114	uint16	switching sequence value relay 08		R	
4116	uint16	switching sequence value relay 09		R	
4118	uint16	switching sequence value relay 10		R	
4120	uint16	switching sequence value relay 11		R	
4122	uint16	switching sequence value relay 12		R	
4192	uint16	determination of fixed stages	fix Stage	R	0: Fix stage 1: Stage 1 is a fixed stage 2: Stage 1 and stage 2 are fixed stages 3: Stages 1, 2 and 3 are fixed stages
4194	uint16	number of contactors used	Stages	R	
4196	uint16	automatic identification of voltage and current source		R	
4198	uint16	enter or read mode of connection		R	
4200	uint16	discharge time	s	R	
4202	uint16	setting cyclic/non-cyclic switching rotation		R	
4204	uint16	threshold for number of switching alarm	operations	R	
4206	uint16	current transformer ratio		RW	Range: $1 \leq x \leq 6000$ Resolution: 1 Multiplier: 1
4212	uint16	voltage transformer ratio		RW	Range: $1 \leq x \leq 300$ Resolution: 1 Multiplier: 1
4216	uint16	invert Alarmrelay		R	
4218	uint16	cos Phi controlband violation		R	
4220	uint16	language		R	
4222	uint16	choke factor	%	R	
4224	uint16	zero Stage detection limit	%	R	
4226	uint16	nominal voltage	V	R	

Address	Format	Identifier	Unit	RW	Description
8192	uint16	Temp-IO config: PT Sensor active/inactive		R	
8194	uint16	Temp-IO config: NTC 1 Sensor active/inactive		R	
8196	uint16	Temp-IO config: NTC 2 Sensor active/inactive		R	
8198	uint16	Temp-IO config: I/O configuration		R	0: Input 1: Output 2: Unconfigured Bit 0-1: I/O 1 Bit 2-3: I/O 2 Bit 4-5: I/O 3 Bit 6-7: I/O 4 Bit 8-9: I/O 5 Bit 10-12: Profile switching pin (0 means deactivated)
8200	int16	Temp-IO config: temperature unit		R	0: °C 1: °F 2: Kelvin
8202	int16	Temp-IO config: PT Sensor alarm threshold	K/°C/ °F	R	
8204	int16	Temp-IO config: NTC 1 Sensor alarm threshold	K/°C/ °F	R	
8206	int16	Temp-IO config: NTC 2 Sensor alarm threshold	K/°C/ °F	R	
12288	uint16	Temp-IO I/O IO Status		R	0: OFF 1: ON Bit 0: IO1 Bit 1: IO2 Bit 2: IO3 Bit 3: IO4 Bit 4: IO5
12290	uint16	Temp-IO PT Sensor Detection		R	0: PT 1000 1: PT 100 2: No Sensor detected

Modbus Specification

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Address	Format	Identifier	Unit	RW	Description
12292	int16	Temp-IO temperature PT	°C	R	Special values: 32765: inactive 32766: no Sensor 32767: out of range Multiplier: 0.1
12294	int16	Temp-IO temperature PT	°F	R	
12296	int16	Temp-IO temperature PT	K	R	
12298	int16	Temp-IO temperature NTC 1	°C	R	
12300	int16	Temp-IO temperature NTC 1	°F	R	
12302	int16	Temp-IO temperature NTC 1	K	R	
12304	int16	Temp-IO temperature NTC 2	°C	R	
12306	int16	Temp-IO temperature NTC 2	°F	R	
12308	int16	Temp-IO temperature NTC 2	K	R	