

Insulation fault locator

ISOM DLD 240/440



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1. GENERAL INFORMATION

This appendix provides a complete description of the Modbus register for the ISOM® ALD 495/395 family of devices to facilitate access to information.

The adjustable parameters for individual keys are listed.

The ISOM® ALD 495/395 device family supports 4-digit addressing and the following Modbus functions:

1. Holding registers for reading values
(Read Holding Register; function code 0x03)
2. Registers for device programming
(Preset Multiple Registers; function code 0x10)

For the complete Modbus protocol specification, visit <http://www.modbus.org>.

2. DATA ACCESS BY MEANS OF MODBUS/TCP-PROTOCOL

Requests to the ALD 495/395 Modbus/TCP-Server are carried out using the Function code FC3 (read input registers). The server generates a function-related response and sends it to the Modbus client.

Maximum of Modbus TCP requests per second: 100/s.

2.1. Exception code

If a request cannot be answered for whatever reason, the server sends a so-called exception code to limit possible errors.

Exception-Code	Description
0x01	Invalid function
0x02	Invalid data access
0x03	Invalid data value
0x04	Slave device error
0x05	Acceptance confirmed (response is delayed)
0x06	Request not accepted (repeat request if necessary)
0x08	Memory: Parity error
0x0A	Gateway path not available
0x0B	Gateway Error

2.2. Modbus request

By means of the function code FC3, the required information, in Words, can be read from the ISOM® ALD 495/395 input registers. To enable this, the start address and the Number of registers to be read must be specified.

Example: the insulation value should be read from the input register with a start address of 0x2000.

2.3. Modbus response

The response consists of 2 bytes per register. The byte sequence is defined with the Most Significant Bit (MSB) first.

Byte	Name	Example
...	...	...
Byte 7	Modbus function code	0x03
Byte 8	Byte count	0x04
Byte 9,10	Value in Register 0	0x1234 (fictitious value)
Byte 11,12	Value in Register 1	0x2345 (fictitious value)

2.4. Structure of exception code

Byte	Name	Example
...	...	...
Byte 7	Modbus function code	0x83
Byte 8	Exception code	0x01 or 0x02

Byte	Name	Example
Byte 0,1	Transaction identifier	0x0000
Byte 2,3	Protocol identifier	0x0000
Byte 4,5	Length field	0x0006
Byte 6	Unit identifier	BCOM device address
Byte 7	Modbus function code	0x03
Byte 8,9	Register address	0x2000
Byte 10,11	Number of Words	0x0002

3. MODBUS REGISTER ASSIGNMENT

3.1. Device family DLD 240/440

3.1.1. Device information

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x510	1296	Device model	16	String UTF 8	RO			
0x520	1312	Article Number	16	String UTF 8	RO			
0x530	1328	Serial Number	16	String UTF 8	RO			
0x540	1344	Manufacturer	48	String UTF 8	RO			
0x570	1392	D-number of Interface	1	UInt16	RO	Software number of Interface		
0x571	1393	Software version interface	1	UInt16	RO			
0x578	1400	D-number measuring technique	1	UInt16	RO	Software number of measuring technique		
0x579	1401	Software version measuring technique	1	UInt16	RO			

3.1.2. Measuring values overview

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x2000 - 0x2016	8192 - 8214	DLD/IdL current measure- ment values	2	Float	RO	Measurement values Channel 1...12		A
0x2018 - 0x202E	8216 - 8238	RCM/Idn current measure- ment values	2	Float	RO	Measurement values Channel 1...12		A
0x2004 - 0x2046	8240 - 8262	Induction	2	Float	RO	Induction of CT channels 1...12		H
0x2060 - 0x206B	8288 - 8299	CT status	1	UInt16	RO	MSG_eMeasCtStatusK1...12: 0 = channel deactivated 1 = no fault 2 = CT connection fault 3 = CT short circuit	0...3	
0x206C - 0x2077	8300 - 8311	Signal quality	1	UInt16	RO	MSG_eMeasEdsQualK1...12: 0 = channel deactivated 1 = no fault 2 = measuring fault	0...2	
0x2078 - 0x208E	8312 - 8335	Relative capacitance	2	Float	RO	Rel. capacitance channels 1...12: MSG_eMeasContRelCapacitanceKx_DLD		
0x2090 - 0x20A6	8336 - 8360	Relative resistance	2	Float	RO	Rel. resistance channels 1...12: MSG_eMeasContRelResistanceKx_DLD		
0x20B0 - 0x20BB	8368 - 8379	Alarm bits IdL	1	UInt16	RO	IdL current alarm value channels 1...12: 0 = no alarm 5 = alarm	0; 5	
0x20C0 - 0x20CB	8384 - 8395	Alarm bits Idn	1	UInt16	RO	Idn current alarm value channels 1...12: 0 = no alarm 5 = alarm	0; 5	
0x20D0 - 0x20DB	8400 - 8411	Alarm bits status	1	UInt16	RO	CT status alarm value channels 1...12: MSG_eMeasCtStatusK1...12 0 = no alarm 4 = alarm	0; 4	

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x20E0 - 0x20EB	8416 - 8427	Alarm bits signal quality	1	Uint16	RO	Sign. quality alarm value channels 1...12: MSG_ eMeasEdsQualK1...12 0 = no alarm 5 = alarm	0; 5	

3.1.3. Interface configuration

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x30F0	12528	RS485 protocol	1	Uint16	R/W	1 = BS-Bus 2 = Modbus RTU	1...2	
0x30F1	12529	Modbus RTU: client ID	1	Uint16	R/W	Default: 100	Modbus RTU 0...247	
0x30F2	12530	BS-Bus address	1	Uint16	R/W	Default: 2	0...79	
0x30F3	12531	Modbus RTU: baudrate	1	Uint16	R/W	1 = 9600 2 = 19200 (default) 3 = 38400 4 = 56700 5 = 115200	1...5	
0x30F4	12532	Modbus RTU: parity				1 = even (default) 2 = odd 3 = none	1...3	
0x30F5	12533	Modbus RTU: Stop bits				1 = 1 2 = 2 3 = auto (default) In auto mode the number of stopbits is chosen, so that the number of Bits (data + parity + stop Bits) is always 11.	1...3	

3.1.4. Measurement parameters

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x3100	12544	Fault memoray	2	Uint16	R/W	1 = on 2 = off	1...2	
0x3101	12545	Trigger mode	2	Uint16	R/W	1 = Com 2 = Auto	1...2	

3.1.5. Channel management

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x3110	12560	Enable / Disable channel	2	Uint16	R/W	Bit mask: Each bit = one channel. Only bits within the range will be taken into account. Bit[0]: Kanal 1 Bit[1]: ... Bit[11]: Kanal 12	Bit[n]: 0 = disabled 1 = enabled 0...4095	
0x3112	12562	Number of channel relays	2	Uint16	RO	Number of IOM channels setting not possible 255 = Number unknown		

3.1.6. Digital input

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x3120	12576	Digital input 1 function	2	Uint16	R/W	Digital input 1 function: 1 = off 2 = TEST 3 = RESET	1...3	
0x3121	12577	Digital input 1 mode	2	Uint16	R/W	Digital input 1 mode: 1 = High active 2 = Low active	1...2	
0x3122	12578	Digital input 1 t(on)	4	Float	R/W	Responsetime after switch-ON	0,1...300	s
0x3124	12580	Digital input 1 t(off)	4	Float	R/W	Responsetime after switch-OFF	0,1...300	s
0x3126	12582	Digital input 2 function	2	Uint16	R/W	Digital input 2 function: 1 = off 2 = TEST 3 = RESET	1...3	
0x3127	12583	Digital input 2 mode	2	Uint16	R/W	Digital input 2 mode: 1 = High active 2 = Low active	1...2	
0x3128	12584	Digital input 2 t(on)	4	Float	R/W	Responsetime after switch-ON	0,1...300	s
0x312A	12586	Digital input 2 t(off)	4	Float	R/W	Responsetime after switch-OFF	0,1...300	s

3.1.7. Digital output

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x3130	12592	Digital output function 1	2	Uint16	R/W	Digital output function 1: 1 = off 2 = Alarm IdL (DLD) 3 = Alarm Idn (RCM) 4 = Device fault 5 = Donnection fault 6 = Commonalarm (all) 7 = BS-Bus failure	1...7	
0x3131	12593	Digital output function 2	2	Uint16	R/W	s.h. 0x3130	1...7	
0x3132	12594	Digital output function 3	2	Uint16	R/W	s.h. 0x3130	1...7	
0x3133	12595	Digital output 1 Test	2	Uint16	R/W	Digital output Test: 1 = on 2 = off	1...2	

3.1.8. Buzzer

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x3140	12608	Buzzer function 1	2	Uint16	R/W	Buzzer function 1: 1 = off 2 = Alarm IdL (DLD) 3 = Alarm Idn (RCM) 4 = Device fault 5 = Connection fault 6 = Insulation fault monitoring (Pulse buzzer) 7 = Common alarm (all, instead of insulation fault monitoring)	1...7	
0x3141	12609	Buzzer function 2	2	Uint16	R/W	s.h. 0x3140	1...7	
0x3142	12610	Buzzer function 3	2	Uint16	R/W	s.h. 0x3140	1...7	
0x3143	12611	Buzzer Test	2	Uint16	R/W	Buzzer Test 1 = on 2 = off	1...2	

3.1.9. Common relay

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x3160	12640	Relay 1 Test	2	Uint16	R/W	1 = Test on 2 = Test off	1...2	
0x3161	12641	Relay 1 Arbeitsweise	2	Uint16	R/W	1 = N/O 2 = N/C	1...2	
0x3162	12642	Relay 1 function 1	2	Uint16	R/W	Relay 1 function 1: 1 = off 2 = Alarm IdL (DLD) 3 = Alarm Idn (RCM) 4 = Device fault 5 = Connection fault 6 = Common alarm (Alles) 7 = BS Bus failure	1...7	
0x3163	12643	Relay 1 function 2	2	Uint16	R/W	s.h. 0x3162	1...7	
0x3164	12644	Relay 1 function 3	2	Uint16	R/W	s.h. 0x3162	1...7	
0x3165	12645	Relay 2 Test	2	Uint16	R/W	1 = TEST on 2 = TEST off	1...2	
0x3166	12646	Relay 2 mode	2	Uint16	R/W	1 = N/O 2 = N/C	1...2	
0x3167	12647	Relay 2 function 1	2	Uint16	R/W	s.h. 0x3162	1...7	
0x3168	12648	Relay 2 function 2	2	Uint16	R/W	s.h. 0x3162	1...7	
0x3169	12649	Relay 2 function 3	2	Uint16	R/W	s.h. 0x3162	1...7	

3.1.10. Channel parameters

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x3200	12800	DLD response values	2	Uint16	R/W	response values insulation fault monitor (µA) increment DLD 440: 0,1 mA increment DLD 240: 1 mA	DLD 440: 20...100 DLD 240: 2...10	µA
0x3201	12801	RCM response values	2	Uint16	R/W	response values residual current (mA) increment DLD 440: 100 mA increment DLD 240: 100 mA	DLD 440: 100...10000 DLD 240: 100...1000	mA
0x3202	12802	CT type	2	Uint16	R/W	1 = Type A 2 = Type AB	1...2	
0x3203	12803	CT monitor	2	Uint16	R/W	1 = on 2 = off	1...2	
0x3204	12804	System type	2	Uint16	R/W	1 = DC 2 = 50 Hz 3 = 60 Hz 4 = 400 Hz	1...4	
0x3205 - 0x320F	12805 - 12815	reserved						

3.1.11. Channel relay parameters

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x3300	13056	Channel relay mode	1	Uint16	R/W	1 = N/O 2 = N/C	1...2	
0x3301	13057	Channel relay Test	1	Uint16	R/W	1 = Test ein 2 = Test aus	1...2	
0x3302	13058	Channel relay function 1	1	Uint16	R/W	Channel relay function 1: 1 = off 2 = Alarm IdL (DLD) 3 = Alarm Idn (RCM) 4 = Connection fault	1...4	
0x3303	13059	Channel relay function 2	1	Uint16	R/W	s.h. 0x3302	1...4	
0x3304	13060	Channel relay function 3	1	Uint16	R/W	s.h. 0x3302	1...4	
0x3305 - 0x330F	13061 - 13071	reserved						

3.1.12. Control commands

Register address (hexadecimal)	Register address (decimal)	Description	Number Register	Data type	Mode	Comment	Range	Unit
0x4803	18435	Test	2	Uint16	WO	Aktiviert den Selbsttest.	64260	
0x4804	18436	Reset	2	Uint16	WO	64770 = DLD Reset: Reset of insulation fault values and alarms. 65025 = Alarm Reset: Reset of alarms. Termi- nates selftest if applicable.	64770, 65025	
0x480B	18443	Buzzer mute	2	Uint16	WO		0	
0x48A1	18593	Factory setting	2	Uint16	WO		65025	

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