

MD Project. Object Model.

Rev.1.0

Revision History

Version	Date	Description
1.0	20.04.2024	Initial document revision

All objects comply with DLMS/COSEM specification (DLMS UA 1000-1 Ed. 15 Parts 1 and 2).

Ownership and licensing.

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Prohibition of undeclared objects. Implementation of COSEM objects, interface classes or methods not listed in this specification is permitted only if they are (a) exhaustively declared by the tenderer in the technical offer, (b) fully documented, and (c) non-mandatory for system operation. No reading, parameterisation, firmware-update or diagnostic function required for operation may depend on undeclared objects.

Functional equivalence. Where this specification describes a concrete implementation of a functional requirement, the tenderer may propose any equivalent implementation based on standard DLMS/COSEM, to be demonstrated at FAT.

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1. Abstract objects

1.1. SAP assignment, Association LN, COSEM logical device name

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	SAP Assignment	17		0-0:41.0.0.255								
1	logical_name		octet-string[6]	0000290000FF				R	R			
2	SAP_assignment_list		asslist_type		list of logical devices 1 logical device (management logical device) with at least 5 associations: Public Client (server address 16), Management Client (server address 1), Reading Client (server address 2), Firmware Update Client (server address 3) and Test Client (server address 4)			R	R			
	Association LN for current client	15		0-0:40.0.0.255	Current Client Association							
1	logical_name		octet-string[6]	0000280000FF			R	R	R		R	R
2	object_list		object_list_type				R	R	R		R	R
3	associated_partners_id		associated_partners_type				R	R	R		R	R
4	application_context_name		application_context_name				R	R	R		R	R
5	xDLMS_context_info		xDLMS_context_type				R	R	R		R	R
6	authentication_mechanism_name		mechanism_name				R	R	R		R	R
7	LLS_secret		octet-string[16]						W		W	
8	association_status		enum				R	R	R		R	R
1	reply_to_HLS_authentication		method					A	A		A	
	Association LN for Public Client	15		0-0:40.0.1.255	Public Client Association							
1	logical_name		octet-string[6]	0000280001FF			R					
2	object_list		object_list_type				R					
3	associated_partners_id		associated_partners_type		Management logical device (1) – public client (16)		R					
4	application_context_name		application_context_name				R					
5	xDLMS_context_info		xDLMS_context_type				R					
6	authentication_mechanism_name		mechanism_name				R					
7	LLS_secret		octet-string[16]									
8	association_status		enum				R					
	Association LN for Reading Client	15		0-0:40.0.2.255	Reading Client Association							
1	logical_name		octet-string[6]	0000280002FF				R	R			
2	object_list		object_list_type					R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
3	associated_partners_id		associated_partners_type		Management logical device (1) – Reading client (2)			R	R			
4	application_context_name		application_context_name					R	R			
5	xDLMS_context_info		xDLMS_context_type					R	R			
6	authentication_mechanism_name		mechanism_name					R	RW			
7	LLS_secret		octet-string[16]						W			
8	association_status		enum					R	R			
	Association LN for Management Client	15		0-0:40.0.3.255	Management Client Association							
1	logical_name		octet-string[6]	0000280003FF					R			
2	object_list		object_list_type						R			
3	associated_partners_id		associated_partners_type		Management logical device (1) – Management client (1)				R			
4	application_context_name		application_context_name						R			
5	xDLMS_context_info		xDLMS_context_type						R			
6	authentication_mechanism_name		mechanism_name						RW			
7	LLS_secret		octet-string[16]						W			
8	association_status		enum						R			
	Association LN for FirmwareUpdate Client	15		0-0:40.0.4.255	FirmwareUpdate Client Association							
1	logical_name		octet-string[6]	0000280004FF							R	
2	object_list		object_list_type								R	
3	associated_partners_id		associated_partners_type		Management logical device (1) – FirmwareUpdate client (3)						R	
4	application_context_name		application_context_name								R	
5	xDLMS_context_info		xDLMS_context_type								R	
6	authentication_mechanism_name		mechanism_name								RW	
7	LLS_secret		octet-string[16]								W	
8	association_status		enum								R	
	Association LN for Test Client	15		0-0:40.0.5.255	Test Client Association							
1	logical_name		octet-string[6]	0000280005FF					R			R
2	object_list		object_list_type						R			R
3	associated_partners_id		associated_partners_type		Management logical device (1) – Test client (4)				R			R
4	application_context_name		application_context_name						R			R
5	xDLMS_context_info		xDLMS_context_type						R			R
6	authentication_mechanism_name		mechanism_name						RW			R
7	LLS_secret		octet-string[16]						W			
8	association_status		enum						R			R
	COSEM logical device name	1		0-0:42.0.0.255								

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
1	logical_name		octet-string[6]	00002A0000FF			R	R	R		R	R
2	value		octet-string[13]		unique identification of the logical device	Handled by the manufacture	R	R	R		R	R

1.2. Security related objects

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Security Setup for Reading Client	64		0-0:43.0.2.255								
1	logical_name		octet-string[6]	00002B0002FF				R	R			
2	security_policy		enum		(0) nothing, (1) all messages to be authenticated, (2) all messages to be encrypted, (3) all messages to be authenticated and encrypted		R	R	R			
3	security_suite		enum		(0) AES-GCM-128 for authenticated encryption and AES-128 for key wrapping			R	R			
4	client_system_title		octet-string					R	R			
5	server_system_title		octet-string					R	R			
1	security_activate (data)		method						A			
2	global_key_transfer (data)		method						A			
	Security Setup for Management Client	64		0-0:43.0.3.255								
1	logical_name		octet-string[6]	00002B0003FF				R	R			
2	security_policy		enum		(0) nothing, (1) all messages to be authenticated, (2) all messages to be encrypted, (3) all messages to be authenticated and encrypted		R	R	R			
3	security_suite		enum		(0) AES-GCM-128 for authenticated encryption and AES-128 for key wrapping			R	R			
4	client_system_title		octet-string					R	R			
5	server_system_title		octet-string					R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
1	security_activate (data)		method						A			
2	global_key_transfer (data)		method						A			
	Security Setup for FirmwareUpdate Client	64		0-0:43.0.4.255								
1	logical_name		octet-string[6]	00002B0004FF							R	
2	security_policy		enum		(0) nothing, (1) all messages to be authenticated, (2) all messages to be encrypted, (3) all messages to be authenticated and encrypted		R				R	
3	security_suite		enum		(0) AES-GCM-128 for authenticated encryption and AES-128 for key wrapping						R	
4	client_system_title		octet-string								R	
5	server_system_title		octet-string								R	
1	security_activate (data)		method								A	
2	global_key_transfer (data)		method								A	
	Security Setup for Test Client	64		0-0:43.0.5.255								
1	logical_name		octet-string[6]	00002B0005FF					R			R
2	security_policy		enum		(0) nothing, (1) all messages to be authenticated, (2) all messages to be encrypted, (3) all messages to be authenticated and encrypted		R		R			R
3	security_suite		enum		(0) AES-GCM-128 for authenticated encryption and AES-128 for key wrapping				R			R
4	client_system_title		octet-string						R			R
5	server_system_title		octet-string						R			R
1	security_activate (data)		method						A			
2	global_key_transfer (data)		method						A			
	Invocation Counter for Reading Client	1		0-x:43.1.2.255								
1	logical_name		octet-string[6]	00xx2B0102FF	x = 1 - global unicast		R	R	R			
2	value		double-long-unsigned				R	R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Invocation Counter for Management Client	1		0-x:43.1.3.255								
1	logical_name		octet-string[6]	00xx2B0103FF	x = 1 - global unicast		R		R			
2	value		double-long-unsigned				R		R			
	Invocation Counter for FirmwareUpdate Client	1		0-x:43.1.4.255								
1	logical_name		octet-string[6]	00xx2B0104FF	x = 1 - global unicast x = 2 - global broadcast		R				R	
2	value		double-long-unsigned				R				R	
	Invocation Counter for Test Client	1		0-x:43.1.5.255								
1	logical_name		octet-string[6]	00xx2B0105FF	x = 1 - global unicast		R		R			R
2	value		double-long-unsigned				R		R			R
	Security Events Counter	1		0-0:96.50.xx.255								
1	logical_name		octet-string[6]	00006032xxFF	x = 32 (0x20) – current counter for correct security operation x = 33 (0x21) – last counter for correct security operation x = 34 (0x22) – current counter for failed security operation x = 35 (0x23) – last counter for failed security operation			R	R			
2	value		long-unsigned					R	R			
	Security Events Interval	3		0-0:96.50.31.255								
1	logical_name		octet-string[6]	000060321FFF				R	R			
2	value		double-long-unsigned			0, 60, 300, 600, 900, 1200, 1800, 3600, 86400 (0 – infinite)		R	RW			
3	scaler_unit		scal_unit_type	{0,7}	scaler=0, unit=seconds			R	R			
	Event Object – Correct Security operation Event Log	1		0-0:96.11.11.255								
1	logical_name		octet-string[6]	0000600B0BFF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	Correct Security operation Event Log	7		0-0:99.98.11.255								
1	logical_name		octet-string[6]	000063620BFF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1,0-0:96.11.11.255,2,0}; {1,0-0:96.50.27.255,2,0}; {1,0-0:96.50.28.255,2,0};	clock; event code; clientID; interfaceID			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	none	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E "Compact action" method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E "Compact action" method -2		A	A			
	Correct Security Operation Event Log Filter	1		0-0:94.11.11.255	Correct security operation event log filter containing log activation and event notification activation							
1	logical_name		octet-string[6]	00005E0B0BFF				R	R			
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] = Default value : 0 for all bits (no event will be sent as notification event)	Array[0] = Mask filter for log of the event bit=0 NOT log bit=1 log Array [1] = Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log Example array[1] Bit36=1 the event with value 36 will be sent as notification event		R	RW			
	Event Object – Failed Security operation Event Log	1		0-0:96.11.12.255								
1	logical_name		octet-string[6]	0000600B0CFF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	Failed Security operation Event Log	7		0-0:99.98.12.255								
1	logical_name		octet-string[6]	000063620CFF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1,0-0:96.11.12.255,2,0}; {1,0-0:96.50.27.255,2,0}; {1,0-0:96.50.28.255,2,0};	clock; event code; clientID; interfaceID			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	none	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E "Compact action" method -1		A	A			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E "Compact action" method -2		A	A			
	Failed Security operation Event Log Filter	1		0-0:94.11.12.255	Failed security operation event log filter containing log activation and event notification activation							
1	logical_name		octet-string[6]	00005E0B0CFF				R	R			
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] = Default value : 0 for all bits (no event will be sent as notification event)	Array[0] = Mask filter for log of the event bit =0 NOT log bit=1 log Array [1] = Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log Example array[1] Bit36=1 the event with value 36 will be sent as notification event		R	RW			
	Configuration unsuccessful logging attempts for reading client	1		0-0:129.1.2.0								
1	logical_name		octet-string[6]	000081010200				R	R			
2	value		unsuccessful_logging_attempts_structure			See Appendix A "Configuration unsuccessful logging attempts"		R	RW			
	Configuration unsuccessful logging attempts for management client	1		0-0:129.1.3.0								
1	logical_name		octet-string[6]	000081010300					R			
2	value		unsuccessful_logging_attempts_structure			See Appendix A "Configuration unsuccessful logging attempts"			RW			
	Configuration unsuccessful logging attempts for firmware update client	1		0-0:129.1.4.0								
1	logical_name		octet-string[6]	000081010400							R	
2	value		unsuccessful_logging_attempts_structure			See Appendix A "Configuration unsuccessful logging attempts"					RW	
	Configuration unsuccessful logging attempts for test client	1		0-0:129.1.5.0								
1	logical_name		octet-string[6]	000081010500					R			
2	value		unsuccessful_logging_attempts_structure			See Appendix A "Configuration unsuccessful logging attempts"			RW			

1.3. Identification Numbers

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Device ID 1	1		0-0:96.1.0.255								
1	logical_name		octet-string[6]	0000600100FF			R	R	R		R	R

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
2	value		octet-string[16]		Meter serial number assigned by the manufacturer		R	R	R		R	R
	Device ID 2	1		0-0:96.1.1.255								
1	logical_name		octet-string[6]	0000600101FF				R	R			
2	value		octet-string[48]					R	RW			
	Device ID 3	1		0-0:96.1.2.255								
1	logical_name		octet-string[6]	0000600102FF				R	R			
2	value		octet-string[48]		Meter Type assigned by the manufacturer			R	R			
	Device ID 4	1		0-0:96.1.3.255								
1	logical_name		octet-string[6]	0000600103FF				R	R			
2	value		octet-string[48]					R	RW			
	Device ID 5	1		0-0:96.1.4.255								
1	logical_name		octet-string[6]	0000600104FF				R	R			
2	value		octet-string[48]					R	RW			
	Device ID 6	1		0-0:96.1.5.255								
1	logical_name		octet-string[6]	0000600105FF				R	R			
2	value		octet-string[24]					R	RW			
	Device ID 7	1		0-0:96.1.6.255								
1	logical_name		octet-string[6]	0000600106FF				R	R		R	
2	value		octet-string[5]		Former firmware version			R	R		R	
	Device ID 10	1		0-0:96.1.9.255								
1	logical_name		octet-string[6]	0000600109FF				R	R			
2	value		octet-string[32]		Device type			R	R			
	Bar code	1		0-0:0.0.0.255								
1	logical_name		octet-string[6]	0000000000FF			R	R	R		R	R
2	value		octet-string[20]				R	R	R		R	R

1.4. Clock

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Clock	8		0-0:1.0.0.255								
1	logical_name		octet-string[6]	0000010000FF				R	R			
2	time		octet-string[12]		current local date and time according to technical specifications			R	RW			R
3	time_zone		long					R	RW			
4	status		unsigned					R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
5	daylights_savings_begin		octet-string[12]		last Sunday in March at 02:00			R	RW			
6	daylights_savings_end		octet-string[12]		last Sunday in October at 03:00			R	RW			
7	daylights_savings_deviation		integer	60				R	RW			
8	daylights_savings_enabled		boolean					R	RW			
9	clock_base		enum	1	Internal crystal			R	R			
	Clock Synchronization	1		0-0:96.2.12.255								
1	logical_name		octet-string[6]	000060020CFF				R	R			
2	value		octet-string[12]		Date-time format			R	R			
	Clock Time Shift Event Limit	3		1-0:0.9.11.255								
1	logical_name		octet-string[6]	010000090BFF				R	R			
2	value		unsigned	30	Maximum allowed time shift without registration of a time shift event			R	RW			
3	scaler_unit		scal_unit_type	{0,7}	scaler=0, unit=seconds			R	R			
	Local Time	1		1-0:0.9.1.255								
1	logical_name		octet-string[6]	0100000901FF				R	R			
2	value		octet-string[4]			Time format (Blue Book ed.12 section 4.1.6)		R	R			R
	Local Date	1		1-0:0.9.2.255								
1	logical_name		octet-string[6]	0100000902FF				R	R			
2	value		octet-string[5]			Date format (Blue Book ed.12 section 4.1.6)		R	R			R

1.5. Activity Calendar and Special Days Table

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Activity Calendar	20		0-0:13.0.0.255	time of use for tariff control							
1	logical_name		octet-string[6]	00000D0000FF				R	R			
2	calendar_name_active		octet-string[8]					R	R			
3	season_profile_active		array[12]					R	R			
4	week_profile_table_active		array[12]		1 week profile per season			R	R			
5	day_profile_table_active		array[24]		Up to 24 days			R	R			
6	calendar_name_passive		octet-string[8]					R	RW			
7	season_profile_passive		array[12]					R	RW			
8	week_profile_table_passive		array[12]					R	RW			
9	day_profile_table_passive		array[24]		Up to 24 days			R	RW			
10	activate_passive_calendar_time		octet-string[12]		immediate activation can be done by setting the activation date to a previous or the current date			R	RW			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
1	activate_passive_calendar (data)		method			data ::= integer (0)			A			
	Special Days Table (active)	11		0-0:11.0.0.255								
1	logical_name		octet-string[6]	00000B0000FF				R	R			
2	entries		array[30]		special days	30 special days		R	R			
	Special Days Table (passive)	11		0-0:11.0.10.255								
1	logical_name		octet-string[6]	00000B000AFF		Activation of the passive tariff by activate_passive_calendar_time in activity calendar		R	R			
2	entries		array[30]		special days	30 special days		R	RW			
	Active Demand Control Threshold	3		0-0:94.11.xx.255								
1	logical_name		octet-string[6]	00005E0BxxFF	x=21..26. rates for Active Demand Import			R	R			
2	value		double-long-unsigned	0; >0	0=Function disabled			R	R			
3	scaler_unit		scal_unit_type	{0,27}	scaler=0, unit=W resolution: 000.000 kW			R	R			
	Passive Demand Control Threshold	3		0-0:94.11.xx.255								
1	logical_name		octet-string[6]	00005E0BxxFF	x=31..36. rates for Active Demand Import	Activation by activate_passive_calendar_time in activity calendar		R	R			
2	value		double-long-unsigned	0; >0	0=Function disabled			R	RW			
3	scaler_unit		scal_unit_type	{0,27}	scaler=0, unit=W resolution: 000.000 kW			R	R			
	Currently active tariff	1		0-0:96.14.0.255								
1	logical_name		octet-string[6]	0000600E00FF				R	R			
2	value		unsigned	1..6	Current active tariff number.			R	R			R
	ID active TOU	1		0-0:0.2.2.255								
1	logical_name		octet-string[6]	0000000202FF				R	R			
2	value		octet-string[8]		Active Calendar Name			R	R			R

1.6. Billing Periods and Profiles

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Active end of billing period 1	22		0-0:15.1.0.255		Single action scheduler for Stored Billing Values Profile						
1	logical_name		octet-string[6]	00000F0100FF				R	R			
2	executed_script		script	0-0:10.0.1.255	billing period reset	MDI reset / end of billing period		R	R			
3	type		enum	1	fixed time, wildcard in date			R	R			
4	execution_time		array		Time = "00000000"; Date = "FFFFFF01FF", at midnight of the first day of every month			R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Predefined Scripts - MDI reset / end of billing period	9		0-0:10.0.1.255								
1	logical_name		octet-string[6]	00000A0001FF				R	R			
2	scripts		array					R	R			
1	execute		method						A			
	Passive end of billing period 1	1		0-0:96.50.58.255	Date/time of passive end of billing period.							
1	logical_name		octet-string[6]	000060323AFF				R	R			
2	value		octet-string[12]			Date-Time format (Blue Book ed.12 section 4.1.6)		R	RW			
	AMR profile status for Billing period 1	1		0-0:96.10.4.255								
1	logical_name		octet-string[6]	0000600A04FF				R	R			
2	value		unsigned		{IV, CA, RES, VH , MP, INT, AL, RES}			R	R			
	Billing period 1	7		0-0:98.1.1.255	End of billing values	Stored Billing Values Profile						
1	logical_name		octet-string[6]	0000620101FF				R	R			
2	buffer		array					R	R			
3	capture_objects		array					R	RW			
4	capture_period		double-long-unsigned	0	triggered from single action scheduler with billing period 1			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	none	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	≥12	≥ 12 months			R	RW			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E "Compact action" method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E "Compact action" method -2		A	A			
	Time stamp of billing period 1 last reset	1		0-0:0.1.2.255	Date/time of the most recent billing period							
1	logical_name		octet-string[6]	0000000102FF				R	R			
2	value		octet-string[12]		Date/time format			R	R			
	Counter of billing period 1 reset	1		0-0:0.1.0.255								
1	logical_name		octet-string[6]	0000000100FF				R	R			
2	value		long-unsigned					R	R			

1.7. Long Power Failures (Counters, Thresholds)

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Time threshold for long power failure	3		0-0:96.7.20.255								
1	logical_name		octet-string[6]	0000600714FF				R	R			
2	value		long-unsigned	180	long power failures = more than 3 minutes			R	RW			
3	scaler_unit		scal_unit_type	{0,7}	scale=0, unit=seconds			R	R			
	Threshold for long power failure	3		0-0:94.11.60.255								
1	logical_name		octet-string[6]	00005E0B3CFF				R	R			
2	value		long-unsigned	xxxx	xx,xx % of Vref (defined in Reference Voltage for power quality measurement).			R	RW			
3	scaler_unit		scal_unit_type	{-2,56}	scaler=-2, unit=%	unit = nominal voltage percent (Reference voltage for PQ)		R	R			
	Duration of long power failures	3		0-0:96.7.xx.255								
1	logical_name		octet-string[6]	00006007xxFF	x=15 in all phases x=16 in phase L1 (Only polyphase meters) x=17 in phase L2 (Only polyphase meters) x=18 in phase L3 (Only polyphase meters)			R	R			
2	value		double-long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,7}	scale=0, unit=seconds			R	R			
	Number of long power failures	1		0-0:96.7.x.255								
1	logical_name		octet-string[6]	00006007xxFF	x=5 in all phases x=6 in all phase L1 (Only polyphase meters) x=7 in all phase L2 (Only polyphase meters) x=8 in all phase L3 (Only polyphase meters)			R	R			
2	value		long-unsigned					R	R			

1.8. Error and alarm handling (error register, alarm register, states)

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Error Object	3		0-0:97.97.0.255	error register							
1	logical_name		octet-string[6]	0000616100FF				R	R			
2	value		double-long-unsigned		error code			R	R			
3	scaler_unit		scal_unit_type	{0, 255}				R	R			
1	reset		method (data)			data – error mask for reset			A			
	Alarm Object	3		0-0:97.98.0.255	alarm register							
1	logical_name		octet-string[6]	0000616200FF				R	R			
2	value		double-long-unsigned		alarm code			R	R			
3	scaler_unit		scal_unit_type	{0, 255}				R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
1	reset		method (data)			data – alarm mask for reset			A			
	Alarm Filter	1		0-0:97.98.10.255								
1	logical_name		octet-string[6]	000061620AFF				R	R			
2	value		double-long-unsigned		This filter defines, if an event is handled as an alarm when it appears bit mask with the same structure as the current value of the alarm object			R	RW			
	States 1	1		0-0:96.10.20.255								
1	logical_name		octet-string[6]	0000600A14FF				R	R			
2	value		double-long-unsigned					R	R			
	States 2	1		0-0:96.10.21.255								
1	logical_name		octet-string[6]	0000600A15FF				R	R			
2	value		double-long-unsigned					R	R			

1.9. Event handling (events and logs)

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Event Object - Standard Event Log	1		0-0:96.11.0.255								
1	logical_name		octet-string[6]	0000600B00FF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	Standard Event Log	7		0-0:99.98.0.255								
1	logical_name		octet-string[6]	0000636200FF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1, 0-0:96.11.0.255,2,0};	clock; event code;			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	none	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E “Compact action” method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E “Compact action” method -2		A	A			
	Standard Event Log Filter	1		0-0:94.73.0.255	Standard event log filter containing log activation and Event Notification activation							
1	logical_name		octet-string[6]	00005E4900FF				R	R			
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] = Default value : 0 for all bits (no event will be sent as notification event)	Array[0] = Mask filter for log of the event bit =0 NOT log bit=1 log Array [1] = Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log Example array[1] Bit36=1 the event with value 36 will be sent as notification event		R	RW			
	Event Object - Fraud Detection Event Log	1		0-0:96.11.1.255								
1	logical_name		octet-string[6]	0000600B01FF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	Fraud Detection Event Log	7		0-0:99.98.1.255								
1	logical_name		octet-string[6]	0000636201FF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1,0-0.96.11.1.255,2,0};	clock; event code;			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	none	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E “Compact action” method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E “Compact action” method -2		A	A			
	Fraud Detection Event Log Filter	1		0-0:94.73.1.255	Fraud detection events filter containing log activation and Event Notification activation							
1	logical_name		octet-string[6]	00005E4901FF				R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] = Default value : 0 for all bits (no event will be sent as notification event)	Array[0] = Mask filter for log of the event bit =0 NOT log bit=1 log Array [1] = Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log Example array[1] Bit36=1 the event with value 36 will be sent as notification event		R	RW			
	Event Object – Cover Opening Event Log	1		0-0:96.11.14.255								
1	logical_name		octet-string[6]	0000600B0EFF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	Cover Opening Event Log	7		0-0:99.98.14.255								
1	logical_name		octet-string[6]	000063620EFF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1,0-0.96.11.14.255,2,0};	clock; event code;			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	none	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E “Compact action” method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E “Compact action” method -2		A	A			
	Cover Opening Event Log Filter	1		0-0:94.73.14.255	Cover opening events filter containing log activation and Event Notification activation							
1	logical_name		octet-string[6]	00005E490EFF				R	R			
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] = Default value : 0 for all bits (no event will be sent as notification event)	Array[0] = Mask filter for log of the event bit =0 NOT log bit=1 log Array [1] = Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log Example array[1] Bit36=1 the event with value 36 will be sent as notification event		R	RW			
	Event Object - Power down/up Event Log	1		0-0:96.11.6.255								

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
1	logical_name		octet-string[6]	0000600B06FF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	Power down/up Event Log	7		0-0:99.98.6.255								
1	logical_name		octet-string[6]	0000636206FF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1,0-0:96.11.6.255,2,0};	clock; event code;			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	None	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E "Compact action" method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E "Compact action" method -2		A	A			
	Power down/up Event Log Filter	1		0-0:94.73.6.255	Power down/up event log filter containing log activation and Event Notification activation							
1	logical_name		octet-string[6]	00005E4906FF				R	R			
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] = Default value : 0 for all bits (no event will be sent as notification event)	Array[0] = Mask filter for log of the event bit =0 NOT log bit=1 log Array [1] = Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log Example array[1] Bit36=1 the event with value 36 will be sent as notification event		R	RW			
	Event Object - Power Quality Non-Finished Log	1		0-0:96.11.5.255								
1	logical_name		octet-string[6]	0000600B05FF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	Power Quality Non-finished Event Log	7		0-0:99.98.5.255								
1	logical_name		octet-string[6]	0000636205FF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1,0-0:96.11.5.255,2,0};	clock; event code;			R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	none	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E "Compact action" method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E "Compact action" method -2		A	A			
	Power Quality Non-finished Event Log Filter	1		0-0:94.73.5.255	Non Finished Quality event log filter containing log activation and Event Notification activation							
1	logical_name		octet-string[6]	00005E4905FF				R	R			
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] = Default value : 0 for all bits (no event will be sent as notification event)	Array[0] = Mask filter for log of the event bit =0 NOT log bit=1 log Array [1] = Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log Example array[1] Bit36=1 the event with value 36 will be sent as notification event		R	RW			
	Time trigger for voltage sags, for voltage swell or long power failure	1		0-0:94.11.80.255								
1	logical_name		octet-string[6]	00005E0B50FF				R	R			
2	value		octet-string[12]		Date time format			R	R			
	Event Object – Finished Power Quality Log	1		0-0:96.11.9.255								
1	logical_name		octet-string[6]	0000600B09FF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	Finished Power Quality Event Log	7		0-0:99.98.9.255								
1	logical_name		octet-string[6]	0000636209FF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1,0-0:96.11.9.255,2,0}; {1,0-0:94.11.80.255,2,0};	clock; Event code ; <Timestamp begin of event PQ log contains errors and alarms concerning mains parameters (under/over-voltages and long power failures)>;			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	none	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E "Compact action" method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E "Compact action" method -2		A	A			
	Power Quality finished Event Log Filter	1		0-0:94.73.9.255	Finished Quality event log filter containing log activation and Event Notification activation							
1	logical_name		octet-string[6]	00005E4909FF				R	R			
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] = Default value : 0 for all bits (no event will be sent as notification event)	Array[0] = Mask filter for log of the event bit =0 NOT log bit=1 log Array [1] = Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log Example array[1] Bit36=1 the event with value 36 will be sent as notification event		R	RW			
	Event Object – PLC Communication Event Log	1		0-0:96.11.7.255								
1	logical_name		octet-string[6]	0000600B07FF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	PLC Communication Event Log	7		0-0:99.98.7.255								
1	logical_name		octet-string[6]	0000636207FF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1,0-0:96.11.7.255,2,0};	Clock; Event code;			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	None	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E "Compact action" method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E "Compact action" method -2		A	A			
	PLC Communication Event Log Filter	1		0-0:94.73.7.255	PLC Communication event log filter containing log activation and Event Notification activation							
1	logical_name		octet-string[6]	00005E4907FF				R	R			
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] = Default value : 0 for all bits (no event will be sent as notification event)	Array[0] = Mask filter for log of the event bit =0 NOT log bit=1 log Array [1] = Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log Example array[1] Bit36=1 the event with value 36 will be sent as notification event		R	RW			
	Event Object - Optical Communication Event Log	1		0-0:96.11.3.255								
1	logical_name		octet-string[6]	0000600B03FF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	Optical Communication Event Log	7		0-0:99.98.3.255								
1	logical_name		octet-string[6]	0000636203FF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1,0-0:96.11.3.255,2,0};	Clock; Event code;			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	None	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E "Compact action" method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E "Compact action" method -2		A	A			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Optical Communication Event Log Filter	1		0-0:94.73.3.255	Optical Communication event log filter containing log activation and Event Notification activation							
1	logical_name		octet-string[6]	00005E4903FF				R	R			
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] = Default value : 0 for all bits (no event will be sent as notification event)	Array[0] = Mask filter for log of the event bit =0 NOT log bit=1 log Array [1] = Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log Example array[1] Bit36=1 the event with value 36 will be sent as notification event		R	RW			
	Event Object – Firmware Event Log	1		0-0:96.11.4.255								
1	logical_name		octet-string[6]	0000600B04FF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	Firmware Event Log	7		0-0:99.98.4.255								
1	logical_name		octet-string[6]	0000636204FF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1,0-0:96.11.4.255,2,0}; {1,1-0:0.2.0.255,2,0}; {1,0-0:96.1.6.255,2,0};	clock; event code; firmware version; former firmware version;			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	none	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E “Compact action” method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E “Compact action” method -2		A	A			
	Firmware Event Log Filter	1		0-0:94.73.4.255	Firmware event log filter containing log activation and Event Notification activation							
1	logical_name		octet-string[6]	00005E4904FF				R	R			
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] =	Array[0] = Mask filter for log of the event bit =0 NOT log bit=1 log Array [1] =	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log		R	RW			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
				Default value : 0 for all bits (no event will be sent as notification event)	Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[1] Bit36=1 the event with value 36 will be sent as notification event						
	Event Object – Synchronization Event Log	1		0-0:96.11.8.255								
1	logical_name		octet-string[6]	0000600B08FF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	Synchronization Event Log	7		0-0:99.98.8.255								
1	logical_name		octet-string[6]	0000636208FF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1,0-0:96.11.8.255,2,0}; {1, 0-0:96.2.12.255,2,0};	clock; event code; former clock (from clock synchronization object);			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	None	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E “Compact action” method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E “Compact action” method -2		A	A			
	Synchronization Event Log Filter	1		0-0:94.73.8.255	Synchronization event log filter containing log activation and Event Notification activation							
1	logical_name		octet-string[6]	00005E4908FF				R	R			
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] = Default value : 0 for all bits (no event will be sent as notification event)	Array[0] = Mask filter for log of the event bit =0 NOT log bit=1 log Array [1] = Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log Example array[1] Bit36=1 the event with value 36 will be sent as notification event		R	RW			
	Event Object – Battery Event Log	1		0-0:96.11.13.255								
1	logical_name		octet-string[6]	0000600B0DFF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Battery Event Log	7		0-0:99.98.13.255								
1	logical_name		octet-string[6]	000063620DFF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2,0}; {1,0-0:96.11.13.255,2,0}; {3,0-0:96.6.3.255,2,0};	clock; event code; battery voltage level;			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	none	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E "Compact action" method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E "Compact action" method -2		A	A			
	Battery Event Log Filter	1		0-0:94.73.13.255	Battery event log filter containing log activation and Event Notification activation							
1	logical_name		octet-string[6]	00005E490DFF				R	R			
2	value		Array [2] of Bit-string[256]	Array[0] = Default values: 1 for all bits (all events will be log into the buffer) Array[1] = Default value : 0 for all bits (no event will be sent as notification event)	Array[0] = Mask filter for log of the event bit =0 NOT log bit=1 log Array [1] = Mask filter of events for being asynchronously sent from the server to the client bit=0 not sent bit=1 sent	Example array[0]: If Bit0=0 => Event with value 0 is not log into the buffer. Bit18=1 Event with value 18 will be log Example array[1] Bit36=1 the event with value 36 will be sent as notification event		R	RW			

1.10. Disconnect control and log

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Disconnect control	70		0-0:96.3.10.255	Controls the connection and disconnection of the premises of the consumer							
1	logical_name		octet-string[6]	000060030AFF				R	R			
2	output_state		boolean					R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
3	control_state		Enum	0;1;2	(0): Disconnected (1): Connected (2):Ready for Re-connection (Manually)			R	R			
4	control_mode		Enum					R	RW			
-1	disconnection reason		double-long-unsigned					R	R			
-2	timeout		unsigned		Timeout for switch on, min			R	RW			
1	remote_disconnect		method						A			
2	remote_connect		method						A			
	Disconnect Script Table	9		0-0:10.0.106.255								
1	logical_name		octet-string[6]	00000A006AFF				R	R			
2	scripts		array					R	R			
1	execute		method						A			
	Event Object - Disconnect Control log	1		0-0:96.11.2.255								
1	logical_name		octet-string[6]	0000600B02FF				R	R			
2	value		unsigned		event number (0 to 255)			R	R			
	Disconnect Control log	7		0-0:99.98.2.255								
1	logical_name		octet-string[6]	0000636202FF				R	R			
2	buffer		array					R	R			
3	capture_objects		array	{8,0-0:1.0.0.255, 2, 0}; {1,0-0:96.11.2.255, 2, 0}; {70,0-0:96.3.10.255,3,0}; {70,0-0:96.3.10.255,-1,0};	clock; control event code; current disconnect control status; disconnection reason;			R	R			
4	capture_period		double-long-unsigned	0	asynchronously			R	R			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	None	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	200				R	R			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E “Compact action” method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E “Compact action” method -2		A	A			
	Disconnect Control log Filter	1		0-0:94.73.2.255	Disconnect Control log filter containing log activation and Notification event activation							
1	logical_name		octet-string[6]	00005E4902FF				R	R			

1.12. Display related objects

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Customer Display Configuration	1		0-0:128.0.1.1								
1	logical_name		octet-string[6]	000080000101				R	R			
2	value		structure			See Appendix A "Display configuration"		R	RW			
1	Test		method						A			A
	Service Display Configuration	1		0-0:128.0.3.1								
1	logical_name		octet-string[6]	000080000301				R	R			
2	value		structure			See Appendix A "Display configuration"		R	RW			
	Display Archive Data Configuration	1		0-0:128.15.3.255								
1	logical_name		octet-string[6]	0000800F03FF				R	R			
2	value		structure			See Appendix A "Display configuration"		R	RW			
	Test Screen Object	1		0-0:128.1.5.255		For displaying all symbols on the LCD						
1	logical_name		octet-string[6]	0000800105FF								
2	value											
	Display Backlight Configuration	1		0-0:128.0.4.1								
1	logical_name		octet-string[6]	000080000401				R	R			
2	value		structure			See Appendix A "Display configuration"		R	RW			

1.13. Limiter objects

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Limiter object	71		0-0:17.0.x.255								
1	logical_name		octet-string[6]	00001100xxFF	x = 0 (for active power) x = 1 (for active power demand) x = 20 (for current Ia) x = 21 (for current Ib) – only polyphaser meter x = 22 (for current Ic) – only polyphaser meter x = 43 (for Idif)x = 71 (for average voltage phase L1) x = 72 (for average voltage phase L2) – only polyphaser meter x = 73 (for average voltage phase L3) – only polyphaser meter			R	R			
2	monitored_value		structure			See Appendix B "Actions for limiters"		R	R			
3	threshold_active							R	R			
4	threshold_normal					Read only for x=1		R	RW			
5	threshold_emergency							R	R			
6	min_over_threshold_duration		double-long-unsigned					R	RW			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
7	min_under_threshold_duration		double-long-unsigned					R	RW			
8	emergency_profile		structure					R	R			
9	emergency_profile_group_id_list		array					R	R			
10	emergency_profile_active		boolean					R	R			
11	actions		structure			See Appendix B “Actions for limiters”		R	RW			

1.14. Other abstract objects

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Active firmware version	1		1-0:0.2.0.255								
1	logical_name		octet-string[6]	0100000200FF			R	R	R		R	
2	Value		octet-string[5]			Version identifier of the currently active firmware in the E-meter	R	R	R		R	R
	Legally relevant part signature	1		1-0:0.2.8.255								
1	logical_name		octet-string[6]	0100000208FF			R	R	R		R	
2	Value		octet-string[8]				R	R	R		R	R
	Non legally relevant part signature	1		1-1:0.2.8.255								
1	logical_name		octet-string[6]	0101000208FF			R	R	R		R	
2	Value		octet-string[8]				R	R	R		R	R
	Message Code	1		0-0:96.13.1.255								
1	logical_name		octet-string[6]	0000600D01FF				R	R			
2	Value		octet-string[8]					R	RW			
	Message Text	1		0-0:96.13.0.255								
1	logical_name		octet-string[6]	0000600D00FF				R	R			
2	Value		octet-string[32]					R	RW			
	Temperature	3		0-0:96.9.0.255								
1	logical_name		octet-string[6]	0000600900FF				R	R			
2	Value		integer					R	R			
3	scaler_unit		scal_unit_type	{0,9}	scale=0, unit=°C			R	R			
	Timeout open session for reading client	3		0-0:94.73.51.255								
1	logical_name		octet-string[6]	00005E4933FF				R	R			
2	value		double-long-unsigned	180 by default				R	RW			
3	scaler_unit		scal_unit_type	{0,7}	scale=0, unit=seconds			R	R			
	Timeout open session for Management client	3		0-0:94.73.52.255								
1	logical_name		octet-string[6]	00005E4934FF				R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
2	value		double-long-unsigned	180 by default				R	RW			
3	scaler_unit		scal_unit_type	{0,7}	scale=0, unit=seconds			R	R			
	Timeout open session for Firmware update client	3		0-0:94.73.53.255								
1	logical_name		octet-string[6]	00005E4935FF				R	R			
2	value		double-long-unsigned	7200 by default				R	RW			
3	scaler_unit		scal_unit_type	{0,7}	scale=0, unit=seconds			R	R			
	Timeout open session for Test client	3		0-0:94.73.54.255								
1	logical_name		octet-string[6]	00005E4936FF				R	R			
2	value		double-long-unsigned	180 by default				R	RW			
3	scaler_unit		scal_unit_type	{0,7}	scale=0, unit=seconds			R	R			
	Client ID	1		0-0:96.50.27.255		for security event log						
1	logical_name		octet-string[6]	000060321BFF				R	R		R	
2	value		unsigned			Client ID for security event log: 1 – Management Client; 2 – Reading Client; 3 – FirmwareUpdate Client; 4 – Test Client;		R	R		R	R
	Interface ID	1		0-0:96.50.28.255		for security event log						
1	logical_name		octet-string[6]	000060321CFF				R	R		R	
2	value		enum			Interface ID for security event log: 0 – optical interface; 1 – PLC interface; 255 – not available		R	R		R	
	Reading client access via interfaces	1		0-0:96.50.22.255								
1	logical_name		octet-string[6]	0000603216FF				R	R			
2	mask_value		long-unsigned	0x0003	(OPTO + PLC)	0x0001 – OPTO interface 0x0002 – PLC interface		R	RW			
	Management client access via interfaces	1		0-0:96.50.23.255								
1	logical_name		octet-string[6]	0000603217FF					R			
2	mask_value		long-unsigned	0x0003	(OPTO + PLC)	0x0001 – OPTO interface 0x0002 – PLC interface Note: there must be at least one interface			RW			
	FW Update client access via interfaces	1		0-0:96.50.24.255								
1	logical_name		octet-string[6]	0000603218FF							R	
2	mask_value		long-unsigned	0x0003	(OPTO + PLC)	0x0001 – OPTO interface 0x0002 – PLC interface Note: there must be at least one interface					RW	
	Test client access via interfaces	1		0-0:96.50.25.255								

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
1	logical_name		octet-string[6]	0000603219FF					R			
2	mask_value		long-unsigned	0x0001	(OPTO)	0x0001 – OPTO interface			RW			
	Parameterization ID	1		0-0:0.2.1.255								
1	logical_name		octet-string[6]	0000000201FF				R	R			
2	value		long-unsigned			CRC16 for configuration objects		R	R			
	Counter parameterization	1		0-0:96.2.0.255								
1	logical_name		octet-string[6]	0000600200FF				R	R			
2	value		double-long-unsigned					R	R			
	Parameterization Change Timestamp	1		0-0:96.2.1.255								
1	logical_name		octet-string[6]	0000600201FF				R	R			
2	value		octet-string[12]			Timestamp of last configuration		R	R			
	Test mode	1		0-0:96.60.71.255								
1	logical_name		octet-string[6]	0000603C47FF				R	R			
2	value		Structure_test_mode			Structure_test_mode { Mode: bool (true(ON) / false(OFF)) Timeout: double-long-unsigned (s) } When TestMode is enabled (ON), the meter constant is 10000 imp/kWh (or imp/kvarh) and the energy is displayed in the format #####.### (kWh/kvarh/kVAh). After the timeout expires (or at start the meter), TestMode is disabled (OFF): the meter constant is 1000 imp/kWh (imp/kvarh) and the energy is displayed in the format specified by the configuration (Customer Display Configuration object).		R	RW			RW
	Output LED	1		0-0:96.3.2.255								
1	logical_name		octet-string[6]	0000600302FF				R	R			
2	value		unsigned		0 = LED indicating Active Energy: OFF with no load and ON (blinking) with load 1 = LED indicating Reactive Energy OFF with no load and ON (blinking) with load 2 = LED indicating Active Energy: ON with no load and ON (blinking) with load 3 = LED indicating Reactive Energy: ON with no load and ON (blinking) with load			R	RW			
	Battery voltage	3		0-0:96.6.3.255								
1	logical_name		octet-string[6]	0000600603FF				R	R			
2	value		long-unsigned					R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
3	scaler_unit		scal_unit_type	{-3,35}	scale=-3, unit=voltage			R	R			
	Nominal Voltage	3		1-0:0.6.0.255								
1	logical_name		octet-string[6]	0100000600FF				R	R			
2	value		long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,35}	scale=0, unit=voltage			R	R			
	Nominal Current	3		1-0:0.6.1.255								
1	logical_name		octet-string[6]	0100000601FF				R	R			
2	value		unsigned					R	R			
3	scaler_unit		scal_unit_type	{-1,33}	scale=-1, unit=A			R	R			
	Maximum Current	3		1-0:0.6.3.255								
1	logical_name		octet-string[6]	0100000603FF				R	R			
2	value		unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,33}	scale=0, unit=A			R	R			
	Nominal Frequency	3		1-0:0.6.2.255								
1	logical_name		octet-string[6]	0100000602FF				R	R			
2	value		long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{-2,44}	scale=-2, unit=Hz			R	R			
	Constant For Active Energy	1		1-0:0.3.3.255								
1	logical_name		octet-string[6]	0100000303FF				R	R			
2	value		long-unsigned					R	R			
	Constant For Reactive Energy	1		1-0:0.3.4.255								
1	logical_name		octet-string[6]	0100000304FF				R	R			
2	value		long-unsigned					R	R			
	Manufacture Date	1		0-0:96.53.19.255								
1	logical_name		octet-string[6]	0000603513FF				R	R			
2	value		octet-string[12]					R	R			
	Date of last calibration	1		0-0:96.2.5.255								
1	logical_name		octet-string[6]	0000600205FF				R	R			
2	value		octet-string[12]					R	R			
	Transformer Ratio Voltage Numerator	1		1-0:0.4.3.255								
1	logical_name		octet-string[6]	0100000403FF				R	R			
2	value		long-unsigned					R	R			
	Transformer Ratio Voltage Denominator	1		1-0:0.4.6.255								
1	logical_name		octet-string[6]	0100000406FF				R	R			
2	value		long-unsigned					R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Transformer Ratio Current Numerator	1		1-0:0.4.2.255								
1	logical_name		octet-string[6]	0100000402FF				R	R			
2	value		long-unsigned					R	R			
	Transformer Ratio Current Denominator	1		1-0:0.4.5.255								
1	logical_name		octet-string[6]	0100000405FF				R	R			
2	value		long-unsigned					R	R			

2. Electricity related objects

2.1. Energy registers

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Active energy (A)	3		1-0:15.8.x.255	A = (A+) + (A-)							
1	logical_name		octet-string[6]	01000F08xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			R
3	scaler_unit		scal_unit_type	{0,30}	scaler=0, unit=Wh resolution: 000.000 kWh			R	R			R
	Active energy import (+A)	3		1-0:1.8.x.255								
1	logical_name		octet-string[6]	01000108xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			R
3	scaler_unit		scal_unit_type	{0,30}	scaler=0, unit=Wh resolution: 000.000 kWh			R	R			R
	Active energy import (+A) for phases L1,L2,L3	3		1-0:xx.8.0.255								
1	logical_name		octet-string[6]	0100xx0800FF	x=21 for L1 x=41 for L2 (Only polyphase meters) x=61 for L3 (Only polyphase meters)			R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,30}	scaler=0, unit=Wh resolution: 000.000 kWh			R	R			
	Active energy import (+A) incremental for LoadProfile1	3		1-0:1.29.0.255								
1	logical_name		octet-string[6]	0100011D00FF				R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,30}	scaler=0, unit=Wh resolution: 000.000 kWh			R	R			
	Active energy import (+A) incremental for BillingProfile1	3		1-0:1.9.x.255								
1	logical_name		octet-string[6]	01000109xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,30}	scaler=0, unit=Wh resolution: 000.000 kWh			R	R			
	Active energy export (-A)	3		1-0:2.8.x.255								
1	logical_name		octet-string[6]	01000208xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			R
3	scaler_unit		scal_unit_type	{0,30}	scaler=0, unit=Wh resolution: 000.000 kWh			R	R			R
	Active energy import (-A) for phases L1,L2,L3	3		1-0:xx.8.0.255								
1	logical_name		octet-string[6]	0100xx0800FF	x=22 for L1			R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
					x=42 for L2 (Only polyphase meters) x=62 for L3 (Only polyphase meters)							
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,30}	scaler=0, unit=Wh resolution: 000.000 kWh			R	R			
	Active energy export (-A) incremental for LoadProfile1	3		1-0:2.29.0.255								
1	logical_name		octet-string[6]	0100021D00FF				R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,30}	scaler=0, unit=Wh resolution: 000.000 kWh			R	R			
	Active energy export (-A) incremental for BillingProfile1	3		1-0:2.9.x.255								
1	logical_name		octet-string[6]	01000209xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,30}	scaler=0, unit=Wh resolution: 000.000 kWh			R	R			
	Reactive energy R+	3		1-0:3.8.x.255								
1	logical_name		octet-string[6]	01000308xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			R
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VARh resolution: 000.000 kvarh			R	R			R
	Reactive energy R+ incremental for LoadProfile1	3		1-0:3.29.0.255								
1	logical_name		octet-string[6]	0100031D00FF				R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VARh resolution: 000.000 kvarh			R	R			
	Reactive energy R+ incremental for BillingProfile1	3		1-0:3.9.x.255								
1	logical_name		octet-string[6]	01000309xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VARh resolution: 000.000 kvarh			R	R			
	Reactive energy R-	3		1-0:4.8.x.255								
1	logical_name		octet-string[6]	01000408xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			R
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VARh resolution: 000.000 kvarh			R	R			R
	Reactive energy R- incremental for LoadProfile1	3		1-0:4.29.0.255								
1	logical_name		octet-string[6]	0100041D00FF				R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VARh resolution: 000.000 kvarh			R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Reactive energy R- incremental for BillingProfile1	3		1-0:4.9.x.255								
1	logical_name		octet-string[6]	01000409xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			
	Reactive energy QI (+Ri)	3		1-0:5.8.x.255								
1	logical_name		octet-string[6]	01000508xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			R
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			R
	Reactive energy QI (+Ri) incremental for LoadProfile1	3		1-0:5.29.0.255								
1	logical_name		octet-string[6]	0100051D00FF				R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			
	Reactive energy QI (+Ri) incremental for BillingProfile1	3		1-0:5.9.x.255								
1	logical_name		octet-string[6]	01000509xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			
	Reactive energy QII (+Rc)	3		1-0:6.8.x.255								
1	logical_name		octet-string[6]	01000608xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			R
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			R
	Reactive energy QII (+Rc) incremental for LoadProfile1	3		1-0:6.29.0.255								
1	logical_name		octet-string[6]	0100061D00FF				R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			
	Reactive energy QII (+Rc) incremental for BillingProfile1	3		1-0:6.9.x.255								
1	logical_name		octet-string[6]	01000609xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			
	Reactive energy QIII (-Ri)	3		1-0:7.8.x.255								
1	logical_name		octet-string[6]	01000708xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			R

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			R
	Reactive energy QIII (-Ri) incremental for LoadProfile1	3		1-0:7.29.0.255								
1	logical_name		octet-string[6]	0100071D00FF				R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			
	Reactive energy QIII (-Ri) incremental for BillingProfile1	3		1-0:7.9.x.255								
1	logical_name		octet-string[6]	01000709xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			
	Reactive energy QIV (-Rc)	3		1-0:8.8.x.255								
1	logical_name		octet-string[6]	01000808xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			R
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			R
	Reactive energy QIV (-Rc) incremental for LoadProfile1	3		1-0:8.29.0.255								
1	logical_name		octet-string[6]	0100081D00FF				R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			
	Reactive energy QIV (-Rc) incremental for BillingProfile1	3		1-0:8.9.x.255								
1	logical_name		octet-string[6]	01000809xxFF	x=0 for total x=1...6 for rate 1...6			R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,32}	scaler=0, unit=VArh resolution: 000.000 kvarh			R	R			
	Apparent energy (+S)	3		1-0:9.8.0.255								
1	logical_name		octet-string[6]	0100090800FF				R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,31}	scaler=0, unit=VAh resolution: 000.000 kVAh			R	R			
	Apparent energy per phase (+S)	3		1-0:x.8.0.255								
1	logical_name		octet-string[6]	0100xx0800FF	x=29 in phase L1 (Only polyphase meters) x=49 in phase L2 (Only polyphase meters) x=69 in phase L3 (Only polyphase meters)			R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,31}	scaler=0, unit=VAh resolution: 000.000 kVAh			R	R			
	Apparent energy (-S)	3		1-0:10.8.0.255								
1	logical_name		octet-string[6]	01000A0800FF				R	R			
2	value		Long64Unsigned					R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
3	scaler_unit		scal_unit_type	{0,31}	scaler=0, unit=VAh resolution: 000.000 kVAh			R	R			
	Apparent energy (-S)	3		1-0:x.8.0.255								
1	logical_name		octet-string[6]	0100xx0800FF	x=30 in phase L1 (Only polyphase meters) x=50 in phase L2 (Only polyphase meters) x=70 in phase L3 (Only polyphase meters)			R	R			
2	value		Long64Unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,31}	scaler=0, unit=VAh resolution: 000.000 kVAh			R	R			

2.2. Demand registers

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Demand Register import (+A)	5		1-0:1.4.0.255								
1	logical_name		octet-string[6]	0100010400FF				R	R			
2	current_average_value		double-long-unsigned					R	R			
3	last_average_value		double-long-unsigned					R	R			
4	scaler_unit		scal_unit_type	{0,27}				R	R			
5	status		null-data					R	R			
6	capture_time		octet-string[12]					R	R			
7	start_time_current		octet-string[12]					R	R			
8	period		double-long-unsigned	900	unit=seconds			R	RW			
9	number_of_periods		long-unsigned	1				R	R			
	Demand Register export (-A)	5		1-0:2.4.0.255								
1	logical_name		octet-string[6]	0100020400FF				R	R			
2	current_average_value		double-long-unsigned					R	R			
3	last_average_value		double-long-unsigned					R	R			
4	scaler_unit		scal_unit_type	{0,27}				R	R			
5	status		null-data					R	R			
6	capture_time		octet-string[12]					R	R			
7	start_time_current		octet-string[12]					R	R			
8	period		double-long-unsigned	900	unit=seconds			R	RW			
9	number_of_periods		long-unsigned	1				R	R			
	Demand Register (A)	5		1-0:15.4.0.255								
1	logical_name		octet-string[6]	01000F0400FF				R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
2	current_average_value		double-long-unsigned					R	R			
3	last_average_value		double-long-unsigned					R	R			
4	scaler_unit		scal_unit_type	{0,27}				R	R			
5	status		null-data					R	R			
6	capture_time		octet-string[12]					R	R			
7	start_time_current		octet-string[12]					R	R			
8	period		double-long-unsigned	900	unit=seconds			R	RW			
9	number_of_periods		long-unsigned	1				R	R			
	Demand Register (+R)	5		1-0:3.4.0.255								
1	logical_name		octet-string[6]	0100030400FF				R	R			
2	current_average_value		double-long-unsigned					R	R			
3	last_average_value		double-long-unsigned					R	R			
4	scaler_unit		scal_unit_type	{0,29}	scaler=0, unit=var resolution: 00.000 kvar			R	R			
5	status		null-data					R	R			
6	capture_time		octet-string[12]					R	R			
7	start_time_current		octet-string[12]					R	R			
8	period		double-long-unsigned	0	unit=seconds			R	RW			
9	number_of_periods		long-unsigned	1				R	R			
	Demand Register (-R)	5		1-0:4.4.0.255								
1	logical_name		octet-string[6]	0100040400FF				R	R			
2	current_average_value		double-long-unsigned					R	R			
3	last_average_value		double-long-unsigned					R	R			
4	scaler_unit		scal_unit_type	{0,29}	scaler=0, unit=var resolution: 00.000 kvar			R	R			
5	status		null-data					R	R			
6	capture_time		octet-string[12]					R	R			
7	start_time_current		octet-string[12]					R	R			
8	period		double-long-unsigned	0	unit=seconds			R	RW			
9	number_of_periods		long-unsigned	1				R	R			
	Maximum Demand Register import (+A)	4		1-0:1.6.x.255								
1	logical_name		octet-string[6]	01000106xxFF	x=0. Total rate x = 1...6 for rates			R	R			
2	value		double-long-unsigned					R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
3	scaler_unit		scal_unit_type	{0,27}	scaler=0, unit=W resolution: 00.000 kW			R	R			
4	status		unsigned		1 = active 0 = inactive			R	R			
5	capture_time		octet-string[12]					R	R			
	Maximum Demand Register export (-A)	4		1-0:2.6.x.255								
1	logical_name		octet-string[6]	01000206xxFF	x=0. Total rate x = 1...6 for rates			R	R			
2	value		double-long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,27}	scaler=0, unit=W resolution: 00.000 kW			R	R			
4	status		unsigned		1 = active 0 = inactive			R	R			
5	capture_time		octet-string[12]					R	R			
	Maximum Demand Register (A)	4		1-0:15.6.x.255								
1	logical_name		octet-string[6]	01000F06xxFF	x=0. Total rate x = 1...6 for rates			R	R			
2	value		double-long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,27}	scaler=0, unit=W resolution: 00.000 kW			R	R			
4	status		unsigned		1 = active 0 = inactive			R	R			
5	capture_time		octet-string[12]					R	R			
	Maximum Demand Register (+R)	4		1-0:3.6.0.255								
1	logical_name		octet-string[6]	0100030600FF				R	R			
2	value		double-long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,29}	scaler=0, unit=var resolution: 00.000 kvar			R	R			
4	status		unsigned		1 = active 0 = inactive			R	R			
5	capture_time		octet-string[12]					R	R			
	Maximum Demand Register (-R)	4		1-0:4.6.0.255								
1	logical_name		octet-string[6]	0100040600FF				R	R			
2	value		double-long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,29}	scaler=0, unit=var resolution: 00.000 kvar			R	R			
4	status		unsigned		1 = active 0 = inactive			R	R			
5	capture_time		octet-string[12]					R	R			

2.3. Load Profiles

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	AMR profile status for Load profile with period 1	1		0-0:96.10.7.255								
1	logical_name		octet-string[6]	0000600A07FF				R	R			
2	value		unsigned		{IV, CA, RES, VH , MP, INT, AL, RES}			R	R			
	Load profile with period 1	7		1-0:99.1.0.255								
1	logical_name		octet-string[6]	0100630100FF				R	R			
2	buffer		array		selective access per range The buffer must be filled monotonously, i.e. no irregular entries are allowed = exactly one entry per capture period			R	R			
3	capture_objects		array	{8,0-0:1.0.0.255,2}; {1,0-0:96.10.7.255,2}; {3,1-0:1.8.0.255,2}; {3,1-0:2.8.0.255,2}; {3,1-0:5.8.0.255,2}; {3,1-0:8.8.0.255,2}	clock; AMR profile status; A+; A-; R1; R4			R	RW			
4	capture_period		double-long-unsigned	3600	3600 s (1 hour)			R	RW			
5	sort_method		enum	1	unsorted (FIFO)			R	R			
6	sort_object		object definition	none	Unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned	1560	1560 (65 days with capture_period=1 hour)			R	RW			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	index_current_value		double-long-unsigned					R	R			
-5	capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E "Compact action" method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E "Compact action" method -2		A	A			
-3	get_buffer_by_index_ascending_compact		method (in_data_asc)			See Appendix E "Compact action" method -3		A	A			
-4	get_buffer_by_index_descending_compact		method (in_data_desc)			See Appendix E "Compact action" method -4		A	A			
	AMR profile status for Load profile with period 2	1		0-0:96.10.8.255								
1	logical_name		octet-string[6]	0000600A08FF				R	R			
2	value		unsigned		{IV, CA, RES, VH , MP, INT, AL, RES}			R	R			
	Load profile with period 2	7		1-0:99.2.0.255								
1	logical_name		octet-string[6]	0100630200FF				R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights							
							PC	RC	MC		FC	TC		
2	buffer		array		selective access per range The buffer must be filled monotonously, i.e. no irregular entries are allowed = exactly one entry per capture period			R	R					
3	capture_objects		array	{8,0-0:1.0.0.255,2}; {1,0-0:96.10.8.255,2}; {3,1-0:1.8.1.255,2}; {3,1-0:1.8.2.255,2}; {3,1-0:5.8.1.255,2}; {3,1-0:5.8.2.255,2}; {3,1-0:8.8.1.255,2}; {3,1-0:8.8.2.255,2}; {4,1-0:1.6.0.255,2}; {4,1-0:1.6.0.255,5};	clock; AMR profile status; A+ (rate1); A+ (rate2); R1 (rate1); R1 (rate2); R4 (rate1); R4 (rate2); MaxDemand(A+) – value; MaxDemand(A+) – capture time			R	RW					
4	capture_period		double-long-unsigned	86400	86400 (1 day)				R	RW				
5	sort_method		enum	1	unsorted (FIFO)				R	R				
6	sort_object		object definition	None	unsorted				R	R				
7	entries_in_use		double-long-unsigned						R	R				
8	profile_entries		double-long-unsigned	90	90 (90 days)				R	RW				
-3	config_id		double-long-unsigned			Actual profile configuration version			R	R				
-4	Index_current_value		double-long-unsigned						R	R				
-5	Capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))			R	R				
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E “Compact action” method -1			A	A				
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E “Compact action” method -2			A	A				
-3	get_buffer_by_index_ascending_compact		method (in_data_asc)			See Appendix E “Compact action” method -3			A	A				
-4	get_buffer_by_index_descending_compact		method (in_data_desc)			See Appendix E “Compact action” method -4			A	A				
	AMR profile status for Load profile with period 3	1		0-0:96.10.9.255										
1	logical_name		octet-string[6]	0000600A09FF					R	R				
2	value		unsigned		{IV, CA, RES, VH , MP, INT, AL, RES}				R	R				
	Load profile with period 3	7		1-0:99.3.0.255										
1	logical_name		octet-string[6]	0100630300FF					R	R				
2	buffer		array		selective access per range The buffer must be filled monotonously, i.e. no irregular entries are allowed = exactly one entry per capture period				R	R				
3	capture_objects		array						R	RW				
4	capture_period		double-long-unsigned						R	RW				
5	sort_method		enum	1	unsorted (FIFO)				R	R				

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
6	sort_object		object definition	None	unsorted			R	R			
7	entries_in_use		double-long-unsigned					R	R			
8	profile_entries		double-long-unsigned					R	RW			
-3	config_id		double-long-unsigned			Actual profile configuration version		R	R			
-4	Index_current_value		double-long-unsigned					R	R			
-5	Capture_time_last_value		double-long-unsigned			utc date time 32 (the number of seconds that have elapsed since January 1, 1980 (midnight UTC))		R	R			
-1	get_buffer_by_index_ascending		method (in_data_asc)			See Appendix E “Compact action” method -1		A	A			
-2	get_buffer_by_index_descending		method (in_data_desc)			See Appendix E “Compact action” method -2		A	A			
-3	get_buffer_by_index_ascending_compact		method (in_data_asc)			See Appendix E “Compact action” method -3		A	A			
-4	get_buffer_by_index_descending_compact		method (in_data_desc)			See Appendix E “Compact action” method -4		A	A			

2.4. Instantaneous Values

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Instantaneous voltage (RMS)	3		1-0:x.7.0.255								
1	logical_name		octet-string[6]	0100xx0700FF	x=32 - phase L1 x=52 - phase L2 (Only polyphase meters) x=72 - phase L3 (Only polyphase meters)			R	R			
2	value		long-unsigned					R	R			R
3	scaler_unit		scal_unit_type	{0,35}	scaler=0, unit=V resolution: 0 V			R	R			R
	Instantaneous current	3		1-0:x.7.0.255								
1	logical_name		octet-string[6]	0100xx0700FF	x=31 - phase L1 x=51 - phase L2 (Only polyphase meters) x=71 - phase L3 (Only polyphase meters)			R	R			
2	value		long-unsigned					R	R			R
3	scaler_unit		scal_unit_type	{-1,33}	scaler=-1, unit=A resolution: 0,0 A			R	R			R
	Instantaneous neutral current	3		1-0:91.7.0.255	Only applicable for meters with neutral current measurement							
1	logical_name		octet-string[6]	01005B0700FF				R	R			
2	value		long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{-1,33}	scaler=-1, unit=A resolution: 0,0 A			R	R			
	Differential current	3		1-0:91.7.2.255	Only applicable for meters with neutral current measurement							
1	logical_name		octet-string[6]	01005B0702FF				R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
2	value		long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{-1,33}	scaler=-1, unit=A resolution: 0,0 A			R	R			
	Instantaneous active power (+P)	3		1-0:x.7.0.255								
1	logical_name		octet-string[6]	0100xx0700FF	x=21 - phase L1 (Only polyphase meters) x=41 - phase L2 (Only polyphase meters) x=61 - phase L3 (Only polyphase meters) x=1 - P+(L1) + P+(L2) + P+(L3)			R	R			
2	value		double-long-unsigned		L ₁ Active power+ (QI+QIV) L ₂ Active power+ (QI+QIV) L ₃ Active power+ (QI+QIV)			R	R			
3	scaler_unit		scal_unit_type	{0,27}	scaler=0, unit=W resolution: 0.000 kW			R	R			
	Instantaneous active power (-P)	3		1-0:x.7.0.255								
1	logical_name		octet-string[6]	0100xx0700FF	x=22 - phase L1 (Only polyphase meters) x=42 - phase L2 (Only polyphase meters) x=62 - phase L3 (Only polyphase meters) x=2 - P-(L1) + P-(L2) + P-(L3)			R	R			
2	value		double-long-unsigned		L ₁ Active power-- (QII+QIII) L ₂ Active power-- (QII+QIII) L ₃ Active power-- (QII+QIII)			R	R			
3	scaler_unit		scal_unit_type	{0,27}	scaler=0, unit=W resolution: 0.000 kW			R	R			
	Instantaneous active power P 	3		1-0:15.7.0.255								
1	logical_name		octet-string[6]	01000F0700FF				R	R			
2	value		double-long-unsigned		Active power (abs(QI+QIV)+(abs(QII+QIII)))			R	R			
3	scaler_unit		scal_unit_type	{0,27}	scaler=0, unit=W resolution: 0.000 kW			R	R			
	Instantaneous active power (sign P)	3		1-0:x.7.0.255								
1	logical_name		octet-string[6]	0100xx0700FF	x=36 - phase L1 (Only polyphase meters) x=56 - phase L2 (Only polyphase meters) x=76 - phase L3 (Only polyphase meters) x=16 – all phases			R	R			
2	value		double-long		Active power (abs(QI+QIV)-abs(QII+QIII))			R	R			
3	scaler_unit		scal_unit_type	{0,27}	scaler=0, unit=W resolution: 0.000 kW			R	R			
	Instantaneous reactive power (+Q)	3		1-0:x.7.0.255								
1	logical_name		octet-string[6]	0100xx0700FF	x=23 in phase L1 (Only polyphase meters) x=43 in phase L2 (Only polyphase meters) x=63 in phase L3 (Only polyphase meters) x=3 Q+(L1) + Q+(L2) + Q+(L3)			R	R			
2	value		double-long-unsigned		L ₁ Reactive power+ (QI+QII) L ₂ Reactive power+ (QI+QII) L ₃ Reactive power+ (QI+QII)			R	R			
3	scaler_unit		scal_unit_type	{0,29}	scaler=0, unit=var resolution: 0.000 kVar			R	R			
	Instantaneous reactive power (-Q)	3		1-0:x.7.0.255								
1	logical_name		octet-string[6]	0100xx0700FF	x=24 in phase L1 (Only polyphase meters) x=44 in phase L2 (Only polyphase meters) x=64 in phase L3 (Only polyphase meters)			R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
					x=4 Q-(L1) + Q-(L2) + Q-(L3)							
2	value		double-long-unsigned		L ₁ Reactive power– (QIII+QIV) L ₂ Reactive power– (QIII+QIV) L ₃ Reactive power– (QIII+QIV)			R	R			
3	scaler_unit		scal_unit_type	{0,29}	scaler=0, unit=var resolution: 0.000 kVar			R	R			
	Instantaneous apparent power (+S)	3		1-0:x.7.0.255								
1	logical_name		octet-string[6]	0100xx0700FF	x=29 in phase L1 (Only polyphase meters) x=49 in phase L2 (Only polyphase meters) x=69 in phase L3 (Only polyphase meters) x=9 S+			R	R			
2	value		double-long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,28}	scaler=0, unit=VA resolution: 0.000 kVA			R	R			
	Instantaneous apparent power (-S)	3		1-0:x.7.0.255								
1	logical_name		octet-string[6]	0100xx0700FF	x=30 in phase L1 (Only polyphase meters) x=50 in phase L2 (Only polyphase meters) x=70 in phase L3 (Only polyphase meters) x=10 S-			R	R			
2	value		double-long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,28}	scaler=0, unit=VA resolution: 0.000 kVA			R	R			
	Frequency	3		1-0:14.7.0.255								
1	logical_name		octet-string[6]	01000E0700FF				R	R			
2	value		long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{-2,44}	scaler=-2, unit=Hz resolution: 0.00 Hz			R	R			
	Angle	3		1-0:81.7.x.255	Only polyphase meters							
1	logical_name		octet-string[6]	01005107xxFF	x=1 Angle of U(L2)-U(L1) -Only polyphase meters x=2 Angle of U(L3)-U(L1) -Only polyphase meters x=12 Angle of U(L3)-U(L2) -Only polyphase meters x=4 Angle of I(L1)-U(L1) x=15 Angle of I(L2)-U(L2) -Only polyphase meters x=26 Angle of I(L3)-U(L3) -Only polyphase meters			R	R			
2	value		long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,8}	scaler=0, unit= degree, resolution: 0 degree			R	R			
	Cos F	3		1-0:x.7.0.255								
1	logical_name		octet-string[6]	0100xx0700FF	x=13 cosF (import); x=33 cosF phase L1 (import) – polyphase meter only; x=53 cosF phase L2 (import) – polyphase meter only;			R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
					x=73 cosF phase L3 (import) – polyphase meter only; x=84 cosF (export); x=85 cosF phase L1 (export) – polyphase meter only; x=86 cosF phase L1 (export) – polyphase meter only; x=87 cosF phase L1 (export) – polyphase meter only;							
2	value		long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{-3,255}	scaler=-3, unit=			R	R			
	Active Quadrant	1		1-1:94.73.100.255								
1	logical_name		octet-string[6]	01015E4964FF				R	R			
2	value		unsigned		0 (no load), 1, 2, 3, 4			R	R			
	Phase Presence	1		1-1:94.73.104.255								
1	logical_name		octet-string[6]	01015E4968FF				R	R			
2	value		unsigned		Bit0 – phase L3 (0 – no phase); Bit1 – phase L2 (0 – no phase) – polyphase meter only; Bit2 – phase L1 (0 – no phase) – polyphase meter only;			R	R			

2.5. Average Values

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Period average	3		1-0:0.8.2.255								
1	logical_name		octet-string[6]	0100000802FF				R	R			
2	value		double-long-unsigned					R	RW			
3	scaler_unit		scal_unit_type	{0,7}	scale=0, unit=seconds			R	R			
	Average voltage (current average value)	3		1-0:x.24.0.255								
1	logical_name		octet-string[6]	0100xx1800FF	x=32 in phase L1 x=52 in phase L2 (Only polyphase meters) x=72 in phase L3 (Only polyphase meters)			R	R			
2	value		long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,35}	scaler=0, unit=V resolution: 0 V			R	R			
	Average voltage (last average value)	3		1-0:x.25.0.255								
1	logical_name		octet-string[6]	0100xx1900FF	x=32 in phase L1 x=52 in phase L2 (Only polyphase meters) x=72 in phase L3 (Only polyphase meters)			R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
2	value		long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{0,35}	scaler=0, unit=V resolution: 0 V			R	R			
	Average current (current average value)	3		1-0:x.24.0.255								
1	logical_name		octet-string[6]	0100xx1800FF	x=31 in phase L1 x=51 in phase L2 (Only polyphase meters) x=71 in phase L3 (Only polyphase meters)			R	R			
2	value		long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{-1,33}	scaler=-1, unit=A resolution: 0,0 A			R	R			
	Average current (last average value)	3		1-0:x.25.0.255								
1	logical_name		octet-string[6]	0100xx1900FF	x=31 in phase L1 x=51 in phase L2 (Only polyphase meters) x=71 in phase L3 (Only polyphase meters)			R	R			
2	value		long-unsigned					R	R			
3	scaler_unit		scal_unit_type	{-1,33}	scaler=-1, unit=A resolution: 0,0 A			R	R			

2.6. Power Quality (Voltage sags and swells)

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Reference Voltage for power quality measurement	3		1-0:0.6.4.255								
1	logical_name		octet-string[6]	0100000604FF				R	R			
2	value		long-unsigned		Reference Voltage for power quality measurement (sags and swells) and for long power fail			R	RW			
3	scaler_unit		scal_unit_type	{0,35}	scaler=0, unit=V resolution: 0 V			R	R			
	Time Threshold for voltage sags	3		1-0:12.43.x.255								
1	logical_name		octet-string[6]	01000C2BxxFF	x = 0,1,2 for 3 threshold for voltage sags			R	R			
2	value		long-unsigned	1	Time threshold for the detection of voltage sags (1 s)			R	RW			
3	scaler_unit		scal_unit_type	{0,7}	scaler=0, unit=seconds			R	R			
	Threshold for voltage sags	3		1-0:12.31.x.255								
1	logical_name		octet-string[6]	01000C1FxxFF	x = 0,1,2 for 3 threshold for voltage sags			R	R			
2	value		long-unsigned		10%, 20%, 70% of decrement over Vref.	7% - 90%		R	RW			
3	scaler_unit		scal_unit_type	{-2,56}	scaler=-2, unit=%	unit = nominal voltage percent		R	R			
	Number of voltage sags in phase L(1,2,3)	1		1-0:x.32.y.255								
1	logical_name		octet-string[6]	0100xx20yyFF	x = 12 in any phase x = 32 in phase L1 (implemented in poly-phase meters only)			R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
					x = 52 in phase L2 (implemented in poly-phase meters only) x = 72 in phase L3 (implemented in poly-phase meters only) y = 0,1,2 for 3 threshold for voltage sags							
2	value		long-unsigned		Number of voltage sags from the origin			R	R			
	Time Threshold for voltage swell	3		1-0:12.44.0.255								
1	logical_name		octet-string[6]	01000C2C00FF				R	R			
2	value		long-unsigned	1	Time threshold for the detection of voltage swell (1 s)			R	RW			
3	scaler_unit		scal_unit_type	{0,7}	scaler=0, unit=seconds			R	R			
	Threshold for voltage swell	3		1-0:12.35.0.255								
1	logical_name		octet-string[6]	01000C2300FF				R	R			
2	value		long-unsigned		10,00% of increment over Vref.	7% - 90%		R	RW			
3	scaler_unit		scal_unit_type	{-2,56}	scaler=-2, unit=%	unit = nominal voltage percent		R	R			
	Number of voltage swell in phase L(1,2,3)	1		1-0:x.36.0.255								
1	logical_name		octet-string[6]	0100xx2400FF	x = 12 in any phase x = 32 in phase L1 (implemented in poly-phase meters only) x = 52 in phase L2 (implemented in poly-phase meters only) x = 72 in phase L3 (implemented in poly-phase meters only)			R	R			
2	value		long-unsigned		Number of voltage sags from the origin			R	R			

3. SafeParameterization related objects

3.1. SafeParameterization related objects

The meter shall support secure atomic parameterisation as specified in Appendix C (REQ-PARAM-1 to REQ-PARAM-3). Implementation Option A (DLMS Message Queue class, class_id 8449, defined in Appendix C) is one accepted solution; any equivalent implementation based on standard DLMS/COSEM services is admissible, subject to demonstration at FAT.

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Request Message Queue	8449		0-0:138.0.0.255		See Appendix C — Implementation Option A						
1	logical_name		octet-string[6]	00008A0000FF				R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
2	Buffer		array		Array of request messages for safe parameterization			R	R			
3	buffer_size		double-long-unsigned					R	R			
4	buffer_free_space		double-long-unsigned					R	R			
5	last_enqueued_message_id		double-long-unsigned					R	R			
1	reset()		method		After invoking this method reset() for the Response Message Queue object {8449: 0-0:138.0.1.255} will be invoked automatically				A			
2	enqueue_message(message)		method						A			
3	remove_messages(last_read_message_id)		method									
	Response Message Queue	8449		0-0:138.0.1.255		See Appendix C — Implementation Option A						
1	logical_name		octet-string[6]	00008A0001FF				R	R			
2	buffer		array		Array of response messages for safe parameterization			R	R			
3	buffer_size		double-long-unsigned					R	R			
4	buffer_free_space		double-long-unsigned					R	R			
5	last_enqueued_message_id		double-long-unsigned					R	R			
1	reset()		method									
2	enqueue_message(message)		method									
3	remove_messages(last_read_message_id)		method						A			

4. Communication related objects

4.1. Prime PLC interface classes

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	61334 4 32 LLC SSCS setup	80		0-0:28.0.0.255								
1	logical_name		octet-string[6]	00001C0000FF				R	R			
2	service_node_address		long-unsigned			Holds the value of the address assigned to the service node during its registration by the base node. After deregistration, the value of this address is NEW, meaning 0xFFE.		R	R			
3	base_node_address		long-unsigned			Holds the value of the base node address to which the service node is registered. After deregistration this address is 0.		R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
1	reset		method			This method is used for deallocating the service node address.			A			
	PRIME NB OFDM PLC Physical layer counters	81		0-0:28.1.0.255								
1	logical_name		octet-string[6]	00001C0100FF				R	R			
2	phy_stats_crc_incorrect_count		long-unsigned			PIB attribute 0x00A0		R	R			
3	phy_stats_crc_fail_count		long-unsigned			PIB attribute 0x00A1		R	R			
4	phy_stats_tx_drop_count		long-unsigned			PIB attribute 0x00A2		R	R			
5	phy_stats_rx_drop_count		long-unsigned			PIB attribute 0x00A3		R	R			
1	reset		method			This method is used for resetting all the counters held by an instance of this interface.			A			
	PRIME NB OFDM PLC MAC setup	82		0-0:28.2.0.255								
1	logical_name		octet-string[6]	00001C0200FF				R	R			
2	mac_min_switch_search_time		unsigned			PIB attribute 0x0010		R	R			
3	mac_max_promotion_pdu		unsigned			PIB attribute 0x0011		R	R			
4	mac_promotion_pdu_tx_period		unsigned			PIB attribute 0x0012		R	R			
5	mac_beacons_per_frame		unsigned			PIB attribute 0x0013		R	R			
6	mac_scp_max_tx_attempts		unsigned			PIB attribute 0x0014		R	R			
7	mac_ctl_re_tx_timer		unsigned			PIB attribute 0x0015		R	R			
8	mac_max_ctl_re_tx		unsigned			PIB attribute 0x0018		R	R			
	PRIME NB OFDM PLC MAC functional parameters	83		0-0:28.3.0.255								
1	logical_name		octet-string[6]	00001C0300FF				R	R			
2	mac_LNID		long			PIB attribute 0x0020		R	R			
3	mac_LSID		unsigned			PIB attribute 0x0021		R	R			
4	mac_SID		unsigned			PIB attribute 0x0022		R	R			
5	mac_SNA		octet-string			PIB attribute 0x0023		R	R			
6	mac_state		enum		(0) Disconnected, (1) Terminal, (2) Switch, (3) Base	PIB attribute 0x0024		R	R			
7	mac_scp_length		long			PIB attribute 0x0025		R	R			
8	mac_node_hierarchy_level		unsigned			PIB attribute 0x0026		R	R			
9	mac_beacon_slot_count		unsigned			PIB attribute 0x0027		R	R			
10	mac_beacon_rx_slot		unsigned			PIB attribute 0x0028		R	R			
11	mac_beacon_tx_slot		unsigned			PIB attribute 0x0029		R	R			
12	mac_beacon_rx_frequency		unsigned			PIB attribute 0x002A		R	R			
13	mac_beacon_tx_frequency		unsigned			PIB attribute 0x002B		R	R			
14	mac_capabilities		long-unsigned			PIB attribute 0x002C		R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	PRIME NB OFDM PLC MAC counters	84		0-0:28.4.0.255								
1	logical_name		octet-string[6]	00001C0400FF				R	R			
2	mac_tx_data_pkt_count		double-long-unsigned			PIB attribute 0x0040		R	R			
3	mac_rx_data_pkt_count		double-long-unsigned			PIB attribute 0x0041		R	R			
4	mac_tx_ctrl_pkt_count		double-long-unsigned			PIB attribute 0x0042		R	R			
5	mac_rx_ctrl_pkt_count		double-long-unsigned			PIB attribute 0x0043		R	R			
6	mac_csma_fail_count		double-long-unsigned			PIB attribute 0x0044		R	R			
7	mac_csma_ch_busy_count		double-long-unsigned			PIB attribute 0x0045		R	R			
1	reset		method			This method is used for resetting all the counters held by an instance of this interface class.			A			
	PRIME NB OFDM PLC MAC network administration data	85		0-0:28.5.0.255								
1	logical_name		octet-string[6]	00001C0500FF				R	R			
2	mac_list_multicast_entries		array		mac_list_multicast_entries_type ::= array mac_list_multicast_entries_element mac_list_multicast_entries_element ::= structure { mcast_entry_LCID: integer, -- LCID of multicast group mcast_entry_members: long -- number of child nodes }	PIB attribute 0x0052		R	R			
3	mac_list_switch_table		array		mac_switch_table ::= array stbl_entry_LSID stbl_entry_LSID ::= long -- SID of attached Switch node	PIB attribute 0x0053		R	R			
4	mac_list_direct_table		array		mac_direct_table ::= array mac_direct_table_element mac_direct_table_element ::= structure { dconn_entry_src_SID: long, dconn_entry_src_LNID: long, dconn_entry_src_LCID: long, dconn_entry_dst_SID: long, dconn_entry_dst_LNID: long, dconn_entry_dst_LCID: long, dconn_entry_DID: octet-string (size 6 bytes) }	PIB attribute 0x0055		R	R			
5	mac_list_available_switches		array		mac_list_available_switches ::= array mac_list_available_switches_element mac_list_available_switches_element ::= structure {	PIB attribute 0x0056		R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
					slist_entry_SNA: octet-string (size 6 bytes), slist_entry_LSID: long, slist_entry_level: integer, slist_entry_rx_level: integer, slist_entry_rx_snr: integer }							
6	mac_list_phy_comm		array		mac_list_phy_comm ::= array phy_comm_element phy_comm_element ::= structure { phy_Comm_EUI: octet-string, phy_Comm_Tx_Pwr: integer, phy_Comm_Tx_Cod: integer, phy_Comm_Rx_Cod: integer, phy_Comm_Rx_Lvl: integer, phy_Comm_SNR: integer, phy_Comm_Tx_Pwr_Mod: integer, phy_Comm_Tx_Cod_Mod: integer, phy_Comm_Rx_Cod_Mod: integer }	PIB attribute 0x0057		R	R			
1	reset		method			This method is used for resetting all the entries (to an array of 0 elements) of the attributes 2 to 6 of the instance of this interface class.			A			
	PRIME NB OFDM PLC MAC address setup	43		0-0:28.6.0.255								
1	logical_name		octet-string[6]	00001C0600FF				R	R			
2	MAC_address		octet-string			Holds the EUI-48 MAC address of the device.		R	R			
	PRIME NB OFDM PLC Application identification	86		0-0:28.7.0.255								
1	logical_name		octet-string[6]	00001C0700FF				R	R			
2	firmware_version		octet-string			PIB attribute 0x0075		R	R			
3	vendor_Id		long-unsigned			PIB attribute 0x0076		R	R			
4	product_Id		long-unsigned			PIB attribute 0x0077		R	R			
	PLC TX Gain/Attenuation	1		0-0:128.0.6.255								
1	logical_name		octet-string[6]	0000800006FF				R	R			
2	Value		integer		-60 ... +30 dB			R	RW			
	PLC Modem State	1		0-0:128.0.7.255								
1	logical_name		octet-string[6]	0000800007FF				R	R			
2	value		enum		0=modem off 1=modem initialization going 2=modem not responding 3=modem initialized in normal mode 4=modem initialized in P2P mode			R	R			
	PLC SNR	1		0-0:128.0.8.255								
1	logical_name		octet-string[6]	0000800008FF				R	R			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
2	value		integer		0 ... 21 dB			R	R			
	PLC Mains Period	1		0-0:128.0.9.255								
1	logical_name		octet-string[6]	0000800009FF				R	R			
2	value		long		Mains period in us. -1 = not determined			R	R			
	BN Lock Timeout	1		0-0:128.0.10.255								
1	logical_name		octet-string[6]	000080000AFF				R	R			
2	value		long-unsigned	0	Time to lock to registered BN in minutes 0=no lock			R	RW			
	Timeout Not Addressed	1		0-0:128.0.11.255								
1	logical_name		octet-string[6]	000080000BFF				R	R			
2	value		long-unsigned	720	Timeout in minutes to reinitialize PLC modem if device not addressed 0=infinite			R	RW			
	PLC Modem Mode	1		0-0:96.50.15.255								
1	logical_name		octet-string[6]	000060320FFF				R	R			
2	value		enum	1	0=modem off 1=normal mode 2=test mode			R	RW			
	PRIME v.1.4 Channel	1		0-0:128.0.12.255								
1	logical_name		octet-string[6]	000080000CFF				R	R			
2	value		integer	1	PRIME v.1.4 channel number 1...8 0 – dynamic channel selection			R	RW			

4.2. Optical interface classes

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	IEC HDLC setup	23		0-0:22.0.0.255								
1	logical_name		octet-string[6]	0000160000FF				R	R			
2	comm_speed		enum	5	(0) 300 baud, (1) 600 baud, (2) 1 200 baud, (3) 2 400 baud, (4) 4 800 baud, (5) 9 600 baud, (6) 19 200 baud, (7) 38 400 baud, (8) 57 600 baud, (9) 115 200 baud			R	RW			
3	window_size_transmit		unsigned	1				R	RW			
4	window_size_receive		unsigned	1				R	RW			
5	max_info_field_length_transmit		long-unsigned	128				R	RW			
6	max_info_field_length_receive		long-unsigned	128				R	RW			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
7	inter_octet_time_out		long-unsigned	25				R	RW			
8	inactivity_time_out		long-unsigned	120				R	RW			
9	device_address		long-unsigned	32				R	RW			

4.3. RS-485 interface classes

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	IEC HDLC setup	23		0-1:22.0.0.255								
1	logical_name		octet-string[6]	0001160000FF				R	R			
2	comm_speed		enum	5	(0) 300 baud, (1) 600 baud, (2) 1 200 baud, (3) 2 400 baud, (4) 4 800 baud, (5) 9 600 baud, (6) 19 200 baud, (7) 38 400 baud, (8) 57 600 baud, (9) 115 200 baud			R	RW			
3	window_size_transmit		unsigned	1				R	RW			
4	window_size_receive		unsigned	1				R	RW			
5	max_info_field_length_transmit		long-unsigned	128				R	RW			
6	max_info_field_length_receive		long-unsigned	128				R	RW			
7	inter_octet_time_out		long-unsigned	25				R	RW			
8	inactivity_time_out		long-unsigned	120				R	RW			
9	device_address		long-unsigned	32				R	RW			

4.4. 3GPP interface classes

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
	Destination event address	1										
1	logical_name		octet-string[6]					R	R			
2	Send destination		octet-string		Address and port Max 128 symbols			R	RW			
	GPRS modem setup class	45		0-0:25.4.0.255		version = 0						
1	logical_name		octet-string[6]	0000190400FF				R	R			
2	APN		octet-string		Defines the access point name of the network.			R	RW			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
3	PIN_code		long-unsigned		Holds the personal identification number.			R	RW			
4	quality_of_service		structure	quality_of_service ::= structure { default: qos_element, requested: qos_element } qos_element ::= structure { precedence: unsigned, delay: unsigned, reliability: unsigned, peak throughput: unsigned, mean throughput: unsigned }	Specifies the quality of service parameters. It is a structure of 2 elements: - the first one defines the default or minimum characteristics of the concerned network. These parameters have to be set to best effort value; - the second element defines the requested parameters.			R	R			
	GSM diagnostic	47		0-0:25.6.0.255		version = 0						
1	logical_name		octet-string[6]	0000190600FF				R	R			
2	operator		visible-string		Holds the name of the network operator e.g. "YourNetOp"			R	R			
3	status		unsigned	(0) not registered, (1) registered, home network, (2) not registered, but searching a new operator to register to, (3) registration denied, (4) unknown, (5) registered, roaming (6) .. (255) reserved	Indicates the registration status of the modem			R	RW			
4	cs_attachment		enum	(0) inactive, (1) incoming call, (2) active, (3) .. (255) reserved	Indicates the current circuit switched status			R	RW			
5	ps_status		enum	(0) inactive, (1) GPRS, (2) EDGE, (3) UMTS, (4) HSDPA, (5) LTE, (6) .. (255) reserved	The ps_status value field indicates the packet switched status of the modem			R	RW			
6	cell_info		structure	cell_info_type ::= structure { 144 cell_ID long-unsigned location_ID long-unsigned signal_quality unsigned ber unsigned }	cell_ID: Two-byte cell ID in hexadecimal format - location_ID: Two-byte location area code (LAC) in hexadecimal format (e.g. "00C3" equals 195 in decimal) - signal_quality: Represents the signal quality: (0) -113 dBm or less, (1) -111 dBm, (2 .. 30) -109 .. -53 dBm, (31) -51 dBm or greater, (99) not known or not detectable - ber: Bit error (BER) measurement in percent:			R	RW			

#	Object/Attribute Name	CL	Type	Value	Meaning	Comments	Access Rights					
							PC	RC	MC		FC	TC
					(0 .. 7) as RXQUAL_n values specified in ETSI GSM 05.08 8.2.4. (99) not known or not detectable							
7	adjacent_cells		array	array adjacent_cell_info adjacent_cell_info::= structure { cell_ID long-unsigned signal_quality unsigned }	cell_ID: Two-byte cell ID in hexadecimal format - signal_quality: Represents the signal quality: (0) -113 dBm or less, (1) -111 dBm, (2 .. 30) -109 .. -53 dBm, (31) -51 dBm or greater, (99) not known or not detectable			R	RW			
8	capture_time		date-time		Holds the date and time when the data has been last captured.			R	RW			
	TCP-UDP setup	41		0-0:25.0.0.255								
1	logical_name		octet-string[6]	0000190000FF				R	R			
2	TCP-UDP_port		long-unsigned	4059	4059/TCP and 4059/UDP used for DLMS/COSEM			R	RW			
3	IP_reference		octet-string[6]	0-0:25.1.0.255	Indicates the registration status of the modem			R	R			
4	MSS		long-unsigned	1280	Maximum Segment Size			R	R			
5	nb_of_sim_conn		unsigned	1	maximum number of simultaneous connections			R	R			
6	inactivity_time_out		long-unsigned		unit=seconds			R	RW			
	IPv4 setup	42		0-0:25.1.0.255								
1	logical_name		octet-string[6]	0000190100FF				R	R			
2	DL_reference		octet-string[6]	0-0:25.4.0.255	References a Data Link layer setup object			R	R			
3	IP_address		double-long-unsigned					R	RW			
4	multicast_IP_address		array		Not used			R	R			
5	IP_options		array					R	RW			
6	subnet_mask		double-long-unsigned	0xFFFFFFFF				R	R			
7	gateway_IP_address		double-long-unsigned					R	R			
8	use_DHCP_flag		boolean	1	(1) TRUE / (0) FALSE			R	R			
9	primary_DNS_address		double-long-unsigned					R	R			
10	secondary_DNS_address		double-long-unsigned					R	R			

Appendix A

1.1. Display Configuration

Lcd_config_structure::= structure

```
{  
    Screen_period      :      unsigned  
    Lcd_off_period     :      unsigned  
    Screen_config      :      array  
}
```

Screen_period -

duration displaying, s (2...255, 0 – duration infinite) - for customer LCD configuration
timeout for service mode, s (1...255, 0 – service mode is disable) - for service LCD configuration

Lcd_off_period -

duration working LCD, min (0...255, 0 – working infinite) - for customer LCD configuration
not used - for service LCD configuration

Screen_config::=structure

```
{  
    class_id           :      long-unsigned  
    logical_name       :      octet-string[6]  
    attribute_id       :      integer  
    format             :      enum  
}
```

format	on LCD
0	(#)
1	(# . #)
2	(# . # #)
3	(# . # # #)
4	(# #)
5	(# # . #)
6	(# # . # #)
7	(# # . # # #)
8	(# # #)
9	(# # # . #)
10	(# # # . # #)
11	(# # # . # # #)
12	(# # # #)
13	(# # # # . #)
14	(# # # # . # #)
15	(# # # # . # # #)
16	(# # # # #)
17	(# # # # # . #)
18	(# # # # # . # #)
19	(# # # # # . # # #)
20	(# # # # # #)
21	(# # # # # # . #)
22	(# # # # # # . # #)
23	(-)
24	(# # # # # # #)
25	(# # # # # # # . #)
26	(-)
27	(-)
28	(# # # # # # # #)
29-255	(-)

1.2. Display Archive Data Configuration

Lcd_achive_data_config_structure::= structure

```

{
    depth:                unsigned
    object_list:          array[n]
}
object_list[i]::= structure
{
    class_id:             long-unsigned
    logical_name:         octet-string[6]
    attribute_id:         integer
}

```

depth - depth archive. (0 - display only current data, 1 – current data + 1 entry from billing profile, ...).

object_list[i] - list of objects for displaying (0 <= i <= 20)
Billing profile must have this objects

1.3. Display Backlight Configuration

```

Lcd_backlight_config_structure::= structure
{
    mode:                unsigned
    timeout:             long-unsigned
}

```

mode - 0 – backlight on; 1 – backlight off; 2 - backlight turns on the button and turns off by timeout

timeout - timeout for mode(2) (s)

1.4. Configuration unsuccessful logging attempts

```

Unsuccessful_logging_attempts_structure::= structure
{
    attempts:            unsigned
    lock_timeout:        long-unsigned
}

```

attempts - number of unsuccessful logging attempts before running lock_timeout (0 – function is disabled)

lock_timeout - Lock timeout connection (min)

2. Appendix B

2.1. Actions for limiters

action ::= structure

```
{
    action_over_threshold:  action_item,
    action_under_threshold: action_item
}
```

action_item ::= structure

```
{
    script_logical_name:  octet-string,
    script_selector:      long-unsigned
}
```

Limiter object	Monitoring object	Script_logical_name	Script_selector	Description
0-0:17.0.0.255	3, 1-0:1.7.0.255, 2	0-0:10.0.106.255	3	Disconnect relay
			4	Connect relay
		0-0:10.0.10.255	3	Set event "Total Active Power Error"
			4	Set event "Total Active Power Ok"
		0-0:10.0.11.255	3	Set event "Total Active Power Error" + disconnect relay
			4	Set event "Total Active Power Ok" + connect relay
0-0:17.0.1.255	5, 1-0:1.4.0.255, 3	0-0:10.0.106.255	35	Disconnect relay
			36	Connect relay
		0-0:10.0.10.255	35	Set event "Demand Error"
			36	Set event "Demand Ok"
		0-0:10.0.11.255	35	Set event "Demand Ok" + disconnect relay
			36	Set event "Demand Error" + connect relay
0-0:17.0.20.255	3, 1-0:31.7.0.255, 2	0-0:10.0.106.255	5	Disconnect relay
			6	Connect relay
		0-0:10.0.10.255	5	Set event "Current exceed phase A error"
			6	Set event "Current exceed phase A Ok"
		0-0:10.0.11.255	5	Set event "Current exceed phase A error" + disconnect relay
			6	Set event "Current exceed phase A Ok" + connect relay
0-0:17.0.21.255	3, 1-0:51.7.0.255, 2	0-0:10.0.106.255	7	Disconnect relay
			8	Connect relay
		0-0:10.0.10.255	7	Set event "Current exceed phase B error"
			8	Set event "Current exceed phase B Ok"
		0-0:10.0.11.255	7	Set event "Current exceed phase B error" + disconnect relay
			8	Set event "Current exceed phase B Ok" + connect relay
0-0:17.0.22.255	3, 1-0:71.7.0.255, 2	0-0:10.0.106.255	9	Disconnect relay
			10	Connect relay
		0-0:10.0.10.255	9	Set event "Current exceed phase C error"

			10	Set event "Current exceed phase C Ok"
		0-0:10.0.11.255	9	Set event "Current exceed phase C error" + disconnect relay
			10	Set event "Current exceed phase C Ok" + connect relay
0-0:17.0.43.255		0-0:10.0.106.255	1	Disconnect relay
			2	Connect relay
		0-0:10.0.10.255	1	Set event 13 (Differential current appeared) in fraud detection event log
			2	Set event 14 (Differential current disappeared) in fraud detection event log
		0-0:10.0.11.255	1	Set event 13 + disconnect relay
			2	Set event 14 + connect relay
0-0:17.0.71.255	3, 1-0:32.25.0.255, 2	0-0:10.0.10.255	37	Set event "Over limit average voltage phase L1"
			38	Set event "Under limit average voltage phase L1"
0-0:17.0.72.255	3, 1-0:52.25.0.255, 2	0-0:10.0.10.255	39	Set event "Over limit average voltage phase L2"
			40	Set event "Under limit average voltage phase L2"
0-0:17.0.73.255	3, 1-0:72.25.0.255, 2	0-0:10.0.10.255	41	Set event "Over limit average voltage phase L3"
			42	Set event "Under limit average voltage phase L3"

3. Appendix C

Secure atomic parameterisation — functional requirement (REQ-PARAM-1 to REQ-PARAM-3)

REQ-PARAM-1. The meter shall support secure, atomic parameterisation. A client (HES, DCU or LR&M device) shall be able to deliver a self-consistent set of parameter settings that is applied only as a whole and only after its completeness and integrity have been verified. If delivery is interrupted (e.g. over PLC), the meter shall keep operating with the last valid parameter set until a complete, integrity-checked set has been received and activated.

REQ-PARAM-2. The mechanism shall provide: (a) delayed activation at a specified activation time; (b) an expiry time after which an unapplied set is discarded; (c) per-request confirmation returned to the client, correlated to the request by identifier; and (d) fragmented delivery with FIFO ordering and duplicate protection.

REQ-PARAM-3 — Implementation options. Implementation Option A, the reference implementation using the DLMS Message Queue interface class (class_id 8449) with the Request/Response Message Queue objects (0-0:138.0.0.255 and 0-0:138.0.1.255) and the message payload format defined below in this appendix, is an accepted solution. A tenderer may instead propose any equivalent implementation built exclusively on standard DLMS/COSEM services — for example SET-with-list for atomic multi-attribute write, passive/active objects with activation_time, or Script table (IC 9) combined with Single action schedule (IC 22) — provided it satisfies REQ-PARAM-1 and REQ-PARAM-2 and is demonstrated at FAT.

3.1. Implementation Option A — Safe parameterisation via the DLMS Message Queue class (class_id 8449)

This appendix describes Implementation Option A referenced in requirement REQ-PARAM-3. It is one accepted way to satisfy REQ-PARAM-1 and REQ-PARAM-2; an equivalent mechanism based on standard DLMS/COSEM services is admissible under the same requirement

3.1.1. Formulation of the Problem

In case of interruption of the parameterization process (local or remote), the meter shall continue to work in accordance with the current parameterization. Until the confirmation of the accuracy of parameterization in the local or remote connection session, the meter should remain in the settings prior to the change carried out.

Thus, some Client (HES, DC or LR&M device) needs to send a number of parameter settings to the Server (meter). The Client uses hazardous communications media like PL or manual operations, communication may be broken at any time then restored. The Server may receive parameter settings in parts, fragment by fragment.

It is supposed that the customer wishes to be sure that the complete set of settings received by the Server will be applied only if it meets the requirement of integrity: the set of parameters received by the meter is complete and is not modified during transfer.

This means that:

- The Client is responsible for generating self-consistent set of parameter settings.
- Before applying settings, the Server must have facility for checking data integrity of the received parameter set.

To be able to meet these requirements, meter shall implement objects of the Message Security interface class.

3.1.2. Message Queue Interface Class

3.1.2.1. General Description

Message Queue interface class makes it possible to implement a queue facility in a COSEM server.

The queue is modeled by a buffer containing a list of messages.

Each message has unique monotonously incrementing serial number, hereafter called `message_id`, and the payload field. `Message_id` is used to implement FIFO discipline and avoid message duplicates. Payload may carry anything useful for specific task (PDU of some communication protocol, DLMS services, text messages, segments of firmware images, etc.) and should be specified separately for each task.

Two user application processes have to be distinguished:

- Enqueueing Application Process (hereafter EP) is the process which enqueues a message, i.e. adds the message to the rear terminal position of the queue. EP sets proper `message_id` and invokes the `enqueue_message()` method of the appropriate Message Queue object. Operation may fail if `message_id` in the new message does not exceed that of the last message already enqueued, or the message size exceeds actual buffer free space.
- Dequeueing Application Process (hereafter DP) is the process which dequeues messages. DP dequeues messages in two steps:

- On the first step DP reads all messages in the buffer using standard DLMS GET service,
- On the second step DP removes all read messages from the front terminal position of the queue, invoking `remove_messages()` method.

This interface class specifies access rights for two abstract application processes mentioned above. In real implementations the role of EP or/and DP can be played by a specific COSEM client or the server AP. Real AP playing the role of EP or/and DP for each Message Queue object (each instance of the Message Queue class) must be specified in the Companion Standard alongside with the OBIS codes, buffer size, etc.

3.1.2.2. Class Definition

Message Queue Interface Class (class_id: 8449, version: 0)

Message Queue	0..n	class_id = 8449, version = 0				Access
Attributes	Data type	Min.	Max.	Def.	Short name	EP/DP
1. logical_name (static)	octet-string				x	R-/R-
2. buffer (dyn.)	array				x + 0x??	R-/R-
3. buffer_size (dyn.)	double-long-unsigned				x + 0x??	R-/R-
4. buffer_free_space (dyn.)	double-long-unsigned				x + 0x??	R-/R-
5. last_enqueued_message_id (dyn.)	double-long-unsigned				x + 0x??	R-/R-
Specific methods	m/o					
1. reset()	m					x + 0x?? -W/--
2. enqueue_message(message)	m					x + 0x?? -W/--
3. remove_messages(last_read_message_id)	m					x + 0x?? --/-W

Attribute description

logical_name	Identifies the Message Queue object instance.
buffer	This is a buffer that contains list of messages. buffer::=array of message message::=structure <pre>{ message_id double-long-unsigned, payload octet-string }</pre> message_id: message number. payload: this is the message body. Payload internal structure is out of the scope of the Message Queue class definition. <i>selective access for this attribute is not available.</i>
buffer_size	Full size of queue buffer, bytes.
buffer_free_space	Free memory space in buffer, bytes.
last_enqueued_message_id	The last message number in queue.

Method description

reset()	This method forces a reset of the queue. After reset invocation the buffer becomes empty, <code>last_enqueued_message_id</code> is equal to 0, <code>buffer_free_space</code> is equal to the <code>buffer_size</code> .
enqueue_message (message)	This method enqueues a message (appends a new message to the end of queue). Returned values: Success = 0, ErrorLength = read-write-denied (3), ErrorMessageId = type-unmatched (12)
remove_messages (last_read_message_id)	This method deletes all messages, for which <code>message_id</code> is less or equal than <code>last_read_message_id</code>. <code>last_read_message_id</code> double-long-unsigned Returned value: <code>buffer_free_space</code> (after removing messages)

Two instances of the Message Queue class shall be implemented in the meter:

1. Request Message Queue object. Buffer stores *request messages*, each of which carries a self-consistent set of parameter settings (requests).
2. Response Message Queue object. Buffer stores *response messages*, each of which carries a set of responses to each request in the request message with the same `message_id`.

The actors in this task are:

1. COSEM Management Client, connected to the PLC or Local (Optical) port of the meter, respectively. This Application Process has rights to:
 - a. Construct and enqueue request message to the Request Message Queue.
 - b. Dequeue response messages from the Response Message Queue.
2. COSEM server application process, running in the meter. This Application Process has the rights to:
 - a. Dequeue request messages from the Request Message Queue.
 - b. Extract requests from a message, execute requests one by one, construct response message with the same `message_id` and enqueue it to the Response Message Queue.

Typical message sequence diagrams are shown in Fig. 1 and Fig. 2:

- Request message originator and response message recipient are hosted in HES.
- Data concentrator opens Application Association with meter on behalf of the Management Client and then acts as a gateway between DCSAP (P3.2) and COSEM/PLC.
- Internal server AP is not shown.

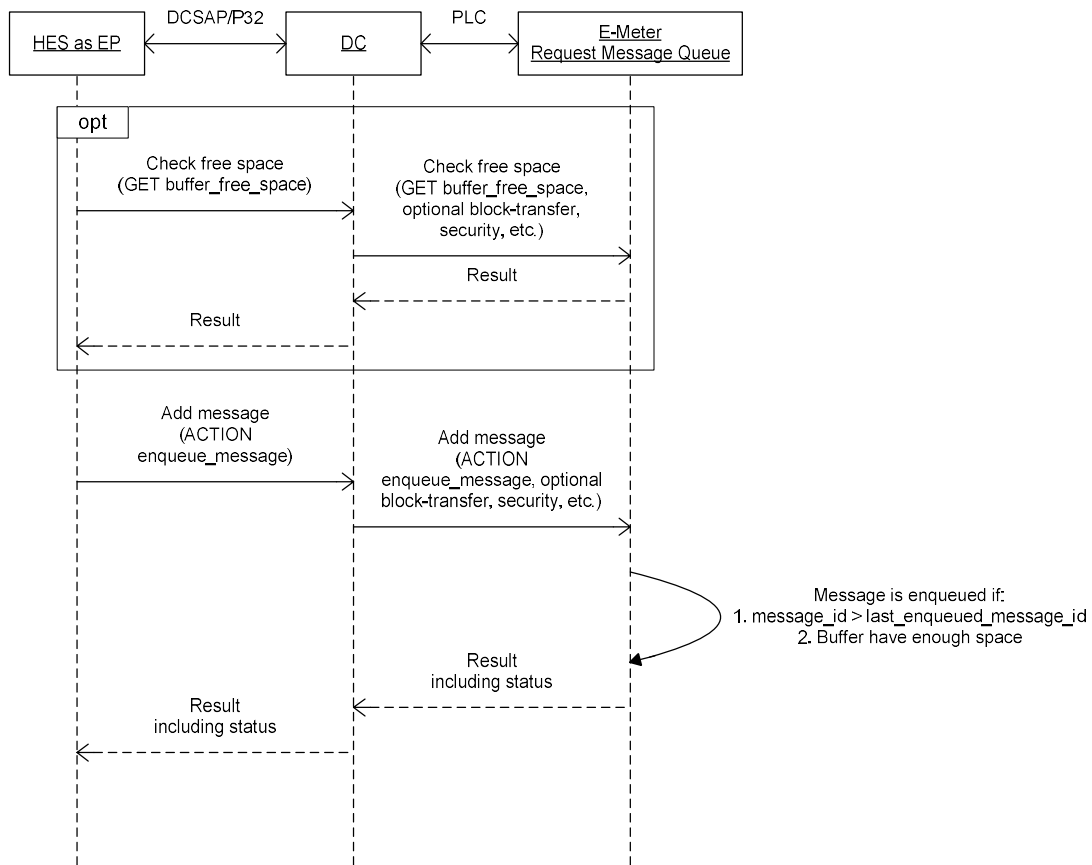


Fig. 1. HES is enqueueing messages to the Request Message Queue

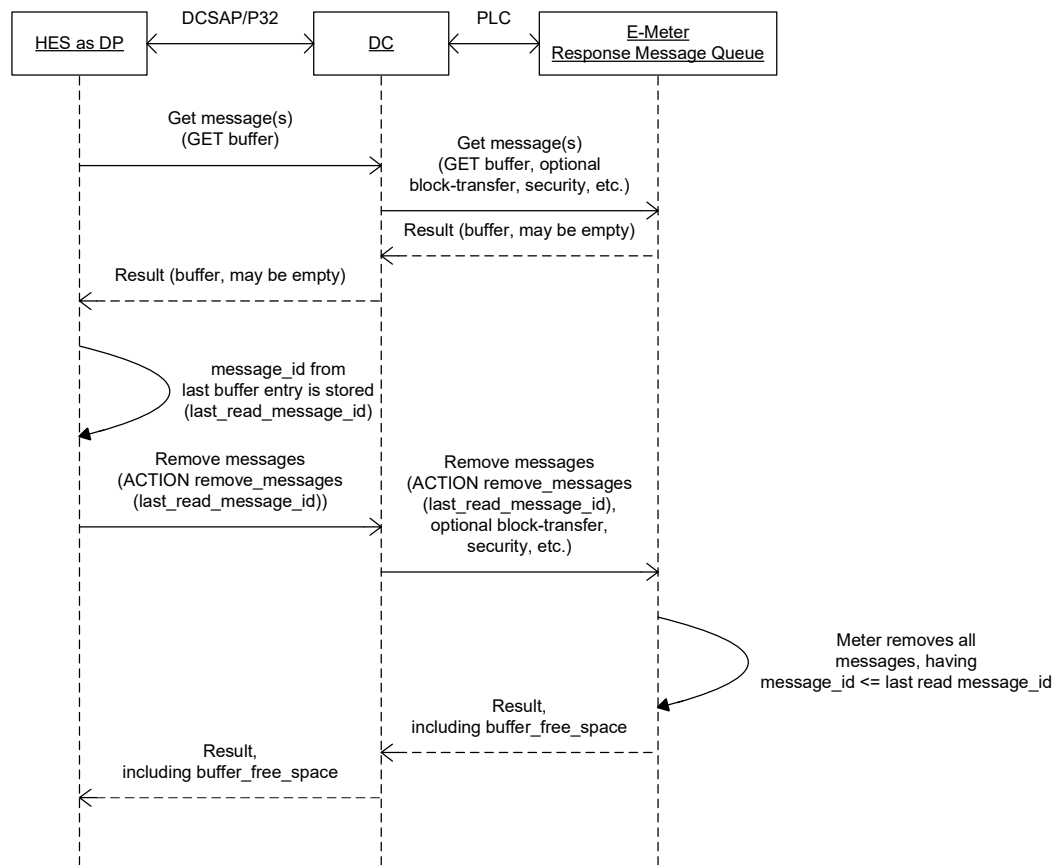


Fig. 2. HES is dequeuing response messages from the Response Message Queue

Message payload format

Request message

Payload ::= SEQUENCE

```

{
  activate_time    date_time
  expire_time     date_time
  request_apdu_list SEQUENCE OF apdu
}

```

activate_time: Determines time when internal DP must invoke COSEM services from request_apdu_list. If activate_time is in future, internal DP postpones dequeuing messages. If activate_time is in the past, meter invokes COSEM services immediately.

expire_time: Determines time when the message expires. If expire_time is not in future, internal DP discards request message and responds with response message with empty response_apdu_list and actual timestamp in the activated_time field.

request_apdu_list: xDLMS APDUs used with LN referencing with no ciphering.

Example:

Payload dump:

```

09 6D 19 07 DD 06 03 01 0E 1E 0F 00 00 00 00 19 07 DD 06 03 01 0F 1E 0F 00 00 00 00 04 C1 01 40 00
08 00 00 01 00 00 FF 05 00 19 FF FF 03 FE 07 02 00 00 00 00 00 00 C1 01 41 00 08 00 00 01 00 00 FF 06
00 19 FF FF 0A FE 07 03 00 00 00 00 00 00 C1 01 42 00 08 00 00 01 00 00 FF 07 00 0F 3C C1 01 43 00 08
00 00 01 00 00 FF 08 00 03 01

```

Fields:

09 6D – octet-string[109]

19 07 DD 06 03 01 0E 1E 0F 00 00 00 00 – activate_time

19 07 DD 06 03 01 0F 1E 0F 00 00 00 00 – expire_time

04 – sequence

C1 01 40 00 08 00 00 01 00 00 FF 05 00 19 FF FF 03 FE 07 02 00 00 00 00 00 00 – request_apdu 1

C1 01 41 00 08 00 00 01 00 00 FF 06 00 19 FF FF 0A FE 07 03 00 00 00 00 00 00 – request_apdu 2

C1 01 42 00 08 00 00 01 00 00 FF 07 00 0F 3C – request_apdu 3

C1 01 43 00 08 00 00 01 00 00 FF 08 00 03 01 – request_apdu 4

Response message

Payload format for response message:

Payload ::= SEQUENCE

{
activated_time date_time
response_apdu_list SEQUENCE OF apdu
}

activated_time: Time when internal DP actually invoked COSEM services from request_apdu_list.

response_apdu_list: xDLMS APDUs used with LN referencing with no ciphering. This field may be empty if corresponding request message was expired.

Example (response for the request message from the previous sub-section):

Payload dump:

09 1D 19 07 DD 06 03 01 0E 1E 0F 00 03 00 00 04 C5 01 40 00 C5 01 41 00 C5 01 42 00 C5 01 43 00

Fields:

09 1D – octet-string[29]

19 07 DD 06 03 01 0E 1E 0F 00 03 00 00 – activated time

04 – sequence

C5 01 40 00 – response_apdu 1

C5 01 41 00 – response_apdu 2

C5 01 42 00 – response_apdu 3

C5 01 43 00 – response_apdu 4.

4. Appendix E

4.1. Compact action

Method -1. out_data get_buffer_by_index_ascending(in_data_asc)

```
in_data_asc ::= structure
{
  index:    double-long-unsigned,
  count:    unsigned
}

out_data_asc ::= structure
{
  config_id:    double-long-unsigned,
  entry_index:  double-long-unsigned,
  is_last_entry: bool,
  buffer:       array
}
```

Method -2. out_data get_buffer_by_index_descending(in_data_desc)

```
in_data_desc ::= structure
{
  index:    double-long-unsigned,
  count:    unsigned
}

out_data_desc ::= structure
{
  config_id:    double-long-unsigned,
  entry_index:  double-long-unsigned,
  is_first_entry: bool,
  buffer:       array
}
```

Method -3. out_data_asc_compact get_buffer_by_index_ascending_compact(in_data_asc)

```
in_data_asc ::= structure
{
  index:    double-long-unsigned,
  count:    unsigned
}

out_data_asc_compact ::= structure
{
  config_id:    double-long-unsigned,
  entry_index:  double-long-unsigned,
  is_last_entry: bool,
```

```

capture_time:      utc-date-time-32,
compact_buffer_descr:  octet-string,
compact_buffer:    octet-string
}

```

Method -4. out_data_desc_compact get_buffer_by_index_descending_compact(in_data_desc)

```

in_data_desc ::= structure

```

```

{
  index:  double-long-unsigned,
  count:  unsigned
}

```

```

out_data_desc_compact ::= structure

```

```

{
  config_id:      double-long-unsigned,
  entry_index:    double-long-unsigned,
  is_first_entry: bool,
  capture_time:   utc-date-time-32,
  compact_buffer_descr:  octet-string,
  compact_buffer:  octet-string
}

```