

Model Implementation Conformance Statement (MICS)

for
“Ekip Com IEC 61850”

Based on IEC 61850-6

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Document Versions

Version	Ekip COM IEC 61850 SW version	Modifications	Release Date	Author
1.0	2.01	First emission	11 Sep, 2014	M. Stucchi
1.1	2.02	Added nodes: F50TDPTOC1, F67PTOC2, F50NTDPTOC3, F50GTDPTOC4, MMTR1, PRGOUTGGIO1	13 Oct, 2014	M. Stucchi
1.2	2.02	Added IdNs DO to ABBEMAX2_Rev1_LPL_A (Ed.1) Corrected GGIO1 LN into PRGOUTGGIO1 Renamed data types according to ABB common rules for type identification <u>Ed. 1 only</u> Added dataNs to MMXU1.PNV	20 Jan, 2015	M. Stucchi
1.3	2.05	Added DOs: <i>Mod, Health, NamePlt</i> to every LN (mandatory in Ed.1, optional in Ed.2) Added DAs to the following DOTypes: <i>stVal</i> to ABBEMAX2_Rev1_INC type <i>d</i> to ABBEMAX2_Rev1_LPL_B <i>pulsQty</i> to ABBEMAX2_Rev1_BCR	26 Jan, 2015	M. Stucchi
1.4	2.05	Removed optional ConfigRev from Model for all LNs but LLN0	9 Feb, 2015	M. Stucchi
1.5	2.09	Changed Mod, Beh, Health from INT32 to Enum (Ed.1), New names for ABBEMAX2_Rev1_INC DO Type: ABBEMAX2_Rev1_ENC New DO types: ABBEMAX2_Rev1_ENS_A, ABBEMAX2_Rev1_ENS_B, ABBEMAX2_Rev1_ENS_C, Added DO: <i>CBOpCap</i> to XCBR LN type (mandatory in Ed.1) Better explanation on enum types MMXU: indication of added node for PNv (Ed.1) Corrected ctlModel attribute type to CtlModels Moved dataNs from ...WYE_B to ...WYE_B Modified CDC Class WYE description Corrected ABBEMAX2_Rev1_WYE_A/B/C types Revised descriptions of ABBEMAX2_Rev1_LPL_A and ABBEMAX2_Rev1_LPL_B New DO type: ABBEMAX2_Rev1_SPS_A and ABBEMAX2_Rev1_SPS_B merged into ABBEMAX2_Rev1_SPS	3 Jun, 2015	M. Stucchi

1.6	2.10	Specified enum type (dir) for: ABBEMAX2_Rev1_ACD Corrected stVal enumerated description for: ABBEMAX2_Rev1_ENC According to TICS 1199 (Ed.1) changed actVal attribute type to INT32 for ABBEMAX2_Rev1_BCR	22 Jul, 2015	M. Stucchi
1.7	2.10	Added origin DA to ABBEMAX2_Rev1_DPC_B	31 Jul, 2015	M. Stucchi
1.8	3.00	Added DO IntIn1 to LN PRGOUTGGIO1. Corrected and unified corresponding CDC INS class ABBEMAX2_Rev1_INS	12 Oct, 2016	M. Stucchi
1.9	3.01	Renamed Rev1 to Rev2 for elements like LNodeType and DOType in order to distinguish the new version once in the market. Added DO Ind5 to Ind16 to LN PRGOUTGGIO1. Modified dataNs description to ABBEMAX2_Rev2_WYE_C. Reordered GGIO DOs according to standard.	28 Apr, 2017	M. Stucchi
1.10	3.02 3.04	Removed references to "Emax2", replaced with "Ekip Com IEC 61850" instead Modified DA default value in NamPlt DO of LN LLNO, in order to be able to use the module with other Circuit Breakers or devices: <i>d</i> from "Emax 2" to "Ekip Com IEC61850" LN LPHD: modified DA <i>model</i> in DO <i>PhyNam</i> so that it can received the content directly from the device, as a string.	21 Nov, 2017	M. Stucchi
1.11	3.05 3.06	Removed DAs from the following DOTypes: <i>range</i> to ABBEMAX2_Rev2_CMV <i>range</i> to ABBEMAX2_Rev2_MV	17 Apr, 2019	M. Stucchi

References

[1] – SACE Emax2, New low voltage air circuit breaker – Technical catalogue

[2] – IEEE Std C37.2-2008 – IEEE Standard for Electrical Power System Device Function Numbers, [..]

Introduction

Ekip COM IEC 61850 provides an IEC 61850 server exposing the protection parameters and measures of ABB SACE Protection Units, and provides controls to external clients. Devices supported by Ekip Com IEC 61850 are protection units for ACBs (SACE Emax2) and for future MCCBs.

The implemented object model is based on the model described in IEC 61850, including LLNs (Logical Nodes, part 7-4) and CDCs (Common Data Classes, part 7-3).

The present document describes the implemented objects.

Logical Device

The following nodes compose the protection units device model.

LN group	LN instance	LN type	Description
System	LPHD1	LPHD	Physical device information
	LLN0	LLN0	Logical Node 0
Supervisory Control	CSWI1	CSWI	Switch controller
Metering and Measurement	MMXU1	MMXU	Measurement
	MMTR1	MMTR	Metering 3 Phase
Protection functions	PTRC1	PTRC	Protection trip conditioning
	F50TDPTOC1	PTOC	Overcurrent protection (S)
	F67PTOC2	PTOC	Overcurrent protection (D)
	F50NTDPTOC3	PTOC	Overcurrent protection (G)
	F50GTDPTOC4	PTOC	Overcurrent protection (Gext)
Protection Related functions	RBRF1	RBRF	Breaker failure
Switchgear	XCBR1	XCBR	Circuit breaker
Generic function references	PRGOUTGGIO1	GGIO	Generic process I/O

Table 1 – Logical Nodes

Logical Nodes

Each of the listed logical nodes is composed by different attributes. Not every attribute listed in the standard as belonging to a Logical Node is actually supported by Ekip Com IEC 61850. This is possible since not all the attributes implementation is mandatory according to the standard. The present chapter will describe the structure of all the Logical Nodes implemented in Ekip Com IEC 61850. The naming convention used by ABB states that the attribute type always has a prefix that is equal to the CDC name (common data class). The adopted CDC only implements the required attributes as a combination of standard requirements (mandatory attributes have always been implemented) and opportunity (optional attributes have been implemented only if useful in the application). Future versions will add more attributes to the classes: these attributes are already present in the device object model, but have at the moment have no connection with the internal values. They are now listed with a red background.

Logical Node LPHD1

Physical device information (LN Class: LPHD)

Data Object Name	Data Object Type	Description
PhyNam	ABBEMAX2_Rev2_DPL	Physical device name plate
PhyHealth	ABBEMAX2_Rev2_ENS_B	Physical device health
Proxy	ABBEMAX2_Rev2_SPS	Indicates if this node is a proxy

Table 2 – LPHD1 Logical node

Logical Node LLNO

Logical Node 0 (LN Class: LLNO)

Data Object Name	Data Object Type	Description
Mod	ABBEMAX2_Rev2_ENC	Mode
Beh	ABBEMAX2_Rev2_ENS_A	Behaviour
Health	ABBEMAX2_Rev2_ENS_B	Health
NamPlt	ABBEMAX2_Rev2_LPL_A	Name plate

Table 3 – LLNO1 Logical node

Logical Node CSWI1

Switch Controller (LN Class: CSWI)

Data Object Name	Data Object Type	Description
Mod	ABBEMAX2_Rev2_ENC	Mode
Beh	ABBEMAX2_Rev2_ENS_A	Behaviour
Health	ABBEMAX2_Rev2_ENS_B	Health
NamPlt	ABBEMAX2_Rev2_LPL_B	Name plate, d=" Switch controller"
Loc	ABBEMAX2_Rev2_SPS	Local control behaviour
Pos	ABBEMAX2_Rev2_DPC_B	Switch, general

Table 4 – CSWI1 Logical node

Logical Node MMXU1

Measurement (LN Class: MMXU).

Note: Ed.1 model has been extended with DO PNV, derived from Ed.2 (where it is a standard DO).

Data Object Name	Data Object Type	Description
Mod	ABBEMAX2_Rev2_ENC	Mode
Beh	ABBEMAX2_Rev2_ENS_A	Behaviour
Health	ABBEMAX2_Rev2_ENS_B	Health
NamPlt	ABBEMAX2_Rev2_LPL_B	Name plate, d="Measurements"
TotW	ABBEMAX2_Rev2_MV	Total active power
TotVAR	ABBEMAX2_Rev2_MV	Total reactive power
TotVA	ABBEMAX2_Rev2_MV	Total apparent power
TotPF	ABBEMAX2_Rev2_MV	Average power factor
Hz	ABBEMAX2_Rev2_MV	Frequency
PPV	ABBEMAX2_Rev2_DEL	Phase to phase voltages
PNV	ABBEMAX2_Rev2_WYE_C	Phase to neutral voltage

A	ABBEMAX2_Rev2_WYE_B	Phase currents
W	ABBEMAX2_Rev2_WYE_A	Phase active power
VAr	ABBEMAX2_Rev2_WYE_A	Phase reactive power
VA	ABBEMAX2_Rev2_WYE_A	Phase apparent power

Table 5 – MMXU1 Logical node

Logical Node MMTR1

Metering 3 Phase (LN Class: MMTR)

Data Object Name	Data Object Type	Description
Mod	ABBEMAX2_Rev2_ENC	Mode
Beh	ABBEMAX2_Rev2_ENS_A	Behaviour
Health	ABBEMAX2_Rev2_ENS_B	Health
NamPlt	ABBEMAX2_Rev2_LPL_B	Name plate, d="Metering (billing purpose)"
TotVAh	ABBEMAX2_Rev2_BCR	Net apparent energy
TotWh	ABBEMAX2_Rev2_BCR	Net real energy
TotVArh	ABBEMAX2_Rev2_BCR	Net reactive energy

Table 6 – PTRC1 Logical node

Logical Node PTRC1

Protection Trip Conditioning (LN Class: PTRC)

Data Object Name	Data Object Type	Description
Mod	ABBEMAX2_Rev2_ENC	Mode
Beh	ABBEMAX2_Rev2_ENS_A	Behaviour
Health	ABBEMAX2_Rev2_ENS_B	Health
NamPlt	ABBEMAX2_Rev2_LPL_B	Name plate, d="Protection Trip conditioning"
Tr	ABBEMAX2_Rev2_ACT	Trip
Str	ABBEMAX2_Rev2_ACD	Start (combination of subscribed protection Str)

Table 7 – PTRC1 Logical node

Logical Node F50TDPTOC1

Time Overcurrent (LN Class: PTOC) – This LN represents “S” protection in Emax2. The LN name adopted the “TD” prefix, as advised in [1], since its typical application with selectivity is fixed time protection.

Data Object Name	Data Object Type	Description
Mod	ABBEMAX2_Rev2_ENC	Mode
Beh	ABBEMAX2_Rev2_ENS_A	Behaviour
Health	ABBEMAX2_Rev2_ENS_B	Health
NamPlt	ABBEMAX2_Rev2_LPL_B	Name plate, d="S Protection (ANSI 50 TD/68/51)"
Str	ABBEMAX2_Rev2_ACD	Start (combination of subscribed protection Str)
Op	ABBEMAX2_Rev2_ACT	Operate

Table 8 – F50TDPTOC1 Logical node

Logical Node F67PTOC2

Time Overcurrent (LN Class: PTOC) – This LN represents “D” protection in Emax2. It is the only protection carrying directional information.

Data Object Name	Data Object Type	Description
Mod	ABBEMAX2_Rev2_ENC	Mode
Beh	ABBEMAX2_Rev2_ENS_A	Behaviour
Health	ABBEMAX2_Rev2_ENS_B	Health
NamPlt	ABBEMAX2_Rev2_LPL_B	Name plate, d=“D Protection (ANSI 67)”
Str	ABBEMAX2_Rev2_ACD	Start (combination of subscribed protection Str)
Op	ABBEMAX2_Rev2_ACT	Operate (combination of subscribed protection Op)

Table 9 – F67PTOC2 Logical node

Logical Node F50NTDPTOC3

Time Overcurrent (LN Class: PTOC) – This LN represents “G” protection in Emax2

Data Object Name	Data Object Type	Description
Mod	ABBEMAX2_Rev2_ENC	Mode
Beh	ABBEMAX2_Rev2_ENS_A	Behaviour
Health	ABBEMAX2_Rev2_ENS_B	Health
NamPlt	ABBEMAX2_Rev2_LPL_B	Name plate, d=“G Protection (ANSI 50N TD/68/51N)”
Str	ABBEMAX2_Rev2_ACD	Start (combination of subscribed protection Str)
Op	ABBEMAX2_Rev2_ACT	Operate (combination of subscribed protection Op)

Table 10 – F50NTDPTOC3 Logical node

Logical Node F50GTDPTOC4

Time Overcurrent (LN Class: PTOC) – This LN represents “Gext” protection in Emax2

Data Object Name	Data Object Type	Description
Mod	ABBEMAX2_Rev2_ENC	Mode
Beh	ABBEMAX2_Rev2_ENS_A	Behaviour
Health	ABBEMAX2_Rev2_ENS_B	Health
NamPlt	ABBEMAX2_Rev2_LPL_B	Name plate, d=“Gext Protection (ANSI 50G TD/51G)”
Str	ABBEMAX2_Rev2_ACD	Start (combination of subscribed protection Str)
Op	ABBEMAX2_Rev2_ACT	Operate (combination of subscribed protection Op)

Table 11 – F50GTDPTOC4 Logical node

Logical Node RBRF1

Breaker failure (LN Class: RBRF)

Data Object Name	Data Object Type	Description
Mod	ABBEMAX2_Rev2_ENC	Mode
Beh	ABBEMAX2_Rev2_ENS_A	Behaviour
Health	ABBEMAX2_Rev2_ENS_B	Health
NamPlt	ABBEMAX2_Rev2_LPL_B	Name plate, d="Breaker failure (backup protection)"
OpEx	ABBEMAX2_Rev2_ACT	Breaker failure (external trip)

Table 12 – RBRF1 Logical node

Logical Node XCBR1

Circuit Breaker (LN Class: XCBR)

Data Object Name	Data Object Type	Description
Mod	ABBEMAX2_Rev2_ENC	Mode
Beh	ABBEMAX2_Rev2_ENS_A	Behaviour
Health	ABBEMAX2_Rev2_ENS_B	Health
NamPlt	ABBEMAX2_Rev2_LPL_B	Name plate, d="Circuit breaker"
Loc	ABBEMAX2_Rev2_SPS	Local control behaviour
OpCnt	ABBEMAX2_Rev2_INS	Operation counter
Pos	ABBEMAX2_Rev2_DPC_A	Switch position
BlkOpn	ABBEMAX2_Rev2_SPC	Block opening
BlkCls	ABBEMAX2_Rev2_SPC	Block closing
CBOpCap	ABBEMAX2_Rev2_ENS_C	Circuit Breaker operating capability

Table 13 – XCBR1 Logical node

Logical Node PRGOUTGGIO1

Generic Process I/O (LN Class: GGIO)

Data Object Name	Data Object Type	Description
Mod	ABBEMAX2_Rev2_ENC	Mode
Beh	ABBEMAX2_Rev2_ENS_A	Behaviour
Health	ABBEMAX2_Rev2_ENS_B	Health
NamPlt	ABBEMAX2_Rev2_LPL_B	Name plate, d="Programmable output (GOOSE transmitted)"
IntIn1	ABBEMAX2_Rev2_INS	Integer status input
Ind1	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind2	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind3	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind4	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind5	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind6	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind7	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind8	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind9	ABBEMAX2_Rev2_SPS	General indication (binary input)

Ind10	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind11	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind12	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind13	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind14	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind15	ABBEMAX2_Rev2_SPS	General indication (binary input)
Ind16	ABBEMAX2_Rev2_SPS	General indication (binary input)

Table 14 – PRGOUTGGIO1 Logical node

Common Data Classes

The data classes derived from the classes declared in IEC61850 – 7 – 3.

ABBEMAX2_Rev2_ACD

CDC Class: ACD (Directional protection activation information)

Attribute	Attribute type	Description
general	BOOLEAN	TRUE FALSE
dirGeneral	Enum	unknown=0 forward backward both
q	Quality	
t	TimeStamp	

Table 15 – ABBEMAX2_Rev2_ACD attributes

ABBEMAX2_Rev2_ACT

CDC Class: ACT (Protection activation information)

Attribute	Attribute type	Description
general	BOOLEAN	intermediate-state off on bad-state
q	Quality	
t	TimeStamp	

Table 16 – ABBEMAX2_Rev2_ACT attributes

ABBEMAX2_Rev2_BCR

CDC Class: BCR (Binary counter reading)

Attribute	Attribute type	Description
actVal	INT32	
q	Quality	
t	TimeStamp	
pulsQty	FLOAT32	fixed to 1

Table 17 – ABBEMAX2_Rev2_BCR attributes

ABBEMAX2_Rev2_CMV

CDC Class: CMV (Complex measured value)

Attribute	Attribute type	Description
cVal	Vector	
q	Quality	
t	TimeStamp	

Table 18 – ABBEMAX2_Rev2_CMV attributes

ABBEMAX2_Rev2_DEL

CDC Class: DEL (Phase to phase related measured values of a three-phase system)

Attribute	Attribute type	Description
phsAB	ABBEMAX2_Rev2_DEL	
phsBC	ABBEMAX2_Rev2_DEL	
phsCA	ABBEMAX2_Rev2_DEL	

Table 19 – ABBEMAX2_Rev2_DEL attributes

ABBEMAX2_Rev2_DPC_A

CDC Class: DPC (Controllable double point)

Attribute	Attribute type	Description
stVal	CODED ENUM	intermediate-state off on bad-state
q	Quality	
t	TimeStamp	
ctlModel	CtlModels	

Table 20 – ABBEMAX2_Rev2_DPC_A attributes

ABBEMAX2_Rev2_DPC_B

CDC Class: DPC (Controllable double point)

Attribute	Attribute type	Description
stVal	CODED ENUM	intermediate-state off on bad-state
q	Quality	
t	TimeStamp	
stSeld	BOOLEAN	The controllable data is in the status "selected"
ctlModel	CtlModels	
origin	Originator	Orcat enum: not-supported bay-control station-control remote-control automatic-bay automatic- station automatic-remote maintenance process not-supported-9 not-supported-10

Table 21 – ABBEMAX2_Rev2_DPC_B attributes

ABBEMAX2_Rev2_DPL

CDC Class: DPL (Device name plate)

Attribute	Attribute type	Description
Vendor	VISIBLE STRING255	"ABB" (fixed)
swRev	VISIBLE STRING255	Protection Unit (mainboard) Sw version MM.mm - e.g. "02.32"
serNum	VISIBLE STRING255	Protection Unit (mainboard) serial number
Model	VISIBLE STRING255	Protection Unit (mainboard) type - e.g. "Ekip Touch (High)". Alternatively, this string can be specified directly from the connected device.

Table 22 – ABBEMAX2_Rev2_DPL attributes

ABBEMAX2_Rev2_ENC

CDC Class: Ed.1 – INC (controllable integer status), Ed.2 – ENC (controllable enumerated status)

Attribute	Attribute type	Description
stVal	Enum, type = Mod	on=1 blocked test test/blocked off
ctlModel	Enum	status-only=0 direct-with-normal-security sbo-with-normal-security direct-with-enhanced-security sbo-with-enhanced-security
q	Quality	
t	TimeStamp	

Table 23 – ABBEMAX2_Rev2_ENC attributes

ABBEMAX2_Rev2_ENS_A

CDC Class: Ed.1 – INS (integer status), Ed.2 – ENS (Enumerated status)

Attribute	Attribute type	Description
stVal	Enum, type = Beh	on=1 blocked test test/blocked off
q	Quality	
t	TimeStamp	

Table 24 – ABBEMAX2_Rev2_ENS_A attributes

ABBEMAX2_Rev2_ENS_B

CDC Class: Ed.1 – INS (integer status), Ed.2 – ENS (Enumerated status)

Attribute	Attribute type	Description
stVal	Enum, type = Health	Ok=0 Warning Alarm
q	Quality	
t	TimeStamp	

Table 25 – ABBEMAX2_Rev2_ENS_B attributes

ABBEMAX2_Rev2_ENS_C

CDC Class: Ed.1 – INS (integer status), Ed.2 – ENS (Enumerated status)

Attribute	Attribute type	Description
stVal	Enum, type = CBOpCap	None=1 Open Close-Open Open- Close-Open Close-Open- Close-Open
q	Quality	
t	TimeStamp	

Table 26 – ABBEMAX2_Rev2_ENS_C attributes

ABBEMAX2_Rev2_INS

CDC Class: INS (integer status)

Attribute	Attribute type	Description
stVal	INT32	
q	Quality	
t	TimeStamp	

Table 27 – ABBEMAX2_Rev2_INS attributes

ABBEMAX2_Rev2_LPL_A

CDC Class: LPL (Logical node name plate)

Attribute	Attribute type	Description
vendor	VISIBLE STRING255	"ABB" (fixed)
swRev	VISIBLE STRING255	Protection Unit (mainboard) Sw version MM.mm - e.g. "02.32"
d	VISIBLE STRING255	"Ekip Com IEC61850" (fixed)
configRev	VISIBLE STRING255	Ekip COM IEC61850 sw version - e.g. "Ekip COM IEC61850 v02.10"
IdNs	VISIBLE STRING255	"IEC 61850-7-4:2003" for Ed.1 (fixed), "IEC 61850-7-4:2010" for Ed.2 (fixed)

Table 28 – ABBEMAX2_Rev2_LPL_A attributes

ABBEMAX2_Rev2_LPL_B

CDC Class: LPL (Logical node name plate)

Attribute	Attribute type	Description
vendor	VISIBLE STRING255	"ABB" (fixed)
swRev	VISIBLE STRING255	Protection Unit (mainboard) Sw version MM.mm - e.g. "02.32"
d	VISIBLE STRING255	Textual description (according to LN)

Table 29 – ABBEMAX2_Rev2_LPL_B attributes

ABBEMAX2_Rev2_MV

CDC Class: MV (Measured value)

Attribute	Attribute type	Description
mag	AnalogueValue_2	
q	Quality	
t	TimeStamp	

Table 30 – ABBEMAX2_Rev2_MV attributes

ABBEMAX2_Rev2_SPC

CDC Class: SPC (Controllable single point)

Attribute	Attribute type	Description
stVal	BOOLEAN	TRUE FALSE
q	Quality	
t	TimeStamp	
ctlModel	CtlModels	

Table 31 – ABBEMAX2_Rev2_SPC attributes

ABBEMAX2_Rev2_SPS

CDC Class: SPS (single point status)

Attribute	Attribute type	Description
stVal	BOOLEAN	Value (TRUE FALSE)
q	Quality	
t	TimeStamp	

Table 32 – ABBEMAX2_Rev2_SPS attributes

ABBEMAX2_Rev2_WYE_A

CDC Class: WYE (Phase to ground/neutral related measured values of a three-phase system)

Attribute	Attribute type	Description
phsA	ABBEMAX2_Rev2_CMV	
phsB	ABBEMAX2_Rev2_CMV	
phsC	ABBEMAX2_Rev2_CMV	

Table 33 – WYE_1_Pow attributes

ABBEMAX2_Rev2_WYE_B

CDC Class: WYE (Phase to ground/neutral related measured values of a three-phase system)

Attribute	Attribute type	Description
phsA	ABBEMAX2_Rev2_CMV	
phsB	ABBEMAX2_Rev2_CMV	
phsC	ABBEMAX2_Rev2_CMV	
neut	ABBEMAX2_Rev2_CMV	Neutral current
net	ABBEMAX2_Rev2_CMV	Ground current

Table 34 – ABBEMAX2_Rev2_WYE_B attributes

ABBEMAX2_Rev2_WYE_C

CDC Class: WYE (Phase to ground/neutral related measured values of a three-phase system)

Attribute	Attribute type	Description
phsA	ABBEMAX2_Rev2_CMV	
phsB	ABBEMAX2_Rev2_CMV	
phsC	ABBEMAX2_Rev2_CMV	
res	ABBEMAX2_Rev2_CMV	Residual voltage
dataNs	VISIBLE STRING255	Implemented in Ed. 1 only (standard from Ed. 2) Name Space in .icd file specifies "IEC 61850-7-4:2007"

Table 35 – ABBEMAX2_Rev2_WYE_C attributes