

## Virtual devices (→IEC - Logical Nodes) and corresponding parameters according to CiA 437

M = Mandatory, C = Conditional (mandatory, if a condition is fulfilled), O = Optional

Remarks and comments by Karlheinz Schwarz (2008-05-09)

The following list of information has been proposed by a group of German vendors and CAN in Automation (CiA). The last column has been included for discussion of the proposed data objects from CiA. It is the intention of these comments to help the WG 17 members to understand the proposed data object for inclusion in the current draft during the meeting in Kassel end of May. I expect some further explanations from CiA. The German WG 17 mirror group wants WG17 to invite Mrs. Olga Fischer from CiA to present and discuss the data objects in Kassel. We discussed in our national WG17 meeting on May 08, that we would like to have Mrs. Fischer available for one hour or so on Wednesday, May 28.

Comments from the WG 17 members are welcome.

Best Regards,

Karlheinz

Virtual device: Photovoltaic inverter

Object name	Access	Category	Data type	Value definition	Comments KHS
Maximal inverter power	ro (measured)	M	Unsigned32	in W	If this is the current rms value, then it is modeled in MMXU. If the maximal means a statistical value (max of last day, ...) then it is modeled in statistical values of MMXU. Extensions for statistical values according to IEC 61850-7-4 edition 2 CDV (57/941/CDV).
Phase number (number of output	ro	M	Unsigned8		For discussion in or before

Object name	Access	Category	Data type	Value definition	Comments KHS
phases)	(status)				Kassel
Phase A information (in which grid-phase the AC current and voltage from inverter phase A is fed)	rw (set-point??)	M	Unsigned8	see (1)	For discussion in or before Kassel
Phase B information (in which grid-phase the AC current and voltage from inverter phase B is fed) (if phase B supported)	rw (set-point??)	M	Unsigned8	see (1)	For discussion in or before Kassel
Phase C information (in which grid-phase the AC current and voltage from inverter phase C is fed) (if phase C supported)	rw (set-point??)	M	Unsigned8	see (1)	For discussion in or before Kassel
Number of mpp-trackers	ro (status)	M	Unsigned8		For discussion in or before Kassel
Phase A AC current	ro (measured)	M	Unsigned24	in A, see (0)	Modeled by MMXU
Phase B AC current (if phase B supported)	ro (measured)	C	Unsigned24	in A, see (0)	Modeled by MMXU
Phase C AC current (if phase C supported)	ro (measured)	C	Unsigned24	in A, see (0)	Modeled by MMXU
Phase A AC voltage	ro (measured)	M	Unsigned24	in V, see (0)	Modeled by MMXU
Phase B AC voltage (if phase B supported)	ro (measured)	C	Unsigned24	in V, see (0)	Modeled by MMXU
Phase C AC voltage (if phase C supported)	ro (measured)	C	Unsigned24	in V, see (0)	Modeled by MMXU
AC frequency	ro (measured)	M	Unsigned16	in 0,1 Hz	Modeled by MMXU
Actual inverter output power	ro (measured)	M	Unsigned32	in W	Modeled by MMXU
Inlet air temperature	ro (measured)	O	Unsigned8	in °C (offset = -40)	May already be modeled by ZINV.HeatSinkTmp or by CCGR. CETmpIn

Object name	Access	Category	Data type	Value definition	Comments KHS
					CETmpOut
Outlet air temperature	ro (measured)	O	Unsigned8	in °C (offset = -40)	May already be modeled by CCGR. CETmpOut
Cooling element temperature	ro (measured)	O	Unsigned8	in °C (offset = -40)	For discussion in or before Kassel
Internal space temperature	ro (measured)	O	Unsigned8	in °C (offset = -40)	May already be modeled by ZINV.EncITmp
<del>Inverter total output energy</del>	ro (measured)	M	Unsigned64	in Ws	Modeled by MMXU
<del>Reset inverter energy counter</del>	rw (command)	M	Unsigned8	0 = No command 1 = Reset counter	Modeled by MMTR
Inverter status	ro (status)	M	Unsigned32	see (2)	The inverter status is a list of various limit violation, error detections, etc. The various bits have to be mapped to different data objects. For example: the bit 7  0b = Voltage not out of limit 1b = Voltage out of limit  is a alarm summary of up to three voltages from MMXU.  Which phase is meant? What is the limit?  I guess that most of these semantics are covered by already existing data objects.
Inverter available status	ro (status)	M	Unsigned32	see (3)	See discussion under Inverter status above.
Inverter supported commands	ro (status)	M	Unsigned32	see (4)	For discussion in or before Kassel
Inverter commands	rw (command)	M	Unsigned32	see (5)	For discussion in or before Kassel
<del>Configured maximal power</del>	rw	O	Unsigned8	0 to 100% of the	Modeled by ZINV.OutWSet

Object name	Access	Category	Data type	Value definition	Comments KHS
	(set-point)			maximal inverter power	OutVarSet
Maximal reactive power	ro (status)	O	Signed16	±(0 to 100%) of the maximal inverter power	Modeled by ZINV.OutVarSet
Reactive power set-point	rw (set-point)	O	Signed8	±(0 to 100%) of the maximal inverter power	

### Virtual device: Solar panel tracking

Object name	Access	Category	Data type	Value definition	Comments KHS
Tracking geometry	ro (status)	M	Unsigned8	see (6)	For discussion in or before Kassel
Tracking technology	ro (status)	M	Unsigned8	1=sensory tracking 2=astronomical tracking	For discussion in or before Kassel
Tracking general status	ro (status)	M	Unsigned16	see (7)	For discussion in or before Kassel
Tracking general error status	ro (status)	M	Unsigned8	see (8)	For discussion in or before Kassel
Tracking command	rw (command)	M	Unsigned8	see (9)	For discussion in or before Kassel
Tracking drive status	ro (status)	M	Unsigned8	see (10)	For discussion in or before Kassel
Tracking drive error status motor 1	ro (status)	M	Unsigned8	see (11)	For discussion in or before Kassel
Tracking drive error status motor 2 (if two-axle tracking is used)	ro (status)	C	Unsigned8	see (11)	For discussion in or before Kassel
Tracking general end switch error status	ro (status)	M	Unsigned8	see (12)	For discussion in or before Kassel
Current azimuth	ro (measured)	M	Unsigned16	in 0,01° see (15)	For discussion in or before Kassel
Current elevation	ro (measured)	M	Unsigned16	in 0,01° see (16)	For discussion in or before Kassel

Object name	Access	Category	Data type	Value definition	Comments KHS
Target azimuth and elevation	rw (set-point)	M	Unsigned16x2	in 0,01° see (15) and (16)	For discussion in or before Kassel
Storm azimuth and elevation	rw (set-point)	M	Unsigned16x2	in 0,01° see (15) and (16)	For discussion in or before Kassel
Snow drop azimuth and elevation	rw (set-point)	M	Unsigned16x2	in 0,01° see (15) and (16)	For discussion in or before Kassel
Maintenance 1 azimuth and elevation	rw (set-point)	M	Unsigned16x2	in 0,01° see (15) and (16)	For discussion in or before Kassel
Maintenance 2 azimuth and elevation	rw (set-point)	M	Unsigned16x2	in 0,01° see (15) and (16)	For discussion in or before Kassel
Night azimuth and elevation	rw (set-point)	M	Unsigned16x2	in 0,01° see (15) and (16)	For discussion in or before Kassel
Fixed azimuth and elevation	rw (set-point)	M	Unsigned16x2	in 0,01° see (15) and (16)	For discussion in or before Kassel
Azimuth offset (The azimuth offset is the deviation from the north-south direction. The azimuth offset is positive increasing if the device is mounted as turned clockwise from north-south direction)	rw (set-point)	O	Unsigned16	in 0,01°	For discussion in or before Kassel
Elevation offset south north (The elevation offset is positive increasing in direction from south to north)	rw (set-point)	O	Unsigned16	in 0,01°	For discussion in or before Kassel
Elevation offset west east (The elevation offset is positive increasing in direction from west to east)	rw (set-point)	O	Unsigned16	in 0,01°	For discussion in or before Kassel
Azimuth interval (if the sensory tracking is used) (If the absolute difference between actual tracker position and sun position is higher than the interval value, then the solar panel shall be tracked)	rw (set-point)	C	Unsigned16	in 0,01°	For discussion in or before Kassel
Elevation interval (if the sensory tracking is used) (If the absolute difference between actual tracker position and sun position is higher than the interval value, then the solar panel shall be tracked)	rw (set-point)	C	Unsigned16	in 0,01°	For discussion in or before Kassel
Current alignment, specific	ro	M	Unsigned8	see (17)	For discussion in or

Object name	Access	Category	Data type	Value definition	Comments KHS
	(status)				before Kassel
Target alignment, specific	rw (set-point)	M	Unsigned8	see (17)	For discussion in or before Kassel
Time interval (if astronomical tracking is used) (time interval after which a tracking operation of each solar panel tracking device shall be done periodically)	rw (set-point)	C	Unsigned16	in s	For discussion in or before Kassel
Solar panel tracking operating time	ro (measured)	M	Unsigned32	in s	For discussion in or before Kassel
Solar panel tracking number of start-ups	ro (status)	O	Unsigned16		For discussion in or before Kassel

#### Virtual device: Wind speed sensor

Object name	Access	Category	Data type	Value definition	Comments KHS
Wind speed	ro (measured)	M	Unsigned8	in m/s	Modeled by MMET (IEC 61850-7-4 edition 2 CDV (57/941/CDV)) HorWdSpd MV Average Horizontal Wind speed VerWdSpd MV Average Vertical Wind speed

#### Virtual device: Wind direction sensor

Object name	Access	Category	Data type	Value definition	Comments KHS
Wind direction	ro (measured)	M	Unsigned16	in 0,01°, see (18)	Modeled by MMET (IEC 61850-7-4 edition 2 CDV (57/941/CDV)) HorWdDir MV Horizontal Wind direction VerWdDir MV Vertical Wind Direction

Object name	Access	Category	Data type	Value definition	Comments KHS

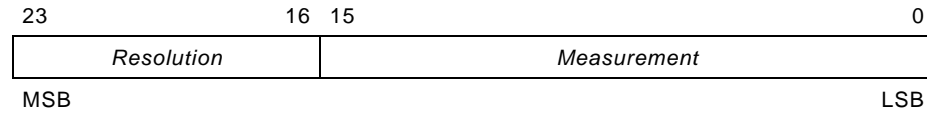
Virtual device: Radiation sensor

Object name	Access	Category	Data type	Value definition	Comments KHS
Radiation sensor mounting	ro (status)	M	Unsigned8	see (19)	Not yet modeled by MMET in IEC 61850-7-4 edition 2 CDV (57/941/CDV). To be commented on CDV.
Radiation sensor direction azimuth (for fixed mounting)	ro (status)	C	Unsigned16	in 0,01° see (15)	Not yet modeled by MMET in IEC 61850-7-4 edition 2 CDV (57/941/CDV). To be commented on CDV.
Radiation sensor direction elevation (for fixed mounting)	ro (status)	C	Unsigned16	in 0,01° see (16)	Not yet modeled by MMET in IEC 61850-7-4 edition 2 CDV (57/941/CDV). To be commented on CDV.
Radiation sensor power	ro (measured)	M	Unsigned16	in W/m <sup>2</sup>	Not yet modeled by MMET in IEC 61850-7-4 edition 2 CDV (57/941/CDV). To be commented on CDV.
Radiation sensor day energy	ro (measured)	M	Unsigned32	in Ws/m <sup>2</sup>	Not yet modeled by MMET in IEC 61850-7-4 edition 2 CDV (57/941/CDV). To be commented on CDV.

Object name	Access	Category	Data type	Value definition	Comments KHS
Radiation sensor gain calibration	rw (set-point)	O	Unsigned16	see (20)	Not yet modeled by MMET in IEC 61850-7-4 edition 2 CDV (57/941/CDV) To be commented on CDV.

(0)

The object structure is specified in Figure 1. The *measurement* values shall be given in (SEE VIRTUAL DEVICE TABLE). The *resolution* values are defined in Table 1.



**Figure 1 – Object structure**

**Table 1 – Value definition of *resolution***

Value	Definition
00 <sub>n</sub>	10 <sup>0</sup>
01 <sub>n</sub>	10 <sup>1</sup>
02 <sub>n</sub>	10 <sup>2</sup>
03 <sub>n</sub>	10 <sup>3</sup>
04 <sub>n</sub>	10 <sup>4</sup>
05 <sub>n</sub>	10 <sup>5</sup>
06 <sub>n</sub>	-10 <sup>0</sup>
07 <sub>n</sub>	-10 <sup>1</sup>
08 <sub>n</sub>	-10 <sup>2</sup>
09 <sub>n</sub>	-10 <sup>3</sup>
0A <sub>n</sub>	-10 <sup>4</sup>
0B <sub>n</sub>	-10 <sup>5</sup>
0C <sub>n</sub> to EF <sub>n</sub>	Reserved
F0 <sub>n</sub>	10 <sup>-1</sup>
F1 <sub>n</sub>	10 <sup>-2</sup>
F2 <sub>n</sub>	10 <sup>-3</sup>
F3 <sub>n</sub>	10 <sup>-4</sup>
F4 <sub>n</sub>	10 <sup>-5</sup>
F5 <sub>n</sub>	-10 <sup>-1</sup>

Value	Definition
F6 <sub>h</sub>	-10 <sup>-2</sup>
F7 <sub>h</sub>	-10 <sup>-3</sup>
F8 <sub>h</sub>	-10 <sup>-4</sup>
F9 <sub>h</sub>	-10 <sup>-5</sup>
FA <sub>h</sub> to FF <sub>h</sub>	Reserved

(1)

Value (hex)	Value (decimal)	Value (binary-coded)	Definition
00 <sub>h</sub>	0	00 00 <sub>b</sub>	Phase is not specified
01 <sub>h</sub>	1	00 01 <sub>b</sub>	N → L1
02 <sub>h</sub>	2	00 10 <sub>b</sub>	N → L2
03 <sub>h</sub>	3	00 11 <sub>b</sub>	N → L3
06 <sub>h</sub>	6	01 10 <sub>b</sub>	L1 → L2
07 <sub>h</sub>	7	01 11 <sub>b</sub>	L1 → L3
09 <sub>h</sub>	9	10 01 <sub>b</sub>	L2 → L1
0B <sub>h</sub>	11	10 11 <sub>b</sub>	L2 → L3
0D <sub>h</sub>	13	11 01 <sub>b</sub>	L3 → L1
0E <sub>h</sub>	14	11 10 <sub>b</sub>	L3 → L2

(2)

Bit	Definition	
0	0 <sub>b</sub> = Power not delivered	1 <sub>b</sub> = Power delivered
1	0 <sub>b</sub> = Stand-by not active	1 <sub>b</sub> = Stand-by active
2	0 <sub>b</sub> = No failure	1 <sub>b</sub> = Failure occurred
3	0 <sub>b</sub> = Power switch-off not active	1 <sub>b</sub> = Power switch-off active
4 and 5	00 <sub>b</sub> = No failure 10 <sub>b</sub> = Temperature derating	01 <sub>b</sub> = Fan is on 11 <sub>b</sub> = Inverter overheating
6	0 <sub>b</sub> = General grid error not detected	1 <sub>b</sub> = General grid error detected
7	0 <sub>b</sub> = Voltage not out of limit	1 <sub>b</sub> = Voltage out of limit

Bit	Definition	
8	0 <sub>b</sub> = Frequency not out of limit	1 <sub>b</sub> = Frequency out of limit
9	0 <sub>b</sub> = Creation of island not detected	1 <sub>b</sub> = Creation of island detected
10	0 <sub>b</sub> = Impedance change not detected	1 <sub>b</sub> = Impedance change detected
11	0 <sub>b</sub> = DC not too low for supplying	1 <sub>b</sub> = DC too low for supplying
12	0 <sub>b</sub> = Ground fault not detected	1 <sub>b</sub> = Ground fault detected
13	0 <sub>b</sub> = Isolation error not detected	1 <sub>b</sub> = Isolation error detected
14	0 <sub>b</sub> = Manufacturer-specific error not detected	1 <sub>b</sub> = Manufacturer-specific error detected
15	0 <sub>b</sub> = Test is not finished	1 <sub>b</sub> = Test is finished

(3)

Bit	Definition	
0	0 <sub>b</sub> = Power delivered status not available	1 <sub>b</sub> = Power delivered status available
1	0 <sub>b</sub> = Stand-by active status not available	1 <sub>b</sub> = Stand-by active status available
2	0 <sub>b</sub> = Failure indication not available	1 <sub>b</sub> = Failure indication available
3	0 <sub>b</sub> = Power switch-off status not available	1 <sub>b</sub> = Power switch-off status available
4 and 5	00 <sub>b</sub> = Temperature status not available 10 <sub>b</sub> = Reserved	01 <sub>b</sub> = Temperature status available 11 <sub>b</sub> = Reserved
6	0 <sub>b</sub> = General grid error status not available status available	1 <sub>b</sub> = General grid error
7	0 <sub>b</sub> = Voltage out of limit status not available status available	1 <sub>b</sub> = Voltage out of limit
8	0 <sub>b</sub> = Frequency out of limit status not available	1 <sub>b</sub> = Frequency out of limit status available
9	0 <sub>b</sub> = Creation of island status not available	1 <sub>b</sub> = Creation of island status available
10	0 <sub>b</sub> = Impedance change status not available	1 <sub>b</sub> = Impedance change status available

Bit	Definition	
11	0 <sub>b</sub> = DC too low status not available	1 <sub>b</sub> = DC too low status available
12	0 <sub>b</sub> = Ground fault status not available	1 <sub>b</sub> = Ground fault status available
13	0 <sub>b</sub> = Isolation error status not available	1 <sub>b</sub> = Isolation error status available
14	0 <sub>b</sub> = Manufacturer-specific error status not available	1 <sub>b</sub> = Manufacturer-specific error status available
15	0 <sub>b</sub> = Test finished status not available	1 <sub>b</sub> = Test finished status available

(4)

Bit	Definition	
0	0 <sub>b</sub> = Power-off command not supported	1 <sub>b</sub> = Power-off command supported
1	0 <sub>b</sub> = Start test command not supported	1 <sub>b</sub> = Start test command supported
2	0 <sub>b</sub> = Switch device off command not supported	1 <sub>b</sub> = Switch device off supported
3	0 <sub>b</sub> = Activate software switch command not supported	1 <sub>b</sub> = Activate software command supported

(5)

Bit	Definition	
0	0 <sub>b</sub> = No power-off command	1 <sub>b</sub> = Emergency power-off
1	0 <sub>b</sub> = Do not start test	1 <sub>b</sub> = Start test
2	0 <sub>b</sub> = No switch device off command	1 <sub>b</sub> = Switch device off
3	0 <sub>b</sub> = No activate software switch command	1 <sub>b</sub> = Activate software switch

(6)

Value	Definition
00 <sub>h</sub>	Reserved
01 <sub>h</sub>	Uniaxial, vertical axis of rotation
02 <sub>h</sub>	Uniaxial, inclined axis of rotation (north-south)
03 <sub>h</sub>	Uniaxial, horizontal axis of rotation (north-south)
04 <sub>h</sub>	Two-axle, vertical and horizontal axis of rotation

05 <sub>h</sub>	Two-axle, two dependent (horizontal) axes of rotation, main axis north-south
06 <sub>h</sub>	Two-axle, two dependent (horizontal) axes of rotation, main axis east-west
07 <sub>h</sub> to FF <sub>h</sub>	Reserved

(7)

Bit	Value	Definition
0	0 <sub>b</sub> 1 <sub>b</sub>	Tracking not operating Tracking operating
1	0 <sub>b</sub> 1 <sub>b</sub>	Tracking not in progress Tracking in progress
2	0 <sub>b</sub> 1 <sub>b</sub>	Target alignment not reached Target alignment reached
3	0 <sub>b</sub> 1 <sub>b</sub>	Reference run not in progress Reference run in progress
4	0 <sub>b</sub> 1 <sub>b</sub>	Reference run not completed Reference run completed
5	0 <sub>b</sub> 1 <sub>b</sub>	No manual mode Manual mode

(8)

Bit	Value	Definition
0	0 <sub>b</sub> 1 <sub>b</sub>	No drive error Drive error
1	0 <sub>b</sub> 1 <sub>b</sub>	No reference error Reference error
2	0 <sub>b</sub> 1 <sub>b</sub>	No internal error Internal error
3	0 <sub>b</sub> 1 <sub>b</sub>	No communication error Communication error

(9)

Value	Definition
00 <sub>h</sub>	Stop
01 <sub>h</sub>	Tracking
02 <sub>h</sub>	Reference run
03 <sub>h</sub>	Manual mode
04 <sub>h</sub> to FF <sub>h</sub>	Reserved

(10)

Bit	Value	Definition
0	0 <sub>b</sub> 1 <sub>b</sub>	Motor 1 not active Motor 1 active
1	0 <sub>b</sub> 1 <sub>b</sub>	Alignment not reached motor 1 Alignment reached motor 1
2	0 <sub>b</sub> 1 <sub>b</sub>	End switch 1 motor 1 not reached End switch 1 motor 1 reached
3	0 <sub>b</sub> 1 <sub>b</sub>	End switch 2 motor 1 not reached End switch 2 motor 1 reached
4	0 <sub>b</sub> 1 <sub>b</sub>	Motor 2 not active Motor 2 active
5	0 <sub>b</sub> 1 <sub>b</sub>	Alignment not reached motor 2 Alignment reached motor 2
6	0 <sub>b</sub> 1 <sub>b</sub>	End switch 1 motor 2 not reached End switch 1 motor 2 reached
7	0 <sub>b</sub> 1 <sub>b</sub>	End switch 2 motor 2 not reached End switch 2 motor 2 reached

(11)

Bit	Value	Definition
0	0 <sub>b</sub> 1 <sub>b</sub>	No alignment error Alignment error
1	0 <sub>b</sub> 1 <sub>b</sub>	No i <sup>2</sup> t (over-current) error i <sup>2</sup> t (over-current) error
2	0 <sub>b</sub> 1 <sub>b</sub>	No temperature error Temperature error
3	0 <sub>b</sub>	No emergency stop

	1 <sub>b</sub>	Emergency stop
4	0 <sub>b</sub> 1 <sub>b</sub>	No supply error Supply error

(12)

Bit	Value	Definition
0	0 <sub>b</sub> 1 <sub>b</sub>	End switch 1 motor 1 no error End switch 1 motor 1 error
1	0 <sub>b</sub> 1 <sub>b</sub>	End switch 2 motor 1 no error End switch 2 motor 1 error
2	0 <sub>b</sub> 1 <sub>b</sub>	End switch 1 motor 2 no error End switch 1 motor 2 error
3	0 <sub>b</sub> 1 <sub>b</sub>	End switch 2 motor 2 no error End switch 2 motor 2 error

(13)

Value	Definition
0000 <sub>h</sub>	Minimum value (Greenwich, towards east positive)
8CA0 <sub>h</sub> (36000 <sub>d</sub> )	Maximum value
8CA1 <sub>h</sub> to FFFF <sub>h</sub>	Reserved

(14)

Value	Definition
0000 <sub>h</sub>	Minimum value (south pole)
2328 <sub>h</sub> (9000 <sub>d</sub> )	Equator
4650 <sub>h</sub> (18000 <sub>d</sub> )	Maximum value (north pole)
4651 <sub>h</sub> to FFFF <sub>h</sub>	Reserved

(15)

Value	Definition
0000 <sub>h</sub>	Minimum value (North)
2328 <sub>h</sub> (9000 <sub>d</sub> )	East
8CA0 <sub>h</sub> (36000 <sub>d</sub> )	Maximum value
8CA1 <sub>h</sub> to FFFF <sub>h</sub>	Reserved

(16)

Value	Definition
0000 <sub>h</sub>	Minimum value (Horizon)
2328 <sub>h</sub> (9000 <sub>d</sub> )	Maximum value (Zenith)
2329 <sub>h</sub> to FFFF <sub>h</sub>	Reserved

(17)

Value	Definition
00 <sub>h</sub>	None
01 <sub>h</sub>	Storm
02 <sub>h</sub>	Snow drop
03 <sub>h</sub>	Maintenance 1
04 <sub>h</sub>	Maintenance 2
05 <sub>h</sub>	Night
06 <sub>h</sub> to FF <sub>h</sub>	Reserved

(18)

Value	Definition
0 <sub>d</sub>	North
9000 <sub>d</sub>	East
18000 <sub>d</sub>	South
27000 <sub>d</sub>	West
35999 <sub>d</sub> (8C9F <sub>h</sub> )	Maximal value
8CA0 <sub>h</sub> to FFFF <sub>h</sub>	Reserved

(19)

Value	Definition
00 <sub>h</sub>	Fixed mounting
01 <sub>h</sub>	Uniaxial, vertical axis of rotation
02 <sub>h</sub>	Uniaxial, inclined axis of rotation (north-south)
03 <sub>h</sub>	Uniaxial, horizontal axis of rotation (north-south)
04 <sub>h</sub>	Two-axle, vertical and horizontal axis of rotation
05 <sub>h</sub>	Two-axle, two dependent (horizontal) axes of rotation, main axis north-south
06 <sub>h</sub>	Two-axle, two dependent (horizontal) axes of rotation, main axis east-west
07 <sub>h</sub> to FF <sub>h</sub>	Reserved

(20)

The values shall be given in  $10^{-4}$  V for  $1 \text{ kW/m}^2$ . The value of  $FFFF_h$  shall indicate an invalid calibration. The value shall be higher than 0.