

## SPA-variables of VAMP 140 Overcurrent and earth fault relay

Software version: 3.30  
( spabus\ acc\_arra.h,v 4.1.1.8 )

R = Read

W = Write

WpO=Protected variable. Access level is 'Operator'

WpC=Protected variable. Access level is 'Configuration'

Ch	Data category	Data Number	Access	Value	Description	Unit	Parameter name	Note
0	I	1	R	0...65000	Phase current I <sub>L</sub>	A	IL	
1	I	1	R	0 .. 65000	Phase current IL1	A	IL1	
0, 2	I	1	R	0 .. 65000	Phase current IL2	A	IL2	
3	I	1	R	0 .. 65000	Phase current IL3	A	IL3	
4	I	1	R	0 .. 65000	Earth fault current I <sub>o</sub>	A	I <sub>o</sub>	
0	I	4	R	0...100	Relative unbalance	%	I2DivI1	
0	I	2	R	16.00 .. 65.00	Frequency	Hz	f	
0	I	3	R	0, 1	Digital input		DI1	

Ch	Data Category	Data Number	Access	Value	Description	Unit	Parameter name	Note
2	I	11	R	0, 1	State of Digital input		DI1	
2	I	12	R	0, 1	State of ARC sensor 1		Arc1	
2	I	13	R	0, 1	State of ARC sensor 2		Arc2	
2	I	14	R	0, 1	State of BI		BIOin	
0	S	1		20...100	Scaling factor for overcurrent stages	%	IsetScale	
0	S	101	R/WpC	1.. 20 000	Nominal primary current	A	CTprimary	
0	S	102	R/WpC	1 .. 10	Nominal secondary current	A	CTsecondary	
0	S	103	R	1, 5	Nominal input current	A	lin_nom	
0	S	104	R/WpC	1.. 20 000	Nominal residual current	A	CTo1primary	
0	S	105	R/WpC	1 .. 10	Residual secondary current	A	CTo1secondary	
0	S	106	R	1, 5	Nominal residual input current	A	Io1in_nom	
0	V	101	R/WpC	1	Reset latches		OM_ResetLatches	
0	V	160	W	0..9998	Password open		pwd	f)
0	V	161	W	-	Password close		pwd	g)
0	V	200	R/WpC	1..899	SPA-address		SpaBusSlaveAddr	
0	V	201	R/WpC	1200, 2400, 4800, 9600, 19200	Communication speed	bps	SpaBusBitRate	i)
0	V	205	R	2.130	Main software version		PrgVersion	

### NOTES:

- f) Default password for configuration level (including operator level) is 1. Default password for operator level is 0.
- g) Value is ignored. The password will also close automatically after ten minutes since the latest open command.
- i) The new value will become valid after the next boot.

## Appendix C

Ch	Data Category	Data Number	Access	Value	Description	Unit	Parameter name	Note
1	V	155	R/WpC	0 .. 15	Event mask for l> stage		EventMaskl_Over1	
2	V	155	R/WpC	0 .. 15	Event mask for l>> stage		EventMaskl_Over2	
3	V	155	R/WpC	0 .. 15	Event mask for l>>> stage		EventMaskl_Over3	
4	V	155	R/WpC	0 .. 15	Event mask for l2> stage		EventMaskl2_Over1	
5	V	155	R/WpC	0 .. 15	Event mask for lo> stage		EventMasklo_Over1	
6	V	155	R/WpC	0 .. 15	Event mask for lo>> stage		EventMasklo_Over2	
7	V	155	R/WpC	0 .. 15	Event mask for lo>>> stage		EventMasklo_Over3	
8	V	155	R/WpC	0 .. 15	Event mask for T> stage		EventMaskT_Over1	
9	V	155	R/WpC	0 .. 15	Event mask for ARC stages			
10	V	155	R/WpC	0 .. 15	Event mask for delayed ARC Light			
11	V	155	R/WpC	0 .. 15	Event mask for CBFP stage		EventMaskCBFP	
12	V	155	R/WpC	0 .. 15	Event mask for digital input 1		EventMaskDigIn	
0	F	1	R	VAMP 140	Type of the device		DeviceType	
0	D	1	R/WpO	01-01-02 09.14;28.100	Date		Date	j)
0	T	1	R/WpO	28.100	Time (seconds & milliseconds)		Time	
0	L	1	R	0...999	Event Code		ReadSpaBusEvent	
0	B	1	R	0...999	Re read event code		ReReadSpaBusEvent	

**NOTES:**

j) Example in date format: '01-01-02 09.14;28.100', eg. year (two last numbers)-month-day hour.min;sec.msec'

k) Look pages 4-6

## Appendix C

Ch	Data Category	Data Number	Access	Value	Description	Unit	Parameter name	Note
1	S	1	R/WpC	0 or 1	Overcurrent stage I> (51)		enable	
1	S	2	R/WpC	0.10 .. 10.00	Overcurrent stage I> (51)	xIn	limit	
1	S	3	R/WpC	0.06 .. 300.00	Overcurrent stage I> (51)	s	delay	
1	S	4	R/WpC	0=DT, 1=NI, 2=VI, 3=EI, 4=LTI	Overcurrent stage I> (51)		delay type	
1	S	5	R/WpC	0.05 .. 3.20	Overcurrent stage I> (51)		inverse time coefficient	
2	S	1	R/WpC	0 or 1	Overcurrent stage I>> (51)		enable	
2	S	2	R/WpC	0.10 .. 20.00	Overcurrent stage I>> (51)	xIn	limit	
2	S	3	R/WpC	0.05 .. 100.00	Overcurrent stage I>> (51)	s	delay	
3	S	1	R/WpC	0 or 1	Overcurrent stage I>>> (51)		enable	
3	S	2	R/WpC	0.10 .. 20.00	Overcurrent stage I>>> (51)	xIn	limit	
3	S	3	R/WpC	0.05 .. 100.00	Overcurrent stage I>>> (51)	s	delay	
5	S	1	R/WpC	0 or 1	Unbalance stage I2> (46)		enable	
5	S	2	R/WpC	5 .. 70	Unbalance stage I2> (46)	%	limit	
5	S	3	R/WpC	1.0 .. 600.00	Unbalance stage I2> (46)	s	delay	
12	S	1	R/WpC	0 or 1	ARC stage I> (50AR)		enable	
12	S	2	R/WpC	0.5 .. 10.00	ARC stage I> (50AR)	pu	limit	
12	S	3	R/WpC	0=none, 1=L1, 2=L2, 3=L1/L2, 4=BI, 5=L1/BI, 6=L2/BI, 7=L1/L2/BI	ARC stage I> (50AR)		selected sensor	

Ch	Data Category	Data Number	Access	Value	Description	Unit	Parameter name	Note
14	S	1	R/WpC	0 or 1	Overload stage T> (49)		enable	
14	S	2	R/WpC	0.50 .. 1.20	Overload stage T> (49)	xln	limit (k)	
14	S	3	R/WpC	2 .. 60	Overload stage T> (49)	min	time constant tau	
14	S	4	R/WpC	60 .. 99	Overload stage T> (49)	%	alarm setting	
20	S	1	R/WpC	0 or 1	Earth fault stage lo> (51N)		enable	
20	S	2	R/WpC	0.005 .. 2.000	Earth fault stage lo> (51N)	pu	limit	
20	S	3	R/WpC	0.08 .. 300.00	Earth fault stage lo> (51N)	s	delay	
21	S	1	R/WpC	0 or 1	Earth fault stage lo>> (51N)		enable	
21	S	2	R/WpC	0.02 .. 2.00	Earth fault stage lo>> (51N)	pu	limit	
21	S	3	R/WpC	0.05 .. 300.00	Earth fault stage lo>> (51N)	s	delay	
21	S	4	R/WpC	0=DT, 1=NI, 2=VI, 3=EI, 4=LTI	Earth fault stage lo>> (51N)		delay type	
21	S	5	R/WpC	0.05 .. 3.20	Earth fault stage lo>> (51N)		inverse time coefficient	
22	S	1	R/WpC	0 or 1	Earth fault stage lo>>> (51N)		enable	
22	S	2	R/WpC	0.05 .. 4.00	Earth fault stage lo>>> (51N)	pu	limit	
22	S	3	R/WpC	0.05 .. 300.00	Earth fault stage lo>>> (51N)	s	delay	

Ch	Data Category	Data Number	Access	Value	Description	Unit	Parameter name	Note
27	S	1	R/WpC	0 or 1	ARC stage lo> (50NAR)		enable	
27	S	2	R/WpC	0.05 .. 1.00	ARC stage lo> (50NAR)	pu	limit	
27	S	3	R/WpC	0=none, 1=L1, 2=L2, 3=L1/L2, 4=BI, 5=L1/BI, 6=L2/BI, 7=L1/L2/BI	ARC stage lo> (50NAR)		selected sensor	
60	S	1	R/WpC	0 or 1	CBFP (50BF)		enable	
60	S	2	R/WpC	1 or 2	CBFP (50BF)		relay to check	
60	S	3	R/WpC	0.1 .. 10.00	CBFP (50BF)		delay	
1,2,3,5 20..22	M	10..17 20..27 30..37 40..47 50..57	R		Stage event buffer (8 last event/stage)			k)

## SpaBus log buffers

Each stage has log buffers that consist time stamp, fault value and elapsed time. Buffer size is 8. Some stages like I> have also fault type and predefault value.

### Format

SpaBus category M is reserved to log buffers.

SpaBus message format to read values from log buffer:

Direction	Action	Channel	Category	Data
>	R	1..60	M	10..57

### Channel

Channel define protection stage. Available stages in VAMP 140

Channel	Stage
1	I>
2	I>>
3	I>>>
5	I2>
12	ARC I>
14	T>
20	Io>
21	Io>>
22	Io>>>
27	ARC Io>
60	CBFP

## Data

Data define what to read in selected stage.

Stages l>, l>>, l>>>

Data	Name	Value	Unit	Note
10..17	Time stamp	y-m-d h.min;sec.msec		Look note (j)
20..27	Fault value	xx.xx	xln	
30..37	Elapsed delay	1..100	%	
40..47	Fault type	1-N, 2-N, 3-N 1-2, 1-3, 2-3, 1-2-3		
50..57	Prefault value	xx.xx	xln	
80..87	Fault type	1 = Fault on line 1 2 = Fault on line 2 3 = Fault on lines 1 and 2 4 = Fault on line 3 5 = Fault on lines 1 and 3 6 = Fault on lines 2 and 3 7 = Fault on lines 1,2 and 3		

Stage ARC I>

Data	Name	Value	Unit	Note
10..17	Time stamp	y-m-d h.min;sec.msec		Look note (j)
20..27	Fault value	xx.xx	pu	
40..47	Fault type	1-N, 2-N, 3-N 1-2, 1-3, 2-3, 1-2-3		
50..57	Prefault value	xx.xx	xln	
80..87	Fault type	1 = Fault on line 1 2 = Fault on line 2 3 = Fault on lines 1 and 2 4 = Fault on line 3 5 = Fault on lines 1 and 3 6 = Fault on lines 2 and 3 7 = Fault on lines 1,2 and 3		

Stage T>

Data	Name	Value	Unit	Note
10..17	Time stamp	y-m-d h.min;sec.msec		Look note (j)
20..27	Fault value (temperature)	xx	%	
30..37	Elapsed delay	1..100	%	
40..47	Fault value (current)	xxxx	A	
50..57	Prefault current	xx.xx	A	

Stages I2&gt;, I0&gt;, I0&gt;&gt;

Data	Name	Value	Unit	Note
10..17	Time stamp	y-m-d h.min;sec.msec		Look note (j)
20..27	Fault value: Stage I2> Fault value: Stages I0>, I0>>	xx xx.xx	% pu	
30..37	Elapsed delay	1..100	%	

Stage ARC I0&gt;

Data	Name	Value	Unit	Note
10..17	Time stamp	y-m-d h.min;sec.msec		Look note (j)
20..27	Fault value	xx.xx	pu	

Stage CBFP

Data	Name	Value	Unit	Note
10..17	Time stamp	y-m-d h.min;sec.msec		Look note (j)
30..37	Elapsed delay	1..100	%	

Latest log values are always in data area X0, eg. data last digit is zero.

Example: Read values from stage 1 >>

1 >> stage channel is 2

Read now latest values from buffer:

	Latest	Previous	..	Oldest
Time stamp	R2M10	R2M11	..	R2M17
Fault value	R2M20	R2M21	..	R2M27
Elapsed delay	R2M30	R2M31	..	R2M37
Fault type	R2M40	R2M41	..	R2M47
Prefault value	R2M50	R2M51	..	R2M57

When log buffer is full and new values are saved to buffer, oldest values from data area X7 will be discard.