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1.0 ABSTRACT

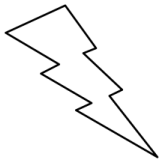
The IF96007A is a plug in hardware module for the following devices :

NA96/NA96+

The measurements that are available are described in the following section and are grouped accordingly to a logical distribution to allow the user to compose his own population of variables as desired.

Physical level

Profibus – 5V according to the standard EN 50170 / up to 12 Mbit



See the installation user manual for details on how to plug in the module in safety.

2.0 VARIABLE DESCRIPTION

The following tables reports the variable descriptions with the correspondent measuring unit and the length.
Then see in the following part of the document how variables have been grouped.

What to do in brief for a 315-2-DP Siemens CPU

1. Set up the hardware rack importing the CPU + the bar
2. Import over the rail bar the NA96
3. Import from the NA96 the modules with the measurements that are necessary and write a little software to copy from the process image of the NA96 , from start address to end address (DP address), all WORDS into a DB.
4. The variables are ready in the process image and what the user must do is to manage the same variables that are split onto 4 BYTES (2 WORDS)
   As all variables are 2 WORDS length, it is necessary to “re-assemble” the data from the high and low WORDS (e.g. the energy values are split onto 4 BYTES – 2 WORDS and they must be grouped into 1 DOUBLE WORD)

The following types of format are used for the data values :

* UD_WORDS : two WORDS - unsigned
* SD_WORDS : two WORDS - signed

E.g.

In the process image of the PLC, if the area that is in use is mapped @address 256 and if the first variable of this area is a long (DOUBLE WORD) variable the user will find the BYTES in the following sequence :

256 : BYTE 0 (LSB)
257 : BYTE 1
258 : BYTE 2
259 : BYTE 3 (MSB)

The variable may be read by a L instruction

```
L   PED  256
```

And stored @address 100 by a T instruction :

```
T   MD   100
```

Variable description

Format	Description	Unit	Variables
UD_WORD	Phase 1 : phase voltage	0.1 V	**U1**
UD_WORD	Phase 2 : phase voltage	0.1 V	**U2**
UD_WORD	Phase 3 : phase voltage	0.1 V	**U3**
UD_WORD	Chained voltage : L1-L2	0.1 V	**U12**
UD_WORD	Chained voltage : L2-L3	0.1 V	**U23**
UD_WORD	Chained voltage : L3-L1	0.1 V	**U31**
UD_WORD	Phase 1 / 12 : phase voltage min	0.1 V	**Umin1**
UD_WORD	Phase 2 / 23 : phase voltage min	0.1 V	**Umin2**
UD_WORD	Phase 3 / 31 : phase voltage min	0.1 V	**Umin3**
UD_WORD	Phase 1 / 12 : phase voltage Max	0.1 V	**UMax1**
UD_WORD	Phase 2 / 23 : phase voltage Max	0.1 V	**UMax2**
UD_WORD	Phase 3 / 31 : phase voltage Max	0.1 V	**UMax3**
UD_WORD	Phase 1 : current	0.1 A	**I1**
UD_WORD	Phase 2 : current	0.1 A	**I2**
UD_WORD	Phase 3 : current	0.1 A	**I3**
UD_WORD	Phase 1 : current demand	0.1 A	**Idmd1**
UD_WORD	Phase 2 : current demand	0.1 A	**Idmd2**
UD_WORD	Phase 3 : current demand	0.1 A	**Idmd3**
UD_WORD	Phase 1 : current peak max demand	0.1 A	**IMpd1**
UD_WORD	Phase 2 : current peak max demand	0.1 A	**IMpd2**
UD_WORD	Phase 3 : current peak max demand	0.1 A	**IMpd3**
UD_WORD	Neutral current	0.1 A	**In**
UD_WORD	3-phase average current (I1+I2+I3)/3	0.1 A	**Iav**
SD_WORD	3-phase : active power	1 W	**P**
SD_WORD	Phase 1 : active power	1 W	**P1**
SD_WORD	Phase 2 : active power	1 W	**P2**
SD_WORD	Phase 3 : active power	1 W	**P3**
SD_WORD	3-phase : reactive power	1 var	**Q**
SD_WORD	Phase 1 : reactive power	1 var	**Q1**
SD_WORD	Phase 2 : reactive power	1 var	**Q2**
SD_WORD	Phase 3 : reactive power	1 var	**Q3**
UD_WORD	3-phase : apparent power	1 VA	**S**
UD_WORD	Phase 1 : apparent power	1 VA	**S1**
UD_WORD	Phase 2 : apparent power	1 VA	**S2**
UD_WORD	Phase 3 : apparent power	1 VA	**S3**
UD_WORD	3-phase : positive active energy / low value	1 Wh	**EAL+**
UD_WORD	3-phase : positive active energy / high value	1 MWh	**EAH+**
UD_WORD	3-phase : positive reactive energy / low value	1 varh	**ERL+**
UD_WORD	3-phase : positive reactive energy / high value	1 Mvarh	**ERH+**
UD_WORD	3-phase : negative active energy / low value	1 Wh	**EAL-**
UD_WORD	3-phase : negative active energy / high value	1 MWh	**EAH-**
UD_WORD	3-phase : negative reactive energy / low value	1 varh	**ERL-**
UD_WORD	3-phase : negative reactive energy / high value	1 Mvarh	**ERH-**
UD_WORD	3-phase : partial active energy / low value	1 Wh	**EAPL+**
UD_WORD	3-phase : partial active energy / high value	1 MWh	**EAPH+**
UD_WORD	3-phase : partial reactive energy / low value	1 varh	**ERPL+**
UD_WORD	3-phase : partial reactive energy / high value	1 Mvarh	**ERPH+**

UD_WORD	3-phase : active power demand	1 W	**PDmd**
UD_WORD	3-phase : reactive power demand	1 var	**QDmd**
UD_WORD	3-phase : apparent power demand	1 VA	**SDmd**
UD_WORD	3-phase : active Max power demand	1 W	**PMpd**
UD_WORD	3-phase : reactive Max power demand	1 var	**QMpd**

UD_WORD	3-phase : apparent Max power demand	1 VA	**SMpd**
UD_WORD	Frequency	0.1 Hz	**Freq**
SD_WORD	3-phase : power factor	0.001	**PF**
SD_WORD	Phase-1 : power factor	0.001	**PF1**
SD_WORD	Phase-2 : power factor	0.001	**PF2**
SD_WORD	Phase-3 : power factor	0.001	**PF3**
UD_WORD	3-phase : power factor sector	0 : PF=1 1 : ind 2 : cap	**SPF**
UD_WORD	Phase-1 : power factor sector	0 : PF=1 1 : ind 2 : cap	**SPF1**
UD_WORD	Phase-2 : power factor sector	0 : PF=1 1 : ind 2 : cap	**SPF2**
UD_WORD	Phase-3 : power factor sector	0 : PF=1 1 : ind 2 : cap	**SPF3**
UD_WORD	THD U1-phase voltage/THD U12-phase-phase voltage	0.1 %	**THDU1/THDU12**
UD_WORD	THD U2-phase voltage/THD U23-phase-phase voltage	0.1 %	**THDU2/THDU23**
UD_WORD	THD U3-phase voltage/THD U31-phase-phase voltage	0.1 %	**THDU3/THDU31**
UD_WORD	THD I1 - phase current	0.1 %	**THDI1**
UD_WORD	THD I2 - phase current	0.1 %	**THDI2**
UD_WORD	THD I3 - phase current	0.1 %	**THDI3**
UD_WORD	Phase-1 : Harmonics of voltage U3,5,7,9	0.1 %	**H1V3,5,7,9**
UD_WORD	Phase-1 : Harmonics of current I3,5,7,9	0.1 %	**H1I3,5,7,9**
UD_WORD	Phase-2 : Harmonics of voltage U3,5,7,9	0.1 %	**H2V3,5,7,9**
UD_WORD	Phase-2 : Harmonics of current I3,5,7,9	0.1 %	**H2I3,5,7,9**
UD_WORD	Phase-3 : Harmonics of voltage U3,5,7,9	0.1 %	**H3V3,5,7,9**
UD_WORD	Phase-3 : Harmonics of current I3,5,7,9	0.1 %	**H3I3,5,7,9**
UD_WORD	Run hour meter	h	**RHM**
UD_WORD	Current transformer ratio	No unit	**KTI**
UD_WORD	Voltage transformer ratio	0.1	**KTU**
UD_WORD	Voltage phase diagnostic		**VPHD**
UD_WORD	Active alarms		**AL**
UD_WORD	Pulse number input 1 (if module IF96011 or 012 present)	No unit	**PN1**
UD_WORD	Pulse number input 2 (if module IF96011 or 012 present)	No unit	**PN2**
UD_WORD	Pulse number input 3 (if module IF96011 or 012 present)	No unit	**PN3**
UD_WORD	Pulse number input 4 (if module IF96011 or 012 present)	No unit	**PN4**
UD_WORD	Input status 1	(**)	**IS**

UD_WORD	Input status 2	(**)	**IS**
UD_WORD	Input status 3	(**)	**IS**
UD_WORD	Input status 4	(**)	**IS**
UD_WORD	Reset of the quantities	(***)	**RES**
UD_WORD	KTI - current transform ratio	No unit	**KTI**
UD_WORD	KTU - voltage transformer ratio	Tenths (*)	**KTU**

(*) e.g. 690/100 => KTU = 69
(**) 0 : open // 1 : close or powered (for NA96/NA96+)
(***) see section 4.0

3.0 MODULE DESCRIPTION

All variables have 2 WORDS length. The relative address refers to the PLC Profibus process image map

Designed for 3n3e wiring			Designed for 3-2e wiring			Designed for 1n1e wiring	
Variables	M1 - relative address		Variables	M2 - relative address		Variables	M3 - relative address
U1	0		U12	0		U1	0
U2	4		U23	4		THDU1	4
U3	8		U31	8		I1	8
U12	12		THDU12	12		THDI11	12
U23	16		THDU23	16		Freq	16
U31	20		THDU31	20		P	20
I1	24		I1	24		Q	24
I2	28		I2	28		S	28
I3	32		I3	32		PF	32
THDI1	36		THDI1	36		SPF	36
THDI2	40		THDI2	40		EAL+	40
THDI3	44		THDI3	44		EAH+	44
Freq	48		Freq	48		ERL+	48
P	52		P	52		ERH+	52
Q	56		Q	56		EAL-	56
S	60		S	60		EAH-	60
P1	64		PF	64		ERL-	64
P2	68		SPF	68		ERH-	68
P3	72		EAL+	72			
Q1	76		EAH+	76			
Q2	80		ERL+	80			
Q3	84		ERH+	84			
PF	88		EAL-	88			
SPF	92		EAH-	92			
EAL+	96		ERL-	96			
EAH+	100		ERH-	100			
ERL+	104						
ERH+	108						
EAL-	112						
EAH-	116						
ERL-	120						
ERH-	124						

Voltages module			Currents module			Min & max values module	
Variables	M4 - relative address		Variables	M5 - relative address		Variables	M6 - relative address
U1	0		I1	0		Umin1	0
U2	4		I2	4		Umin2	4
U3	8		I3	8		Umin3	8
U12	12		In	12		UMax1	12
U23	16		Iav	16		UMax2	16
U31	20					UMax3	20
						Idmd1	24
						Idmd2	28
						Idmd3	32
						IMpd1	36
						IMpd2	40
						IMpd3	44

Harmonics module			Energies module			Power module			Power factor module	
Variables	M7 - relative address		Variables	M8 - relative address		Variables	M9 - relative address		Variables	M10 - relative address
THDU1	0		EAL+	0		P	0		PF	0
THDU2	4		EAH+	4		Q	4		PF1	4
THDU3	8		ERL+	8		S	8		PF2	8
THDI1	12		ERH+	12		P1	12		PF3	12
THDI2	16		EAL-	16		P2	16		SPF	16
THDI3	20		EAH-	20		P3	20		SPF1	20
H1V3	24		ERL-	24		Q1	24		SPF2	24
H1V5	28		ERH-	28		Q2	28		SPF3	28
H1V7	32		EAPL+	32		Q3	32		Freq	32
H1V9	36		EAPH+	36		S1	36		RHM	36
H2V3	40		ERPL+	40		S2	40			
H2V5	44		ERPH+	44		S3	44			
H2V7	48					PDmd	48			
H2V9	52					QDmd	52			
H3V3	56					SDmd	56			
H3V5	60					PMpd	60			
H3V7	64					QMpd	64			
H3V9	68					SMpd	68			
H1I3	72									
H1I5	76									
H1I7	80									
H1I9	84									
H2I3	88									
H2I5	92									
H2I7	96									
H2I9	100									
H3I3	104									
H3I5	108									
H3I7	112									
H3I9	116									

General variable			THD module			Variable Reset		
Variables	M11 - relative address		Variables	M12 - relative address		Variables	M13 - relative address	
VPHD	0		THDU1	0		RES	0	This is the only writable module and is used to reset the quantities of the meter.
AL	4		THDU2	4				
PN1	8		THDU3	8				
PN2	12		THDI1	12				
PN3	16		THDI2	16				
PN4	20		THDI3	20				
IS1	24							
IS2	28							
IS3	32							
IS4	36							
KTI	40							
KTU	44							

4.0 VARIABLE RESET

To reset desired measurements write the following word (in binary)
The LSW (Low Significant Word) is used.

```
MSB                                                 LSB
 0|0|0|0|0|0|0|0|b8|b7|b6|b5|b4|b3|b2|b1|b0

 b0 = 1  =>  Reset Hour Meter
 b1 = 1  =>  Reset Peak Maximum Demand
 b2 = 1  =>  Reset Maximum Voltage values
 b3 = 1  =>  Reset Maximum Current values
 b4 = 1  =>  Reset Minimum Voltage values
 b5 = 1  =>  Reset Active Partial Energy
 b6 = 1  =>  Reset Reactive Partial Energy
 b7 = 1  =>  Reset Counter Input 1
 b8 = 1  =>  Reset Counter Input 2

 b9 .. b15 = 0
```