An Indo-french joint venture

emfis vifpe-RS485 MODBUS

Operating Instruction

ISO-9001:2000

HPL SOCOMEC Pvt. Ltd.

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General Information

Function

This model of emfis vifpe with RS485 provides communication facility on RS485 MODBUS®. Emfis vifpe with RS485 works with RS 485 on a master slave configuration, where the emfis vifpe is the slave and the master can be computer/PLC etc.

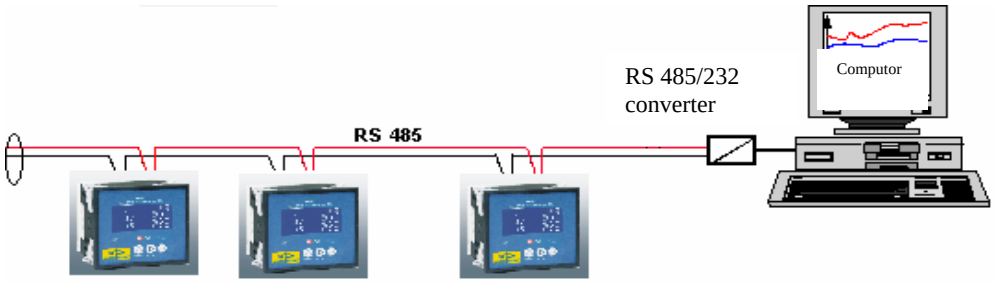
The following are also supplied with this model:

1. CD of Monitoring Software
2. 2 numbers 120Ω End-Of-Line resistance.(this includes one number extra supplied as spare)

General Points

For standard configuration, an RS 485 serial link 2 wire is used to connect up to 32 emfis vifpe with the master(computer/PLC etc.) over a distance of 1000meters using MODBUS® protocol.

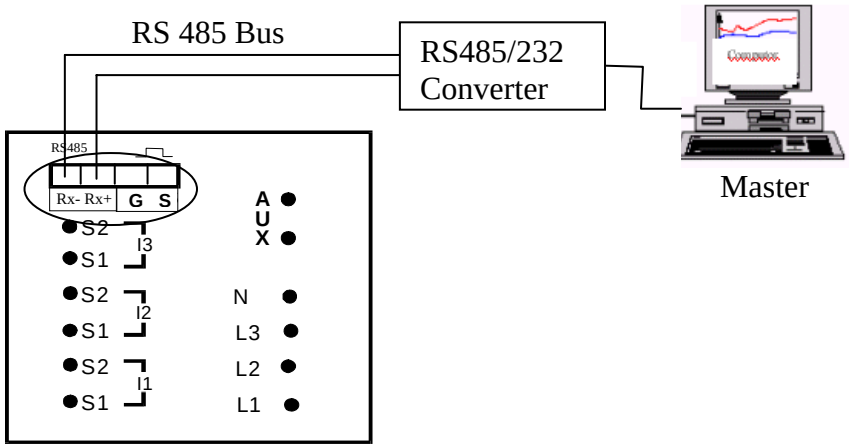
Typical Network Architecture

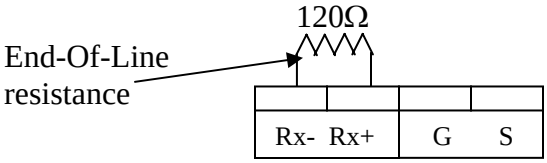


Cables and RS485/232 converter, computer are not supplied with this emfis

Recommendation:
Please use a shielded twisted pair cable for connection. A repeater should be used if one intends to exceed the cable distance of 1000 meters.

Connection Diagram





Note: This serial communication requires 120Ω end-of-line resistance to be connected on first and last device in an RS485 MODBUS® network.

The End –Of-Line resistance supplied with emfis is to be connected between Rx- and Rx+ as shown above

Programming

For programming of emfis vifpe please refer the emfis vifpe operating instruction Reference No. HSPL/EMFIS vifpe/0207. Programming described below pertains to communication parameter only.

For communication the following parameters can be configured/programmed in emfis vifpe using the push buttons

1. Slave Address (01 to 99)
2. Baud Rate (4800,9600,19200)

Keys	Instruction	Display	Comment
▷	Press the key for 1 second Then release	PS0---	You are now in configuration mode. Password has to be entered

NB: Enter the access code '1234' to access the programming parameters and proceed as below:

Keys	Instruction	Display	Comment
△	Press Once	PS1---	first digit increases by 1
▷	Press once	PS10--	moves one digit right
△	Press Twice	PS12--	second digit increases by 2
▷	Press Once	PS120-	moves one digit right
△	Press Thrice	PS123-	third digit increases by 3
▷	Press Once	PS1230	moves one digit right
△	Press Four Times	PS1234	fourth digit increases by 4
↵	Press once	t 14.07.05 d 09.06.04	password has been confirmed after pressing the enter push button.

Programming of Slave Address:

Note: The configuration of slave address starts after CT ratio configuration screen(as described in emfis vifpe manual Ref. No. HSPL/EMFIS vifpe/ 0207). The default address setting is 05 if this setting is ok then press ▷ to move on to programming of baud rate. If address is to be changed then proceed as below. (The slave address can be configured between 01 to 99).

In this example it is explained how to set the slave address as 16.

Keys	Instruction	Display	Comment
▷	Press Twice	SL 05	You have now accessed the default/ Previously set slave address
↵	Press Once	SL 0-	You are now in slave address configuration mode
△	Press once	SL 1-	first digit increases by 1
▷	Press Once	SL 10	moves one digit right
△	Press six times	SL 16	second digit increases by 6
↵	Press Once		The display flickers and displays the updated address and returns to auto scroll mode. If the display does not flicker and directly goes to auto scroll mode then the address has not been updated.

Selection of Baud Rate

After the last step explained on page number 4, use the following step.

▷	Press Once	Bd 9600	You have now accessed the default/ Previously set baud rate

Note: The default baud rate is set as 9600 bps if this setting is ok then press ▷ to pass to view Serial Number of the meter (Sn). If baud rate is to be changed then proceed as below.

Keys	Instruction	Display	Comment
↵	Press Once	Bd 9600	You are now in baud rate selection mode
△	Press once	Bd 19200	Press again for 4800, 9600 bauds
↵	Press Once		Return to the auto scroll mode.

COMMUNICATION

The MODBUS used by the emfis vifpe involves a dialogue using a Master-Slave hierarchical structure. The mode of communication is the RTU (Remote Terminal Unit) using hexadecimal characters of at least 8 bits.

The standard communication frame consists of

Slave address	Function code	Address	Data	CRC16

Following function code is used to communicate with emfis vifpe:

3: to read n words (maximum 20)

Table of values for communication

S No.	No of words	No of information bytes	Parameter	Unit	Address (hex)
1	1	2	PHASE TO NEUTRAL VOLTAGE U1	Volt	340
2	1	2	PHASE TO NEUTRAL VOLTAGE U2	Volt	341
3	1	2	PHASE TO NEUTRAL VOLTAGE U3	Volt	342
4	1	2	PHASE1 CURRENT	Amp	343
5	1	2	PHASE2 CURRENT	Amp	344
6	1	2	PHASE3 CURRENT	Amp	345
7	2	4	ACTIVE ENERGY	KWH*0.065535	346
8	1	2	ACTIVE POWER PHASE 1	KW/10	34C
9	1	2	ACTIVE POWER PHASE 2	KW/10	34D
10	1	2	ACTIVE POWER PHASE 3	KW/10	34E
11	1	2	APPARENT POWER PHASE 1	KVA/10	34F
12	1	2	APPARENT POWER PHASE 2	KVA/10	350
13	1	2	APPARENT POWER PHASE 3	KVA/10	351
14	1	2	REACTIVE POWER PHASE 1	KVAR/10	352
15	1	2	REACTIVE POWER PHASE 2	KVAR/10	353
16	1	2	REACTIVE POWER PHASE 3	KVAR/10	354
17	1	2	POWER FACTOR PHASE 1	.01	355
18	1	2	POWER FACTOR PHASE 2	.01	356
19	1	2	POWER FACTOR PHASE 3	.01	357
20	1	2	FREQUENCY	HZ/10	358
21	1	2	PHASE TO PHASE VOLTAGE U12	Volt	359
22	1	2	PHASE TO PHASE VOLTAGE U23	Volt	35A
23	1	2	PHASE TO PHASE VOLTAGE U31	Volt	35B
24	1	2	∑ ACTIVE POWER	KW/10	35C
25	1	2	∑ APPARENT POWER	KVA/10	35D
26	1	2	∑ REACTIVE POWER	KVAR/10	35E
27	1	2	AVERAGE VALUE ∑ ACTIVE POWER	KW/10	35F
28	1	2	AVERAGE VALUE ∑ APPARENT POWER	KVA/10	360
29	1	2	AVERAGE VALUE ∑ REACTIVE POWER	KVAR/10	361
30	1	2	MAXIMUM VALUE ∑ ACTIVE POWER	KW/10	362

31	1	2	MAXIMUM VALUE ∑ APPARENT POWER	KVA/10	363
32	1	2	MAXIMUM VALUE ∑ REACTIVE POWER	KVAR/10	364
33	1	2	AVERAGE VALUE I1	Amp	365
34	1	2	AVERAGE VALUE I2	Amp	366
35	1	2	AVERAGE VALUE I3	Amp	367
36	1	2	MAXIMUM VALUE I1	Amp	368
37	1	2	MAXIMUM VALUE I2	Amp	369
38	1	2	MAXIMUM VALUE I3	Amp	36A
39	1	2	∑ POWER FACTOR	.01	36B
40	1	2	TOTAL CURRENT	Amp	36C
41	1	2	CT Ratio	-	375
42	2	4	SERIAL NUMBER		376

Note: serial number value is in BCD.

Format of data for Power Factor is as follows:

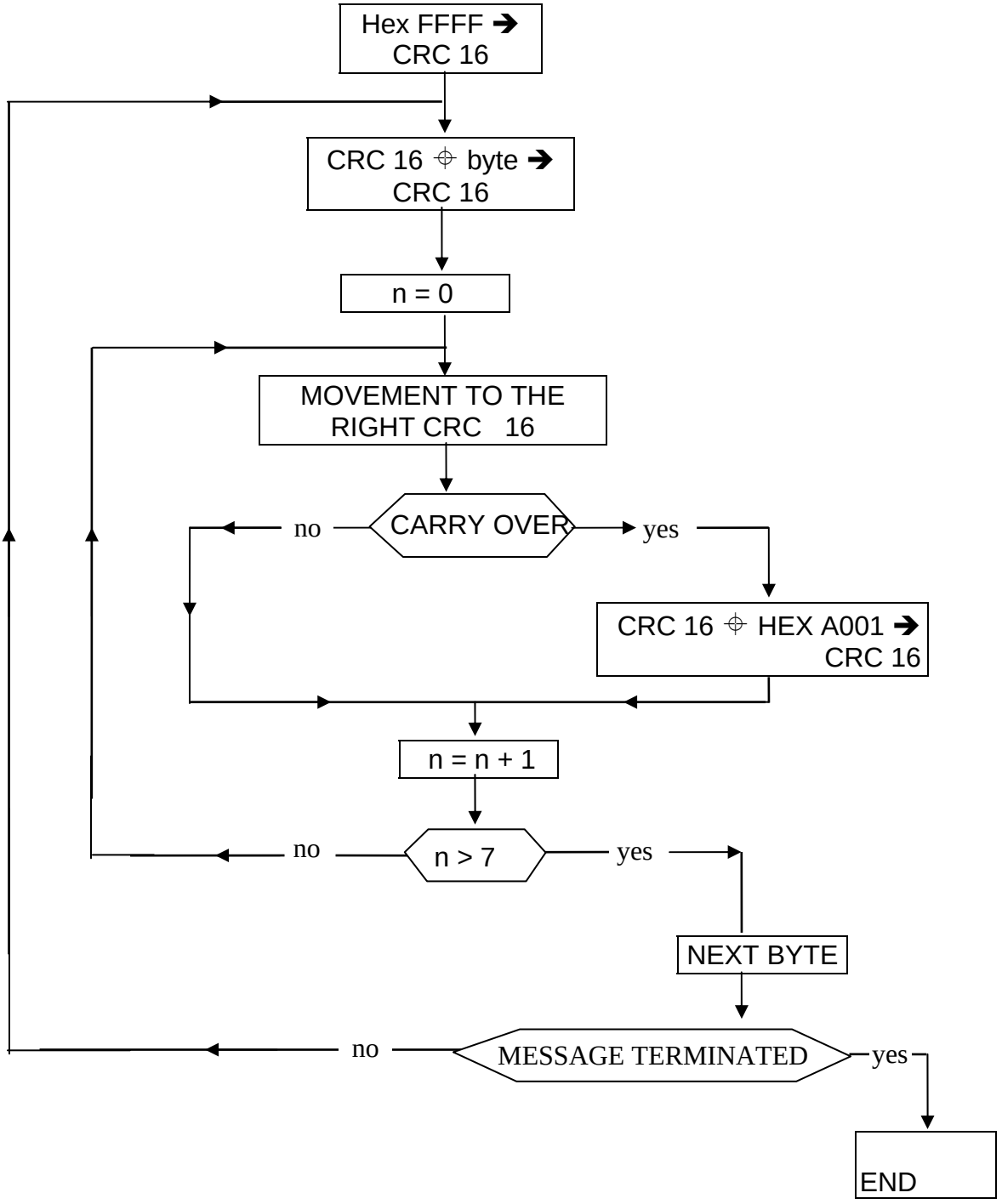
1. Power Factor (1 word or 2 bytes)

MSB LSB

Higher Byte represents the sign of the power factor.'1' is for capacitive load & '0' is for inductive load.

Lower Byte represents the value of the power factor.

GUIDE TO CRC 16 CALCULATION



⊕ = OR exclusive
n = number of information bit

In the CRC 16, the first octet transmitted is LSB

EXAMPLE : Developpement of CRC

		CRC 16				FLAG
Initialisation CRC register		1111	1111	1111	1111	
⊕ of 1st character				0000	0010	
		1111	1111	1111	1101	
	Movement 1	0111	1111	1111	1110	1
Flag to 1, ⊕ Polynome		1010	0000	0000	0001	
		1101	1111	1111	1111	
	Movement 2	0110	1111	1111	1111	1
Flag to 1, ⊕ Polynome		1010			0001	
		1100	1111	1111	1110	
	Movement 3	0110	0111	1111	1111	0
Flag to 0	Movement 4	0011	0011	1111	1111	1
		101			1	
		1001	0011	1111	1110	
	Movement 5	0100	1001	1111	1111	0
	Movement 6	0010	0100	1111	1111	1
		101			1	
		1000	0100	1111	1110	
	Movement 7	0100	0010	0111	1111	0
	Movement 8	0010	0001	0011	1111	1
		101			1	
		1000	0001	0011	1110	
⊕ 2nd character				0000	0111	
		1000	0001	0011	1001	
	Movement 1	0100	0000	1001	1100	1
		101			1	
		1110	0000	1001	1101	
	Movement 2	0111	0000	0100	1110	1
		101			1	
		1101	0000	0100	1111	
	Movement 3	0110	1000	0010	0111	1
		101			1	
		1100	1000	0010	0110	
	Movement 4	0110	0100	0001	0011	0
	Movement 5	0011	0010	0000	1001	1
		101			1	
		1001	0010	0000	1000	
	Movement 6	0100	1001	0000	0100	0
	Movement 7	0010	0100	1000	0010	0
	Movement 8	0001	0010	0100	0001	0

Monitoring Software

One Cd of Monitoring Software is supplied with emfis vifpe RS485 model Ref EM-vifpeA2. On receipt of the CD please print this file for reference and future use. This file also gives the installation procedure for the software.

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