APPLICATION SERVER GATEWAY

METER ENERGY – MODULE

Connection and Technical Specification

Version 1.0.5 (Aug 2015)

PT. PLN (PERSERO) KANTOR PUSAT

2015

Contents :

REVISIONS

VERSION	DATE	DESCRIPTION
1.0.1	Aug, 2013	Channel Load Profile has 14
1.0.2	Jan, 2014	1. Column for MTI=3200 has been deleted - TotalKVAMaxEkspor - TotalKVAMaxImpor 2. Alter length any column for MTI=3200 3. Change PAN define for MTI=3200
1.0.3	Feb, 2014	1. Add new parameter 3800 – 302 sync Time 2. Kolom Spek teknis nambah 1 kolom Keterangan 3. Max Retries , No limit until get RC=0000
1.0.4	Mar, 2014	Add and revision of PAN in 3200 ,3100 , and 3300
1.0.5	Aug, 2015	1. Message flow, Request data Lost (3200+Req) 2. In 3200 ,alter sequence of FaktorKerja and Frequency 3. In 3200 ,Set Unit (Kilo, Mega, or Unit) 4. In Additional Private Data 3210,add new Request Data Lost 5. In 3100 add Total KWH Kirim and Terima and Alter Sequence of KWH WBP. 6. Add Reference number into database , for message data accuration.

SECTION 1

Background

PLN (Perusahaan Listrik Negara) is a government company supplies electricity for All Indonesian. As one of public company, major purpose is how to collect meter Energy transaction from generation, transmission , and distribution . Currently, there is more than Meter using AMR with Pull data accessing PLN database directly using different approach. Along with internal requirements comes from internal PLN and based on existing operation problems, PLN proposed a single and centralized data access through a unified gateway using financial standard messaging protocol, ISO8583:2003 (http://www.iso.org).

The simple idea is all meters which is need to access PLN's database must enter through single unified and standard gateway using standard message and standard mechanism. Further, direct access to database is highly prohibited.

Connection Architecture

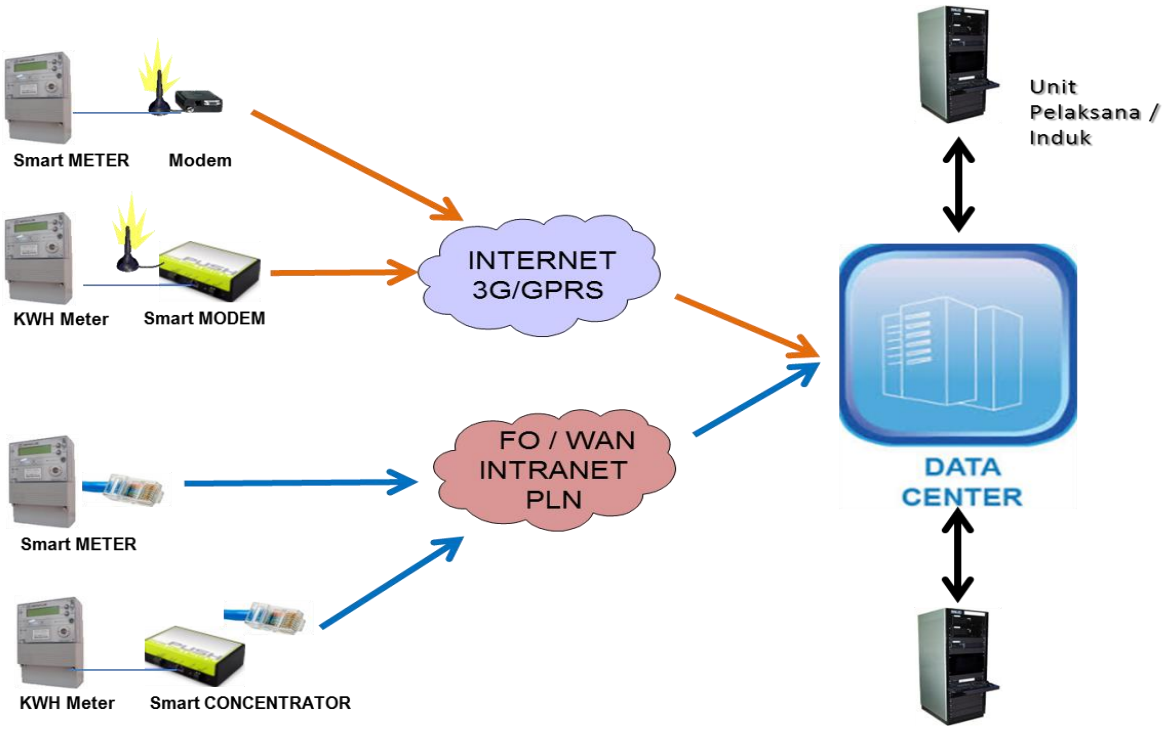


Figure 1 Skema

METER System can access Gateway PLN System using dedicated communication channel like FO or using any telecommunication provider like 3G/GPRS for link reliability and availability reasons. Any other connection other than mentioned, must be discussed first with DIVSIM.

SECTION 2
MESSAGE/PROTOCOL SPECIFICATION

Messaging System

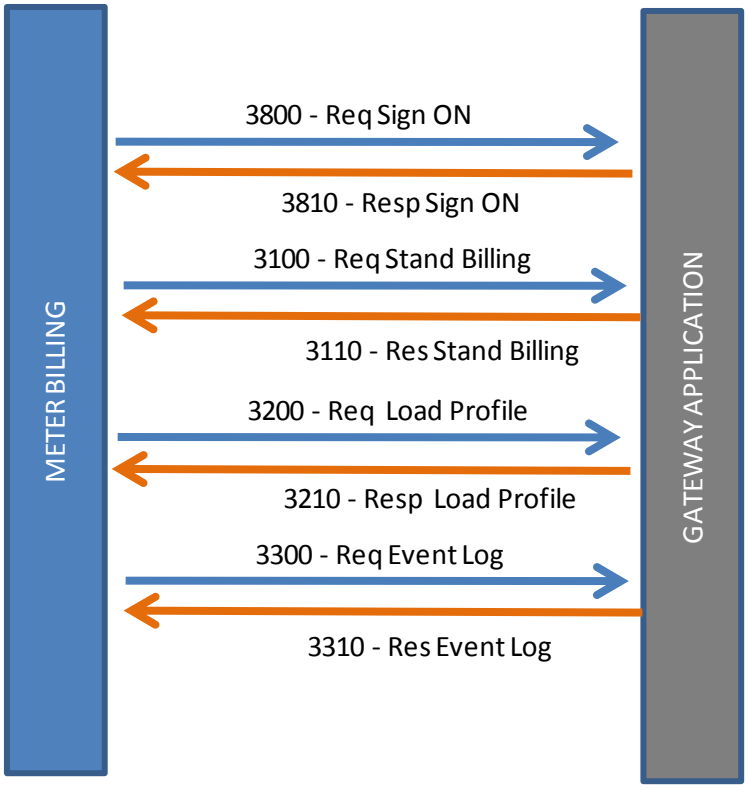
TCP/IP Communication System will bring the information from KWh Meter System and PLN-Application Server Gateway and vice-versa.

The standard communication protocol that used by PLN Application Server is TCP/IP ("telnet" like), where client must send a negative byte value -1 (hexa-1x01 in JAVA/C instead of bytes of CRLF characters for real telnet application) to indicate END OF MESSAGE (EOM). Every request message will be responded by an appropriate reply according to each request type

Each message must be trailed by a negative byte value -1 (hexa-1x01 in JAVA/C) indicates end of message (EOM). The Meter must be blocked, wait for a response from PLN Gateway (synchronous). If a connection time-out was occurred (20-40 seconds were lapsed), SWITCHING can assume the network link was broken and response with TIMEOUT was

Message Sequence and Flow

Message sequence and flow can be illustrated as following:



Before doing any activities, METER must sign-on first by sending a message with type 3800 – Network Management Request and action 001 – Sign-On to GATEWAY with a predefined identification code(METER ID) provided by PLN. If the METER signed-on successfully (described in response message sent by GATEWAY with type 3810 – Network Management Response), METER can do any SEND DATA as long as available network connection to GATEWAY.

To enable Send data, METER must send message any type 3100 – STAND BILLING Request to PLN GATEWAY System. The key information must be send in this message is METER ID NUMBER ,the unique number. GATEWAY will response with message type 3110 –Response.

If technical problem was occurred, broken network link for instance, there is possibility that METER does not get the response sent by GATEWAY. In this case, METER must sent message RE-TRIES with the same type MTI until succes.

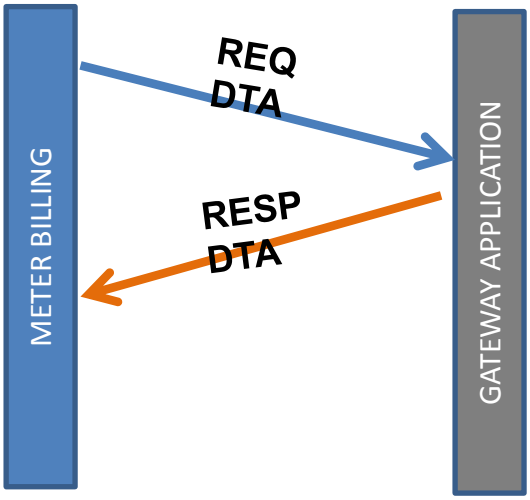
SECTION 3
MESSAGE FLOW

While sending/receiving message, Meter KWh may get one of two following situations:

- Normal
- FAIL to get response message
- Late Response
- Repeat Sending data
- Request Lost Data

METER must be smart when the situation is not NORMAL. METER System must send re-tries request if it was occurred and send until get response in a period of time. PLN was recommended that the grace period for sending and receiving messages are 20 – 40 seconds. Grace period here means how long METER or GATEWAY must be wait the message before disconnecting the connection and assumes that other party or network is broken.

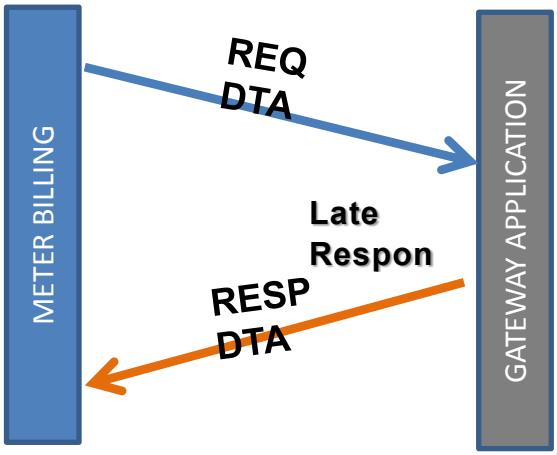
Normal



KETERANGAN :

REQ DTA : Meter Mengirimkan Data Billing padaperiodeTertentu,

Late Respone

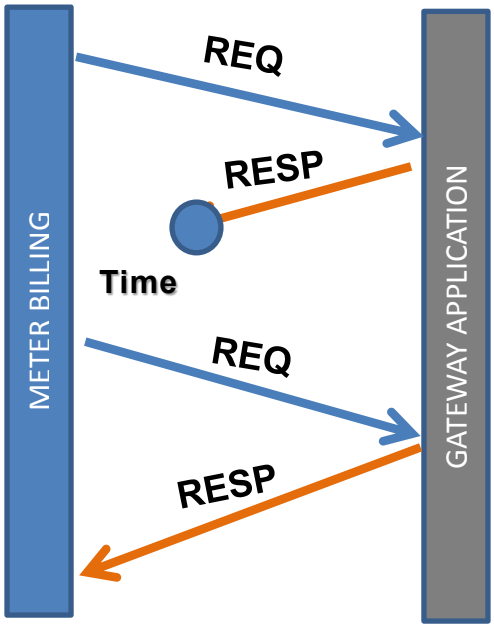


KETERANGAN :

REQ DTA : Meter Mengirimkan Data Billing padaperiodeTertentu, kodemsg=3100

RESP DTA : Meter MenerimaResponSuksesdari Gateway, kodemsg=3110

Time Out

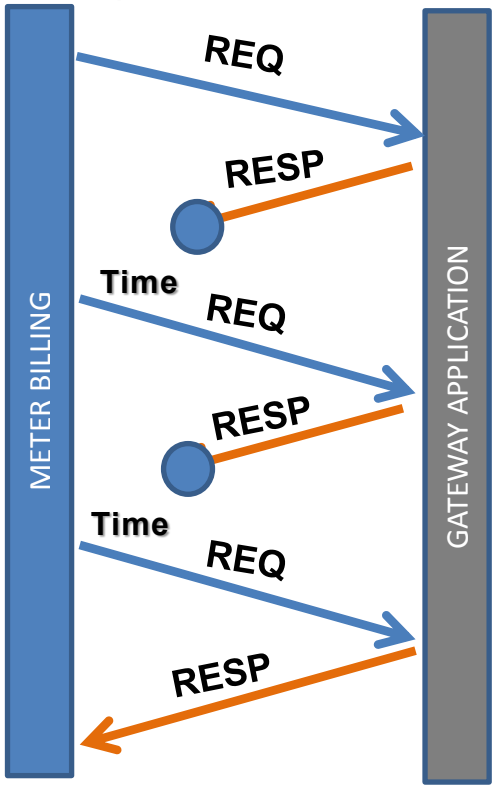


KETERANGAN :

REQ DTA : Meter Mengirimkan Data Billing pada periode Tertentu

RESP DTA : Meter Menerima Respon Sukses dari Gateway

Re-Tries sending if Time out/fail



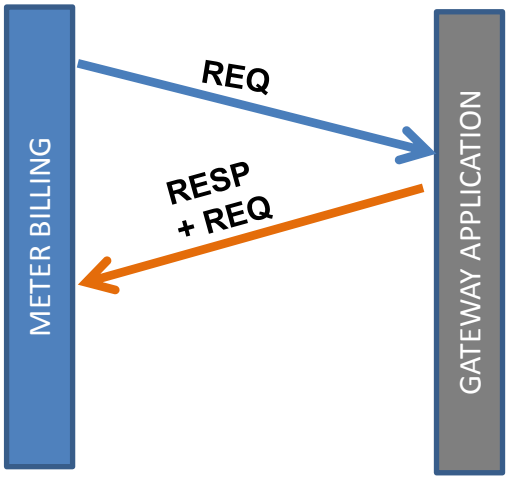
KETERANGAN :

REQ DTA : Meter Mengirimkan Data Billing pada periode Tertentu

RESP DTA : Meter Menerima Respon Sukses dari Gateway

Time Out : failed Communication

Request Data Lost



KETERANGAN :

REQ : Meter Mengirimkan Load Profile 3200

SECTION 4
MESSAGE/PROTOCOL SPECIFICATION

A. Network Management

A.1 Request Message

Message Type Identifier : 3800
Sender : Meter KWh
Purpose : Request network management action to GATEWAY

No	Name	Sub Field	Type	Length	format	Description	Value / e.g.	information
1	MTI		N	4		Message Type Indicator 3800 = NetMan Request		
2	Date & Time, Local Meter		N	14	CCYYMMDDhhmmss	20130821091010	2013-08-21 09:10:10	
3	Action code		AN	3		001 = sign-on 002 = sign-off 301 = echo test 302 = sync time	001 = first connection 301 = keep exists send every 5 minutes GSM/GPRS and every 24 hours in TCP/IP	302 = synchronize between meter and server time at 00:00AM 002 = end connection
4	Additional Private Data							
		Serial number Meter	AN	15	space right-padding	Serial Number Meter 071008504	071008504	
		IP Address	AN	15		XXX.XXX.XXX.XXX	172.168.102.100	Ip connection

A.2 Respon Message

Message Type Identifier : 3810
Sender : Gateway PLN
Purpose : Response the network management action request to Meter KWh

No	Name	Sub Field	Type	Length	format	Description	Value / e.g.	information
1	MTI		N	4		Message Type Indicator 3810 = NetMan Response		
2	Date & Time, Local Meter		N	14	CCYYMMDDhhmmss	20130821091010	2013-08-21 09:10:10	Jika clock di Meter berselang 5 Menit dengan jam server, maka clock di Meter diupdate dengan jam server (action code=302)
3	Action code		AN	3		001 = sign-on 002 = sign-off 301 = echo test 302 = sync time		302=synchronize time
4	Response Code		AN	2		00 = successful 05 = ERROR - Other 11 = ERROR - Need to sign-on 30 = ERROR - Invalid message 32 = ERROR - Unregistered Meter 68 = ERROR - Timeout 90 = ERROR - Cut-off is in progress		
5	Additional Private Data							
		Serial number Meter	AN	15	space right-padding	Serial Number Meter 071008504		

Catatan :

Jika clock di Meter berselang 5 Menit dengan jam server, maka clock di Meter diupdate dengan jam server (action code=302)

B. End Of Billing

B.1 Request Message

Message Type Identifier : 3100
Sender : Meter KWh
Purpose : Send Stand Billing to GATEWAY

No	Name	Sub Field	Type	Length	format	Description	Value / e.g.	information
1	MTI		N	4		Message Type Indicator 3100 = Send Stand Billing		
2	Date & Time, Local Meter		N	14	CCYYMMDDhhmmss	20130821091010	2013-08-21 09:10:10	
3	Primary Account Number (PAN)		N	3	zero left-padding	401 Terima dari Luar Pln 402 Terima dari Proyek 403 Terima dari Sewa 404 Terima dari Unit Lain 405 Pembangkit Sendiri 406 PS KIT 407 PS Gi 408 Kirim Ke Unit Lain 409 Kirim Ke Luar Pln 410 Kirim Ke Proyek 411 PS DIST 412 KTT	Fungsi Meter : 407 = Meter Pemakaian Sendiri Gardu Induk	
4	Additional Private Data							
		Serial number Meter	AN	15	space right-padding	Serial Number Meter 071008504	071008504	
		Date & Time, Meter saved	N	14	CCYYMMDDhhmmss	20130821091010	2013-08-21 09:10:10	
		Stand Minor Unit	N	1	1 .. 6	Number of decimal value 0 = no decimal value n = n-last digits of value amount are decimal values	6	
		Stand KWh WBP kirim	AN	15	zero left-padding	000000000400500	400.5	Snapshot sesuai Setting Waktu

		Stand KWh WBP terima	AN	15	zero left-padding	000006402510000	6402.51	Snapshot sesuai Setting Waktu
		Stand KWh LWBP1 kirim	AN	15	zero left-padding	000000400500000	400.5	Snapshot sesuai Setting Waktu
		Stand KWh LWBP1 terima	AN	15	zero left-padding	000006402510000	6402.51	Snapshot sesuai Setting Waktu
		Stand KWh LWBP2 kirim	AN	15	zero left-padding	00000004005000	400.5	Snapshot sesuai Setting Waktu
		Stand KWh LWBP2 terima	AN	15	zero left-padding	000006402510000	6402.51	Snapshot sesuai Setting Waktu
		Stand KWH TOTAL kirim	AN	15	zero left-padding	000006402510000	6402.51	Snapshot sesuai Setting Waktu
		Stand KWH TOTAL Terima	AN	15	zero left-padding	000006402510000	6402.51	Snapshot sesuai Setting Waktu
		Stand KVArh kirim	AN	15	zero left-padding	000000654500000	654.5	Snapshot sesuai Setting Waktu
		Stand KVArh terima	AN	15	zero left-padding	000000301500000	301.5	Snapshot sesuai Setting Waktu
		Stand KVAMax	AN	15	zero left-padding	000000999550000	999.55	Snapshot sesuai Setting Waktu
		Date & Time, KVAMax	N	14	CCYYMMDDhhmmss	20130821091010	8/21/2013 09:10:10	Snapshot sesuai Setting Waktu

Catatan :

1. End Of Billing dikirim per Tanggal 1 pukul 10:00:00 WIB clock pada Meter.
2. Urutan STAND KWH End Of Billing :
    a. KWH WBP
    b. KWH LWBP 1
    c. KWH LWBP 2
    d. KWH TOTAL
3. Jika pada Meter Eksisting Tidak ada channel LWBP1 atau LWBP2 → Stand KWHmeter di isi ke kolom KWH TOTAL
4. Jika pada Meter Eksisting Tidak ada channel LWBP1 / LWBP2 / WBP → Stand KWHmeter di isi ke kolom KWH TOTAL

B.2 Respon Message

Message Type Identifier : 3110
Sender : Gateway PLN
Purpose : Response stand Billing request to Meter KWh

No	Name	Sub Field	Type	Length	format	Description	Value / e.g.	information
1	MTI		N	4		Message Type Indicator	3110 = Stand Billing Response	
2	Date & Time, Local Meter		N	14	CCYYMMDDhhmmss	20130821091010	2013-08-21 09:10:10	
3	Primary Account Number (PAN)		N	3	zero left-padding	401 Terima dari Luar Pln 402 Terima dari Proyek 403 Terima dari Sewa 404 Terima dari Unit Lain 405 Pembangkit Sendiri 406 PS KIT 407 PS Gi 408 Kirim Ke Unit Lain 409 Kirim Ke Luar Pln 410 Kirim Ke Proyek 411 PS DIST 412 KTT	Fungsi Meter : 407 = Meter Pemakaian Sendiri Gardu Induk	
4	Response Code		AN	2		00 = successful 05 = ERROR - Other 11 = ERROR - Need to sign-on 30 = ERROR - Invalid message 32 = ERROR - Unregistered Meter 68 = ERROR - Timeout 90 = ERROR - Cut-off is in progress		
5	Additional Private Data							
		Serial number Meter	AN	15	space right-padding	Serial Number Meter 071008504	071008504	

C. Load Profile

C.1 Request Message

Message Type Identifier : 3200
Sender : Meter KWh
Purpose : Send Load profile to GATEWAY

No	Name	Sub Field	Type	Length	format	Description	Value / e.g.	information
1	MTI		N	4		Message Type Indicator 3200 = SendLoad Profile		
2	Date & Time, Local Meter		N	14	CCYYMMDDhhmmss	20130821091010	2013-08-21 09:10:10	
3	Primary Account Number (PAN)		N	3	zero left-padding	401 Terima dari Luar Pln 402 Terima dari Proyek 403 Terima dari Sewa 404 Terima dari Unit Lain 405 Pembangkit Sendiri 406 PS KIT 407 PS Gi 408 Kirim Ke Unit Lain 409 Kirim Ke Luar Pln 410 Kirim Ke Proyek 411 PS DIST 412 KTT	Fungsi Meter : 407 = Meter Pemakaian Sendiri Gardu Induk	
4	Additional Private Data							
		Serial number Meter	AN	15	space right-padding	Serial Number Meter 071008504	071008504	
		Date & Time, Meter saved	N	14	CCYYMMDDhhmmss	20130821091010	2013-08-21 09:10:10	
		Stand Minor Unit	N	1	1 .. 6	Number of decimal value 0 = no decimal value n = n-last digits of value amount are decimal values	6	Jumlah decimal dibelakang koma
		Total KWh kirim	AN	15	zero left-padding	Total Kwh kirim 000000040050000	40.05 Kwh	Summary 30 Menit

		TotalKVArh kirim	AN	15	zero left-padding	Total KVArh kirim 000000190010000	190.01 KVarh	Summary 30 Menit
		TotalKWh terima	AN	15	zero left-padding	Total Kwh terima 000000640251000	640.251 Kwh	Summary 30 Menit
		TotalKVArh terima	AN	15	zero left-padding	Total KVArh terima 000000000150000	0.15 KVarh	Summary 30 Menit
		TeganganFasa R	AN	9	zero left-padding	TeganganFasa R 499500000	499.5	Snapshot
		TeganganFasa S	AN	9	zero left-padding	TeganganFasa S 000198980	0.19898	Snapshot
		TeganganFasa T	AN	9	zero left-padding	TeganganFasa T 020011000	20.011	Snapshot
		ArusFasa R	AN	10	zero left-padding	ArusFasa R 0002248000	2.048 A	Snapshot
		ArusFasa S	AN	10	zero left-padding	ArusFasa S 0003048000	3.048 A	Snapshot
		ArusFasa T	AN	10	zero left-padding	ArusFasa T 0002208000	2.208 A	Snapshot
		FaktorKerja	AN	7	zero left-padding	Factor Kerja (cos q) 0990000	0.99	Snapshot
		Frekuensi	AN	8	zero left-padding	Frekuensi 49500000	49.5 Hertz	Snapshot
		Total Daya MW	AN	11	zero left-padding	Daya 00029125000	29.125	Snapshot
		Total Daya MVAR	AN	11	zero left-padding	Daya Reaktif 13000160000	13000.16	Snapshot

1. Load profile dikirim per 30 Menit , terhitung pukul 00:00:00 WIB clock pada Meter
2. Peak Koinsiden (KW) → Pemakaian energy KWh (load profile) dalam 30 Menit * 2
3. Satuan Energi :

Kolom	1	2	3	4	5	6	7	8	9	10	11	12	13	14
MU/MP	K	K	K	K	K	K	K	U	U	U	U	U	M	M
PS	K	K	K	K	U	U	U	U	U	U	U	U	K	K

K = Kilo , M = Mega , U = Unit

4. Urutan Kolom :

    1. KWh Kirim
    2. KVArH Kirim
    3. KWh Terima
    4. KVArH Terima
    5. Tegangan R
    6. Tegangan S
    7. Tegangan T
    8. Arus R
    9. Arus S
    10. Arus T
    11. Faktor kerja (cos q)
    12. Frequency (Herzt)
    13. Daya
    14. Daya Reaktif

C.1 Respon Message

Message Type Identifier : 3210
Sender : Gateway PLN
Purpose : Response Load Profile request to Meter KWh

No	Name	Sub Field	Type	Length	format	Description	Value / e.g.	information
1	MTI		N	4		Message Type Indicator 3210 = load Profile Response		
2	Date & Time, Local Meter		N	14	CCYYMMDDhhmmss	20130821091010	2013-08-21 09:10:10	
3	Primary Account Number (PAN)		N	3	zero left-padding	401 Terima dari Luar Pln 402 Terima dari Proyek 403 Terima dari Sewa 404 Terima dari Unit Lain 405 Pembangkit Sendiri 406 PS KIT 407 PS Gi 408 Kirim Ke Unit Lain 409 Kirim Ke Luar Pln 410 Kirim Ke Proyek 411 PS DIST 412 KTT	Fungsi Meter : 407 = Meter Pemakaian Sendiri Gardu Induk	
4	Response Code		AN	2		00 = successful 05 = ERROR - Other 11 = ERROR - Need to sign-on 30 = ERROR - Invalid message 32 = ERROR - Unregistered Meter 68 = ERROR - Timeout 90 = ERROR - Cut-off is in progress		
5	Additional Private Data							
		Serial number Meter	AN	15	space right-padding	Serial Number Meter 071008504	071008504	
		Request Data Lost	AN	6	Zero left padding	First Request = 1..254	001255 (if any)	Request data lost

						End Request = 1..255	000000 (default)	from index 1 until 255. Index 1 are last data created

D. Event Log

D.1 Request Message

Message Type Identifier : 3300
Sender : Meter KWh
Purpose : Send Event Log to GATEWAY

No	Name	Sub Field	Type	Length	format	Description	Value / e.g.	information
1	MTI		N	4		Message Type Indicator 3300 = SendEvent Log		
2	Date & Time, Local Meter		N	14	CCYYMMDDhhmmss	20130821091010	2013-08-21 09:10:10	
3	Primary Account Number (PAN)		N	3	zero left-padding	401 Terima dari Luar Pln 402 Terima dari Proyek 403 Terima dari Sewa 404 Terima dari Unit Lain 405 Pembangkit Sendiri 406 PS KIT 407 PS Gi 408 Kirim Ke Unit Lain 409 Kirim Ke Luar Pln 410 Kirim Ke Proyek 411 PS DIST 412 KTT	Fungsi Meter : 407 = Meter Pemakaian Sendiri Gardu Induk	
4	Additional Private Data							
		Serial number Meter	AN	15	space right-padding	Serial Number Meter 071008504	071008504	
		Date & Time, Meter saved	N	14	CCYYMMDDhhmmss	20130821091010	2013-08-21 09:10:10	

		Event Code	A	4	zero left-padding	0001 – Tegangan hilang Fasa R 0002 – Tegangan hilang Fasa S 0003 – Tegangan hilang Fasa T 0004 – Arus Hilang Fasa R 0005 – Arus Hilang Fasa R 0006 – Arus Hilang Fasa R 0007 – Frekuensi Treshold keluar dr batas 0008 – Tegangan under voltage 0009 – Unbalanced arus 0010 – Unbalanced tegangan 0011 – Kesalahan Pengkabelan …….. 8888 – Kejadian pada modem 9999 – Kejadian lain belum didefinisikan	0001	
		Event Name	A	50	SpaceRight-padding	Event Log Name	Tegangan hilang Fasa R	Bila event code telah didefinisikan event name tidak di isi

D.2 Respon Message

Message Type Identifier : 3310
Sender : Gateway PLN
Purpose : Response Event Log request to Meter KWh

No	Name	Sub Field	Type	Length	format	Description	Value / e.g.	information
1	MTI		N	4		Message Type Indicator 3310 = Event Log Response		
2	Date & Time, Local Meter		N	14	CCYYMMDDhhmmss	20130821091010	2013-08-21 09:10:10	
3	Primary Account Number (PAN)		N	3	zero left-padding	401 Terima dari Luar Pln 402 Terima dari Proyek 403 Terima dari Sewa 404 Terima dari Unit Lain 405 Pembangkit Sendiri	Fungsi Meter : 407 = Meter Pemakaian Sendiri Gardu Induk	

						406 PS KIT 407 PS Gi 408 Kirim Ke Unit Lain 409 Kirim Ke Luar Pln 410 Kirim Ke Proyek 411 PS DIST 412 KTT		
4	Response Code		AN	2		00 = successful 05 = ERROR - Other 11 = ERROR - Need to sign-on 30 = ERROR - Invalid message 32 = ERROR - Unregistered Meter 68 = ERROR - Timeout 90 = ERROR - Cut-off is in progress		
5	Additional Private Data							
		Serial number Meter	AN	15	space right-padding	Serial Number Meter 071008504	071008504	

Catatan :