

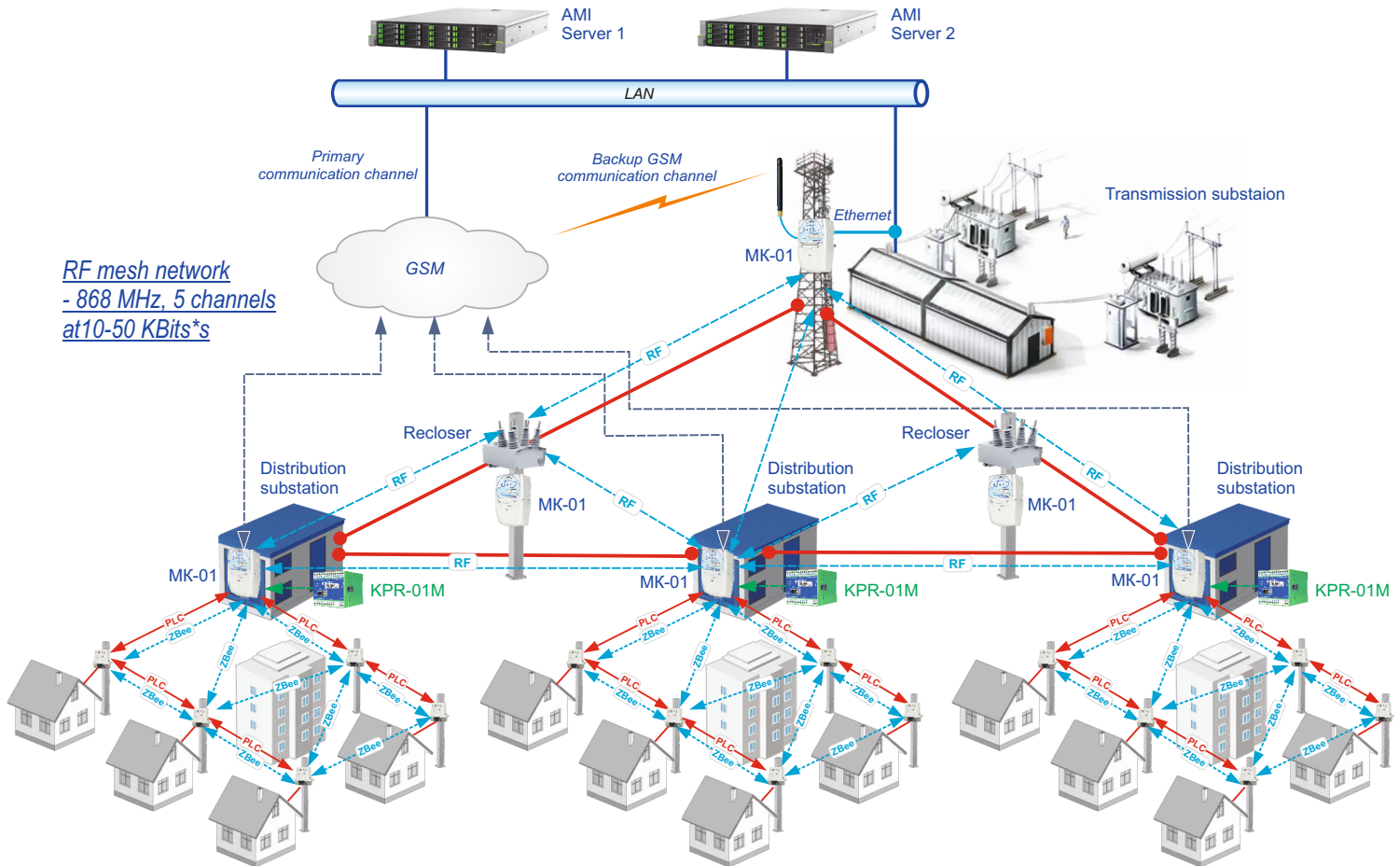


Smart grid solution for distribution networks and communities

Your own smart grid / wireless digital communication infrastructure based on wireless and PLC mesh networks

Innovative solution based on highly integrated devices and ISM communication channels.

- Power network observability, reduction of system interruption frequency (SAIFI) and duration (SAIDI);
- Mesh RF-, PLC- and ZigBee communication networks;
- Single integrated solution for distribution grid and for «last mile»;
- Highly integrated equipment. Most of monitoring and control tasks are performed by metering units.



RF mesh network
- 868 MHz, 5 channels
at 10-50 KBits*s

PLC mesh network - 2.4 KBit*s

ZigBee mesh network - 250 KBit*s (16 channels)



Certified by
Russian Register



1. General

Smart grid is an intelligent power network with its own communication channels, covering the power transmission networks and «last mile» networks. Own communication channels is a good option that could reduce expenses and improve network reliability in some cases.

2. Purpose

- 1) Improving reliability – better SAIDI and SAIFI due to the full observability distribution networks. Implementation of the automatic self-repairing function of electrical networks using reclosers.
- 2) Reducing technical and commercial losses of electricity, increasing the economic efficiency of power grid companies.

3. Advantages

- 1) Own structure of communication channels:
 - use of the 868 MHz or -2.4 GHz wireless sensor networks (RF - ZigBee);
 - mesh technology for data transmission over OHL (PLC), RF, ZigBee.
- 2) Comprehensive solution – integration of the household consumers metering system in order to reduce the level of electricity losses.
- 3) Integration of reclosers into the system for reconfiguring the grid sections and reducing reducing the consumers outage rate and duration.
- 4) Automatic detection of the line damage location and the allocation of an emergency area.

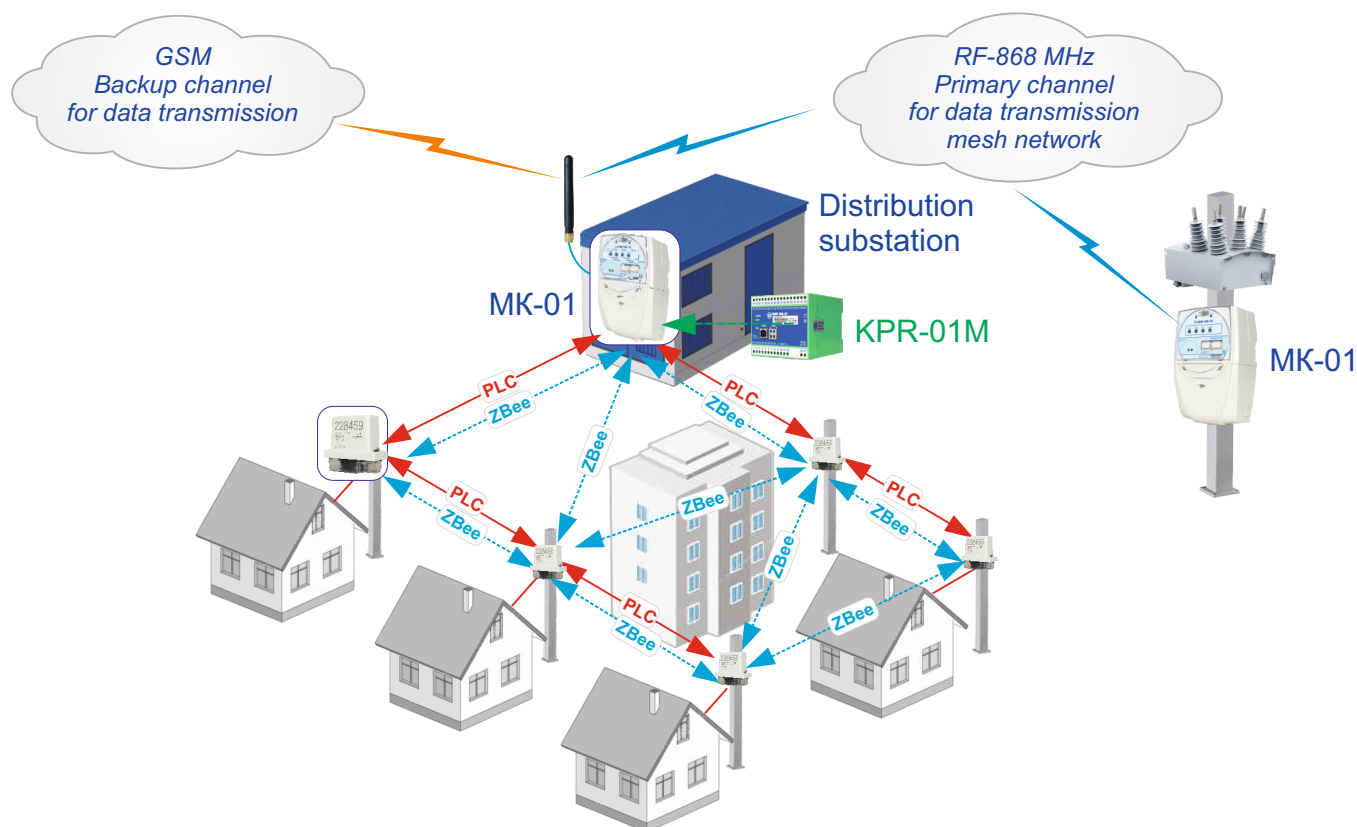
4. Implementation

The intelligent power grid is represented by the following elements: low and medium voltage distribution substations and recloser. Each network element is a communication node between levels.

Communication channels are implemented using mesh technologies within the ISM band. Integration of all systems into a single digital space allows you to manage the power grid in safe and efficient manner.

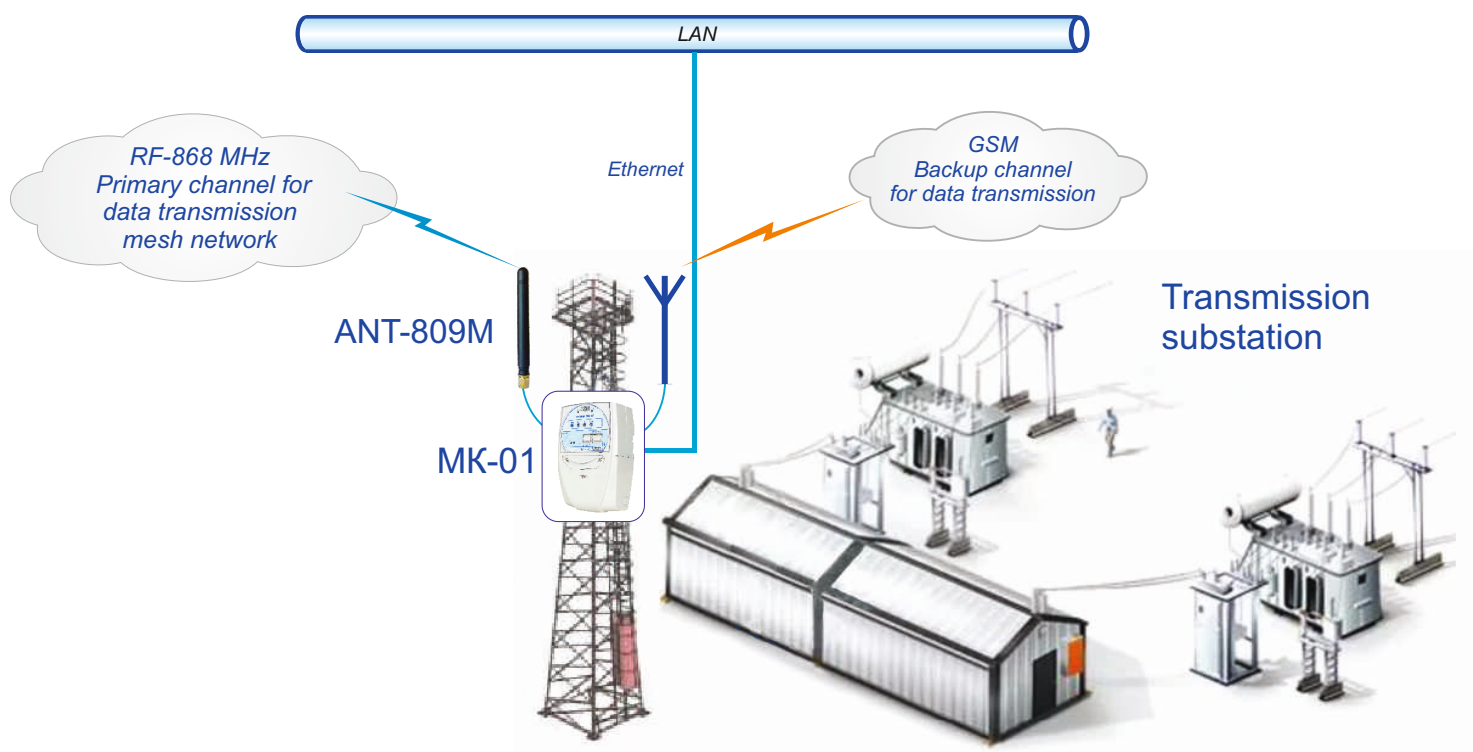
Any of the MK-01 data concentrators can be a network coordinator and entry point for collecting information.

Low voltage distribution substation equipment set



Pos.	Name	Quantity	Price, eur.	Amount excl. VAT, eur.	Note
	Equipment and materials				
1	Instrumental cabinet			1,840.00	
1.1	Instrumental cabinet	1			With terminal switch, clamps
1.2	Data concentrators MIR MK-01-230-G-P2P1RRZF	1			GSM/2RS485/PLC/RF/ZigBee
1.3	Bay controller MIR KPR-01M-A-5(50)-230IP-R2 E-8TS230-2TU-RP230-K				8 discrete inputs, 2 discrete outputs, I, P, Q, S/ faults logging/RS485/2Ethernet TX MODBUS RTU/TCP/IEC 60870-5-101/104
2	Communication facilities			315.00	
2.1	RF-868 antenna	1			
2.2	Lightning arrester	1			
2.3	GSM antenna	1			
2.4	Mast	1			
3	Installation parts kit	1			
4	Cable	1			
	Works and services				
5	Survey and design works				Confirmed by estimates
6	Installation works				Confirmed by estimates
	Additional equipment				
7	Single outlet metering point energy			155.00	Commercial metering/feeder
7.1	Metering unit MIR S-07.05S-230-5(10)-PZ-D	1			
7.2	Testing box intermediate	1			
	Total equipment			2,310.00	

High voltage transmission substation equipment set



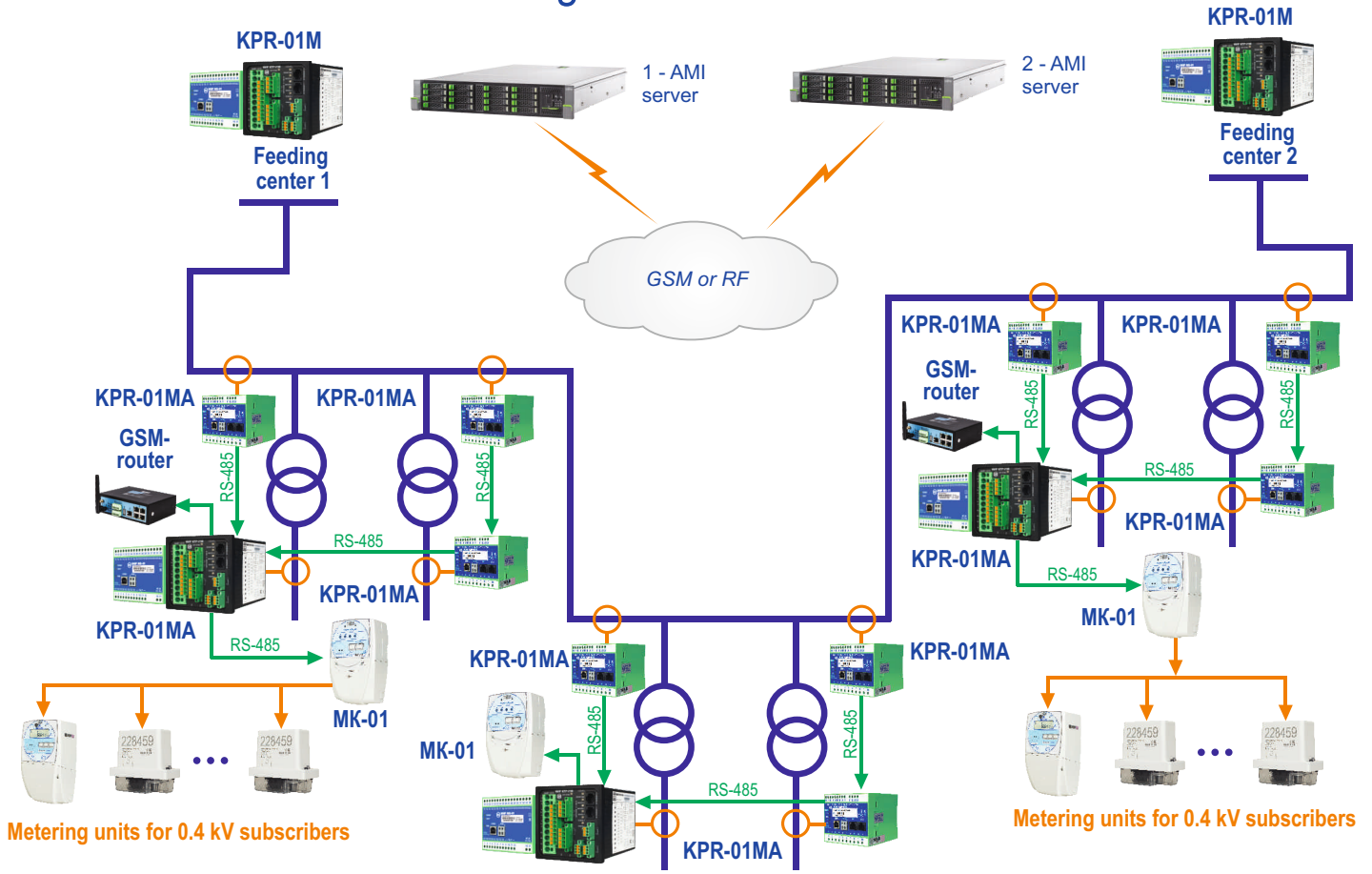
Pos.	Name	Quantity	Price, eur.	Amount excl. VAT, eur.	Note
	Equipment and materials				
1	Communication equipment	1		790.00	Provides communication via GSM channel
1.1	Data concentrator MIR MK-01 MIR MK-01-230-G-P2P1RR2F	1	450.00		
		1			GSM/2RS485/PLC/RF/ZigBee
2	Communication facilities			385.00	
2.1	RF-868 antenna	1			
2.2	GSM antenna	1			
2.3	Lightning arrester	1			
2.4	Mast	1			
3	Installation parts kit	1			
4	Cable	1			
	Works and services				
5	Survey and design works				Confirmed by estimates
6	Installation works				Confirmed by estimates
	Total equipment			1,175.00	

Recloser equipment set



Pos.	Name	Quantity	Price, eur.	Amount excl. VAT, eur.	Note
	Equipment and materials				
1	Data concentrator MIR MK-01-230-G-P2P1RRZF	1		450.00	GSM/2RS485/PLC/RF/ZigBee
2	Communication facilities			315.00	
2.1	RF-868 antenna	1			
2.2	Lightning arrester	1			
2.3	GSM antenna	1			
2.4	Mast	1			
3	Installation parts kit	1			
4	Cable	1			
	Works and services				
5	Survey and design works				Confirmed by estimates
6	Installation works				Confirmed by estimates
	Total equipment			765.00	

Medium voltage distribution substation set



Pos.	Name	Quantity	Price, eur.	Amount excl. VAT, eur.	Note
	Equipment and materials				
1	Cabinet			6,400.00	
1.1	Instrumental cabinet	1			With set of additional equipment and installation parts
1.2	Data concentrator MIR MK-01.G-PRZ	1	305.00		GSM/PLC/RF/ZigBee
1.3	Bay controller MIR KPR-01M-5(150)-230-3R2E-8TC24-2TU-IP230	2	874.00		8 discrete inputs, 2 discrete outputs/ /U, I, P, Q, S/faults logging/3RS485/2Ethernet TX MODBUS RTU/TCP/IEC 60870-5-101/104
1.4	Bay controller MIR KPR-01M-A-5(50)-230IP-3R-8TS24-2TU-RP230	2	450.00		8 discrete inputs, 2 discrete outputs/U, I, P, Q, S /RAS/Emergency processes/3RS485 MODBUS RTU/ Instrumentation parameters/IEC 60870-5-101/104
1.5	I/O extension unit MIR MV-01-R-16TS230 4TUDC-IP24	2	386.00		Instrumentation parameters
2	Communication facilities			220.00	
2.1	RF-868 antenna	1			
2.2	GSM antenna	1			
2.3	Mast	1			
3	Transformers			1,640.00	
3.1	Transformer Type 1	4			
3.2	Transformer Type 2	6			
4	Installation parts kit	1			
5	Cable	1			
	Works and services				
6	Survey and design works				Confirmed by estimates
7	Installation works				Confirmed by estimates
	Total equipment			8,260.00	

New generation of equipment for smart grids

Smart grid metering equipment for communities

MIR S-04
three phase metering unit for indoor installation
Inom (Imax) = 5(100A)



MIR S-05
single phase metering unit for indoor installation
Inom (Imax) = 5(80A)



MIR S-07
three phase metering unit
Inom (Imax) = 5(10A)



MIR DP-01
Remote display



MIR S-04
three phase metering unit for outdoor installation
Inom (Imax) = 5(100A)



MIR S-05
single phase metering unit for outdoor installation
Inom (Imax) = 5(80A)



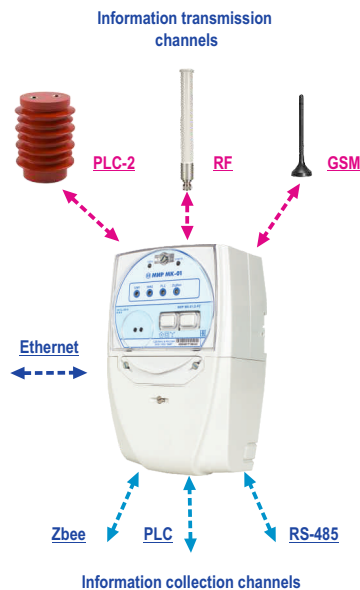
RF comm unit MIR MB-02 (USB-RF):
remote meter reading and configuration



MIR DP-01.P
Remote display



MIR MK-01 data concentrator - the core of mesh network



1. Communication interfaces:
 - RS485 – 2 pcs for reclosers;
 - PLC – 2 pcs.;
 - RF;
 - ZigBee;
 - Ethernet.

2. Two server sockets in GPRS channel and three client ones.

3. Automatic arranging mesh networks in ZigBee, PLC, RF.

4. Data storage within:
 - 90 days, hourly readings;
 - 35 days, daily readings;
 - 3 years, monthly readings;
 - 5000 records of the meter events logs

5. Support for IEC-101/104 protocols;

6. Supply voltage 220 or 12-24 V.

Smart grid equipment for distribution network

Full functional solution

MIR KPR-01M

- 1) bay controller with discrete I/O expansion modules and prompt blocking logic;
- 2) data acquisition and transmission devices;
- 3) serial ports server – up to 4xRS-485;
- 4) digital transducer;
- 5) power quality instrumentation, class A;
- 6) electric energy meter;
- 7) oscilloscope recorder;
- 8) switch – 2 ethernet ports;
- 9) current measurement device short circuit up to 50 times over Inom;
- 10) support of smart substation protocols – IEC 61850-8 (MMS, GOOSE).



Low cost solution

MIR KPR-01MA

- 1) Controller with discrete I/O module;
- 2) digital transducer;
- 3) power quality instrumentation;
- 4) electric energy meter;
- 5) oscilloscope recorder;
- 6) switch – 2 ethernet ports;
- 7) current measurement device short circuit up to 10 In.





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