



POWER QUALITY ANALYSIS

SERVICE DESCRIPTION & PRICELIST

WHITE PAPER

Industry insight to Power Quality issues

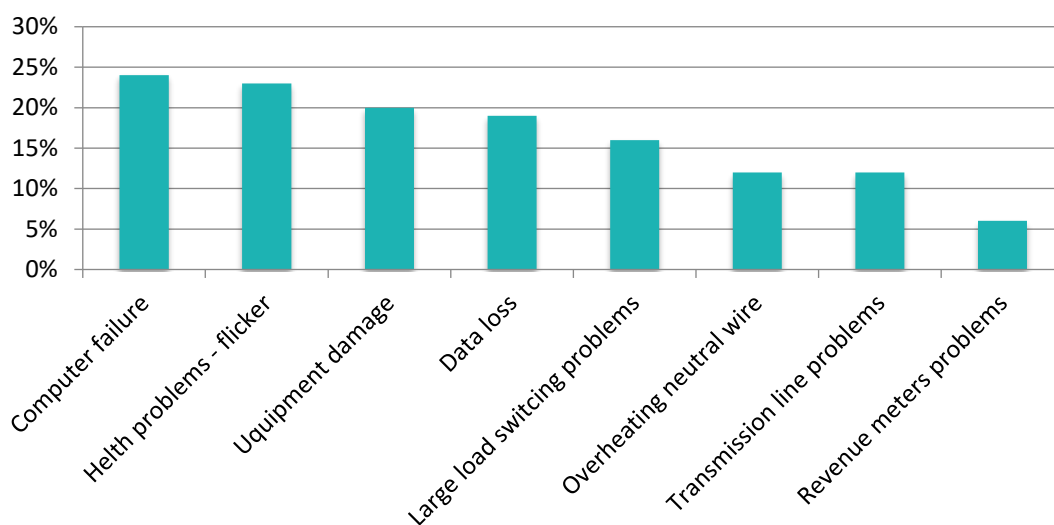
Most of electric power users understand a term “power quality” purely on a basis of electric power interruptions (power outages). Which is to some extent true. Interruptions are easy to detect they have a direct influence on production process and causes are mostly well known. On the other hand, there are phenomena related to supply of electric power that mostly hard to detect have indirect influence on production process and which causes are mostly not clear. In addition, their influence to production process and product operation is very random and it does not show all the time.

Bad power quality consequences can be viewed through technical aspects such as:

- Malfunction of appliances, medical equipment, laboratory apparatus...
- Burn-out and/or fast ageing of heavy industrial motors
- Ageing and destruction of power factor correction capacitors
- Stopping or resetting of control systems that depends on computers

Frequency of individual PQ related complaint:

Research by EU institute Cooper, 2001. Owners' reports included 1400 objects in eight EU countries.



* Source: European Association of Electrical Contractors, „Solving poor Power Quality (PQ) “

Economic Activity	PQ related expenses
Semiconductor industry	3.800.000 €
Financial trading	6.000.000 € / hour
Computing centre	750.000 €
ICT	30.000 € / min
Steel industry	350.000 €
Glass industry	250.000 €

* Source: D. Chapman, "Copper," Copper Development Association, March 2001. [Online]. Available: <http://www.copperinfo.co.uk>. [Accessed 2013].

“Comparing voltage and current related disturbances helps distinguish between disturbances coming from the grid and disturbances generated by installed equipment (production processes, generators...)”

Power Quality test and measurement equipment

Power Quality phenomena have usually very short duration, are not periodic and their parameters have very low or extra-large magnitudes. Therefore, it is not possible to try to measure and observe such phenomena by using standard measuring equipment that is used for measuring electrical parameters under normal operational conditions.

Measuring equipment that should be used for this purpose is known as “Class A” measuring equipment. It is used when precise measurements are necessary, for example, for contractual applications that may require resolving disputes, verifying compliance with standards, etc. Such measuring equipment is usually certified by an external authorised laboratory that assures proper RMS measuring procedures and data processing methods, real time-clock accuracy and others. Only equipment with certificate can be used for proper and authorised PQ measuring reporting.

“Class A requirements precisely define measuring and calculation methods. This allows comparable results between different producers”

ISKRA d.o.o. is a company with many years of experience in development and production of precise and reliable test and measurement equipment for power distribution companies, industry, buildings and traffic automation. Our goal is to provide to customers accurate and precise information about their system operation.

With respect to power quality related problems, we have prepared products and services to support customers according to their level of experience and personnel expertise and availability.

“iMC784 represents significant added value due to its wide variety of functions. It can support not only electrical values but also other physical quantities like temp., humidity, wind speed, solar irradiation... It can also track and record digital inputs like counting, access control, reading status of other equipment...”

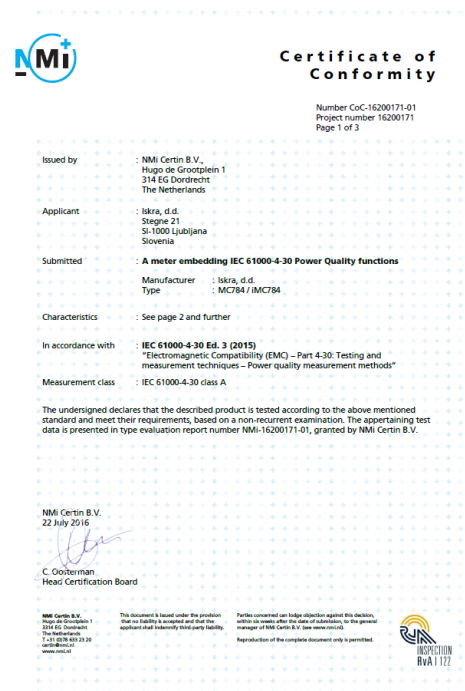
FIX INSTALLED PQ ANALYSER iMC784 is intended for permanent PQ monitoring and detailed event analysis on all voltage levels, automatic reporting and possibility to record and analyse various events. Its advanced operation is useful for network specialists to help finding problems in a network, forecasts potential problems and for future network planning. Its up-to-date communication support and standard data formats enable fast integration into network or industry management systems.

ISKRA iMC784 combines four devices in one:

- ❖ Class A certified PQ analyser
- ❖ Multifunctional measuring device
- ❖ Secondary protection device
- ❖ Accurate energy meter

For more info about iMC784 please visit:

<https://www.iskra.eu/en/Power-monitoring-devices/Advanced-Power-Quality-Analyser-MC-784/>



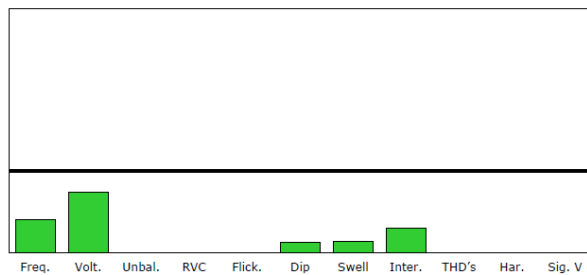
FIX INSTALLED PQ ANALYSER MC774 is intended for permanent PQ monitoring and automatic reporting. It is most cost effective Class A certified PQ analyser. When primary task is observing PQ parameters and issuing weekly PQ reports without a need for complex settings and involvement of dedicated technical personnel, MC774 is a perfect choice.



Power Quality Report - EN 50160

Report	Measuring point
Report number: 10/2013	Device type: Iskra MC774 - Class A
Start date: 3.3.2013	Serial No.: MCD14626
End date: 9.3.2013	Location: Main line
Compliance: OK	Description: MC774 PQ analyser
Status: Complete	System: Low voltage
Monitoring time: 7.00:00:00	Connection: Phase to neutral
Evaluation: Non Flagged deviations	Voltage: 230 V
Flicker calculation: 230V lamp	Frequency: 50 Hz

Parameter	Comp.	L1 (System)	L2	L3	Multi Phase
Frequency Variations 1	OK	99,80 %	-	-	
Frequency Variations 2	OK	100,00 %	-	-	
Voltage Variations 1	OK	96,30 %	97,50 %	98,00 %	
Voltage Variations 2	OK	100,00 %	100,00 %	100,00 %	
Voltage Unbalances	OK	100,00 %	-	-	
Rapid voltage changes	OK	0	0	0	0
Flickers Pst	-	100,00 %	100,00 %	100,00 %	
Flickers Plt	OK	100,00 %	100,00 %	100,00 %	
Voltage Dips	OK	0 / 0	0 / 0	0 / 0	0 / 6
Voltage Swells	OK	0 / 0	0 / 0	0 / 0	0 / 7
Short Interruptions	OK	0 / 0	0 / 0	0 / 0	0 / 30
Long Interruptions	OK	0 / 0	0 / 0	0 / 0	0 / 3
THD's	OK	100,00 %	100,00 %	100,00 %	
Harmonics	OK	100,00 %	100,00 %	100,00 %	
Signaling voltage	OK	100,00 %	100,00 %	100,00 %	



Powered by Iskra MC774 - Class A, Serial No.: MCD14626

1 / 6



Power Standards Lab
2020 Challenger Drive #100
Alameda, CA 94501 USA
TEL ++1-510-522-4400
FAX ++1-510-522-4455
www.PowerStandards.com

Certificate of Conformity
IEC 61000-4-30 Class A

ISKRA SISTEMI MC774
with compatible GPS receiver or NTP server

IEC 61000-4-30 Ed. 2
230V, 50/60 Hz, L-N U_{ph} for all parameters

Section	Power Quality Parameter	Class A Compliance	Class B Compliance	Class C Compliance	Remarks
5.1	Power frequency	Yes	Yes	Yes	
5.2	Magnitude of the supply voltage	Yes	Yes	Yes	
5.3	Flicker	Yes	Yes	(N/A)	
5.4	Supply voltage dips and swells	Yes	Yes	Yes	
5.5	Voltage interruptions	Yes	Yes	Yes	
5.7	Supply voltage unbalance	Yes	Yes	Yes	
5.8	Voltage harmonics	Yes	Yes	Yes	
5.9	Voltage interharmonics	Yes	Yes	Yes	
5.10	Mains signaling voltage	Yes	Yes	Yes	
5.12	Underdeviation and overdeviation	Yes	(N/A)	(N/A)	
4.4	Mains measurement approximation intervals	Yes	Yes	Yes	
4.6	Time clock uncertainty	Yes	Yes	Yes	Tested with NTP server
4.7	Flagging	Yes	Yes	(N/A)	
6.1	Transient influence quantities	Yes	(N/A)	(N/A)	

(N/A) - Not Applicable. Tests to be performed by the customer.

This certificate summarizes the results of the PSL IEC 61000-4-30 Power Quality Measurement Methods Compliance Report, document #PSL 61000-4-30 Ed 2 Test Report - MC774 - Iskra, dated 30 July 2013. PSL tested two samples, S/N MCD15976 and MCD15975, at 230VAC, 50/60 Hz. Manufacturer states that these samples are representative of the MC774 series.



MC774 - Iskra



Alex McEachern 30 July 2013
Alex@PowerStandards.com

Statement of IEC 61000-4-30 Compliance

PORTABLE PQ ANALYSER PNA784 is intended for field PQ monitoring and detailed event analysis on all voltage levels, automatic reporting and possibility to record and analyse various events. It supports split-core current sensing, which allow uninterrupted production process and very flexible power consumption range.



Portable PQ analyser PNA784:

- ❖ *Rogowski coil CT*
- ❖ *Split-core current clamps*
- ❖ *Battery back-up power*
- ❖ *GSM communication support*



“PNA784 is a robust portable PQ analyser. Case can be locked and left on-site for longer period of monitoring. “PQ analyser is normally set up by a Setting & Monitoring software MiQen.

<https://www.iskra.eu/en/Iskra-Software/MiQen-Settings-Studio/>

Service for on-site Power Quality, analysis, assessment and consulting

ISKRA d.o.o. is offering a service related to described Power Quality related problems. Problems usually arise within production (certain machines tend to reset and behave randomly or they even break in some cases) or products do not comply with quality standards when installed in certain markets and applications. Finding a problem in such cases is primarily connected with understanding of related PQ problems. Most companies start searching for a problem in equipment used and in operators/workers, resulting in loss of time and additional expenses. And secondly it is important to find proper test and measuring equipment and experts that will perform analysis, assessment and help finding a solution.

MiQen is user friendly and powerful tool comes free as a part of PQ monitoring package." GSM communication allows online readings from locations without wired communication



ISKRA's offer consist of three levels of involvement:

1. Rental of measuring equipment

This service includes:

- ❖ Test equipment rental
- ❖ 1-hour consultation
 - Advice with a customer on problems that have arisen
 - Advice to a customer a proper measuring device
- ❖ Optional: 1-2 day training course for setting up and using the equipment

Customer should in this case appoint a dedicated person, who will be responsible for installation of equipment, performance of measurements and analysis of results.

This service is useful for companies who need to make an analysis for they are not sure where a cause is. In final stage, they usually buy a certain number of PQ analysers.

It is possible to rent a test and measurement equipment for a short or long period according to pricelist:

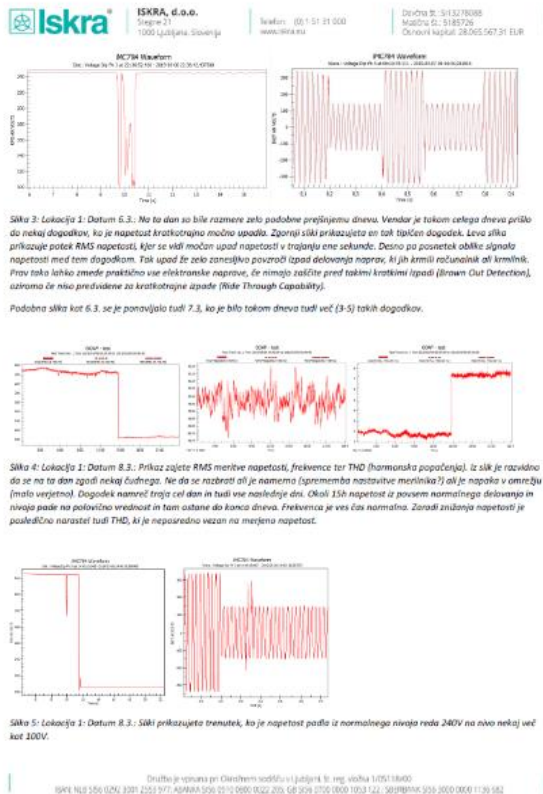
Price of <u>daily</u> rental from:	< 2 days	1 week	2 weeks	>1 month
Type of measuring device				
MC774	50 €	25 €	17 €	10 €
iMC784	70 €	35 €	25 €	14 €
PNA784	100 €	50 €	35€	20 €
Training course	360€ per day			

2. Rental of measuring equipment with analysis and report

This service includes:

- ❖ Test equipment rental
- ❖ 1-hour consultation
 - Advice with a customer on problems that have arisen
 - Advice to a customer a proper measuring device
- ❖ Optional: 1-2 day training course for setting up and using the equipment
- ❖ Detailed analysis of recorded data and preparation of a report
- ❖ Optional: Consulting for mitigation of PQ problems and preparation of solution

Customer should in this case appoint a dedicated person, who will be responsible for installation of equipment. When measuring equipment and test procedure will be running in longer period and test results should be performed in parallel, a dedicated person will be also responsible for sending downloaded data to ISKRA experts to perform analysis.



When ISKRA experts receive all required data, they will prepare a complete test report not later than one week after.

Optionally ISKRA can offer consultation for mitigation of PQ related problems and prepare a solution.

This service is useful for companies facing serious and frequent PQ related problems and need to understand reasons and possible solutions. In final stage, they usually buy a certain number of PQ analysers.

It is possible to loan a test and measurement equipment for a short or long period according to pricelist:

Price of <u>daily</u> rental:	< 2 days	1 week	2 weeks	>1 month
Type of measuring device				
MC774	50 €	25 €	17 €	10 €
iMC784	70 €	35 €	25 €	14 €
PNA784	100 €	50 €	35€	20 €
Training course	360 € per day			
Price of report:				
Test and analysis report	480 €			

Cost of optional consultation will be individually set according to further arrangement between ISKRA d.o.o. and customer. Cost depends on number of locations, nature of PQ problems, required installations of various equipment...

Cost of optional consultation will be individually set according to further arrangement between ISKRA d.o.o. and customer. Cost depends on number of locations, nature of PQ problems, required installations of various equipment...

3. Rental of measuring equipment and complete performance of on-site equipment installation, analysis and report

This service includes:

- ❖ Test equipment rental
- ❖ 1-hour consultation
 - Advice with a customer on problems that have arisen
 - Advice to a customer a proper measuring device
- ❖ Optional: 1-2 day training course for setting up and using the equipment
- ❖ On-site equipment connection and set-up
- ❖ Detailed analysis of recorded data and preparation of a report
- ❖ Optional: Consulting for mitigation of PQ problems and preparation of solution

ISKRA d.o.o. will take care of all required measuring equipment installation. Customer shall dedicate a person who will allow ISKRAs technicians access to required installation documentation and to installation cabinets.

This service is useful for companies facing serious and frequent PQ related problems where prompt analysis and solution is required. They also need to understand reasons, possible causes and further actions. In final stage, they usually buy a certain number of PQ analysers, educate internal personnel and invest into automatic analytical tool.

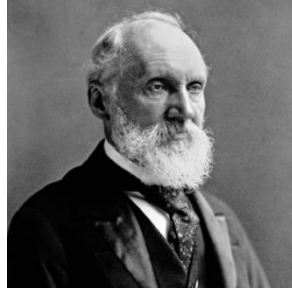
Cost of this turn-key solution depends on distance, required number of testing days and optional arrangements.

Price of <u>daily rental</u> :	< 2 days	1 week	2 weeks	>1 month
Type of measuring device				
MC774	50 €	25 €	17 €	10 €
iMC784	70 €	35 €	25 €	14 €
PNA784	100 €	50 €	35€	20 €
Training course	360 € per day			

Price of installations and connections:	<50km	<100km	<200km	<250km
	220 €	330 €	555 €	664 €

Price of recording:	< 2 days	1 week	2 weeks	>1 month
	44 €	38 €	31 €	29 €

Price of report:	
Test and analysis report	480 €



“To measure is to know - if you cannot
measure it, you cannot improve it”

William Thomson, Lord Kelvin

ISKRA D.O.O. | Stegne 21 | SI-1000 Ljubljana | www.iskra.eu

Goran Ambrožič
Project Manager

goran.ambrozic@iskra.eu

Aljoša Hecl
Business Development Manager

aljosa.hecl@iskra.eu

