



TECHNICAL REPORT



**Power quality management –
Part 100: Impact of power quality issues on electric equipment and power
system**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references	9
3 Terms and definitions	9
4 General impacts of power quality issues.....	12
4.1 General.....	12
4.2 Harmonic distortion.....	12
4.3 Voltage unbalance	13
4.4 Voltage deviation	13
4.5 Frequency deviation.....	13
4.6 Flicker and rapid voltage change	14
4.7 Voltage dip	14
4.8 Transient over-voltages	14
4.9 Voltage swell	14
5 Continuous power quality disturbances impact.....	14
5.1 The impact of voltage deviation.....	14
5.1.1 General	14
5.1.2 Impact on equipment	16
5.1.3 Impact on power system	17
5.2 The impact of frequency deviation.....	18
5.2.1 General	18
5.2.2 Impact on electrical equipment	19
5.3 The impact of voltage unbalance.....	21
5.3.1 General	21
5.3.2 Impact on electrical equipment	22
5.3.3 Impact on power system	27
5.3.4 Impact on electrical equipment	30
5.3.5 Impact on power system	32
5.3.6 Impact on electrical equipment	34
5.3.7 Impact on electrical equipment	40
6 Discontinuous power quality disturbances impact	41
6.1 The impact of voltage dip and short time interruptions	41
6.1.1 General	41
6.1.2 Impact on power system equipment.....	42
6.1.3 Effects on end users' devices	43
6.1.4 Useful impacts assessment indices.....	45
6.2 The impact of voltage swell.....	47
6.2.1 General	47
6.2.2 Impact on power system	48
6.2.3 Effects on some electrical equipment.....	48
6.3 The impact of transient over-voltage	49
6.3.1 General	49
6.3.2 Impact on power system equipment.....	49
6.3.3 Effects on some electrical equipment.....	50
Annex A (informative) Case analysis: Voltage deviation impact on power loss	52

A.1	Loss of low voltage distribution network	52
A.1.1	Transformer iron loss	52
A.1.2	Transformer copper loss	52
A.2	LED Lights	55
Annex B (informative)	Case analysis: Voltage unbalance impact	57
B.1	Three-phase unbalance leads to voltage deviation	57
B.2	Increases the loss of power network	58
Annex C (informative)	Case analysis: flicker and rapid voltage change impact	61
C.1	The impact of RVC on induction motor	61
C.2	The impact of RVC on electrolytic capacitor lifetime	63
C.3	The experiment of the impact of voltage fluctuation on induction motor life	64
C.4	Voltage fluctuation reduces the energy efficiency	67
Annex D (informative)	Case analysis: Harmonic, inter-harmonic and the high frequency component impact	70
D.1	Harmonic impact on tripping time of relay protection device	70
D.2	The impact of harmonics on billable meters in Markal, Dist. Pune Steel Mill	71
D.3	The impact of harmonics on power cable	72
D.3.1	Parameter aspect	72
D.3.2	Performance aspect	73
D.4	The impact of inter-harmonics on sub-synchronous oscillation of power system	74
Annex E (informative)	Case: Voltage dip impact	76
E.1	Voltage dip sensitive equipment tolerance test	76
E.1.1	Alternating current contactor (ACC) voltage dip tolerance results	76
E.1.2	PLC voltage dip tolerance test and test results	78
E.1.3	Relay voltage dip tolerance test and test results	81
E.2	Voltage dip sensitive industrial customers	87
Annex F (informative)	Case: Voltage swell impact	88
Annex G (informative)	Case: Transient over-voltage impact	89
G.1	Test waveform	89
G.2	Case of interaction between the power system and communications system	89
G.3	Case of 10kV hybrid OHL-cable system during energization	89
Bibliography	90
Figure 1	–The influence of under-voltage deviation on transmission loss	18
Figure 2	– Derating factor for motors operating with phase voltage unbalance	23
Figure 3	– Percentage changes in torques of induction motor	24
Figure 4	– Standard drive with DC-link LC filter under 5 % grid voltage amplitude unbalanced condition	27
Figure 5	– Proportion of neutral line additional loss (%)	28
Figure 6	– Neutral shift vector diagram	29
Figure 7	– Capacitor current value under different voltage fluctuations condition	32
Figure 8	– Current waveform and spectrum, transformer derating due to current harmonic losses up to 2 kHz	35
Figure 9	– Effect of harmonics on power loss	38
Figure 10	– Effect of harmonics on temperature rise	38

Figure 11 – Effect of harmonics on expected useful life	39
Figure 12 – ITIC (CBEMA) curve for equipment connected to 120 V 60 Hz systems...	44
Figure 13 – Region of uncertainty for sensitivity curves of equipment	45
Figure A.1 – Equivalent circuit diagram of low voltage distribution network	52
Figure A.2 – The relationship between the ratio of constant impedance load to constant power load and voltage deviation in the connected system when the additional copper loss is 0	54
Figure A.3 – U-I curves of four LED lamps	56
Figure A.4 – P-U curves of four LED lamps	56
Figure B.1 – Guowan #2 station	57
Figure B.2 – Voltage curve of Guowan #2 station on January 27	57
Figure B.3 – Three – phase power curve of Guowan #2 station on January 27	58
Figure B.5 – Losses vs. unbalance factor.....	60
Figure C.1 – Energy efficiency indexes of A phase when the frequency of am wave is 8,8 Hz.....	61
Figure C.2 – Energy efficiency indexes of A phase when the amplitude modulation is 10 % (based on 50Hz system)	62
Figure C.3 – Motor lifetime estimation with load torque gradually increase subject to 10 % voltage magnitude change and different modulation frequency.....	64
Figure C.4 – Motor lifetime estimation with load torque gradually increase subject to 10 % voltage magnitude change and different modulation frequency.....	64
Figure C.5 – The comparison of motor lifetime between voltage fluctuations condition and normal condition.....	65
Figure C.6 – Motor lifetime estimation with light load subject to various voltage fluctuations	66
Figure C.7 – Motor lifetime estimation with heavy load subject to various voltage fluctuations	67
Figure C.8 – Three-dimensional diagram of copper loss of A phase stator	68
Figure C.9 – Three-dimensional diagram of copper loss of A phase rotor.....	68
Figure C.10 – Three-dimensional diagram of iron loss of A phase	68
Figure C.11 – Three-dimensional diagram of energy efficiency of A phase.....	69
Figure D.1 – Test setup	70
Figure D.2 – Tripping time with distortion current (each test for each order harmonic with 20% distortion)	71
Figure D.3 – Recording kWh consumption at HT consumer metering installation.....	72
Figure D.4 – Effect of harmonics on resistance (R)	72
Figure D.5 – Effect of harmonics on inductance (L).....	72
Figure D.6 – Effect of harmonics on power loss	73
Figure D.7 – Effect of harmonics on temperature rise	74
Figure D.8 – Effect of harmonics on expected lifetime.....	74
Figure E.1 – VTC (voltage tolerance curve) under different POW	76
Figure E.2 – VTC (voltage tolerance curve) under different PAJ.....	77
Figure E.3 – Voltage tolerance curve of each PLC	78
Figure E.4 – Voltage tolerance curves of P1 and P3 at different starting phases	79
Figure E.5 – Voltage tolerance curve of P1 at different supply voltages	80
Figure E.6 – The relation curve between different harmonic phases and U_{dC}	80

Figure E.7 – When THD is 5 % and 10 %, the voltage tolerance curve of P3 of different sub-harmonics is tested at 0° of harmonic phase	81
Figure E.8 – Voltage dip sensitivity curve of R1 relay at the starting point of 0°-360°	82
Figure E.9 – The maximum normal operating duration curve of R1 relay obtained at voltage dip starting point from 0° to 360°	83
Figure E.10 – Sensitivity curves of 8 relays obtained at voltage dip starting point of 0° and 90°	84
Figure E.11 – Critical voltage difference	85
Figure E.12 – VTC under voltage dips with/without harmonics	85
Figure E.13 – Sensitivity curves of R1 and R4 relays influenced by operation voltage before voltage dip occurring at voltage dip starting point 0°/90°	86
Table E.4 – Successive dips testing information	86
Table 1 – reference information of voltage deviation impacts	15
Table 2 – reference documents on impact of frequency deviation	19
Table 3 – reference documents on the impact of voltage unbalance.....	22
Table 4 – Effect of voltage Unbalance on motors at full load	24
Table 5 – Line loss and additional loss increase under three-phase current unbalance	28
Table 6 – Reference documents on the impact of flicker and RVC	30
Table 7 – Reference documents on impact of harmonic and inter-harmonic	33
Table 8 – The actual measured capacitance value change rate.....	37
Table 9 – Reference documents on impact of voltage dip and short time interruption	42
Table 10 – reference documents on impact of voltage swell.....	48
Table 11 – Reference documents for impact evaluation of transient over-voltages	49
Table A.1 – Test object parameters	55
Table A.2 – Raw data of fluorescent lamp under AC power supply	55
Table B.1 – Simulation results of output voltage.....	58
Table B.2 – Load distribution (L1, L2 and L3) and unbalance index D (%) for the 6 KVA network.....	59
Table B.3 – Load distribution (L1, L2 and L3) and unbalance index D (%) for the 18 KVA network.....	59
Table B.4 – Load distribution (L1, L2 and L3) and unbalance index D (%) for the 180 KVA network.....	59
Table C.1 – The variation trend of motor energy efficiency η with voltage fluctuation (%)	69
Table D.1 – Test 1 THD=20 %	71
Table E.1 – Tested ACC	76
Table E.2 – Tested PLC equipment.....	78
Table E.3 – Number and type of low voltage relay	81

INTERNATIONAL ELECTROTECHNICAL COMMISSION

POWER QUALITY MANAGEMENT –**Part 100: Impact of power quality issues
on electrical equipment and power system**

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IEC TR 63222-100 has been prepared by IEC technical committee 8: System aspects of electrical energy supply. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
8/1648/DTR	8/1660/RVDTR

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available

at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 63222 series, published under the general title *Power quality management*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

The impacts of power quality issues increasingly attract much attention with modern industrial development. The integration of nonlinear loads, such as power-electronic based equipment, electric arc furnace, electric locomotive, etc., and faults or other events such as short-circuit and lightning strikes directly or indirectly cause power quality issues.

If public supply system power quality is not within the reasonable range defined in IEC TS 62749, and/or the demand-side power quality is not appropriately managed (e.g. IEC TR 63191) and/or the equipment immunity does not accommodate the expected environment, the performance of equipment may be impacted, likely causing malfunction, maloperation, or damage, and likewise the power system itself.

On the other hand, the quality of power is not absolute. Regarding the levels of power quality, the situation differs. So called “poor” power quality level for one grid may be acceptable or good for another internal application depending on the system configuration, the transfer characteristics between the different voltage levels (attenuation or amplification), the immunity of the equipment /installations/appliances, the actual disturbance levels on the system, etc.

In terms of power quality, the situation in micro-grid on islanding mode, off grid, mini-grid or weak grid may differ from that in public supply system. The level of power quality may worsen even far outside the recommended values defined by IEC TS 62749. In those forementioned grids, appliances may need to be better designed for immunity to power quality issues.

This document, which is a Technical Report, collects relevant information on power quality impact from, e.g., CIGRE reports, case study, research findings, etc., in order to uncover the mechanism of how electrical equipment/installations are impacted under specific power quality condition, as well as to fully understand the reasons of power quality management.

This document focuses on the public supply system. Notionally, the mechanisms of how electrical equipment/installations/system are impacted by power quality disturbances are applicable for so-called weak grids.

The contents of this document can help network users and equipment suppliers make rational investments and actively cooperate with network operators to take specific measures to improve power quality.

The contents of this document can also support IEC TR 63222-101, namely, power quality management-power quality data applications.

POWER QUALITY MANAGEMENT –

Part 100: Impact of power quality issues on electrical equipment and power system

1 Scope

This part of IEC 63222, which is a Technical Report, collects relevant information on power quality impacts from, e.g., CIGRE reports, case studies, research findings, etc., in order to uncover the mechanisms of how electrical equipment/installations/system are impacted by power quality disturbances, as well as to fully understand the guidelines for power quality management.

The contents of this document aim to help network operators, network users and equipment suppliers make rational investments and actively cooperate to manage power quality and keep it consistent with relevant EMC standards.

NOTE 1 The boundaries between the various voltage levels may be different for different countries/regions. In the context of this document, the following terms for system voltage are used:

- low voltage (LV) refers to $U_N \leq 1 \text{ kV}$
- medium voltage (MV) refers to $1 \text{ kV} < U_N \leq 35 \text{ kV}$
- high voltage (HV) refers to $35 \text{ kV} < U_N \leq 230 \text{ kV}$

NOTE 2 Because of existing network structures, in some countries/regions, the boundary between medium and high voltage can be different.

2 Normative references

There are no normative references in this document.