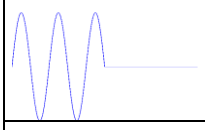
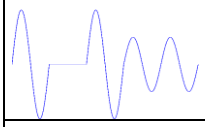
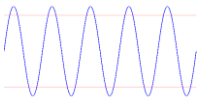
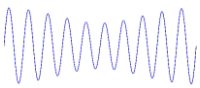
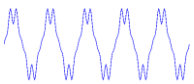
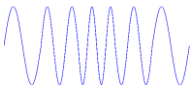
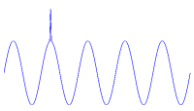
UPS Systems
Q/E-Matrix

Model:	**Nominal active power (P_{Nom}): kW**
Manufacturer:	**Nominal apparent power (S_{Nom}): kVA**
Circuit arrangement:	**Maximum active power (P_{Max_Cap}): kW at capacitive load**
Classification code:	

Mains voltage during normal operation (U_{NORM} according to EN 50160)	
	Voltage 230 V +/- 10 % Frequency 50 Hz +/- 1.0 %

Output voltage of the UPS
The output voltage of the UPS has to be within U_{Norm} in all mode of operation as normal mode, bypass mode and stored energy mode.

Mains disturbances (Input)	**Disturbance** (Testing procedure) Range	**Filtering of mains disturbances (Output)**			
		Normal mode (operation through UPS Path)		**Bypass mode** (operation through bypass before mains disturbance)	
		U_{NORM} o.k. ?	**Deviation of U_{NORM}**	**U_{NORM} o.k. ?**	**Deviation of U_{NORM}**
	**Outage** (Chap. 2) t_{UI} > 1 s	Yes/No		Yes/No	
	**Voltage interruption** (Chap. 4.1, 4.4 – 4.5) t_{UI} < 1 s	Yes/No		Yes/No	
	**Over- and undervoltages** (Chap. 3.1 – 3.3) ΔU_I = +/- 10 % ΔU_I = +/- 25 %	Yes/No		Yes/No	
	**Voltage sags / brownouts** (Chap. 4.1 – 4.3) ΔU_I = - 30 % ΔU_I = - 60 %	Yes/No		Yes/No	
	**Harmonic voltages** (Chap. 5) Distortion level class 3 according to IEC 61000-4-13	Yes/No		Yes/No	
	**Frequency variations** (Chap. 3.1; 3.4 – 3.5) Δf_{IStep} = +/- 10 % Δf_{ICont} = +/- 10 %	Yes/No		Yes/No	
	**Transients** (Chap. 6 & 7) Fast transients according to IEC 61000-4-4	Yes/No		Yes/No	
	Energy loaded transients according to IEC 61000-4-5	Yes/No		Yes/No	

Legend:

U_{NORM}	Normal voltage according to EN 50160 (230 V +/- 10 %; 50 Hz +/- 1.0 %)
P_{Nom}	Max. continuous nominal output power at linear ohmic load
S_{Nom}	Max. continuous nominal output power at non-linear load according to IEC 62040-3
P_{Max_Cap}	Max. continuous output power at linear capacitive load with cos φ = 0.9 cap

Circuit arrangement and Classification code:
according to IEC 62040-3

Load:
100 % linear ohmic or apparent load
The transients are measured at 100 % linear apparent load or at a load of maximum 16 A / phase at UPS-Systems with a power higher than 20 kVA

Power factor and harmonic currents during normal operation at the input at 230 V
(Testing procedure chapter 8)

Normal mode (operation through UPS Path)			**Load at the output**
Power factor	**THDi of the input current**	**Individual harmonic currents**	
λ =	k = %		at 100 % linear ohmic load (P_{Nnom})
λ =	k = %		at 100 % non-linear load according to IEC 62040-3 (S_{Nom})
λ =	k = %		at maximum output current (Power factor λ =)
λ =	k = %		at 0-10 %, 50 %, 100 %, asymmetric non-linear load according to IEC 62040-3
Bypass mode (operation through bypass)			**Load at the output**
Power factor	**THDi of the input current**	**Individual harmonic currents**	
λ =	k = %		at 100 % linear ohmic load (P_{Nnom})
λ =	k = %		at 100 % non-linear load according to IEC 62040-3 (S_{Nom})
λ =	k = %		at maximum output current (Power factor λ =)
λ =	k = %		at 0-10 %, 50 %, 100 %, asymmetric non-linear load according to IEC 62040-3

Losses and efficiency during normal operation (Input voltage U_I = 230 V +/- 10 %)
(Testing procedure chapter 9)

Normal mode (operation through UPS Path)

Power	**Losses (in W) and efficiency (in %) during normal operation through UPS-Path with**							
	Linear ohmic load		Non-linear load according to IEC 62040-3		Maximum output current (λ =)		Asymmetric non-linear load according to IEC 62040-3	
25 % Nom. power	W	%	W	%	------	------	------	------
50 % Nom. power	W	%	W	%	------	------	W	%
75 % Nom. power	W	%	W	%	------	------	------	------
100 % Nom. power	W	%	W	%	W	%	------	------
Standby Losses:	W	at U_{out} = nominal voltage and I_{out} = 0 A						

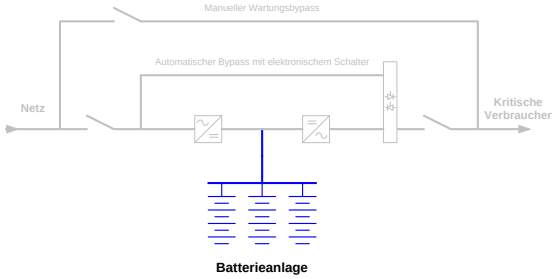
Bypass mode (operation through bypass)

Power	**Losses (in W) and efficiency (in %) during normal operation through bypass with**							
	Linear ohmic load		Non-linear load according to IEC 62040-3		Maximum output current (λ =)		Asymmetric non-linear load according to IEC 62040-3	
50 % Nom. power	W	%	W	%	------	------	W	%
100 % Nom. power	W	%	W	%	W	%	------	------
Standby Losses:	W	at U_{out} = nominal voltage and I_{out} = 0 A						

UPS Systems
Q/E-Matrix supplementary sheet for storages

Battery device (optionally be combined with a flywheel)

Topology

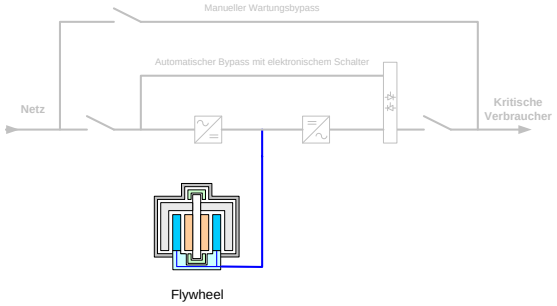


Technical data

Energy storage capacity	Ah
Supply voltage	V DC
Voltage ripple	%
Max. charge current	A
Min. charge time from 0% to 100%	min.
Max. discharge current	A
Min. discharge time	min.
Continuous charge current	A
Efficiency of storage	%
Ambient temperature from to	°C
Noise level	< 5 dB
Max. number of charge/discharge cycles	

Flywheel (optionally be combined with battery storages)

Topology

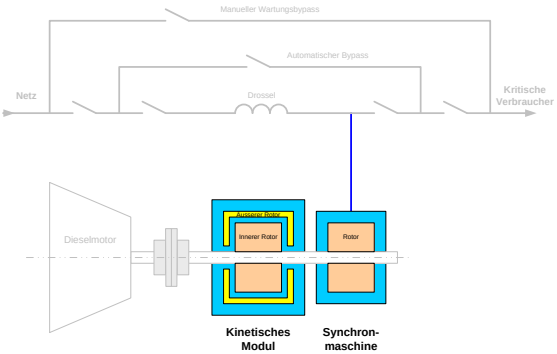


Technical data

Energy storage capacity	Ah
Supply voltage	V DC
Voltage ripple	%
Max. charge current	A
Min. charge time from 0% to 100%	min.
Max. discharge current	A
Min. discharge time	min.
Continuous charge current	A
Efficiency of storage	%
Ambient temperature from to	°C
Noise level	< 5 dB
Max. number of charge/discharge cycles	

Kinetic module with synchronous machine (for diesel dynamic UPS systems)

Topology



Technical data

Energy storage capacity	kWh
Supply voltage	V AC
Max. THD of voltage	%
Max. charge current	A
Min. charge time from 0% to 100%	min.
Max. discharge current	A
Min. discharge time	min.
Continuous charge current	A
Efficiency of storage	%
Ambient temperature from to	°C
Noise level	dB
Max. number of charge/discharge cycles	