Technical Data Sheet

STANDARD CONFIGURATION - -

TDS0432 – *mtu* Kinetic PowerPack Single

Voltage/Frequency	480V / 60Hz
Rated Power	1250 kVA at cos ϕ = 0.8
Critical Power	1250 kVA
Diesel Engine	MTU 16V2000G86S-TB FO
Revision	06

A Rolls-Royce solution

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NOTES:

- Information is given for guidance only and is subject to adjustment at the final design stage.
- Pictures are not contractual.

1 SYSTEM GENERAL SPECIFICATIONS

1.1 Ratings

Characteristics	Value	Unit	Remark
Rated critical power	1250	kVA	at cos ϕ = 0.8
Overload in conditioning and independent modes	10	%	of rated critical power
Maximum load step	100	%	of rated critical power
Efficiency	93.8	%	In conditioning mode, including choke losses

1.2 Key dimensions and weight of the mtu Kinetic PowerPack

See drawing 371139.

1.3 Normal service conditions

Min./Max. temperature	Min./Max. relative humidity	Maximum altitude	Air quality
-25°C / 40°C	20 / 90 % non condensing	400 m a.s.l.	No dust or sand loaded air

Except if otherwise stated, all values of this data sheet are given for above environmental conditions. For conditions out of these limits, please consult with us: air-conditioned power and control panels are available, filters can be added for application in dusty/sandy environments... For more details on air quality, refer to document TI0047 – Environmental conditions. For storage/transport conditions please consult with us.

1.4 Air flow requirements

Working mode	Air purpose	Value	Unit
Conditioning mode	Ventilation	24200	m³/h
Independent mode	Combustion	6500	m³/h
	Option 1: Remote radiator with electrically driven fans		
	Cooling	57500	m³/h
	TOTAL	64000	m³/h
	Option 2: Free-standing radiator with electrically driven fans		
	Cooling	Min 79000	m³/h
	TOTAL	As per selected cooler	m³/h

1.5 Noise levels in conditioning mode (measured at 1 meter)

Freq. (Hz)	63	125	250	500	1000	2000	4000	8000	Global
Pressure	95dB	97dB	101dB	100dB	99dB	96dB	90dB	85dB	103dB(A)

1.6 Engine noise levels (measured at 1 meter)

Freq. (Hz)	63	125	250	500	1000	2000	4000	8000	Global
Pressure	74dB	89dB	91dB	97dB	99dB	99dB	101dB	100dB	107dB(A)

1.7 Exhaust noise levels (measured at 1 meter)

Freq. (Hz)	63	125	250	500	1000	2000	4000	8000	Global
Pressure	108dB	129dB	122dB	119dB	117dB	114dB	105dB	89dB	122dB(A)

1.8 Noise levels in independent mode (measured at 1 meter)

Freq. (Hz)	63	125	250	500	1000	2000	4000	8000	Global
Pressure	95dB	98dB	101dB	102dB	102dB	101dB	102dB	100dB	108dB(A)

1.9 Vibrations

More than 96% of the vibrations are eliminated by vibrations dampers inserted between an intermediate frame and the main frame, thus allowing the power module to be laid directly on the ground.

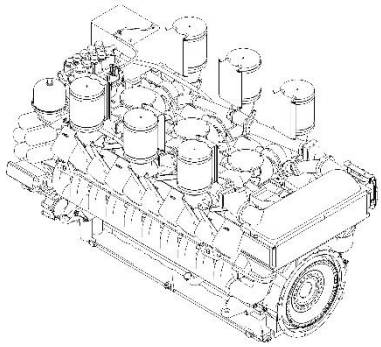
1.10 Power module colours

Engine	Stato-Alternator	Frame
RAL 7001 (Silver grey)	RAL 9010 (Pure white)	RAL 5002 (Ultramarine blue)

1.11 Special features

Accessories	Included
Vibration monitoring – Stato-Alternator	No
Bearings automatic greasing (AGB)	No
Electrical measurements real-time recording	No
Engine automatic lubricant refill	No

2 DIESEL ENGINE



2.1 Main features

Characteristic	Value	Unit	Remark
Brand	MTU		
Model	16V2000G86S-TB FO		
Rated speed	1800	RPM	
Displacement	35.7	l	
Number of cylinders	16		
Electrical system	24	V DC	
Prime power (PRP)	-	kW	At 25°C and 100kPa according to ISO 3046
Standby power (ESP)	1371	kW	

2.2 Special features and auxiliaries

Accessories	Included
Prelubrication pump	Yes
Manual oil sump extraction pump	Yes
Water circuit preheating with thermostatic control and circulation pump	Yes
Air/water charge air cooler	Yes
Oil pressure electrical sensor	Yes
Water temperature electrical sensor	Yes
Overspeed electrical sensor	Yes
Fuel cooler	Yes

2.3 Fluids capacities

Fluid type	Quantity	Unit
Lubricating oil capacity (total)	102	l
Lubricating oil consumption at rated power	#N	l/h
Coolant capacity in engine circuit (radiator not included)	70	l
Coolant capacity in aftercooler circuit (if applicable and radiator not included)	25	l

2.4 Fuel

Fuel consumption (Admissible tolerance: +/-5%)	g/kWh	l/h
at 100% ESP	200	323
at 25% rated output power	221	74
at 50% rated output power	206	138
at 75% rated output power	197	197
at rated output power	196	262

Other characteristics	Value	Unit
Fuel maximum inlet temperature	65	°C
Maximum fuel flow	1500	l/h

2.5 Exhaust

Characteristics	Value	Unit
Exhaust gas flow	18400	m³/h
Exhaust gas temperature	545	°C
Heat rejection to exhaust	NA	kW
Exhaust back pressure (Design value)	30	mbar
Maximum exhaust back pressure	85	mbar

Exhaust emissions (ESP)	Value	Unit
Complies with	-	
NOx	3500	mg/m³
CO	650	mg/m³
Unburned hydrocarbons	150	mg/m³
Particulate matter (Dust)	50	mg/m³

2.6 Radiator

Characteristics	Value	Unit
Maximum air temperature at radiator outlet	< 85	°C
Maximum total power consumption of the fans (*)	50	kW
Heat rejection, engine cooling circuit	590	kW
Heat rejection, aftercooler circuit	350	kW
Max. static head of coolant above engine	15	m
Engine circuit		
Max. pressure drop external to engine	100	kPa
Coolant flow rate	47	m³/h
Coolant temperature FROM engine	100	°C
Aftercooler circuit		
Max. pressure drop external to engine	100	kPa
Coolant flow rate	15.5	m³/h
Coolant temperature TO aftercooler	60	°C
Option 1: Remote radiator with electrically driven fans		
Static pressure reserve	-	Pa
Radiator air inlet temperature	40	°C
Option 2: Free-standing radiator with electrically driven fans		
Static pressure reserve	As per selected cooler	Pa
Radiator air inlet temperature	45	°C

(*) If a remote radiator is used, this value includes the power of both the radiator fans and the power module cooling fans in independent mode. Please consult with us for proper selection and dimensioning of remote radiator.

2.7 Electric starting system

Qty of starters	System voltage	Type of batteries	Total Cold Crank Amps @ 24VDC	
			CCA DIN -18°C	CCA EN -18°C
2	24 V	Maintenance free, lead acid	2400A	3840 A

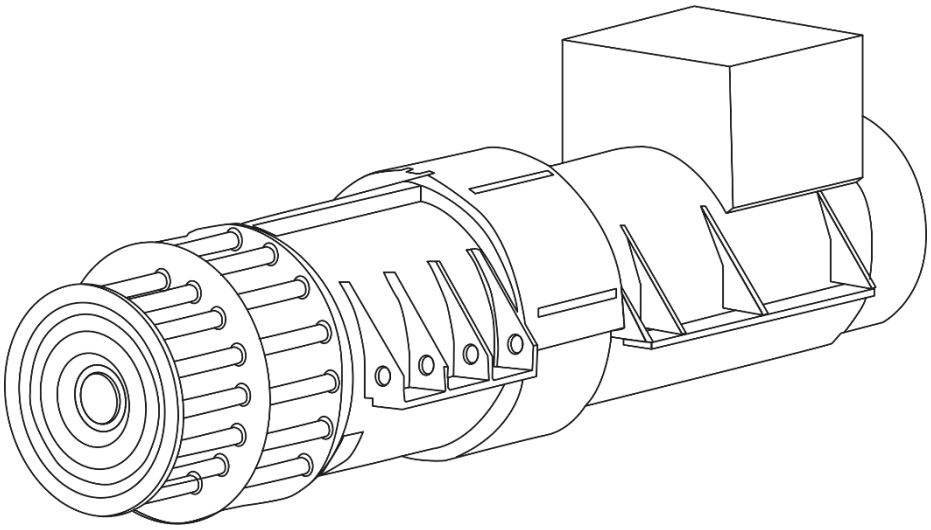
NOTES:

- 12VDC batteries are connected in series by pairs to obtain 24VDC.
- The required number of pairs of batteries is derived out of the Total CCA divided by the respective CCA (DIN or EN) of one battery, rounded up to a multiple of the quantity of starters.

3 ELECTROMAGNETIC CLUTCH

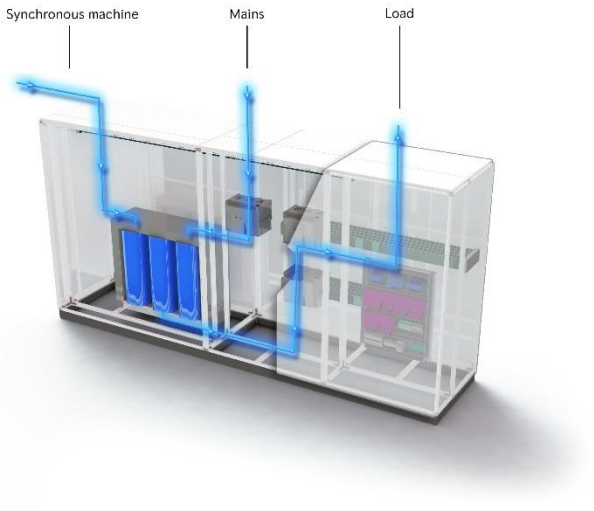
Characteristics	Value	Unit
Brand	Stromag	
Model	MEA-A 1000	
Features	Brushless, ringless, lubrication and maintenance free	
Excitation	24	V DC
Coupling	Rubber type	
Housing	PI-560/1000/00/21R	

4 STATO-ALTERNATOR



Characteristic	Value	Unit	Remark
Brand	RRSL		
Model	KS5-560B-0J-AX		
In accordance with	IEC standards		
Rotating speed (inner/outer rotor)	1800/3000	RPM	
Rated frequency	60	Hz	
Voltage	480	V AC	
Power factor	0.8		Lagging
Rated current (In)	1504	A	
Continuous output power	1250	kVA	
Max. capacitive reactive power	590	kVAr	
Insulation temperature class	Class H		
Operation to class	Class F		
Protection degree	IP23		
Short circuit current to upstream	3	In	From KP only
Short circuit current to downstream	23	In	From KP only

5 POWER PANEL



Characteristics	Value	Unit
Earthing system	TNS	
Internal separations form	3B	
Rated short-time withstand current (Icw)	50	kA/1sec
Min. operating ambient temperature	5	°C
Max. operating ambient temperature (*)	40	°C
Complies with	IEC standards	
Protection degree	IP32	
Standard colour	RAL 7035 (Light grey)	

(*) Average over 24h not to exceed 35°C.

5.1 Dimensions and weight

Characteristics	Value	Unit
Width	3696	mm
Depth	1200	mm
Overall height	2350	mm
Weight	4200	kg

NOTES:

- Dimensions and weight are estimates and must be confirmed after detailed design phase.
- Provide approximately 10 cm above panel top to allow ventilation air to escape freely.
- Cable entry possible from top, bottom, left or right. To be specified when ordering.

5.2 Choke

Characteristics	Value	Unit
Inductance type	Three-phase, with five-limb core	

5.3 Circuit breakers

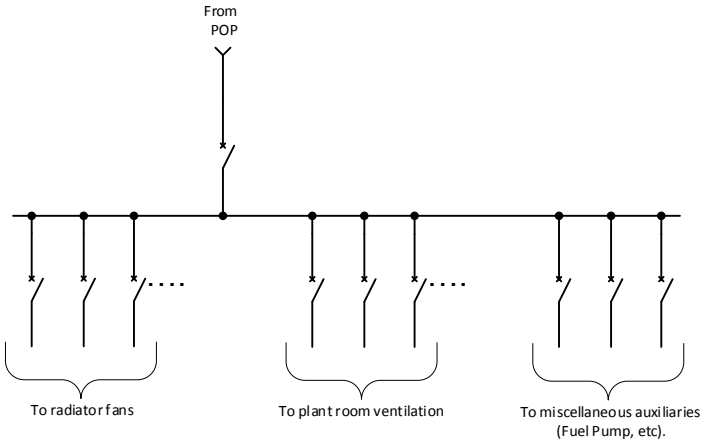
#	Circuit breaker	Rating (A)	Number of poles	Fixed / Withdrawable	Rated breaking capacitiy (Ics)
1	Remotely controlled CB QD1 – UPSTREAM	2000	3	Withdrawable	65kA
1	Remotely controlled CB QD2 – DOWNSTREAM	2000	3	Withdrawable	
1	Remotely controlled switch QD3 – AUTOMATIC BYPASS	2000	3	Withdrawable	

NOTES:

- RRSL scope of supply is limited to breakers QD1, QD2, QD3. The other breakers (for instance QDA, QDB, QMB…) are by others.
- Breakers are not accessible from the front of the panel.

6 AUXILIARY PANEL (One per unit)

The AXL panel is intended to distribute AC voltages to the auxiliaries (radiator, fuel pump, etc). The continuous availability of these voltages is critical for the good operation of the ***mtu*** Kinetic PowerPack installation, which is why it is supplied from the downstream bus of the Power Panel.



Characteristics	Value	Unit
Min operating ambient temperature	5	°C
Max operating ambient temperature (*)	40	°C
Complies with	IEC standards	
Protection degree	IP43	
Standard colour	RAL 7035 (Light grey)	

(*) Average over 24h not to exceed 35°C

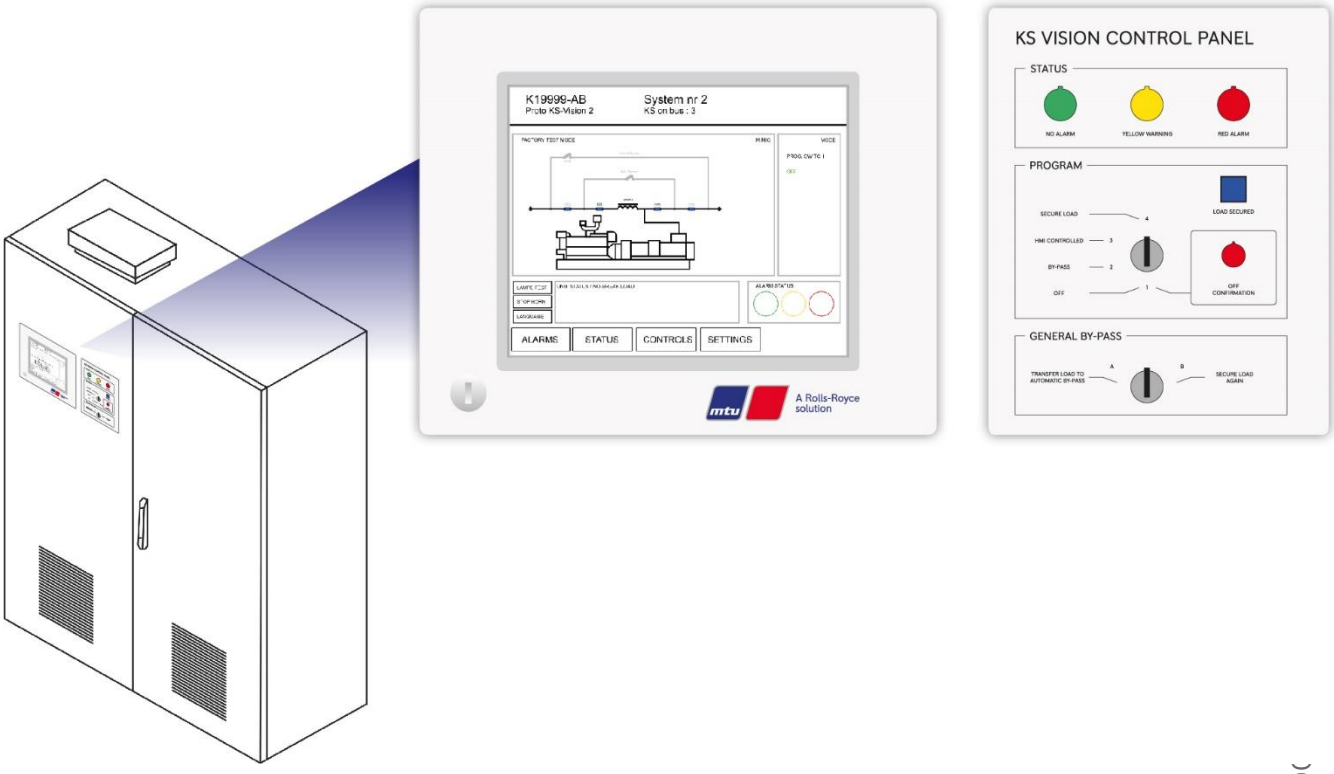
6.1 Dimensions and weight

Characteristics	Value	Unit
Width	1000	mm
Depth	500	mm
Overall height	2210	mm
Weight	400	kg

NOTES:

- Dimensions and weight are estimates and must be confirmed after detailed design phase.
- Provide approximately 10 cm above panel top to allow ventilation air to escape freely.
- Cable entry possible from top.

7 CONTROL PANEL



Characteristics	Value	Unit
Min operating ambient temperature	5	°C
Max operating ambient temperature (*)	40	°C
Complies with	IEC standards	
Protection degree	IP43	
Standard colour	RAL 7035 (Light grey)	

7.1 Dimensions and weight

Characteristics	Value	Unit
Width	1600	mm
Depth	500	mm
Overall height	2210	mm
Weight	560	kg

NOTES:

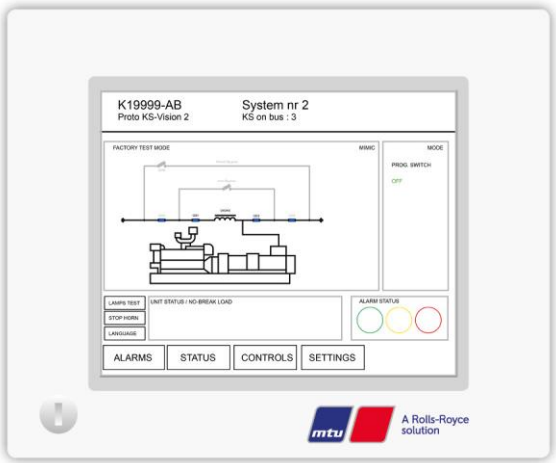
- Dimensions and weight are estimates and must be confirmed after detailed design phase.
- Provide approximately 10 cm above panel top to allow ventilation air to escape freely.
- Cable entry possible from top, bottom, left or right. To be specified when ordering.

7.2 HMI touch screen

The HMI touch screen located on the front door provides access to:

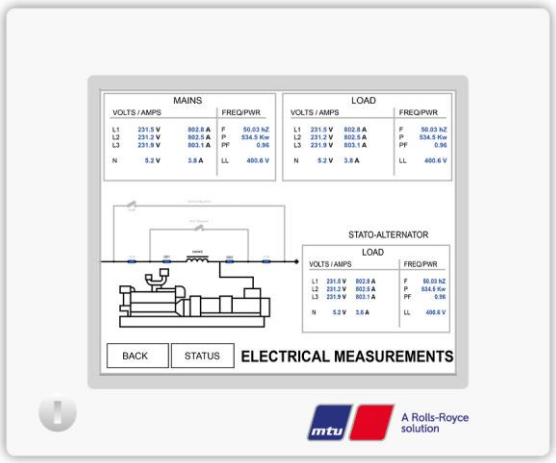
- Measurements (voltage, frequency, power factor, temperature…)
- Controls (secure load, by-pass, engine test, mains fault test…)
- Status (alarms, maintenance, position of breakers…)
- Language selection (integrated languages: EN, FR, DE, ES, NL…)
- Settings (clock, scheduling of maintenance and system tests…)

The following screens give some examples of these functionalities.



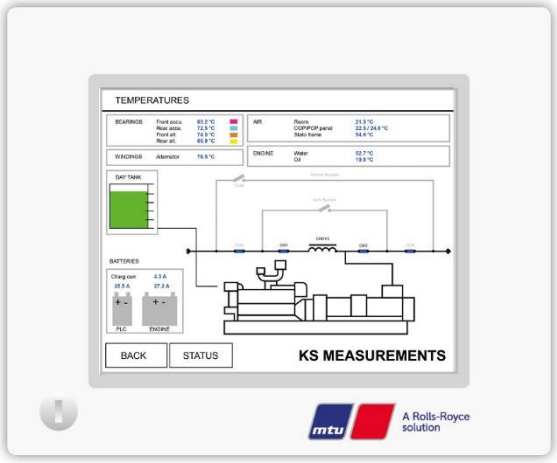
HMI Main Screen

General information and access to other screens.



HMI Electrical Measurements

Displays all needed electrical measurements like voltage, current, power factor…



HMI KP Measurements

Displays mechanical information like fuel tank level or bearings temperatures.

7.3 Built in features

The following features/components are part of the KS-VISION® system and are integrated in the Control Panel:

- Digital Control Module (DCM) is responsible for the real-time control which includes:
  - Accu inner and outer rotor speed regulation
  - Voltage regulation
  - Mains failure detection
  - Synchronizer control
  - …
- SAIA Programmable Logic Controller (PLC)
- Communication means:
  - Remote supervision over Ethernet (Modbus TCP/IP available as an option)
  - Digital I/O's
- Accu maintenance braking
- Energy storage and recovery checks
- Engine speed control and regulation
- Emergency stop
- …

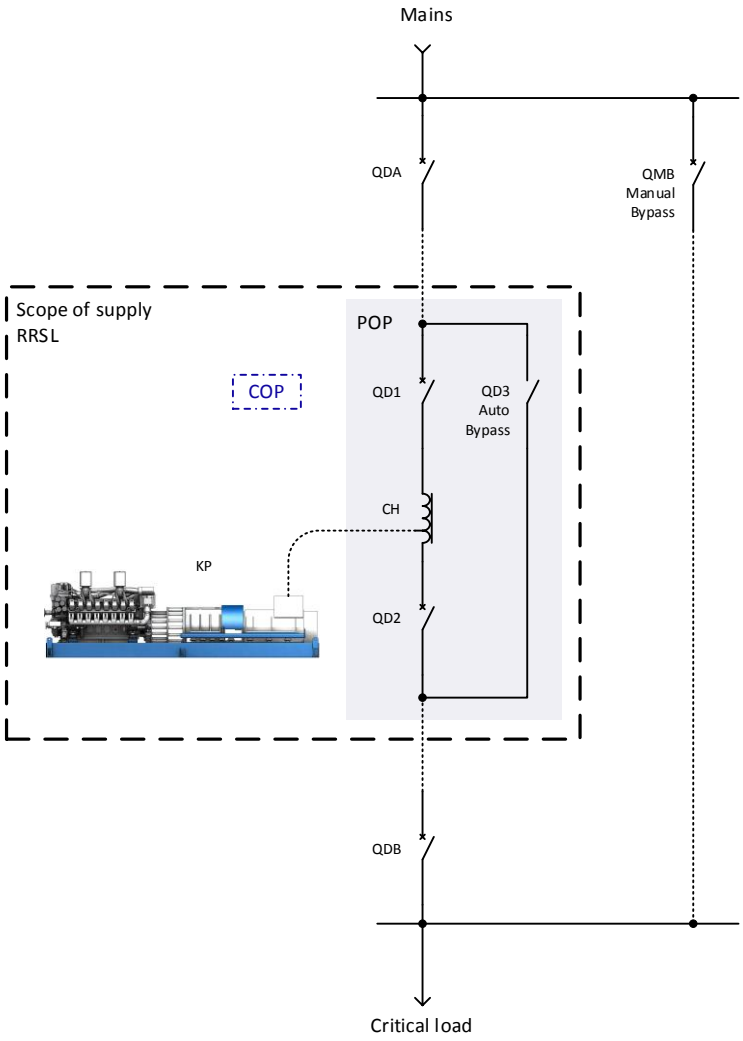
7.4 Communication bus length

Two communication protocols are used: Profinet (PLC) and Canbus (DCM and rEDBus).
The communication buses must have the following characteristics:

- Ethernet:
  1. Cat6 or better
  2. Individual and overall shield (S/FTP or equivalent)
  3. Maximum cable length (point to point): 100m
- Canbus:
  1. Canbus certified cable
  2. Maximum bus length: 400m
  3. Characteristic impedance: 120 Ω at 1MHz
  4. Section: 0.75 mm² (18 AWG)

With bus length being defined as the length of cable between the first and last equipment communicating.

8 SINGLE LINE DIAGRAM



9 ELECTRICAL PERFORMANCES

9.1 Acceptable mains tolerance in conditioning mode

Characteristics	Value
Frequency tolerance (Permanent)	± 0.4 Hz
Voltage tolerance (Permanent)	± 10 %

9.2 Voltage regulation (conditioning and independent mode)

Conditions	Value
In steady state conditions	± 1 %
For load variation of 10%	± 1 %
For load variation of 50%	± 5 %
On mains failure at 100% load	± 5%

9.3 Frequency regulation in independent mode

Conditions	Value
In steady state conditions	± 0.2 %
For load variation of 10%	± 0.5 %
For load variation of 50%	± 1Hz
On mains failure at 100% load	± 1Hz

9.4 Harmonics

Characteristics	Value
Total harmonic distortion (THD) on linear load	≤ 3 %

9.5 Phase angle

Conditions	Value
With balanced load	120° ± 0°
With 25 % unbalanced load	120° ± 1°

NOTE:
- Typical values.