Description SEV-MT 480 P

1 Vegetable oil cogeneration unit consists of:

1.1 Vegetable oil cogeneration unit

type:	SEV-MT 480P
electric power:	max. 480 kW with power factor 1
electric efficiency:	approx. 41,5 %
thermal efficiency:	approx. 42,0 %
rotations:	1.500 1/min
voltage:	230/400 V
frequency:	50 Hz

consumption vegetable oil: approx. 228 g/KW - 110 Kg/h

engine: product - MTU, type - 18V 2000 G63 18 cylinders in V, water cooled,

turbo charged with intercooler

diesel engine with:
- dry air filter with low pressure display
- electronic control
- lube cooler integrated in cooling system
- temperature control for separate cylinder
  with thermocouples or for each cylinder bank
- alert and disconnection by SPC
- protection against contact

generator:
product: Stamford or similar - type: HCI 634 H, synchronous,
3 phases, brushless, self-exciting, self-regulating, air cross
flow ventilated, protection manner IP 22

construction:
engine fly-wheel and generator shaft coupled, engine and generator
coupled over SAE flange and fixed to one unit, aggregate on torsion
resistant base frame - fastened with vibration adapters

dimensions:
approx. 4.100 x 1.700 x 2.200 mm
(without exhaust silencer and heat exchanger)

weight:
approx. 6.800 kg

other:
- with battery and power starter unit
- system according to VDE 0530 / IEC 34.1vegetable oil specification:

for operating with vegetable oil (Fully Refined Palm or Colza Oil)

The quality of the vegetable oil has to meet the standard E DIN 51605 (see attached file 3).

The observing of the vegetable specification has to be proved by customer using an analysis in conjunction with the lube oil analyses. in container 1

1.2 Control unit for net-parallel operation

Switchboard unit in steel cabinet with door and backboard, powder-coated, color RAL 7035, mounting and bottom plate.

protection / test:
IP 56 towards EN 60 529/10.91
IP 55 towards EN 60 529/10.91 for ES 5080.500.
NEMA 12 fulfilled

consisting of:
- motor-driven capacity switch
- electronic speed regulation for the engine
- cos phi-regulation for the parallel mains operation

SEVA VISTA control unit:
==========
automatic engine-/generator control unit SEVA VISTA
- complete engine control and observation,
- complete generator observation and display of all relevant data (voltage, frequency, power), overload,

power responce
- automatic synchronization and additional connection switching of generator power switch
- regulation for constant aggregate power, or alternatively, regulation of aggregate power depending on effective usable power at point of net entrance
- observation device for the parallel mains operation according to VDEW guidelines

Monitoring of all relevant data (bvoltage, frequency, power, temperatures, oil pressure etc.) on a 5,7" touch screen panel. Scratc- resistant front screen saftey glass.

other:
- alarm management
- monitoring for diagnostic of errors
- visual monitoring of the operational charactaristics
  trend setting with installed ISDN unit
- remote diagnostic
- possibility for remote access

Necessary adaptations to Italian Standards are realized by Progetto Energia

1.3 SEV-Remote VISTA.06
software module to establish an ethernet connection for an external access to the visualised automatic control (VISTA) in the switch cabinet - monitoring of all relevant data for CHP operation

system requirements:
- operating system Windows 2000, XP- available ISDN access

1.4 Transfer of faults
using telephone dialing device

requirements: analog or ISDN access

1.5 Oil refill device
completely mounted with supply tank for lube oil

storage tank for cleaning fuel storing of biodiesel to start and stop the cogen set
completely mounted in container 2

construction:
- double walled safety tank consisting of an inner container
made of polyethylene and a galvanized sheet steel outside
- multiple tanks can be combined in line or in blocks

equipment:
- level indicator
- optical leakage detector
- limiting value transmitter
with overfill protection

content: 4.000 litres

1.6 Urea tank device consists of:
2x1.000 l tank
completely mounted in container 1

1.7 Mountings for vegetable oil operation
- preheating unit for vegetable oil over plate heat exchanger
- additional particle filter for vegetable oil / heating oil operation

1.8 Fuel meter
fuel amount measurement with automatic control for the fuel consumption

1.9 Pump aggregate for clean fuel
complete installed incl. connection to the co generating system

1.10 Coolwater heat exchanger
for medium water / water
style variant as plate heat exchanger

1.11 Container 40 ft. (container 1)
extra width / extra height
special design for cogeneration units

sound pressure level:
67 db(A) in an distance of 10 m

Custom-made product with the dimensions 9.125 x 3.000 x 3.000 mm
[L x W x H], to ensure an optimal air ventilation and deairing of the container and to alleviate the service at the aggregate.

construction:
- steel sheet
- tightened floor truss
- roof & wall casing:
  moulded steel panel 1,5 mm
- 1 x container door outside 1 m width
- 1 x container door outside 2 m width
- 1 x screwed front wall
- insulation roof & wall:
  60 mm mineral wool + perforated sheet metal 1,0 mm
- finishing outside: standard 80 micron
- illumination in the container

1.12 Systemcontainer 20 ft. (container 2)
extra width / extra height
Custom-made product with the dimensions 6.058 x 3.000 x 2.591 mm
[L x W x H],

construction:
- steel sheet
- tightened floor truss
- roof & wall casing:
  moulded steel panel 1,5 mm
- 1 x container door outside 1 m width
- insulation roof & wall:
  60 mm mineral wool + perforated sheet metal 1,0 mm
- finishing outside: standard 80 micron
- illumination in the container

1.13 Air condition system for container 1
equipment for cooling the engine room consisting of:
ventilation duct
- splitter attenuator
- temperature controled fan

1.14 Sound absorber
and exhaust gas pipe
built-on the container roof
height of exhaust gas escape 10m over ground.
To reduce the exhaust sound emissions of approx. 35 dB(A

1.15 Secondary sound absorber
built on the container roof
for further reduction of the exhaust sound emissions.
alternatively to 1.14 1.15; combinated sound absorber

1.16 Smoke detector
for the monitoring of closed rooms
with potential-free contact for the deactivation
of the CHP and if necessary the ventialtion

1.17 Recooling system
mounted on the container roof

construction:
desk cooler for the application as external
emergency cooling for cogeneration units

1.18 Recooling system
mounted on the container roof

1.19 Selective Catalytic Reduction (SCR)
with urea spray valve
mounted on the container roof

consisting of:

- SCR catalyser
- active urea injection
- SCR module
- SCR diffuser
- air compressor
- NOx controller
-facility to the injection of the urea with air
Reduces the NOx content to <450mg/Nm³

1.20 Fuel tank unit control

Switchboard unit mounted in separate steel cabinet with door and backboard, powder-coated, color RAL 7035, mounting plate and bottom plate.

Monitoring of all relevant data on a 5,7" touch screen panel.

The display is provided with a tough and scratch-resistant front made of laminated safety glass.
The control system is compatible with the SEVA VISTA control unit for cogen sets and collects following parameters:
- vegetable oil
- water temperature (flow/return) including activation of the circulation pump via three-way valve
- continuous level control with alarm system
- control of vegetable oil temperature
- activation and control of an applied ring line pump
- biodiesel
- continuous level control with alarm system

Start up:
==========
The start up and hand over takes place in two steps.
1. start up with heating oil / diesel / biodiesel
2. start up with vegetable oil after 50 - 100 operating hours
Before start up with biogas the quality of the vegetable oil has to be save.
Within the scope of start up the hand over takes place, an additional date for hand over is liable for costs. If the hand over fails without our liability, the start up substitue the hand over.

Ambient conditions:
==========
All capacity and consumption details refer to 300 K (27 °C) ambient temperature, 60 % relative humidity and 110 m height above sea level (1.000 hPa = 1.000 mbar).
The combustion air has to meet outer air quality.

Documents:
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Operating instructions and spare part lists for engine, generator and control as well as a complete documentation of all applied components and assemblies in Italien language.

Service conditions:
==========
All rotating and stiring parts of a cogeneration unit are subject to abrasion and the operator has to make sure that the service conditions in the operating instructions are observed.

The maintenance rates appointed in the operating instructions for engine, generator,
heat exchanger and the electric equipment must be completed by
qualified personnel according to the Progetto Energia S.r.l. maintenance plan and documented
in the Progetto Energia S.r.l. maintenance manual to keep the guarantee claims.

Due to the use of vegetable oil an early abrasion of the fuel system and the combustion chamber is possible. Therefor the customer has to bear the incidental costs.

Preconditions for the installation:
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- A dry and dust-free assembly without external vibrations has to be ensured
- Outdoor installation of the cogenaration unit: During the winter months the operator has to make arrangements to prevent a cooling down of the fuel.
- The current supply has to be protected by emergency units. If no emergency power supply is planned, the shutdown of several consumers, resp. of all consumers has to be ensured without any consequences for the cogeneration unit.
- The aggregate has to be announced at a fire insurance and a machinery breakdown insurance.

The delivery of spare parts are guaranteed for 10 years after delivery.