

TECHNICAL INFORMATION

FOR 10 SET DIESEL GENERATING POWER OF MAN B&W 9L58/64

CAPACITY : 12.5 MW/SET

TECHNICAL INFORMATION FOR 10 x MAN B&W 9L58/64

A) ENGINE OPERATION CONDITION

1. Total engine running hours

| Engine No. | Engine serial number | The year of operation | Total running hours until |
|------------|----------------------|-----------------------|---------------------------|
| Engine #01 | 1110047 | 1998/06 | 28628 |
| Engine #02 | 1110048 | 1998/06 | 29837 |
| Engine #03 | 1110049 | 1998/06 | 31037 |
| Engine #04 | 1110050 | 1998/06 | 32472 |
| Engine #05 | 1110051 | 1998/06 | 31242 |
| Engine #06 | 1110052 | 1998/06 | 30071 |
| Engine #07 | 1110066 | 1998/05 | 31352 |
| Engine #08 | 1110067 | 1998/05 | 27531 |
| Engine #09 | 1110068 | 1998/05 | 31271 |
| Engine #10 | 1110069 | 1998/05 | 29947 |

2. Engine overhaul condition

- Each engine set already been carried out for 1st time of minor overhaul within 10,000 hours operation ; and also been required for carry out for 2nd time overhauled within 20,000 hours.

- All engine sets was been carried out for 1st time Major overhaul within 30,000 hours operation.

- And after all engine running within 40,000 hours, then also been required carry out for next minor engine overhaul of the 2nd round requirement.

- The specified working details for Minor engine overhaul as follows:

Replacment for piston ring ; honing the cylinder liner ; checked with main bearing shell ; camshaft bearing shell ; maintenance for cylinder head cover ; nozzle testing ; turbocharger ; inter-cooler ; governor ; inlet/exhaust valve and starting valve ...

- The specified working details for Major engine overhaul as follows:

Replacement for main bearing shell ; camshaft bearing shell ; connecting rod bearing shell ; maintenance of vibrator and also carried out the works as same as the details of the minor overhaul condition.

| Engine No. | Times of carried out for Minor overhaul | Times of carried out for Minor overhaul |
|------------|--|--|
| Engine #01 | 4 | 1 |
| Engine #02 | 4 | 1 |
| Engine #03 | 4 | 1 |
| Engine #04 | 4 | 1 |
| Engine #05 | 4 | 2 |
| Engine #06 | 4 | 1 |
| Engine #07 | 4 | 2 |
| Engine #08 | 4 | 1 |
| Engine #09 | 4 | 2 |
| Engine #10 | 4 | 1 |

B) ENGINE TECHNICAL SPECIFICATION AND OPERATION DATA

1. Diesel engine main technical data

Type : MAN B&W 9L58 / 64 / Water-cooled , In-line engine / Exhaust turbocharger with inter-cooler

Rated output : 11925 KW / 428 r.p.m.

Heavy Fuel oil consumption : ≤ 185 g / KW.h

Lub.oil consumption : ≤ 1 g / KW.h

2. Alternator technical data

Type : SIEMENS IDK5928-3DE 07-2

Excitation mode : Brushless / Open wind cooling

Rated output : 14500 KVA

Rated capacity : 11KV

Rated current : 761A

Frequency : 50 Hz

C) EXISTING ENGINE PERFORMANCE DATA AT SITE

Output : 11500 KW

Heavy Fuel oil consumption : 185 g / KW.h

Lub.oil consumption : 0.985 g / KW.h

SCOPY OF SUPPLY FOR 10 X MAN B&W 9L58/64

A) MECHANICAL PART

| Description | Type / Technical specification | Qty |
|--------------------------------|---------------------------------------|------------|
| 1. Engine equipment | | |
| 01 Diesel engine | 9 L 58/64 | 10 |
| Rated output | 11925 KW | |
| Frequency | 428 rpm | |
| Bore | 580 mm | |
| Stroke | 640 mm | |
| 01-1 Turbocharger | MAN / Type NA57 T8 | 10 |
| Speed | 15000 rpm | |
| 01-2 Air cooler | Flate- tube type (Chinese made) | 10 |
| 01-3 Governor | Woodward / Type : PGG200 | |
| 2. Auxilaries equipment | | |
| 02-1 Lub oil sytem | | |
| 02-1.1 Lub oil pump | motor-driven / W-90 KW | 10 |
| 02-1.2 Lub.oil tank | 15 m3 with level indicator | 10 |
| 02-1.3 Lub.oil delivery pump | motor-driven / 2.2kw | |
| 02-1.4 Lub.oil seperator | Westfalia / Type : 6.61.07 | 10 |
| 02-1.5 Lub.oil pre-seperator | Westfalia / Type : 2.05.5.420.750 | 10 |
| 02-1.6 Lub.oil cooler | Plate - heated exchanger | 10 |
| 02-1.7 Lub.oil seperator | Westifalia / Type : OSB35.02.066 | 6 |

| | |
|---|----|
| Alfa-laval / Type : LOPX713 SFD-34-50 | 4 |
| 02-1.8 Relevant valve and instruments | 10 |
| 02-1.9 Piping | 10 |
| 02-2 Cylinder liner cooling system | |
| 02-2.1 Water circulating pump motor-driven / W-37kw | 10 |
| 02-2.2 Water cooler Plate - heated exchanger | 10 |
| 02-2.3 Water expansion tank 500L , with level indicator | 10 |
| 02-2.4 Turbocharger cleaning device | 10 |
| 02-2.5 Relevant valve and instruments | 10 |
| 02-2.6 Piping | 10 |
| 02-3 Cooling water system | |
| 02-3.1 Water circulating pump mtor-driven / W-37kw | 10 |
| 02-3.2 Water cooler Plate - heated exchanger | 10 |
| 02-3.3 Water expansion tank 500L , with level indicator | 10 |
| 02-3.4 Relevant valve and instruments | 10 |
| 02-3.5 Piping | 10 |
| 02-4 Raw water sytem | |
| 02-4.1 Raw water pump Motor-driven / W-55KW | 10 |
| 02-4.2 Relevant valve and instruments | 10 |
| 02-4.3 Piping | 10 |
| 02-5 Nozzle cooling system | |
| 02-5.1 Water circulating pump Motor-driven / W-0.75KW | 10 |

| | |
|---------------------------------------|----|
| 02-5.2 Water cooler | 10 |
| 02-5.3 Relevant valve and instruments | 10 |
| 02-5.4 Piping | 10 |

B) ELECTRIC EQUIPMENTS

| Description | Type / Technical specification | Qty |
|--------------------|---------------------------------------|------------|
|--------------------|---------------------------------------|------------|

| | | |
|---------------------------------|--------------------------------|----|
| 1) Synchronous generator | SIEMENS / Type 1DK5928-3DE07-Z | 10 |
|---------------------------------|--------------------------------|----|

Rated capacity : 14500 KVA

Power factor : 0.8

Rated current : 761A

Rated Voltage : 11 KV

Rotation speed : 428 r.p.m.

Insulated Class : F

Excited voltage : 65V

Excited current : 9.6A

2) 11KV switchgear

| | |
|---|----|
| a) SIEMENS switchgear / Type : 8BJ20 | 10 |
|---|----|

(For generator) CT ratio : 1000 /5A

PT ratio : 11000 /100 V , Y-Y connection

b) SIEMENS 11 KV vacuum circuit breaker

Type : 3AF1762-3

Rated current : 1250A

Short current : 40KA

Max.working pressure : 12KV

Impulsed voltage : 75KV

Control voltage : 220V DC

3) 11 KV switchgear

a) SIEMENS / Type : 8BJ20

3

(For station transformer) CT ratio : 100 /5A

b) SIEMENS 11 KV vacuum circuit breaker

Type : 3AF1762-3

Rated current : 1250A

Short current : 40KA

Max. working pressure : 12KV

Impulsed voltage : 75KV

Control voltage : 220V DC

4) 11 KV switchgear

a) SIEMENS / Type : 8BJ20

3

(For sub-station transformer) CT ratio : 2500 /5A

PT ratio : 11000 / 100V Y-Y connection

b) SIEMENS 11 KV vacuum circuit breaker

Type : 3AF1766-3

Rated current : 2500A

Short current : 40KA

Max. working pressure : 12KV

Impulsed voltage : 75KV

Control voltage : 220V DC

5) Bus coupling CT cabinet

a) SIEMENS / Type : 8BJ20

1

CT ratio : 2500 /5A

b) SIEMENS 11 KV vacuum circuit breaker

Type : 3AF1766-3

Rated current : 2500A

Short current : 40KA

Max. working pressure : 12KV

Impulsed voltage : 75KV

Control voltage : 220V DC

6) Bus coupling PT cabinet

SIEMENS supplied / Y-Y connection

3

2 x Type : 8BJ20/1103.1

1 x Type : 8BJ20-01 / 1216.1

7) 400V switchgear (L.V side)

SIEMENS / Type 8PU003

3

Circuit breaker / Type : 3WN1 731-MM68-1LA2-Z

S05+S13

Rated current : 3150A

Short current : 100kA

Control voltage : 220V DC

8) 400V distribution panel

SIEMENS supplied

2

| | | |
|--|------------------------------|----|
| 9) 400V L.V.bus coupling panel | SIEMENS supplied | 1 |
| 10) Netual earthing switchgear | SIEMENS supplied | 3 |
| 11) D.C charging switchgear | DC 220V | 1 |
| 12) D.C charging switchgear | DC 24V | 1 |
| 13) Batteries unit | DC 220V | 1 |
| 14) Batteries unit | DC 24V | 1 |
| 15) Station transformer | Trafo-Union / Type : TS6241D | 3 |
| Rated capacity : 1600kVA | | |
| 16) Sub station transformer | | no |
| Rated capacity : 40000kVA | | |
| 17) Generator control panel | SIEMENS supplied | 10 |
| 18) Bus coupling switchgear + | SIEMENS supplied | 1 |
| Manual control device | | 1 |
| 19) Station transformer control panel | SIEMENS supplied | 3 |
| 20) 11kV bus coupling PT control panel | SIEMENS supplied | 3 |
| 21) Sub station transformer control panel | SIEMENS supplied | 3 |
| Automatic control device | SIEMENS supplied | 1 |
| 22) Engine control switchgear | SIEMENS supplied | 10 |
| 23) Engine control switchgear | SIEMENS supplied | 10 |
| (in front of engine side) | | |
| 24) Engine exciting control panel | | 10 |
| 25) Lub.oil pump control box | | 10 |

| | | |
|--|------------------|----|
| 26) Lub.oil back flushing control box | | 10 |
| 27) Engine turning device control box | | 10 |
| 28) Control cables | | 10 |
| Included supply for : | | |
| - generator ; | | |
| - generator H.V ; | | |
| - station transformer with control | | |
| - diesel engine control | | |
| - auxiliaries equipment | | |
| 29) D.C. distribution panel | SIEMENS supplied | 1 |