

Maintenance Record

MAN Industrial Gas Engines

Imprint

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Dear customer,

Congratulations on deciding to purchase an MAN gas engine! These engines are characterised by high levels of performance and operational reliability whilst requiring a minimum of outlay on maintenance. However, in order to guarantee trouble-free operation, it is necessary to perform regular check-ups and maintenance tasks.

This maintenance record provides an overview of all prescribed maintenance jobs.

The maintenance tasks must be carried out at an authorised workshop after a specific number of operating hours.

The following publications are available to help you work with your new engine:

- Operator's manual
- Service products for MAN gas engines
- Spare parts catalogue
- Maintenance record

We are glad to answer any specific questions you may have if there is anything not covered by this publication. Please remember to quote the **fourteen-digit engine number** with all enquiries. It can be found in the General Details form or on the engine model plate.

Yours faithfully, MAN Truck & Bus AG Werk Nürnberg

List of abbreviations

ETC	Exhaust gas turbocharger
ОН	Operating hours
TV	Throttle valve
CL	Coolant
ZPR	Zero pressure regulator
LT	Low temperature
Р	Pressure
-	-
Т	Temperature
ΔΡ	Pressure differential
° bef. TDC	Degrees crank angle before top dead centre

General details

The General Details form must be completed by the authorised workshop or the unit manufacturer as part of the start-up process.

Name and address of customer	Name and address of unit manufacturer
Details of engine	
Engine type:	Installed rated output in kW:
Plant no.:	Start-up date:
Engine number	Deted encod (mm)
Engine number:	Rated speed [rpm]
Name of the MAN representative:	
Details of drive system	
Drive type (e.g. generator, pump, compressor):	
Construction no., year of manufacture	
Place and date of 20–50 hour service:	

Start-up

Initial start-up of the MAN gas engine must be carried out by an authorised MAN Truck & Bus AG workshop or by the unit manufacturer.

It is essential that the start-up log with measurement sheet and the General Details sheet be completed in full and returned to MAN Truck & Bus AG.

The inspection record from the unit manufacturer and the MAN gas engine start-up log will then be passed on to the authorised MAN Truck & Bus AG workshop.

The MAN warranty only becomes effective once these documents have been received and checked.

Measurement sheets

Start-up

Start-up measurement sheet									Page 1 of 2
Basic data									
Appendix	Type of system	Syster	n operating	hours		System constru year	iction	Elec	trical power rating
	Quanting	Defer		- / - ! - : ! - : - : '-:	ОН			0	KWh _{el}
	Operating method	Refere	nce variabi	e / start require	ements			Spe	ed
									rpm
Installation conditions	Installation height	Air pre	ssure	Air humidi	ty	Outside temper			compartment perature
	m		mba	ır	%		°C		C°
	Engine type		E	Engine number		Plant number			Engine operating hours
									ОН
Engine									No. engine starts
	Gas mixer type			Alternator ty	rpe		Air filte	er typ	e
	Ignition system ty	rpe		Ignition coil type Spa			Spark	plug	type
Components									
	Catalytic converte	er type		Silencer type		Exhaus	xhaust heat exchanger type		
Service	Engine oil type		Engine oil	change		eze / corrosion in	hibitor	С	concentration
products			Interval		type				%
	Type of gas		Methane	content CH4	Sulphu	r / hydrogen sulp	bide		ower calorific value, Hu
Fuel	Type of gas		Methane	%	Gaipila	r / nyurogen sup	ppm		kWh/Nm ³
Place:	Da	ate:		Cı	istomer's	signature		aintei Inatu	nance personnel Ire



Start-up measurement sheet

Page 2 of 2

		r		
Emissions	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train	mbar	ZPR mbar	%	•
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
ntake system				
	°C	mbar	mbar	
Turkeekersing	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	٥
	T: exhaust gas upstream of	P: exhaust gas back pressure,	T: exhaust gas	T: exhaust gas
Exhaust system	ETC bank A/B	bank A/B	up/downstream of catalytic converter	up/downstream of exhaust heat exchanger
	°C	mbar	°C	۰
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
			temperature	engine
Cooling circuit	°C	°C	bar	l/mi
	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	l/m
	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode
Ignition system				distance
	° bef. TDC	° bef. TDC	v	1
			•	
Operating data d	of engine at 50% rated power		· ·	
Operating data o	of engine at 50% rated power NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
	NOx emissions		O2 content of exhaust gas	
	NOx emissions mg/Nm ³	mg/Nm ³	O2 content of exhaust gas	Lambda value
Emissions	NOx emissions		O2 content of exhaust gas	
Emissions	NOx emissions mg/Nm ³	mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	Lambda value Gas temperature
Emissions	NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value Gas temperature
Operating data o Emissions Gas train Intake system	NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	Lambda value Gas temperature • Throttle valve position
Emissions Gas train	NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture %	Lambda value Gas temperature • Throttle valve position
Emissions Gas train Intake system	NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar	Lambda value Gas temperature • Throttle valve position
Emissions Gas train	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar	mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C	Lambda value Gas temperature ° Throttle valve position T: exhaust gas upstream of ETC bank A/B
Emissions Gas train Intake system	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Emissions Gas train Intake system Turbocharging	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature • Throttle valve position T: exhaust gas upstream of ETC bank A/B • T: exhaust gas up/downstream of exhaust heat exchanger
Emissions Gas train Intake system Turbocharging	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Emissions Gas train Intake system Turbocharging Exhaust system	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature • Throttle valve position T: exhaust gas upstream of ETC bank A/B • T: exhaust gas up/downstream of exhaust heat exchanger
Emissions Gas train Intake system Turbocharging Exhaust system	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Emissions Gas train Intake system	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity,
Emissions Gas train Intake system Turbocharging Exhaust system	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba CL circulation quantity, engine
Emissions Gas train Intake system Turbocharging Exhaust system	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	mg/Nm ³ Gas pressure downstream of ZPR P: intake vacuum P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mb CL circulation quantity, engine
Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mb CL circulation quantity, engine
Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	mg/Nm ³ Gas pressure downstream of ZPR P: intake vacuum P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine //mi

Return to service after Revision R2

Return to service after Revision R2										Page 1 of 2	
Basic data											
Appendix	Type of system	Syster	n operati	ng hc	ours		System constru year	uction	Ele	ctrical power rating	
						он	Jour			KWh _{el}	
	Operating method	Refere	ence varia	able /	' start require	ements			Spe	eed rpm	
Installation conditions	Installation height	Air pre	ir pressure Air humidity			Outside tempe			t compartment perature		
	m		m	bar		%		°C		3 °	
	Engine type			Eng	gine number		Plant numbe	r		Engine operating hours	
Engino										ОН	
Engine										No. engine starts	
	Gas mixer type				Alternator type Air			Air filte	er ty	pe	
Components	Ignition system ty	rpe			Ignition coil type Spar			Spark	plug	j type	
	Catalytic converte	Catalytic converter type			Silencer type			Exhau	Exhaust heat exchanger type		
Service products	Engine oil type		Engine oil cl interval		I change Antifre type		eeze / corrosion inhibitor		(Concentration %	
	Type of gas		Methan	ie coi	ntent CH4	Sulphu	r / hydrogen sul	phide	L	_ower calorific value, Hu	
Fuel					%			ppm	1	kWh/Nm³	
Place:	Da	ate:			Cu	stomer's	signature		ainte gnati	enance personnel ure	



Return to service after Revision R2

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	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm³	%	
Gas train	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
	mbar	mbar	%	°
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system	°C	mbar	mbar	9
Turbocharging	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
	mbar	mbar	°C	0
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	٥
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
	°C	°C	bar	l/mi
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	l/mi
Ignition system	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode distance
.g	° bef. TDC	° bef. TDC	v	

	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm³	%	
Gas train	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
Gastrain	mbar	mbar	%	°C
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system	℃	mbar	mbar	%
Turbocharging	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
laiseenaiging	mbar	mbar	°C	°C
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	°C
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mbai
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
Cooling circuit	C°	°C	bar	l/mir
	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	℃	°C	bar	l/min
Place:	Date:	Customer's	signature Main signa	tenance personnel ature

Return to service after Revision R3

Return to service after Revision R3										Page 1 of 2
Basic data										
Appendix	Type of system	Syster	n operatir	ng ho	ours		System constr year	uction	Ele	ctrical power rating
						он	,			KWh _{el}
	Operating method	Refere	ence varia	ble /	start require	ements			Spe	eed rpm
Installation conditions	Installation height	Air pre	oressure Air humidity			Outside tempe			t compartment perature	
	m		m	bar		%		°C		3 °
	Engine type			Eng	jine number		Plant numbe	er		Engine operating hours
Engine										ОН
Lingine										No. engine starts
	Gas mixer type				Alternator type		Air filte	er ty	pe	
Components	Ignition system ty	/pe			Ignition coil type Spar			Spark	plug	g type
	Catalytic converte	Catalytic converter type		;	Silencer type E			Exhau	ist h	eat exchanger type
Service products	Engine oil type	Engine oil type Engine oil interval		oil ch	il change Antifree type		reeze / corrosion inhibitor		(Concentration %
	Type of gas		Methan	e cor	ntent CH4	Sulphu	r / hydrogen su	lphide		_ower calorific value, Hu
Fuel					%		, ,	ppm		kWh/Nm ³
Place:	Da	ate:			Cu	stomer's	signature		ainte gnat	enance personnel ure



Return to service after Revision R3

Page 2 of 2

Operating data of	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train		ZPR .		
	mbar	mbar	%	°(
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system	°C	mbar	mbar	%
Turbooborging	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	°
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	℃	mbar	°C	°
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
	°C	၁ °	bar	l/mii
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	l/mir
Ignition system	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode distance
.g	° bef. TDC	° bef. TDC	v	n
Operating data of	of engine at 50% rated power		•	
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm³	%	
Gas train	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
	mbar	mbar	%	°
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position

	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system				
	D°	mbar	mbar	%
Turbocharging	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
·	mbar	mbar	°C	°C
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	C°	mbar	°C	°C
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication				
		D°	bar	mbar
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
	°C	°C	bar	l/min
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	l/min
Place:	Date:	Customer's	signature Main signa	tenance personnel ature

Return to service after temporary withdrawal

	Return to service after temporary withdrawal								Page 1 of 2		
Basic data											
Appendix	Type of system	System	n operating	g hou	urs		System construction E		Ele	ctrical power rating	
						он				KWh _{el}	
	Operating method	Refere	ference variable / start requirements					Spe	eed rpm		
Installation conditions	Installation height	Air pre	-					t compartment perature			
	m		mb	bar		% °C		°C		°C	
	Engine type			Eng	ine number		Plant number			Engine operating hours	
Engine										ОН	
Lingine										No. engine starts	
	Gas mixer type			Alternator type			Air filt	Air filter type			
Components	Ignition system ty	vpe		Ignition coil type			Spark plug type				
	Catalytic converte	er type		S	Silencer type	e		Exhau	ust h	eat exchanger type	
Service products	Engine oil type		Engine o interval	5		Antifree type	eze / corrosion ir	hibitor	(Concentration %	
	Type of gas		Methane	con	tent CH4	Sulphu	r / hydrogen sulp	hide		_ower calorific value, Hu	
Fuel	Type of gae		Methane content CH4 Sulphi			Calpila	, nyarogon oak	ppn		kWh/Nm ³	
Place:	Da	ate:			Cu	stomer's	signature		ainte gnati	enance personnel ure	



Return to service after temporary withdrawal

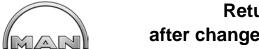
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Operating data of	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train		ZPR		
	mbar	mbar	%	°C
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system	°C	mbar	mbar	%
Turbocharging	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
rai beenai ging	mbar	mbar	°C	°C
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	°C
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
O I'm m in it	°C	°C	bar	l/mir
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	l/mir
Ignition system	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode distance
	° bef. TDC	° bef. TDC	v	m
Operating data of	of engine at 50% rated power			
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm³	mg/Nm³	%	
Gas train	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
	mbar	mbar	%	°C
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system				1

	I: Intake air	P: Intake vacuum	Δ P: gas mixer	I hrottle valve position
Intake system	℃	mbar	mbar	%
Turbocharging	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
ranseenanging	mbar	mbar	°C	°C
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	°C
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mbar
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
	°C	°C	bar	l/min
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	l/min
Place:	Date:	Customer's	signature Main signa	tenance personnel ature

Return to service after change of customer/location

	aft	ter ch			to se custo		e /location	1	Page 1 of 2	
Basic data										
Appendix	Type of system	System	operating	hours	S		System constru year	uction	Elec	ctrical power rating
			ОН							KWh _{el}
	Operating method	Referer	eference variable / start requirements				;	Spe	ed rpm	
Installation conditions	Installation height m	Air pres	mbar %			y %	Outside tempe			compartment perature °C
			IIIDa					U		~
	Gas mixer type			Alte	ernator ty	Air filte			ər type	
Components	Ignition system type			Ignition coil type Spar			Spark p	plug	type	
	Catalytic converte	er type		Silencer type				Exhaust heat exchanger type		eat exchanger type
	Engine type		E	Ingine	e number		Plant numbe	r		Engine operating hours
										он
Engine										No. engine starts
Service products	Engine oil type	pe Engine oil interval		l chan	nge	Antifree type	eeze / corrosion inhibitor		Concentration %	
	Type of gas		Methane of	contei	nt CH4	Sulphu	r / hydrogen sul	phide	L	ower calorific value, Hu
Fuel					%			ppm		kWh/Nm ³
Place:	Da	ate:			Cu	stomer's	signature		iinte natu	nance personnel ure



Return to service after change of customer/location

Page 2 of 2

l/min

l/min

CL circulation quantity, LT

Operating data of	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
Gas train	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
	mbar	mbar	%	°C
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system	°C	mbar	mbar	%
Turbocharging	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
	mbar	mbar	°C	°C
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	°C
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mbar
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
• • • •	°C	°C	bar	l/min
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	l/min
Ignition system	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode distance
ignition system	° bef. TDC	° bef. TDC	v	m
Operating data of	of engine at 50% rated power	•	·	•
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
Gas train	mbar	mbar	%	°C
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system	D°	mbar	mbar	%
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of	T: exhaust gas upstream of
Turbocharging	mbar	mbar	cooler °C	ETC bank A/B
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	°C
Lubrigation	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mbar
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
		1	1	1

T: CL outflow LT mixture

°C

bar

P: CL LT mixture cooler

°C

T: CL inflow LT mixture cooler

Cooling circuit

Completion of maintenance tasks

General information

Please note that the maintenance tasks may only be carried out by authorised MAN workshops.

The workshop will stamp a checklist to confirm that the tasks have been completed correctly at each service.

It is important to ensure that all entries are duly made in full and are clearly legible.

A test run must be carried out after every service.

Notes about tasks that appear necessary or work/repairs carried out may also be kept.

Start-up

The Start-up form must be completed by the authorised workshop or the unit manufacturer and forwarded to MAN Truck & Bus AG as part of the start-up process.

Service at 20-50 operating hours

This first service is essential.

The General Details form must be completed by the authorised workshop or the unit manufacturer and forwarded to MAN Truck & Bus AG as part of the start-up process.

NOTE

In the case of complaints within the warranty period, maintenance records E2/E3 must also be presented.

Important instructions concerning technical safety and the safety of personnel are specifically highlighted, as indicated below.

🛕 Danger

Refers to working and operating procedures which must be followed in order to avoid exposing people to risk.

A Caution

Refers to working and operating procedures which must be followed in order to avoid material damage or destruction.

NOTE

An explanatory note which is useful for understanding the working or operating procedure to be performed.

Assembling pipes

<u> </u>Danger

Do not bend pipes of any kind.

Mounting gaskets

Gaskets are often fitted with adhesives or sealing compounds as an aid to installation or to improve the seal. This can result in the seal slipping during operation due to the so-called sewing-machine effect, causing leaks to occur. This is especially likely where parts with different rates of thermal expansion are connected (e.g. aluminium and cast iron).

Example:

If an adhesive or sealing compound is used on the cover of the front crankshaft oil seal, the gasket will gradually slip inside over time due to the varying thermal expansion rates. Oil leaks will occur which might be wrongly attributed to the shaft seal.

Correct installation of gaskets can only be achieved if the following principles are observed:

- Only use genuine MAN seals and gaskets.
- Make sure that the areas to be sealed are undamaged and clean.
- Do not use adhesive agents or sealing agents. To facilitate installation, a little grease can be used to stick the seal to the part to be mounted.
- Tighten the bolts evenly to the specified tightening torque.

Mounting O-rings

- Only use genuine MAN O-rings.
- Make sure that the areas to be sealed are undamaged and clean.
- As a rule, moisten the seals with engine oil when fitting.

Warranty conditions

Scope of the warranty

MAN Truck & Bus AG guarantees that any components of engine series E08, E26, E28 and E32 acknowledged to be faulty will be either replaced or repaired, as decided by MAN Truck & Bus AG. The following warranty conditions (as contained in the terms of delivery) are applicable here:

Repairs

In order for work to be carried out as required, the customer must

- Grant the necessary time and opportunity
- Furnish, at his expense, the necessary assistants, equipment and facilities and carry out ancillary work
- Perform, at his expense, all work above and beyond the original scope of the order

Once per case of damage, MAN Truck & Bus AG will undertake appropriate travel expenses as required by authorised service technicians, and appropriate shipping costs for replacement and reconditioned parts. Additional special travel and transport costs will be borne by the customer. Repairs will be carried out during normal, regular working hours. The extra cost of any work carried out outside regular working hours will be borne by the customer.

The warranty does not cover:

- The replacement of wearing parts, e.g. filters, V-belts, operating fluids (oil, anti-freeze and anti-corrosion agents)
- The costs of normal, routine prescribed inspections
- Damage caused by the use of unsuitable service products or by improper handling/operation
- Any costs indirectly incurred in connection with warranty cases, for downtimes, loss of time, expenses for sustenance, accommodation, freight costs, fuel costs, etc. or any other follow-on costs
- Damage caused by failure to follow the guidelines prescribed in the installation manual for industrial gas engines

Notes	

Maintenance schedules and maintenance records

Service intervals for E0834 LE302, E0836 LE202/LE302 "Natural gas"

	After start-					
	up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	800	1,600	10,000	30,000	60,000
Interval after operating hours at 1800 rpm	20-50	600	1,200	10,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Carry out a leak test	X	Х				
Check bolt connections	Х	Х				
Change engine oil; oil analysis*)	Х	Х				
Change engine oil filter*)	Х	Х				
Record operating data****)	Х	Х				
Check start procedure	Х	Х				
Adjust/check throttle valve	Х		Х			
Clean/check gas filter	Х		Х			
Clean/check air filter	Х		Х			
Clean/replace pickups	Х		Х			
Check coolant concentration	Х		Х			
Check ignition time	Х		Х			
Check coolant circuit / system pressure	х		х			
Measure crankcase pressure	Х		Х			
Measure exhaust back pressure including catalytic converter	х		x			
Check emissions and Lambda	Х		Х			
Check exhaust system for air leaks / external soiling	х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		Х				
Check valve clearance and adjust if necessary			Х			
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler	Х		Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace cylinder liner					Х	
Check/replace connecting rods					Х	
Replace piston rings					Х	
Check/replace pistons					Х	
Replace cylinder heads					Х	
Complete engine overhaul						Х

Service intervals for E0834 LE302, E0836 LE202/LE302 "Special gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	300	1,500	10,000	30,000	60,000
Interval after operating hours at 1800 rpm	20-50	300	1,200	10,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Carry out a leak test	X	Х				
Check bolt connections	Х	Х				
Change engine oil*)	Х	Х				
Change engine oil filter*)	х	Х				
Record operating data****)	х	Х				
Check start procedure	х	Х				
Adjust/check throttle valve	х		Х			
Clean/check gas filter	х		Х			
Clean/check air filter	х		Х			
Clean/replace pickups	х		Х			
Check coolant concentration	х		Х			
Check ignition time	х		Х			
Check coolant circuit / system pressure	Х		х			
Measure crankcase pressure	х		Х			
Measure exhaust back pressure including catalytic converter	Х		х			
Check emissions and Lambda	Х		Х			
Check exhaust system for air leaks / external soiling	х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		Х				
Check valve clearance and adjust if necessary			Х			
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler			Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			x			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace cylinder liner					Х	
Check/replace connecting rods					Х	
Replace piston rings					Х	
Check/replace pistons					Х	
Replace cylinder heads					Х	
Complete engine overhaul						Х

Service intervals for E0834 E302/312, E0836 E302/312 "Natural gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	800	2,400	15,000	30,000	60,000
Interval after operating hours at 1800 rpm	20-50	600	1,800	12,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Carry out a leak test	x	х				
Check bolt connections	X	x x				
Change engine oil; oil analysis*)	X	× X				
Change engine oil filter*)	X	X				
Record operating data****)	X	x x				
Check start procedure	x	x				
Adjust/check throttle valve	X	X	X			
Clean/check gas filter	X		X			
Clean/check air filter	X		X			
Clean/replace pickups	X		X			
Check coolant concentration	X					
Check ignition time			X			
Check coolant circuit / system	X X		x			
pressure						
Measure crankcase pressure	X		Х			
Measure exhaust back pressure including catalytic converter	Х		Х			
Check emissions and Lambda	Х		Х			
Check exhaust system for air leaks / external soiling	х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		х				
Check valve clearance and adjust if necessary		х				
Replace spark plugs			х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler	Х		Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			x			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace cylinder liner					Х	
Check/replace connecting rods					х	
Replace piston rings					х	
Check/replace pistons					Х	
Replace cylinder heads					Х	
Complete engine overhaul			1			Х

Service intervals for E2876 E312, E2842 E312, E2676 E302, E3262 E302 "Natural gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	800**)	2,400	15,000	25,000	50,000
Interval after operating hours at 1800 rpm	20-50	600**)	1,800	12,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Carry out a leak test	X	Х				
Check bolt connections	х	Х				
Change engine oil; oil analysis*)	х	Х				
Change engine oil filter*)	х	Х				
Record operating data****)	х	Х				
Check start procedure	х	Х				
Adjust/check throttle valve	x		х			
Clean/check gas filter	x		х			
Clean/check air filter	х		х			
Clean/replace pickups	х		Х			
Check coolant concentration	x		Х			
Check ignition time	x		Х			
Check coolant circuit / system pressure	х		x			
Measure crankcase pressure	X		Х			
Measure exhaust back pressure including catalytic converter	x		x			
Check emissions and Lambda	х		Х			
Check exhaust system for air leaks / external soiling	х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		Х				
Check valve clearance and adjust if necessary		Х				
Replace spark plugs			Х			
Check compression pressure			х			
Check/replace oil separator			х			
Check/clean mixture cooler	X		Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			x			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace cylinder liner					Х	
Check/replace connecting rods					Х	
Replace piston rings					х	
Check/replace pistons					Х	
Replace cylinder heads					Х	
Complete engine overhaul						Х

Service intervals for E2876 TE302 "Special gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	300**)	1,500	15,000	30,000	60,000
Interval after operating hours at 1800 rpm	20-50	300**)	1,200	12,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Carry out a leak test	X					
Check bolt connections	X	X				
	Х	Х				
Change engine oil; oil analysis*)	Х	Х				
Change engine oil filter*)	Х	Х				
Record operating data	Х	Х				
Check start procedure	Х	Х				
Adjust/check throttle valve	Х		Х			
Clean/check gas filter	х		Х			
Clean/check air filter	Х		Х			
Clean/replace pickups	Х		Х			
Check coolant concentration	Х		Х			
Check ignition time	Х		Х			
Check coolant circuit / system pressure	х		х			
Measure crankcase pressure	Х		Х			
Measure exhaust back pressure including catalytic converter	х		х			
Check emissions and Lambda	х		Х			
Check exhaust system for air leaks / external soiling	х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		х				
Check valve clearance and adjust if necessary			х			
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler	х		Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace cylinder liner					Х	
Check/replace connecting rods			1		Х	
Replace piston rings			1		х	
Check/replace pistons			1	1	х	
Replace cylinder heads			1		х	
Complete engine overhaul			1			Х

Service intervals for E2876 LE302/LE212 "Natural gas"

	After start- up and R1-	A.II.				
Interval after operating hours at	R2	All	All	up to	up to	up to
1500 rpm	20-50	800**)	1,600	15,000	25,000	50,000
Interval after operating hours at 1800 rpm	20-50	600**)	1,200	12,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Carry out a leak test	x	х				
Check bolt connections	Х	Х				
Change engine oil; oil analysis*)	Х	Х				
Change engine oil filter*)	Х	Х				
Record operating data****)	Х	Х				
Check start procedure	Х	Х				
Adjust/check throttle valve	Х		Х			
Clean/check gas filter	Х		Х			
Clean/check air filter	Х		Х			
Clean/replace pickups	Х		Х			
Check coolant concentration	Х		Х			
Check ignition time	Х		Х			
Check coolant circuit / system pressure	х		х			
Measure crankcase pressure	Х		Х			
Measure exhaust back pressure including catalytic converter	х		х			
Check emissions and Lambda	Х		Х			
Check exhaust system for air leaks / external soiling	х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		Х				
Check valve clearance and adjust if necessary			Х			
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler			Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace cylinder liner					Х	
Check/replace connecting rods					Х	
Replace piston rings					Х	
Check/replace pistons					Х	
Replace cylinder heads					Х	
Complete engine overhaul						Х

Service intervals for E2876 LE302 "Special gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	300**)	1,500	15,000	30,000	60,000
Interval after operating hours at 1800 rpm	20-50	300**)	1,200	12,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Ourse and a local local						
Carry out a leak test	Х	Х				
Check bolt connections	Х	Х				
Change engine oil; oil analysis*)	Х	Х				
Change engine oil filter*)	Х	Х				
Record operating data****)	Х	Х				
Check start procedure	Х	Х				
Adjust/check throttle valve	x		Х			
Clean/check gas filter	Х		Х			
Clean/check air filter	Х		Х			
Clean/replace pickups	х		Х			
Check coolant concentration	x		Х			
Check ignition time	x		Х			
Check coolant circuit / system pressure	х		х			
Measure crankcase pressure	Х		Х			
Measure exhaust back pressure including catalytic converter	х		х			
Check emissions and Lambda	Х		Х			
Check exhaust system for air leaks / external soiling	x					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		х				
Check valve clearance and adjust if necessary			x			
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler			Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace cylinder liner			1		Х	
Check/replace connecting rods					Х	
Replace piston rings				1	х	
Check/replace pistons			1	1	Х	
Replace cylinder heads					х	
Complete engine overhaul						Х

Service intervals for E2876 LE202 "Special gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	300**)	1,500	15,000	25,000	30,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Carry out a leak test	x	x				
Check bolt connections	х	Х				
Change engine oil; oil analysis*)	х	Х				
Change engine oil filter*)	х	Х				
Record operating data****)	х	Х				
Check start procedure	х	Х				
Adjust/check throttle valve	х		х			
Clean/check gas filter	х		Х			
Clean/check air filter	Х		х			
Clean/replace pickups	Х		Х			
Check coolant concentration	х		Х			
Check ignition time	х		х			
Check coolant circuit / system pressure	х		x			
Measure crankcase pressure	Х		Х			
Measure exhaust back pressure including catalytic converter	х		x			
Check emissions and Lambda	х		Х			
Check exhaust system for air leaks / external soiling	Х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		х				
Check valve clearance and adjust if necessary			х			
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler			х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace cylinder liner					Х	
Check/replace connecting rods					Х	
Replace piston rings					Х	
Check/replace pistons					Х	
Replace cylinder heads					Х	
Complete engine overhaul				1		Х

Service intervals for E2848 LE322 "Natural gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	800**)	1,600	15,000	25,000	50,000
Interval after operating hours at 1800 rpm	20-50	600**)	1,200	12,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Check flexible steel lines	Х					
Carry out a leak test	х	Х				
Check bolt connections	х	Х				
Change engine oil; oil analysis*)	х	Х				
Change engine oil filter*)	х	Х				
Record operating data****)	х	Х				
Check start procedure	х	Х				
Adjust/check throttle valve	х		Х			
Clean/check gas filter	х		Х			
Clean/check air filter	Х		Х			
Clean/replace pickups	х		Х			
Check coolant concentration	х		Х			
Check ignition time	х		Х			
Check coolant circuit / system pressure	Х		х			
Measure crankcase pressure	х		Х			
Measure exhaust back pressure including catalytic converter	х		х			
Check emissions and Lambda	х		Х			
Check exhaust system for air leaks / external soiling	х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		х				
Check valve clearance and adjust if necessary			х			
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler	X		Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace cylinder liner					Х	
Check/replace connecting rods					Х	
Replace piston rings					Х	
Check/replace pistons					Х	
Replace cylinder heads					Х	
Complete engine overhaul						Х

Service intervals for E2848 LE322 "Special gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	300**)	1,500	15,000	30,000	60,000
Interval after operating hours at 1800 rpm	20-50	300**)	1,200	12,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Carry out a leak test	Х	Х				
Check bolt connections	х	Х				
Change engine oil; oil analysis*)	x	Х				
Change engine oil filter*)	х	Х				
Record operating data****)	Х	Х				
Check start procedure	Х	Х				
Adjust/check throttle valve	х		Х			
Clean/check gas filter	Х		Х			
Clean/check air filter	х		Х			
Clean/replace pickups	х		Х			
Check coolant concentration	Х		Х			
Check ignition time	x		Х			
Check coolant circuit / system pressure	х		х			
Measure crankcase pressure	Х		Х			
Measure exhaust back pressure including catalytic converter	х		х			
Check emissions and Lambda	Х		Х			
Check exhaust system for air leaks / external soiling	х					
Check intake vacuum		Х				
Check spark plugs		Х				
Check valve clearance and adjust if necessary		х				
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler			Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace cylinder liner					Х	
Check/replace connecting rods					Х	
Replace piston rings					Х	
Check/replace pistons					Х	
Replace cylinder heads					х	
Complete engine overhaul						х

Service intervals for E2842 LE322/LE332 "Natural gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	800**)	1,600	15,000	25,000	50,000
Interval after operating hours at 1800 rpm	20-50	600**)	1,200	12,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Check flexible steel lines	Х					-
Carry out a leak test	х	Х				
Check bolt connections	х	Х				
Change engine oil; oil analysis*)	х	Х				
Change engine oil filter*)	х	Х				
Record operating data****)	х	Х				
Check start procedure	х	Х				
Adjust/check throttle valve	х		Х			
Clean/check gas filter	х		Х			
Clean/check air filter	х		Х			
Clean/replace pickups	х		Х			
Check coolant concentration	х		Х			
Check ignition time	х		Х			
Check coolant circuit / system pressure	х		х			
Measure crankcase pressure	Х		Х			
Measure exhaust back pressure including catalytic converter	х		х			
Check emissions and Lambda	Х		Х			
Check exhaust system for air leaks / external soiling	х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		х				
Check valve clearance and adjust if necessary			х			
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler	Х		Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace exhaust pipe				Х		
Replace turbo charger				Х		
Replace cylinder liner					Х	
Check/replace connecting rods					Х	
Replace piston rings					Х	
Check/replace pistons					Х	
Replace cylinder heads					Х	
Complete engine overhaul						Х

Service intervals for E2842 LE322/LE202 "Special gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	300**)	1,500	15,000	30,000	60,000
Interval after operating hours at 1800 rpm	20-50	300**)	1,200	12,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Carry out a leak test	Х	Х				
Check bolt connections	Х	Х				
Change engine oil; oil analysis*)	Х	Х				
Change engine oil filter*)	Х	Х				
Record operating data****)	Х	Х				
Check start procedure	Х	Х				
Adjust/check throttle valve	Х		Х			
Clean/check gas filter	Х		Х			
Clean/check air filter	х		х			
Clean/replace pickups	х		х			
Check coolant concentration	х		Х			
Check ignition time	х		Х			
Check coolant circuit / system pressure	х		х			
Measure crankcase pressure	Х		Х			
Measure exhaust back pressure including catalytic converter	Х		х			
Check emissions and Lambda	Х		Х			
Check exhaust system for air leaks / external soiling	х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		х				
Check valve clearance and adjust if necessary			х			
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler			Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace exhaust pipe multi-piece rings				x		
Replace cylinder liner					Х	
Check/replace connecting rods					Х	
Replace piston rings					Х	
Check/replace pistons					Х	
Replace cylinder heads					Х	
Complete engine overhaul						Х

Service intervals for E2676 LE202 "Natural gas"

	After start-up and R1-R2	All	All	up to	up to	un to
Interval after operating hours at	20-50	800	1,600	15,000	up to 25,000	up to 50,000
1500 rpm Interval after operating hours at	20-50	600	1,200	15,000	20,000	40,000
1800 rpm Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Check flexible steel lines	X	E2	ES	KI)	R2)	кэ)
Carry out a leak test	X	x				
Check bolt connections	X	X				
Change engine oil; oil analysis*)	X	X				
Change engine oil filter*)	X	X				
Record operating data****)						
Check start procedure	X	X				
Adjust/check throttle valve	X	Х	X			
Clean/check gas filter	X		X			
Clean/check gas filter	X		X			
	Х		Х			
Clean/replace pickups	Х		Х			
Check coolant concentration	Х		Х			
Check ignition time	Х		Х			
Check coolant circuit / system pressure	Х		х			
Measure crankcase pressure	Х		Х			
Measure exhaust back pressure including catalytic converter	Х		x			
Check emissions and Lambda	Х		Х			
Check exhaust system for air leaks / external soiling	Х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		х				
Check valve clearance and adjust if necessary			x			
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler	х		Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace cylinder liner					Х	
Check/replace connecting rods					Х	
Replace piston rings					х	
Check/replace pistons					х	
Replace cylinder heads					х	
Complete engine overhaul						х

Service intervals for E2676 LE202/LE212 "Special gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	300	1,500	15,000	25,000	30,000
Interval after operating hours at 1800 rpm	20-50	300	1,200	12,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Carry out a leak test	Х	Х				
Check bolt connections	х	Х				
Change engine oil; oil analysis*)	х	Х				
Change engine oil filter*)	х	Х				
Record operating data****)	х	Х				
Check start procedure	х	Х				
Adjust/check throttle valve	х		Х			
Clean/check gas filter	х		Х			
Clean/check air filter	х		Х			
Clean/replace pickups	х		Х			
Check coolant concentration	х		Х			
Check ignition time	х		Х			
Check coolant circuit / system pressure	Х		х			
Measure crankcase pressure	Х		Х			
Measure exhaust back pressure including catalytic converter	х		х			
Check emissions and Lambda	Х		Х			
Check exhaust system for air leaks / external soiling	х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		Х				
Check valve clearance and adjust if necessary		Х				
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler			Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				Х		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace cylinder liner					Х	
Check/replace connecting rods					Х	
Replace piston rings					Х	
Check/replace pistons					Х	
Replace cylinder heads					Х	
Complete engine overhaul						Х

Service intervals for E3268 LE212, E3262 LE202/LE232 "Natural gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	800	1,600	15,000	25,000	50,000
Interval after operating hours at 1800 rpm	20-50	600	1,200	15,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Check flexible steel lines	Х					
Carry out a leak test	Х	Х				
Check bolt connections	х	Х				
Change engine oil; oil analysis*)	Х	Х				
Change engine oil filter*)	х	Х				
Record operating data****)	х	Х				
Check start procedure	х	Х				
Adjust/check throttle valve	х		Х			
Clean/check gas filter	х		Х			
Clean/check air filter	х		Х			
Clean/replace pickups	х		Х			
Check coolant concentration	х		Х			
Check ignition time	х		Х			
Check coolant circuit / system pressure	х		х			
Measure crankcase pressure	Х		Х			
Measure exhaust back pressure including catalytic converter	х		х			
Check emissions and Lambda	х		Х			
Check exhaust system for air leaks / external soiling	Х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		Х				
Check valve clearance and adjust if necessary			х			
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler	х		Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				х		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace cylinder liner					Х	
Check/replace connecting rods					Х	
Replace piston rings					Х	
Check/replace pistons					Х	
Replace cylinder heads					Х	
Complete engine overhaul						Х

Service intervals for E3268 LE222/LE232, E3262 LE212/LE242 "Special gas"

	After start-up and R1-R2	All	All	up to	up to	up to
Interval after operating hours at 1500 rpm	20-50	300	1,500	15,000	20,000	30,000
Interval after operating hours at 1800 rpm	20-50	300	1,200	12,000	20,000	40,000
Service interval	E1	E2	E3	R1***)	R2***)	R3***)
Carry out a leak test	х	Х				
Check bolt connections	х	Х				
Change engine oil; oil analysis*)	х	Х				
Change engine oil filter*)	х	Х				
Record operating data****)	х	Х				
Check start procedure	Х	Х				
Adjust/check throttle valve	х		Х			
Clean/check gas filter	х		Х			
Clean/check air filter	х		Х			
Clean/replace pickups	х		Х			
Check coolant concentration	х		Х			
Check ignition time	Х		Х			
Check coolant circuit / system pressure	х		x			
Measure crankcase pressure	х		Х			
Measure exhaust back pressure including catalytic converter	х		х			
Check emissions and Lambda	Х		Х			
Check exhaust system for air leaks / external soiling	Х					
Check intake vacuum		Х				
Check spark plugs, replace if necessary		Х				
Check valve clearance and adjust if necessary			х			
Replace spark plugs			Х			
Check compression pressure			Х			
Check/replace oil separator			Х			
Check/clean mixture cooler			Х			
Check/calibrate sensors			Х			
Check exhaust system bolt connections			х			
Replace coolant				X		
Measure crankshaft axial play				Х		
Replace turbo charger				Х		
Replace exhaust pipe multi-piece rings				х		
Replace cylinder liner					х	
Check/replace connecting rods					Х	
Replace piston rings					Х	
Check/replace pistons					Х	
Replace cylinder heads					Х	

Complete engine overhaul			Х

Information on service intervals

The maintenance tasks shown above must be carried out by a MAN Truck & Bus AG authorised workshop or the unit manufacturer when the relevant number of operating hours has been reached.

- *) Engine oil change times should be calculated based on routine oil analyses subject to operating conditions and the engine oil used in accordance with MAN works standard M37271-2 for natural gas and M3271-4 for special gas.
- **) Tighten cylinder head bolts at 400 operating hours
- ***) For Revisions R1, R2, R3, the intervals are predictions and are non-binding, but take into account the minimum gas quality requirements for MAN industrial engines and the operation of engines within the Technical Instructions governing exhaust gas emission limits.
- ****) MAN data memory; read and store data (if present).
- If there are fluctuations in gas composition, regular oil analysis must be carried out

Oil analysis tables

Oil analysis table: natural gas

	Natural gas	
	Engine operating hours	3
Mineral oil	Part/fully synthetic oil	
50 operating hours	50 operating hours	Oil change
Max. 400 operating hours	Max. 800 operating hours	Oil change with oil analysis as check
Gradual increase in oil chang hours)*)	ge times possible with oil analysis (ir	stages up to max. 100 operating

Oil analysis table: special gas

Special gases (biogas / landfill gas / sewage gas)							
Engine operating hours	Oil operating hours						
50 operating hours	50 operating hours	Oil change					
Max. 300 operating hours	Max. 300 operating hours	Oil change with oil analysis as check					
Gradual increase in oil chang hours)*)	je times possible with oil analysis (in	stages up to max. 100 operating					

*) Only in consultation with MAN Truck & Bus AG, Customer Services department at the Nuremberg plant.

Important information on the maintenance records:

NOTE

The following maintenance records are stored (E2 x15; E3 x10) and are to be kept in this maintenance book once completed.

NOTE

In the case of complaints within the warranty period, the data records recorded and stored from engines with MAN data memory must be presented as well. Completed maintenance records should also be returned to MAN Truck & Bus AG in the case of goodwill requests.

Maintenance records E2 and E3 should be stored with the relevant engine/unit documents. In the case of complaints within the warranty period, completed maintenance records should be returned to MAN Truck & Bus AG.

Address: MAN Truck & Bus AG Werk Nürnberg Abt. SEP Vogelweiherstr. 33 90411 Nuremberg Engines.components@de.man-mn.com Tel: 0911 420 – 0 Fax: 0911 420 – 1932

Notes	

		E2 Page 1 of 2					
Basic data							
Appendix	Type of system	System operatin	ng ho	urs	System construction year	Ele	ctrical power rating
				ОН			KWh _{el}
	Operating method	Reference varia	ble /	start requirements		Spe	eed
							rpm
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature
	m	ml	bar	%	°C		°C
	Engine type		Eng	ine number	Plant number		Engine operating hours
Frankra							он
Engine							No. engine starts

	Gas mixer type		Alternator ty	ре	Air filter	type
Components	Ignition system type		Ignition coil t	type	Spark p	lug type
	Catalytic converter type	Silencer type		9	Exhaust	t heat exchanger type
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion type	inhibitor	Concentration %
	Type of gas	Methane c	content CH4	Sulphur / hydrogen s	ulphide	Lower calorific value, Hu
Fuel			%		ppm	kWh/Nm ³
Comment:						
Place:	Date:		Cu	stomer's signature		ntenance personnel lature



Operating data of	of engine at 100% rated power	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train		ZPR		
	mbar T: intake air	mbar P: intake vacuum	% Δ P: gas mixer	°C
Intake system				
	°C	mbar	mbar	%
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	°C
	T: exhaust gas upstream of	P: exhaust gas back pressure,	T: exhaust gas	T: exhaust gas
Exhaust system	ETC bank A/B	bank A/B	up/downstream of catalytic converter	up/downstream of exhaust heat exchanger
-	°C	mbar	°C	°C
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mbar
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
			temperature	engine
Cooling circuit	°C	°C	bar	l/min
	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	l/min
	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode
Ignition system	° bef. TDC	° bef. TDC	v	distance
	bei. TDC	bei. ibc	v	m
Operating data of	of engine at 50% rated power			
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train		ZPR .		
	mbar T: intake air	P: intake vacuum	% Δ P: gas mixer	°C
Intake system	1. Intake an			
•	°C	mbar	mbar	%
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	°C
	T: exhaust gas upstream of	P: exhaust gas back pressure,	T: exhaust gas	T: exhaust gas
Exhaust system	ETC bank A/B	bank A/B	up/downstream of catalytic converter	up/downstream of exhaust heat exchanger
-	°C	mbar	°C	°C
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	har	mbor
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	mbar CL circulation quantity,
			temperature	engine
Cooling circuit	°C	۵	bar	l/min
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	I/min
	J			
Place:	Date:	Customer's	0	atenance personnel ature

		Maintenance record					Maintenance record E2 Page 1 of 2				
Basic data											
Appendix	Type of system	System operatir	ng ha	ours	System construction year	Ele	ctrical power rating				
				ОН			KWh _{el}				
	Operating method	Reference varia	able /	start requirements		Spe	eed				
							rpm				
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature				
	m	m	bar	%	°C		C°				
	Engine type		Eng	gine number	Plant number		Engine operating hours				
							он				
Engine							No. engine starts				

	Gas mixer type		Alternator ty	ре	Air filter	type
Components	Ignition system type		Ignition coil	type	Spark p	lug type
	Catalytic converter type	Silencer type		e	Exhaust	t heat exchanger type
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion in type	hibitor	Concentration %
				•		
 [Type of gas	Methane c	content CH4	Sulphur / hydrogen sulp	hide	Lower calorific value, Hu
Fuel	Type of gas	Methane c	content CH4 %	Sulphur / hydrogen sulp	ohide ppm	Lower calorific value, Hu kWh/Nm ³
Fuel Comment:	Type of gas	Methane c		Sulphur / hydrogen sulp		
	Type of gas	Methane c		Sulphur / hydrogen sulp		
	Type of gas Date:	Methane c	%	Sulphur / hydrogen sulp	ppm	



Operating data of	of engine at 100% rated powe	er		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
Gas train	mbar		%	•
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
ntake system	°c	mbar	mbar	
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of	T: exhaust gas upstream of
Turbocharging			cooler	ETC bank Ă/B
	mbar		°C	°
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
-	°C	mbar	°C	•
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
			temperature	engine
Cooling circuit	٦°	-	bar	l/mi
	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	0°	-	bar	l/mi
Ignition system	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode distance
	° bef. TDC	° bef. TDC	v	n
Operating data of	of engine at 50% rated power	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR		Gas moisture	Gas temperature
Gas train	mbar	ZPR mbar	%	•
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system				
	°C	P: charge air upstream of TV	T: mixture downstream of	T: exhaust gas upstream of
Turbocharging		1. charge an upstream of 1V	cooler	ETC bank A/B
· · · · · · · · · · · · · · · · · · ·	mbar	mbar	°C	٥,
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
Exhilder by otom	D°	mbar	°C	•
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication				
		°C	bar	mba
		T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
	T: CL engine inlet			
	CL engine inlet	℃	bar	l/mi
Cooling circuit		T: CL outflow LT mixture	bar P: CL LT mixture cooler	l/mi
Cooling circuit	°C	T: CL outflow LT mixture cooler	bar	
Cooling circuit	°C	T: CL outflow LT mixture	bar P: CL LT mixture cooler	

Maintenance record							E2 Page 1 of 2	
Basic data								
Appendix	Type of system	System operating hours			System construction year	Ele	ctrical power rating	
			ОН				KWh _{el}	
	Operating method	Reference varia	Reference variable / start requirements			Spe	eed	
							rpm	
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature	
	m	m	bar	%	°C		C°	
	Engine type		Eng	gine number	Plant number		Engine operating hours	
							он	
Engine							No. engine starts	

	Gas mixer type Ignition system type		Alternator ty	ре	Air filter type		
Components			Ignition coil type		Spark plug type		
	Catalytic converter type		Silencer type	Silencer type		Exhaust heat exchanger type	
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion ir type	hibitor	Concentration %	
Fuel	Type of gas	Methane c	content CH4	Sulphur / hydrogen sulp	hide	Lower calorific value, Hu	
Fuel	Type of gas	Methane c	content CH4 %	Sulphur / hydrogen sulp	bhide ppm	Lower calorific value, Hu kWh/Nm ³	
Fuel Comment:	Type of gas	Methane c		Sulphur / hydrogen sulp			
	Type of gas	Methane c		Sulphur / hydrogen sulp			
	Type of gas Date:	Methane c	%	Sulphur / hydrogen sulp	ppm Main		



Operating data o			1	Г
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train	mbar	ZPR	%	•
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
ntake system			J	
-	°C	mbar	mbar	c
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	•
	T: exhaust gas upstream of	P: exhaust gas back pressure,	T: exhaust gas	T: exhaust gas
Exhaust system	ETC bank A/B	bank A/B	up/downstream of catalytic converter	up/downstream of exhaust heat exchanger
	°C	mbar	°C	•
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication				
	T: CL anging inlat	°C	bar	mbi
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
On a line of the lit	°C	°C	bar	l/m
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	I/mi
	Ignition time control	-	Ignition energy	Spark plug electrode
		Ignition time measurement		Spark blud electrode
Ignition system		Ignition time measurement	ignition energy	distance
Ignition system	° bef. TDC	° bef. TDC	Ignition energy V	
		° bef. TDC		distance
	° bef. TDC	° bef. TDC		distance
Operating data o	° bef. TDC of engine at 50% rated power NOx emissions	° bef. TDC	V O2 content of exhaust gas	distance
Operating data o	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³	° bef. TDC CO emissions mg/Nm ³	O2 content of exhaust gas	distance
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions	° bef. TDC	V O2 content of exhaust gas	distance
Operating data o	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	distance Lambda value Gas temperature
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value Gas temperature
Operating data of Contract of	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	* bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	distance Lambda value Gas temperature Throttle valve position
Operating data of Contract of	° bef. TDC of engine at 50% rated power NOx emissions gas pressure upstream of ZPR mbar T: intake air °C	[°] bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar	distance Lambda value Gas temperature Throttle valve position
Operating data o Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	* bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	distance Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions gas pressure upstream of ZPR mbar T: intake air °C	[°] bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	[°] bef. TDC CO emissions <u>mg/Nm³</u> Gas pressure downstream of ZPR <u>mbar</u> P: intake vacuum <u>mbar</u> P: charge air upstream of TV <u>mbar</u> P: exhaust gas back pressure,	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar	[°] bef. TDC CO emissions <u>mg/Nm³</u> Gas pressure downstream of ZPR <u>mbar</u> P: intake vacuum <u>mbar</u> P: charge air upstream of TV <u>mbar</u>	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	[°] bef. TDC CO emissions <u>mg/Nm³</u> Gas pressure downstream of ZPR <u>mbar</u> P: intake vacuum <u>mbar</u> P: charge air upstream of TV <u>mbar</u> P: exhaust gas back pressure,	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data o Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	[°] bef. TDC CO emissions <u>mg/Nm³</u> Gas pressure downstream of ZPR <u>mbar</u> P: intake vacuum <u>mbar</u> P: charge air upstream of TV <u>mbar</u> P: exhaust gas back pressure, bank A/B	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	[°] bef. TDC [°] bef. TDC CO emissions <u>mg/Nm³</u> Gas pressure downstream of ZPR <u>mbar</u> P: intake vacuum <u>mbar</u> P: charge air upstream of TV <u>mbar</u> P: exhaust gas back pressure, bank A/B <u>mbar</u>	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mb CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C T: CL outflow LT mixture	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber P: crank chamber CL circulation quantity, engine <i>I/mi</i> CL circulation quantity, LT
	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	distance Lambda value Gas temperature Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine //mi

Maintenance record							E2 Page 1 of 2
Basic data							
Appendix	Type of system	, , , , , , , , , , , , , , , , , , , ,			System construction year	Ele	ctrical power rating
			он				KWh _{el}
	Operating method	Reference varia	Reference variable / start requirements			Spe	eed
							rpm
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature
	m	m	bar	%	°C		C°
	Engine type		Eng	gine number	Plant number		Engine operating hours
							он
Engine							No. engine starts

	Gas mixer type		Alternator ty	Alternator type		Air filter type	
Components	Ignition system type			Ignition coil type		Spark plug type	
	Catalytic converter type		Silencer type		Exhaust	Exhaust heat exchanger type	
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion i type	nhibitor	Concentration %	
	Type of gas	Methane c	content CH4	Sulphur / hydrogen sul	lphide	Lower calorific value, Hu	
Fuel			%		ppm	kWh/Nm ³	
Comment:							
Place:	Date:		Cu	stomer's signature		ntenance personnel nature	
					Sign		



		1	1	
F	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
Gas train	mbar	mbar	%	•
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
ntake system				
	°C	mbar	mbar T: mixture downstream of	Travbauet goo upstroom of
Turbocharging		P: charge air upstream of TV	cooler	T: exhaust gas upstream of ETC bank A/B
andocharging	mbar	mbar	°C	٥
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
Exhaust System	°C	mbar	°C	ribut oxonangor
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mb
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
			temperature	engine
Cooling circuit	°C	°C	bar	l/m
	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	l/m
	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode distance
lanition system				alotarioo
Ignition system	° bef. TDC	° bef. TDC	v	r
		° bef. TDC	v	
	of engine at 50% rated power			
Operating data o		° bef. TDC	V O2 content of exhaust gas	
Operating data o	of engine at 50% rated power			
Operating data o	of engine at 50% rated power	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	
Operating data o	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value Gas temperature
Operating data o	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	Lambda value Gas temperature
Operating data o Emissions Gas train	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	Lambda value Gas temperature Throttle valve position
Operating data o Emissions Gas train	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar	Lambda value Gas temperature Throttle valve position
Operating data o Emissions Gas train ntake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	Lambda value Gas temperature Throttle valve position
Operating data o Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data o Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Dperating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mb CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C T: CL inflow LT mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C T: CL outflow LT mixture cooler	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mate CL circulation quantity, engine <i>Vm</i> i CL circulation quantity, LT mixture cooler
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mb CL circulation quantity, engine //m CL circulation quantity, LT

Maintenance record							E2 Page 1 of 2	
Basic data								
Appendix	Type of system	System operating hours			System construction year	Ele	ctrical power rating	
			ОН				KWh _{el}	
	Operating method	Reference varia	Reference variable / start requirements			Spe	eed	
							rpm	
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature	
	m	m	bar	%	°C		C°	
	Engine type		Eng	gine number	Plant number		Engine operating hours	
							он	
Engine							No. engine starts	

	Gas mixer type		Alternator ty	ре	Air filter type Spark plug type		
Components	Ignition system type			type			
	Catalytic converter type		Silencer typ	Silencer type		Exhaust heat exchanger type	
Service products	Engine oil type	e Engine oil interval		change Antifreeze / corrosion in type		Concentration %	
				•			
 [Type of gas	Methane c	content CH4	Sulphur / hydrogen sulp	hide	Lower calorific value, Hu	
Fuel	Type of gas	Methane c	content CH4 %	Sulphur / hydrogen sulp	ohide ppm	Lower calorific value, Hu kWh/Nm ³	
Fuel Comment:	Type of gas	Methane c		Sulphur / hydrogen sulp			
	Type of gas	Methane c		Sulphur / hydrogen sulp			
	Type of gas Date:	Methane c	%	Sulphur / hydrogen sulp	ppm		



	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train	mbar	ZPR	0/	•
	T: intake air	P: intake vacuum	% Δ P: gas mixer	Throttle valve position
Intake system				
	٦°	mbar	mbar	q
Turbocharging	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	•
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	•
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
			temperature	engine
Cooling circuit	°C T: CL inflow LT mixture cooler	°C	P: CL LT mixture cooler	I/mi
		cooler	operating temperature	mixture cooler
	٦°	℃ 	bar	l/mi
	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	n
		° bef. TDC	v	
	of engine at 50% rated power			
Operating data of		° bef. TDC	V O2 content of exhaust gas	
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³	O2 content of exhaust gas	Lambda value
Operating data of Emissions	of engine at 50% rated power	CO emissions	O2 content of exhaust gas	
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil bar	Lambda value Gas temperature ° Throttle valve position T: exhaust gas upstream of ETC bank A/B ° T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mbi CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine <i>V</i> mi CL circulation quantity, LT
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine

Maintenance record							E2 Page 1 of 2	
Basic data								
Appendix	Type of system				System construction year	Ele	ctrical power rating	
			ОН				KWh _{el}	
	Operating method	Reference varia	Reference variable / start requirements			Spe	eed	
							rpm	
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature	
	m	m	bar	%	°C		°C	
	Engine type		Eng	gine number	Plant number		Engine operating hours	
							он	
Engine							No. engine starts	

	Gas mixer type		Alternator ty	Alternator type		Air filter type	
Components	Ignition system type		Ignition coil type		Spark p	Spark plug type	
	Catalytic converter type		Silencer type	Silencer type		Exhaust heat exchanger type	
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion type	inhibitor	Concentration %	
Fuel	Type of gas	Methane of	content CH4	Sulphur / hydrogen su	Iphide	Lower calorific value, Hu	
ruei			%		ppm	kWh/Nm ³	
Comment:							
Place:	Date:		Cu	stomer's signature		ntenance personnel ature	



1 0	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
Gas train	mbar	mbar	%	°(
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system	°C	mbar	mbar	a
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of	T: exhaust gas upstream of
Turbocharging			cooler	ETC bank A/B
	T: exhaust gas upstream of	P: exhaust gas back pressure,	°C T: exhaust gas	° T: exhaust gas
Exhaust system	ETC bank A/B	bank A/B	up/downstream of catalytic converter	up/downstream of exhaust heat exchanger
	°C	mbar	°C	•
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
	°C	°C	temperature bar	engine I/mi
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture	P: CL LT mixture cooler	CL circulation quantity, LT
		cooler	operating temperature	mixture cooler
	°C	°C	Ignition energy	I/mi Spark plug electrode
	Ignition time control	Ignition time measurement	ignition energy	
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	distance n
	° bef. TDC of engine at 50% rated power	° bef. TDC	ν	
		° bef. TDC	V O2 content of exhaust gas	
Operating data c	of engine at 50% rated power	CO emissions	O2 content of exhaust gas	
Operating data c	of engine at 50% rated power			
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	r Lambda value Gas temperature
Operating data c Emissions Gas train	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value Gas temperature
Operating data c Emissions Gas train	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer mbar	Lambda value Gas temperature • Throttle valve position
Operating data c Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	Lambda value Gas temperature Throttle valve position
Operating data c Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture & A P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil bar	Lambda value Gas temperature ° Throttle valve position T: exhaust gas upstream of ETC bank A/B ° T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba
Operating data c Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity,
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine <i>I/mi</i> CL circulation quantity, LT

Maintenance record							E2 Page 1 of 2
Basic data							
Appendix	Type of system	System operatir	System operating hours System construction year			Ele	ctrical power rating
				ОН			KWh _{el}
	Operating method	Reference varia	ble /	start requirements		Spe	eed
							rpm
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature
	m	m	bar	%	°C		C°
	Engine type		Eng	gine number	Plant number		Engine operating hours
							он
Engine							No. engine starts

	Gas mixer type			ре	Air filter	Air filter type		
Components	Ignition system type		Ignition coil t			Spark plug type		
	Catalytic converter type		Silencer type			t heat exchanger type		
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion i type	nhibitor	Concentration %		
	Type of gas	Methane c	content CH4	Sulphur / hydrogen sul	lphide	Lower calorific value, Hu		
Fuel			%		ppm	kWh/Nm ³		
Comment:								
Place:	Date:		Cu	stomer's signature		ntenance personnel nature		
					Sign			



	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train	mbar	ZPR	%	•0
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system				
	°C Δ P: mixture cooler	mbar P: charge air upstream of TV	mbar T: mixture downstream of	۶ T: exhaust gas upstream of
Turbocharging		1. Charge an upstream of 1V	cooler	ETC bank A/B
	mbar	mbar	°C	°C
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	°(
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
	°C	°C	temperature bar	engine I/mi
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture	P: CL LT mixture cooler	CL circulation quantity, LT
	°C	cooler °C	operating temperature	mixture cooler
	Ignition time control	Ignition time measurement	Ignition energy	I/mi Spark plug electrode
	Ignition anto control	ightion tine medearement	ignition energy	
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	n
	° bef. TDC of engine at 50% rated power	° bef. TDC	v	
		° bef. TDC	V O2 content of exhaust gas	
Operating data of	of engine at 50% rated power	CO emissions	O2 content of exhaust gas	n
	of engine at 50% rated power	CO emissions mg/Nm ³ Gas pressure downstream of		n
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	r Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	n Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	r Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer mbar	r Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	r Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture & A P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity,
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: charge air upstream of TV mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine Umit CL circulation quantity, LT

MAR		E2 Page 1 of 2					
Basic data							
Appendix	Type of system	System operatir	System operating hours System construction year			Ele	ctrical power rating
				ОН			KWh _{el}
	Operating method	Reference varia	eference variable / start requirements Speed		eed		
							rpm
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature
	m	m	bar	%	°C		C°
	Engine type		Eng	gine number	Plant number		Engine operating hours
							он
Engine							No. engine starts

	Gas mixer type		Alternator ty	ре	Air filter type		
Components	Ignition system type	n type		Ignition coil type		Spark plug type	
	Catalytic converter type		Silencer typ	e	Exhaust	t heat exchanger type	
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion in type	hibitor	Concentration %	
				•			
 [Type of gas	Methane c	content CH4	Sulphur / hydrogen sulp	hide	Lower calorific value, Hu	
Fuel	Type of gas	Methane c	content CH4 %	Sulphur / hydrogen sulp	ohide ppm	Lower calorific value, Hu kWh/Nm ³	
Fuel Comment:	Type of gas	Methane c		Sulphur / hydrogen sulp			
	Type of gas	Methane c		Sulphur / hydrogen sulp			
	Type of gas Date:	Methane c	%	Sulphur / hydrogen sulp	ppm		



	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train	mbar	ZPR	0/	•
	T: intake air	P: intake vacuum	% Δ P: gas mixer	Throttle valve position
Intake system				
	٦°	mbar	mbar	q
Turbocharging	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	•
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	•
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
			temperature	engine
Cooling circuit	°C T: CL inflow LT mixture cooler	°C	P: CL LT mixture cooler	I/mi
		cooler	operating temperature	mixture cooler
	٦°	℃ 	bar	l/mi
	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	n
		° bef. TDC	v	
	of engine at 50% rated power			
Operating data of		° bef. TDC	V O2 content of exhaust gas	
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³	O2 content of exhaust gas	Lambda value
Operating data of Emissions	of engine at 50% rated power	CO emissions	O2 content of exhaust gas	
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil bar	Lambda value Gas temperature ° Throttle valve position T: exhaust gas upstream of ETC bank A/B ° T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mbi CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine <i>V</i> mi CL circulation quantity, LT
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine

MAR		E2 Page 1 of 2					
Basic data							
Appendix	Type of system	System operatir	System operating hours System construction year			Ele	ctrical power rating
				ОН			KWh _{el}
	Operating method	Reference varia	eference variable / start requirements Speed		eed		
							rpm
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature
	m	m	bar	%	°C		C°
	Engine type		Eng	gine number	Plant number		Engine operating hours
							он
Engine							No. engine starts

	Gas mixer type			ре	Air filter	Air filter type		
Components	Ignition system type		Ignition coil t			Spark plug type		
	Catalytic converter type		Silencer type			t heat exchanger type		
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion type	inhibitor	Concentration %		
	Type of gas	Methane c	content CH4	Sulphur / hydrogen su	ılphide	Lower calorific value, Hu		
Fuel			%		ppm	kWh/Nm ³		
Comment:								
Place:	Date:		Cu	stomer's signature		ntenance personnel nature		
					Sign	attic		



	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train	mbar	ZPR	%	•0
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system				
	°C Δ P: mixture cooler	mbar P: charge air upstream of TV	mbar T: mixture downstream of	۶ T: exhaust gas upstream of
Turbocharging		1. Charge an upstream of 1V	cooler	ETC bank A/B
	mbar	mbar	°C	•(
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	°(
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
	°C	°C	temperature bar	engine I/mii
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture	P: CL LT mixture cooler	CL circulation quantity, LT
	°C	cooler °C	operating temperature	mixture cooler
	Ignition time control	Ignition time measurement	Ignition energy	I/mi Spark plug electrode
	Igniaen ante conaei	ignition time medeulement	ightion onorgy	distance
Ignition system				uistance
Ignition system	° bef. TDC	° bef. TDC	v	n
	° bef. TDC	° bef. TDC	v	
		° bef. TDC	V O2 content of exhaust gas	
Operating data of	of engine at 50% rated power	CO emissions	O2 content of exhaust gas	n
Operating data of	of engine at 50% rated power	CO emissions mg/Nm ³ Gas pressure downstream of		n
	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	n Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	n Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	n Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer mbar	n Lambda value Gas temperature °t Throttle valve position
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	Lambda value Gas temperature °(
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture & A P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity,
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: charge air upstream of TV mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine <i>Vm</i> i
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature °(Throttle valve position 9 T: exhaust gas upstream of ETC bank A/B °(T: exhaust gas up/downstream of exhaust heat exchanger °(P: crank chamber mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature °C Throttle valve position °T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust heat exchanger °C P: crank chamber mba CL circulation quantity, engine <i>I</i> /mit CL circulation quantity, LT



Type of system	System operating h	ours	System construction year	Electrical power rating
		ОН		KWh _{el}
Operating method	Reference variable	/ start requirements		Speed
				rpm
Installation height	Air pressure	Air humidity	Outside temperature	Unit compartment temperature
m	mbar	%	⊃°	٦°
Engine type	En	gine number	Plant number	Engine operating hours
				он
				No. engine starts
	Operating method Installation height m	Operating method Reference variable Installation height Air pressure m mbar	Operating method Reference variable / start requirements Installation height Air pressure m Air humidity m mbar %	Operating method Reference variable / start requirements year Installation height Air pressure m bar Air humidity Outside temperature

	Gas mixer type		Alternator ty	pe	Air filter type		
Components	Ignition system type		Ignition coil 1	type	Spark p	lug type	
	Catalytic converter type		Silencer type		Exhaust heat exchanger type		
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion in type	hibitor	Concentration %	
	Type of gas	Methane c	ontent CH4	Sulphur / hydrogen sulp	hide	Lower calorific value, Hu	
Fuel			%		ppm	kWh/Nm ³	
Comment:							
Place:	Date:		Cu	stomer's signature		ntenance personnel ature	



	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train	mbar	ZPR	%	•0
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system				
	°C Δ P: mixture cooler	mbar P: charge air upstream of TV	mbar T: mixture downstream of	۶ T: exhaust gas upstream of
Turbocharging		1. Charge an upstream of 1V	cooler	ETC bank A/B
	mbar	mbar	°C	°C
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	°(
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
	°C	°C	temperature bar	engine I/mi
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture	P: CL LT mixture cooler	CL circulation quantity, LT
	°C	cooler °C	operating temperature	mixture cooler
	Ignition time control	Ignition time measurement	Ignition energy	I/mi Spark plug electrode
	Ignition anto control	ightion tine medearement	ignition energy	
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	n
	° bef. TDC of engine at 50% rated power	° bef. TDC	v	
		° bef. TDC	V O2 content of exhaust gas	
Operating data of	of engine at 50% rated power	CO emissions	O2 content of exhaust gas	n
	of engine at 50% rated power	CO emissions mg/Nm ³ Gas pressure downstream of		n
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	r Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	n Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	r Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer mbar	Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture & A P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity,
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: charge air upstream of TV mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine Umit CL circulation quantity, LT

Maintenance record							E2 Page 1 of 2	
Basic data								
Appendix	Type of system	System operatir	System operating hours System year			Ele	ctrical power rating	
			ОН				KWh _{el}	
	Operating method	Reference varia	Reference variable / start requirements			Spe	eed	
							rpm	
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature	
	m	m	bar	%	°C		C°	
	Engine type		Eng	gine number	Plant number		Engine operating hours	
							он	
Engine							No. engine starts	

	Gas mixer type			ре	Air filter type		
Components	Ignition system type			Ignition coil type		Spark plug type	
	Catalytic converter type		Silencer type		Exhaust heat exchanger type		
Service products	Engine oil type Engine oil interval		change	change Antifreeze / corrosion in type		Concentration %	
				•			
 [Type of gas	Methane c	content CH4	Sulphur / hydrogen sulp	hide	Lower calorific value, Hu	
Fuel	Type of gas	Methane c	content CH4 %	Sulphur / hydrogen sulp	ohide ppm	Lower calorific value, Hu kWh/Nm ³	
Fuel Comment:	Type of gas	Methane c		Sulphur / hydrogen sulp			
	Type of gas	Methane c		Sulphur / hydrogen sulp			
	Type of gas Date:	Methane c	%	Sulphur / hydrogen sulp	ppm		



	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train	mbar	ZPR	0/	•
	T: intake air	P: intake vacuum	% Δ P: gas mixer	Throttle valve position
Intake system				
	٦°	mbar	mbar	q
Turbocharging	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	•
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	•
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
			temperature	engine
Cooling circuit	°C T: CL inflow LT mixture cooler	°C	P: CL LT mixture cooler	I/mi
		cooler	operating temperature	mixture cooler
	٦°	℃ 	bar	l/mi
	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	n
		° bef. TDC	v	
	of engine at 50% rated power			
Operating data of		° bef. TDC	V O2 content of exhaust gas	
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³	O2 content of exhaust gas	Lambda value
Operating data of Emissions	of engine at 50% rated power	CO emissions	O2 content of exhaust gas	
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil bar	Lambda value Gas temperature ° Throttle valve position T: exhaust gas upstream of ETC bank A/B ° T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mbi CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine <i>V</i> mi CL circulation quantity, LT
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine

Maintenance record							E2 Page 1 of 2	
Basic data								
Appendix	Type of system	System operatir	System operating hours System year			Ele	ctrical power rating	
			ОН				KWh _{el}	
	Operating method	Reference varia	Reference variable / start requirements			Spe	eed	
							rpm	
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature	
	m	m	bar	%	°C		C°	
	Engine type		Eng	gine number	Plant number		Engine operating hours	
							он	
Engine							No. engine starts	

	Gas mixer type			Alternator type		Air filter type	
Components	Ignition system type			Ignition coil type		Spark plug type	
	Catalytic converter type		Silencer type	Silencer type		Exhaust heat exchanger type	
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion type	inhibitor	Concentration %	
	Type of gas	Methane c	content CH4	Sulphur / hydrogen su	ılphide	Lower calorific value, Hu	
Fuel			%		ppm	kWh/Nm ³	
Comment:							
Place:	Date:		Cu	stomer's signature		ntenance personnel nature	
					Sign	attic	



Operating data c	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train	mbar	ZPR mbar	%	°C
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system				
	°C	mbar	mbar	%
Turbooharging	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	°C
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	°C
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
			temperature	engine
Cooling circuit	°C	°C	bar	l/mir
-	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	l/mir
	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	distance m
			v	
	° bef. TDC of engine at 50% rated power			m
	of engine at 50% rated power	CO emissions	O2 content of exhaust gas	
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³	O2 content of exhaust gas	rr Lambda value
Operating data of	of engine at 50% rated power	CO emissions	O2 content of exhaust gas	m
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	rr Lambda value Gas temperature
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	m Lambda value Gas temperature
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	C Throttle valve position
Operating data of Emissions Gas train	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture %	rr Lambda value Gas temperature °C Throttle valve position
Operating data of Emissions Gas train	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture Δ P: gas mixer T: mixture downstream of cooler	rr Lambda value Gas temperature °C Throttle valve position
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C	T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture Δ P: gas mixer T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	T: exhaust gas upstream of ETC bank A/B C T: exhaust gas upstream of ETC bank a/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature °C Throttle valve position 7: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas upstream of exhaust heat exchanger °C P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas upstream of exhaust heat exchanger °C P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil bar	T: exhaust gas upstream of ETC bank A/B T: exhaust gas upstream of ETC bank A/B C T: exhaust gas up/downstream of exhaust heat exchanger C P: crank chamber mbai CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	T: exhaust gas upstream of ETC bank A/B T: exhaust gas upstream of ETC bank A/B C T: exhaust gas up/downstream of exhaust heat exchanger C P: crank chamber mban CL circulation quantity, engine //mir
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature °C Throttle valve position % T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust heat exchanger °C P: crank chamber mbar CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	m Lambda value Gas temperature °C Throttle valve position % T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas upstream of ETC bank A/B °C P: crank chamber mbar CL circulation quantity, engine I/min CL circulation quantity, LT

Maintenance record							E2 Page 1 of 2	
Basic data								
Appendix	Type of system	System operatir	System operating hours System co			Ele	ctrical power rating	
			ОН				KWh _{el}	
	Operating method	Reference varia	Reference variable / start requirements			Spe	eed	
							rpm	
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature	
	m	m	bar	%	°C		C°	
	Engine type		Enę	gine number	Plant number		Engine operating hours	
							он	
Engine							No. engine starts	

	Gas mixer type		Alternator ty	pe	Air filter type		
Components	Ignition system type			Ignition coil type		Spark plug type	
	Catalytic converter type		Silencer type	Silencer type		Exhaust heat exchanger type	
Service products	Engine oil type	e oil type Engine oil interval		change Antifreeze / corrosion in type		Concentration %	
Fuel	Type of gas	Methane c	content CH4	Sulphur / hydrogen sulp	ohide	Lower calorific value, Hu	
Fuel	Type of gas	Methane c	content CH4 %	Sulphur / hydrogen sulp	ohide ppm	Lower calorific value, Hu kWh/Nm ³	
Fuel Comment:	Type of gas	Methane c		Sulphur / hydrogen sulp			
	Type of gas	Methane c		Sulphur / hydrogen sulp			
	Type of gas Date:	Methane c	%	Sulphur / hydrogen sulp	ppm		



	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train	mbar	ZPR	%	•0
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system				
	°C Δ P: mixture cooler	mbar P: charge air upstream of TV	mbar T: mixture downstream of	۶ T: exhaust gas upstream of
Turbocharging		1. Charge an upstream of 1V	cooler	ETC bank A/B
	mbar	mbar	°C	°C
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	°(
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
	°C	°C	temperature bar	engine I/mi
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture	P: CL LT mixture cooler	CL circulation quantity, LT
	°C	cooler °C	operating temperature	mixture cooler
	Ignition time control	Ignition time measurement	Ignition energy	I/mi Spark plug electrode
	Ignition anto control	ightion tine medearement	ignition energy	
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	n
	° bef. TDC of engine at 50% rated power	° bef. TDC	v	
		° bef. TDC	V O2 content of exhaust gas	
Operating data of	of engine at 50% rated power	CO emissions	O2 content of exhaust gas	n
	of engine at 50% rated power	CO emissions mg/Nm ³ Gas pressure downstream of		n
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	r Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	n Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	r Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer mbar	Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	r Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture & A P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity,
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: charge air upstream of TV mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine Umit CL circulation quantity, LT

	Maintenance record						
Basic data							
Appendix	Type of system				System construction year	Ele	ctrical power rating
			ОН				KWh _{el}
	Operating method	Reference varia	Reference variable / start requirements			Spe	eed
							rpm
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature
	m	m	bar	%	°C		C°
	Engine type		Eng	gine number	Plant number		Engine operating hours
							он
Engine							No. engine starts

	Gas mixer type			Alternator type		Air filter type	
Components	Ignition system type			Ignition coil type		Spark plug type	
	Catalytic converter type		Silencer type	Silencer type		t heat exchanger type	
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion type	inhibitor	Concentration %	
	Type of gas	Methane c	content CH4	Sulphur / hydrogen su	ılphide	Lower calorific value, Hu	
Fuel			%		ppm	kWh/Nm ³	
Comment:							
Place:	Date:		Cu	stomer's signature		ntenance personnel nature	
					Sign	attic	



	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train		ZPR		•(
	T: intake air	P: intake vacuum	% Δ P: gas mixer	Throttle valve position
Intake system				
	٦°	mbar	mbar	9
Turbocharging	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turboenarging	mbar	mbar	°C	•
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	•
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
			temperature	engine
Cooling circuit	°C T: CL inflow LT mixture cooler	°C	P: CL LT mixture cooler	I/mi
		cooler	operating temperature	mixture cooler
	0 °	°C	bar	l/mi
	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	distance
		° bef. TDC	v	
	of engine at 50% rated power			
Operating data of		CO emissions	V O2 content of exhaust gas	
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³	O2 content of exhaust gas	Lambda value
Operating data of Emissions	of engine at 50% rated power	CO emissions	O2 content of exhaust gas	
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	Lambda value Gas temperature Throttle valve position
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture & A P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine <i>I/mi</i> CL circulation quantity, LT
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine

		Main	tei	nance reco	rd		E2 Page 1 of 2
Basic data							
Appendix	Type of system	System operatir	ng ha	ours	System construction year	Ele	ctrical power rating
				ОН			KWh _{el}
	Operating method	Reference varia	able /	start requirements		Spe	eed
							rpm
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature
	m	m	bar	%	°C		C°
	Engine type		Eng	gine number	Plant number		Engine operating hours
							он
Engine							No. engine starts

	Gas mixer type		Alternator ty	ре	Air filter	type
Components	Ignition system type		Ignition coil	type	Spark p	lug type
	Catalytic converter type		Silencer typ	e	Exhaust	t heat exchanger type
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion in type	hibitor	Concentration %
<u> </u>	Type of gas	Methane c	content CH4	Sulphur / hydrogen sulp	hide	Lower calorific value, Hu
Fuel	Type of gas	Methane c	content CH4 %	Sulphur / hydrogen sulp	ohide ppm	Lower calorific value, Hu kWh/Nm ³
Fuel Comment:	Type of gas	Methane o		Sulphur / hydrogen sulp		
	Type of gas	Methane c		Sulphur / hydrogen sulp		
	Type of gas Date:	Methane c	%	Sulphur / hydrogen sulp	ppm Main	



	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train	mbar	ZPR	%	•0
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system				
	°C Δ P: mixture cooler	mbar P: charge air upstream of TV	mbar T: mixture downstream of	۶ T: exhaust gas upstream of
Turbocharging		1. Charge an upstream of 1V	cooler	ETC bank A/B
	mbar	mbar	°C	°C
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	D°	mbar	°C	°(
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
	°C	°C	temperature bar	engine I/mi
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture	P: CL LT mixture cooler	CL circulation quantity, LT
		cooler	operating temperature	mixture cooler
	°C	°C	Ignition energy	I/mi Spark plug electrode
Ignition system	Ignition time control	Ignition time measurement	ignition energy	
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	distance n
	° bef. TDC of engine at 50% rated power	° bef. TDC	v	
		° bef. TDC	V O2 content of exhaust gas	
	of engine at 50% rated power	CO emissions	O2 content of exhaust gas	n
Operating data of	of engine at 50% rated power			n
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	n Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	n Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	r Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer mbar	Throttle valve position
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	r Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture & A P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity,
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: charge air upstream of TV mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: charge air upstream of TV mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine <i>I/mi</i> CL circulation quantity, LT

Maintenance Record E3

Engine

	Maintenance Record								
Basic data									
Appendix	Type of system	Type of system System operating hours System construction year		Electrical power rating					
			ОН	-	KWh _{el}				
	Operating method	Reference variable	/ start requirements		Speed				
					rpm				
Installation conditions	Installation height	Air pressure	Air humidity	Outside temperature	Unit compartment temperature				
	m	mbar	%	°C	°C				
	Engine type	E	ngine number	Plant number	Engine operating hours				
					ОН				

The Components section should only be completed in the case of engine modifications

	Gas mixer type		Alternator ty	ре	Air filter	Air filter type		
Components	Ignition system type		Ignition coil	type	Spark plug type			
	Catalytic converter type		Silencer type	e	Exhaust	heat exchanger type		
Service products	Engine oil type	Engine oil interval	change	Antifreeze / corrosion in type	hibitor	Concentration %		
_ .	Type of gas	Methane of	content CH4	Sulphur / hydrogen sulphide		Lower calorific value, Hu		
Fuel			%		ppm	kWh/Nm ³		
Comment:								
Place:	Date:		Cı	ustomer's signature		intenance personnel nature		

No. engine starts



Maintenance record

E3

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of engine at 100% rated power	r		
NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
mg/Nm ³	mg/Nm ³	%	
Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
mbar	mbar	%	°
T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
℃	mbar	mbar	9
Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of	T: exhaust gas upstream of
mbar	mbar		ETC bank A/B
		T: exhaust gas	T: exhaust gas
ETC bank Ă/B	bank A/B	up/downstream of catalytic converter	up/downstream of exhaust heat exchanger
°C	mbar	°C	٥(
Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
	°C	bar	mba
T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity, engine
°C	°C	bar	I/mi
T: CL inflow LT mixture cooler	T: CL outflow LT mixture	P: CL LT mixture cooler	CL circulation quantity, LT
°C			mixture cooler
Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode
			distance
° bef. TDC	° bef. TDC	v	
	° bef. TDC	v	distance
° bef. TDC	° bef. TDC CO emissions	V O2 content of exhaust gas	distance
° bef. TDC of engine at 50% rated power		- -	distance r
° bef. TDC of engine at 50% rated power NOx emissions	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	distance r
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³	O2 content of exhaust gas	distance r Lambda value Gas temperature
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	distance r
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	distance r Lambda value Gas temperature Throttle valve position
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	distance r Lambda value Gas temperature Throttle valve position
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler	distance r Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C	distance r Lambda value Gas temperature Throttle valve position 7: exhaust gas upstream of ETC bank A/B
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler	distance r Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	distance r Lambda value Gas temperature Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	distance r Lambda value Gas temperature Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil	distance r Lambda value Gas temperature Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	distance r Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity,
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	distance r Lambda value Gas temperature Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba CL circulation quantity, engine
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	distance
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	distance r Lambda value Gas temperature Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber CL circulation quantity,
° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber CL circulation quantity, engine //mi CL circulation quantity, LT
	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C T: CL inflow LT mixture cooler	NOx emissions CO emissions mg/Nm³ mg/Nm³ Gas pressure upstream of ZPR Gas pressure downstream of ZPR mbar mbar T: intake air P: intake vacuum °C mbar Δ P: mixture cooler P: charge air upstream of TV mbar mbar T: exhaust gas upstream of ETC bank A/B P: exhaust gas back pressure, bank A/B °C mbar Measuring point, engine oil T T: engine oil °C °C T: CL engine inlet T: CL engine outlet °C °C T: CL inflow LT mixture cooler T: CL outflow LT mixture cooler °C °C	NOx emissions CO emissions O2 content of exhaust gas mg/Nm³ mg/Nm³ % Gas pressure upstream of ZPR Gas pressure downstream of ZPR Gas moisture mbar mbar % T: intake air P: intake vacuum Δ P: gas mixer °C mbar mbar Δ P: mixture cooler P: charge air upstream of TV T: mixture downstream of cooler T: exhaust gas upstream of ETC bank A/B P: exhaust gas back pressure, bank A/B T: exhaust gas up/downstream of catalytic converter °C mbar °C Measuring point, engine oil T T: engine oil P: engine oil T: CL engine inlet T: CL engine outlet P: CL engine operating temperature °C °C bar T: CL inflow LT mixture cooler T: CL outflow LT mixture cooler P: CL LT mixture cooler operating temperature

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	Maintenance record									E3 Page 3 of 3		
Type of system		Systen	n operatin	ig hours	Er					Operating hours since last check		
Engine type	Engine number				PI	lant numb	ber			Valve clearance Compression pressure		
Valve clearance on	"cold" en	aine (enc	aine temp). <50 °C∖)							
cylinder	1	2	3	4	, 5	6	7	8	9	10	11	12
Inlet actual measurement	++			<u> </u>	1	-		-	-			
Outlet actual measurement												
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Inlet adjusted value	+		3		5	U	1	0	3	10	┝──┤	12
Outlet adjusted value											_	
Compression pressures												
Measurement		Ad										
conditions	Target	Act	uai	_								
Engine temperature	>50 °C											
Starter speed	>140 rp	om										
	<u> </u>	<u> </u>		<u> </u>								
								L				
					Throttle valve must be open when measuring compression pressure Check air filter and exhaust system before measuring							
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Compression	• · · ·	-		<u> · ·</u>	+						···	
pressure before inspection												
Compression		<u> </u>	<u> </u>	<u> </u>	+		<u> </u>					
pressure												
after inspection												
Comment:												
Place:		Date:			Cu	stomer's	signature	;	Mainter	nance per	rsonnel	
									signatu	ire		

Basic data									
Appendix	Type of system	System operating hours			System construction year	Ele	ctrical power rating		
		ОН			5	KWh _{el}			
	Operating method	Reference variable / start requirements				Speed			
							rpm		
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature	Unit compartment temperature			
	m	m	bar	%	°C		°C		
	Engine type		Enç	gine number	Plant number		Engine operating hours		
							он		
Engine							No. engine starts		

Gas mixer type			Alternator type			Air filter type		
Components	Ignition system type omponents		Ignition coil	type	Spark plug type			
	Catalytic converter type		Silencer type	9	Exhaust	heat exchanger type		
Service	Engine oil type	Engine oil change interval		Antifreeze / corrosion in type	Antifreeze / corrosion inhibitor			
products		incrvar		iype		%		
Fuel	Type of gas	Methane c	ontent CH4	Sulphur / hydrogen sulp	Sulphur / hydrogen sulphide			
ruei			%		ppm	kWh/Nm ³		
Comment:								



Maintenance record

E3

operating data t	of engine at 100% rated powe	1		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
Gas train	mbar	mbar	%	°C
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system	°C	mbar	mbar	%
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of	T: exhaust gas upstream of
Turbocharging	mbar	mbar	cooler °C	ETC bank A/B
	T: exhaust gas upstream of	P: exhaust gas back pressure,	T: exhaust gas	T: exhaust gas
Exhaust system	ETC bank Ă/B	bank A/B	up/downstream of catalytic converter	up/downstream of exhaust heat exchanger
	°C	mbar	°C	°
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
	°C	°C	bar	l/mii
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	l/mi
	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode
Ignition system		°		distance
Ignition system	° bef. TDC	° bef. TDC	v	distance
		° bef. TDC	v	
Operating data of	° bef. TDC	° bef. TDC	V O2 content of exhaust gas	
Operating data of	° bef. TDC			n
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	n
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³	O2 content of exhaust gas	n Lambda value
Operating data of Emissions	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	n Lambda value Gas temperature
Operating data of Emissions	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	n Lambda value Gas temperature °C Throttle valve position
Operating data of Emissions	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	n Lambda value Gas temperature °(Throttle valve position 9 T: exhaust gas upstream of
Operating data of Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature °C Throttle valve position 9 T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C	T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature °(Throttle valve position ? T: exhaust gas upstream of ETC bank A/B °(T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature °(Throttle valve position ? T: exhaust gas upstream of ETC bank A/B °(T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature °(Throttle valve position ° T: exhaust gas upstream of ETC bank A/B °(T: exhaust gas up/downstream of exhaust heat exchanger °(P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Chrottle valve position Throttle valve position S T: exhaust gas upstream of ETC bank A/B C T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature Gas temperature Throttle valve position 7: exhaust gas upstream of ETC bank A/B 1: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine <i>I</i> /mi
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	Lambda value Gas temperature °(Throttle valve position 9 T: exhaust gas upstream of ETC bank A/B °(T: exhaust gas up/downstream of exhaust heat exchanger °(P: crank chamber mba CL circulation quantity, engine
	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature °C Throttle valve position °C T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust heat exchanger °C P: crank chamber mba CL circulation quantity, engine <i>I/mii</i> CL circulation quantity, LT

MAR				E3 Page 3 of 3									
Type of system		Syster	m operatir	ng hours	Er	ngine ope	erating ho	urs		Operating hours since last check			
Engine type	5							Valve clearance Compression pressure					
Valve clearance on	"cold" engine (engine temp. <50 °C)												
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Inlet actual measurement													
Outlet actual measurement													
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Inlet adjusted value	•	-	5	-	5	•		Ŭ	5	10		12	
Outlet adjusted value													
Compression press	ures			· · · · · ·	1			11					
Measurement	Target	Ac	tual										
Engine temperature	>50 °C												
Starter speed	>140 rpm												
					pressu	ttle valve re Check	e must be c air filter	e open wh and exha	en meas lust syste	uring con em before	npressic e measu	on ring	
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Compression pressure before inspection													
Compression pressure after inspection													
Comment:	after inspection												
Place:		Date:			Cu	stomer's	signature	•	Mainter signatu	nance per	sonnel		

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Maintenance Record

MAR									
Basic data									
Appendix	Type of system	System operating hours			System construction year	Ele	ctrical power rating		
				ОН		KWh _{el}			
	Operating method	Reference variable / start requirements				Speed			
							rpm		
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature		
	m	m	bar	%	°C	°C			
	Engine type		Eng	gine number	Plant number		Engine operating hours		
Frankra							он		
Engine							No. engine starts		

	Gas mixer type		Alternator ty	ре	Air filter	Air filter type		
Components	Ignition system type		Ignition coil	type	Spark plug type			
	Catalytic converter type Si		Silencer type	Silencer type		t heat exchanger type		
Service	Engine oil type	Engine oil change interval		Antifreeze / corrosion ir	hibitor	Concentration		
products		Interval		type		%		
Fuel	Type of gas	Methane of	content CH4	Sulphur / hydrogen sulphide		Lower calorific value, Hu		
ruei			%		ppm	kWh/Nm ³		
Comment:								
Place:	Date:		Cı	ustomer's signature		intenance personnel nature		



Maintenance record

E3

Operating data d	of engine at 100% rated power	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
Gas train	mbar	mbar	%	°C
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system	°C	mbar	mbar	%
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	°C
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	℃ 	mbar	°	0°
Lubrication	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
		°C	bar	mbar
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
Cooling circuit	0 °	0°	bar	l/min
· · · · · · · · · · · · · · · · · · ·	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	℃	℃	bar	l/min
Ignition system	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode distance
5	° bef. TDC	° bef. TDC	v	m
Operating data of	of engine at 50% rated power			
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
Gas train	mbar	mbar	%	°C
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system	°C	mbar	mbar	%
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	°C
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	℃ 	mbar	°	0°
Lubrication	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
		°C	bar	mbar
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
Cooling circuit	° C	°C	bar	l/min
	T: CL inflow LT mixture cooler	T: CL outflow LT mixture	P: CL LT mixture cooler	CL circulation quantity, LT
		cooler	operating temperature	mixture cooler

			Ма	inten	ance	recor	ď			E3 Page 3 of 3			
Type of system		Syster	m operatin	g hours	E	ngine ope	erating ho	urs	Opera check	Operating hours since last check			
Engine type		Engine	e number							Valve clearance Compression pressure			
Valve clearance on	"cold" en	gine (enç	gine temp	. <50 °C)									
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Inlet actual measurement													
Outlet actual measurement													
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Inlet adjusted value													
Outlet adjusted value													
Compression press	ures												
Measurement conditions	Target Actual												
Engine temperature	>50 °C												
Starter speed	>140 rp	m											
					Thro pressu	ttle valve re Check	e must be air filter	e open whe and exhau	n meas st syste	uring cor em before	npressic e measu	on ring	
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Compression pressure before inspection Compression													
pressure after inspection													
Comment:													
Place:		Date:			Cu	stomer's	signature		Mainte signatu	nance pei ire	sonnel		

		Main	itei	nance reco	rd	E3 Page 1 of 3				
Basic data										
Appendix	Type of system	System operation	ng ho	ours	System construction year	Electrical power rating				
				ОН		KWh				
	Operating method	Reference varia	able /	start requirements		Speed				
						rpm				
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature	Unit compartment temperature				
	m	m	bar	%	°C		°C			
	Engine type		Enç	gine number	Plant number		Engine operating hours			
							он			
Engine							No. engine starts			

	Gas mixer type		Alternator ty	pe	Air filter type			
Components	Ignition system type		Ignition coil	type	Spark plug type			
	Catalytic converter type		Silencer type	e	Exhaust heat exchanger type			
Service	Engine oil type	il type Engine oil o interval		Antifreeze / corrosion in type	hibitor	Concentration		
products		interval		туре		%		
Fuel	Type of gas	Methane c	ontent CH4	Sulphur / hydrogen sulp	hide	Lower calorific value, Hu		
						-		
			%		ppm	kWh/Nm ³		
Comment:			%		ppm	kWh/Nm ³		
			%		ppm	kWh/Nm ³		



Maintenance record

E3

Operating data of				
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
Gas train	mbar	mbar	%	°C
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system	D°	mbar	mbar	%
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of	T: exhaust gas upstream of
Turbocharging	mbar	mbar	cooler °C	ETC bank A/B
	T: exhaust gas upstream of	P: exhaust gas back pressure,	T: exhaust gas	T: exhaust gas
Exhaust system	ETC bank A/B	bank A/B	up/downstream of catalytic converter	up/downstream of exhaust heat exchanger
	°C	mbar	°C	°C
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mbar
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
O	℃	°C	bar	l/min
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	D°	°C	bar	l/mir
		1 10 11	1 10	Coorte plug algetra da
Ignition system	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode distance
Ignition system	Ignition time control ° bef. TDC	Ignition time measurement ° bef. TDC	Ignition energy	
		° bef. TDC		distance
Operating data of	° bef. TDC	° bef. TDC		distance
Operating data of	° bef. TDC of engine at 50% rated power	° bef. TDC	v	distance m
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of	V O2 content of exhaust gas	distance m
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³	° bef. TDC	O2 content of exhaust gas	distance m Lambda value Gas temperature
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	[°] bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	distance m Lambda value Gas temperature
Operating data of Emissions	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	V O2 content of exhaust gas % Gas moisture %	distance m Lambda value Gas temperature C Throttle valve position
Operating data of Emissions	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	[°] bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	distance m Lambda value Gas temperature C Throttle valve position % T: exhaust gas upstream of
Operating data of Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler	distance m Lambda value Gas temperature C Throttle valve position % T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C	distance m Lambda value Gas temperature °C Throttle valve position % T: exhaust gas upstream of ETC bank A/B °C
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of	distance m Lambda value Gas temperature C Throttle valve position 7: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas	distance m Lambda value Gas temperature C Throttle valve position T: exhaust gas upstream of ETC bank A/B C T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	distance m Lambda value Gas temperature C Throttle valve position T: exhaust gas upstream of ETC bank A/B C T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	distance m Lambda value Gas temperature C Throttle valve position % T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust heat exchanger °C P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum P: orarge air upstream of TV mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	distance m Lambda value Gas temperature °C Throttle valve position % T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust heat exchanger °C P: crank chamber mbar CL circulation quantity,
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar	distance m Lambda value Gas temperature °C Throttle valve position % T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust heat exchanger °C P: crank chamber mbai CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	distance m Lambda value Gas temperature C Throttle valve position % T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber CL circulation quantity, engine
	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	distance m Lambda value Gas temperature °C Throttle valve position % T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust heat exchanger °C P: crank chamber mbar CL circulation quantity, engine //min

			Ма	inten	ance	recor	ď			E3 Page 3 of 3			
Type of system		Syster	m operatin	g hours	E	ngine ope	erating ho	urs	Opera check	Operating hours since last check			
Engine type		Engine	e number							Valve clearance Compression pressure			
Valve clearance on	"cold" en	gine (enç	gine temp	₀. <50 °C)									
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Inlet actual measurement													
Outlet actual measurement													
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Inlet adjusted value													
Outlet adjusted value													
Compression press	ures												
Measurement conditions	Target Actual												
Engine temperature	>50 °C												
Starter speed	>140 rp	m											
					Thro	ttle valve re Check	e must be air filter	e open whe and exhau	n meas ist syste	uring con em before	npressic e measu	on ring	
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Compression pressure before inspection Compression													
pressure after inspection													
Comment:													
Place:		Date:			Cu	stomer's	signature		Mainter signatu	nance per ire	sonnel		

		Main	ter	nance Reco	ord	E3 Page 1 of 3				
Basic data										
Appendix	Type of system	System operation	ng ho	ours	System construction year	Electrical power rating				
				ОН	, cu.	KWh _{el}				
	Operating method	Reference varia	able /	start requirements		Speed				
	memou					rpm				
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature	Unit compartment temperature				
	m	m	bar	%	°C		°C			
	Engine type		Enç	gine number	Plant number		Engine operating hours			
							он			
Engine							No. engine starts			

	Gas mixer type		Alternator ty	ре	Air filter	Air filter type			
Components	Ignition system type ponents		Ignition coil	type	Spark plug type				
	Catalytic converter type		Silencer type	9	Exhaust heat exchanger type				
Service	Engine oil type Engine oil interval		change	Antifreeze / corrosion in type	hibitor	Concentration			
products		interval		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		%			
Fuel	Type of gas	Methane c	ontent CH4	Sulphur / hydrogen sulp	hide	Lower calorific value, Hu			
ruei			%		ppm	kWh/Nm ³			
Comment:									
Place:	Date:		Cı	ustomer's signature		intenance personnel nature			



Maintenance record

E3

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Operating data c	of engine at 100% rated powe	r		
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
Gas train	mbar	mbar	%	°C
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
Intake system	°C	mbar	mbar	%
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of	T: exhaust gas upstream of
Turbocharging	mbar	mbar	cooler °C	ETC bank A/B
	T: exhaust gas upstream of	P: exhaust gas back pressure,	T: exhaust gas	T: exhaust gas
Exhaust system	ETC bank Ă/B	bank A/B	up/downstream of catalytic converter	up/downstream of exhaust heat exchanger
	°C	mbar	C°	°C
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mbai
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
	°C	℃	bar	l/min
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	C°	°C	bar	l/mir
	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode
lanition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	distance m
	° bef. TDC of engine at 50% rated power	° bef. TDC	v	
Operating data of		° bef. TDC	V O2 content of exhaust gas	
Operating data of	of engine at 50% rated power		- -	m
Operating data of	of engine at 50% rated power	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	m
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³	O2 content of exhaust gas	M Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	M Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	C Throttle valve position
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	T: exhaust gas upstream of
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler	C C Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas	T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	T: exhaust gas upstream of ETC bank A/B C T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature C Throttle valve position T: exhaust gas upstream of ETC bank A/B C T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	T: exhaust gas upstream of ETC bank A/B C T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil bar	Lambda value Gas temperature °C Throttle valve position % T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust heat exchanger °C P: crank chamber mbar
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas upstream of exhaust heat exchanger °C P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature C Throttle valve position 7: exhaust gas upstream of ETC bank A/B C T: exhaust gas up/downstream of exhaust heat exchanger C P: crank chamber mbar CL circulation quantity, engine
Operating data of	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature C Throttle valve position % T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust heat exchanger °C P: crank chamber Mbar CL circulation quantity, engine <i>V</i> min CL circulation quantity, LT
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature °C Throttle valve position T: exhaust gas upstream of ETC bank A/B °C T: exhaust gas up/downstream of exhaust heat exchanger °C P: crank chamber mbar CL circulation quantity, engine

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			Ма	inten	ance	recor	ď			E3 Page 3 of 3			
Type of system		Syster	m operatin	g hours	E	ngine ope	erating ho	urs	Opera check	Operating hours since last check			
Engine type		Engine	e number							Valve clearance Compression pressure			
Valve clearance on '	"cold" en	gine (enç	gine temp	. <50 °C)									
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Inlet actual measurement													
Outlet actual measurement													
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Inlet adjusted value													
Outlet adjusted value													
Compression press	ures												
Measurement conditions	Target Actual												
Engine temperature	>50 °C												
Starter speed	>140 rp	m											
					Thro pressu	ttle valve re Check	e must be cair filter	e open whe and exhau	n meas st syste	uring cor em before	npressic e measu	on ring	
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Compression pressure before inspection													
Compression pressure after inspection													
Comment:													
Place:		Date:			Cu	stomer's	signature	1	Mainte signatu	nance per ire	rsonnel		

Basic data								
Appendix	Type of system	System operating hours			System construction year	Ele	ctrical power rating	
		ОН			y ca.	KWh _{el}		
	Operating method	Reference variable / start requirements				Speed		
	method						rpm	
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature	Unit compartment temperature		
	m	m	bar	%	°C		°C	
	Engine type		Enç	gine number	Plant number	I	Engine operating hours	
							он	
Engine							No. engine starts	

	Gas mixer type		Alternator ty	ре	Air filter type		
Components	Ignition system type		Ignition coil	type	Spark plug type		
	Catalytic converter type		Silencer type	9	Exhaust heat exchanger type		
Service	Engine oil type	ngine oil type Engine oil chai interval		Antifreeze / corrosion in type	hibitor	Concentration	
products						%	
Fuel	Type of gas	Methane c	content CH4 Sulphur / hydrogen sulph		hide	Lower calorific value, Hu	
Fuel			%		ppm	kWh/Nm ³	
Comment:							
Place:	Date:		Cı	ustomer's signature		intenance personnel nature	



Maintenance Record

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	Nou emissione			
F	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train		ZPR		
	mbar T: intake air	P: intake vacuum	%	
ntake system		F. Intake vacuum	Δ P: gas mixer	Throttle valve position
make system	°C	mbar	mbar	c
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	e i o dalik A/B
	T: exhaust gas upstream of	P: exhaust gas back pressure,	T: exhaust gas	T: exhaust gas
Exhaust system	ETC bank A/B	bank A/B	up/downstream of catalytic converter	up/downstream of exhaust heat exchanger
Exhaust system	°C	mbar	°C	near exenanger
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication			Ŭ	
		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating temperature	CL circulation quantity, engine
	°C	°C	bar	l/mi
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture	P: CL LT mixture cooler	CL circulation quantity, LT
		cooler	operating temperature	mixture cooler
	°C	°C	Ignition energy	I/m Spark plug electrode
	ignition time control	ignition time measurement	ignition energy	
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	r
		° bef. TDC	v	
	of engine at 50% rated power		- -	
Operating data of		° bef. TDC	V O2 content of exhaust gas	
Operating data of	of engine at 50% rated power	CO emissions mg/Nm ³	O2 content of exhaust gas	Lambda value
Operating data of	of engine at 50% rated power NOx emissions	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³	O2 content of exhaust gas	Lambda value Gas temperature
Operating data of	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	Lambda value Gas temperature
Operating data of Emissions	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar	Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	Lambda value Gas temperature Throttle valve position
	of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba
Operating data of Emissions Gas train Intake system Turbocharging	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity,
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mb CL circulation quantity, engine //m CL circulation quantity, LT
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum Mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mb CL circulation quantity, engine

	Maintenance Record									E3 Page 3 of 3		
Type of system		Syster	m operatin	ig hours	E	ngine ope	erating ho	urs	Opera check	ating hours	s since la	ist
Engine type	Engine number				P	ant numb	er			Valve clearance Compression pressure		
Valve clearance on	"cold" en	gine (en	gine temp	o. <50 °C)								
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Inlet actual measurement												
Outlet actual measurement												
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Inlet adjusted value												
Outlet adjusted value												
Compression press	ures											
Measurement conditions	Target	Ac	tual									
Engine temperature	>50 °C											
Starter speed	>140 rp	m										
					Thro	ttle valve re Check	e must be c air filter	e open when and exhau	n meas st syste	uring con em before	npressic e measu	on ring
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Compression pressure before inspection												
Compression pressure after inspection												
Comment:												
	Comment:											
Place:		Date:			Cu	stomer's	signature	ł	Mainter signatu	nance per ire	sonnel	

Basic data								
Appendix	Type of system	System operating hours			System construction year	Ele	ctrical power rating	
		ОН			, ca.	KWh _{el}		
	Operating method	Reference varia	able /	start requirements		Speed		
	method						rpm	
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature	Unit compartment temperature		
	m	m	bar	%	°C	°C		
	Engine type		Enç	gine number	Plant number		Engine operating hours	
							он	
Engine							No. engine starts	

	Gas mixer type		Alternator ty	ре	Air filter type			
Components	Ignition system type		Ignition coil	type	Spark plug type			
	Catalytic converter type		Silencer type	9	Exhaust	Exhaust heat exchanger type		
Service	Engine oil type Engine oil oi interval		change	Antifreeze / corrosion in type	hibitor	Concentration		
products		interver		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		%		
Fuel	Type of gas	Methane c	content CH4 Sulphur / hydrogen sulpl		hide	Lower calorific value, Hu		
ruei			%		ppm	kWh/Nm ³		
Comment:								
Place:	Date:		Cı	ustomer's signature		intenance personnel nature		



Maintenance Record

E3

Operating data of				
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Sas train	mbar	ZPR mbar	%	
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
ntake system	⊃°	mbar	mbar	
	Δ P: mixture cooler	mbar P: charge air upstream of TV	mbar T: mixture downstream of	T: exhaust gas upstream of
Turbocharging			cooler	ETC bank A/B
	mbar	mbar	°C	·
Exhaust system	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
	°C	mbar	°C	
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mb
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
	°C	°C	temperature bar	engine I/m
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture	P: CL LT mixture cooler	CL circulation quantity, LT
	°C	cooler ° C	operating temperature bar	mixture cooler
	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	distance
			V	
	° bef. TDC		V O2 content of exhaust gas	
Operating data of	° bef. TDC	° bef. TDC		
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	
Operating data o	^o bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value Gas temperature
Operating data o	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas % Gas moisture %	Lambda value Gas temperature
Operating data of Emissions Gas train	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	Lambda value Gas temperature
Operating data of Emissions Gas train	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar	Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	Lambda value Gas temperature
Operating data o Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Ignition system Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Furbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	[°] bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	[°] bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C T: CL outflow LT mixture	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mb CL circulation quantity, engine <i>I/m</i> CL circulation quantity, LT
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mb CL circulation quantity, engine

	Maintenance Record										E3 9 3 of 3	
Type of system		Syster	m operatin	ig hours	E	ngine ope	erating ho	urs	Opera check	ating hours	s since la	ist
Engine type	Engine number				P	lant numb	er			Valve clearance Compression pressure		
Valve clearance on	"cold" en	gine (eng	gine temp). <50 °C)								
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Inlet actual measurement												
Outlet actual measurement												
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Inlet adjusted value												
Outlet adjusted value										<u> </u>		
Compression press	ures											
Measurement conditions	Target	Act	tual									
Engine temperature	>50 °C											
Starter speed	>140 rp	m										
					Thro	ttle valve re Check	e must be cair filter	e open when	n meas ist syste	uring con em before	npressic e measu	on ring
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Compression pressure before inspection												
Compression pressure after inspection												
Comment:												
	Comment:											
Place:		Date:			Cu	istomer's	signature	ł	Mainter signatu	nance per ire	sonnel	

Basic data							
Appendix	Type of system	System operating hours			System construction year	Ele	ctrical power rating
		он			, cu.	KWh _{el}	
	Operating method	Reference varia	able /	start requirements		Speed	
	memou						rpm
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature	Unit compartment temperature	
	m	m	bar	%	°C		°C
	Engine type		Enç	gine number	Plant number		Engine operating hours
							он
Engine							No. engine starts

	Gas mixer type		Alternator ty	ре	Air filter	type
Components	Ignition system type		Ignition coil	type	Spark p	lug type
	Catalytic converter type		Silencer type	e	Exhaust	heat exchanger type
Service	Engine oil type	Engine oil interval	change	Antifreeze / corrosion in type	hibitor	Concentration
products				.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		%
Fuel	Type of gas	Methane c	ontent CH4	Sulphur / hydrogen sulp	hide	Lower calorific value, Hu
ruei			%		ppm	kWh/Nm ³
Comment:						



Maintenance Record

E3

	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train	mbar	ZPR mbar	%	•
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
ntake system				
	C	mbar	mbar	c.
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of cooler	T: exhaust gas upstream of ETC bank A/B
Turbocharging	mbar	mbar	°C	•
	T: exhaust gas upstream of	P: exhaust gas back pressure,	T: exhaust gas	T: exhaust gas
Exhaust system	ETC bank A/B	bank A/B	up/downstream of catalytic converter	up/downstream of exhaust heat exchanger
	۵°	mbar	°C	٥
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
		J J J J J J J J J J	temperature	engine
Cooling circuit	°C	°C	bar	l/mi
	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	°C	°C	bar	l/m
	Ignition time control	Ignition time measurement	Ignition energy	Spark plug electrode
Ignition system	° bef. TDC	° bef. TDC	v	distance
	bei. IDC			
			v	r
Operating data of	of engine at 50% rated power		V	
Operating data o	of engine at 50% rated power NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
	NOx emissions	CO emissions	O2 content of exhaust gas	
	NOx emissions mg/Nm ³		- -	
Operating data o Emissions Gas train	NOx emissions	CO emissions mg/Nm ³	O2 content of exhaust gas	Lambda value
Emissions	NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	Lambda value Gas temperature
Emissions Gas train	NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value Gas temperature
Emissions	NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture %	Lambda value Gas temperature • Throttle valve position
Emissions Gas train	NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of
Emissions Gas train Intake system	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler	Lambda value Gas temperature • Throttle valve position T: exhaust gas upstream of ETC bank A/B
Emissions Gas train	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Emissions Gas train Intake system Turbocharging	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Emissions Gas train Intake system Turbocharging	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Emissions Gas train Intake system Turbocharging	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Emissions Gas train Intake system Turbocharging Exhaust system	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Emissions Gas train Intake system Turbocharging Exhaust system	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba
Emissions Gas train Intake system Turbocharging Exhaust system	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Emissions Gas train Intake system Turbocharging Exhaust system	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Emissions Gas train Intake system	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine //m CL circulation quantity, LT
Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C T: CL inflow LT mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler operating temperature	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine //mi CL circulation quantity, LT mixture cooler
Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mb CL circulation quantity, engine //m CL circulation quantity, LT

			Mai	inten	ance I	Reco	rd				E3 9 3 of 3	
Type of system		Syster	m operatin	ig hours	Eı	ngine ope	erating ho	urs	Opera check	ating hours	s since la	ast
Engine type		Engin	e number		PI	ant numb	ber			clearance pression p		
Valve clearance on	"cold" en	gine (en	gine temp	. <50 °C)								
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Inlet actual measurement												
Outlet actual measurement												
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Inlet adjusted value												
Outlet adjusted value												
Compression press	ures											
Measurement conditions	Target	Ac	tual									
Engine temperature	>50 °C											
Starter speed	>140 rp	m										
					Thro	ttle valve re Check	e must be c air filter	e open when and exhau	n meas st syste	uring con em before	npressic e measu	on ring
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Compression pressure before inspection												
Compression pressure after inspection												
Comment:												
Place:		Date:			Cu	stomer's	signature	3	Mainter signatu	nance per Ire	sonnel	

		Main	ter	nance Reco	ord		E3 Page 1 of 3
Basic data							
Appendix	Type of system	System operation	ng ho	ours	System construction year	Ele	ctrical power rating
				ОН	y ca.		KWh _{el}
	Operating method	Reference varia	able /	start requirements		Spe	eed
	method						rpm
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment perature
	m	m	bar	%	°C		°C
	Engine type		Enç	gine number	Plant number	I	Engine operating hours
							он
Engine							No. engine starts

	Gas mixer type		Alternator ty	ре	Air filter	type
Components	Ignition system type		Ignition coil	type	Spark pl	lug type
	Catalytic converter type		Silencer type	9	Exhaust	heat exchanger type
Service	Engine oil type	Engine oil interval	change	Antifreeze / corrosion in type	hibitor	Concentration
products		incrvar		iype		%
Fuel	Type of gas	Methane c	ontent CH4	Sulphur / hydrogen sulp	hide	Lower calorific value, Hu
ruei			%		ppm	kWh/Nm ³
Comment:						



Maintenance record

E3

Operating data of				
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of ZPR	Gas moisture	Gas temperature
Gas train	mbar	mbar	%	•(
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
ntake system	°C	mbar	mbar	%
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of	T: exhaust gas upstream of
Turbocharging	mbar	mbar	cooler °C	ETC bank A/B
	T: exhaust gas upstream of	P: exhaust gas back pressure,	T: exhaust gas	T: exhaust gas
Exhaust system	ETC bank A/B	bank A/B	up/downstream of catalytic converter	up/downstream of exhaust heat exchanger
	°C	mbar	°C	•(
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
	°C	°C	temperature bar	engine I/mii
Cooling circuit	T: CL inflow LT mixture cooler	T: CL outflow LT mixture	P: CL LT mixture cooler	CL circulation quantity, LT
		cooler	operating temperature	mixture cooler
	°C	°C	lgnition energy	I/mi Spark plug electrode
		ignition time measurement	ignition energy	Spark plug electrode
Ignition system				distance
Ignition system	° bef. TDC	° bef. TDC	v	distance n
		° bef. TDC	v	
Operating data of	° bef. TDC	° bef. TDC	V O2 content of exhaust gas	
Operating data of	° bef. TDC		- -	
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	r
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	CO emissions mg/Nm ³ Gas pressure downstream of ZPR	O2 content of exhaust gas % Gas moisture	Lambda value Gas temperature
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³	CO emissions mg/Nm ³ Gas pressure downstream of	O2 content of exhaust gas	Lambda value Gas temperature
Operating data of Emissions	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar	Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer	Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	Lambda value Gas temperature Throttle valve position
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure,	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	Lambda value Gas temperature Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity,
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil	O2 content of exhaust gas % Gas moisture % ∆ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter P: engine oil bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine <i>I/mi</i> CL circulation quantity, LT
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber CL circulation quantity, engine <i>I/mi</i>

			Mai	nten	ance I	Reco	rd				E3 9 3 of 3	
Type of system		Syster	m operatin	g hours	E	ngine ope	erating ho	urs	Opera check	ating hours	s since la	ast
Engine type		Engine	e number		P	ant numb	er			clearance pression p		
Valve clearance on	"cold" en	gine (en	gine temp	. <50 °C))							
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Inlet actual measurement												
Outlet actual measurement												
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Inlet adjusted value				<u> </u>								
Outlet adjusted value												
Compression press	ures											
Measurement conditions	Target	Act	tual									
Engine temperature	>50 °C											
Starter speed	>140 rp	m										
					Thro	ttle valve re Check	e must be cair filter	open wher and exhau	n meas st syste	uring con em before	npressic e measu	on ring
cylinder	1	2	3	4	5	6	7	8	9	10	11	12
Compression pressure before inspection												
Compression pressure after inspection												
Comment:												
Place:		Date:			Cu	stomer's	signature		Mainter signatu	nance per ire	sonnel	

		Main	ter	nance Reco	ord		E3 Page 1 of 3
Basic data							
Appendix	Type of system	System operation	ng ho	ours	System construction year	Ele	ctrical power rating
				ОН	, ca.		KWh _{el}
	Operating method	Reference varia	able /	start requirements		Spe	eed
	method						rpm
Installation conditions	Installation height	Air pressure		Air humidity	Outside temperature		t compartment
	m	m	bar	%	°C		°C
	Engine type		Enç	gine number	Plant number		Engine operating hours
							он
Engine							No. engine starts

	Gas mixer type		Alternator ty	ре	Air filter	type
Components	Ignition system type		Ignition coil	type	Spark p	lug type
	Catalytic converter type		Silencer type	e	Exhaust	heat exchanger type
Service	Engine oil type	Engine oil interval	change	Antifreeze / corrosion in type	hibitor	Concentration
products		interval		, ypo		%
Fuel	Type of gas	Methane c	ontent CH4	Sulphur / hydrogen sulp	hide	Lower calorific value, Hu
ruei			%		ppm	kWh/Nm³
Comment:						
Place:	Date:		Cu	ustomer's signature		intenance personnel nature



Maintenance Record

E3

Operating data of	3			
	NOx emissions	CO emissions	O2 content of exhaust gas	Lambda value
Emissions	mg/Nm ³	mg/Nm ³	%	
	Gas pressure upstream of ZPR	Gas pressure downstream of	Gas moisture	Gas temperature
Gas train		ZPR		
	mbar	mbar	%	•
	T: intake air	P: intake vacuum	Δ P: gas mixer	Throttle valve position
ntake system	D°	mbar	mbar	
	Δ P: mixture cooler	P: charge air upstream of TV	T: mixture downstream of	T: exhaust gas upstream of
Turbocharging			cooler	ETC bank A/B
	mbar	mbar	°C	۰
	T: exhaust gas upstream of ETC bank A/B	P: exhaust gas back pressure, bank A/B	T: exhaust gas up/downstream of catalytic converter	T: exhaust gas up/downstream of exhaust heat exchanger
Exhaust system	°C	mbar	°C	neat exchanger
	Measuring point, engine oil T	T: engine oil	P: engine oil	P: crank chamber
Lubrication	Measuring point, engine on 1			
Lubrication		°C	bar	mba
	T: CL engine inlet	T: CL engine outlet	P: CL engine operating	CL circulation quantity,
			temperature	engine
Cooling circuit	°	°C	bar	l/mi
-	T: CL inflow LT mixture cooler	T: CL outflow LT mixture cooler	P: CL LT mixture cooler operating temperature	CL circulation quantity, LT mixture cooler
	C°	°C	bar	l/mi
		Ignition time measurement	Ignition energy	Spark plug electrode
	Ignition time control	ignition time measurement	5	
Ignition system				distance
Ignition system	Ignition time control ° bef. TDC	° bef. TDC	v	
				distance
	° bef. TDC			distance
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions	° bef. TDC	V O2 content of exhaust gas	distance
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³	° bef. TDC CO emissions mg/Nm ³	O2 content of exhaust gas	distance
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of	V O2 content of exhaust gas	
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³	° bef. TDC CO emissions mg/Nm ³	O2 content of exhaust gas	Lambda value Gas temperature
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR	V O2 content of exhaust gas % Gas moisture %	distance Lambda value Gas temperature
Operating data of Emissions	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	O2 content of exhaust gas % Gas moisture	Lambda value Gas temperature
Operating data of Emissions	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm ³ Gas pressure upstream of ZPR mbar	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar	V O2 content of exhaust gas % Gas moisture %	distance Lambda value Gas temperature Throttle valve position
Operating data of Emissions	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of
Operating data of	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer T: mixture downstream of cooler °C T: exhaust gas up/downstream of	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	° bef. TDC CO emissions mg/Nm ³ Gas pressure downstream of ZPR mbar P: intake vacuum P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C	[°] bef. TDC CO emissions <u>mg/Nm³</u> Gas pressure downstream of ZPR <u>mbar</u> P: intake vacuum <u>mbar</u> P: charge air upstream of TV <u>mbar</u> P: exhaust gas back pressure, bank A/B <u>mbar</u> T: engine oil	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity,
Operating data of Emissions Gas train Intake system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba CL circulation quantity, engine <i>I/m</i>
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C T: CL engine outlet °C T: CL outflow LT mixture	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar P: CL LT mixture cooler	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber mba CL circulation quantity, engine <i>Im</i>
Operating data of Emissions Gas train Intake system Turbocharging Exhaust system Lubrication	° bef. TDC of engine at 50% rated power NOx emissions mg/Nm³ Gas pressure upstream of ZPR mbar T: intake air °C Δ P: mixture cooler mbar T: exhaust gas upstream of ETC bank A/B °C Measuring point, engine oil T T: CL engine inlet °C	° bef. TDC CO emissions mg/Nm³ Gas pressure downstream of ZPR mbar P: intake vacuum mbar P: charge air upstream of TV mbar P: exhaust gas back pressure, bank A/B mbar T: engine oil °C	V O2 content of exhaust gas % Gas moisture % Δ P: gas mixer mbar T: mixture downstream of cooler °C T: exhaust gas up/downstream of catalytic converter °C P: engine oil bar P: CL engine operating temperature bar	distance Lambda value Gas temperature Throttle valve position T: exhaust gas upstream of ETC bank A/B T: exhaust gas up/downstream of exhaust heat exchanger P: crank chamber Mba CL circulation quantity, engine

	Maintenance Record									E3 Page 3 of 3			
Type of system	System operating hou			g hours					Opera check	Operating hours since last check			
Engine type	Engine number									Valve clearance Compression pressure			
Valve clearance on	"cold" en	gine (en	gine temp	. <50 °C))								
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Inlet actual measurement			T I		T			\Box			_		
Outlet actual measurement													
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Inlet adjusted value													
Outlet adjusted value													
Compression press	ures												
Measurement conditions	Target	Ac	tual										
Engine temperature	>50 °C												
Starter speed	>140 rp	m											
					Thro pressu	ttle valve re Check	e must be cair filter	e open when and exhau	n meas st syste	uring con em before	npressic e measu	on ring	
cylinder	1	2	3	4	5	6	7	8	9	10	11	12	
Compression pressure before inspection													
Compression pressure after inspection													
Comment:													
Place:		Date:			Cu	stomer's	signature	1	Mainter signatu	nance per Ire	sonnel		

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