



547915 EN (11 / 05 / 2005)

MSI 20 D Série 2-E2 - MSI 20 D BUGGIE Série 2-E2

MSI 25 D Série 2-E2 - MSI 25 D BUGGIE Série 2-E2

MSI 30 D Série 2-E2 - MSI 30 D BUGGIE Série 2-E2

MSI 35 Turbo Série 2-E2

MSI 35 Turbo BUGGIE Série 2-E2

MH 20-4 Turbo BUGGIE Série 2-E2

MH 25-4 Turbo BUGGIE Série 2-E2

REPAIR MANUAL



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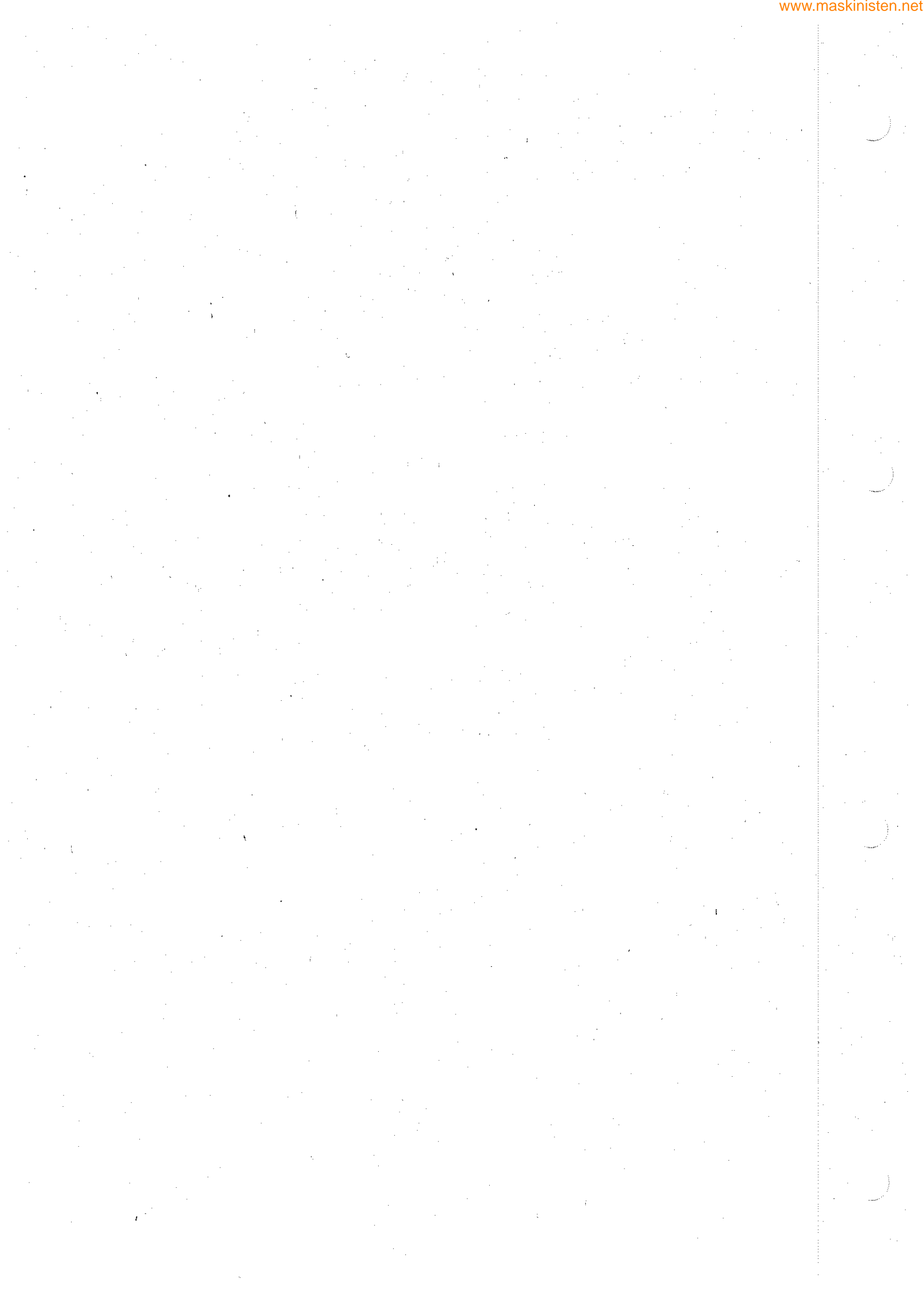
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**MSI 20 D Série 2-E2 - MSI 20 D BUGGIE Série 2-E2
MSI 25 D Série 2-E2 - MSI 25 D BUGGIE Série 2-E2
MSI 30 D Série 2-E2 - MSI 30 D BUGGIE Série 2-E2**

**MSI 35 Turbo Série 2-E2
MSI 35 Turbo BUGGIE Série 2-E2**

**MH 20-4 Turbo BUGGIE Série 2-E2
MH 25-4 Turbo BUGGIE Série 2-E2**

REPAIR MANUAL

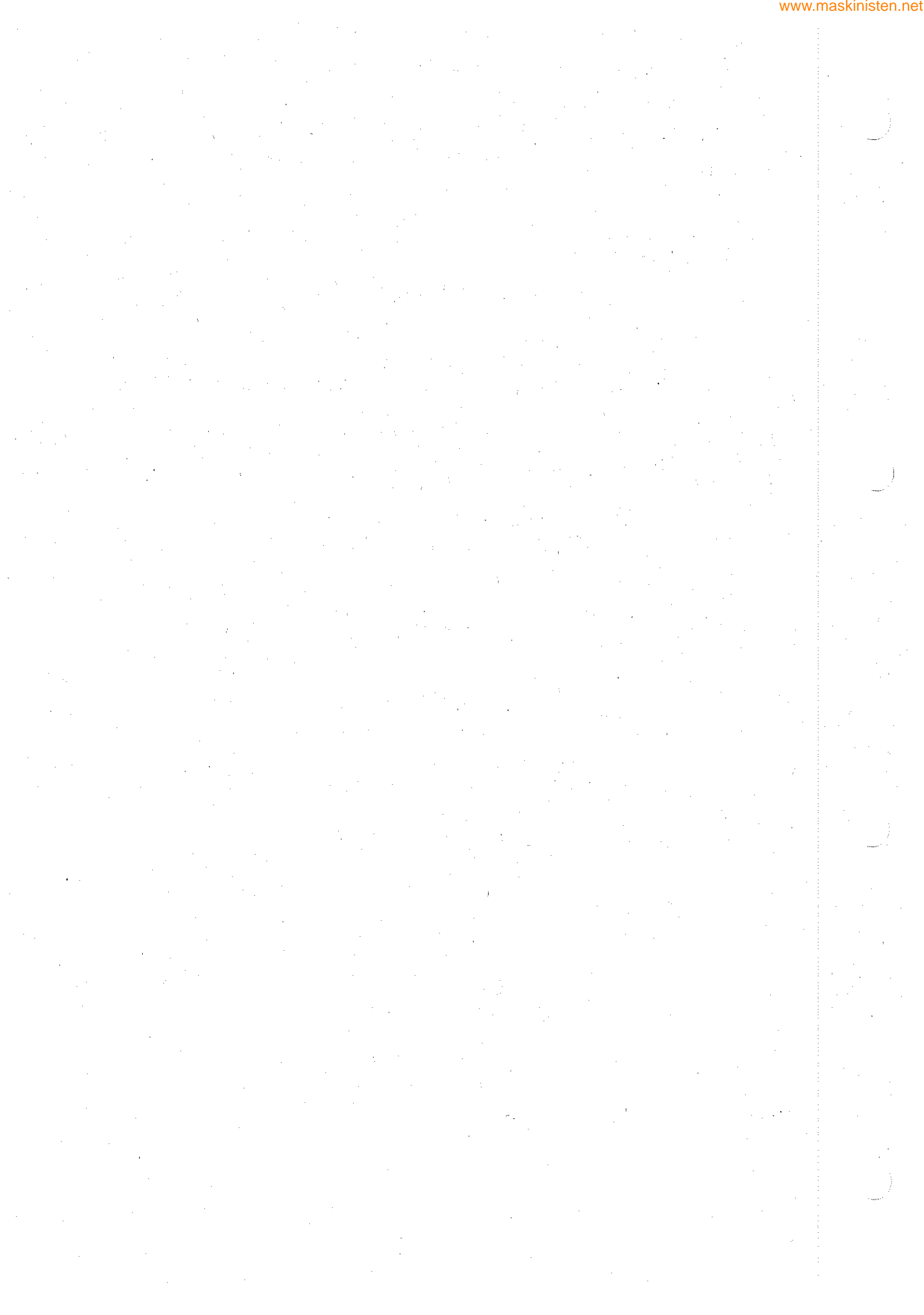


1st DATE OF ISSUE

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GROUP 0

GENERAL POINTS

LIFT TRUCK CHARACTERISTICS

0-1-M116 EN

MSI 20 D Série 2-E2 - MSI 20 D BUGGIE Série 2-E2

MSI 25 D Série 2-E2 - MSI 25 D BUGGIE Série 2-E2

MSI 30 D Série 2-E2 - MSI 30 D BUGGIE Série 2-E2

MSI 35 Turbo Série 2-E2

MSI 35 Turbo BUGGIE Série 2-E2

MH 20-4 Turbo BUGGIE Série 2-E2

MH 25-4 Turbo BUGGIE Série 2-E2

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CHARACTERISTICS

I.C. ENGINE

MSI 20 D Série 2-E2 - MSI 20 D BUGGIE Série 2-E2
 MSI 25 D Série 2-E2 - MSI 25 D BUGGIE Série 2-E2
 MSI 30 D Série 2-E2 - MSI 30 D BUGGIE Série 2-E2
 MSI 35 Turbo Série 2-E2
 MSI 35 Turbo BUGGIE Série 2-E2
 MH 20-4 Turbo BUGGIE Série 2-E2
 MH 25-4 Turbo BUGGIE Série 2-E2

PERKINS 404C-22 (HP81468U)
 PERKINS 404C-22 (HP81468U)
 PERKINS 404C-22 (HP81468U)
 PERKINS 404C-22T (HR81469U)
 PERKINS 404C-22T (HR81469U)
 PERKINS 404C-22T (HR81469U)
 PERKINS 404C-22T (HR81469U)

	404C-22	404C-22T
- Type	4 in line	4 in line
- Number of cylinders	4	4
- Number of strokes	Natural	Turbocharged
- Suction	Indirect	Indirect
- Injection system	1.3.4.2.	1.3.4.2.
- Ignition sequence		
- Clearance of rocker valve (cold)		
. Inlet	0,20 mm	0,20 mm
. Exhaust	0,20 mm	0,20 mm
- Capacity	2216 cm ³	2216 cm ³
- Bore	84 mm	84 mm
- Stroke	100 mm	100 mm
- Compression ratio	23,3/1	23,3/1
- Nominal rating loaded	2800 rpm	2800 rpm
- Rating slow unladen	900 + 50 rpm	900 ± 25 rpm
- Max. rating unladen	3025 rpm	3000 rpm
- Power ISO/TR 14396	51 cv/37,3 kw	61 cv/44,7 kw
- Maximum torque ISO/TR 14396	143 Nm at 1800 rpm	190 Nm at 1800 rpm
- Air cleaner	Dry 3 μ	Dry 3 μ

COOLING CIRCUIT

	404C-22	404C-22T
- Type	By water	By water
- Fan	Blowing	Blowing
. Number of blades	6	7
. Diameter	381 mm (15")	406 mm (16")
- Thermostat		
. Start opening	80°C / 84°C	71°C
. Full opening	95°C	82°C

HYDROSTATIC TRANSMISSION

HYDROSTATIC PUMP

	MANNESMANN REXROTH A4VG71DA1D7/32R
- Type	with variable cubic capacity and with automatic power governor
- Gear reverser	Electromagnetic 12V
. Number of forward gears	1
. Number of reverse gears	1
- Main pump	
. Max./Mini displacement	0 to 71 cm ³ /r
. Max. flow rate	196 L/mn
. Working pressure	497 Bar
- Boost pump	
. Displacement	. cm ³
. Max. flow rate	. L/mn
. Boost pressure Max. R.P.M.	27 Bar (transmission in neutral)

FRONT WHEEL HYDROSTATIC MOTOR

	MANNESMANN REXROTH A2FE28/61W
- Type	with fixed capacity
. Max. displacement	28 cm ³ /r

MSI 20 D Série 2-E2 - MSI 20 D BUGGIE Série 2-E2
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 MSI 30 D Série 2-E2 - MSI 30 D BUGGIE Série 2-E2
 MSI 35 Turbo Série 2-E2 - MSI 35 Turbo BUGGIE Série 2-E2

FRONT WHEEL REDUCERS

- Type

BREVINI**CWD 2050/1M**

MH 20-4 Turbo BUGGIE Série 2-E2
 MH 25-4 Turbo BUGGIE Série 2-E2

FRONT WHEEL REDUCERS

- Type

BREVINI**CWD 2050.1M/CF.1M****REAR WHEEL HYDROSTATIC MOTOR**

- Type

. Max. displacement

POCLAIN HYDRAULICS**MS02**398 cm³/tr**BRAKE**

- Type

. Number of steel disks
 . Number of friction disks

Multidisc brake immersed in oil.

4

5

- Service brakes

Foot pedal. Hydraulic brake acting on front wheels through pressure break.

- Parking brake

Switch. Electro-hydraulic brake acting on front wheels through pressure break.

ELECTRIC CIRCUIT

- Earth

Negative

- Battery

12 V - 110 Ah - 750 A EN

- Alternator

12 V - 55 A

. Type

Magneti Marelli A127

. Tension regulator

Incorporated into the alternator

- Starter

12 V - 2 KW

. Type

Bosch

CHARACTERISTICS**MSI 20 D Série 2-E2 + BUGGIE****FRONT TYRES**

DIMENSIONS	PRESSURE	TYRE LOAD		PRESSURE ON THE CONTACT SURFACE		AREA OF THE CONTACT SURFACE	
				HARD GROUND	LIGHT GROUND	HARD GROUND	LIGHT GROUND
275/70R22,5 RHS 148/145M TUBELESS	9 BAR	FRONT UNLADEN	900 KG	KG/CM2		CM2	
		FRONT LADEN	2500 KG	KG/CM2		CM2	
10.5R20 14PR MPT80 134G TUBELESS	4,4 BAR	FRONT UNLADEN	900 KG	KG/CM2	KG/CM2	CM2	CM2
		FRONT LADEN	2500 KG	KG/CM2	KG/CM2	CM2	CM2
8.25X20 CSE SC15	Solid	FRONT UNLADEN	900 KG	3,47 KG/CM2		266 CM2	
		FRONT LADEN	2500 KG	6,61 KG/CM2		375 CM2	
15,5/55R18 14PR SPPG7 TUBELESS	3,3 BAR	FRONT UNLADEN	900 KG	2,61 KG/CM2	1,45 KG/CM2	345 CM2	621 CM2
		FRONT LADEN	2500 KG	3,05 KG/CM2	1,70 KG/CM2	816 CM2	1468 CM2
12.0-18 T86 TUBE TYPE 12PR	3,5 BAR	FRONT UNLADEN	900 KG	6,92 KG/CM2	2,27 KG/CM2	130 CM2	396 CM2
		FRONT LADEN	2600 KG	9,32 KG/CM2	3,16 KG/CM2	279 CM2	824 CM2
275/80R20 XM27 144A2/132B TUBELESS	4,1 BAR	FRONT UNLADEN	900 KG	KG/CM2	KG/CM2	CM2	CM2
		FRONT LADEN	2500 KG	KG/CM2	KG/CM2	CM2	CM2
285/70R19,5 XZY 140/137L TUBELESS	6 BAR	FRONT UNLADEN	900 KG	6,62 KG/CM2		136 CM2	
		FRONT LADEN	2500 KG	5,86 KG/CM2		431 CM2	

REAR TYRES

DIMENSIONS	PRESSURE	TYRE LOAD		PRESSURE ON THE CONTACT SURFACE		AREA OF THE CONTACT SURFACE	
				HARD GROUND	LIGHT GROUND	HARD GROUND	LIGHT GROUND
7.00X12 14PR IC40	4,5 BAR	REAR UNLADEN	1050 KG	KG/CM2		CM2	
		REAR LADEN	400 KG	KG/CM2		CM2	
27.10.12 14PR IC12	4,5 BAR	REAR UNLADEN	1050 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR LADEN	400 KG	KG/CM2	KG/CM2	CM2	CM2
7.00X12 CSE SC10	Solid	REAR UNLADEN	1050 KG	5,85 KG/CM2		178 CM2	
		REAR LADEN	400 KG	3,60 KG/CM2		113 CM2	
195R14C 106/104N SPLT3 TUBELESS	5 BAR	REAR UNLADEN	1050 KG	6,08 KG/CM2	4,94 KG/CM2	173 CM2	213 CM2
		REAR LADEN	400 KG	5,45 KG/CM2	4,21 KG/CM2	73 CM2	94 CM2
7,00R12 XZM 136A5 TUBELESS	3,5 BAR	REAR UNLADEN	1050 KG	3,25 KG/CM2		323 CM2	
		REAR LADEN	400 KG	3,20 KG/CM2		125 CM2	

HYDRAULIC CIRCUIT

- Type of pump	Gear pump with flow divider
. Capacity	26,4 cm ³
. Flow rate at full speed	79 L/mn
. Flow rate at 2800 rpm	74 L/mn
. Flow rate at 2000 rpm	53 L/mn
- Pressure	
. Lifting, tilting, attachment circuit	
Double mast	140 Bar
Double mast with free-acting lift	140 Bar
Triple mast with free-acting lift	140 Bar
Triple mast without free-acting lift	145 Bar
. Steering circuit	125 Bar
- Filtration	
. Return	10 µ
. Suction	100 µ

SPECIFICATIONS

- Level of sound pressure in the driver's cab LpA (according to standard prEN 12053 : 1995)	
. Overhead guard	83 dB
. Cab	81 dB
- Level of sound power in the LwA environment (according to directive 2000/14 CE guaranteed)	104 dB
- Speed of movement of lift truck in standard configuration on horizontal ground (except particular conditions)	
. Forward unladen	20 km/h
. Reverse unladen	20 km/h
- Standard lift height	3300 mm
- Rated capacity with standard mast	2000 kg
- Load center	500 mm
- Weight of forks (each)	43 kg
- Lifting motions with standard mast	
. Unladen lifting	0,60 m/s
. Rated load lifting	0,55 m/s
. Unladen lowering	0,46 m/s
. Rated load lowering	0,47 m/s
- Lift truck weight with standard mast	
. Unladen	3840 kg
. Rated load	5840 kg
- Axle weight with standard mast (transport position)	
. Front unladen	1780 kg
rated load	5020 kg
. Rear unladen	2060 kg
rated load	820 kg
- Tensile strain at coupling hook	
. Unladen	1300 daN
. Rated load	2400 daN
- Maximum ramp negotiable in forward motion	
. Unladen	32 % at 1 km/h
. Rated load	33 % at 1 km/h

CHARACTERISTICS**MSI 25 D Série 2-E2 + BUGGIE****FRONT TYRES**

DIMENSIONS	PRESSURE	TYRE LOAD		PRESSURE ON THE CONTACT SURFACE		AREA OF THE CONTACT SURFACE	
				HARD GROUND	LIGHT GROUND	HARD GROUND	LIGHT GROUND
275/70R22,5 RHS 148/145M TUBELESS	9 BAR	FRONT UNLADEN	900 KG	KG/CM2		CM2	
		FRONT LADEN	2950 KG	KG/CM2		CM2	
10.5R20 14PR MPT80 134G TUBELESS	5,3 BAR	FRONT UNLADEN	900 KG	KG/CM2	KG/CM2	CM2	CM2
		FRONT LADEN	2950 KG	KG/CM2	KG/CM2	CM2	CM2
8.25X20 CSE SC15	Solid	FRONT UNLADEN	900 KG	3,47 KG/CM2		266 CM2	
		FRONT LADEN	2950 KG	7,41 KG/CM2		398 CM2	
15,5/55R18 14PR SPPG7 TUBELESS	4 BAR	FRONT UNLADEN	900 KG	3,00 KG/CM2	1,67 KG/CM2	300 CM2	540 CM2
		FRONT LADEN	2950 KG	3,58 KG/CM2	1,99 KG/CM2	822 CM2	1480 CM2
12.0-18 T86 TUBE TYPE 12PR	3,5 BAR	FRONT UNLADEN	900 KG	6,92 KG/CM2	2,27 KG/CM2	130 CM2	396 CM2
		FRONT LADEN	2950 KG	9,69 KG/CM2	3,31 KG/CM2	304 CM2	891 CM2
275/80R20 XM27 144A2/132B TUBELESS	4,1 BAR	FRONT UNLADEN	900 KG	KG/CM2	KG/CM2	CM2	CM2
		FRONT LADEN	2950 KG	KG/CM2	KG/CM2	CM2	CM2
285/70R19,5 XZY 140/137L TUBELESS	7 BAR	FRONT UNLADEN	900 KG	6,70 KG/CM2		134 CM2	
		FRONT LADEN	2950 KG	6,21 KG/CM2		476 CM2	

REAR TYRES

DIMENSIONS	PRESSURE	TYRE LOAD		PRESSURE ON THE CONTACT SURFACE		AREA OF THE CONTACT SURFACE	
				HARD GROUND	LIGHT GROUND	HARD GROUND	LIGHT GROUND
7.00X12 14PR IC40	5,3 BAR	REAR UNLADEN	1200 KG	KG/CM2		CM2	
		REAR LADEN	400 KG	KG/CM2		CM2	
27.10.12 14PR IC12	4,5 BAR	REAR UNLADEN	1200 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR LADEN	400 KG	KG/CM2	KG/CM2	CM2	CM2
7.00X12 CSE SC10	Solid	REAR UNLADEN	1200 KG	6,30 KG/CM2		190 CM2	
		REAR LADEN	400 KG	3,60 KG/CM2		113 CM2	
7,00R12 XZM 136A5 TUBELESS	4 BAR	REAR UNLADEN	1200 KG	KG/CM2		CM2	
		REAR LADEN	400 KG	KG/CM2		CM2	

HYDRAULIC CIRCUIT

- Type of pump	Gear pump with flow divider
. Capacity	26,4 cm ³
. Flow rate at full speed	79 L/mn
. Flow rate at 2800 rpm	74 L/mn
. Flow rate at 2000 rpm	53 L/mn
- Pressure	
. Lifting, tilting, attachment circuit	
Double mast	170 Bar
Double mast with free-acting lift	170 Bar
Triple mast with free-acting lift	170 Bar
Triple mast without free-acting lift	180 Bar
. Steering circuit	125 Bar
- Filtration	
. Return	10 μ
. Suction	100 μ

SPECIFICATIONS

- Level of sound pressure in the driver's cab LpA (according to standard prEN 12053 : 1995)	
. Overhead guard	83 dB
. Cab	81 dB
- Level of sound power in the LwA environment (according to directive 2000/14 CE guaranteed)	104 dB
- Speed of movement of lift truck in standard configuration on horizontal ground (except particular conditions)	
. Forward unladen	20 km/h
. Reverse unladen	20 km/h
- Standard lift height	3300 mm
- Rated capacity with standard mast	2500 kg
- Load center	500 mm
- Weight of forks (each)	43 kg
- Lifting motions with standard mast	
. Unladen lifting	0,60 m/s
. Rated load lifting	0,55 m/s
. Unladen lowering	0,46 m/s
. Rated load lowering	0,47 m/s
- Lift truck weight with standard mast	
. Unladen	4150 kg
. Rated load	6650 kg
- Axle weight with standard mast (transport position)	
. Front unladen	1760 kg
rated load	5880 kg
. Rear unladen	2390 kg
rated load	770 kg
- Tensile strain at coupling hook	
. Unladen	1300 daN
. Rated load	2400 daN
- Maximum ramp negotiable in forward motion	
. Unladen	29 % at 1 km/h
. Rated load	31 % at 1 km/h

CHARACTERISTICS**MSI 30 D Serie 2-E2 + BUGGIE****FRONT TYRES**

DIMENSIONS	PRESSURE	TYRE LOAD		PRESSURE ON THE CONTACT SURFACE		AREA OF THE CONTACT SURFACE	
				HARD GROUND	LIGHT GROUND	HARD GROUND	LIGHT GROUND
275/70R22,5 RHS 148/145M TUBELESS	9 BAR	FRONT UNLADEN	850 KG	KG/CM2		CM2	
		FRONT LADEN	3300 KG	KG/CM2		CM2	
10.5R20 14PR MPT80 134G TUBELESS	5,6 BAR	FRONT UNLADEN	850 KG	KG/CM2	KG/CM2	CM2	CM2
		FRONT LADEN	3300 KG	KG/CM2	KG/CM2	CM2	CM2
8.25X20 CSE SC15	Solid	FRONT UNLADEN	850 KG	3,37 KG/CM2		265 CM2	
		FRONT LADEN	3300 KG	8,02 KG/CM2		411 CM2	
15,5/55R18 14PR SPPG7 TUBELESS	4,5 BAR	FRONT UNLADEN	850 KG	KG/CM2	KG/CM2	CM2	CM2
		FRONT LADEN	3300 KG	KG/CM2	KG/CM2	CM2	CM2
12.0-18 T86 TUBE TYPE 12PR	4,2 BAR	FRONT UNLADEN	850 KG	7,23 KG/CM2	2,40 KG/CM2	117 CM2	353 CM2
		FRONT LADEN	3300 KG	11,05 KG/CM2	3,80 KG/CM2	299 CM2	869 CM2
285/70R19,5 XZY 140/137L TUBELESS	8 BAR	FRONT UNLADEN	850 KG	KG/CM2		CM2	
		FRONT LADEN	3300 KG	KG/CM2		CM2	

REAR TYRES

DIMENSIONS	PRESSURE	TYRE LOAD		PRESSURE ON THE CONTACT SURFACE		AREA OF THE CONTACT SURFACE	
				HARD GROUND	LIGHT GROUND	HARD GROUND	LIGHT GROUND
7.00X12 14PR IC40	6,7 BAR	REAR UNLADEN	1400 KG	KG/CM2		CM2	
		REAR LADEN	450 KG	KG/CM2		CM2	
27.10.12 14PR IC12	4,5 BAR	REAR UNLADEN	1400 KG	KG/CM2	KG/CM2	CM2	CM2
		REAR LADEN	450 KG	KG/CM2	KG/CM2	CM2	CM2
7.00X12 CSE SC10	Solid	REAR UNLADEN	1400 KG	6,85 KG/CM2		204 CM2	
		REAR LADEN	450 KG	3,80 KG/CM2		119 CM2	
7,00R12 XZM 136A5 TUBELESS	4,75 BAR	REAR UNLADEN	1400 KG	4,73 KG/CM2		296 CM2	
		REAR LADEN	450 KG	3,49 KG/CM2		129 CM2	

HYDRAULIC CIRCUIT

- Type of pump	Gear pump with flow divider
. Capacity	26,4 cm3
. Flow rate at full speed	79 L/mn
. Flow rate at 2800 rpm	74 L/mn
. Flow rate at 2000 rpm	53 L/mn
- Pressure	
. Lifting, tilting, attachment circuit	
Double mast	185 Bar
Double mast with free-acting lift	185 Bar
Triple mast with free-acting lift	185 Bar
. Steering circuit	125 Bar
- Filtration	
. Return	10 µ
. Suction	100 µ

SPECIFICATIONS

- Level of sound pressure in the driver's cab LpA (according to standard prEN 12053 : 1995)	
. Overhead guard	83 dB
. Cab	81 dB
- Level of sound power in the LwA environment (according to directive 2000/14 CE guaranteed)	104 dB
- Speed of movement of lift truck in standard configuration on horizontal ground (except particular conditions)	
. Forward unladen	20 km/h
. Reverse unladen	20 km/h
- Standard lift height	3300 mm
- Rated capacity with standard mast	3000 kg
- Load center	500 mm
- Weight of forks (each)	55 kg
- Lifting motions with standard mast	
. Unladen lifting	0,50 m/s
. Rated load lifting	0,46 m/s
. Unladen lowering	0,46 m/s
. Rated load lowering	0,47 m/s
- Lift truck weight with standard mast	
. Unladen	4530 kg
. Rated load	7530 kg
- Axle weight with standard mast (transport position)	
. Front unladen	1710 kg
rated load	6600 kg
. Rear unladen	2810 kg
rated load	930 kg
- Tensile strain at coupling hook	
. Unladen	1300 daN
. Rated load	2400 daN
- Maximum ramp negotiable in forward motion	
. Unladen	28 % at 1 km/h
. Rated load	30 % at 1 km/h