

SALES DIVISION NETWORK TECHNICAL INFORMATION

WORKSHOP MANUAL



ludix

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CHARACTERISTICS

CHARACTERISTICS

Engine characteristics

Engine	2-stroke, exhaust air injection (I.A.E.)
	Air cooling
Bore x stroke	39.9 X 39.8
Cubic capacity	49.9 cc
Max. power output	3.2 kW
Max. torque engine speed	6800 rpm
Maximum power output engine speed	7100 rpm
Ignition	CDI
Sportz plug	NGK BR7HS
Spark plug	Eyquem R850
Carburettor	Gurtner PY 12
Oil pump control unit	Dell'Orto
Air pump	Dell'Orto
Oil pump	Dell'Orto
Magneto	Kokusan 89 W
Starter motor	Mitsuba 150 W ou Moric 160 W
Exhaust	Catalytic

Engine markings

Engine type

HA1



1. Engine number

Frame characteristics

Capacities

Fuel tank	5.5 litres Lead-free 95 or 98
Oil tonk	1.2 litre
Oli talik	Semi-synthetic oil
	0.12 litre
Transfer box	Oil SAE 80W90
	Life lubricated
Fork	Mechanical

Machine markings



- 1. Manufacturer's plate
- 2. VIN number

SERVICE SCHEDULE AND COMMISSIONING

SERVICE SCHEDULE AND COMMISSIONING

Heavy duty servicing is for machines used under "harsh" conditions: door-to-door deliveries, intensive urban use (courier), short journeys with engine cold, dusty areas, ambient temperature over 30°C.

Service operations	500 kms	Every 5000 kms	Every 10000 kms
	or 1 months	or 12 months	
Heavy duty servicing	500 kms	Every 2500 kms	Every 5000 kms
<u>Check:</u>			
Idle setting	Х	X	Х
Throttle cable play	X	X	Х
Steering column play	Х	X	Х
Functioning of electrical devices	Х	X	Х
Condition and adjustment of front and rear	Х	X	Х
brake cables *			
Condition of fuel pipes	X	X	Х
Condition of oil pipes	Х	X	Х
Condition of front brake fluid pipe	X	X	Х
Tyre pressures	Х		
Tyre condition, pressure and wear		X	Х
Brake fluid level	X	X	X
Battery electrolyte level *	X	X	Х
Tightness of nuts and bolts	X	X	Х
<u>Change:</u>			
Spark plug		X	Х
Inlet silencer			Х
Front brake pads or linings #		X	Х
Rear brake linings * #			Х
Drive pulley rollers #		X	Х
Transmission belt			Х
<u>Check and remove carbon:</u>			
Piston			Х
Cylinder head			Х
Exhaust port			Х
<u>Check and lubricate:</u>	1	1	
Expanding flange driven pulley and needle			Х
cages			
Drive pulley / expanding flange		X	Х
Kickstart drive gear and kickstart shaft		X	X
Front and rear brake cam		X	Х
<u>Clean and adjust:</u>	1		
Carburettor			X
<u>Test machine:</u>	r	1	
On road	X	X	X

* Depending on equipment

If necessary

SERVICE SCHEDULE AND COMMISSIONING

Battery preparation (except for maintenance-free battery)*

- Remove the battery
- Remove the 6 filler caps and the vent plug
- Fill the battery with electrolyte to the level marked UPPER LEVEL
- Electrolyte: (35% sulphuric acid = 1.28g/cm3) 1 litre can ref: 752740, 5 litre can ref: 752741.
- Leave the battery to stand for around half an hour
- Top up if necessary
- Charge the battery for at least 2 hours with a current of 400 mA (0.4A)
- Refit the battery and connect the vapour vent pipe
- Connect the red wires to the + terminal and the green wire to the terminal
- Then, the battery level should be topped up if necessary, after fully charging, using distilled water only.

Checks before handing over to the customer

- Check the wheel nuts are tight
- Check nuts and bolts are tight
- Check brake adjustment and efficiency
- Check the tyre pressures cold
- Check operation of the lights, flashers *, horn, and brake light
- Check the different warning lights work
- Carry out a road test
- * Depending on equipment

SPECIAL IMPORTANT POINTS

SPECIAL IMPORTANT POINTS

<u>Oil and fuel</u>

This machine is designed to run on super 95 or 98 <u>unleaded fuel</u> The oil to use for the separate lubrication system is semi-synthetic oil

The oil pump must be bled according to the methods specified depending on the models.

The air pipe between the air pump and the exhaust has specific heat resistance properties. In case of replacement, an original pipe must be fitted.

For machines equipped with a battery, the instrument panel oil warning light comes on when the ignition is turned on and then goes off when the engine starts ; this means that the lubrication system warning light and electrical circuit are operational

TIGHTENING TORQUES AND SPECIAL TOOLS

TIGHTENING TORQUES AND SPECIAL TOOLS

Tightening torques

Body panels:	
Bottom panel	0.4 m.daN
Floor	0.4 m.daN
Handlebar cover	0.1 m.daN
Front panel	0.1 m.daN
Rear shield	0.1 m.daN
Side fairings	0.1 m.daN
Front mudguard	0.8 m.daN
Grab handle	1.2 m.daN

Frame:

Front wheel spindle nut	6 m.daN
Rear wheel spindle nut	10 m.daN
Engine to rod pivot	5.2 m.daN
Frame to rod pivot	5.2 m.daN
Shock absorber top mount	4.3 m.daN
Shock absorber bottom mount	2 m.daN
Exhaust to cylinder mounting nut	1.5 m.daN
Exhaust fixing bolt on engine casing	2 m.daN
Upper cone (in 2 operations)	4 and 2.3 m.daN
Steering locknut	7 m.daN
Front brake caliper	2.5 m.daN
Front brake disc	1 m.daN

Standard:

Nut and bolt 5 mm diameter	0.5 m.daN
Nut and bolt 6mm diameter	1 m.daN
Nut and bolt 8mm diameter	2.2 m.daN
Nut and bolt 10mm diameter	3.5 m.daN
Nut and bolt 12mm diameter	5.5 m.daN

<u>Special tools:</u>	
Designation	Reference
Hose clamp	755996
Steering column wrench	757860
Oil circuit bleeding harness	757854

CONTROL CABLE AND HARNESS ROUTINGS

Ludix basic version





Ludix luxury version





Caption for Ludix basic and luxury versions

- 1. Main harness
- 2. Front brake cable
- 3. Rear brake cable
- 4. Throttle cable
- 5. Speedometer cable
- 6. Horn
- 7. Regulator
- 8. Fuse
- 9. Battery
- 10. Oil pump control unit
- 11. HT coil
- 12. Oil pump
- 13. Starter motor relay
- 14. CDI ignition unit
- A. Cable sheath guide
- B. Clip for positioning the harness on the frame
- C. Clip
- D. Plastic tie



BODY PANELS

Removal of the front leg shield Procedure 1

- Disconnect the speedometer cable from the drive system

- Unclip the front mudguard cable clip
- Remove the leg shield 4 fixing bolts (1)







- Unclip the rubber protector (2)
- Disconnect the headlight
- Disconnect the instrument cluster (3)
- Remove the front leg shield

Removal of the rear leg shield Procedure 2

- Remove the front leg shield (see procedure 1)

- Remove the rear leg shield 4 fixing bolts (1)

BODY PANELS

Remove the ignition switch key

- Unclip the rear leg shield from the footboard assembly (A)

- Remove the rear leg shield



Removal of the floor assembly Procedure 3

- Remove the rear shield panel (see procedure 2)
- Remove the shock absorber trim (1) (1 screw)
- Remove the rear side fairings (2) (2 screws each)



- Remove the 2 clips (2) to avoid scratches on the frame

- Remove the cap / footrest assembly (4) (1 screw each) $% \left(1 \right) = \left(1 \right) \left(1 \right)$

- Remove the floor 2 fixing bolts (5)
- Remove the floor assembly

BODY PANELS

Removal of the lower panel

- Remove the floor assembly (see procedure 3)
 Unhook the lower panel (1) from the frame



- - Pivot the lower panel to the right in order to release the frame front clip

FRAME

<u>*Removal of the handlebar* **Procedure 4**</u> - Remove the rear shield panel (see procedure 2) - Disconnect the RH and LH flashers from the main harness

- Remove the handlebar front cover 4 fixing bolts (1)



2



- - Remove the handlebar rear cover 3 fixing bolts (2)

- - Remove the RH and LH grips (3)
- Remove the handlebar central fixing bolt (4)
- Remove the handlebar

Removal of the fork or cone, cups, lower ball cage

- Remove the rear shield panel (see procedure 2)
- Remove the front mudguard (1)
- Slacken the front wheel spindle nut (2)
- Remove the 2 front brake caliper bolts (3)
- Suspend the front caliper without disconnecting it
- Remove the front wheel



- - Remove the handlebar central fixing screw and bolt (4)

- Suspend the handlebar

- Remove the steering nut and its stack using tool par number: 757860

- Remove the fork

Note: it is recommended to check that the ball cages, raceway and steering cone are in good condition and to replace them if necessary





Steering composition

- 1. Self-lubricating lower ball cage
- 2. Upper ball cage
- 3. Adjustable cone
- 4. Rubber washer
- 5. Locknut
- 6. Lockwasher

MISCELLANEOUS OPERATIONS

Removal of the front brake hydraulic hose

- Remove the rear shield panel (see procedure 2)
- Remove the handlebar front cover 4 fixing bolts
- Remove the handlebar front cover

- Protect any plastics which may be exposed to brake fluid splashes

- Remove the screws (1) from the hydraulic hose to the master cylinder and to the brake caliper

- Remove the brake hydraulic hose

When refitting, bleed the brake circuit

Removal of the rear brake cable

- Remove the rear shield panel (see procedure 2)
- Remove the handlebar front cover
- Remove the brake cable (1)

Note:

- When refitting, first insert the cable into the guide (2) and take it out through the battery cover at (A)

- Then, insert the cable in the battery cover again and take it out at the rear side of the floor (B)
- Make sure the cable passes through its different

guides







<u>Removal of the oil and fuel tank assembly or the tap</u> - Remove the fixing bolt (1) from the saddle and the tank

- Remove the saddle
- Remove the tank assembly rear fixing nut (2)

- - Disconnect the oil level low switch from the harness (3) under the tank

- Close the fuel tap
- Disconnect the fuel pipe (4) from the tap
- Place a hose clamp P/N 755996 on the oil feed pipe to the oil pump (5)
- Disconnect the oil pump inlet pipe
- Remove the oil and fuel tank assembly

Note: Using a clean cloth, protect the pump against dirt splashes

When refitting, bleed the oil pump according to the recommended method





<u>Removal of the headlight bulb, instrument panel,</u> <u>speedometer cable</u>

- Remove the front leg shield (see procedure 1)
- Unclip the rubber protector (1)
- Remove the headlight bulb
- Remove the 3 headlight fixing bolts (2)
- Remove the headlight
- Remove the 3 instrument panel fixing bolts (3)

- Remove the instrument panel and/or with the speedometer cable

Note: When removing the speedometer cable, the headlight must be removed

Removal of the ignition switch

- Remove the rear shield panel (see procedure 2)

- Disconnect the ignition switch

- Remove the tamperproof bolt (1) using an adapted tool

- Remove the ignition switch







<u>Removal of the voltage regulator or high-tension</u> <u>coil</u>

- Remove the battery cover (1 screw)
- Disconnect and remove the battery (1 screw)

- Disconnect and remove the voltage regulator (1) or the high-tension coil (2) (1 screw each) from the battery cover

<u>Removal of the starter motor relay or CDI module,</u> <u>fuse, oil pump control unit</u>

- Remove the battery cover (1 screw)
- Disconnect the battery

- Disconnect and remove the element concerned (1) from the battery cover

Note: All these elements are placed in supports which are integrated in the battery compartment

<u>Removal of the throttle cable</u>

- Remove the floor assembly (see procedure 3)

- Remove the RH grip (2 screws)
- Release the accelerator cable by turning it 1/4 of a turn
- Remove the carburettor chamber cover
- Remove the valve

- Unclip the cable from the cable clips and plastic tie (1) on the frame

- Remove the throttle cable (2)

<u>Note:</u> On Ludix basic version, the throttle cable is a cable adjusted and cut according to the customer's requirements, connected to the turning handle The cable must be changed each time it is removed

Removal of the horn

- Remove the floor assembly (see procedure 3)
- Disconnect the horn (1)
- Remove the horn







Removal of the exhaust Procedure 5

- Disconnect the air pipe (1) from the exhaust

- Remove the 2 exhaust nuts on the cylinder nose

Remove the 2 fixing bolts (2) from the exhaust and the stiffener plate (3) on the engine casing
Remove the exhaust

<u>Note:</u> The 2 exhaust fixing bolts on the engine casing are pre-coated with locking compound and must be changed when they are removed, including the exhaust seal at cylinder end

Removal of the oil pump

- Remove the oil pump (1) fixing bolt
- Disconnect the oil pump connecting pipes
- Disconnect the oil pump
- Remove the oil pump

Note: The oil pump circuit must be bled according to the specified procedure each time a work is carried out on the lubrication system





<u>Oil pump bleeding procedure on LUDIX with</u> <u>battery</u>

- Check the level in the oil tank
- Check the ignition is off.
- Disconnect the oil pump
- Disconnect the oil inlet pipe from the carburettor
- Use a recipient to recover the oil when bleeding
- Turn on the ignition
- Connect the oil pump

Note:

The procedure starts with a slow pumping during 4-5 minutes, followed by a faster pumping during 30 seconds.

During the bleeding procedure, the instrument panel oil warning light flashes as the pump is activated and stays on at the end of the bleeding.

During bleeding, ensure the oil flows regularly and there are no air bubbles in the pipe Otherwise, repeat the operation

- Turn off the ignition

- Connect the oil inlet pipe to the carburettor

<u>Oil pump bleeding procedure on LUDIX without</u> <u>battery</u>

- Prepare a battery correctly loaded
- Check the level in the oil tank
- Disconnect the oil pump
- Remove the battery cover
- Disconnect the voltage regulator

- Connect the red wire on the supply harness P/N 757854 to the red wire on the regulator connector (A)

- Connect the green wire on the supply harness to the ground screw on the casing cover (B)

- Connect the 2 supply harness wires to the battery (red to + and green to -)

- Disconnect the oil inlet pipe from the carburettor
- Use a recipient to recover the oil when bleeding
- Connect the oil pump to begin the procedure

<u>Note</u>: The procedure starts with a slow pumping during 4-5 minutes, followed by a faster pumping during 30 seconds.

During the bleeding procedure, the instrument panel oil warning light flashes as the pump is activated and stays on at the end of the bleeding.

During bleeding, ensure the oil flows regularly and there are no bubbles in the pipe Otherwise, repeat the operation

- Disconnect the battery and the supply harness
- Connect the voltage regulator
- Connect the oil inlet pipe to the carburettor



WORK ON THE ENGINE WITHOUT REMOVING THE ENGINE

WORK ON THE ENGINE WITHOUT REMOVING THE ENGINE

<u>Removal of the magneto flywheel armature</u>

- Remove the exhaust (see procedure 5)
- Remove the battery cover (1 screw)
- Disconnect and remove the battery (1 screw)

- Disconnect the armature from the main harness (in the lower panel)

Note: See the *50cc Engine, Horizontal Cylinder, IAE* workshop manual for removal of the cooling volute, magneto flywheel rotor and armature



Removal of the starter motor

- Remove the battery cover (1 screw)
- Disconnect and remove the battery (1 screw)
- Disconnect the starter motor from the main harness
- (in the lower panel, from the battery cover)
- Remove the starter motor (1) 2 bolts
- Remove the starter motor



Removal of the carburettor Procedure 6

- Remove the shock absorber trim
- Remove the LH side fairing
- Close the fuel tap
- Disconnect the air pipe (1) from the air filter housing (2)
- Remove the air filter housing (1 screw and 1 clip)



WORK ON THE ENGINE WITHOUT REMOVING THE ENGINE

- Disconnect the choke (3) from the main harness

- Disconnect the fuel (4) and separate lubrication (5) pipes

- Remove the chamber cover (6) (1 bolt)
- Disconnect the throttle cable
- Remove the carburettor (1 clip)







<u>Removal of the inlet coupling and valves</u> - Remove the carburettor (see procedure 6)

Note: See the *50cc Engine, Horizontal Cylinder, IAE* workshop manual for removal of the inlet coupling and valves

<u>Removal of the cylinder and piston</u>

- Remove the floor assembly (see procedure 3)
- Remove the exhaust (see operation 5)

Note: See the *50 cc Engine, Horizontal Cylinder, IAE* workshop manual for removal of the cylinder cover, cylinder head, cylinder and piston.

WORK ON THE ENGINE WITHOUT REMOVING THE ENGINE

<u>Removal of the engine mounting linkrod</u>

- Remove the shock absorber trim (1 screw)
- Remove the side fairings (2 screws each)
- Remove the shock absorber lower mount (1)
- Suspend the rear of the machine
- Remove the 2 linkrod fixing pins (2)
- Remove the engine mounting linkrod

Note: When refitting, ensure correct positioning of the rubber bump stop of the engine mounting linkrod



ELECTRICITY

<u>Removal of the main harness</u>

- Remove the floor assembly (see procedure 3)
- Remove the handlebar front cover

- Depending on the model, disconnect: the battery the brake light switches the steering lock the RH and LH switches the front direction indicators the horn the voltage regulator the CDI unit the starter motor relay the oil pump control unit the high tension coil the magneto flywheel armature the starter motor the choke the oil level low switch the oil pump the rear light the rear direction indicators

- Unclip the harness from its supports on the frame and cut the plastic ties

- Remove the main harness

ENGINE REMOVAL

ENGINE REMOVAL

Removal of the power unit

- Remove the battery cover
- Disconnect and remove the battery

- Disconnect the choke, suppressor, ignition rotor and starter motor (depending on model) from the main harness

- Close the fuel tap

- Disconnect the oil level low switch from the main harness under the fuel tank
- Disconnect the carburettor throttle cable and the fuel and oil supply pipes
- Disconnect the rear brake cable
- Suspend the rear of the machine
- Remove the engine to rod fixing pin
- Remove the shock absorber lower mount
- Remove the power unit

<u>Removal of the engine</u>

- Remove the rear mudguard
- Remove the exhaust
- Remove the rear wheel
- Remove the stand
- Remove the kickstart pedal
- Remove the air filter housing
- Remove the carburettor

FRAME

Removal of the frame

This method is used only when changing the frame only, with the removal of several assemblies When changing the frame due to an accident, the method must be completed by the repair or replacement of damaged items

- Remove the battery cover
- Disconnect and remove the battery (depending on model)
- Remove the floor assembly (see procedure 3)
- Remove the lower panel
- Remove the handlebar front cover
- Remove the throttle cable from the grip
- Remove from the main harness:
 - the LH or RH control clusters

the front direction indicators

- Remove the metal clamp from the front brake cable
- Disconnect and remove the steering lock
- Remove the tube pivot handlebar shaft
- Tilt the handlebar assembly
- Remove the fork assembly with the wheel
- Remove the horn and the voltage regulator without disconnecting them
- Remove the battery tray with the starter motor relay, oil pump control unit and CDI unit without disconnecting them
- Disconnect and remove the high tension coil
- Disconnect the starter motor and magneto flywheel harnesses from the main harness
- Close the fuel tap
- Disconnect the oil level low switch
- Remove the saddle, tank assembly and storage compartment
- Remove the oil pump without disconnecting it
- Remove the grab handle
- Remove the rear light and rear direction indicator assembly without disconnecting them
- Remove the shock absorber upper mount
- Remove the engine linkrod to frame shaft
- Unclip the harness from the frame and cut the plastic ties
- Remove the frame
- Remove the manufacturer's plate (A), captive nuts and linkrod rubber bump stop

FRAME

Frame fitting

- Engrave the VIN number
- Fit the manufacturer's plate
- Fit the upper and lower steering cups
- Fit the steering lock

Note: Use a shear bolt when refitting the steering lock

- Fit the frame on the power unit
- Fit the shaft on the engine mounting linkrod
- Fit the shock absorber upper mount
- Grease the upper steering cup
- Position the self-lubricating ball cage in the lower cup
- Fit the fork assembly in the fork tube
- Position the ball cage in the upper cup
- Position the steering nuts and washers

<u>Note:</u> Once the steering play has been assembled and tightened according to the recommended torques, check for correct steering functional clearance

- Position the handlebar assembly
- Position and tighten the handlebar fixing bolt and nut

- Fit the main harness, starter motor harness and flywheel output harness (clips and plastic ties) on the frame RH side once they have been connected

- Position and connect the high tension coil
- Position the battery tray

- Position the voltage regulator, starter motor relay, CDI unit and oil pump control unit in the battery tray supports

- Position and connect the horn
- Connect the steering lock
- Fit the brake and throttle cables on the frame LH side
- Fit the fuel and oil tank assembly
- Connect the fuel and oil tank supply pipes
- Connect the choke
- Connect the oil level low switch to the main harness under the tank assembly
- Fit the saddle
- Fit the floor assembly (see procedure 3, in reverse order to removal)
- Connect the rear light
- Position and connect the battery
- Fit the battery cover

<u>Note:</u> Test all electrical functions of the machine Carry out a road test to check the machine as a whole



RECOMMENDS





REF: 757812

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