

---

## Section 5

# Vegetation cutter

---

# BDM 48 Brusher Deminer

*Pro Mac Manufacturing Ltd., Canada*



*PRO MAC BDM 48 attached to a CASE 9040 B excavator*

## General description

The **BDM48** is mounted on a case 904B tracked excavator with a protection package for the operator and arm. A blast damping system protects the excavator arm from explosive blast. Quick release valves on the hydraulic system avoid hydraulic damage from heavy blast.

The prime mover has a purpose-built cab designed to withstand blast from anti-tank mines and ordnance up to 105mm artillery rounds.

The system provides the following general capabilities:<sup>1</sup>

- safety and security for the operator by working from the cleared area;
- removes vegetation to prepare ground for other clearance assets;
- removes tripwire threat;
- removes or reduces anti-personnel mine threat by neutralising mines.

## Clearance and cutting methodology

The Pro Mac BDM 48 Brushcutter Deminer is a Rotary Drum (Arbor) System that removes brush and bamboo. It can grind anti-personnel mines to a depth of 200mm. The maximum reach radius at ground level is 9m.

The drum, with its 23 cutter bits, rotates with a speed of up to 2,300rpm and covers a working width of 1,220mm.

## Machines in use to date

- One machine operated by the Canadian International Demining Corps (CIDC) in Thailand.

## Engine, fuel and oil

- The prime mover (excavator) CASE 9040B is powered by a diesel engine.
- It is recommended that performance formula diesel fuel additive should be put into the fuel tank every third fill.
- The hydraulic system of the excavator uses CASE IH Hy-Tran Ultra (MS 1209) hydraulic oil.
- Lubetec anti-friction treatment is used in both the hydraulic and engine oil systems.

## Factory support

- PROMAC offers a training package for machine operators and for service and repair personnel at the factory. This package is part of the unit purchase.
- Spare parts for the BDM 48 head are shipped with the unit. These spare parts consist of several sets of spare cutter bits, bearings, seals and a spare drive motor and shaft assembly.

- Spare parts for the excavator are available through authorized distributors for the specific make of excavator. The Thailand system is mounted on a CASE 9040B, the same unit as a Link Belt 3400 or a Sumitomo 220. Many types of excavator can be used provided that they have the necessary flow and hydraulic pressure (190l per minute and 282 bar) required for the BDM 48.
- In hotter regions it is necessary to increase the cooling system capacity of the excavator for the engine and hydraulic system. These modifications would be standard for Southeast Asia and other high ambient temperature areas.
- Instruction manuals are included as part of the sale. They will be provided in the relevant language of the purchaser and are part of the purchase package.
- Additional operator training and attachment overhaul training packages are available.

### Maintenance and support

Operators and servicing personnel must be able to perform basic service requirements such as:

- Oil and filter changes on excavator,
- Lube and service deminer head,
- Inspect and clean the unit after each working day.

Cutter bits are subject to wear and tear and will often require replacement. Maintenance personnel for the system will be required to weld new cutter bits. Rates of wear and tear will depend on soil conditions.

### Tests and evaluations

- The BDM 48 system underwent evaluation by CCMAT (Canadian Centre for Mine Action Technologies), DRES (Defence Research Establishment Suffield) and TMAC (Thailand Mine Action Centre) in April-June 2001. During evaluation, Mechanical Reproduction Mines (MRM) and M14 anti-personnel mines were used.
- CIDC summarised its observations and analysis of the performance of BDM48 covering the period August 2001 to March 2002.
- Test report: [www.itcp.ws](http://www.itcp.ws).



Example of a bite from the PRO MAC BDM 48

### Reported limitations and strengths

#### Limitations

- The BDM 48 head is not designed for clearance of anti-tank mines.<sup>1</sup>
- Complete with armoured excavator, the system weighs 34 tonnes. For transport over longer distances, a low-loader is required.<sup>2</sup>
- The clearance depth is limited to approx. 20cm.
- A highly experienced operator is needed.<sup>2</sup>
- Productivity limited by requirement to operate from safe area.

#### Strengths

- A useful tool that combines bush cutting with the ability to spot clear anti-personnel mines.
- Works through root structure and rough ground.
- Works in and around obstacles.
- Capability to detonate or neutralise all mines to a depth of 200mm.<sup>1</sup>

1. PROMAC manufacturer letter dated 8 October 2001.

2. Test report Thailand Mine Action Centre, *Standard Operating Procedures Mechanical Assistance to Demining — Promac Brush Deminer 48 (BDM 48)*, May 2001.

# Digger D-1

*Digger DTR, Switzerland*



*Digger in operation*

## General description

The **Digger D-1** is a lightweight, remotely controlled vegetation cutter developed by the Swiss NGO, Digger DTR (Demining Technologies Research), which has mine clearance experience in Croatia and Cambodia.

The vehicle consists of an armoured, V-shaped hull which potentially minimises the damage caused by anti-personnel mines or UXO detonations. The cutting tool, which can be either a flail system or a mulcher, is attached to the front of the vehicle. The system is remotely controlled up to a range of 300m by an operator placed behind a shield in line of sight. According to the manufacturer, the flail system has the potential to neutralise flush-to-surface-laid anti-personnel mines. The cutting tool is proven to remove tripwires if encountered.

Despite its rugged design the machine should not operate in areas where anti-tank mines are suspected.

## Clearance and cutting methodology

The rotor on the cutting unit operates at approximately 500rpm, using 44 adjustable chisels to remove thick vegetation and trees. The minimum cutting depth is 2cm above ground.

To increase cutting depth, a flail unit was developed after initial tests in Albania. The rotor operates at 500rpm, using 40 chains. Hardened steel hammers are attached to the end of the 50cm long chains. The cutting depth is manually adjustable from 5cm above to 5cm below surface.

This multi-tool concept will be applied to the upgraded version of the machine. A shovel and various area-reduction tools are planned to be available for the Digger 2 which will give the machine the ability to achieve a variety of demining tasks.

## Machines in use to date

- D-1 will be deployed to Sri Lanka from 2004 to 2005 with the Swiss Foundation for Mine Clearance (FSD).
- The prototype of the machine was tested by Swiss Foundation for Mine Clearance (FSD) in Albania and Kosovo (July – September 2002).
- The D-2, (second generation) will be available for purchase in 2005.

## Engine, fuel and oil

- The D-1 is equipped with a 2.7l, five-cylinder Kubota diesel engine (46kW/62hp).
- Fuel capacity is 50 l with an approx. fuel consumption of 10l/h.
- The engine oil capacity is 12l. Hydraulic fluid capacity is 120l.
- D-2 will be equipped with a 3.3l Kubota diesel engine (51kW/69 hp).

### Factory support

- Manufacturer provides training for operators.
- Available stock of spare parts reduces machine down-time.
- Manuals and documentation in English, French and German are included in the purchase package.
- One-year factory warranty.
- On-line technical service (Internet).
- Digger offers an all-inclusive hiring concept.

### Maintenance and support

- Daily servicing is required. Major servicing after 200 working hours.
- Recommended crew: one operator (remote control), one mechanic.
- Machine can be delivered in a 20ft container, equipped with a basic mobile workshop.

### Tests and evaluations

- The Swiss Army carried out blast tests on the chassis and the cutting tool. Six detonations with 730g of TNT each including fragmentation were carried out at different distances (0.04m to 1m) to the cutting tool. Five detonations of 200g of TNT were fired beneath the tracks. In all cases no serious damage was caused either by blast or fragments. The test report is available on the manufacturer's website.
- The Swiss Foundation for Mine Clearance (FSD) tested the machine over a period of 2 months in Albania in live suspect areas. Some manufacturing defects were reported. The experience gained during these tests was used for upgrading the D-1. PMA-1 detonations under the vehicle's tracks caused no damage to the system. The protective shield was tested against the effect of a PMR 2A fired from a distance of 6m. No serious damage was observed.
- Detailed information is available on the manufacturer's website.



PMA 1 fired under Digger chain



The cutting system undergoing trials

### Reported limitations and strengths

#### Limitations

- The system is designed to operate in anti-personnel mine-affected areas only.
- Difficult to operate from a long distance (more than 200m ). (This applies to all remotely controlled systems.)

#### Strengths

- Manoeuvrable and easy to transport.
- Transportable in a 20ft container, equipped with a small workshop.
- Above-average hill-climbing ability.
- Lightweight and rugged design.
- Task versatility (with other attachments).

# Hydrema M1220 Light Armoured and R1820

A/S Hydrema Danmark, Denmark



*Hydrema M1220 Light Armoured with bush cutter*

## General description

The **Hydrema M1220 Light Armoured** is based on the commercial Hydrema excavator series. The boom is available as a one- or two-piece implement. In the excavator role, the machine can be fitted with three different excavator buckets. The operator is protected from blast and fragments, and ballistic protection from rounds up to 7.62mm (NATO). The cab is mounted to the chassis on a rubber platform to reduce noise levels. The machine has permanent 4 x 4 wheel drive, with an optional gear allowing the machine to travel at up to 30km/h on paved roads.

The manufacturer has not provided further information.

The **Hydrema R 1820** is a powerful, high-capacity excavator (18-20 tonnes). It has a two-piece boom configuration for extended reach, height and low front turning radius. A neck cylinder provides safe stowage when travelling.

The unit can be fitted with various track types, depending on ground conditions.

A large armoured cab gives the operator protection against fragments and bullets to level C4 according to DIN 52290 (Deutsche Industrie Norm), part 2 (cal. 7.62x 51mm).

Computerised instrumentation provides information such as running time and maintenance scheduling to the operator.

## Working methodology

The main use of the M1220 Light Armoured is to cut vegetation. The working width of the bush cutter is 1,000mm, with 18 cutter bits mounted to the 100mm-diameter rotating drum. The arm of the Hydrema can reach the 392kg bush cutter out to 8,500mm. With a digger bucket, the boom can extend its reach to 9400mm. The M1220 has a maximum lift of 7 tonnes.

The R1820 is a multi-purpose construction machine which can also be used for vegetation cutting.

## Machines in use to date

- M 1220 Light Armoured: one system sold to MgM in Namibia for use in Angola.
- R 1820: four systems were purchased by the Swedish military and are currently employed in the Balkans.

## Engine, fuel and oil

- M1220 Light Armoured: Perkins 1004-40 T turbo-diesel engine, four-cylinder 4.0l water-cooled with 75kw.
- R1820: Perkins 1004-4TW, turbocharged, intercooler, 91kw.
- 250l fuel tank capacity (for both machines).

- 180l hydraulic tank capacity (for both machines).

### Factory support

- Training of operators is part of the purchase package.
- Comprehensive manuals and documentation are part of the purchase package.

### Maintenance and support

- The manufacturer has not provided further information.

### Tests and evaluations

- Both systems have been on the market for several years and therefore tested under operational conditions.



Hydrema R 1820

### Reported limitations and strengths

#### Limitations

- No information available.

#### Strengths

- No information available.

# Komatsu PC60 Vegetation Cutter

Komatsu, Japan



KOMATSU PC 60 vegetation cutter

## General description

The **Komatsu PC 60 Vegetation Cutter** combines vegetation cutting and terrain levelling. The system features heavy armour protection for the driver's cab, fuel tank, hydraulic tank and engine. The system is not capable of withstanding an anti-tank mine blast. Tests carried out using live mines such as OZM3 and M18A1 confirmed the survivability of the system against anti-personnel mine blasts.

With a total weight of approx. 10 tonnes, the machine is practical for deployment to countries where road infrastructure is poor. Low ground pressure allows for operation in wet and muddy ground conditions.

Low average fuel consumption and robust design are aimed at reducing operational costs of the machine.

## Clearance methodology

The cutter unit cuts vegetation up to 100mm in diameter to a working width of 1,000mm. The cutter unit rotating drum is attached to a hydraulically-operated arm with a reach of 6.70m.

No further information is provided by the manufacturer.

## Machines in use to date

- Two machines have been operated by CMAC since 2000.

## Engine, fuel and oil

- The Komatsu 4D95 diesel engine powers both machines.
- The hydraulic brush cutter attachment is powered by the main engine.

## Factory support

- Komatsu provides training both for operators and mechanics.
- Manuals are available in English or any language required by the purchaser.
- Worldwide servicing and spare parts network reduces machine down-time.

## Maintenance and support

- The system features a water separator for poor quality fuel, a corrosion resistor for hard water treatment and a larger engine cooling system for tropical conditions.

### Tests and evaluations

- The prototype of the PC 60 was tested in Cambodia. Operational performance and survivability fulfil CMAC requirements.
- The survivability test was carried out by using anti-personnel pressure mines (OZM3 and M18A1).



*Komatsu vegetation cutter operating in Cambodia*

### *Reported limitations and strengths*

#### **Limitations**

- Machine is not capable of withstanding an anti-tank mine blast.
- The vegetation cutting performance is limited to 100mm stem in diameter.

#### **Strengths**

- Lightweight.
- Worldwide servicing network provides access to spares.

## Technical data sheet

## BDM 48 Brusher Deminer

### a. Dimensional data

1.	Total length:	9,880mm
2.	Maximum reach radius:	9,000mm
3.	Width total:	3,380mm
4.	Working width:	1,220mm
5.	Height, minimum:	3,070mm
6.	Height, overall:	As per boom position
7.	Mass, basic vehicle:	32,000kg
8.	Mass, working tool:	1,820kg
9.	Mass, total:	34,000kg

### b. Driving specifications

10.	Wheels/ tracks:	Tracks
11.	Ground pressure, max weight:	Not given
12.	Hill climbing ability:	35°

### c. Clearance performance

13.	Number of cutting tools:	23 cutter bits
14.	Gap between drums/ chisels/chains:	Overlapping bits
15.	Rotation speed:	1,900-2,300rpm
16.	Working depth, max.:	Up to 200mm
17.	Working speed:	
	• in thick underbrush and bamboo:	4-8m <sup>2</sup> /min <sup>a)</sup>
18.	Control of working depth:	Manual
19.	Machines in use:	1
20.	Other types:	Not given
21.	Location of use:	Thailand
22.	Total area cleared so far:	Not given

### d. System specifications

23.	Engine:	Cummins GT830 (CASE 9040B)
24.	Fuel capacity:	310l
25.	Fuel consumption:	Not given
26.	Separate engine for tilling unit:	No
27.	Transition:	—
28.	Cooling system engine:	35l
29.	Hydraulic oil capacity:	216l

### e. Comfort and security

30.	Air conditioning:	Not given
31.	Operator comfort:	Not given
32.	Armour:	Not given
33.	Remote control:	No

### f. Costs

34.	Cost of system:	Not given
35.	Other costs:	Not given
36.	Transport limitation:	Max. speed on tracks 5km/h. Normally on trailer
37.	Availability for hire:	Not given

a) According to the manufacturer.

## Technical data sheet

## Digger D-1

### a. Dimensional data

1.	Length without attachment:	3,000mm
2.	Total length:	3,500mm
3.	Width without attachment:	1,400mm
4.	Width total:	1,800mm
5.	Clearing/working width:	1,600mm (flail)
6.	Height, overall:	1,700mm
7.	Mass, basic vehicle:	3,500kg
8.	Mass, working tool:	400kg (flail)
9.	Mass, total:	3,900kg

### b. Driving specifications

10.	Wheels/ tracks:	Steel fabricated tracks
11.	Ground pressure:	Approx. 1kg/cm <sup>2</sup>
12.	Hill climbing ability:	30°

### c. Working performance

13.	Number of chains/tools:	Flail (40 chains) or mulcher (44 chisels)
14.	Gap between chisels/chains:	Overlap
15.	Length of chains:	500mm
16.	Diameter of drum:	Mulcher: 350mm
17.	Rotation speed:	500rpm (flail and mulcher)
18.	Working depth, max:	Flail: -50mm to +50mm; mulcher: +20mm
19.	Working speed <sup>a)</sup>	
	• light soil/ small vegetation:	2,000m <sup>2</sup> /h
	• medium soil/medium vegetation:	1,500m <sup>2</sup> /h
	• heavy soil/ dense vegetation:	600m <sup>2</sup> /h
20.	Control of working depth:	Flail: adjustable, mulcher: manual
21.	Machines in use:	1
22.	Other types:	D-2 (second generation)
23.	Location of use:	Sri Lanka
24.	Total area cleared so far:	Not given

### d. System specifications

25.	Engine:	Kubota 5-cylinder diesel engine, 2.7l, 46kw (D-2: 51kw)
26.	Fuel capacity:	50l
27.	Fuel consumption:	10l
28.	Separate engine for working unit:	No
29.	Cooling system engine:	Water cooled
30.	Hydraulic oil capacity (both engines):	120l

### e. Comfort and security

31.	Air conditioning:	—
32.	Operator comfort:	Remote control, with operator protection shield
33.	Armour:	10mm hardened steel
34.	Remote control:	Yes
	• greatest distance:	More than 300m

### f. Costs

35.	Cost of system:	CHF165,000 (Digger-D 2)
35.	Other costs:	
	• spare parts set:	CHF20,000 (for flail and vehicle)
	• repair costs for one year:	Included in spare part set
36.	Transport limitation:	20ft container with workshop inside
37.	Availability for hire:	Yes, with 2 Digger staff (operator and mechanic), transportation and logistic included

a) According to the manufacturer.

## Technical data sheet

## Hydrema M1220/R1820

### a. Dimensional data

1.	Length total:	6,610mm/8,340mm
2.	Maximum reach radius:	1,000mm
3.	Width total:	2,486 mm/2,880mm
4.	Working width:	Not given
5.	Height, minimum:	Not given
6.	Height, overall:	3,920mm/2,959mm (in transportation mode)
7.	Mass, basic vehicle:	18,000-20,000kg
8.	Mass, attachments:	392kg (for bush cutter head)
9.	Mass, total:	Max. 13,500kg

### b. Driving specifications

10.	Wheels/ tracks:	4 wheels 8 x 9 – 20 EM (with twin tyres 4 x 600/40 – 22,5/ tracks)
11.	Ground pressure, max weight:	0,32-0,57kg/cm <sup>2</sup>
12.	Hill climbing ability:	Not given

### c. Working performance

13.	Number of cutting tools:	Not given
14.	Gap between drums, chisels, chains:	Not given
15.	Rotation speed:	Not given
16.	Working depth, max:	5,700 mm/6,600mm (max. digging depth)
17.	Working speed brush cutter:	Not given
18.	Control of working depth:	Not given
19.	Machines in use:	1/4
20.	Other types:	Not given
21.	Location of use:	Angola, Balkans
22.	Total area cleared so far:	Not given

### d. System specifications

23.	Engine:	Perkins 1004 – 40 T turbo-diesel engine, four-cylinder, 4.0l, with 75kw/ turbocharged intercooler, 91kw
24.	Fuel capacity:	250l
25.	Fuel consumption:	Not given
26.	Separate engine for tilling unit:	Not given
27.	Transition:	Not given
28.	Cooling system engine:	Water cooled
29.	Hydraulic oil capacity:	180l

### e. Comfort and security

30.	Air conditioning:	Optional
31.	Operator comfort:	Comfort drivers seat damped against shock wave from mine explosions, vibration damped cab, heating system, other equipment is available as an option
32.	Armour:	DIN 52290-2/DIN 52290-2 class C5
33.	Remote control:	Not given

### f. Costs

34.	Cost of system:	Not given
35.	Other costs:	Not given
36.	Transport limitation:	For long distances transportation on a low-bed trailer is required
37.	Availability for hire:	Not given

a) According to the manufacturer.

## Technical data sheet

## Komatsu PC 60

### a. Dimensional data

1.	Total length:	6,320mm
2.	Maximum reach radius:	6,705mm
3.	Width total:	2,605mm
4.	Working width:	1,000 mm
5.	Height, minimum:	2,890 mm
6.	Height, overall:	6,715mm
7.	Mass, basic vehicle:	10,400kg
8.	Mass, working unit:	500kg
9.	Mass, total:	10,900kg

### b. Driving specifications

10.	Wheels/ tracks:	Tracks
11.	Ground pressure, max weight:	0.4kg/cm <sup>2</sup>
12.	Hill climbing ability:	15°

### c. Working performance

13.	Number of cutting tools:	40
14.	Gap between tools:	6 lines on the circumference
15.	Rotation speed:	2,500rpm
16.	Working depth max.:	Not given
17.	Working speed:	Not given
18.	Control of working depth:	Manual
19.	Machines in use:	2
20.	Other types:	Bigger and more powerful model is available as well
21.	Location of use:	Cambodia
22.	Total area cleared so far:	Not given

### d. System specifications

23.	Engine:	Komatsu 4D95
24.	Fuel capacity:	130l
25.	Fuel consumption:	6l per hour
26.	Separate engine for tilling unit:	No
27.	Transition:	Not given
28.	Cooling system engine:	Water cooled
29.	Hydraulic oil capacity:	57l

### e. Comfort and security

30.	Air conditioning:	Yes
31.	Operator comfort:	Not given
32.	Armour:	See general description
33.	Remote control:	No

### f. Costs

34.	Cost of system:	Not given
35.	Other costs:	Not given
36.	Transport limitation:	For long distances transportation on a low-bed trailer is required
37.	Availability for hire:	Not given

## COMPARATIVE ANALYSIS

	BDM 48	Digger D-1
<b>a. Dimensional data</b>		
1. Total length:	9,880mm	3,500mm
2. Maximum reach radius:	9,000mm	—
3. Width total:	3,380mm	1,800mm
4. Working width:	1,220mm	1,600mm (flail)
5. Height, minimum:	3,070mm	1,500mm
6. Height, overall:	As per boom position	1,700mm
7. Mass, basic vehicle:	32,000kg	3,500kg
8. Mass, working tool:	1,820kg	400kg (flail)
9. Mass, total:	34,000kg	3,900kg
<b>b. Driving specifications</b>		
10. Wheels/ tracks:	Tracks	Steel fabricated tracks
11. Ground pressure, max weight:	Not given	Approx. 1kg/cm <sup>2</sup>
12. Hill climbing ability:	35°	30°
<b>c. Working performance</b>		
13. Number of cutting tools:	23 cutter bits	Flail(40 chains) or mulcher (44 chisels) Length of chains: 500mm Diameter of mulcher: 350mm
14. Gap between drums/ chisels/chains:	Overlapping bits	Overlap
15. Rotation speed:	1,900-2,300rpm	500rpm (flail and mulcher)
16. Working depth, max.:	Up to 200mm	Flail: -50mm to +50mm Mulcher: +20mm
17. Working speed:		
• light soil/ small vegetation:		2,000m <sup>2</sup> /h <sup>Ⓞ</sup>
• medium soil/medium vegetation:		1,500m <sup>2</sup> /h <sup>Ⓞ</sup>
• heavy soil/ dense vegetation:		600m <sup>2</sup> /h <sup>Ⓞ</sup>
• in thick underbrush and bamboo: 4-8m <sup>2</sup> /min <sup>Ⓞ</sup>		
18. Control of working depth:	Manual	Flail: adjustable, mulcher: manual
19. Machines in use:	1	1
20. Other types:	Not given	D-2 (second generation)
21. Location of use:	Thailand	Sri Lanka
22. Total area cleared so far:	Not given	Not given
<b>d. System specifications</b>		
23. Engine:	Cummins GT830 (CASE 9040B)	Kubota 5-cylinder diesel engine, 2,7l, 46kw (d-2: 51kw)
24. Fuel capacity:	310l	50l
25. Fuel consumption:	Not given	10l
26. Separate engine for tilling unit:	No	No
27. Transition:	—	—
28. Cooling system engine:	35l	Water cooled
29. Hydraulic oil capacity:	216l	120l
<b>e. Comfort and security</b>		
30. Air conditioning:	Not given	—
31. Operator comfort:	Not given	Remote control, with operator protection shield
32. Armour:	Not given	10mm hardened steel
33. Remote control:	No	Yes
• greatest distance:		More than 300m
<b>f. Costs</b>		
34. Cost of system:	Not given	CHF165,000 (Digger D-2)
35. Other costs:	Not given	
• spare parts set:		CHF20,000 (for flail and vehicle)
• repair costs for one year:		Included in spare parts set
36. Transport limitation:	Max. speed on tracks 5km/h. Normally on trailer	20ft container with workshop inside
37. Availability for hire:	Not given	Yes, with Digger-2 staff, transportation and logistic incl.

## Vegetation cutter

Hydrema 1220 and R1820	Komatsu PC 60
6,610mm/8,340mm	6,320m
1,000mm	6,705mm
2,486 mm/2,880mm	2,605mm
Not given	1,000 mm
Not given	2,890 mm
3,920mm/2,959mm (in transportation mode)	6,715mm
18,000-20,000kg	10,400kg
392kg (for bush cutter head)	500kg
Max. 13,500kg	10,900kg
4 wheels 8 x 9 – 20 EM (with twin tyres 4 x 600/40)	Tracks
0.32-0.57kg/cm <sup>2</sup>	0.4kg/cm <sup>2</sup>
Not given	15°
Not given	40
Not given	6 lines on the circumference
Not given	2,500rpm
5,700 mm/6,600mm (max digging depth).	Not given
Not given	Not given
Not given	Manual
1/4	2
Not given	Bigger and more powerful model is available as well
Angola, Balkans	Cambodia
Not given	Not given
Perkins 1004 – 40 T turbo-diesel engine, 4-cylinder, 4l, with 75kw/ turbocharged intercooler, 91kw	Komatsu 4D95
250l	130l
Not given	6l per hour
Not given	No
Not given	Not given
Water cooled	Water cooled
180l	57l
Optional	Yes
Comfort drivers seat damped against shock wave from mine explosions, vibration damped cab, heating system, other equipment is available as an option	Not given
DIN 52290-2/DIN 52290-2 class C5	See general description
Not given	No
Not given	Not given
Not given	Not given
For long distances transportation on a low-bed trailer is required	For long distances transportation on a low-bed trailer is required
Not given	Not given