

# ROUGH TERRAIN CRANE

## TR-200M

### *JAPANESE SPECIFICATIONS*

OUTLINE	SPEC. NO.
5-section Boom	TR-200M-4-00109

Control No. JA-01

# TR-200M

## CRANE SPECIFICATIONS

### CRANE CAPACITY

8.5m	4-Boom	20,000kg	at 3.5m	( 7 part-line)
	5-Boom	4,800kg	at 6.5m	( 7 part-line)
14.4m	4-Boom	12,000kg	at 5.5m	( 6 part-line)
	5-Boom	4,800kg	at 11.0m	( 6 part-line)
20.3m	4-Boom	9,000kg	at 6.0m	( 4 part-line)
	5-Boom	4,800kg	at 10.0m	( 4 part-line)
26.2m	4-Boom	7,000kg	at 6.5m	( 4 part-line)
	5-Boom	4,800kg	at 7.0m	( 4 part-line)
32.1m	5-Boom	3,400kg	at 10.0m	( 4 part-line)
Single top				
	4-Boom	3,000kg		( 1 part-line)
	5-Boom	2,500kg		( 1 part-line)

### MAX. LIFTING HEIGHT

4-Boom	26.9m
5-Boom	32.7m

### MAX. WORKING RADIUS

4-Boom	24.0m
4-Boom	30.0m

### BOOM LENGTH

8.5m – 32.1m

### BOOM EXTENSION

23.6m (5-Boom)

### BOOM EXTENSION SPEED

23.6m / 45s

### MAIN WINCH SINGLE LINE SPEED

High range:	121m/min	(4th layer)
Low range:	58m/min	(4th layer)

### MAIN WINCH HOOK SPEED

High range:	17.3m/min	(7 part-line)
Low range:	8.3m/min	(7 part-line)

### AUXILIARY WINCH SINGLE LINE SPEED

High range:	103m/min	(2nd layer)
Low range:	50m/min	(2nd layer)

### AUXILIARY WINCH HOOK SPEED

High range:	103m/min	(1th layer)
Low range:	50m/min	(1th layer)

### BOOM ELEVATION ANGLE

0° – 82°

### BOOM ELEVATION SPEED

0° – 82° / 34s

### SWING ANGLE

360° continue

### SWING SPEED

3.4rpm

### WIRE ROPE

Main Winch

16mm × 175m (Diameter×Length)  
7×7+6×WS(36) Spin-resistant wire rope

Auxiliary Winch

16mm × 80m (Diameter×Length)  
7×7+6×Fi(29) Spin-resistant wire rope

### BOOM

5-section hydraulically telescoping boom of box construction.  
(stages 2~5;synchronized: stages 2~4; synchronized)

### BOOM EXTENSION

1 double-acting hydraulic cylinder  
3 wire rope type telescoping device

### SINGLE TOP

Single sheave. Mounted to main boom head for single line work.

### HOIST

Driven by hydraulic motor and via planetary gear reducer.  
With free-fall device.  
Automatic brake (with foot brake for free-fall device)  
2 single winches

### BOOM ELEVATION

1 double-acting hydraulic cylinders

### SWING

Hydraulic motor driven planetary gear reducer  
Swing bearing  
Swing free/lock changeover type  
Hand brake

### OUTRIGGERS

Fully hydraulic X-type (floats mounted integrally)  
Slides and jacks each provided with independent operation device.

Full extended width	5.8m
Middle extended width	4.7m
Minimum extended width	3.6m

### MAX. OUTRIGGER LOAD

22.6t

### HYDRAULIC PUMPS

Variable piston pump and gear pump

### HYDRAULIC OIL TANK CAPACITY

375 liters

### SAFETY DEVICES

Automatic moment limiter (AML)  
With working range function  
Over-winding cutout  
Working area control device  
Level gauge  
Hook safety latch  
Winch drum lock  
Hydraulic safety valve  
Telescopic counterbalance valve  
Elevation counterbalance valve  
Jack pilot check valve  
Swing lock

### EQUIPMENTS

Crane cab heater (with defroster)  
Hydraulic oil temperature indication lamp  
Oil cooler  
Winch drum rotation indicator  
Operation pedals for elevating/ telescoping  
Radio

## CARRIER SPECIFICATIONS

### ENGINE

Model MITSUBISHI 6D14  
 Type 4-cycle, 6-cylinder, direct-injection, water-cooled diesel engine (with turbo charger)  
 Piston displacement 6,557cc  
 Max. output 185PS at 2,800rpm  
 Max. torque 58kg·m at 1,600rpm

### TORQUE CONVERTER

3-element, 1-stage unit (with automatic lock-up mechanism)

### TRANSMISSION

Power shift type (wet multi-plate clutch)  
 3 forward and 1 reverse speeds

### REDUCER

Axle dual-ratio reduction

### DRIVE

2-wheel drive (4×2) / 4-wheel drive (4×4) selection

### FRONT AXLE

Full floating type

### REAR AXLE

Full floating type (with no-spin differential)

### SUSPENSION

Front Parallel leaf spring type  
 Rear Parallel leaf spring type

### STEERING

Fully hydraulic power steering  
 With reverse steering correction mechanism

### BRAKE SYSTEM

#### Service Brake

Hydro-pneumatic brake  
 Disk brake

#### Parking Brake

Mechanically operated, internal expanding duo-servo shoe type acting on drum at transmission case rear.

#### Auxiliary Brake

Electro-pneumatic operated exhaust brake.  
 Auxiliary braking device for operations

### FRAME

Welded box-shaped structure

### ELECTRIC SYSTEM

24 V DC. 2 batteries of 12V (120Ah)

### FUEL TANK CAPACITY

250 liters

### TIRES

Front 14.00R24 ☆☆☆(OR)  
 Rear 14.00R24 ☆☆☆(OR)

### CAB

Two-man type

With sun visor and trim

Rubber mounted type

Fully adjustable seat (with headrest, seat belt)

Adjustable handle (tilt, telescoping)

Roof windshield lock warning

### SAFETY DEVICES

Emergency steering device

Spring lock device

Rear wheel steering lock device

Engine over-run alarm

Overshift prevention device

Parking brake alarm

## GENERAL DATA

### DIMENSIONS

Overall length	10,470mm
Overall width	2,490mm
Overall height	3,420mm
Wheel base	3,100mm
Tread Front	2,070mm
Rear	2,070mm

### WEIGHTS

Gross vehicle weight	
Total	23,200kg
Front	11,575kg
Rear	11,625kg

### PERFORMANCE

Max. traveling speed	49km/h
Gradeability (tan θ)	0.6
Min. turning radius	4.7m (4-wheel steering) 8.0m (2-wheel steering)

**TOTAL RATED LOADS**

- (1) With outriggers set (360°)
- (i) 4 section boom condition

Unit:ton

Outriggers fully extended					
A	8.5m	14.4m	20.3m	26.2m	
B (m)					
2.5	20.0	12.0	9.0		
3.0	20.0	12.0	9.0		
3.5	20.0	12.0	9.0	7.0	
4.0	18.5	12.0	9.0	7.0	
4.5	16.5	12.0	9.0	7.0	
5.0	15.0	12.0	9.0	7.0	
5.5	13.7	12.0	9.0	7.0	
6.0	12.5	11.4	9.0	7.0	
6.5	11.5	10.6	8.5	7.0	
7.0		9.9	8.0	6.8	
8.0		8.4	7.2	6.15	
9.0		6.8	6.4	5.55	
10.0		5.8	5.8	5.05	
11.0		4.8	4.9	4.65	
12.0		4.15	4.2	4.2	
13.0			3.65	3.65	
14.0			3.2	3.2	
15.0			2.8	2.8	
16.0			2.5	2.5	
17.0			2.2	2.2	
18.0			2.0	2.0	
19.0				1.75	
20.0				1.4	
22.0				1.1	
24.0				0.8	

Unit:ton

Outriggers middle extended					
A	8.5m	14.4m	20.3m	26.2m	
B (m)					
2.5	20.0	12.0	9.0		
3.0	20.0	12.0	9.0		
3.5	20.0	12.0	9.0	7.0	
4.0	18.5	12.0	9.0	7.0	
4.5	16.5	12.0	9.0	7.0	
5.0	14.5	12.0	9.0	7.0	
5.5	12.0	12.0	9.0	7.0	
6.0	10.1	10.3	9.0	7.0	
6.5	8.7	8.9	8.5	7.0	
7.0		7.9	7.85	6.8	
8.0		6.15	6.15	6.15	
9.0		5.0	5.05	5.05	
10.0		4.15	4.2	4.2	
11.0		3.5	3.55	3.55	
12.0		3.0	3.05	3.05	
13.0			2.65	2.65	
14.0			2.3	2.3	
15.0			2.0	2.0	
16.0			1.75	1.75	
17.0			1.55	1.4	
18.0			1.35	1.2	
19.0				1.0	
20.0				0.85	
22.0				0.6	
24.0				0.4	

Unit:ton

Outriggers minimum extended					
A	8.5m	14.4m	20.3m	26.2m	
B (m)					
2.5	20.0	12.0	9.0		
3.0	20.0	12.0	9.0		
3.5	18.9	12.0	9.0	7.0	
4.0	14.2	12.0	9.0	7.0	
4.5	11.3	11.5	9.0	7.0	
5.0	9.3	9.5	9.0	7.0	
5.5	7.9	8.0	8.1	7.0	
6.0	6.8	6.9	6.95	6.95	
6.5	5.9	6.0	6.05	6.05	
7.0		5.3	5.35	5.35	
8.0		4.2	4.25	4.25	
9.0		3.4	3.45	3.45	
10.0		2.8	2.9	2.85	
11.0		2.35	2.4	2.4	
12.0		2.0	2.0	2.05	
13.0			1.7	1.7	
14.0			1.4	1.35	
15.0			1.1	1.1	
16.0			0.9	0.9	
17.0			0.75	0.75	
18.0			0.6	0.6	
19.0				0.45	

A = Boom length  
B = Working radius

(ii) 5 section boom condition

Unit: ton

Outriggers fully extended					Outriggers middle extended					Outriggers minimum extended							
A	8.5m	14.4m	20.3m	26.2m	32.1m	A	8.5m	14.4m	20.3m	26.2m	32.1m	A	8.5m	14.4m	20.3m	26.2m	32.1m
B (m)						B (m)						B (m)					
2.5	4.8	4.8	4.8			2.5	4.8	4.8	4.8			2.5	4.8	4.8	4.8		
3.0	4.8	4.8	4.8			3.0	4.8	4.8	4.8			3.0	4.8	4.8	4.8		
3.5	4.8	4.8	4.8	4.8		3.5	4.8	4.8	4.8	4.8		3.5	4.8	4.8	4.8	4.8	
4.0	4.8	4.8	4.8	4.8	3.4	4.0	4.8	4.8	4.8	4.8	3.4	4.0	4.8	4.8	4.8	4.8	3.4
4.5	4.8	4.8	4.8	4.8	3.4	4.5	4.8	4.8	4.8	4.8	3.4	4.5	4.8	4.8	4.8	4.8	3.4
5.0	4.8	4.8	4.8	4.8	3.4	5.0	4.8	4.8	4.8	4.8	3.4	5.0	4.8	4.8	4.8	4.8	3.4
5.5	4.8	4.8	4.8	4.8	3.4	5.5	4.8	4.8	4.8	4.8	3.4	5.5	4.8	4.8	4.8	4.8	3.4
6.0	4.8	4.8	4.8	4.8	3.4	6.0	4.8	4.8	4.8	4.8	3.4	6.0	4.8	4.8	4.8	4.8	3.4
6.5	4.8	4.8	4.8	4.8	3.4	6.5	4.8	4.8	4.8	4.8	3.4	6.5	4.8	4.8	4.8	4.8	3.4
7.0		4.8	4.8	4.8	3.4	7.0		4.8	4.8	4.8	3.4	7.0		4.8	4.8	4.8	3.4
8.0		4.8	4.8	4.7	3.4	8.0		4.8	4.8	4.7	3.4	8.0		4.3	4.45	4.5	3.4
9.0		4.8	4.8	4.3	3.4	9.0		4.8	4.8	4.3	3.4	9.0		3.55	3.7	3.7	3.4
10.0		4.8	4.8	4.0	3.4	10.0		4.3	4.45	4.0	3.4	10.0		2.95	3.05	3.1	3.1
11.0		4.8	4.5	3.8	3.2	11.0		3.65	3.8	3.6	3.0	11.0		2.5	2.6	2.6	2.6
12.0		4.3	4.3	3.5	3.0	12.0		3.15	3.25	3.1	2.8	12.0		2.1	2.2	2.2	2.2
13.0			3.85	3.2	2.85	13.0			2.85	2.7	2.5	13.0			1.9	1.9	1.9
14.0			3.4	3.0	2.7	14.0			2.5	2.5	2.3	14.0			1.65	1.7	1.7
15.0			3.0	2.85	2.5	15.0			2.2	2.2	2.1	15.0			1.45	1.5	1.5
16.0			2.7	2.65	2.4	16.0			1.95	1.95	1.9	16.0			1.1	1.1	1.1
17.0			2.4	2.4	2.3	17.0			1.7	1.7	1.7	17.0			1.0	1.0	1.0
18.0			2.2	2.2	2.15	18.0			1.55	1.55	1.55	18.0			0.8	0.8	0.8
19.0				2.0	2.0	19.0			1.3	1.3	1.3	19.0				0.7	0.7
20.0				1.8	1.8	20.0			1.1	1.1	1.1	20.0				0.5	0.5
22.0				1.5	1.5	22.0				0.9	0.9	22.0					
24.0				1.1	1.1	24.0				0.6	0.6	24.0					
26.0					0.9	26.0					0.4	26.0					
28.0					0.7												
30.0					0.5												

A = Boom length  
B = Working radius

**PRECAUTIONS TO BE TAKEN WHEN THE OUTRIGGERS ARE EXTENDED:**

1. The total rated loads shown are for the case when the crane is set horizontally on firm ground. The values above the bold lines are based on the crane strength while those below are based on the crane stability.
2. The weights of the slings and hooks (main winch hook: 220kg, auxiliary winch hook: 60kg) are included in the total rated loads shown.
3. The total rated load is based on the actual working radius including the deflection of the boom.
4. The chart below shows the standard number of part lines for each boom length. The load per line should not exceed 2.9t for the main winch and 3.0t for the auxiliary winch.

<b>A</b>	8.5m	14.4m	20.3m	26.2m	32.1m	<b>J</b>
<b>H</b>	7	6	4	4	4	1

A = Boom length    H = No. of part-line    J = Single top

5. As a rule, free-fall operation should be performed only when lowering the hook alone. If a hoisted load must be lowered by free-fall operation, the load must be kept below 1/5th of the total rated load and sudden braking operations must be avoided.
6. The total rated load for the single top shall be the value obtained by subtracting 160kg from the total rated load of the boom and must not exceed 3.0t. However, for a boom length which exceeds 26.2m, the limit shall be 2.5t.

**2-(2) Without outriggers**  
**(i) 4 section boom condition**

Unit:ton

B ( m )	Stationary						Creep (travelling at 1.6km/h or less)					
	8.5m BOOM		14.4mBOOM		20.3mBOOM		8.5m BOOM		14.4mBOOM		20.3mBOOM	
	F	G	F	G	F	G	F	G	F	G	F	G
3.0	12.2	8.2	8.7	7.2			8.5	6.5	6.7	5.0		
3.5	10.7	7.2	8.7	7.0	6.2	4.5	8.3	5.6	6.7	5.0	5.2	3.7
4.0	10.2	6.0	8.7	5.6	6.2	4.5	7.5	4.7	6.7	4.6	5.2	3.7
4.5	9.1	4.9	8.0	4.5	6.2	4.5	6.8	3.7	6.3	3.7	5.2	3.7
5.0	8.0	4.0	7.2	3.75	6.2	4.1	6.1	3.1	5.8	3.0	5.2	3.3
5.5	6.9	3.4	6.4	3.2	5.7	3.5	5.4	2.6	5.2	2.5	4.8	2.8
6.0	6.1	2.8	5.65	2.7	5.3	3.0	4.9	2.2	4.6	2.1	4.4	2.3
6.5	5.2	2.4	4.9	2.2	4.85	2.55	4.2	1.8	4.05	1.7	4.0	2.0
7.0			4.3	1.85	4.5	2.2			3.6	1.4	3.7	1.7
8.0			3.3	1.25	3.7	1.65			2.75	0.9	3.1	1.2
9.0			2.55	0.8	3.0	1.2			2.15	0.6	2.5	0.9
10.0			2.05	0.4	2.5	0.85			1.75		2.05	0.6
11.0			1.6		2.0	0.55			1.35		1.65	
12.0			1.25		1.6				1.05		1.3	
13.0					1.3						1.05	
14.0					1.05						0.85	
15.0					0.85						0.65	
16.0					0.65						0.5	
17.0					0.45							

**B = Working radius F = Front G = 360°**

## (ii) 5 section boom condition

Unit:ton

B ( m )	Stationary						Creep (travelling at 1.6km/h or less)					
	8.5m BOOM		14.4m BOOM		20.3m BOOM		8.5m BOOM		14.4m BOOM		20.3m BOOM	
	F	G	F	G	F	G	F	G	F	G	F	G
3.0	4.8	4.8	4.8	4.8			4.8	4.8	4.8	4.8		
3.5	4.8	4.8	4.8	4.8	4.8	4.5	4.8	4.8	4.8	4.8	4.8	3.7
4.0	4.8	4.8	4.8	4.8	4.8	4.5	4.8	4.7	4.8	4.6	4.8	3.7
4.5	4.8	4.8	4.8	4.5	4.8	4.5	4.8	3.7	4.8	3.7	4.8	3.7
5.0	4.8	4.0	4.8	3.75	4.8	4.1	4.8	3.1	4.8	3.0	4.8	3.3
5.5	4.8	3.4	4.8	3.2	4.8	3.5	4.8	2.6	4.8	2.5	4.8	2.8
6.0	4.8	2.8	4.8	2.7	4.8	3.0	4.8	2.2	4.6	2.1	4.4	2.3
6.5	4.8	2.4	4.8	2.2	4.8	2.55	4.2	1.8	4.05	1.7	4.0	2.0
7.0			4.3	1.85	4.5	2.2			3.6	1.4	3.7	1.7
8.0			3.3	1.25	3.7	1.65			2.75	0.9	3.1	1.2
9.0			2.55	0.8	3.0	1.2			2.15	0.6	2.5	0.9
10.0			2.05	0.4	2.5	0.85			1.75		2.05	0.6
11.0			1.6		2.0	0.55			1.35		1.65	
12.0			1.25		1.6				1.05		1.3	
13.0					1.3						1.05	
14.0					1.05						0.85	
15.0					0.85						0.65	
16.0					0.65						0.5	
17.0					0.45							

B = Working radius F = Front G = 360°



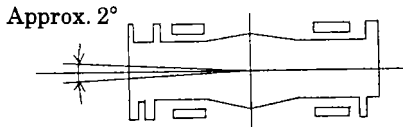
**PRECAUTIONS TO BE TAKEN WHEN THE OUTRIGGERS ARE NOT MOUNTED:**

1. The total rated loads shown are for the case when the crane is set horizontally on firm ground. The values above the bold lines are based on the crane strength while those below are based on the crane stability. The foundation, working conditions, etc. should be taken into consideration adequately when using the crane for actual work. (Tire air pressure: 9.0kg/cm<sup>2</sup>).
2. The weights of the slings and hooks are included in the total rated loads shown.
3. The total rated loads are based on the actual working radii into which are included the deflections of the boom and the tires.
4. The chart below shows the standard number of part lines for each boom length. The load per line should not exceed 2.9t (main winch hook).

<b>A</b>	8.5m	14.4m	20.3m	<b>J</b>
<b>H</b>	7	6	4	1

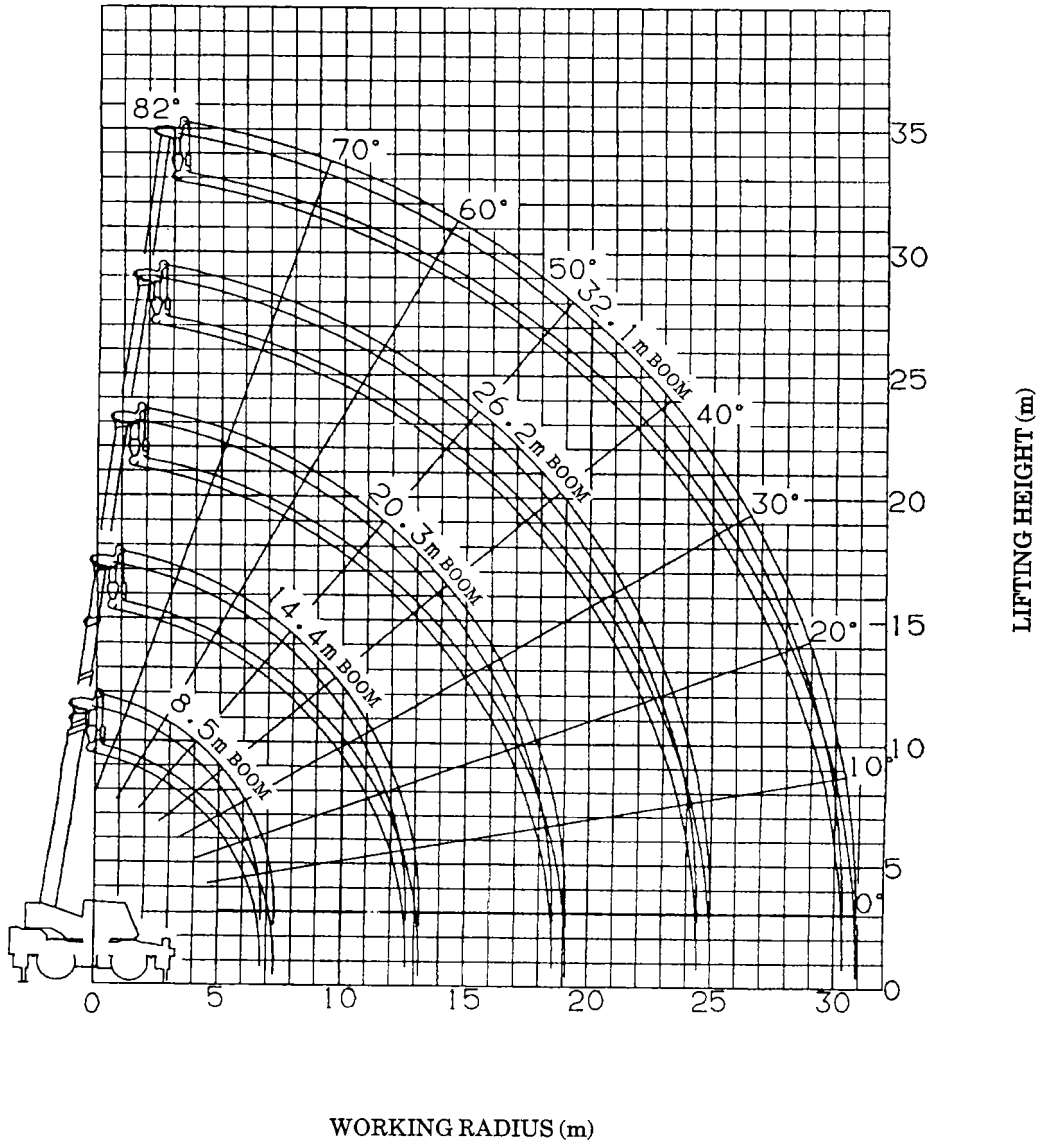
A = Boom length  
 H = No. of part-line  
 J = Single top

5. The total rated load for the single top shall be the value obtained by subtracting 120kg from the total rated load of the boom and must not exceed 3.0t.
6. Free-fall operations should not be performed without outriggers.
7. The 20.3m boom, the jib and the single top should not be used without the outriggers.
8. The boom must be kept inside a 2° area (1° each to the left and right) over front of the carrier when performing "Over front" crane operations without the outriggers.



9. When creeping while hoisting a load, the swing brake should be applied, the load should be kept as close to the ground as possible but not touching the ground and the speed should be kept at 1.6km/h or less. In particular, any abrupt steering, starting or braking must be avoided.
10. Crane operations should not be performed when creeping while hoisting a load.

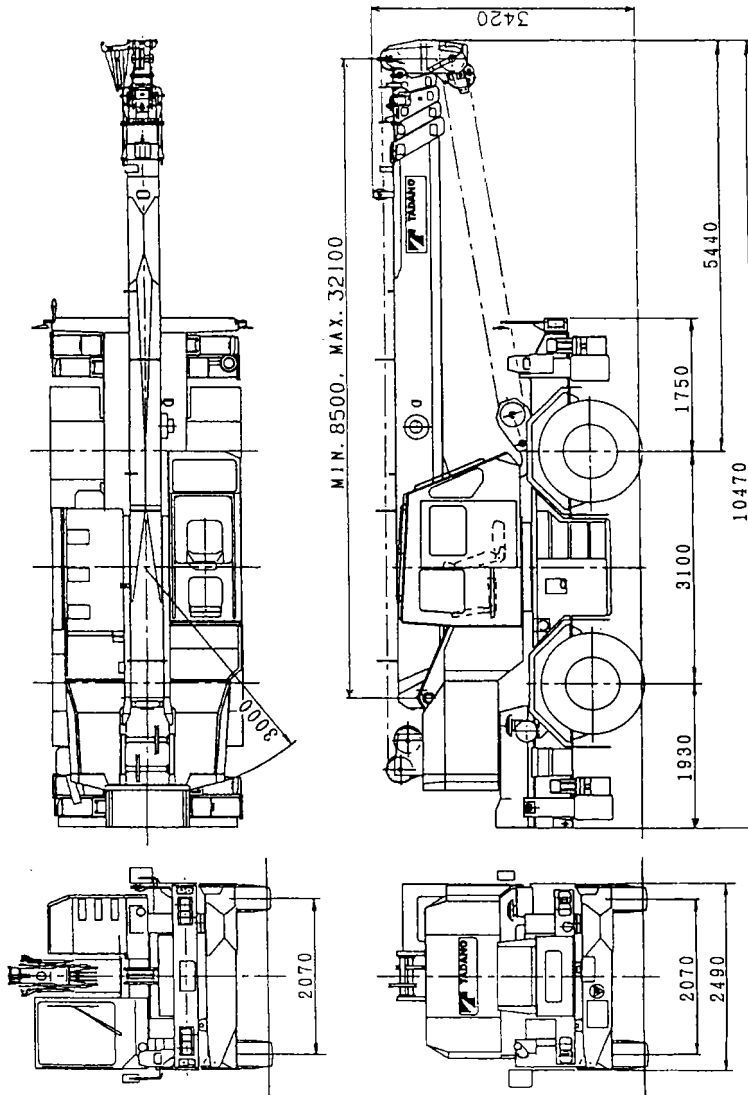
**WORKING RADIUS - LIFTING HEIGHT**



**NOTES:**

1. The deflection of the boom is not incorporated in the figure above.
2. The figure above is for the case when the outriggers are fully extended (360°).

**DIMENSIONS** (1/100)



◆ MEMO ◆

A series of horizontal dashed lines for writing a memo.