ROUGH TERRAIN CRANE

TR-250M

JAPANESE SPECIFICATIONS

OUTLINE	SPEC. NO.
4-section Boom, 2-staged Power Tilt Jib X-type Outrigger	TR-250M-6-00101

Control No. JA-02

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TR-250M

CRANE SPECIFICATIONS

CRANE CAPACITY

9.5m	Boom	25,000kg	at 3.5m	(8part-line)
16.5m	Boom	19,000kg	at 4.0m	(6part-line)
23.5m	Boom	12,500kg	at 5.0m	(4part-line)
30.5m	Boom	7,000kg	at 8.0m	(4part-line)
8.0m	Jib	3,000kg	at 72 °	(1part-line)
13.0m	Jib	2,000kg	at 76 °	(1part-line)
Single top		3,500kg		(1part-line)

MAX.LIFTING HEIGHT

Boom 31.3m
Jib 44.2m

MAX.WORKING RADIUS

Boom 28.0m
Jib 35.0m

BOOM LENGTH

9.5m – 30.5m

BOOM EXTENSION

21.0m

BOOM EXTENSION SPEED

21.0m/90s

JIB LENGTH

8.0m, 13.0m

MAIN WINCH SINGLE LINE SPEED

120m/min (4th layer)

MAIN WINCH HOOK SPEED

15.0m/min (8 part-line)

AUXILIARY WINCH SINGLE LINE SPEED

120m/min (4th layer)

AUXILIARY WINCH HOOK SPEED

120m/min (1 part-line)

BOOM ELEVATION ANGLE

0 °– 83 °

BOOM ELEVATION SPEED

0 °– 83 °/45s

SWING ANGLE

360 °continue

SWING SPEED

2.6rpm

WIRE ROPE

Main Winch
16mm x 170m (Diameter x Length)
Spin-resistant wire rope
Auxiliary Winch
16mm x 98m (Diameter x Length)
Spin-resistant wire rope

BOOM

4-section hydraulically telescoping boom of box construction
(stage 2: sequential; stages 3,4: synchronized)

BOOM EXTENSION

2 double-acting hydraulic cylinders
1 wire rope type telescoping device

JIB

Quick-turn type (2-staged type which stores alongside below the base boom section and extendible from under the boom (with 2nd stage being a pull-out type))
Hydraulic non-stage offset (5 °– 45 °) type

SINGLE TOP

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

HOIST

Driven by hydraulic motor and via spur gear reducer.
With free-fall device.
Automatic brake (with foot brake for free-fall device)
2 single winches
With flow regulator valve with pressure compensation

BOOM ELEVATION

1 double-acting hydraulic cylinder
With flow regulator valve with pressure compensation

SWING

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

OUTRIGGERS

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

Fully extended width	6.3m
Middle extended width	5.9m, 5.0m
Minimum extended width	3.6m

OPERATION METHOD

Hydraulic pilot valve operation

MAX. VERTICAL LOAD CAPACITY OF OUTRIGGER

26.7t

HYDRAULIC PUMPS

2 variable piston pumps
2 gear pumps

HYDRAULIC OIL TANK CAPACITY

380 liters

SAFETY DEVICES

Automatic moment limiter (AML)
Swing automatic stop device
Over-winding cutout device
Working area control device
Free-fall interlock device
Outrigger extension width detector
Winch drum lock
Level gauge
Hook safety latch
Hydraulic safety valve
Telescopic counterbalance valve
Elevation counterbalance valve
Power tilt counterbalance valve
Jack pilot check valve
Swing lock

EQUIPMENT

Air-conditioner with dehumidifier
Hydraulic oil temperature indication lamp
Radio
Oil cooler
Visual-type winch drum rotation indicator
Operation pedals
ISO arrangement: for telescoping/auxiliary hoisting
TADANO arrangement: for elevating/telescoping
Television (option)

CARRIER SPECIFICATIONS

ENGINE
Model MITSUBISHI 6D16
(with turbo charger and air cooler)
Type 4-cycle, 6-cylinder, direct-injection, water-cooled diesel engine
Piston displacement 7,545cc
Max. output 250PS at 2,800rpm
Max. torque 72kg·m at 1,400rpm

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

TRANSMISSION
Automatic and manual transmission
Power shift type (wet multi-plate clutch)
4 forward and 1 reverse speeds (with Hi/Low settings)

REDUCER
Axle dual-ratio reduction

DRIVE
2-wheel drive (4X2) / 4-wheel drive (4X4) selection

FRONT AXLE
Full floating type

REAR AXLE
Full floating type

SUSPENSION
Front
Hydro-pneumatic suspension (with hydraulic lock cylinder)
Rear
Hydro-pneumatic suspension (with hydraulic lock cylinder)

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
Hydrodynamic retarder
Electro-pneumatic operated exhaust brake
Auxiliary braking device for operations

FRAME
Welded box-shaped structure

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

FUEL TANK CAPACITY
300 liters

TIRES
Front 385/95R25 170E ROAD
Rear 385/95R25 170E ROAD

CAB
One-man type
With interior equipment
Liquid filled rubber mounted type
Fully adjustable foldable seat
(with headrest and seat belt)
Adjustable handle (tilt, telescoping)
Intermittent type windshield/roof wiper (with washer)
Power window
Side visor

SAFETY DEVICES
Emergency steering device
Suspension lock device
Rear wheel steering lock device
Engine over-run alarm
Overshift prevention device
Parking brake alarm
Powered mirror for right side of boom
Monitor TV for left side of boom (option)

EQUIPMENT
Centralized oiling device
Electric mirror

GENERAL DATA

DIMENSIONS

Overall length	11,130mm
Overall width	2,620mm
Overall height	3,410mm
Wheel base	3,500mm
Tread Front	2,170mm
Rear	2,170mm

WEIGHTS
Gross vehicle weight

Total	26,495kg
Front	13,250kg
Rear	13,245kg

PERFORMANCE

Max. traveling speed	49km/h
Gradeability (tan θ)	0.57
Min. turning radius	5.0m (4-wheel steering)
	8.4m (2-wheel steering)

TOTAL RATED LOADS

(1) With outriggers set
[BOOM]

Unit : ton

Outriggers fully extended (6.3m) –360 °–				
B \ A	9.5m	16.5m	23.5m	30.5m
2.5m	25.0	19.0	12.5	
3.0m	25.0	19.0	12.5	
3.5m	25.0	19.0	12.5	7.0
4.0m	23.0	19.0	12.5	7.0
4.5m	21.2	18.0	12.5	7.0
5.0m	19.4	16.7	12.5	7.0
5.5m	17.8	15.6	11.75	7.0
6.0m	16.3	14.6	11.1	7.0
6.5m	15.1	13.8	10.5	7.0
7.0m	13.7	13.0	10.0	7.0
8.0m		10.55	9.0	7.0
9.0m		8.5	8.2	6.3
10.0m		7.05	7.3	5.8
11.0m		5.85	6.4	5.3
12.0m		4.95	5.5	4.9
13.0m		4.2	4.75	4.5
14.0m		3.6	4.1	4.15
15.0m			3.6	3.8
16.0m			3.15	3.45
17.0m			2.8	3.05
18.0m			2.45	2.7
19.0m			2.15	2.45
20.0m			1.9	2.2
21.0m			1.7	1.95
22.0m				1.75
24.0m				1.4
26.0m				1.15
28.0m				0.95
a (°)	0 ～ 83			

Unit : ton

Outriggers middle extended (5.9m) –Over sides–				
B \ A	9.5m	16.5m	23.5m	30.5m
2.5m	25.0	19.0	12.5	
3.0m	25.0	19.0	12.5	
3.5m	25.0	19.0	12.5	7.0
4.0m	23.0	19.0	12.5	7.0
4.5m	21.2	18.0	12.5	7.0
5.0m	19.4	16.7	12.5	7.0
5.5m	17.8	15.6	11.75	7.0
6.0m	16.3	14.6	11.1	7.0
6.5m	15.1	13.8	10.5	7.0
7.0m	13.0	12.6	10.0	7.0
8.0m		9.7	9.0	7.0
9.0m		7.7	8.2	6.3
10.0m		6.3	7.0	5.8
11.0m		5.2	6.0	5.3
12.0m		4.35	5.1	4.9
13.0m		3.7	4.35	4.5
14.0m		3.15	3.8	4.05
15.0m			3.3	3.6
16.0m			2.85	3.15
17.0m			2.5	2.75
18.0m			2.2	2.45
19.0m			1.95	2.2
20.0m			1.7	1.95
21.0m			1.5	1.75
22.0m				1.55
24.0m				1.2
26.0m				0.95
27.9m				0.75
a (°)	0 ～ 83			

A= Boom length B= Working radius
a= Boom angle range (for the unladen condition)

[BOOM]

Unit : ton

Outriggers middle extended (5.0m) –Over sides–				
A / B	9.5m	16.5m	23.5m	30.5m
2.5m	25.0	19.0	12.5	
3.0m	25.0	19.0	12.5	
3.5m	25.0	19.0	12.5	7.0
4.0m	23.0	19.0	12.5	7.0
4.5m	21.2	18.0	12.5	7.0
5.0m	18.4	16.7	12.5	7.0
5.5m	15.4	15.0	11.75	7.0
6.0m	13.0	12.6	11.1	7.0
6.5m	11.2	10.8	10.5	7.0
7.0m	9.5	9.4	10.0	7.0
8.0m		7.3	8.0	7.0
9.0m		5.85	6.5	6.3
10.0m		4.75	5.4	5.6
11.0m		3.9	4.55	4.8
12.0m		3.3	3.85	4.15
13.0m		2.75	3.3	3.55
14.0m		2.3	2.85	3.1
15.0m			2.45	2.7
16.0m			2.1	2.35
17.0m			1.8	2.1
18.0m			1.55	1.8
19.0m			1.35	1.6
20.0m			1.15	1.4
21.0m			0.95	1.2
22.0m				1.05
24.0m				0.75
26.0m				0.5
a (°)	0～83			23～83

Unit : ton

Outriggers minimum extended (3.6m) –Over sides–				
A / B	9.5m	16.5m	23.5m	30.5m
2.5m	25.0	19.0	12.5	
3.0m	25.0	19.0	12.5	
3.5m	20.5	19.0	12.5	7.0
4.0m	16.0	15.7	12.5	7.0
4.5m	12.8	12.6	12.5	7.0
5.0m	10.7	10.5	11.0	7.0
5.5m	9.05	8.8	9.4	7.0
6.0m	7.7	7.6	8.2	7.0
6.5m	6.6	6.5	7.25	7.0
7.0m	5.8	5.6	6.4	6.5
8.0m		4.4	5.05	5.3
9.0m		3.4	4.05	4.35
10.0m		2.7	3.3	3.65
11.0m		2.15	2.75	3.05
12.0m		1.7	2.3	2.6
13.0m		1.3	1.9	2.2
14.0m		1.0	1.6	1.85
15.0m			1.35	1.55
16.0m			1.1	1.3
17.0m			0.9	1.05
18.0m			0.7	0.9
19.0m			0.5	0.7
20.0m				0.55
a (°)	0～83		25～83	44～83

A= Boom length B= Working radius
a= Boom angle range (for the unladen condition)

[JIB]

Unit : ton

Outriggers fully extended (6.3m) −360 °−												
C	30.5m Boom + 8.0m Jib						30.5m Boom + 13.0m Jib					
D	5 °		25 °		45 °		5 °		25 °		45 °	
E (°)	B (m)	M	B (m)	M	B (m)	M	B (m)	M	B (m)	M	B (m)	M
83	4.4	3.0	7.1	2.1	9.0	1.6	5.8	2.0	10.0	1.2	13.4	0.8
76	9.4	3.0	12.0	2.1	13.6	1.6	11.7	2.0	15.5	1.2	18.3	0.8
72	12.2	3.0	14.7	2.1	16.0	1.6	14.8	1.75	18.4	1.1	20.9	0.8
70	13.5	2.8	15.9	2.1	17.3	1.6	16.2	1.65	19.8	1.05	22.2	0.8
65	16.5	2.35	18.8	1.8	20.0	1.5	19.8	1.4	23.1	0.95	25.1	0.78
60	19.4	2.0	21.6	1.55	22.5	1.35	23.1	1.2	26.1	0.9	27.8	0.75
55	22.1	1.45	24.1	1.35	24.8	1.2	26.2	1.05	29.0	0.85	30.3	0.74
50	24.6	1.05	26.4	1.0	26.9	0.95	29.0	0.85	31.4	0.75	32.4	0.7
45	26.9	0.75	28.4	0.7	28.7	0.7	31.5	0.6	33.5	0.55	34.1	0.55
40	29.1	0.55	30.2	0.5			33.6	0.4	35.0	0.4		
35	31.0	0.38	31.8	0.35								
a (°)	34 ～ 83				44 ～ 83		39 ～ 83				44 ～ 83	

Unit : ton

Outriggers middle extended (5.9m) −Over sides−												
C	30.5m Boom + 8.0m Jib						30.5m Boom + 13.0m Jib					
D	5 °		25 °		45 °		5 °		25 °		45 °	
E (°)	B (m)	M	B (m)	M	B (m)	M	B (m)	M	B (m)	M	B (m)	M
83	4.4	3.0	7.1	2.1	9.0	1.6	5.8	2.0	10.0	1.2	13.4	0.8
76	9.4	3.0	12.0	2.1	13.6	1.6	11.7	2.0	15.5	1.2	18.3	0.8
72	12.2	3.0	14.7	2.1	16.0	1.6	14.8	1.75	18.4	1.1	20.9	0.8
70	13.5	2.8	15.9	2.1	17.3	1.6	16.2	1.65	19.8	1.05	22.2	0.8
65	16.5	2.35	18.8	1.8	20.0	1.5	19.8	1.4	23.1	0.95	25.1	0.78
60	19.3	1.85	21.6	1.55	22.5	1.35	23.1	1.2	26.1	0.9	27.8	0.75
55	22.0	1.3	24.1	1.15	24.8	1.1	26.2	1.05	29.0	0.85	30.3	0.74
50	24.4	0.9	26.3	0.85	26.9	0.8	28.9	0.7	31.3	0.6	32.3	0.6
45	26.7	0.6	28.3	0.55	28.7	0.55	31.4	0.5	33.4	0.4	34.0	0.4
40	28.8	0.4	30.1	0.35			33.6	0.3				
a (°)	39 ～ 83				44 ～ 83		39 ～ 83		44 ～ 83			

B= Working radius C= Jib length D= Jib offset
E= Boom angle M= Total rated loads
a= Boom angle range (for the unladen condition)

[JIB]

Unit:ton

Outriggers middle extended (5.0m) –Over sides–												
C	30.5m Boom + 8.0m Jib						30.5m Boom + 13.0m Jib					
D	5 °		25 °		45 °		5 °		25 °		45 °	
E (°)	B (m)	M	B (m)	M	B (m)	M	B (m)	M	B (m)	M	B (m)	M
83	4.4	3.0	7.1	2.1	9.0	1.6	5.8	2.0	10.0	1.2	13.4	0.8
76	9.4	3.0	12.0	2.1	13.6	1.6	11.7	2.0	15.5	1.2	18.3	0.8
72	12.2	3.0	14.7	2.1	16.0	1.6	14.8	1.75	18.4	1.1	20.9	0.8
70	13.5	2.8	15.9	2.1	17.3	1.6	16.2	1.65	19.8	1.05	22.2	0.8
65	16.3	2.0	18.8	1.8	20.0	1.5	19.8	1.4	23.1	0.95	25.1	0.78
60	19.1	1.3	21.4	1.15	22.5	1.1	23.0	1.0	26.1	0.9	27.8	0.75
55	21.8	0.8	23.9	0.75	24.7	0.75	25.9	0.65	28.8	0.6	30.1	0.5
50	24.3	0.5	26.1	0.45	26.7	0.45	28.7	0.4	31.2	0.35	32.1	0.3
a (°)	49 ～ 83						49 ～ 83					

Unit:ton

Outriggers minimum extended (3.6m) –Over sides–												
C	30.5m Boom + 8.0m Jib						30.5m Boom + 13.0m Jib					
D	5 °		25 °		45 °		5 °		25 °		45 °	
E (°)	B (m)	M	B (m)	M	B (m)	M	B (m)	M	B (m)	M	B (m)	M
83	4.4	3.0	7.1	2.1	9.0	1.6	5.8	2.0	10.0	1.2	13.4	0.8
76	9.4	3.0	12.0	2.1	13.6	1.6	11.7	2.0	15.5	1.2	18.3	0.8
72	11.9	2.2	14.5	1.8	16.0	1.6	14.8	1.75	18.4	1.1	20.9	0.8
70	13.1	1.8	15.7	1.5	17.2	1.35	16.1	1.4	19.8	1.05	22.2	0.8
65	16.0	1.0	18.5	0.9	19.8	0.8	19.4	0.8	22.9	0.65	25.0	0.55
60	18.9	0.5	21.1	0.45	22.2	0.4	22.6	0.4	25.8	0.35	27.5	0.3
a (°)	59 ～ 83						59 ～ 83					

B= Working radius C= Jib length D= Jib offset
E= Boom angle M= Total rated loads
a= Boom angle range (for the unladen condition)

PRECAUTIONS TO BE TAKEN WHEN THE OUTRIGGERS ARE EXTENDED:

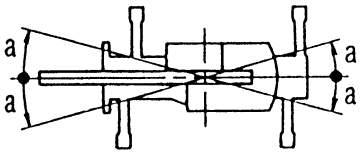
1. The total rated loads shown are for the case where the crane is set horizontally on firm level ground. They include the weights of the slings and hooks (main hook: 260kg, 12t hook: 170kg, auxiliary hook: 60kg).
   The values above the bold lines are based on the crane strength while those below are based on the crane stability.
2. Since the working radii are based on the actual values including the deflection of the boom, operations should be performed in accordance with the working radii.
3. Jib operations should be performed in accordance with the boom angle, irrespective of the boom length. The working radii are reference values for the case where the jib is mounted on a 30.5m boom.
4. The total rated load for the single top shall be the value obtained by subtracting the weight of the hook mounted on the boom from the total rated load of the boom and must not exceed 3.5t.
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 chart below shows the standard number of part lines for each boom length. The load per line should not exceed 3.17t for the main winch and 3.5t for the auxiliary winch.

A	9.5m	16.5m	23.5m	30.5m	J
H	8	6	4	4	1

A= Boom length H= No. of part-lines
J= Jib/Single top

7. The hoisting performance for the "Over sides" range will differ according to the extended width of the outriggers. Operations should be performed in accordance with the performance corresponding to the extended width.
   Also, although the hoisting performances for the "Over front" and "Over rear" ranges are equivalent to those of the "outriggers fully extended" condition, the front and rear ranges (angle a) will differ according to the width to which the outriggers are extended in the left and right directions.

Extended width	Middle extended (5.9m)	Middle extended (5.0m)	Minimum extended (3.6m)
Angle a °	35	25	15



(2) Without outriggers

Unit : ton

B (m)	Stationary						Creep (travelling at 1.6km/h or less)					
	9.5m Boom		16.5m Boom		23.5m Boom		9.5m Boom		16.5m Boom		23.5m Boom	
	F	G	F	G	F	G	F	G	F	G	F	G
3.0	14.0	9.0	9.0	7.3			10.5	7.0	7.5	5.1		
3.5	14.0	7.6	9.0	7.3	6.5	4.5	10.5	6.2	7.5	5.1	5.5	3.2
4.0	12.5	6.3	9.0	5.85	6.5	4.5	9.5	5.3	7.5	4.9	5.5	3.2
4.5	10.9	5.2	9.0	4.75	6.5	4.5	8.7	4.4	7.5	3.95	5.5	3.2
5.0	9.55	4.3	8.2	4.0	6.5	4.3	8.0	3.6	7.0	3.3	5.5	3.2
5.5	8.3	3.6	7.4	3.3	6.1	3.7	6.9	3.0	6.2	2.7	5.15	3.1
6.0	7.2	3.0	6.6	2.8	5.65	3.2	5.9	2.5	5.5	2.3	4.8	2.7
6.5	6.25	2.5	5.9	2.35	5.25	2.75	5.1	2.1	4.9	1.9	4.45	2.3
7.0	5.2	2.0	5.25	1.95	4.85	2.4	4.3	1.7	4.35	1.6	4.15	2.0
8.0			4.1	1.4	4.1	1.8			3.4	1.1	3.5	1.5
9.0			3.25	0.95	3.5	1.4			2.7	0.7	2.95	1.1
10.0			2.6	0.6	3.0	1.05			2.15		2.45	0.8
11.0			2.1		2.55	0.75			1.7		2.05	0.6
12.0			1.7		2.2				1.35		1.7	
13.0			1.35		1.85				1.1		1.45	
14.0			1.0		1.55				0.8		1.2	
15.0					1.3						1.0	
16.0					1.05						0.85	
17.0					0.85						0.7	
18.0					0.65						0.55	
19.0					0.5							
a (°)	0～77			42～77	25～77	56～77	0～77			47～77	31～77	56～77

B= Working radius F= Front G= 360 °
a= Boom angle range (for the unladen condition)

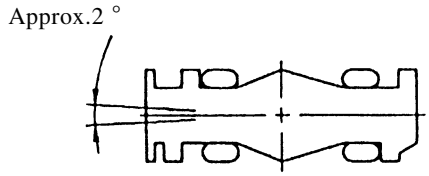
PRECAUTIONS TO BE TAKEN WHEN THE OUTRIGGERS ARE NOT MOUNTED:

1. The total rated loads shown are for the case where the tire air pressure on firm level ground is as specified (9.00kg/cm^2) and the suspension-lock cylinder is retracted as much as possible. They include the weights of the slings and hooks (main hook: 260kg, 12t hook: 170kg, auxiliary hook: 60kg).
   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 for actual work.
2. Since the working radii are based on the actual values including the deflection of the boom and the tires, operations should be performed in accordance with the working radii.
3. The chart below shows the standard number of part lines for each boom length. The load per line should not exceed 3.17t for the main winch and 3.5t for the auxiliary winch.

A	9.5m	16.5m	23.5m	Single top
H	8	6	4	1

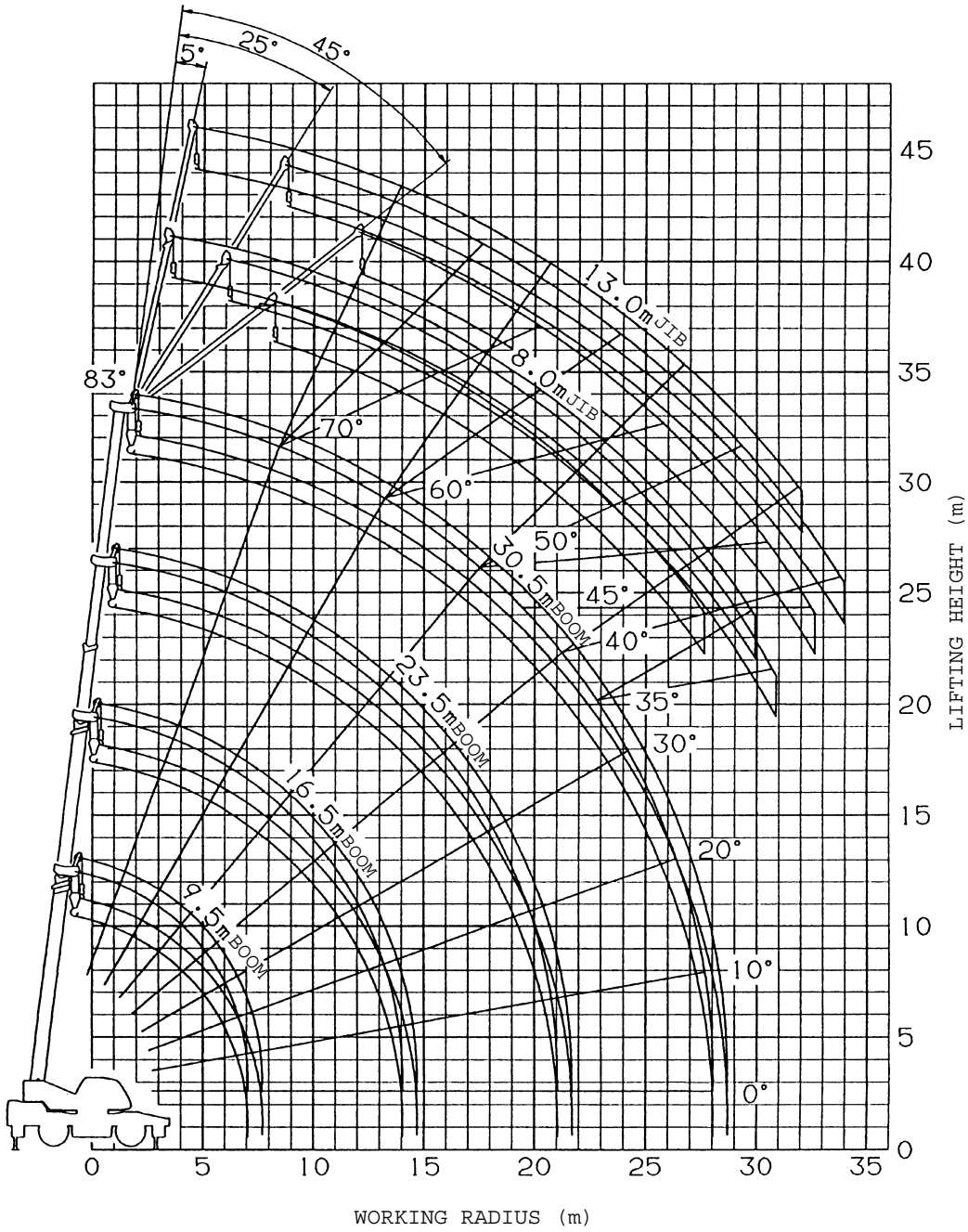
A= Boom length H= No. of part-lines

4. "Over front" crane operations should be performed only when the AML "over-front area indicator lamp" is lit. The boom must be kept inside a 2 ° area over front of the carrier when performing "Over front" crane operations without the outriggers.



5. The total rated load for the single top shall be the value obtained by subtracting the weight of the hook mounted on the boom from the total rated load of the boom and must not exceed 3.5t.
6. Free-fall operations should not be performed without outriggers.
   Booms over 23.5m in length and jibs should not be used without outriggers.
7. The "Drive Mode Selection" switch should be set to "4-wheel•Lo" for creeping while hoisting a load and the shift lever should be set to first.
8. 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.
9. 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 where the outriggers are fully extended (360 °).

DIMENSIONS (1/100)