TR

ROUGH TERRAIN CRANE

TR-500M

JAPANESE SPECIFICATIONS

OUTLINE	SPEC. NO.
6-section Boom, 2-stage Jib	TR-500M-2-00103

Control No. JA-03

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TR-500M

CRANE SPECIFICATIONS

CRANE CAPACITY

9.7m	Boom	45,000kg	at 3.5m	(11 part-line)
16.0m	Boom	30,000kg	at 4.5m	(8 part-line)
22.3m	Boom	20,000kg	at 5.0m	(5 part-line)
28.6m	Boom	12,000kg	at 8.0m	(4 part-line)
34.9m	Boom	10,000kg	at 7.0m	(4 part-line)
38.05m	Boom	8,000kg	at 9.0m	(4 part-line)
41.2m	Boom	6,000kg	at 11.0m	(4 part-line)
7.8m	Jib	3,500kg	at 76°	(1 part-line)
12.5m	Jib	2,500kg	at 76°	(1 part-line)
Single top		4,000kg		(1 part-line)

MAX. LIFTING HEIGHT
Boom 41.6m
Jib 54.6m

MAX. WORKING RADIUS
Boom 34.0m
Jib 40.0m

BOOM LENGTH
9.7m – 41.2m

BOOM EXTENSION
31.5m

BOOM EXTENSION SPEED
31.5m / 123s

JIB LENGTH
7.8m, 12.5m

MAIN WINCH SINGLE LINE SPEED
124m/min (5th layer)

MAIN WINCH HOOK SPEED
11.2m/min (11 part-line)

AUXILIARY WINCH SINGLE LINE SPEED
124m/min (5th layer)

AUXILIARY WINCH HOOK SPEED
124m/min (1 part-line)

BOOM ELEVATION ANGLE
0° – 83°

BOOM ELEVATION SPEED
0° – 83° / 75s

SWING ANGLE
360° continue

SWING SPEED
High range: 2.3 rpm
Low range: 1.0 rpm

WIRE ROPE
Main Winch
18mm × 224m (Diameter × Length)
Spin-resistant wire rope
Auxiliary Winch
18mm × 120m (Diameter × Length)
Spin-resistant wire rope

BOOM
6-section hydraulically telescoping boom of hexagonal box construction
(stages 2,3: synchronized; stages 4,5,6: synchronized)

BOOM EXTENSION
3 double-acting hydraulic cylinder
2 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))
Triple offset (5°, 25°, 45°) type

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

HOIST
Driven by hydraulic motor driven and via bevel gear reducer.
With free-fall device.
(with operation lock device for prevention of misoperation)
Automatic brake (with foot brake for free-fall device)
2 single winches
With flow regulator valve with pressure compensation

BOOM ELEVATION
2 double-acting hydraulic cylinders
With flow regulator valve with pressure compensation

SWING
Hydraulic motor driven planetary gear reducer
Swing bearing
High/Low speed selection
Swing free/lock changeover type
Hand brake

OUTRIGGERS
Fully hydraulic H-type (floats mounted integrally)
Slides and jacks each provided with independent operation device.
Full extended width 7.25m
Middle extended width 5.5m, 4.0m
Minimum extended width 2.57m

OPERATION METHOD
Hydraulic pilot valve operation

MAX. OUTRIGGER LOAD
39.2t

HYDRAULIC PUMPS
2 variable piston pumps
2 gear pumps

HYDRAULIC OIL TANK CAPACITY
650 liters

SAFETY DEVICES
Automatic moment limiter (AML)
Multi-display indication
Over-winding cutout
Working area control device
Outrigger extension width detector
Winch drum lock
Level gauge
Hook safety latch
Hydraulic safety valve
Telescopic counterbalance valve
Elevation counterbalance valve
Jack pilot check valve
Swing lock

EQUIPMENTS
Heat pump type air-conditioner
Hydraulic oil temperature indication lamp
Radio
Oil cooler
Tactile-type winch drum rotation indicator
Operation pedals for elevating operation
Centralized oiling device (carrier)
Television (option)

CARRIER SPECIFICATIONS

ENGINE
Model NISSAN DIESEL MOTOR CO., LTD. PF6T (with turbo charger)
Type 4-cycle, 6-cylinder, direct-injection, water-cooled diesel engine
Piston displacement. 12,503cc
Max. output 290PS at 2,100rpm
Max. torque 122kg·m at 1,200rpm

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

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

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
Hydrodynamic retarder
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
300 liters

TIRES
Front 18.00R25☆☆(OR)
Rear 18.00R25☆☆(OR)

CAB
Two-man type
With sun visor and trim
Rubber mounted type
Fully adjustable foldable seat
(with headrest, armrest, seat belt)
Adjustable handle (tilt, telescoping)
Roof windshield lock warning
Intermittent type roof wiper (with washer)

SAFETY DEVICES
Emergency steering device
Spring 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

GENERAL DATA

DIMENSIONS
Overall length	11,930mm
Overall width	3,000mm
Overall height	3,770mm
Wheel base	4,850mm
Tread Front	2,430mm
Rear	2,430mm

WEIGHTS
Gross vehicle weight	
Total	37,790kg
Front	18,900kg
Rear	18,890kg

PERFORMANCE
Max. traveling speed	45km/h
Gradeability (tan θ)	0.6
Min. turning radius	6.3m (4-wheel steering)
	10.8m (2-wheel steering)

TOTAL RATED LOADS

(1) With outriggers set
[BOOM]

Unit:ton

Outriggers fully extended (7.25m)							-360°-
A / B	9.7 m	16.0 m	22.3 m	28.6 m	34.9 m	38.05m	41.2 m
2.5 m	45.0	30.0	20.0	12.0			
3.0 m	45.0	30.0	20.0	12.0			
3.5 m	45.0	30.0	20.0	12.0	10.0		
4.0 m	39.5	30.0	20.0	12.0	10.0	8.0	
4.5 m	35.5	30.0	20.0	12.0	10.0	8.0	
5.0 m	32.0	28.0	20.0	12.0	10.0	8.0	6.0
5.5 m	29.0	26.0	19.8	12.0	10.0	8.0	6.0
6.0 m	26.5	24.1	18.7	12.0	10.0	8.0	6.0
6.5 m	24.0	22.4	17.6	12.0	10.0	8.0	6.0
7.0 m	22.0	20.6	16.7	12.0	10.0	8.0	6.0
8.0 m		17.5	15.0	12.0	9.2	8.0	6.0
9.0 m		14.2	13.4	11.5	8.5	8.0	6.0
10.0 m		11.8	11.05	10.5	8.0	7.75	6.0
11.0 m		9.8	9.2	9.5	7.6	7.25	6.0
12.0 m		8.2	7.75	8.5	7.1	6.75	5.9
13.0 m		7.0	6.6	7.4	6.7	6.3	5.5
14.0 m			5.65	6.5	6.3	6.0	5.2
16.0 m			4.15	4.9	5.3	5.3	4.6
18.0 m			2.95	3.75	4.15	4.4	4.1
20.0 m				2.9	3.3	3.5	3.6
22.0 m				2.2	2.6	2.8	2.95
24.0 m				1.6	2.05	2.3	2.35
26.0 m				1.0	1.6	1.85	1.9
28.0 m					1.2	1.4	1.5
30.0 m					0.8	1.0	1.15
32.0 m						0.65	0.85
34.0 m							0.55
a (°)	0~83					18~83	30~83

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

[BOOM]

Unit:ton

Outriggers middle extended (5.5m) -Over sides-							
A / B	9.7 m	16.0 m	22.3 m	28.6 m	34.9 m	38.05m	41.2 m
2.5 m	45.0	30.0	20.0	12.0			
3.0 m	45.0	30.0	20.0	12.0			
3.5 m	41.0	30.0	20.0	12.0	10.0		
4.0 m	36.8	30.0	20.0	12.0	10.0	8.0	
4.5 m	33.2	30.0	20.0	12.0	10.0	8.0	
5.0 m	30.2	26.0	20.0	12.0	10.0	8.0	6.0
5.5 m	25.2	23.0	19.8	12.0	10.0	8.0	6.0
6.0 m	21.0	20.7	18.7	12.0	10.0	8.0	6.0
6.5 m	18.2	18.0	16.8	12.0	10.0	8.0	6.0
7.0 m	15.5	15.2	15.1	12.0	10.0	8.0	6.0
8.0 m		11.9	11.6	12.0	9.2	8.0	6.0
9.0 m		9.5	9.15	10.2	8.5	8.0	6.0
10.0 m		7.65	7.35	8.35	8.0	7.75	6.0
11.0 m		6.25	6.0	6.95	7.0	7.25	6.0
12.0 m		5.15	4.9	5.85	6.3	6.3	5.9
13.0 m		4.2	4.0	4.95	5.5	5.5	5.5
14.0 m			3.25	4.2	4.75	4.8	5.0
16.0 m			2.05	3.0	3.55	3.6	3.8
18.0 m			1.05	2.1	2.65	2.7	2.9
20.0 m				1.35	1.95	2.05	2.25
22.0 m				0.7	1.3	1.5	1.7
24.0 m					0.8	1.0	1.2
26.0 m						0.6	0.8
a (°)	0~83			24~83	37~83	43~83	48~83

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

[BOOM]

Unit:ton

Outriggers middle extended (4.0m) -Over sides-							
A / B	9.7 m	16.0 m	22.3 m	28.6 m	34.9 m	38.05m	41.2 m
2.5 m	40.0	30.0	20.0	12.0			
3.0 m	40.0	30.0	20.0	12.0			
3.5 m	33.4	30.0	20.0	12.0	10.0		
4.0 m	26.5	27.0	20.0	12.0	10.0	8.0	
4.5 m	21.0	21.5	20.0	12.0	10.0	8.0	
5.0 m	17.4	17.4	17.0	12.0	10.0	8.0	6.0
5.5 m	14.6	14.5	14.2	12.0	10.0	8.0	6.0
6.0 m	12.5	12.2	12.0	12.0	10.0	8.0	6.0
6.5 m	10.5	10.5	10.4	11.3	10.0	8.0	6.0
7.0 m	9.0	9.1	9.0	10.0	9.5	8.0	6.0
8.0 m		6.9	6.8	7.8	8.0	8.0	6.0
9.0 m		5.4	5.25	6.2	6.65	6.7	6.0
10.0 m		4.3	4.1	5.0	5.6	5.7	5.9
11.0 m		3.4	3.15	4.05	4.65	4.75	5.0
12.0 m		2.6	2.45	3.3	3.85	4.0	4.2
13.0 m		1.85	1.75	2.7	3.2	3.35	3.55
14.0 m			1.15	2.15	2.7	2.85	3.0
16.0 m				1.2	1.8	2.0	2.15
18.0 m					1.1	1.3	1.5
20.0 m						0.75	0.95
a (°)	0~83		39~83	46~83	53~83	55~83	58~83

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

[BOOM]

Unit:ton

Outriggers minimum extended (2.57m) -Over sides-							
A / B	9.7 m	16.0 m	22.3 m	28.6 m	34.9 m	38.05m	41.2 m
2.5 m	15.0	11.0	11.0	7.0			
3.0 m	15.0	11.0	11.0	7.0			
3.5 m	15.0	11.0	11.0	7.0	6.0		
4.0 m	13.8	11.0	11.0	7.0	6.0	5.5	
4.5 m	11.3	10.5	10.4	7.0	6.0	5.5	
5.0 m	9.3	8.8	8.55	7.0	6.0	5.5	5.0
5.5 m	7.7	7.3	7.15	6.5	6.0	5.5	5.0
6.0 m	6.5	6.1	6.0	5.8	5.5	5.3	5.0
6.5 m	5.5	5.2	5.0	5.1	5.0	5.0	5.0
7.0 m	4.6	4.4	4.2	4.5	4.5	4.5	4.5
8.0 m		3.2	3.0	3.5	3.6	3.7	3.8
9.0 m		2.3	2.05	2.5	2.8	2.9	3.1
10.0 m		1.5	1.35	1.8	2.1	2.3	2.5
11.0 m		0.8					
a (°)	0~79	35~79	56~83	65~83	70~83	72~83	73~83

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

[JIB] Unit:ton

Outriggers fully extended (7.25m) -360°-						
C / D / E (°)	7.8 m			12.5 m		
	5°	25°	45°	5°	25°	45°
83	3.5	2.4	1.5	2.5	1.4	0.8
76	3.5	2.4	1.5	2.5	1.4	0.8
74	3.25	2.2	1.5	2.25	1.4	0.8
72	2.95	2.1	1.48	2.05	1.3	0.8
70	2.65	1.95	1.45	1.9	1.25	0.8
68	2.4	1.85	1.43	1.75	1.2	0.79
65	2.1	1.7	1.4	1.55	1.1	0.77
60	1.7	1.45	1.3	1.3	0.95	0.74
55	1.3	1.2	1.15	1.08	0.85	0.72
50	0.75	0.65	0.6	0.6	0.5	0.48
48	0.55	0.45	0.4	0.4	0.35	0.33
a (°)	47 ～ 83					

Unit:ton

Outriggers middle extended (5.5m) -Over sides-						
C / D / E (°)	7.8 m			12.5 m		
	5°	25°	45°	5°	25°	45°
83	3.5	2.4	1.5	2.5	1.4	0.8
76	3.5	2.4	1.5	2.5	1.4	0.8
74	3.25	2.2	1.5	2.25	1.4	0.8
72	2.95	2.1	1.48	2.05	1.3	0.8
70	2.65	1.95	1.45	1.9	1.25	0.8
68	2.4	1.85	1.43	1.75	1.2	0.79
65	1.75	1.55	1.4	1.45	1.1	0.77
60	0.8	0.7	0.65	0.6	0.5	0.45
a (°)	59 ～ 83					

C = Jib length D = Jib offset E = Boom angle
a = Boom angle range (for the unladen condition)

[JIB]

Unit:ton

Outriggers middle extended (4.0m) -Over sides-						
C / D / E (°)	7.8 m			12.5 m		
	5°	25°	45°	5°	25°	45°
83	3.5	2.4	1.5	2.5	1.4	0.8
76	3.5	2.4	1.5	2.5	1.4	0.8
74	2.6	2.2	1.5	2.1	1.4	0.8
72	2.0	1.7	1.48	1.6	1.3	0.8
70	1.5	1.25	1.1	1.2	0.95	0.8
a (°)	69 ～ 83					

C = Jib length D = Jib offset E = Boom angle
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 when the outriggers are 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 slings and hooks (390kg for a 45 ton capacity hook, 290kg for a 25 ton capacity hook and 100kg for a 4 ton capacity hook) 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 4.1t for the main winch and 4.0t for the auxiliary winch.

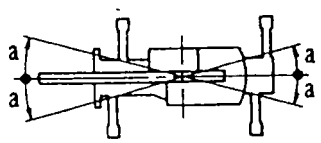
A	9.7 m	16.0 m	22.3 m	28.6 m	34.9 m	38.05m	41.2 m	J
H	11	8	5(6)	4	4	4	4	1

The value in( ) is for a 25t hook.

A = Boom length H = No. of part-line J = Jib / 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 300kg from the total rated load of the boom and must not exceed 4.0t.
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 (5.5m)	Middle extended (4.0m)	Minimum extended
Angle a°	25	15	5



(2) Without outriggers

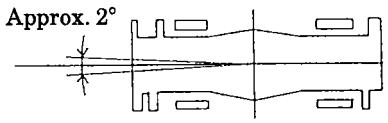
Unit:ton

B (m)	Stationary						Creep (travelling at 1.6km/h or less)					
	9.7m BOOM		16.0m BOOM		22.3m BOOM		9.7m BOOM		16.0mBOOM		22.3mBOOM	
	F	G	F	G	F	G	F	G	F	G	F	G
3.0	20.0	12.5	15.0	10.0			14.5	8.0	10.5	6.5		
3.5	20.0	12.5	15.0	10.0			14.5	8.0	10.5	6.5		
4.0	20.0	11.0	15.0	10.0	11.0	5.5	14.5	8.0	10.5	6.5	8.0	4.5
4.5	18.0	9.0	15.0	8.5	11.0	5.5	12.9	6.8	10.5	6.5	8.0	4.5
5.0	16.0	7.4	15.0	7.0	11.0	5.5	11.5	5.8	10.5	5.3	8.0	4.5
5.5	14.3	6.2	14.0	5.7	11.0	5.3	10.3	4.8	10.5	4.4	8.0	4.1
6.0	12.8	5.2	13.0	4.8	11.0	4.4	9.3	4.0	10.0	3.7	8.0	3.55
6.5	11.7	4.35	12.0	4.05	10.0	3.7	8.6	3.35	9.3	3.15	8.0	3.05
7.0	10.8	3.7	11.0	3.4	9.2	3.0	7.9	2.8	8.5	2.7	7.4	2.55
8.0			9.0	2.3	7.7	2.0			7.0	1.85	6.4	1.65
9.0			7.0	1.3	6.4	1.15			5.9	1.1	5.4	0.95
10.0			5.7	0.6	5.4				4.8	0.5	4.5	
11.0			4.7		4.5				3.9		3.7	
12.0			4.0		3.8				3.3		3.1	
13.0			3.4		3.2				2.8		2.6	
14.0					2.7						2.2	
16.0					1.8						1.5	
18.0					1.05						0.85	
a (°)	0～77.5			41～77.5	25～77.5	61～77.5	0～77.5			41～77.5	25～77.5	61～77.5

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

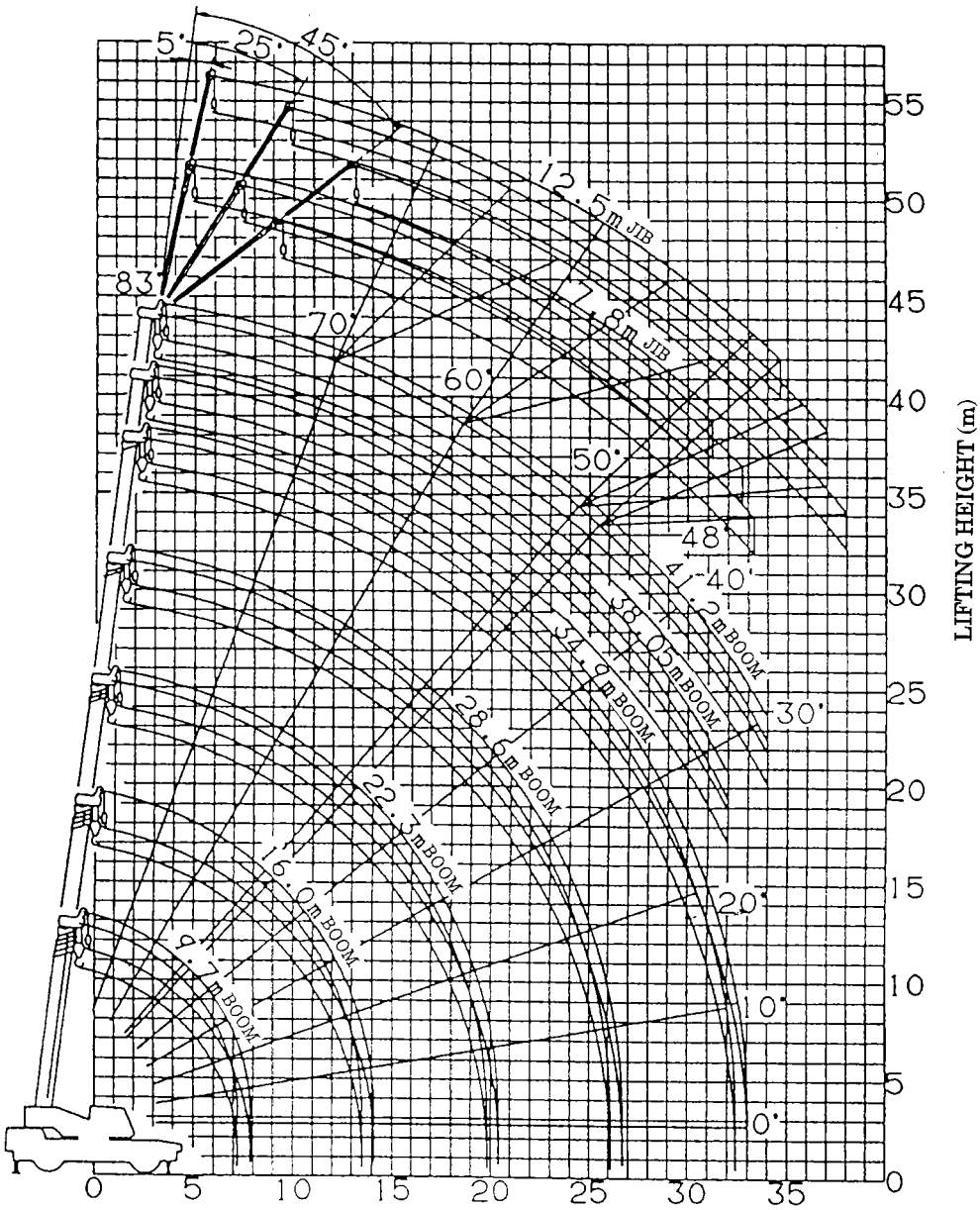
PRECAUTIONS TO BE TAKEN WHEN THE OUTRIGGERS ARE NOT MOUNTED:

1. The total rated loads shown are for the case when the crane is set horizontally on firm ground with the spring-lock cylinder being retracted as much as possible. The values above the bold lines are based on the tire 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: 8.0kg/cm^2).
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 deflection of the boom and the tires.
4. The total rated load for the single top shall be the value obtained by subtracting 300kg from the total rated load of the boom and must not exceed 4.0t.
5. Free-fall operations should not be performed without outriggers.
6. Booms over 22.3m in length and jibs should not be used without outriggers.
7. "Over front" crane operations should be performed only when "Over front" is displayed on the standard display. The boom must be kept inside a 2° area in front of the carrier when performing "Over front" operations without the outriggers.



8. The "Drive, Speed Selection" switch should be set to "4-wheel · Lo" for creeping while hoisting a load.
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.

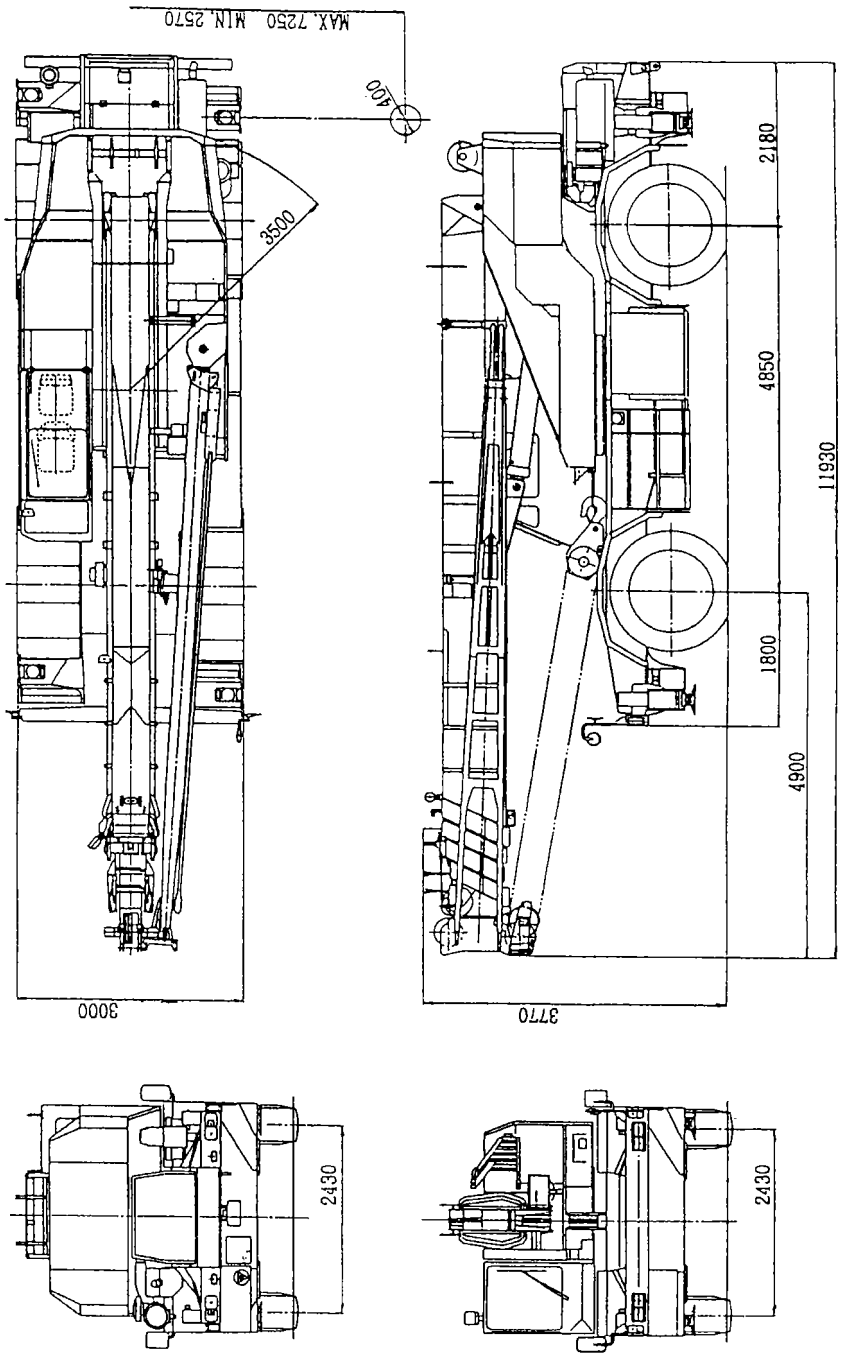
WORKING RADIUS - LIFTING HEIGHT



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 ◆