

ROUGH TERRAIN CRANE

TR-160M

JAPANESE SPECIFICATIONS

OUTLINE	SPEC. NO.
4-section Boom, 1-staged Jib	TR-160M-2-00101

Control No. JA-01

TR-160M

CRANE SPECIFICATIONS

CRANE CAPACITY

7.4m Boom	16,000kg	at 3.0m	(6 part-line)
12.3m Boom	11,000kg	at 4.0m	(4 part-line)
17.2m Boom	7,500kg	at 4.5m	(4 part-line)
22.1m Boom	5,000kg	at 5.5m	(4 part-line)
6.3m Jib	2,000kg	at 73°	(1 part-line)
Single top	2,500kg		(1 part-line)

MAX. LIFTING HEIGHT

Boom	22.5m
Jib	28.5m

MAX. WORKING RADIUS

Boom	20.0m
Jib	27.1m

BOOM LENGTH

7.4m - 22.1m

BOOM EXTENSION

14.7m

BOOM EXTENSION SPEED

14.7m / 65s

JIB LENGTH

6.3m

MAIN WINCH SINGLE LINE SPEED

High range:	76m/min	(4th layer)
Low range:	36m/min	(4th layer)

MAIN WINCH HOOK SPEED

High range:	12.7m/min	(6 part-line)
Low range:	6.0m/min	(6 part-line)

AUXILIARY WINCH SINGLE LINE SPEED

High range:	77m/min	(2nd layer)
Low range:	37m/min	(2nd layer)

AUXILIARY WINCH HOOK SPEED

High range:	77m/min	(1 part-line)
Low range:	37m/min	(1 part-line)

BOOM ELEVATION ANGLE

-2° - 80°

BOOM ELEVATION SPEED

-2° - 80° / 37s

SWING ANGLE

360° continue

SWING SPEED

2.7 rpm

WIRE ROPE

Main Winch

14mm × 125m (Diameter×Length)
 7×7+6×WS(31) Class B ordinary · Z twist
 Spin-resistant wire rope
 Breaking strength 15.5t

Auxiliary Winch

14mm × 65m (Diameter×Length)
 7×7+6×WS(31) Class B ordinary · Z twist
 Spin-resistant wire rope
 Breaking strength 15.5t

BOOM

4-section hydraulically telescoping boom of box construction.

(stage 2: sequential; stages 3, 4: synchronized)

BOOM EXTENSION

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

JIB

Stored within boom
 Dual offset (0°, 30°) type.

SINGLE TOP

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

HOIST

Hydraulic motor driven 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 5.4m

Middle extended width 4.4m

Minimum extended width 3.3m

MAX. OUTRIGGER LOAD

16.8t

HYDRAULIC PUMPS

Variable piston pump and gear pump

HYDRAULIC OIL TANK CAPACITY

289 liters

SAFETY DEVICES

Automatic moment limiter (AML)

With working range limiting 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 6D31
 Type 4-cycle, 6-cylinder, direct-injection, water-cooled diesel engine (with turbo charger)
 Piston displacement 4,948cc
 Max. output 155PS at 2,800rpm
 Max. torque 42.0kg·m at 1,800rpm

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

200 liters

TIRES

Front 12.00R24☆☆☆(OR)
 Rear 12.00R24☆☆☆(OR)

CAB

One-man type
 With sun visor and trim
 Rubber mounted type
 Fully adjustable seat (with headrest and 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	9,410mm
Overall width	2,350mm
Overall height	3,320mm
Wheel base	2,900mm
Tread Front	1,980mm
Tread Rear	1,980mm

WEIGHTS

Gross vehicle weight	
Total	17,795kg
Front	8,900kg
Rear	8,895kg

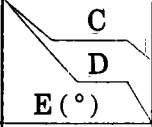
PERFORMANCE

Max. traveling speed	48km/h
Gradeability (tan θ)	0.6
Min. turning radius	4.3m (4-wheel steering) 7.0m (2-wheel steering)

TOTAL RATED LOADS

(1) With outriggers set (360°)
(i)

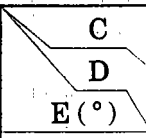
Unit : ton

Outriggers fully extended (5.4 m)							
A \ B (m)	7.4m	12.3m	17.2m	22.1m	 E (°)	6.3 m JIB	
						0 °	30°
2.5	16.0	11.0	7.5		80	2.0	1.2
3.0	16.0	11.0	7.5		75	2.0	1.2
3.5	14.0	11.0	7.5	5.0	73	2.0	1.15
4.0	12.5	11.0	7.5	5.0	70	1.75	1.1
4.5	11.3	10.2	7.5	5.0	65	1.45	1.05
5.0	10.4	9.4	7.0	5.0	60	1.2	1.0
5.5	9.6	8.8	6.6	5.0	55	1.05	0.95
6.0		8.2	6.2	4.7	50	0.95	0.85
7.0		6.75	5.5	4.15	45	0.85	0.8
8.0		5.3	4.9	3.65	40	0.8	0.75
9.0		4.25	4.4	3.3	35	0.75	0.7
10.0		3.5	3.75	2.95	30	0.7	0.65
11.0			3.2	2.7	25	0.6	
12.0			2.7	2.5	20	0.55	
13.0			2.3	2.3	15	0.5	
14.0			2.0	2.05	10	0.45	
15.0			1.7	1.8	5	0.45	
16.0				1.6			
17.0				1.4			
18.0				1.2			
19.0				1.05			
20.0				0.95			

A = Boom length
 B = Working radius
 C = Jib length
 D = Jib offset
 E = Boom angle

(ii)

Unit : ton

Outriggers middle extended (4.4 m)							
B (m) \ A	7.4m	12.3m	17.2m	22.1m	 C D E (°)	6.3 m JIB	
						0°	30°
2.5	16.0	11.0	7.5		80	2.0	1.2
3.0	16.0	11.0	7.5		75	2.0	1.2
3.5	14.0	11.0	7.5	5.0	73	2.0	1.15
4.0	12.5	11.0	7.5	5.0	70	1.75	1.1
4.5	11.3	10.2	7.5	5.0	65	1.45	1.05
5.0	9.4	9.1	7.0	5.0	60	1.2	1.0
5.5	8.0	7.75	6.6	5.0	55	1.05	0.95
6.0		6.6	6.2	4.7	50	0.95	0.85
7.0		4.95	5.2	4.15	45	0.75	0.7
8.0		3.85	4.15	3.65	40	0.6	0.55
9.0		3.05	3.35	3.3	35	0.5	0.45
10.0		2.5	2.75	2.85	30	0.4	0.35
11.0			2.25	2.4	25	0.3	
12.0			1.9	2.0			
13.0			1.6	1.7			
14.0			1.35	1.45			
15.0			1.15	1.25			
16.0				1.05			
17.0				0.9			
18.0				0.75			
19.0				0.65			
20.0				0.55			

A = Boom length
B = Working radius
C = Jib length
D = Jib offset
E = Boom angle

(iii)

Unit : ton

Outriggers minimum extended (3.3m)							
A \ B (m)	7.4m	12.3m	17.2m	22.1m	6.3 m JIB		
					E (°)	0°	30°
2.5	16.0	11.0	7.5		80	2.0	1.2
3.0	14.0	11.0	7.5		75	2.0	1.2
3.5	11.2	10.5	7.5	5.0	73	2.0	1.15
4.0	8.8	8.5	7.5	5.0	70	1.75	1.1
4.5	7.2	6.9	7.0	5.0	65	1.45	1.05
5.0	6.0	5.7	5.9	5.0	60	1.05	0.9
5.5	5.1	4.8	5.05	5.0	55	0.7	0.65
6.0		4.15	4.35	4.5	50	0.5	0.45
7.0		3.1	3.35	3.45	45	0.35	0.3
8.0		2.35	2.65	2.75			
9.0		1.85	2.15	2.2			
10.0		1.4	1.7	1.75			
11.0			1.35	1.45			
12.0			1.1	1.15			
13.0			0.85	0.95			
14.0			0.65	0.8			
15.0				0.65			
16.0				0.5			

A = Boom length
 B = Working radius
 C = Jib length
 D = Jib offset
 E = Boom angle

NOTES:

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 (main winch hook: 150kg, 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 2.75t for the main winch and 2.5t for the auxiliary winch.

A	7.4m	12.3m	17.2m	22.1m	J
H	6	4	4	4	1

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 110kg from the total rated load of the boom and must not exceed 2.5t.

(2) Without outriggers

Unit: ton

B (m)	Stationary						Creep (travelling at 1.6km/h or less)					
	7.4m BOOM		12.3m BOOM		17.2m BOOM		7.4m BOOM		12.3m BOOM		17.2m BOOM	
	F	G	F	G	F	G	F	G	F	G	F	G
3.0	8.0	5.0	6.5	4.5	4.8	3.0	6.5	4.2	5.0	3.4	3.8	2.3
3.5	7.3	4.1	6.5	3.7	4.8	3.0	5.7	3.5	5.0	3.1	3.8	2.3
4.0	6.5	3.5	5.9	3.1	4.8	3.0	5.0	2.95	4.55	2.6	3.8	2.3
4.5	5.7	3.0	5.3	2.6	4.8	2.7	4.4	2.5	4.1	2.15	3.8	2.3
5.0	4.9	2.45	4.7	2.1	4.8	2.4	3.9	2.0	3.7	1.75	3.8	1.95
5.5	4.1	2.0	4.1	1.7	4.2	2.0	3.5	1.65	3.3	1.4	3.4	1.65
6.0			3.5	1.4	3.65	1.65			2.9	1.15	3.1	1.35
7.0			2.6	0.85	2.8	1.1			2.2	0.7	2.35	0.9
8.0			1.95	0.5	2.2	0.7			1.65		1.85	0.55
9.0			1.45		1.7	0.4			1.2		1.45	
10.0			1.05		1.3				0.85		1.1	
11.0					1.0						0.8	
12.0					0.75						0.6	
13.0					0.5						0.4	

B = Working radius F = Front G = 360°

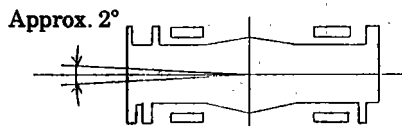
NOTES:

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: 9.00kg/cm²).
2. The weights of the slings and hooks (main winch hook: 150kg, auxiliary winch hook: 60kg) 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 chart below shows the standard number of part lines for each boom length. The load per line should not exceed 2.75t (for the main winch).

A	7.4 m	12.3m	17.2m
H	6	4	4

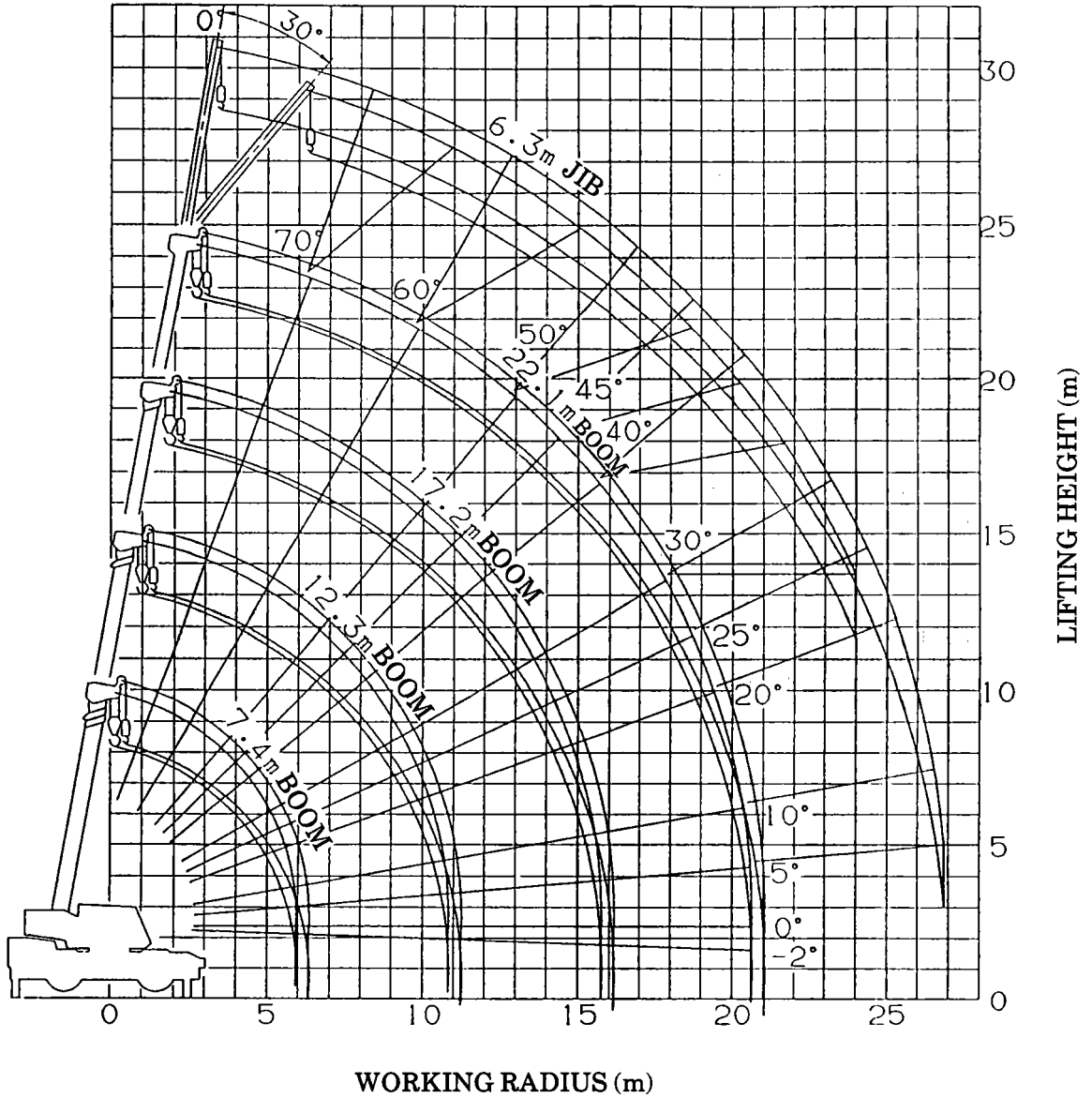
A = Boom length H = No. of part-line

5. The total rated load for the single top shall be the value obtained by subtracting 80kg from the total rated load of the boom and must not exceed 2.5t.
6. Free-fall operations should not be performed without outriggers.
7. Booms over 22.1m in length and jibs should not be used without outriggers.
8. "Over front" crane operations should be performed with the boom being inside a 2° area (1° each to the left and right) over front of the carrier.



9. The "Drive, Speed Selection" switch should be set to "4-wheel · Lo" for creeping while hoisting a load.
10. 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.
11. Crane operations should not be performed when creeping while hoisting a load.

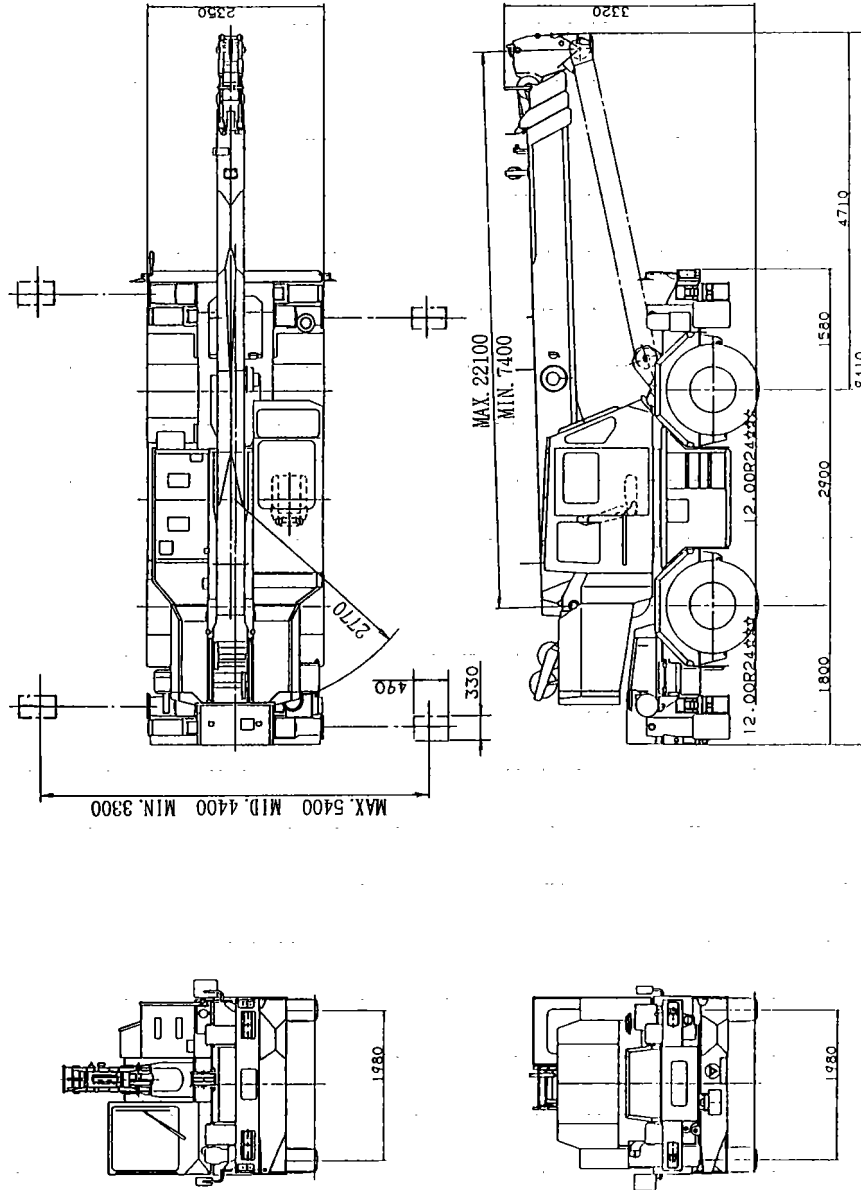
WORKING RADIUS - LIFTING HEIGHT



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.