DENSO

VM-D/G Series

Cleanroom Type Robot (Class 100)

DENSO ROBOT

Vertical articulated

VM-6083D/G-P100, VM-60B1D/G-P100

OWNER'S MANUAL (SUPPLEMENT)

Preface

This robot unit (except the controller) is the cleanroom type (class 100).

This manual describes about the cleanroom type robot for VM-6083D/G and VM-60B1D/G series.

This book is a supplement to the “VM-D or VM-G SERIES MANUALS”. Use this supplement together with the “VM-D or VM-G SERIES MANUALS”.

Before use, read this manual carefully together with related manuals to safely get the maximum benefit from your robot in your assembling operations.

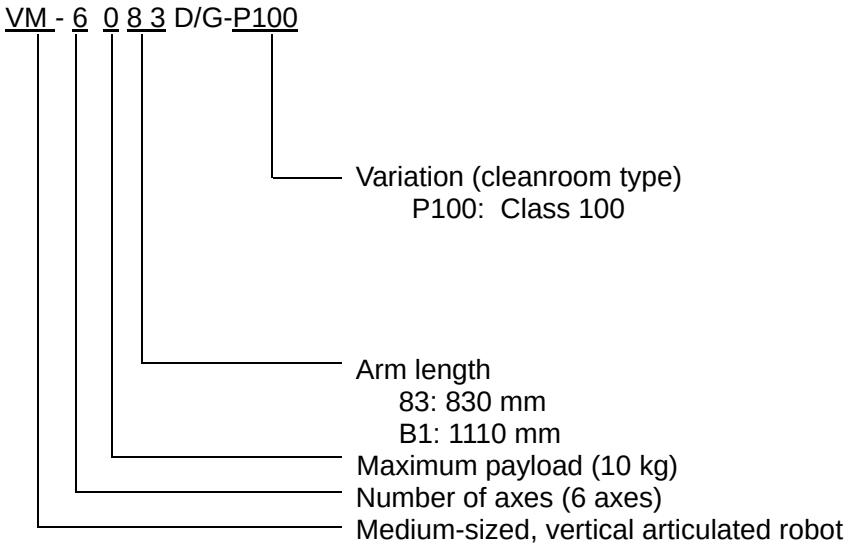
Robot models covered by this manual

Medium-sized, vertical articulated VM-D or VM-G series (Class 100 for cleanroom type)

VM-6083D/G-P100

VM-60B1D/G-P100

Coding of the set model:



Contents

1 Robot Unit Specifications

Reference manual [VM-D or VM-G series, GENERAL INFORMATION ABOUT ROBOT, Chapter 3]

Following tables list the robot unit specifications of the VM-6083D/G-P100 and VM-60B1D/G-P100.

(1) VM-6083D/G-P100

VM-6083D/G-P100, specifications

Item		Specifications
Model name of robot set **(Note 1)**		VM-6083D/G-P100
Model name of robot unit		VM-6083D/GM-P100
Overall arm length		385 (first arm) + 445 (second arm) = 830 mm
Arm offset		J1 (swing): 180 mm, J3 (front arm): 100 mm
Maximum motion area		R = 1111 mm (end-effector mounting face) R = 1021 mm (Point P: J4, J5, J6 center)
Motion range		J1 : ±170°, J2 : +135°, -90°, J3 : +165°, -80° J4 : ±185°, J5 : ±120°, J6 : ±360°
Maximum payload		10 kg
Maximum composite speed		8300 mm/s (at the center of an end-effector mounting face)
Position repeatability **(Note 2)**		In each of X, Y and Z directions: ±0.05 mm
Maximum allowable inertia moment		Around J4 and J5: 0.36 kgm^2 Around J6: 0.064 kgm^2
Position detection		Absolute encoder
Drive motor and brake		AC servomotors for all joints, Brakes for joints J2 to J6
User air piping **(Note 3)**		6 systems (ϕ4x6), 3 solenoid valves (2-position, double solenoid) contained.
User signal line		10 (for proximity sensor signals, etc.)
Air source	Operating pressure	1.0×10^5 Pa to 3.9×10^5 Pa
	Maximum allowable pressure	4.9×10^5 Pa
Weight		Approx. 78 kg
Clean class for cleanroom type		Class 100 (0.3 μ) at use points

Note 1: The model name of robot set refers to the model name of a complete set including a robot unit and robot controller.

Note 2: Position repeatability is the value at constant ambient temperature.

(2) VM-60B1D/G-P100

VM-60B1D/G-P100, specifications

Item		Specifications
Model name of robot set **(Note 1)**		VM-60B1D/G-P100
Model name of robot unit		VM-60B1D/GM-P100
Overall arm length		520 (first arm) + 590 (second arm) = 1110 mm
Arm offset		J1 (swing): 180 mm, J3 (front arm): 100 mm
Maximum motion area		R = 1388 mm (end-effector mounting face) R = 1298 mm (Point P: J4, J5, J6 center)
Motion range		J1 : ±170°, J2 : +135°, -90°, J3 : +168°, -80° J4 : ±185°, J5 : ±120°, J6 : ±360°
Maximum payload		10 kg
Maximum composite speed		8300 mm/s (at the center of an end-effector mounting face)
Position repeatability **(Note 2)**		In each of X, Y and Z directions: ±0.07 mm
Maximum allowable inertia moment		Around J4 and J5: 0.36 kgm^2 Around J6: 0.064 kgm^2
Position detection		Absolute encoder
Drive motor and brake		AC servomotors for all joints, Brakes for joints J2 to J6
User air piping **(Note 3)**		6 systems (ϕ4x6), 3 solenoid valves (2-position, double solenoid) contained.
User signal line		10 (for proximity sensor signals, etc.)
Air source	Operating pressure	1.0×10^5 Pa to 3.9×10^5 Pa
	Maximum allowable pressure	4.9×10^5 Pa
Weight		Approx. 80 kg
Clean class for cleanroom type		Class 100 (0.3 μ) at use points

Note 1: The model name of robot set refers to the model name of a complete set including a robot unit and robot controller.

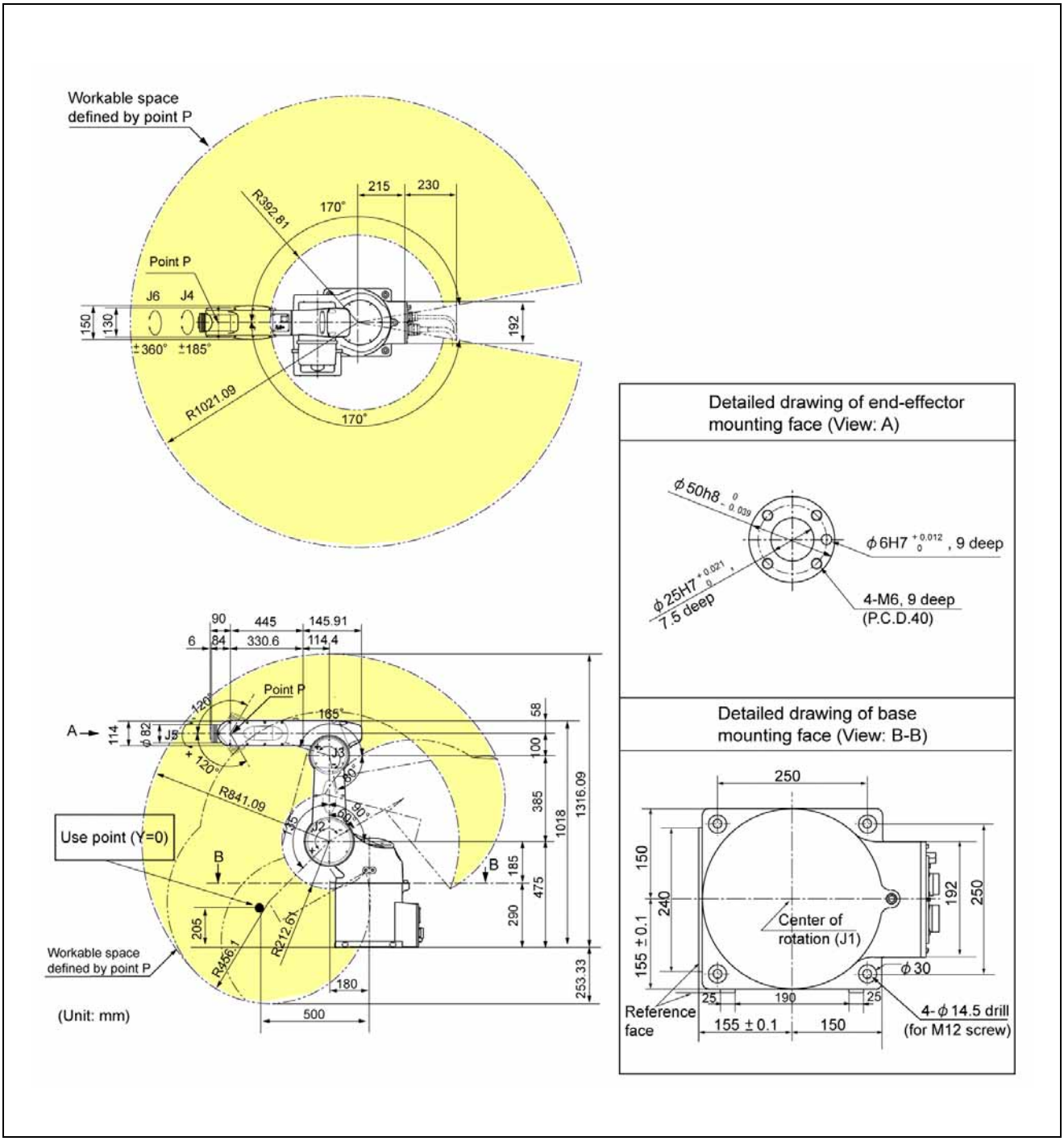
Note 2: Position repeatability is the value at constant ambient temperature.

2 Outer Dimensions and Workable Space of the Robot Unit

Reference manual [VM-D or VM-G series, GENERAL INFORMATION ABOUT ROBOT, Chapter 3]

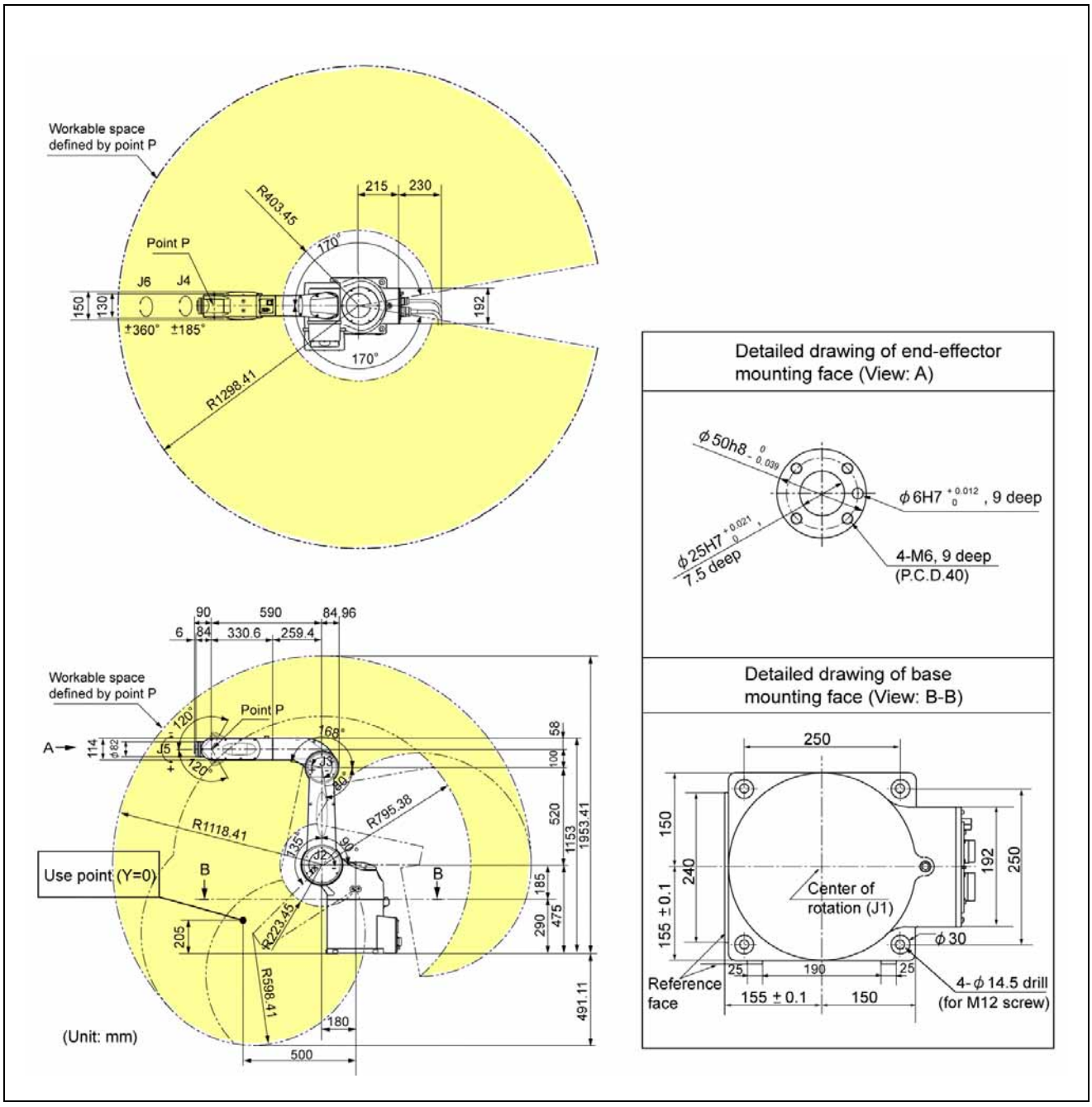
Following figures show the outer dimensions and workable space of the robot.

(1) VM-6083D/G-P100



Outer dimensions and workable space (VM-6083D/G-P100)

(2) VM-60B1D/G-P100

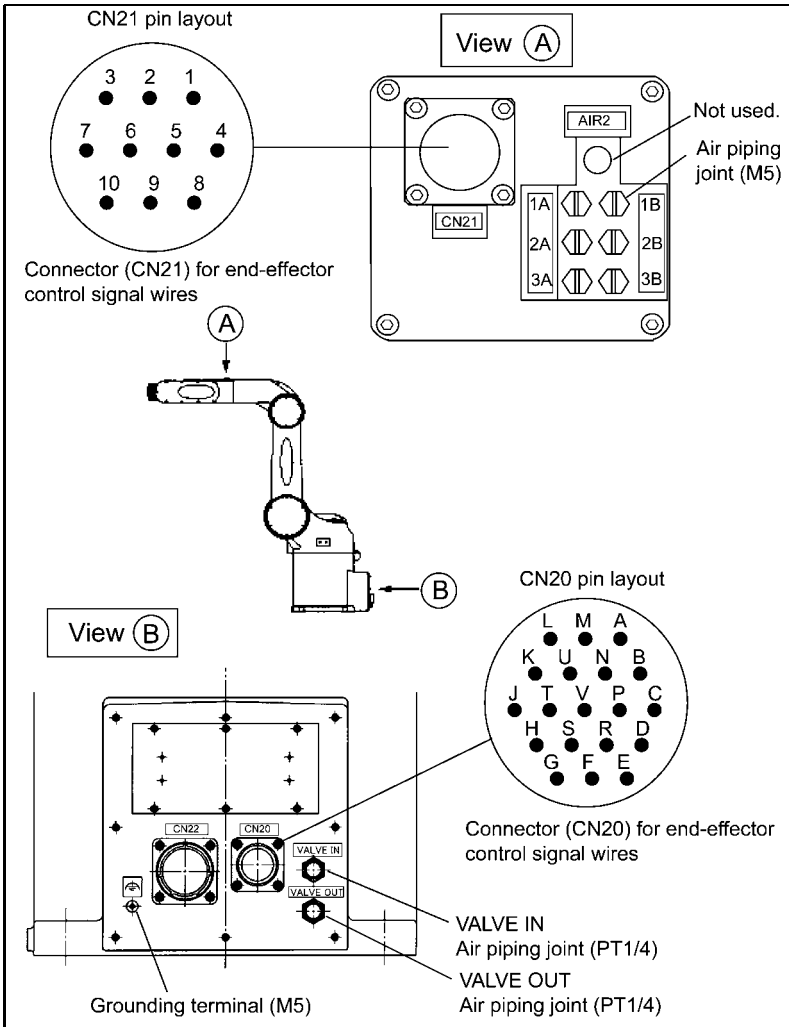


Outer dimensions and workable space (VM-60B1D/G-P100)

3 Air Piping and Signal Wiring

Reference manual [VM-D or VM-G series, GENERAL INFORMATION ABOUT ROBOT, Chapter 3]

The VM-6083D/G-P100 & VM-60B1D/G-P100 are equipped with 6 air pipes for air chuck, 10 signal lines, and 3 solenoid valves in it. The air piping and signal wiring is shown in Figure below. The specifications of the solenoid valves are common to the VM-D/G series.



Valve Symbols Air Intake/Exhaust States

(1A and 1B are piping joint symbols.)

Air piping joint			Valve signal		
	Air intake	Exhaust	Solenoid valve	Solenoid A	Solenoid B
AIR1	1A	1B	1	ON	OFF
	1B	1A	1	OFF	ON
	2A	2B	2	ON	OFF
	2B	2A	2	OFF	ON
	3A	3B	3	ON	OFF
	3B	3A	3	OFF	ON
AIR2			Not used for cleanroom type		

CN20 Pin Assignment

For controller I/O unit, NPN type (source IN, sink OUT)

CN20 pin No.	Used for:
M	+24V
N	solenoid 1A (solenoid valve 1)
P	Solenoid 1B (solenoid valve 1)
R	Solenoid 2A (solenoid valve 2)
S	Solenoid 2B (solenoid valve 2)
T	Solenoid 3A (solenoid valve 3)
U	Solenoid 3B (solenoid valve 3)

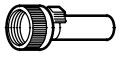
For controller I/O unit, PNP type (sink IN, source OUT)

CN20 pin No.	Used for:
M	0V
N	Solenoid 1A (solenoid valve 1)
P	Solenoid 1B (solenoid valve 1)
R	Solenoid 2A (solenoid valve 2)
S	Solenoid 2B (solenoid valve 2)
T	Solenoid 3A (solenoid valve 3)
U	Solenoid 3B (solenoid valve 3)

Note 1 : Pins A to K on CN20 and pins #1 to #10 on CN21 are connected with each other as shown below. The allowable current per line is 1 A.

CN20	A	B	C	D	E	F	G	H	J	K
CN21	1	2	3	4	5	6	7	8	9	10

Note 2 : Use the attached connector sets for CN20 and CN21.

Connector set part No.	Part No.	Model and part name	Appearance
410889-0010	410877-0120 (for CN20)	H/M3106A22-14S (straight plug) (HIROSE ELECTRIC CO., LTD.)	
	410877-0130 (for CN20)	H/MS3057-12A (cord clamp) (HIROSE ELECTRIC CO., LTD.)	Applicable wire diameter ϕ11.4 to 15.9 
	410877-0140 (for CN20)	H/MS3057-12A1 (cord clamp) (HIROSE ELECTRIC CO., LTD.)	Applicable wire diameter ϕ8 to 11.6
	410877-0070 (for CN21)	EBLP1610M (L type plug connector) (DDK Electronics, Inc.)	

Air Piping and Signal Wiring [VM-6083D/G-P100 & VM-60B1D/G-P100]

4 Notes when Handling the Cleanroom Type

The cleanroom type of the VM-6083D/G-P100 & VM-60BD/G-P100 robot satisfies Clean Class 100 (0.3 μ); however, the robot controller does not.

When carrying out installation, maintenance or inspection jobs of the cleanroom type robot in your clean room, be sure to follow your dust-proof job rules. If you remove the covers from the robot controller or robot unit, even the cleanroom type may scatter worn belt dust, piping grease, dust or dirt accumulating inside.

Jobs requiring special care

- CALSET
- Cleaning of cooling fan filters in the robot controller
- Replacement of encoder backup batteries
- Replacement of controller memory backup batteries
- Inspection of timing belts
- Replacement of controller fuses
- Replacement of controller output ICs

VM-6083D/G-P100 & VM-60B1D/G-P100
Cleanroom Type Robot (Class 100)

OWNER'S MANUAL
(SUPPLEMENT)

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DENSO WAVE INCORPORATED
Factory Automation Division 9G

The purpose of this manual is to provide accurate information in the handling and operating of the robot. Please feel free to send your comments regarding any errors or omissions you may have found, or any suggestions you may have for generally improving the manual.

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