

**YASKAWA**

# MOTOMAN GP-series

Handling & General Application



Controlled by  
YRC1000

MOTOMAN GP8



reddot award 2018  
winner

# MOTOMAN GP-series

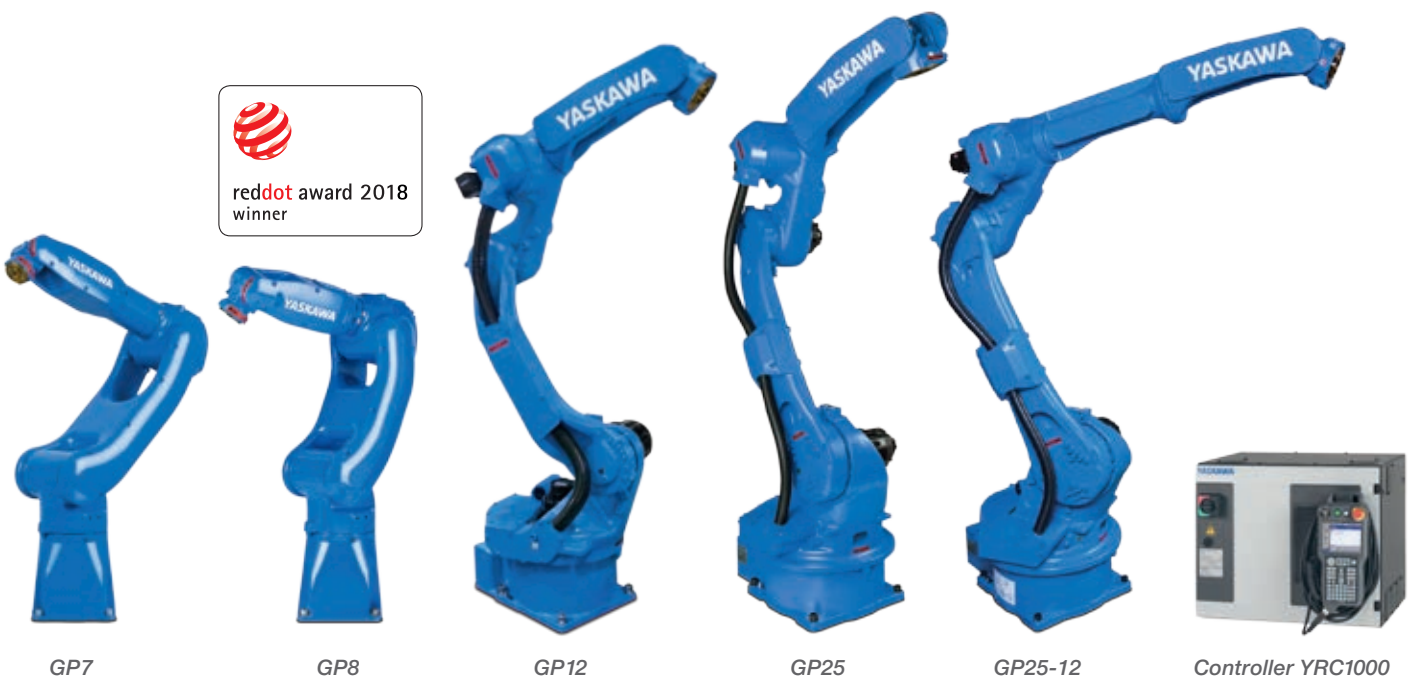
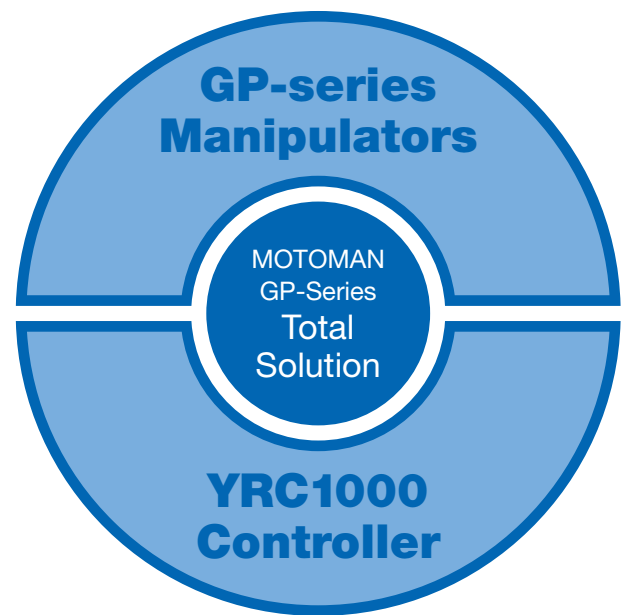
## Robot System Solutions MOTOMAN GP-series

Find smart solutions for production site issues with YASKAWA's cutting-edge robot systems.



## YASKAWA has the Answer!

We can meet customer's diversified needs with a variety of functions and components.

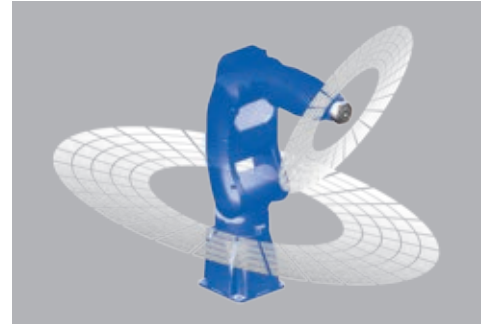


# GP7 and GP8 – Compact and High Speed

## Increase Productivity

### Highest payloads, speeds and wrist allowable moment in its class

- A variety of workpieces can be transferred and different grippers can be mounted with 7-kg and 8-kg payloads and 38 % greater allowable moment
- Speeds of all axes have been increased by 39 % (max)
- Acceleration/deceleration control has been improved to achieve maximum reduction of acceleration/deceleration times for all robot postures



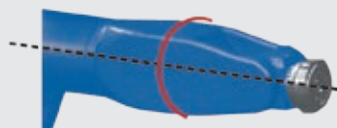
### Reduced interference radius when S-axis is turning



Former model MH5(L)S II  
Interference radius: 182 mm

New model GP7 and GP8  
Interference radius: 140 mm

### Reduced interference radius when the wrist is turning



Former model (MH5S II): 73 mm  
New model (GP7 and GP8): 67 mm

## Make Equipment compact

### Slim and easy-to-use structure

- Slim robot body requires minimum installation space (minimizes L-U axis offset)
- The manipulator cable can be connected at the bottom section, which reduces interference with walls and requires far less installation space when compared with cable connections on the side of the robot
- Increased maximum reach and horizontal reach enables robots to operate in wider work areas
- The slim, straight, and symmetrical arm design minimize interference with peripheral devices even in small spaces



Manipulator cable connection on the side and bottom (optional) of the robot

## Improve efficiency in Installation, Operation and Maintenance of Equipment

### Easy set-up

- Only one cable is required, which reduces setup time

### High environmental performance

- Its structure can resist dust and coolants due to its IP67 standard protection class

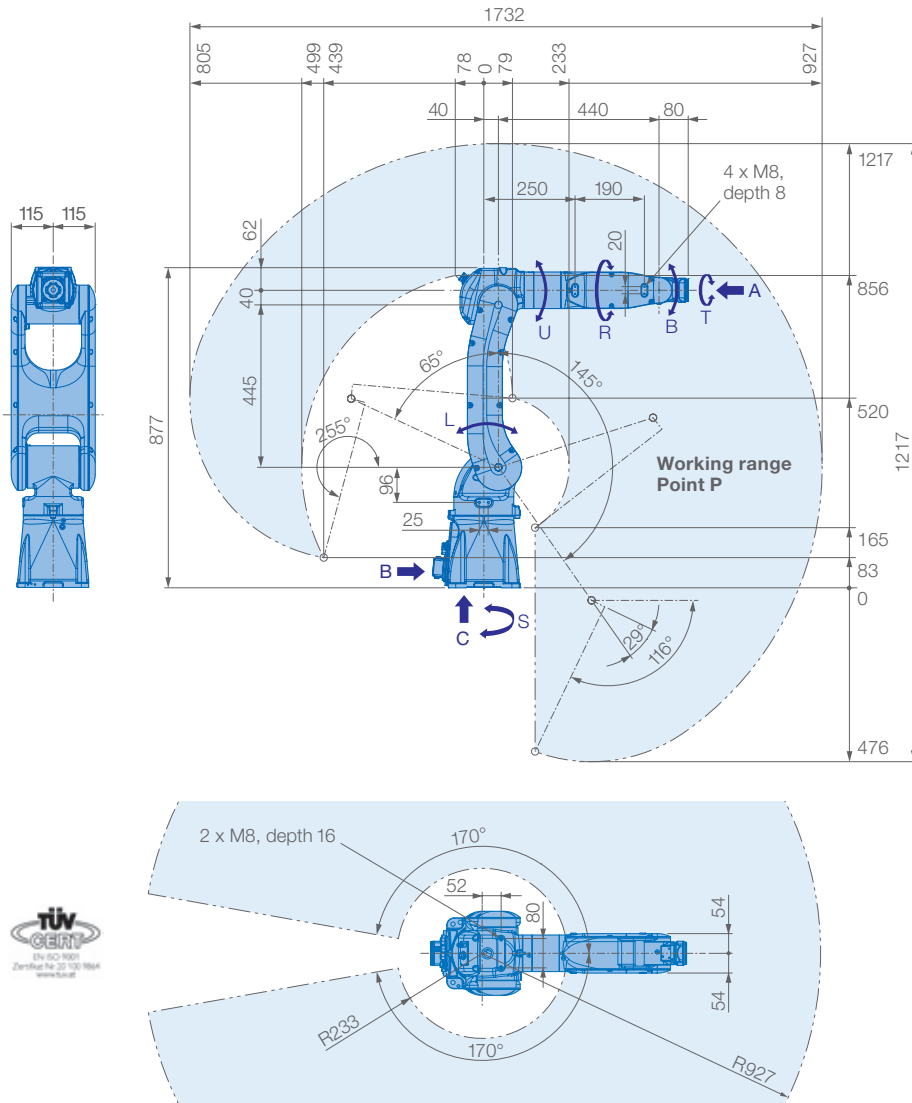
### Easy-to-clean design

- Robot surface is designed to prevent adherence of dust

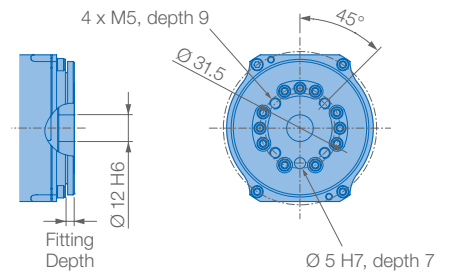
### Easy maintenance

- Data saving feature enables to replace the wire harness in the robot without having to connect to a battery
- Productivity improvement due to reduction in number of cables & connectors

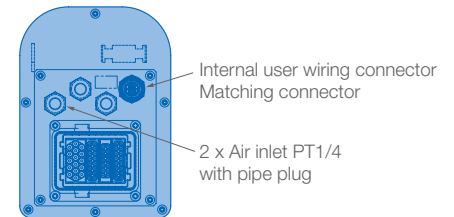




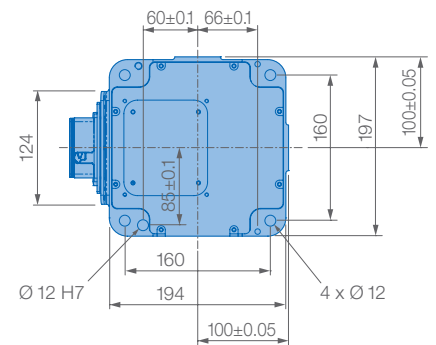
## View A



## View B



## View C



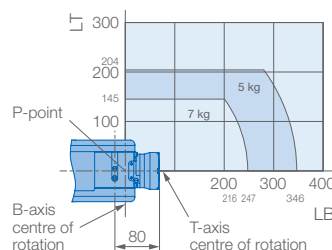
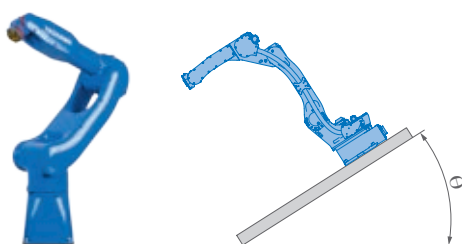
Mounting options: Floor, ceiling, wall, tilt\*

Protection class: IP67

\* tilt with condition of angle – see table below

- Free from corrosive gasses or liquids, or explosive gasses
- Free from exposure to water, oil or dust
- Free from excessive electrical noise (plasma)

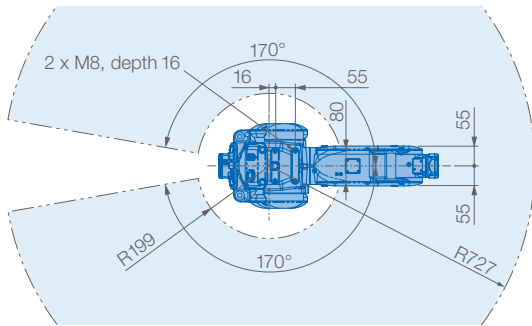
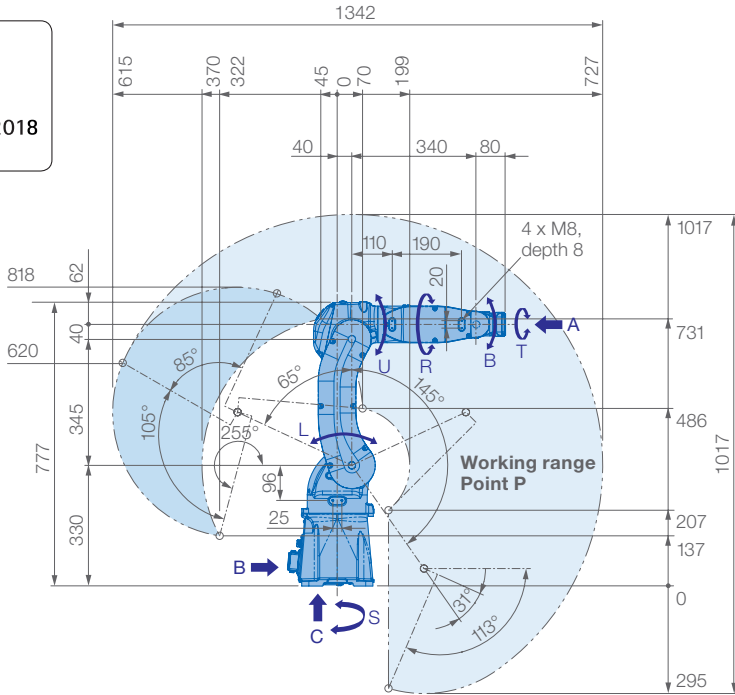
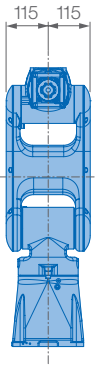
## Allowable wrist load



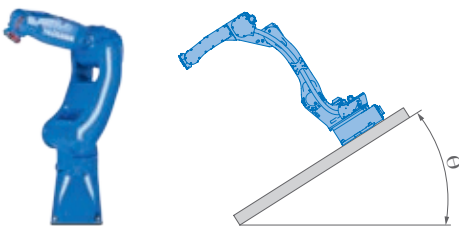
Robot installation angle $\Theta$ [deg.]	S-axis operating range [deg.]
$0 \leq \Theta \leq 30$	$\pm 170$ degrees or less (no limit)
$30 < \Theta \leq 35$	$\pm 60$ degrees or less
$35 < \Theta \leq 40$	$\pm 50$ degrees or less
$40 < \Theta \leq 45$	$\pm 45$ degrees or less
$45 < \Theta \leq 50$	$\pm 40$ degrees or less
$50 < \Theta \leq 60$	$\pm 35$ degrees or less
$60 < \Theta$	$\pm 30$ degrees or less

## Specifications GP7

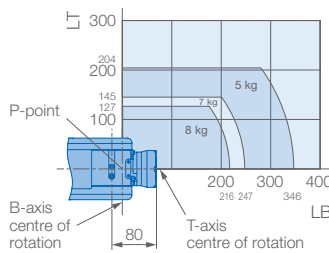
Axes	Maximum motion range [°]	Maximum speed [°/sec.]	Allowable moment [Nm]	Allowable moment of inertia [kg · m <sup>2</sup> ]	Controlled axes	6
S	$\pm 170$	375	–	–	Max. payload [kg]	7
L	+145/–65	315	–	–	Repeatability [mm]	$\pm 0.03^*$
U	+255/–116	410	–	–	Max. working range R [mm]	927
R	$\pm 190$	550	17	0.5	Temperature [°C]	0 to +45
B	$\pm 135$	550	17	0.5	Humidity [%]	20 – 80
T	$\pm 360$	1000	10	0.2	Weight [kg]	34
					Power supply, average [KVA]	1**



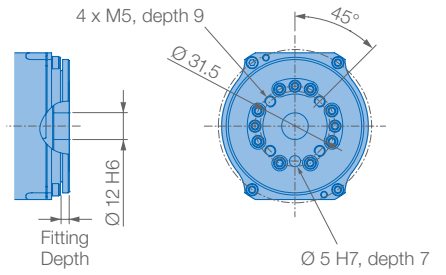
- Free from corrosive gasses or liquids, or explosive gasses
- Free from exposure to water, oil or dust
- Free from excessive electrical noise (plasma)



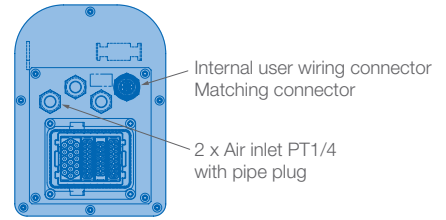
**Allowable wrist load**



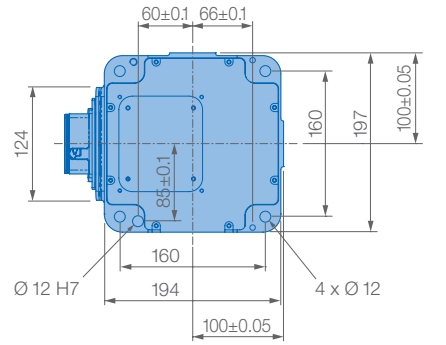
**View A**



**View B**



**View C**



Mounting options: Floor, ceiling, wall, tilt\*  
Protection class: IP67

\* tilt with condition of angle – see table below

Robot installation angle $\theta$ [deg.]	S-axis operating range [deg.]
$0 \leq \theta \leq 30$	$\pm 170$ degrees or less (no limit)
$30 < \theta \leq 35$	$\pm 60$ degrees or less
$35 < \theta \leq 40$	$\pm 50$ degrees or less
$40 < \theta \leq 45$	$\pm 45$ degrees or less
$45 < \theta \leq 50$	$\pm 40$ degrees or less
$50 < \theta \leq 60$	$\pm 35$ degrees or less
$60 < \theta$	$\pm 30$ degrees or less

**Specifications GP8**

Axes	Maximum motion range [°]	Maximum speed [°/sec.]	Allowable moment [Nm]	Allowable moment of inertia [kg · m <sup>2</sup> ]	Controlled axes	
S	$\pm 170$	455	–	–	Max. payload [kg]	6
L	+145/–65	385	–	–	Repeatability [mm]	8
U	+255/–113	520	–	–	Max. working range R [mm]	$\pm 0.02^*$
R	$\pm 190$	550	17	0.5	Temperature [°C]	727
B	$\pm 135$	550	17	0.5	Humidity [%]	0 to +45
T	$\pm 360$	1000	10	0.2	Weight [kg]	20 – 80
					Power supply, average [KVA]	32
						1**

\* Conforms to ISO 9283 \*\* Varies in accordance with applications and motion patterns Note: SI units are used for specifications.

All dimensions in mm

# GP12, GP25 and GP25-12

## Increase Productivity

### Highest payloads, speeds and wrist allowable moment in its class

- The productivity of the customer's equipment can be improved with the highest speed in the 12 and 25 kg payload class
- Acceleration/deceleration control has been improved to achieve maximum reduction of acceleration/deceleration times for all robot postures

Maximum speed has been increased 15% (max.) in comparison to the former model



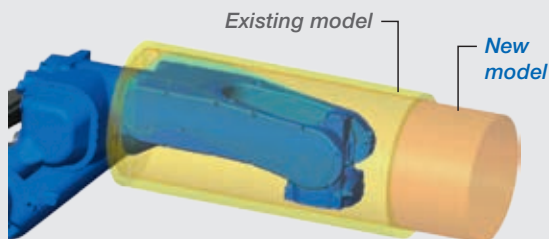
### Hollow arm



50 mm dia.



50 mm dia.



Minimized interference radius of the wrist  
MH12/MH24 (earlier models): 136/147 mm  
GP12/GP25 (new models): 120/138 mm

## Make Equipment compact

### Easy-to-use structure

- The hollow arm structure to store cables reduces operation restriction due to cable interference, simplifies teaching and eliminates cable disconnection caused by interference

### Best accessibility in its class

- The slim arm design minimizes interference with peripheral devices even in small spaces

## Improve Efficiency in Installation, Operation and Maintenance of Equipment

### Easy set-up

- Only one cable is required, which reduces setup time

### Wrist structure with great environment resistance

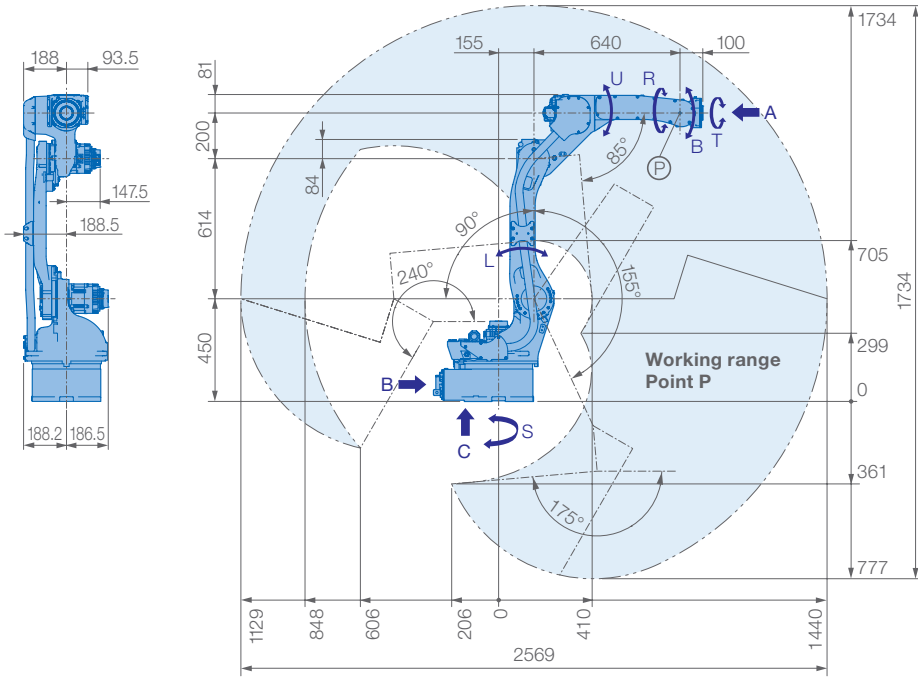
- Wrist structure of R, B and T axes are IP67-compliant as a standard specification
- Wrist structure of S, L and U axes are IP54-compliant (option IP65)

### Easy maintenance

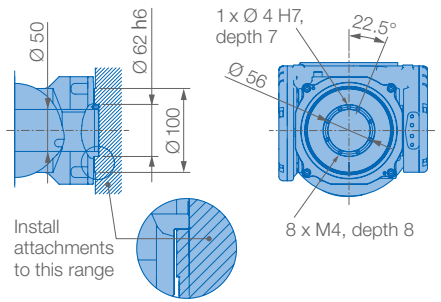
- Data saving feature enables to replace the wire harness in the robot without having to connect to a battery
- Productivity improvement due to reduction in number of cables & connectors



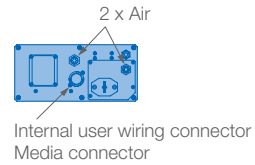




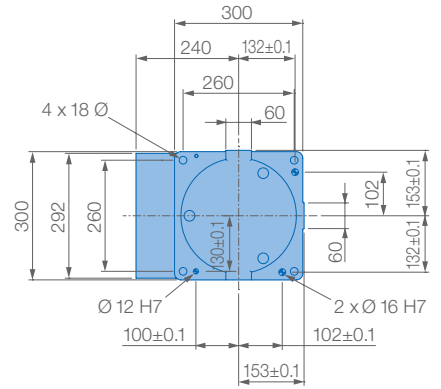
View A



View B



View C



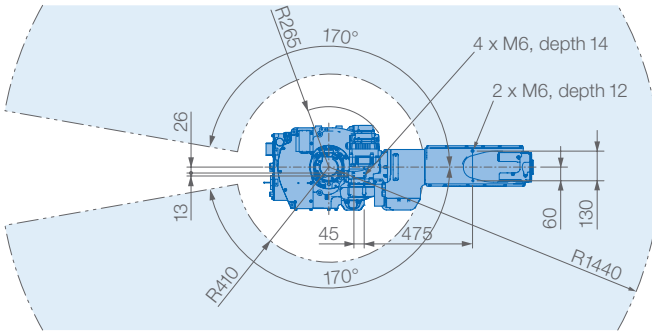
Mounting options: Floor, ceiling, wall, tilt\*

Protection class: Main axes (S, L, U) IP54 (option 65), wrist IP67

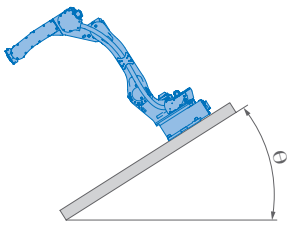
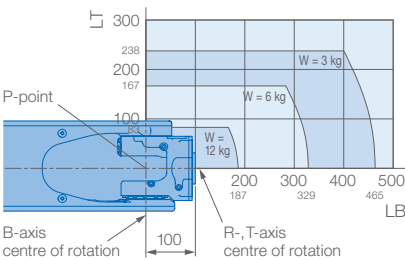
\* tilt with condition of angle – see table below

Robot installation angle $\Theta$ [deg.]	S-axis operating range [deg.]
$0 \leq \Theta \leq 30$	$\pm 170$ degrees or less (no limit)
$30 < \Theta \leq 35$	$\pm 60$ degrees or less
$35 < \Theta \leq 40$	$\pm 50$ degrees or less
$40 < \Theta \leq 45$	$\pm 45$ degrees or less
$45 < \Theta \leq 50$	$\pm 40$ degrees or less
$50 < \Theta \leq 60$	$\pm 35$ degrees or less
$60 < \Theta$	$\pm 30$ degrees or less

- Free from corrosive gasses or liquids, or explosive gasses
- Free from exposure to water, oil or dust
- Free from excessive electrical noise (plasma)



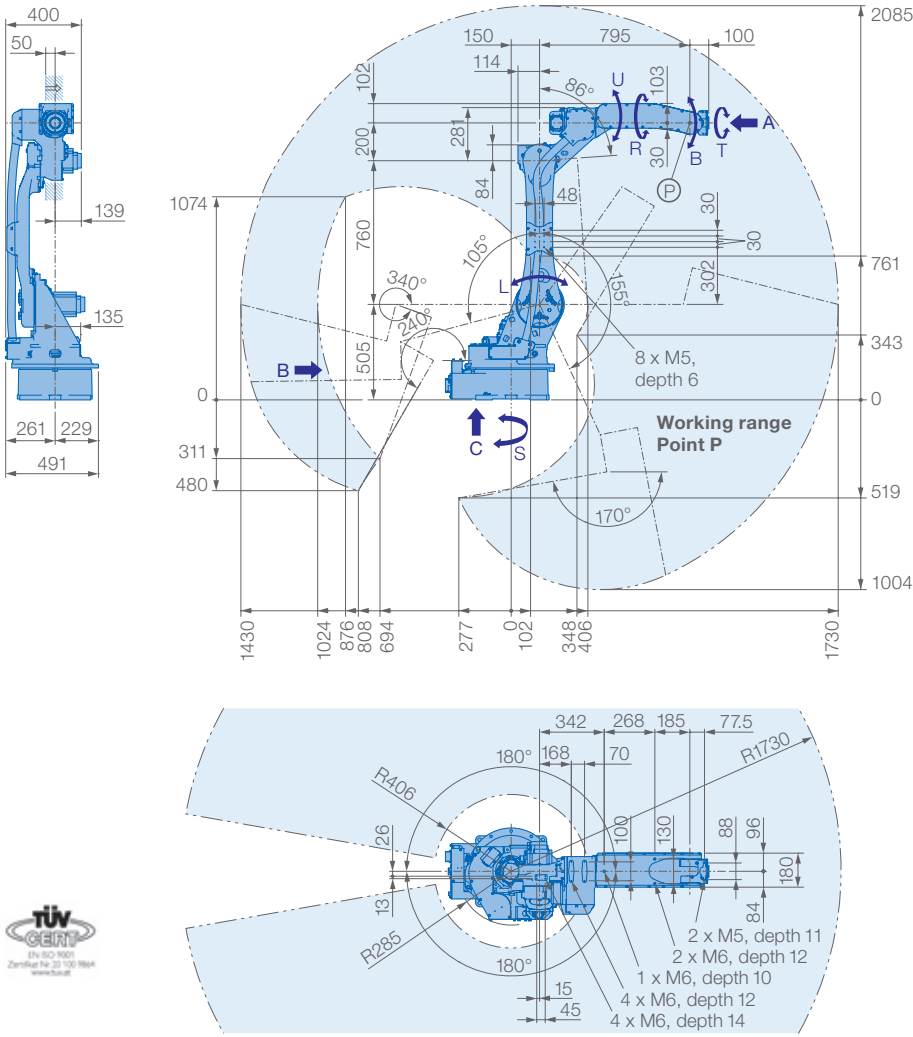
Allowable wrist load



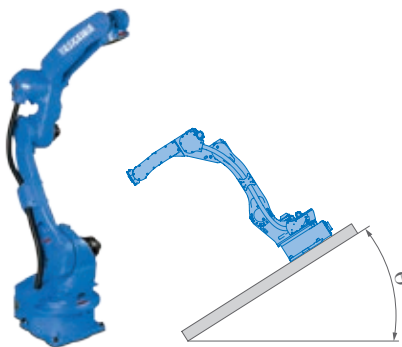
Specifications GP12					
Axes	Maximum motion range [°]	Maximum speed [°/sec.]	Allowable moment [Nm]	Allowable moment of inertia [kg · m <sup>2</sup> ]	Controlled axes
S	$\pm 170$	260	–	–	6
L	+155/–90	230	–	–	Max. payload [kg]
U	+155/–85	260	–	–	Repeatability [mm]
R	$\pm 200$	470	22	0.65	Max. working range R [mm]
B	$\pm 150$	470	22	0.65	Temperature [°C]
T	$\pm 455$	700	9.8	0.17	Humidity [%]
					Weight [kg]
					Power supply, average [KVA]

\* Conforms to ISO 9283 \*\* Varies in accordance with applications and motion patterns Note: SI units are used for specifications.

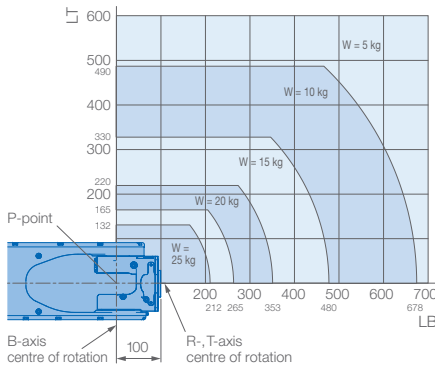
All dimensions in mm



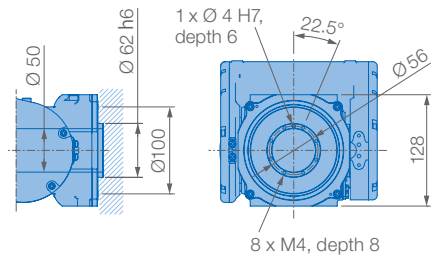
- Free from corrosive gasses or liquids, or explosive gasses
- Free from exposure to water, oil or dust
- Free from excessive electrical noise (plasma)



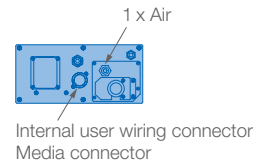
### Allowable wrist load



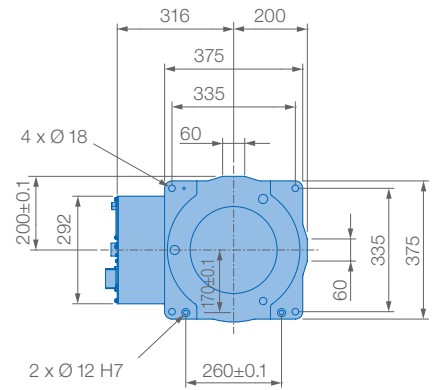
### View A



### View B



### View C



Mounting options: Floor, ceiling, wall, tilt\*

Protection class: Main axes (S, L, U) IP54 (option 65), wrist IP67

\* tilt with condition of angle – see table below

Robot installation angle $\Theta$ [deg.]	S-axis operating range [deg.]
$0 \leq \Theta \leq 30$	$\pm 170$ degrees or less (no limit)
$30 < \Theta \leq 35$	$\pm 60$ degrees or less
$35 < \Theta \leq 40$	$\pm 50$ degrees or less
$40 < \Theta \leq 45$	$\pm 45$ degrees or less
$45 < \Theta \leq 50$	$\pm 40$ degrees or less
$50 < \Theta \leq 60$	$\pm 35$ degrees or less
$60 < \Theta$	$\pm 30$ degrees or less

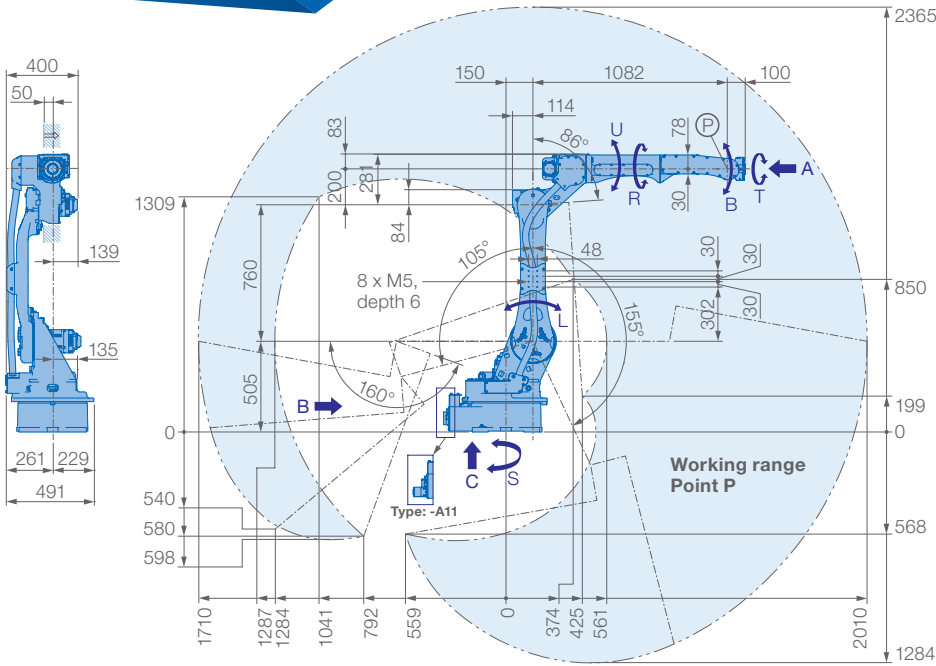
### Specifications GP25

Axes	Maximum motion range [°]	Maximum speed [°/sec.]	Allowable moment [Nm]	Allowable moment of inertia [kg · m <sup>2</sup> ]	Controlled axes	6
S	$\pm 180$	210	–	–	Max. payload [kg]	25
L	$+155/-105$	210	–	–	Repeatability [mm]	$\pm 0.06^*$
U	$+160/-86$	265	–	–	Max. working range R [mm]	1730
R	$\pm 200$	420	52	2.3	Temperature [°C]	0 to +45
B	$\pm 150$	420	52	2.3	Humidity [%]	20 – 80
T	$\pm 455$	885	32	1.2	Weight [kg]	250
					Power supply, average [KVA]	2,0**

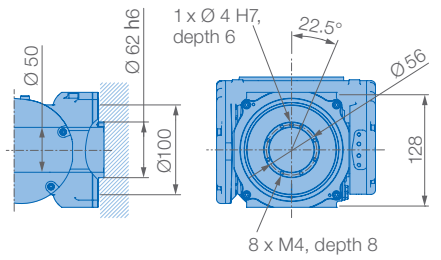
\* Conforms to ISO 9283 \*\* Varies in accordance with applications and motion patterns Note: SI units are used for specifications.

All dimensions in mm

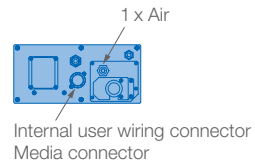




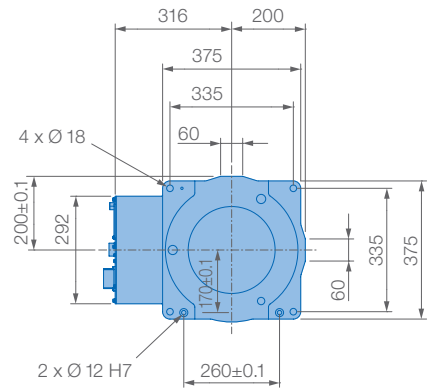
**View A**



**View B**



**View C**

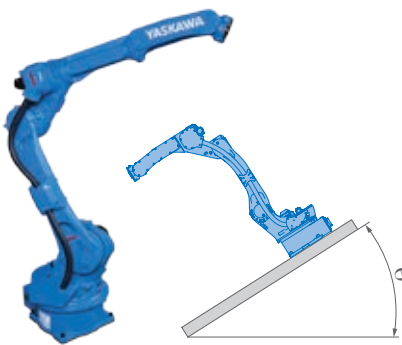


Mounting options: Floor, ceiling, wall, tilt\*

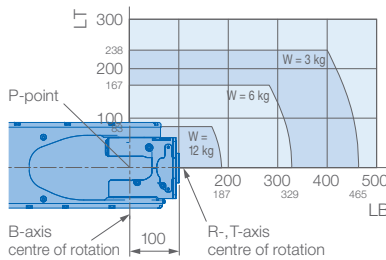
Protection class: Main axes (S, L, U) IP54 (option 65), wrist IP67

\* tilt with condition of angle – see table below

- Free from corrosive gasses or liquids, or explosive gasses
- Free from exposure to water, oil or dust
- Free from excessive electrical noise (plasma)



**Allowable wrist load**



Robot installation angle $\theta$ [deg.]	S-axis operating range [deg.]
$0 \leq \theta \leq 30$	$\pm 180$ degrees or less (no limit)
$30 < \theta \leq 35$	$\pm 60$ degrees or less
$35 < \theta$	$\pm 30$ degrees or less

**Specifications GP25-12**

Axes	Maximum motion range [°]	Maximum speed [°/sec.]	Allowable moment [Nm]	Allowable moment of inertia [kg · m <sup>2</sup> ]	Controlled axes	6
S	$\pm 180$	210	–	–	Max. payload (on U-axis) [kg]	12 (9)
L	$+155/-105$	210	–	–	Repeatability [mm]	$\pm 0.08^*$
U	$+160/-86$	220	–	–	Max. working range R [mm]	2010
R	$\pm 200$	435	22	0.65	Temperature [°C]	0 to +45
B	$\pm 150$	435	22	0.65	Humidity [%]	20 – 80
T	$\pm 455$	700	9.8	0.17	Weight [kg]	260
					Power supply, average [KVA]	2.0**

\* Conforms to ISO 9283 \*\* Varies in accordance with applications and motion patterns **Note:** SI units are used for specifications.

All dimensions in mm

# Robot Controller & Software

## MOTOMAN YRC1000

Industrial Robot Controller

### KEY BENEFITS

- Compact, fast and flexible
- Global standardization (no transformer required)
- High path accuracy
- High efficiency



### Optimal Industrial Design

- Volume: 125 liters



### Improved Programming Pendant



### Specifications Controller YRC1000

<b>Dimensions</b>	598 (W) x 490 (H) x 427 (D) mm (125 l without protrusion parts)
<b>Mass</b>	70 kg max. (possible to control three external axes)
<b>Cooling system</b>	Indirect cooling
<b>Ambient temperature</b>	During operation: 0°C to +45°C / During storage: -10°C to +60°C
<b>Relative humidity</b>	90 % max. (non-condensing)
<b>Power supply</b>	Three-phase 380–440 VAC (+10 %, -15 %), 50/60 Hz Hz (±2 %)
<b>Digital I/Os</b>	Specialized signals: 19 inputs and 6 outputs / General signals: 40 inputs and 40 outputs
<b>Programming capacity</b>	JOB: 200,000 steps, 10,000 instructions / CIO ladder: 20,000 steps
<b>Expansion slots</b>	2 x PCIe or 2 x PCI or 1 x PCI/1 x PCIe
<b>LAN (Connection to host)</b>	2 (10BASE-T/100BASE-TX)
<b>Interface</b>	RS-232C/RS422: 1 ch (used by switching)

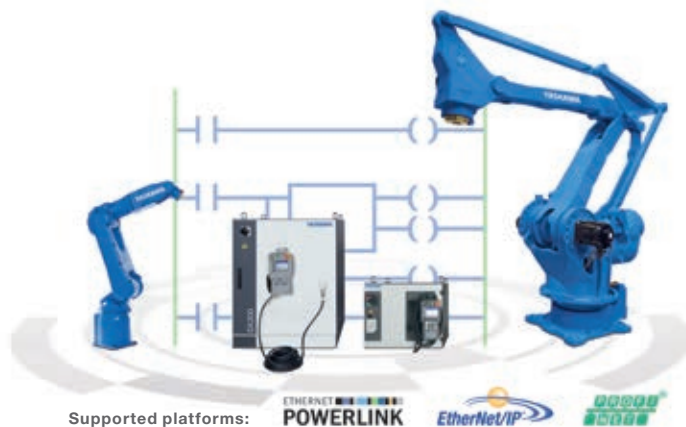
# MotoLogix

Interface for MOTOMAN robot programming and control via PLC

## KEY BENEFITS

- Robot programming carried out in PLC language – unified for the whole system
- Connects all peripheral devices (sensor, camera, conveyor) through PLC
- Robot completely integrated in the PLC and HMI environment
- Testing of the complete PLC/HMI robot application using virtualization (MotoSim)
- Assurance of a YASKAWA path accuracy (calculation in MOTOMAN controller)
- All YASKAWA DX200 and YRC1000 robots can be controlled
- No Teach pendant nor YASKAWA robotics knowledge is required for robot programming and operation
- Data stored in the PLC, not in the robot controller
- Control up to 16 axes over one MotoLogix interface
- Online-help is included in built in library

\* If the DX200 and YRC1000 are equipped with a Functional Safety Unit (FSU) the amount of tools is limited to 16.



MotoLogix specifications	
Supported robots	All DX200 and YRC1000 types
Number of robots	Up to 4 robots (or 16 external axes) for each MotoLogix system
Number of MotoLogix systems per PLC	Only limited by PLC and fieldbus capacity
Number of motions, userframes, tools	Only limited by PLC memory*
Number of interference zones	32
Number of conveyors for Conveyor tracking	Only limited by PLC hardware and memory
Robot controller cycle time	4 ms
Data exchange for one MotoLogix system	436 byte consistent data is cyclically exchanged between PLC and each MotoLogix system
Required available PLC memory	> 512 kb (depends on complexity of application)

# Vision System

Camera & Software MotoSight2D



## KEY BENEFITS

### Camera:

- Direct communication with software MotoSight2D
- High speed and resolution
- Flexible mounting (on robot or free standing)
- Several equipment available

### Software:

- Monitoring of up to 4 cameras
- Display camera image (live) on robot teach pendant
- Simple assignment of vision results to robot variables
- Storage of current jobs and images

Model	Technical data YASKAWA Cameras			
	Resolution	Processor speed	Frame/Second	Vision tools
MS100	800 x 600	1 x Base model	102	<b>Limited Tool Set</b> Pattern, Edge, Blob, Circle, Curve, Histogram, Geometry, Image Filters, Standard Calibration (9-Points)
MS200	800 x 600	3 x Base model	102	<b>Full Tool Set</b> Pattern, Edge, Blob, Circle, Curve, Histogram, Geometry, Image Filters, Standard Calibration (9-Points) PatMax (Geometric pattern matching technology), Advanced Calibration (non-linear calibration), and caliper tool, OCR, OCV; 2D Matix and Barcode reading
MS300	1280 x 1024	6 x Base model	60	<b>High Resolution &amp; Full Tool Set</b> Pattern, Edge, Blob, Circle, Curve, Histogram, Geometry, Image Filters, Standard Calibration (9-Points) PatMax (Geometric pattern matching technology), Advanced Calibration (non-linear calibration), and caliper tool, OCR, OCV; 2D Matix and Barcode reading

## YASKAWA GROUP

- AT YASKAWA Austria  
Schwechat/Wien  
+43(0)1-707-9324-15
- CZ YASKAWA Czech s.r.o.  
Rudná u Prahy  
+420-257-941-718
- ES YASKAWA Ibérica, S.L.  
Gavà/Barcelona  
+34-93-6303478
- FR YASKAWA France SARL  
Saint-Aignan-de-Grand-Lieu  
+33-2-40131919
- FI YASKAWA Finland Oy  
Turku +358-(0)-403000600
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Torino +39-011-9005833
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- RO Sam Robotics srl  
Timisoara +40-720-279-866  
MPL Automation S.R.L.  
Satu Mare +40 (0) 261 750 741



## YASKAWA Headquarters

YASKAWA Europe GmbH  
Robotics Division  
Yaskawastraße 1  
85391 Allershausen, Germany  
Tel. +49 (0) 8166/90-0  
Fax +49 (0) 8166/90-103

robotics@yaskawa.eu.com  
www.yaskawa.eu.com

## YASKAWA ACADEMY and sales office Frankfurt

YASKAWA Europe GmbH  
Robotics Division  
Hauptstraße 185  
65760 Eschborn, Germany  
Tel. +49 (0) 6196/77725-0  
Fax +49 (0) 6196/77725-39



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