

YASKAWA

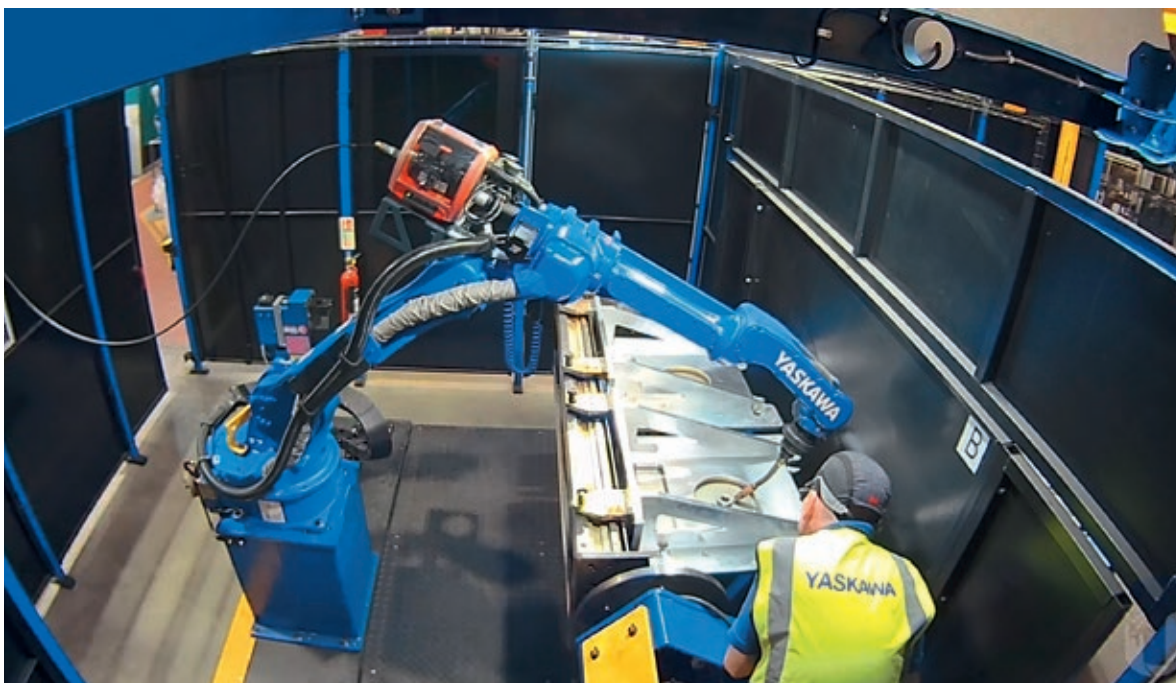
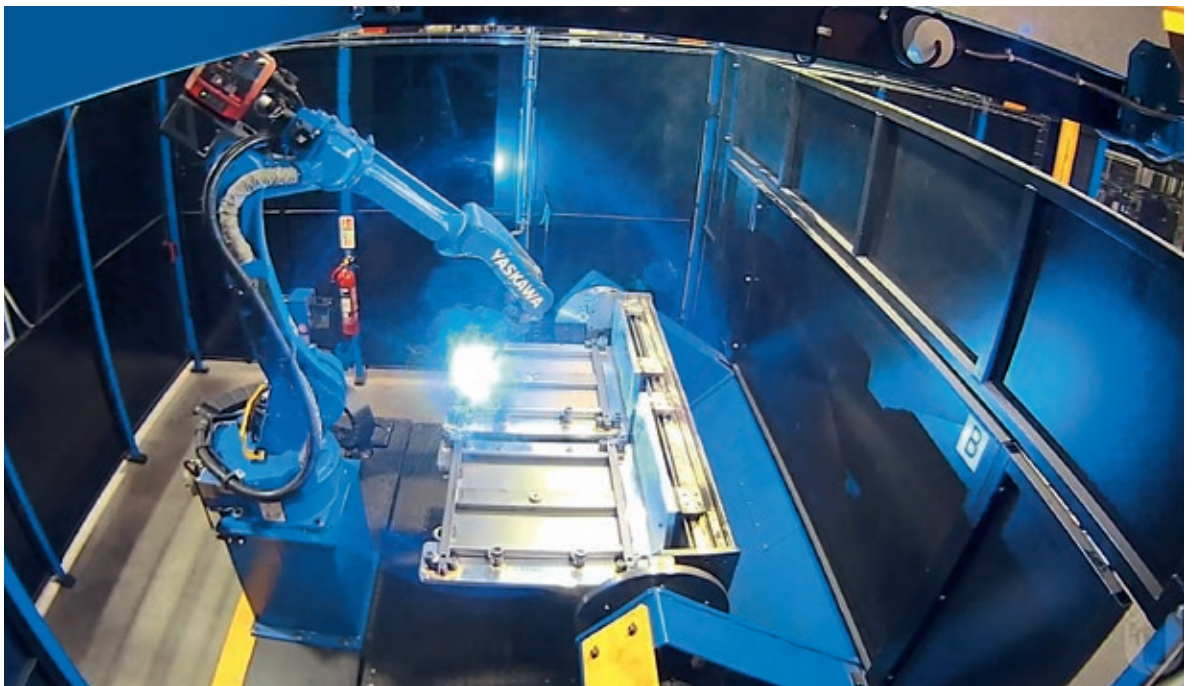
MOTOMAN AR-series

Arc Welding



Controlled by
YRC1000

Masters of Robotics, Motion and Control



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MOTOMAN AR-series

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JOB EDIT DISPLAY UTILITY 12 4 5 6 7 8 9 10 11 12

JOB CONTENT
J:T-ACHSE
CONTROL GROUP: R1
S:0000
TOOL: **

0000
0001 0001 00 MOVJ VJ=100.00
0002 0002 00 TIMER T=1.00
0003 0002 00 MOVJ VJ=100.00
0004 END

MOVJ VJ=20.00

Main Menu Simple Menu

MULTI LAYOUT TOOLSEL COORD. ENTRY SIMPLE MENU DIRECT OPEN CANCEL SELECT

MAIN MENU

SERVO ON
SERVO ON READY
HIGH SPEED
FAST
MANUAL SPEED
SLOW

X- R- X+ R+
Y- B- Y+ B+
Z- T- Z+ T+
8- 8+

E- E+
SHIFT INTER LOCK 7 SMOV 8 9
ROBOT INFORM LIST 4 5 6
EX AXIS USAGE 1 2 3
AUX MOTION TYPE 0 TOOL ON TOOL OFF TOOL ON JOB TOOL OFF JOB

TEST START SHIFT
BWD FWD
DELETE INSERT
MODIFY ENTER

YASKAWA

MOTOMAN YRC1000

Industrial Robot Controller



High Performance Controller YRC1000 for MOTOMAN Robots

The MOTOMAN YRC1000 is a compact, fast and flexible controller for MOTOMAN robots that combines high performance robot control in a small footprint cabinet with volume of 125 litres and a maximum weight of 70 kg.

Besides the typical Yaskawa controller functionality, the YRC1000 includes additional functional improvements. Speed of the controller has been increased by lowering a ladder scanning time.

Path accuracy improvement assures increased precision in trajectory performance independently on the motion speed.

User interface supports smartphone like touch operations and allows the user to 3D simulate robots motion on PP screen before and during execution of the real robot arm. Service staff can directly connect to the PP user interface for remote service purposes. Total programming pendant's weight was reduced to 730 grams which offers more convenient use by the operator. The new controller simplifies maintenance by offering preventive maintenance information and powerful software tools for analysis and notification.

KEY BENEFITS

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

Optimal Industrial Design

- Volume: 125 liters



Programming Pendant (PHG) – ergonomical, light and easy





Specifications controller YRC1000

Dimensions	598 (W) x 490 (H) x 427 (D) mm (125 l without protrusion parts)
Weight	70 kg max. (possible to control three external axes)
Protection class	IP54
Cooling system	Indirect cooling
Ambient temperature	During operation: 0°C to +45°C / During storage: -10°C to +60°C
Relative humidity	90 % max. (non-condensing)
Power supply	Three-phase 380–440 VAC (+10 %, -15 %), 50/60 Hz (±2 %)
Digital I/Os	Specialized signals: 19 inputs and 6 outputs / General signals: 40 inputs and 40 outputs
Programming capacity	JOB: 200,000 steps, 10,000 instructions / CIO ladder: 20,000 steps
Expansion slots	2 x PCIe or 2 x PCI or 1 x PCI/1 x PCIe
LAN (Connection to host)	2 (10BASE-T/100BASE-TX)
Interface	RS-232C/RS422: 1 ch (used by switching)

Common Size for use
in Japan, Asia, Europe, and the U.S.



Improved Programming Pendant



Specifications programming pendant

Dimensions	152 (W) x 299 (H) x 53 (D) mm
Weight	0.730 kg
Material	Reinforced plastics
Operation device	Select keys, axis keys, numerical/application keys, mode selector switch with keys (mode: teach, play, and remote), emergency stop button, enable switch, SD card interface device, USB port (1 port)
Display	5.7-inch color LCD, touch panel 640 x 480 pixels
IEC protection class	IP54

ArcWorld RS & HS

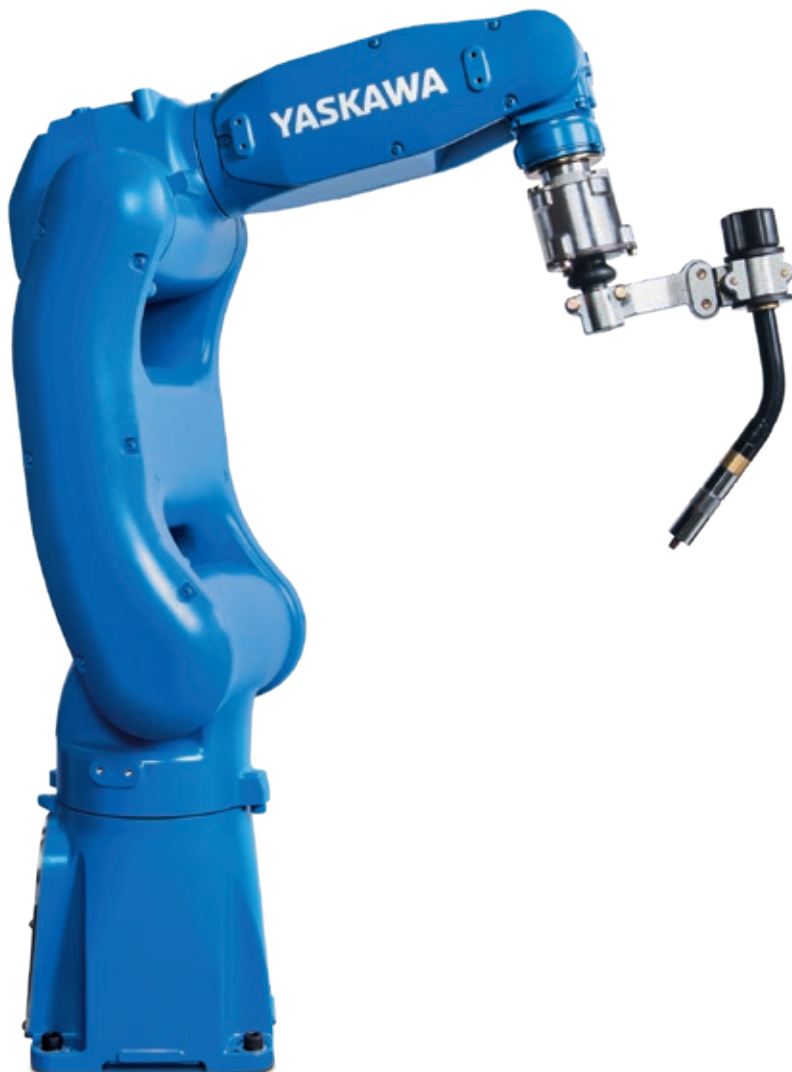
Compact Workstation for welding small Components



ArcWorld
LESS SPACE | MORE OUTPUT

MOTOMAN AR700

Arc Welding with the AR-series



The MOTOMAN AR700 is a compact high-speed 6-axis robot which provides accurate performance to achieve optimal results in extremely difficult conditions and especially for the high demands of arc welding applications.

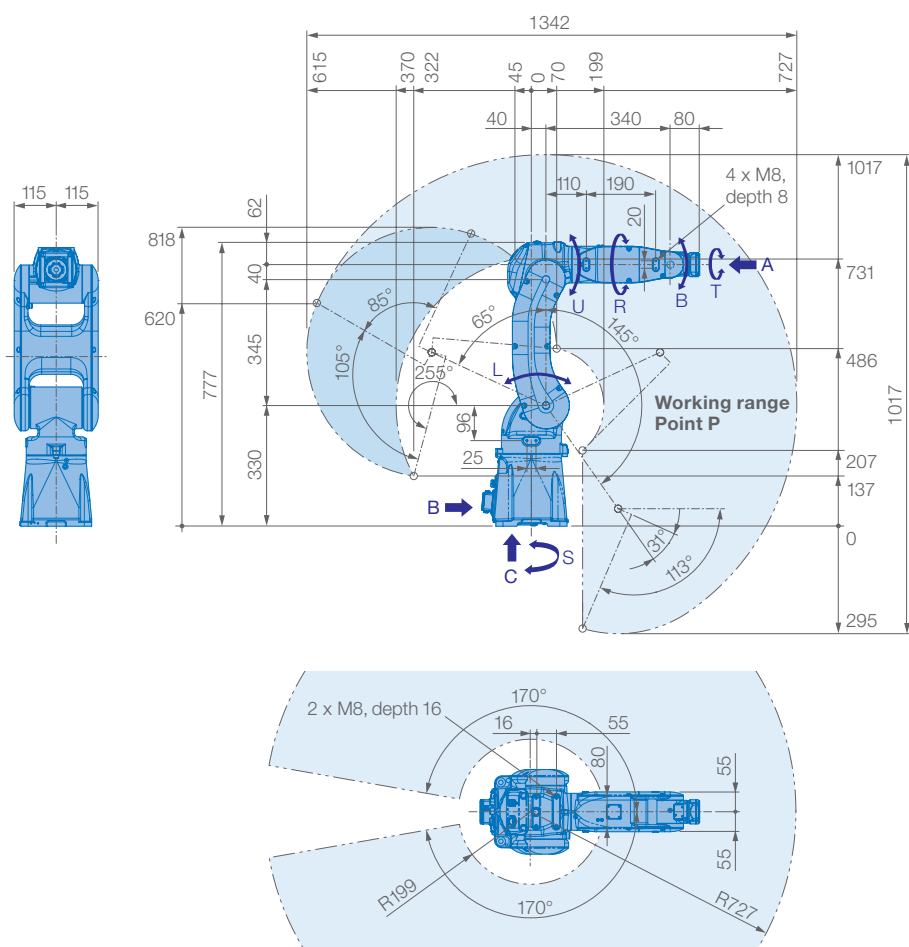
With a payload of up to 8 kg and a working range of 700 mm, this robot enables welding of a broad variety of small workpieces with high quality results. The applicable inertia and axis speeds have been significantly raised, which leads to a “best in class” performance, speed and acceleration.

The slim, straight and symmetrical arm design minimizes interference with peripherals even in small workspaces. The MOTOMAN AR700 is easy to clean and well protected (by protection class IP67) against dust or coolants. Cable routing is possible from the side of the robot socket or from the bottom through the base plate (option). This enables an easy and space-saving integration into its environment.

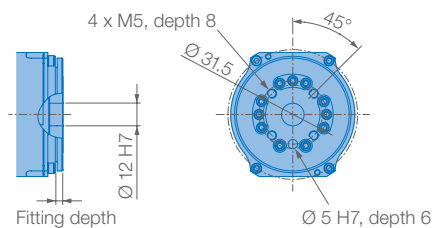
KEY BENEFITS

- Compact, fast and accurate
- High acceleration
- Protection class IP67
- Less interferences due to optimized design
- Simple integration, installation and maintenance

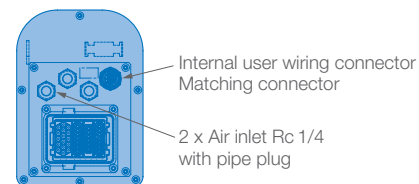
Controlled by
YRC1000



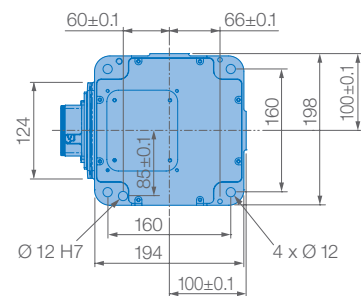
View A



View B



View C

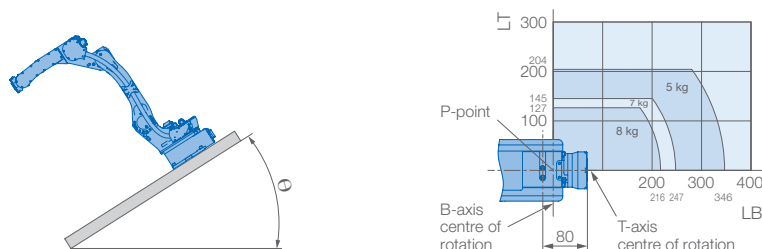


Mounting options: Floor, ceiling, wall, tilt*

IP Protection: IP67

* tilt with condition of angle – see table below

Allowable wrist load



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

Specifications AR700					
Axes	Maximum motion range [°]	Maximum speed [°/s]	Allowable moment [Nm]	Allowable moment of inertia [kg · m ²]	Controlled axes
S	± 170	455	–	–	6
L	$+145/-65$	385	–	–	8
U	$+190/-70$	520	–	–	Repeatability [mm]
R	± 190	550	17	0.5	$\pm 0.01^*$
B	± 135	550	17	0.5	Max. working range R [mm]
T	± 360	1000	10	0.2	727
					Temperature [°C]
					0 to +45
					Humidity [%]
					20 – 80
					Weight [kg]
					35
					Power supply, average [kVA]
					1**

* Conforms to ISO 9283 ** Varies in accordance with applications and motion patterns

MOTOMAN AR900

Arc Welding with the AR-series



The MOTOMAN AR900 is a compact high-speed 6-axis robot which provides accurate performance to achieve optimal results in extremely difficult conditions and especially for the high demands of arc welding applications.

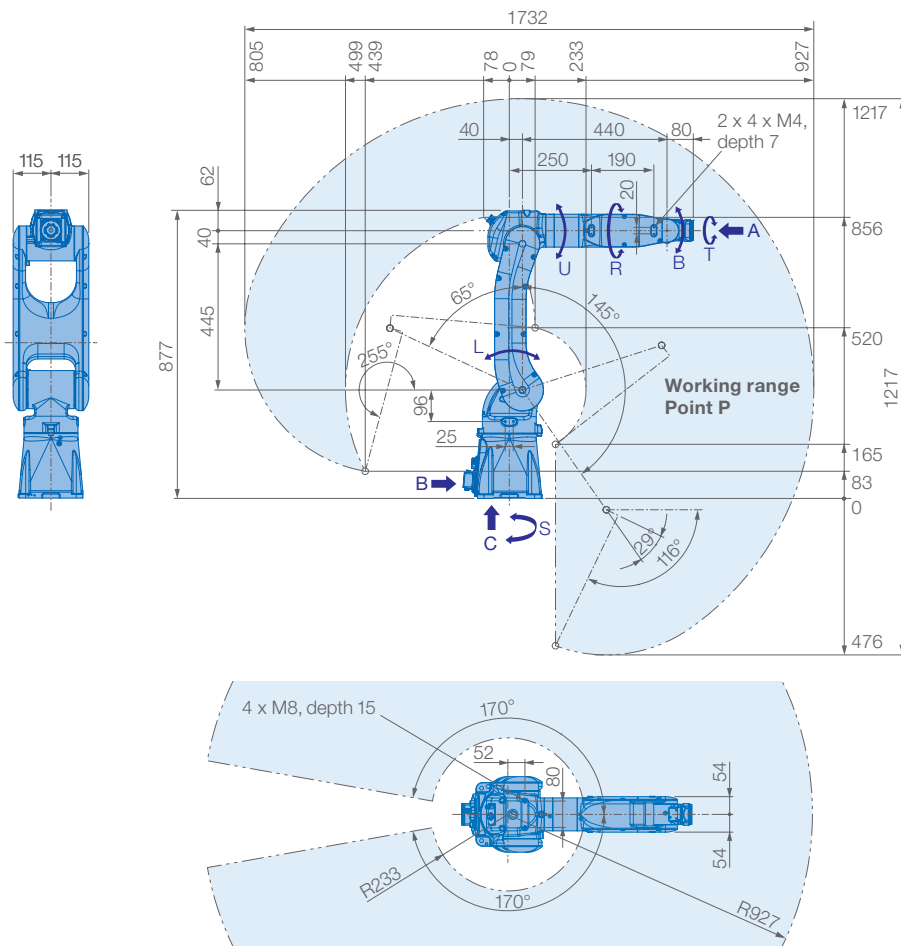
With a payload of up to 7 kg and a working range of 900 mm, this robot enables welding of a broad variety of small workpieces with high quality results. The applicable inertia and axis speeds have been significantly raised, which leads to a “best in class” performance, speed and acceleration.

The slim, straight and symmetrical arm design minimizes interference with peripherals even in small workspaces. The MOTOMAN AR900 is easy to clean and well protected (by protection class IP67) against dust or coolants. Cable routing is possible from the side of the robot socket or from the bottom through the base plate (option). This enables easy and space-saving integration into its environment.

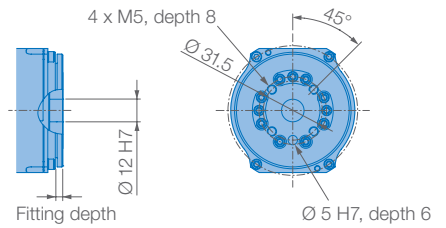
KEY BENEFITS

- Compact, fast and accurate
- High acceleration
- Protection class IP67
- Less interferences due to optimized design
- Simple integration, installation and maintenance

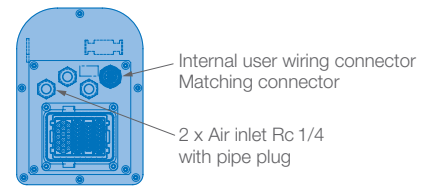
Controlled by
YRC1000



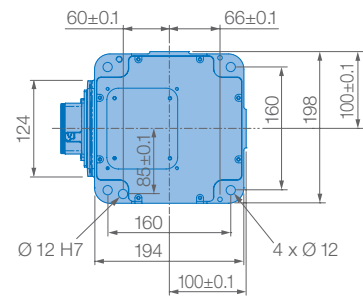
View A



View B



View C

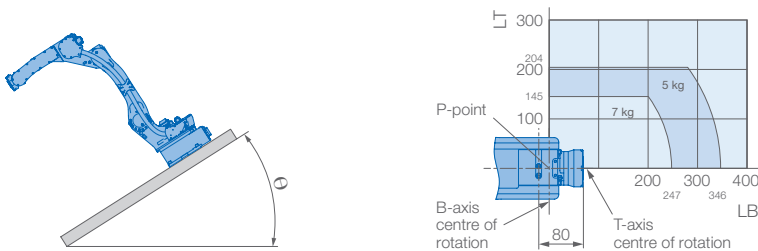


Mounting options: Floor, ceiling, wall, tilt*

IP Protection: IP67

* tilt with condition of angle – see table below

Allowable wrist load



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

Specifications AR900					
Axes	Maximum motion range [°]	Maximum speed [°/s]	Allowable moment [Nm]	Allowable moment of inertia [kg · m ²]	Controlled axes
S	± 170	375	–	–	6
L	$+145/-65$	315	–	–	Max. payload [kg]
U	$+190/-70$	410	–	–	Repeatability [mm]
R	± 190	550	17	0.5	Max. working range R [mm]
B	± 135	550	17	0.5	Temperature [°C]
T	± 360	1000	10	0.2	Humidity [%]
					Weight [kg]
					Power supply, average [kVA]

* Conforms to ISO 9283 ** Varies in accordance with applications and motion patterns

MOTOMAN AR1440

Arc Welding with the AR-series



The six-axis MOTOMAN AR1440 robot provides fast and accurate performance to achieve optimal results in extremely difficult conditions and especially for the high demands of arc welding applications.

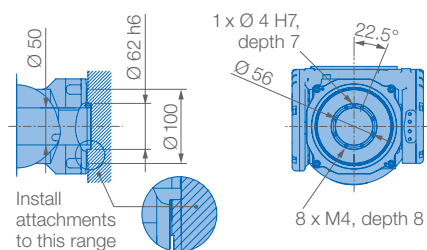
With a payload of up to 12 kg, its wire feed system, the maximum working range of 1440 mm and integrated media hose package, this robot enables simple machining of bulky and hard-to-access workpieces with high quality results. Furthermore, the slim design allows high-density robot placement in confined spaces.

The fast motion sequences of the MOTOMAN AR1440 robot reduce welding cycle times and the hollow wrist of 50 mm allow integrated torch cabling in the robot arm in order to avoid collisions with the workpiece or other robots.

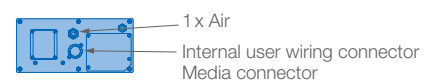
The integration of the power cable and the air connections in the base enable an enlarged turning range of more than 340°.

KEY BENEFITS

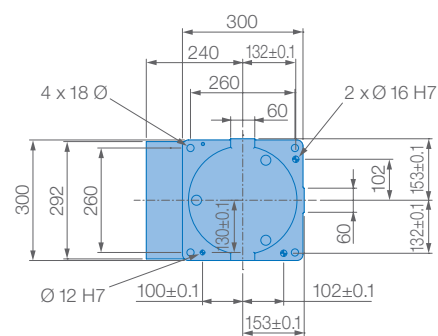
- Fast motion sequences
- Wide motion range
- High path accuracy
- High density placement due to slim design
- Integrated cabling avoids interferences



View B



View C

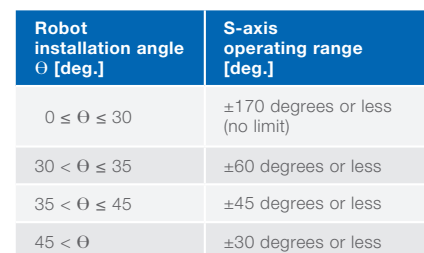


Mounting options: Floor, ceiling, wall, tilt*

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

* tilt with condition of angle – see table below

Allowable wrist load



Specifications AR1440						
Axes	Maximum motion range [°]	Maximum speed [°/sec.]	Allowable moment [Nm]	Allowable moment of inertia [kg · m²]	Controlled axes	6
					Max. payload [kg]	12
S	±170	260	–	–	Repeatability [mm]	±0.02*
L	+155/–90	230	–	–	Max. working range R [mm]	1440
U	+155/–85	260	–	–	Temperature [°C]	0 to +45
R	±200	470	22	0.65	Humidity [%]	20 – 80
B	±150	470	22	0.65	Weight [kg]	150
T	±455	700	9.8	0.17	Power supply, average [KVA]	1.5**

* Conforms to ISO 9283 ** Varies in accordance with applications and motion patterns

MOTOMAN AR1730

Arc Welding with the AR-series



The powerful, dynamic six-axis MOTOMAN AR1730 robot provides highest motion performance in its class to achieve optimal results in extremely difficult conditions and especially for the high demands of arc welding applications.

With a high payload of up to 25 kg and a wide working range of 1730 mm this robot supports welding of bulky workpieces and mounting a broad variety of heavy welding and cutting equipment.

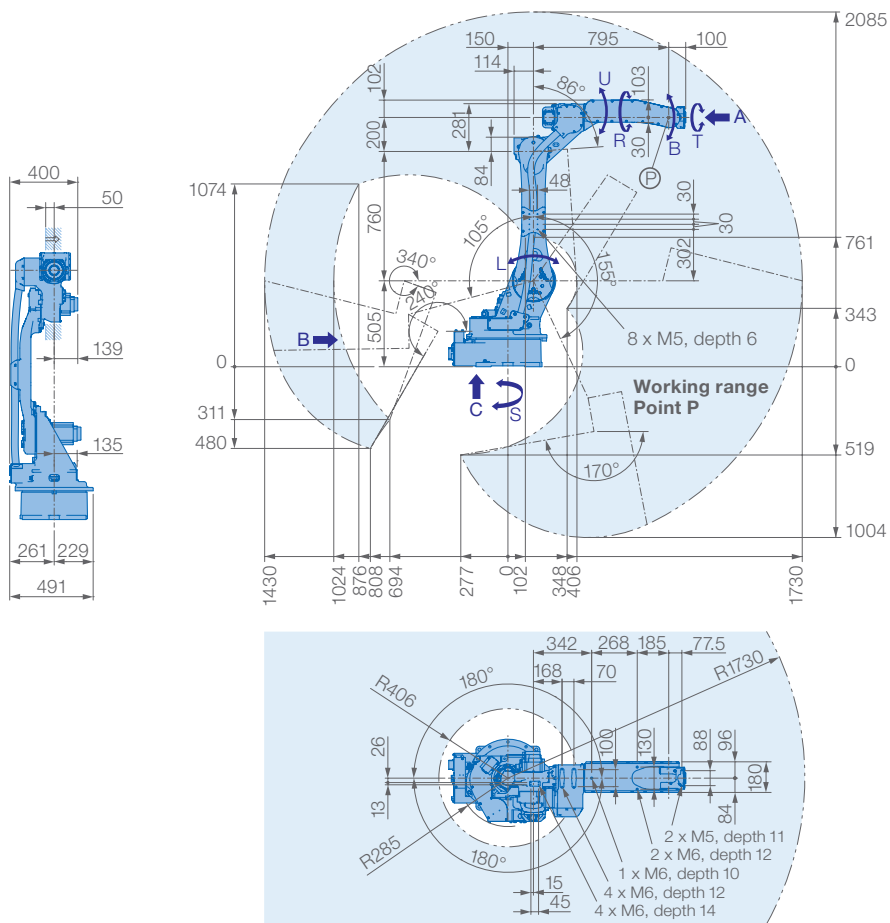
Its hollow arm design enables leading the welding cables and wire feeding through the arm to the wrist, which saves valuable space around it. The MOTOMAN AR1730 allows easy programming and enables high freedom of motion.

The wire feeder can be mounted in the prepared space at axis 3, supporting short distance and centric supply of the welding wire to the weld torch. The streamlined, slightly bowed arm structure reduces the interference area between the jigs and work pieces.

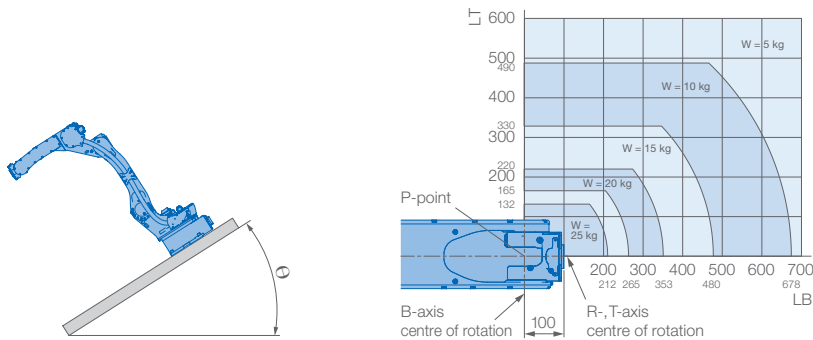
KEY BENEFITS

- Powerful and dynamic
- Wide motion range
- High path accuracy
- Easy programming
- Less interferences due to optimized design

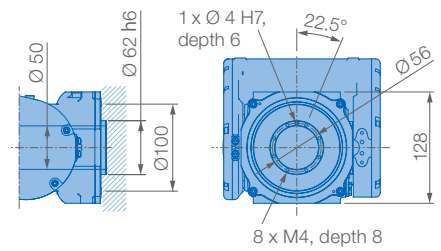
Controlled by
YRC1000



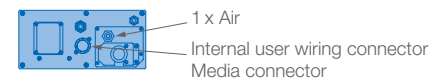
Allowable wrist load



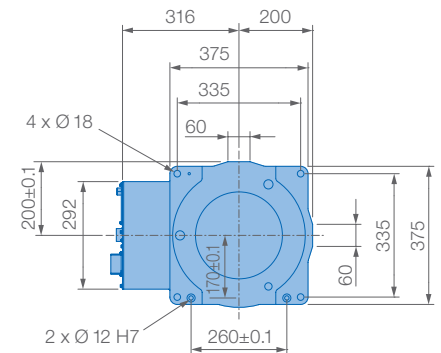
View A



View B



View C



Mounting options: Floor, ceiling, wall, tilt*

Protection class: Main axes (S, L, U) IP54 (option IP65), wrist IP67

* tilt with condition of angle – see table below

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

Specifications AR1730

Axes	Maximum motion range [°]	Maximum speed [°/sec.]	Allowable moment [Nm]	Allowable moment of inertia [kg · m ²]	Controlled axes	
S	± 180	210	–	–	Max. payload [kg]	25
L	$+155/-105$	210	–	–	Repeatability [mm]	$\pm 0.02^*$
U	$+160/-86$	265	–	–	Max. working range R [mm]	1730
R	± 200	420	52	2.3	Temperature [°C]	0 to +45
B	± 150	420	52	2.3	Humidity [%]	20 – 80
T	± 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

MOTOMAN AR2010

Arc Welding with the AR-series



The 6-axis robot MOTOMAN AR2010 of our AR series, thanks to its high path accuracy, is an optimal robot for arc welding applications.

With a payload of up to 12 kg and a wide working range of 2010 mm this robot supports welding of bulky workpieces.

Its hollow arm design enables leading the welding cables and wire feeding through the arm to the wrist, which saves valuable space around it. The MOTOMAN AR2010 allows easy programming and enables high freedom of motion.

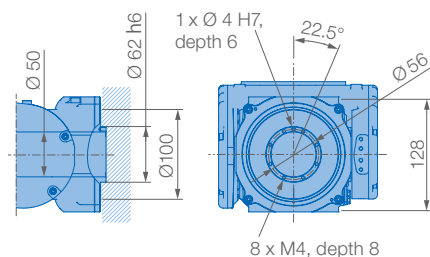
The wire feeder can be mounted in the prepared space at axis 3, supporting short distance and centric supply of the welding wire to the weld torch. The streamlined, slightly bowed arm structure reduces the interference area between the jigs and work pieces.

The robot is controlled by the YRC1000 controller which facilitates both programming and use with a wide range of functions specially designed for arc welding applications.

KEY BENEFITS

- Wide motion range
- High path accuracy
- Easy programming
- Less interferences due to optimized design

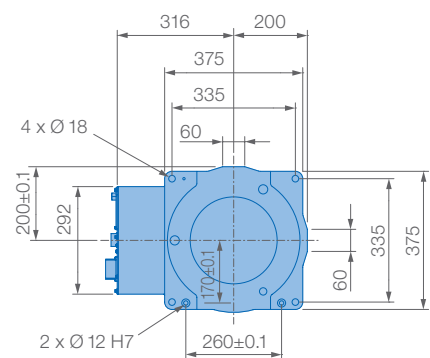
Controlled by
YRC1000



View B



View C



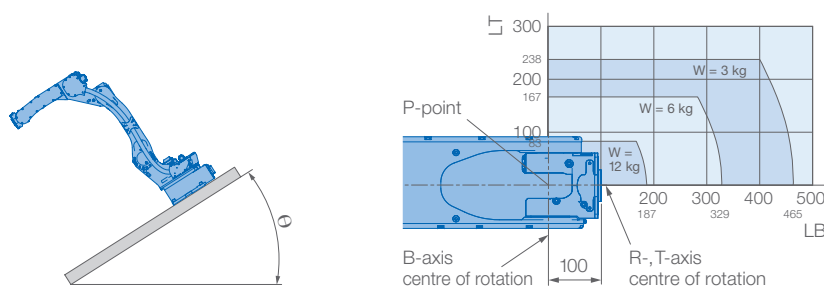
Mounting options: Floor, ceiling, wall, tilt*

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

* tilt with condition of angle – see table below

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

Allowable wrist load

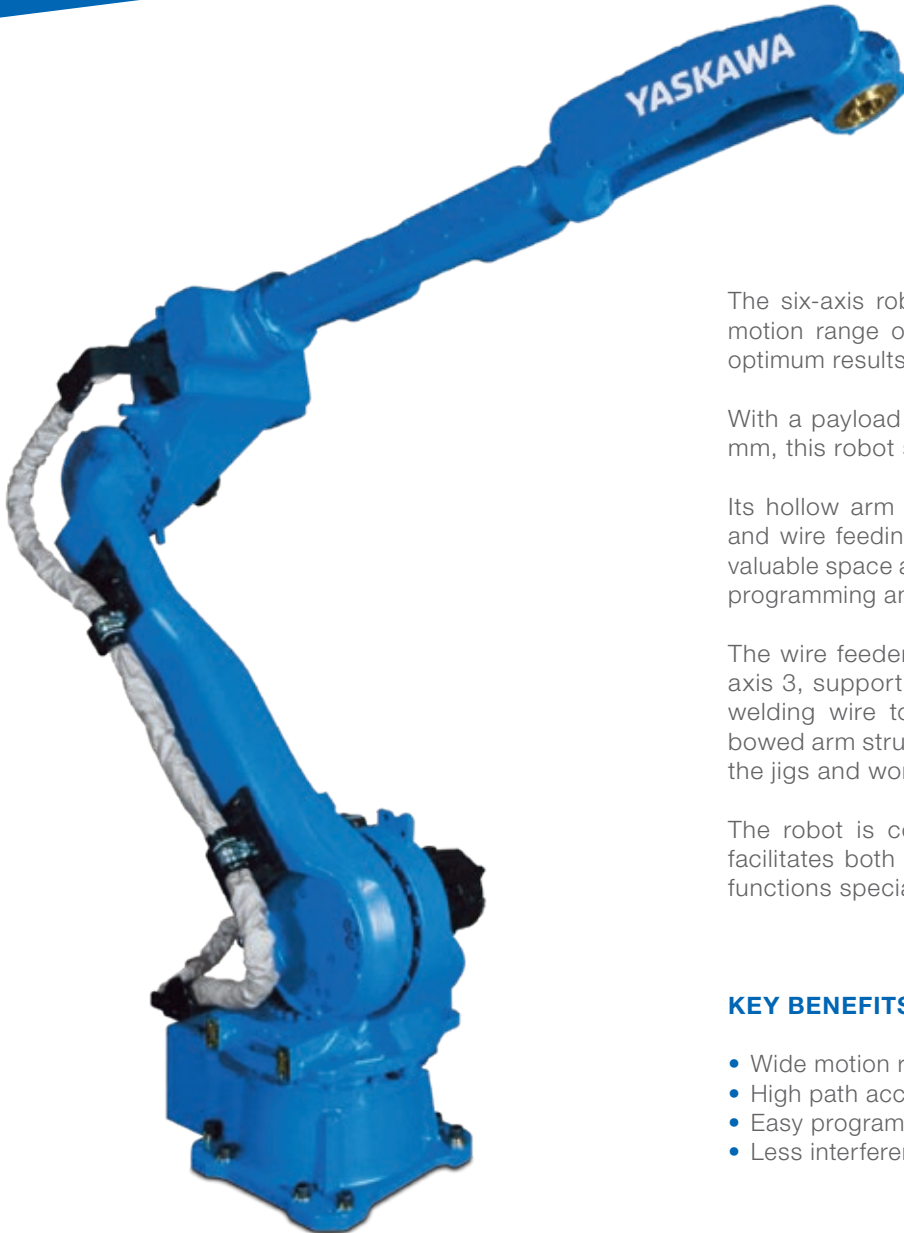


Specifications AR2010						
Axes	Maximum motion range [°]	Maximum speed [°/sec.]	Allowable moment [Nm]	Allowable moment of inertia [kg · m²]	Controlled axes	6
					Max. payload (on U-axis) [kg]	12 (9)
S	±180	210	–	–	Repeatability [mm]	±0.03*
L	+155/–105	210	–	–	Max. working range R [mm]	2010
U	+160/–86	220	–	–	Temperature [°C]	0 to +45
R	±200	435	22	0.65	Humidity [%]	20 – 80
B	±150	435	22	0.65	Weight [kg]	260
T	±455	700	9.8	0.17	Power supply, average [KVA]	2.0**

* Conforms to ISO 9283 ** Varies in accordance with applications and motion patterns

MOTOMAN AR3120

Arc Welding with the AR-series



The six-axis robot MOTOMAN AR3120 provides the widest motion range of our AR-series and high path accuracy for optimum results of arc welding applications.

With a payload of up to 20 kg and a motion range of 3124 mm, this robot supports welding of bulky workpieces.

Its hollow arm design enables leading the welding cables and wire feeding through the arm to the wrist, which saves valuable space around it. The MOTOMAN AR3120 allows easy programming and enables high freedom of motion.

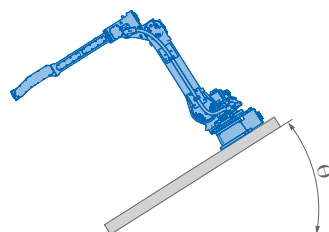
The wire feeder can be mounted in the prepared space at axis 3, supporting short distance and centric supply of the welding wire to the weld torch. The streamlined, slightly bowed arm structure reduces the interference area between the jigs and work pieces.

The robot is controlled by the YRC1000 controller which facilitates both programming and use with a wide range of functions specially designed for arc welding applications.

KEY BENEFITS

- Wide motion range
- High path accuracy
- Easy programming
- Less interferences due to optimized design

Controlled by
YRC1000



The graph in Figure 10.10 illustrates the relationship between Load (LT) and Length (LB) for a beam with four different weights (W = 6 kg, 10 kg, 16 kg, 20 kg). The Y-axis (LT) ranges from 0 to 333, and the X-axis (LB) ranges from 0 to 500. The curves show that as the weight increases, the P-point (centre of rotation) moves further from the R-point (centre of rotation). The P-point is marked on the Y-axis at 100, 125, 200, 300, and 333. The R-point is marked on the X-axis at 105, 250, 324, 418, and 500.

[illegible]

* tilt with condition of angle – see table below

Robot installation angle θ [deg.]	S-axis operating range [deg.]
$0 \leq \theta \leq 30$	± 180 degrees or less (no limit)
$30 < \theta \leq 35$	± 60 degrees or less
$30 < \theta \leq 45$	± 45 degrees or less
$45 < \theta$	± 30 degrees or less

Specifications AR3120						
Axes	Maximum motion range [°]	Maximum speed [°/sec.]	Allowable moment [Nm]	Allowable moment of inertia [kg · m²]	Controlled axes	6
					Max. payload [kg]	20
S	±180	180	–	–	Repeatability [mm]	±0.07
L	+135/–90	180	–	–	Max. working range R [mm]	3124
U	+206/–80	180	–	–	Temperature [°C]	0 to +45
R	±200	400	39.2	1.05	Humidity [%]	20 – 80
B	±150	430	39.2	1.05	Weight [kg]	560
T	±455	630	19.6	0.75	Power supply, average [KVA]	2.0



ArcWorld RS & HS

Compact Workstation for welding small Components



Notes

[illegible]

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All drawing dimensions in mm.
Technical data may be subject to change without previous notice.
Please request detailed drawings at robotics@yaskawa.eu.com.

AR-series
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