

# UINGMAN THE COBOT TOOL CHANGER SYSTEM



PLUG AND PLAY AUTOMATIC & MANUAL TOOL CHANGE FOR COBOTS



## SPECIFICATIONS





E A Trip



#### PLUG AND PLAY

Installed in few minutes out-of-the-box. Automatic tool change setup in 1 minute.

#### **ONE FITS ALL**

Automatic and manual tool change in one. Standard ISO flange – Strong and light.

#### COBOT SAFE

Designed & tested for ISO/TS 15066 compliance and with redundant safety lock.

#### THE TOOL CHANGER

The WINGMAN is suitable for use on cobots of all sizes and will fit in applications with only little space.

Combined height	30 mm / 0.18 in
Combined weight	260 g / 0.57 lbs
Rated payload	33 kg / 73 lbs
Repeatability	+-0,03 mm / 0.0012 in

#### THE TOOL HOLDER

The holder provides a standard solution to store end-effectors and the holder is part of the automatic tool change mechanism.

Holder's maximum payload	5 kg / 11 lbs
Maximum tool imbalance	1 Nm
Material	Stainless steel





#### ELECTRICAL PASS-THROUGH MODULES

The modules clicks on the WINGMAN's housing without use of tools. There is room for three sets of module, which allow for three different sources of electrical power/control

Manufacturing country	DENMARK
Material	High grade aluminium
Surface treatment	Special



Bas WINGMAN

#### **HIGH QUALITY**

The WINGMAN Tool Changer System is made of precision machined metal parts.

Connectors	Std. cobot M8 / 8 pin
Rated voltage/amps	30 ACDC / 1,5 A
IP classification	IP54

#### THE HIGH FLOW PASS-THROUGH MODULES

The modules clicks on the WINGMAN's housing without use of tools. The WINGMAN can hold three sets of modules.

Maximum pressure	10 bar
Push-in fittings	2 x Ø6 mm hoses
Pass-through clearance	Ø4 mm





#### **BUILT-IN AIR PASS-THROUGH**

The WINGMAN Tool Changer housings feature built-in channels for pneumatic pass-through.

Maximum pressure	10 bar
Channels for fittings	2 x M5
Pass-through clearance	Ø2,7 mm



# **INTERFACE OVERVIEW**

Pos.:	Part number:	Description:	Interfaces with:
0		Robot / Cobot	1 6A 6B
1	WM1-P-01-01-XX	Robot Part	0 2 4A 5A 7A 7B
2	WM1-P-02-01	Tool Part	<b>1 3 4B 5B 7A 7B</b>
3	WM1-P-03-01	Tool Part Holder	2
<b>4</b> A	WM1-A-01-01	El pass-through module for Robot Part	<b>1 4</b> B
<b>4</b> B	WM1-A-01-02- <b>XX</b>	El pass-through module for Tool Part	<b>2 4 A</b>
5A	WM1-A-03-01	Air pass-through module for Robot Part	<b>1</b> 5B
5B	WM1-A-03-02	Air pass-through module for Tool Part	<b>2</b> 5A
6A	WM1-A-02-01- <b>XX</b>	Cable for robot tool flange connector	<b>(0) 4A</b>
6B	WM1-A-02-03	Cable for robot controller	<b>0 4 A</b>
7A	WM1-A-06-01	Fittings straight for built-in air pass-through	12
<b>7</b> B	WM1-A-06-02	Fittings angled for built-in air pass-through	12

#### WINGMAN STANDARD KITS modules built-in pneumatic + electric modules high flow Two-way automatic kit, built-in pneumatic + electric + WM1-K-05-00-XX Two-way automatic kit, built-in pneumatic WM1-K-03-00 Trainer/demo in case Two-way automatic kit, | WM1-K-04-00-**XX** kit kit robot brand code: Two-way automatic kit, WM1-DK-05-00-X One-way manuel WM1-K-01-00 Two-way manuel WM1-K-02-00 01 = Universal Robots(UR) Accessories kit WM1-AK-01-<u>00-</u>> 02 = Techman/Omron 03 = Doosan Robots 04 = Fanuc CRX1: Robot Part 1 1 1 1 1 1 (Including URcap software for UR) WM1-P-01-01-X 2: Tool Part 2 2 2 2 2 1 WM1-P-02-01 3: Tool Part Holder 2 2 2 2 WM1-P-03-01 4A: Electrical pass-through for 1 1 1 robot part, female M8 connector WM1-A-01-01 4B: Electrical pass-through for 2 2 2 tool part, male M8 connector WM1-A-01-02-) 5A: High flow air pass-through 1 for robot part, 6 mm hose 1 WM1-A-03-01 5B: High flow air pass-through 2 for tool part, 6 mm hose 2 WM1-A-03-02 6A: Electrical cable for installation 1 1 on robot tool flage connector WM1-A-02-01-) 6B: Electrical cable for installation 1 along robot arm to controller, 5 m WM1-A-02-03 7A: Fittings set (two) I-shape for 3 3 robot/tool part for 4 mm hose WM1-A-04-01 7B: Fittings set (two) L-shape for 3 robot/tool part for 4 mm hose WM1-A-04-02 Case for two-way kits 1 WM1-A-05-01



## Datasheet - TOOL CHANGER



\* The rated payload is based on the payload's center of gravity being 100 mm from the center of the tool changer, a dynamic force of maximum 2G and of 5. Maximum allowed payload must always be calculated for the application.







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The WINGMAN Tool Changer has a proven breaking load at 20,77 kN (2.150 kg) and a yield load at 14 kN (1.425 kg) in direction, F.

The maximum allowed static load calculation is based on a theoretical minimum yield load at 12 kN.

When evaluating a robot application, first determine the *maximum allowed static loads* for F,max; Mb,max and Mt,max that apply for your application by choosing a *safety factor(S)* and look up in beneath table.

For *safety factor(S)*, use 5 when failure does not pose a risk to human life and use 10 when failure poses a risk to human life.



MAXIMUM ALLOWED STATIC LOAD			
Safety factor:	5	10	
F,max:	2400 N	1200 N	
Mb,max:	65 Nm	32,5 Nm	
Mt,max:	40 Nm	20 Nm	

#### MAXIMUM ALLOWED PAYLOAD CALCULATION

To calculating the maximum allowed payload for your application, determine the:

- G,max => Maximum dynamic forces.
   To determine the dynamic forces(G,max), consult your cobot's documentation to find out the maximum acceleration / deacceleration for your cobot.
- Dmb => Distance (Dmb) from the tool part center to the payloads Center of Gravity in meters that causes Mb type torque.
- Dmt => Distance (Dmt) from the *tool part* center to the payloads Center of Gravity in meters that causes Mt type torque.

	F	Mb	Mt
Maximum allowed payload =	F,max / G,max / 9,82	Mb,max / G,max / Dmb / 9.82	Mt,max / G,max / Dmt / 9,82
<ul> <li>Maximum allowed payload EXAMPLE =</li> <li>Safety factor 5 = 2400N, 65 Nm &amp; 40 Nm</li> <li>Maximum dynamic force, G,max = 2.</li> <li>Distance, Dmt = 0,05 m.</li> <li>Distance, Dmb = 0,1 m.</li> </ul>	2400 N / 2 / 9,82 = 122 Kg	65 Nm / 2 / 0,1 m / 9,82 = 33 Kg	40 Nm / 2 / 0,05 / 9,82 = 40 kg
Maximum allowed payload EXAMPLE RESULT =	The <b>lowest relevant</b> calculated value for F, Mb and Mt determines the <i>maximum allowed payload</i> .		
	In case that the cobot only moves the payload in only one axis that results in only F type load on the tool changer:		
	Maximum allowed payload = 122 kg. In case that the cobot moves the payload in directions that results in F, Mb and MT type loads on the tool changer:		122 kg.
			nat results in F, Mb and MT type
		Maximum allowed payload =	33 kg.

Alternatively, to calculating the *maximum allowed payloads* for a robot application, the *maximum allowed payloads* can be determined from the graphs on the next page.





TripleA robotics makes flexible automation possible and profitable for high mix and low volume production companies through **A**pplicable, **A**daptable and **A**ffordable robotic tools.



## Datasheet - TOOL PART HOLDER



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### STATIC LOAD LIMITS FOR TOOL PART HOLDER

Automatic tool change with the WINGMAN Tool Changer System will work best and will provide the longest product life span when used within the limits for rated couple payload and rated couple torque.

The WINGMAN Tool Changer System will do automatic tool change even though the limits are exceeded however, use outside the limits is not recommended and will be on the *system integrators* (user) own risk.

#### Lubrication:

The tool part holder does not come pre-lubricated. Lubrication of the tool part holder is optional but will be necessary to achieve long life span and smooth tool change. For end-effector that result in a rated couple payload(F) > 1 kg and/or a rated couple torque(M+ & Mb) > 0 Nm lubrication is mandatory. For lubrication is used a silicone based grease.



MAXIMUM ALLOWED STATIC LOADF,max (Rated couple payload):50 N / 5 kgMt+, max (Rated couple torque):1 NmMt-, max (Rated couple torque):0 NmMb, max (Rated couple torque):1 Nm







4B	WM1-A-01-02- <b>XX</b>	Pass-through module, electric for tool part, M8 8 positions.		Pos.: 2
	WM1 A-02-01- <b>XX</b>	Electric cable 0,22 m for pass-through module, M8 8 pin, connector L shape.		Pos.: 4A
	WM1 A-02-03	Electric cable 5 m for pass-through module for <b>robot part</b> , M8 8 pin, male/open- end to connect to controller.		Pos.: 4A
TECHNICAL DATA				
Housing material:		Surface treated aluminum		
Rated voltage (AC/DC):		30 V		

Rated voltage (AC/DC):	30 V
Rated current at 40°C:	1,5 A
Number of positions:	8
IP classification when connected:	IP54
Gold plated contacts:	10 µ"
Connector type facing robot (4A)	Female, 8 pin, Internal threaded M8 - IEC 61076-2-104
Connector type facing tool (4B)	Male or female, 8 pin, External threaded M8 - IEC 61076-2-104



**WARNING** Electricity to a pass-through module must be turned off and any residual electricity must be eliminated before tool change takes place. Failing in doing so will result in damage to the electric connectors and can result in injury.











WARNING Energy (vacuum, air pressure) to a pass-through module must be turned off and any residual air pressure or vacuum in the system must be eliminated before tool change takes place. Failing in doing so can result in hardware damage and injury.







## Datasheet – URcap software

Part no.: WM1-A-04-01					
		😣 🖨 🗊 🛛 Universal Rol	😣 🔿 🗈 Universal Robots Graphical Programming Environment		
ET TripleR robotics		> Basic	۹		
		> Advanced	1 V Robot Program		
		<b>&gt;</b> Templates	2 - empty>		
		V URCaps			
		AAA - Tools			
		AAA - Get			
		1001			
		AAA - Put			
		Tool			
			(I)		
PART NUMBERS					
Pos.:	Part no.:	Description:	Interfaces with:		
	WM1-A-04-01	UR cap software. License for use on one robot	Universal robots		
		TECHNICA	L DATA		
For use on:		Universal Robots:			
		CB3 series installed with Polyscope version 3.13 or later and			
1		e-series installed with Polyscope version 5.8 or later.			
License: Main features:		License for use on one robot only.			
ואומווו וכמנעו כז.		AAA - Get Tools > Add this node to you robot program when you want the robot to get an end-effector			
		AAA – Put Tool > Add this node to you robot program when you want the robot to put back an end-effector.			
		1. 1-minute tool change setup as only one waypoint must be teached per end-effector.			

PART NUMBERS						
: Part no.: De:	scription:	Interfaces with:				
WM1-A-04-01 UR cap software. Licen	se for use on one robot.	Universal robots				
TECHNICAL DATA						
use on:	Universal Robots:					
	CB3 series installed with Polyscope version 3.13 or later and					
	e-series installed with Polyscope version 5.8 or later.					
ise:	License for use on one robot only.					
1 features: AAA – Tools > Add thi	AAA – Tools > Add this node in top of your robot program and configure your end-effectors here.					
AAA – Get Tools > Ade	AAA – Get Tools > Add this node to you robot program when you want the robot to get an end-effector.					
AAA – Put Tool > Add	AAA – Put Tool > Add this node to you robot program when you want the robot to put back an end-effector.					
	1. 1-minute tool change se	tup as only one waypoint must be teached per end-effector.				
	2. Store data in the robot p	program for all your favorite end-effectors.				
	3. Easy toggle of e.g. paylo	ad, TCP, COG and tool voltage in tool changes.				
	4. Optional exit and enter v	waypoints to ensure free passage to and from the tool area.				
	5. Adjustment of the tool of	hangers orientation on the robot to allow odd orientation e.g.				
	for use in double mount	applications.				
	6. Several possibilities to o	ptimize tool change waypoints.				
	7. Optimized to ensure no	conflicts with other URcaps installed on the robot (e.g. no				
	threads running in the b	ackground and no interference with Tool IO's).				