SYSTEM OVERVIEW

WINGMAN™ Tool Changer

Look up the part numner suffix **XXX** for your robot brand and model in **"Table 2" on page C-3**

AUTOMATIC tool change

MANUAL tool change

Robot Part		Tool Part		Tool Part Holder (necessary to achieve automatic tool change)	
1 		2 		3 	
Part number:	Page:	Part number:	Page:	Part number:	Page:
WM1-P-01-01-XXX	E-2	WM1-P-02-01-XXX	E-2	WM1-P-03-01	E-6

A Pass-through interface Robot side A

B Pass-through interface Tool side B

KITS AND COBOT CONNECTIVITY

Kits

See KIT content **"Illustration 2" on page C-2**

Table 2 - Cobot specific part number suffix XXX
(Reservations are made for incorrect/obsolete data)

Table 2

Cobot Brand	Cobot Model (OBS! The WINGMAN Tool Changer system might not support the full dynamic payload capasity of the cobot. Please refer to the WINGMAN Tool Changer **Datasheets** for payload calculations)	TC parts		Manual kits		Automatic kits				Electrical cable must be ordered separately for kit type **K-04** and **K-05**: **TF** = Connect at Tool Flange **CC** = Connect at Cabinet See cables page **E-12**
							Cables not included			
		WM1-P-01-01-XXX	WM1-P-02-01-XXX	WM1-K-01-00-XXX	WM1-K-02-00-XXX	WM1-K-03-00-XXX	WM1-K-04-00-XXX	WM1-K-05-00-XXX	WM1-DK-05-00-XXX	
ABB	GoFa CRB 15000	AB1	AB1	AB1	AB1	AB1	AB1 (1)	AB1 (1)	AB1	TF: (Not yet available) CC: WM1-A-02-02-02
AUBO	i3, i5, i7	AU1	AU1	AU1	AU1	AU1	AU1	AU1	AU1	TF: WM1-A-02-01-04 CC: WM1-A-02-02-02
AUBO	i10, i12, i16	AU1	AU1	AU1	AU1	AU1	AU1	AU1	AU1	TF: (Not yet available) CC: WM1-A-02-02-02
AUBO	i20	AU1 (3)	AU1	AU1 (3)	AU1 (3)	AU1 (3)	AU1 (2)(3)	AU1 (2)(3)	AU1 (3)	TF: (Not yet available) CC: WM1-A-02-02-02
Denso	COBOTTTA PRO1300	DE1	DE1	DE1	DE1	DE1	DE1 (1)	DE1 (1)	DE1	TF: WM1-A-02-01-11 CC: WM1-A-02-02-02
Doosan Robotics	H2017, H2515, M0609, M0617, M1013, M1509, A0509, A0509s, A0912, A0912s	DR1	DR1	DR1	DR1	DR1	DR1	DR1	DR1	TF: WM1-A-02-01-03a CC: WM1-A-02-02-02
Fanuc	CRX: 5iA	FA1	FA1	FA1	FA1	FA1	FA1	FA1	FA1	TF: WM1-A-02-01-01 CC: WM1-A-02-02-02
Fanuc	CRX: 10iA, 10iA/L, 20iA/L	FA1	FA1	FA1	FA1	FA1	FA1	FA1	FA1	TF: WM1-A-02-01-07 CC: WM1-A-02-02-02
Fanuc	CRX: 25iA	FA2	FA2	FA2	FA2	FA2	FA2 (2)	FA2 (2)	FA2	TF: WM1-A-02-01-07 CC: WM1-A-02-02-02
Hans Robot	Elfin3, Elfin5, Elfin10	HR1	HR1	HR1	HR1	HR1	HR1	HR1	HR1	TF: (Not yet available) CC: WM1-A-02-02-02
Kassow	KR810, KR1018, KR1205, KR1410, KR1805	KA1	KA1	KA1	KA1	KA1	KA1	KA1	KA1	TF: WM1-A-02-01-05 CC: WM1-A-02-02-02
Kuka	LBR iiwa	KU1	KU1	KU1	KU1	KU1	KU1	KU1	KU1	TF: (Configurable) CC: WM1-A-02-02-02
Kuka	LBR iisy (With special KUKA designed TF connector)	KU2	KU2	KU2	KU2	KU2	KU2 (2)	KU2 (2)	KU2	TF: (Not available) CC: WM1-A-02-02-02
Omron	TM5-700, TM5-900, TM12, TM14, TM16, TM20. TM5S, TM7S, TM12S, TM14S, TM25S	OM1	OM1	OM1	OM1	OM1	OM1	OM1	OM1	TF: WM1-A-02-01-02a CC: WM1-A-02-02-02
Techman	TM5-700, TM5-900, TM12, TM14, TM16, TM20. TM5S, TM7S, TM12S, TM14S, TM25S	TM1	TM1	TM1	TM1	TM1	TM1	TM1	TM1	TF: WM1-A-02-01-02a CC: WM1-A-02-02-02
Universal Robots	UR3cb, UR3e, UR5cb, UR5e (**Before** *September 2024 = male TF connector)*	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1	TF: WM1-A-02-01-01 CC: WM1-A-02-02-02
	UR10cb, UR10e, UR16e (**Before** *September 2024 = male TF connector)*	UR1	UR1	UR1	UR1	UR1	UR1	UR1	UR1	TF: WM1-A-02-01-07 CC: WM1-A-02-02-02
	UR3e, UR5e (**After** *September 2024 = female TF connector)*	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	TF: WM1-A-02-01-12 CC: WM1-A-02-02-02
	UR10e, UR16e (**After** *September 2024 = female TF connector)*	UR2	UR2	UR2	UR2	UR2	UR2	UR2	UR2	TF: WM1-A-02-01-10 CC: WM1-A-02-02-02
	UR20, UR30	UR2 (3)	UR2 (3)	UR2 (3)	UR2 (3)	UR2 (3)	UR2 (2)(3)	UR2 (2)(3)	UR2 (3)	TF: WM1-A-02-01-10 CC: WM1-A-02-02-02

(1) 1 pcs. SM1-P-10-01-01 must be ordered separately (adds 10mm distance and rotates the TF by 22,5 degrees).
(2) 1 pcs. SM1-P-10-01-01 + 1 pcs. SM1-P-20-01-01 must be ordered separately (adds 30mm distance and rotates the TF by 45 degrees).
(3) Adaptor flange must be installed to convert the cobot's Tool Flange (not provided by TripleA robotics).

DATASHEET

WINGMAN™ Tool Changer - Robot Part and Tool Part

Part numbers: WM1-P-01-01-..., WM1-P-02-01-...

WM1-P-01-01...
The WINGMAN Robot Part

WM1-P-02-01...
The WINGMAN Tool Part

The **WINGMAN™** system's **patented** mechanical locking mechanism provides easy manual and automatic tool change in one device without the need for electricity or compressed air.

General information

PROPERTIES	
Installed weight on robot:	280g (bolts included)
Installed height on robot:	30mm
Rated Payload (Maximum Payload): (1) (2)	33kg (100kg)
Repeatability:	+- 0,03mm and +-0,15 deg.
Flanges on Robot Part and Tool Part:	ISO 9409-1-50-4-M6
Housing material:	Surface treated aluminum (Color tone may vary)
Screwes and dowel pin for Robot Part, included:	4 x M6x12mm (ISO10642/BN2100) 1 x Ø6h6 (DIN6325/BN858)
(1) The allowed payload for the specific application must be calculated. See page **E-4** (2) For automatic tool change application, make sure to also check and comply with the payload limits for the WINGMAN Tool Part Holder (PN: WM1-P-03-...). See page **E-6**.	

Pass-through air ports, built-in

PASS-THROUGH, BUILT-IN AIR	
Built-in air ports (O-ring OR 2,57-1,78 VMQ 50):	2 pcs.
Port threads / Intended for hose size:	M5 / Ø4mm
Pressure range:	-0,9 to 10 bar
I-shaped (not included):	PN: WM1-A-06-01 (Ø4mm hose)
L-shaped (not included):	PN: WM1-A-06-02 (Ø4mm hose)

Pass-through modules

PASS-THROUGH, MODULES	
Pass-through modules (not included):	Up to 3 sets of pass-through modules can be installed.

Warning

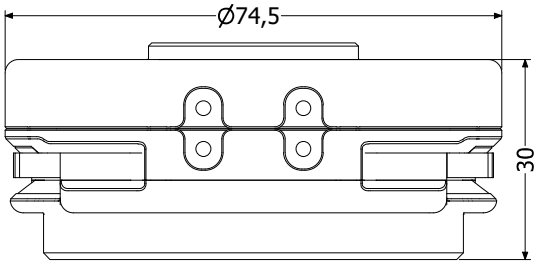
Please read the WINGMAN User Guide page 1!

To prevent overload and damage to the Tool Part levers (Repair kit WM-SK-01-03), the cobots Robot Limits (safety feature that limits robot force) must be set to a maximum of **100N** to apply as the cobot performes the automatic tool change sequence.

DATASHEET

WINGMAN™ Tool Changer - Robot Part and Tool Part

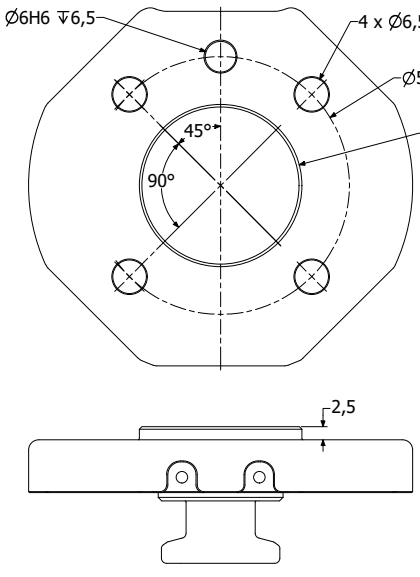
Part numbers: WM1-P-01-01-..., WM1-P-02-01-...



Tool Changer part for **robot** side (side A)

126g **WM1-P-01-01-...**

The WINGMAN™ Robot Part for the cobot

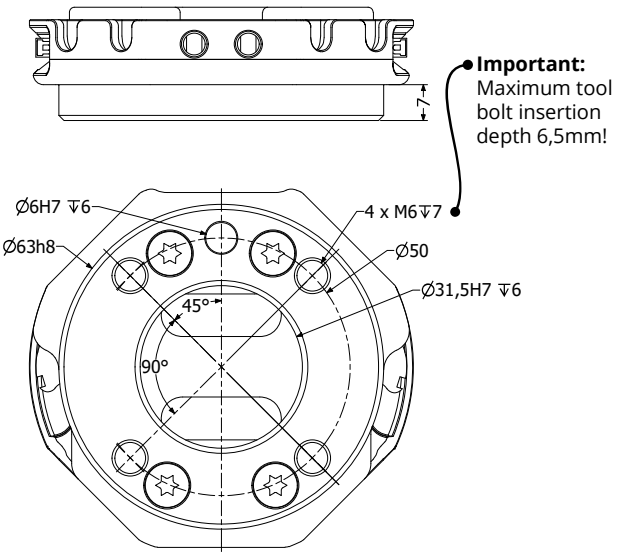


MATCH

Tool Changer part for **tool** side (side B)

WM1-P-02-01-... 156g

The WINGMAN™ Tool Part for each tool deployed



DATASHEET

WINGMAN™ Tool Changer - Robot Part and Tool Part

Part numbers: WM1-P-01-..., WM1-P-02-...

PAYLOAD CALCULATION

G,max => The maximum dynamic force that can arise in the application all scenarios considered.
Dmb => Distance from the Tool Part (TF) center to the payloads Center of Gravity that causes Mb torque.
Dmt => Distance from the Tool Part (TF) center to the payloads Center of Gravity that causes Mt torque.
F,max = 1000N (static/constant)
Mb,max = 80N (static/constant)
Mt,max = 80N (static/constant)

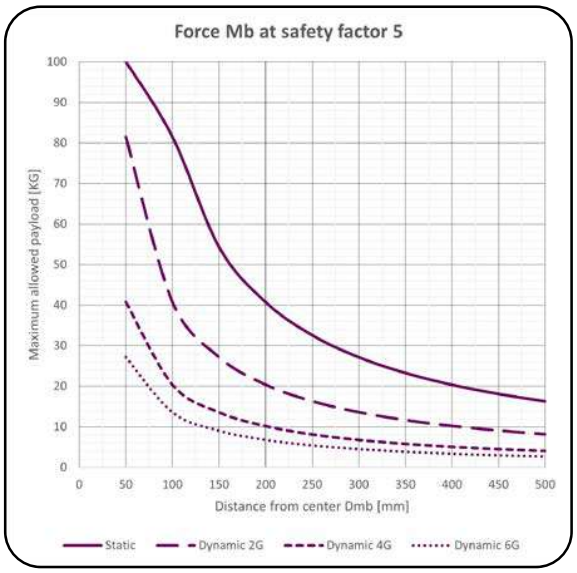
	F	Mb	Mt
Formulas:	F,max / G,max / 9,82	Mb,max / G,max / Dmb / 9,82	Mt,max / G,max / Dmt / 9,82
Example calculation*: • Maximum dynamic force, G,max = 2. • Distance, Dmt = 0,1 m. • Distance, Dmb = 0,12 m.	1000N / 2 / 9,82 = 50kg	80 Nm / 2 / 0,12m / 9,82 = 33Kg*	80 Nm / 2 / 0,10m / 9,82 = 40kg

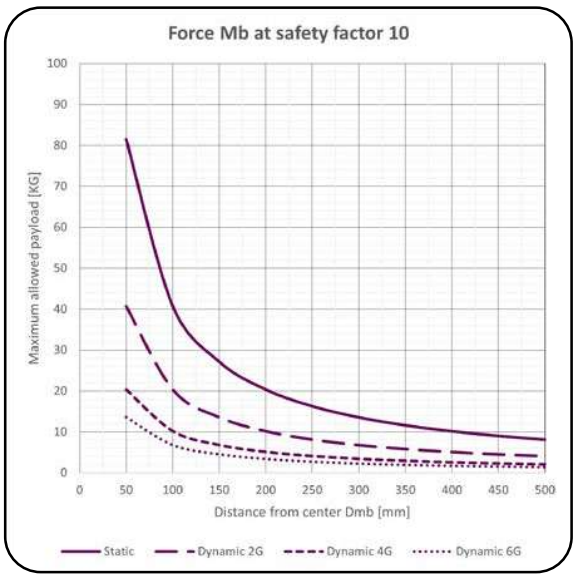
*The lowest weight calculated between **F**, **Mb**, **MT** is 33kg in the example which means that maximum 33kg is allowed on the robot at Dmt=0,1m, Dmb=0,12m and G,max=2.

PAYLOAD SAFETY FACTOR

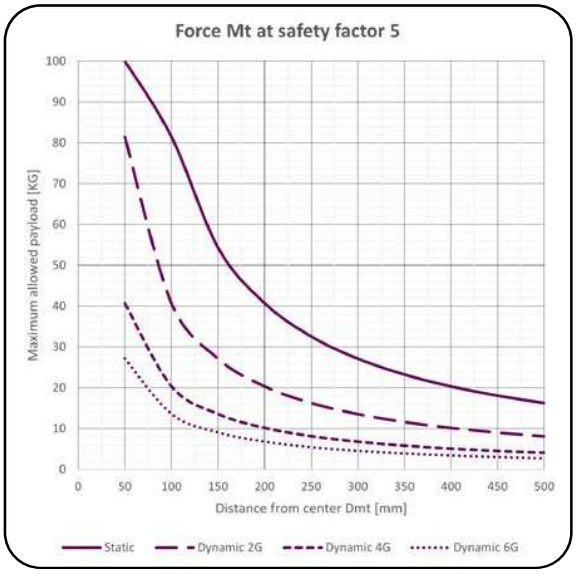
Above formulas and example calculations are with a **safety factor of 5** to the tool changers yield strength.
In case the consequense of failure is high, a **safety factor of 10** should be used instead and more frequent inspections must be made in accordance with the WINGMAN User Guide. To translate the calculated payload values from safety factor 5 to safety factor 10 simply multiply the values with 5/10. 33kg at safety factor 5 will translate to 16,5kg.

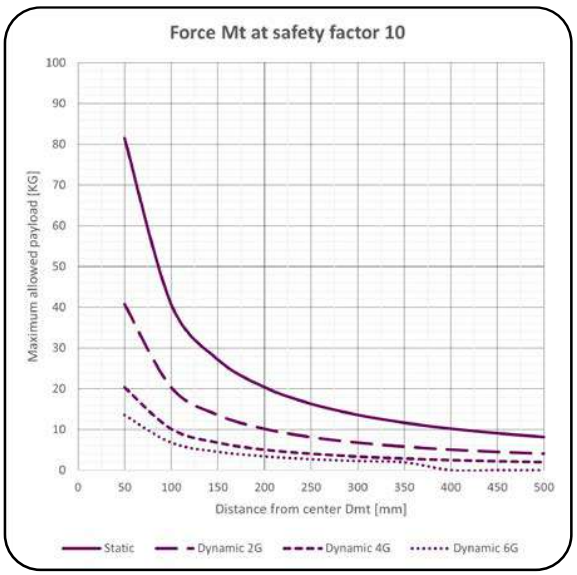
Mb





Mt





DATASHEET

WINGMAN™ Tool Changer - Tool Part Holder

Part numbers: WM1-P-03-01

WM1-P-03-01
Tool Part Holder

The **WINGMAN**™ system's **patented** mechanical locking mechanism provides easy manual and automatic tool change in one device without the need for electricity or compressed air.

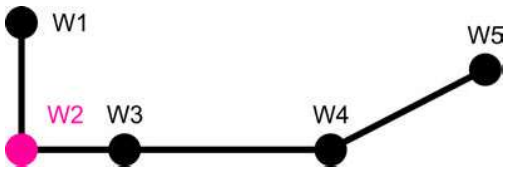
General information

The WINGMAN Tool Part Holder (WM1-P-03-01) provides automatic tool change capability to the WINGMAN Tool Changer system. The Tool Part Holder interacts mechanically with the WINGMAN Tool Part (WM1-P-02-01-01).

PROPERTIES	
Weight:	254g
Material:	Stainless Steel 304 (surface gloss may vary)
Payload and imblance, maximum: (1)	5kg and 1Nm
Installation:	Horrizontally on rigid structure
Installation method:	M6 wing screws
WINGMAN approx. resistance for automatic tool change:	30-40N
(1) The allowed payload for the specific application must comply with the maximum **Payload Limits** to achieve smooth and reliable automatic tool change.	

Waypoints for automatic tool change

Basic automati tool change is simply a matter of teaching your cobot a few waypoints to move the WINGMAN Tool Part (WM1-P-02-01-01) in to and out of the WINGMAN Tool Part Holder (WM1-P-03-01).



Warning

Please read the WINGMAN User Guide page 1!

To prevent overload and damage to the Tool Part levers (Repair kit WM-SK-01-03), the cobots Robot Limits (safety feature that limits robot force) must be set to a maximum of **100N** to apply as the cobot performes the automatic tool change sequence.

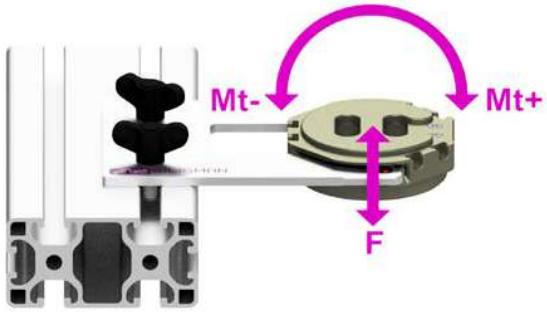
DATASHEET

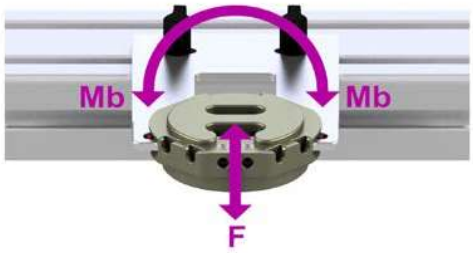
WINGMAN™ Tool Changer - Tool Part Holder

Part numbers: WM1-P-03-01

Payload Limits

TOOL PART HOLDER PAYLOAD LIMITS	
F,max (Rated couple payload):	50 N / 5 kg
Mt+, max (Rated couple torque):	1 Nm
Mt-, max (Rated couple torque):	0 Nm
Mb, max (Rated couple torque):	1 Nm





To achieve reliable and long lasting automatic tool change with the WINGMAN™ Cobot Tool Changer system, please make sure to comply within the Tool Part Holder payload limits.

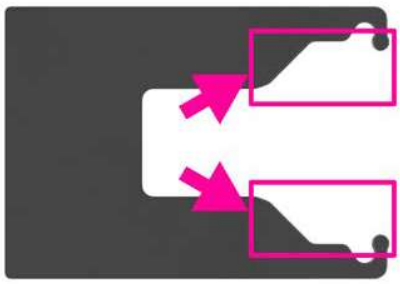
The tool's balance (maximum 1Nm of imbalance) is of importance to achieve smooth and reliable automatic tool change.

Tool change with heavier tools then 5 kg/1Nm is possible but will require a custom-made bracket solution to support the tool weight and inbalance as coupling and decoupling takes place

Lubrication

In case you are running the WINGMAN™ system on the limits of the Tool Part Holder's payload limits and are experiencing unreliable automatic tool change, then lubricating the Tool Part Holder is likely to help.

We recommend using a silicone based silicone grease.



WM1-A-03-01 282g

Tool Part Holder for each tool deployes