

UR3

Výkon

Opakovatelnost	±0,1 mm / ±0,0039 in (4 mils)
Provozní teplota	0–50°*
Příkon	Min. 90 W, typicky 125 W, max. 250 W
Kolaborativní fungování	15 vyspělých nastavitelných bezpečnostních funkcí. TüV NORD schválená bezpečnostní funkce Zkoušeno v souladu s: EN ISO 13849:2008 PL d

Specifikace

Užitečné zatížení	3 kg / 6,6 lbs
Dosah	500 mm / 19,7 in
Stupně volnosti	6 otočných kloubů
Programování	Grafické uživatelské rozhraní Polyscope na panelu s 12" dotykovým displejem

Pohyb

Pohyb os robotického ramena	Pracovní rozsah	Maximální rychlost
Podstavec	± 360°	± 180°/s
Rameno	± 360°	± 180°/s
Loket	± 360°	± 180°/s
Zápěstí 1	± 360°	± 360°/s
Zápěstí 2	± 360°	± 360°/s
Zápěstí 3	Nekonečné	± 360°/s
Běžný nástroj		1 m/s / 39,4 in/s

Vlastnosti

Klasifikace IP	IP64
ISO Class Cleanroom	5
Hluk	<65 dB(A)
Montáž robota	Libovolná
I/O porty	Digitální vstupy 2 Digitální výstupy 2 Analogové vstupy 2 Analogové výstupy 0

I/O elektrické napájení nástroje 12 V / 24 V 600 mA v nástroji

Fyzické

Rozměry	Ø 128 mm
Materiály	Hliník, plast PP
Typ konektoru nástroje	M8
Délka kabelu robotického ramena	6 m / 236 in
Hmotnost s kabelem	11 kg / 24,3 lbs

*Robot může pracovat v rozsahu teplot 0-50 °C. Při nepřetržité vysoké rychlosti klouby se povolená okolní teplota snižuje.

KONTROLÉR

Vlastnosti

Klasifikace IP	IP20
ISO Class Cleanroom	6
Hluk	<65 dB(A)
I/O porty	Digitální vstupy 16 Digitální výstupy 16 Analogové vstupy 2 Analogové výstupy 2
I/O elektrické napájení	24 V 2 A
Komunikace	TCP/IP 100Mbit, Modbus TCP, Profinet, EthernetIP
Napájecí zdroj	100-240 VAC, 50-60 Hz

Fyzické

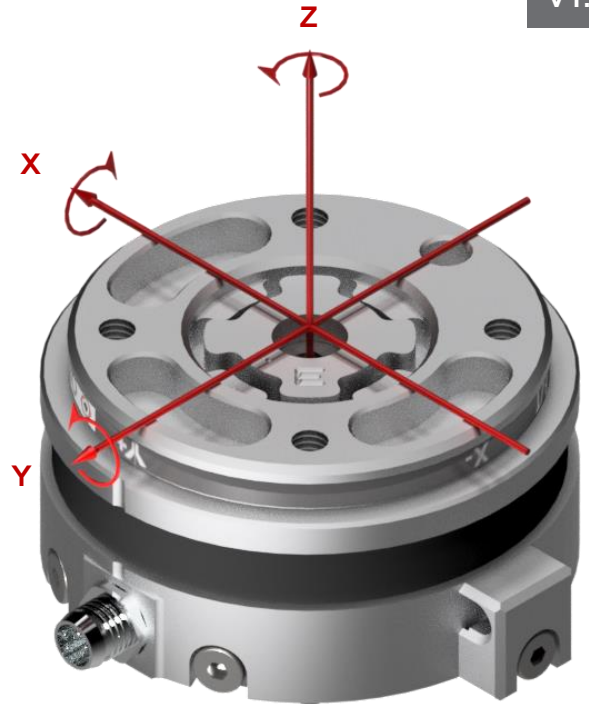
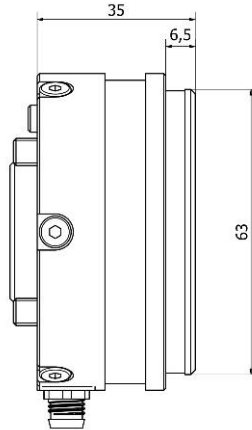
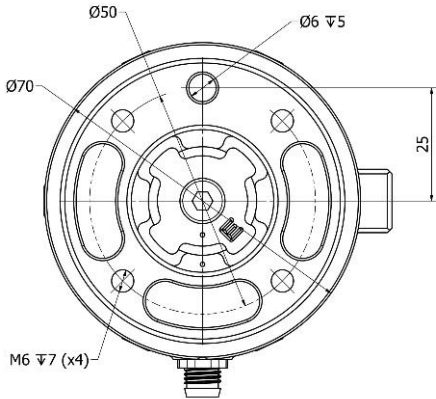
Velikost kontroléru (ŠxVxH)	475 mm x 423 mm x 268 mm / 18,7 x 16,7 x 10,6 in
Hmotnost	15 kg / 33,1 lbs
Materiály	Ocel

Ovládací panel (TEACH PENDANT)

Vlastnosti

Klasifikace IP	IP20
Fyzické	
Materiály	Hliník, PP
Hmotnost	1,5 kg
Délka kabelu	4,5 m / 177 in





6-Axis F/T sensor

HEX-E

Description:

OptoForce 6 axis F/T sensors provide 6 degrees of freedom force and torque measurement. Our sensors are designed to fit most of the currently used industrial robot arms. Integration with the various available interfaces is simple. Common applications are **force control** devices, **teach in activities**, and **crash detection**, but the sensors can be used next to **end effectors** in case of **grinding**, **polishing** or **deburring** tools. High durability and an unlimited number of custom opportunities resemble all of our sensor types.

We offer these sensors mostly for **system integrator** companies, **robot arm manufacturers**.

Benefits:

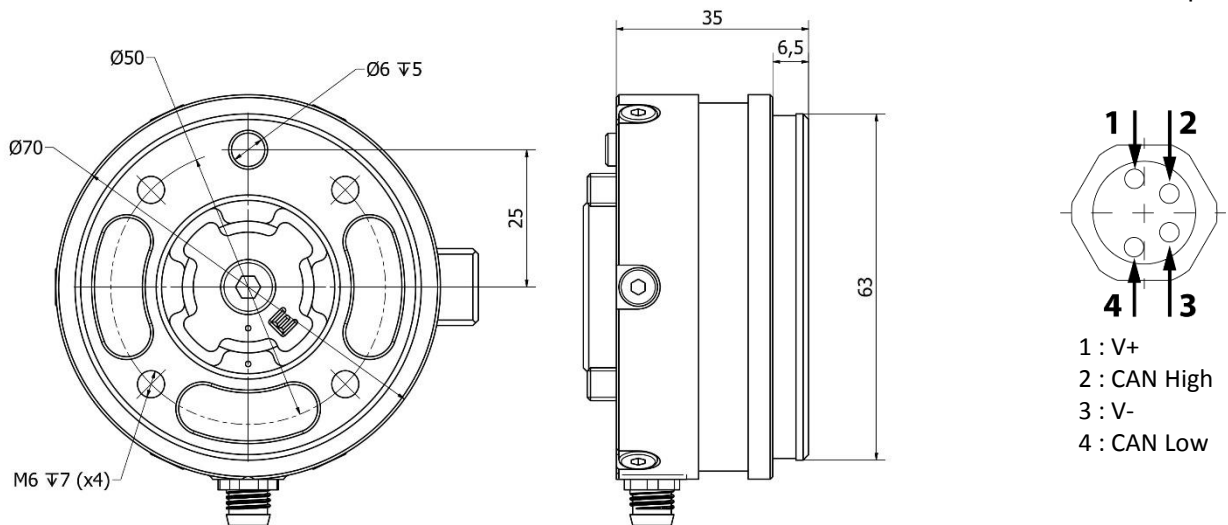
- Multi axis force measurement
- High resolution
- Dust and water proof (IP65)
- High overload range
- Mechanical shock resistant
- Cost efficient solution
- Easy integration
- Mechanical overload protection

	Nominal Capacity	Deformation (Deflection)
F _{xy}	± 200 N	± 1.7 mm
F _z	± 200 N	± 0.3 mm
T _{xy}	± 10 Nm	(± 2.5 °)
T _z	± 6.5 Nm	(± 5 °)



Sensor Dimensions

Connector pinout



- 1 : V+
 2 : CAN High
 3 : V-
 4 : CAN Low

SPECIFICATIONS

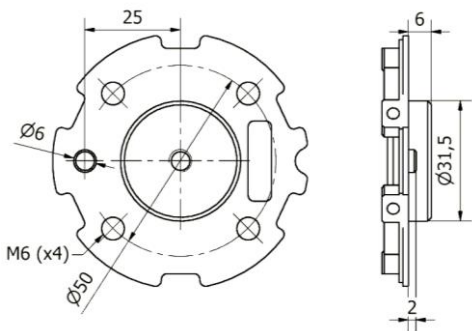
Sensor Type	6-Axis Force/Torque Sensor			
Dimensions	Height x diameter		35 x 70 mm	
Weight	(With built-in adapter plates)		260g	
	Fxy	Fz	Txy	Tz
Nominal Capacity (N.C)	200 N	200 N	10 Nm	6.5 Nm
Single axis overload	500 %	500 %	500 %	500 %
Signal noise ¹ (typical)	0.035 N	0.15 N	0.002 Nm	0.001 Nm
Noise-free resolution (typical)	0.2 N	0.8 N	0.010 Nm	0.002 Nm
Single axis deformation at N.C (typical)	± 1.7 mm	± 0.3 mm	± 2.5 °	± 5 °
Full scale nonlinearity	< 2%			
Hysteresis (measured on Fz axis , typical)	< 2 %			
Crosstalk (typical)	< 5 %			
Working temperature range	All axes		0 C° - +55 C°	
Power requirement	DC input range 7-24V		0.8 W	
Sensor mounting screws	5 x M4 x 8 mm 1 x M4 x 12 mm		DIN7984	
Tool mounting screws	4 x M6 x 8 mm		DIN7984	

¹ : Signal noise is defined as the standard deviation (1 σ) of a typical one second no-load signal.

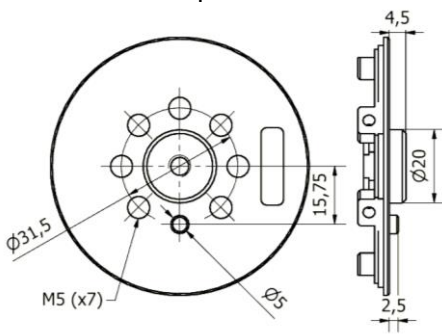
INTERFACE TYPES

USB	CAN	Ethernet - TCP/UDP	EtherCAT
Maximum sampling frequency 500 Hz			
Supported systems Windows; Linux; ROS; UR			

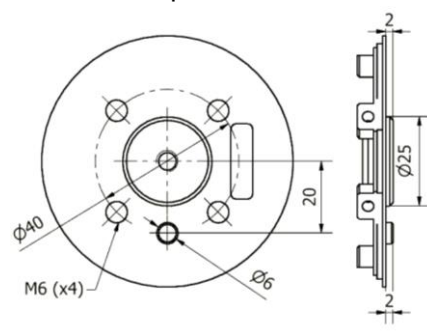
Adapter A



Adapter B



Adapter C



Adapter A	Adapter B	Adapter C
Universal Robots UR3	ABB IRB 120	ABB IRB 1410
Universal Robots UR5	ABB IRB 1200	ABB IRB 2400L
Universal Robots UR10	KUKA KR3 Agilus	KUKA KR6
KUKA KR20	KUKA KR Agilus sixx	KUKA KR16
	KUKA KR Agilus five	KUKA KR16 L6
	KR Cybertech nano	KUKA KR16 S

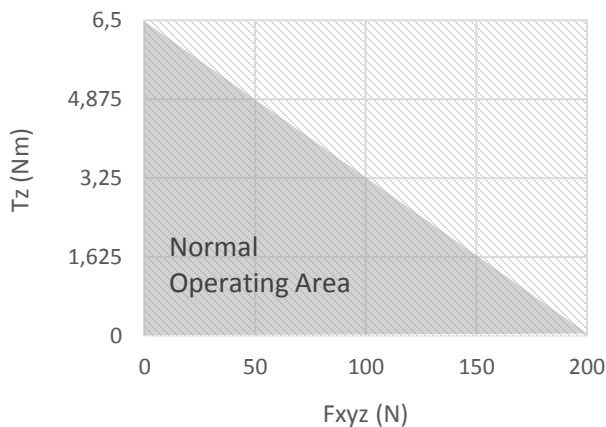
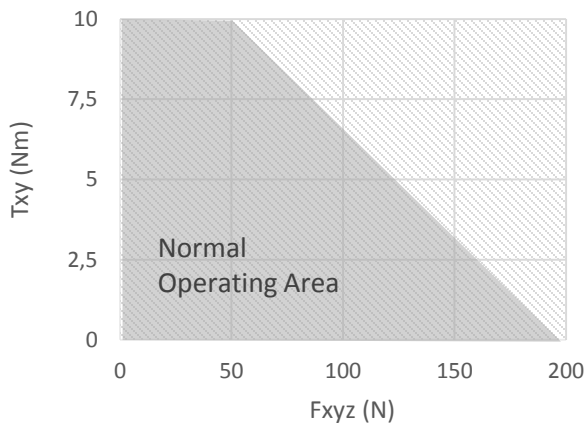


COMPLEX LOADING

During single-axis loading the sensor could only be operated up to its nominal capacity. Above the nominal capacity the reading is inaccurate and invalid.

During complex loading (*when more than one axis is loaded*) the nominal capacities can be reduced. The following diagrams show the affected complex loading scenarios.

Please note that the sensor **could not be operated** outside of the Normal Operating Area.





The RG2 gripper is a flexible electric gripper specially designed for robots from Universal Robots. The long stroke allows the gripper to handle a variety of object sizes. Adjusting the gripping force allows the gripper to handle both delicate and heavy object. The standard fingers can be used with many different objects, it is also possible to fit custom fingers.

The installation complexity is minimal as the cable attaches directly onto any robot from Universal Robots.

All configurations of the gripper are controlled from the Universal Robots software.

Features

- **Simple installation**

Runs directly from the robot.

- **Integrated control board**

No need for wiring or external programming.

- **Flexible**

Allows handling of multiple sized objects.

- **Supports dual grippers**

Two grippers can be operated without any extra wiring.

- **Adjustable force**

Is set in the URcap.

- **Quick finger change**

Replace the standard fingertips by loosening two screws.

- **Plug n' produce**

Mount, connect, - Automate.

- **Failsafe operation**

In case of power loss the gripping force is maintained.

- **Force and Width detection**

Uses I/O's to give feedback on reached force and width.

- **Analog width feedback**

One of the analog inputs on the robot is always corresponding to the present finger position.

- **Tool output extension**

The robot tool connector is extended to the gripper connector.

Technical specifications

<i>Technical data</i>	<i>Min</i>	<i>Typical</i>	<i>Max</i>	<i>Units</i>
Total stroke (adjustable)	0	-	110	[mm]
Finger position resolution	-	0,1	-	[mm]
Repetition accuracy	-	0,1	0,2	[mm]
Reversing backlash	0,2	0,4	0,6	[mm]
Gripping force (adjustable)	3	-	40	[N]
Gripping force accuracy	±0,05	±1	±2	[N]
Gripping speed*	55	110	184	[mm/s]
Gripping time**	0,04	0,07	0,11	[s]
Operating voltage***	10	24	26	[V DC]
Power consumption	1,9	-	14,4	[W]
Maximum Current	25	-	600	[mA]
Ambient operating temperature	5	-	50	[°C]
Storage temperature	0	-	60	[°C]
Product weight	-	0,65	-	[kg]

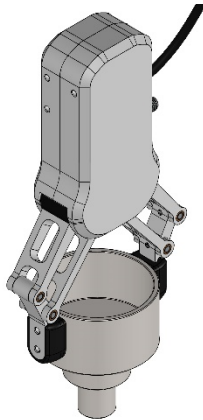
* see speed table

** based on 8mm total movement between fingers, see speed table

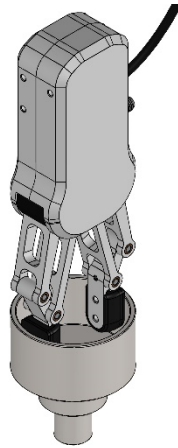
***At 12V the gripper runs at approximately half the normal speed

Gripper work range

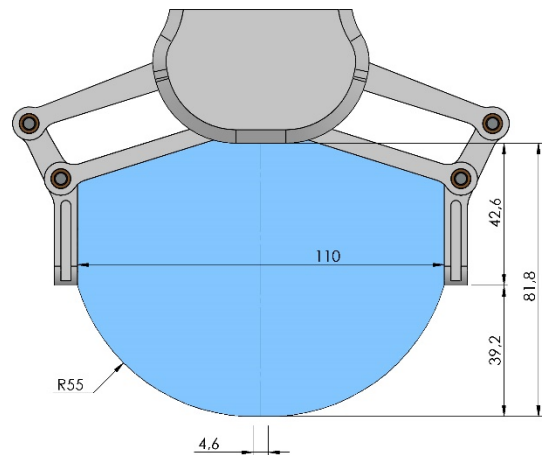
External Grip



Internal Grip

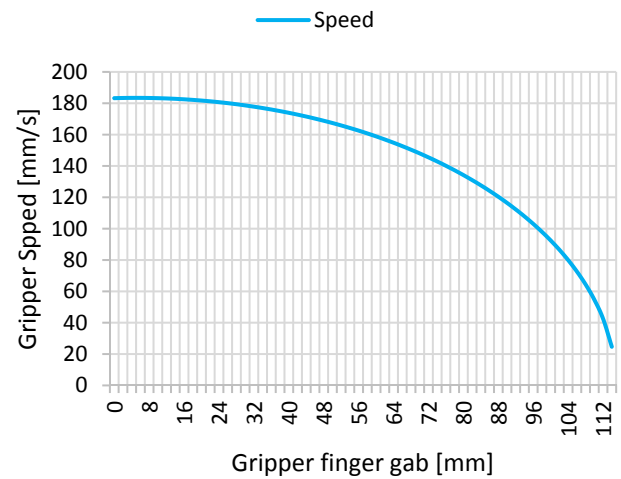


Fingers are rotated.



Gripping speed

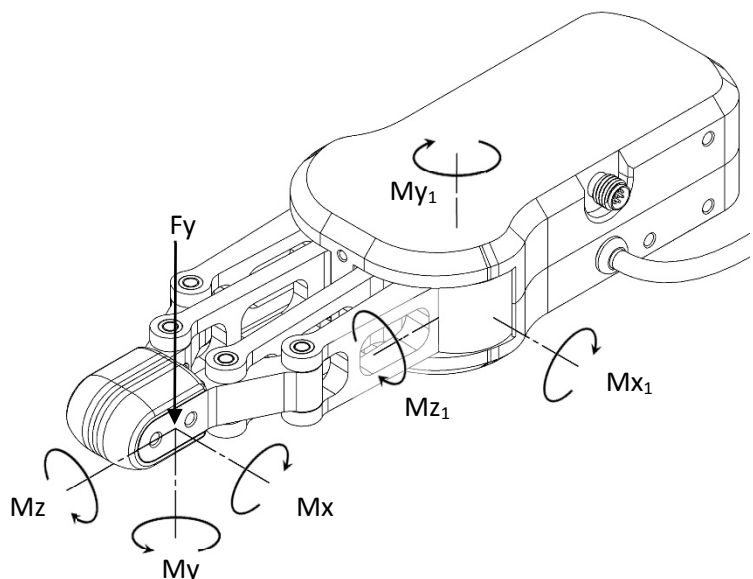
The Speed table illustrates the difference in speed relative to the grippers finger position.



Load capacity

Parameter	Static	Unit
Fy	362	[N]
Mx	7,55	[Nm]
My	4,1	[Nm]
Mz	6,92	[Nm]
Mx₁	22	[Nm]
My₁	11	[Nm]
Mz₁	22	[Nm]

The parameters in the fingertips are calculated at the shown closed position and will change in relation to the finger positions.

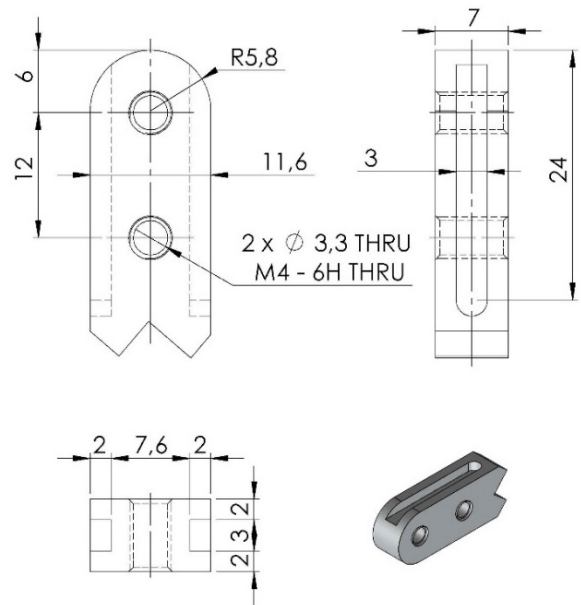
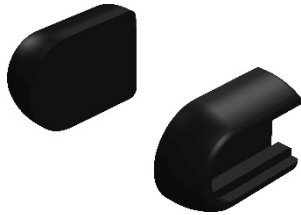


Fingers

The standard fingers can be used for many different workpieces. If custom fingers are required, they can be made to fit the gripper finger tips.

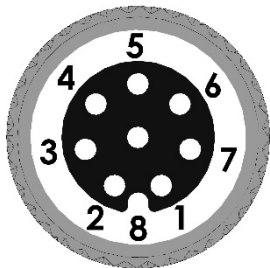
Standard fingers

For a variety of workpieces



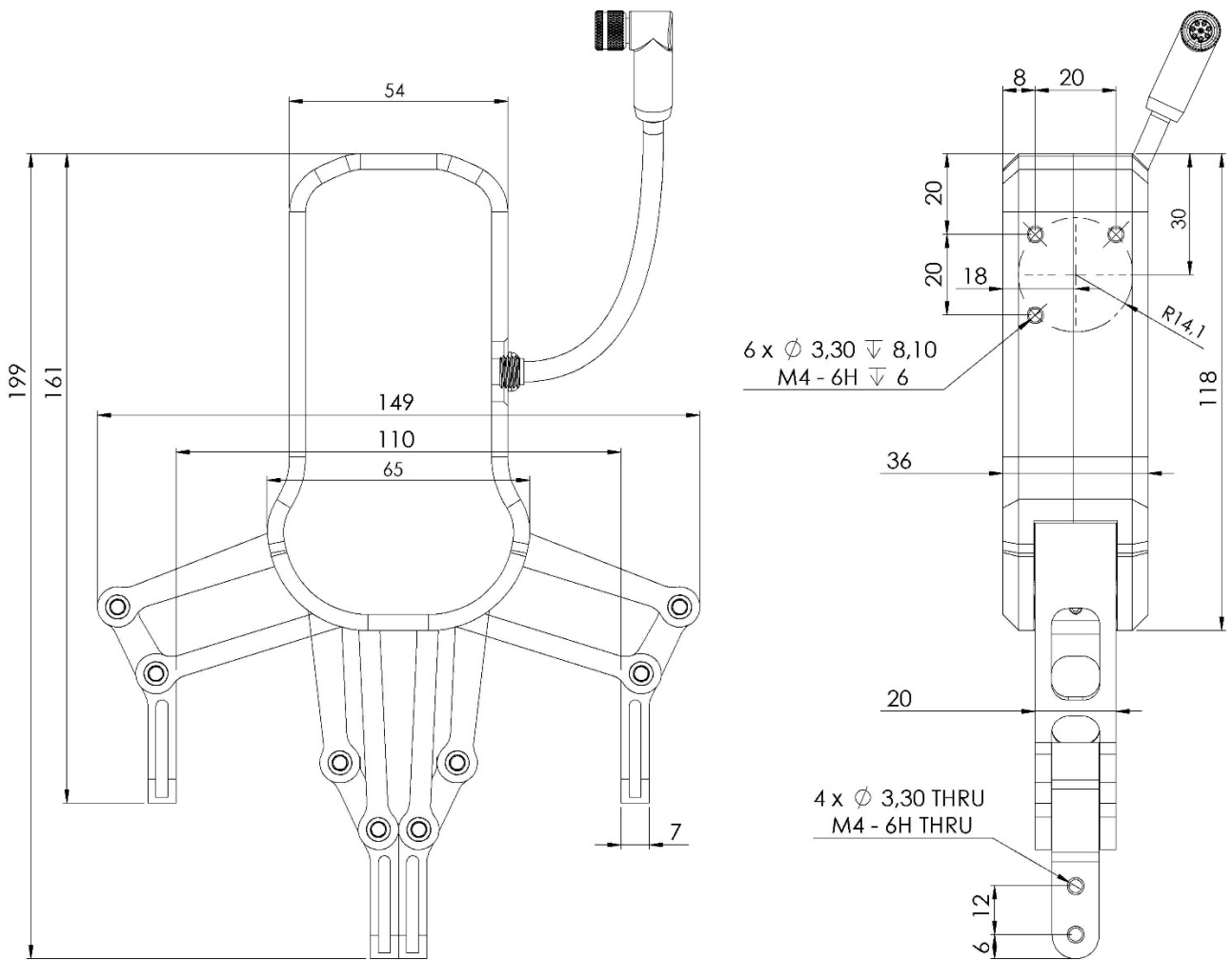
Dimensions of the gripper aluminum finger tips.

Tool connector pinout

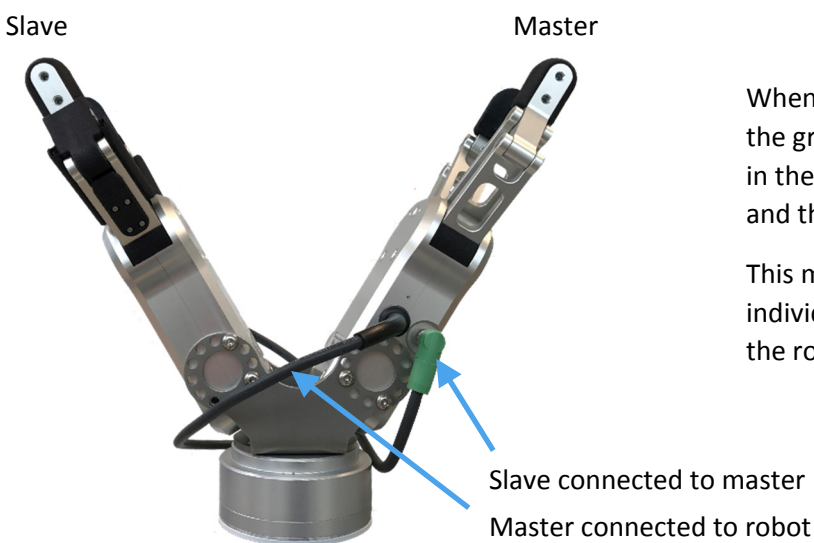


<i>pin</i>	<i>wire</i>	<i>UR I/O</i>	<i>UR I/O V3</i>
1	White	AI2	Tool analog input 2
2	Brown	AI3	Tool analog input 3
3	Green	DI9	Tool input 1
4	Yellow	DI8	Tool input 0
5	Gray	Power	24V DC
6	Pink	DO9	Tool output 1
7	Blue	DO8	Tool output 0
8	Red	GND	0V DC

Mechanical dimensions



Gripper output connector



When one gripper is connected to another via the gripper output connector, the first gripper in the chain (from the robot) becomes master and the second slave.

This makes it possible to use both grippers individually, using only two digital outputs from the robot.

I/O Feedback

The gripper uses DI8, DI9 and AI3 to give feedback on its status and finger position.

Use DI8 to detect if the gripper grabbed a workpiece or stopped at a given position.

DI9 will go LO (Busy) when the gripper is programmed, moving or changing force.

<i>Digital status Feedback</i>	<i>Tool Inputs</i>	
UR Version 3	0	1
UR Version 1 & 2	DI8	DI9
Position Reached	LO	-
Force Reached	HI	-
Gripper Busy	-	LO
Gripper Ready	-	HI

Analog feedback

AI2 outputs a voltage corresponding to the gripper width.

<i>Analog Feedback</i>			
	UR Input	Voltage	Width
Actual Width @ 0V:5V	AI2	0...3.7V*	0...110mm
Actual Width @ 0V:10V	AI2	0...3.0V*	0...110mm

* Due to the grippers analog output resistance (10kΩ), the analog feedback voltage will be affected by the robot input resistance. For the robots from Universal Robots, the input resistance is 29kΩ @ 0V:5V and 15kΩ @ 0V:10V, that results in a maximum input voltage of $5V \cdot \frac{29k\Omega}{10k\Omega+29k\Omega} = 3.7V @ 0V: 5V$ and $5V \cdot \frac{15k\Omega}{10k\Omega+15k\Omega} = 3.0V @ 0V: 10V$ which correspond to the maximum width of 110mm.

The actual width can be calculated by $\frac{\text{voltage}}{\text{maximum input voltage}} \cdot 110\text{mm}$.

ADAPTIVE GRIPPER 3-FINGER

GIVE TO YOUR ROBOT HAND-LIKE CAPABILITIES THROUGH A RUGGED AND AGILE GRIPPER.



FLEXIBLE

Handles a wide variety of part geometries and sizes.

POWERFUL CONTROL INTERFACE

Easy control of fingers' position, speed and force. Grip detection.

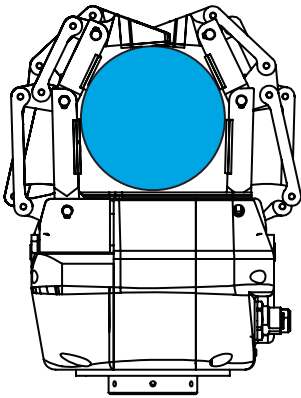
RUGGED AND RELIABLE

Designed for industrial environments.

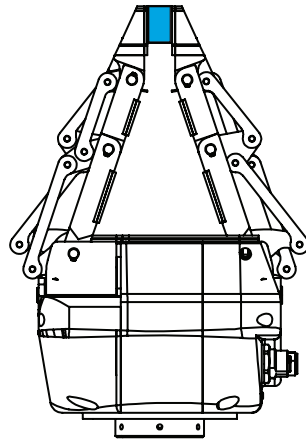


ADAPTIVE GRIPPER

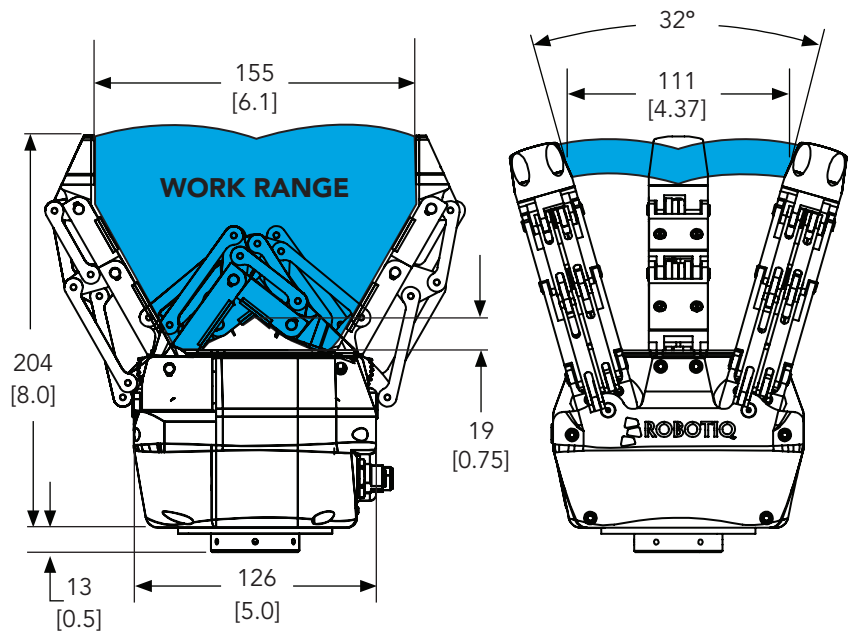
3-FINGER



ENCOMPASSING GRIP



FINGERTIP GRIP



*Figures not showing mechanical coupling to robot.

UNITS: mm
[in.]

TECHNICAL DATA

MECHANICAL SPECIFICATIONS

Gripper opening (see figure)	0 to 155 mm	0 to 6.1 in
Gripper weight	2.3 kg	5 lbs
Object diameter for encompassing	20 to 155 mm	0.79 to 6.1 in
Maximum recommended payload (encompassing grip)	10 kg	22 lbs
Maximum recommended payload (fingertip grip) 0.4 friction coefficient between finger rubber and steel part, safety factor of 2	2.5 kg	5.5 lbs
Grip force (fingertip grip)*	15 to 60 N	3.4 to 13.5 lbf
Closing speed (fingertip grip)	22 to 110 mm/s	0.87 to 4.33 in/s
Operating temperature	-10°C to 50°C	14°F to 122°F
Finger position repeatability (fingertip grip)	0.05 mm	0.002 in

* ±15%, varies with speed and force parameters

ELECTRICAL SPECIFICATIONS

Nominal supply voltage	24 V DC ±10%
Absolute maximum supply voltage	28 V DC
Quiescent power (minimum power consumption)	4.1 W
Peak power (at maximum gripping force)	36 W
2 x 5 m (16.4 ft) shielded high-flex cables included	

CONTROL

Communication protocol options	Modbus TCP, EtherNet/IP, PROFINET, EtherCAT, DeviceNet, CANopen
Communication by default	Modbus RTU (RS-485, half-duplex)
Programmable gripping parameters	Position, speed and force control of each finger Lateral finger position control
Status LEDs (on gripper)	Power, communication and error
Feedback	Grip detection, motor encoder position and motor current