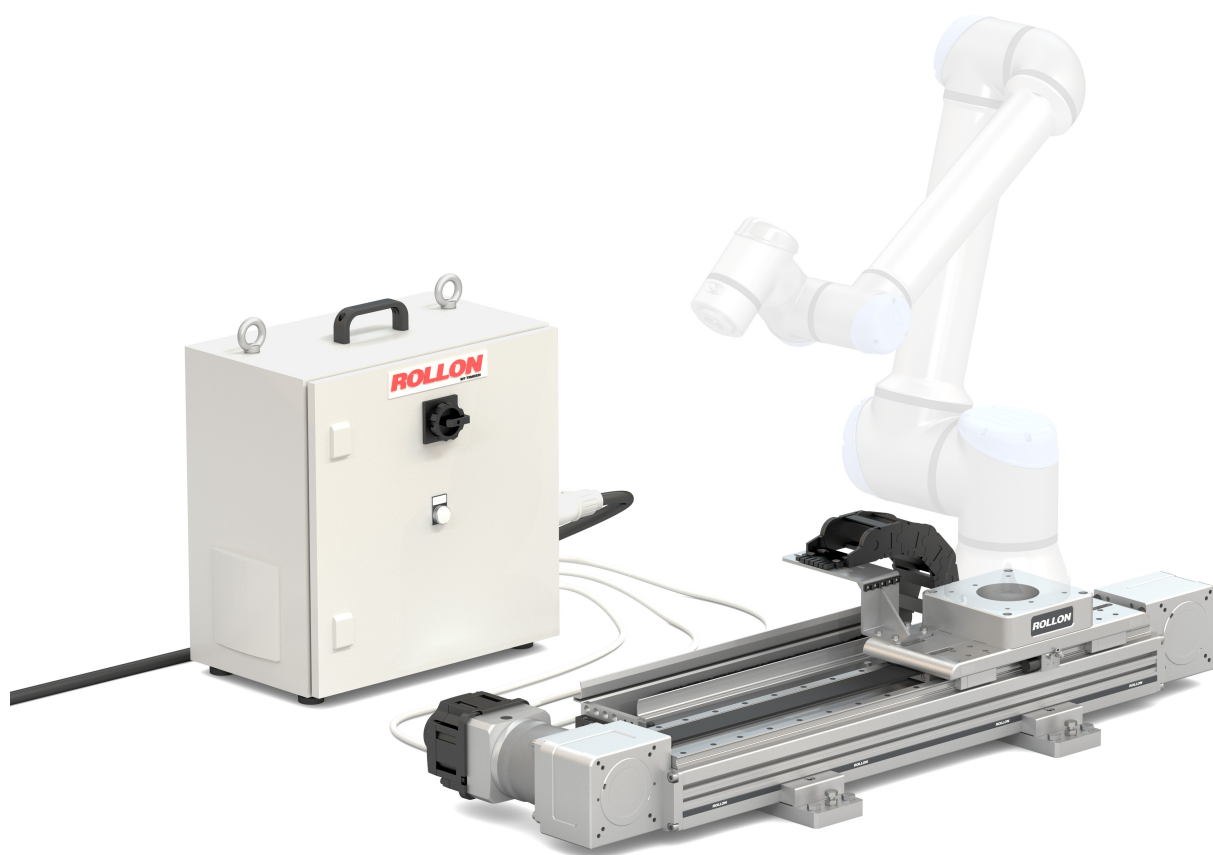


CTU

Data sheet - rev. 1.0



ACTUATORS AND SYSTEMS

myRollon

MyRollon is **your digital working platform** for linear guides, telescopic rails, actuators and actuator systems.

With myRollon, it is possible to determine the best linear motion solution according to your application specifications.

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► ORDERING KEY

■ CTU

CTU	12-1S	0000	H	3	C	P	L	3	S	
	16-1S		V	5				5	T	
	22-1S			10						
				16						
				20						
				30						
High-Flex cable - Optional S = 6 m, T = 12 m										
Kit cables length - 3 = 3m, 5 = 5m										
Profile mounting kit height adjustable - Optional										
Pneumatic circuit - Optional										
Clamping elements - Optional										
Robot size - 3 = UR3e, 5 = UR5e, 10 = UR10e, 16 = UR16e, 20 = UR20, 30 = UR30										
Mounting configuration - H = horizontal, V = vertical										
Total length of the unit [mm]										
Size - 12 = 120, 16 = 160, 22 = 220										
Series										

Ordering example: **CTU16-1S1130H10CPL3T**

► FEATURES AND ADVANTAGES



Fig.1

Enhancing productivity with safety at the forefront.

Cobot Transfer Unit (CTU) is a turnkey system designed to extend the range of motion and capabilities of Universal Robots' collaborative robots, enabling them to handle tasks beyond their fixed range of motion. The Rollon CTU has been tested and certified by Universal Robots to be easily integrated with their cobots.

CTU features a steel reinforced belt drive and an extruded aluminum profile, which combines high stiffness with lightness, enabling horizontal and vertical mounting. The carriage is supported by recirculating ball guides and can reach strokes up to 5500 mm, with extensions available upon request.

Rollon's CTU comes with a plug-and-play kit that simplifies installation. The kit includes an axis sized according to the robot's size, Rollon's URCap software, the hardware included in the electrical cabinet, a gearbox, motor and drive, proximity sensors and cables. Rollon's URCap is the dedicated software for the Universal Robots teach-pendant. It simplifies programming and controls of all features, making it easy to program advanced functions and control up to 6 external axes.

Different safety options, such as a laser scanner (not supplied by Rollon), can be integrated into the system to further enhance safety. Additional brakes on the carriage can be added as an option.

The Cobot Transfer Unit is particularly suitable for tasks like light material handling, assembly, pick-and-place, or packaging.

Performance characteristics

- Available sizes: 120, 160, 220
- Max. operating speed: 1.5 m/s
- Max. acceleration: 3 m/s²
- Max. stroke: 5500 mm
- Repeatability: ±0.11 to ±0.14 mm depending on the size
- Profile material: Aluminum
- Drive: Toothed belt AT pitch
- Guide: Recirculating ball bearings
- Mounting: Horizontal, vertical
- Power voltage: 230V (power cable supplied with a Schuko plug)

Robot compatibility

- Designed for cobots: UR3e, UR5e, UR10e, UR16e, UR20 and UR30

Components

- Electrical cabinet
- Connection cables
- Interface for electrical cables
- Mechanical interface with UR Robot on the carriage
- Energy chain
- Motor and gearbox

Optional accessories

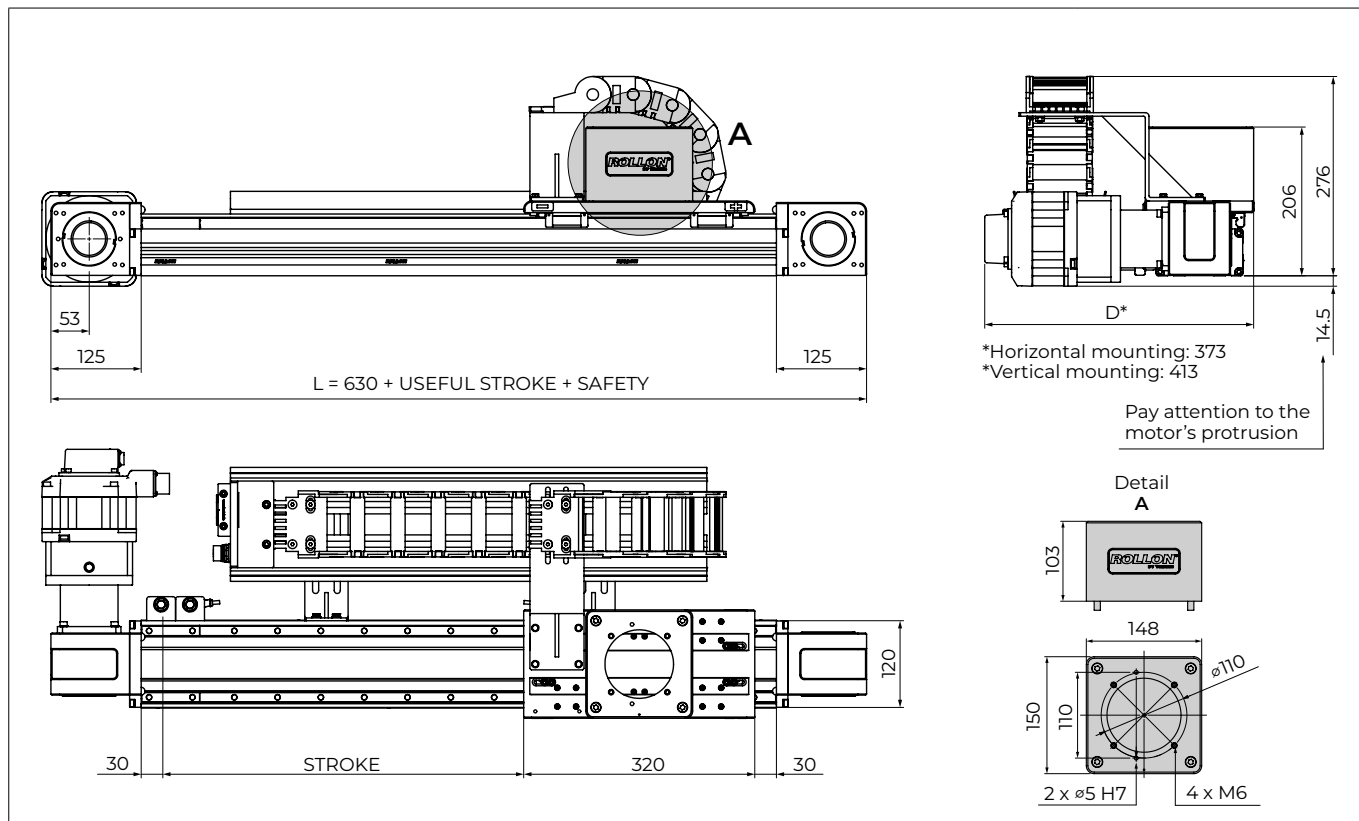
- High-flex robot power and signal cable
- Profile mounting kit - height adjustable
- Pneumatic clamping system
- Pneumatic circuit

MAIN ADVANTAGES

Compactness	Safety	Ease of installation	Versatility	All-in-one
The compact design and available strokes help to ensure a simple and reliable movement.	The optimization of dynamics, emergency functions and the possibility of integrating external safety sensors creates a safe and reliable solution.	The plug-and-play setup makes it easy to assemble the system quickly and efficiently.	Horizontal or vertical mounting allows for space optimization, adapting to different application requirements.	Several standard components and optional accessories are available to facilitate assembly and enhance safety.

► COMPONENTS AND DIMENSIONS

■ CTU120-1S for UR3e



Technical data	
Max. useful stroke length [mm]	5500
Max. positioning repeatability [mm]*	± 0.11
Max. speed [m/s]	1.5
Max. acceleration [m/s ²]	3.0
Weight for 100 mm useful stroke [kg]	1.1
Rail size [mm]	15

*Positioning repeatability of actuator including gearbox angular clearance.

Tab.1

Driving belt and pulley data	
Belt type	40 AT 10
Belt width [mm]	40
Belt length [mm]	2 x L - 187
Belt weight [kg/m]	0.23
Pulley type	Z 21
Pulley pitch diameter [mm]	66.84
Carriage displacement per pulley turn [mm]	210

Tab.2

Axis stroke* [mm]	Axis length L [mm]	Weight** [kg]
500	1130	32
1000	1630	37
1500	2130	43
2000	2630	49
2500	3130	55
3000	3630	60
3500	4130	66
4000	4630	71
4500	5130	77
5000	5630	82
5500	6130	88

*Longer strokes are available on request. **Weight of the electrical cabinet excluded, see page 10. For further information, please contact our Technical Department.

Tab.3

Cobot compatibility	
Brand	Universal Robots
Model	UR3e

Tab.4

Cobot data	
Payload [kg]	3
Weight [kg]	11.2

Tab.5

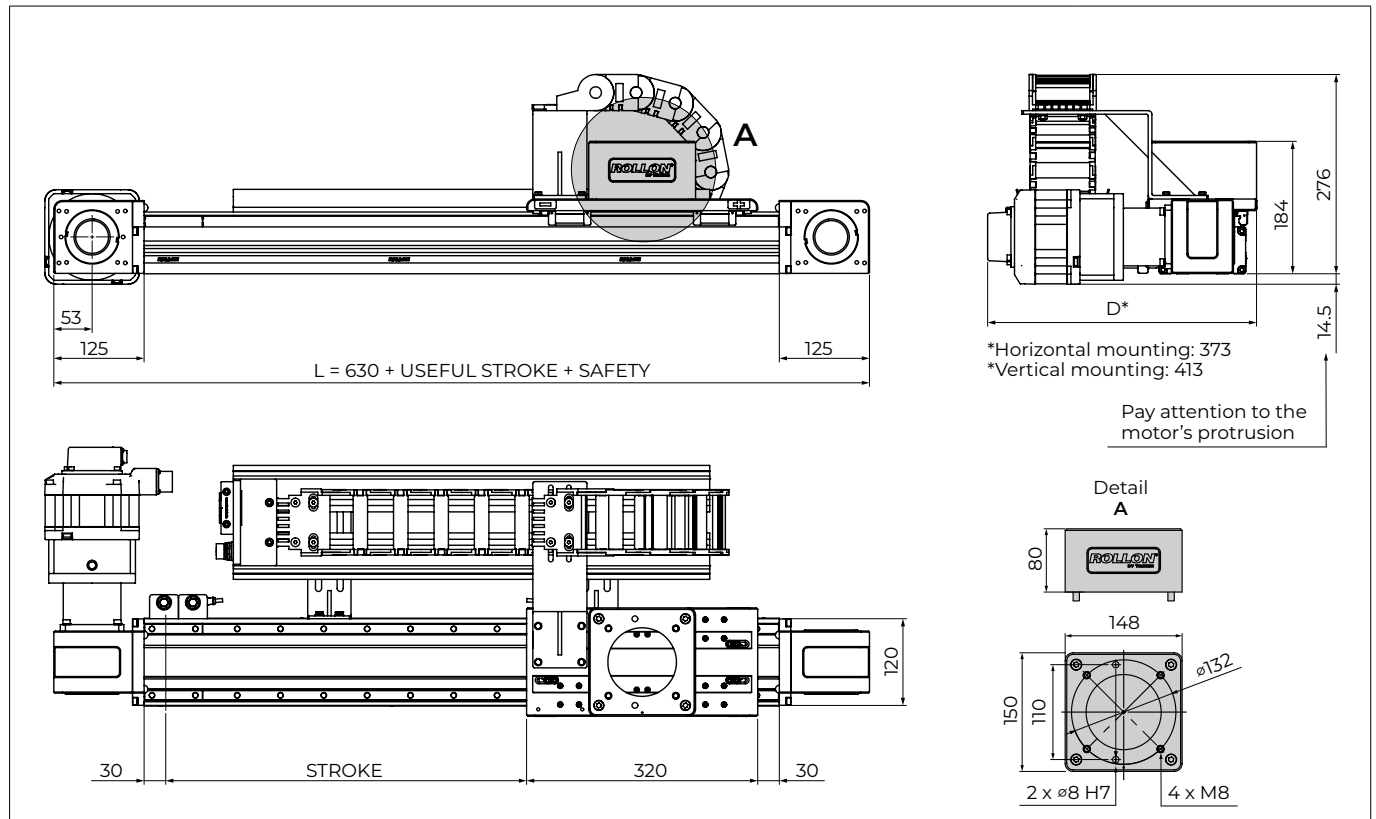
■ CTU120-1S for UR5e


Fig.3

Technical data	
Max. useful stroke length [mm]	5500
Max. positioning repeatability [mm]*	± 0.11
Max. speed [m/s]	1.5
Max. acceleration [m/s ²]	3.0
Weight for 100 mm useful stroke [kg]	1.1
Rail size [mm]	15

*Positioning repeatability of actuator including gearbox angular clearance.

Tab.6

Driving belt and pulley data	
Belt type	40 AT 10
Belt width [mm]	40
Belt length [mm]	2 x L - 187
Belt weight [kg/m]	0.23
Pulley type	Z 21
Pulley pitch diameter [mm]	66.84
Carriage displacement per pulley turn [mm]	210

Tab.7

Axis stroke* [mm]	Axis length L [mm]	Weight** [kg]
500	1130	31
1000	1630	37
1500	2130	42
2000	2630	48
2500	3130	54
3000	3630	59
3500	4130	65
4000	4630	70
4500	5130	76
5000	5630	81
5500	6130	87

*Longer strokes are available on request. **Weight of the electrical cabinet excluded, see page 10. For further information, please contact our Technical Department.

Tab.8

Cobot compatibility	
Brand	Universal Robots
Model	UR5e

Tab.9

Cobot data	UR5e
Payload [kg]	5
Weight [kg]	20.6

Tab.10

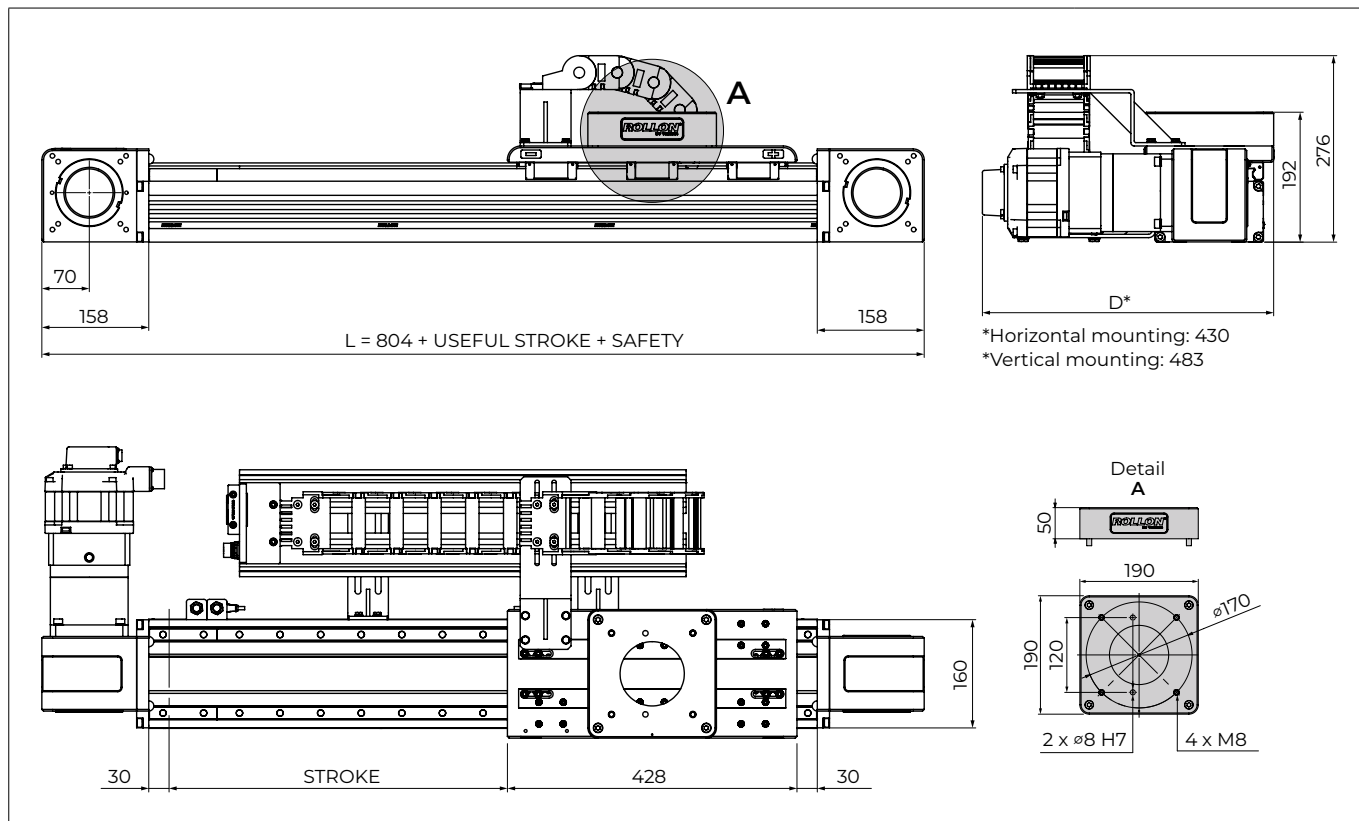
■ CTU160-1S for UR10e and UR16e


Fig.4

Technical data	
Max. useful stroke length [mm]	5500
Max. positioning repeatability [mm]*	± 0.13
Max. speed [m/s]	1.5
Max. acceleration [m/s ²]	3.0
Weight for 100 mm useful stroke [kg]	2.1
Rail size [mm]	20

*Positioning repeatability of actuator including gearbox angular clearance.

Tab.11

Driving belt and pulley data	
Belt type	50 AT 10
Belt width [mm]	50
Belt length [mm]	$2 \times L - 270$
Belt weight [kg/m]	0.29
Pulley type	Z 27
Pulley pitch diameter [mm]	85.94
Carriage displacement per pulley turn [mm]	270

Tab.12

Axis stroke* [mm]	Axis length L [mm]	Weight** [kg]
500	1304	55
1000	1804	64
1500	2304	78
2000	2804	89
2500	3304	99
3000	3804	110
3500	4304	121
4000	4804	132
4500	5304	143
5000	5804	154
5500	6304	165

*Longer strokes are available on request. **Weight of the electrical cabinet excluded, see page 10. For further information, please contact our Technical Department.

Tab.13

Cobot compatibility	
Brand	Universal Robots
Model	UR10e and UR16e

Tab.14

Cobot data	UR10e	UR16e
Cobot payload [kg]	12.5	16
Cobot weight [kg]	33.5	33.1

Tab.15

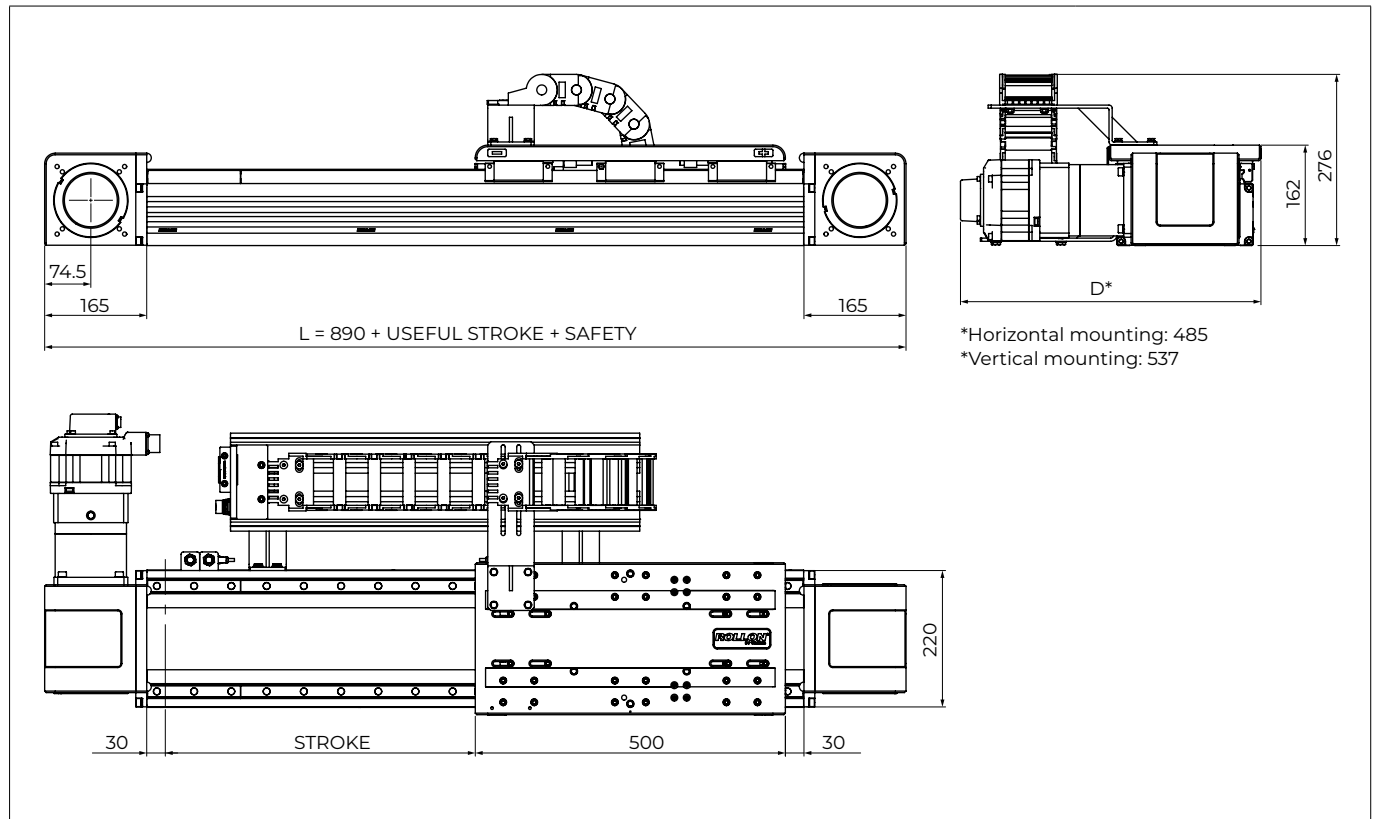
■ CTU220-IS for UR20 and UR30


Fig.5

Technical data

Max. useful stroke length [mm]	5500
Max. positioning repeatability [mm]*	± 0.14
Max. speed [m/s]	1.5
Max. acceleration [m/s ²]	3.0
Weight for 100 mm useful stroke [kg]	2.8
Rail size [mm]	25

*Positioning repeatability of actuator including gearbox angular clearance.

Tab.16

Driving belt and pulley data

Belt type	100 AT 10
Belt width [mm]	100
Belt length [mm]	2 x L - 220
Belt weight [kg/m]	0.58
Pulley type	Z 32
Pulley pitch diameter [mm]	101.86
Carriage displacement per pulley turn [mm]	320

Tab.17

Axis stroke* [mm]	Axis length L [mm]	Weight** [kg]
500	1389	77
1000	1889	90
1500	2389	108
2000	2889	121
2500	3389	135
3000	3889	150
3500	4389	164
4000	4889	179
4500	5389	193
5000	5889	207
5500	6389	221

*Longer strokes are available on request. **Weight of the electrical cabinet excluded, see page 10. For further information, please contact our Technical Department.

Tab.18

Cobot compatibility

Brand	Universal Robots
Model	UR20 and UR30

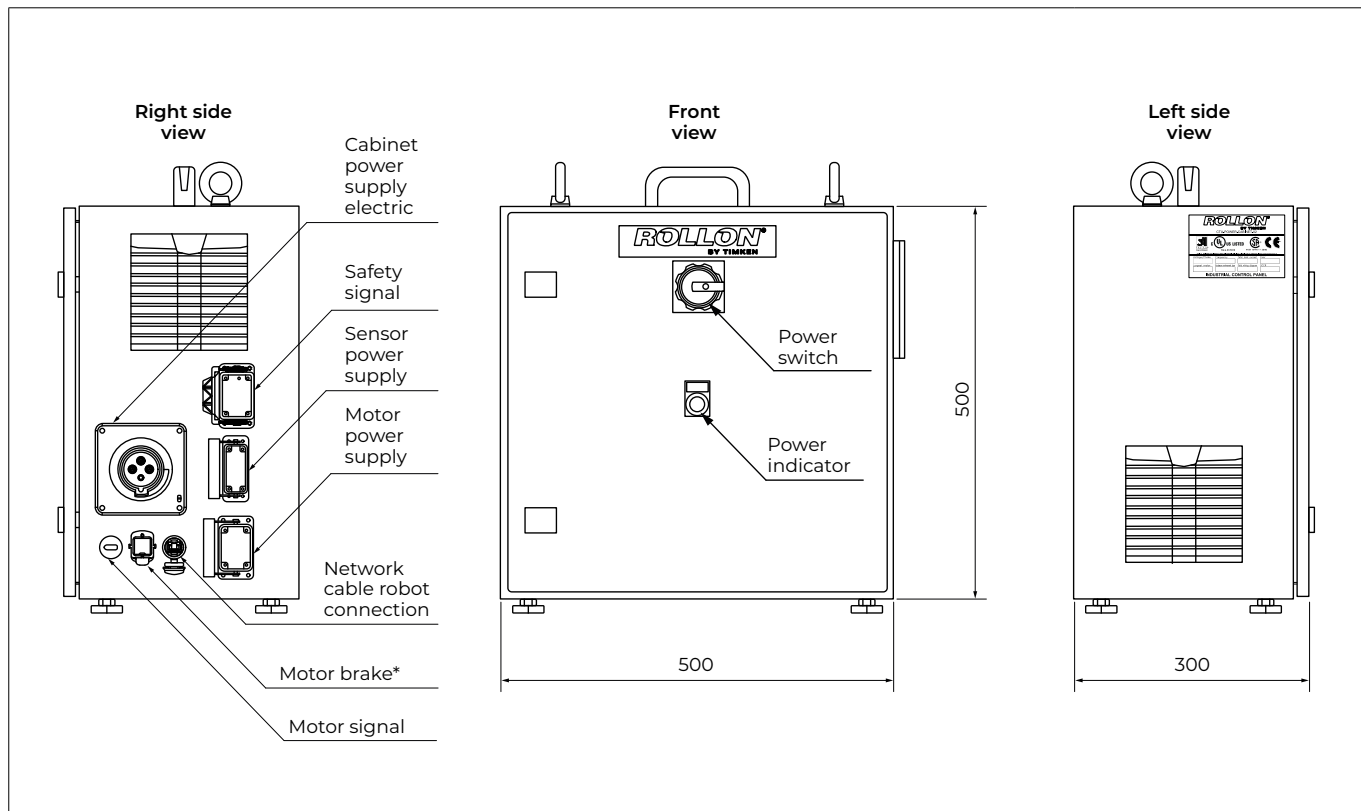
Tab.19

Cobot data	UR20	UR30
Cobot payload [kg]	25	35
Cobot weight [kg]	64	63.5

Tab.20

■ Electrical cabinet (included)

CTU features a compact electrical cabinet. It is CE, UL, and CSA certified and operates at 230 V (single-phase AC power system). The cabinet is supplied with a power cable featuring a Schuko plug and external connector cables, allowing it to be plugged into various I/O systems.



Electrical cabinet weight: 30 kg. *Only for vertical arrangements.

Fig.6

■ Cable kit power/supply (included)

Depending on the order the cables will be supplied in sections 3 or 5 meters in length. The kit includes:

- ▣ Motor power cable
- ▣ Motor signal cable
- ▣ Motor brake cable (only for vertical arrangement)
- ▣ Power cable
- ▣ Sensor power cable
- ▣ Network cable robot connection

■ Energy chain (included)

CTU features a high-stability, low-noise, and long service life energy chain. As a standard, the energy chain is available with snap-open feature the long inner radius.

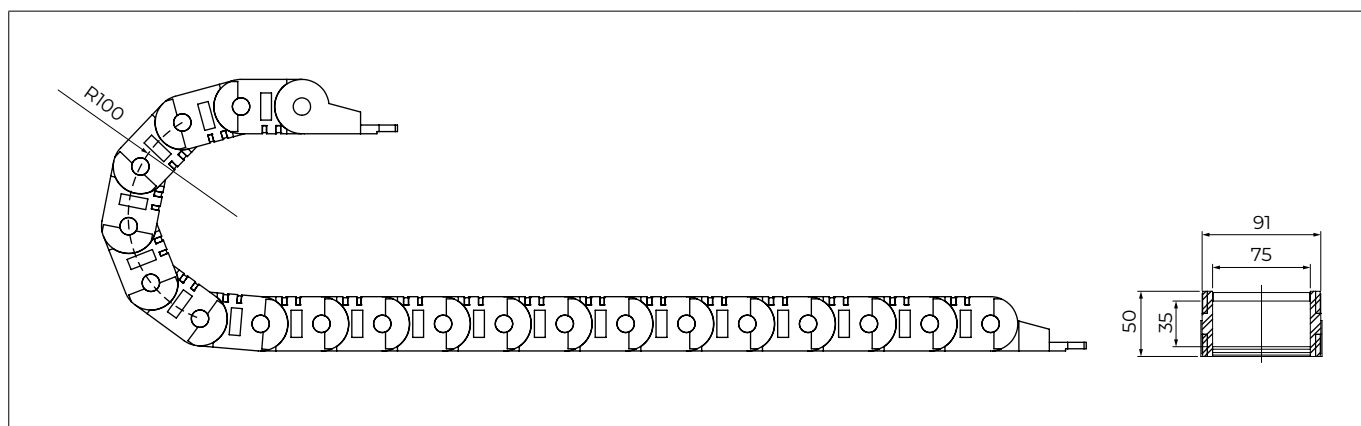


Fig.7

■ **Sensors (included)**

CTU is supplied with two stroke limit sensors, one homing sensor, and a sensor dog mounted on the carriage.

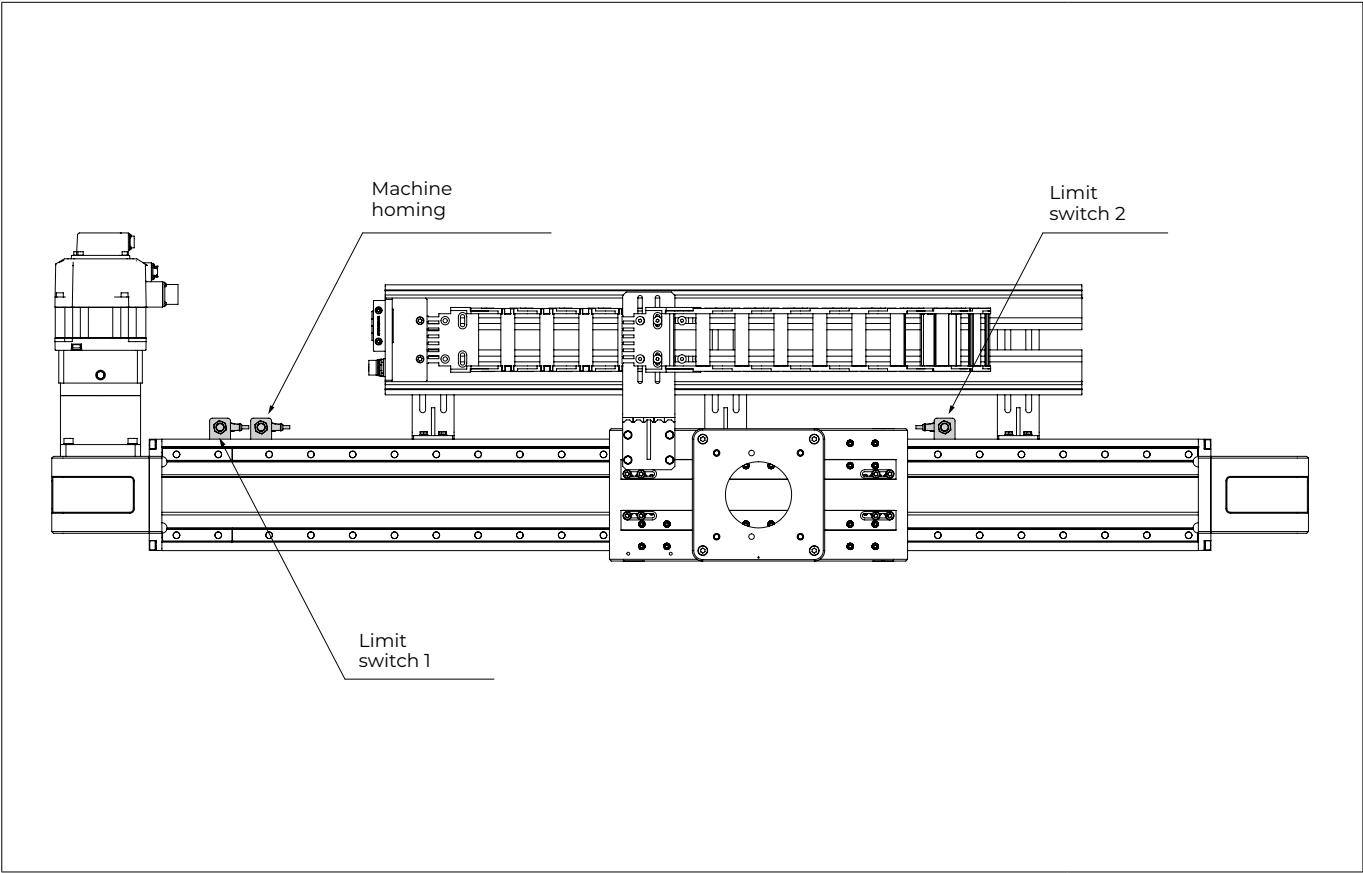


Fig.8

■ **Profiles**

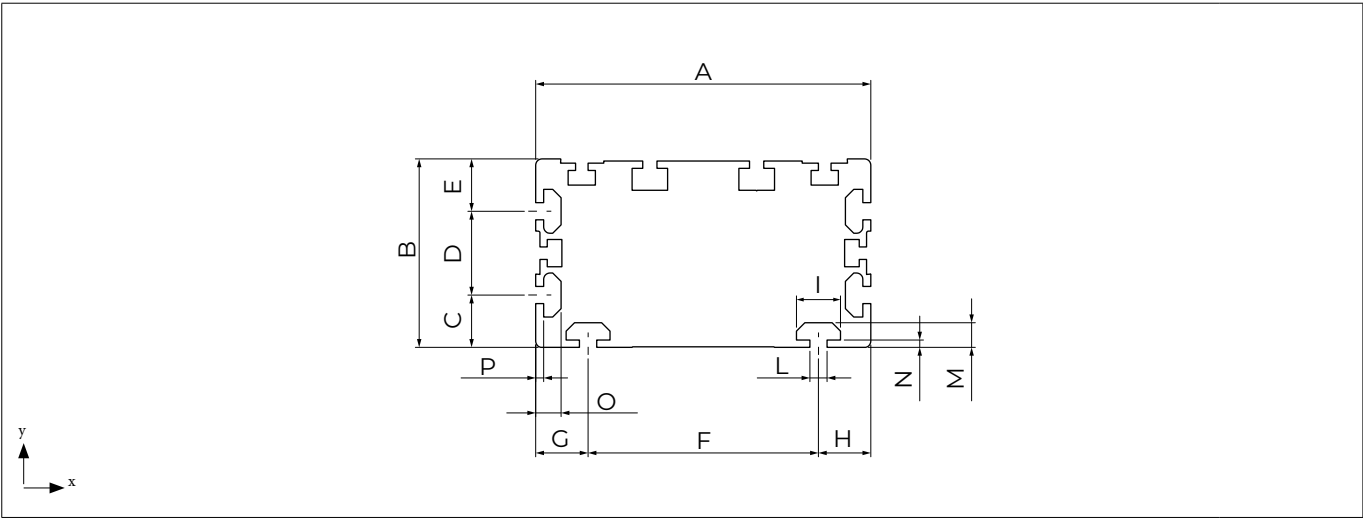


Fig.9

Type	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	I [mm]	L [mm]	M [mm]	N [mm]	O [mm]	P [mm]
CTU120-1S	120	65	20	-	-	80	20	20	20	8.35	11.3	3	-	-
CTU160-1S	160	90	25	40	25	110	25	25	21	8.2	11.8	3.5	12.1	3.8
CTU220-1S	220	100	25	50	25	170	25	25	21	8.2	11.8	3.5	12.1	3.8

Tab.21

► ACCESSORIES

■ Overview

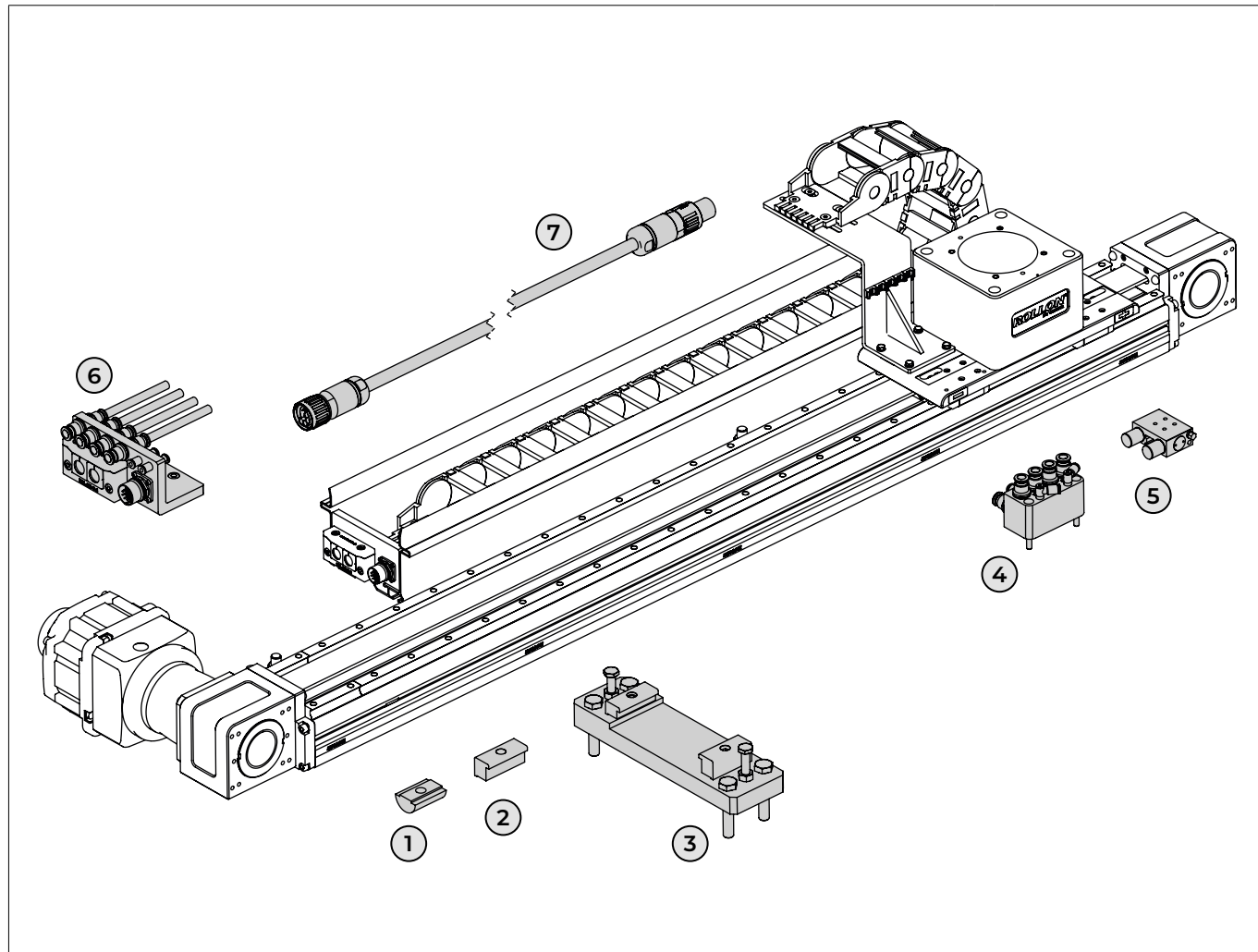


Fig.10

Ref.	Description	Note
1	Threaded insert	
2	Fixing bracket	
3	Profile mounting kit - height adjustable	Are pre-assembled on the CTU when the option is ordered.
4	Pneumatic distribution group [carriage side]	It is automatically included when the Pneumatic Circuit option is ordered.
5	Pneumatic clamping elements	Must be ordered as an option when ordering the CTU.
6	Plugs group for Pneumatics [cable chain]	It is automatically included when the Pneumatic Circuit option is ordered.
7	UR Robot High Flex Cable 6 m or 12 m	Upon request.

Tab.22

■ Profile mounting

To install the CTU, we recommend using threaded inserts, fixing brackets or height-adjustable profile mounting kit.

■ Threaded inserts

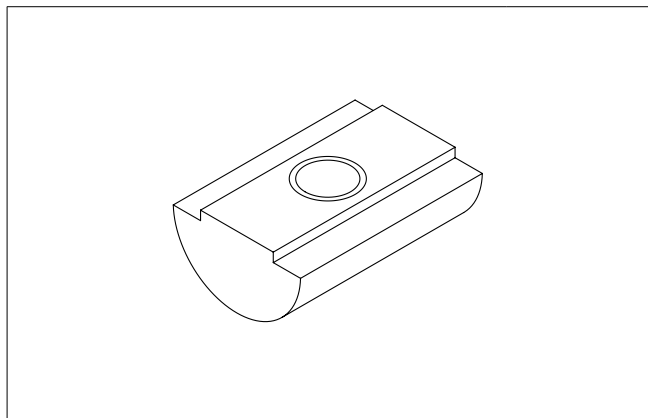


Fig.11

Type	Hole	Length [mm]	Code
CTU120-1S	M6	20	6000437
CTU160-1S	M6	20	6000437
CTU160-1S	M8	20	6001544
CTU220-1S	M6	20	6000437
CTU220-1S	M8	20	6001544

Steel nuts to be used in the slots of the aluminium profile.

Tab.23

■ Fixing brackets

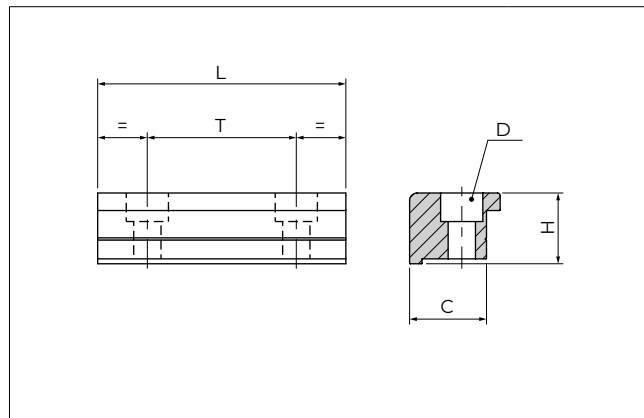


Fig.12

Type	L [mm]	T [mm]	C [mm]	H [mm]	D [mm]	Code
CTU120-1S	50	-	16	20.7	M5	1000111
CTU160-1S	100	-	31	28.5	M10	1002377
CTU220-1S	100	-	31	28.5	M10	1002377

Tab.24

■ Threaded inserts and fixing brackets positioning

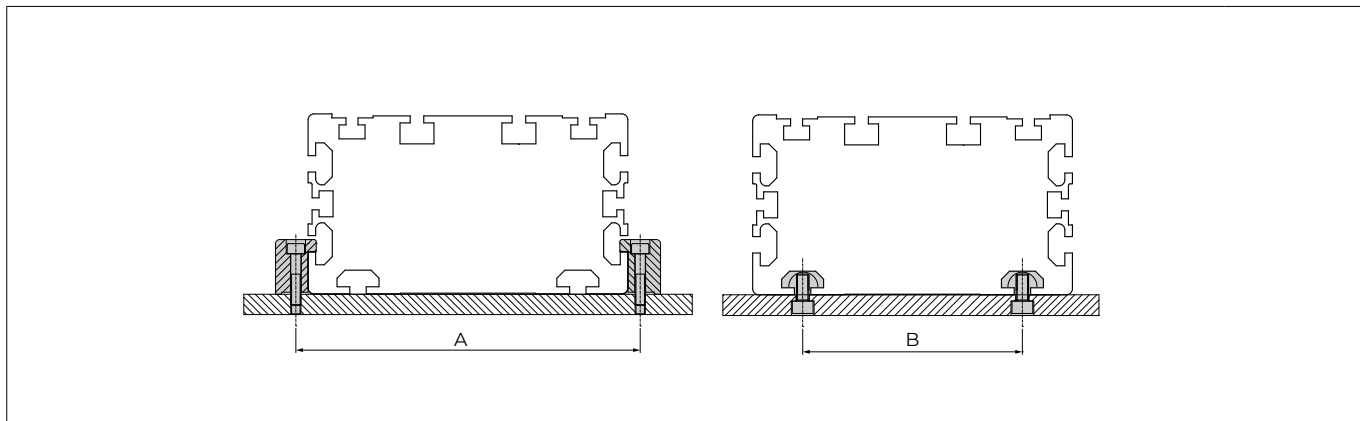


Fig.13

Type	A [mm]	B [mm]
CTU120-1S	132	80
CTU160-1S	180	110
CTU220-1S	240	170

Warning: Do not fix the linear units through the drive ends.

Tab.25

■ Profile mounting kit - height adjustable

Before placing the CTU in the working position, all leveling screws must be set at the end of the stroke. Once the axis is in place, the leveling screw can be used to level it and compensate for misalignments caused by inaccurate mounting surfaces and/or potential misalignment of the support crosspieces. After leveling, the two fixing screws must be secured.

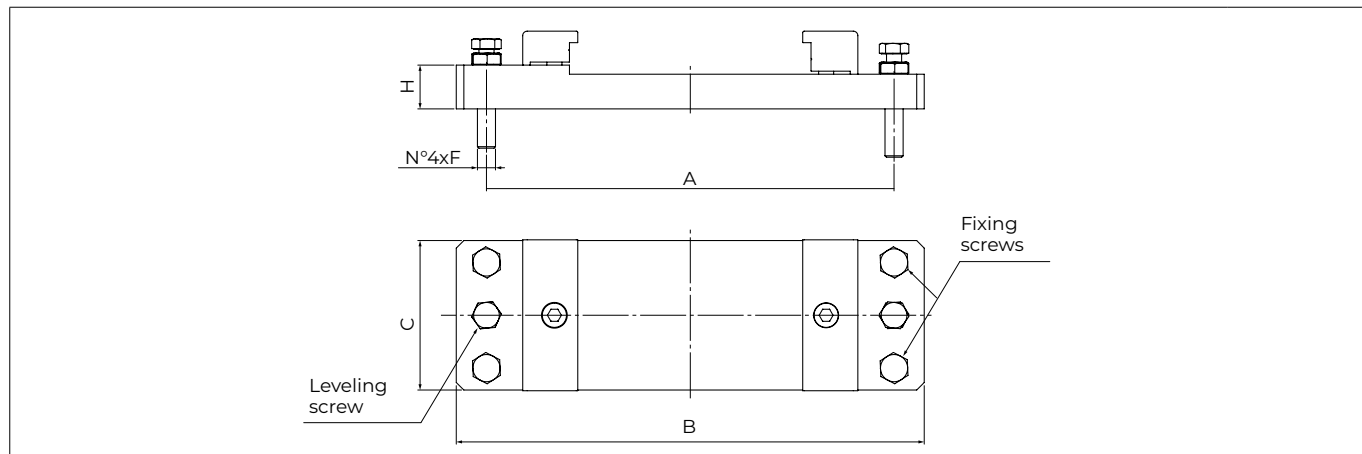


Fig.14

Type	A [mm]	H [mm]	B [mm]	C [mm]	F [mm]	Weight [kg]
CTU120-1S	190	25	230	69	M10	1
CTU160-1S	270	29	310	99	M12	2.8
CTU220-1S	330	29	370	99	M12	3.2

Tab.26

■ Recommended number of profile mounting kit

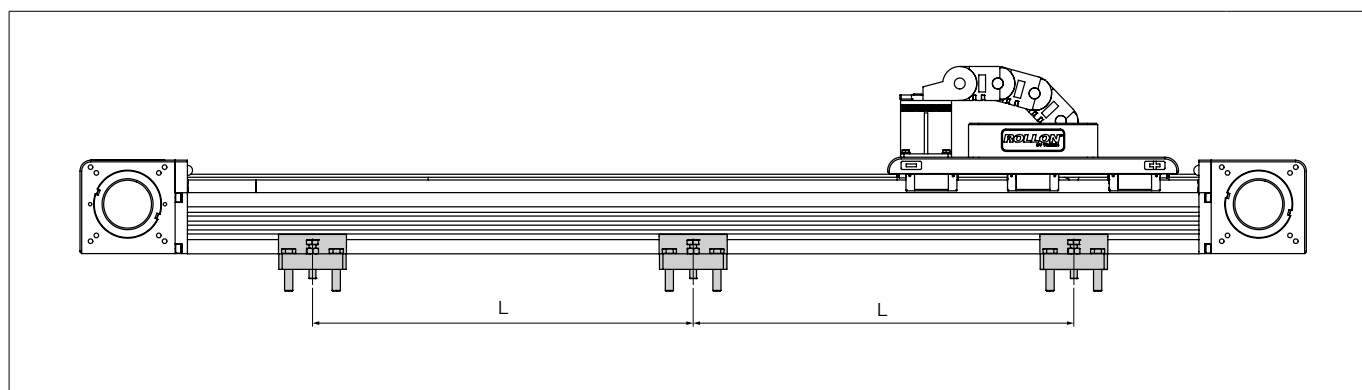


Fig.15

Type	Size	Stroke [mm]	Nb. of profile mountings per axis	L [mm]
CTU	120-1S 160-1S 220-1S	500	2	500
		1000	3	
		1500	4	
		2000	5	
		2500	6	
		3000	7	
		3500	8	
		4000	9	
		4500	10	
		5000	11	
		5500	12	

Tab.27

■ CTU dimensions including profile mounting kit

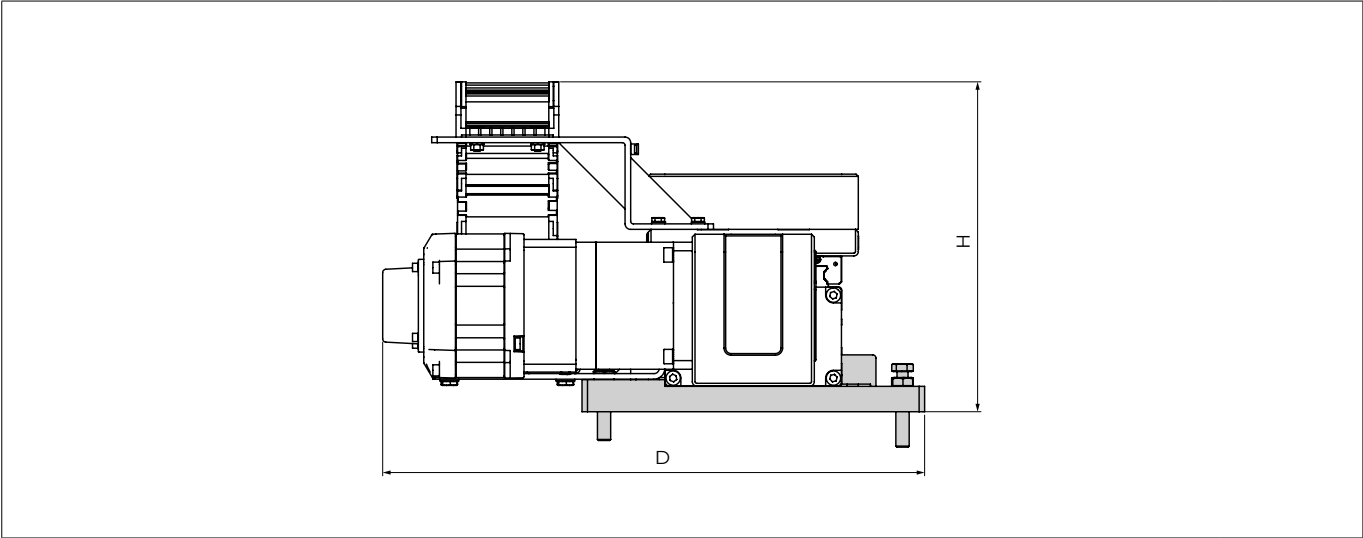


Fig.16

Type	Size	Mounting type	Universal Robots cobot	D [mm]	H [mm]
CTU	120-1S	H	UR3e - UR5e	413	295
		V	UR3e - UR5e	453	295
	160-1S	H	UR10e - UR16e	490	298.5
		V	UR10e - UR16e	543	298.5
	220-1S	H	UR20 - UR30	547	300
		V	UR20 - UR30	600	300

H = horizontal, V = vertical

Tab.28

■ Pneumatic circuit

When installed, the air ports allowing to power the robot accessories or activating the clamping elements. Air inlets are placed at the end of the cable carrier support frame and air outlets on the carriage (see Fig.10).

A-B-C-D: Air inlets to power robot accessories (Fig.17). Corresponding air outlets are on the axis carriage. The cable carrier is supplied with 4 air cables.

E-F: Air inlet for carriage clamping elements (Fig.18). Corresponding air outlets are on the axis carriage. Clamping elements is available upon request.

Air inlets

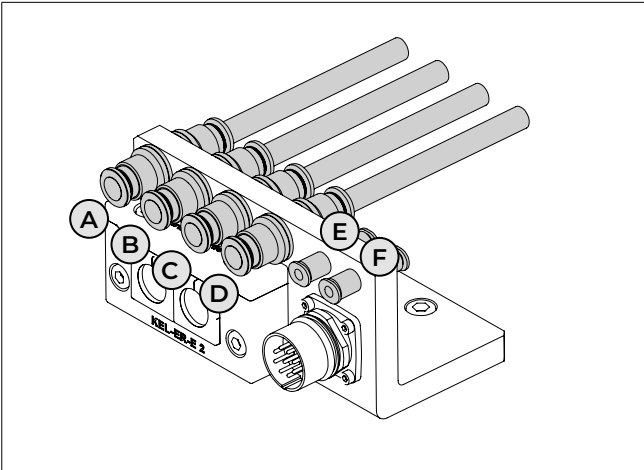


Fig.17

Air outlets

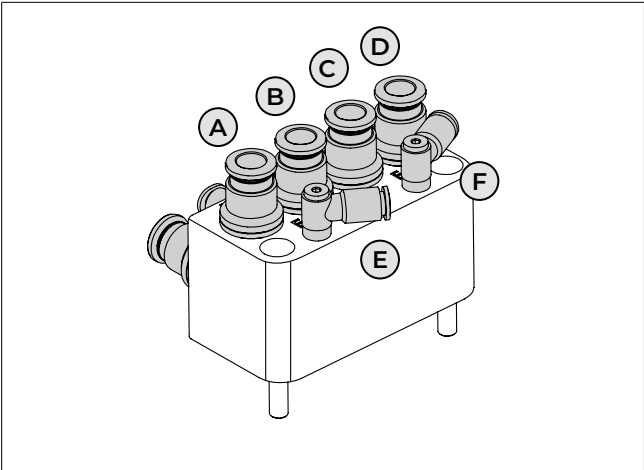


Fig.18

■ Pneumatic clamping elements

Dedicated pneumatic clamping elements are available for every CTU size and must be requested at the time of ordering, using the specific code (see Ordering Key). When the pneumatic clamping elements are ordered, the plug group for pneumatics is also supplied.

The system must be connected to an air pressure supply of 5.5 bar. The air pressure holds the clamping elements open, and if the air supply is cut off, they close on the two rails with the total clamping force shown in the table below.

Type	Clamping force [N]
CTU120-1S	800
CTU160-1S	1200
CTU220-1S	1500

Tab.29

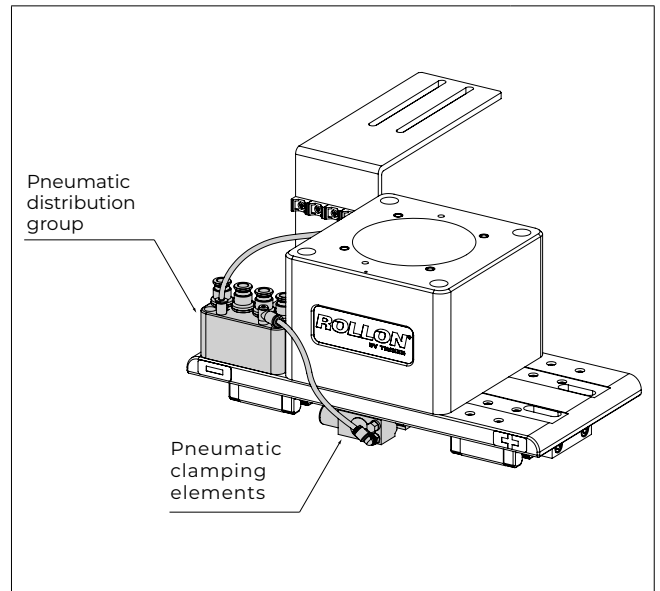


Fig.19

■ High-Flex UR robot power and signal cable

High-Flex cable can be ordered as an option and it is available in lengths of 6 m or 12 m. A certain amount of the total length of the cable is used to accommodate the stroke. To determine the residual length available outside the cable carrier, we recommend using the following formulas:

- Residual cable length = Cable length - X

Cable length [m]	Code
6	S
12	T

Tab.30

Type	Axis stroke* [mm]	X [m]
CTU120-1S CTU160-1S CTU220-1S	500	1.40
	1000	1.65
	1500	1.90
	2000	2.15
	2500	2.40
	3000	2.65
	3500	2.90
	4000	3.15
	4500	3.40
	5000	3.65
	5500	3.90

Tab.31

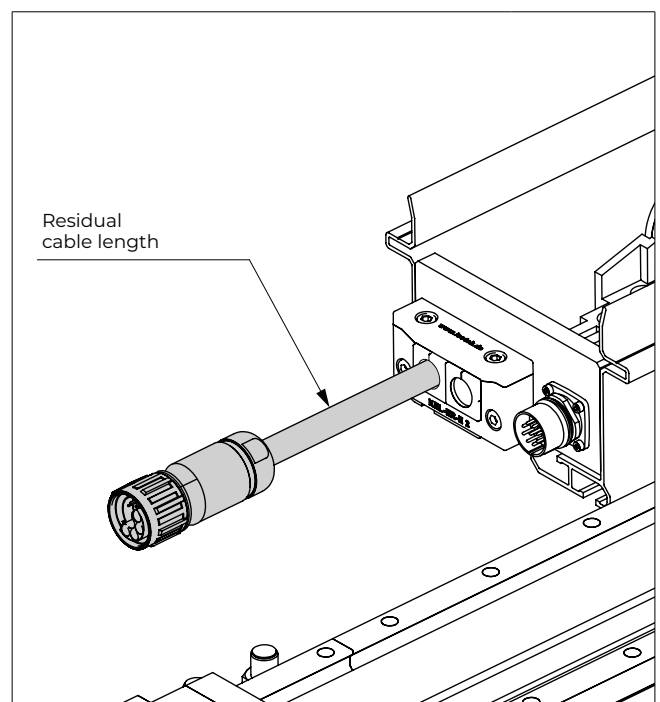


Fig.20

► USE AND MAINTENANCE

■ Lubrication

The recirculating ball guide system guarantees a long interval between maintenance cycles: every 2000km or 1 year of use, based on the value reached first.

- Insert the tip of the grease gun into the designated grease blocks.
- Type of lubricant: Lithium soap grease of class NLGI 2.

Contact Rollon for further advice

Type	Quantity [cm³]
CTU120-1S	0.7
CTU160-1S	1.4
CTU220-1S	2.4

Tab.32

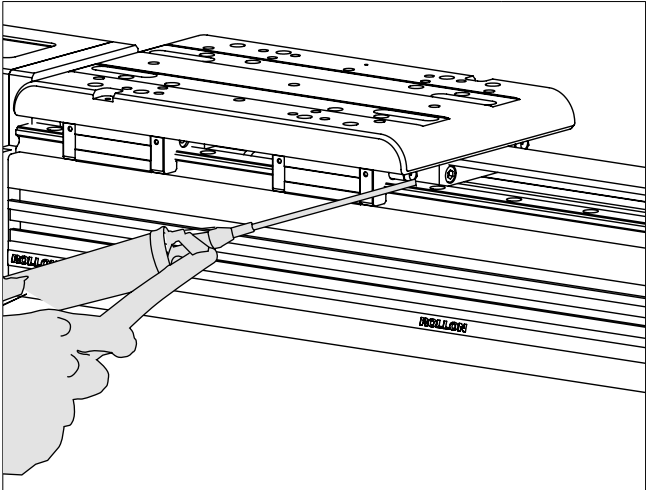


Fig.21

■ Mounting options

CTU's features may change according to the operating orientation. Please specify before ordering if a vertical or horizontal mounting configuration is needed, as shown on the Ordering Key page.

Horizontal mount

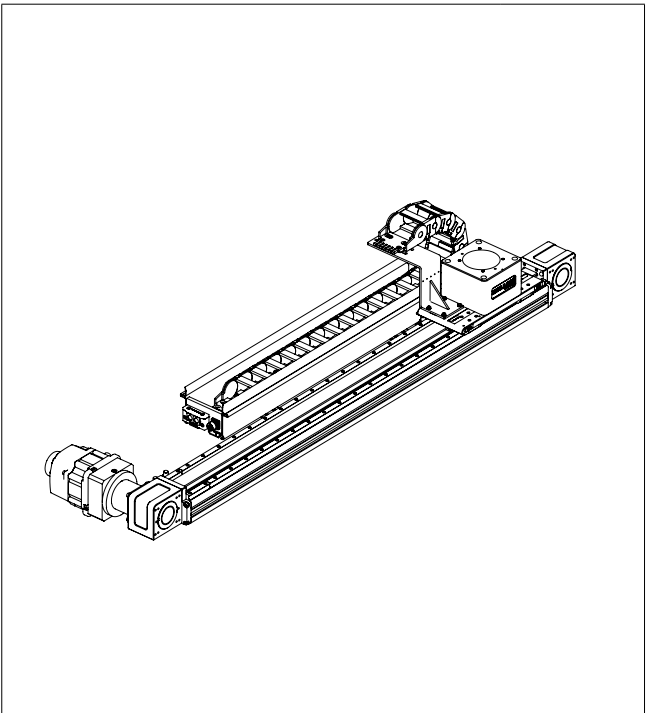
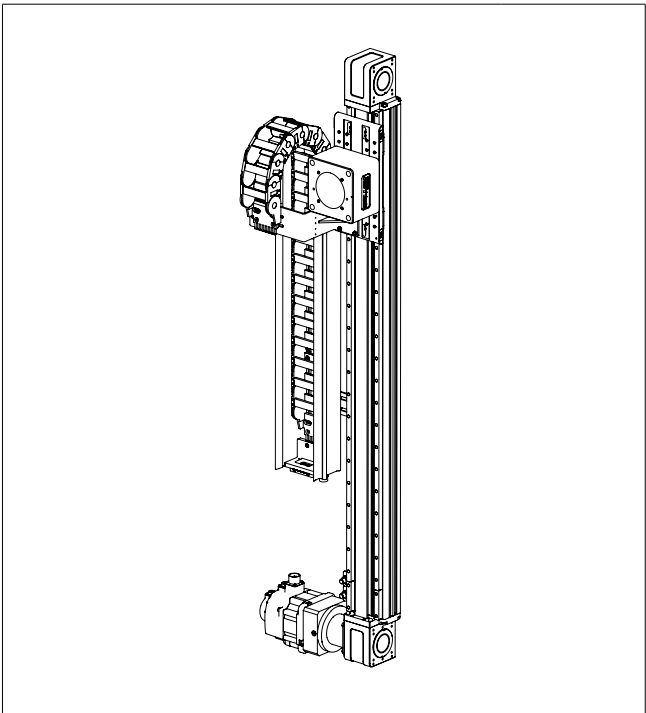


Fig.22

Vertical mount*



*Motor brake included.

Fig.23

■ Anchoring the CTU

Anchor the CTU to a stable and rigid structure through of the fixing holes either of the mounting bracket or the profile mounting kit - height adjustable.

Therefore, make sure that:

The embedment length of the anchor screw must be at least 1.5 times the diameter. For correct anchoring, follow the directions provided by the bushing manufacturer:

- ▣ For M8 screws: $8 \times 1.5 = 12$ mm embedment
- ▣ For M10 screws: $10 \times 1.5 = 15$ mm embedment
- ▣ For M8 screws: $8 \times 9 = 72$ mm embedment
- ▣ For M10 screws: $10 \times 9 = 90$ mm embedment

For complete instructions on handling, anchoring, and setting up the CTU, download the Assembly Manual from my.rollon.com.

■ Gearbox and servo motor

CTU is a turnkey solution that comes with pre-selected, pre-sized components, including a gearbox and a servo motor. Each size of the CTU is supplied with a dedicated low-backlash gearbox to ensure high reliability and optimal response to different application requirements. Similarly, each size also has its own high-performance, brushless rotary servo motor, carefully sized to optimize power consumption and the weight/performance ratio. These motors stand out for their compactness, responsiveness, precision, and long-term reliability.

■ Software Rollon URCap

The Rollon URCap is easy to install and set up on the UR teach-pendant. It features fast and user-friendly programming through the “Program” tab of the UR teach-pendant. Advanced programming functions allow users to set homing, manual carriage positions, and travel speed according to the application. Additionally, it enables the control of up to six external axes. Debug functions are available for error handling, with detailed instructions for troubleshooting provided in the manual.

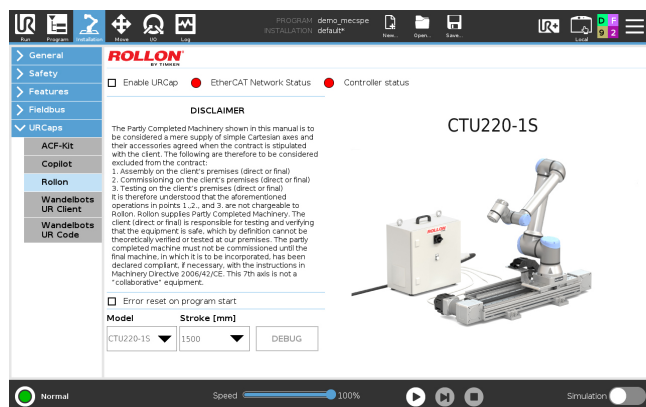


Fig.24

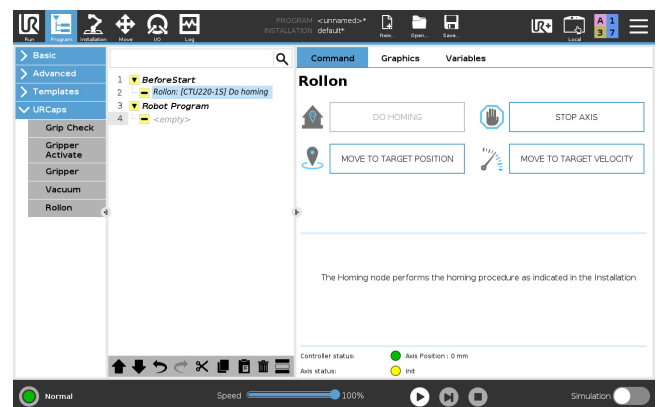


Fig.25

WARNINGS AND LEGAL NOTES



The Partly Completed Machinery shown in this manual should be considered only as a supply of simple Cartesian axes and their accessories, as agreed upon when the contract was stipulated with the client.

The following operations are therefore excluded from the contract:

1. Assembly on the client's premises (directly or ultimately)
2. Commissioning on the client's premises (directly or ultimately)
3. Testing on the client's premises (directly or ultimately)

It is therefore understood that the aforementioned operations in points 1., 2., and 3. are not chargeable to Rollon.

Rollon supplies Partly Completed Machinery. The customer (direct or final) is responsible for testing and verifying the safety of the equipment, as this cannot by definition be fully verified or tested theoretically at our premises. The partly completed machine must not be commissioned until the final machine, in which it is to be incorporated, has been declared compliant (if necessary) with the instructions of Machinery Directive 2006/42/CE.

The CTU is not considered "collaborative" equipment.



Before incorporating the partly completed machinery, we recommend carefully consulting this chapter as well as the assembly manual supplied with the individual modules.



The manufacturer shall not be considered responsible for any consequences resulting from improper use, use other than that for which the axis or system of axes was designed, or from failure to comply with Good Motorering Practices and the instructions provided in this manual during the incorporation phases.



The information contained in this chapter and in the manuals for the individual modules, is provided for use by highly qualified and certified personnel, who possess adequate competence to incorporate the partly completed machinery.



To avoid equipment damage, do not operate using improper or inadequate tools.



Caution during installation and handling operations. Equipment is extremely heavy — handle with care.



Warning: moving parts. Never leave objects on the axis.



When handling the axis or system of axes, always ensure that the support or anchoring surfaces are fully supported to prevent bending.



For special installations, always verify the thread depth on moving elements before assembly.



In order to stabilize the axis or system of axes, it is mandatory, before handling, to securely lock the mobile parts. When moving axes with vertical translation (Z-axes) or combination systems (horizontal X-axis and/or more than one vertical Z-axis), all vertical axes must be moved to their respective lower limit switches.



Ensure that the system is installed on a flat and level surface.



During operation, strictly adhere to the specific performance values declared in the catalog or, where applicable, the load and dynamic performance characteristics specified during the initial design phase.



Do not overload the equipment. Do not subject it to torsion stresses.



For modules or parts of modular systems with vertical movement (Z axis), the installation of self-braking motors is mandatory to prevent the risk of the axis dropping.



Do not leave the equipment exposed to atmospheric conditions.



The images in this manual should be considered merely indicative and not binding; therefore, the actual product supplied may differ from the images contained in this manual. Rollon S.r.l. has chosen to include only illustrative examples.



Before mounting the motor on the gearbox, it is advisable to perform a preliminary test of the motor itself, without connection to the gear unit. Testing of this component has not been performed by the machine manufacturer; therefore, it is the responsibility of Rollon's customer to carry out the test to verify correct motor operation.



Systems supplied by Rollon S.r.l. are not designed or intended to operate in ATEX environments.

■ Residual risks

- Mechanical risks due to the presence of moving elements (X, Y axes).
- Risk of fire resulting from the flammability of the belts used on the axes, for temperatures in excess of 250 °C in contact with the flame.
- The risk of the Z axis dropping during handling and installation operations on the partly completed machinery, before commissioning.
- Risk of the Z axis dropping during maintenance operations in the case of a drop in the electrical power supply voltage.
- Crushing hazard near moving parts with divergent and convergent motion.
- Shearing hazard near moving parts with divergent and convergent motion.
- Cutting and abrasion hazards.

■ ISO 9001:2015

Rollon S.r.l. is certified ISO 9001:2015.

Starting in 1995, Rollon has defined and built its own quality management system to ensure that Client expectations and needs are satisfied, conformity with standards and contractual specifications are guaranteed, and efficient management of its corporate activities is achieved.

Within this scope, Rollon has identified its management and production processes, and designed the sequences and interactions, established criteria and control methods for implementation, analyses and measurements to record, and determined necessary actions.

Warranty conditions

Rollon S.r.l. provides the following warranty pursuant to art. 1512 of the Italian Civil Code: the proper function of its products for the period of one year from their delivery, when their concrete application is suggested by the Technical or Commercial Office of our company and as long as any reports of malfunction are submitted in writing within eight days from their discovery. This warranty does not cover damage or defects due to external agents, insufficient maintenance, overloading, use of improper lubricant, natural use, inexact product choice, assembly errors or other causes attributable to improper use and not attributable to the manufacturing of the product.

The warranty is limited to repair and/or replacement, excluding claims for further damages.

■ Instructions of an environmental nature

Rollon operates with respect for the environment, in order to limit environmental impact. The following is a list of some instructions of an environmental nature for correct management of our supplies. Our products are mainly composed of:

Material	Details of the supply
Alluminum alloys	Profiles, pleates, various details
Steel with various composition	Screws, racks and pinions, and rails
Plastic	PA6 – Chains PVC – Covers and sliding block scrapers
Rubber of various types	Plugs, seals
Lubrication of various types	Used for the lubrication of sliding rails and bearings
Rust proof protection	Rust proof protection oil
Wood, polyethylene, cardboard	Transport packaging

At the end of the product's life cycle, it is therefore possible to recover the various elements, in compliance with current regulations on waste issues.



IMPORTANT!

The machine rails are protected with a layer of rust-proof oil or specific grease. Use suitable gloves when handling.

■ Safety warnings for handling and transport

- The manufacturer has paid the utmost attention to packaging in order to minimize risks related to shipping, handling and transport.
- Transport can be facilitated by shipping certain components dismantled and appropriately protected and packaged.
- Handling (loading and unloading) must be carried out in compliance with information directly provided on the machine, on the packing and in the user manuals.

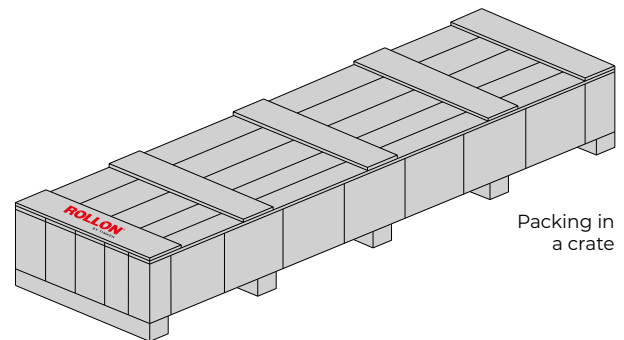
- Personnel authorized to lift and handle the machine and its components shall possess acquired and acknowledged skills and experience in the specific sector, besides having full control of the lifting devices used.
- Handling and transport must be carried out with vehicles presenting adequate loading capacity, and the machines shall be anchored to the established points.
- During handling and if required by the conditions, have one or more people assist in order to ensure adequate warnings.
- If the machine has to be moved with vehicles, ensure that they are suitable for the purpose, and perform loading and unloading without risks for the operator and for people directly involved in the process.
- Before transferring the equipment onto the vehicle, ensure that both the quasi-machine and its components are adequately secured, and that their profile does not exceed the maximum bulk allowed. Place the necessary warning signs, if necessary.
- Unload the axes in the immediate vicinity of the area of installation, and store them in an environment protected against weather.
- Failure to comply with the information provided might entail risks for the safety and health of people, and can cause economic loss.
- The Installation Manager must have the project to organize and monitor all operative phases.
- The installation site must have adequate environmental conditions (lighting, ventilation, etc.).
- The installation site temperature must be within the maximum and minimum range allowed.
- Ensure that the installation site is protected against weather, does not contain corrosive substances, and is free of the risk of explosion and/or fire.
- Installation in environments presenting a risk of explosion and/or of fire must ONLY be done if the machine has been DECLARED COMPLIANT for such use.

■ Transport

- Transport, also based on the final destination, can be done with different vehicles.
- Perform transport with suitable devices that have adequate loading capacity.
- Ensure that the machine and its components are adequately anchored to the vehicle.
- Ensure that all moving parts are secured before transport.

■ Packaging

- Packaging is done keeping in mind the bulk reduction.
- Transport can be facilitated by shipping certain components dismantled and appropriately protected and packaged.
- All necessary information for loading and unloading is written on the packaging.
- Every shipment is accompanied by a document ("Packing list") with the list and description of the axes.
- Packaging for maritime/air transport is the "barrier bag" type to guarantee preservation of the packaged elements.
- Bulk components are appropriately placed along with the axes (with or without packaging) to avoid sudden and unexpected movements.
- The packaging material must be appropriately disposed of in compliance with the legislation in force.



■ Handling and lifting

- Correctly connect the lifting devices to the established points on the boxes and/or on the packages.



Symbol indicating the center of mass of the package to handle.



Symbol indicating the pick up points to use to lift the package.

These symbols can be found on the Partly Completed Machinery or on the crate.

- Before handling, read the instructions, especially safety instructions, provided in the installation manual, on the packages and/or on the dismantled parts.
- DO NOT attempt, in any way, to bypass handling methods and the established lifting, moving and handling points of each package and/or dismantled part.

- Slowly lift the package to the minimum necessary height and move it with the utmost caution to avoid dangerous oscillations.
- Make sure you can see properly. DO NOT move the machine with an inadequate visual field and when there are obstacles along the route to the final location.
- DO NOT allow people to either transit or linger within the range of action when lifting and handling loads.
- Do not stack packages to avoid damaging them, and reduce the risk of sudden and dangerous movements.
- In case of prolonged storage, regularly ensure that there are no variations in the storage conditions of the packages.

■ Check axis integrity after shipment

Every shipment is accompanied by a document ("Packing list") with the list and description of the axes.

- Upon receipt check that the material received corresponds to specifications in the delivery note.
- Check that packaging is perfectly intact and, for shipments without packaging, check that each axis is intact.
- In case of damages or missing parts, contact the manufacturer to define the relevant procedures.

■ Installation

- Fitting out the established location in advance makes it possible to avoid wasting the time of installation technicians.
- Evaluate in advance whether the machine must interact with other production units, ensuring that integration can be implemented correctly, in compliance with standards and without risks.
- The manager shall assign installation and assembly interventions
- ONLY to authorized technicians with acknowledged know-how.
- State-of-the-art connections to power sources (electric, pneumatic, etc.) must be ensured, in compliance with relevant regulatory and legislative requirements.
- State-of-the-art connections, alignment and leveling are essential to avoid additional interventions and to ensure correct machine function.
- Upon completion of the connections, run a general check to ascertain that all work has been correctly carried out and to ensure compliance with requirements.
- Failure to comply with the information provided might entail risks for the safety and health of people, and can cause economic loss.

