

Crustcrawler Pro-Series Robotic Arm Technical Reference

VERSION 1.0



Robotic
CrustCrawler
Design & Development

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WARRANTY

CrustCrawler warrants its products against defects in materials and workmanship for a period of 30 days. If you discover a defect, CrustCrawler will, at its option, repair, replace, or refund the purchase price. Simply call for a Return Merchandise Authorization (RMA) number, write the number on the outside of the box and send it back to CrustCrawler. Please include your name, telephone number, shipping address, and a description of the problem. We will return your product, or its replacement, using the same shipping method used to ship the product to CrustCrawler. This warranty does not cover the Robotis servos. Robotis servos are covered under the Robotis warranty and require a Return Merchandise Authorization (RMA) number authorized by Robotis only. Crustcrawler does not have the authority to replace or repair the Robotis line of servos as all repair/ replacement authority is determined and completed by Robotis.

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Support

Crustcrawler wants to ensure your success, so if you ever need support you can contact us at:

Phone: - 480-577-5557

E-mail – support@crustcrawler.com

CrustCrawler Forum - <http://forum.crustcrawler.com/phpBB3/index.php>

Robotis Support Site: <http://support.robotis.com>

The Robotis support site is loaded with free software downloads including a complete Software Development Kit (SDK) for both multiple controllers. Detailed specifications for the complete line of Robotis Servos can also be found here. Visit this site often as it is updated on a daily basis.

REQUIRED TOOLS

The following tools will be required to build the Crustcrawler Pro-Series of components:

- Small head, 6 in.(15.24cm) or longer Phillips screwdriver
- Needle nose pliers
- Optional thread locker

Note: CrustCrawler provides the Allen wrenches with all kit components.

COMPATIBILITY

The Crustcrawler Pro-Series of robotic arm components are compatible with the following Robotis servos:

- AX-12A / AX-18A (wrist rotate component only)
- MX-28T / MX-28R / RX-28 (HN07-N101 Type only)
- MX-64T / MX-64R / RX-64 (HN05-N101 Type only)
- MX-106T / MX-106R

Note #1:

The “HN05-N101 Type and HN07-N101 Type” designations indicates the type of servo horn hole pattern that comes standard with the servo. HN05-N101 and HN07-N101 type servos have the same servo horn hole patterns as the MX servo series and will work with the Crustcrawler Pro-Series of robotic arm components.

Note #2:

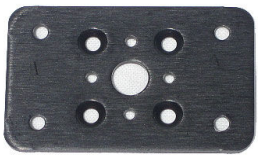
The MX-28T, MX-64T and the MX-106T type servos are 3-pin serial and the MX28R/64R/106R use 4-pin RS232 communication protocols. Please keep this in mind when selecting the type of servo you are going to use on the CrustCrawler Pro-Series Robotic arm.

Note #3:

Since the connections between servos are to be connected to each other (daisy chained) when building the robotic arm, it is a best practice to use servos of the same type of communication protocol but is not necessarily required.

CRUSTCRAWLER PRO-SERIES COMPONENTS

The Crustcrawler Pro-Series of arm components are made to connect in any number of different ways using simple hand tools. The following is a list of Pro-Series Arm components with a complete listing of hardware parts contained within each kit.

PART #	DESCRIPTION	HARDWARE
	2.5in (6.35cm) Girder Weight - .8oz.	(12) #4 Lock nuts (4) #4 - 1/4" screws (8) #4- .31in. Countersink Screws
	5 in. (12.7cm) Girder Weight - 1.3oz.	(12) #4 Lock nuts (4) #4 - 1/4" screws (8) #4- .31in. Countersink Screws
	Adjustable 8.31in. (21.11cm) to 13.21 in. (33.81cm) Girder Weight - 3.9oz.	(12) #4 Lock nuts (4) #4 - 1/4" screws (8) #4 - .31in. Countersink Screws
	Single Plate Adapter This plate is required any time a single axis is going to be connected to one end of the girder. Weight - .6oz.	(4) #4 - .31in. Countersink Screws

PART #	DESCRIPTION	HARDWARE
	<u>MX/RX-28 Single Axis Kit</u> Height = 2.91in.(7.39cm) Width = 1.89in(4.8cm) Weight = 3.4 oz.	(4) #4 Lock nuts (4) #4- 1/4in. Screws (4) M2.5 – 8mm screws/ nuts
	<u>MX/RX-64 Single Axis Kit</u> Height = 3.50in.(8.89cm) Width = 2.21in.(5.6cm) Weight = 6 oz.	(4) #4 Lock nuts (4) #4- 1/4in. Screws (4) M2.5 – 8mm screws / nuts
	<u>MX-106 Single Axis Kit</u> Height = 3.6in (9.14cm) Width = 2.45in. (6.22cm) Weight = 6.9oz.	(4) #4 Lock nuts (4) #4- 1/4in. Screws (4) M2.5 – 8mm screws/ nuts
	<u>MX/RX-28 Dual Axis Kit</u> Height = 3.10in.(7.87cm) Width = 4.94in.(12.54cm) Weight = 8.10oz.	(16) #4- .31” countersink screws (4) #4-1/4” screws (8) #4- Lock Nuts (8) M2.5 – 8mm screws / nuts
	<u>MX/RX-64 Dual Axis Kit</u> Height = 3.68in.(9.34cm) Width = 5.10in.(12.95cm) Weight = 13.2oz.	(16) #4- .31” countersink screws (4) #4-1/4” screws (8) #4- Lock Nuts (8) M2.5 – 8mm screws/ nuts

	<u>MX-106 Dual Axis Kit</u> Height = 3.79in. (9.62cm) Width = 5.32in (13.51cm) Weight = 15oz.	(16) #4- .31" countersink screws (4) #4-1/4" screws (8) #4- Lock Nuts (4) M2.5 – 8mm screws/nuts
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WRIST ROTATE MODULES

	Weight = 3.5oz.	(4) M2 – 14mm screws (12) #4 – 1/4" screws (4) #4 lock nuts (2) AX Side brackets (2) RX/MX-28 angle brackets (1) .394" (9.93mm) Axis Spacer
	Weight = 4.5oz.	(4) M2 – 14mm screws (8) M2.5 – 8mm screws (12) #4 – 1/4" screws (4) #4 lock nuts (2) MX Side brackets (2) RX/MX-28 angle brackets (1) .394" (9.93mm) Axis Spacer
	Weight = 6.6oz.	(4) M2 – 14mm screws (8) M2.5 – 8mm screws (12) #4 – 1/4" screws (4) #4 lock nuts (2) MX Side brackets (2) RX/MX-64 angle brackets (1) .394" (9.93mm) Axis Spacer

PART #	DESCRIPTION	HARDWARE
	MX/RX-28 Turntable Dimensions - 4.5" X 4.5" (11.43cm X 11.43cm) Mounting Tabs - 5.25" (13.33cm) center to center	(4) M2 8mm countersink screws (4) M2 10mm screws (1) Turntable spacer (1) Turntable bearings set
	MX/RX-64 Turntable Dimensions - 4.5" X 4.5" (11.43cm X 11.43cm) Mounting Tabs - 5.25" (13.33cm) center to center	(4) M2.5 8mm countersink screws (4) M2.5 10mm screws (1) Turntable spacer (1) Turntable bearing set
	MX-106 Turntable Dimensions - 4.5" X 4.5" (11.43cm X 11.43cm) Mounting Tabs - 5.25" (13.33cm) center to center	(4) M2.5 8mm countersink screws (4) M2.5 - 10mm screws (1) Turntable spacer (1) Turntable bearing set

BUILDING YOUR CRUSTCRAWLER PRO-SERIES ROBOTIC ARM

The Crustcrawler Pro-Series Robot Arm can be built from the turntable upwards in the following configurations:

- **Turntable to Dual Axis**
- **Turntable to Single Axis**
- **Turntable to Girder**
- **Dual Axis to Girder**
- **Single Axis to Girder**
- **Axis to Axis**
- **Axis to Girder**
- **Girder to Axis**
- **Axis to Wrist Rotate**

End effectors, such as Crustcrawler's line of grippers can be attached to the Pro-Series of components in several ways as well:

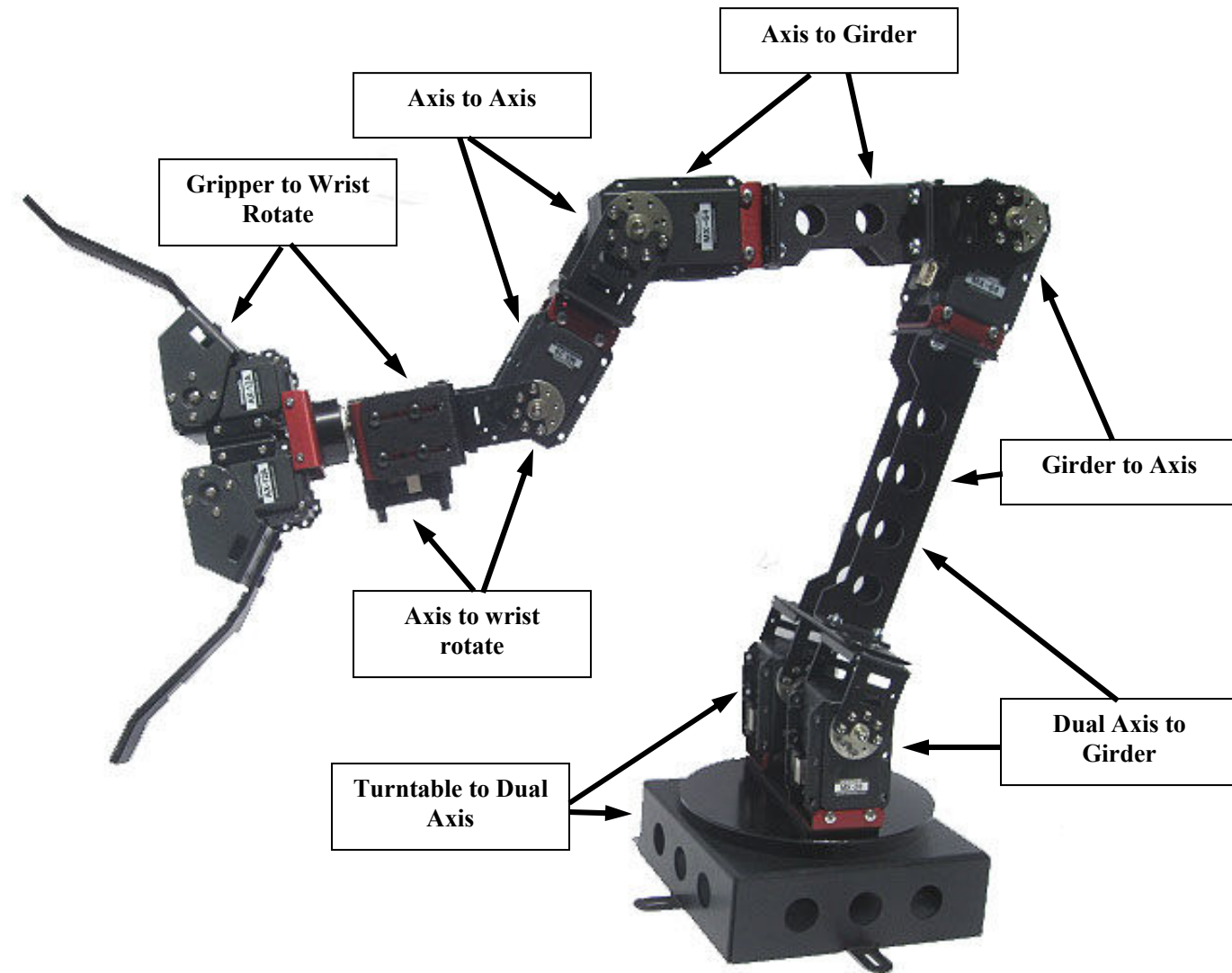
- **End effector to servo**
- **End effector to wrist rotate kit**
- **End effector to girder (Crustcrawler Dual Gripper and Big Gripper kits only)**

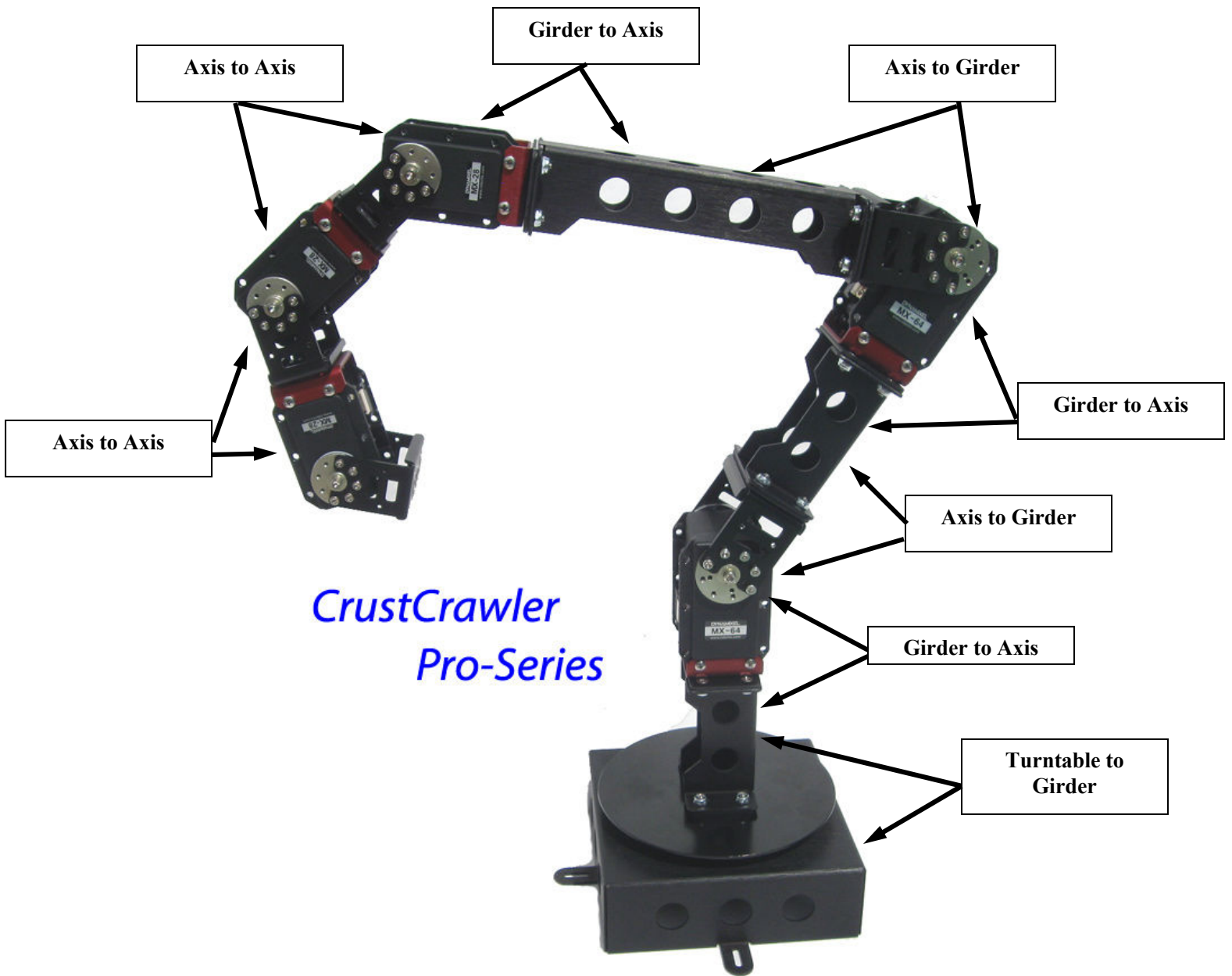
This technical guide will illustrate the most common and useful build configurations for the Crustcrawler Pro-Series Robotic Arm components but not necessarily all of the combinations that can be attained with the Pro-Series interchangeable components. We encourage you, our customer, to explore the various ways that to build your robotic arm using the flexible Crustcrawler Pro-Series of components.

CRUSTCRAWLER PRO-SERIES SAMPLE CONFIGURATIONS

Illustrated below are just a few example configurations of how the CrustCrawler Pro-Series Robotic Arm components can be put together to make a custom robotic arm. All Crustcrawler Pro-Series Arm components can be placed in any order.

EXAMPLE #1





EXAMPLE #2

CRUSTCRAWLER PRO-SERIES PARTS GUIDE

The illustration below provides an example of the most common parts that are required to build a custom robotic arm using Crustcrawler's Pro-Series of modular components.

Note 1: When transitioning from a single axis to a girder and/or a girder to a single axis, a “**Single Axis Mounting Plate**” is needed for each transition.

Note 2: When transitioning from an MX-64 or MX-106 Single Axis to an MX-28 Wrist Rotate assembly, the **MX-64/106 Axis to MX-28 Wrist Rotate Adapter** is required.

