YASKAWA

Servo Gun Actuators; Tolomatic, Exlar, Obara, Diakont, ARO, Honda

Subject: **Servo Gun Motors-Actuators (non-Yaskawa brands)**
Controller: YRC1000 and DX200
Product: Tolomatic, Exlar, Obara, Diakont, ARO, and Honda actuators
Application: Spot Welding
Robot: SP and GP

Summary: Servo actuators are popular for spot guns because they combine the motor and ball screw drive into a single unit. The robot controller has parameters in software to properly run these motors when they are selected from a list during set-up. New motor series were recently added (2025) from **Exlar (Curtiss-Wright)** (**GTW-80, GTW-100**) and **Tolomatic** (**CSW and SWA**). These motors are added to the list which already supports their legacy motors as well as motors from Obara, Diakont, ARO, and Honda. With the motor list it is easy for integrators to set-up a GUN-x axis for the actuator on the servo gun. The Maintenance mode SET-UP procedure establishes detailed control parameters (SVMxG) for the motor and then the pressure calibration and other gun operation characteristics are entered by integrator or end users in the GUN CONDITION FILE.

One of the key elements of controlling the motor is the encoder mounted to its shaft. Yaskawa has changed encoder types over the years and the Sigma 7 is the newest model introduced on the YRC controller. It has the advantage of not requiring a battery to back up its position when powered down. Tolomatic and Exlar have incorporated the Sigma 7 encoders on their recent motor models. They also use older encoders for using the motors on the older DX200 controllers. The controller needs the following software versions or later to have the motors appear in the motor selection list.

Controller	Software ver.	Param ver.
YRC1000	YAS5.30.00A	4.52/4.62*
DX200	DN4.06.00-00	3.12/3.16*

*A few additional Tolomatic motors were added in second release

The version must be the above or higher to show the new Exlar or Tolomatic motors. The PARAMETER version is the specific software, but it is normally paired with System software version (**YRC shown)

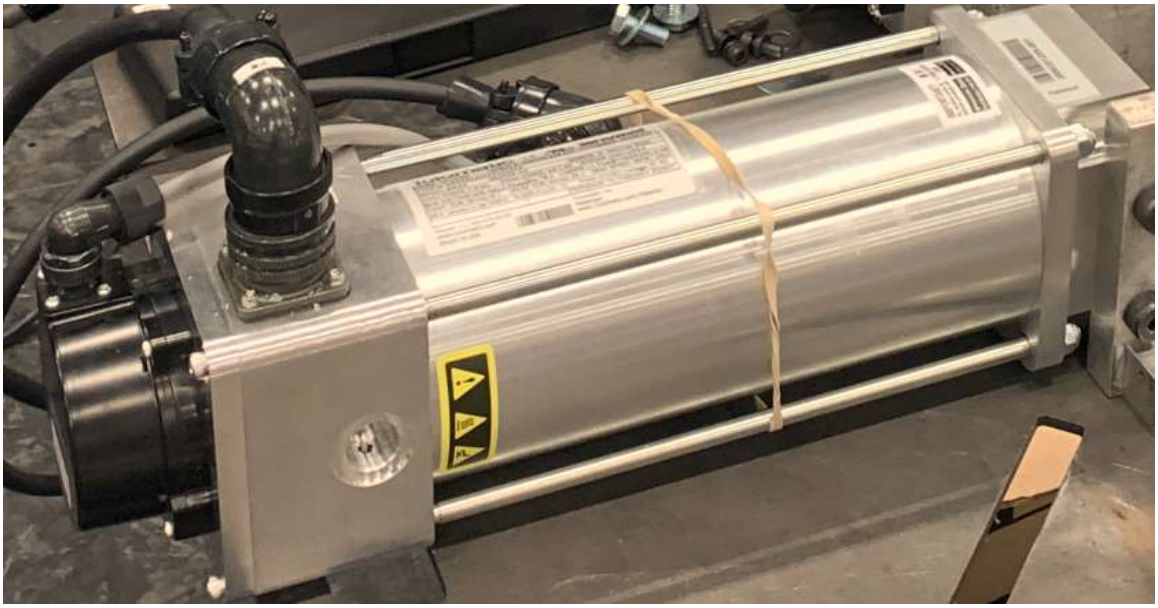
New Exlar and Tolomatic Motors: The new Sigma 7 encoders have a stand-alone housing mounted to the end of the motor and marked with UTTAH-B24RU on the end. These are for the YRC1000 controller and the motor selections in the list will end with -Y18. Some motors may have a protective housing on the end obscuring the encoder model # and one may have to refer to the manufacturer for type. Tolomatic uses an older encoder type which is denoted with -Y4 on DX200 and YRC1000 controllers.

Chris Anderson 6/6/2024

New Exlar and Tolomatic Motors			
MOTOR	ENCODER	YRC1000	DX200**
SW4MV22R	Sigma 3 (-YE4)	X	X
SW4MV23R	Sigma 3	○*	○*
SW4MV23W	Sigma 3	○*	○*
CSWL3SV23W	Sigma 3	○	○
CSW3SV23W	Sigma 3	○	○
CSW3SV24W	Sigma 3	○*	○*
CSW3SV23R	Sigma 3	○*	○*
GTW-100	Sigma 3	○	○
GTW-80	Sigma 3	○	○

SW4MV22R	Sigma 7 (-YE18)	X	X
SW4MV23R	Sigma 7	○	○
SW4MV23W	Sigma 7	X	X
CSWL3SV23W	Sigma 7	○	○
CSW3SV23W	Sigma 7	○	○
CSW3SV24W	Sigma 7	○	○
CSW3SV23R	Sigma 7	○	○
GTW-100	Sigma 7	○	○
GTW-80	Sigma 7	○	○

*Denotes motors added in PRM ver 4.62 (YRC) and 3.16 (DX2)
**It should be possible to use Sigma 7 encoders on DX200 (select -YE18 motor).

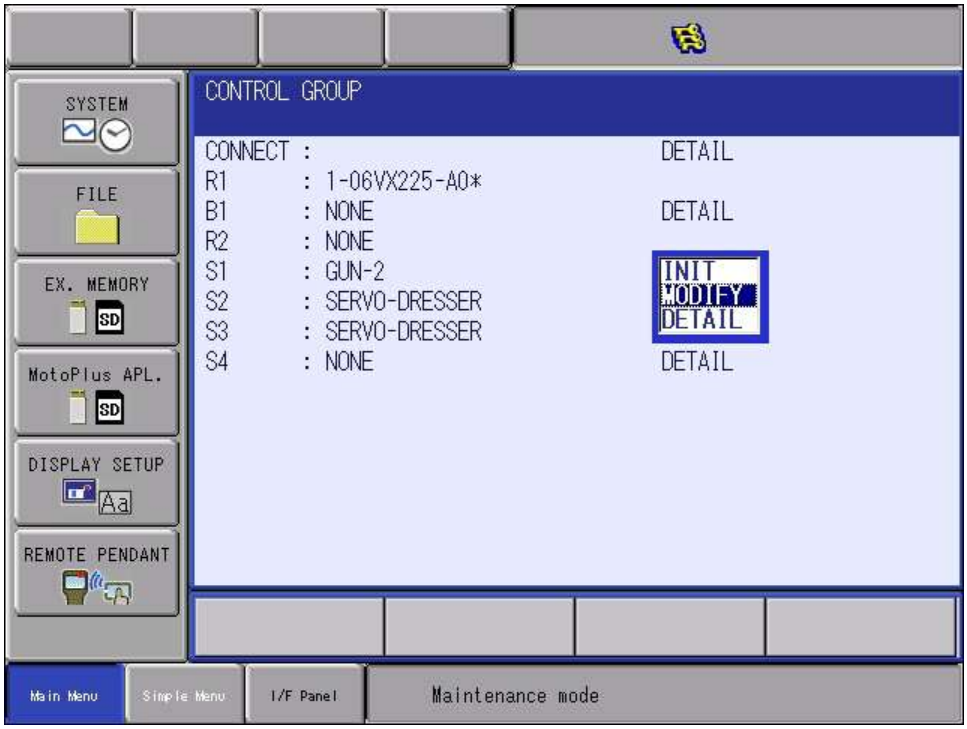


Tolomatic motor with Sigma 7 encoder mounted

Exlar GTW-80 and GTW-100 motors with Sigma 7 encoders.

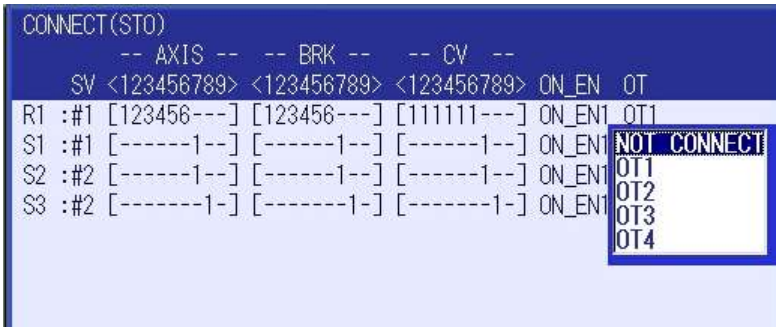
Details for Adding Motors: The set-up of a gun axis is done in the Maintenance mode. The parameters that control servo motors (SVMxG) are restricted by password, but are configured when selecting motors from the list. Spot welding robots need to be configured with the MOTOR GUN application and then the external axis can be set-up as a GUN-1 under CONTROL GROUP menu.

The hardware will detect when amplifiers are mounted. The pull down menu for DETAIL will allow you to INITialize an axis or MODIFY one already configured. Select DETAIL if it is desired to view the configuration and then do not accept any changes.

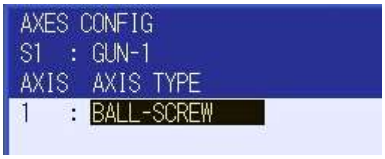


Select the GUN-1 for the servo gun axis. Note that external axes can be configured as SERVO-DRESSER axes. (GUN-2 and GUN-3 are for less common 2-axis guns with double actuators or 3-axis guns)

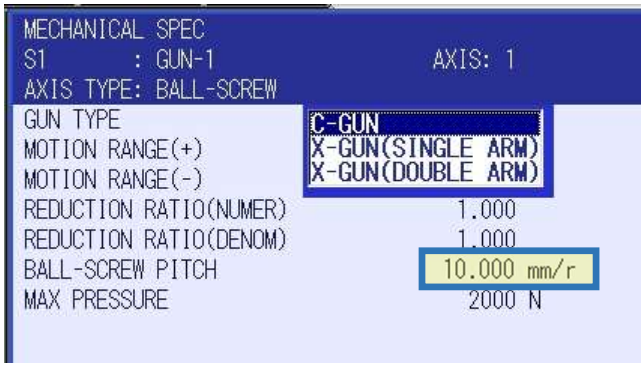
The system will assign the axis to the specific amplifier and converter. It is uncommon for gun actuators to have brakes. Leaving the Brake designation in the center column will not cause a problem because nothing is connected. If the motor does have a brake, then it must be connected to the proper pins on the servo board. Use the pull down menu to specify NOT CONNECT for the Over Travel switch on the motor (an Alarm will occur if a connection is specified and not connected).



The system will identify that you are trying to set-up a Ball-Screw. Hit ENTER.

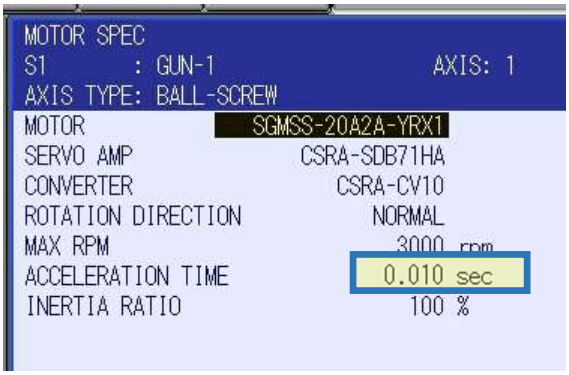


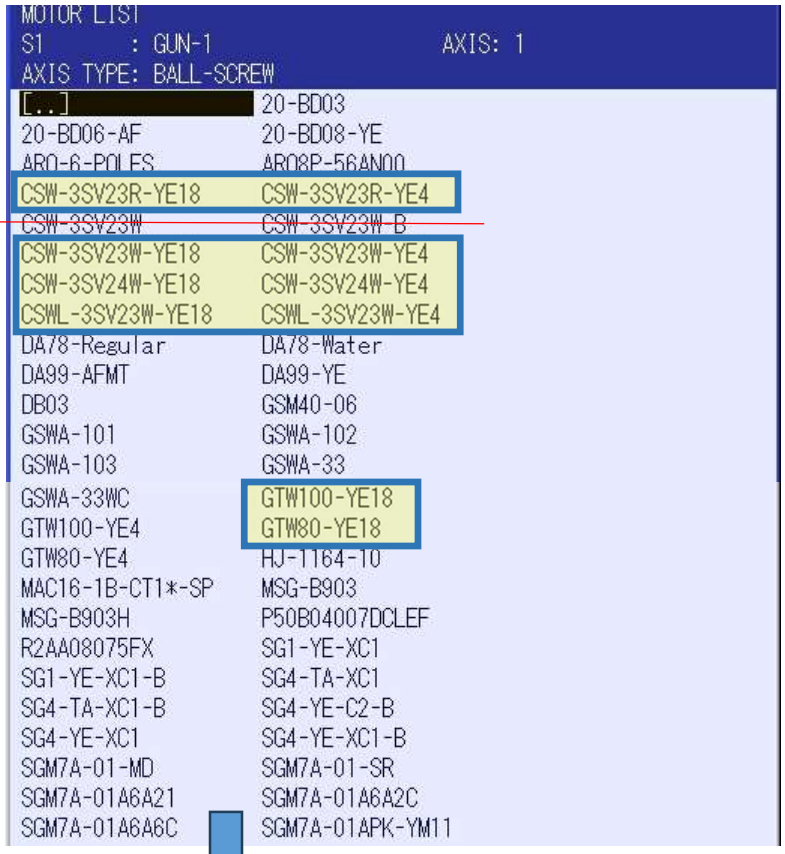
Select the Gun type from the pull down menu. (Refer to the MOTOR GUN SETUP PROCEDURE MANUAL, 194831-1CD)



Enter the Ball-Screw pitch from the actuator information. The vendors make motors with 5 mm or 10 mm pitch settings and this is independent of the motor selection and parameters! The motion range and Max Pressure can be set during set-up, but they will be adjusted based on settings in the GUN CONDITION FILE during gun calibration.

The motor selection is made from this screen. With cursor on the motor type press SELECT to get the menu. Most other settings on this screen stay default except the MAX RPM which will come from the motor label. The Converter is CSRA-CV10 on larger robots and needs to change to CSRA-CV05 for smaller (<25kg payload) robots.





Select the OTHER menu and the list of motors will be shown. They are alphabetically listed and pick the motor with -YE18 for the Sigma 7 encoder.

Cursor over the motor and press ENTER to return to the MOTOR SPEC screen. Be sure to set the MAX RPM and then press ENTER.

The system will generate Dialog screens asking if you are sure you want to MODIFY the control group. Respond YES to confirm. It will prompt if you want to initialize GUN CONDITION and other Spot files, these are less critical, but it can assist set-up by populating data in the Gun File.

Confirming Gun Axis Configuration: Select the SYSTEM menu and then CONTROLLER INFORMATION menu. Use the cursor keys to scroll down through the various settings in the controller. It will display the number of axes and the application that is specified. Farther down it will show the information from the SET-UP menu for the GUN-1 axis and then the motor.