SAC-RDE
Installation Instructions

Ormec's SAC-RDE series of servodrives are designed to be a drop in replacement for SAC-DE drives..

This document contains instructions for the quick replacement of an existing SAC-DE drive with a SAC-RDE drive. It does not cover all features of the new drive. Complete documentation can be found in document SAC-RDE Reference Manual, part number SAC-RDE-02.

The SAC-RDE is based on ORMEC's latest technology and is preconfigured as a replacement for Ormec's SAC-DE servodrive running a MAC-DE motor. In addition a conversion kit, SAC-KRDE, is available and provides converter cables so that all existing cables can be used, further simplifying the installation and reducing the cost.

There are minor differences in the operation of the DE and RDE servodrives. Details can be found at the end of these instructions.

Step 1: Verify current setup.

> **Warning**: This is what is expected in your current system. If it is not what you have then this procedure may not work correctly. Check carefully and contact ORMEC Support if needed.

The existing configuration should have:

- A SAC-DE servodrive
- A MAC-DE motor with incremental feedback
- A Gen3 or Orion controller
- A CBL-DEMAC feedback cable from the motor to the servodrive
- A CBL-DEMAC1 motor power cable from the motor to the servodrive
- A cable connecting the servodrive to the controller
- The servodrive should be configured for a resolution of 2040 lines/rev. (8160 counts/rev after 4x multiplication in the controller.)

If the existing configuration differs in any way adjustments will be needed.

- Feedback resolution can be changed using Ormec's MotionSet configuration tool.
- Cable differences can be accommodated with a cable change.
- For other differences consult Ormec support for assistance in the conversion.
- Note that a /nn on a cable indicates the length of the cable. Any value is acceptable.
- If an external regen resistor was used contact Ormec Support for assistance.

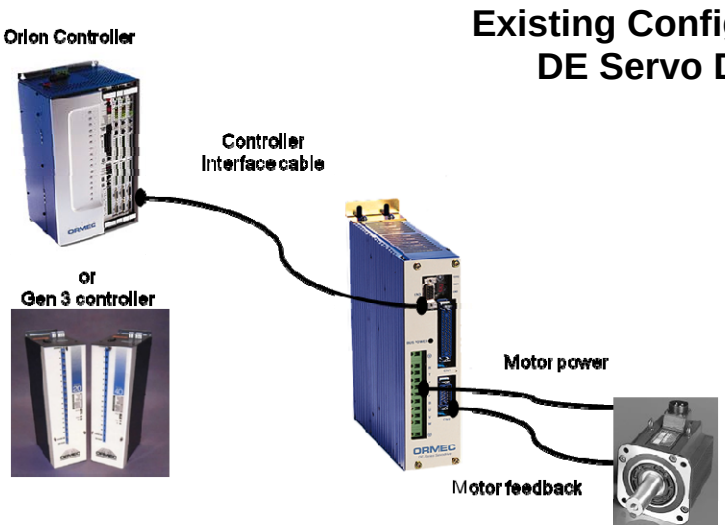


Figure 1 Existing DE system

Use the table below to verify your existing equipment and that you have the correct replacement drive.

Current Equipment		**Replacement Servodrive**
Servodrive	**Motor**	
SAC-DE01A2/I	MAC-DE003A2/I	SAC-RDE01A2-I
SAC-DE02A1/I	MAC-DE003A1/I	SAC-RDE02A1-I
SAC-DE02B2/I	MAC-DE006B2/I	SAC-RDE02B2-I
SAC-DE03B1/I	MAC-DE006B1/I	SAC-RDE03B1-I
SAC-DE03C2/I	MAC-DE011C2/I	SAC-RDE03C2-I
SAC-DE04C1/I	MAC-DE008C1/I	SAC-RDE04C1-I
SAC-DE04D2/I	MAC-DE021D2/I	SAC-RDE04D2-I

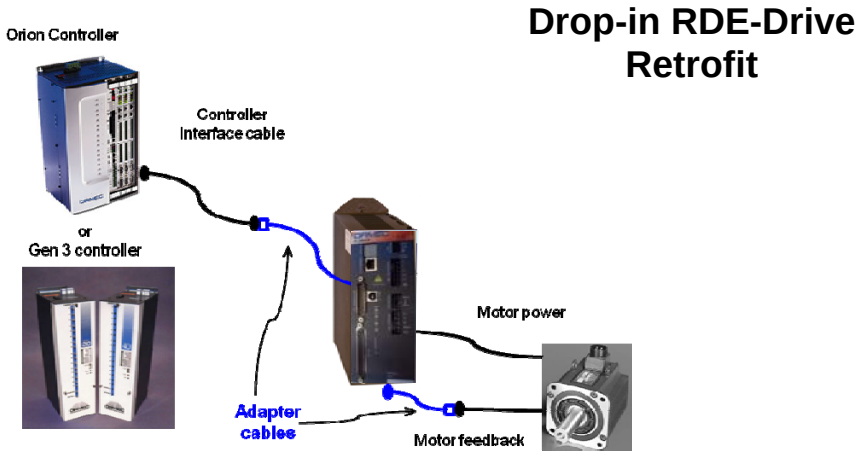
Step 2: Remove existing servodrive.

The existing SAC-DE servodrive must be removed from the panel.

- Be sure all power is turned off and that the servodrive has had time to discharge.
- Label or note where all of the wires and cables are connected to the servodrive. Especially note the connection to R and T and r and t. The upper case and lower case version are different.
- Disconnect all wires and cables.
- Remove the servodrive from the panel.

Step 3: Mounting new SAC-RDE.

The replacement system will look like:



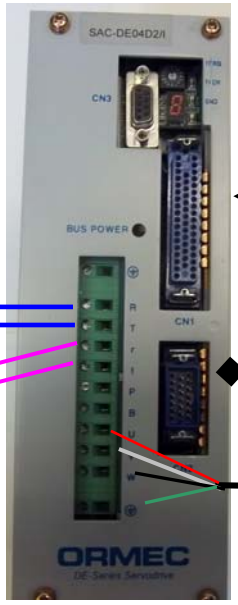
Identify where the new servodrive will be mounted on the panel. This procedure assumes it will be in the space vacated by the SAC-DE. If not cable and wire lengths may not be long enough.

- Conversion kit SAC-KRDE includes a mounting adapter plate so that the new servodrive can be mounted using the same holes. Note that some replacement models are slightly wider and require 0.6" of clearance on the left side to use the same mounting holes. Mount the SAC-RDE to the adapter plate.
- If not using the adapter plate then mark the panel with the new mounting hole pattern
    - Carefully drill and tap 3 holes. Be sure to protect other equipment on the panel so that metal fillings or shavings do not fall onto or into other equipment. Three #10 screws are recommended.
- Mount the new SAC-RDE to the panel.

If your controller is a GN3 continue to step 5. If your controller is an Orion continue to step 4.

Step 4: Connecting to an Orion controller.
Verify that you have an Orion controller. If it is a GN3 controller go to Step 5.

Existing Configuration DE Servo Drive



Controller
Orion or GN3

Main power
R and T

Control power
r and t

Feedback cable

U = Red
V = White
W = Black
Gnd = Green

Drop-in RDE-Drive Retrofit

Control power
r and t

Main power
L1 and L2

Controller
Orion or GN3

CBL-XRDE

U = Red
V = White
W = Black
Gnd = Green

Feedback cable

CBL-XRDEMAC

You have 3 connection approaches:

1. **Keep existing cables** - Use conversion kit SAC-KRDE to provide in-line adapter cables and a mounting plate. This is easiest solution but adds another connection point.
2. **Replace cables** – Purchase cables SAC-RDEMAC/nn and SAC-ARDE/nn of the correct length. Remove the old cables and install the new cables. The motor power cable remains the same. This eliminates the additional connection point but requires access to the cable run from the motor to the servodrive.
3. **Supply your own** cables or conversion. This saves the cost of the cables but requires you to find all the connectors and parts and engineer the conversion. Consult the complete SAC-RDE manual for additional details.

<u>First connect power wires</u>.

- The wires which were connected to lower case r and t on the SAC-DE should be connected to lower case r and t on the SAC-RDE. These terminals are the 1st and 2nd located on terminal block TB2.
- The wires connected to upper case R and T on the SAC-DE should be connected to L1 and L2 on the SAC-RDE. These terminals are the 3rd and 4th located on terminal block TB2.
- Connect the ground wire to the terminal labeled FG. This is the 6th terminal on terminal block TB2.

<u>Second connect the motor to the SAC-RDE servodrive</u>.

- Find cable CBL-XRDEMAC, an in-line adaptor cable.
- Connect one end to CBL-DEMAC coming from the motor and the other end to J6 on the bottom of the SAC-RDE servodrive.
- Find CBL-DEMAC1 coming from the motor.
    - Connect the red wire to terminal U. (Pin 1 on TB4.)
    - Connect the white wire to terminal V. (Pin 2 on TB4.)
    - Connect the black wire to terminal W. (Pin 3 on TB4.)
    - Connect the green wire to terminal GND. (Pin 4 on TB4.)
    - Connect the shield to terminal FG. (Pin 5 on TB4.)
- If your wire colors are different then use the connection record you made when disconnecting the old drive. The connection pattern is old U to new U, old V to new V, old W to new W, old GND to new GND. Shield goes to FG. All connections are on TB4.

<u>Third connect the SAC-RDE servodrive to the Orion controller</u>.

If using adapter cables.

- Find cable CBL-XRDE, an in-line adapter cable.
- Connect one end to the CBL-ADE coming from the Orion and the other end to J3 on the front of the SAC-RDE servodrive.
- This procedure assumes that the configuration jumpers in the Orion are set in the default position. If you suspect otherwise then they should be checked and verified. Instructions can be found below.

If using new cables.

- Find cable CBL-ARDE, a controller interface cable.
- Connect one end to the Orion axis interface where the original cable was connected and the other end to J3 on the front of the SAC-RDE servodrive.
- Replace the existing feedback cable, CBL-DEMAC with new cable CBL-RDEMAC.
- The motor power cable did not need to be replaced. The bare wires can connect to the SAC-RDE.

Both procedures assume that the configuration jumpers in the Orion are set in the DE drive position. If you suspect otherwise then they should be checked and changed if necessary. Instructions can be found below.

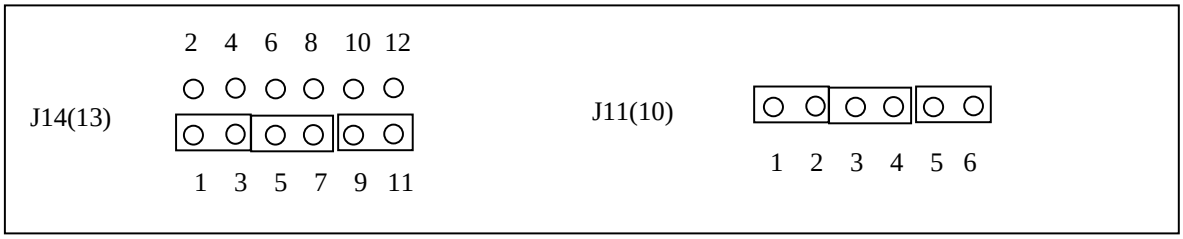
Secure all cables and wires. Double check all connections before turning on the power.

The system should now be ready. Turn on the power and test the system.

If you need to check the jumper settings in the Orion controller.

- Label or note where all of the wires and cables are connected to the ORN-DSP-Ax card.
- **USE APPROPRIATE STATIC CONTROL MEASURES. A WRIST STRAP TO GROUND IS HIGHLY RECOMMENDED**.
- Remove the axis interface card. (The CBL-ADE was plugged to it.)
- If your cable was connected to Axis A (top connector) locate J14. If your cable was connected to Axis B (bottom connector) locate J13. These are near the right side about half way down the board.
- Change the jumpers on J14 or J13 to be as shown below. ONLY change the jumpers for the axis where the SAC-DE was connected. Changing the other axis configuration will cause that axis to fail to operate correctly.

DSP JUMPER CONFIGURATION



- Carefully insert the axis interface card into the Orion. Secure the top and bottom screws.

Drive differences.

The SAC-RDE will replace the SAC-DE in most ways. However, there will be a few differences in operation.

- The SAC-RDE provides electronic braking which functions the same as dynamic braking in the SAC-DE during deceleration of the motor. However, the SAC-DE exhibited some holding torque when at rest and the SAC-RDE does not.

Step 5: Connecting to a GN3 controller.

Verify that you have a GN3 controller. If it is an Orion controller skip to Step 4.

You have 3 connection approaches:

1. **Keep existing cables** - Use conversion kit SAC-KRDE to provide in-line adapter cables and a mounting plate. This is easiest solution but adds another connection point.
2. **Replace cables** – Purchase cables SAC-RDEMAC/nn and SAC-GEN3-ARDE/nn of the correct length. Remove the old cables and install the new cables. The motor power cable remains the same. This eliminates the additional connection point but requires access to the cable run from the motor to the servodrive.
3. **Supply your own** cables or conversion. This saves the cost of the cables but requires you to find all the connectors and parts and engineer the conversion.

First connect power wires.

- The wires which were connected to lower case r and t on the SAC-DE should be connected to lower case r and t on the SAC-RDE. These terminals are the 1st and 2nd located on terminal block TB2.
- The wires connected to upper case R and T on the SAC-DE should be connected to L1 and L2 on the SAC-RDE. These terminals are the 3rd and 4th located on terminal block TB2.
- Connect the ground wire to the terminal labeled FG. This is the 6th terminal on terminal block TB2.

Second connect the motor to the SAC-RDE servodrive.

- Find cable CBL-XRDEMAC, an in-line adaptor cable.
- Connect one end to CBL-DEMAC coming from the motor and the other end to J6 on the bottom of the SAC-RDE servodrive.
- Find CBL-DEMAC1 coming from the motor.
    - Connect the red wire to terminal U. (Pin 1 on TB4.)
    - Connect the white wire to terminal V. (Pin 2 on TB4.)
    - Connect the black wire to terminal W. (Pin 3 on TB4.)
    - Connect the green wire to terminal GND. (Pin 4 on TB4.)
    - Connect the shield to terminal FG. (Pin 5 on TB4.)
- If your wire colors are different then use the connection record you made when disconnecting the old drive. The connection pattern is old U to new U, old V to new V, old W to new W, old GND to new GND. Shield goes to FG. All connections are on TB4.

Third connect the SAC-RDE servodrive to the GEN3 controller.

If using adapter cables.

- Find cable CBL-XRDE, an in-line adapter cable.
- Connect one end to the CBL-GN3-ADE coming from the Gen3 and the other end to J3 on the front of the SAC-RDE servodrive.
- This procedure assumes that the configuration jumpers in the Gen3 are set in the default position. If you suspect otherwise then they should be checked and verified. Instructions can be found below.

If using new cables.

- Find cable CBL-GEN3-ARDE, a controller interface cable.
- Connect one end to the Gen3 axis interface where the original cable was connected and the other end to J3 on the front of the SAC-RDE servodrive.
- Replace the existing feedback cable, CBL-DEMAC with new cable CBL-RDEMAC.
- The motor power cable did not need to be replaced. The bare wires can connect to the SAC-RDE.

Both procedures assume that the configuration jumpers in the Gen3 are set in the DE drive position. If you suspect otherwise then they should be checked and changed if necessary. Instructions can be found below.

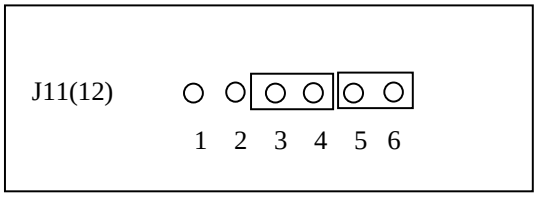
Secure all cables and wires. Double check all connections before turning on the power.

The system should now be ready. Turn on the power and test the system.

If you need to check the jumper settings in the Gen3 controller.

- Label or note where all of the wires and cables are connected to the ORN-DSP-Ax card.
- **USE APPROPRIATE STATIC CONTROL MEASURES. A WRIST STRAP TO GROUND IS HIGHLY RECOMMENDED**.
- Remove the axis interface card. (The CBL-GN3-ADE was plugged to it.)
- If your cable was connected to Axis A (top connector) locate J11. If your cable was connected to Axis B (bottom connector) locate J12. These are near the right side about half way down the board.
- Change the jumpers on J11 or J12 to be as shown below. ONLY change the jumpers for the axis where the SAC-DE was connected. Changing the other axis configuration will cause that axis to fail to operate correctly.

DSP JUMPER CONFIGURATION



- Carefully insert the axis interface card into the Gen3. Secure the screws.