Orca Series Modbus over Half-Duplex RS485

User Guide 230323

Version 1.0, March 2023

CONTENTS

REVISION HISTORY

Version	Date	Author	Reason
1.0	March, 2023	kh	Initial Release

Overview

This document is intended for people who intend to connect an Orca Series motor to a PLC, HMI, etc, using a half-duplex RS485 connection.

Since the Orca Series motors feature a full-duplex RS485 interface, the 4-wire interface must be properly bridged to a 2-wire interface.

For other information on the Orca Series Modbus interface, including the memory map, protocol specifics, and additional features, please consult UG210912 – Orca Series Modbus User Guide

Signal Connections

To operate the Orca Series motor's Modbus interface in half-duplex, make sure the following connections are made:

1. Bridge Orca pin 1 (signal A) and Orca pin 3 (signal Y), and connect to PLC signal A
2. Bridge Orca pin 2 (signal B) and Orca pin 6 (signal Z), and connect to PLC signal B
3. Connect Orca pin 8 (Ground) and the PLC communication ground.

   This connection is not necessary so long as the PLC and motor power supply ground are connected somewhere else.

4. Connect the RJ45 shield to the grounded PLC chassis – or ensure that the motor chassis is otherwise grounded.

Table of required connections

Half-Duplex PLC Signal	Orca Series Signals	RJ45 Pins	Notes
A	A_2, Y_2	1, 3	Bridge Orca signals
B	B_2, Z_2	2, 6	Bridge Orca signals
GND	GND	8	*may not be required, when PLC and Orca power supply are otherwise connected
Chassis	Chassis	Shield	

RJ45 Pin descriptions for half duplex operation

RJ45 Pin	Orca Series Signal	Half Duplex PLC	Interface
1	A_2	A	Modbus
2	B_2	B	
3	Y_2	A	
4	A_1	N/A	IrisControls™
5	B_1	N/A	
6	Z_2	B	Modbus
7	+5V	N/A	
8	GND	GND	Common

Orca Firmware Requirements

An important note is that several Orca Series firmware versions will not support half-duplex Modbus.

The firmware version and firmware build date of the motor can be checked by connecting the motor to IrisControls and looking at the Home screen.

For a firmware update, please contact support@irisdynamics.com or any representative.

Firmware version compatibility

Orca Firmware	Build Date	Compatible with Half-Duplex MODBUS
6.1.4	any	No
6.1.5	any	No
6.1.6	Before March 20, 2023	No
6.1.6	On or After March 20, 2023	Yes

Example system wiring

A convenient and effective way to bridge A/Y and B/Z signals from the Orca Series PCB is with an RJ45-to-screw terminal interface board. The JZ-RJ45-8/8 is an example of a breakout board that interfaces with a DIN rail for mounting next to a PLC. There are many other solutions on the market for this purpose as well.

!! Important note on pin names !!

Unfortunately, the JZ-RJ45-8/8 breaks standard RJ45 pin name conventions; please note that labels on this product are inverse from the RJ45 standard and the tables in our data sheets.

The picture below shows a JZ-RJ45-8/8 breakout board wired to bridge the A/Y and B/Z signals from the Orca Series motor.

JZ-RJ45-8/8 Example Wiring