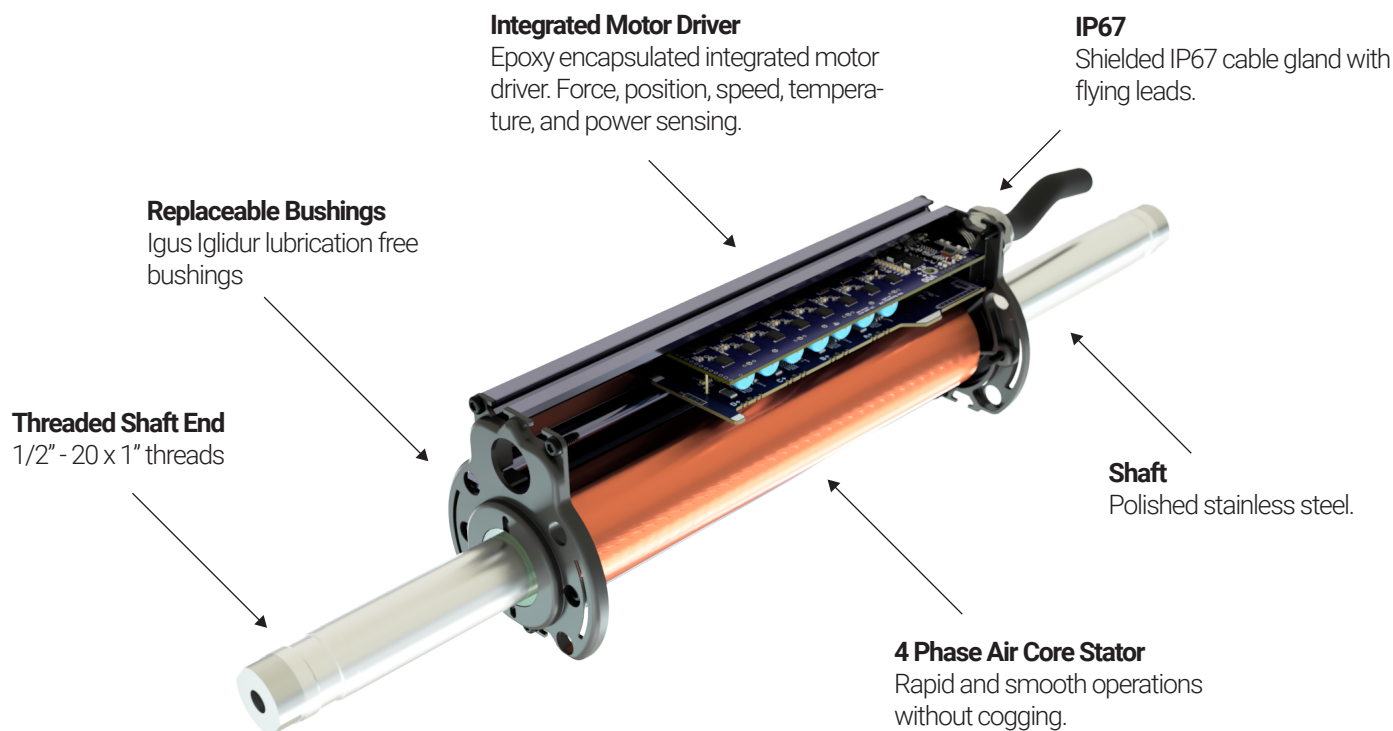




Orca™ Series Datasheet

Intelligent Linear Motor





Orca Series Overview

Our Orca Series Linear Motors features high performance, ultra-low latency, low TCO, and silent operation. These motors are inherently force controlled making them ideal for applications with human-machine interaction.

Our all-in-one approach means every motor includes integrated drivers, power delivery, logic, and sensing. There is no requirement to buy a separate controller.

Product Highlights

- Integrated IP67 Motor Driver
- Integrated Position and Force Sensing
- Low Latency
- Silent < 20 dBA
- Force Controlled
- Customisable Travel Length
- Low Voltage DC 12-58V
- Single Moving Part
- Hardened RS485
- Back Drivable with Zero Force Ripple
- Low Maintenance
- 4 Phase Integrated Motor Driver

Orca™ Series Overview							
Part Number	Nominal Voltage	Peak Force at Nominal Voltage		Peak Power at Nominal Voltage		Force Sensor Accuracy	Position Sensor Accuracy
		20 °C N (lbf)	80 °C N (lbf)	20 °C W	80 °C W		
ORCA-6-24V	24	394 (89)	326 (73)	899	761	±0.25 (±0.055)	± 100 (±0.0039)
ORCA-6-48V	48	533 (120)	434 (98)	1644	1352	±0.25 (±0.055)	
ORCA-15-48V	48	800 (180)	651 (146)	1480	1217	±0.49 (±0.11)	



ORCA-6-24V Specifications

ORCA-6-24V				
General Specifications				
Item	Min	Max	Unit	Notes
Supply Voltage	12	58	V	
Supply Current	0.01	37	A	
Continuous Power		24	W	20 C ambient, still air
		75	W	20 C ambient, forced air
Chassis Temperature	-20	80	°C	
Thermal Time Constant		300	s	
Force and Power				
Item	20°C	80°C	Unit	Notes
Force Constant	13.1	11.8	N/√W	Power required = (Force / Force Constant) ²
	2.96	2.65	lbf/√W	
Peak Power	231	190	W	12 Vdd
Peak Force	200	163	N	
	45	37	lbf	
Peak Power	899	761	W	24 Vdd
Peak Force	394	326	N	
	89	73	lbf	
Peak Power	899	1094	W	36 Vdd
Peak Force	394	390	N	
	89	88	lbf	
Peak Power	899	1094	W	48 Vdd
Peak Force	394	390	N	
	89	88	lbf	
Sensors				
Item	Value		Unit	Notes
Position Sensor Type	Integrated Hall			
Position Sensor Output	Absolute			Requires home on power-up
Position Sensor Accuracy*	±100		μm	200 Hz bandwidth
	±0.0039		inch	
Position Sensor Accuracy*	±150		μm	1500 Hz bandwidth
	±0.0059		inch	
Thermal Sensors	Driver and Stator			Auto shut-off, adjustable limits
Force Sensor Type	Integrated Sensor			
Force Sensor Accuracy*	±0.25		N	
	±0.055		lbf	
*For information on higher accuracy options, please contact sales@irisdynamics with your requirements				



ORCA-6-24V Specifications continued

ORCA-6-24V Cont.			
Communications			
Item	Value	Unit	Notes
Standard	RS485		
Duplex	Full		
Protocol	MODBUS RTU		High throughput modes available
RX+, RX- Termination	120	Ω	
Maximum Baudrate	1	Mbps	
Stator Mechanical Specification			
Item	Value	Unit	Notes
Width	83	mm	
	3.27	inch	
Height	90.9	mm	
	3.58	inch	
Length	182.4	mm	
	7.18	inch	
Mass	2.23	kg	
	4.93	lb	
IP Rating	IP67		
Epoxy Potting Compound	UL94 v-0		
Bushings	Igus GFM-2526-25		
Shaft Mechanical Specification			
Item	Value	Unit	Notes
Length	381	mm	Custom shaft lengths available
	15	inch	
Stroke	198.6	mm	Custom shaft lengths available
	7.82	inch	
Diameter	25	mm	
	0.984	inch	
Mass	1.38	kg	
	3.05	lb	
Material	Stainless Steel		
Coupling	1/2-20 Threaded Hole		



ORCA-6-48V Specifications

ORCA-6-48V				
General Specifications				
Item	Min	Max	Unit	Notes
Supply Voltage	12	58	V	
Supply Current	0.01	34	A	
Continuous Power		24	W	20 C ambient, still air
		75	W	20 C ambient, forced air
Chassis Temperature	-20	80	°C	
Thermal Time Constant		300	s	
Force and Power				
Item	20°C	80°C	Unit	Notes
Force Constant	13.1 2.96	11.8 2.65	N/√W lbf/√W	Power required = (Force / Force Constant) ²
Peak Power	103	85	W	
Peak Force	133 30	109 24	N lbf	12 Vdd
Peak Power	411	338	W	
Peak Force	267 60	217 49	N lbf	24 Vdd
Peak Power	925	761	W	
Peak Force	400 90	326 73	N lbf	36 Vdd
Peak Power	1644	1352	W	
Peak Force	533 120	434 98	N lbf	48 Vdd
Sensors				
Item	Value	Unit	Notes	
Position Sensor Type	Integrated Hall			
Position Sensor Output	Absolute			Requires home on power-up
Position Sensor Accuracy*	±100 ±0.0039	μm inch	200 Hz bandwidth	
Position Sensor Accuracy*	±150 ±0.0059	μm inch	1500 Hz bandwidth	
Thermal Sensors	Driver and Stator			Auto shut-off, adjustable limits
Force Sensor Type	Integrated Sensor			
Force Sensor Accuracy*	±0.25 ±0.055	N lbf		
*For information on higher accuracy options, please contact sales@irisdynamics with your requirements				

ORCA-6-48V Specifications continued



ORCA-6-48V Cont.			
Communications			
Item	Value	Unit	Notes
Standard	RS485		
Duplex	Full		
Protocol	MODBUS RTU	High throughput modes available	
RX+, RX- Termination	120	Ω	
Maximum Baudrate	1	Mbps	
Stator Mechanical Specification			
Item	Value	Unit	Notes
Width	83	mm	
	3.27	inch	
Height	90.9	mm	
	3.58	inch	
Length	182.4	mm	
	7.18	inch	
Mass	2.23	kg	
	4.93	lb	
IP Rating	IP67		
Epoxy Potting Compound	UL94 v-0		
Bushings	Igus GFM-2526-25		
Shaft Mechanical Specification			
Item	Value	Unit	Notes
Length	381	mm	Custom shaft lengths available
	15	inch	
Stroke	198.6	mm	Custom shaft lengths available
	7.82	inch	
Diameter	25	mm	
	0.984	inch	
Mass	1.38	kg	
	3.05	lb	
Material	Stainless Steel		
Coupling	1/2-20 Threaded Hole		



ORCA-15-48V Specifications

ORCA-15-48V				
General Specifications				
Item	Min	Max	Unit	Notes
Supply Voltage	12	58	V	
Supply Current	0.01	31	A	
Continuous Power		75	W	20 C ambient, still air
		225	W	20 C ambient, forced air
Chassis Temperature	-20	80	°C	
Thermal Time Constant		300	s	
Force and Power				
Item	20°C	80°C	Unit	Notes
Force Constant	20.8	18.7	N/√W	Power Required = (Force / Force Constant) ²
	4.67	4.20	lbf/√W	
Peak Power	92	76	W	12 Vdd
Peak Force	200	163	N	
	45	37	lbf	
Peak Power	370	304	W	24 Vdd
Peak Force	400	326	N	
	90	73	lbf	
Peak Power	832	685	W	36 Vdd
Peak Force	600	488	N	
	135	110	lbf	
Peak Power	1480	1217	W	48 Vdd
Peak Force	800	651	N	
	180	146	lbf	
Sensors				
Item	Value		Unit	Notes
Position Sensor Type	Integrated Hall			
Position Sensor Output	Absolute			Requires home on power-up
Position Sensor Accuracy*	±100		µm	200 Hz bandwidth
	±0.0039		inch	
Position Sensor Accuracy*	±150		µm	1500 Hz bandwidth
	±0.0059		inch	
Thermal Sensors	Driver and Stator			Auto shut-off, adjustable limits
Force Sensor Type	Integrated Sensor			
Force Sensor Accuracy*	±0.49		N	
	±0.11		lbf	
*For information on higher accuracy options, please contact sales@irisdynamics with your requirements				



ORCA-15-48V Specifications continued

ORCA-15-48V Cont.			
Communications			
Item	Value	Unit	Notes
Standard	RS485		
Duplex	Full		
Protocol	MODBUS RTU		High throughput modes available
RX+, RX- Termination	120	Ω	
Maximum Baudrate	1	Mbps	
Stator Mechanical Specification			
Item	Value	Unit	Notes
Width	83	mm	
	3.27	inch	
Height	90.9	mm	
	3.58	inch	
Length	411	mm	
	16.18	inch	
Mass	5.17	kg	
	11.41	lb	
IP Rating	IP67		
Epoxy Potting Compound	UL94 v-0		
Bushings	Iigus GFM-2526-25		
Shaft Mechanical Specification			
Item	Value	Unit	Notes
Length	762	mm	Custom shaft lengths available
	30	inch	
Stroke	351	mm	Custom shaft lengths available
	13.82	inch	
Diameter	25	mm	
	0.984	inch	
Mass	2.77	kg	
	6.12	lb	
Material	Stainless Steel		
Coupling	1/2-20 Threaded Hole		



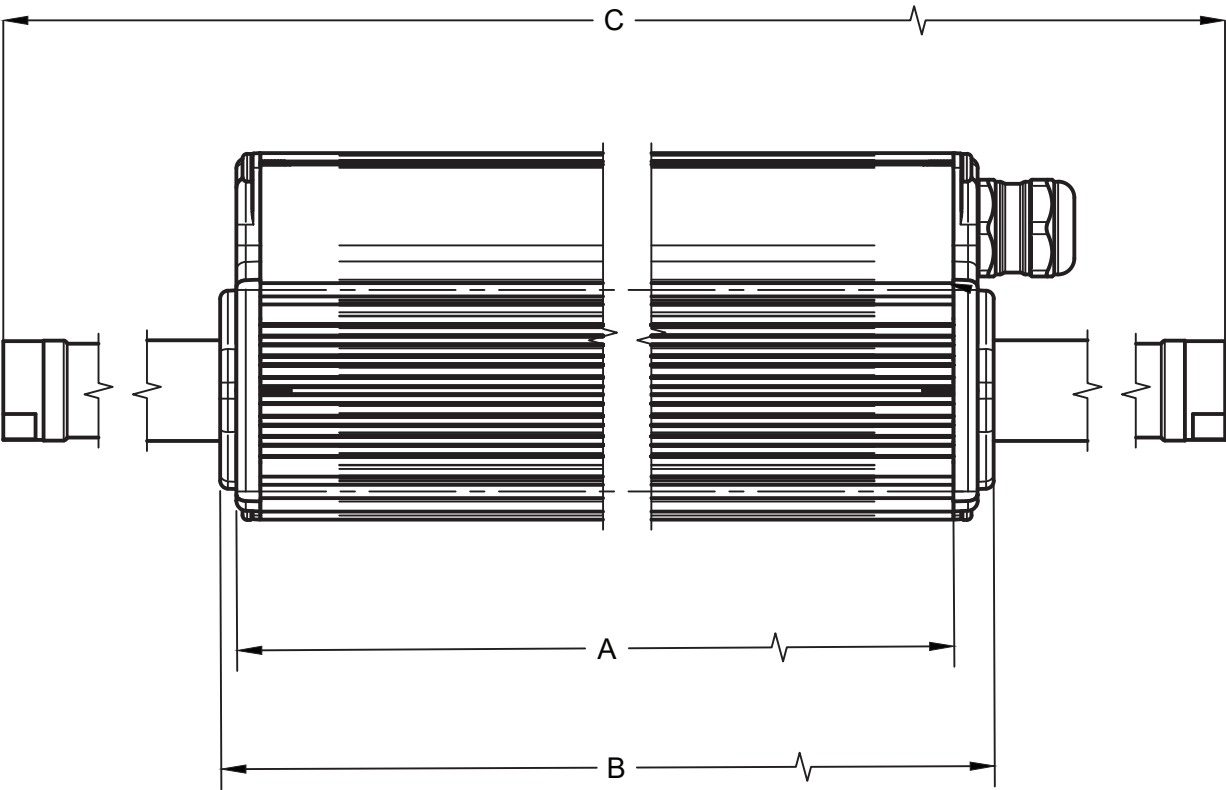
Mechanical Drawings

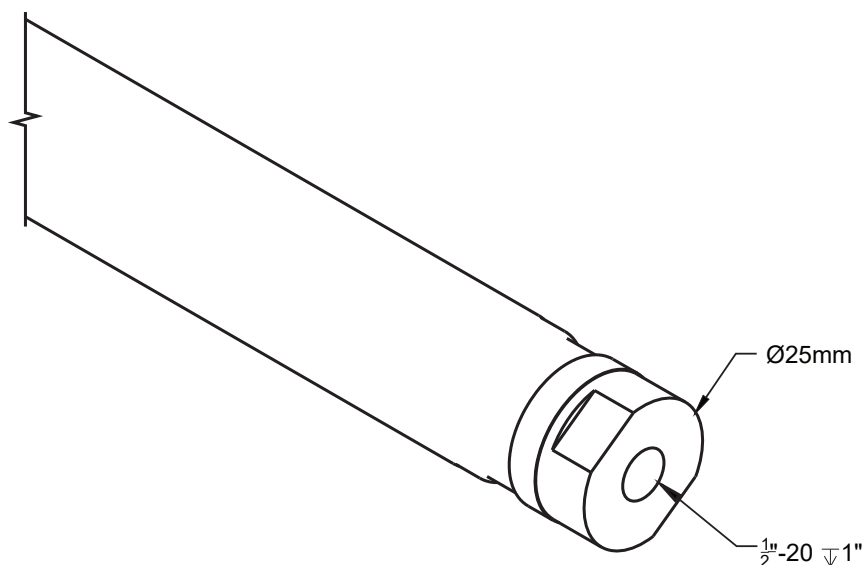
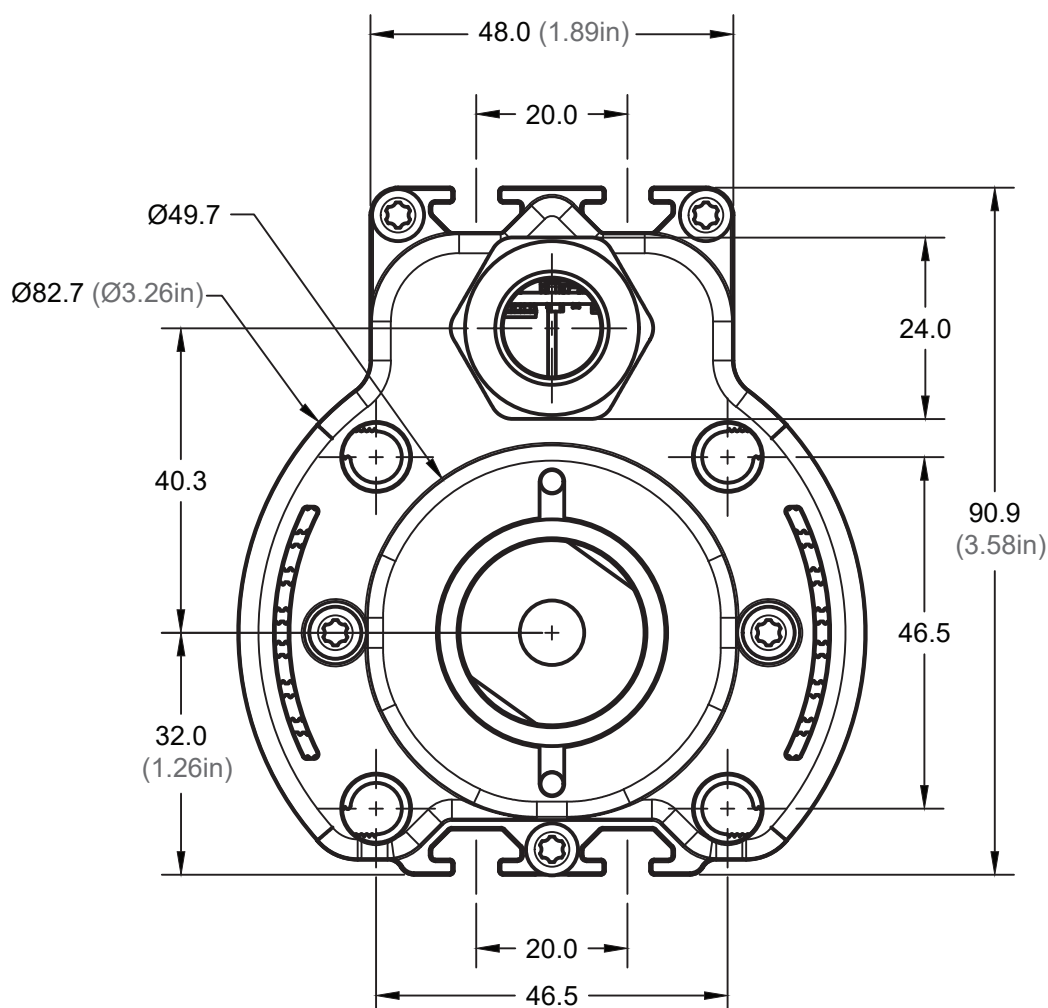
Uniquely designed for your hardware

Orca Series motors come in standard sizes as shown in the table below. Stroke length is shaft length minus stator length.

The Orca Series is built to standard mechanical specifications, see below. Please contact us at sales@irisdynamics.com if your application requires modifications from this standard. Common modifications include shaft length, rear tube length, and stator colour.

Orca™ Series Dimensions				
Model	Housing Length (A)	Stator Length (B)	Shaft Length (C)	Unit
ORCA-6-24V	174.4	182.4	381	mm
	6.87	7.18	15	inch
ORCA-6-48V	174.4	182.4	381	mm
	6.87	7.18	15	inch
ORCA-15-48V	403	411	762	mm
	15.87	16.18	30	inch



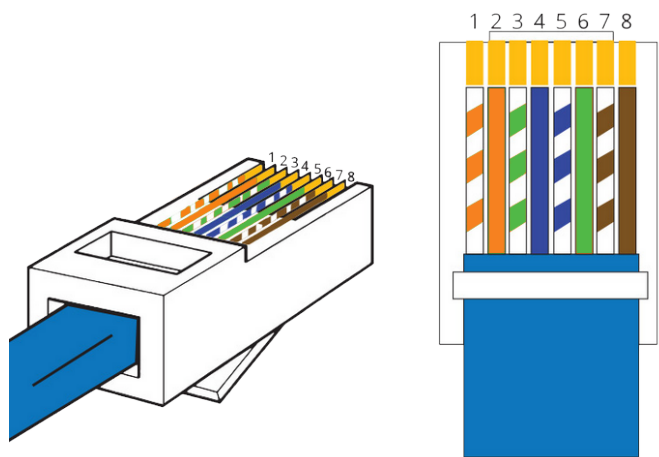




Electrical & Software Interfacing

RJ45 Pinout

Orca Series motors include a shielded communication cable of twisted pairs carrying the differential signals used to transmit and receive characters.



Number	Use
1	MODBUS RX+
2	MODBUS RX-
3	MODBUS TX+
4	IrisControls™ TX/RX+
5	IrisControls™ TX/RX-
6	MODBUS TX-
7	+5V
8	GND

MODBUS RTU Serial Interface

Orca Series motors feature a 'field-bus' serial communication interface which allows configuration, control, and monitoring. Features of the motors are offered by exposing data fields as 'registers' which can be written to and read from by sending and receiving characters over the serial interface.

Serial communications are implemented using a subset of the MODBUS RTU specification, with additional functionality to support a high-speed stream of commands and feedback.

The MODBUS Serial Communications User Manual is available for download at irisdynamics.com/downloads

IrisControls™

Orca Series motors feature a built-in graphical user interface called IrisControls, which can be used to view details and configure settings. This interface provides an easy way to visually tune the internal PID position controller, set up motion profiles, and add performance restrictions. IrisControls can also capture and log information from the motor while connected.

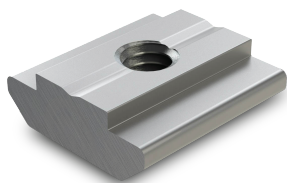
The IrisControls Windows application can connect with Orca motors over a USB connection, which is normally carried out with a USB-to-RS485 cable, and a RJ-splitter (see Accessories).

IrisControls is available for Windows 7 and later and is available for download at irisdynamics.com/downloads

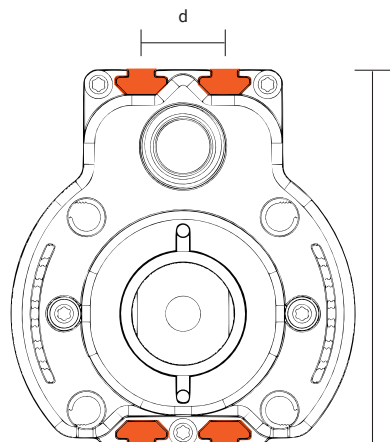


Accessories

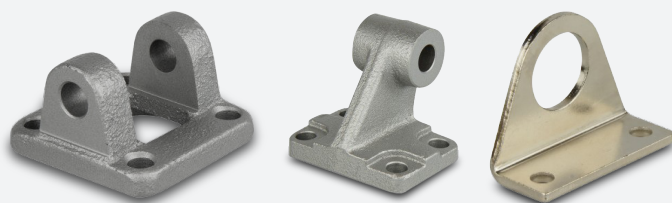
T-SLOT MOUNTING



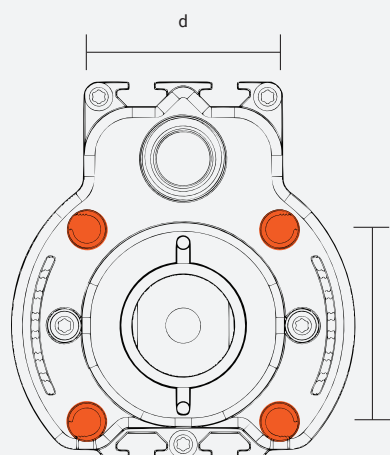
Size	6 mm T-slots
d	20 mm
h	90.9 mm



PNEUMATIC TUBE MOUNTING



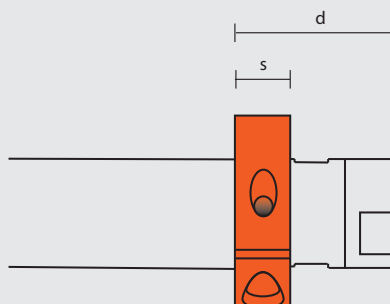
Size	ISO15552 50mm Pneumatic Tube
d	46.5 mm



SHAFT COLLAR



ID	25 mm
OD	45 mm
s	12.7 mm
d	35 mm





Accessories continued

REAR TUBES

Size (ID)	50mm Extrusion
Size (OD)	55mm Extrusion
Material	Aluminium

For custom rear tube lengths please contact sales@irisdynamics.com.



USB CABLES

USB-to-RS485	This cable converts USB Serial port data to the half-duplex RS485 industrial signals used by Orca devices to connect to IrisControls for access to the GUI, and for firmware upgrades.
USB-to-RS422	This optional cable converts USB Serial port data to full-duplex RS422 industrial signals and allows forces, positions, and motions to be commanded from Windows, MacOS, or Linux without the need for an intermediate controller.



RJ SPLITTER

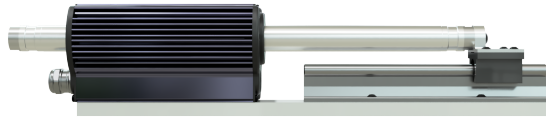
Size	45 mm x 40 mm x 20 mm
Connector A	RJ45 Female
Connector B	2 X RJ45 Female

When both interfaces (MODBUS and IrisControls) are to be used at once an RJ45 splitter accessory allows easy connection to the shared RJ45 connector.



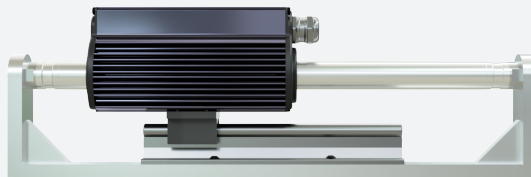


Potential Applications



MOVING SHAFT

In a moving shaft configuration, the stator is fixed and the shaft actuates the load.



MOVING STATOR

In moving stator configurations, the shaft is fixed on both ends and the stator moves. Multiple stators can be installed along a single shaft if the application requires it. Moving stators are advantageous for applications with length restrictions.



CLEVIS/UNIVERSAL JOINT

An optional rear shaft cover allows mounting using ISO 1552 50mm pneumatic tube attachments, enabling the line of action to move with the load. Useful for replacing traditional lead screw or pneumatic actuators. Rear shaft cover is cut to match desired shaft length. Optional rear plate can be modified or removed to facilitate chosen mounting hardware.



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