Programmable Motion Controller

dPLC_R7

Revision Version 1.0.0

Contents

General Description

The **dPLC** is a modular scalable industrial programmable motion controller which offers an easy installation, a low-cost implementation, while remaining very user-friendly, to any automation process, with compatibility with other PLC devices.

The controller is accompanied with a customized software denominated **dMotion**, which purpose is to give users a high learning curve when using the controller, without indulging too much in the programming. Allowing new users, the possibility of setting up processes with efficiency, precision, and highly configurable.
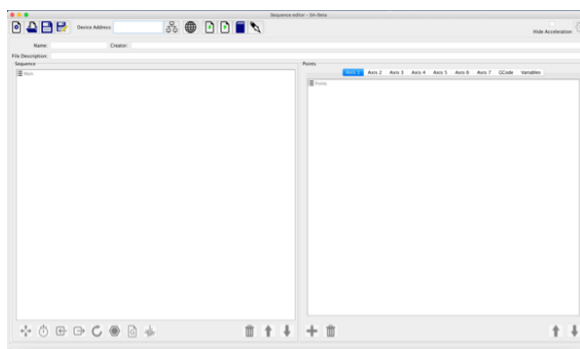

Figure 1 dPLC controller.

Figure 2 dMotion Interface.

Applications

- Pick-n-Place Machines.
- Cartesian Coordinate Robots.
- Selective soldering machines.
- Laser beam welding machines.
- CNC machines.
- Assembly lines.

Features

- Compatible with other PLC structures.
- Compact design.
- Real-time Feedback.
- Scalable.
- Precision of 32 micro-stepping.
- Configurable speed.
- Reads and applies G-code.
- Saves previous sequences.
- Expandable MicroSD memory card.
- Touch-screen of 320x480.
- Less feedback connectors and cables.
- Own software (**dMotion**).
- Intuitive learning capability.
- User-friendly design.
- Webserver.
- Ethernet connections.
- Easy-installation.
- Up to 7 single axes of movement.

General Specifications

Model		dPLC_R7
Enclosure		Fixed on rails inside a cabinet
Dimensions (H x D x W)		
Weight		
Electrical Specifications	Supply Voltage	24V
	Operating Voltage Range	
	Power Consumption	
Application Environment	Operating Temperature	
	Ambient storage temperature	
	Noise Resistance	

Slots 1 to 7

Ethernet
Micro USB
uSD Card
Battery

Figure 3 dPLCR7 Peripherals Overview 1.

Display 320x480 (Touchscreen)
GP Port
GP Port
Power Supply
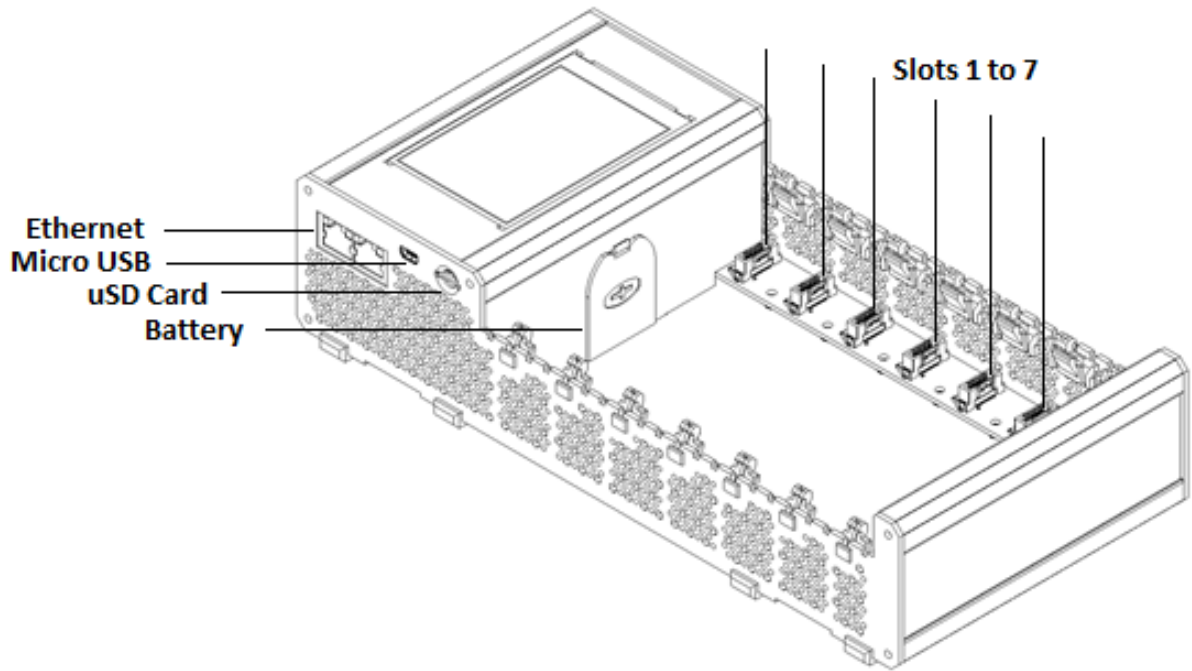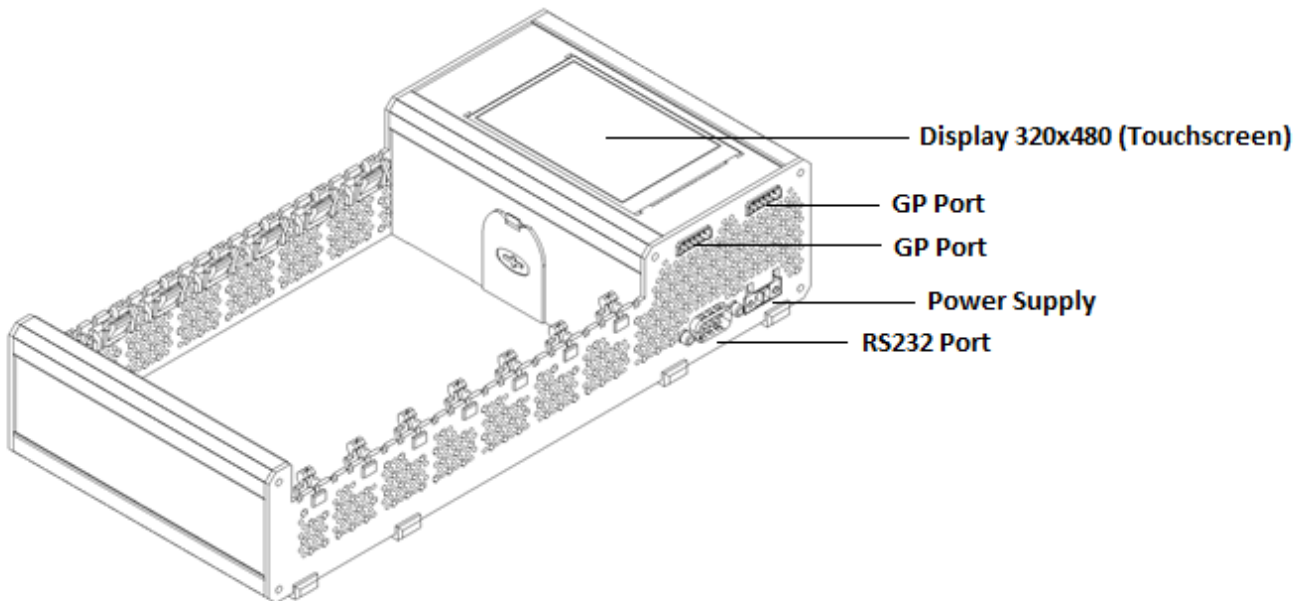RS232 Port

Figure 4 dPLCR7 Peripherals Overview 2.

Expansion Modules

The **dPLC** is capable of handling up to seven expansion modules, managing the information of each and showing the information in real-time to the user through the display on the device. Some expansion modules are market-ready while others are still in development to further increase the capabilities of the motion controller.

- ▪ **I/O Module**

To be defined.

- ▪ **Stepper controller module**

A single stepper module has the capacity of handling a closed loop stepper motor, the feedback being a 325 readings per revolution encoder attached to the stepper motors.
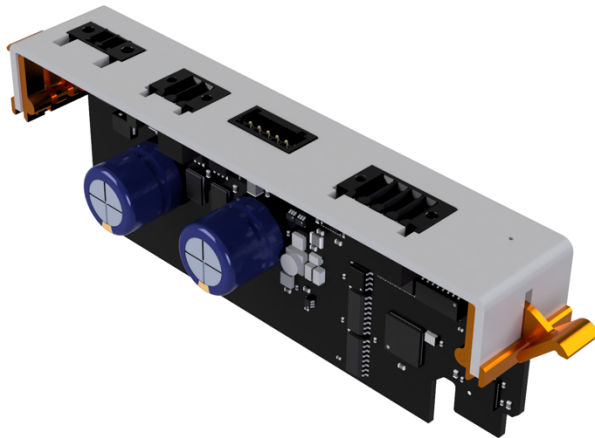

Figure 5 Stepper expansion module.

There's a variety of stepper motors available to better suit the needs of the user, this to allow the compatibility to several actuators in the market.

All of the stepper motors offer a high reliability in any process when comes to precision, speed, tolerance, and a combination of all the previous. This combined with the **dMotion** software, gives the user a powerful tool of control in any automation process or assembly where precision is key.

Currently the offered motors are:

- ▪ **Closed-loop Stepper Motor** of sizes NEMA 17, NEMA 23, NEMA 34. With and without a brake additament. **1***

- ▪ **Closed-loop I/O Stepper Motor** of sizes NEMA 17, NEMA 23, NEMA 34. Which offers a PNP output besides the encoder connections. With and without a brake additament. **1***

1* - With the exception of NEMA 17 that doesn't not support a brake additament.

Application Stepper Motors (dSMXXXX series)

The following are the steppers being offered to the public, for information regarding the dSMXXXX series motors it's suggested to check the datasheets in our website www.dciplc.com.

- ▪ **Closed-loop Stepper Motors (No Break additament)**

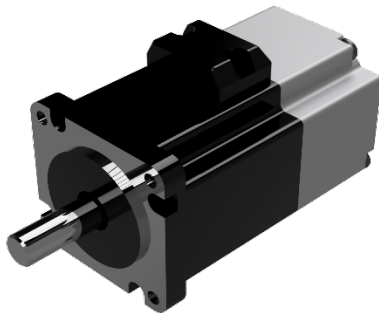| Model	Phase	NEMA	Step Angle	Phase Current	Phase Resistance	Phase Inductance	Holding Torque	Rotor Inertia	Bi/Unipolar	Weight	Body Length	Encoder
			o	A/ø	Ω/ø	mH/ø	N.m	g.cm^2	# of Leads	kg	mm	P/R
dSM17A	2	17	1.8	1.7	1.5	2.8	0.4	54	Bi (4)	0.32	43	325
dSM17B	2	17	1.8	2.3	1.0	1.9	0.5	77	Bi (4)	0.4	51	325
dSM17C	2	17	1.8	2.3	1.4	3.1	0.7	110	Bi (4)	0.55	67	325
dSM23A	2	23	1.8	4.2	0.4	1.2	1.1	200	Bi (4)	0.7	56	325
dSM23B	2	23	1.8	4.2	0.7	2.0	2.2	480	Bi (4)	1.15	80	325
dSM23C	2	23	1.8	4.2	0.7	2.5	2.5	800	Bi (4)	XXXXX	100	325
dSM34A	2	34	1.8	7.0	0.28	1.8	4.2	1400	Bi (4)	XXXXX	80	325
dSM34B	2	34	1.8	7.0	0.38	3.2	8.0	2700	Bi (4)	XXXXX	114	325
dSM34C	2	34	1.8	7.0	0.45	5.2	12	4000	Bi (4)	XXXXX	150	325

Figure 6 dSM17A.

Figure 7 dSM17A connectors.

Closed-loop I/O Stepper Motors (No break additament)

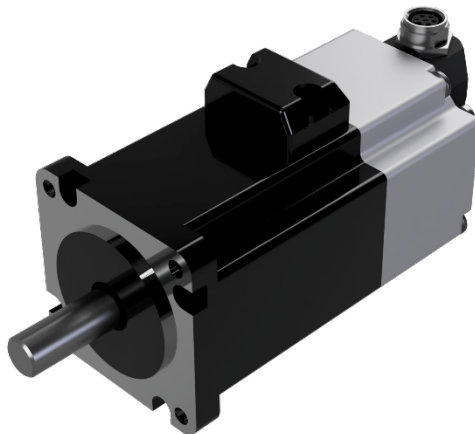| Model	Phase	NEMA	Step Angle	Phase Current	Phase Resistance	Phase Inductance	Holding Torque	Rotor Inertia	Bi/Unipolar	Weight	Body Length	Encoder
			o	A/∅	Ω/∅	mH/∅	N.m	g.cm^2	# of Leads	kg	mm	P/R
dSM17AIO	2	17	1.8	1.7	1.5	2.8	0.4	54	Bi (4)	0.32	43	325
dSM17BIO	2	17	1.8	2.3	1.0	1.9	0.5	77	Bi (4)	0.4	51	325
dSM17CIO	2	17	1.8	2.3	1.4	3.1	0.7	110	Bi (4)	0.55	67	325
dSM23AIO	2	23	1.8	4.2	0.4	1.2	1.1	200	Bi (4)	0.7	56	325
dSM23BIO	2	23	1.8	4.2	0.7	2.0	2.2	480	Bi (4)	1.15	80	325
dSM23CIO	2	34	1.8	4.2	0.7	2.5	2.5	800	Bi (4)	XXXXX	100	325
dSM34AIO	2	34	1.8	7.0	0.28	1.8	4.2	1400	Bi (4)	XXXXX	80	325
dSM34BIO	2	34	1.8	7.0	0.38	3.2	8.0	2700	Bi (4)	XXXXX	114	325
dSM34CIO	2	34	1.8	7.0	0.45	5.2	12	4000	Bi (4)	XXXXX	150	325

Figure 8 dSM17BIO

Figure 9 dSM17BIO connectors.

Closed loop-Stepper Motors (With Break additament)

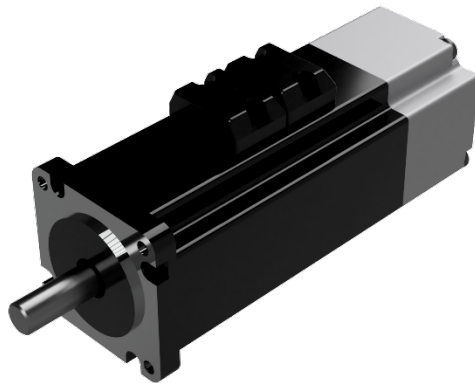| Model	Phase	NEMA	Step Angle	Phase Current	Phase Resistance	Phase Inductance	Holding Torque	Rotor Inertia	Bi/Unipolar	Weight	Body Length	Encoder
			o	A/∅	Ω/∅	mH/∅	N.m	g.cm^2	# of Leads	kg	mm	P/R
dSM17BB	2	17	1.8	2.3	1	1.9	0.5	77	Bi (4)	0.4	51	325
dSM17CB	2	17	1.8	2.3	1.4	3.1	0.7	110	Bi (4)	0.55	67	325
dSM23AB	2	23	1.8	4.2	0.4	1.2	1.1	200	Bi (4)	0.7	56	325
dSM23BB	2	23	1.8	4.2	0.7	2	2.2	480	Bi (4)	1.15	80	325
dSM23CB	2	23	1.8	4.2	0.7	2.5	2.5	800	Bi (4)	XXXXX	100	325
dSM34AB	2	34	1.8	7.0	0.28	1.8	4.2	1400	Bi (4)	XXXXX	80	325
dSM34BB	2	34	1.8	7.0	0.38	3.2	8	2700	Bi (4)	XXXXX	114	325
dSM34CB	2	34	1.8	7.0	0.45	5.2	12.0	4000	Bi (4)	XXXXX	150	325

Figure 10 dSM17BB.

Figure 11 dSM17BB connectors.

Closed loop-I/O Stepper Motors (With break additament)

| Model	Phase	NEMA	Step Angle	Phase Current	Phase Resistance	Phase Inductance	Holding Torque	Rotor Inertia	Bi/Unipolar	Weight	Body Length	Encoder
			o	A/∅	Ω/∅	mH/∅	N.m	g.cm^2	# of Leads	kg	mm	P/R
dSM17BBIO	2	17	1.8	2.3	1	1.9	0.5	77	Bi (4)	0.4	51	325
dSM17CBIO	2	17	1.8	2.3	1.4	3.1	0.7	110	Bi (4)	0.55	67	325
dSM23ABIO	2	23	1.8	4.2	0.4	1.2	1.1	200	Bi (4)	0.7	56	325
dSM23BBIO	2	23	1.8	4.2	0.7	2	2.2	480	Bi (4)	1.15	80	325
dSM23CBIO	2	34	1.8	4.2	0.7	2.5	2.5	800	Bi (4)	XXXXX	100	325
dSM34ABIO	2	34	1.8	7.0	0.28	1.8	4.2	1400	Bi (4)	XXXXX	80	325
dSM34BBIO	2	34	1.8	7.0	0.38	3.2	8	2700	Bi (4)	XXXXX	114	325
dSM34CBIO	2	34	1.8	7.0	0.45	5.2	12.0	4000	Bi (4)	XXXXX	150	325
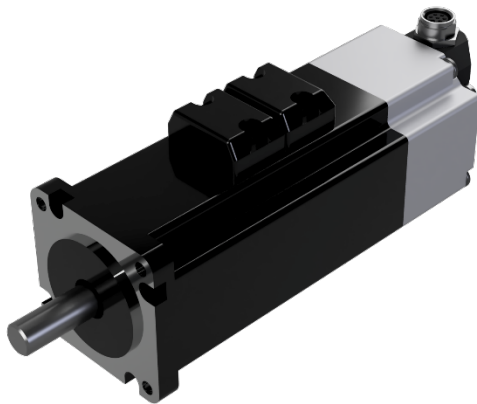
Figure 12 dSM17BBIO.

Figure 13 dSM17BBIO connectors.