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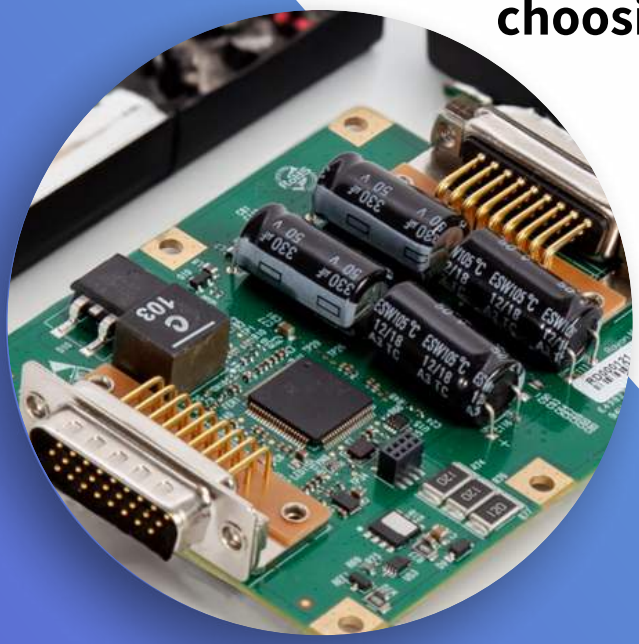
WHITE PAPER

What are the key considerations when choosing a servo motor control Solution



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SERVO MOTION CONTROLLER

Since the first days of the electrical motor, controlling the motor has become a major challenge and basic requirements.

The DC electric motors are based on DC current that runs through them, mostly from a power source such as Battery. We will find the electrical motor in almost every aspect of our lives, yet advanced usage is required to control those motors in a more advanced and efficient way.
As we all know, the main computer of any mobile, battery-based, platform, is a “smart” device, whereas the Motor is the, well, how to say it – is not!
The Motion controller often called also as Motion driver, is the one in charge of mediating between those two
In most cases, the computer gives instructions to a motion controller, and the motion controller uses those instructions to create the right volume of the current at the relevant time to the electric DC or BLDC motor.
For example, if the main computer instructs the AGV (Autonomous Ground vehicle) or a turret (RWS – Remote Weapon System) to move from point A to point B at a certain speed, pace, or acceleration, the motion controller “translates” the command into a current in specific amplitude and specific timing.
This way we can control the activity of the motor in a very accurate way.

What is a servo drive?
A servo drive is a motion control device that can help us to achieve a high level of accuracy in the behavior of the motor. Servo drives mines we can gain control of either of three types of loops:

- Velocity/speed loop
- Positioning loop
- Torque loop (current or force needed to move)

The Servo motion control driver is also based on the fact he can “close” the loop, which means – he gets feedback from the motor with the help of sensors and devices (Such as “ encoders “), and with this feedback, they “know” what should be the amount of current to rush into the motor and when.

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How are motion control drivers used?

As said, Motion control drivers are used in mobile platforms – Military mobile platforms (gimbals, turrets, propulsion, UAVs, UGVs, and more), industrial ones (such as AGV, AMR, or Robotics applications), in eV (Electrical Vehicles) or Micro eV (Scooters, Rakshas and more).
Users will choose their electrical motor based on RPM, Voltage, currents, Torque, and other parameters, if it's a DC or BLDC (Brushless DC – which is more efficient), and then will choose the right motion control driver.
The feedback will be chosen too – means, which type of encoder (Incremental, absolute) or other (Hall-sensors), the type of communication with the main computer and with the feedback, and more.
In this way, the user will put together the power train and will control the motion system.
Yet, this might be challenging for some users – to integrate this motion control system altogether.
Therefore, more parameters lead you in choosing the right motion control driver.

Contact us to learn more about how Redler's motion control products can meet your needs.

Choosing the right servo motion controller brand
There are four major parameters to consider when choosing a motion control driver:

- Size (small, low weight is often required)
- Power density (including requirements to produce a lot of power with a small footprint)
- Performance (whether the servo drive's performance capabilities align with requirements)
- Price

That pushes the motion control solutions to be an electrical commodity.
Yet, some other parameters are overlooked, and they are having a significant impact on the success of the integration and eventually the application.
There are many things to consider when choosing a servo motor supplier. The first step is to ensure that the servo drive itself meets the requirements of the use case or application. For example, there are two types of motors–brushless and brush. Brush motors are an older technology, generally need more maintenance, and tend to wear out over time. Brushless DC motors, on the other hand, are more efficient and require less maintenance. Not all servo drives work with both types of motors, so it's important to select one that is suitable for the motor discipline in which it will be used.

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Other key considerations when choosing a servo motor Solution

Redler's Rayon servo motion control drivers offer motion control solutions in a very small footprint and with high power density in a variety of power requirements. a compact design suitable for both smaller applications like UAVs and gimbals, and large-scale applications including turrets, RWS, AGV, eV and Miro eV, Robotics steering, powering flaps actuators, propulsion, wing motor controlling, missiles, and rockets, antennas/vision system movement control, and much more.

Yet, as said, size and performances are important, and though the Rayon motion controllers are very cost-effective and attractive – those are not enough when you choose to put together your power train and motion control system.

Design-To-Implementation and Aftersales support

Support can be critical to successful application implementation. Many servo motor suppliers do not have the capacity or capability to provide this support, leaving customers to work out complex motion control issues on their own. This can significantly slow down development and manufacturing processes and lead to unexpected costs and delays.

Thus, helping with operation alongside integration becomes significant to the user. In Redler, you'd find the Design-to-Implementation and after-project support.

How to design your system correctly, which product, how to connect it, integration troubleshooting, and technical issues if to come after the implementation.

<u>Vendor flexibility</u>

Designs are not static, and modifications are often needed during the design-though-implementation process. When a modification is necessary, manufacturers can either adapt their application to the existing servo drive or adapt the servo drive to the updated system requirements. The second strategy enables more options, but it is only possible with vendor flexibility. If your chosen servo motor supplier is flexible, they will have the capacity to make necessary modifications for the right business case.

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This alongside understanding the needs of the industry such as standards (mil-1275, Mil-461, Mil810, ISO26262, ASIL B, STO, and more), certifications (CE, UL, and others), and how to manage a successful project (SRR, PDR, CDR, PRR, FAI, etc.)

User-friendly software

Servo drives are configured using their proprietary software, so it's important to investigate the software that each Motion controller brings along with it. On one hand, it's a good idea to select sophisticated software that offers the maximum number of features and options. On the other hand, complex software can be difficult to use and implement. Choosing software with a user-friendly GUI (Graphical User Interface) will give you the options you need in a format that is easy to manage.

The Graphic User Interface software is also a major important tool. With this tool the user sets his motion control loops, does motion calibration of the motor and motion driver, thus, the GUI of the motion controller must be extensive, yet intuitive – like in the Rayon motion control GUI - as we call it: it is so sophisticated it becomes simple.

With Redler, this is becoming an advantage – once you used this motion control software, you won't go back.

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