Application Note AN0101: icon supplied from batteries

Introduction

The power supply working range for icon actuators is 9 – 29 VDC. For 12 VDC actuators, the working area is narrowed down to 9 - 15 VDC, i.e. a rather tight voltage window. As this voltage specification is for the controller itself (i.e., not at cable end), it means that the 12V-icons are heavily depending on a strong and stable power supply. If the supply voltage drops to 9 VDC or less, the icon controller stops movement for safety reasons.

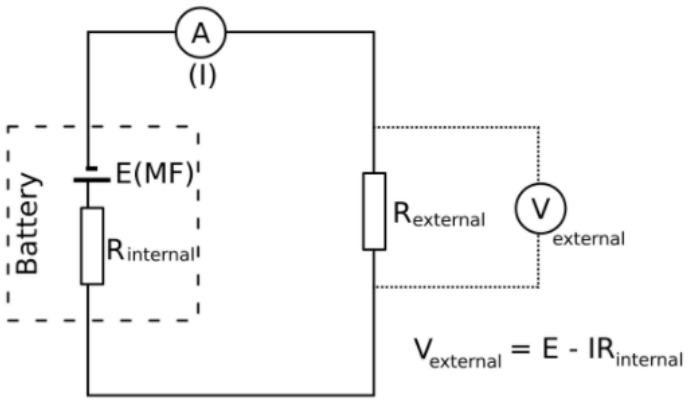
icon actuators have built-in overcurrent protection but during start and stop, higher current is allowed for 200ms. In these situations, the actual current will be higher than the value set for "Current cutoff" in parameter settings.

Due to the internal resistance of a battery (which may vary with battery quality), high currents will lead to voltage drop. Long and/or thin wires from power source to icon may also have an adverse effect regarding voltage drops and cause the actual voltage to drop to or below the minimum level of 9 VDC.

Choose a high-quality battery

Voltage-loss in the battery can be critical under high load, and the 200ms "boost" must be taken into consideration when evaluating a setup. For icon35 a maximum current of 8 ADC must be used and for icon50, the value is 30 ADC per actuator supplied by the battery. A high-quality battery has a low internal resistance (approximately 5 mΩ) and a low-quality battery can have up to approximately 2 Ω of internal resistance. Standard quality batteries have an internal resistance of approximately 20 mΩ.

The figure below explains the theory behind the topic.



$R_{Internal}$ = 20 mΩ
E = 12 VDC
4 x icon50: IDC = 120 ADC
$V_{internal}$ = 2,4 VDC (loss)

$V_{ext.}$ is now 9,6 VDC during "boost".

With additional cable-losses, the actual supply voltage for the actuator may be critical.

concens
member of bansbach group
Oddesundvej 1 | DK-6715 Esbjerg N | Denmark
+45 7011 1131 | info@concens.com | VAT: DK10132266
WWW.CONCENS.COM

How do these problems manifest themselves?

If the supply voltage for an icon actuator is too low, the actuator may generate a humming sound from the motor as it tries to start but stops again due to low voltage. In addition to this, there is a risk that parameter data inside the actuator are destroyed due to lack of ability to save this information in a proper way when powering up and down.

How to get around these issues?

The following recommendations will reduce the risk for problems when running icon actuators on battery:

1. Use a high-quality battery (5 mΩ) and increase square dimension of supply wires. For 12 VDC icons, maximum length is five meters of standard cable. It is an option to order the actuator with only one meter of cable and then use cable with thicker wires as extension. This will reduce the wire losses and minimize risk for problems.
2. As mentioned above, 24 VDC icon versions are more tolerant to voltage fluctuations than 12 VDC versions. In a setup with two or more batteries, it may be beneficial to pair two batteries in series to achieve 24 VDC supply and use 24 V icons. 24 VDC will reduce currents and minimize voltage drops in the setup.

Concluding remarks

Please note that batteries will degrade over time. This is a chemical process starting a day one.

For more information on the best design please contact support@concens.com.

Concens A/S
03.01.2024 – MTS/RL

concens
member of bansbach group
Oddesundvej 1 | DK-6715 Esbjerg N | Denmark
+45 7011 1131 | info@concens.com | VAT: DK10132266
WWW.CONCENS.COM