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ABSTRACT

This invention relates to a control system for at least one actuator, comprising a central control unit (4) controlling the power to the actuator/s (1, 2, 3) and a handset (5) to activate said system, wherein a parameter memory (6, 7, 8) connected to the wiring (9, 10, 11) between the central control unit (4) and the actuator/s (1, 2, 3) is arranged to supply the central control unit (4) with a predetermined set of characteristics for the application of the actuator/s (1, 2, 3).

CONTROL SYSTEM OF PARAMETERS IN ACTUATOR SYSTEM

Field of the Invention

The invention relates to a system of electric actuators where it is desirable to control certain parameters in relation to application. Furthermore, the invention relates to a
 5 method that is efficient from a production point of view to obtain said desirable function.

Background of the Invention

Typical applications for the invention is controlling motion of seating in powered
 10 wheelchairs or other types of vehicles. Also beds, furniture and lifting devices of various types are also fitted with systems of electric actuators.

All actuators are connected to a central unit which have some kind of operator interface, like a keyboard. The central unit contains driver electronics to control the actuator. The
 15 most common parameter that need to be controlled is current limit, which will effectively limit the force that can be supplied from the actuator. Also speed and start/stop ramps are examples of parameters that may need control. Regardless of the number of parameters that may need adaptation to a specific application, there is a logistic problem attached. Normally these parameters will be loaded into the memory of
 20 the central unit, thus making every application unique. Which in turn means that all applications will have to have its unique versions of the central unit. Alternatively, some part of the distributing chain will have to configure the central units to fit a certain application. Neither of the said methods is desirable from a logistic point of view.

Prior art

It is known from US 7932687 that the current limit in a system of actuators can in fact be changed by “pressing a key” on a handset. A problem that immediately arises is the fact that the maximum current limit for a certain application can involve safety issues and therefore should not be changeable for the end user. This is solved by having a
 30 “special” handset for a chosen few which are allowed to change the current limit.

Summary of the Invention

In view of the above-mentioned and other drawbacks of the prior art, a general object of the present invention is to provide a method of controlling parameters that is effective
 35 from a production, logistic and cost point of view. When a system of actuators are

designed into f.ex.an electric wheelchair, there will be a number of adaptations made to the actuator to fit. Typical examples are end-mount design and cable length. This means that the application dictates customisation of cable between motor and central unit. I.e. production facility must handle this level of customisation.

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The invention takes advantage of this fact and integrates a parameter memory device in the cable between actuator and central unit – in such a way that the central unit can read a number of parameters from this memory device and setup the functions accordingly.

The benefit from this approach is that the central unit can be the same for any

10 application. And furthermore, when replacements are made in field, the parameters will be intact regardless of which part that is replaced (central unit or actuators).

Brief Description of the Drawings

15 The various aspects of the invention, including its particular features and advantages, will be readily understood from the following illustrative and non-limiting detailed description and the accompanying drawings, in which:

Fig. 1 illustrates schematically at least an exemplary embodiment of the present
20 inventive concept;

Fig. 2 illustrates schematically at least an exemplary embodiment of the mentioned
parameter memory;

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Detailed Description of Exemplary Embodiments of the Invention

The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which currently preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should
30 not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided for thoroughness and completeness, and fully convey the scope of the invention to the skilled addressee. Like reference characters refer to like elements throughout.

35 Fig 1 depicts the main parts of a typical system with three actuators. System is powered by means of a battery (BAT1) which drives the motors through a H-bridge comprising four transistors (Q1..4), where the active channel is selected by pressing a key on the

keyboard activating one of the relays (K1..3) to select the corresponding actuator (ACT1..3). In order to individually control the characteristics of the actuators, one or more parameters are read by the controller through the Memory interface (Memory IF) from the corresponding parameter memory (MEM1..3) prior to actually starting the

5 actuator. The parameter memory is connected into the wiring between central unit and actuator (CABLE1..3). This method will ensure that the correct parameters always are used, even if individual actuators or complete central unit are replaced. The design of the memory unit can be of different types with different number of needed wires. This presented example use only one wire to feed power and extract data from the memory.

10 Ground reference for this design is created by activating Q3 thus using one motor wire. The memory design can be simplified by adding separate supply wire.

The usual configuration of an H-bridge includes some kind of motor current measurement and control – which are omitted for clarity.

15 Fig 2 shows the basic principal schematic of one of the above mentioned “single wire” type of memory, e.g. ref. nr 6 in fig 1. It has a parasitic supply comprising a rectifier element D1 with a reservoir capacitor C1 and a voltage regulator M1. The regulator (M1) supplies energy to the serial interface M2 and the memory device M3. The serial

20 interface M2 can send and receive serial data through the single wire (P10) which is connected to the central unit and by decoding this data enable the central unit to access the memory unit M3, where data can be read.

It is understood that the modules described here as M1, M2 and M3 in reality can be

25 integrated into the same physical device.

The invention is not limited by the embodiments shown above. It is evident for the skilled person that a variety of modifications may be made, providing a similar kind of functionality, without the use of inventive skill. For instance, it is evident for the skilled

30 person that for a memory (MEM1..3) in this context, there exist some obvious modifications regarding the ability to deliver one or more parameters to the central unit, e.g. by means of a “simple memory” in the form of at least one conductor in the actuator wire harness 9, 10, 11, presenting a single resistance, single parameter, memory device for interaction with the central unit.

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CLAIMS

1. A control system for at least one actuator, comprising a central control unit (4) controlling the power to the actuator/s (1, 2, 3) and a handset (5) to activate said system, characterised by the addition of a parameter memory (6, 7, 8) connected to the wiring (9, 10, 11) between the central control unit (4) and the actuator/s (1, 2, 3) arranged to supply the central control unit (4) with a predetermined set of characteristics for the application of the actuator/s (1, 2, 3).
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2. A control system according to claim 1, characterised by a plurality of actuators (6, 7, 8).
- 10 3. A control system according to claim 1 or 2, wherein the parameter memory (6, 7, 8) is arranged to supply the current limit to the central control unit (4).
4. A control system according to claim 1, 2 or 3, wherein the parameter memory (6, 7, 8) is arranged to supply two current limits to the central control unit (4), where in one current limit is used to limit current in one direction and the other current
15 limit is used to limit current in the other direction.
5. A control system of actuators according to any above claim, wherein the parameter memory (6, 7, 8) is arranged to supply start and stop ramp speed parameters to the central control unit (4).



