



AN OVATION HOLDINGS COMPANY

## **DHC-400**

### Troubleshooting Guide

#### **FAULT INDICATORS**

The DHC-400 detects various fault conditions that prohibit the unit from controlling the actuator. A combination of the three Fault indicators (red, yellow, and green) will turn on or flash to indicate a specific detected fault. If an appropriate relay option module is installed, the Fault relay output on the option module will turn off (indicating a fault) when any of the Fault indicators turn on or flash. A communications option module can also read the specific conditions causing a fault. Note that a fault condition DOES NOT disable the motor outputs when manually controlling the actuator with the adjust buttons; while useful for troubleshooting, care should be exercised when operating the motor under a fault condition. The OVERRIDE mode can also operate the motor when a fault condition exists.

Note that the indicators may not indicate all the fault conditions that may exist. This means that when the indicated fault is corrected, the unit may display another fault that has not been corrected. The table below provides a summary of the Fault indications which is followed by a description of each fault.

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RED	YEL	GRN	FAULT
flash	OFF	OFF	Low Battery Voltage
flash	flash	OFF	Motor 1 Stall
flash	OFF	flash	Motor 2 Stall
flash	flash	flash	Double Stall
flash	ON	OFF	Motor 1 Current Trip
flash	OFF	ON	Motor 2 Current Trip
flash	ON	ON	Double Current Trip
ON	OFF	OFF	Battery Over Voltage
ON	flash	OFF	Motor 1 No Motion
ON	OFF	flash	Motor 2 No Motion
ON	flash	flash	Double No Motion
OFF	OFF	flash	Feedback Alarm
OFF	flash	OFF	Loss of Command
OFF	ON	OFF	Command Out of Range
OFF	flash	flash	Feedback Alarm and Loss of Command
OFF	ON	flash	Feedback Alarm and Command Out of Range

**Low Battery Voltage** - If the supply voltage drops below 10V, the motor outputs are disabled and the red fault LED will flash indicating a low voltage condition. After the voltage returns, there is a retry delay before normal operation resumes. In AUTO and OVERRIDE modes, this retry delay will increase with each repeated low voltage fault to protect both the battery and the drive mechanism. Once a movement is completed without low voltage condition, the retry delay is reset to three seconds. In all other modes of operation, the retry delay is fixed at three seconds to allow for uninterrupted setup and configuration. A low battery voltage fault can indicate an uncharged or undersized battery, an undersized power supply or undersized power supply wiring (see WIRE TABLE in manual).

**Motor 1 Stall** - A *stall* condition is detected when no actuator motion is detected while the Motor 1 output is turned on and drawing more than 0.5A of motor current. The fault condition will disable the Motor 1 output only, and the fault is cleared when the DHC-400 detects a motion greater than 1.5° in either direction. The fault can be cleared if 1) the command signal commands a Motor 2 operation, 2) manual operation with the adjust buttons results in a motion greater than 1.5°, or 3) a mechanical manual override forces the 1.5° motion, provided the mechanical motion is monitored by the feedback pot.

**Motor 2 Stall** - A *stall* is detected when no actuator motion is detected while the Motor 2 output is turned on and drawing more than 0.5A of motor current. The fault can be cleared in the same manner as previously described for a Motor 1 Stall.

**Double Stall** - If the DHC-400 detects a *stall* condition in both directions, both motor outputs will be disabled. The command signal cannot clear this condition; only manual operation or a mechanical override can clear the fault. Alternatively, the DHC-400 can be powered off and then on to temporarily clear the fault; however, this practice should be avoided without permanently correcting the cause of such a fault.

# DHC-400 Gen 2

## Quick Cal & Troubleshooting Guide

**Motor 1 Current Trip** - A *current trip* fault is detected when the motor current exceeds see the CURRENT TRIP SETTING while the Motor 1 output is turned on. The fault can be cleared in the same manner as previously described for a Motor 1 Stall. NOTE: Successive attempts with manual operation using the adjust buttons can exceed the torque limit set by the Trip Setting.

**Motor 2 Current Trip** - A *current trip* fault is detected when the motor current exceeds see the CURRENT TRIP SETTING while the Motor 2 output is turned on. The fault can be cleared in the same manner as previously described for a Motor 1 Current Trip.

**Double Current Trip** - If the DHC-400 detects a *current trip* fault in both directions, both motor outputs will be disabled. The fault can be cleared in the same manner as previously described for a Double Stall.

**Battery Over Voltage** - If the supply voltage exceeds 30V, the motor outputs are disabled to protect both the DHC-400 and the actuator motor. Also, the red fault LED will turn on to indicate the fault. The fault LED will stay on for three seconds after the voltage drops below 30 volts, at which point normal operation will resume. If any appropriate relay option module is installed, the fault relay will turn off if the over-voltage condition lasts for more than one second. Once the voltage drops below 30 volts, the relay output will turn back on. Note; Earlier versions of the DHC-400 Gen 1 may not have this feature. Contact Peaktronics, Inc. for more information. WARNING! Exposing the DHC-400 to frequent or continuous voltages above 30V can damage the unit. The user should take steps to suppress or eliminate possible supply voltage conditions above 30V.

**Motor 1 No Motion** - A *no motion* fault occurs after 10 seconds of no actuator movement while motor 1 is powered on and drawing less than 0.5A. If the fault is triggered instantaneously, this is caused by a *short circuit* between motor 1 & 2 outputs, BAT NEG, or EARTH ground connections. To clear the fault, follow the same procedure as for a Motor 1 stall. A *stall* typically indicates a heavy load, while a *no motion* fault suggests worn motor brushes, a loose motor wire or disengaged feedback potentiometer. Note that the stalls can't be detected in applications with small motors (locked rotor currents under 0.5A); only a no motion fault can be detected.

**Motor 2 No Motion** - A *no motion* fault occurs after 10 seconds of no actuator movement while Motor 2 is powered on and drawing less than 0.5A. If the fault is triggered instantaneously, this is caused by a *short circuit* between motor 1 & 2 outputs, BAT NEG, or EARTH ground connections. To clear the fault, follow the same procedure as for a Motor 1 stall. A *no motion* fault differs from a *stall* as stated in the motor 1 no motion fault section. See Motor 1 for more details.

**Double No Motion** - If the DHC-400 detects a *no motion* fault in both directions, both motor outputs will be disabled. The fault can be cleared in the same manner as previously described for a Double Stall.

**Feedback Alarm** - A fault condition is detected whenever the feedback signal is out of range (that is, less than 5% of the potentiometer value or more than 95% of the potentiometer value), or when any of the potentiometer connections are broken. Normal operation resumes when the potentiometer is reconnected or back in range.

**Loss of Command** - When using 1-5V, 2-10V, 4-20mA, or a Digital input type for the command signal, a *loss of command* condition is detected whenever the input is disconnected, the input is connected backwards, or the input becomes less than 0.75V (for 1-5V input), 1.5V (for 2-10V input) or 3mA. A loss of command cannot be detected for a 0-5V or 0-10V command signal. The fault indication will remain on until the signal is corrected or reconnected. The actuator moves to a default position, as set by the LOSS OF COMMAND mode, while a *loss of command* condition exists.

**Command Out of Range** - An out of range condition is detected whenever the input becomes greater than 5.25V (for a 0-5V or 1-5V input), 10.5V (for a 0-10V or 2-10V input), or 21mA. When using a 0-5V or 0-10V command signal, an out of range condition is detected if the input is connected backwards. The fault indication will remain on until the signal is corrected. The motor outputs are turned off while a *command out of range* condition exists.