

LOGICPlus™



Carriage Controller SPECIFICATIONS

Specifications For Mobile Storage Systems

Computer Control Component

Background

The purchaser wishes to obtain a mobile storage system offering a computer logic system to control carriage movement, adjustments, and security access. The purchaser recognizes that a state of the art logic system is essential if the mobile storage system is to offer the flexibility, reliability and durability required by the purchaser. The purchaser will accept only logic systems offering complete functionality.

The purchaser will accept only logic systems where software is developed utilizing ISO9001 certified procedures. Purchaser will accept only logic system components that have been assembled under ISO 9001 certified manufacturing procedures. To assure that the logic system meets the purchaser's requirements the following set of specifications has been developed. The purchaser has identified one acceptable logic system. The purchaser will consider only mobile storage systems offering the approved component or equal. To be considered equal the logic system must meet the requirements set forth below.

Approved Logic System *LOGICPlus™*

Software Requirements

Software Development To be acceptable the software utilized by the logic system must have been developed under QS 9000 certified methods and procedures. Software developers must have at least ten years experience developing logic control systems for mobile storage systems. Software cannot be a 1.0 release. There must be a formal plan for continued development of the software. Software development plan must specify that up to three subsequent version releases will be compatible with the release being utilized in the logic system components being purchased as a part of this requisition.

The logic system must allow user function programming and system adjustment programming through the use of a program provided on CD ROM as a standard.

Component Assembly To be acceptable, a manufacturer utilizing certified ISO9001 procedures must assemble the logic system circuit boards.

Testing Requirements

Testing Authority Approvals To be acceptable the entire logic system must have been approved by UL 1950, cUL, ENEC, CE, IEC 950

Operating Requirements

The logic system must allow for control of the mobile storage system through user operation or from a PC utilizing RS485 communication. The logic control system must allow system operating and system security access adjustments by authorized users from a PC or from a simple one touch hand held device (transponder technology preferred). The logic system must allow for remote system preventive maintenance monitoring and remote service.

The logic system must allow for uncomplicated user reprogramming without the need to use specially trained outside personnel.

User Interface User interface to operate the system must be accomplished through the use of a heat sensitive or pressure sensitive touchpad. The user interface may not incorporate moving parts. **Systems utilizing buttons, switches or other mechanical devices for activation are not acceptable.** User interface must provide, as a standard, a contact area large enough to enable handicapped users easy access to the system. User interface must provide a contact area, as a standard, large enough to accommodate “hands full” activation by system users.

User interface or touchpad must provide a clear and easy to understand indication that a carriage has been secured for limited access.

User interface must provide a diagnostic display that gives a clear indication of a system operating problem. The logic system must be able to indicate the type of problem on the user interface. **Systems that provide only a problem indication with no diagnostic capabilities are unacceptable.**

Carriage Movement Control Logic system must provide soft carriage starting and stopping to avoid unnecessary motor and parts wear.

The logic system must be able to monitor motor current consumption to automatically detect changes in carriage weight load so that carriage running speed and carriage stopping distances may remain consistent after load weight changes. Logic system must provide consistent running speeds and stopping distances even though carriages within a system are carrying significantly different weights. **Logic systems requiring manual weight evaluation and adjustment are unacceptable.**

Carriage Stopping Control The logic system must provide for smooth stopping through the use of infrared analog sensors, which automatically calculate and adjust slow down and stopping time requirements based on the weight being carried. This system cannot utilize mechanical or moving parts to accomplish carriage stopping. **Limit switches or other such mechanical devices are unacceptable.**

Carriage Stopping Distance Adjustment The logic system must provide for adjusting carriage stopping distances to allow a greater distance between carriages in their closed positions. This allows for storage of items extending past the edge of the system shelving. The stopping distance change must be accomplished with no moving parts or mechanical devices. **Logic systems requiring the use of limit switches or other mechanical devices are unacceptable.** Stopping distance adjustment must be able to be accomplished from a PC and by at least one other method. One touch transponder technology is the preferred method for adjustment. **Systems requiring multiple programming steps with hand held devices for making adjustments are unacceptable.**

Converting Mobile Carriage To Stationary The logic system must allow all carriages to be converted from stationary to mobile or mobile to stationary to accommodate changes in mobile system usage levels or patterns on a temporary or permanent basis. The logic system must allow for this conversion directly from a PC or by an authorized user utilizing a one touch hand held device (transponder technology preferred). **Systems requiring manual key locks or systems requiring multiple step programming are unacceptable.**

Creating Dual Access Aisles The logic system must be designed in such a way that only one CPU is required for each carriage with the capability of controlling and synchronizing the keypads at either end of the carriage.

Limiting Aisle Access (Security Function) The logic system must allow for limiting specific aisle access to specific authorized users. Access to secured aisles by authorized users must be accomplished in a simple one-touch manner (transponder technology preferred). **Systems requiring multiple digit code inputs are unacceptable.** Logic system must permit up to ten unique security authorization patterns as a standard. Logic system must allow access authorization changes to be made remotely from a PC. Logic system must allow for user changes of the access keys (transponders preferred) through the use of a PC without special personnel or training required. **Logic systems using mechanical key and lock devices are unacceptable.**

Safety Systems The logic system must provide at least two built-in safety systems as standard functionality included with all logic units shipped. One safety system must be passive requiring no action by the user for activation. Activation must occur automatically upon the opening of an aisle. The passive safety system must remain in force restricting carriage movement until a user touching the touchpad on both sides of

The open aisle deactivates it. The logic system must require the next user to touch the touchpad on **both** sides of the open aisle prior to creating a new aisle. **Systems requiring that only one side on an open aisle be deactivated are unacceptable.** The logic system must allow user programming of passive safety unblock duration times. **Logic systems that require specially trained service personnel for adjustments to the safety systems are unacceptable.**

A second safety system must be provided as standard functionality with all units shipped. A logic system capable of recognizing the change in motor current utilized as the result of pressure applied against the moving carriage or its contents and instantaneously shutting down carriage movement is preferred. **Logic systems providing no safety functionality as a standard with all units shipped are unacceptable.**

The logic system must be capable of interface with additional safety systems such as PIR detection systems, safety plinth or safety sweeps.

The logic system must allow for user programming of aisle light activation when an aisle is opened. The system must allow for user programming aisle light duration time.

In the event of power failure the logic system must be capable of recognizing that carriages have been stopped during an aisle opening sequence and automatically activate the passive safety system. When power is restored, this capability will prevent movement until after the passive safety system is deactivated. This feature is considered to be of key importance because a user may enter a partially opened aisle during the power outage and still be in the partially opened aisle when power is restored. **Logic systems not offering this automatic feature in the event of power failure are unacceptable.**

Ability to Interface with Building Environmental Systems The logic system must be capable of interfaces with environmental systems such as fire alarm and suppression, temperature control, humidity control and ventilation control. The logic system must allow for user programming of defined carriage response to activation by such systems. The logic system must allow for user programming of automatic carriage positioning in off-hour periods. **Logic systems requiring specially trained technical personnel to accomplish this function programming are unacceptable.**