MagneMotion Glossary of Terms

Bulletin Numbers MML, QS, QSHT, NC-*

AB QUALITY

Allen-Bradley

by **ROCKWELL AUTOMATION**

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

⚠	**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

⚠	**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

These labels may also be on or inside the equipment to provide specific precautions.

⚡	**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.

🔥	**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

💥	**ARC FLASH HAZARD:** Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

The following icon may appear in the text of this document.

💡	Identifies information that is useful and can help to make a process easier to do or easier to understand.

💡	Rockwell Automation recognizes that some of the terms that are currently used in our industry and in this publication are not in alignment with the movement toward inclusive language in technology. We are proactively collaborating with industry peers to find alternatives to such terms and making changes to our products and content. Please excuse the use of such terms in our content while we implement these changes.

Glossary

Application Code Manager:
Rockwell Automation Software capable of reproducing standardized blocks of code capable of interfacing with the QuickStick®, QuickStick® HT™, or MagneMover® LITE™ systems utilizing the MagneMotion® ICT Libraries.

Bandwidth:
The measure of maximum data rate that can be transferred. It is generally conveyed in terms of bits/second from the physical point of view and does not include the packet framing or the normal overhead associated with coordinating data across the channel.

Block:
See Motor Block.

Bogie:
A structure underneath a Vehicle to which a Magnet Array is attached. The structure is then attached to the vehicle.

Brick-wall Headway:
The space that is maintained between vehicles to make sure that a trailing vehicle is able to stop safely if the lead vehicle stops suddenly ("hits a brick wall").

Byte:
An octet of data (8 bits).

Clearance Distance:
The position on a path associated with a node where the trailing edge of a vehicle is considered cleared from the node. See Node Clearance Distance.

Component:
The main parts that form a Transport System. Also called system components, these include the High-Level Controller, Motors, Nodes, Node Controllers, Paths, and Vehicles.

Configuration File:
See Node Controller Configuration File.

Configurator:
The application that is used to define and edit the basic operating parameters of the transport system that are stored in the Node Controller Configuration File.

Control Path:
The path that is linked to a Peer Path to create a junction. Once linked, this path remains the Control Path for the life of the junction until the junction transitions to the unlinked state.

Controller:
A device that monitors and controls the operating conditions of the equipment being monitored. In a transport system, the types of controllers include the High-Level Controller, Node Controller, and Host Controller.

Controller (Master)
The supervisory controller for each motor, it communicates with the Driver (Slaves)s to direct Motor Block operation and read motor sensors. It communicates vehicle positions and other information to the Node Controller and upstream and downstream motors. It is internal to the motor assembly on MagneMover LITE and QuickStick motors. For QuickStick HT motors, it is in the Motor Controller (Inverter).

Couple:
The joining of a Vehicle into a Platoon, where one vehicle follows another vehicle at a defined distance.

Cycle Length:
The distance between the centerlines of two like poles on the Magnet Array.

Demo Script:
A text file that is used with the NCHost TCP Interface Utility for test or demonstration purposes to move vehicles on the Transport System.

Glossary

Design Specifications: The unique parameters for a specific transport system.

Downstream: The end of a motor or Path as defined by the logical forward direction. Vehicles typically enter the motor or path on the Upstream end.

Downstream Gap: The physical distance from the end of the stator in one motor to the beginning of the stator in the next motor downstream on the same path. This distance includes the Motor Gap.

Drive (disambiguation): See Motor Controller (Inverter).

Driver (Slaves) The subordinate controllers for the motor, they communicate with the Controller (Master) and operate the Inverters and position-sense hardware. They are internal to the motor assembly on MagneMover LITE and QuickStick motors. For QuickStick HT motors, they are in the Motor Controller (Inverter).

Emergency Off: A user-supplied device that disconnects AC power to the transport system.

Emergency Stop: A user-supplied circuit with a locking button that anyone can press to stop motion in the transport system. It can be wired through the digital I/O on some Node Controllers.

EMO: See Emergency Off.

Emulate 3D: Turnkey software capable of emulating automation operations. Used to configure, program, and simulate a Transport System without the need for another available Utility.

Entry Gate: The position on a path associated with a node where the leading edge of a vehicle is considered cleared from the node.

Entry Path: A path whose Downstream end is a member of a node. A Vehicle that is moving downstream enters a node on an entry path.

Equivalent-Route: A path in a set of Moving Path Node member paths that offers a route to a destination that is reachable via any other path in the set.

ERF Files: See Motor ERF Image Files (ERF File).

Ethernet Chain: Ethernet chains allow devices to be connected in series with standard Ethernet cable without the need for additional network switches. A daisy-chain device has two embedded Ethernet ports that function as an Ethernet switch and an interface to the local device. This embedded switch allows information to flow to the device or flow through the ports to other devices in the chain.

Ethernet Motor Commissioning Tool:
A utility that helps the user generate a MagneMotion Information and Configuration Service (MICS) Files. The MICS File defines the IP Address and Directionality of the motors in the system based on their MAC Address.

Ethernet/IP™: One of the available network protocols used to establish communications between a Host Controller and the HLC in a transport system, Ethernet/IP is used to exchange status and command data. See also MMI-UM004.

Exit Path: A path whose Upstream end is a member of a node. A vehicle that is moving Downstream exits a node on an exit path.

E-stop: See Emergency Stop.

FastStop:	A command to stop all Vehicle motion on the specified path or all paths abruptly. FastStop causes the motors to apply reverse thrust to all vehicles on the specified paths, which causes the vehicles to stop as fast as possible. Only used with QuickStick and QuickStick HT transport systems.
Fixed Path:	A path whose position is fixed in the track layout. See Moving Path.
Following Vehicle:	A vehicle following another vehicle in a Platoon. This vehicle can be following either the lead vehicle or another following vehicle.
Forward Direction:	The default direction of motion, from Upstream to Downstream, on a Transport System.
Glide Puck:	A preconfigured vehicle for use on MagneMover LITE System that uses low friction skids to slide on the integral rails.
Global Directives:	The Demo Script commands that define the general operating characteristics for all vehicles specified. See also Vehicle Directives.
Ground:	The reference point in an electrical circuit from which voltages are measured. This point is typically a common return path for electric current. See also PE.
Guideway:	A component of the Track System that consists of rails or other devices in contact with the Vehicle, either through wheels or low friction runners on the vehicle. The guideway maintains the proper relationship between the vehicles and the motors. In the MagneMover LITE System, the guideway is the integral rails that are mounted on the motors.
Hall Effect Sensor:	A transducer that varies its output in response to changes in a magnetic field. Hall Effect Sensors (HES) are used by linear synchronous motors (LSM) for vehicle positioning and speed feedback.
Headway:	The space that is maintained before a vehicle to make sure that the vehicle is able to stop safely. See Brick-wall Headway.
High-Level Controller:	The application in a Node Controller that communicates with the Host Controller. Only one node controller per HLC Control Group runs the High-Level Controller application. In a Transport System with only one node controller, it runs both the node controller and high-level controller applications.
HLC:	See High-Level Controller.
HLC Control Group:	The portion of a multi-HLC LSM transport system under control of a specific HLC.
HMI:	See Human Machine Interface.
Host Application:	The software on the host controller that provides monitoring and control of the transport system.
Host Control Session:	A session between a host controller application (such as the NCHost TCP Interface Utility) and an HLC that allows control of all aspects of transport system operation. The Host Control Session also allows active monitoring of transport system status.
Host Controlled Mechanism:	An external mechanical mechanism controlled by a third-party device or PLC. Examples of this could be a switch, screw, rack and pinion, turntable, or elevator. Also known as a User Supplied Mechanism.

Host Controller: The user-supplied controller that provides control and sequencing for the operation of the Transport System.

Host Status Session: A session between a host controller application (such as the NCHost TCP Interface Utility) and an HLC that only provides active monitoring of transport system status.

Human Machine Interface:
The hardware or software through which an operator interacts with a PLC.

ICT: See Independent Cart Technology (ICT).

ID: The software labels used to identify various components of the transport system to help ensure proper execution of commands involving vehicle position, vehicle destination, and transport system configuration. ID types include vehicle and path.

Independent Cart Technology (ICT):
A programmable intelligent conveyor system that uses linear synchronous motors for moving multiple independently controlled vehicles.

ICT Libraries: A repository of pre-written code that establishes communications between the Host Controller and the High-Level Controller and facilitates the monitoring and control of the transport system from the Host Controller..

Interface: A specific device or program that enables a user to connect or communicate with a computer.

Interlock: A user-supplied circuit that is used to stop motion in the Transport System. It is wired through the digital I/O on the Node Controller.

Inverter: The hardware that converts DC from the propulsion power bus to pulse-width modulated AC to energize the coils in a Motor Block. Inverter handles only Propulsion Power handling chores in LSMs.

Keep-out Area: A section of a motor where a Vehicle that is moving in the specified direction of the area is not allowed to enter the area unless it has permission from the motors to either move past or stop within the area. Once a vehicle enters the keep-out area in the specified direction, all other vehicles that are moving in the same direction must wait to enter the area until that vehicle exits.

Lead Vehicle: The vehicle at the front of a Platoon. This vehicle determines the destination, acceleration, and velocity of the platoon.

Linked Path Junction: The aligned junction in a Moving Path between two member paths where motor-to-motor communication is being forwarded.

Logic Power: The power that is used for the controllers and signals.

LSB: Least Significant Byte.

LSM: Linear Synchronous Motor. See MagneMover LITE, QuickStick, and QuickStick HT.

MagneMotion Information and Configuration Service (MICS) Files:
XML files (MICS_motor_data.xml) that contains the network topology parameters for the transport system using motors connected via Ethernet. The file includes the MAC address of each motor and the location of each motor on a path. The MICS file is uploaded to each Node Controller in a Transport System.

NC File Retrieval Tool: A desktop utility that aids the user in extracting all Log files and any relevant system information for troubleshooting in a single ZIP file.

MagneMotion System Configurator Tool:
A desktop utility that helps the user create and modify the Node Controller Configuration File to define the transport system. This file is used for transport systems that include QuickStick, QuickStick HT, or MagneMover LITE motors. (See also MMI-UM046 and MMI-UM010.)

MagneMover LITE has a visual interface where motors can be dragged and dropped to build an NDX Layout File from which the Node Controller Configuration File may be generated. An MMTRK Track File can be generated from a complete MagneMover LITE Node Controller Configuration File to be opened in NCHost TCP Interface Utility.

MagneMover LITE: A linear synchronous motor with integrated guideways and vehicles that enable quick, efficient conveyance of small loads. See MMI-UM002.

MagneMover LITE System:
A group of specific components that contribute to a Transport System. These components include MagneMover LITE motors, Node Controllers, Pucks, and other components.

Magnet Array: The magnets that are attached to the Vehicle. It is the motor secondary, moved by the primary in the motor.

Magnet Array Type Files:
XML files (magnet_array_type.xml) that contain basic information about the specific Magnet Array type that is used on the vehicles in the Transport System. The magnet array type file is uploaded to each Node Controller in the transport system.

MM LITE™: See MagneMover LITE.

MML™: See MagneMover LITE.

Motion Controller: The user-supplied controller for direct control of vehicles through the LSM Synchronization option. It can reside on the Host Controller.

Motor: See LSM.

Motor Block: A discrete motor primary section (coil or set of coils) in a motor that can be energized independently. This section can contain only one vehicle during transport system operation.

Motor Controller (Inverter):
The hardware that converts DC from the propulsion power bus to AC to energize the coils in a Motor Block and contains the Driver (Slaves) and the Inverter for QuickStick HT motors.

Motor ERF Image Files (ERF File):
The software files for the motors (motor_image.erf). The Motor ERF image files are uploaded to all node controllers in the transport system and then programmed into all motors.

Motor Gap:	The physical distance between two motors that are mounted end to end. This gap excludes the distance from the end of the stator to the end of the motor housing.
Motor Type Files:	XML files (motor_type.xml) that contain basic information about the specific motor types being used. The Motor Type files are uploaded to all node controllers in the transport system.
Moving Path:	A path that is moved to align with the end of another path. See Fixed Path.
MSB:	Most Significant Byte.
NC:	See Node Controller.

NCHost TCP Interface Utility:

A Desktop utility that allows the user to interface with the high-level controller to send path, node, and vehicle commands. The utility also allows the visualization of the system's status with a TCP/IP connection without using a host controller.

Network:	Ethernet network providing communications, Ethernet/IP™, between the host controller, motors, and the HLC. TCP/IP is used between the node controllers.
Node:	A junction that is defined as the beginning, end, or intersection of Paths. The different node types define their use: Simple, Relay, Terminus, Merge, Diverge, Gateway, Moving Path, Overtravel, Merge-Diverge, and so on. See MMI-UM046 for node type definitions ('Create and Edit Nodes').

Node Clearance Distance:

The position on a path associated with a node where the trailing edge of a vehicle is considered cleared from the node. See Clearance Distance.

Node Controller:	The hardware and the application running on that hardware that coordinate vehicle motion along a path or paths. The node controller is responsible for the motors on all paths originating from nodes that the node controller is responsible for. There can be multiple node controllers in a transport system, each responsible for a subset of the nodes within the transport system.

Node Controller Configuration File:

The XML file unique to the transport system that defines the basic operating parameters of the transport system. A copy of the Node Controller Configuration File is uploaded to each node controller in the transport system.

NRTL/ATL:	Nationally Recognized Test Lab/Accredited Test Lab. OSHA recognizes NRTL organizations in accordance with 29 CFR 1910.7 to test and certify equipment or materials (products). Accreditation bodies evaluate ATL organizations to ISO/IEC 17025 for testing and calibration laboratories.

Output Signal Switching Device (OSSD):

The interface of a sensor (such as a light curtain) designed for reliably signaling a safety-related event. OSSD signals are outputs from the protective device to a safety relay.

Path:	A designation for one or more motors placed end to end which defines a linear route for vehicle travel. A path begins at the <u>Upstream</u> end of the first motor in the series and ends at the <u>Downstream</u> end of the last motor in the series. All paths must begin at a <u>Node</u> and the beginning of a path is always the zero position for determining positions along that path.
PE:	Protective Earth. A conductor that is provided for safety purposes (for example, against the risk of electric shock) and which also provides a conductive path to earth. See also, <u>Ground</u>.
Peer Path:	The path that is linked to a <u>Control Path</u> to create a junction. Once linked, this path remains the Peer Path for the life of the junction until the junction transitions to the unlinked state.
PID Tuning:	A trial and error procedure in which the Control Loop Parameters are modified to improve the vehicle performance during motion and settling.
Pitch:	The distance between a point on one coil and the corresponding point on an adjacent coil in the same motor or an adjacent motor. Or, the distance between a point on one magnet and the corresponding point on an adjacent equivalent magnet in the same array.
Platoon:	A group of vehicles that are moving together and following a lead vehicle. This group of vehicles is allowed to maintain a distance between each other while in motion that is less than the <u>Brick-wall Headway</u>, also called platooning.
PLC:	See <u>Programmable Logic Controller (PLC)</u>.
Position:	A specific location on a <u>Path</u>, which is measured from the beginning of that path, which is used as a vehicle destination. Position zero on any path is defined as the leading edge of the first LSM in the path.
	A vehicle at a specific position has its midpoint over that location on the path.
Power Supply:	The equipment that is used to convert facility AC power to the correct voltages for the transport system.
Programmable Logic Controller (PLC):	
	A <u>Programmable Logic Controller (PLC)</u> is a user-supplied dedicated controller consisting of Processor and I/O modules that provides control, sequencing, and safety interlock logic for the operation of the transport system. A type of <u>Host Controller</u> that can send and receive message commands to and from
Propulsion Power:	The power that is used for vehicle motion.
Protected Area:	The area around a node that is defined by the <u>Entry Gates</u> and <u>Node Clearance Distances</u>. This area is used to make sure that vehicles do not collide with other vehicles in the node or with the mechanism that is related to the node.
Puck:	A preconfigured vehicle for use on MagneMover LITE transport systems. The magnet array is mounted to the puck and interacts with the motors, which move each vehicle independently. See <u>Glide Puck</u> and <u>Wheeled Puck</u>. See also, <u>Vehicle</u>.
QS:	See <u>QuickStick</u>.
QuickStick:	A linear synchronous motor that enables quick, efficient conveyance of large loads on user-designed guideways and vehicles. See <u>MMI-UM006</u> for QS 100 and <u>MMI-UM047</u> for QS 150.

QuickStick HT:	A linear synchronous motor that enables quick, efficient conveyance of large loads on user-designed guideways and vehicles. See MMI-UM007.

- QSHT (Gen 2) is a QSHT system utilizing QSMC motor controllers as the remote element of the motor

    - QSMC motor controller is the remote motor controller for the QSHT 1.0 m or 0.5 m double-wide motor. One QSMC is used for each QSHT motor.

    - QSMC-2 motor controller is the remote motor controller for the QSHT 0.5 m motor. One QSMC-2 is required for every two consecutive QSHT 0.5 m motors.

- QSHT 5700 is a QSHT system utilizing QSHT 5700 motor controller as the remote element of the motor

    - The QSHT 5700 motor controller is a Kinetix® 5700 drive that was modified to control the QSHT motor. One motor controller can control one 1.0 m motor, or one or two consecutive 0.5 m motors, or one 0.5 m double-wide motor.

QuickStick System:	A group of specific components that contribute to a Transport System. These components include QuickStick motors, Node Controllers, Motor Controller (Inverter)s (QSHT only), Host Application, Magnet Arrays, Vehicle, Track System, and other components.
Reset:	A command to reset motors on one or all paths in a Transport System which will clear all vehicle records from the motors and release control of all vehicles. Paths must be reset when starting a system, after replacing a motor on a path, or after programming the motors on a path.
Resume:	A command to restart vehicle motion on a specific path or all paths after a Suspend motion or FastStop command was issued. Resume is also used after an E-stop was issued and the E-stop button has been manually reset.
Sensor Map:	A snapshot of the signal state of vehicle magnet array sensors that are collected from all blocks of a motor.
Signal:	Each motor contains sensors that detect the magnetic field from the magnet array. When the signal from the sensors is higher than a threshold, the signal bit for the associated sensor is set high, otherwise it is set low.
Single Vehicle Area:	A unidirectional area of a Path. Only one vehicle that is moving in the specified direction of the area is allowed to enter the area at a time. Other vehicles on the path that are moving in the same direction as the initial vehicle in the SVA must wait to enter this area until the previous vehicle exits. This queueing allows one vehicle to move backward and forward along a portion of a path without interfering with any other vehicles.
Specific Path:	A fixed path in the Transport System when using a Moving Path that can satisfy a specific route specified by the Host Controller.
Specific-Route Path:	A path in a set of Moving Path Node member paths that offers a specific route to a destination that is reachable only by a Fixed Path in the set.

Startup:	A command following a [Reset] or [Warm Reset] command, to enable one or more paths on the [Transport System]. Startup forces a rescan of the [Specific Path] or all paths to locate all the vehicles on those paths. Paths can not be started if the [E-stop], [Interlock], or [FastStop] is active.
Station:	A specific location on a [Path], which is measured from the beginning of that path, and identified with a unique ID, used as a [Vehicle] destination.
Stator:	The stationary part of the [Motor] over which the [Magnet Array] moves.
Suspend:	A command to stop all vehicle motion on the [Specific Path] or all paths in the [Transport System] and to keep additional movement from occurring.
Switch:	The mechanical guide for positioning a vehicle through [Guideway] sections that merge or diverge. For a QuickStick transport system, see also [Host Controlled Mechanism]. For MagneMover Lite transport systems, the motor module that contains the mechanism for aligning the rails or guideway to merge or diverge paths.
SYNC IT™:	Provides direct control by a motion controller of up to three [Sync Zone]s (requires sync-enabled motors) where the host controller generates the vehicle motion profile.
Sync Zone:	An area where vehicle motion can be synchronized with other systems through direct control of the motor by the host controller.
System Component:	See [Component].
Tandem Vehicle:	A vehicle that uses dual [Bogie]s (two magnet arrays on pivoting carriers that are linked to the vehicle) to provide enough thrust to carry larger loads.
TCP/IP:	Transmission Control Protocol/Internet Protocol. TCP/IP stands for Transmission Control Protocol/Internet and is a suite of communication protocols used to interconnect network devices on the Internet.
Track File:	A text file (track_file.mmtrk) that contains graphical path and motor information about the [Transport System]. The track file is used by the [NCHost TCP Interface Utility] to provide a graphical representation of the transport system to monitor system operation.
Track Layout File:	An XML file (track_layout.ndx) that contains the parameters for the graphical representation of a [MagneMover LITE] transport system. The Track Layout File is used by the [MagneMotion System Configurator Tool] to generate the [Node Controller Configuration File] and the [Track File] for MagneMover LITE systems.
Track System:	The components that physically support and move vehicles. For a QuickStick or QuickStick HT transport system, the track includes a [Guideway], one or more [QuickStick] or [QuickStick HT] motors, mounting hardware, and a stand system. For a MagneMover LITE transport system, the track includes the [MagneMover LITE] motors and stands.
Transport System:	The components that collectively move user material. These components include the [Motor]s, external [Motor Controller (Inverter)]s (QSHT only), [Track System], [Node Controller]s, [Vehicle]s, cables, and hardware.
Uncouple:	Remove a vehicle from a [Platoon].

Upstream:	The beginning of a motor or path as defined by the logical forward direction. The upstream ends of all paths are connected to a [Node Controller](#). Vehicles typically exit the motor or path on the [Downstream](#) end.
User Supplied Mechanism:	see [Host Controlled Mechanism](#).
Utility:	A program designed to help manage or tune a system. Examples include: [MagneMotion System Configurator Tool](#), [NCHost TCP Interface Utility](#), [Ethernet Motor Commissioning Tool](#), [NC File Retrieval Tool](#), [Virtual Scope Utility](#), [Emulate 3D](#), and [Application Code Manager](#).
V-Brace:	The mechanical fixture that is used to align and secure [MagneMover LITE](#) guide rail and motor sections.
Vehicle:	The independently controlled moving element in a [Transport System](#). The vehicle consists of a platform that carries the payload and a passive magnet array to provide the necessary propulsion and position sensing. All vehicles on paths in the transport system that are connected through nodes must be the same length.

The transport system constantly monitors and controls vehicle position and velocity for the entire time the vehicle is on the transport system. All vehicles are assigned a unique ID at startup and retain that ID until the transport system is restarted or the vehicle is removed or deleted. |
Vehicle Directives:	The [Demo Script](#) commands that define the individual motion characteristics for a specific vehicle. See also [Global Directives](#).
Vehicle Gap:	The distance between the bottom of the [Magnet Array](#) that is attached to a vehicle and the top surface of a motor.
Vehicle ID Server Database:	The HLC database for the assignment and tracking of vehicle IDs in the transport system. When using [HLC Control Groups](#), the Server HLC maintains this database.
Vehicle ID Client Database:	The Client HLC database for tracking of vehicle IDs in the HLC Control Group managed by that Client HLC and assigned by the Server HLC. This database is only used when using [HLC Control Groups](#) to subdivide a transport system.
Vehicle Master:	The motor controlling the [Vehicle](#).
Vehicle Signal:	A motor software flag for each vehicle that is used to indicate if the vehicle is detected on the transport system.
Vehicle Spacing:	The distance between two vehicles on the same [Path](#).
Virtual Scope Utility:	Software application supplied by Rockwell Automation to monitor and record the change of motor performance parameters. These parameters are displayed as waveforms to monitor and record the motor and vehicle performance parameters.
Warm Reset:	A command to reset the motors on the specified path or all paths, which clears all vehicle records from the motors and releases control of all vehicles. The Warm Reset does not interrupt Ethernet communication between the motors on those paths.

Wheeled Puck: A preconfigured vehicle for use on MagneMover LITE transport systems that uses low friction wheels to ride on the integral rails.

Zero Point: The position on the Upstream end of a Path that denotes the first part on which a Vehicle travels.

Additional Resources

Before configuring or running the components, consult the following documentation. You can view or download publications at rok.auto/literature.

Resource	Description
MagneMotion QuickStick and QuickStick HT Design Guide, publication MMI-RM001	This manual explains how to design and configure the track layout and transport system.
MagneMotion Glossary of Terms, publication MMI-RM003	This manual includes definitions of MagneMotion and industry terms.
MagneMotion System Configurator User Manual, publication MMI-UM046	This manual explains how to use the MagneMotion System Configurator to create and modify the Node Controller Configuration File (Configuration File) for the MagneMotion transport systems.
QuickStick Motors Technical Data, publication MMI-TD051	This manual includes technical specifications for the QuickStick 100 and QuickStick 150 motors.
MagneMotion Node Controller Interface User Manual, publication MMI-UM001	This manual explains how to use the supplied interfaces to configure and administer node controllers that are used with transport systems. This manual also provides basic troubleshooting information.
MagneMotion LSM Synchronization Option User Manual, publication MMI-UM005	This manual explains how to install, operate, and maintain the LSM Synchronization Option for use with transport systems.
MagneMotion NCHost TCP/IP Interface Utility User Manual, publication MMI-UM010	This manual explains how to use the NCHost TCP/IP Interface Utility to run a transport system for testing and debugging. This manual also explains how to develop Demo Scripts to automate vehicle motion for that testing.
MagneMotion Virtual Scope Utility User Manual, publication MMI-UM011	This manual explains how to install and use the Virtual Scope utility. This utility provides real-time feedback of the change in Linear Synchronous Motor (LSM) performance parameters.
MagneMotion Node Controller Hardware User Manual, publication MMI-UM013	This manual explains how to install and maintain the node controllers that are used with transport systems.
MagneMover LITE Ethernet Motor Configuration and Communication, publication MMI-UM031	This manual describes the network topologies for wiring MagneMover LITE Ethernet motors and for combining both RS-422 and Ethernet motors in the same transport system.
Power Supply Reference Manual 1606-XLS960F-3, publication 1606-RM032	The manual provides the specifications for the 1606 power supplies.
MagneMotion Host Controller TCP/IP Communication Protocol User Manual, publication MMI-UM003	These manuals describe the communication protocols between the high level controller and a host controller. These manuals also provide basic troubleshooting information.
MagneMotion Host Controller EtherNet/IP Communication Protocol User Manual, publication MMI-UM004	
MagneMover LITE User Manual, publication MMI-UM002	This manual explains how to install, operate, and maintain the MagneMover LITE transport system. This manual also provides information about basic troubleshooting.

Resource	Description
QuickStick 100 User Manual, publication MMI-UM006	This manual explains how to install, operate, and maintain the QuickStick 100 transport system. This manual also provides information about basic troubleshooting.
QuickStick 150 User Manual, publication MMI-UM047	This manual explains how to install, operate, and maintain the QuickStick 150 motors and magnet arrays. This manual also provides information about basic troubleshooting.
QuickStick HT User Manual, publication MMI-UM007	This manual explains how to install, operate, and maintain the QuickStick High Thrust (QSHT) transport system. This manual also provides information about basic troubleshooting.
EtherNet/IP Network Devices User Manual, publication ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, publication ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
System Security Design Guidelines Reference Manual, publication SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation® products in a secure system, harden the control system, manage user access, and dispose of equipment.
UL Standards Listing for Industrial Control Products, publication CMPNTS-SR002	Assists original equipment manufacturers (OEMs) with construction of panels, to help ensure that they conform to the requirements of Underwriters Laboratories.
American Standards, Configurations, and Ratings: Introduction to Motor Circuit Design, publication IC-AT001	Provides an overview of American motor circuit design based on methods that are outlined in the NEC.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications.	Provides declarations of conformity, certificates, and other certification details.

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Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates.	rok.auto/support
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment should be collected separately from any unsorted municipal waste.

Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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