

Modbus TCP/IP
User Manual



Contents

Preface	3
Terms of use	4
Revision overview.....	5
Connection diagram	6
Applicable for: LA14, LA25, LA36, LA37, LA76 and LA77	6
Applicable for: LC3 IC.....	7
I/O specifications.....	8
Parallel.....	10
Getting started	12
Power supply.....	12
Configuration	12
Parameters to be verified by Actuator Connect™	13
Command examples	14
General run prerequisites	14
Run the actuator outwards	14
Register overview.....	15
Command details	15
Feedback status details	16
Parallel feedback status details.....	18
Diagnostics data	19
Error codes	23
Parallel error codes.....	24

Preface

Dear User,

We are delighted that you have chosen a LINAK® product.

LINAK systems are high-tech products based on many years of experience in the manufacture and development of actuators, lifting columns, desk frames, electric control boxes, controls, batteries, accessories and chargers.

This User Manual does not address the end user. It is intended as a source of information for the equipment or system manufacturer only, and it will tell you how to install, use and maintain your LINAK electronics. The manufacturer of the end product has the responsibility to provide a User Manual, where relevant safety information from this manual is passed on to the end user.

We are convinced that your LINAK product/system will give you many years of problem-free operation.

Before our products leave the factory, they undergo both function and quality testing. Should you, nevertheless, experience problems with your product/system, you are always welcome to contact your supplier.

LINAK subsidiaries and some distributors situated all over the world have authorised service centres, which are always ready to help you. Locate your local contact information on the back page.

LINAK provides a warranty on all products. (See warranty section).

This warranty, however, is subject to correct use in accordance with the specifications, maintenance being done correctly, and any repairs being carried out at a service centre, which is authorised to repair LINAK products.

Changes in installation and use of LINAK systems can affect their operation and durability. The products may only be opened by authorised personnel.

This User Manual has been written based on the present technical knowledge. LINAK reserves the right to carry out technical modifications and keeps the associated information updated.

LINAK A/S

Terms of use

LINAK® takes great care in providing accurate and up-to-date information on its products. However, the user is responsible for determining the suitability of LINAK products for a specific application.

Due to continual development, LINAK products are subject to frequent modifications and changes. LINAK reserves the rights to conduct modifications, updates, and changes without any prior notice. For the same reason, LINAK cannot guarantee the correctness and actual status of imprinted information on its products.

LINAK uses its best efforts to fulfil orders. However, for the reasons mentioned above, LINAK cannot guarantee availability of any particular product at any given time. LINAK reserves the right to discontinue the sale of any product displayed on its website or listed in its catalogues or in other written material created and produced by LINAK, LINAK subsidiaries, or LINAK affiliates.

All sales are subject to the 'Standard Terms of Sale and Delivery for LINAK A/S' available on LINAK websites.

LINAK and the LINAK logotype are registered trademarks of LINAK A/S. All rights reserved.

Revision overview

Edition 2

Item number for cable kit added	Page 6-7
'Manual run' changed to 'Extends actuator' and 'Retracts actuator'	Page 6-8
'Service interface' changed to 'Parallel data'	Page 6-8
'Service interface GND' changed to 'Parallel GND'	Page 6-8
'V DC' added	Page 6-8
Information about separate supplies added	Page 8
'Parallel' section updated	Page 10-11
Power supply table updated	Page 12
'Configuration' updated	Page 12
IP address updated	Page 13
'Run out command' changed to 'Command examples'	Page 14
'Communication sequence...' changed to 'Run the actuator outwards'	Page 14

Edition 1

New document

Connection diagram

Applicable for: LA14, LA25, LA36, LA37, LA76 and LA77

Power

BROWN

24/48 V DC

BLUE

GND



Control

1

Extends the actuator

2

Retracts the actuator

4*

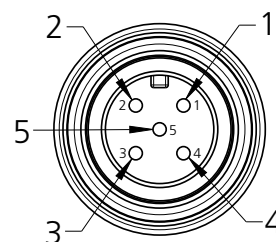
Split power supply V DC

3

Parallel data

5

Parallel GND



M12

Communication

1

ETH_TX+

2

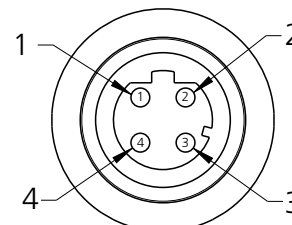
ETH_RX+

3

ETH_TX-

4

ETH_RX-



M12



The physical layer conforms to the IEEE 802.3-2018 standard with communication speeds of 10 Mbps and 100 Mbps, respectively. Cable length is reduced to = 100 m without repeater, as determined by IEEE 802.3-2018.

* Split power supply and motor supply (Brown), which refer to a common GND (Blue).

This approach is used to maintain power on the intelligent part of the actuator. In case the main supply is disconnected, split power supply allows e.g. that the position is maintained. The main supply may be disconnected for reasons related to safety, maintenance or installation.



Actuator Connect™ is available for Modbus TCP/IP actuators and can be used for:

Diagnostics, manual run and configuration. The newest version is available online [here](#).



Connect the actuator to Actuator Connect via a USB adapter cable (must be purchased separately) to enable and configure various features.

Item number for cable kit: 0367996

Connection diagram

Applicable for: LC3 IC

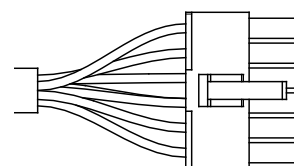
Power

BROWN	24/48 V DC
BLUE	GND



Control

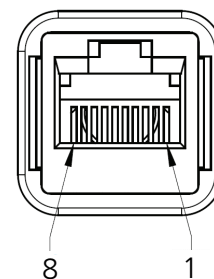
RED	Extends the actuator
BLACK	Retracts the actuator
ORANGE*	Split power supply V DC
VIOLET	Parallel data
WHITE	Parallel GND



**Molex mini-fit
12-pin**

Communication

1	ETH_TX+
3	ETH_RX+
2	ETH_TX-
6	ETH_RX-



RJ45



The physical layer conforms to the IEEE 802.3-2018 standard with communication speeds of 10 Mbps and 100 Mbps, respectively. Cable length is reduced to = 100 m without repeater, as determined by IEEE 802.3-2018. The wiring conforms to the T-568A standard.

* Split power supply and motor supply (Brown), which refer to a common GND (Blue).

This approach is used to maintain power on the intelligent part of the actuator. In case the main supply is disconnected, split power supply allows e.g. that the position is maintained. The main supply may be disconnected for reasons related to safety, maintenance or installation.



Actuator Connect™ is available for Modbus TCP/IP actuators and can be used for:


Diagnostics, manual run and configuration. The newest version is available online [here](#).



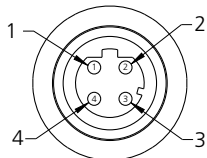
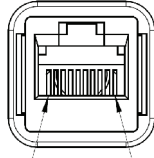
Connect the actuator to Actuator Connect via a USB adapter cable (must be purchased separately) to enable and configure various features.

Item number for cable kit: 0367996

I/O specifications

Input/Output	Specification	Comments
Description	The communication protocol conforms to the IEEE 802.3-2018 Ethernet standard with communication speeds of 10 Mbps and 100 Mbps.	 Modbus TCP/IP
Brown	Connect Brown to positive 24/48 V DC	<p>Note:</p> <p>Do not change the power supply polarity on the Brown and Blue wires!</p> <p>Only for powering the motor driver module.</p> <p>Power supply GND is electrically connected to the housing through a capacitor and resistor in parallel.</p>
Blue	Connect Blue to negative GND	
PIN out	Data cable M12 - 5-pin male	
Pin 1	Extends the actuator	<p>The signal becomes active at:</p> $V_{IN} > 67\%$ of V DC
Pin 2	Retracts the actuator	<p>The signal becomes inactive at:</p> $V_{IN} < 33\%$ of V DC Input current: 10 mA
Pin 4	Split power supply V DC	<p>Split power supply:</p> <p>24 V DC with ≈ 28 mA current consumption. 48 V DC with ≈ 16 mA current consumption.</p> <p>The split power supply uses the common GND from the power supply (Blue).</p> <p>Split power supply is only for powering the communication of the integrated controller.</p>
Pin 3	Parallel data	<p>The Parallel drive function will support up to 8 actuators running simultaneously.</p> <p>It is possible to run Parallel with a main power supply or separate power supplies.</p>
Pin 5	Parallel GND	<p>It is possible to run Parallel with a main power supply or separate power supplies. If separate supplies are used, they must have the same potential, and the power supply GND (Blue wires) must be connected in the common ground.</p>

I/O specifications

PIN in		Data cable M12 - 4-pin female
Pin 1	ETH_TX+	
Pin 2	ETH_RX+	
Pin 3	ETH_TX-	
Pin 4	ETH_RX-	
PIN in		RJ45 (Only for LC3 IC)
Pin 1	ETH_TX+	
Pin 3	ETH_RX+	
Pin 2	ETH_TX-	
Pin 6	ETH_RX-	

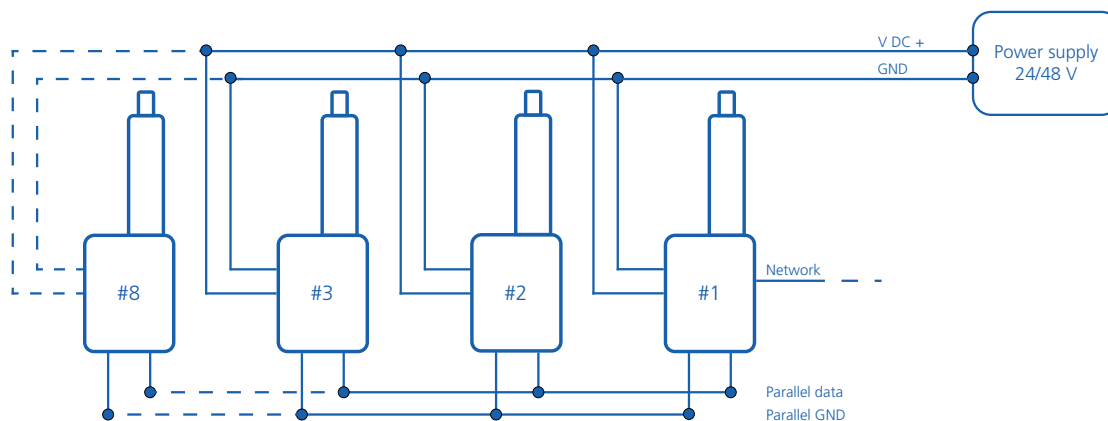
Parallel

The industrial LINAK® actuators can be ordered with parallel functionality. If this feature is enabled, it is possible to run up to 8 actuators in a parallel system with just one actuator occupying an Ethernet port connection. The system works as a critical parallel, meaning that all actuators must be present in the system and have the exact same configuration (both mechanical and software functionality).

Below is a checklist to ensure that the system operates as intended:

Action	Description
Set up parallel in Actuator Connect™	Each actuator must be configured to operate in parallel (2-8 actuators). This can be set up using the Actuator Connect tool. <i>Please note: In some cases this is pre-configured from factory.</i>
Wire up the system	The actuators feature internal communication for parallel synchronisation and error codes.
Check cable lengths	Keep the total length of the communication line below 40 meters to avoid communication dropouts. In a parallel system with 8 actuators this would result in signal cable lengths of <5 metres.
Check power supply	The system can be designed with either one main power supply or it can be supplied by individual supplies corresponding to the number of actuators in the system. Please respect actuator specifications regarding voltage level and current consumption! Make sure that the power supplies have a common GND and the same potential.

Option 1 - A simple parallel setup

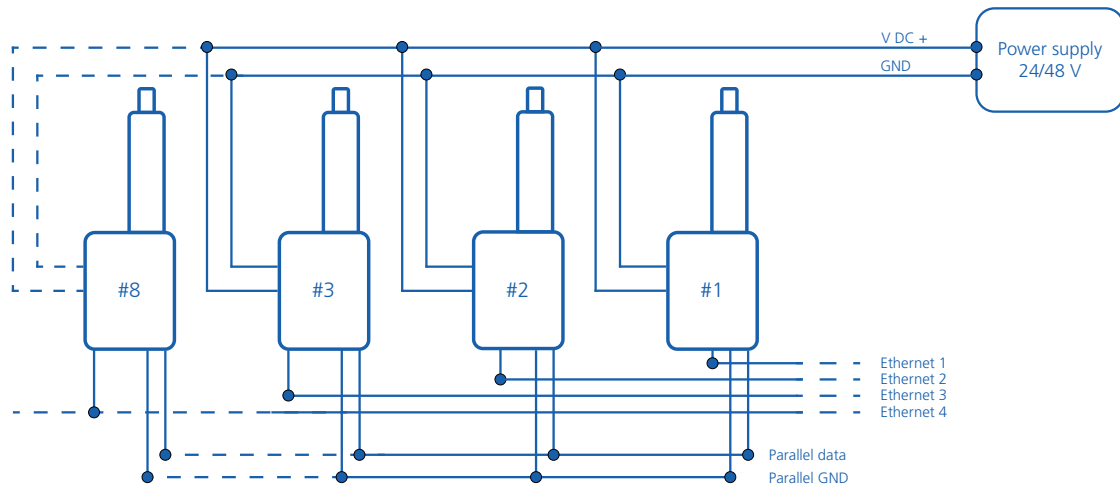


In a simple parallel setup there is only one actuator connected to the network communication. This actuator receives run commands and shares data with the controller. The remaining actuators in the system are only connected to internal parallel communication. This way, the internal communication ensures that the system operates in parallel and stops in case of an obstacle, or when other errors occur on one of the actuators.

The actuators share simple error messages with the master, which can be distributed via the network.

Parallel

Option 2 - Bus communication on all actuators



If there is a need for e.g. monitoring the real-time data of each actuator, it is possible to connect all actuators as nodes to the network. This will provide comprehensive usage data, which can be used to enhance performance in the application. Similar to option 1, this requires that all actuators are connected to internal parallel communication.

Getting started

This section further describes how to communicate with LINAK® Modbus TCP/IP actuators and contains examples of typical user scenarios and application solutions. All examples include references to registers which are further described in detail below.

Power supply

Modbus TCP/IP actuators are available with the following supply voltage range: 24 and 48 V DC. The accepted supply voltage range is specified for the version as shown below:

Supply voltage	Function	Voltage range		
		V _{IN}	V _{TYP}	V _{MAX}
24 V	Motor	18 V	24 V	32 V
	Modbus TCP/IP communication	10 V	24 V	39 V
48 V	Motor	36 V	48 V	58 V
	Modbus TCP/IP communication	10 V	48 V	60 V

For more information about wiring/connector, please see the connection diagram.

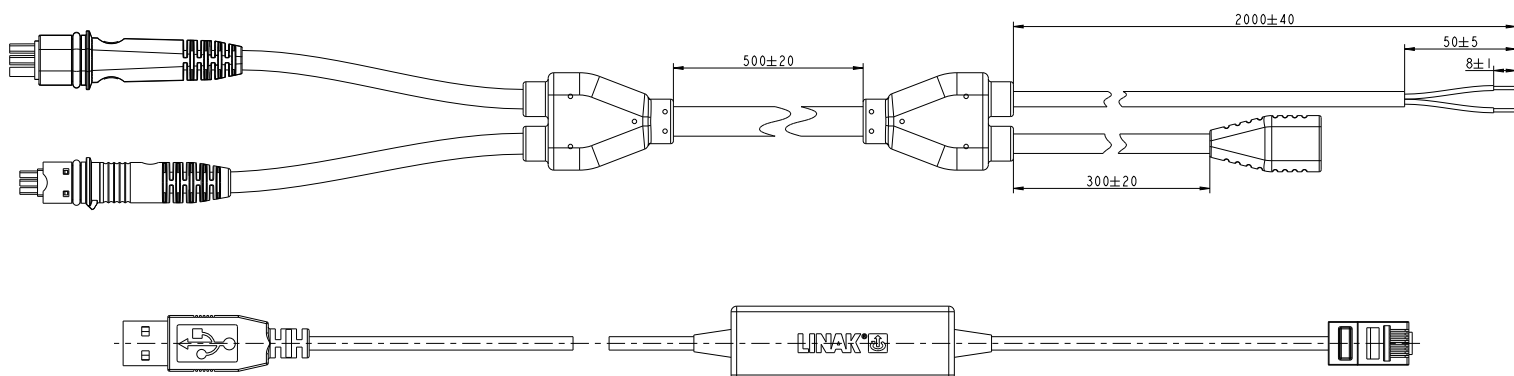
Configuration

Before being integrated into a Modbus system, a few of the actuator parameters must be checked and eventually changed. This preparation is done via the use of the configuration tool Actuator Connect™ and guarantees that the actuator is able to execute basic functionality.

Further fine-tuning may be required to fulfil system or application requirements. Via this tool it is also possible to access historical usage data and real-time monitoring.

Valid for LA33, LA36, LA37, LA76 and LA77:

A separate configuration cable (item no. 0367996) is required to use Actuator Connect on a PC. This cable must be connected to the 6-pin and 9-pin connector on the actuator side. On the opposite side, power must be applied to the flying leads, and the USB connector must be inserted into your PC.



For more information about wiring/connector, please see the connection diagram.

Parameters to be verified by Actuator Connect™

Parameters	Description
DHCP	DHCP is a client/server protocol that automatically provides an IP address. If enabled: below parameters are not configurable
IP Address	Set the device IP address to a unique address in the network. 192.168.1.10 (Default)
Subnet mask	Set the subnet mask. 255.255.255.0 (default)
Gateway	Set the gateway. 192.168.1.1 (default)

The full Application Data Unit (ADU) used by the Modbus TCP/IP protocol is encapsulated within the data segment of a conventional TCP packet. This packet is then transmitted over the network to the designated system port number 502, a port which is exclusively allocated for Modbus application communications.



Users are strongly advised against configuring their assets directly to the public internet. By taking this precautionary measure, the risk of unauthorized and malicious cyber activities from external threats is significantly reduced.

Command examples

Before the actuator can engage movement, some general prerequisites must be fulfilled. Timing (e.g. when the actuator is still moving), environmental conditions and errors may indicate that the actuator is in a state where further operation is not possible.

General run prerequisites

Step	Register*	Action
1	HR 8193 (0x2001)	<p>“Communication heartbeat counter” must be incremented periodically with the value ranging from 0-255.</p> <p>Must be updated in periods no longer than 500 ms.</p> <p>If not updated within 500 ms, the actuator will stop and the “Error Code” register will read a value of 5.</p>
2	HR 8194 (0x2002)	<p>“Position” must be set to = 64259 for ‘Stop’.</p> <p>To prevent unintended movement, it is required to send a ‘Stop’ command before running the actuator.</p>
3	HR 8452 (0x2104)	“Error Code” must be = 0.
4	HR 8451 (0x2103)	“Status Flags” bit 2 (Overcurrent) must be = 0.
5	HR 8451 (0x2103)	“Status Flags” bit 5 (Heartbeat needed) must be = 0.
6	HR 8451 (0x2103)	“Status Flags” bit 6 (Actuator is running outside normal conditions) must be = 0.

* HR = Holding register

Run the actuator outwards

Step	Register	Action
1	-	Check that general run prerequisites are fulfilled.
2	HR 8195 (0x2003)	<p>“Current” must be set to a value.</p> <p>0-250 = Current limit 0.25 A/bit</p> <p>251 = Default current limit set via Actuator Connect™</p> <p>252-255 = Reserved</p>
3	HR 8196 (0x2004)	<p>“Speed” must be set to a value.</p> <p>0-200 = Speed 0.5% /bit</p> <p>201-250 = 100% speed</p> <p>251 = Default speed set via Actuator Connect</p> <p>252-255 = Reserved</p>
4	HR 8197 (0x2005)	<p>“Soft Start” must be set to a value.</p> <p>0-250 = Start ramp time 0.05 s/bit</p> <p>251 = Default speed set via Actuator Connect</p> <p>252-255 = Reserved</p>
5	HR 8198 (0x2006)	<p>“Soft Stop” must be set to a value.</p> <p>0-250 = Stop ramp time 0.05 s/bit</p> <p>251 = Default speed set via Actuator Connect</p> <p>252-255 = Reserved</p>
6	HR 8194 (0x2002)	“Position” must be set to = 64257 for Run out.
7**	HR 8451 (0x2103)	“Status Flags” bit 3 will change to 1 to indicate that the actuator is running out.

** Optional

Register overview

Command details

Index		Data type	Access	Name	Details	Description	Unit
[hex]	[dec]						
0x2001	8193	UINT8	RW	Communication Heartbeat Counter	0-255	Without regular updates, actuator will stop	
0x2002	8194	UINT16	RW	Position	0-64255	Run to position	0.1 mm/bit
					64256	Clear error register (see 0x1001)	Command
					64257	Run out	Command
					64258	Run in	Command
					64259	Stop	Command
					64260	Recovery run out	Command
					64261	Recovery run in	Command
					64262-65535	Invalid value, actuator will not run	Reserved
0x2003	8195	UINT8	RW	Current	0-250	Maximum current limit	0.25 A/bit
					251	Use default current value	Command
					252-255	Invalid value, actuator will not run	Reserved
					0-200	Speed to use	0.5 %/bit
0x2004	8196	UINT8	RW	Speed	201-250	Use 100% speed	
					251	Use default speed value	Command
					252-255	Invalid value, actuator will not run	Reserved
					0-250	Start ramping time	0.05 s/bit
0x2005	8197	UINT8	RW	Soft Start	251	Use default soft start value	Command
					252-255	Invalid value, actuator will not run	Reserved
					0-250	Stop ramping time	0.05 s/bit
0x2006	8198	UINT8	RW	Soft Stop	251	Use default soft stop value	Command
					252-255	Invalid value, actuator will not run	Reserved
					252-255	Invalid value, actuator will not run	Reserved

Feedback status details

Index		Data type	Access	Name	Details	Description	Unit
[hex]	[dec]						
0x2101	8449	UINT16	R	Position	0–64255	Position of the actuator piston	0.1 mm/bit
					64256–65023	Reserved	
					65024	Position lost	
					65025–65535	Reserved	
0x2102	8450	UINT8	R	Current	0	Not running	
					1–250	Measured motor current	0.25 A/bit
					251–253	Reserved	
					254	Fault in current measurement circuit	
					255	Reserved	
0x2103	8451	UINT8	R	Status Flags		8-bit independent status bit-indicators	
					b0	Endstop reached in	
					b1	Endstop reached out	
					b2	Overcurrent	
					b3	Running out	
					b4	Running in	
					b5	Heartbeat needed	
					b6	Actuator is running outside nominal conditions	
b7	Reserved						

Feedback status details

Index		Data type	Access	Name	Details	Description	Unit
[hex]	[dec]						
0x2104	8452	UINT8	R	Error Code		8-bit error code indicating the currently active error of highest priority	
					0	No error detected	
					1	'Run' command overruled	
					2	Position sensor	
					3	Overvoltage	
					4	Undervoltage	
					5	Communication sync	
					6	Endstop switch	
					7	Temperature	
					8	Internal motor controller	
					9	Internal power supply	
					10	Internal current measurement	
					11	Parallel arbitration	
					12	Position not changing	
					13	Position initialisation not possible	
					14	Alone in parallel system	
					15	Incorrect number in parallel system	
	254	Other internal error (Not specified)					
	255	Other external error (Not specified)					
0x2105	8453	UINT16	R	Speed	0–4015	Speed of actuator piston	0.1 mm/s /bit
					4016–65535	Reserved	
0x2106	8454	UINT8	R	Input State	b0–b1	Input 1 level	25% /bit
					b2–b3	Input 2 level	25% /bit
					b4–b5	Input 3 level	25% /bit
					b6–b7	Always set	Reserved

Parallel feedback status details

Index [hex]	Index [dec]	Data type	Access	Name	Details	Description	Unit
0x2107	8455	UINT32	R	Error Source	0	No error is active on any actuator in parallel system, or error source ID is irrelevant ("Parallel start-up" error is reported by an actuator still connected to the system)	32-bit IP address
					1-4294967295	IP address of actuator with highest priority error	
0x2109	8456	UINT8	R	Error Group	0	No error detected	8-bit error code indicating the currently active error of highest priority on any actuator in the parallel system
					1	Current overload	
					2	Hardware	
					3	Temperature	
					4	Overvoltage	
					5	Undervoltage	
					6	Analogue input out of range (N/A for bus interfaces)	
					7	Position not changing	
					8	Run signal overruled	
					9	Position initialisation not possible	
					10	Parallel start up	
					11	Parallel running	
					12	BLDC motor	
					13	Endstop switch	
					14	Parallel communication	
					15	Parallel setup stopped	
0x210A	8457	UINT8	R	Status Flags	b0	Parallel Endstop reached out	8-bit independent status bit-indicators
					b1	Parallel Endstop reached in	
					b2	Parallel running outside nominal conditions	
					b3–b7	Reserved	
					24	Other error	
					25	Position lost	

Diagnosics data

Index		Data type	Access	Name	Details	Description	Unit
[hex]	[dec]						
0x4001	16385	UINT8	RW	Current Limit Out			0.25 A/bit
0x4002	16386	UINT8	RW	Current Limit In			0.25 A/bit
0x4003	16387	UINT16	RW	Soft Start Time Out			1 ms/bit
0x4004	16388	UINT16	RW	Soft Start Time In			1 ms/bit
0x4005	16389	UINT16	RW	Soft Stop Time Out			1 ms/bit
0x4006	16390	UINT16	RW	Soft Stop Time In			1 ms/bit
0x4007	16391	UINT8	RW	Maximum Speed	0–200		0.5 %/bit
					201–255		100%
0x4008	16392	UINT16	RW	Virtual Endstop Reached Out Position			0.1 mm/bit
0x4009	16393	UINT16	RW	Virtual Endstop Reached In Position			0.1 mm/bit
0x400A	16394	UINT32	R	UIN			8 number format
0x400C	16396	UINT32	R	SW Variant		Software number (e.g. 1050000)	SWxxxxxxVx-x
0x400E	16398	UINT32	R	SW Version Major			SWxxxxxxVx-x
0x4010	16400	UINT32	R	SW Version Minor			SWxxxxxxVx-x
0x4012	16402	UINT32	R	Config. Production Order Number			
0x4014	16404	UINT32	R	Production Date			yyyymmdd
0x4016	16406	UINT8	R	Maximum Current Seen			0.25 A/bit
0x4017	16407	UINT8	R	Maximum FET Temperature Seen			1 °C/bit - 40
0x4018	16408	UINT8	R	Maximum Ambient Temperature Seen			1 °C/bit - 40
0x4019	16409	UINT8	R	Minimum Ambient Temperature Seen			1 °C/bit - 40
0x401A	16410	UINT32	R	Current Usage			1 As/bit
0x401C	16412	UINT32	R	Runtime			1 s/bit

Diagnostics data

Index		Data type	Access	Name	Details	Description	Unit
[hex]	[dec]						
0x401E	16414	UINT8	R	Number of Stops Due to Overvoltage			
0x401F	16415	UINT8	R	Number of Stops Due to FET Overtemperature			
0x4020	16416	UINT8	R	Number of Stops Due to Ambient Overtemperature			
0x4021	16417	UINT8	R	Number of Stops Due to Low Voltage			
0x4022	16418	UINT8	R	Number of Stops Due to Hall Errors			
0x4023	16419	UINT8	R	Number of Stops Due to Endstop Reached Switch Errors			
0x4024	16420	UINT8	R	LINAK Current Overload Out Stops			
0x4025	16421	UINT8	R	LINAK Current Overload in Stops			
0x4026	16422	UINT8	RW	Resettable Custom Current Overload Out Stops			
0x4027	16423	UINT8	RW	Resettable Custom Current Overload in Stops			
0x4028	16424	UINT16	R	Communication Errors			
0x4029	16425	UINT32	R	Number of Endstop Reached Out			
0x402B	16427	UINT32	R	Number of Endstop Reached In			
0x402D	16429	UINT32	R	Number of Starts Out			
0x402F	16431	UINT32	R	Number of Starts In			

Diagnostics data

Index		Data type	Access	Name	Details	Description	Unit
[hex]	[dec]						
0x4031	16433	UINT32	R	Total Piston Distance			5 m/bit
0x4033	16435	UINT16	R	Last Stop Reason ID 0		Stop reason ID	
0x4034	16436	UINT8	R	Last Stop Count ID 0		Number of consecutive stop reasons of the same type	
0x4035	16437	UINT32	R	Last Stop Powered Time ID 0		Powered time when the last stop occurred	1 s/bit
0x4037	16439	UINT16	R	Last Stop Reason ID 1		Stop reason ID	
0x4038	16440	UINT8	R	Last Stop Count ID 1		Number of consecutive stop reasons of the same type	
0x4039	16441	UINT32	R	Last Stop Powered Time ID 1		Powered time when the last stop occurred	1 s/bit
0x403B	16443	UINT16	R	Last Stop Reason ID 2		Stop reason ID	
0x403C	16444	UINT8	R	Last Stop Count ID 2		Number of consecutive stop reasons of the same type	
0x403D	16445	UINT32	R	Last Stop Powered Time ID 2		Powered time when the last stop occurred	1 s/bit
0x403F	16447	UINT16	R	Last Stop Reason ID 3		Stop reason ID	
0x4040	16448	UINT8	R	Last Stop Count ID 3		Number of consecutive stop reasons of the same type	
0x4041	16449	UINT32	R	Last Stop Powered Time ID 3		Powered time when the last stop occurred	1 s/bit
0x4043	16451	UINT16	R	Last Stop Reason ID 4		Stop reason ID	
0x4044	16452	UINT8	R	Last Stop Count ID 4		Number of consecutive stop reasons of the same type	
0x4045	16453	UINT32	R	Last Stop Powered Time ID 4		Powered time when the last stop occurred	1 s/bit

Diagnostics data

Index		Data type	Access	Name	Details	Description	Unit
[hex]	[dec]						
0x4047	16455	UINT32	R	Total Corrected Distance			1 mm/bit
0x4049	16457	UINT8	R	FET Temperature			1 °C/bit - 40
0x404A	16458	UINT8	R	Ambient Temperature			1 °C/bit - 40
0x404B	16459	UINT16	R	Stroke Length			0.1 mm/bit
0x404D	16461	UINT16	R	Zero Point Offset			0.1 mm/bit
0x404F	16463	UINT32	R	Actuator PO Number			
0x4051	16465	UINT8		LINAK Special Function	0		Reserved
			RW		1	Restart actuator	
					2-255		Reserved
0x4052	16466	UINT32	R	IP Address 1 in Parallel System			
0x4054	16468	UINT32	R	IP Address 2 in Parallel System			
0x4056	16470	UINT32	R	IP Address 3 in Parallel System			
0x4058	16472	UINT32	R	IP Address 4 in Parallel System			
0x405A	16474	UINT32	R	IP Address 5 in Parallel System			
0x405C	16476	UINT32	R	IP Address 6 in Parallel System			
0x405E	16478	UINT32	R	IP Address 7 in Parallel System			
0x4060	16480	UINT32	R	IP Address 8 in Parallel System			

Error codes

Error	Description
0	No error detected No LINAK defined error detected
1	'Run' command overruled As a safety precaution to prevent unintentional movement at power-up, the actuator will not run until a 'Stop' command or 'Clear error' command has been sent.
2	Position sensor Position sensors are outside of expected operating range. VCC motor OK. 10 pulses were reported on one Hall sensor and no Hall pulses on the other. Send 'Clear error' command to clear error. If the error persists, contact LINAK or replace the product.
3	Overvoltage Input supply voltage is above operating voltage level. Consult the documentation for correct voltage levels. The error will automatically be cleared when voltage is within operating limits.
4	Undervoltage Input supply voltage is below operating voltage level. Consult the documentation for correct voltage levels. The error will automatically be cleared when voltage is within operating limits.
5	Communication sync Heartbeat from the master is not within the expected heartbeat interval. Consult the documentation for minimum requirements for heartbeat interval.
6	Endstop switch (N/A for bus interfaces) Endstop switches are behaving unexpectedly. Both endstop switches have been activated simultaneously for more than 100 ms. Perform the initialization process by running the actuator fully extended and retracted.
7	Temperature Internal actuator temperature is above operating limit. Consult the documentation for correct temperature levels. The error will automatically be cleared when the temperature is within operating limits.
8	Motor controller Internal motor controller hardware error. Send 'Clear error' command to clear error. If the error persists, contact LINAK or replace the product.
9	Internal power supply The internal power supply is behaving unexpectedly. Send 'Clear error' command to clear error. If the error persists, contact LINAK or replace the product.
10	Internal current measurement Internal current reference is outside the expected limits. Send 'Clear error' command to clear error. If the error persists, contact LINAK or replace the product.
11	Parallel arbitration Start-up parallel configuration procedure in progress.

Error codes

Error	Description
12	Position not changing Internal position sensor is behaving unexpectedly and motor might stall. Please check your application for blockage or other irregularities. If the error persists, contact LINAK or replace the product.
13	Position initialisation not possible Internal initialisation parameters missing. Contact LINAK.
14	Alone in parallel system Incorrect number of actuators in parallel system.
15	Incorrect number in parallel system Incorrect number of actuators in parallel system or wrongly configured
254	Other internal error (Not specified) Unspecified internal hardware/software error. Send 'Clear error' command to clear error. If the error persists, contact LINAK or replace the product.
255	Other external error (Not specified) Unspecified external hardware/software error. Please inspect your application for possible issues. Send 'Clear error' command to clear error.

Parallel error codes

Error	Description
0	No error detected No LINAK defined error detected
1	Current overload Current draw is above allowed operating limit. Reduce load, send a 'Clear error' command, and run the actuator in the opposite direction.
2	Hardware Internal hardware error. Send 'Clear error' command to clear error. If the error persists, contact LINAK or replace the product.
3	Temperature Internal actuator temperature is above operating limit. Consult the documentation for correct temperature levels. The error will automatically be cleared when the temperature is within operating limits.
4	Overvoltage Input supply voltage is above operating voltage level. Consult the documentation for correct voltage levels. The error will automatically be cleared when voltage is within operating limits.
5	Undervoltage Input supply voltage is below operating voltage level. Consult the documentation for correct voltage levels. The error will automatically be cleared when voltage is within operating limits.

Parallel error codes

Error	Description
6	<p>Analogue input out of range (N/A for bus interfaces)</p> <p>Analogue input signal is outside operating limits. Servo or Proportional. Consult the documentation for correct input signal.</p>
7	<p>Position not changing</p> <p>Internal position sensor is behaving unexpectedly and motor might stall. Please check your application for blockage or other irregularities. If the error persists, contact LINAK or replace the product.</p>
8	<p>Run signal overruled</p> <p>Communication has been overruled by a higher priority input. Communication is split into the following priorities:</p> <ol style="list-style-type: none"> 1. Bus communication (CAN bus, Ethernet, etc.) 2. LINAK service tool (Actuator Connect™) 3. Manual run using Red and Black wires <p>Send a 'Clear error' command to continue.</p>
9	<p>Position initialisation not possible</p> <p>Internal initialisation parameters missing. Contact LINAK.</p>
10	<p>Parallel start-up</p> <p>Error in parallel setup. The number of connected actuators does not match your configuration. Check the configuration by using the LINAK tool Actuator Connect.</p>
11	<p>Parallel running</p> <p>The actuators are performing the internal setup and are not ready for operation.</p>
12	<p>BLDC motor</p> <p>Internal hardware error. Send 'Clear error' command to clear error. If the error persists, contact LINAK or replace the product.</p>
13	<p>Endstop switch (N/A for bus interfaces)</p> <p>Endstop switches are behaving unexpectedly. Both endstop switches have been activated simultaneously for more than 100ms. Perform the initialization process by running the actuator fully extended and retracted.</p>
14	<p>Parallel communication</p> <p>Error in internal parallel communication. More than 5 communication errors in 500 ms. Please check the wire connections and re-power the complete setup.</p>

Parallel error codes

Error	Description
15	Parallel setup stopped One or more actuators cannot comply with commands and stop. Master commands 'Stop' to other actuators in the network. Send 'Clear error' command to clear error. If the error persists, check your application and wire connections and re-power your complete setup.
24	Other error Actuator receives an undefined error code. This can be due to outdated firmware. Send 'Clear error' command to clear error. If the error persists, contact LINAK or replace the product.
25	Position lost Follow the relevant initialisation procedures by running the actuators from fully retracted to fully extended. If the error persists, contact LINAK or replace the product.

Contacts

FACTORIES

Denmark - Headquarters
LINAK A/S
Phone: +45 73 15 15 15
Fax: +45 74 45 80 48
Fax (Sales): +45 73 15 16 13
Web: www.linak.com

China
LINAK (Shenzhen) Actuator Systems, Ltd.
Phone: +86 755 8610 6656
Phone: +86 755 8610 6990
Web: www.linak.cn

Slovakia
LINAK Slovakia s.r.o.
Phone: +421 51 7563 444
Web: www.linak.sk

Thailand
LINAK APAC Ltd.
Phone: +66 33 265 400
Web: www.linak.com

USA
LINAK U.S. Inc.
Americas Headquarters
Phone: +1 502 253 5595
Fax: +1 502 253 5596
Web: www.linak-us.com
www.linak-latinamerica.com

SUBSIDIARIES

Australia
LINAK Australia Pty. Ltd
Phone: +61 3 8796 9777
Fax: +61 3 8796 9778
E-mail: sales@linak.com.au
Web: www.linak.com.au

Austria
LINAK Zweigniederlassung - Österreich (Wien)
Phone: +43 (1) 890 7446
Fax: +43 (1) 890 744615
E-mail: info@linak.de
Web: www.linak.at - www.linak.hu

Belgium
LINAK Actuator-Systems NV/SA
(Belgium & Luxembourg)
Phone: +32 (0)9 230 01 09
E-mail: beinfo@linak.be
Web: www.linak.be - www.fr.linak.be

Brazil
LINAK Do Brasil Comércio De Atuadores Ltda.
Phone: +55 (11) 2832 7070
Fax: +55 (11) 2832 7060
E-mail: info@linak.com.br
Web: www.linak.com.br

Canada
LINAK Canada Inc.
Phone: +1 502 253 5595
Fax: +1 416 255 7720
E-mail: info@linak.ca
Web: www.linak-us.com

Czech Republic
LINAK C&S s.r.o.
Phone: +42 058 174 1814
Fax: +42 058 170 2452
E-mail: info@linak.cz
Web: www.linak.cz - www.linak.sk

Denmark - International
LINAK International
Phone: +45 73 15 15 15
E-mail: info@linak.com
Web: www.linak.com

Denmark - Sales
LINAK Danmark A/S
Phone: +45 86 80 36 11
Fax: +45 86 82 90 51
E-mail: linak@linak-silkeborg.dk
Web: www.linak.dk

Finland
LINAK OY
Phone: +358 10 841 8700
E-mail: linak@linak.fi
Web: www.linak.fi

France
LINAK France E.U.R.L
Phone: +33 (0) 2 41 36 34 34
Fax: +33 (0) 2 41 36 35 00
E-mail: linak@linak.fr
Web: www.linak.fr

Germany
LINAK GmbH
Phone: +49 6043 9655 0
Fax: +49 6043 9655 60
E-mail: info@linak.de
Web: www.linak.de

India
LINAK A/S India Liaison Office
Phone: +91 120 4531797
Fax: +91 120 4786428
E-mail: info@linak.in
Web: www.linak.in

Ireland
LINAK UK Limited (Ireland)
Phone: +44 (0)121 544 2211
Fax: +44 (0)121 544 2552
+44 (0)796 855 1606 (UK Mobile)
+35 387 634 6554 (Rep.of Ireland Mobile)
E-mail: sales@linak.co.uk
Web: www.linak.co.uk

Italy
LINAK ITALIA S.r.l.
Phone: +39 02 48 46 33 66
Fax: +39 02 48 46 82 52
E-mail: info@linak.it
Web: www.linak.it

Japan
LINAK K.K.
Phone: 81-45-533-0802
Fax: 81-45-533-0803
E-mail: linak@linak.jp
Web: www.linak.jp

Malaysia
LINAK Actuators Sdn. Bhd.
Phone: +60 4 210 6500
Fax: +60 4 226 8901
E-mail: info@linak-asia.com
Web: www.linak.my

Netherlands
LINAK Actuator-Systems B.V.
Phone: +31 76 5 42 44 40 /
+31 76 200 11 10
E-mail: info@linak.nl
Web: www.linak.nl

New Zealand
LINAK New Zealand Ltd
Phone: +64 9580 2071
Fax: +64 9580 2072
E-mail: nzsales@linak.com.au
Web: www.linak.com.au

Norway
LINAK Norge AS
Phone: +47 32 82 90 90
E-mail: info@linak.no
Web: www.linak.no

Poland
LINAK Polska
LINAK Danmark A/S (Spółka Akcyjna)
Phone: +48 22 295 09 70 /
+48 22 295 09 71
E-mail: info@linak.pl
Web: www.linak.pl

Republic of Korea
LINAK Korea Ltd.
Phone: +82 2 6231 1515
Fax: +82 2 6231 1516
E-mail: info@linak.kr
Web: www.linak.kr

Slovakia
LINAK Slovakia S.R.O.
Phone: +421 51 7563 444
Web: www.linak.sk

Spain
LINAK Actuadores, S.L.U
Phone: +34 93 588 27 77
Fax: +34 93 588 27 85
E-mail: esma@linak.es
Web: www.linak.es

Sweden
LINAK Scandinavia AB
Phone: +46 8 732 20 00
Fax: +46 8 732 20 50
E-mail: info@linak.se
Web: www.linak.se

Switzerland
LINAK AG
Phone: +41 43 388 31 88
Fax: +41 43 388 31 87
E-mail: info@linak.ch
Web: www.linak.ch - www.fr.linak.ch
www.it.linak.ch

Taiwan
LINAK (Shenzhen) Actuator systems Ltd.
Taiwan Representative office
Phone: +886 2 272 90068
Fax: +886 2 272 90096
E-mail: sales@linak.com.tw
Web: www.linak.com.tw

Turkey
LINAK İth. İhr. San. ve Tic. A.Ş.
Phone: +90 312 4726338
Fax: +90 312 4726635
E-mail: info@linak.com.tr
Web: www.linak.com.tr

United Kingdom
LINAK UK Limited
Phone: +44 (0)121 544 2211
Fax: +44 (0)121 544 2552
E-mail: sales@linak.co.uk
Web: www.linak.co.uk

DISTRIBUTORS

Argentina
Novotec Argentina SRL
Phone: 011-4303-8989 / 8900
Fax: 011-4032-0184
E-mail: info@novotecargentina.com
Web: www.novotecargentina.com

Colombia
MEM Ltda
Phone: +[57] (1) 334-7666
Fax: +[57] (1) 282-1684
E-mail: servicioalcliente@memltda.com.co
Web: www.mem.net.co

India
Mechatronics Control Equipments India Pvt Ltd
Phone: +91-44-28558484, 85
E-mail: bala@mechatronicscontrol.com
Web: www.mechatronicscontrol.com

Indonesia
PT. Himalaya Everest Jaya
Phone: +6 221 544 8956 /+6 221 544 8965
Fax: +6 221 619 1925
Fax (Sales): +6 221 619 4658
E-mail: hejplastic-div@centrin.net.id
Web: www.hej.co.id

Israel
NetivTech LTD
Phone: +972 55-2266-535
Fax: +972 2-9900-560
Email: info@NetivTech.com
Web: www.netivtech.com

Singapore
Servo Dynamics Pte Ltd
Phone: +65 6844 0288
Fax: +65 6844 0070
E-mail: servodynamics@servo.com.sg

South Africa
Industrial Specialised Applications CC
Phone: +27 011 466 0346
E-mail: gartht@isagroup.co.za
Web: www.isaza.co.za

United Arab Emirates
Mechatronics
Phone: +971 4 267 4311
Fax: +971 4 267 4312
E-mail: mechtron@emirates.net.ae