

easyE-i
*the intelligent actuator
with slim design*

Bansbach
easylift

**Integrated
Controller
MDO**

easyE-i **Integrated Controller MDO**

The MDO is chosen when it is necessary to run multiple actuators synchronously.

The easyE-i-line is a series of actuators, mechanically similar to the easyE-line, with integrated controller which enables the use of Modbus RTU on an RS485 serial communication. The easyE-i-line options provide everything from easy maintenance, user friendly control and installation, to a wide range of customizable settings and feedback that will help tailor the movement solution to your specific needs and applications.

MDO (Multiple / Direction / Override) is the most advanced version of the easyE-line family. It is recognized by the capital letter F in the part number (e.g. EEL35100H24A1000F1MS-11).

The MDO version is for use with bus communication but has got inputs at pin 5 and pin 6 for direction command (these are active „low“). Pin 7 is an „OVERRIDE“ input. When pin 7 on one of the actuators is pulled down it is possible to run this single actuator by pressing the buttons on the handset connected to this specific actuator. Pin 3 is a signal GND connection.

Features

The Modbus addresses for the actuators are 200 through 207 and 200 is the master.

All parameter settings must be identical except for the Modbus address.

The most important feature with the MDO version is that it enables you to run at a minimum two actuators and up to eight actuators synchronously.

Parameter settings are done by connecting to the Bansbach Config-Tool software on your pc with the programming cable and the i-connect-box. Power supply must be connected to the i-connect-box too.

The Bansbach Config-Tool software is free and available on our website.

www.bansbach.de/easyE-i/configtool

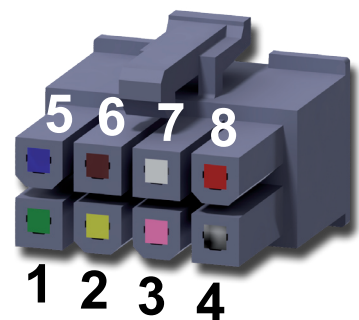
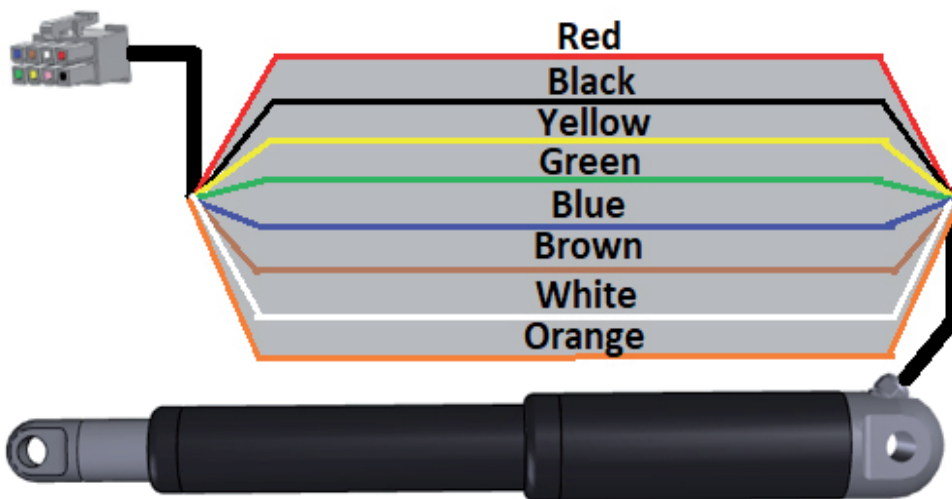


Bansbach Config-Tool

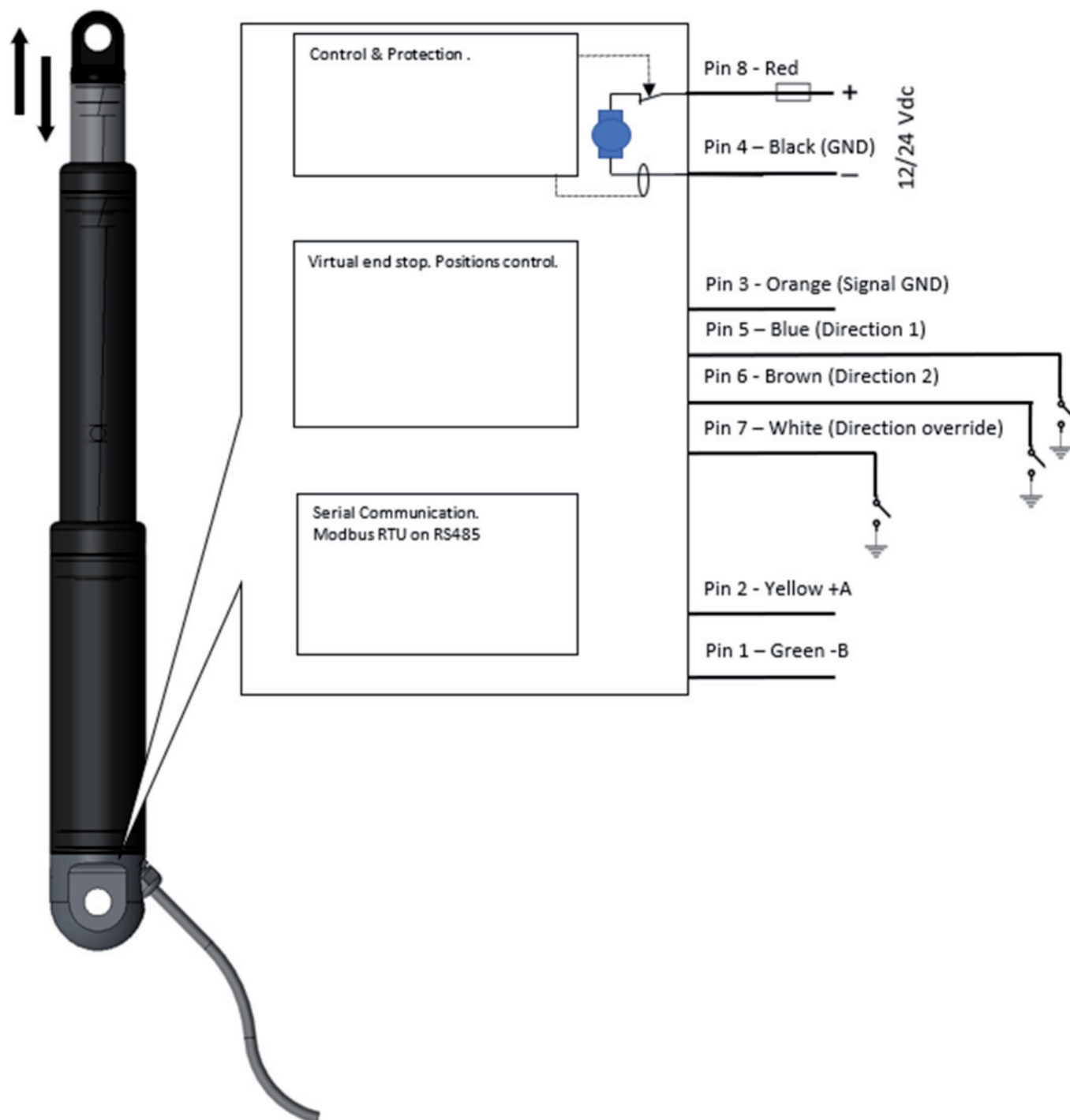
Connection

If nothing else is specified, the Bansbach actuator will be fitted with the 8P Molex Mini fit JR connector and will have the connection and wire colors as specified.

MDO Pin Assignment		
Pin No.	Wire color	Function
1	Green	RS485 -B
2	Yellow	RS485 +A
3	Orange	GND Signal
4	Black	GND Power
5	Blue	Direction in (BWD)
6	Brown	Direction out (FWD)
7	White	Override
8	Red	Power [12 or 24 VDC]

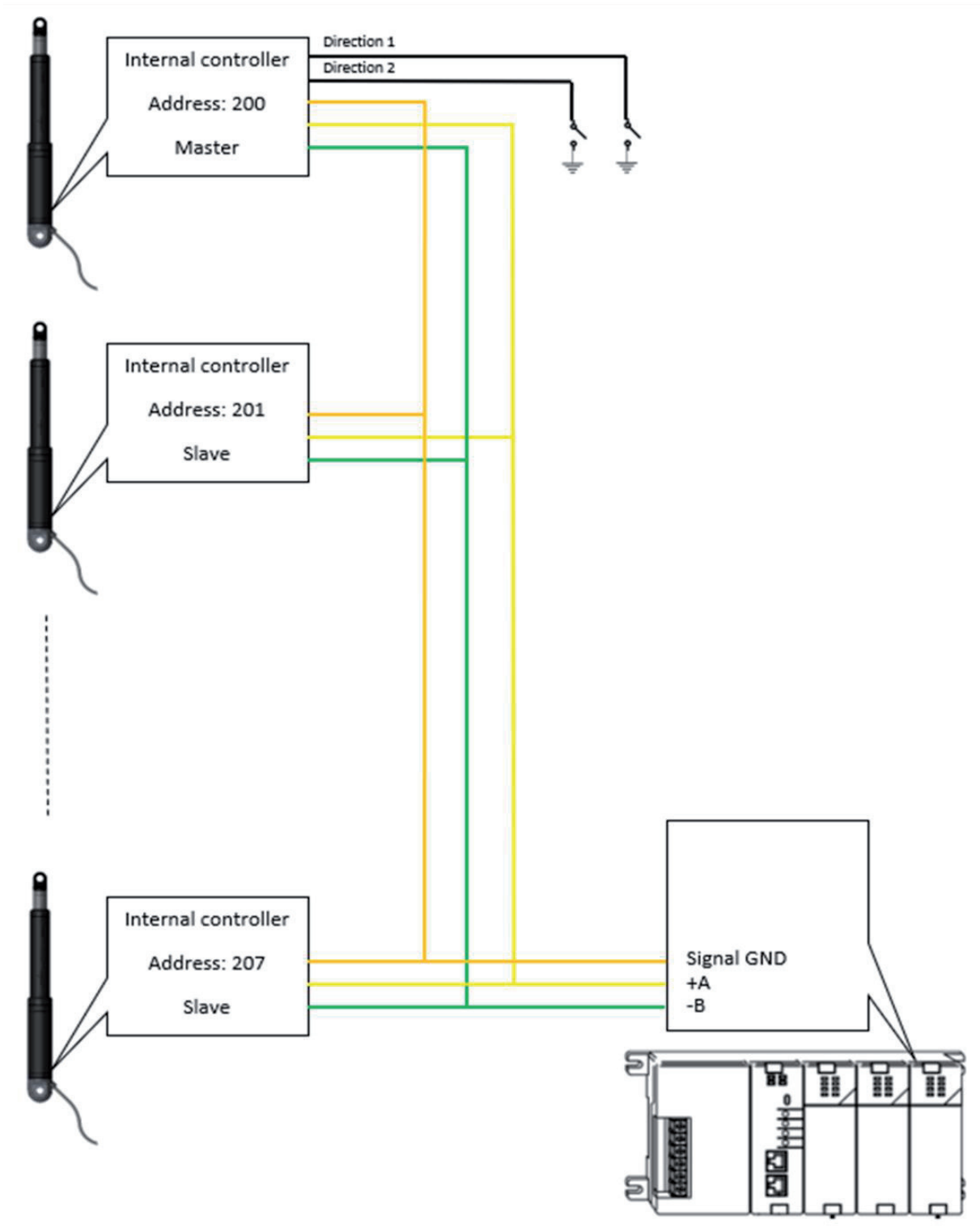


Block diagram



The block diagram is showing the connection on the MDO actuator. It is important that only the „Master“ has direction control. Other actuators are only „movable“ when override switch is enabled.

Block diagram MDO system installation

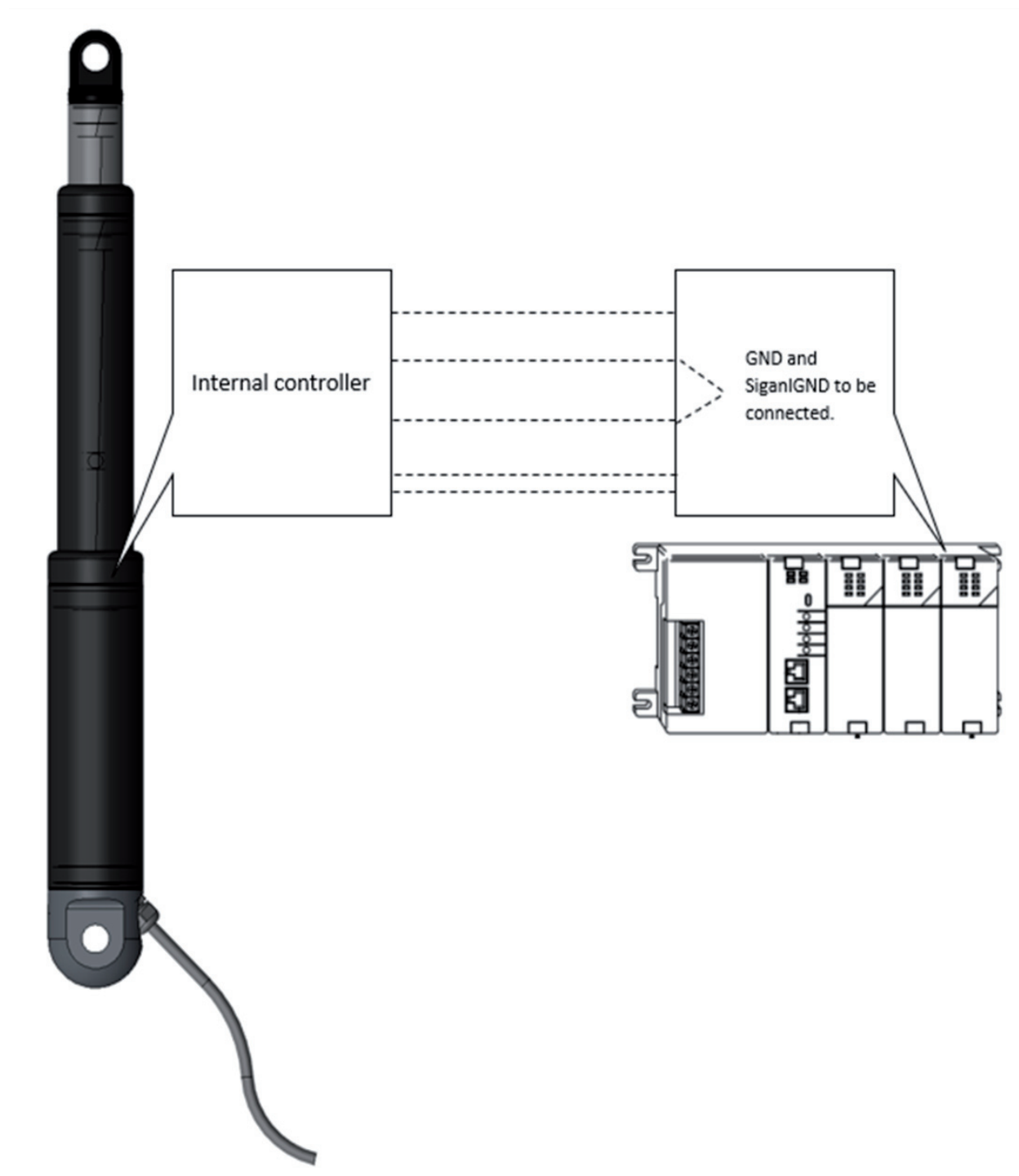


The block diagram is showing the connection necessary for getting the synchronous system to run. It uses the RS485/Modbus RTU network to communicate, and the master is there by keeping track of the other actuators performance.

- ❶ Be aware when setting up the parameters for the MDO function all actuators need to have the exactly same setup. Only addresses need to be continually.
- ❶ Only the specific MDO Modbus commands can be used.

Interconnecting

For obtaining the best result for both measurement and communication the ground and signal ground are to be connected at the end of the line. If using i-connect-box this has already been done. And no extra effort is needed.



Installation process

To install the MDO actuators correctly please follow this process. If the actuators are ordered pre-installed by Bansbach, some of the steps can be skipped.

1. Setting up address

The actuators as a default will come with 8 addresses. The first thing to do is to set up the correct address for an MDO system. This is done in the Bansbach Config Tool.

No. 1 MDO actuator needs to have the address No. 200 this is going to be the MASTER, the next 201,202 and so on.

Modbus Address [1..247]

8

2. Setup and parameters

The actuator with the address no. 200 is the first actuator that will be setup. Chose that actuator in the Bansbach Config Tool actuator list. That is shown on the first page.

Actuators:				Auto Addr Range
8				
Actuator:	200	.	.	<input checked="" type="checkbox"/> Active
Actuator:	201	.	.	<input type="checkbox"/> Active
Actuator:	202	.	.	<input type="checkbox"/> Active
Actuator:	203	.	.	<input type="checkbox"/> Active
Actuator:	204	.	.	<input type="checkbox"/> Active
Actuator:	205	.	.	<input type="checkbox"/> Active
Actuator:	206	.	.	<input type="checkbox"/> Active
Actuator:	207	.	.	<input type="checkbox"/> Active

Make sure all parameters are correct!

Overview	Actuator	Service	Graph	Factory Setting
Pos: 353		Run State: IDLE		Current: 0 mA
<input checked="" type="checkbox"/> Read and Update		Stop Reason: BOOTED		Distance: 353
<div>PARAMETERS RUN RUN PARALLEL EXTRA</div>				
Speed [%]	Current Cutoff [mA], Inwards	H/L Min Speed [% of H/L speed]	Ramp acceleration [%/s]	
100	2500	50	150	
Home Offset [steps]	Current Cutoff [mA], Outwards	H/L Max Current [mA]	Ramp deceleration [%/s]	
50	2500	400	150	
Ramp Down before Target [steps]	Voltage Cutoff [mV], Low	H/L Check Time Limit [ms]	Ramp quick deceleration [%/s]	
5	9000	1000	300	
Safe Zone Forward [steps]	Voltage Cutoff [mA], High	H/L Timeout [s]		
40650	29000	120		
Safe Zone Backwards [steps]	Max. Stroke Length [steps]		Maximum speed [ticks/s]	
50	40700		450	
			Deadband speed [ticks/s]	
			10	
			Check Delay, Current, Velocity change [ms]	
			250	
			Max Current Time Limit [ms]	
			250	
<div>Save/Update</div>				

If some parameters need to be changed, do so! but remember that all MDO actuators need to have the same parameters.

One parameter that is very important for the correct operation of the MDO actuator is the Maximum speed parameter. An MDO actuator will run at constant velocity, this need to be setup for loaded velocity. 450 for 24Vdc supply and 225 for 12 Vdc supply.

Maximum speed [ticks/s]

450

Check if the stroke length is correct! „It should be correct setup from factory“.

Max. Stroke Length [steps]

6000

If not change it manually or by performing a Learning process. (See Learning and homing in the chapter for „Generally used functions and Settings“.

Then perform a „Homing“ see chapter for „Generally used functions and settings“.

The next step is to do the same process for the other MDO actuators in that are meant to be in the system. Chose the next actuator in line and do the same process.

Overview	Actuator	Service	Graph	Factory Setting
Actuators: <div>8</div> <div>Auto Addr Range</div>				
Actuator:	200	.	.	<input type="checkbox"/> Active
Actuator:	201	.	.	<input checked="" type="checkbox"/> Active
Actuator:	202	.	.	<input type="checkbox"/> Active
Actuator:	203	.	.	<input type="checkbox"/> Active
Actuator:	204	.	.	<input type="checkbox"/> Active
Actuator:	205	.	.	<input type="checkbox"/> Active
Actuator:	206	.	.	<input type="checkbox"/> Active
Actuator:	207	.	.	<input type="checkbox"/> Active

❗ Be aware when setting up the parameters for the MDO function all actuators need to have the exact same setup. Only addresses need to be continuously.

Overview

Actuator

Service

Graph

Factory Setting

Pos: 353
Run State: IDLE
Current: 0 mA
☒ Read and Update
Stop Reason: BOOTED
Distance: 353

PARAMETERS

RUN

RUN PARALLEL

EXTRA

Speed [%]

100

Current Cutoff [mA], Inwards

2500

H/L Min Speed [% of H/L speed]

50

Ramp acceleration [%/s]

150

Home Offset [steps]

50

Current Cutoff [mA], Outwards

2500

H/L Max Current [mA]

400

Ramp deceleration [%/s]

150

Ramp Down before Target [steps]

5

Voltage Cutoff [mV], Low

9000

H/L Check Time Limit [ms]

1000

Ramp quick deceleration [%/s]

300

Safe Zone Forward [steps]

40650

Voltage Cutoff [mA], High

29000

H/L Timeout [s]

120

Safe Zone Backwards [steps]

50

Max. Stroke Length [steps]

40700

Maximum speed [ticks/s]

450

Deadband speed [ticks/s]

10

Check Delay, Current, Velocity change [ms]

250

Max Current Time Limit [ms]

250

Save/Update

Overview

Actuator

Service

Graph

Factory Setting

☒ Read and Update

Config

Motor Parameters

Export/Import

DFU

PID proportional gain [x1000]

400

Maximum allowed velocity error per second [steps/s] - 0=disabled

50

PID integration gain [x1000]

500

Position window before stopping [steps]

0

PID differential gain [x1000]

0

Speed used in position controller when stopping in [%] of max speed

10

Save/Update

Check that parameter are the same for all actuator „Actuator parameters“ and „Service motor parameters“.

Parring the system

When all actuators are setup correctly and connected to the bus, they are ready to be build as a system „Paired“.

Go to „Overview“ activate actuator address 200 as the only one. Other actuators must not be activated.

The screenshot shows the 'Overview' tab of the Bansbach Config Tool. At the top, there are menu items: File, Config, Factory Special, and WWW. Below them are sub-tabs: Overview, Actuator, Service, Graph, and Factory Setting. The 'Actuators:' section has a dropdown menu set to '2' and an 'Auto Addr Range' button. Below this is a table with two rows of actuator data:

Actuator:				
200	.	.	.	<input checked="" type="checkbox"/> Active
201	.	.	.	<input type="checkbox"/> Active

The go to the folder „Actuator-RUN PARALLEL“ chose the button „Scan Slaves“. Now the system is build and it can be tested.

① Before testing secure that all actuators are aligned.

Testing is done by typing in a position under „Target Position“ and hitting the button „Run Parallel“

The screenshot shows the 'RUN PARALLEL' sub-tab of the Bansbach Config Tool. At the top, there are menu items: File, Config, Factory Special, and WWW. Below them are sub-tabs: Overview, Actuator, Service, Graph, and Factory Setting. The 'RUN PARALLEL' sub-tab is active. It contains the following fields and buttons:

Pos: Run State: Current:
☒ Read and Update Stop Reason: Distance from Target:

PARAMETERS RUN RUN PARALLEL EXTRA

Target Position [steps]
0

Run Parallel Scan Slaves

Stop Parallel

In Parallel mode, the Master node is by design always #200.

After the "Run Parallel" or "Scan Slaves" command has been sent, polling (Read and Update) is stopped to release the Modbus. Reactivate when run has completed

① It is very important that the folder „Actuator-RUN PARALLEL“ is the only folder that is used/visual when running parallel. All others interfere with the command execution.

① When running with handset please disconnect Bansbach Config Tool or only have the „Actuator RUN PARALLEL“ folder open. All others will interfere with the command execution.

Generally used functions and settings

Start and stop ramp is a percentage to a second, so 100% is a second. If the stop function is activated the quick deceleration time is used.

Ramp acceleration [%/s]

Ramp deceleration [%/s]

Ramp quick deceleration [%/s]

Speed limits the maximum speed.

Speed [%]

Current-limits are individual for reverse and forward directions. Refer to datasheet for actual actuator for maximum recommended current when adjusting.

Current Cutoff [mA], Inwards

Current Cutoff [mA], Outwards

Speed limits the maximum speed.

Speed [%]

Homing and Learning are two functions for the correct installation and setup of the actuator. Homing returns the actuator to the inwards mechanical end of the actuator. And the Learning performs a measurement of the actuator stroke and stores it.

The Bansbach actuators comes with default setup from the factory.

Choose the process to run and press „Run Learn“. If something should occur and you wish to stop the process press „stop“. The process will then not be stored.

Learn ENHANCED
☒ Learn Home
☐ Learn Positions
☐ Learn Speed
☐ Learn Ramp
☐ Learn PID

Speed [%]

Run Learn

Stop

It is possible to choose if the Learning or Homing is done from inwards to outward (retracted) or from outwards to inwards (extracted).

Actuator Home Position
☒ Retracted
☐ Extracted

- ① A set of special parameters will be used under learning / Homing. That will mean that the speed and current is as default set to be lower.

H/L Min Speed [% of H/L speed]

H/L Max Current [mA]

H/L Check Time Limit [ms]

H/L Timeout [s]

- ① If using range scale, the parameters for that will be erased under learning.

Stroke Length is the total length of the movement length and is measured as counting steps/tics from the encoder in the actuator. It is possible to type in the stroke length or it will be updated under learning.

Max. Stroke Length [steps]

① If the stroke length is manually typed in. It is necessary to also manually typing in the safe-zone.

Safe-zone is the work area of the actuator and is measured as counting steps/ticks from the encoder in the actuator. This will as default under learning be set to 50 step/ticks from outwards/inwards. This function will then use a small bit of the stroke length for securing that the actuator is not running in I-trip/overcurrent at the end.

Safe Zone Forward [steps]

Safe Zone Backwards [steps]

Other functions and information

Actuator overview is the first page in the Bansbach Config Tool and is showing the actuators that are installed and setup.

Actuators:			
2	Auto Addr Range		
Actuator: 8	Prd: 0x22137000	Uptime: 0:00:00:27.267	<input checked="" type="checkbox"/> Active
Actuator: 9	.	.	<input type="checkbox"/> Active

Type in the numbers of actuator and the individual addresses. It is only possible to work with one actuator at a time. But it is possible to see all active actuators at a time.

① If the actuator is recognized the uptime counter will be counting when „active“ is chosen.

Adding more actuators: For adding more actuators in the Bansbach Config-Tool they need to have different addresses. All actuators come with a default address „8“ from factory. And if more actuators are needed, they need to have individual addresses. So this must be change once at a time.

Type in the new address „between 1 and 199“ an save.

Modbus Address [1..247]

Save/Update

① Adress 200 to 207 is reserved for parallel drive.