



# Supplementary Document to the Interroll MultiControl User Manual Firmware version 1.2

- ZPA
- I/O device
- Teach-in

This document is valid only in connection with the "Interroll MultiControl" User Manual 2.2  
(06/2016)



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## Product description

A MultiControl can control up to four RollerDrives with different speed levels, accelerations, and decelerations. Depending on the number of configured outputs, up to eight inputs can be interpreted.

The integrated programs of the MultiControl permit zero pressure accumulation conveying. Each MultiControl controls up to four zones. One zone corresponds to a conveyor section consisting of RollerDrive, rotating rollers, and the corresponding sensors and switches. Depending on the program selected, it is possible to assign up to three slave RollerDrives.

The single release program makes zero pressure accumulation conveying possible, because the zones hold back the goods being conveyed until the logic detects the subsequent zone to be “free”. If the goods being conveyed begin to accumulate, a signal is sent to the upstream zone, which causes the goods being conveyed to be held back. There is always a gap between the goods being conveyed; there is no pressure accumulation.

If the ZPA programs (zero pressure accumulation) are not used, then the MultiControl can work as an I/O device.

The combination of a MultiControl and the associated zones, RollerDrive, and sensors is referred to as a “module”.

To configure larger conveying systems, multiple modules can be linked together. For this purpose, different IP addresses are assigned to the MultiControls. The connection to additional conveying systems is done by means of configurable inputs/outputs. The data interchange with a master control system ( PLC ) is provided via the field bus systems “PROFINET”, “EtherNet/IP”, or “EtherCat”.

The MultiControl has an integrated web server, which generates a user interface for configuration of the MultiControl. On a computer connected to the MultiControl, this user interface can be called up in a web browser.

Except for a web browser, no other software has to be installed on the computer.

## Use

- ZPA function (zero pressure accumulation) for straight segments and curves
- Start/stop function
- Single release
- Train release
- I/O device without ZPA functions
- Fault analysis
- For EtherCat is only I/O device available.



## Network settings in the web browser

Bus protocol <input type="radio"/> EtherCAT <input checked="" type="radio"/> PROFINET <input type="radio"/> EtherNet/IP		Neighbours IP address upstream : <input type="text" value="0.0.0.0"/> IP address downstream : <input type="text" value="0.0.0.0"/> IP address side 1 : <input type="text" value="0.0.0.0"/> IP address side 2 : <input type="text" value="0.0.0.0"/> IP address transfer 1 : <input type="text" value="0.0.0.0"/> IP address transfer 2 : <input type="text" value="0.0.0.0"/> IP address transfer 3 : <input type="text" value="0.0.0.0"/> IP address transfer 4 : <input type="text" value="0.0.0.0"/>	
Addresses IP address : <input type="text" value="192.168.0.1"/> Network mask : <input type="text" value="255.255.255.0"/> Gateway : <input type="text" value="0.0.0.0"/>		Options <input type="checkbox"/> Big Endian Format	
Domains Host name : <input type="text" value="multicontrol"/> Domain name : <input type="text"/> DNS server 1 : <input type="text" value="0.0.0.0"/> DNS server 2 : <input type="text" value="0.0.0.0"/>			
Configuration mode <input checked="" type="radio"/> Static <input type="radio"/> I/O Controller			

If the MultiControl is to be connected to a master control system, the associated “bus protocol” must be selected.

As delivered, the IP address of the MultiControl is 192.168.0.1; it can be changed in the field “IP address”.

All MultiControls must be in the same sub-network; the default setting is 255.255.255.0.

This makes it theoretically possible to set up a conveyor with 253 MultiControls.

For larger conveyors, the “network mask” can be adjusted accordingly.

In the field “Domains-/-Host name”, a name is assigned to the MultiControl. The default name is MultiControl.

The default setting of the “configuration mode” is “static”.

The position in the conveying system is determined under “neighbours”.

“Neighbors / IP address upstream” is the left neighbor.

“Neighbors / IP address downstream” is the right neighbor.

Additional functions can be used only in connection with Interroll 24V conveyor modules.

(See additional user manual.)

For communication among multiple MultiControls, it is necessary to connect them together with a PROFINET network cable, even if no master control system is used.

### Note:

Altered parameters must be transferred to the MultiControl by hitting the “Submit” button.



## Example: Conveyor with three MultiControls

### First MultiControl

Bus protocol  
 EtherCAT  
 PROFINET  
 EtherNet/IP

Addresses  
 IP address : 192.168.0.20  
 Network mask : 255.255.255.0  
 Gateway : 0.0.0.0

Domains  
 Host name : multicontrol  
 Domain name :  
 DNS server 1 : 0.0.0.0  
 DNS server 2 : 0.0.0.0

Configuration mode  
 Static  
 I/O Controller

Neighbours  
 IP address upstream : 0.0.0.0  
 IP address downstream : 192.168.0.21  
 IP address side 1 : 0.0.0.0  
 IP address side 2 : 0.0.0.0  
 IP address transfer 1 : 0.0.0.0  
 IP address transfer 2 : 0.0.0.0  
 IP address transfer 3 : 0.0.0.0  
 IP address transfer 4 : 0.0.0.0

Options  
 Big Endian Format

IP address of the MultiControl 192.168.0.20  
 IP address upstream 0.0.0.0  
 IP address downstream 192.168.0.21

### Second MultiControl

Bus protocol  
 EtherCAT  
 PROFINET  
 EtherNet/IP

Addresses  
 IP address : 192.168.0.21  
 Network mask : 255.255.255.0  
 Gateway : 0.0.0.0

Domains  
 Host name : multicontrol  
 Domain name :  
 DNS server 1 : 0.0.0.0  
 DNS server 2 : 0.0.0.0

Configuration mode  
 Static  
 I/O Controller

Neighbours  
 IP address upstream : 192.168.0.20  
 IP address downstream : 192.168.0.22  
 IP address side 1 : 0.0.0.0  
 IP address side 2 : 0.0.0.0  
 IP address transfer 1 : 0.0.0.0  
 IP address transfer 2 : 0.0.0.0  
 IP address transfer 3 : 0.0.0.0  
 IP address transfer 4 : 0.0.0.0

Options  
 Big Endian Format

IP address of the MultiControl 192.168.0.21  
 IP address upstream 192.168.0.20  
 IP address downstream 192.168.0.22

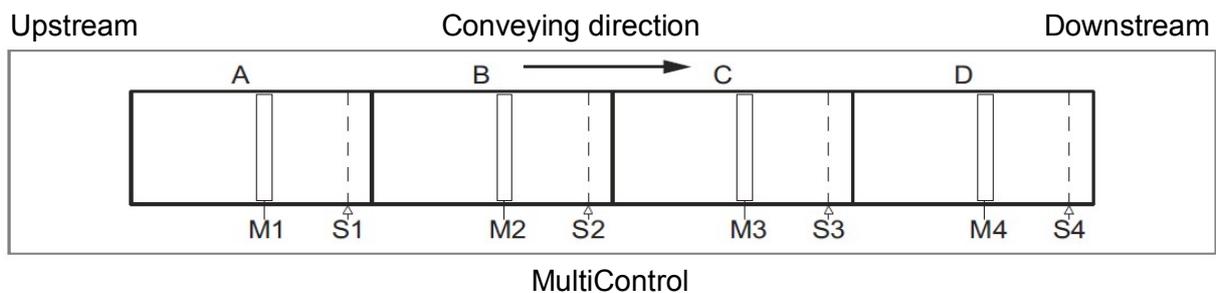


### Third MultiControl

Bus protocol <input type="radio"/> EtherCAT <input checked="" type="radio"/> PROFINET <input type="radio"/> EtherNet/IP		Neighbours IP address upstream : 192.168.0.21 IP address downstream : 0.0.0.0 IP address side 1 : 0.0.0.0 IP address side 2 : 0.0.0.0 IP address transfer 1 : 0.0.0.0 IP address transfer 2 : 0.0.0.0 IP address transfer 3 : 0.0.0.0 IP address transfer 4 : 0.0.0.0	
Addresses IP address : 192.168.0.22 Network mask : 255.255.255.0 Gateway : 0.0.0.0		Options <input type="checkbox"/> Big Endian Format	
Domains Host name : multicontrol Domain name : DNS server 1 : 0.0.0.0 DNS server 2 : 0.0.0.0			
Configuration mode <input checked="" type="radio"/> Static <input type="radio"/> I/O Controller			

IP address of the MultiControl 192.168.0.22  
 IP address upstream 192.168.0.21  
 IP address downstream 0.0.0.0

### ZPA programs with stop function



S1–S4 = zone sensors, M1–M4 = RollerDrive, A–D = Zone 1–Zone 4

### Single release

In the ZPA programs, one MultiControl can control up to four zones. Each zone can be stopped via an input or an PLC.  
 The conveying process is carried out from upstream to downstream; here from left to right. For a conveying direction from right to left, the MultiControl should be installed on the opposite side of the conveyor. The start zone is always Zone 1; it is not possible to define Zone 2 as start zone.  
 Depending on the control program selected, the sensors and motors are assigned.

Number of zones	Control program	Assigned sensors and motors
1	1fachStauplatz_Zone_Stop	S1 (for M1, M2, M3, M4)
2	2fachStauplatz_Zone_Stop	S1 (for M1 + M3), S2 (for M2 + M4)
3	2fachStauplatz_Zone_Stop	S1 (for M1), S2 (for M2), S3 (for M3)
4	4fachStauplatz_Zone_Stop	S1 (for M1), S2 (for M2), S3 (for M3), S4 (for M4)

Free RollerDrive connections can be used as slave motors, as shown in the table.

If there is an active stop signal, the goods to be conveyed are still transported to the zone sensor. The RollerDrive is not stopped immediately. The goods to be conveyed are transported further after the stop signal has been reset, if the downstream zone is free. If the goods to be conveyed are removed from a stopped zone, and the stop signal is reset, the RollerDrive starts, and, after Timer 4 expires, the conveying process is continued. If the goods to be conveyed are placed in the zone sensor before Timer 4 expires, the conveying process starts immediately.

If goods to be conveyed block the zone sensor, the RollerDrive stops after expiration of Timer 2. After a pause, which is equivalent to Timer 2, the RollerDrive restarts. This process repeats itself until the goods to be conveyed have been removed from the zone sensor. As long as the zone sensor is blocked, the upstream zone is stopped.

After leaving the zone sensor, goods to be conveyed must reach the next zone sensor within the time for Timer 2. If Timer 2 is stopped, the upstream zone stops. After expiration of the Timer 2 time, the zone is interpreted as free, and the upstream zone can take in goods. It is assumed that the goods to be conveyed have been removed.

After goods to be conveyed have left the zone sensor, the RollerDrive continues to run as set for Timer 3.

### Train release

For Train release, the following programs are available:

Number of zones	Control program	Assigned sensors and motors
1	1fachStauplatz_TrainRelease	S1 (for M1, M2, M3, M4)
2	2fachStauplatz_TrainRelease	S1 (for M1 + M3), S2 (for M2 + M4)
3	3fachStauplatz_TrainRelease	S1 (for M1), S2 (for M2), S3 (for M3)
4	4fachStauplatz_TrainRelease	S1 (for M1), S2 (for M2), S3 (for M3), S4 (for M4)

Free RollerDrive connections can be used as slave motors, as shown in the table.

The parameter Timer 1 influences the time-delayed starting of the RollerDrive in Train release.



## I/O device

In the “I/O Device” program, it is possible to control the motors and the inputs/outputs using a program created in the master control system.

### Assignment of the input and output signals

The assignment of zone sensors 1 to 4 is preset. Additional inputs/outputs can be configured. The speed settings of the motors are made using positive or negative percentage reference settings in the corresponding output bytes. In the master controller, the “Move” command is used for this purpose.

## Configuration in the web browser

### Control Program Selection

Control Program Selection	
Program ID :	3fachStauplatz_Zone_Stop
Version :	2015-02-17-09
Control Timer	
Timer #1 (0-30000 ms) :	2000
Timer #2 (0-30000 ms) :	4000
Timer #3 (0-30000 ms) :	5000
Timer #4 (0-30000 ms) :	1000

ZPA Single release Program ID	ZPA Train release Program ID	No ZPA Program ID
1fachStauplatz_Zone_Stop	1fachStauplatz_TrainRelease	I/O device
2fachStauplatz_Zone_Stop	2fachStauplatz_TrainRelease	
3fachStauplatz_Zone_Stop	3fachStauplatz_TrainRelease	
4fachStauplatz_Zone_Stop	4fachStauplatz_TrainRelease	

Additional functions can be used only in connection with Interroll 24V conveyor modules of the Interroll automation system. (See additional user manual for the additional functions.)

### Control timer

- Timer #1: Single release: not used  
Train release: time-delayed starting of the RollerDrive
- Timer #2: Accumulation monitoring
- Timer #3: After-run of RollerDrive
- Timer #4: Fault reset



The timer parameters apply for all zones. The default parameters must be adapted to the specific conveying system.

In the “I/O Device” program, the timers have no effect.

**Note:**

Altered parameters must be transferred to the MultiControl by hitting the “Submit” button.

**Motor settings**

Motor 1

Enable

Roller diameter (30.0-99.9 mm) :

Gearing ratio (1-99) :

Direction :  clockwise  counterclockwise

Normal speed (0.1-1.99 m/s) :

Alternate speed (0.1-1.99 m/s) :

Acceleration (0.0-9.99 m/s<sup>2</sup>) :

Deceleration (0.0-9.99 m/s<sup>2</sup>) :

Motor 2

Enable

Roller diameter (30.0-99.9 mm) :

Gearing ratio (1-99) :

Direction :  clockwise  counterclockwise

Normal speed (0.1-1.99 m/s) :

Alternate speed (0.1-1.99 m/s) :

Acceleration (0.0-9.99 m/s<sup>2</sup>) :

Deceleration (0.0-9.99 m/s<sup>2</sup>) :

Motor 3

Enable

Roller diameter (30.0-99.9 mm) :

Gearing ratio (1-99) :

Direction :  clockwise  counterclockwise

Normal speed (0.1-1.99 m/s) :

Alternate speed (0.1-1.99 m/s) :

Acceleration (0.0-9.99 m/s<sup>2</sup>) :

Deceleration (0.0-9.99 m/s<sup>2</sup>) :

Motor 4

Enable

Roller diameter (30.0-99.9 mm) :

Gearing ratio (1-99) :

Direction :  clockwise  counterclockwise

Normal speed (0.1-1.99 m/s) :

Alternate speed (0.1-1.99 m/s) :

Acceleration (0.0-9.99 m/s<sup>2</sup>) :

Deceleration (0.0-9.99 m/s<sup>2</sup>) :

Motors not used must be deactivated, in order to avoid error messages.

“Roller diameter”, “gearing ratio”, and “normal speed” must be set in accordance with the RollerDrive used.

The parameter “direction” is used to adjust the direction of rotation of the RollerDrive for the installation position (direction of rotation, viewed from end of the cable of the RollerDrive).

“Acceleration” and “deceleration” change the start/stop behavior of the RollerDrive.

The parameter “alternate speed” currently has no function.

In the I/O Device program, the speed setting in percent is based on the value set here under “normal speed”.

**Note:**

Altered parameters must be transferred to the MultiControl by hitting the “Submit” button.



## Digital I/O settings

Sensor 1  
 Type :  PNP  NPN  
 Polarity :  positive  negative

Sensor 3  
 Type :  PNP  NPN  
 Polarity :  positive  negative

I/O 1  
 Type :  PNP  NPN  
 Polarity :  positive  negative  
 Function : PLC Input

I/O 3  
 Type :  PNP  NPN  
 Polarity :  positive  negative  
 Function : PLC Input

Sensor 2  
 Type :  PNP  NPN  
 Polarity :  positive  negative

Sensor 4  
 Type :  PNP  NPN  
 Polarity :  positive  negative

I/O 2  
 Type :  PNP  NPN  
 Polarity :  positive  negative  
 Function : PLC Input

I/O 4  
 Type :  PNP  NPN  
 Polarity :  positive  negative  
 Function : PLC Input

I/O State LEDs enabled

Sensors 1 to 4 are always assigned to the zone sensors. I/O 1 to I/O 4 can be configured.

I/O functions 1 to 4:

Function	Description
PLC input	Input signal from PLC
PLC output	Output signal to PLC
Sensor 5	Start sensor for Zone 1
Control input 1	Stops Zone 1
Control input 2	Stops Zone 2
Control input 3	Stops Zone 3
Control input 4	Stops Zone 4
Control output 1	Output signal, Zone 1 blocked
Control output 2	Output signal, Zone 2 blocked
Control output 3	Output signal, Zone 3 blocked
Control output 4	Output signal, Zone 4 blocked

These functions have no effect on the I/O Device control program.

Additional functions can be used only in connection with Interroll 24V conveyor modules of the Interroll automation system. (See additional user manual for the additional functions.)

### Note:

Altered parameters must be transferred to the MultiControl by hitting the "Submit" button.



**Example: Start sensor**

Sensor 1  
 Type :  PNP  NPN  
 Polarity :  positive  negative

I/O 1  
 Type :  PNP  NPN  
 Polarity :  positive  negative  
 Function :

Sensor 2  
 Type :  PNP  NPN  
 Polarity :  positive  negative

I/O 2  
 Type :  PNP  NPN  
 Polarity :  positive  negative  
 Function :

Sensor 3  
 Type :  PNP  NPN  
 Polarity :  positive  negative

I/O 3  
 Type :  PNP  NPN  
 Polarity :  positive  negative  
 Function :

Sensor 4  
 Type :  PNP  NPN  
 Polarity :  positive  negative

I/O 4  
 Type :  PNP  NPN  
 Polarity :  positive  negative  
 Function :

I/O 1 function = sensor 5  
 The sensor connected to I/O 1 is configured as the start sensor.

**Example: Stopping Zone 3**

Sensor 1  
 Type :  PNP  NPN  
 Polarity :  positive  negative

I/O 1  
 Type :  PNP  NPN  
 Polarity :  positive  negative  
 Function :

Sensor 2  
 Type :  PNP  NPN  
 Polarity :  positive  negative

I/O 2  
 Type :  PNP  NPN  
 Polarity :  positive  negative  
 Function :

Sensor 3  
 Type :  PNP  NPN  
 Polarity :  positive  negative

I/O 3  
 Type :  PNP  NPN  
 Polarity :  positive  negative  
 Function :

Sensor 4  
 Type :  PNP  NPN  
 Polarity :  positive  negative

I/O 4  
 Type :  PNP  NPN  
 Polarity :  positive  negative  
 Function :

I/O 2 function = control input 3  
 The third zone is stopped with a signal to I/O 2.

I/O 4 function = control output 3  
 The status (zone sensor blocked) of the third zone is output at I/O 4.



### Digital I/O states

Sensor 1 State : Off	Sensor 3 State : Off
I/O 1 State : Off	I/O 3 State : Off
Sensor 2 State : Off	Sensor 4 State : Off
I/O 2 State : Off	I/O 4 State : Off

Display of the switching states of the connected sensors and I/O. Status changes become visible only after refreshing the web browser (key F5).

### Error settings

System Errors		Control Errors	
Network Error	: Warning	Control Error 1	: Ignore
Over Voltage Error	: Warning	Control Error 2	: Ignore
Under Voltage Error	: Warning	Control Error 3	: Ignore
Motor Error	: Warning	Control Error 4	: Ignore
General Control Error	: Ignore	Control Error 5	: Ignore
		Control Error 6	: Ignore
		Control Error 7	: Ignore
		Control Error 8	: Ignore

### Network error

Monitoring the communication between MultiControl and PLC.

Ignore	Error is not displayed
Warning	Error is displayed by a 2x-blinking error LED; the conveying process is not interrupted
Immediate stop	Conveying process is interrupted; error is displayed by a 2x-blinking error LED

The default setting is warning.

If the MultiControl is operated without PLC, the ignore setting is recommended.  
 If the MultiControl is operated with PLC, the immediate stop setting is recommended.

### Motor error

Monitoring the motors.

Immediate stop	Error is displayed by a 3x-blinking error LED. Other motors connected to the MultiControl stop. There is no infeed stop for the upstream MultiControl.
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**Warning** Error is displayed by a 3x-blinking error LED.  
Other motors connected to the MultiControl turn.  
Once the error is no longer present, the LED goes out.

The control settings for errors 1–8 have no function.  
“Immediate Stop” and “Normal Stop” behave in the same way.

## Up/download

### Download

Bus Config : [download](#)  
Application Config : [download](#)

### Upload

Bus Config : [upload](#)  
Application Config : [upload](#)  
Software-Update : [upload](#)

The download function can be used to download configuration data from a MultiControl and store it on the PC.

The upload function makes it possible to read data into a MultiControl.  
“Bus config” saves the data of the network settings. “Application config” saves the program data.

## Saving the data

Place the mouse cursor on the “Download” button and open the menu with a right mouse click. Select the save location using “Save target as”.

## Uploading the data

Click on the “Upload” button. Select the save file in the target directory. Clicking on the “Upload” button transfers the data to the MultiControl.

## Teach-in process

The teach-in process provides for automatic addressing of multiple MultiControls. Furthermore, it provides the option of transferring configurations from one MultiControl to others.

In this process, the following settings are transferred or specified:

- The number of motors connected to each MultiControl
- The number of zones for each MultiControl
- The sensor configuration (type PNP/NPN and switching logic normally open/closed)
- Assignment of a network address to each MultiControl
- Assignment of a name for each MultiControl
- The neighbour relationships of the MultiControl
- Direction of rotation of the motors for the desired transport direction



### Prerequisites

All MultiControls are in the delivery state.

The sensors matches the default setting of the MultiControl “PNP normally closed”.

(See “Configuring the sensors”.)

No goods are on the conveyor.

The process goes through multiple steps:

Step 1: Reading in the motor configuration

Step 2: Assigning the “slave RollerDrive”

Step 3: Ending the “teach-in” process

### Basic setting of the MultiControl

The name and IP address of the first MultiControl can be changed before the teach-in process. The names and IP addresses of the additional connected MultiControls are increased by 1 during the teach-in process.

### Reading in the motors

To start the “teach-in” process, the magnetic sensor must be actuated. When the magnetic sensor detects the magnet, the “Fault” LED lights up continuously.

After one second, running lights start on the LED bar on the left side of MultiControl.

As soon as LED “RD2” lights up, remove the magnet and wait until the running lights start in the right LED bar. Re-actuate the magnetic sensor. When LED “I/O3” lights up, remove the magnet.

The RollerDrives connected to the first MultiControl turn; with a slight delay, all the RollerDrives of the conveyor system also begin to turn.

### Assigning the slave RollerDrive

With the magnet, again select the LED “RD2” on the left side, remove the magnet, and wait until the running lights start in the right LED bar. Re-actuate the magnetic sensor. When LED “RD4” lights up, remove the magnet.

If RollerDrives are connected to a MultiControl, but no corresponding zone sensors, they are detected as slave RollerDrives. The slave RollerDrives of a zone turn in a pulsing fashion. The slave RollerDrives are assigned by activating the corresponding zone sensor.

Program	Assigned sensors and motors
4fach-Stauplatz	S1 (for M1), S2 (for M2), S3 (for M3), S4 (for M4)
3fach-Stauplatz	S1 (for M1), S2 (for M2), S3 (for M3)
2fach-Stauplatz	S1 (for M1 + M3), S2 (for M2 + M4)
1fach-Stauplatz	S1 (for M1+M2+M3+M4)



After all the slave RollerDrives have been assigned, the RollerDrive of the first zone begins to turn in an alternating fashion.

As soon as the RollerDrive begins to turn in the conveying direction, place an item into the zone sensor of the first zone. The teach-in process now runs automatically. If the direction of rotation of a RollerDrive does not match the conveying direction, it is changed. (Item shuttles.) Due to the necessary data transfer, there are pauses in the transitions from one MultiControl to the next.

After the item has reached the last zone sensor, the “teach-in” process can be concluded. To do so, actuate the magnetic sensor. When the magnetic sensor detects the magnet, the “Fault” LED lights up continuously.

After one second, running lights start on the LED bar on the left side of MultiControl.

As soon as LED “RD2” lights up, remove the magnet and wait until the running lights start in the right LED bar. Re-actuate the magnetic sensor. When LED “I/O4” lights up, remove the magnet.

### Aborting the teach-in process

In order to abort the teach-in process, the magnetic sensor must be actuated. When the magnetic sensor detects the magnet, the “Fault” LED lights up continuously.

After one second, running lights start on the LED bar on the left side of MultiControl.

As soon as LED “RD2” lights up, remove the magnet and wait until the running lights start in the right LED bar. Re-actuate the magnetic sensor. When LED “Sensor 3” lights up, remove the magnet. All MultiControls must be set to the factory settings before the teach-in process is started.

### Configuring the sensors

If the sensors do not match the factory settings of the MultiControl, it is possible to change them using the magnet.

To do so, actuate the magnetic sensor. When the magnetic sensor detects the magnet, the “Fault” LED lights up continuously.

After one second, running lights start on the LED bar on the left side of MultiControl.

As soon as LED “I/O1” lights up, remove the magnet and wait until the running lights start in the right LED bar. Re-actuate the magnetic sensor.

When LED of the desired sensor type lights up, remove the magnet.

Sensor type	LED MultiControl
PNP normally closed	Sensor 3
NPN normally closed	I/O3
PNP normally open	RD3
NPN normally open	RD4



## Appendix

### Illustration from the cyclical process image

#### Inputs (observing and analyzing)

Process image "Universal Full"

Byte	Bit	Category	Description	Type	Comment
0	.0	Sensors	Sensor 1	BOOLEAN	
0	.1	Sensors	Sensor 2	BOOLEAN	
0	.2	Sensors	Sensor 3	BOOLEAN	
0	.3	Sensors	Sensor 4	BOOLEAN	
0	.4	Sensors	Sensor 5	BOOLEAN	Start sensor
0	.5	Sensors	Sensor 6	BOOLEAN	
0	.6	Sensors	Sensor 7	BOOLEAN	
0	.7	Sensors	Sensor 8	BOOLEAN	
1	.0	Digital I/Os PLC input PLC output Handshakes: In Up In Out Out Up Out Down	I/O 1	BOOLEAN	
1	.1	Digital I/Os PLC input PLC output Handshakes: In Up In Out Out Up Out Down	I/O 2	BOOLEAN	



1 .2	Digital I/Os PLC input PLC output Handshakes: In Up In Out Out Up Out Down	I/O 3	BOOLEAN	
1 .3	Digital I/Os PLC input PLC output Handshakes: In Up In Out Out Up Out Down	I/O 4	BOOLEAN	
2 .0	MotorStates RD1	Error1	BOOLEAN	High = motor error, low = motor OK
2 .1	MotorStates RD2	Error2	BOOLEAN	
2 .2	MotorStates RD3	Error3	BOOLEAN	
2 .3	MotorStates RD4	Error4	BOOLEAN	
3	MotorStates RD1	Speed1	SINT	Speed 0–100 ( 0 = stop, 100 = max speed), Negative sign reverses the direction
4	MotorStates RD2	Speed2	SINT	
5	MotorStates RD3	Speed3	SINT	
6	MotorStates RD4	Speed4	SINT	
8	MotorStates RD1	Motorcurrent1	INT	Average current in mA
10	MotorStates RD2	Motorcurrent2	INT	
12	MotorStates RD3	Motorcurrent3	INT	
14	MotorStates RD4	Motorcurrent4	INT	



16	SystemState	Voltage_Motor	INT	Voltage "Motor Power" in mV	
18	SystemState	Voltage_Logic	INT	Voltage "Power Logic + Sensors" in mV	
20	SystemState	Temperature	INT	Temperature in 0.1°C	
22	SystemState	SystemUpTime	DINT	Operating time in seconds since the last start/restart	
26	.0	ControllInputs	ControllInput 1	BOOLEAN	Stop Zone 1
26	.1	ControllInputs	ControllInput 2	BOOLEAN	Stop Zone 2
26	.2	ControllInputs	ControllInput 3	BOOLEAN	Stop Zone 3
26	.3	ControllInputs	ControllInput 4	BOOLEAN	Stop Zone 4
28	.0	ControlOutputs	ControlOutput1	BOOLEAN	Zone 1 blocked = 1
28	.1	ControlOutputs	ControlOutput2	BOOLEAN	Zone 2 blocked = 1
28	.2	ControlOutputs	ControlOutput3	BOOLEAN	Zone 3 blocked = 1
28	.3	ControlOutputs	ControlOutput4	BOOLEAN	Zone 4 blocked = 1
29	.0	HandshakeSignals	In_Up	BOOLEAN	Start signal first zone
29	.1	HandshakeSignals	In_Down	BOOLEAN	Start signal end zone
29	.4	HandshakeSignals	Out_Up	BOOLEAN	High/low = zone free/busy
29	.5	HandshakeSignals	Out_Down	BOOLEAN	High/low = zone busy/free
31	ZoneStates	ZoneError1	SINT	0 = OK, ≠ 0 = zone error	
32	ZoneStates	ZoneError2	SINT	0 = OK, ≠ 0 = zone error	
33	ZoneStates	ZoneError3	SINT	0 = OK, ≠ 0 = zone error	
34	ZoneStates	ZoneError4	SINT	0 = OK, ≠ 0 = zone error	



## Outputs (control)

Process image "Universal Full"

Byte	Bit	Category	Description	Type	Comment
0	.0	Digital Outputs PLCOutput	Output1	BOOLEAN	
	.1	Digital Outputs PLCOutput	Output2	BOOLEAN	
0	.2	Digital Outputs PLCOutput	Output3	BOOLEAN	
0	.3	Digital Outputs PLCOutput	Output4	BOOLEAN	
1		Motor RD1	Speed1	SINT	Speed 0–100 (0 = stop, 100 = max speed), Negative sign reverses the direction
2		Motor RD2	Speed2	SINT	Speed 0–100 (0 = stop, 100 = max speed), Negative sign reverses the direction
3		Motor RD3	Speed3	SINT	Speed 0–100 (0 = stop, 100 = max speed), Negative sign reverses the direction
4		Motor RD4	Speed4	SINT	Speed 0–100 (0 = stop, 100 = max speed), Negative sign reverses the direction
5	.0	Control Inputs Overwrite	ControllInput1	BOOLEAN	Stop Zone 1
5	.1	Control Inputs Overwrite	ControllInput2	BOOLEAN	Stop Zone 2
5	.2	Control Inputs Overwrite	ControllInput3	BOOLEAN	Stop Zone 3
5	.3	Control Inputs Overwrite	ControllInput4	BOOLEAN	Stop Zone 4



8 .0	Handshake Signals Overwrite	In Up	BOOLEAN	In_Up, start first zone
8 .1	Handshake Signals Overwrite	In Down	BOOLEAN	In_Down, start last zone
8 .4	Handshake Signals Overwrite	Out Up	BOOLEAN	Not used
8 .5	Handshake Signals Overwrite	Out Down	BOOLEAN	Not used

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