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Operating instructions and spare parts list

OptiMove CR06
Axes control unit

Translation of the original operating instructions

Gema

Documentation OptiMove CR06

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General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the OptiMove CR06 Axes control unit.

These safety regulations must be read and understood before the OptiMove CR06 Axes control unit.

Safety symbols (pictograms)

The following warnings with their meanings can be found in the Gema operating instructions. The general safety precautions must also be followed as well as the regulations in the operating instructions.

DANGER!
Danger due to live electricity or moving parts. Possible consequences: Death or serious injury

WARNING!
Improper use of the equipment could damage the machine or cause it to malfunction. Possible consequences: minor injuries or damage to equipment

INFORMATION!
Useful tips and other information

Conformity of use

1. The OptiMove CR06 Axes control unit is built to the latest specification and conforms to the recognized technical safety regulations. It is designed for the normal application of powder coating.
2. Any other use is considered as non-conform. The manufacturer is not responsible for damage resulting from improper use of this equipment; the end-user alone is responsible. If the OptiMove CR06 Axes control unit is to be used for other purposes or other substances outside of our guidelines then Gema Switzerland GmbH should be consulted.
3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of

use. The OptiMove CR06 Axes control unit should only be used, maintained and started up by trained personnel, who are informed about and are familiar with the possible hazards involved.

4. Start-up (i.e. the execution of a particular operation) is forbidden until it has been established that the OptiMove CR06 Axes control unit has been set up and wired according to the guidelines for machinery ((2006/42/CE). EN 60204-1 (machine safety) must also be observed.
5. Unauthorized modifications to OptiMove CR06 Axes control unit exempt the manufacturer from any liability from resulting damage.
6. The relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations are to be observed.
7. Furthermore the country-specific safety regulations must be observed.

Explosion protection	Protection type	Temperature class
CE Ex II 3D	IP54	85 °C

Technical safety regulations for stationary electrostatic powder spraying equipment

General information

The powder spraying equipment from Gema is designed with safety in mind and is built according to the latest technological specifications. This equipment can be dangerous if it is not used for its specified purpose. Consequently it should be noted that there exists a danger to life and limb of the user or third party, a danger of damage to the equipment and other machinery belonging to the user and a hazard to the efficient operation of the equipment.

1. The powder spraying equipment should only be started up and used once the operating instructions have been carefully studied. Improper use of the controlling device can lead to accidents, malfunction or damage to the control itself.
2. Before every start-up check the equipment for operational safety (regular servicing is essential)!
3. The local safety guidelines are to be followed for safe operation.
4. Safety precautions specified by local legislation must be observed.
5. The plug must be disconnected before the machine is opened for repair.
6. The plug and socket connection between the powder spraying equipment and the mains network should only be taken out when the power is switched off.
7. The connecting cable between the controlling device and the spray gun must be set up so that it cannot be damaged during

operation. Safety precautions specified by local legislation must be observed!

8. Only original Gema spare parts should be used, because the explosion protection will also be preserved that way. Damage caused by other parts is not covered by guarantee.
9. If Gema powder spraying equipment is used in conjunction with machinery from other manufacturers then their safety regulations must also be taken into account.
10. Before starting work familiarize yourself with all installations and operating elements, as well as with their functions! Familiarization during operation is too late!
11. Caution must be exercised when working with a powder/air mixture! A powder/air mixture in the right concentration is flammable! Smoking is forbidden in the entire plant area!
12. As a general rule for all powder spraying installations, persons with pacemakers should never enter high voltage areas or areas with electromagnetic fields. Persons with pacemakers should not enter areas with powder spraying installations!

WARNING!
We emphasize that the customer himself is responsible for the safe operation of equipment. Gema is in no way responsible for any resulting damages!

Safety conscious working

Each person responsible for the assembly, start-up, operation, service and repair of powder spraying equipment must have read and understood the operating instructions and the chapter "Safety regulations". The operator must ensure that the user has had the appropriate training for powder spraying equipment and is aware of the possible sources of danger.

The powder spraying equipment should only be used by trained and authorized personnel. This applies to modifications to the electrical equipment, which should only be carried out by a specialist.

The operating instructions and the necessary closing down procedures must be followed before any work is carried out concerning the set-up, start-up, operation, modification, operating conditions, mode of operation, servicing, inspection or repairs.

The powder spray equipment can be turned off by using the main switch or failing that, the emergency shut-down. Individual components can be turned off during operation by using the appropriate switches.

Individual safety regulations for the operating firm and/or operating personnel

1. Any operating method which will negatively influence the technical safety of the powder spraying equipment is to be avoided.
2. The operator should care about no non-authorized personnel works on the powder spraying equipment (e.g. this also includes using the equipment for non-conform work).
3. For dangerous materials, the employer has to provide an operating instructions manual for specifying the dangers arising for hu-

mans and environment by handling dangerous materials, as well as the necessary preventive measures and behavior rules. The operating instructions manual has to be written in an understandable form and in the language of the persons employed, and has to be announced in a suitable place in the working area.

4. The operator is under obligation to check the powder spraying equipment at least once every shift for signs of external damage, defects or changes (including the operating characteristics) which could influence safety and to report them immediately.
5. The operator is obliged to check that the powder spraying equipment is only operated when in satisfactory condition.
6. As far as it is necessary, the operating firm must ensure that the operating personnel wear protective clothing (e.g. facemasks).
7. The operating firm must guarantee cleanliness and an overview of the workplace with suitable instructions and checks in and around the powder spraying equipment.
8. No safety devices should be dismantled or put out of operation. If the dismantling of a safety device for set-up, repair or servicing is necessary, reassembly of the safety devices must take place immediately after the maintenance or repair work is finished. The powder spraying device must be turned off while servicing is carried out. The operator must train and commit the responsible personnel to this.
9. Activities such as checking powder fluidization or checking the high voltage spray gun etc. must be carried out with the powder spraying equipment switched on.

Notes on special types of hazard

Power

It is necessary to refer once more to the danger of life from high-voltage current if the shut-down procedures are not observed. High voltage equipment must not be opened - the plug must first be taken out - otherwise there is danger of electric shock.

Powder

Powder/air mixtures can be ignited by sparks. There must be sufficient ventilation in the powder coating booth. Powder lying on the floor around the powder spraying device is a potentially dangerous source of slipping.

Static charges

Static charges can have the following consequences: Charges to people, electric shocks, sparking. Charging of objects must be avoided - see "Earthing".

Grounding/Earthing

All electricity conducting parts found in the workplace (1 meter around each booth opening, according to EN 12981), and particularly the objects to be coated, have to be grounded. The earthing resistance must amount to maximally 1 MOhm. The resistance must be tested on a regular basis. The condition of the machinery surroundings as well as the suspension gear must ensure that the machinery remains earthed. If the earthing of the machinery includes the suspension arrangements, then these must

constantly be kept clean in order to guarantee the necessary conductivity. The appropriate measuring devices must be kept ready in the workplace in order to check the earthing.

Compressed air

When there are longer pauses or stand-still times between working, the powder spraying equipment should be drained of compressed air. There is a danger of injury when pneumatic hoses are damaged and from the uncontrolled release and improper use of compressed air.

Crushing and cutting

During operation, moving parts may automatically start to move in the operating area. It must be ensured that only instructed and trained personnel go near these parts. The operator should ensure that barriers comply with the local security regulations.

Access under exceptional circumstances

The operating firm must ensure that local conditions are met when repairs are made to the electronic parts or when the equipment is restarted so that there are additional measures such as barriers to prevent unauthorized access.

Prohibition of unauthorized conversions and modifications to machines

All unauthorized conversions and modifications to electrostatic spraying equipment are forbidden for safety reasons.

The powder spraying equipment should not be used if damaged, the faulty part must be immediately replaced or repaired. Only original Gema replacement parts should be used. Damage caused by other parts is not covered by guarantee.

Repairs must only be carried out by specialists or in Gema workshops. Unauthorized conversions and modifications may lead to injury or damage to machinery. The Gema Switzerland GmbH guarantee would no longer be valid.

Safety requirements for electrostatic powder coating

1. This equipment is dangerous if the instructions in this operating manual are not followed.
2. All electrically conductive parts located in the zone 22 and especially the work pieces must be grounded.
3. The floor of the coating area must conduct electricity (normal concrete is generally conductive).
4. The operating personnel must wear electricity conducting footwear (e.g. leather soles).
5. The operating personnel should hold the gun with bare hands. If gloves are worn, these must also conduct electricity.
6. The supplied earthing cable (green/yellow) must be connected to the earthing screw of the electrostatic powder spraying hand appliance. The earthing cable must have a good metallic connection with the coating booth, the recovery unit and the conveyor chain and with the suspension arrangement of the objects.

7. The electricity and powder supply to the hand guns must be set up so that they are fully protected against heat and chemical damage.
8. The powder coating device may only be switched on once the booth has been started up. If the booth cuts out then the powder coating device must be switched off.
9. The earthing of all electricity conducting devices (e.g. hooks, conveyor chains) must be checked on a weekly basis. The earthing resistance must amount to maximally 1 MOhm.
10. The control device must be switched off if the hand gun is cleaned or the nozzle is changed.
11. When working with cleaning agents there may be a risk of hazardous fumes. The manufacturer's instructions must be observed when using such cleaning agents.
12. The manufacturer's instructions and the applicable environmental requirements must be observed when disposing of powder lacquer and cleaning agents.
13. If any part of the spray gun is damaged (broken parts, tears) or missing then it should not be used.
14. For your own safety, only use accessories and attachments listed in the operating instructions. The use of other parts can lead to risk of injury. Only original Gema replacement parts should be used.
15. Repairs must only be carried out by specialists and under no circumstances should they be carried out in the operating area. The former protection must not be reduced.
16. Conditions leading to dangerous levels of dust concentration in the powder spraying booths or in the powder spraying areas must be avoided. There must be sufficient technical ventilation available, to prevent a dust concentration of more than 50% of the lower explosion limit (UEG) (UEG = max. permissible powder/air concentration). If the UEG is not known then a value of 10 g/m³ should be used.

A summary of the directives and standards

European directives RL

2006/42/EC	Machinery
94/9/EC	Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres
2004/108/EC	Electromagnetic Compatibility (EMC)
87/404/EC	Simple Pressure Vessels

EN European standards

EN ISO 12100-1: 2004	Safety of Machinery – Basic Concepts, General Principles for Design –Part 1: Basic Terminology, Methodology
EN ISO 12100-2: 2004	Safety of Machinery – Basic Concepts, General Principles for Design – Part 2: Technical Principles
EN ISO 14121-1:	Safety of Machinery – Risk Assessment, Part 1: Princip-

2007	les
EN 60204-1: 2006	Safety of Machinery – Electrical Equipment of Machines – Part 1: General Requirements
EN 13980:2002	Potentially Explosive Atmospheres – Application of Quality Systems
EN ISO 9001: 2008	Quality Management Systems – Requirements
EN 12981+A1: 2009	Coating Plants – Spray Booths for Application of Organic Powder Coating Material – Safety Requirements
EN 50177:2006	Automatic Electrostatic Spraying Equipment for Flammable Coating Powder
EN 1953:1998	Atomising and Spraying Equipment for Coating Materials
EN 61241-0:2006	Electrical Apparatus for Use in the Presence of Combustible Dust – General Requirements
EN 61241-2-2: 1995	Electrical Apparatus for Use in the Presence of Combustible Dust – Part 2: Test Methods
EN 61241-10: 2004	Electrical Apparatus for Use in the Presence of Combustible Dust – Part 10: Classification of Areas Where Combustible Dusts Are or May Be Present
EN 1127-1:2008	Explosive Atmospheres – Basic Concepts and Methodology

Product specific security measures

- The installation work, to be done by the customer, must be carried out according to local regulations
- Before starting up the plant a check must be made that no foreign objects are in the booth or in the ducting (input and exhaust air)
- It must be observed, that all components are grounded according to the local regulations, before start-up

Special security measures

1. It must be ensured that all components are earthed according to the local regulations before start-up.
2. The OptiMove CR06 Axes control unit should only be switched on and operated after carefully reading these operating instructions. Incorrect operation of the axes control unit can lead to accidents, malfunctions or damage to the plant.
3. **WARNING!**
   The force of the reciprocator/axes is much greater than that of humans! All axes must be secured against access during operation (see local regulations). Never stand under the Z-carriage when the reciprocator is not operating!
4. The installation work to be done by the customer must be carried out according to local regulations.
5. The plug-in connections between the OptiMove CR06 Axes control unit and the power section of the ZA04 Reciprocator may only be removed when the power supply is switched off.
6. The connecting cables between the control unit and the reciprocator/axes must be installed in such a way that they cannot be damaged during axes operation. Safety precautions specified by local legislation must be observed!
7. The **maximum upper stroke limit** of the reciprocator must always be set with reference to the **maximum height of the booth gun slots**. If an incorrect (too high) stroke limit is set, this can lead to the **damage** of the reciprocator and/or the booth!

Attention:
During a test run, it must be guaranteed that the unit is not damaged by the test! In particular, the limitations of the stroke range have to be observed (for more details, please refer to section "System parameter P1 - setting the upper stroke limit")!

8. The voltage supply of the reciprocator is guaranteed by the OptiMove CR06 Axes control unit. The supply voltage amounts to 230 VAC and must always be conducted via the emergency stop circuit. In case of an emergency, the voltage supply to the motor may be interrupted with the emergency stop key.
9. When repairing the reciprocator, both the axes control equipment and the reciprocator must be disconnected from the mains according to the local safety regulations!

10. Repairs may be made only by authorized Gema service centers. Unauthorized conversions and modifications may lead to injury or damage to machinery. The Gema Switzerland GmbH guarantee would no longer be valid.
11. We emphasize that the customer himself is responsible for the safe operation of equipment. Gema Switzerland GmbH will not be responsible for any resulting damage!

About this manual

General information

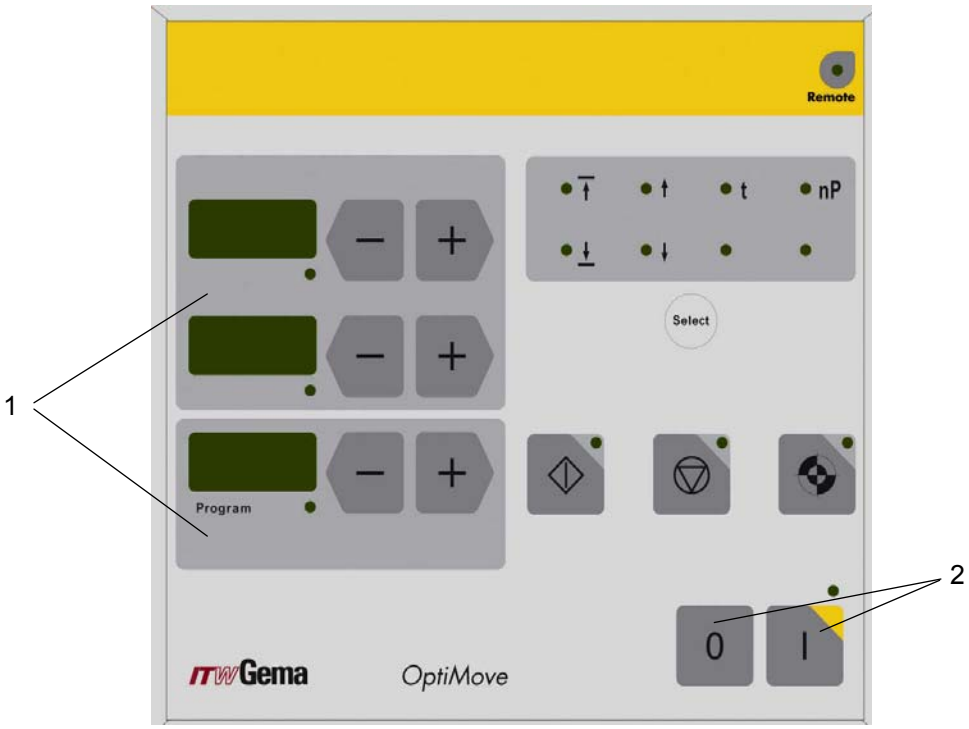
These operating manual contains all important information which you require for the working with the OptiMove CR06 Axes control unit. It will safely guide you through the start-up process and give you references and tips for the optimal use of your new powder coating system.

Information about the function mode of the individual system components - reciprocators, booths, powder gun controls, powder guns etc. - should be referenced to their corresponding documents.

Function description

OptiMove CR06 Axes control unit

Operating panel



OptiMove CR06 - operating panel

1 Operating and display elements

2 Power switch ON/OFF

Field of application

The OptiMove CR06 Axes control unit is designed exclusively for operating electrically driven reciprocators/axes in electrostatic powder coating plants. Any other use is considered as non-conform. The manufacturer is not responsible for any damage resulting from this - the risk for this is assumed by the user alone!

The start-up (i.e. the start of intended operation) is forbidden until it is determined that the control and the reciprocator are installed and connected according to the machine guideline (2006/42/EC). EN 60204-1 (machine safety) must also be observed!

For a better understanding of the relationships in powder coating it is recommended to read the operating instructions of other components, thoroughly, so as to be familiar with their functions also.

Technical Data

OptiMove CR06 Axes control unit

General data

OptiMove CR06	
Number of axes per control unit	1
Maximum available programs	255
Max. stroke height (theoretical)	5 m
Maximum speed	0.6 m/s
Minimum speed	0.08 m/s
Acceleration	0.1 - 2.0 m/s^2

Electrical data

OptiMove CR06	
Nominal input voltage	230 VAC
Tolerance	+10% / -10%
Frequency	50/60 Hz
Rated output of the solenoid valve	24 VDC
Fuse F1	10 AT
Power consumption	1.1 kW
Protection type	IP54
Operating temperature	0°C - +40°C (+32°F - +104°F)
Storing temperature	-20°C - +70°C (-4°F - +158°F)

Dimensions

OptiMove CR06	
Width	244 mm
Depth	221 mm
Height	177 mm
Weight	3.5 kg

Structure and function

OptiMove CR06 Axes control unit - structure

The OptiMove CR06 Axes control unit is available as an enclosure version for building into an AS03/AS04 control system.

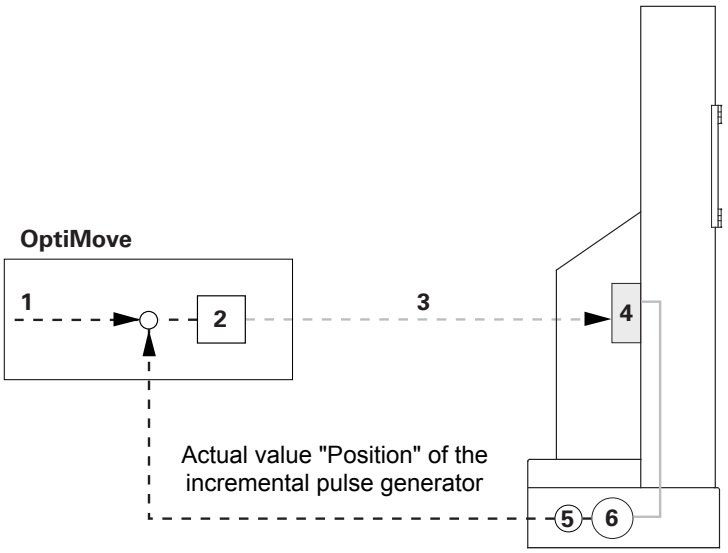
Function description

The OptiMove CR06 Axes control unit is used in axis control systems. A complete axis control system consists of an OptiMove control unit, a frequency converter and a reciprocator with AC motor. The frequency converter receives the supply voltage and control signal directly from the OptiMove Axes control unit.

The OptiMove CR06 Axes control unit, which contains the regulation, visualization and input unit, is responsible for the exact positioning adjustment of the carriage by evaluating the signal from the reciprocator incremental pulse generator in the reciprocator.

The drive motor is equipped with an electrical holding brake. When the axis control unit holds an axis position (axis standstill), the holding brake will be activated and the frequency transformer released with a time delay (motor without current).

Configuration



OptiMove CR06 Axes control unit - function

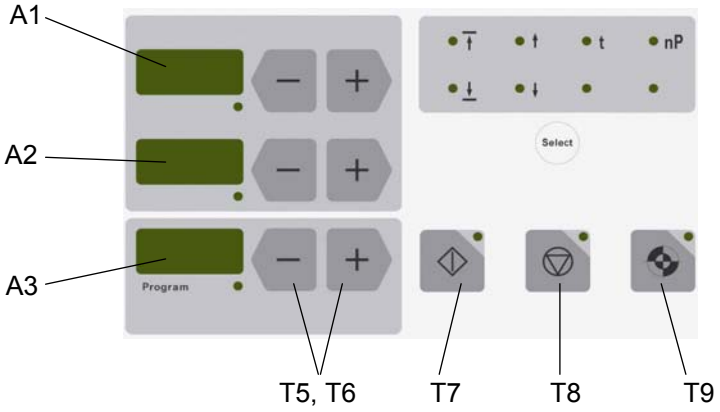
1 Desired position value
2 Regulator
3 RPM preset value
4 Frequency converter
5 Incremental pulse generator
6 AC motor

Operating and display elements, operating modes

Display and input buttons

The control unit is operated by a membrane keypad with input and display elements. All displays (**A1-A3**) are 7 segment displays and all LEDs are green.

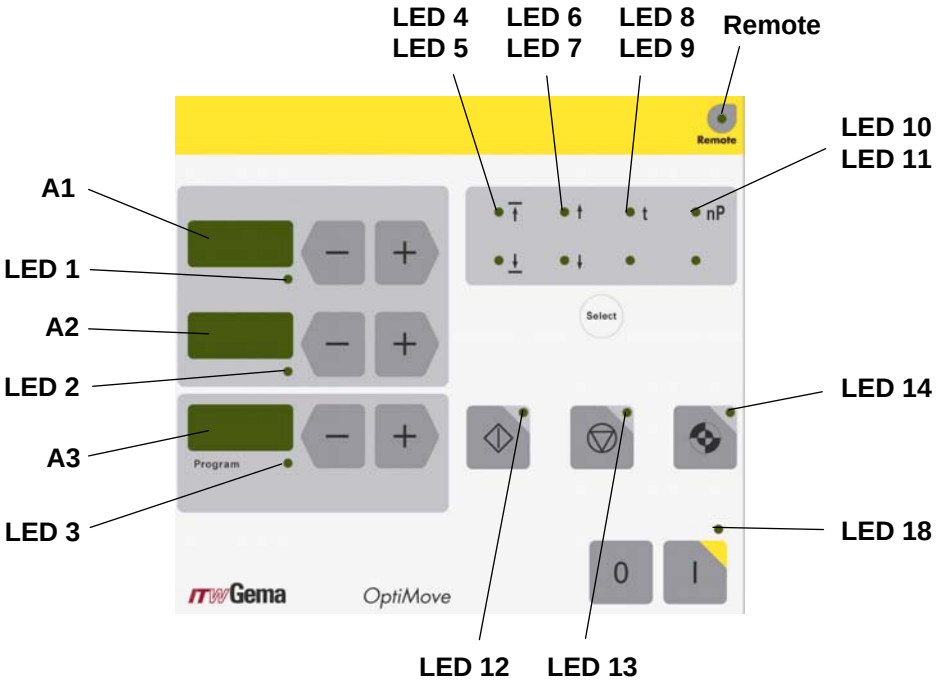
In the **Manual** operating mode, all operation functions are released with the foil keyboard. In the **Remote** operating mode, only visualization functions are available.



Attention:
The keys of the input field should only be pressed with fingertips and under no circumstances with fingernails or hard objects!

Display	Description
A1	Actual value display (axis position) Desired value input (position above, speed upwards, dwell time, program address)
A2	Actual value display (axis speed) Desired value input (position below, speed downwards)
A3	Displays the selected program number or the error code

Key	Description
	Start axis (**T7**)
	Stop axis (**T8**) press for 5 seconds = system parameter
	Start reference point travel (**T9**)
	Input keys for desired values and system parameters (increase value)
	Input keys for desired values and system parameters (decrease value)
T5, T6	Input keys for program number, error acknowledgment
Select	Activate display mode (select desired value input LED 4 - LED 11)



LED	Description
1 **2** **3**	Desired/actual value mode (dark = actual value mode / green = desired value mode)
4-11	Parameter selection display
12	Axis started
13	Axis stopped
14	Axis referencing
Remote	Remote, semiautomatic, keyboard lock
18	Power switch ON

Operating modes

The OptiMove CR06 Axes control unit provides following operating modes:

- Manual
- Remote
- Semiautomatic
- Keyboard lock

The OptiMove CR06 Axes control unit enables the simply creation of 255 programs with the help of the necessary parameters.

Manual operating mode

The manual operation permits the selection and the start of the travel programs by the operator on the panel. In addition, the operator has the possibility to change the program number or directly modify the running program.

In this operating mode, all display and operating functions are possible by the operating panel, such as:

- Program numbers selection
- Input mode/display mode selection
- Preset value setting in the input mode (only in pendulum operation)
- Start/stop
- Error messages acknowledgement
- System parameter mode

Remote operating mode

In the remote operating mode, the control unit is controlled by CAN bus or DigitalBus.

Only a limited operation is possible by the operating panel, namely:

- Input mode/display mode selection (preset values and actual values visualization)
- Acknowledgement of error messages

The remote operating mode is displayed on the operating panel by lighting-up of the green Remote LED. In the remote operating mode, the start and the stop keys are out of function.

Keyboard lock

In the **Keyboard lock** operating mode, the control unit operating panel is locked. The prerequisite for it is that the **System parameter P9** must already have been correctly set (**P9=1**, for more see "Setting the system parameters“).

If the systems parameter **P9=1** is set, the keyboard lock function can be activated through the remote digital input. This is displayed on the operating panel by lighting-up of the green **Remote** LED.

Then, only a limited operation is possible by the operating panel, namely:

- Start, stop, referencing axes
- Input mode/display mode selection (preset values and actual values visualization)
- Error messages acknowledgement

Start-up

Connections - rear side

Connections - rear side

2.1 Power supply line

2.2 Reciprocator power supply

2.3 Reciprocator control signals

2.4 DigitalBus parallel interface

2.5 CAN bus input

2.6 CAN bus output

The cable connections have different plugs and cannot be wrongly connected on assembly.

Attention:
Before disconnecting the cables from the sockets, always switch off the equipment and disconnect the mains cable!

Initial start-up

Measures before initial start-up

All devices are parameterized and marked on delivery (station, axis and address definition), however, they can be adapted according to client's plant specifications.

Note:
All changed values have absolutely to be entered into the parameter table (therefore, see the appendix)!

Electrical wiring and screening concept

All CAN bus users are to be wired in accordance to the enclosed electrical diagrams.

Attention:
The control unit must be connected to the EMERGENCY STOP power circuit, i.e. when an EMERGENCY STOP takes place, the reciprocator brake is activated, and the control unit will be switched off!

- Assembly and fitting of electric devices may only be done by an electrics specialist!
- For trouble-free operation with high data transmission rates, a clear grounding concept is mandatory. A uniform grounding potential is a prerequisite for this!
- Exclusively screened cables are to be used for the wiring. The cable shield must be connected at both sides largely to the ground!

Attention:
Both ends of the cable shield must generally, or as often as possible, be connected to ground, otherwise malfunctions can occur! Furthermore, the reliability of the unit and the normal processing procedure could be reduced!

Setting the system parameters

The OptiMove CR06 Reciprocator control unit is adapted with the system parameters to the reciprocator type and the plant specific characteristics.

In order to set the system parameters, proceed as follows:

1. To enter the system parameter mode, press and hold the  key for 5 seconds. The LEDs L1-L3 illuminate
2. Select the desired parameter P1-P12 on the display A1 by using the  and  keys
3. Set the corresponding parameter values on the display A2 by using the  and  keys

4. Press  in order to exit the system parameter mode

System parameters - overview

Name	Description	Values	Remarks
P1	Upper stroke limit	0.00 - 5.00 m **0.30 m**	
P2	Operating mode	**1 - Pendulum operation** 2 - Sequence program 3 - Semiautomatic pendulum operation 4 - X-GunClean sequence program	
P3	Acceleration	0.10 - 2.00 m/s^2 **1.50 m/s^2**	Horizontal axis 0.10 m/s^2
P4	Max. speed	0.08 - 0.60 m/s **0.60 m/s**	Horizontal axis 0.10 m/s
P5	Open loop gain	10 - 100 **40**	
P6	Incremental pulse generator adjustment	10 - 1500 impulse/cm **750**	for Horizontal axis with serial number (see Rating plate): 18401.xxxx = **1012** (displayed as .0.1.2) 18402.xxxx = **940**
P7	Compensation of holding brake delay time	0 - 500 ms **100**	
P8	Communication	**0 - Digital Bus Error = 1** 1 - CAN Open 2 - Digital Bus Error = 0	from software version 1.06
P9	Keyboard lock	**0 - Keyboard lock inactive** 1 - Keyboard lock activated	Activate keyboard lock by signal Remote=1 Exception: Start, stop, axes referencing, error acknowledgement, preset value display
P10	Referencing mode	**0 - Proximity switch** 1 - Running into end buffer	ZA06 and XT11are referenced with proximity switch
P11	CAN Baud rate	0 - 7 **3 - 125 kBit/s**	
P12	CAN address	0 - 127 **1**	

Default values are printed in **bold**

Attention:
If an incorrect system parameter is set, this can lead to damage to the axes and/or the booth!

System parameter P1 - setting the upper stroke limit

If the OptiMove CR06 Axes control unit operates with an Gema reciprocator, all system parameters are already set to the values for this axis. The only system parameter which must be set, is the upper stroke limit.

The maximum stroke height (max. travel) is limited by the upper stroke limit. The maximum stroke height is limited by the corresponding height of the used reciprocator or by the maximum height of the gun slots in the booth. The upper stroke limit of the OptiMove CR06 Axes control unit is always set at 0.3 meters by the factory.

In order to set the upper stroke limit (system parameter 1), proceed as follows:

1. To enter the system parameter mode, press and hold the  key for 5 seconds.
   The LEDs **L1-L3** illuminate
2. Select the parameter **P1** on the display **A1** using the  and  keys
3. Set the upper stroke limit value on the display **A2** using the  and  keys

Attention:
Always pay attention to the gun positions and the maximum height of the gun slots in the booth! If an incorrect (too high) stroke limit is set, this can lead to damage to the reciprocator and/or the booth!

4. Press the  key in order to exit the system parameter mode

Operation

Operating the axes control

Up to 255 programs can be entered and/or recalled with the OptiMove CR06 Axes control unit. Each program contains data about the speeds and the positions of the axis movements.

Switch on/off the axes control unit

1. Press the I key
   The LED above the key illuminates

By first switch on of the equipment, the preselected factory settings are displayed:

xxx on the display **A1** = value for position

xxx on the display **A2** = value for speed

xxx on the display **A3** = program number

2. Press the 0 key
   The device is switched off

By switching off the equipment (also when the equipment is disconnected from the mains), the actual settings are retained.

Travel to reference point

In order that the OptiMove CR06 Axes control unit can enter the position of the axis as accurately as possible during operation, the triggered axis must first travel to the reference point each time it is switching on. The prerequisite for this is that the reference point is already set correctly (see also the corresponding instructions in the respective axis operating manual).

Note:
The axis must also be referenced again after each axis-specific error (H01, H02, H03, H04). If the axis is referenced, it can not be referenced a second time unless the above conditions are given!

1. Press the key
   The LED of the key blinks, for indicating, that the reference point travel has not been carried out yet
2. Press the key
   The control unit starts the reference travel
3. At the end of the reference travel, the LED of the key expires and the axis is referenced

Note:
If the axis can collide somewhere, or the guns are incorrectly mounted, or the lower reversing point is situated too low, the axis can be stopped by pressing the key! By pressing the key again, the reference travel will continue!

The procedure described above relates to the reference point traveling in manual operation. In automatic operation, the reference point traveling is triggered by ID no. 7 with the DigitalBus and by the corresponding command with the CAN bus.

Start/stop the reciprocator

1. Switch on the axes control unit
2. If necessary, change to another program (see chapter "Program change")
3. Press the key
   The reciprocator is started, and the selected program is activated. The corresponding LED illuminates
4. Press the key
   The reciprocator is stopped
   - The display **A1** shows the actual axis position. The corresponding LED remains unlit

Program change

The program change can be done by keyboard (manually) or through external control signals. In addition, a program change can be made either during operation or at a standstill. In both cases the modifications are stored in the program memory, i.e. after restarting the OptiMove control unit, the last entered axis programs are available again.

Note:
If a program change is made during operation, the axis terminates the old command, which is still in the memory, and takes over the new program (positions or speed) by the next cycle change!

1. Select the desired program number in the **Program** keypad using − or +
   - The LED illuminates for 3 seconds and then deletes, i.e. the program change has been accepted. The new program number is shown on the display **A3**
   - The display **A1** shows the axis position. The corresponding LED remains unlit
   - The display **A2** shows the axis speed. The corresponding LED remains unlit

Displaying the cycle time

Only possible in pendulum mode / semiautomatic mode!

1. Start the reciprocator (see also "Start/stop the reciprocator“)
2. Press − or + in the display field **A2** and keep it pressed. The display **A2** shows the cycle time of the actual program sequence in seconds (from 00.0 to 99.9). If the axis is restarted, then the cycle time 00.0 seconds is displayed. Only when a cycle (whole pendulum movement) has been traveled, the measured cycle time is shown and updated after each further cycle (pendulum movement)
3. Read off the cycle time and use it in the program for the calculation of the optimal sine curve

Edit programs

In the **Edit** program mode, the input parameter values can be selected or changed.

Note:
All program data must be determined. Therefore, use the program tables in the appendix of this operating manual!

The programs can be edited during operation and also at a standstill.

Note:
If the system parameter P2 is set to "2" or "4", editing is only possible at a standstill!

In both cases the modifications are stored in the program memory, i.e. after restarting the OptiMove CR06 Axes control unit, the last entered program values are available again.

Note:
If a program is edited during operation, the axis terminates the old command, which is still in the memory, and takes over the new program values (positions or speed) by the next cycle change!

Note:
The input mode is locked in Remote operating mode!

Axes operating modes

General information

The OptiMove CR06 Axes control unit is universally used for all Gema axes. To be ideally equipped for all conditions, the operating mode can be set in the system parameter mode **P2**. The following axes operating modes can be selected:

- Pendulum operation
- Sequence program
- Semiautomatic pendulum operation
- X-GunClean sequence program

In the following chapter, the different axis operating modes are described in detail.

Pendulum operating mode

In this operating mode, the axis executes a continuous stroke movement according to the adjusted parameters. The different values, as well as start and stop functions, can be set in a user-friendly way by keyboard.

The operator can read the set and current data directly on the display. To be equipped for all operating processes, up to 255 different programs can be stored.

Note:
The system parameter P2 must be set on 1 (pendulum operating mode)!

The equipment is operated by the operating panel. The following possibilities are available:

- Referencing axes
- Start/stop
- Edit programs
- Program change
- Selection input mode/display mode
- Acknowledgement of error messages

Editing/setting

1. Select the desired program number in the **Program** keypad using − and + (see also "Program change").
   The display **A3** shows the program number
2. Press the **Select** key:
   The LEDs in the display area **A1** and **A2**, and the LEDs and illuminate green
3. Input the desired value for the upper reversing point on the display **A1** using the keys − and +
4. Input the desired value for the lower reversing point on the display **A2** using the keys − and +

Note:
If a same value is selected for the input of the upper and the lower position, this results in a positioning command, i.e. the axis stops in this position!

5. Press the **Select** key again:
   LEDs and illuminate green
6. Input the desired value for the speed upwards on the display **A1** using the keys − and +
7. Input the desired value for the speed downwards on the display **A2** using the keys − and +
8. Press the **Select** key again, or press or , in order to exit the **Editing** mode

Sequence program

A sequence program is created by joining a number of individual program steps. The program steps are then processed in a certain order. A sequence program can consist of a single program step when only one position is to be approached, i.e. when positioning the X axis.

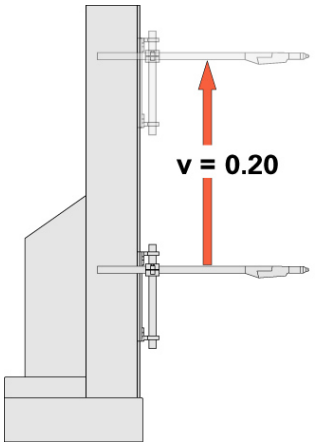
The prerequisite for the programming of sequence programs is that the system parameter P2 is already set correctly P2=2 (see also "Setting the system parameters")!

Structure of a program step (procedure step)

Display	Input parameter	Input range
	Travel position [m]	0.00 - P_max. (P_max. is set with system parameter **P1**)
	Speed [m/s]	0.08 - V_max. (V_max. is set with system parameter **P4**)
	Dwell time (in the travel position) [sec.]	0-5.00
	Following program address	0-255
Display A3	Program number	1-255

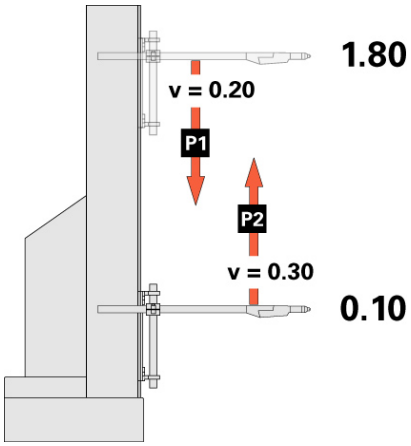
1. Select the desired program number in the **Program** keypad using  and  (see chapter "Program change").
   The display **A3** shows the program number
2. Press the **Select** key:
   LED  illuminates green. The LED in the display area **A1** illuminates green too. The display **A2** remains dark
3. Input the desired value for the desired position on the display **A1** using the keys  and 
4. Press the **Select** key again:
   LED  illuminates greenInput the desired speed value on the display **A1** using the keys  and 
6. Press the **Select** key again:
   LED illuminates green
7. Input the desired dwell time value on the display **A1** using the keys  and 
8. Press the **Select** key again:
   LED  illuminates green
9. Input the address of the following program on the display **A1** using the keys  and 
   0 = no further program step
10. Press the **Select** key again, or press  or  , in order to exit the **Editing** mode

Programming example - positioning



	Program no. 1
Display	Input value
● $\overline{\uparrow}$	1.00 m
● ↑	0.20 m/s
● t	0 s
● nP	0

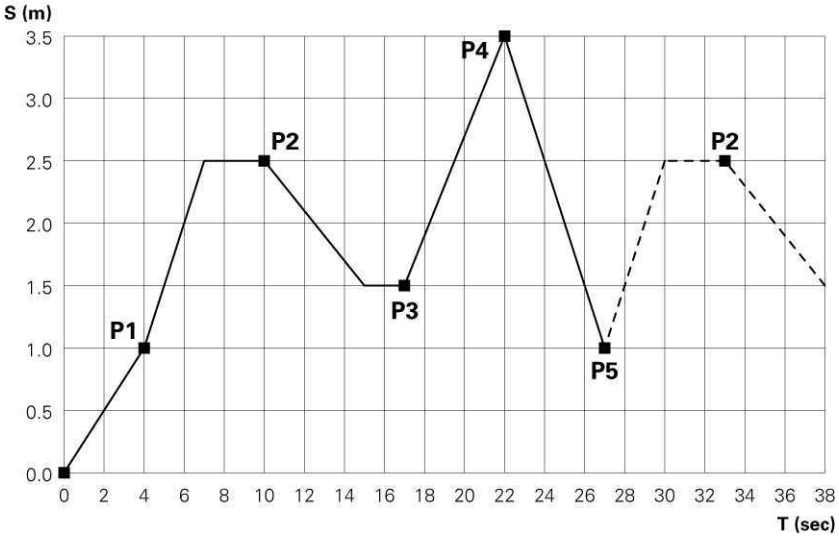
Programming example - pendulum movement



	Program no. 1	Program no. 2
Display	Input value	Input value
● $\overline{\uparrow}$	0.10 m	1.80 m
● ↑	0.20 m/s	0.30 m/s
● t	0 s	0 s
● nP	2	1

Programming example with path-time diagram

	P1	P2	P3	P4	P5
● $\overline{t}$	1.00	2.50	1.50	3.50	1.00
● $\dot{t}$	0.25	0.50	0.20	0.40	0.50
● t	0.00	3.00	2.00	0.00	0.00
● nP	2	3	4	5	2



Semiautomatic pendulum operating mode

Basically, the semiautomatic pendulum operating mode operates in the same way as the standard pendulum operating mode. However, the axis can be started or stopped by a control signal. In this operating mode, the pendulum movement is completely executed and the travel stops at the lower reversing point. As a result, a sequence control with object recognition and "Axis start/stop“ can be realized in a simple way.

Note:
The system parameter P2 must be set on 3 (semiautomatic pendulum operating mode)!

The start release takes place by pin 3 at plug **2.1 Mains connection** or the parallel interface at plug **2.4** (for more details, see section "Pin assignment"). During operation, the axis can not be stopped with the stop key.

Only a limited operation is possible by the operating panel, namely:

- Referencing axes
- Program editing when axis is moving
- Program change when axis is moving
- Input mode/display mode selection (preset values and actual values visualization)
- Error messages acknowledgement

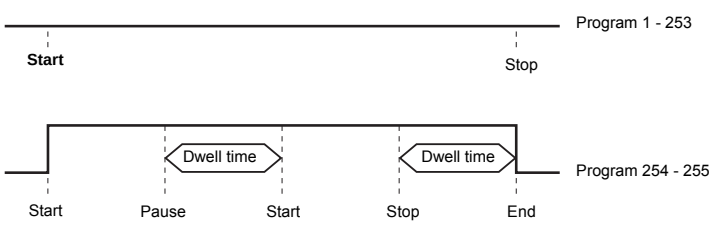
The program editing requires the same procedures as in the standard semiautomatic operating mode.

Sequence program X-GunClean

The X-GunClean sequence program is based in terms of function and operation on the sequence program. This program is used to execute a gun cleaning with the X axis. The programs 1-253 allow to travel to different positions. Thereby, the digital output 2 always remains on **low**. The programs 254 and 255 actuate the digital output 2 (see graph). The operator has now the possibility to trigger a gun cleaning with these two positions.

Note:
The system parameter P2 has to be set to 4 (X-GunClean sequence program)!

P2 = 4 X-GunClean sequence program



The program editing requires the same procedure as in the sequence program.

Setup

If an object is hanging in the booth, it is very advantageous if the upper and lower reversing point (or travel positions in sequence programs) can be directly taken from the object to be coated in a Teach-In procedure. The program parameters of the present program can be set, and the axis travels with this modification. It is also possible to select the program number.

Setup mode by keyboard (pendulum operating mode / semiautomatic mode)

1. Press the **Select** and the key simultaneously
   The corresponding LED blinks
2. Press − or + in the display area **A1**, in order to start the axis
   - LED **1** blinks
   - Axis travels to the upper reversing point
3. Adjust the upper reversing point on display **A1** using the keys − and +
   - Axis travels with the modification
   - The position of the upper reversing point is programmed
4. Press − or + in the display area **A2** in order to start the axis
   - LED **2** blinks
   - Axis travels to the lower reversing point
5. Adjust the lower reversing point on display **A2** using the keys − and +
   - Axis travels with the modification
   - The position of the lower reversing point is programmed
6. Select the desired program number in the **Program** keypad using − or +. The display **A3** shows the program number
7. Press the key in order to exit the setup mode

Setup mode by keyboard (sequence program)

1. Press the **Select** and keys simultaneously
   The corresponding LED blinks
2. Press − or + in the display area **A1**, in order to start the axis
   - Axis travels to the position of the first program step
3. On the display **A1**, adjust the position using the keys − and +
   - **LED 1** blinks

- Axis travels with the change
- The position of the first program step is programmed

4. Press to select the next program step
   - Display **A3** shows - - -
5. Select the desired program number in the keyboard **Program** using and
   The display **A3** shows the program number
6. Repeat steps 2-5 for other programs
7. Press to exit the setup mode

RAM reset

On a RAM reset all preset values and system parameters are loaded with default values.

Enter the RAM reset mode

1. Switch off the reciprocator control by pressing the key
2. Keep pressed the key and at the same time switch on the reciprocator control with . Keep pressed down for 10 seconds.
   The value **255** appears on the display **A3**, and the LED **L3** blinks. All other displays are not illuminated
3. Press the key, in order to exit the RAM reset mode

Default values after RAM reset

Name	Default value
Preset values	
Position above [m]	**0.30**
Position below [m]	**0.00**
Speed upwards [m/s]	**0.20**
Speed downwards [m/s]	**0.20**
System parameters	
P1 - Upper stroke limit (also applied as travel position for horizontal axis)	**0.30**
P2 - Operating mode	**1**
P3 - Acceleration [m/s^2]	**1.50**
P4 - Max. speed [m/s]	**0.60**
P5 - Open loop gain	**40**
P6 - Incremental pulse generator adjustment [pulse/cm]	**750**
P7 - Compensation of holding brake delay time [ms]	**100**
P8 - Communication	**0**
P9 - Keyboard lock	**0**

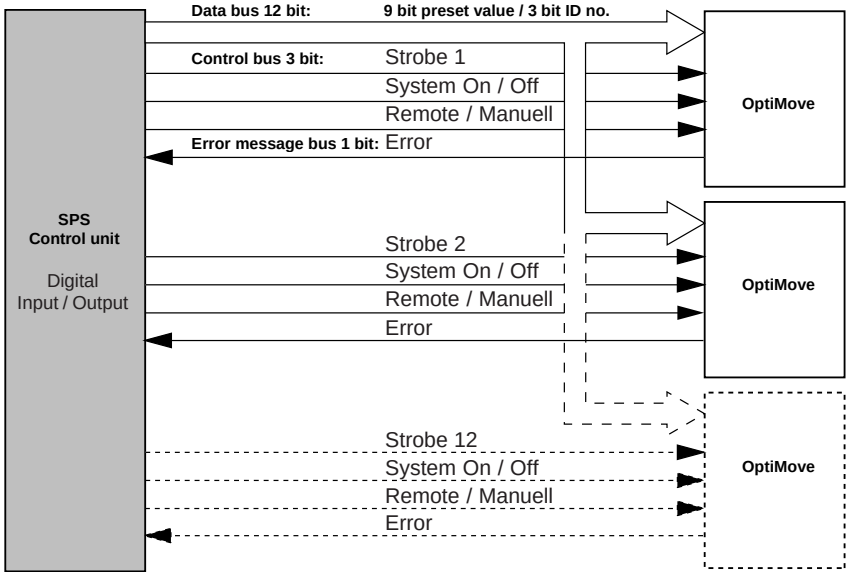
Name	Default value
P10 - Referenzierungsart	**0**
P11 - CAN-Baud rate	**3**
P12 - CAN address	**1**

Note:
These default values are valid from software version V1.06!

DigitalBus parallel interface

Overview

The axes control unit is connected to a superordinated control (PLC) by DigitalBus. The DigitalBus has a 17 bit parallel interface. The interface includes 15 digital inputs and 2 digital outputs. The digital inputs are subdivided into a data bus, consisting of 12 bits and a control bus, consisting of 3 bits. The digital outputs consist of the error message bit and the program active bit.



Controlling by superordinated control unit

16 bits parallel bus structure

D8	D7	D6	D5	D4	D3	D2	D1	D0	A2	A1	A0	Remote	System	Strobe	Error	Program active
Value									Command			Input			Output	Output
Data												Control			Status	

Data bits (Data)

The data bus width is 12 bits. The first 9 bits are used to transfer the data for the different operating parameters to the control unit. The data for the corresponding preset values are assigned with an identification number, consisting of 3 bits.

Control bits (Control)

For inputs, there are 3 control bits available:

- **Axis Start** - Start/Stop reciprocator
- **Strobe** - Data transfer activation
- **Remote** - Operating mode

Status bits (Status)

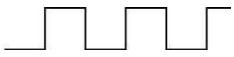
For outputs, there are 2 status bits available:

- **Error** - Axis not referenced
- **Program active**

Status bit 1:

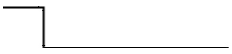
Status bit 1 has assigned two functions:

1. After switching on, an impulse of 0,1 s is present, that means, the axis has to be referenced:

   OptiMove ON 

2. The composite error message indicates all errors which are present in the control unit. Error function according to system parameter **P8**:

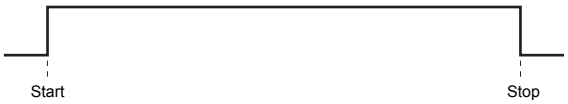
   P8=0 - Error 

   P8=2 - Error 

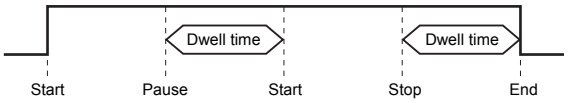
Status bit 2:

Status bit 2 indicates the operating status of the reciprocator. The following diagram shows how the output reacts in the different operating modes:

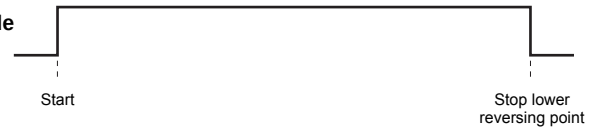
P2 = 1 Pendulum operating mode



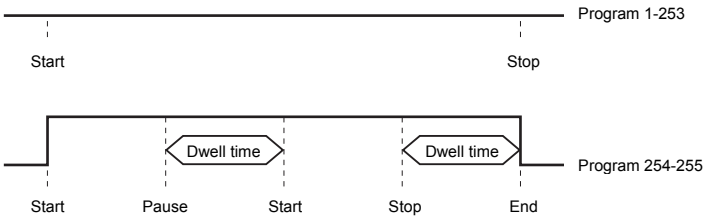
P2 = 2 Sequence program



P2 = 3 Pendulum operating mode semiautomatic



P2 = 4 X-GunClean sequence program



Note:
By traveling to a reference point, the output always remains on "low"!

Command table and value ranges

Command code A0:A2	Designation	Value range	Unit	Resolution	Pendulum operation P2=1 P2=3	Sequence program P2=2 P2=4
0	Upper position	0.00 - 5.00	m	0.01	X	X
1	Lower position	0.00 - 5.00	m	0.01	X	X
2	Speed	0.08 - 0.60	m/s	0.01	X	X
3	Speed	0.08 - 0.60	m/s	0.01	X	
4	Dwell time	0 - 5.00	s	0.01		X
5	Following program address	0 - 255	-	1		X
6	Program no.	1 - 255	-	1	X	X
7	Start travel to reference point	0 - 1	-	1	X	X

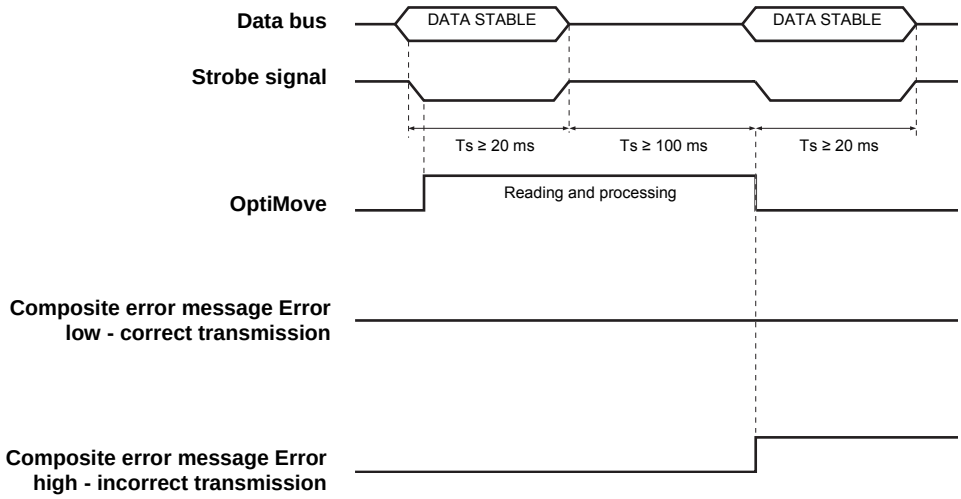
X = is used in the respective mode

Note:
If a program is edited during operation, the axis terminates the old command, which is still in the memory, and takes over the new program values (positions or speed) by the next cycle change!

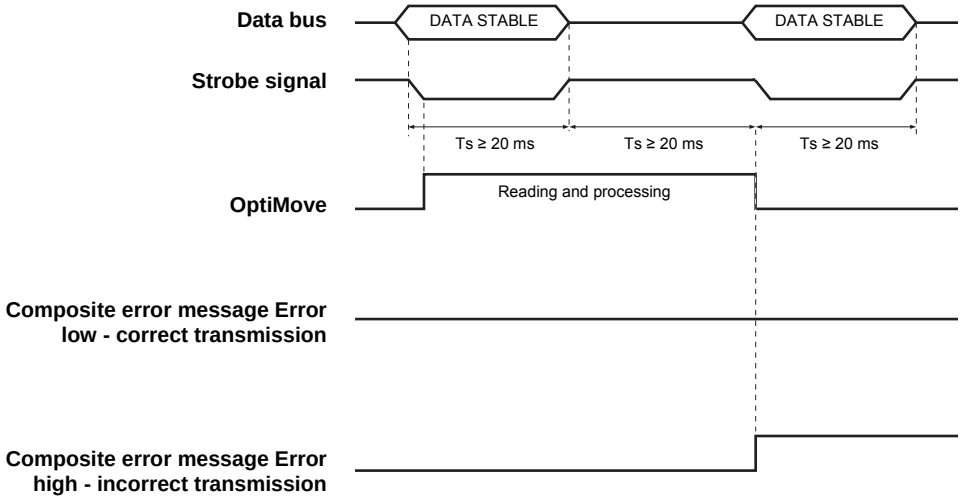
Note:
If the system parameter P2 is set on "2" or "4", editing is only possible at a standstill!

Control sequence

Control sequence for program number change (identification number 6)



Control sequence for program parameter (identification numbers 0-5)



Data transfer

The data transfer from the data bus is initiated by a negative flank of the **Strobe** control signal.

The Data bus is read in for data validation 3 times and the results compared, after every negative **Strobe** flank. If an error occurs, the digital output **Error** is set at **high** and the error message **H30** is shown on display **A3**.

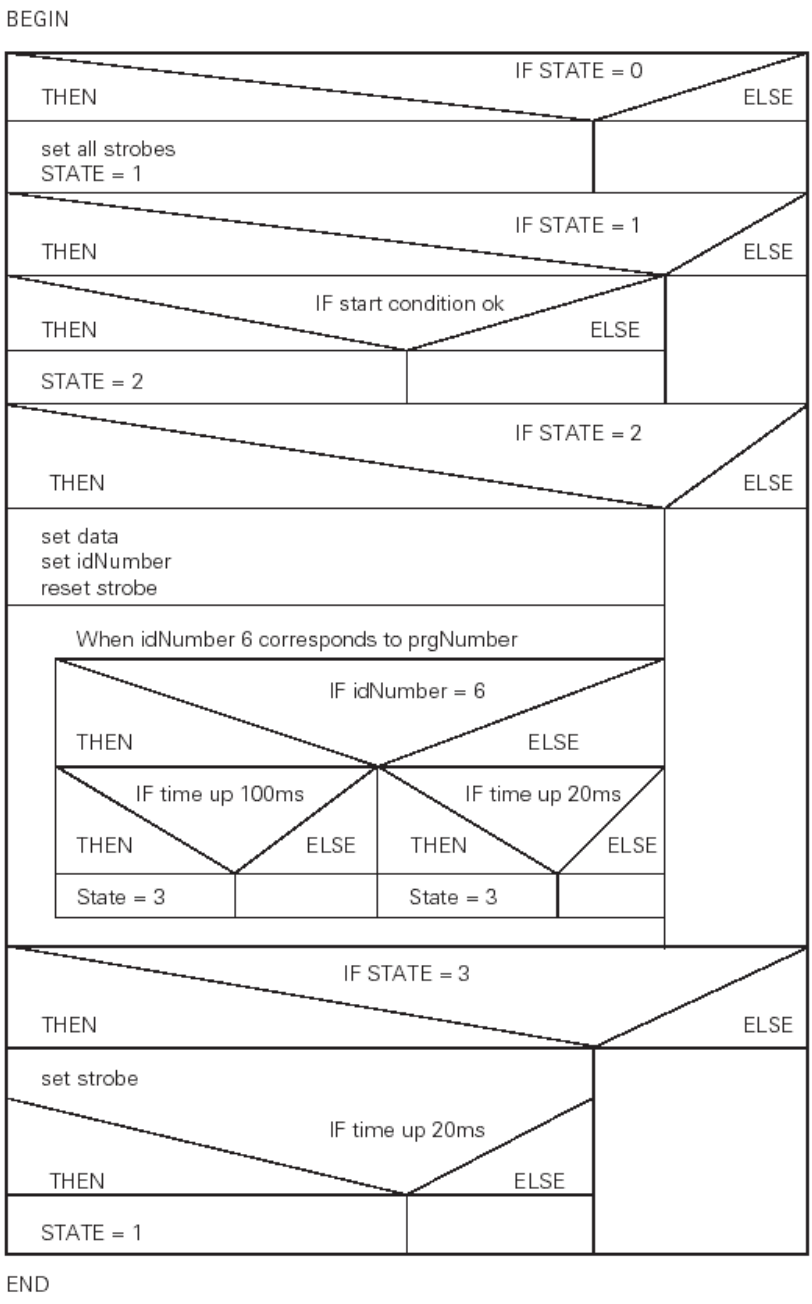
Software description

For each OptiMove axes control unit it exists one strobe signal and one error signal. The data signals and the identification number signals are used in common for all OptiMove control units. The OptiMove takes over the data with the negative flank of the strobe signal.

Explanation:
The simultaneous transmission of identical data to all OptiMove units only occurs at the negative flank of all strobe signals.

Example of a PLC program:

Functional block statements

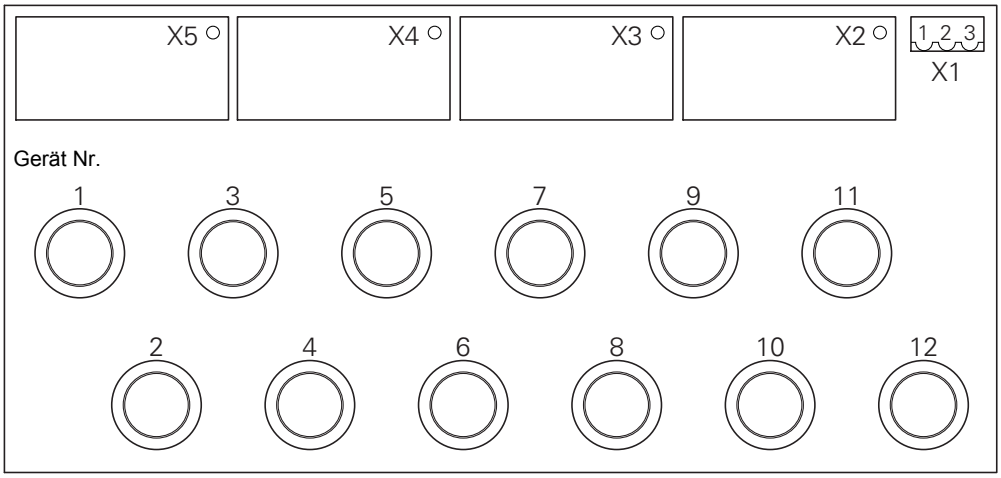


Digital Connector CD02 with connection designations

The interface between the OptiMove CR06 Axes control unit and the PLC is given by the Digital Connector CD02. All parallel interface signals of up to 12 devices are fed connection-friendly on plugs.

The exact plug assignment for the connection to the PLC is evident in the following illustration:

X5		**X4**		**X3**		**X2**	**X1**
1-12	Strobe	1-12	D8	1-12	Prog. active	1-8/13-20 D0-D7	1: GND
13-24	Axis Start	13-24	Remote/man.	13-24	Error/not ref.	9-11/21-23 A0-A2	2: +24 VDC
							3: PE



Digital Connector CD02

CAN bus

General information

The OptiMove CR06 Axes control unit is fitted with a CAN bus interface as standard, and can be operated as a simple CANopen-Slave in a network with a central control unit (Master).

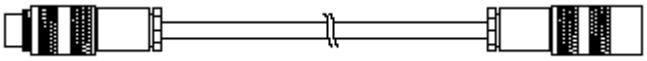
The communication between the users in the network takes place by CAN bus, therefore each existent component must be classified with a individual user address (Node-ID = identification number). The allocation is described in the section "Setting the user address (ID number)". The transmission speed setting is determined by adjusting the Baud rate (see therefore "Setting the Baud rate").

Hardware

The OptiMove control units are connected to the central PLC control unit with 4 pin CAN bus cables. The last bus client is fitted with a terminal plug with terminal resistor in order to terminate the network correctly. A maximum of up to 125 users can be connected in a network.

CAN bus cable - plug assignment

Pin	Signal	Color
1	GND	white
2	+24 VDC	brown
3	CAN H	green
4	CAN L	yellow



CAN bus cable

Setting the user address (ID Number)

1. To enter the system parameter mode, press and hold the key for 5 seconds. The LEDs **L1-L3** illuminate
2. Select the parameter **P12** on the display **A1** using the − or + key
3. Select an address between **1** and **127** on the display **A2** using the − or + key
4. Press the key, in order to exit the system parameter mode

Attention:
The selected address in the system parameter P12 may never be "0", the address must be unique and may not conflict with the numbers of other existing users!

Setting the Baud rate

1. To enter the system parameter mode, press and hold the key for 5 seconds
   The LEDs **L1-L3** illuminate
2. Select the parameter **P11** on the display **A1** using the − or + key
3. Select a value between **0** und **7** on the display **A2** using the − or − key

Set value - P11	CAN Baud rate
0	20 kbit/s
1	50 kbit/s
2	100 kbit/s
3	**125 kbit/s (Default)**
4	250 kbit/s
5	500 kbit/s
6	800 kbit/s
7	1 Mbit/s

The Baud rate is selected with 125 kbits as default. This setting permits a maximum cable length of approx. 500 m from the first to the last CAN bus client. If longer cables are used, select a lower Baud rate.

4. Press the key, in order to exit the system parameter mode

Note:
For details of the CANopen interface, please refer to the separate "OM function specifications" operating manual!

Troubleshooting

General information

All error messages are displayed as an error code (**H01-H99**) on the seven segment display **A3** (instead of the program number).

If an error is present in the system, the cause must be eliminated, before further operation is possible.

If the fault has been eliminated, this must be acknowledged by pressing the − or + key on the **Program** keypad.

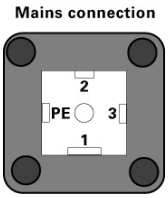
Error code	Description	Action
Axis		
H01	Upper end stop (system parameter P1) overrun	Emergency stop Axis can only travel downwards Axis must be referenced again
H02	Tracking error too large	In order to prevent a larger tracking error, the speed must be reduced.
H03	Encoder cable broken	Emergency stop Axis must be referenced again
H04	Wrong encoder rotating direction	Emergency stop Axis must be referenced again
H05	Desired travel position is larger then the defined end position (system parameter P1)	Limit the travel position according to system parameter P1
H06	Lower end stop overrun	Emergency stop Axis can only travel upwards Axis must be referenced again
H07	Proximity switch signal is permanent active during the reference travel	Referencing not successful
H08	No proximity switch signal during the reference travel	Referencing not successful
H09	Speed value larger than system parameter P4	Limit speed according to system parameter P4
H10	Axis position not correctly stored during switching off	Axis position = Upper end stop - axis can only travel downwards
H11	Frequency converter error	Emergency stop

Error code	Description	Action
H12	Axis cannot be started, because not referenced	
H13	Axis cannot be referenced, because already referenced	
H15	Parameter input in sequence program not possible, because program is running	
H16	Axis cannot be started during reference travel	
Hardware		
H20	24 VDC supply voltage too high (26.5 VDC)	Stop axis (soft stop)
H21	24 VDC supply voltage too low (20.8 VDC)	Emergency stop Store axis position, current program number and axis status Stop the system
H23	EEPROM content invalid	Load factory configuration
DigitalBus		
H30	Data validation error	Reject data
H31	Data outside the value range	Reject data
H32	Data reception overflow	Reject data
CAN bus		
H40	Permanent CAN bus error (BUS_OFF), i.e. no power supply or cable is not connected	
H41	Too many errors during sending (ERROR_PASSIVE)	
H42	Overflow on reception	
H43	Overflow on transmission	
H44	Master failed	Stop axis (soft stop)
H45	Data outside the value range	Reject data
H46	Invalid Node ID set	Node ID=127

Hardware

Pin allocations

2.1



Plug 2.1 - Mains connection

Pin	Function
1	Neutral conductor
2	Phase (230 VAC)
3	Axis start (230 VAC)
PE	Ground

Plug 2.2 - Drive supply

Pin	Function
1	Neutral conductor
2	Phase
3	Not connected
PE	Ground

Plug 2.3 - Drive I/O

Pin	Function
1	GND frequency converter
2	24 V frequency converter
3	Frequency converter error
4	RPM preset value
5	Motor right running (UP)
6	Motor left running (DOWN)
7	Reserve
8	Reserve
9	24 VDC OptiMove
10	Motor brake
11	Proximity switch
12	Reserve
13	B+
14	B-

Pin	Function
15	A-
16	A+
17	O+
18	O-
19	GND OptiMove
Enclosure	Shield

Plug 2.4 - DigitalBus parallel interface

Pin	Bit	Function
A	D0	Preset values, program no. Binary value 1
B	D1	Preset values, program no. Binary value 2
C	D2	Preset values, program no. Binary value 3
D	D3	Preset values, program no. Binary value 4
E	D4	Preset values, program no. Binary value 5
F	D5	Preset values, program no. Binary value 6
G	D6	Preset values, program no. Binary value 7
H	D7	Preset values, program no. Binary value 8
I	A0	Identification number Binary value 1
K	A1	Identification number Binary value 2
L	A2	Identification number Binary value 3
M	12 IN	Axis_Start
N	13 IN	Strobe (data reception from data bus)
O	14 IN	Remote/manual
P	D8	Preset values, program no. Binary value 9
R	GND_External	GND
S	1 OUT	Error, axis not referenced
T	2 OUT	Program_Active
U	24VDC_External	24 VDC digital outputs
Enclosure	Shield	Shield

Plug 2.5 - CAN bus IN

Pin	Function
1	GND
2	24 VDC
3	CAN_H
4	CAN_L
Enclosure	Shield

Plug 2.6 - CAN bus OUT

Pin	Function
1	GND
2	24 VDC
3	CAN_L
4	CAN_H
Enclosure	Shield

Spare parts list

Ordering spare parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

- Type and serial number of your powder coating equipment
- Order number, quantity and description of each spare part

Example:

- **Type** OptiMove CR06 Axes control unit,
  Serial number 1234 5678
- **Order no.** 203 386, 1 piece, Clamp - Ø 18/15 mm

When ordering cable or hose material, the required length must also be given. The spare part numbers of this yard/meter ware is always marked with an *****.

The wear parts are always marked with a #.

All dimensions of plastic hoses are specified with the external and internal diameter:

Example:

Ø 8/6 mm, 8 mm outside diameter (o/d) / 6 mm inside diameter (i/d)

WARNING!
Only original Gema spare parts should be used, because the hazardous location approval will be preserved that way! The use of spare parts from other manufacturers will invalidate the Gema guarantee conditions!

OptiMove CR06 Axes control unit - spare parts list

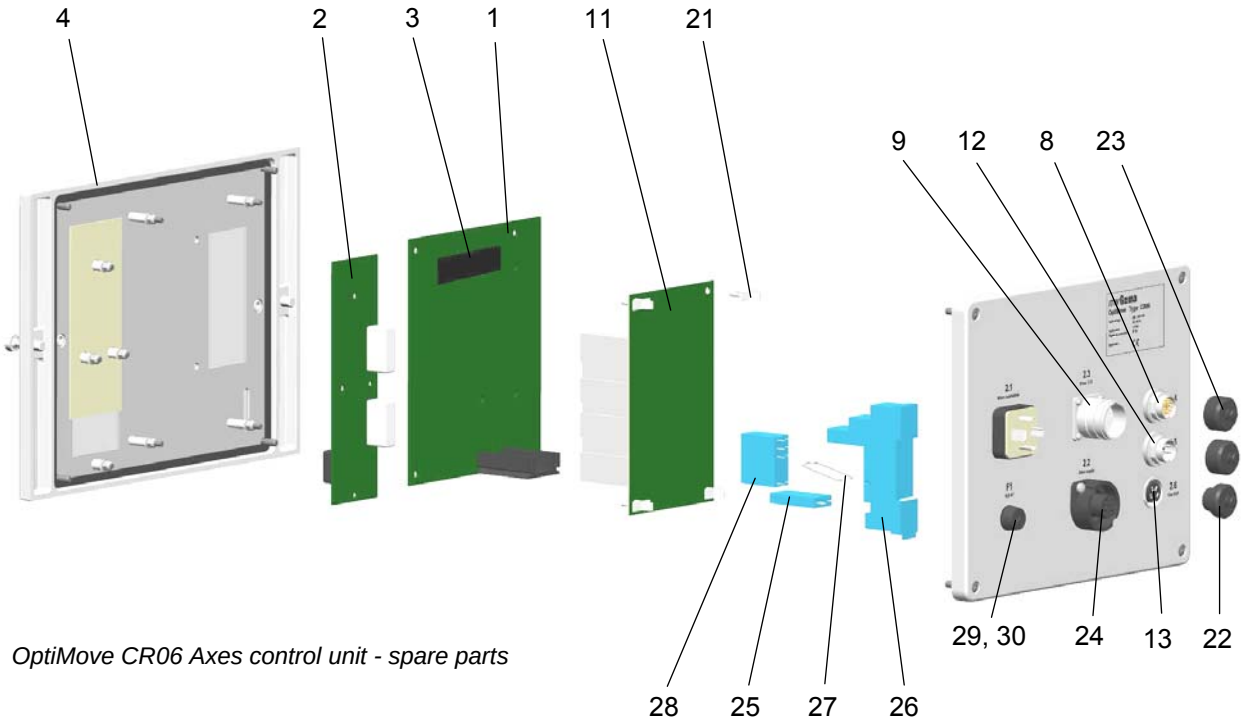
	OptiMove CR06 Axes control unit - complete	**1002 860**
	Front plate - complete (incl. pos. 1, 2, 3 and 4)	1002 859
1	Main board - complete	1000 202
2	Power board - complete	1000 245
3	EPROM - program version V x.x (current software)	1000 610
4	Flat keyboard with frame - complete	1002 858
8	DigitalBus connection - complete	1000 284
9	Reciprocator control signals connection - complete	1000 285
11	Power pack - 24 VDC	389 277
11.1	Mini fuse - 4 AT, for pos. 11	262 897
12	Connection "CAN-Bus IN" - complete	387 541
13	Connection "CAN-Bus OUT" - complete	387 550
21	Standoff	263 508
22	Dust protection cap for housing	265 446
23	Dust protection cap for plug	265 438
24	Connection for reciprocator power supply - complete	1000 286
25	Free-wheeling diode for relay	258 075
26	Relay socket	251 135
27	Safety strap for relay socket	1001 063
28	Relay - 24 VDC 2UK	1002 915
29	Fuse - 10 AT	200 174
30	Fuse holder	200 131
	ZA04 mains cable - 20 m	1000 280
	ZA04 signal cable - 20 m	1000 281

Optional features (not shown)

	Digital Connector CD02 (CR06-PLC interface)	382 825
	Digital cable 19-poles - 1.50 m	1001 500
	Digital cable 19-poles - 3.50 m	1000 933
	Digital cable 19-poles - 4.50 m	1000 934
	Digital cable 19-poles - 5.50 m	1000 935
	Digital cable 19-poles - 6.50 m	1000 936
	CAN hub - complete	1001 787

OptiMove CR06 Axes control unit - spare parts

CAN bus cable - 0.50 m	1002 655
CAN bus cable - 4.50 m	387 592
CAN bus cable - 5.50 m	388 521
CAN bus cable - 6.50 m	388 530
Bus terminal resistor	387 606



OptiMove CR06 Axes control unit - spare parts

Appendix - program table

Prog.-no.	Upper position	Lower position	V_{UP}	V_{DOWN}	t *	nP *
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