Power Supply for Mobile Systems
Control module with battery holder for *modulog* modules

Advantages
- Off-grid power supply
- Use in mobile systems
- Compact design
- No downtime
- Fast charging
- High process times by powerful battery
- Long service life
- Ergonomic design
- Safe and precise handling
- Modular system with many possible combinations
- Integrated protection functions
- Protection against deep discharge

modulog
Power supply for mobile systems

Technical data

Voltage	24 V
Capacity	4.5 Ah

Part numbers

Rechargeable battery	**3822184**
Quick battery charger	**3822177**
Control module standard	**3821270**
with memory function	**3821270M**

Combinable with the modules

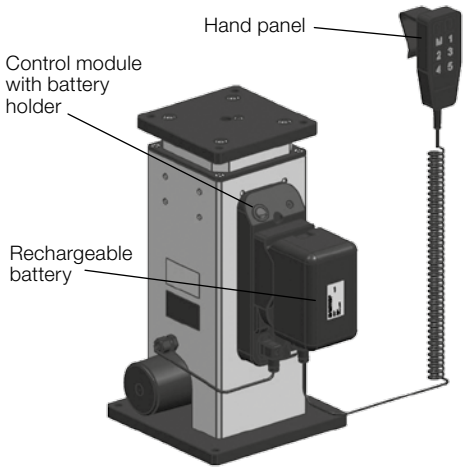
- Lifting module – electro-mechanical as per data sheet M 4.202, M 4.301, M 4.401, M 4.501 **with code letter B or I**

- Cart module WMS as per data sheet M 5.101
- Linear actuator – electro-mechanical as per data sheet L 1.101 **with code letter I**
- Electrical operating elements, lines and connectors as per data sheet M 8.203

Application
The individual components are used for power supply for mobile systems in industrial assembly. They are suitable for electro-mechanical lifting modules or linear actuators with 24 V.

Fixing and installation
The control module with battery holder can be fixed with two screws M8 to the provided threads in the lifting modules at the outer profiles.
The supply line of the electrical actuator and the operating element are plugged in at the carrier plate of the control module.

Installation example



Description
A system with different individual components allows a network-independent power supply for electrical lifting modules. A rechargeable battery supplies the drive unit with energy. The battery can be recharged by an external quick battery charger.
In order to guarantee working without downtime, it is recommended to have a second rechargeable battery.
Control modules with battery holder for a single module are used to control lifting modules. Various operating elements allow an efficient functionality.

The following items are required for an operational system.
- Rechargeable battery
- Control module with battery holder
- Operating element
- Quick battery charger

Variants
The standard variant provides the functions “up/down” in touch control.
All variants are designed for the operation with lifting modules with **code letter B or I**.
The integrated electronic ensures in combination with the stroke measuring system of the lifting modules a soft start and stop to protect all components.
Also, current limitation and duty cycle limitation help to increase the service life.

Further variants of the control modules with battery holder allow the functions of storable intermediate positions for reproducible approach. On request, the functions synchronization control and individually preset stroke end positions are possible.

Material
All essential elements are made of shock-resistant plastic to obtain a high robustness.

Control module with battery holder for *modulog* lifting modules

Advantages

- Microprocessor controlled
- Controlled positioning in stroke end positions and memory positions
- Soft start
- Protective functions:
  Electronic current limitation, overcurrent cut-off, detection of blockades, duty cycle limitation
- Charge state warning via LED
- Extensive fault diagnostic
- Fault signalling via flash code

modulog

Control module with battery holder

for 1 *modulog* module
with incremental stroke measuring system

Part no. **3821 270**

Accessories

- Electrical operating elements, cables and connectors as per data sheet M 8.203

modulog

Control module with battery holder

with memory function

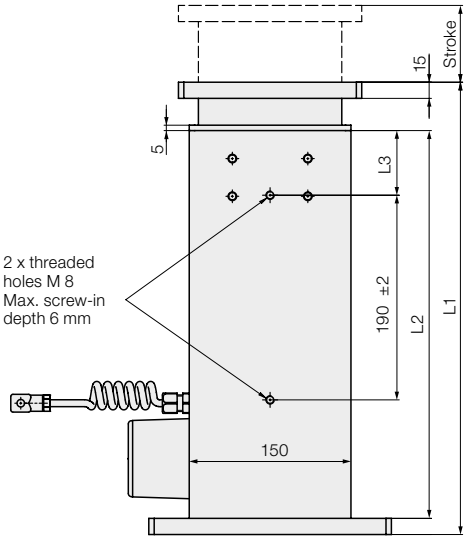
for 1 *modulog* module
with incremental stroke measuring system

Part no. **3821 270M**

Accessories

- Electrical operating elements, cables and connectors as per data sheet M 8.203

Dimensions



Stroke [mm]	**L1** [mm]	**L2** [mm]	**L3** [mm]
200	420	360	60
300	520	460	135
400	620	560	185
500	720	660	235
600	820	760	285

Fixing and installation

Fixation and installation of the control module can be carried out directly at the lifting module in prepared bore holes.

Description

The control module with battery holder is the key element of the system to which all further components are connected. It is suitable for a lifting module with different force levels / stroke lengths and incremental stroke measuring system. The holder for the rechargeable battery is already integrated in the control module and forms a compact unit for supply and control of the drive module. The control unit in the control module has connections for the lifting module, for one operating element and control signals for optional functions.

Optional function:

The **memory function** allows to store up to five height positions. These can be recalled again and again or newly stored. Thus ergonomically reasonable working heights can be obtained for different persons or different working heights within one assembly process can be determined. Operation is made via an operating panel that allows to store the height positions as well as to call them. Due to safety reasons a movement is always made by touch control.

Technical data

Operating voltage (battery)	25.2 V
Electronic current limitation	8 A
Duty cycle	15 %, 1.5 min ON
Protection class	III
Code class (in mated condition)	IP 30
Standby current consumption	approx. 7 mA
Electrical connections	Plug connection secured by screw
Weight	approx. 700 g

modulog
Rechargeable battery

Part no. 3822184

Description
The rechargeable battery is a Li-Ion battery and is used with its 25.2 V and 4500 mAh for ROEMHELD lifting modules as an energy source. The high capacity in a compact housing allows an efficient and flexible use.

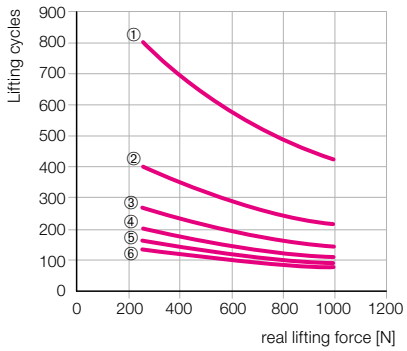
Important notes
For charging of the batteries exclusively the quick battery charger part-no. **3822177** from ROEMHELD may be used.

Technical data

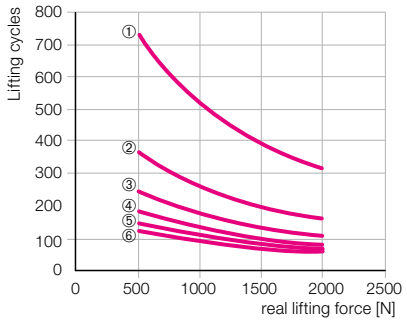
Nominal voltage	25.2 V
Nominal capacity	4500 mAh
Charging current	max. 3A
Operating temperature Charging	10 °C … + 40 °C
Operating temperature Discharging	0 °C … + 50 °C
Storage temperature	– 20 °C … + 35 °C
Dimensions (L x W x H)	135 x 85 x 91 mm
Weight	approx. 860 g

Capacity of the rechargeable battery
Based on the following diagrams, the possible number of cycles with a completely charged battery can roughly be determined.
They are presented as a function of the different force levels and stroke lengths using an individually-operated lifting module as an example.

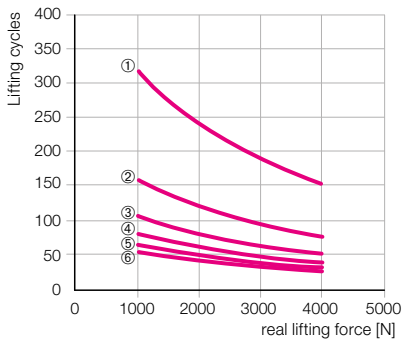
Lifting module 1000 N



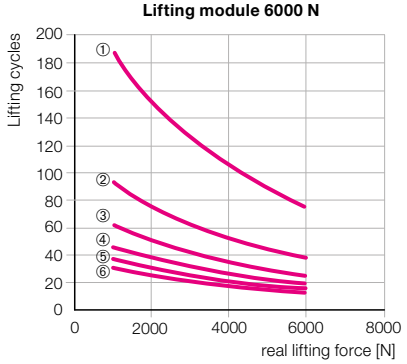
Lifting module 2000 N



Lifting module 4000 N



Lifting module 6000 N



① = 100 mm stroke
② = 200 mm stroke
③ = 300 mm stroke
④ = 400 mm stroke
⑤ = 500 mm stroke
⑥ = 600 mm stroke

modulog
Quick battery charger

Part no. 3822177

Description
The quick battery charger is used to recharge the rechargeable battery (part-no. **3822184**).

Technical data

Supply voltage	220 … 240 V ± 10 %
Frequency of the supply voltage	50 … 60 Hz
Output voltage	9.6 … 28.8 V
Charging current	2.9 A ± 10 %
Power limitation	max. 55 … 70 W
Charging time for 4.5 Ah	approx. 2 h
Ambient temperature Storage	– 20 °C … + 60 °C
Ambient temperature Operation	+ 5 °C … + 40 °C
Protection class	II
Code class	IP 30
Dimensions (L x W x H)	152 x 86 x 76 mm
Weight	approx. 550 g

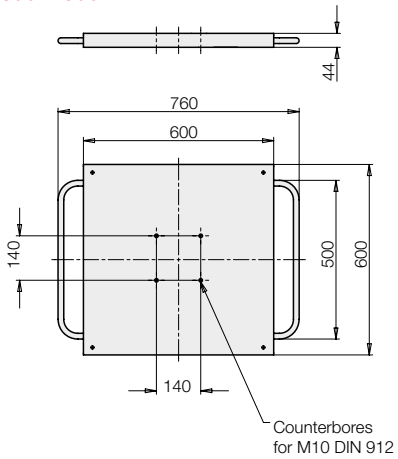
Variants
Quick battery charger for use at 100 … 120 V AC 50 … 60 Hz

Part no. 3822182

Important notes
The battery charger is equipped with a Euro plug. A plug adaptor is country-specific required.

Table Plate with one *modulog* Interface
with or without handles

Steel table plate with 2 handles – 600 x 600 mm



Application

Table plate with two handles for example to move the lifting carts.

Principal use

- Workpiece carriers
- Height-adjustable working tables
- Assembly carts
- Rotatable assembly working plates

Advantages

- Very stable version
- Integrated sturdy handles
- *modulog* interface

Material

Table plate: Stainless steel, bright surface
Handles: Steel profile, welded, black-lacquered

Notes

The fixing screws M10 are completely covered below the steel sheet plate and are not included in our delivery.

Length of the screws = 3 mm + screw-in depth.

modulog
Table plate

Part no. 6505-040

Technical data

Maximum load: 6,000 N centric

Combinable with the modules

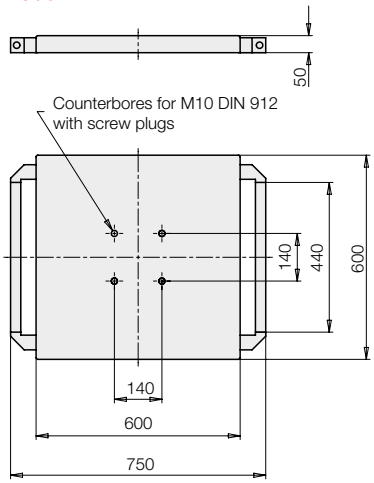
- Rotating module – vertical axis DMV 600 as per data sheet M 1.301

- Lifting modules as per data sheet M 4.XXX

***modulog* interface**

- centric 140 x 140 - Ø 10.5 mm

Wodden table plate with 2 handles – 600 x 600 mm



Application

Table plate with two handles for example to move the lifting carts.

Principal use

- Workpiece carriers
- Height-adjustable working tables
- Assembly carts
- Rotatable assembly working plates

Advantages

- Stable and stylish version
- Integrated sturdy handles
- *modulog* interface

Material

Table plate: Multiplex beech, 50 mm, surface clear coated
Handles: anodized aluminium

Application example

Wooden table plate – mounted on the lifting module Shop-Floor and cart module WMS

modulog
Table plate

Part no. 6505-051

Technical data

Maximum load: 2,000 N centric

Combinable with the modules

- Rotating module – vertical axis DMV 600 as per data sheet M 1.301

- Lifting modules as per data sheet M 4.XXX

***modulog* interface**

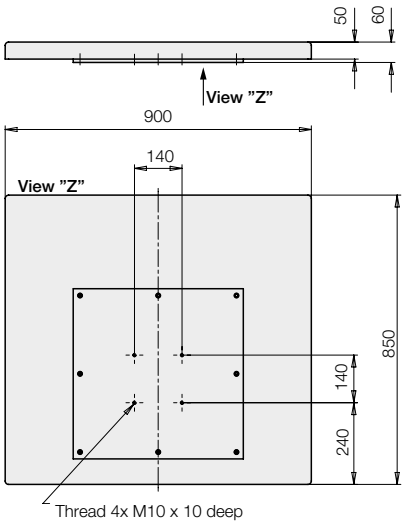
- centric 140 x 140 - Ø 10.5 mm

Note

The fixing screws M10 are not included in our delivery.
Length of the screws = 35 mm + screw-in depth.

Screw plugs for the counterbores are included in our delivery.

Wooden table plate with steel strengthening, without handles – 900 x 850 mm



Advantages

- Strengthened and stylish version
- *modulog* interface

Material

Table plate: Multiplex beech, 50 mm, surface clear coated

Reinforcing plate: steel lacquered

Note

The fixing screws M10 are not included in our delivery.

Application

Table plate with radiused edges and eccentric *modulog* interface.

Supported by a reinforcing plate made of steel for high loads.

Fields of application are, for example, industrial applications with standing work places.

Principal use

- Ergonomic assembly places
- Height-adjustable working tables

modulog
Table plate

Part no. 6505-050

Technical data

Maximum load: 4,000 N centric

Combinable with the modules

- Rotating module – vertical axis DMV 600 as per data sheet M 1.301

- Lifting modules as per data sheet M 4.XXX

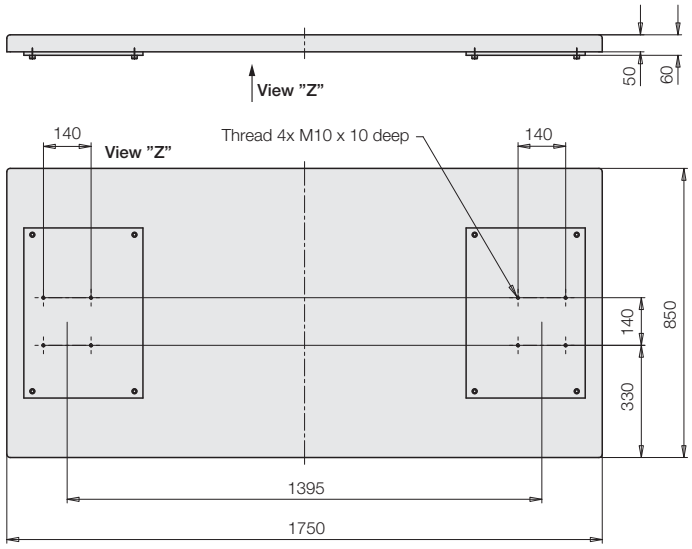
***modulog* interface**

- eccentric 140 x 140 mm - M10

Table plate with two *modulog* interfaces

Wooden table plate with steel strengthening – 1750 x 850 mm

with reinforcing plates



modulog Table plate

Part-no. 6505-060

Technical characteristics

Maximum load: 4.000 N plane

Combinable with the modules

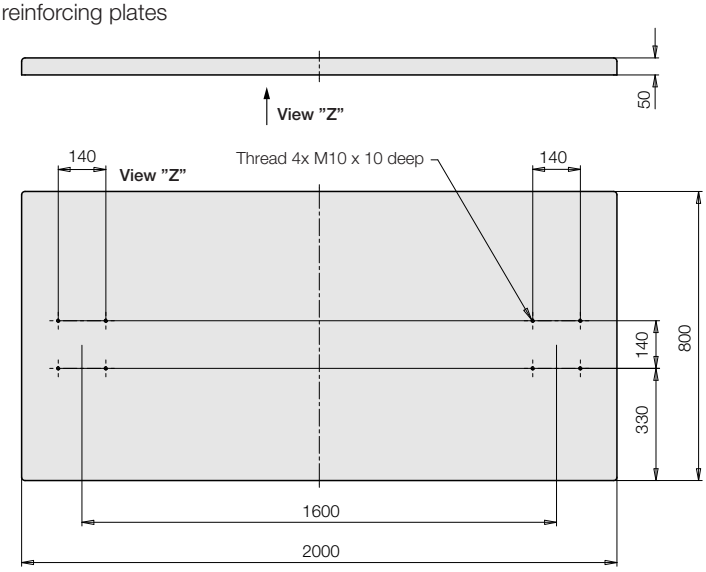
- Lifting modules as per data sheet M 4.301

***modulog* interfaces**

- eccentric 2 off 140 x 140 mm - M10

Wooden table plate – 2000 x 800 mm

with reinforcing plates



modulog Table plate

Part-no. 6505-061

Technical characteristics

Maximum load: 3.000 N plane

Combinable with the modules

- Lifting modules as per data sheet M 4.301

***modulog* interfaces**

- eccentric 2 off 140 x 140 mm - M10

Application

Table plate with radiused edges and two eccentric *modulog* interfaces.

Supported by a reinforcing plate made of steel for high loads.

Fields of application are, for example, industrial applications with standing work places.

Advantages

- Strengthened and stylish version
- *modulog* interfaces

Material

Table plate:	Multiplex beech, 50 mm, clear coated
Reinforcing plate:	steel lacquered

Principal use

- Ergonomic assembly places
- Height-adjustable working tables

Note

The fixing screws M10 are not included in our delivery.

Application example

Height-adjustable working tables composed by the table plate 1750 x 850 m, two electrically-operated lifting modules Shop-Floor with supply unit and the floor module FMD 800.

Adaptor Plates
for *modulog* interfaces

Adaptor plate DMH 140

Advantages
- *modulog* interface
- Simple vertical mounting of the rotating module - horizontal axis DMH
- Easy mounting
- Standard plate

Application
The adaptor plate DMH 140 allows vertical mounting of the rotating module - horizontal axis DMH 200 on modules with a modulog interface 140 x 140.

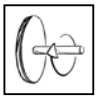
Material
steel, black oxide

Note
The fixing screws M10 are not included in our delivery.

modulog
Adaptor plate
for rotating modules DMH 200
Part no. 6311-326

***modulog* interface**
• 140 x 140 mm – M10

Mounting scheme - example

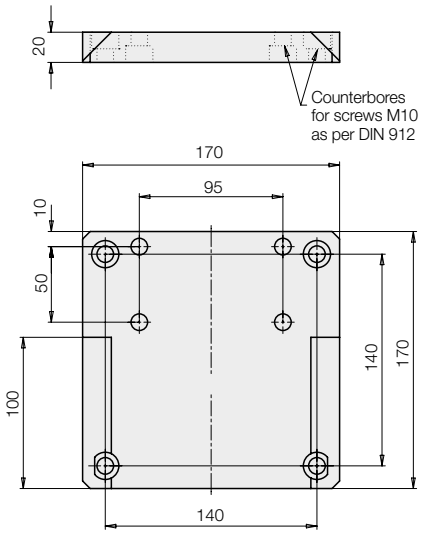


Rotating module - horizontal axis DMH with interface
95 x 50 mm – M10

Adaptor plate **DMH 140**

Lifting module
with top plate interface
140 x 140 – Ø 10.5 mm

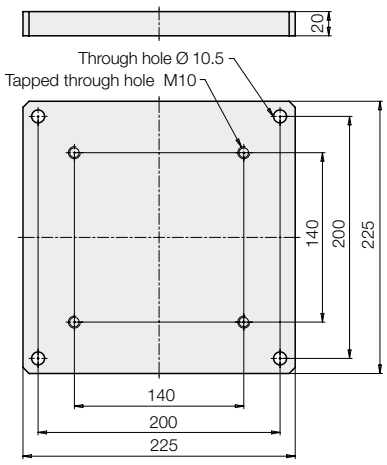
Dimensions



Application example

Rotating module - horizontal axis DMH 200 vertically mounted on a lifting module Shop-Floor

Adaptor plate 140 – 200



Advantages
- Simple mounting of *modulog* modules with different interfaces
- Easy mounting
- Standard plate

Application
By means of the adaptor plate 140 – 200 modules with a 140 x 140 mm *modulog* interface can be mounted onto a 200 x 200 mm *modulog* interface.
For example a rotating module - vertical axis on a cart or floor module.

Material
steel, black oxide

Note
The fixing screws M10 are not included in our delivery.

modulog
Adaptor plate
Interface 140 to 200
Part no. 6311-417

***modulog* interface**
- 140 x 140 mm – M10
- 200 x 200 mm – Ø 10.5 mm

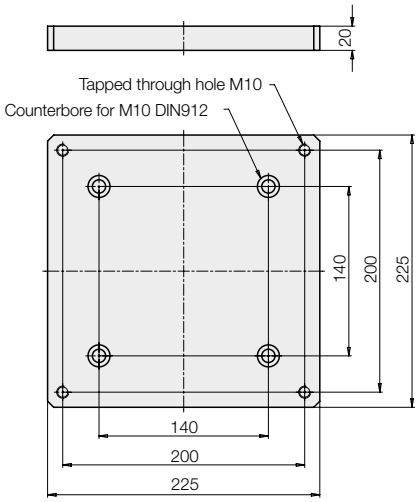
Mounting scheme - example

Rotating module - vertical axis DMV with interface **140 x 140 mm – M10.5**

Adaptor plate **140 – 200**

Cart module WMS with interface **200 x 200 – M10**

Adaptor plate 200 – 140



Advantages
- Simple mounting of *modulog* modules with different interfaces
- Easy mounting
- Standard plate

Application
By means of the adaptor plate 200 – 140 modules with a 200 x 200 mm *modulog* interface can be mounted onto a 140 x 140 mm *modulog* interface.
For example a lifting module on a rotating module - vertical axis.

Material
steel, black oxide

Note
The fixing screws M10 are not included in our delivery.

modulog
Adaptor plate
Interface 200 to 140
Part no. 6311-423

***modulog* interface**
- 200 x 200 mm – M10
- 140 x 140 mm – Ø 10.5 mm

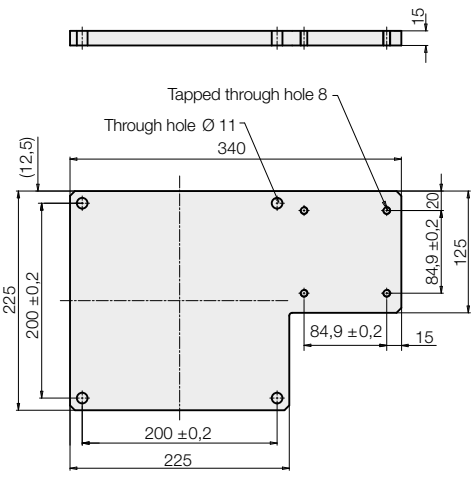
Mounting scheme - example

Lifting module with base plate interface **200 x 200 mm – Ø 10.5**

Adaptor plate **200 – 140**

Rotating module - vertical axis DMV with interface **140 x 50 mm – M10**

Adaptor plate 6312-748



Advantages
- Easy installation of indexing with foot pedal
- Easy mounting
- Standard plate

Application
The indexing mechanism of the rotating modules can be fixed on the floor with the adaptor plate 6312-748. With the adaptor plate, all foot pedals for rotating and tilting modules such as per data sheet M 1.101 can be quickly and safely fixed.
The application is optimised for cart modules below the base plate of lifting modules.

Material
aluminium, black anodised

Note
The fixing screws M8 are not included in our delivery.

modulog
Adaptor plate
Pedal-operated indexing
Part no. 6312-748

***modulog* interface**
- 200 x 200 mm – Ø 10.5 mm

Flange Plate
for *modulog* rotating modules

Flange plate Ø 170 mm

Advantages:

- Individual design for fixing of component parts
- Simple mounting
- Standard plate

Application

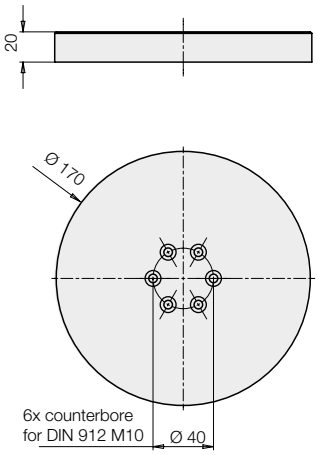
The flange plate can be used instead of the *modulog* flange plate of the rotating modules - horizontal axis DMH and rotating modules - vertical axis DMV.

Compared with the *modulog* flange plate, this plate does not have an 140 x 140 *modulog* interface.

This plate offers the possibility to design individual fixing for component parts. Specific bore patterns or other provisions for the location of component parts or fixtures can be provided by the user.

The flange plate can be easily exchanged against the *modulog* flange plate.

Dimensions



Material

Steel, black oxide

Note

Fixing of the flange plate at the rotating module is made by the available screws M10 of the rotating module.

modulog
Flange plate

Part no. 6311-400

Combinable with the modules

- Rotating module – horizontal axis DMH 200 as per data sheet M 1.101

- Rotating module – vertical axis DMV 1000 as per data sheet M 3.101

Application example

Rotating module - vertical axis DMV 1000 with flange plate Ø 170

Base Plates
for *modulog* lifting modules

Base plate 500 x 500 mm

Advantages
- *modulog* interface
- Increased stability
- Installation possible on many sub-floors
- Easy mounting

Application
Base plates are primarily used with lifting modules.
They are screwed to the lifting module and the floor to get a larger support surface and an increased stability of the lifting module.
The use of base plates is especially recommended for sub-floors with unknown strength and high torque loads.

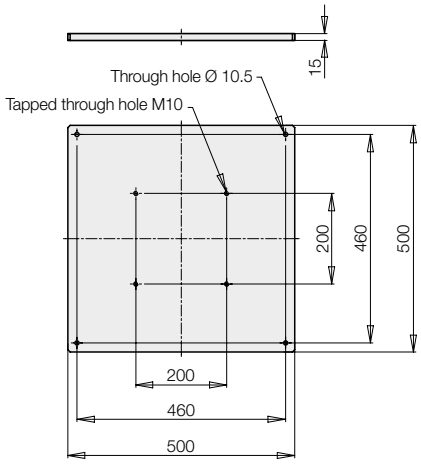
modulog
Base plate

Part no. 631XXXX

Combinable with the module
- Lifting modules as per data sheet M 4.XXX

***modulog* interface**
- 200 x 200 - M10
- 140 x 140 - M10

Base plate 500 x 500 mm
Standard version
with single modulog interface 200 x 200
with 4 threads M10
Part no.: 6311412
Use primarily for individual lifting modules



Material
Steel, black oxide

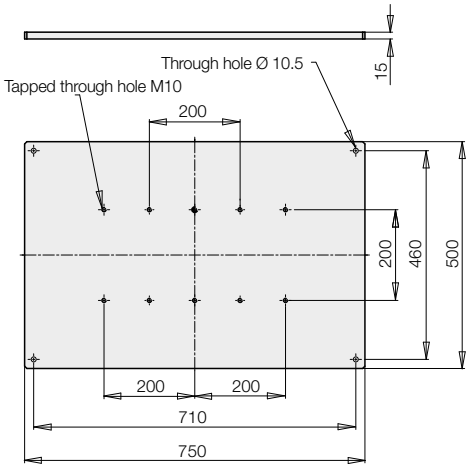
For lifting modules:
- Basic
- Shop-Floor
- Strong
- Shop Floor Telescope
- Solid

Important note!
The fixing screws M10 are not included in our delivery.

Application example

Lifting module Shop-Floor with base plate

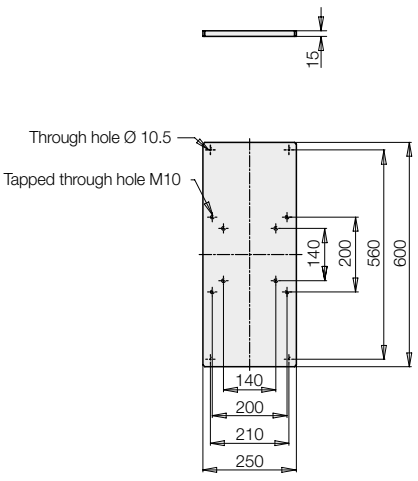
Base plate 750 x 500 mm
modulog interface 200 x 200
with 10 threads M10
Part no.: 6311460
Use primarily for lifting modules with higher max. torque load M 4.401, M 4.402 and M 4.501



For lifting modules:
- Basic
- Range
- Shop-Floor
- Strong
- Twin-Strong
- Shop Floor Telescope
- Solid

Base plate 600 x 250 mm
modulog interface 200x200 and 140x140 each provided with 4 threads M10

Part no.: 6312161
Use primarily for lifting units in synchronism



For lifting modules:
- Basic
- Shop-Floor
- Shop Floor Telescope
- Strong
- Solid

Electrical Operating Elements, Lines and Connectors
for *modulog* modules

Application
Electrical operating elements for the operation of electrical *modulog* modules.

Advantages
- Comfortable operation
- Flexible positioning in an ergonomically favourable place
- Coiled cable
- Plug secured by screws

Description
The hand panel has two buttons which operate the functions "up" and "down".
At the back of the body there is a hook to hang up the hand panel in an ergonomically favourable place.
The relaxed coiled cable is approx. 0.9 m long and can be pulled up to a length of 1.6 m.

Operation
Push the buttons "up" and "down" with the thumb in touch control mode.
When releasing a push-button the connected module stops immediately.

Material
Body: Polyamide
Connecting cable: PUR

modulog
Hand panel
with up/down function
Part no. 3823-025

Combinable with the modules

- Rotating modules as per data sheet M 1.201 and M 3.201
- Control modules as per data sheet M 8.200
- Control module with battery holder as per data sheet M 8.201

Technical data

Dimensions	56 x 130 x 23 mm
Code class	IP 66
Connecting cable	Coiled cable 1.6 m (usable length) with connector

Installation
Voltage supply and control of the hand panel is made by a *modulog* control module.
The hand panel is ready for use after connection of the plug to the control module.

Application
Electrical operating elements for the operation of electrical *modulog* modules with memory function

Description
The hand panel with memory function has two push-buttons "up" and "down" to adjust the lifting modules and 5 programmable buttons for the memory function.
To store a position, the lifting module is moved into the desired position and either the "M" button is operated at the same time with one of the position push-buttons "1 – 5" or the "M" button and shortly afterwards one of the five position push-buttons.
The stored positions "1 – 5" can be approached by means of the position push-buttons. The stored positions are durably kept until they are overwritten by a new storage process.

Operation
Push the buttons "up" and "down" or "1 – 5" with the thumb in touch control mode.

Material
Body: Polyamide
Connecting cable: PUR

modulog
Hand panel
with memory function
Part no. 3823-160

Combinable with the modules

- Control modules as per data sheet M 8.200
- Control module with battery holder as per data sheet M 8.201

Technical data

Dimensions	56 x 130 x 23 mm
Code class	IP 66
Connecting cable	Coiled cable 1.9 m (usable length) with connector

Installation
Voltage supply and control of the hand panel is made by a *modulog* control module.
The hand panel is ready for use after connection of the plug to the control module.

Description
The foot switch is equipped with two push-buttons for the functions "up" and "down".
The bottom side is skid-proof so that also in industrial applications a fixed position can be guaranteed.

Operation
Push the buttons "up" and "down" with the foot in touch control mode.
When releasing a push-button the connected module stops immediately.

Material

Body:	Polyamide
Connecting cable:	PUR

Application
Electrical operating elements for the operation of electrical *modulog* lifting modules.

modulog
Foot switch
with up/down function
Part no. 3823-038

Combinable with the modules

- Rotating modules as per data sheet M 1.201 and M 3.201
- Control modules as per data sheet M 8.200
- Control module with battery holder as per data sheet M 8.201

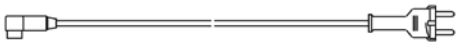
Technical data

Dimensions	109 x 209 x 38 mm
Code class	IP 65
Connecting cable	3 m, smooth with connector

Installation
Voltage supply and control of the foot switch is made by a *modulog* control module.
The foot switch is ready for use after connection of the plug to the control module.

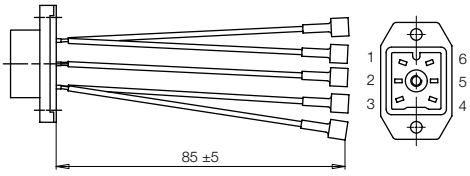
Accessories

Mains cable	
Cable version	smooth with shaped plug
Nominal voltage	230 V AC
Length	3 m
Material of isolation	PUR
Part no.	**3823-040**



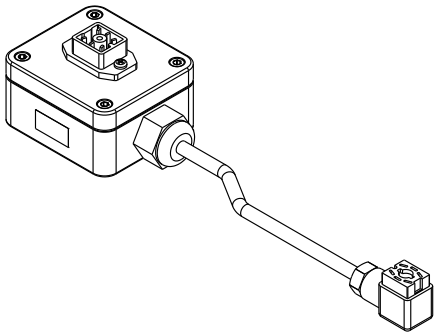
Connector	**Part no.**
Cable socket for self-assembly control ports	**3141-868**
Cable socket for self-assembly power supply	**3141-871**
Device plug for connection of ROEMHELD actuator to user control	**3823-048**

Device plug 3823-048



Extension cable			
Cable version	smooth	smooth	smooth
Nominal voltage	24 V DC	24 V DC	24 V DC
Length	5 m	8 m	10 m
Material of isolation	PVC	PVC	PVC
Part no.	**3823-175L050**	**3823-175L080**	**3823-175L100**

For the connection of the lifting module to the control or from the operating elements to the control.



Control Modules
for *modulog* modules

Application
Electronic control module for one *modulog* module and one operating element.

Note
The mains cable 230 VAC for power supply of the control module is not included in our delivery; it can be ordered separately as an accessory.

Material
Body: ABS

Fixing and installation
The control module is fixed with 4 screws M6 at the external clips. Operating elements, mains cables and lifting modules are connected with plug connections secured by screws to the control module.
Control modules with memory function or synchronization control are equipped with a setting mode that allows the operation of lifting modules with different force levels and stroke lengths with the control.
During the first start up, the setting mode has to be activated by the user. The control automatically adapts itself to the connected lifting module.
The process in detail, see operating manual.

Advantages
- Power supply and control in one device
- Plug-in connections for all devices to be connected
- Voltage supply 230 V AC
- Mains connection with shaped plug
- Compact and sturdy version
- Overload protection device

Description
The control module is used for power supply and control of one *modulog* lifting module with one operating element (as per data sheet M 8.203).

Variant
Ergonomically reasonable working heights for persons of different height as well as differently defined, reproducible nominal working heights within an assembly process can be stored with the memory function. **The memory function** allows to store up to five height positions of the lifting module. These can be recalled again and again or newly stored.
Operation is made via a hand panel that allows to store the height positions as well as to call them. Due to safety reasons, a movement is always made by touch control.

modulog
Control module
for 1 *modulog* module
with memory function
Part no. 3821-XXX

Combinable with the modules
- Lifting modules
  as per data sheet M 4.XXX

Part numbers

Control module	Part no.
for 1 module **with code letter E**	**3821-246**

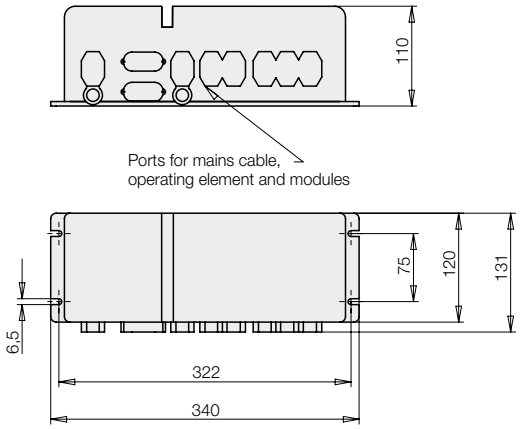
Control module with memory function	Part no.
for 1 module **with code letter B or I**	**3821-415M**

Technical data

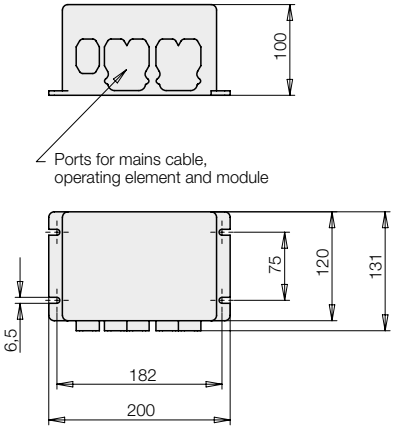
Supply voltage	230 V AC, 50 cycles
Operating voltage	24 V DC
Rating	240 VA
Electronic current limitation	10 A
Duty cycle	15 % – 1.5 min ON
Protection class	II
Code class	IP 66
Electrical connections	Plug connection secured by screw

Required accessories
Electrical operating elements, lines and connectors
as per data sheet M 8.203

Dimensions
For 1 module with memory function



Dimensions
For 1 module



Control modules for 2, 3 or 4 *modulog* modules
– with synchronization control – memory function

Application
Electronic control module for 2, 3 or 4 *modulog* modules with synchronization control and one hand panel or foot switch.

Note
The mains cable 230 VAC for power supply of the control module is not included in our delivery; it can be ordered separately as an accessory.

Material
Body: ABS

Fixing and installation
The control module is fixed with screws M6 at the external clips.
Mains cables, operating elements and lifting modules are connected with plug connections secured by screws to the control module.

Advantages
- Power supply and control for 2, 3 or 4 *modulog* modules and one hand panel or foot switch in one device
- Simple start up of installations with modules with synchronization control
- Plug-in connections for all devices to be connected
- Voltage supply 230 V AC
- Simple mains connection with shaped plug
- Compact design and sturdy version

Description
The control module is used for power supply and control of either 2, 3 or 4 *modulog* lifting modules with one operating element.

Accessory
Electrical operating elements, lines and connectors as per data sheet M 8.203

Variants
Control modules with additional connections for external limit switches are available on request.

Important note!
When using lifting modules with synchronization control, the following conditions must be met.
- All lifting units must be arranged parallel to each other and aligned. Especially in case of high loads on the system, considerable friction forces can occur in case of insufficient parallelism due to deformation of the system which can impair their function.
- The load must be located so that a small difference in height of the lifting modules cannot lead to a possible danger of persons or forced conditions between the lifting modules.
- A bearing with longitudinal compensation transverse to the lifting modules (fixed bearing-floating bearing) or an elastic buffer between the lifting modules and the fixtures is recommended.

modulog
Control module
for 2, 3 or
4 *modulog* modules
Part no. 3821-41XX

Combinable with the modules
- Lifting modules as per data sheet M 4.301

Part numbers

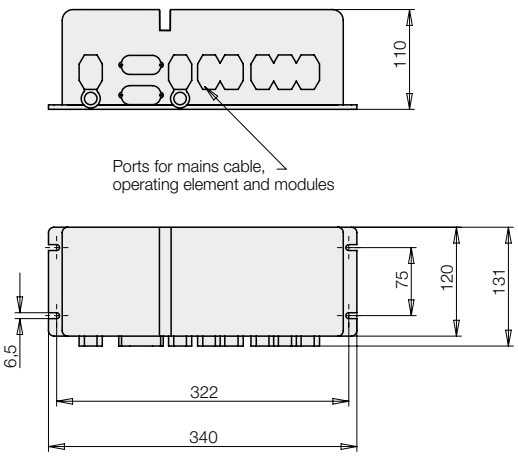
Control module	Part no.
for 2 modules with synchronization control **with code letter G**	**3821-416**
for 3 modules with synchronization control **with code letter G**	**3821-417**
for 4 modules with synchronization control **with code letter G**	**3821-418**

Control module with memory function (5 Pos.)	**Part no.**
for 2 modules with synchronization control **with code letter G**	**3821-416M**
for 3 modules with synchronization control **with code letter G**	**3821-417M**
for 4 modules with synchronization control **with code letter G**	**3821-418M**

Technical data

Supply voltage	230 V AC, 50 cycles
Operating voltage	24 V DC
Rating	240/480 VA
Electronic current limitation	depending on the version: 11 A or 22 A
Duty cycle	15 % – 1.5 min ON
Protection class	II
Code class	IP 66
Electrical connections	Plug connection secured by screw

Dimensions
For 2 modules



For 3 or 4 modules