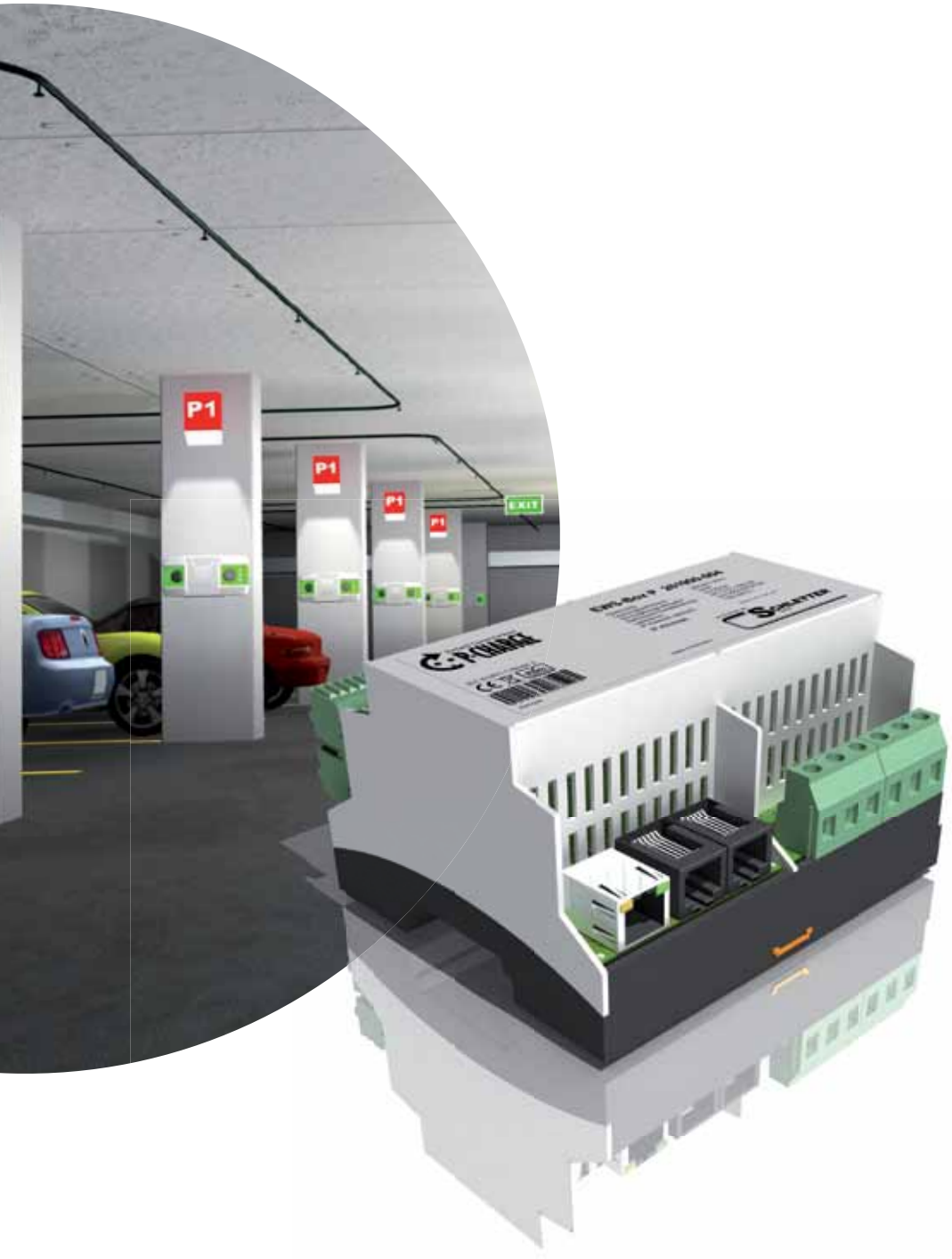
Einfach Strom tanken

P-CHARGE

Operating Instructions Status as of 08/2012

P-CHARGE EWS-Box

Controller for electric charging stations

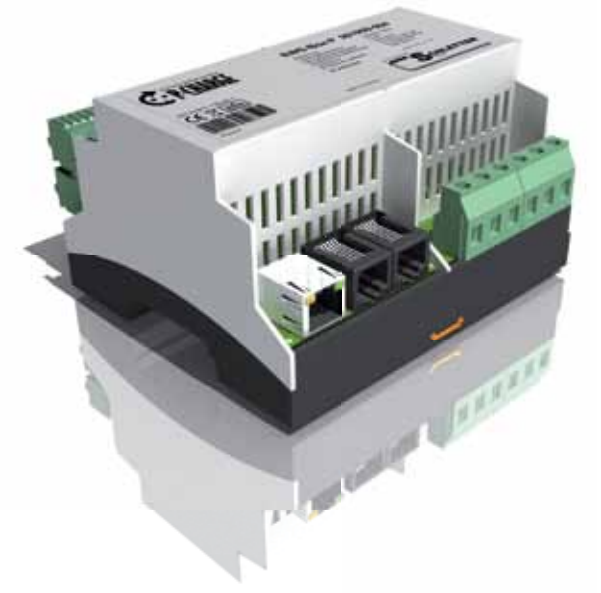


Operating Instructions Status as of 08/2012

Einfach Strom tanken
P-CHARGE

P-CHARGE EWS-Box

Controller for electric charging stations



3.1 Preface

The communication module was designed and is deployed as the main control unit for an electric vehicle charging station. It can serve as a Wallbox on a private site or, equally, in a fully equipped charging pillar in a commercial environment. The primary function of the EWS-Box is to ensure that the charging process is effected as per user request once an appropriate connection between electric vehicle and charging station has been detected.
The module performs all control and notification functions required for the connection of an electric vehicle to a cable-bound charging device and complies with IEC 61851, Mode 3. In order to meet increased demand, particularly in the commercial environment, the communication module is capable of monitoring and controlling two connected users simultaneously but independently of each other.
A module can be aligned to environmentally-specific parameters to be run as a self-sufficient operation, or can be integrated into a wider network of systems. For this purpose, both charging outlets can be monitored and managed via telecontrol systems, facilitated by the integrated communication options and hosted by one main instance. The module is of compact design and is particularly suited to application with standardized bearing rail combinations (top-hat rail mounting).

2 Hardware

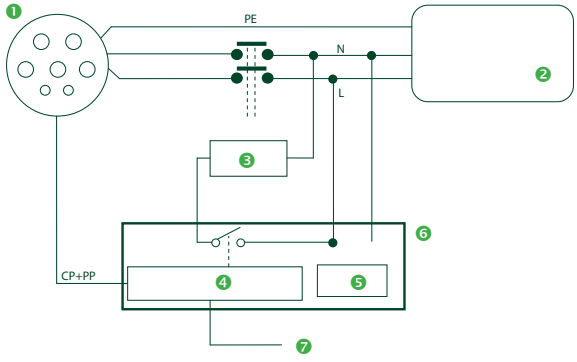
2.1 STRUCTURE

2.1.1 MECHANICAL

The module is contained within a plastic housing and is deployed in assembly outfits in accordance with DIN EN 60715. This enables integration into systems which host components arranged in sequence. The retaining clips are integrated into the underside of the housing, ensuring secure adherence to the mounting rails.
Once the module is secure on the rails, all connections can be accessed from above and below. Alignment of the module can be arbitrary and is dependent solely upon the location of the power-supply lines. The running of supply lines to and from the module must be effected in accordance with the connection diagram and with the installation instructions.
The housing cover can be easily removed and replaced for maintenance purposes. The snap-on housing has a securely lockable cover. In order to install the power backup circuit board, the cover can be released from the locking device and tilted upwards. It is not necessary to remove the snap-on housing for this purpose..

2.1.2 ELECTRICAL

The communication module is connected to the mains power supply. In a three-phase circuit, L1 is run to the module. The mains connection serves only to supply the module and for activation of the AC contactor and the ventilation mechanism (L1 is interconnected), not for the supply of power to the user or to any other system components.



Schematic overview diagram
(only one user depicted)

1. Charging socket IEC 62196-2
2. Main supply with fuse protection and RCD
3. Charging contactor
4. Management
5. Power
6. Communication module
7. System (local or remote management)

The electric vehicle has the capacity to signal to the charging system a need for ventilation (e.g. for gassing batteries). If a ventilation system has been pre-configured by the user, it is activated by the communication module. If this is not the case, then authorization to charge the respective vehicle is not granted. The user is responsible for ensuring that the ventilation system is compliant with all vehicle manufacturers and with all legal regulations. One universal ventilation system is activated for both users as it is assumed that the two vehicles are charged in close proximity to each other.
The module has an internal residual current device (6.3A/fuse) which serves solely to protect the communication system. In addition to the main fuse, installation of an RCD switch is also recommended for protection of the entire system. Cables and safety components to be connected to the module are not delivered as integral components of the communication system and must therefore comply, separately, with legal requirements for electrical safety. The user is obligated to compare the data sheets for the deployed components with the communication module data and to conciliate these..

2.2 MANAGEMENT

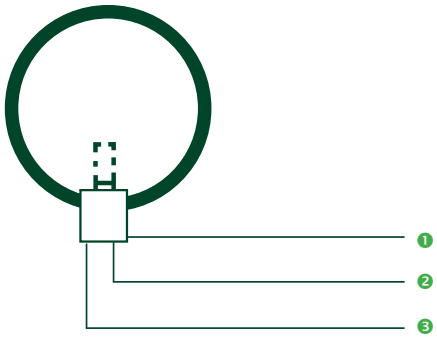
2.2.1 WORKFLOW

A powerful 16bit microprocessor is active within the communications box. This ensures a fast response to a variety of potential environmental factors by processing system-generated instructions effectively and without long wait times. Basic management of the system can be carried out by the communication module itself. Initiation of the charging process is a 3-phase process:

1. Connection of a charging cable is detected.
2. A response from the proximity circuit (PP) confirms the connected cable and correlates it with the charging capability of the system. If compatible, (the maximum current carrying capability of the cable must correspond to that of the system), communication is initiated with the electric vehicle.
3. With the aid of the pilot function (CP) of the connection cable, the communication module determines the presence of the electric vehicle and validates the necessity for activation of a ventilation system (for gassing batteries). Should ventilation be necessary, this is duly activated for the entire system, irrespective of whether or not it is required for the second user.

If all conditions are fulfilled and the user has initiated the charging process by pressing the START button (locally or remotely), the charging outlet is locked, the charging contactor is activated and the charging process started. The charging process is monitored by a higher level, intelligent control system.

PLEASE NOTE: The box does not provide this intelligence. It does not recognize the energy requirement of the connected unit, nor can it align the charging process to the current conditions. During the course of the charging process, it simply conveys to the electric vehicle the volume of energy currently available by the system, if this information is known. If the system cannot communicate the actual quantity of energy available to the module, then the communication module pre-supposes that the quantity of available energy complies with the maximum configured for the module.



1. RM (3)*
2. P-Pol (1)
3. N-Pol (2)

** In brackets, no. of terminals to user plug X401/402*

[1] USER stands for electric vehicle (EV) or charging outlet.

Possible settings can be configured in advance via the jumper, with the following limits:

1. 13A
2. 20A
3. 32A
4. 63A (3-PH)/70A (1-PH)

These values simply convey the capacity of the communication module to scale the connected cable to the available system resources. The system manufacturer is responsible for aligning the module values with those of the system. Please refer to the installation guide for possible jumper configuration options. A configured value can be further limited by a system parameter but not exceeded. If a module has an integrated cable, then this value also applies to the cable as there is no resistance detection.

2.2.2 SECURITY LOCKING

The outlet locking device is triggered prior to the start of the charging process and is monitored. A driver circuit controls the locking and unlocking of the connection mechanism, although, depending on the configuration, the user can choose from a number of supported mechanisms (motor/magnetic). The driver circuit ensures that the latching pins are guided into the correct position at the right time. A response circuit signals the end of the movement of the latching pins via a switching mechanism which is monitored by the communication module. Use of the communication module motor control requires an external source of power to the designated clamps (min. 12V/3A).

Here the classification of communication module to proprietary manufacturers.

Pins on locking mechanism			Pins on communication module
Walther	**Bals**	**MENNEKES**	
3	1	1	Locking+ (1)
1	3	3	Locking- (2)
Addtional RM cable White on +12V Blue is return	2	2	Response (3)

The pin classification on the communication module applies to both USER[1] 1 and to USER2.

Example - motorized locking device.

Action	P-pole	N-pole
Extend latching pins (lock)	12V	0V
Retract latching pins (unlock)	0V	12V

The user is responsible for ensuring that the electronic data and the mechanical running of the deployed locking mechanism are supported by the communication module. The drive circuit can only supply mechanisms with driving voltage of 12V and a max. load current of 5A.

The communications box monitors the availability of mains power and switches the mechanism to "unlock" in the event of a power outage. Prerequisite is that the external 12V power supply delivers energy to the amount of min. 200ms (determined from the hold up time) for the communication module (which is also supplied by external voltage in the event of network outage).

2.2.3 POWER-BACKUP (EWS-BOX P)

With variant EWS Box P, the user can deploy the Power Backup function. This solution integrates the generation of required energy to the locking mechanism switch within the module. A special circuit saves all non-required energy in the dormant periods in order to feed the locking mechanism later if required. The power backup provides the required energy for unlocking the charging outlet in the event of a network outage. The additional circuit board is pre-installed in the P variant - the communication module autonomously detects the use of the Power Backup function and engages itself accordingly. The module continuously checks the energy status until sufficient power is available to supply the locking / unlocking devices.

ATTENTION: This results in an extended response-time. Once activated, it will take up to 260 seconds for sufficient energy to be saved. If several switching operations are triggered, one after another, then then a few seconds may be needed until sufficient energy is available for the next operation.

2.3 FEEDBACK SIGNALS

2.3.1 SYSTEM

The connected system can provide current information via a series of feedback terminals within the communication module. A separate series of terminals is available for each user.

Includes:

- Feedback contactor - the system registers the correct switching of the power-supply contactor. As long as the auxiliary contact is active, power can be supplied to the electric vehicle and the locking mechanism can not be opened.
- RCD feedback - the system registers the release of the RCD switch and with it an interruption to the supply of power.
- Meter input signal - Energy metering impulses generated by a meter during the course of the current charging process are transmitted to the communication module by the system (via the usual S+ S- mechanism). The user must stipulate (in the configuration settings) in which resolution the impulse values are to be read (e.g. 1000 impulses/kWh). These values can be taken from the data sheets for the active meter. It is assumed that there is a voltage impulse of 0 ➔ +12V ➔ 0 at the S- input constitutes a counting pulse of between 30 ms and 200 ms. Prerequisite: the S+ input was connected at +12V). Shorter impulses are disregarded, longer impulses interpreted as errors.
- Feedback locking mechanism - The system advises of the latching / unlatching of the mechanism via a switch in the locking device (generally connection 2). With this feedback signal, the module acknowledges a correctly locked charging socket and can authorize the start of a charging session.

2.3.2 USERS

Two different information options are available to each user

1. 4 x LEDs

– LED1 – Error, the module has detected a fault situation. A root cause analysis must be performed on any fault which hinders the running of a charging process.The problem must be corrected for the process to continue uninterrupted. Here are a few examples of possible errors:

  - the connected cable is not compatible with the energy capacity of the module.
  - the locking mechanism could not be could not be closed in the required position.
  - the RCD switch was not released

If the fault cannot be localized, the current status must be read. More information can be found in the software manual.

– LED2 – On / Ready, this LED-output signalizes 3 states:

  - *OFF* – no (recognizable) cable connected at the outlet and no Start command triggered
  - *FLASHING* – either the system is searching for a vehicle at the connected cable, or, if a vehicle is present, the system is awaiting a START command.
  - *ON* – a START command was received and the charging process has been initiated

– LED3 – optimized charging, the user has requested a customized charging process for this connection, i.e. the charging session is controlled by (externally set) parameters, e.g. The use of cost-efficient off-peak power, time-apportioned fleet management. More information can be found in the software manual.
– LED4 - no classification. The LEDs, (together with the meter input S-) share a supply line (+12V - max. 40 mA) that is to be used exclusively to this purpose.

2 4 x buttons

– Button 1 – Start, the user can initiate a charging process via this button. LED2 blinks to indicate that the request has been acknowledged. Once all prerequisites are fulfilled (correct cable connected, electric vehicle shows ready, no error messages) then the locking device is activated and the charging process started. The user can query the current status (e.g. energy meter) locally or remotely.
– Button2 –Stop, a currently running charging process is ended. The supply of power is deactivated and the locking device opened.
– Button3 – optimized charging, the user commissions a customized charging process. This means that the charging process will be subject to certain parametric factors. The parameters are set and maintained via a management system. The session can thus incorporate time-related- or personal dependencies. More information can be found in the software description.
– Button4 - not used, Buttons must activate a connection in accordance with GND (PE) in order to trigger a response.

2.4 COMMUNICATION

2.4.1 CHARACTERISTICS

Particularly characteristic of the communication module is the flexible management and the monitoring capability via an affiliated system. This allows for operation both in a closed environment (such as a Wallbox for private use) and as an integrated management component within a complex network (fleet management in commercial sector). Irrespective of how the control module is managed, certain environmental parameters must be input.

- The system mode - the module can be set up to be managed locally (standalone) with/without RFID-authorization or for remote management (ethernet) with/without RFID authorization.
- Security locking - the module must be configured to recognize and manage the respective locking device. Data e.g. switching diagram for the locking circuitry can be referenced in the manufacturer's data sheet and should be compared and aligned with the data from the communication module.
- Metered impulses can be interpreted in different ways and this must be taken into account when specifying the number of impulses in one kWh for the purpose of precise billing. Impulse values per kWh vary by electronic meter manufacturer. This value must be taken from the manufacturer's data sheet and must be entered here.
- Ventilation support - the user must enter whether or not a ventilation system has been installed and whether this is can be switched on and off. If this is not the case, vehicles which require and request ventilation must not be connected.

2.4.2 PC CONFIGURATION

A local manager can integrate the module into his own system via the configuration port in order to administer all necessary parameters. This connection uses a serial RS232 interface across which only data lines are used (no hardware flow control). The transmission parameters (115200, 8N1) are hard-coded and cannot be changed. The latest versions of the firmware can also be loaded via this port.
The protocol for the download, management and status notification queries can be referenced in the software description.

PLEASE NOTE: This port will be used for multiple functions in future developments. The PC configuration must therefore be set up with a configuration bridge.

2.4.3 ETHERNET

A remote manager can integrate the communication module into his entire system for controlling purposes and for performing status queries. This capability is enabled via a web interface stored within the module, which an authorized user can access using a standard internet browser. All approved information is held in the temporary memory for this interface and can be called up at any time. The module must be made known to the system via the user settings, although the MAC address is fixed. The user must enter the network data in the designated fields together with the IP address by which the module is to be accessed.
Should servicing be necessary, the default IP-address can be restored at any time via a configuration bridge. Further information relating to access to the communication module via the ethernet port can be referenced in the software manual.

2.4.4 RFID

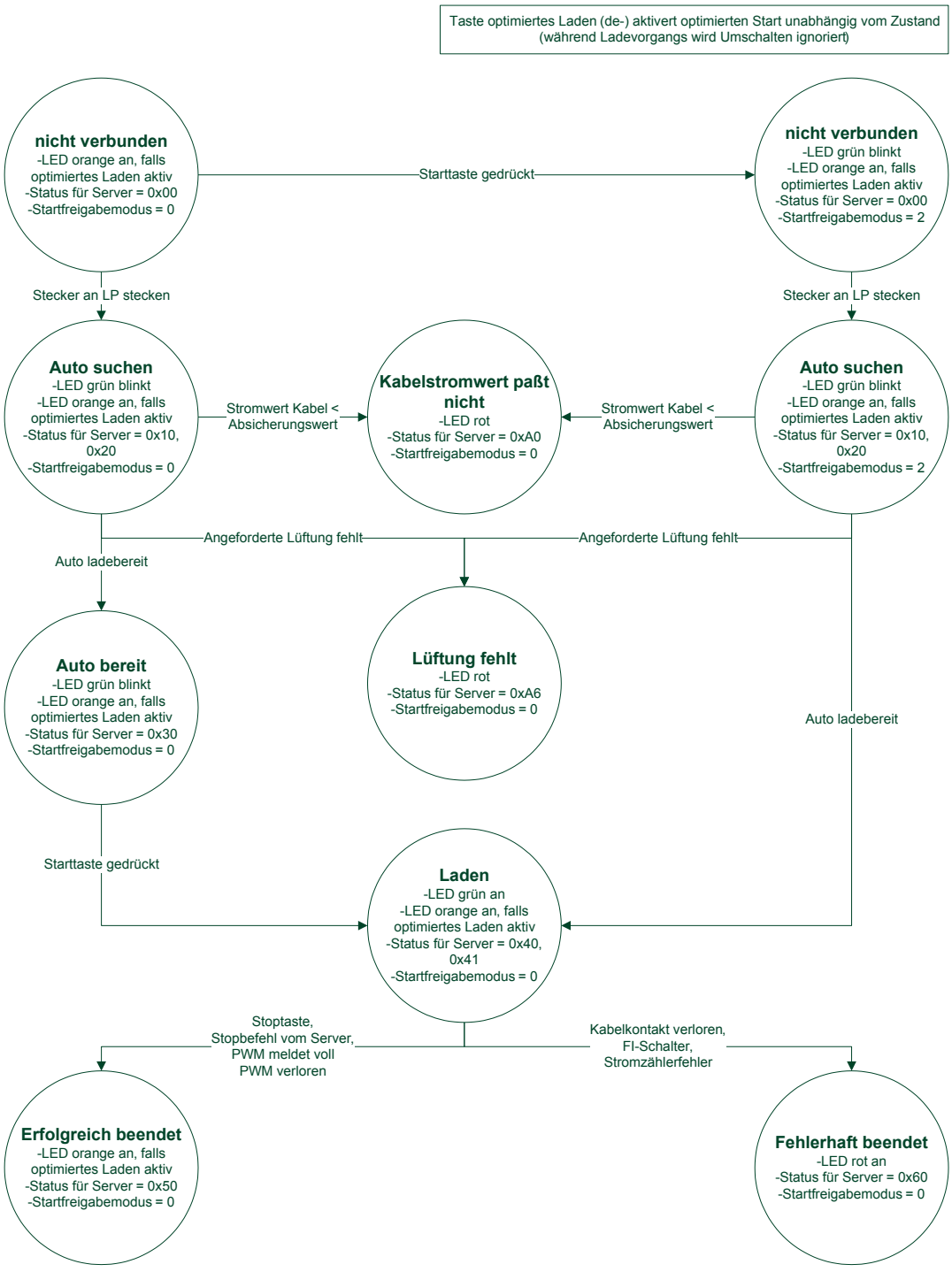
A user operates the communication module in an authorized mode, i.e. only people with an appropriately authorized card may initiate a charging process. These cards are scanned by an RFID card reader (e.g. the MCS Multi Card Reader), which then transmits the card data to the module via the RFID port. The module verifies the transmitted data and compares it with a stored list. The list consists of single items, group items and blocked items. Authorization for single items is granted to the card-owner, exclusively. With group items, all members of the specified group are authorized to initiate a charging process, although if the owner of a card is blocked, all other members are also refused access to the system.
The communication module can administer 64 such items. The operator is responsible for maintaining data stored in the list.

3 Software

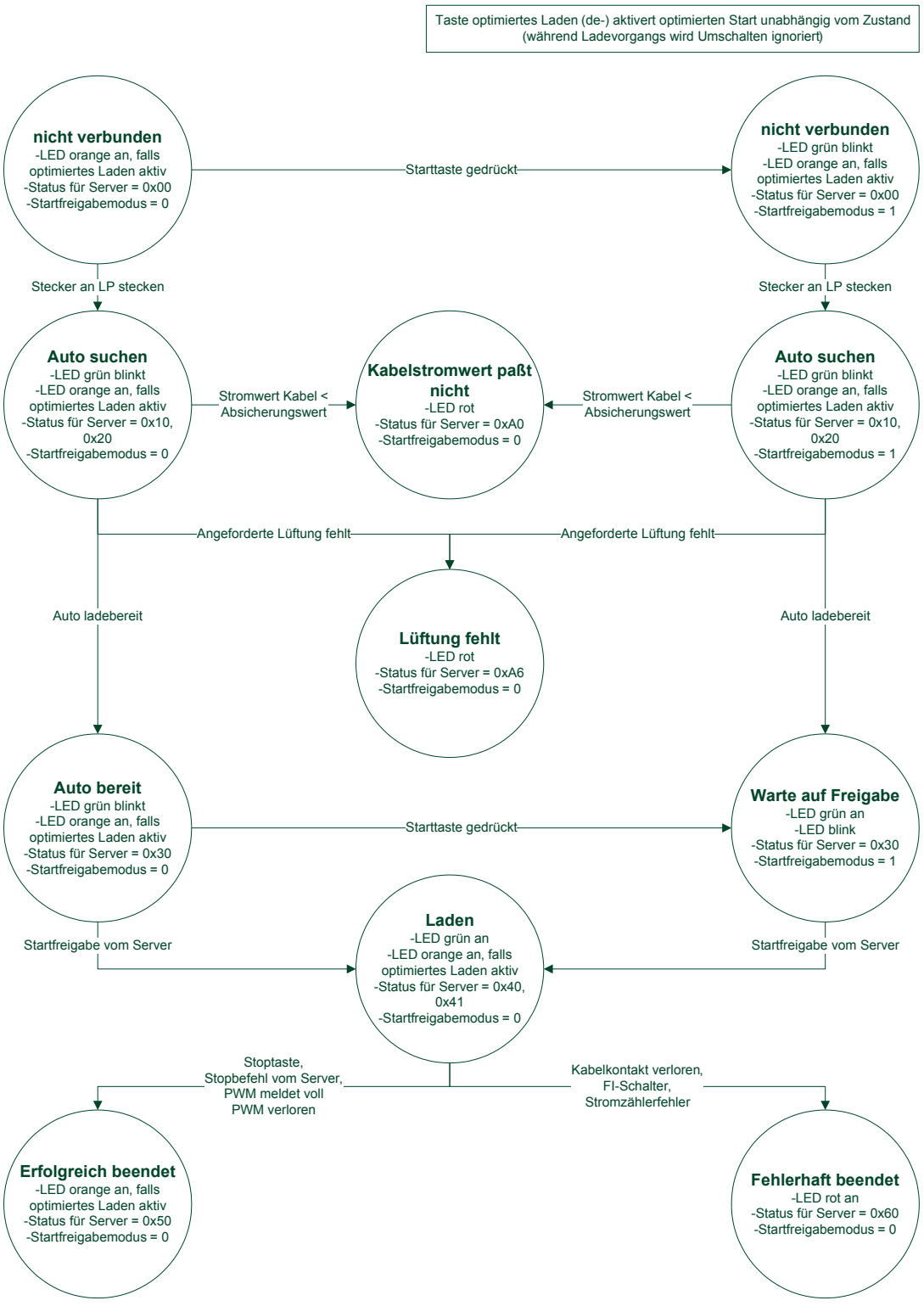
3.1 DESCRIPTION OF FUNCTIONALITY

Error conditions are not covered here; On removal of the cable at the vehicle side (if not locked) the system returns to basic mode "not connected"., the start-release mode is not automatically reset as several identification procedures are possible following an incorrect connection of the cable.
With RFID activations, the START button is only accepted following correct authentication and the remaining procedure is the same - the server is able to decide if should send a START command or not.

3.1.1 STANDALONE



3.1.2 SERVER CONNECTION



3.1.3 RFID-INTEGRATION

The card is held up to the device and the START button is pressed (it is irrelevant in which order). The device acknowledges the user based on information stored on the card. This information is considered "current" until a new card is presented. If the device has been configured as a stand-alone machine, then the local permissions' list is queried. Non-corresponding cards are rejected as invalid. If the card is accepted, the session is immediately activated once the START button is pressed and the card information is set for the specific charging port. With server-controlled systems the server now receives a request for a START command. In such cases the card information is allocated to the charging port on the server. The STOP button is always activated locally with no server interaction, however, in RFID mode, the same card must be held up to the device as was originally used to initiate the charging session. To terminate a process after pressing START, the card must first be removed prior to pressing STOP or the session is approved and confirmed immediately by the system.

3.2 COMMUNICATION WITH THE MODULE

3.2.1 RS232 settings

Communication via serial interfaces is carried out using the following parameters:

Baud rate:	115200 Baud
Data bits:	8
Parity:	None
Stop bit:	1
Handshake:	none

3.2.2 DATA PROTOCOL / SERVER CONNECTION PER API

MCS Binary

STX	Parameter length	Msg ID	Parameters	BCC
0x02	16 Bit Big Endian	1 byte	n byte	1 byte
			User data	

BCC: XOR across length + user data

Standard MsgID: 'D' = Debuginfo
'I' = Application info
'C' = Command (first 2 byte parameters are CmdID)
'A' = Commandanswer (first 2 byte parameters are CmdID)
> = 0x80 = Application specific

Example: Command

FW-ID? →	0x02	0x0002	'C'	"id"	BCC
"1.0" ←	0x02	0x0005	'A'	"id1.0"	BCC

The binary protocol has a length specification (variable data length for later extensions or optimization of transmission paths such as TCP,) CRC, timeout of 100m/sec for incorrect length specifications and basic data types for the general processing and classification of queries / responses / classification of information and wakeup logic (wakeup with all symbols !=STX. Wakeup symbols which, on arrival of the first response, can no longer be misinterpreted, no extra timeouts required.). Parameter lengths can amount to a total of 1040 bytes.

All symbols outside a command (before STX) are simply returned (echo mode) if the module is ready for new commands.

The same binary protocol applies for both communication paths but with different parameters:

	RS232	Ethernet / TCP
Wakeup function	no	no
Signal timeout within a command	100 msec	2 sec.

3.2.3 INFO DATA SET

The server should poll the status regularly (e.g. every 2 seconds). In so doing, the server connection is tested by the server and the current meter status can be displayed. To facilitate a quick response to user information, the box sends a data set for important results which can be immediately polled by the server. The data set contains the following user data:

- 1 Byte MsgID = ‚I'
- 2 Byte info data set ID „if"
- 1 Byte change bits:
  - Bit 2: 1 = Auto 1 Result (Start/Stop via button or website, charging terminated / interrupted)
  - Bit 1: 1 = Auto 2 Result
  - Bit 0: 1 = RFID-Status changed (new card presented)

3.2.4 COMMAND REFERENCE

Activate firmware	
CmdID	"fw" / 0x6677
Parameters	
Response	1 byte RC
Description	Processes compressed firmware in temp-ROM Address 0 from

Query firmware version	
CmdID	"id" / 0x6964
Parameters	
Response	11 byte firmware ID
Description	

Delete temp-ROM	(Sectors 0-2)
CmdID	"oe" / 0x6F65
Parameters	32 bit start address
	32 bit number of bytes to be deleted
Response	1 byte RC
Description	
Delete temp-ROM	(Sectors 0-2)
CmdID	"ow" / 0x6F77
Parameters	32 bit start address
	32 bit number of bytes to be written
	(max 1024)
x bytes data	
Response	1 byte RC
Description	

Charging port status	
CmdID	"rc" / 0x7263
Parameters	
Response	following data 2x, for Port 1 and Port 2 respectively
	• 1 byte status o 0x00: not connected
	o 0x10: searching for communication
	o 0x20: awaiting charging request / vehicle
	o 0x30: awaiting start command
	o 0x40: Charging
	o 0x41: optimized charging
	o 0x50: Charging completed without error
	o 0x60: Charging session interrupted
	o 0xA0: Error: Measured current cable
	o 0xA1: Error: Locking
	o 0xA2: Error: Unlocking
	o 0xA3: Error: Activate contactor
	o 0xA4: Error: Deactivate contactor
	o 0xA5: Error: invalid configuration
	o 0xA6: Error: Ventilation not supported
	o 0xF0: Initialization (Charging Power Backup)
	o 0xFF: Manual control / test mode
	• 8 bit current value cable in amperes
	• 8 bit current max output from the box power delivered in amperes
	• 1 byte request for ventilation (1 = an)
	• 1 byte Start release mode
	o 1: Start (e.g. using button) request by Server
	o 2: Start release (by server or directly by button if Standalone)
	• 1 byte parameters optimized Start activated
	• 1 byte last charging result (after charging end)
	o 1 = OK, Stop by user
	o 2 = OK, Stop by vehicle
	o 3 = OK, CP-communication lost (cable detatched from car)
	o 4 = Error, Cable contact lost
	o 5 = Error, RCD
	o 6 = Error, Energy meter
	o 7 = Error, Server timeout
	• 32 bit current charging time in secs
	• 32 bit current meter status in Wh
	• 32 bit last charging time in secs
	• 32 bit last meter status in Wh
	• 32 bit absolute meter status in Wh
	• 32 bit absolute cycle counter
	• 1 byte lock status (1 = locked)
	• 1 byte contactor status (1 = active)
	• 1 byte RCD status (1 = active)
	• 16 bit PWM min in 1/100tel V
	• 16 bit PWM max in 1/100tel V
	• 16 bit cable voltage in 1/100tel V
	• 1 byte buttons/LED info (1 = active)

	o bit 7: LED reserve
	o bit 6: LED orange
	o bit 5: LED green
	o bit 4: LED red
	o bit 3: Button 4
	o bit 2: Button 3
	o bit 1: Button 2
	o bit 0: Button 1
	• 1 byte RFID logged in (1 = logged in, following data valid)
	• 16 bit RFID logged in group number
	• 16 bit RFID logged in card number
	• 8 byte RFID logged in username
Description	

Read RFID card memory	
CmdID	„rf“ / 0x7266
Parameters	
Response	see parameters from "sf" command
Description	

Read Userinfo parameters	
CmdID	"ri" / 0x7269
Parameters	
Response	see parameters from "sf" command
Description	
Read system parameters	
CmdID	"rp" / 0x7270
Parameters	
Response	see parameters from "sp" command
Description	
Read Systemstatus	
CmdID	"rs" / 0x7273
Parameters	
Response	11 byte firmware ID
	• 1 byte status
	o bit 4: Powerbackup timeout
	o bit 3: Powerbackup ready / charged
	o bit 2: Powerbackup circuit available
	o bit 1: Latching device configured
	o bit 0: Newstart ID
	• 12 byte serial number
	• 32 bit web interface size in byte
	• 16 bit web interface CRC
	• 20 byte web interface version info
	• 1 Byte LAN-Chip Init-error (0 = OK)
	• 6 byte MAC address
	• 1 byte Serverstatus (1 = connected)
	• 4 byte IP of queried web client
	• 8 bit max. charging current / residual current of the box in amperes
	• 1 byte ventilation active

	• 16 bit time / year (according to time-zone)
	• 1 bit time / month (according to time-zone)
	• 1 bit time / day (according to time-zone)
	• 1 bit time / hour (according to time-zone)
	• 1 bit time / minute (according to time-zone)
	• 1 bit time / seconds (according to time-zone)
	• 1 byte RFID reader-Init error (0 = OK, located)
	• 11 byte RFID reader FW ID
	• 1 byte (1 = day found, 0 = day not found, all further data invalid)
	• 7 byte detected RFID day number
	• 1 byte 1 = valid RFID card read (local authorization not tested and confirmed with OK with ethernet)
	• 1 byte LAN-Chip decoding error (0 = OK)
	• 16 bit RFID group number
	• 16 bit RFID card number (within group)
	• 8 byte RFID username
Description	

Read User parameters	
CmdID	"ru" / 0x7275
parameters	
Response	see parameters from "su" command
Description	

Write time	
CmdID	"sc" / 0x7363
Parameter	16 bit year
1 byte month	
1 byte day	
1 byte hour:	
1 byte minute	
1 byte seconds	
Response	1 byte RC
Description	Set time

RFID write card memory	
CmdID	"sf" / 0x7366
Parameter	64 * 32 bit, respectively
	• bit 31-28:
	o 0 = free entry
	o 1 = whole group is released
	o 2 = individual card is released
	• bit 27-14: Group number
	• bit 13-0: Card number (within group)
Response	1 byte RC
	• 0 = OK
	• Other: Error
Description	

Write Userinfo parameters	
CmdID	"si" / 0x7369
Parameter	• 30 byte username
	• 30 byte Address/Street
	• 30 byte Address/Town
	• 20 byte Telephone number
	• 20 byte Customer number
Response	1 byte RC
	• 0 = OK
	• Other: Error
Description	

Control command Start/Stop	
CmdID	"sl" / 0x736C
Parameter	• 1 byte car number (1 or 2)
	• 1 byte command
	o 1 = Stop
	o 2 = Request Start (Simulate button)
	o 3 = Start release / Direct start
	o 4 = activate optimized charging
	o 5 = deactivate optimized charging
Response	1 byte RC
	• 0 = OK
	• 1.2 = Invalid parameter
	• 3 = Invalid configuration
	• 4 = Charging is complete, Disconnect cable.
	• 5 = The current value of this cable is not compatible with the outlet capacity
	• 6 = Locking /Unlocking error
	• 7 = Contactor error
	• 8 = Ventilation not supported
	• 9 = Initializing, not ready
	• Other: unknown
Description	

Write system parameters	
CmdID	"sp" / 0x7370
Parameter	• 12 byte admin password
	• 1 byte number of charging ports (1 or 2)
	• 1 byte system mode
	o bit 1: 1 = with RFID authentication
	o bit 0: 0 = Standalone, 1 = Servermode
	• 32 bit pulse meter conversion (Pulse pro kWh)
	• 1 byte locking type
	o 0 = mechanical / unidirectional pulse
	o 1 = mechanical / bidirectional pulse
	o 2 = magnetic / input low active
	o 3 = magnetic / input high active
	• 4 byte RFID card pin (ASCII)
	• 1 byte 1 = ventilation installed
	• 1 byte maximum charging current in amperes (limited by jumper with fully integrated cables -> also cables with / without integrated cable detection)

	• 1 byte Power fail mode
	(1 = automatic restart)
	• 1 byte cable mode
	(0 = plugin, 1 = fully integrated)
Response	1 byte RC
	• 0 = OK
	• Other: Error
Description	The following parameters cannot be changed across the network.
	• Servermode
	Parameters can only be changed if no vehicle is connected (Status 0x00, 0x10 or 0xA2 or 0xA5)

Set current limit	
CmdID	"st" / 0x7374
Parameter	• 1 byte car number (1 or 2)
	• 1 byte current in amperes (Maximum working voltage is defined by set value for resistance), 0 = Limit deactivated)
Response	1 byte RC
	• 0 = OK
	• Other: Error
Description	The limits are not saved with deactivation

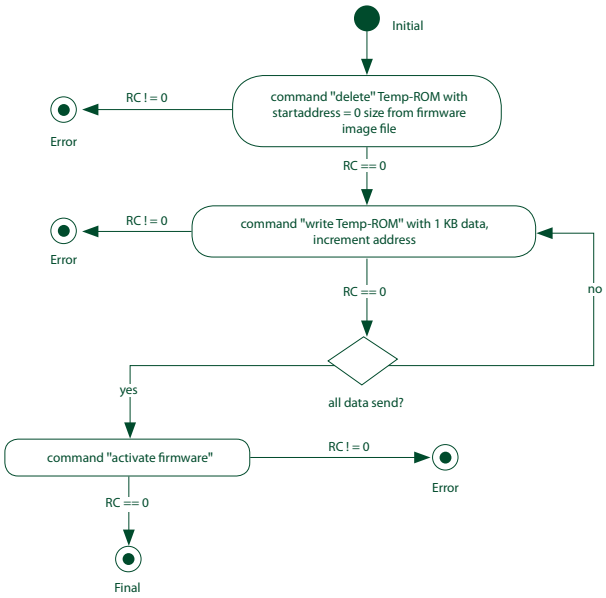
Write User parameter	
CmdID	"su" / 0x7375
Parameter	• 12 byte User password
	• 4 byte own IP
	• 16 bit own port for server connection
	• 4 byte gateway IP
	• 4 byte network mask
	• 4 byte server IP
	• 16 bit server port
	• 1 byte language, 0 = German
	• 1 byte timezone
	o 0 = GMT
	o 1 = CET (Germany)
Response	1 byte RC
	• 0 = OK
	• Other: Error
Description	

Activate web interface	
CmdID	"wa" / 0x7761
Parameters	
Response	1 byte RC
Description	Loaded webpage is imported into web interface temporary memory

Delete web interface memory	
CmdID	"we" / 0x7765
Parameter	32 bit Start address (max 384K)
	32 bit number of bytes to be deleted (max 384K)
Response	1 byte RC
Description	Analog "oe"

Write to web interface memory	
CmdID	"ww" / 0x7777
Parameter	32 bit Start address (max 384K)
	32 bit number of bytes to be written (max 1024)
	x bytes data
Response	1 byte RC
Description	Analog "ow"

Reset	
CmdID	"zz" / 0x7A7A
Parameters	
Response	
Description	Execute process reset once response has been issued



3.2.4.1 FIRMWARE UPDATE

(See image left)

3.3 RFID-CARD STRUCTURE

Standard Mifare Classic cards are used.

Each card has a user ID. A 28 bit ID is used - 14 bit for the group allocation and 14 bit for the group member - i.e. a max. of 16384, each with 16384 members can be maintained (0 is not used). A 32 bit table is maintained in the communication module. An ID is stored in the upper 4-bits of this table.

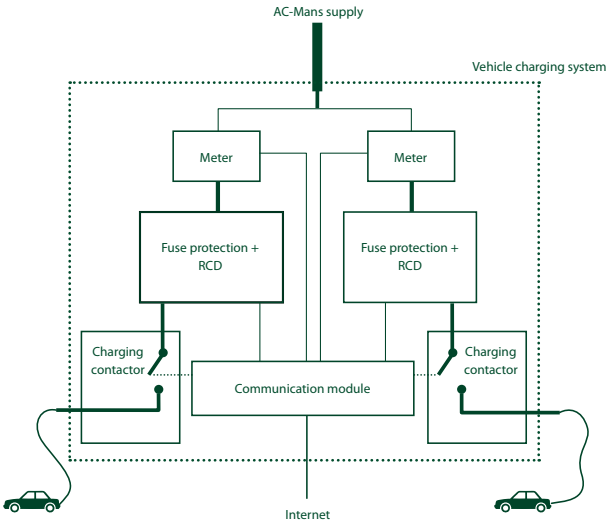
0 = no input
1 = individual activation
2 = group activation
3 = individual card block

In EEPROM there is space for 256 Byte = 64 entries

SUMMARY: The single box can maintain 64 entries; a mix of activated groups and individual cards can be maintained; 16384 different groups each with 16384 members can exist. Individual cards can be singled out and blocked, even if a group has been activated.

4 Installation guidelines

4.1 INTEGRATION INTO A SYSTEM

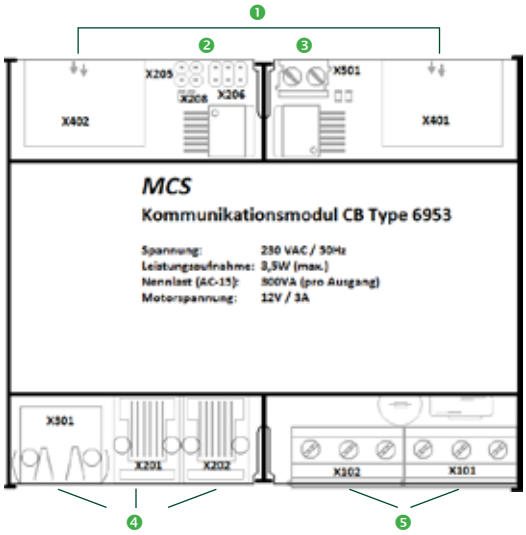


The communication module is intended for use in a closed unit, whereby the individual components are mounted on rails (top-hat rail mounting).

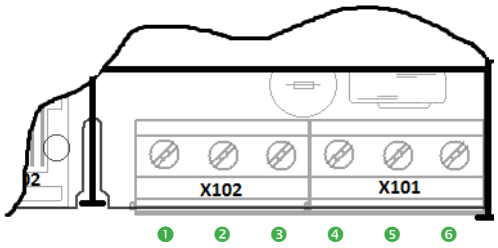
The module should only be integrated into housing units which protect sufficiently against humidity and extreme weather conditions. The DIN IEC 61851 standard applies here.

All wiring must be connected correctly, as outlined in this manual, before the module can be put into operation. The upper part of the housing must be engaged and the fold-out cover must be latched. Once the module is mounted on the rails, all connection elements should be accessible. The module can be so arranged that the supply lines be routed to the respective contact components via the most direct route possible.
The communication module meets all the requirements for devices in overvoltage category II. In order to meet the requirements of a higher overvoltage category, the external protection measures must also be fulfilled.
(c.f. image on next page).

Operating Instructions Status as of 08/2012



1. User-connections
2. Configuration bridge
3. Motor voltage
4. Serial interfaces (2x), Ethernet (1x)
5. Mains terminal



1. Contactor fan (VL)
2. Contactor User 2
3. Contactor User 1
4. Phase conductor (L1)
5. Neutral conductor (N)
6. Grounding conductor (PE)

The line connections are not covered and are therefore easily accessible. All lines must be laid in such a way that even a cable rupture at the terminal point does not result in a short circuit to the network terminals. This is best achieved by fixing the wiring close to the housing.

PLEASE NOTE. Electrical discharging can damage internal module components. The unit must be grounded (earthed) prior to any installation work directly connected to the communication module.

4.2 MAINS TERMINALS

Particular care and attention is needed when connecting wiring to the mains terminals as this task exposes the engineer to dangerous levels of voltage. For this reason, many installation tasks at the mains terminals must be carried out by qualified personnel only and must be performed under voltage-free conditions only. The legal standards must be observed in accordance with DIN/VDE regulations. Wires must have a cross-section of min. 1.5 mm^2 and must be capped in ferrules. They may not extend into areas where there is a risk of short circuit with other wiring.
Terminals are to be tightened as specified in the diagram which, for clarity should be mounted on the wall of the housing.

4.2.1 SUPPLY TERMINAL

The power supply terminal receives the mains power supply lines as well as those for the communication module, the contactor circuit and the ventilation circuit.

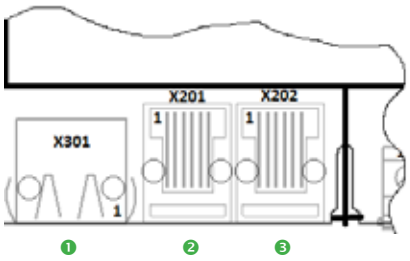
Supply terminal (X101)	
KL1	L – Phase conductor
KL2	N – Neutral conductor
KL3	PE – Earth-ground conductor

4.2.2 CONTACTOR TERMINAL

The contactor terminal is the output for the contactor circuit The L conductor is connected to the adjacent contactor via the communication module, whereby a nominal charge of 300VA (AC-15) per user can be connected. The ventilation connection activates a contactor / relay which serves both electric vehicles in equal measure.

Contactor terminal (X102)	
KL1	Contactor fan
KL2	Contactor USER2
KL3	Contactor USER1

ATTENTION: These connections are designed solely for the activation of charging contactors and/or fan contactors and should never be used for the transmission of power to a vehicle!



1. Ethernet
2. PC – configuration (serial)
3. RFID card reader (serial)

4.3 COMMUNICATION – INTERFACES

4.3. INTRODUCTION

The integrated communication interfaces facilitate the control of access authorization, the local management of configuration settings and the integration of the module into an existing management system. The wires must have compatible contact plugs, each with a retaining clip to prevent unintentional detachment of the connection. The wires must not protrude from the sides of the clamps.

4.3.2 ETHERNET

The internet port supports transmissions in accordance with 10/100BASE-T, the integrated LEDs ID Link/Data transmission (green/green blinking) as well as the transmission speed (yellow = 100MBits/s).
The ethernet port has its own pre-programmed, fixed MAC address. The IP address is preset (192.168.0.1) and can be changed via the configuration settings (no DHCP).(see 4.4). For service purposes, it is possible to restore the factory set IP address in order to re-establish accessibility of the module on the network. The ethernet NIC port also supports crossover detection.

Ethernet (X301)	
1	TX+
2	TX-
3	RX+
4	–
5	–
6	RX-
7	–
8	–

4.3.3 PC – CONFIGURATION

This terminal allows for the entry of system-relevant settings and for the transmission of permanent status queries. Software updates are also possible via this connection. A RS232 communication protocol with signal level is used.

- 115200 BAUD
- No parity
- 8 data bits
- 1 Stop bit
- No hardware flow control

RS232 PC (X201)	
1	TxD
2	R-bridge 5
3	RxD
4	GND
5	R-bridge 2
6	Bridge GND

The bridge between 2 and 5 can be switched on the PCB from host to detection. To ensure a consistent and reliable operation, we recommend the use of a connecting cable MCS MK W201.

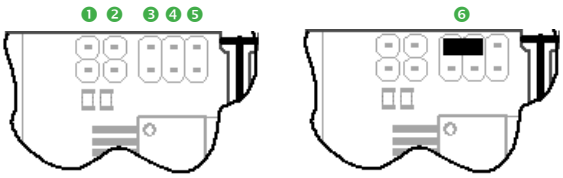
4.3.4 RFID READER

This terminal facilitates the connection of an RFID reader, which controls and monitors authorized access to the system.

RS232 RFID (X202)	
1	TxD
2	R-bridge 5
3	RxD
4	GND
5	R-bridge 2
6	Bridge GND

The connection is optimized for the application of the MCS Multicard Reader. The use of a connecting cable MCS MKL W202 is recommended in this case.

4.4 CONFIGURATION SWITCH



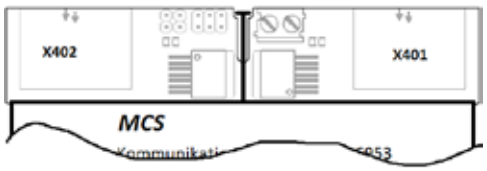
1. IP-RESET
2. PC-COM
3. 20A
4. 32A
5. 63A (70A one phase)
6. 13A (default)

The communication module has several switches which can be set externally by the user without the need to remove the upper housing. The switches are operated via short circuit bridges (so-named jumpers), whose pins induce the various tasks. Jumpers must be set prior to the startup of the module in order to be recognized. The module is assigned a defined current carrying capacity and can be deployed to a number of pre-defined areas.

The default minimum value 13A is achieved if no short circuit bridge is configured or if the default position is used.

PLEASE NOTE. The communication module is not able to balance the current-carrying capacity against the configured bridge. The user must therefore ensure that the system is able to fulfil all necessary prerequisites. The task of the mode bridge is to compare the capacity of a connected cable with the potential of the respective system.

The IP-RESET switch restores a previously configured IP address to the output value. (192.168.0.1).
The PC-COM forces local Management across the PC interface X201. In future versions, additional components will be able to communicate across the then open short-circuit bridge via this interface.



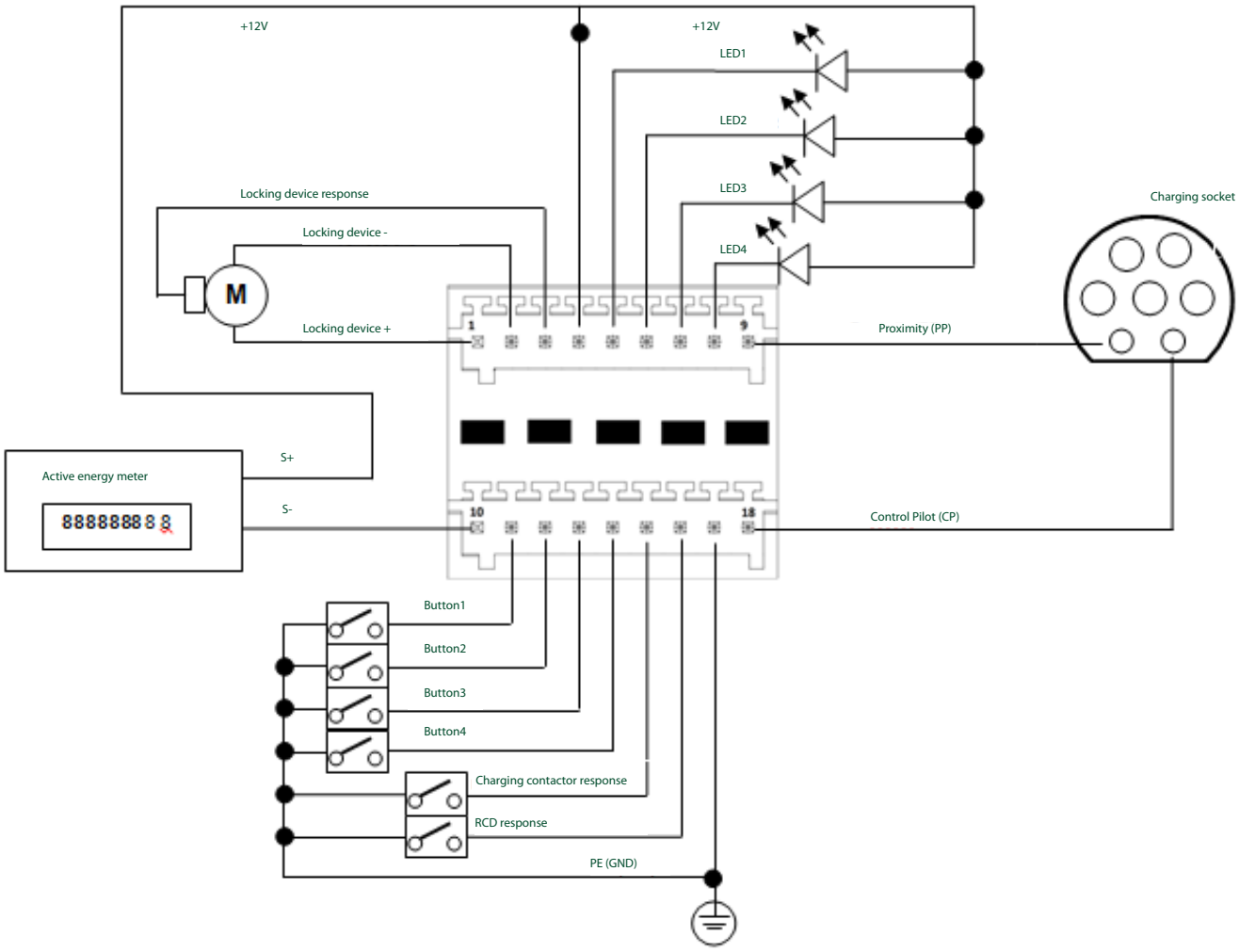
4.5 USER-INTERFACE

The communication module can supply power to 2 respective users (electric vehicles) independently of each other.

User1 is connected via X401 and User2 via X402. The cables to the terminal blocks must be so laid that they do not come into contact with higher voltage components. The permissible loads must never be exceeded, the applied voltage must remain within the specified value range. The connections are identical for both users, therefore only the pin configuration and connection plan for one terminal socket are provided:

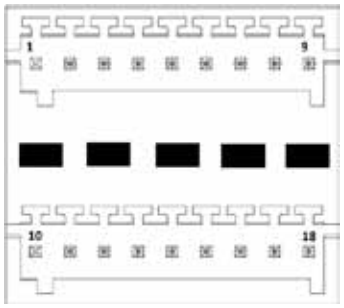
USER1 (X401) and USER2 (X204)	
1	Locking+
2	Locking-
3	Locking device response
4	+12V (LED+S+)
5	LED1 – Error
6	LED2 – ON/Ready
7	LED3 – opt. Charging
8	LED4 –
9	Proximity (PP)
10	Meter (S-)
11	Button1 – START
12	Button2 – STOP
13	LED3 – opt. Charging
14	Button4 –
15	Contactor RM
16	RCD-RM
17	RM-Basic (PE)
18	Control (CP)

SCHEMATIC CONNECTION DIAGRAM



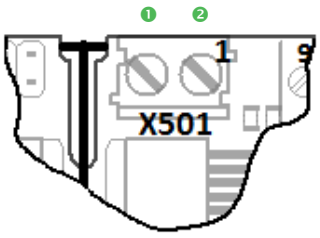
Terminals	Specification	Annotations
1, 2, 3*	**1.2 output:** 12V/max.5A must either be fed externally or is achieved via the optional power backup circuit. **3 – Input:** Response input for the latching of the locking device, max. 12V.	Activation is dependant upon the locking system used with the charging socket. Generally the line which supplies +Potential for **locking** and -Potential for **unlocking** is fed to Terminal 1. The line which supplies potential required for **locking** (+Potential) and for **unlocking** (-Potential) is fed to Terminal 2. The latching of the locking device is returned via Terminal 3. The respective locking mechanism can be selected via the configuration setting.
4	**Output:** 12V /max 40mA	Supply to the closed LEDs (Anode) and to the impulse counter S+ Typically S+ of an electronic active energy meter is connected with this pin.
5, 6, 7, 8,	**Output:** Open collector - with 1kOhm	Connect LED cathodes here, LEDs can be operated directly at Terminal 4.
9	**Output:** Proximity line (PP)	Is connected directly with the PP of the socket outlet. The connected cable is detected.
10	**Input:** 5V < S- < 24V	The counting pulse input. Can be connected directly to an S-output of an electronic active energy meter. **PLEASE NOTE.** S+ must comply with the range value. Ideally S+ should be clamped to Terminal 4 insofar as S+ presents no additional loads.
11, 12, 13, 14,	**Input:** When open - 3.3V, do not apply voltage. When closed - c1mA	Push-button inputs, voltage free against PE is recognized as a key-press.
15, 16	**Input:** When open - 3.3V, do not apply voltage. When closed - c1mA	Return inputs from the user contactor and from the RCD circuit; voltage free against PE is recognized as a response.
17	PE – Earth-ground conductor	This connection can be used as reference potential for terminals 11-16. This is connected internally with PE.
18	**Output:** 12V < Control Pilot (CP) < -12V	Is connected directly with the CP of the socket outlet.

*The locking mechanism varies from manufacturer to manufacturer, here a selection of activation and configuration options. (See table right).



Pins on the locking mechanism and selection of locking/response mechanism		Pins on communication module
Walther motorisch/lowAktiv	**Bals motorisch/impuls**	**MENNEKES motorisch/impuls**
3	1	Locking+ (1)
1	3	Locking- (2)
Addtional RM cable White on +12V Blue is return	2	Response (3)

Electrical contact is applied to the terminal socket (viewed here from the front) via a terminal block - ideally ordered together with the module. It should be noted that one terminal block is required for each row (Pins 1-9 and Pins 10-18 respectively).



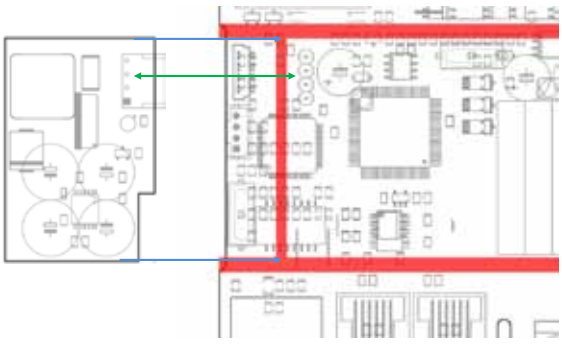
1 0V
2 +12V

4.6 12V - SUPPLY

An external 12V supply (+/- 5%) can be saved via the terminal socket X501 whereby only one power-limited source can be used in accordance with EN60950-1.

This serves to provide the integrated locking mechanism with the necessary power it needs to operate. This buffer also provides the module with an emergency supply of power for a short time following a network outage. The module acknowledges a power outage and triggers an emergency release.

PLEASE NOTE. This function is not designed to provide a continual supply of power to the module during a power outage. It serves solely to terminate a open charging session safely and to secure any data. Where there is sufficient voltage, the firmware terminates the charging and attempts to save all relevant data, whereupon it closes all contacts and opens the latching device. The connected power supply must be capable of providing full capacity power over a period of min. 200 ms per connected user. This time period can be determined from the HOLD-UP time in the data sheet to the power supply.



4.7 POWER-BACKUP

The user can also use the EWS Box P with integrated Power Backup circuit for the provision of energy to the locking system. In an idle state this circuit board collects sufficient energy to activate the locking device.
The circuit board is positioned (with the help of channel guides in the upper housing) such that the terminal sockets and plugs contact correctly.

On the upper side of the Power Backup, 2 LEDs display the functionality of the circuit board. The green LED documents the circuit board operation, the red LED displays the charging process. As long as the charging session is in progress, (red LED is active), there is insufficient surplice energy available to release the locking device. The module monitors this state and drives the required amount of energy to the locking mechanism at the correct time (red LED off).

Einfach Strom tanken

P-CHARGE

» Further **P-CHARGE** products

and detailed product information can be found under www.p-charge.eu

Mounting of the product and connection to the grid must be carried out exclusively by qualified personnel. The product requires regular maintenance in accordance with the service information included on delivery. We recommend that maintenance of the product be carried out by appropriately trained experts. We accept no liability for damage of any kind not covered by the General Terms and Conditions; particularly for damage caused by vandalism, lightning/overvoltage, nor for consequential costs for automobiles / vehicles nor according to technical connection regulations. In the event of a warranty claim, the company Schletter GmbH shall bear the costs required for transport, travel, labour and materials only; excluded are the additional and potentially substantial costs incurred for transfer of the object to a location other than the target site. In the event of a warranty claim, the product must be returned to the company Schletter GmbH for fault diagnosis and supplementary performance if required. The General Terms and Conditions of Sale and Supply of Schletter GmbH (AGB) shall apply here. These can be referenced on the internet under http://www.schletter.de/588-0-AGB.html. Clause 10 of the AGB is not applicable in this case.

A product of Schletter GmbH | Gewerbegebiet an der B15 | Alustraße 1 | 83527 Kirchdorf / Haag i. OB | www.schletter.eu

Subject to technical modifications and printing errors. Status as of 08/2012