Compax3

Compax3S Installation Manual

Single axis devices

Paper version

C3Manager-Compax3S
> **Unterlagen / Software**
> user guides / tools
> manuels / tools:
◆ **Compax3 - DVD (english, deutsch, français)**
  +
◆ **StartUp Guide (english / deutsch)**
◆ **Compax3S Installations-Handbuch deutsch**
◆ **Compax3S Installation Manual english**
◆ **Manuel technique Compax3S français**

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We checked the contents of this publication for compliance with the associated hard and software. We can, however, not exclude discrepancies and do therefore not accept any liability for the exact compliance. The information in this publication is regularly checked, necessary corrections will be part of the subsequent publications.

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1. Notes on the Documents Supplied

Compax3 – Installti-on manual

The present manual contains the installation instructions for the associated Compax3 device series (refer to Chapter "Device Assignment").

> **This installation manual does contain only the basic information; for more detailed information please refer to the Help-files of the individual Compax3 device types.**

Compax3 - DVD

C3 ServoManager

The enclosed self-starting* DVD contains the "C3 ServoManager" software tool for configuring, optimizing etc. Compax3.
Please use always the latest C3 ServoManager version,

Parker Integrated Engineering Tool

Furthermore, the "Parker Integrated Engineering Tool", a software tool for the project management of several Parker Motion Control products, can be found on the C3 DVD.
Several axes are managed in a common project. The Compax3 ServoManager is integrated per "Plug & Play" for each Compax3 axis. The configuration, optimization,.. take place in the same way as in an independently working C3 ServoManager.

> **The "C3 ServoManager" software tool is also functioning independently from the Parker Integrated Engineering Tool!**

Online help system

After the installation of the ServoManager you can copy the desired Online help system with the "C3 ServoManager Help Installer" (you can select the C3 device type as well as the desired language) to your PC. The help system can be called up directly from the ServoManager. You will find the complete description of the selected device type in these online help files.
Please note that the help files are associated with defined device and software versions.

Catalogs

The catalogs supplied provide an overview of and information on the Compax3 device series.

Adobe Acrobat Reader®

For reading PDF files you need the "Adobe Acrobat Reader", a software tool which is available free of charge. and it is distributed and generally accepted throughout the world. You can also download it directly from the Adobe website at: www.adobe.com/products/acrobat.

* If your PC has not been set up accordingly, start the "start.htm" file on the CD.

1.1 C3 ServoManager

**Installation of the C3
ServoManager**

**The Compax3 ServoManager can be installed directly from the Compax3
DVD. Click on the appropriate hyperlink or start the installation program
"C3Mgr_Setup_V.... .exe" and follow the instructions.**

PC requirements

Recommendation:

Operating system:	MS Windows XP SP2 / MS Windows 2000 as from SP4 / (MS Vista)
Browser:	MS Internet Explorer 6.x
Processor:	Intel Pentium 4 / Intel Core 2 Duo / AMD Athlon class as from >=2GHz
RAM memory:	>= 1024MB
Hard disk:	>= 20GB available memory
Drive:	DVD drive
Monitor:	Resolution 1024x768 or higher
Graphics card:	on onboard graphics (for performance reasons)
Interface:	USB

Minimum requirements:

Operating system:	MS Windows XP SP2 / MS Windows 2000 as from SP4
Browser:	MS Internet Explorer 6.x
Processor:	>= 1.5GHz
RAM memory:	512MB
Hard disk:	10GB available memory
Drive:	DVD drive
Monitor:	Resolution 1024x768 or higher
Graphics card:	on onboard graphics (for performance reasons)
Interface:	USB

Note:

♦ For the installation of the software you need administrator authorization on the target computer.

♦ Several applications running parallelly, reduce the performance and operability.

♦ especially customer applications, exchanging standard system components (drivers) in order to improve their own performance, may have a strong influence on the communication performance or even render normal use impossible.

♦ Operation under virtual machines such as Vware Workstation 6/ MS Virtual PC is not possible.

♦ Onboard graphics card solutions reduce the system performance by up to 20% and cannot be recommended.

♦ Operation with notebooks in current-saving mode may lead, in individual cases, to communication problems.

Connection between   Your PC is connected with Compax3 via a RS232 cable (SSK1).
PC - Compax3   Cable SSK1 (COM 1/2-interface on the PC to X10 on the Compax3 or via adapter
SSK32/20 on programming interface of Compax3H).
Start the Compax3 servo manager and make the setting for the selected interface
in the menu"**Options Communication settings RS232/RS485...**".

Device Selection   In the menu tree under device selection you can read the device type of the con-
nected device (Online Device Identification) or select a device type (Device Selec-
tion Wizard).

Configuration   Then you can double click on "Configuration" to start the configuration wizard. The
wizard will lead you through all input windows of the configuration.

Contents

2. Introduction

2.1   Device assignment

This manual applies to the following devices:

◆ Compax3S025V2 + supplement

◆ Compax3S063V2 + supplement

◆ Compax3S100V2 + supplement

◆ Compax3S150V2 + supplement

◆ Compax3S015V4 + supplement

◆ Compax3S038V4 + supplement

◆ Compax3S075V4 + supplement

◆ Compax3S150V4 + supplement

◆ Compax3S300V4 + supplement

2.2   Type specification plate

You will find the exact description of the device on the type specification plate, which can be found on the device:

Compax3 - Type specification plate:

Explanation:

1	Type designation The complete order designation of the device (2, 5, 6, 9, 8).
2	**C3:** Abbreviation for Compax3 **S025:** Single axis device, nominal device current in 100mA (025=2.5A) **M050:** Multi-axis device, nominal device current in 100mA (050=5A) **H050:** High power device, nominal device current in 1A (050=50A) **MP10:** Mains module 3AC230...480V, nominal power in 1kW (10=10kW) **D6:** Nominal supply voltage (6=560VDC) **V2:** Mains supply voltage (2=230VAC/240VAC, 4=400VAC/480VAC)
3	Unique number of the particular device
4	Nominal supply voltage Power Input: 1AC = single phase, 3AC = three phase / input current
5	Designation of the feedback system **F10:** Resolver **F11:** SinCos© / Single- or Multiturn **F12:** Feedback module for direct drives
6	Device interface **I10:** Analog, step/direction and encoder input **I11 / I12:** Digital Inputs / Outputs and RS232 / RS485 **I20:** Profibus DP / **I21:** CANopen / **I22:** DeviceNet / **I30:** Ethernet Powerlink / **I31:** EtherCAT **C10:** integrated controller C3 *power*PL*m*C **C13:** integrated controller C3 *power*PL*m*C with Profibus
7	Date of factory test
8	Options **Mxx:** I/O extension, HEDA **Sx:** optional safety technology on the C3M
9	Technology function **T10:** Servo controller **T11:** Positioning **T30:** Motion control programmable according to IEC61131-3 **T40:** Electronic cam generation
10	CE compliance
11	Certified safety technology
12	UL certification

2.3　　　Packaging, transport, storage

Packaging material and transport

Caution!　　　　　*The packaging material is inflammable, if it is disposed of improperly by burning, lethal fumes may develop.*

The packaging material must be kept and reused in the case of a return shipment. Improper or faulty packaging may lead to transport damages.

Make sure to transport the drive always in a safe manner and with the aid of suitable lifting equipment (**Weight** (see page 39)). Do never use the electric connections for lifting. Before the transport, a clean, level surface should be prepared to place the device on. The electric connections may not be damaged when placing the device.

First device checkup

◆ Check the device for signs of transport damages.

◆ Verify, if the indications on the **Type identification plate** (see page 8) correspond to your requirements.

◆ Check if the consingment is complete.

Storage

If you do not wish to mount and install the device immediately, make sure to store it in a dry and clean **environment** (see page 43). Make sure that the device is not stored near strong heat sources and that no metal chippings can get into the device.

Disposal

This product contains materials that fall under the special disposal regulation from 1996, which corresponds to the EC directory 91/689/EEC for dangerous disposal material. We recommend to dispose of the respective materials in accordance with the respectively valid environmental laws. The following table states the materials suitable for recycling and the materials which have to be disposed of separately.

Material	suitable for recycling	Disposal
Metal	yes	no
Plastic materials	yes	no
Circuit boards	no	yes

Please dispose of the circuit boards according to one of the following methods:

◆ Burning at high temperatures (at least 1200°C) in an incineration plant licensed in accordance part A or B of the environmental protection act.

◆ Disposal via a technical waste dump which is allowed to take on electrolytic aluminium condensers. Do under no circumstances dump the circuit boards at a place near a normal waste dump.

2.4   Safety Instructions

2.4.1.   General hazards

General Hazards on Non-Compliance with the Safety Instructions
The device described in this manual is designed in accordance with the latest technology and is safe in operation. Nevertheless, the device can entail certain hazards if used improperly or for purposes other than those explicitly intended. Electronic, moving and rotating components can

◆ constitute a hazard for body and life of the user, and

◆ cause material damage

Usage in accordance with intended purpose

The device is designed for operation in electric power drive systems (VDE0160). Motion sequences can be automated with this device. Several motion sequences can be combined by interconnecting several of these devices. Mutual interlocking functions must be incorporated for this purpose.

2.4.2.   Safety-conscious working

This device may be operated only by qualified personnel.
Qualified personnel in the sense of these operating instructions consists of:

◆ Persons who, by virtue to their training, experience and instruction, and their knowledge of pertinent norms, specifications, accident prevention regulations and operational relationships, have been authorized by the officer responsible for the safety of the system to perform the required task and in the process are capable of recognizing potential hazards and avoiding them (definition of technical personnel according to VDE105 or IEC364),

◆ Persons who have a knowledge of first-aid techniques and the local emergency rescue services.

◆ Persons who have read and will observe the safety instructions.

◆ Those who have read and observe the manual or help (or the sections pertinent to the work to be carried out).

This applies to all work relating to setting up, commissioning, configuring, programming, modifying the conditions of utilization and operating modes, and to maintenance work.
This manual and the help information must be available close to the device during the performance of all tasks.

2.4.3.   Special safety instructions

♦ Check the correct association of the device and its documentation.

♦ Never detach electrical connections while voltage is applied to them.

♦ Safety devices must be provided to prevent human contact with moving or rotating parts.

♦ Make sure that the device is operated only when it is in perfect condition.

♦ Implement and activate the stipulated safety functions and devices.

♦ Operate the device only with the housing closed.

♦ Make sure that all axes are sufficiently fixed.

♦ Attention during configuration downloads with master - slave couplings (electronic gear, cam)
Deactivate the drive before starting the configuration download: Master and Slave axis

♦ Check that all live terminals are secured against contact. Fatal voltage levels of to 850V occur.

♦ Do not bypass power direct current

Due to movable machine parts and high voltages, the device can pose a lethal danger. Danger of electric shock in the case of non-respect of the following instructions. The device corresponds to DIN EN 61800-3, i.e. it is subject to limited sale. The device can emit disturbances in certain local environments. In this case, the user is liable to take suitable measures.

♦ The device must be permanently grounded due to high earth leakage currents.

♦ The drive motor must be grounded with a suitable protective lead.

♦ The devices are equipped with high voltage DC condensers. Before removing the protective cover, the discharging time must be awaited. After switching off the energy, it may take up to 5 minutes to discharge the capacitors. Danger of electric shock in case of non respect.

♦ Before you can work on the device, the supply voltage must be switched off at the L1, L2 and L3 clamps. Wait at least 3 minutes so that the power direct current may sink to a secure value (<50V). Check with the aid of a voltmeter, if the voltage at the DC+ and DC- clamps has fallen to a value below 50V (not possible on the Compax3M).

♦ Do never perform resistance tests with elevated voltages (over 690V) on the wiring without separating the circuit to be tested from the drive.

♦ In the event of a device exchange it is absolutely necessary to transfer the configuration determining the correct operation of the drive to the device, before the device is put into operation.

♦ The device contains electrostatically sensitive components. Please heed the electrostatic protection measures while working at/with the device as well as during installation and maintenance.

Attention hot surface!

The heat dissipator can reach very high temperatures (>70°C)

Protective covers

The user is responsible for protective covers and/or additional safety measures in order to prevent damages to persons and electric accidents.

2.5   Warranty conditions

◆ The device must not be opened.

◆ Do not make any modifications to the device, except for those described in the manual.

◆ Make connections to the inputs, outputs and interfaces only in the manner described in the manual.

◆ Fix the devices according to our **mounting instructions.** (see page 35)
We cannot provide any guarantee for any other mounting methods.

Note on exchange of options

Compax3 options must be exchanged in the factory to ensure hardware and software compatibility.

◆ When installing the device, make sure the heat dissipators of the device receive sufficient air and respect the recommended mounting distances of the devices with integrated ventilator fans in order to ensure free circulation of the cooling air.

◆ Make sure that the mounting plate is not exposed to external temperature influences.

2.6   Conditions of utilization

2.6.1.   Conditions of utilization for CE-conform operation

- Industry and trade -

The EC guidelines for electromagnetic compatibility 2006/95/EC and for electrical operating devices for utilization within certain voltage limits 2004/108/EC are fulfilled when the following boundary conditions are observed:

Operation of the devices only in the condition in which they were delivered, i.e. with all housing panels.

In order to ensure contact protection, all mating plugs must be present on the device connections even if they are not wired.

Mains filter: A mains filter is required in the mains input line if the motor cable exceeds a certain length. Filtering can be provided centrally at the plant mains input or separately at the mains input to each device or with C3M for each axis combination.

Devices in a commercial and residential area (limit values of Class C2 in accordance with EN 61800-3)

The following mains filters are available for independent utilization:

Device: Compax3	Order No.:	Condition:
S0xxV2	NFI01/01	Only for motor lines > 10m
S1xxV2, S0xxV4, S150V4	NFI01/02	Only for motor lines > 10m
S300V4	NFI01/03	independent of the length of the motor cable (always required)

Industrial area (limit values class C3 in accordance with EN 61800-3)

Longer motor cable lengths are possible in industrial areas.

Connection length: Connection between mains filter and device:

unshielded: < 0.5m
shielded: < 5m (fully shielded on ground – e.g. ground of control cabinet)

Motor and Feedback cable:

Operation of the devices only with motor and feedback cables whose plugs contain a special full surface area screening.

Requirements for Compax3S motor cable

<100 m (the cable must not be rolled up!)
A motor output filter is required for motor cables >20m :

- ◆ MDR01/04 (max. 6.3A rated motor current)
- ◆ MDR01/01 (max. 16A rated motor current)
- ◆ MDR01/02 (max. 30A rated motor current)

Shielding connection of the motor cable

The cable should be fully screened and connected to the Compax3 housing. We offer a special Shield connecting terminal as accessory item (ZBH./...).
The shield of the cable must also be connected with the motor housing. The fixing (via plug or screw in the terminal box) depends on the motor type.

Requirements for encoder cable Compax3:   <100m

Requirements for other cables   Corresponding to the specifications of the terminal clamp with a temperature range of up to 60°C.

Motors: Operation with standard motors.

Control: Use only with aligned controller (to avoid control loop oscillation).

Grounding: Connect the filter housing and the Compax3 to the cabinet frame, making sure that the contact area is adequate and that the connection has low resistance and low inductance.
Never mount the filter housing and the device on paint-coated surfaces!

Cable installation: Signal lines and power lines should be installed as far apart as possible.
Signal leads should never pass close to excessive sources of interference (motors, transformers, contactors etc.).

Accessories: Make sure to use only the accessories recommended by Parker

Connect all cable shields at both ends, ensuring large contact areas!

Warning:

This is a product in the restricted sales distribution class according to EN 61800-3. In a domestic area this product can cause radio frequency disturbance, in which case the user may be required to implement appropriate remedial measures.

2.6.2.   Conditions of utilization for UL certification Compax3S

UL certifiction for Compax3S

conform to UL:	◆ according to UL508C
Certified	◆ E-File_No.: E235 342

The UL certification is documented by a "UL" logo on the device (type specification plate).

"UL" logo

Conditions of utilization

◆ The devices are only to be installed in a degree of contamination 2 environment (maximum).

◆ The devices must be appropriately protected (e.g. by a switching cabinet).

◆ The X2 terminals are not suitable for field wiring.

◆ Tightening torque of the field wiring terminals (green Phoenix plugs)

◆ C3S0xxV2	0.57 - 0.79Nm	5 - 7Lb.in
◆ C3S1xxV2, C3S0xxV4, C3S150V4	0.57 - 0.79Nm	5 - 7Lb.in
◆ C3S300V4	1.25 - 1.7Nm	11 - 15Lb.in

◆ Temperature rating of field installed conductors shall be at least 60°C Use copper lines only
Please use the cables described in the accessories chapter, they do have a temperature rating of at least 60°C.

◆ Maximum ambient temperature: 45°C.

◆ Suitable for use on a circuit capable of delivering not more than 5000 rms symmetrical amperes and 480 volts maximum.

ATTENTION
Danger of electric shock.
Discharge time of the bus capacitator is 5 minutes.

◆ The drive provides internal motor overload protection.
This must be set so that 200% of the motor nominal current are not exceeded.

◆ Cable cross-sections

 ◆ Mains input: corresponding to the recommended fuses.

 ◆ Motor cable: corresponding to the **nominal output currents** (see page 39)

 ◆ Maximum cross-section limited by the terminals mm^2 / AWG

◆ C3S0xxV2	2.5mm^2	AWG 12
◆ C3S1xxV2, C3S0xxV4, C3S150V4	4.0mm^2	AWG 10
◆ C3S300V4	6.0mm^2	AWG 7

◆ Fuses
In addition to the main fuse, the devices must be equipped with a S 201 K or S 203 K fuse made by ABB.

- ◆ C3S025V2: ABB, nominal 480V 10A, 6kA
- ◆ C3S063V2: ABB, nominal 480V, 16A, 6kA
- ◆ C3S100V2: ABB, nominal 480V, 16A, 6kA
- ◆ C3S150V2: ABB, nominal 480V, 20A, 6kA
- ◆ C3S015V4: ABB, nominal 480V, 6A, 6kA
- ◆ C3S038V4: ABB, nominal 480V, 10A, 6kA
- ◆ C3S075V4: ABB, nominal 480V, 16A, 6kA
- ◆ C3S150V4: ABB, nominal 480V, 20A, 6kA
- ◆ C3S300V4: ABB, nominal 480V, 25A, 6kA

2.6.3.   Current on the mains PE (leakage current)

⚠ This product can cause a direct current in the protective lead. If a residual current device (RCD) is used for protection in the event of direct or indirect contact, only a type B (all current sensitive) RCD is permitted on the current supply side of this product . On the other hand a different protective measure must be taken, such as for example separation from the environment by double or enforced insulation or separation from the supply network by a transformer.
Please heed the connection instructions of the RCD supplier.
Mains filters do have high leakage currents due to their internal capacity. An internal mains filter is usually integrated into the Compax3 servo controllers. Additional leakage currents are caused by the capacities of the motor cable and of the motor windings. Due to the high clock frequency of the power output stage, the leakage currents do have high-frequency components. Please check if the FI protection switch is suitable for the individual application.
If an external mains filter is used, an additional leakage current will be produced.
The figure of the leakage current depends on the following factors:

- Length and properties of the motor cable
- Switching frequency
- Operation with or without external mains filter
- Motor cable with or without shield network
- Motor housing grounding (how and where)

Remark:

- The leakage current is important with respect to the handling and usage safety of the device.
- A pulsing leakage current occurs if the supply voltage is switched on.

Please note:

The device must be operated with effective grounding connection, which must comply with the local regulations for high leakage currents (>3.5mA).
Due to the high leakage currents it is not adviseable to operate the servo controller with an earth leakage circuit breaker.

2.6.4.   Supply networks

The Compax3 servo controller series is designed for fixed connection to TN networks (TN-C, TN-C-S or TN-S). Please note that the line-earth voltage may not exceed 300VAC.

◆ When grounding the neutral conductor, mains voltages of up to 480VAC are permitted.
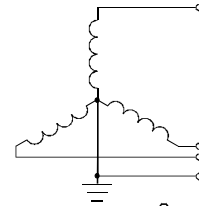
◆ When grounding an external conductor (delta mains, two-phase mains), mains voltages (external conductor voltages) of up to 300VAC are permitted.
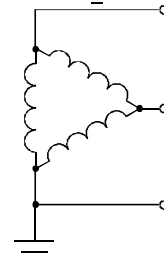
Servo controllers which are to be connected to an IT network must be provided with a separating transformer. Then the Compax3 device is operated locally like in a TN network. The secondary sided center of the separating transformer must be grounded and connected to the PE connector of the Compax3.

2.7   Manufacturer's Declaration of Conformity

As defined by the EC Electromagnetic Compatibility (EMC) Directive 89/336/EEC and

the EC Directive relating to electrical equipment designed for use within
certain voltage limits (Low Voltage Directive)
73/23/EEC

We (the manufacturer)

Parker Hannifin GmbH & Co.KG

hereby declare that the product(s) listed below:

Device type: Intelligent servo drives

Device model: Compax3

to which this declaration relates, including the product model placed on the market by us, have been designed and manufactured in conformity with the essential requirements of the Standards and other Normative Documents listed in the following.

Applied harmonized Standards, especially:

Electromagnetic Compatibility
EN 61 800-3 **VDE 0160 part 100**	EMC product standard for adjustable speed electrical power drive systems including special testing procedures

Safety
EN 50 178/ **VDE 0160**	Electronic equipment for use in power installations.

Caution!

The present Manufacturer's Declaration of Conformity is valid only if the master conditions for operation described in the "Conditions of Use" section have been met.
In the case of non-conformity with these conditions or upon modification of the product, the present declaration will become invalid.

3. Compax3 device description

3.1   State of delivery

Compax3 is delivered without configuration!
After switching on the 25VDC supply, the red LED is flashing while the green LED
is dark.
Please configure the device with the help of the Windows-Software "Compax3 –
ServoManager"!

3.2   Meaning of the status LEDs - Compax3 axis controller

Device status LEDs	Right LED (red)	Left LED (green)
Voltages missing	off	off
During the booting sequence	alternately flashing	
No configuration present. SinCos© feedback not detected. Compax3 IEC61131-3 program not compatible with Compax3 Firmware. no Compax3 IEC61131-3 program For F12: Hall signals invalid.	Flashes slowly	off
Axis without current excitation	off	Flashes slowly
Power supplied to axis; commutation calibration running	off	Flashes quickly
Axis with current excitation	off	on
Axis in fault status / fault present / axis energized (error reaction 1)	Flashes quickly	on
Axis in fault status / fault present / axis deenergized (error reaction 2)	on	off
Compax3 faulty: Please contact us.	on	on

3.3   Connections of Compax3S

3.3.1.   Compax3S connectors
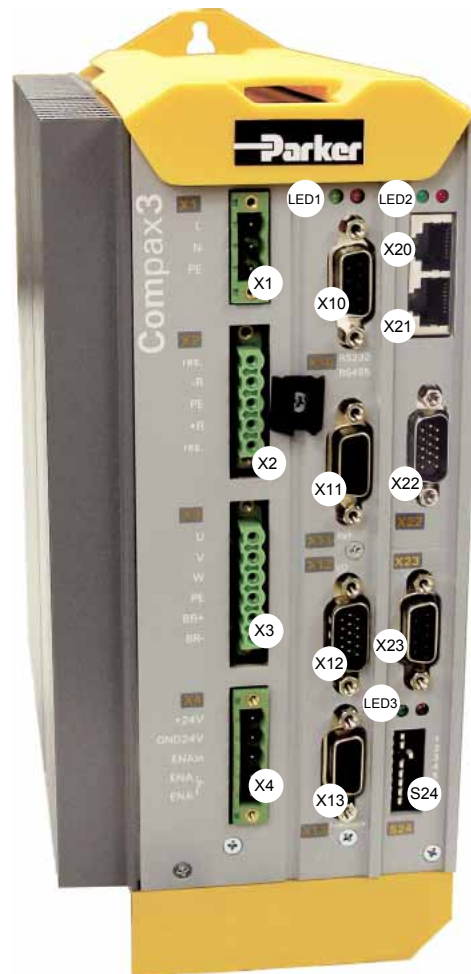
X1	AC Supply	X20	HEDA in (Option)	
X2	Ballast / DC power voltage	X21	HEDA out (Option)	
X3	Motor / Brake	X22	Inputs Outputs (Option M10/12)	
X4	24VDC / Enable	X23	Bus (Option)	connector type depends on the bus system!
X10	RS232/RS485	S24	bus settings	
X11	Analog/Encoder	LED1	Device status LEDs	
X12	Inputs/Outputs	LED2	HEDA LEDs	
X13	Motor position feedback	LED3	Bus LEDs	

⚡ **Always switch devices off before wiring them!**

Dangerous voltages are still present until 5 minutes after switching off the power supply!

⚡ **Caution!**

When the control voltage is missing there is no indication whether or not high voltage supply is available.

⚠ **PE connection**

The PE connection is made with 10mm^2 via a grounding screw at the bottom of the device.

⚠ **Attention hot surface!**

The heat dissipator can reach very high temperatures (>70°C)

Line cross sections of the line connections X1, X2, X3

Compax3 device:	Cross-section: Minimum... Maximum[mm^2]
S025V2, S063V2	0,25 ... 2.5 (AWG: 24 ... 12)
S100V2, S150V2 S015V4, S038V4, S075V4, S150V4	0,25 ... 4 (AWG: 24 ... 10)
S300V4	0,5 ... 6 (AWG: 20 ... 7)

3.3.2. Connector and pin assignment C3S

Overview:

Further information on the assignment of the plug mounted at the particular device can be found below!

In detail: The fitting of the different plugs depends on the extension level of Compax3. In part, the assignment depends on the Compax3 option implemented.

Compax3 1AC Power supply

X1

X1/1	L	
X1/2	N	
X1/3	PE	

X10: RS485 vierdraht

RS485 +5V	X10/1
RxD	X10/2
TxD/	X10/3
res.	X10/4
GND	X10/5
res.	X10/6
TxD	X10/7
RxD/	X10/8
+5V	X10/9

X10: RS485 zweidraht

RS485 +5V	X10/1
res.	X10/2
TxD_RxD/	X10/3
res.	X10/4
GND	X10/5
res.	X10/6
TxD_RxD/	X10/7
res.	X10/8
+5V	X10/9

X10: RS232

EnableRS232 0V	X10/1
RxD	X10/2
TxD	X10/3
DTR	X10/4
GND	X10/5
DSR	X10/6
RTS	X10/7
CTS	X10/8
+5V	X10/9

X20: HEDA in — option M11 (M10=+I/Os)

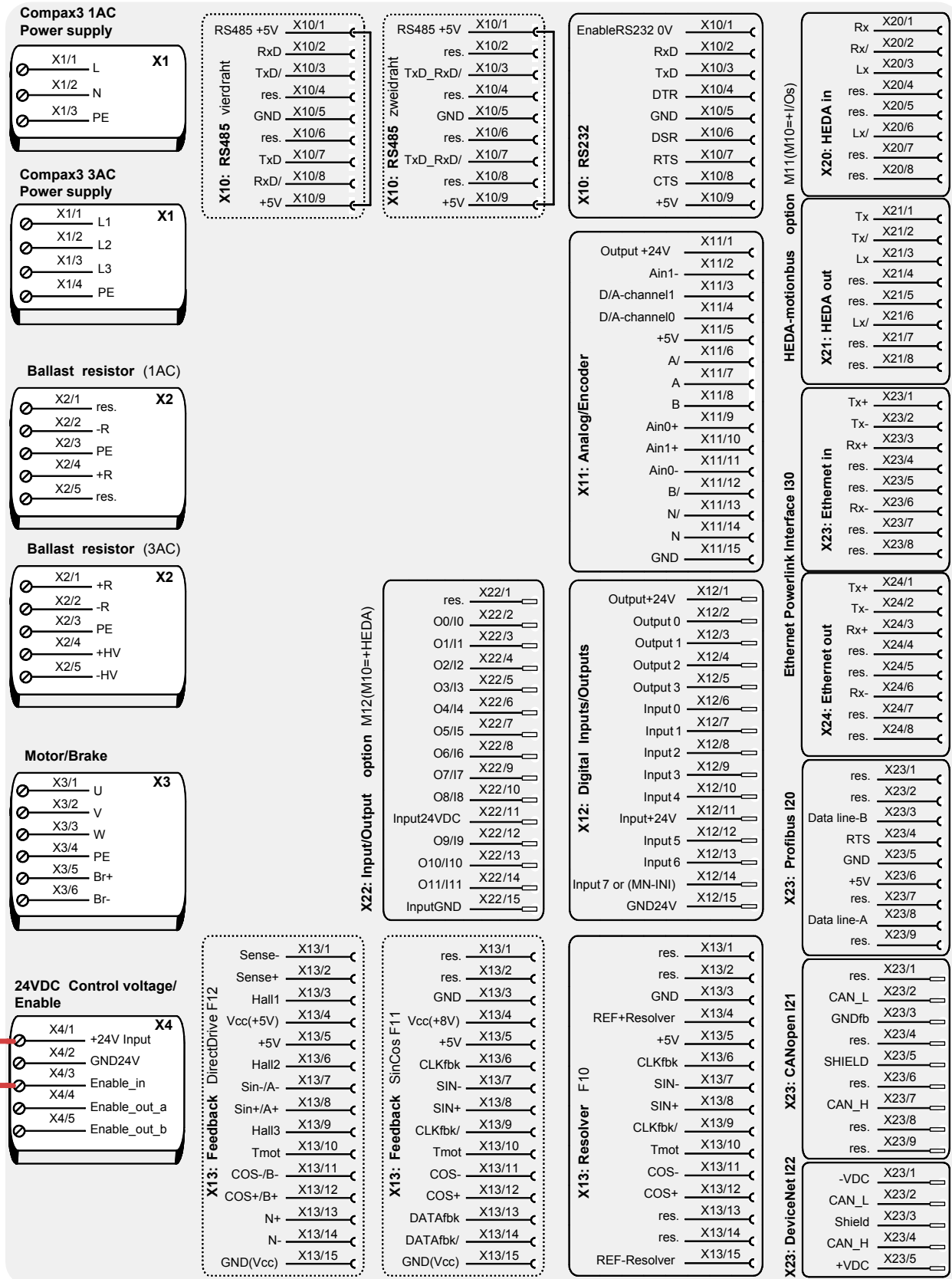|	
Rx	X20/1
Rx/	X20/2
Lx	X20/3
res.	X20/4
res.	X20/5
Lx/	X20/6
res.	X20/7
res.	X20/8

Compax3 3AC Power supply

X1

X1/1	L1	
X1/2	L2	
X1/3	L3	
X1/4	PE	

X11: Analog/Encoder

Output +24V	X11/1
Ain1-	X11/2
D/A-channel1	X11/3
D/A-channel0	X11/4
+5V	X11/5
A/	X11/6
A	X11/7
B	X11/8
Ain0+	X11/9
Ain1+	X11/10
Ain0-	X11/11
B/	X11/12
N/	X11/13
N	X11/14
GND	X11/15

X21: HEDA out — HEDA-motionbus

Tx	X21/1
Tx/	X21/2
Lx	X21/3
res.	X21/4
res.	X21/5
Lx/	X21/6
res.	X21/7
res.	X21/8

Ballast resistor (1AC)

X2

X2/1	res.	
X2/2	-R	
X2/3	PE	
X2/4	+R	
X2/5	res.	

X23: Ethernet in — Ethernet Powerlink Interface I30

Tx+	X23/1
Tx-	X23/2
Rx+	X23/3
res.	X23/4
res.	X23/5
Rx-	X23/6
res.	X23/7
res.	X23/8

Ballast resistor (3AC)

X2

X2/1	+R	
X2/2	-R	
X2/3	PE	
X2/4	+HV	
X2/5	-HV	

X22: Input/Output — option M12(M10=+HEDA)

res.	X22/1
O0/I0	X22/2
O1/I1	X22/3
O2/I2	X22/4
O3/I3	X22/5
O4/I4	X22/6
O5/I5	X22/7
O6/I6	X22/8
O7/I7	X22/9
O8/I8	X22/10
Input24VDC	X22/11
O9/I9	X22/12
O10/I10	X22/13
O11/I11	X22/14
InputGND	X22/15

X12: Digital Inputs/Outputs

Output+24V	X12/1
Output 0	X12/2
Output 1	X12/3
Output 2	X12/4
Output 3	X12/5
Input 0	X12/6
Input 1	X12/7
Input 2	X12/8
Input 3	X12/9
Input 4	X12/10
Input+24V	X12/11
Input 5	X12/12
Input 6	X12/13
Input 7 or (MN-INI)	X12/14
GND24V	X12/15

X24: Ethernet out

Tx+	X24/1
Tx-	X24/2
Rx+	X24/3
res.	X24/4
res.	X24/5
Rx-	X24/6
res.	X24/7
res.	X24/8

X23: Profibus I20

res.	X23/1
res.	X23/2
Data line-B	X23/3
RTS	X23/4
GND	X23/5
+5V	X23/6
res.	X23/7
Data line-A	X23/8
res.	X23/9

Motor/Brake

X3

X3/1	U	
X3/2	V	
X3/3	W	
X3/4	PE	
X3/5	Br+	
X3/6	Br-	

X13: Feedback DirectDrive F12

Sense-	X13/1
Sense+	X13/2
Hall1	X13/3
Vcc(+5V)	X13/4
+5V	X13/5
Hall2	X13/6
Sin-/A-	X13/7
Sin+/A+	X13/8
Hall3	X13/9
Tmot	X13/10
COS-/B-	X13/11
COS+/B+	X13/12
N+	X13/13
N-	X13/14
GND(Vcc)	X13/15

X13: Feedback SinCos F11

res.	X13/1
res.	X13/2
GND	X13/3
Vcc(+8V)	X13/4
+5V	X13/5
CLKfbk	X13/6
SIN-	X13/7
SIN+	X13/8
CLKfbk/	X13/9
Tmot	X13/10
COS-	X13/11
COS+	X13/12
DATAfbk	X13/13
DATAfbk/	X13/14
GND(Vcc)	X13/15

X13: Resolver F10

res.	X13/1
res.	X13/2
GND	X13/3
REF+Resolver	X13/4
+5V	X13/5
CLKfbk	X13/6
SIN-	X13/7
SIN+	X13/8
CLKfbk/	X13/9
Tmot	X13/10
COS-	X13/11
COS+	X13/12
res.	X13/13
res.	X13/14
REF-Resolver	X13/15

X23: CANopen I21

res.	X23/1
CAN_L	X23/2
GNDfb	X23/3
res.	X23/4
SHIELD	X23/5
res.	X23/6
CAN_H	X23/7
res.	X23/8
res.	X23/9

24VDC Control voltage/ Enable

X4

X4/1	+24V Input	
X4/2	GND24V	
X4/3	Enable_in	
X4/4	Enable_out_a	
X4/5	Enable_out_b	

X23: DeviceNet I22

-VDC	X23/1
CAN_L	X23/2
Shield	X23/3
CAN_H	X23/4
+VDC	X23/5

The jumper drawn in at X4 (at the left side in red) is used to enable the device for testing purposes.

During operation, the enable input is in most cases swtiched externally.

3.3.3.   Control voltage 24VDC / enable connector X4 C3S

PIN	Description
1	+24V (supply)
2	Gnd24 V
3	Enable_in
4	Enable_out_a
5	Enable_out_b

Line cross sections:
minimum: 0.25mm^2
maximum: 2.5mm^2
(AWG: 24 ... 12)

Control voltage 24VDC Compax3S and Compax3H

Controller type	Compax3
Voltage range	21 - 27VDC
Mains module	with switch-on current limitation, due to capacitive load
Fuse	MCB miniature circuit breaker or "delayed action fuse", due to capacitive load
Current drain of the device	0.8A
Total current drain	0.8 A + Total load of the digital outputs + current for the motor holding brake
Ripple	0.5Vpp
Requirement according to safe extra low voltage (SELV)	yes
Short-circuit proof	conditional (internally protected with 3.15AT)

Hardware - enable (input X4/3 = 24VDC)

This input is used as safety interrupt for the power output stage.
Tolerance range: 18.0V - 33.6V / 720Ω

Safe standstill (X4/3=0V)

For implementation of the "Safe standstill" safety feature in accordance with the "protection against unexpected start-up" described in EN1037. Observe instructions in the corresponding section with the circuitry examples!
The energy supply to the drive is reliably shut off, the motor has no torque.
A relay contact is located between X4/4 and X4/5 (normally closed contact)

Enable_out_a - Enable_out_b	Power output stage is
Contact opened	activated
Contact closed	disabled

Series connection of these contacts permits certain determination of whether all drives are de-energized.

Relay contact data:

Switching voltage (AC/DC): 100mV -60V
Switching current: 10mA - 0.3A
Switching power: 1mW...7W

3.3.4.   Motor / Motor brake (C3S connector X3)
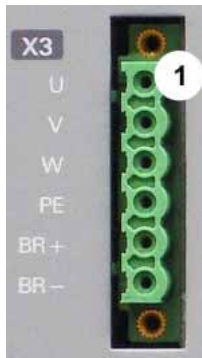
PIN	Designation	
1	U (motor)	
2	V (motor)	
3	W (motor)	
4	PE (motor)	
5	BR+	Motor holding brake *
6	BR-	Motor holding brake *

*** Please note that Compax3 will report error "open circuit at holding brake"
(5481h / 2163d) if the current is < 150mA.
If needs be, use a parallel resistor of 150Ohm for relay control!**
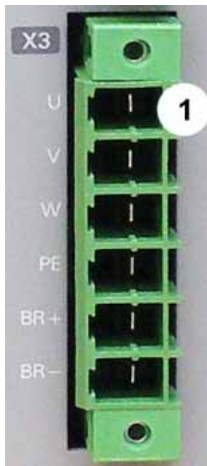
Requirements for motor cable

<100 m (the cable must not be rolled up!)
A motor output filter is required for motor cables >20m :

Shielding connection of the motor cable

The cable should be fully screened and connected to the Compax3 housing. We offer a special Shield connecting terminal as accessory item (ZBH./...).
The shield of the cable must also be connected with the motor housing. The fixing (via plug or screw in the terminal box) depends on the motor type.

⚠ **Motor holding brake!**

Connect the brake only on motors which have a holding brake! Otherwise make no brake connections at all.

Requirements cables for motor holding brake

If a motor holding brake is present, **a cable** of the motor holding brake must be fed on the device side through the toroidal core ferrite provided as accessory ZBH0x/xx (63Ω @1MHz, di=5.1mm), in order to ensure error-free switching on and off of the motor holding brake.

Motor holding brake output

Motor holding brake output	Compax3
Voltage range	21 – 27VDC
Maximum output current (short circuit proof)	1.6A
Minimum output current	150 mA

Motor cable

3.3.5.   C3Sxxx V2

3.3.5.1   Main voltage supply C3S connector X1

Device protection

By cyclically switching on and off the power voltage, the input current limitation can be overloaded, which will cause a device error.

Therefore please wait at least 2 minutes after switching off before you switch the device on again!

Power supply plug X1 for 1 AC 230VAC/240VAC devices
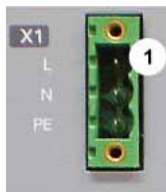
PIN	Designation
1	L
2	N
3	PE

Mains connection Compax3S0xxV2 1AC

Controller type	S025V2	S063V2
Supply voltage	Single phase 230VAC/240VAC 80-253 VAC/50-60Hz	
Input current	6Aeff	13Aeff
Maximum fuse rating per device (=short circuit rating)	10 A (MCB miniature circuit breaker)	16 A (MCB miniature circuit breaker)

Always switch devices off before wiring them!

Dangerous voltages are still present until 5 minutes after switching off the power supply!

Power supply plug X1 for 3AC 230VAC/240VAC devices

PIN	Designation
1	L1
2	L2
3	L3
4	PE

Mains connection Compax3S1xxV2 3AC

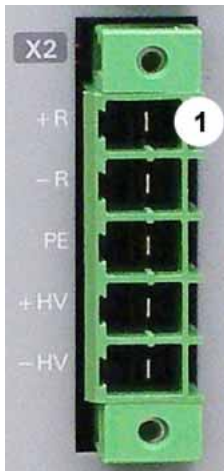| Controller type	S100V2	S150V2
Supply voltage	Three phase 3* 230VAC/240VAC 80-253 VAC/50-60Hz	
Input current	10Aeff	13Aeff
Maximum fuse rating per device (=short circuit rating)	16 A (MCB miniature circuit breaker)	20 A (MCB miniature circuit breaker)

Caution!

The 3AC V2 – devices must only be operated with three phases!

⚡ **Always switch devices off before wiring them!**

Dangerous voltages are still present until 5 minutes after switching off the power supply!

3.3.5.2	Braking resistor / high voltage DC C3S connector X2

In this chapter you can read about:

The energy generated during braking operation is absorbed by the Compax3 storage capacity.
If this capacity is too small, the braking energy must be drained via a braking resistor.

Braking resistor / high voltage supply plug X2 for 1AC 230VAC/240VAC devices
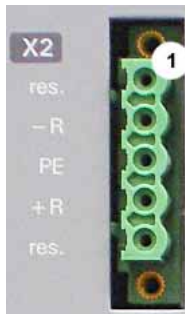
PIN	Designation
1	Reserved
2	- braking resistor (not short-circuit protected!)
3	PE
4	+ braking resistor (not short-circuit protected!)
5	Reserved

Braking operation Compax3S0xxV2 1AC

Controller type	S025V2	S063V2
Capacitance / storable energy	560μF / 15Ws	1120μF / 30Ws
Minimum braking- resistance	100Ω	56Ω
Recommended nominal power rating	20 ... 60W	60 ... 180W
Maximum continuous current	8A	15A

Caution!

The power voltage DC of two Compax3 1AC V2 devices (230VAC/240VAC devices) must not be connected.

Braking resistor / high voltage supply plug X2 for 3AC 230VAC/240VAC devices
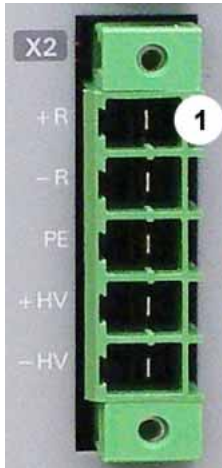
PIN	Description	
1	+ Braking resistor	no short-circuit protection!
2	- Braking resistor	
3	PE	
4	+ DC high voltage supply	
5	- DC high voltage supply	

Braking operation Compax3S1xxV2 3AC

Controller type	S100V2	S150V2
Capacitance / storable energy	780µF / 21Ws	1170µF / 31Ws
Minimum braking- resistance	22Ω	15Ω
Recommended nominal power rating	60 ... 450W	60 ... 600W
Maximum continuous current	20A	20A

Connection of a braking resistor

Mimimum line cross section: 1.5mm^2
Maximum line length: 2m
Maximum output voltage: 400VDC

3.3.6.   C3Sxxx V4

3.3.6.1   Power supply connector X1 for 3AC 400VAC/480VAC-C3S devices

Device protection

By cyclically switching on and off the power voltage, the input current limitation can be overloaded, which will cause a device error.

Therefore please wait at least 2 minutes after switching off before you switch the device on again!

PIN	Designation
1	L1
2	L2
3	L3
4	PE

Mains connection Compax3SxxxV4 3AC

Controller type	S015V4	S038V4	S075V4	S150V4	S300V4
Supply voltage	Three phase 3*400VAC/480VAC 80-528VAC / 50-60Hz				
Input current	3Aeff	6Aeff	10Aeff	16Aeff	22Aeff
Maximum fuse rating per device(=short circuit rating)	6A	10A	16A	20A	25A
	MCB miniature circuit breaker				D*

* for **UL conform operation** (see page 15): MCB miniature circuit breaker S273-K.

Caution!

The 3AC V4 – devices must only be operated with three phases!

⚠ **Always switch devices off before wiring them!**

Dangerous voltages are still present until 5 minutes after switching off the power supply!

3.3.6.2 Braking resistor / high voltage supply connector X2 for 3AC 400VAC/480VAC_C3S devices

PIN	Description	
1	+ Braking resistor	no short-circuit protection!
2	- Braking resistor	
3	PE	
4	+ DC high voltage supply	
5	- DC high voltage supply	

Braking operation Compax3SxxxV4 3AC

Controller type	S015V4	S038V4	S075V4	S150V4	S300V4
Capacitance / storable energy	235μF / 37Ws	235μF / 37Ws	470μF / 75Ws	690μF / 110Ws	1100μF / 176Ws
Minimum braking- resistance	100Ω	100Ω	56Ω	33Ω	15Ω
Recommended nominal power rating	60 ... 100W	60 ... 250W	60 ... 500 W	60 ... 1000 W	60 ... 1000 W
Maximum continuous current	10A	10A	15A	20A	30A

Connection of a braking resistor

Mimimum line cross section: $1.5mm^2$
Maximum line length: 2m
Maximum output voltage: 800VDC

3.3.6.3 Connection of the power voltage of 2 C3S 3AC devices

Caution!

> **The power voltage DC of the single phase Compax3 servo axes must not be connected!**

In order to improve the conditions during brake operation, the DC power voltage of 2 servo axes may be connected.
The capacity as well as the storable energy are increased; furthermore the braking energy of one servo axis may be utilized by a second servo axis, depending on the application.

⚠️ **It is not permitted to connect the power voltage in order to use one brake circuit for two servo axes, as this function cannot be ensured reliably.**

Note the following:

Caution! In case of non-compliance with the following instructions, the device may be destroyed!

◆ You can only connect two similar servo axes (same power supply; same rated currents)

◆ Connected servo axes must always be fed separately via the AC power supply.

If the external pre-fuse of one of the servo axes takes action, the second servo axis must also be disconnected automatically.

Please connect as follows:

Servo axis 1 X2/4 to servo axis 2 X2/4
Servo axis 1 X2/5 to servo axis 2 X2/5

3.4   Signal interfaces

3.4.1.   RS232 / RS485 interface (plug X10)

Interface selectable by contact functions assignment of X10/1:
X10/1=0V RS232
X10/1=5V RS485

PIN X10	RS232 (Sub D)
1	(Enable RS232) 0V
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	+5V

RS485 2-wire

PIN X10	RS485 two wire (Sub D) Pin 1 and 9 jumpered externally
1	Enable RS485 (+5V)
2	res.
3	TxD_RxD/
4	res.
5	GND
6	res.
7	TxD_RxD
8	res.
9	+5V

RS485 4-wire

PIN X10	RS485 four wire (Sub D) Pin 1 and 9 externally jumpered
1	Enable RS485 (+5V)
2	RxD
3	TxD/
4	res.
5	GND
6	res.
7	TxD
8	RxD/
9	+5V

USB - RS232/RS485 converter

The following USB - RS232 converters were tested:
◆ ATEN UC 232A
◆ USB GMUS-03 (available under several company names)
◆ USB / RS485: **Moxa Uport 1130** http://www.moxa.com/product/UPort_1130.htm
◆ Ethernet/RS232/RS485: **NetCom 113** http://www.vscom.de/666.htm

3.4.2.   Resolver / Feedback (connector X13)

PIN X13	Feedback /X13 High Density /Sub D (depending on the Feedback module)		
	Resolver (F10)	SinCos (F11)	EnDat 2.1 (F12)
1	Reserved	Reserved	Sense -*
2	Reserved	Reserved	Sense +*
3	GND	GND	Reserved
4	REF-Resolver+	Vcc (+8V)	Vcc (+5V) * max. 350mA load
5	+5V (for temperature sensor)		
6	Reserved	Reserved	CLKfbk
7	SIN-	SIN-	SIN- / A- (Encoder)
8	SIN+	SIN+	SIN+ / A+ (Encoder)
9	Reserved	Reserved	CLKfbk/
10	Tmot*	Tmot*	Tmot*
11	COS-	COS-	COS- / B- (Encoder)
12	COS+	COS+	COS+ / B+ (Encoder)
13	Reserved	DATAfbk	DATAfbk
14	Reserved	DATAfbk/	DATAfbk/
15	REF-Resolver-	GND (Vcc)	GND (Vcc)

*X13 Pin10 Tmot may not be connected at the same time as X15 (on Compaxx3M).

Resolver cables can be found in the accessories chapter of the device description.
SinCos© - cables can be found in the accessories chapter of the device description.
EnDat cable GBK38 can be found in the accessories chapter of the device description

PIN X13	Feedback /X13 High Density /Sub D
	Direct drives (F12)
1	Sense -*
2	Sense +*
3	Hall1 (digital)
4	Vcc (+5V) * max. 350mA load
5	+5V (for temperature<and_Hall sensors>)
6	Hall2 (digital)
7	SIN-, A- (Encoder) or analog Hall sensor
8	SIN+, A+, (Encoder) or analog Hall sensor
9	Hall3 (digital)
10	Tmot*
11	COS-, B- (Encoder) or analog Hall sensor
12	COS+, B+ (Encoder) or analog Hall sensor
13	N+
14	N-
15	GND (Vcc)

*X13 Pin10 Tmot may not be connected at the same time as X15 (on Compaxx3M).

Note on F12:

*+5V (Pin 4) is measured and controlled directly at the end of the line via Sense – and Sense +.
Maximum cable length: 100m

Caution!

♦ Pin 4 and Pin 5 must under no circumstances be connected!

♦ Plug in or pull out feedback connector only in switched off state (24VDC switched off).

3.4.3.   Analog / Encoder (plug X11)

PIN X11	Reference High Density Sub D	Encoder	SSI
		Encoder	SSI
1	+24V (output) max. 70mA		
2	Ain1 -: analog input - (14Bit; max. +/-10V)		
3	D/A monitor channel 1 (±10V, 8-bit resolution)		
4	D/A monitor channel 0 (±10V, 8-bit resolution)		
5	+5V (output for encoder) max. 150mA		
6	- Input: steps RS422 (5V - level)	**A/** (Input / simulation)	Clock-
7	+ Input: steps RS422 (5V - level)	**A** (Input / simulation)	Clock+
8	+ Input: direction RS422 (5V - level)	**B** (Input / simulation)	
9	Ain0 +: analog input + (14Bit; max. +/-10V)		
10	Ain1 +: analog input + (14Bit; max. +/-10V)		
11	Ain0 -: analog input - (14Bit; max. +/-10V)		
12	- Input: direction RS422 (5V - level)	**B/** (Input / simulation)	
13	Reserved	**N/** (Input / simulation)	DATA-
14	Reserved	**N** (Input / simulation)	DATA+
15	GND		

Technical data X11 (see page 42)

3.4.3.1   Wiring of analog interfaces

Output
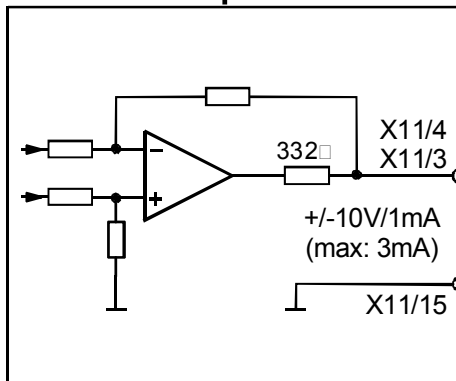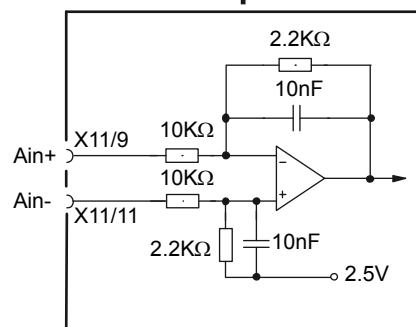
Input

Please note: with Ain- on earth and Ain+ open, 2.02V are read in.

Structure image of the internal signal processing of the analog inputs Ain1 (X11/10 and X11/2) has the same wiring!

3.4.3.2   Connections of the encoder interface
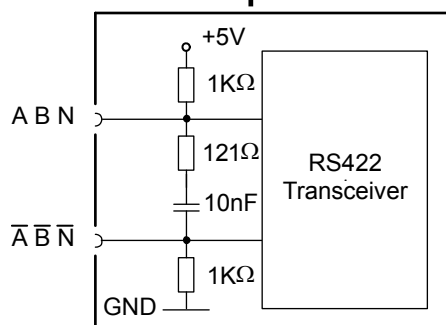
The input connection is available in triple (for A & /A, B & /B, N & /N)

3.4.4.   Digital inputs/outputs (plug X12)

X12 Pin	Input/output	I/O /X12 High density/Sub D
1	Output	+24VDC output (max. 340mA)
2	O0	Output 0 (max. 100mA)
3	O1	Output 1 (max. 100mA)
4	O2	Output 2 (max. 100mA)
5	O3	Output 3 (max. 100mA)
6	I0	Input 0
7	I1	Input 1
8	I2	Input 2
9	I3	Input 3
10	I4	Input 4
11	E	24V input for the digital outputs Pins 2 to 5
12	I5	Input 5
13	I6	Input 6
14	I7	Input 7
15	Output	Gnd 24 V

All inputs and outputs have 24V level.
The exact assignment depends on the the device type!
You will find the description of the device-specific assignment in the online help which can be opened from the Compax3 – ServoManager.
Maximum capacitive loading of the outputs: 50nF (max. 4 Compax3 inputs).

3.4.4.1   Connection of the digital Outputs/Inputs

Wiring of digital outputs

Status of digital inputs
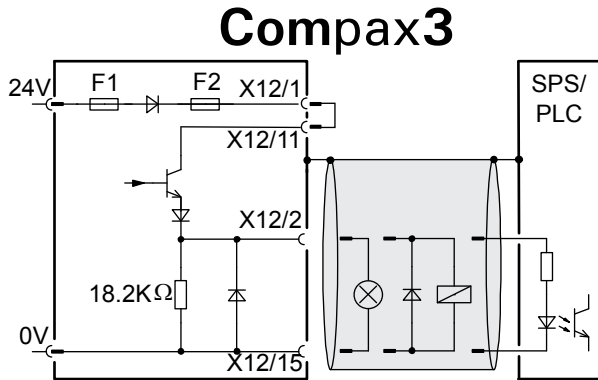
The circuit example is valid for all digital outputs!
The outputs are short circuit proof; a short circuit generates an error.
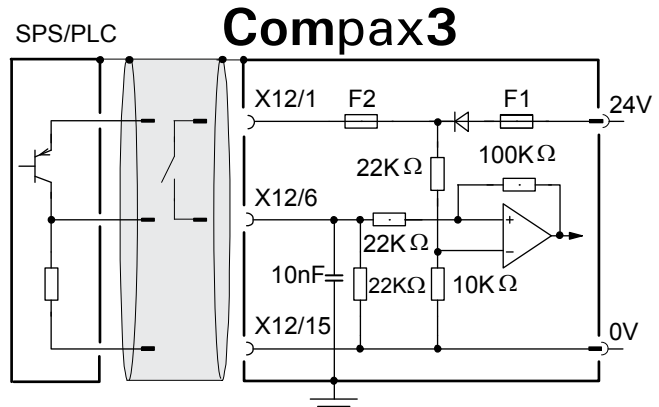
The circuit example is valid for all digital inputs!
Signal level:

◆ > 9.15V = "1" (38,2% of the control voltage applied)

◆ > 8.05V = "0" (33.5% of the control voltage applied)

F1: delayed action fuse
F2: quick action electronic fuse; can be reset by switching the 24VDC supply off and on again.

3.5   Installation and dimensions Compax3

3.5.1.   Mounting and dimensions Compax3S0xxV2
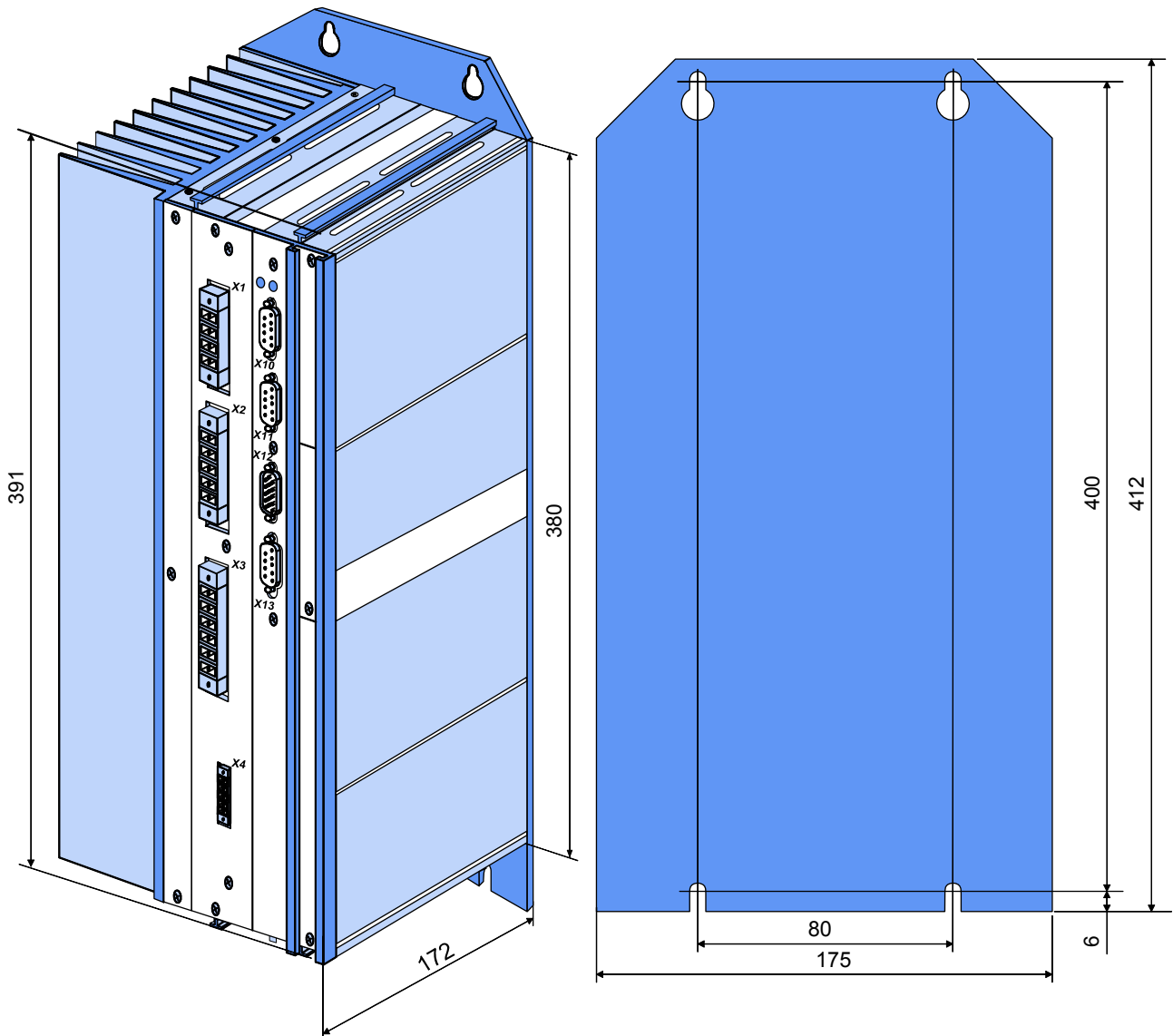
Mounting:

3 socket head screws M5
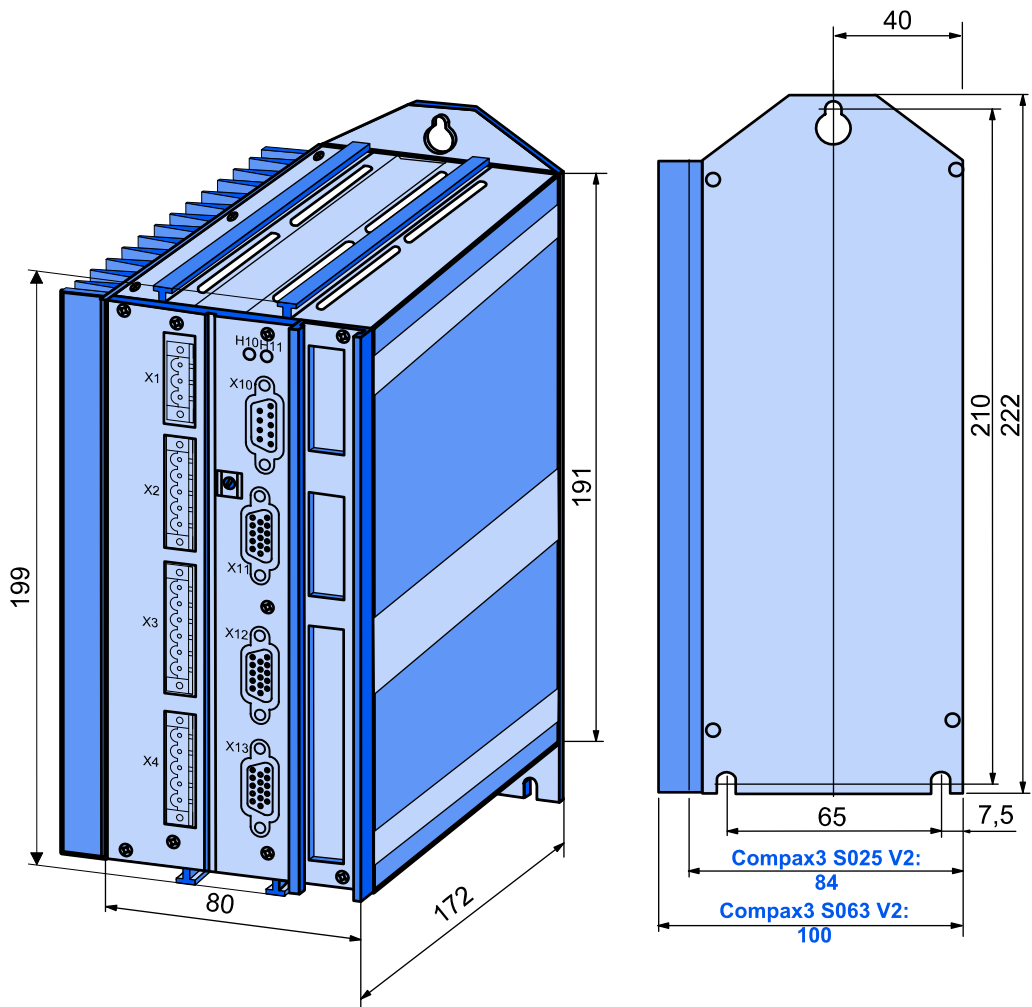
Please respect an appropriate mounting gap in order to ensure sufficient convection:

◆ At the side: 15mm

◆ At the top and below: at least 100mm

3.5.2.   Monting and dimensions Compax3S100V2 and S0xxV4

Mounting:

3 socket head screws M5
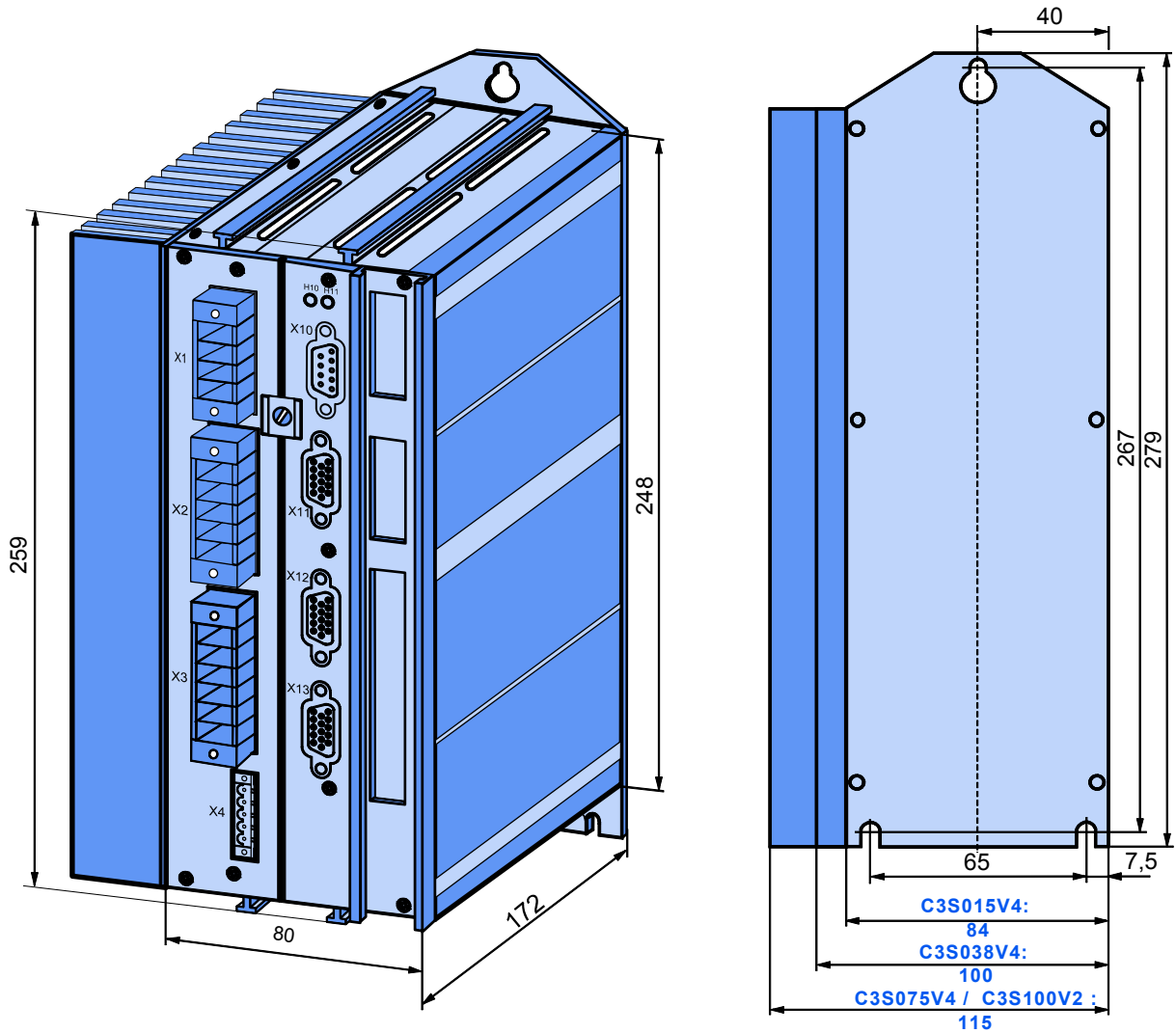
Please respect an appropriate mounting gap in order to ensure sufficient convection:

◆ At the side: 15mm

◆ At the top and below: at least 100mm

3.5.3.   Mounting and dimensions Compax3S150V2 and S150V4

Mounting:

4 socket head screws M5
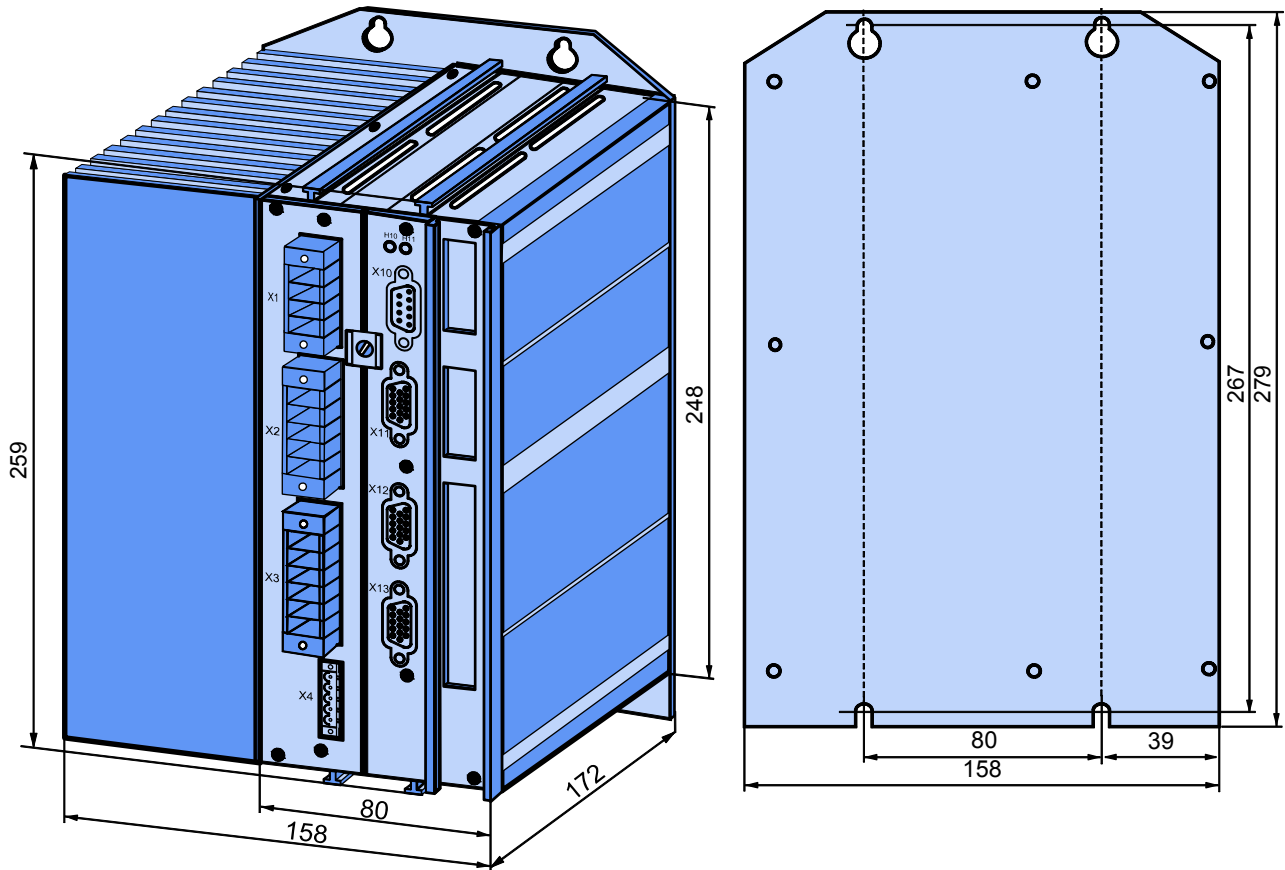
Please respect an appropriate mounting gap in order to ensure sufficient convection:

♦ At the side: 15mm

♦ At the top and below: at least 100mm

3.5.4.   Mounting and dimensions Compax3S300V4

Mounting:

4 socket head screws M5

Please respect an appropriate mounting gap in order to ensure sufficient convection:

◆ At the side: 15mm

◆ At the top and below: at least 100mm

Compax3S300V4 is force-ventilated via a fan integrated into the heat dissipator!

4. Specifications

Mains connection Compax3S0xxV2 1AC

Controller type	S025V2	S063V2
Supply voltage	Single phase 230VAC/240VAC 80-253 VAC/50-60Hz	
Input current	6Aeff	13Aeff
Maximum fuse rating per device (=short circuit rating)	10 A (MCB miniature circuit breaker)	16 A (MCB miniature circuit breaker)

Mains connection Compax3S1xxV2 3AC

Controller type	S100V2	S150V2
Supply voltage	Three phase 3* 230VAC/240VAC 80-253 VAC/50-60Hz	
Input current	10Aeff	13Aeff
Maximum fuse rating per device (=short circuit rating)	16 A (MCB miniature circuit breaker)	20 A (MCB miniature circuit breaker)

Mains connection Compax3SxxxV4 3AC

Controller type	S015V4	S038V4	S075V4	S150V4	S300V4
Supply voltage	Three phase 3*400VAC/480VAC 80-528VAC / 50-60Hz				
Input current	3Aeff	6Aeff	10Aeff	16Aeff	22Aeff
Maximum fuse rating per device(=short circuit rating)	6A	10A	16A	20A	25A
	MCB miniature circuit breaker				D*

* for **UL conform operation** (see page 15): MCB miniature circuit breaker S273-K.

Control voltage 24VDC Compax3S and Compax3H

Controller type	Compax3
Voltage range	21 - 27VDC
Mains module	with switch-on current limitation, due to capacitive load
Fuse	MCB miniature circuit breaker or "delayed action fuse", due to capacitive load
Current drain of the device	0.8A
Total current drain	0.8 A + Total load of the digital outputs + current for the motor holding brake
Ripple	0.5Vpp
Requirement according to safe extra low voltage (SELV)	yes
Short-circuit proof	conditional (internally protected with 3.15AT)

Output data Compax3S0xx at 1*230VAC/240VAC

Controller type	S025V2	S063V2
Output voltage	3x 0-240V	3x 0-240V
Nominal output current	2.5Arms	6.3Aeff
Pulse current for 5s	5.5Aeff	12.6Aeff
Power	1kVA	2.5kVA
Switching frequency	16kHz	16kHz
Power loss for In	30W	60W

Output data Compax3S1xx at 3*230VAC/240VAC

Controller type	S100V2	S150V2
Output voltage	3x 0-240V	3x 0-240V
Nominal output current	10Aeff	15Aeff
Pulse current for 5s	20Aeff	30Aeff
Power	4kVA	6kVA
Switching frequency	16kHz	8kHz
Power loss for In	80 W	130W

Output data Compax3Sxxx at 3*400VAC

Controller type	S015V4	S038V4	S075V4	S150V4	S300V4
Output voltage	3x 0-400V				
Nominal output current	1.5Aeff	3.8Aeff	7.5 Aeff	15Aeff	30Aeff
Pulse current for 5s	4.5Aeff	9.0Aeff	15Aeff	30Aeff	60Aeff
Power	1kVA	2.5kVA	5kVA	10kVA	20kVA
Switching frequency	16kHz	16kHz	16kHz	8kHz	8kHz
Power loss for In	60W	80 W	120W	160W	350W

Output data Compax3Sxxx at 3*480VAC

Controller type	S015V4	S038V4	S075V4	S150V4	S300V4
Output voltage	3x 0-480V				
Nominal output current	1.5Aeff	3.8Aeff	6.5Aeff	13.9Aeff	30Aeff
Pulse current for 5s	4.5Aeff	7.5 Aeff	15Aeff	30Aeff	60Aeff
Power	1.25kVA	3.1kVA	6.2kVA	11.5kVA	25kVA
Switching frequency	16kHz	16kHz	16kHz	8kHz	8kHz
Power loss for In	60W	80 W	120W	160W	350W

Resolution of the motor position

For option F10: Resolver	◆ Position resolution: 16Bit (= 0.005°) ◆ Absolute accuracy: ±0,167°
For option F11: SinCos©	◆ Position resolution: 13.5Bit/Encoder sine period => 0.03107°/encoder resolution
For option F12:	◆ Maximum position resolution 　◆ Linear: 24 Bits per motor magnet spacing 　◆ Rotary: 24 bits per motor revolution ◆　Resolution for analog hall sensors with 1Vss signal (e.g. EnDat): 13.5 bits / graduation of the scale of the enco-der ◆ For RS 422 encoders: 4x encoder resolution ◆ Accuracy of the feedback zero pulse acquisition = accuracy of the feedback resolution ◆ Resolution for analog hall sensors with 1Vss signal: 13.5 bits / motor magnet spacing

Precision

The exactitude of the position signal is above all determined by the exactitude of the feedback system used.

Motors and feedback systems supported

Motors
Direct drives
◆ Linear motors
◆ Torque motors
	◆ Sinusoidal commutated synchronous motors
	 ◆ Maximum rotating field frequency: 1,000Hz
	 ◆ Max. velocity at 8 pole motors: 15000min^{-1}.
	 ◆ General max. speed:
	  60*1000/number of pole pairs in [min^{-1}].
	 ◆ Max. number of poles = 600
	◆ Sinusoidal commutated asynchronous motors
	 ◆ Maximum rotating field frequency: 1,000Hz
	 ◆ Max. speed: 60*1000/number of pole pairs - slip in [min^{-1}].
	 ◆ Field suppression: typically up to triple (higher on request).
	◆ Temperature sensor: KTY84-130
	  (insulated according to EN60664-1 or IEC60664-1)
	◆ 3 phase synchronous direct drives

Position encoder (Feedback)	
	Option F10: Resolver Feedback
LTN:	◆ JSSBH-15-E-5 ◆ JSSBH-21-P4 ◆ RE-21-1-A05 ◆ RE-15-1-B04
Tamagawa:	◆ 2018N321 E64
Siemens:	◆ 23401-T2509-C202
	Option F11: SinCos$^{©}$
	◆ Singleturn (SICK|Stegmann) ◆ Multiturn (SICK|Stegmann) Absolute position up to 4096 motor revolutions. ◆ Rotary feedback with HIPERFACE® interface: e.g.: SRS50, SRM50, SKS36, SKM36, SEK52

Special encoder systems for direct drives	**Option F12**
Analog hall sensors	◆ Sine - cosine signal (max. **5Vss[1]**; typical 1Vss) 90° offset ◆ U-V Signal (max. **5Vss[2]**; typical 1Vss) 120° off-set.
Encoder (linear or rotatory)	◆ Sine-cosine (max. **5Vss[3]**; typical 1Vss) (max. 400kHz) or ◆ TTL (RS422) (max. 5MHz) with the following modes of commutation: ◆ automatic commutation or ◆ Digital hall sensors (e.g. DiCoder©)
Digital, bidirectional interface	◆ All EnDat 2.1 or EnDat 2.2 feedback systems with incremental track (sine-cosine track) ◆ linear or rotary ◆ max. 400kHz Sine-Cosine
Distance coded feedback systems	◆ Distance coding with 1VSS - Interface ◆ Distance coding with RS422 - Interface (Encoder)

Motor holding brake output

Motor holding brake output	Compax3
Voltage range	21 – 27VDC
Maximum output current (short circuit proof)	1.6A
Minimum output current	150 mA

Safety technology Compax3S

Safe torque-off as per EN954-1, category 3 Certified: (BG-PRÜFZERT certification number: 0403005)	◆ For implementation of the "protection against unexpected start-up" function described in EN1037. ◆ Note the circuit examples circuit examples.

UL certifiction for Compax3S

conform to UL:	◆ according to UL508C
Certified	◆ E-File_No.: E235 342

The UL certification is documented by a "UL" logo on the device (type specification plate).

"UL" logo

Insulation requirements

Protection class	Protection class I according to EN60664-1
Protection against human contact with dangerous voltages	According to En 61800-5-1
Overvoltage category	Voltage class III according to EN 60664-1
Degree of contamination	Degree of contamination 2 according to EN 60664-1 and EN 61800-5-1

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[1] Max. differential input between SIN- (X13/7) and SIN+ (X13/8).
[2] Max. differential input between SIN- (X13/7) and SIN+ (X13/8).
[3] Max. differential input between SIN- (X13/7) and SIN+ (X13/8).

Environmental conditions Compax3S and Compax3H

General ambient conditions	According to **EN 60 721-3-1 to 3-3**
	Climate (temperature/humidity/barometric pressure): Class 3K3
Permissible ambient temperature:	
Operation	0 to +45 C Class 3K3
Storage	-25 to +70 C Class 2K3
Transport	–25 to +70 C Class 2K3
Tolerated humidity:	No condensation
Operation	<= 85% class 3K3	(Relative humidity)
Storage	<= 95% class 2K3	
Transport	<= 95% class 2K3	
Elevation of operating site	<=1000m above sea level for 100% load ratings
	<=2000m above sea level for 1% / 100m power reduction
	Please inquire for greater elevations
Mechanic resonances:	EN 60068-2-6 (sinusoidal excitation)
Sealing	IP20 protection class according to EN 60 529

Cooling Compax3S and Compax3H

Cooling mode:	C3S025V2 ... S150V4: Convection
	C3S300V4 & C3H: Forced air ventilation with fan in the heat dissipator
	Air flow rate: 459m³/h (C3H)
Supply:	C3S300V4, C3H050, C3H090 internal C3H125, C3H155 external
	220/240VAC: 140W, 2.5µF, Stator - 62Ω
	Optionally on request:
	110/120VAC: 130W, 10µF, Stator - 16Ω
	Circuit breaker: 3A

EMC limit values Compax3S and Compax3H

EMC interference emission	Limit values according to EN 61 800-3,
	Limit value class C3/C4 without additional mains filter:
	Information on C2 limit value classes (see page 13)
EMC disturbance immunity	Industrial area limit values in accordance with EN 61 800-3

EC directives and harmonised EC norms

Low voltage directive 2006/95/EC	EN 61800-5-1, Standard for electric power drives with settable speed; requirements to electric safety
	EN 60664-1, isolation coordinates for electricale equipment in low-voltage systems
	EN 60 204-1, machinery standard partly applied
EC-EMC-directive 2004/108/EC	EN 61 800-3, EMC norm
	Product standard for variable speed drives

> **Detailed information on the technical data of the Compax3 devices can be found in the Help- or PDF-files of the individual Compax3 device types.**

5. Index