Hardware and Engineering

XStart

11/01 AWB2700-1426GB

MOELLER

Think future. Switch to green.

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Translator: Scriptor GmbH

Warning!
Dangerous electrical voltage!

Before commencing the installation

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Earth and short circuit.
- Cover or enclose neighbouring units that are live.
- Follow the engineering instructions (AWA) of the device concerned.
- Only suitably qualified personnel in accordance with EN 50110-1/-2 (VDE 0105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE) must be connected to the protective earth (PE) or to the potential equalisation. The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference do not impair the automation functions.
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation.

- Suitable safety hardware and software measures should be implemented for the I/O interface so that a line or wire breakage on the signal side does not result in undefined states in the automation devices.
- Ensure a reliable electrical isolation of the low voltage for the 24 volt supply. Only use power supply units complying with IEC 60364-4-41 (VDE 0100 Part 410) or HD 384.4.41 S2.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
- Emergency stop devices complying with IEC/EN 60204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause uncontrolled operation or restart.
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been installed with the housing closed. Desktop or portable units must only be operated and controlled in enclosed housings.

- Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented.
- Wherever faults in the automation system may cause damage to persons or property, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks etc.).
- According to their degree of protection frequency inverters may feature during operation live, bright metal, or possibly moving, rotating parts or hot surfaces.
- The impermissible removal of the necessary covers, improper installation or incorrect operation of motor or frequency inverter may cause the failure of the device and may lead to serious injury or damage.
- The relevant national regulations apply to all work carried on live frequency inverters.
- The electrical installation must be carried out in accordance with the relevant regulations (e. g. with regard to cable cross sections, fuses, PE).
- All work relating to transport, installation, commissioning and maintenance must only be carried out by qualified personnel. (IEC 60 364 and HD 384 and national work safety regulations).

- Installations fitted with frequency inverters must be provided with additional monitoring and protective devices in accordance with the relevant safety regulations etc. Modifications to the frequency inverters using the operating software are permitted.
- All shrouds and doors must be kept closed during operation.
- In order to reduce hazards to persons or equipment, the user must include in the machine design measures that restrict the consequences of a malfunction or failure of the drive (increased motor speed or sudden standstill of motor). These measures include:
  – Other independent devices for monitoring safety-related variables (speed, travel, end positions etc.).
  – Electrical or non-electrical system related measures (interlocks or mechanical interlocks).
  – Live parts or cable connections of the frequency inverter must not be touched after it has been disconnected from the power supply due to the charge in capacitors. Appropriate warning signs must be provided.

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About this Manual

Introduction

This manual contains detailed information about mounting / dismounting as well as electrical installation of motor starters from the XStart series. It is valid only in conjunction with the manual „XI/ON PROFIBUS-DP", AWB2700-1394GB.

> All descriptions, safety and warning notes as well as all other advices contained in the XI/ON Manual AWB2700-1394GB remain valid unless otherwise specified.

As well as describing the mechanical and electrical features of XStart, this manual also describes its connection to PROFIBUS-DP via a XI/ON station.

> Please read this chapter carefully. Safety aspects should not be left to chance when dealing with electrical equipment.

This manual has been specially conceived for personnel with the necessary qualifications.

Please refer to the manual „XI/ON PROFIBUS-DP" AWB2700-1394GB for further information concerning XI/ON, PROFIBUS-DP as well as mounting and other information.

Prescribed Use

The devices described in this manual must be used only in applications prescribed in this manual or in the respective technical descriptions, and only in connection with components and devices from third party manufacturers that have been certified.

Appropriate transport, storage deployment and mounting as well as careful operating and thorough maintenance guarantee trouble-free and safe operation of these devices.

Notes Concerning Project Engineering / Installation of this Product

It is imperative that all respective safety measures and accident protection guidelines be adhered to.

In accordance with DIN VDE 0105-100 only qualified electricians or personnel that have received electrotechnical instructions are permitted to carry out the electrical installation and commissioning of XStart.

Explanation of the Symbols Used

This sign can be found next to all warning notes that indicate a safety hazard. This can relate to probable danger to personnel or damage to the system (hardware and software).

This sign means for the operator: work with extreme caution.

This sign can be found next to all warning notes that indicate a potential safety hazard. This can relate to possible danger to personnel or damage to the system (hardware and / or software).

This sign can be found next to all general notes that supply important information about one or more operating steps. These specific notes are intended to make operation easier and avoid unnecessary work due to incorrect handling.

1   Introduction to XStart

Chapter Overview   This chapter describes the basic features of XStart and
contains an overview of the XStart components.

The Basic Concept

XStart is the modular, bus compatible version of the proven motor starters from Moeller. It connects motors with the world of XI/ON; thereby adding system flexibility to the available plant.

XStart presently offers motor starters in 4 versions:

- Direct starters with AGM auxiliary contacts (trip-indicating)
- Direct starters without AGM auxiliary contacts
- Reversing starters with AGM auxiliary contacts
- Reversing starters without AGM auxiliary contacts

The XStart modules are made up of a base module and a performance module. This performance module contains the successful motor-protective circuit-breaker PKZM0 as well as one or two contactors. They enable a bus connection with assigned motor ratings up to 2.2 kW with a rated operational voltage of 400 V AC.

The connection to XI/ON is made via the internal XI/ON module bus; just simply connect the XStart module to the right side of the XI/ON station.

Xstart can be used with the following XI/ON gateways:

- XN-GW-PBDP-1.5MB   XI/ON gateway PROFIBUS-DP with 1.5 Mbaud; tension clamp connection
- XN-GW-PBDP-1.5MB-S   XI/ON gateway PROFIBUS-DP with 1.5 Mbaud; screw connection
- XN-GW-PBDP-12MB   XI/ON gateway PROFIBUS-DP with 12 Mbaud

⚠ XStart can not be operated in conjunction with the PROFIBUS-DP 1.5 Mbaud standard XI/ON gateway: XN-GW-PBDP-1.5MB-STD.

→ The connection to the fieldbus is made via the XI/ON gateway, as is described in the manual "XI/ON PROFIBUS-DP", AWB2700-1394GB.
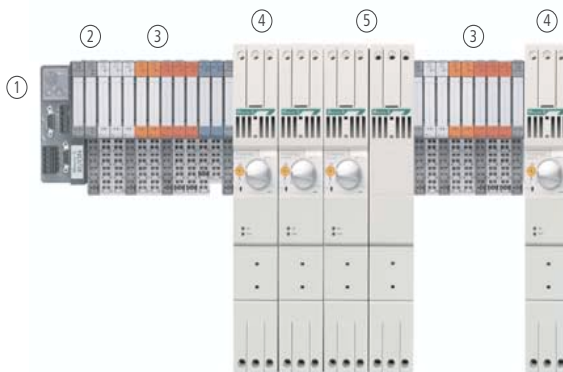
Figure 1:   Example of a XI/ON station with XStart

① XI/ON gateway for PROFIBUS-DP
② Power distribution module
③ XI/ON I/O modules
④ XStart direct starter module
⑤ XStart reversing starter module

Flexibility
You can adapt XStart to exactly match your plant.

XStart can be added to any point on your XI/ON station, which enables you to divide your station into plant areas of applications to suit your needs.

The motor can be switched off on the spot via the rotary handle.

Easy to operate
All XStart modules are made up of a base module and a performance module.

To mount, simply press the complete module on to the two top-hat rails. The base module can be mounted first, and the performance module added later.

No tools are required to mount or dismount either the performance modules or the base modules.

The performance modules can be mounted or dismounted without interrupting the power supply or output wiring. This means that the system carries on operating, even when you are required to exchange performance modules.

Separate release within the plant is not necessary.

The performance modules can be dismounted without interrupting the power supply. Leading contacts ensure that the motor is automatically turned off.

The XStart Components

→ | Detailed descriptions and technical data of the individual XStart components is contained in chapter 2 of this manual. The Appendix contains ordering information with all XStart components and accessories as well as other useful information.

Direct starter

The direct starter is composed of a PKZM0 motor starter and a DILEM contactor to turn the motor on and off.

It is used to both control and monitor the connected motor as well as to route the main and auxiliary power.

The performance module can be pulled for commissioning or maintenance purposes without having to interfere with the wiring.

Direct starters are available without AGM auxiliary contacts (trip-indicating) or with AGM auxiliary contacts.

Figure 2: Direct start without AGM auxiliary contact, with base module

Please observe that the direct starter with AGM auxiliary contact requires double the mounting space.

Reversing starter

The reversing starter is composed of a PKZM0 motor starter and two DILEM contactor one for the right-handed and one for the left-handed rotation of the motor.

It is used to both control and monitor the connected motor as well as to route the main and auxiliary power.

The performance module can be pulled for commissioning or maintenance purposes without having to interfere with the wiring.

Reversing starters are available without AGM auxiliary contacts (trip-indicating) or with AGM auxiliary contacts.

Figure 3:   Reversing starter with base module

Base module

The base module is used for fixing the performance module to the top-hat rails. It contains the electronics, which monitor and the correct functioning of the performance module generate error or diagnostic messages when necessary.

The base module provides the connection to the XI/ON gateway and the XI/ON modules via the internal XI/ON module bus.

The coding of the performance module is contained in the electronics of the base module, so that false plugging is diagnosed. A false performance module cannot be activated.

The base modules are available in the following versions:

• For direct starters without AGM auxiliary contacts
• For direct starter with AGM auxiliary contacts and for reversing starters

Figure 4: Base module for direct starters without AGM auxiliary contact (side view)

Accessories for distribution of power

To reduce wiring costs, accessories are available for distribution of power.

Should it be planned to mount several XStart modules next to one another, the power can be supplied via a power supply terminal. This power distributor is available for operating currents up to a maximum of 63 A.

Figure 5: Three-phase commoning link for maximum 4 XStart modules
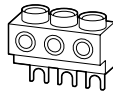
Figure 6: Power supply terminal for power distribution.

2   Technical Data

Chapter Overview   You can find the following subjects in this chapter:

Introduction

This chapter contains the technical data and additional information for the individual XStart modules.

The chapter is composed of the general technical data, the description of the individual modules, wiring and electrical circuit diagrams as well as information concerning parameter and diagnostic options.

The specific technical data, the LED indicators and the corresponding base modules are listed for each individual module.

➡ The representation of the diagnostics - and parameterization options to PROFIBUS-DP are described in chapter 5.

The module abbreviations are explained as follows:

Table 1:   Legend of module abbreviations

Abbreviations	Description	Example
Performance module		
XS	System identification for XStart	**XS**1-DS0-340-K06
DS	Function of the performance module: Direct starter	XS1-**DS**0-340-K06
RS	Function of the performance module: Reversing starter	XS1-**RS**0-340-K06
0	Function of the performance module: Standard	XS1-DS**0**-340-K06
3	Number of poles	XS1-DS0-**3**40-K06
4	Performance module voltage: > 400 V AC	XS1-DS0-3**4**0-K06
0	Performance module versions: without AGM	XS1-DS0-34**0**-K06
1	Performance module versions: with AGM	XS1-DS0-34**1**-K06
K	Information about the resistive rating of the performance module in kW: The digit in front of the K indicates the value before the comma. The digit behind the K indicates the value after the comma. Example: 1K5 corresponds to a performance of 1.5 kW	XS1-DS0-340-**K**06
xKx	Universal information concerning performance	XS1-DS0-340-**1K5**
Base module		
XS	System identification for XStart	**XS**-XBMS-DS0-A
XB	Base module for XStart	XS-**XB**MS-RS0-A
MS	Motor starter	XS-XB**MS**-RS0-A
DS	Function of the performance module: Direct starter	XS-XBMS-**DS**0-A
RS	Function of the performance module: Reversing starter	XS-XBMS-**RS**0-A
0	Function of the performance module: Standard	XS-XBMS-RS**0**-A
A	Design of the base module	XS-XBMS-RS0-**A**

The following abbreviations are used in the technical data and wiring diagrams:

Table 2: Technical abbreviations and symbols

Abbreviation	Designation
I_e	Rated operational current
I_{EI}	Nominal current via supply terminal
I_{MB}	Nominal current via the module bus
I_q	Rated conditional short-circuit current
I_u	Rated uninterrupted current
L1, 2, 3	Phase conductor 1, 2, 3
P_N	Rated operational power
PE	Protective earth
U_e	Rated operational voltage
U_{EI}	Nominal voltage via power distribution module
U_i	Rated insulation voltage

Dimensions

Dimensions for direct starter
The dimensions relate to the complete module (performance module including base module).

Dimensions in mm/inch (W x L x H)

without AGM auxiliary detector   45 x 128 x 300 /
                                      1.77 x 5.04 x 11.81

with AGM auxiliary detector   90 x 128 x 300 /
                                      3.54 x 5.04 x 11.81

Dimensions for reversing starter
The dimensions relate to the complete module (performance module including base module).

Dimensions in mm (W x L x H)

without AGM auxiliary detector   90 x 128 x 300 /
                                      3.54 x 5.04 x 11.81

with AGM auxiliary detector   90 x 128 x 300 /
                                      3.54 x 5.04 x 11.81

Dimension drawings

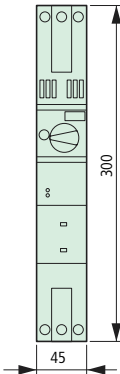➔ | All dimensions are shown in mm.

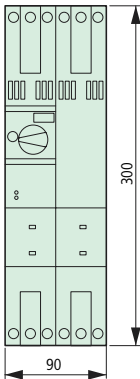

Figure 7:   Front view of direct starter without AGM

Figure 8:   Front view of direct starter with AGM
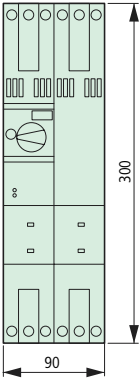
2

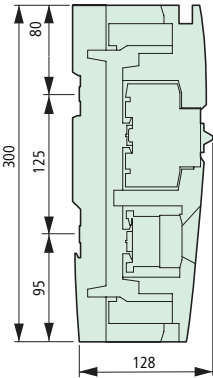Figure 9:   Front view of reversing starter with / without AGM

Figure 10: Side view of XStart complete with base module

General Technical Data

The detailed technical data for the PKZM0 and DILEM used in XStart can be found in the main catalogue, "Industrial Switching Devices", HPL0211-2002D, in chapter 05 for DILEM and 08 for PKZM0.

Table 3:   Technical Data for XStart

General Information

Standards and regulations	• IEC / EN 60 947-1 • IEC / EN 60 947-4-1 • DIN EN 61 1131 • EN 50 081-1 • EN 50 082-2
Radio interference suppression, limit value class	according to EN 55 011; „A"
Protection class	IP 20
Protection against direct contact according to VDE 0106 Part 100	finger and back-of-hand proof

Ambient temperature
    Storage min. / max.
    open min. / max.
	
	-25 °C / +70 °C
	0 °C / +55 °C

Climatic proof
    Damp heat, cyclic
    Damp heat, constant
	
	according to IEC 60 068-2-3
	according to IEC 60 068-2-3

Shock resistance (half-sinusoidal shock 20 ms)	8 g
Mounting position / distance between the top-hat rails (concentric)	vertical / 125 mm / 4.92 inch

Connection cross-sections
    Power supply terminal for
    three-phase commoning link
 	
    Motor outgoing circuit
	
	2.5 to 25 mm^2 / 0.004 to 0.04 inch^2 stranded
	2.5 to 16 mm^2 / 0.004 to 0.0256 inch^2 flexible core with ferrules
	1 x (1 to 6) mm^2 / 1 x (0.0016 to 0.0096) inch^2 solid core
	1 x (1 to 4) mm^2 / 1 x (0.0016 to 0.064) inch^2 flexible core with ferrules
	2 x (1 to 2.5) mm^2 / 2 x (0.0016 to 0.004) inch^2 solid core
	2 x (1 to 2.5) mm^2 / 2 x (0.0016 to 0.004) inch^2 flexible core with ferrules

General Information

Tightening torque of the connection screws	1.7 Nm
Mechanical lifespan of the DILEM contactors	10×10^6

Main supply circuit

Rated operational voltage U_e	415 V AC
Rated operational power P_N	see Ordering Information
Rated insulation voltage U_i	690 V
Rated conditional short-circuit current I_q	100 kA
Overvoltage category / pollution degree	III / 3
Rated operational current of the three-phase comming link I_u	63 A

Short-circuit rating of the contactors
    Classification type „2"
    Classification type „1"
	
	10 A gG/gL
	20 A gG/gL

Auxiliary circuit

Nominal voltage U_{El}	24 V DC
Permissible range	according to EN 61 131-2
Nominal current from the module bus I_{MB}	$\leqq$ 45 mA
Nominal current via supply terminal I_{El}	$\leqq$ 100 mA per controlled contactor
Rated insulation voltage U_i	690 V
Overvoltage category / pollution degree	III / 3

Diagnostic Messages of the Performance Module

The performance module has two LEDs on the front „RUN" and "ERROR", with the aid of which different operating statuses or faults can be indicated.

Figure 11: LEDs for indicating diagnostics

Table 4:   Diagnostic messages via LED

LED	Display	Operating mode	Meaning	Remedy
RUN	Green, flashing, 0.5 Hz	Start standby mode	Normal operation[1], PKZM0 is ON, DILEM is OFF	-
	Green	Normal operation	Normal operation[1], PKZM0 is ON, DILEM is ON	-
	OFF		PKZM0 is switched off; PKZM0 trip (performance module without AGM)	Switch the PKZM0 on.
ERROR	Red, flashing, 5 Hz	Actuation follows	Normal operation[1], contactor does not pick up	Replace the performance module.
		No actuation	Normal operation[1], contactor is welded toge-ther	Replace the performance module.
	Red, flashing, 0.5 Hz	Actuation follows	Normal operation[1], PKZM0 trip (only with performance modules with AGM)	Check the wiring of the motor.
	Red, flashing, 0.5 Hz, and LED RUN green, flas-hing, with 0.5 Hz		Ident error, wrong perfor-mance module plugged	Plug a perfor-mance module of the correct perfor-mance class.

1)   Normal operation: The module is connected to XI/ON,
     the 24 V DC auxiliary voltage is connected.

Module Parameters   The following parameters can be set for XStart:

Table 5:   Parameters for XStart

Parameter name	Value
Kind of power module	Direct -on-line-starter [1]
	Reversing-starter
Trip indicating AGM	without AGM [1]
	with AGM
Power level	0.06 kW [1]
	0.09 kW
	0.18 kW
	0.25 kW
	0.55 kW
	0.75 kW
	1.5 kW
	2.2 kW
Accepted higher kW ratings[2]	0 [1]
	1
	2
	3
	4
	5
	6
	7
AGM: accepted deviation[2]	Identification necessary[1]
	Deviation accepted

1) Preset
2) These parameters are valid only if the value „Ident-bypass" has been set in the process data. The values can be set, for example, via the control program. A further possibility is via the software I/O*assistant*.

The value of the parameter „accepted highes kW ratings" means by how many performance classes the performance module used can deviate upwards. Downward deviations are generally only permissible if the value „Ident-bypass" has been set in the process data.

The parameter „AGM: accepted deviation" determines if the deviation is permissible for the performance modules equipped with AGM auxiliary switches.
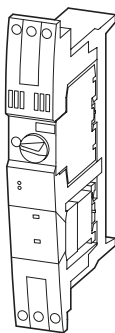
**Direct Starter Without
AGM Auxiliary Contacts**

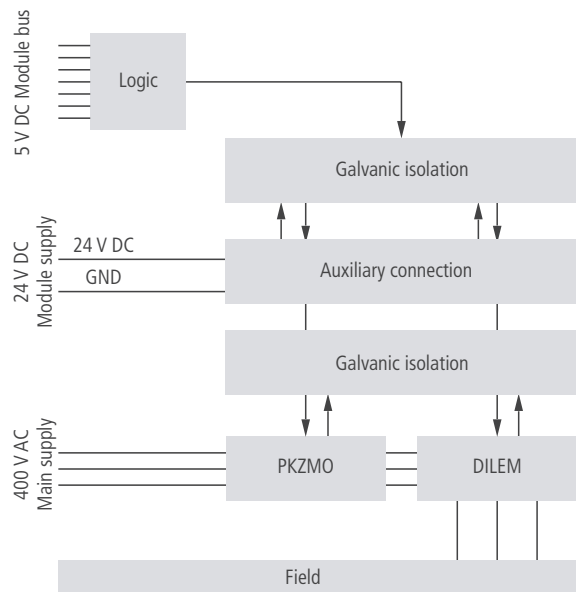Figure 12: Direct starter without AGM

Figure 13: Block diagram

Table 6:   Module overview

Designation	Rated operational power P_N at 400 V AC	Rated operational current I_e at 400 V AC	Rated uninterrupted current I_u at 400 V AC	Classification type
XS1-DS0-340-K06	0.06 kW	0.21	0.25	2
XS1-DS0-340-K09	0.09 kW	0.31	0.4	2
XS1-DS0-340-K18	0.18 kW	0.6	0.63	2
XS1-DS0-340-K25	0.25 kW	0.8	1.0	2
XS1-DS0-340-K55	0..55 kW	1.5	1.6	2
XS1-DS0-340-K75	0.75 kW	1.9	2.5	1
XS1-DS0-340-1K5	1.5 kW	3.6	4.0	1
XS1-DS0-340-2K2	2.2 kW	5.0	6.3	1

Diagnostic messages
The module has the following diagnostic data available:

- „device identification error"
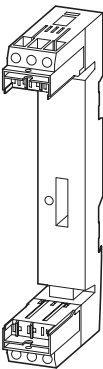- „DIL1 error"

Base module

Figure 14: Base module XS1-XBMS-DS0-A
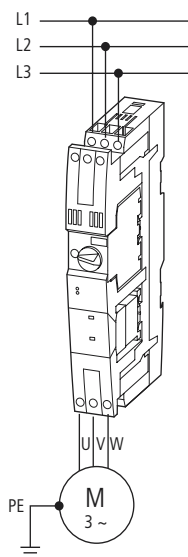
Wiring diagram

Figure 15: Wiring diagram direct starter without AGM
XS1-DS0-340-xKx

**Direct Starter With AGM
Auxiliary Contacts**
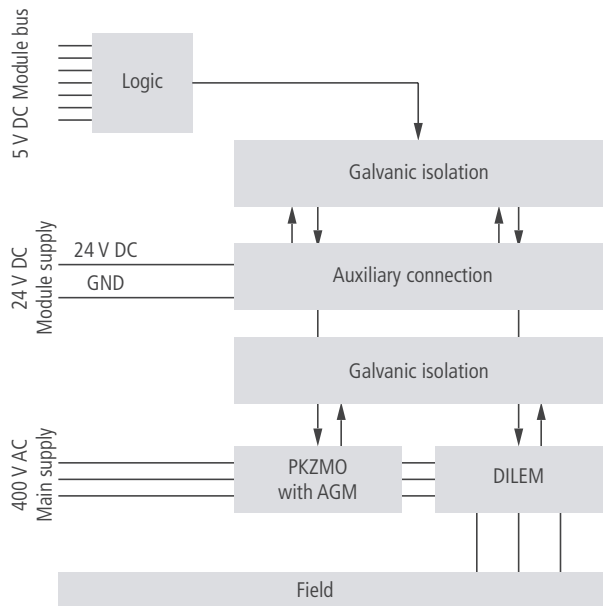

Figure 16: Direct starter with AGM

Figure 17: Block diagram

Table 7:   Module overview

Designation	Rated operational power P_N at 400 V AC	Rated operational current I_e at 400 V AC	Rated uninter-rupted current I_u at 400 V AC	Classification type
XS1-DS0-341-K06	0.06 kW	0.21	0.25	2
XS1-DS0-341-K09	0.09 kW	0.31	0.4	2
XS1-DS0-341-K18	0.18 kW	0.6	0.63	2
XS1-DS0-341-K25	0.25 kW	0.8	1.0	2
XS1-DS0-341-K55	0.55 kW	1.5	1.6	2
XS1-DS0-341-K75	0.75 kW	1.9	2.5	1
XS1-DS0-341-1K5	1.5 kW	3.6	4.0	1
XS1-DS0-341-2K2	2.2 kW	5.0	6.3	1

Diagnostic messages
The module has the following diagnostic data available:

- „device identification error"
- „PKZ short-circuit"
- „PKZ load dump"
- „DIL1 error"
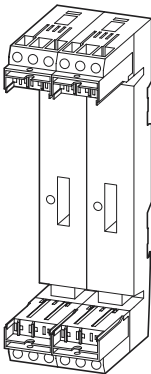
Base module

Figure 18: Base module XS1-XBMS-RS0-A
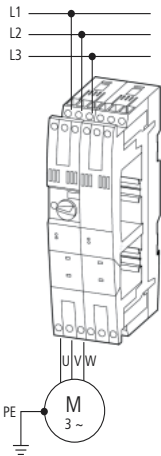
Wiring diagram

Figure 19: Wiring diagram direct starter with AGM
XS1DS0-341-xKx
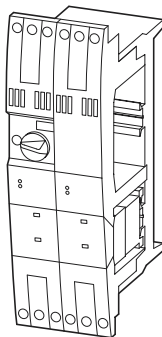
**Reversing starter without
AGM auxiliary contacts**

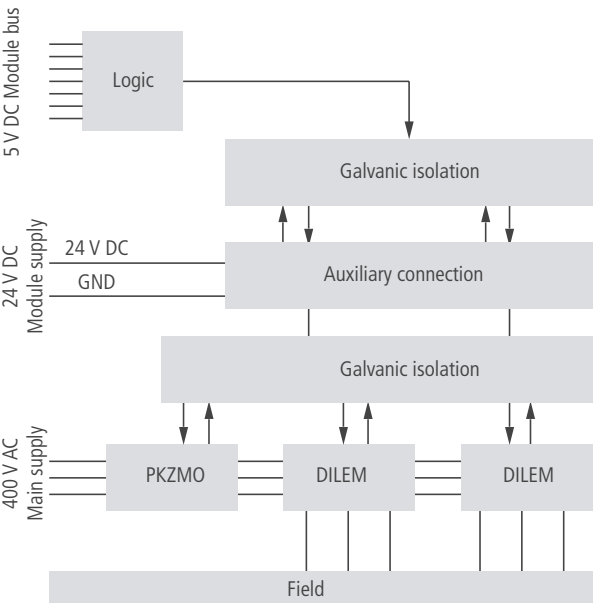Figure 20: Reversing starter without AGM

Figure 21: Block diagram

Table 8:   Module overview

Designation	Rated operational power P_N at 400 V AC	Rated operational current I_e at 400 V AC	Rated uninter-rupted current I_u at 400 V AC	Classification type
XS1-RS0-340-K06	0.06 kW	0.21	0.25	2
XS1-RS0-340-K09	0.09 kW	0.31	0.4	2
XS1-RS0-340-K18	0.18 kW	0.6	0.63	2
XS1-RS0-340-K25	0.25 kW	0.8	1.0	2
XS1-RS0-340-K55	0.55 kW	1.5	1.6	2
XS1-RS0-340-K75	0.75 kW	1.9	2.5	1
XS1-RS0-340-1K5	1.5 kW	3.6	4.0	1
XS1-RS0-340-2K2	2.2 kW	5.0	6.3	1

Diagnostic messages
The module has the following diagnostic data available:

• „device identification error"

• „DIL1 error"

• „DIL2 error"
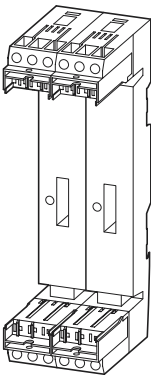
Base module

Figure 22: Base module XS1-XBMS-RS0-A

Wiring diagram

Figure 23: Wiring diagram reversing starter without AGM
XS1-RS0-340-xKx

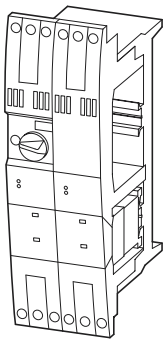**Reversing starter with AGM auxiliary contacts**

Figure 24: Reversing starter with AGM
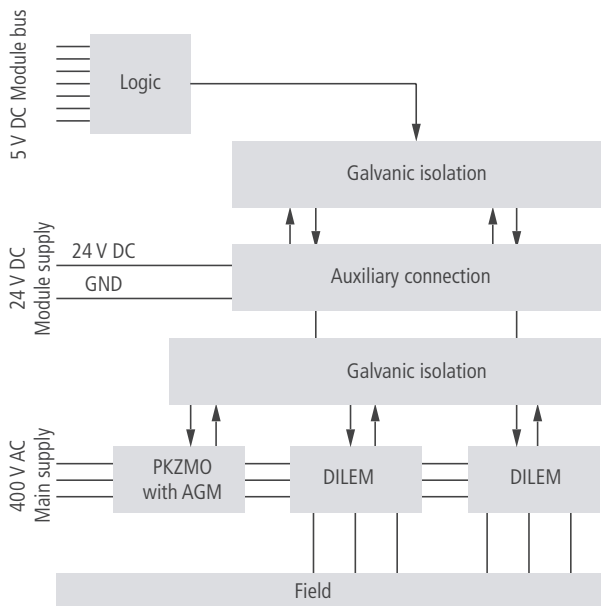
Figure 25: Block diagram

Table 9:   Module overview

Designation	Rated operational power P_N at 400 V AC	Rated operational current I_e at 400 V AC	Rated uninter-rupted current I_u at 400 V AC	Classification type
XS1-RS0-341-K06	0.06 kW	0.21	0.25	2
XS1-RS0-341-K09	0.09 kW	0.31	0.4	2
XS1-RS0-341-K18	0.18 kW	0.6	0.63	2
XS1-RS0-341-K25	0.25 kW	0.8	1.0	2
XS1-RS0-341-K55	0.55 kW	1.5	1.6	2
XS1-RS0-341-K75	0.75 kW	1.9	2.5	1
XS1-RS0-341-1K5	1.5 kW	3.6	4.0	1
XS1-RS0-341-2K2	2.2 kW	5.0	6.3	1

Diagnostic messages
The module has the following diagnostic data available:

- „device identification error"
- „PKZ short-circuit"
- „PKZ load dump"
- „DIL1 error"
- „DIL2 error"

Base module

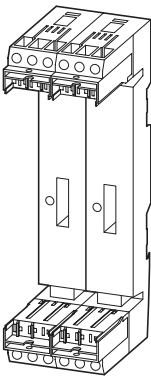Figure 26: Base module XS1-XBMS-RS0-A

Wiring diagram
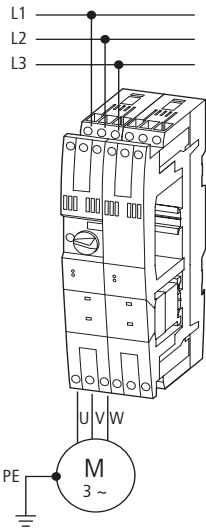

Figure 27: Wiring diagram reversing starter with AGM
            XS1-RS0-341-xKx

3 Mounting / Dismounting

Chapter Overview   You can find the following subjects in this chapter:

| **Mechanical Mounting** | **General Mounting Regulations** |

Notes on mounting / dismounting of XI/ON modules can be found in the manual "XI/ON PROFIBUS-DP", AWB2700-1394GB.

The following regulations are valid in addition to the mounting notes given in the manual:

- The XStart modules are mounted on to two parallel top-hat mounting rails.
- These two top hat rails have a concentric distance of 125 mm / 4.92 inch.
- It is not necessary to supply XStart with 24 V DC auxiliary voltage via a separate power distribution module. If however a potential isolation to the remaining XI/ON modules is required, a power distribution module can be mounted before the first XStart module from the left.
- If further XI/ON modules follow XStart on the XI/ON station, then a new power distribution module must be mounted to the right of each last XStart module. The reason for this is to be found in the separation of the C-rail: This being interrupted by the XStart modules.

Figure 28: XI/ON system extension with two groups of XStart and potential isolation

Mounting rails

To mount XStart, a second mounting rail is required to be mounted at a concentric distance of 125 mm / 4.92 inch below the mounting rail for the XI/ON station. Both mounting rails should be mounted on the same mounting plate.

➜ Please observe the notes about the correct mounting and grounding in chapters 6 and 7 of the manual „XI/ON PROFIBUS-DP".

Dimension drawings
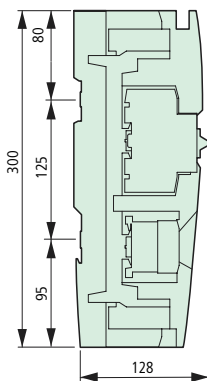
➜ All dimensions are shown in mm.

Figure 29: Side view of XStart module (complete with base module)
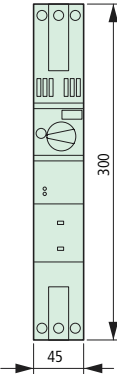
Figure 30: Front view of direct starter without AGM auxiliary detector
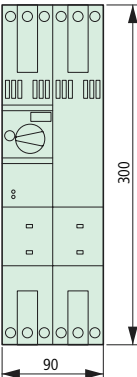
Figure 31: Front view of direct starter with AGM, reversing starter with and without AGM

Mounting XStart Base Modules

Please observe:

- Both mounting rails must already be securely mounted.
- The XI/ON gateway and the required XI/ON base modules must already be mounted. It should be taken in to consideration that once the XStart modules are mounted it is difficult to mount further XI/ON modules to the left of the XStart modules.
- If you wish to extend an existing XI/ON station with XStart modules, you must first remove the end plate along with the end bracket. The procedure for their removal is described in the section "Dismounting from the Mounting Rail" in chapter 6 of the "XI/ON PROFIBUS-DP" manual.
- It is possible to mount the base module without a performance module or complete with the plugged performance module.

Follow the procedure below to mount the XStart base modules:
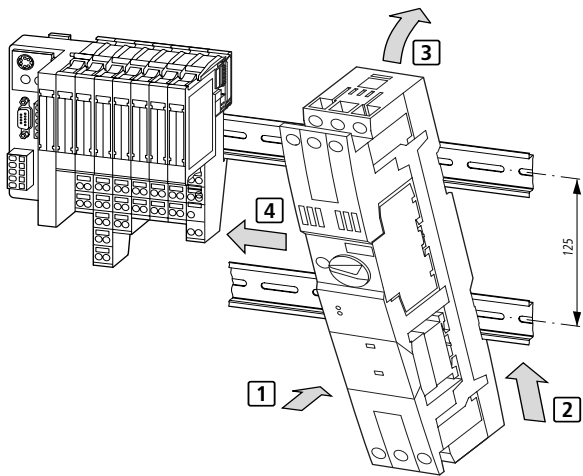
Figure 32: Mounting an XStart module

▶ Position the lower groove on the rear of the first module onto the lower edge of the mounting rail. ①

▶ Push the module upwards until you notice a firm resistance ②

▶ Tilt the top of the module away from you and towards the mounting rail. ③ Press the Module firmly against the upper mounting rail until the upper locating hooks lock in with an audible click; then let go carefully.

▶ Slide the module as far to the left as possible, closing any gap between it and the last XI/ON base module. ④ Correct mounting guarantees a secure connection and the communication via the XI/ON module bus.

Repeat the steps ① to ④ if you wish to mount further XStart modules.

Plugging the Performance Modules

• The appropriate XStart base module must already be mounted.

➡ It is recommended to blow clean the station using compressed air before plugging the performance modules. This prevents dust and grains of dirt from contaminating the plug-in contacts and thereby negatively influencing the station communications.

Follow the procedure below to plug the XStart performance modules:
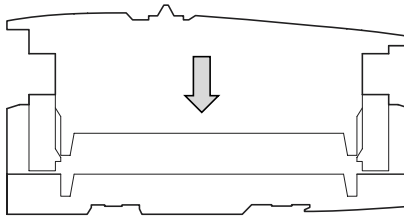
Figure 33: Plugging an XStart performance module

▶ Hold the performance module at both ends.
▶ Press the performance module squarely on to the base module until it locks in with an audible click.

Ensure that both retaining brackets at the upper and lower ends of the performance module are completely closed. These brackets ensure that the performance module is securely fixed to the base module.

Plugging the performance module has no affect on the wiring of the base module, that means, it makes no difference if the base module is wired or not.

The circuit-breaker on the XStart module must be set to „OFF" when the performance module is being mounted.

Coding

The coding of the base module and the corresponding performance module is done electronically:

Appropriate parameterization of the XStart module allows you to determine which type of performance module with which performance class can be operated by the corresponding base module. In addition, you can determine via the parameters if an upward deviation in the rating class is permissible and how great the deviation is allowed to be.

Should the type and / or rating class of the plugged performance module not match the parameterized values, a diagnostic message is generated and the performance module cannot be activated.

Example:
You wish to use a direct starter performance module with a rating class of 0.18 kW. You determine via the parameters that an upward deviation for 2 rating classes is permissible. Thus, you could plug a direct starter with a rating class of up to 0.55 kW in to that base module. A diagnostic message is generated. The performance module can be activated.

A downward deviation, meaning, the use of a performance module with a lower ratings class than that set in the parameters is always possible. This deviation also leads to a diagnostic message.

➡

The parameterized upward or downward deviation of the ratings class is only possible if the value "Ident bypass" has been set in the process data. If this value is not set, the performance module cannot be activated if there is a deviation in its ratings class.

Maximum Number of Modules

A maximum of 20 XStart modules can be used in a XI/ON station as direct starters without AGM auxiliary detectors. The following table offers an overview of the maximum number of different XStart module types, on condition that the entire XI/ON station is composed of XStart modules of the same type:

Table 10: Maximum No. of Modules

Type	Module	Maximum number
Direct starter, without AGM	XS1-DS0-340-xKx	20
Direct starter, with AGM	XS1-DS0-341-xKx	10
Reversing starter, without AGM	XS1-RS0-340-xKx	10
Reversing starter, with AGM	XS1-RS0-341-xKx	10

Restrictions can follow if additional power distribution modules are used, for example, to create potential groups.

It must be ensured that the correct base modules are used if Bus Refreshing modules are employed for potential isolation purposes!

If the system limits are exceeded, the software I/O *assistant* generates an error message once the <Station ➔ Verify> command is activated.

Dismounting   Please observe the following regulations when dismounting:

- Individual modules can only then be removed if the modules on their right side have been moved further to the right along the mounting rail. Thereby, there must be a minimum distance of 30 mm between the base module to be removed and the neighboring modules.
- It is only possible to dismount the base modules if the XI/ON station is disconnected from the power supply and the wiring of the base module concerned has been removed.

The XI/ON station must be disconnected from the power supply before beginning with the dismounting procedure. All wiring must be removed.

Please refer to chapter 6 of the „XI/ON PROFIBUS-DP" manual for further notes about dismounting.

Dismounting XStart Modules

Please observe:

- You can remove the XStart modules as a complete module.
- You can remove the performance module first and then remove the base module. The appropriate procedures are described in the following sections.
- No tools are required to dismount XStart modules.

Proceed as follows to dismount the XStart modules:
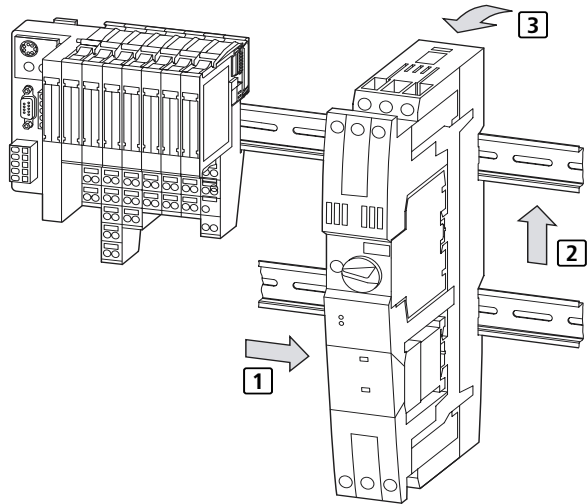
Figure 34: Dismounting a complete XStart module

▶ Slide the XStart modules to the right until the distance between them and the next module on their left is at least 30 mm.①

▶ Push the XStart module upwards until you notice a firm resistance.②

▶ Tilt the top of the XStart module towards you and away from the mounting rail. ③

▶ Remove the XStart module from the mounting rail.

Dismounting Performance Modules

Please observe:

No tools are required to dismount the performance modules.

Proceed as follows to dismount the XStart performance modules:
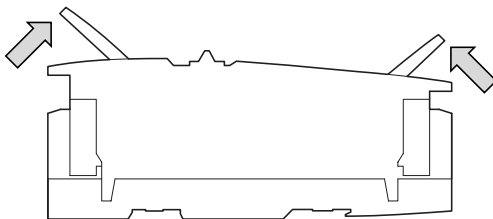
Figure 35: Dismounting the performance modules - step 1

▶ Open both retaining brackets on the upper and lower ends of the performance module upwards.

The performance module is no longer fixed to the base module. At the same time the performance module is carefully lifted a little. This lifting causes the auxiliary circuit to be automatically interrupted. The contactor drops out, and the main supply circuit is also interrupted.
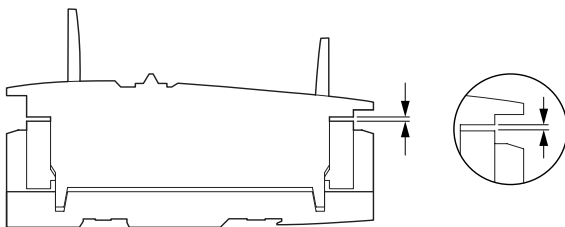
Figure 36: Automatic interruption of the auxiliary circuit by lifting the performance module.
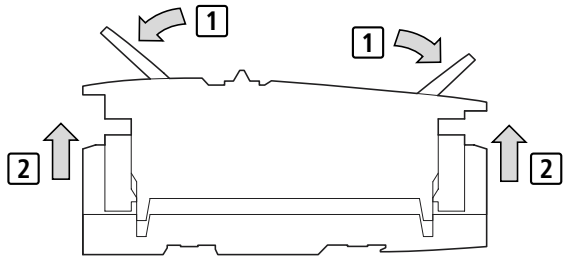
Figure 37: Removing the performance module from the base module

▶ Close both retaining brackets on the upper and lower ends of the performance module. ①
This unlocks the performance module.

▶ The performance module is removed by holding it at both ends and squarely pulling it away from the base module. ②

➡ Once the performance module has been pulled, the base module can be locked with a padlock; the maximum diameter of the U-bolt should not exceed 4.5 mm. This efficiently prevents performance modules from being plugged (for example, during the commissioning phase).
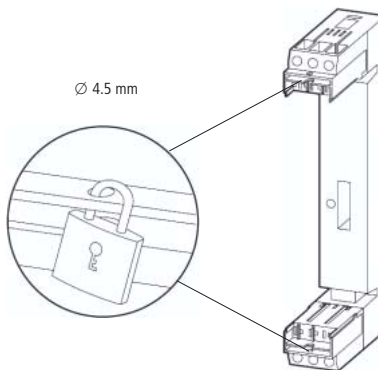
Figure 38: Locking the base module with a padlock

Dismounting Base Modules

Follow the procedure described in the section
„Dismounting XStart Modules" to dismount base modules.

4 Electrical Installation

Chapter Overview   You can find the following subjects in this chapter

4

General Notes

This chapter contains detailed information concerning the electrical installation of XStart modules.

Please refer to the manual „XI/ON PROFIBUS-DP", AWB2700-1394GB for further information concerning the electrical installation of XI/ON.

In accordance with DIN VDE 0105-100, only qualified electricians or personnel who have received electrotechnical instructions are permitted to carry out electrical installation and commissioning of XStart!

Potential Relationships

The potential relationships of a XI/ON station are characterized by the following features:

• The system's joint power supply to the XI/ON gateway, XI/ON I/O modules and XStart modules as well as the field supply for the XI/ON I/O modules is distributed via the Bus Refreshing module.

• All modules (gateway, I/O modules, XStart) are connected capacitively to the mounting rails via the base modules.

• Separate power supplies for the system and the field level allow a potential-free installation.

The following block diagram represents the possible arrangement of a typical XI/ON station with XStart modules.
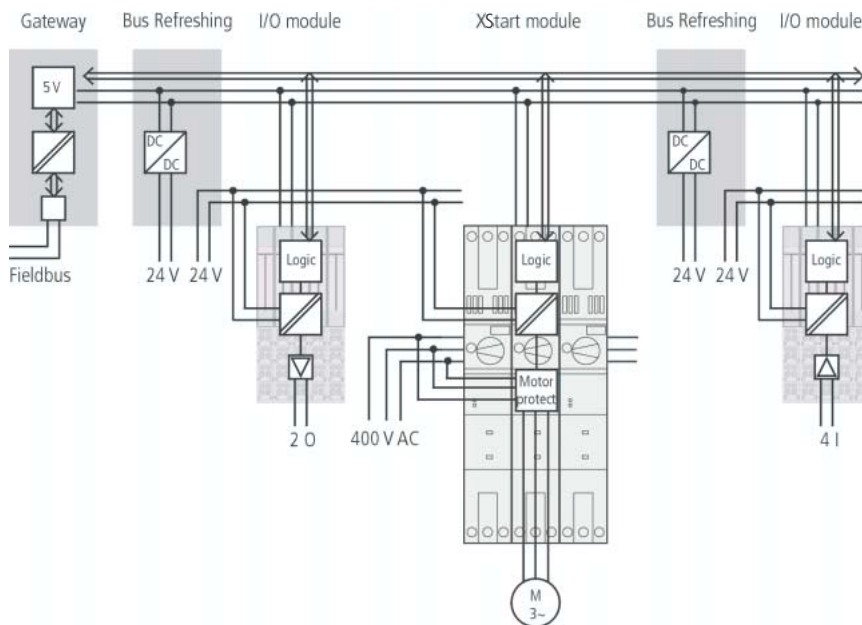
Figure 39: Block diagram of a XI/ON station with XStart modules

→ Please refer to chapter 7 of the „XI/ON PROFIBUS-DP" manual for further notes concerning potential relationships in a XI/ON station.

Electromagnetic Compatibility

XI/ON products comply in full with the requirements pertaining to EMC regulations. Nevertheless, an EMC plan is required before installation. This should take into consideration all potential electromechanical sources of interference, such as, galvanic, inductive and capacitive couplings as well as radiation couplings.

Ensuring Electromagnetic Compatibility

The EMC of XI/ON modules is guaranteed if the following basic rules are adhered to during installation:

• Correct and large surface grounding of inactive metal components
• Correct shielding of cables and devices
• Proper cable routing - correct wiring
• Creation of a standard reference potential and grounding of all electrically operated devices.
• Special EMC measures for special applications

Grounding of Inactive Metal Components

All inactive metal components (for example: switchgear cabinets, switchgear cabinet doors, supporting bars, mounting plates, top-hat rails and so forth) must be connected to one another over a large surface area and with a low impedance (grounding). This guarantees a standardized reference potential area for all control elements. The influence of coupled disturbances is reduced.

• In the areas around screw connections, the painted anodized or isolated metal components must be freed of the isolating layer. Protect the points of contact against rust.
• Connect all free moving groundable components (cabinet doors, separate mounting plates and so forth) by using short bonding straps to large surface areas.
• Avoid the use of aluminum components, because its quick oxidizing properties make it unsuitable for grounding.

The grounding must never - even inadvertently - take on a dangerous touch potential. Therefore, always protect the ground potential with a protective cable.

PE Connection
A central connection must be established between ground and PE connection (protective earth).

Earth-Free Operation

Observe all relevant safety regulations when operating an earth-free system.

Protect against high frequency interference signals

⚠️ In order to comply with radiation limit values in accordance with EN 55011/ 2000, the supply cables of the module XN-BR-24VDC-D for supplying the gateway with power are to be fed through a ferrite ring (PS416-ZBX-405). This is to be placed immediately next to the connection terminals. From there on, it is not permitted to make connections to further devices.

Mounting rails

All mounting rails must be mounted on to the mounting plate with a low impedance, over a large surface area, and must be correctly earthed. Use corrosion-protected mounting rails.
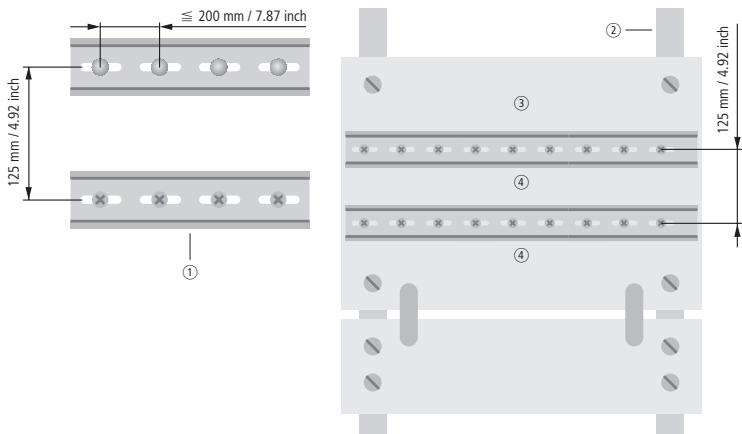
Figure 40: Mounting options

① TS 35 mounting rail
② Mounting rail
③ Mounting plate
④ TS 35 mounting rail

Mount the mounting rails over a large surface area and with a low impedance to the support system using screws or rivets.

Remove the isolating layer from all painted, anodized or isolated metal components at the connection point. Protect the connection point against corrosion (for example, with grease, caution: use only suitable grease).

→ Please refer to chapter 7 of the „XI/ON PROFIBUS-DP" manual for further notes concerning EMC compliant switchgear cabinet installation.

Wiring

The wiring of XStart modules covers the main supply circuit only. The auxiliary circuit is automatically created following the mounting of base and performance modules.

Wiring an XStart Module

The power supply to the XStart module is fed from above via three conductors. The connection is achieved via screw terminals.

The connection of the current outputs is made via the underside of the XStart module and equally by using screw terminals.
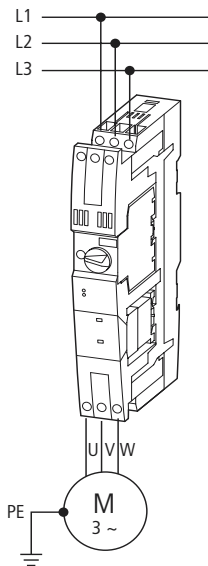
Figure 41: Connection diagram of direct starter without
AGM auxiliary contacts

Wiring Several XStart Modules

Various numbers of modules can be supplied via a three-phase commoning link depending on the type of XStart modules used.

- 4 direct starter without AGM auxiliary contacts
- 2 direct starter with AGM auxiliary contacts
- 2 reversing starters with or without AGM auxiliary contacts

Mixed operation is also permissible.
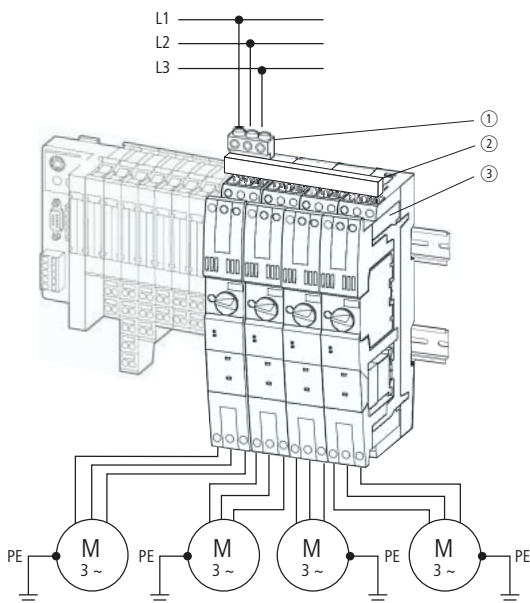
Figure 42: Connection diagram for several direct starter
without AGM

① Power supply terminal for three-phase commoning link
② Three-phase commoning link for up to 4 direct starters without
   AGM auxiliary contacts.
③ Direct starter without AGM auxiliary contact

Several XStart modules can be supplied with power via a
joint three-phase commoning link.

This requires the power supply to be applied only once via
the power supply terminal.

⚠️ It is not permitted for the maximum current via the three-
phase commoning link to exceed 63 A.

5 Connection to PROFIBUS-DP

Chapter Overview

You can find the following subjects in this chapter:

5

General Notes on PROFIBUS-DP

This chapter contains detailed information about the connection of XStart to PROFIBUS-DP.

Please refer to the manual „XI/ON PROFIBUS-DP", AWB2700-1394GB for further information concerning PROFIBUS-DP and XI/ON.

The connections of XStart to a Moeller PLC and a Siemens PLC are described.

→ | Designations for hardware and software used in this chapter are registered and protected trademarks of the respective manufacturer.

XStart is fieldbus independent. The connection and communication with the other fieldbus stations can only be achieved via the XI/ON gateway.

Electronic Device Data Sheets (GSD Files)

The XStart modules are incorporated in the PROFIBUS-DP structure with the aid of the electronic device data sheets. These device data are described in the XI/ON specific GSD files from the version 1.4 onwards.

- XN02B2E.gsd → Extended GSD file for the 1.5 Mbaud XI/ON gateway
- XN02B2S.gsd → Standard GSD file for the 1.5 Mbaud XI/ON gateway
- XN02B3E.gsd → Extended GSD file for the 12 Mbaud XI/ON gateway
- XN02B3S.gsd → Standard GSD file for the 12 Mbaud XI/ON gateway

The respective actual versions of the GSD files are available directly from Moeller. It is also possible to obtain updates by downloading the files from the PROFIBUS User Organization's homepage (www.profibus.com) or from the Moeller homepage www.moeller.net.

➡️ XStart cannot be operated in connection the XI/ON
gateway PROFIBUS-DP Standard.

XStart is available only in the module description according
to type version. That means, the XStart modules are depicted
with a special identification format. This enables an exact
identification of the XStart modules. The XI/ON gateway will
accept replacement modules of an identical type only.

A compressed module description of the XStart modules is
not possible.

➡️ Please refer to chapters 2 and 3 of the
„XI/ON PROFIBUS-DP" manual for further details about
the GSD files.


```
; XS1-XBM -----------------------------------
Module = "  T-XS1-XBM' 0xC3,0x00,0x00,0x33,0x46,0x01
Channel_Diag(16)="Identfehler"
Channel_Diag(17)="PKZ Kurzschluss"
Channel_Diag(18)="PKZ Ueberlast"
Channel_Diag(19)="DIL1 defekt"
Channel_Diag(20)="DIL2 defekt"
Ext_Module_Prm_Data_Len = 3
Ext_User_Prm_Data_Const(0) = 0x00,0x00,0x00
Ext_User_Prm_Data_Ref(0) = 200
Ext_User_Prm_Data_Ref(0) = 201
Ext_User_Prm_Data_Ref(2) = 205
Ext_User_Prm_Data_Ref(1) = 202
Ext_User_Prm_Data_Ref(2) = 204
EndModule
; -----------------------------------------
```

Figure 43: Description of XStart in the GSD file

Parameterization for XStart

Each XStart module requires 3 bytes of parameters in the PROFIBUS-DP telegram. The following table shows the structure of these 3 bytes.

Table 11: Parameters for XStart

Byte	Bit	Parameter name	Value	Meaning
0	0	trip indicating AGM	0	without AGM [1]
			1	with AGM
	4	kind of power module	0	direct-on-line-starter [1]
			1	reversing starter
1	4 to 0	power level	00010	0.06 kW [1]
			00011	0.09 kW
			00100	0.18 kW
			00101	0.25 kW
			00110	0.55 kW
			00111	0.75 kW
			01000	1.5 kW
			01001	2.2 kW
2	3 to 0	no. accepted higher kW ratings[2]	0000	0 [1]
			0001	1
			0010	2
			0011	3
			0100	4
			0101	5
			0110	6
			0111	7
	7 to 4	AGM: accepted deviation [2]	0000	identification necessary[1]
			0001	deviation accepted

1) Standard settings of the parameters

2) These parameters are valid only if the value „Ident-bypass" has been set in the process data. The values can be set, for example, via the control program. A further possibility is via the software I/O*assistant*.

The texts listed in the columns „Parameter name" and „Meaning" correspond to the entries in the GSD file. Moreover, these texts with identical wordings are contained in the configuration software of the PROFIBUS-DP master used.

Diagnostic Messages for XStart	XStart modules require 1 byte for diagnostic data in a PROFIBUS-DP telegram. The following table shows the structure of this diagnostic byte:

Table 12: XStart diagnostic messages

Bit	Diagnostic	Note
0	device identification error	The module identification of the plugged performance module does not correspond to the parameterized module identification. The parameterized rating class has been exceeded or fallen short of.
1	PKZ short-circuit [1]	The diagnostic was set, as soon as an interruption at the AGM was recognized. It remains set until acknowledged by pressing the red reset button of the AGM.
2	PKZ load dump [1]	The diagnostic message remains until the knob-operated rotary switch of the PKZM0 is turned back to the „ON" position.
4	DIL1 error	
5	DIL2 error [2]	

1) only with XStart with AGM

2) only with reversing starters

The texts listed in the „Diagnostics" column correspond to the entries in the GSD file.

Process Data

XStart has 1 byte of input data and 1 byte of output data available. The following table shows the respective structure:

Table 13: Process data

Process data	Bit	Contents	Value	Meaning
Input data				
	0	Actual status DIL1	0	OFF
			1	ON
	1	Actual status DIL2 [1]	0	OFF
			1	ON
	2	Status PKZM0	0	OFF
			1	ON
	3	Reserved	0	-
	4 to 7	Not assigned		
Output data				
	0	Required status DIL1	0	OFF
			1	ON
	1	Required status DIL2 [1]	0	OFF
			1	ON
	2	Reserved	0	-
	3	Ident-bypass	0	No tolerance
			1	Tolerance not permitted
	4 to 7	Not assigned		

1) ... only with reversing starters

Maximum Number of Modules

A XI/ON station can consist of a XI/ON gateway, a Bus Refreshing module and a maximum of 20 XStart modules as direct starters without AGM auxiliary detectors. The following table offers an overview of the maximum number of different XStart module types, on condition that the entire XI/ON station is composed of XStart modules of the same type:

Table 14: Maximum number of modules

Type	Module	Maximum number
Direct starter, without AGM	XS1-DS0-340-xKx	20
Direct starter, with AGM	XS1-DS0-341-xKx	10
Reversing starter, without AGM	XS1-RS0-340-xKx	10
Reversing starter, with AGM	XS1-RS0-341-xKx	10

Restrictions can follow if additional power distribution modules are used, for example, to create potential groups.

It must be ensured that the correct base modules are used if Bus Refreshing modules are employed for potential isolation purposes!

The software I/O*assistant* generates an error message via the <Station ➔ Verify> command as soon as the system limits are exceeded.

Please refer to chapter 5 of the „XI/ON PROFIBUS-DP" manual for further notes about maximum station extension of a XI/ON station.

Connection to a Moeller PLC PS4-341-MM1 with LE4-504-BS1

The following describes the integration of XStart in a XI/ON station that is connected to a Moeller PLC PS4-341-MM1 via the local expansion module LE4-504-BS1.

The Moeller configuration software „CFG-DP", version 2.0 is used to configure the XI/ON station in this example.

Reading-in the GSD file

➡️ The procedure used for the reading-in of the GSD file is described in section „Connection to a Moeller PS416 PLC" in chapter 3 of the „XI/ON PROFIBUS-DP" manual.

Proceed as follows to update your GSD file:

▶ Copy the GSD file to the directory "...\Fieldbus\Profibus\GSD".

▶ Press the "Ok" button to confirm the appearing dialog box to overwrite an existing file.

▶ Icon files that may already exist do not have to be overwritten.

▶ Start the software „CFG-DP".

After these steps the actual XI/ON entry can be found as usual in the selection dialog box for slaves.

Configuring the XI/ON Station with XStart

Proceed as follows to insert your XStart modules in a new or
in an existing XI/ON station:

▶ Double click the corresponding XI/ON station or insert an
new XI/ON station in your fieldbus structure.
▶ Select the entry „T-XS1-XBM" in the configuration dialog
box and add the necessary amount of modules via the
button „Append Module".

Slave Configuration

General
Device   XN-GW-PBDP-1.5MB   Station address   2
Description Slave2
☑ Activate device in actual configuration
☑ Enable watchdog control   GSD file   XN02B2E.GSD

Max. length of in-/output data	352	Byte	Length of in-/output data	7	Byte
Max. length of input data	176	Byte	Length of input data	4	Byte
Max. length of output data	176	Byte	Length of output data	3	Byte
Max. number of modules	128		Number of modules	5	

OK
Cancel
Parameter Data...
DPV1 Settings

Assigned master
Station address 1
Master1
1 / LE4-504-BS1

Module	Inputs	Outputs	In/Out	Identifier
		2 Word		0x83, 0x41,
S-XN-1CNT-24VDC(C)			4 Word	0xF3
T-XN-1CNT-24VDC(C)	4 Word	4 Word		0xC3, 0xC3,
S-XN-1CNT-24VDC(M)			4 Word	0xF3
T-XN-1CNT-24VDC(M)	4 Word	4 Word		0xC3, 0xC3,
T-XS1-XBM	1 Byte	1 Byte		0xC3, 0x00,

Actual slave
Station address 2
Slave2
2 / XN-GW-PBDP-1.5MB

Slot	Idx	Module	Symbol	Type	I Addr.	I Len.	Type	O Addr.	O Len.
1	1		Module0						
2	1		Module1	IB	0	1			
3	1		Module2	IB	0	1	QB	0	1
4	1		Module3	IB	0	1	QB	0	1
5	1		Module4	IB	0	1	QB	0	1

Append Module
Remove Module
Insert Module
Predefined Modules
Symbolic Names

Figure 44: Selection of XStart modules

Example of Diagnostics with a Moeller PLC PS4-341-MM1

The software „CFG-DP", version 2.0 from Moeller is used in our example to describe diagnostic messages.

When connected to a Moeller PLC PS4-341-MM1, the diagnostic is done via the local expansion module LE4-504-BS1.

The diagnostics are described in the dialog box „Extended Device Diagnostic":
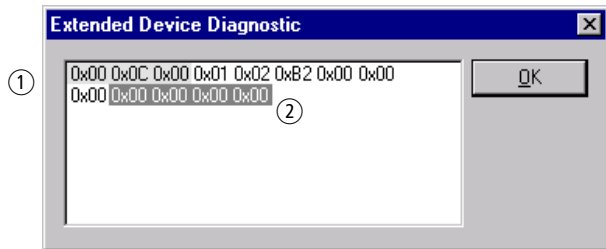

Figure 45: Diagnostic description of a XI/ON station with XStart

① Diagnostic bytes 0 to 2
② Diagnostic bytes 9 to 12

The hexadecimal data shown in the figure above have the following meanings:

Table 15: Diagnostic bytes

Diagnostic byte	Meaning	Remark
0	Status area 1 of the station	-
1	Status area 2 of the station	-
2	Status area 3 of the station	-
3	Master's address, from where the slave was configured	According to DP standards
4 to 5	Slave identifier	According to DP standards
6 to 8	Diagnostic bytes 0 to 2 of the XI/ON Gateway	Refer to chapter 2 of the manual „XI/ON PROFIBUS-DP"
9 to 12	Diagnostic bytes of the modules capable of diagnosis in the XI/ON station (Bus Refreshing module, 3 XStart modules)	see section „Diagnostic Messages for XStart" in this chapter as well as chapter 4 of the manual „XI/ON PROFIBUS-DP"

5

Connection to a Siemens S7-300 PLC

The following describes the integration of XStart in a XI/ON station that is connected to a Siemens S7-300 PLC.

The software package „SIMATIC Manager" Version 5.0.5.0 from Siemens is used in this example.

Reading-in the GSD File

→ The procedure used for the reading-in of the XI/ON GSD file is described in the section „Connection to a Siemens S7 PLC" in chapter 3 of the „XI/ON PROFIBUS-DP" manual.

Proceed as follows to update your GSD file:

▶ Copy the corresponding GSD file to the "Step7\S7data\GSD" directory.
▶ Start the "SIMATIC Manager" software and open the hardware configurator.
▶ Click the <Extra → Update catalog> command.

Subsequently, the updated entry for XI/ON can be found as usual in the hardware catalog.

Configuring the XI/ON Station with XStart

Proceed as follows to insert your XStart modules in a new or in an existing XI/ON station:

▶ Select the corresponding XI/ON station in the PROFIBUS-DP structure or insert a new XI/ON station.

▶ In the case of a new XI/ON station, insert all required XI/ON modules in the correct order.

▶ Select the entry „T-XS1-XBM" for XStart from the hardware catalog. Using a drag-and-drop operation, place it in the required position of the selected XI/ON station's module list.
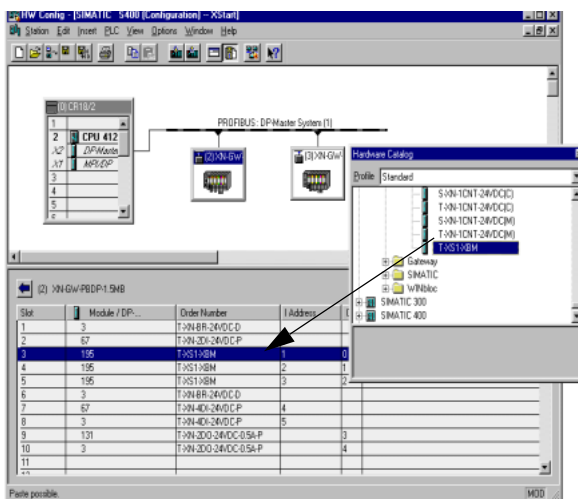

Figure 46: Inserting XStart modules

Please observe that a power supply module must again be added first when adding XI/ON modules after a group of XStart modules (in the example: the entry „T-XN-BR-24VDC-D").

Setting the Parameters for XStart Modules

Double-click the corresponding entry in the module list to open the DP Slave Properties dialog box of an XStart module. It is possible to set various parameters in this dialog box:
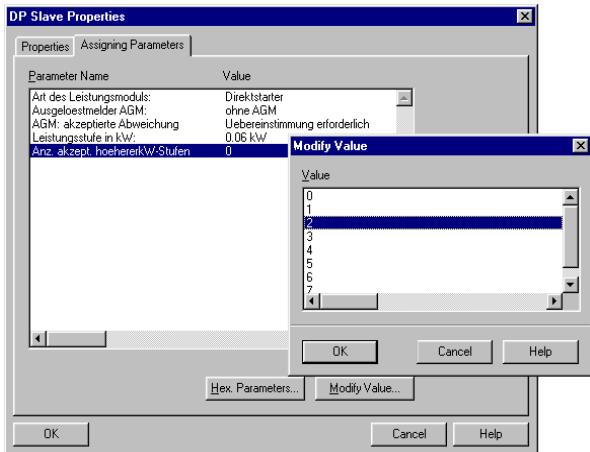

Figure 47: Parameterization of an XStart module

Diagnostics Based on Example of a Siemens S7-400 PLC

The diagnostic functions of XStart modules that are connected to a Siemens PLC require a special function block, which can be obtained directly from Siemens.

The individual diagnostics are shown in a table of variables.

Example:

Figure 48: Diagnostics description in the software STEP 7 - table of variables

The operands have the following meanings:

Table 16: Operands legend

Operand	Status value	Meaning
DB101.DBW	0	PLC- internal information
DB101.DBW	2	PLC- internal information
DB99.DBB 2072	B#16#08	Station status byte 1
DB99.DBB 2073	B#16#0C	Station status byte 2
DB99.DBB 2074	B#16#00	Station status byte 3
DB99.DBB 2075	B#16#02	Address of diagnostic master
DB99.DBB 2076	B#16#02	Identity-number high byte
DB99.DBB 2077	B#16#B2	Identity-number low byte
DB99.DBB 2078	B#16#0C	Gateway diagnostic byte 0
DB99.DBB 2079	2#0000_0000	Gateway diagnostic byte 1
DB99.DBB 2080	2#0000_0000	Gateway diagnostic byte 2
DB99.DBB 2081	2#0000_0000	Diagnostic byte module 1 XN-BR-24VDC-D
DB99.DBB 2082	2#0000_0000	Diagnostic byte module 2 XS1-XBM
DB99.DBB 2083	2#0000_0000	Diagnostic byte module 3 XS1-XBM
DB99.DBB 2084	2#0000_0000	Diagnostic byte module 4 XS1-XBM
DB99.DBB 2085	2#0000_0000	Diagnostic byte module 5 XN-BR-24VDC-D
DB99.DBB 2086	2#0000_0000	Diagnostic byte module 6 XN-2DO-24VDC-0.5A-P
DB99.DBB 2087	2#0000_0000	Diagnostic byte module 7 XN-2DO-24VDC-0.5A-P

The in grey highlighted operands correspond to the standard header of PROFIBUS-DP standards. The diagnostic bits and bytes for the gateway and for the XI/ON modules are described in the manual „XI/ON PROFIBUS-DP", AWB2700-1394GB.

Appendix

Glossary

AGM	Trip-indicating auxiliary contact, additional switch with which a PKZM0 can be extended
Ambient temperature, open (see IEV 441-11-13)	Temperature of the room (for example, workshop, switchroom) in which the switching device is installed.
Back-of-hand proof	A switching device whose electrically live parts cannot be touched within in an imaginary sphere with a diameter of 50 mm is said to be back-of-hand proof.
Classification type	State of a switchgear assembly (motor starter) during and after the test with the $\Rightarrow$ **rated conditional short-circuit current**: Classification type „1": No risk to persons or installation No immediate operational readiness required Damages to the starter are permissible Classification type „2": No risk to persons or installations Starter is suitable for further operation No damage to the starter with exception of a slight welding of the switching contacts, if these can be easily separated without any appreciable deformation
Damp heat, constant	Climatic test, in which a switching device is tested at a constant humidity of 93 %, and an ambient temperature of 40 °C. During this test, checks are made of the electrical and mechanical functions of the switching device.
Damp heat, cyclic	Climatic test, in which a switching device is tested during changing climatic cycles. A cycle consists of 12 hours at 93 % relative humidity and 40 °C ambient temperature, and 12 hours at 95 % relative humidity and 25 °C ambient temperature. During this test, checks are made of the electrical and mechanical functions of the switching device.
Nominal voltage (see IEC 38)	Voltage, after which electrical equipment is called and to which particular operating features relate.

Glossar

Overvoltage category (see IEC/EN 60 947-1)	Code number for overvoltages, for example, due to lightning strike or switching operations that can possible occur at the point of installation. Industrial switching devices are covered by overvoltage category III. In accordance with the overvoltage categories, the use of switching devices is permissible in the following areas of applications: Overvoltage category IV: Installation directly at the connection point of the installation (direct lightning strike possible), for example, at an overhead cable connection. Overvoltage category III: Electrical equipment of which special demands are made in relation to reliability for connecting to stationary facilities, these being protected by lightning arresting facilities, for example, switches in low-voltage distribution plants or in controls used in industrial applications. Overvoltage category II: Devices for connecting to stationary installations, for example, household appliances, electrical tools. Overvoltage category I: Electrical equipment for connection to electrical circuits with overvoltage protective equipment, for example, electronic equipment.
Pollution degree (see IEC/EN 60 947-1)	Coding number for expected amount of conductive dust and humidity that can lead to the reduction of the voltage proofing of the switching device. The pollution degree is described in the following: Pollution degree 1: There are no or only dry occurrences of non-conductive pollution. The pollution does not influence the voltage proofing. Pollution degree 2: Usually only non-conductive pollution. However, temporary occurrences of conductivity are to be reckoned with. Pollution degree 3: (switching devices for industrial use) Conductive pollution or dry, non-conductive pollution that can become conductive due to condensation. Pollution degree 4: The pollution leads to a permanent conductivity, for example, due to conductive dust, rain of snow.

Protection against direct contact	Protective measures incorporated in the design, which prevent direct touch (without tools) of live plant components (safe from finger touch, back-of-hand proof).
Rated conditional short-circuit current I_q (see IEC/EN 60 947-1 / IEV 441-17-20)	Short-circuit current that can be carried through a short-circuit safety facility, for example, a switching device protected by a motor-protective circuit-breaker, for example, a contactor, during the break time of the safety facility.
Rated operational power P_N (see IEC/EN 60 947-1)	Power rating, with which a switching device can switch at the assigned $\Rightarrow$ **rated operational voltage** corresponding to the utilization category, for example, contactor of the utilization category AC-3: 37 kW at 400 V
Rated operational voltage U_e (see IEC/EN 60 947-1)	Voltage to which the characteristic values of a switching device relate. The highest rated operational voltage must never be higher that the $\Rightarrow$ **rated insulation voltage**.
Rated operational current I_e (see IEC/EN 60 947-1)	Current that a switching device can carry, taking in to consideration $\Rightarrow$ the **rated operational voltage**, service life, utilization category and ambient temperature.
Rated uninterrupted current I_u (see IEC/EN 60 947-1)	Current that a switching device can carry when in uninterrupted operation (for weeks, months or years).
Rated insulation voltage U_i (see IEC/EN 60 947-1)	Voltage to which insulation test and creepage distances relate. The highest $\Rightarrow$ **rated operational voltage** must never be higher that the rated insulation voltage.
Safe from finger touch	A switching device is said to be safe from finger touch when the electrically live parts cannot be touched when the actuating elements are being operated. This is true also for the operation of adjoining switching devices. The safe from finger touch area of pressure operated electrical equipment is a circle around the actuating element with a minimum radius of 30 mm vertical to the operating facility. Within this circle, parts that are dangerous to touch are permitted to be arranged at a depth of at least 80 mm below the operating level.

Glossar

Shock resistance	Characteristic of a switching device, to survive sudden movements without alterations to the operating status and without damage. The contacts of switching devices that are in operation are not allowed to lift; the main contacts of switches that are not in operation are not allowed to hit together. A circuit-breaker must not trip, and no changes are permitted to occur to the circuit state of control circuit isolators.
Supply terminal	Base module of either a Power Feeding module or a Bus Refreshing module via which the supply voltage is fed for the XI/ON modules.

Abbreviations   Tabelle 17: Legend of module abbreviations

Abbreviations	Description	Example
Performance module		
XS	System identification for XStart	**XS**1-DS0-340-K06
DS	Function of the performance module: Direct starter	XS1-**DS**0-340-K06
RS	Function of the performance module: Reversing starter	XS1-**RS**0-340-K06
0	Function of the performance module: Standard	XS1-DS**0**-340-K06
3	Number of poles	XS1-DS0-**3**40-K06
4	Performance module voltage: > 400 V AC	XS1-DS0-3**4**0-K06
0	Performance module versions: without AGM	XS1-DS0-34**0**-K06
1	Performance module versions: with AGM	XS1-DS0-34**1**-K06
K	Information about the resistive rating of the performance module in kW: The digit in front of the K indicates the value before the comma. The digit behind the K indicates the value after the comma. Example: 1K5 corresponds to a performance of 1.5 kW	XS1-DS0-340-**K**06
xKx	Universal information concerning performance	XS1-DS0-340-**1K5**
Base module		
XS	System identification for XStart	**XS**-XBMS-RS0-A
XB	Base module for XStart	XS-**XB**MS-RS0-A
MS	Motor starter	XS-XB**MS**-RS0-A
DS	Function of the performance module: Direct starter	XS-XBMS-**DS**0-A
RS	Function of the performance module: Reversing starter	XS-XBMS-**RS**0-A
0	Function of the performance module: Standard	XS-XBMS-DS**0**-A
A	Design of the base module	XS-XBMS-RS0-**A**

Ordering Information and Accessories   XStart

	Base modules	
	XS1-XBMS-DS0-A	XS1-XBMS-RS0-A
Performance modules		
Direct starter without AGM		
XS1-DS0-340-K06	X	
XS1-DS0-340-K09	X	
XS1-DS0-340-K18	X	
XS1-DS0-340-K25	X	
XS1-DS0-340-K55	X	
XS1-DS0-340-K75	X	
XS1-DS0-340-1K5	X	
XS1-DS0-340-2K2	X	
Direct starter with AGM		
XS1-DS0-341-K06		X
XS1-DS0-341-K09		X
XS1-DS0-341-K18		X
XS1-DS0-341-K25		X
XS1-DS0-341-K55		X
XS1-DS0-341-K75		X
XS1-DS0-341-1K5		X
XS1-DS0-341-2K2		X

	Base modules	
	XS1-XBMS-DS0-A	XS1-XBMS-RS0-A
Performance modules		
Reversing starter without AGM		
XS1-RS0-340-K06		X
XS1-RS0-340-K09		X
XS1-RS0-340-K18		X
XS1-RS0-340-K25		X
XS1-RS0-340-K55		X
XS1-RS0-340-K75		X
XS1-RS0-340-1K5		X
XS1-RS0-340-2K2		X
Reversing starter with AGM		
XS1-RS0-341-K06		X
XS1-RS0-341-K09		X
XS1-RS0-341-K18		X
XS1-RS0-341-K25		X
XS1-RS0-341-K55		X
XS1-RS0-341-K75		X
XS1-RS0-341-1K5		X
XS1-RS0-341-2K2		X

Glossar

Accessories

Designation		Type
Mechanical accessories		
Lockable finger-grip knob for locking the XStart module as a main switch in accordance with VDE 0113		AK-PKZ0
Sealing device to protect against manipulation, sealable with commercially available seal wire		PL-PKZ0
Electrical accessories		
Three-phase commoning link for 2 direct starters without AGM		B3.0/2-PKZ0
Three-phase commoning link for 4 direct starters without AGM or 2 direct starters with AGM or 2 reversing starters		B3.0/4-PKZ0
Power supply terminal for three-phase commoning link		BK25/3-PKZ0
Empty connection cover, protected against accidental contact, for covering non-occupied connections on the three-phase commoning link.		H-B3-PKZ0
Documentation		
Manual „XI/ON PROFIBUS-DP"	German English	AWB2700-1394D AWB2700-1394GB
Main Catalogue Automation Systems German		HPL0213-2002D
Main Catalogue Industrial Switching Devices German		HPL0211-2002D
Supplementary Catalogue XI/ON	German English	NK2725-1042D NK2725-1042GB

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