**Sensor Module External
SME91, SME92, SME93, SME94**

SIMODRIVE 611

simodrive

SIEMENS

SIEMENS

SIMODRIVE

AC Motors
SME9x Sensor Module External

Manual

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER
indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING
indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE
indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

⚠ WARNING
This device may only be used for the applications described in the catalog or the technical description and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens. Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

Trademarks

All names identified by ® are registered trademarks of the Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Preface

Information on the documentation

You will find an overview of the documentation, which is updated on a monthly basis, in the available languages in the Internet under:

http://www.siemens.com/motioncontrol

Select the menu items "Support" → "Technical Documentation" → "Overview of Publications".

The Internet version of DOConCD (DOConWEB) is available at:

http://www.automation.siemens.com/doconweb

Information on the range of training courses and FAQs (frequently asked questions) are available on the Internet under:

http://www.siemens.com/motioncontrol under the menu item "Support"

Target group

This manual is aimed at planning, project, and design engineers as well as electricians, fitters, and service personnel.

Benefits

This equipment manual describes the scope of application and the functions of the SME9x Sensor Module External.

Technical Support

If you have any technical questions, please contact our hotline:

	Europe / Africa	Asia / Australia	America
Phone	+49 (0) 180 5050 – 222	+86 1064 719 990	+1 423 262 2522
Fax	+49 (0) 180 5050 – 223	+86 1064 747 474	+1 423 262 2289
Internet	http://www.siemens.com/automation/support-request		
E-mail	mailto:adsupport@siemens.com		

Note

For technical support telephone numbers for different countries, go to:
http://www.siemens.com/automation/service&support

Questions about this documentation

If you have any questions (suggestions, corrections) regarding this documentation, please fax or e-mail us at:

Fax	+49 9131 98 63315
E-mail	E-mail to: docu.motioncontrol@siemens.com

A fax form is available in the appendix of this document.

Internet address for products

http://www.siemens.com/motioncontrol

EC Declaration of Conformity

The EC Declaration of Conformity (to Low-Voltage Directive 2006/95/EC) is available at the following Internet address in the folder "Drive Technology":

http://support.automation.siemens.com/WW/llisapi.dll?func=cslib.csinfo&lang=de&siteid=csius&objid=19183574

If you do not have access to the Internet, contact your local Siemens office to obtain a copy of the EC Declaration of Conformity.

Table of contents

Safety information

<div style="text-align: right; font-size: 2em;">1</div>

> ⚠️ **DANGER**
>
> Cables with open cable ends must be connected in compliance with the specifications for safety isolation as defined by EN 61800-5-1.

Problem-free and safe operation is dependent on proper transport, storage, installation, assembly, commissioning, operation and maintenance, as well as protection against soiling and contact with aggressive materials. Please also observe the guidelines in the relevant sections!

Residual risks of power drive systems

When carrying out a risk assessment of the machine in accordance with the EU Machinery Directive, the machine manufacturer must consider the following residual risks associated with the control and drive components of a power drive system (PDS).

1. Unintentional movements of driven machine components during commissioning, operation, maintenance, and repairs caused by, for example:
   - Hardware defects and/or software errors in the sensors, controllers, actuators, and connection technology
   - Response times of the controller and drive
   - Operating and/or ambient conditions not within the scope of the specification
   - Parameterization, programming, cabling, and installation errors
   - Use of radio devices / cellular phones in the immediate vicinity of the controller
   - External influences / damage.

2. Exceptional temperatures as well as emissions of light, noise, particles, or gas caused by, for example:
   - Component malfunctions
   - Software errors
   - Operating and/or ambient conditions not within the scope of the specification
   - External influences / damage.

3. Hazardous shock voltages caused by, for example:
   - Component malfunctions
   - Influence of electrostatic charging
   - Induction of voltages in moving motors
   - Operating and/or ambient conditions not within the scope of the specification
   - Condensation / conductive contamination

   – External influences / damage

   – Improper protective conductor connection at high leakage currents.

4. Electrical, magnetic, and electromagnetic fields that can pose a risk to people with a pacemaker and/or implants if they are too close.

5. Emission of pollutants if components or packaging are not disposed of properly.

An assessment of the residual risks of PDS components (see points 1 to 5 above) established that these risks do not exceed the specified limit values.

For more information about residual risks of the power drive system components, see the relevant chapters in the technical user documentation.

Description of the product

<div style="text-align: right; font-size: 3em;">2</div>

SME9x Sensor Module External

2.1 Properties

Standards and regulations

The product complies with the standards relating to the Low-Voltage Directive and EMC Directive stated in the EC Declaration of Conformity.

2.1.1 Overview

Table 2-1 Uses and applications of the SME9x

SME9x	Signal cables	1FNx linear motors	1FW6 torque motors
Conditions input signals and transfers these to the drive converter	Temperature sensors • PTC or bimetallic thermoswitch • KTY 84	X	X
Transfers input signals to the drive converter	Position measuring system	X	
Transfers input signals to the drive converter	Angular position measuring system		X
Transfers input signals to the drive converter	Commutation sensor (Hall sensors)	X	

2.1.2 Benefits

The SME9x (Sensor Module External)

• provides motor protection,

• evaluates the actual operating temperature,

• allows motor sensors to be connected close to the motor and

• allows the PMS (position or angular position measuring system) to be connected close to the motor,

• provides safety isolation compliant with EN 61800-5-1 for connection of temperature monitoring circuits

for drives with 1FN1 linear motors, 1FN3 linear motors and 1FW6 torque motors. It therefore allows various types of external PMS to be used.

Due to its rugged construction, the SME9x can be mounted directly in the machine.

2.1.3 Applications

In systems with an SME9x, temperature sensors (PTC sensors or bimetallic thermoswitches and KTY 84) of 1FN1 linear motors, 1FN3 linear motors and 1FW6 torque motors can be directly evaluated on the SIMODRIVE 611 and POSMO CD/CA drive converters.

The PTC triple sensors or bimetallic thermoswitches integrated in each motor phase are evaluated to protect the motor against overheating. The KTY 84 temperature sensor integrated in a phase winding or between two phase windings is also simultaneously evaluated. It is not necessary to externally monitor the motor temperature.

The inputs of the SME9x for motor temperature sensors (PTC, KTY, bimetallic thermoswitches) are safely isolated from hazardous circuits in accordance with DIN EN 61800-5-1.

It cannot be guaranteed that the SME9x will function correctly when used with other types of motor.

2.2 Technical features

Table 2-2   Technical features

Technical feature	Value or design
Operating voltage:	5 V DC +/5 %
Current consumption:	approx. 5 mA
Current (looped-through):	50 mA (15 mA for cURus)
Installation altitude:	Up to 4,000 m above sea level
Dimensions of the device without connections:	L x W x H = 150 mm x 64 mm x 34 mm
Dimensions of the device with connections:	L x W x H = 150 mm x 64 mm x 62 mm
Weight of the complete device:	SME91: 721 g SME92: 763 g SME93: 745 g SME94: 787 g
Degree of protection according to EN 60529	IP67 (when connected)

Table 2-3   Climatic requirements

Requirement	Class
Ambient temperature	
Storage in accordance with EN 60721-3-1	1K5; - 25 °C $\leq$ T $\leq$ + 70 °C
Transport in accordance with EN 60721-3-2	2K2; - 25 °C $\leq$ T $\leq$ + 70 °C
Operation in accordance with EN 60721-3-3	3K6; - 5 °C $\leq$ T $\leq$ + 55 °C
Relative humidity	$\geq$ 5 % $\leq$ 85 %

Table 2-4   Additional requirements

Requirement	Class
Storage in accordance with EN 60721-3-1	1M3, 1B1
Transport in accordance with EN 60721-3-2	2M1 (2M2 in transport packaging), 2B1
Operation in accordance with EN 60721-3-3	Vibration 3M1, shock 3M4, 3B1

2.3 Order designation

2.3.1 Order designation SME9x

Table 2-5   Order designations for SME9x

SME9x	
Name	**Order designations / MLFB**
SME91: 1 connection for the drive converter control board 1 connection for EnDat PMS 1 connection for temperature sensors	1FN1910-0AA20-1AA0
SME92: 1 connection for the drive converter control board 1 connection for EnDat PMS 2 connections for temperature sensors	1FN1910-0AA20-2AA0
SME93: 1 connection for the drive converter control board 1 connection for incremental PMS 1 connection for HSB 1 connection for temperature sensors	1FN1910-0AA20-3AA0
SME94: 1 connection for the drive converter control board 1 connection for incremental PMS 1 connection for HSB 2 connections for temperature sensors	1FN1910-0AA20-4AA0

2.3.2 Order designation for feeder cables

Table 2-6   Order designations for basic cables for sensors, SIMODRIVE 611 system

Signal cable		
Name		**Order designations / MLFB**
SME9x:	Cable between motor (temp) – SME9x	**For 1FN3050:** - (cable is permanently attached to motor) **For 1FN3100 - 1FN3150:** 6FX7002-2SL01-1☐☐0 **For 1FN3300 - 1FN3900:** 6FX7002-2SL02-1☐☐0 **For 1FW6:** - (cable is permanently attached to motor)
SME91/SME92:	Cable between SME9x – drive converter Sub-D	6FX☐002-2EQ10-1☐☐0
SME93/SME94:	Cable between SME9x – drive converter Sub-D	6FX☐002-2CA31-1☐☐0

Table 2-7   Order designations for basic cables for sensors, POSMO CD/CA system

Signal cable		
Name		**Order designations / MLFB**
SME9x:	Cable between motor (temp) – SME9x	**For 1FN3050:** - (cable is permanently attached to motor) **For 1FN3100 - 1FN3150:** 6FX7002-2SL01-1☐☐0 **For 1FN3300 - 1FN3900:** 6FX7002-2SL02-1☐☐0 **For 1FW6:** - (cable is permanently attached to motor)
SME91/SME92:	Cable between SME9x – drive converter	6FX1002-2AA70-1☐☐0
SME93/SME94:	Cable between SME9x – drive converter	6FX1002-2AA60-1☐☐0

Table 2-8   Order designations for extensions for signal cables (recommendations),
             SIMODRIVE 611 and POSMO CD/CA systems

Signal cable		
Name		**Order designations / MLFB**
SME9x:	Extension between motor (temp) – SME9x	6FX7002-2SL10-1□□0
SME91/SME92:	Extension between EnDat PMS – SME9x	6FX□002-2AD04-....
SME93/SME94:	Extension between inc. PMS – SME9x	6FX□002-2CB54-....
SME91/SME92:	Extension between SME9x – drive converter	6FX□002-2EQ14-1□□0
SME93/SME94:	Extension between SME9x – drive converter	6FX□002-2CA34-1□□0
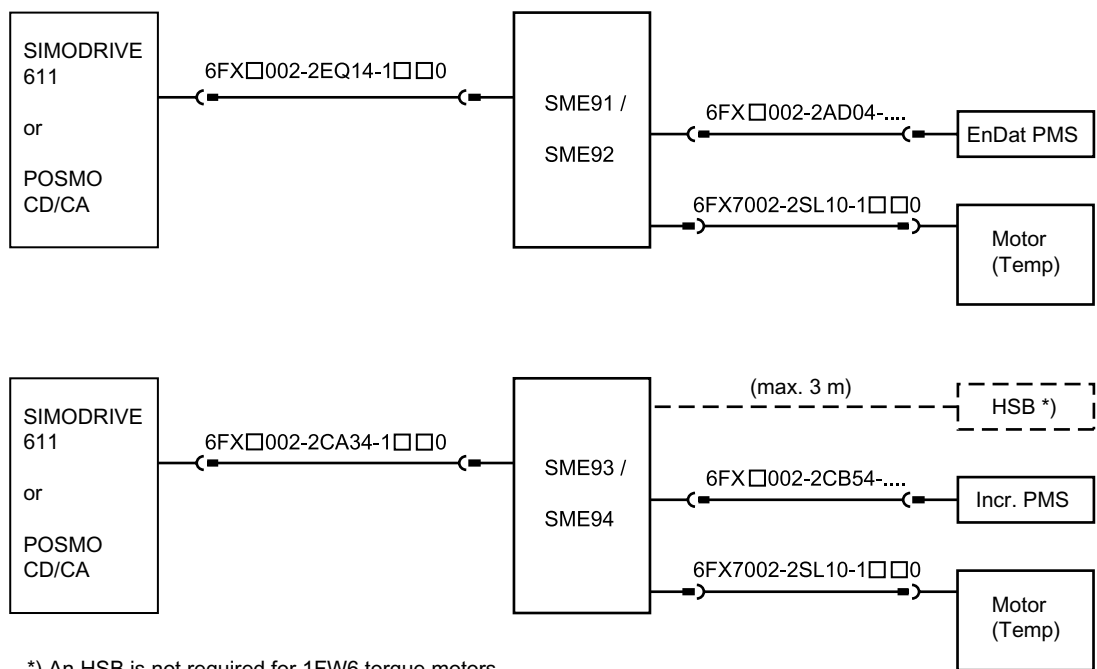
*) An HSB is not required for 1FW6 torque motors

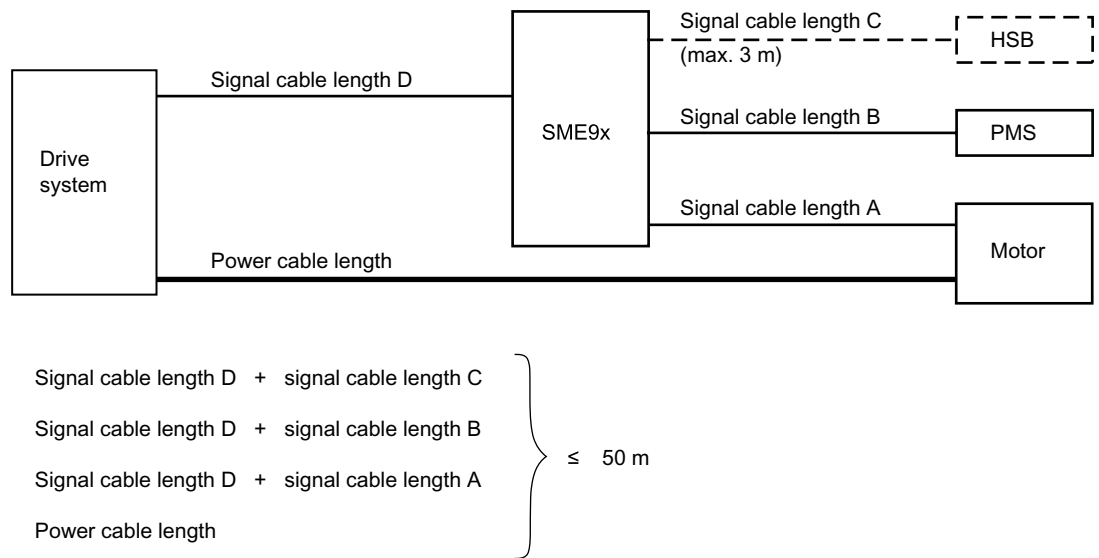Figure 2-1   Overview of order designations for signal cable extensions

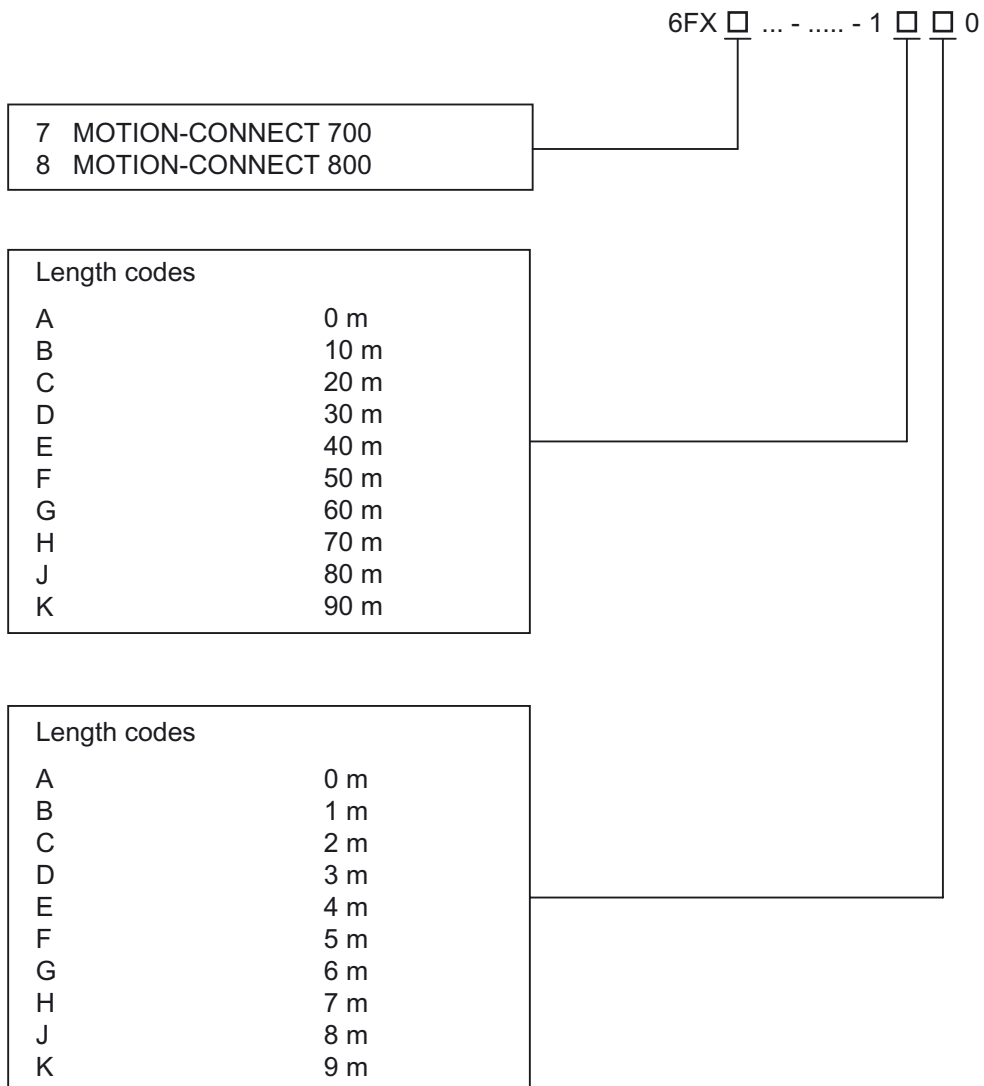Figure 2-2   Maximum permissible cable lengths

6FX □ ... - ..... - 1 □ □ 0

7	MOTION-CONNECT 700
8	MOTION-CONNECT 800

Length codes	
A	0 m
B	10 m
C	20 m
D	30 m
E	40 m
F	50 m
G	60 m
H	70 m
J	80 m
K	90 m

Length codes	
A	0 m
B	1 m
C	2 m
D	3 m
E	4 m
F	5 m
G	6 m
H	7 m
J	8 m
K	9 m

Figure 2-3   Information about the ordering code

Note

Additional information about ordering codes is provided in catalog NC 60.

When required, angular connectors can be purchased (however, not for signal cables for temperature sensors). Please contact your local Siemens office.
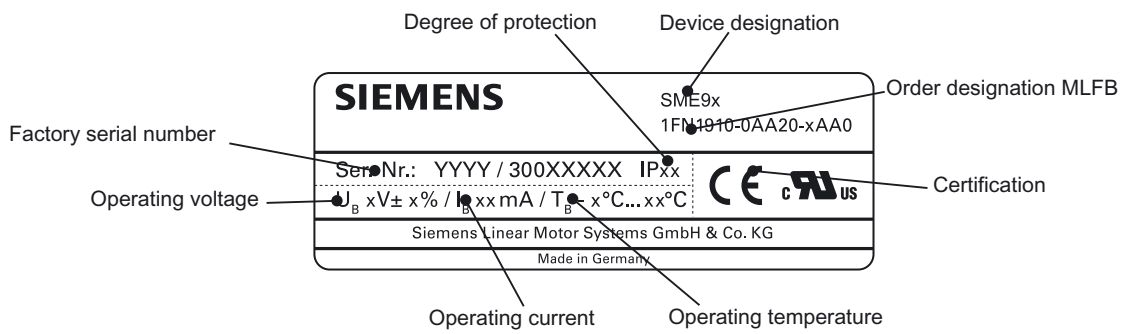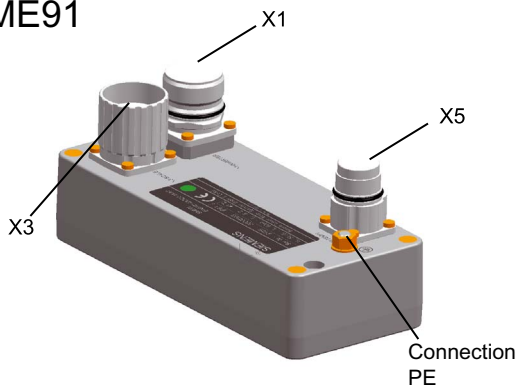
2.4   Rating plate

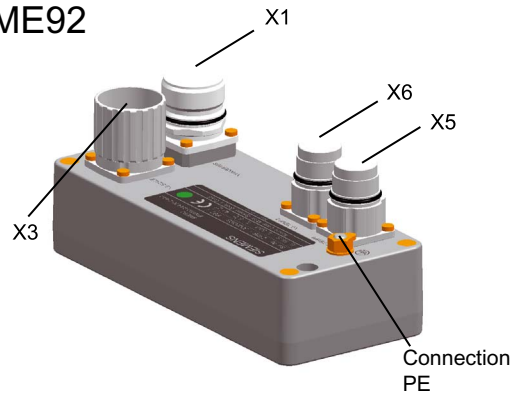Figure 2-4   Rating plate for SME9x (schematic diagram)

Device components

3.1   Overview of the device design
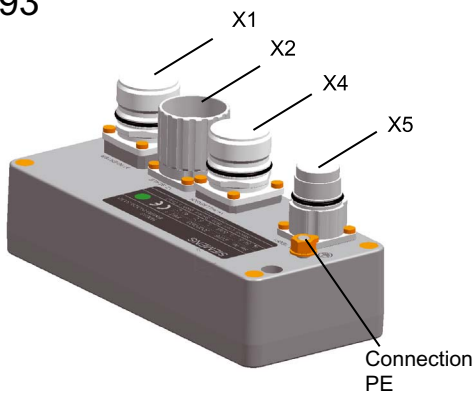
Device design

SME91

SME92
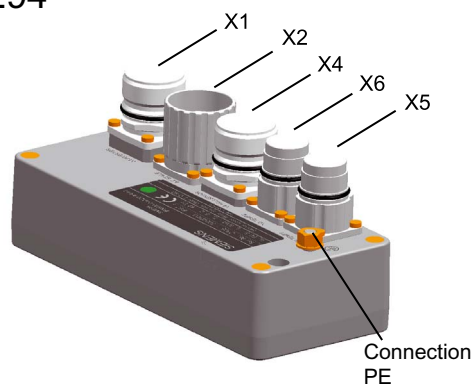
SME93

SME94

Figure 3-1   Models and design of SME9x

Device models

There are a total of four different device models. They differ in the number of connections for the temperature sensors, the type of connector for the position and angular position measuring system (PMS) and in the option for connecting a Hall sensor box (HSB). For interface designations, refer to the following table.

Table 3-1   Device versions with interface designations, system: SIMODRIVE 611 and POSMO CD/CA
              MLFB: 1FN1910-0AA20-xxxx

Interface	Designation	Meaning	SME91	SME92	SME93	SME94
			-1AA0	-2AA0	-3AA0	-4AA0
X1	INVERTER	Output to the drive converter control board, 17 pin	X	X	X	X
X2	SCALE	Input for the incremental PMS, 12 pin			X	X
X3	SCALE	Input for EnDat PMS, 17 pin	X	X		
X4	HALLSENSOR	Input for HSB, 9 pin			X	X
X5	TEMP1	Input for temperature sensor, 7 pin	X	X	X	X
X6	TEMP2	Input for temperature sensor, 7 pin		X		X

The SME92 and SME94 are suitable for applications where two motors are operated in parallel on one drive converter. The PTC sensors or bimetallic thermoswitches and the KTY 84 sensors of both motors can be connected to the SME92 or SME94.

Position detection

The position of a motor is detected either by an EnDat PMS or by an incremental PMS. A Hall sensor box (HSB) may also need to be connected for 1FN1 or 1FN3 linear motors in order to determine the commutation position.

3.2   Scope of functions

Operating principle

The SME9x has plug-in connections for the motor sensor signals so that they can be connected to the analog motor encoder interface of the SIMODRIVE 611 or POSMO CD/CA drive converters via the standard motor encoder cable and then evaluated.

While the motor temperature remains within tolerance, the SME9x instantaneously transfers the actual resistance value of the KTY84 temperature sensor input to the drive converter.

The SME9x notifies the converter as soon as the resistance of the PTC temperature sensor input exceeds tolerance (> 1560 Ω) as the result of a motor phase overheating, i.e. as soon as the prewarning threshold is exceeded. The converter issues the warning "Motor temperature prewarning" and triggers a system response (e.g. emergency retraction).

2 seconds after the prewarning threshold is reached, the SME9x sends another message to the converter. The converter issues the message "Trip limit motor temperature" and shuts down.

For further details, please refer to the descriptions and diagrams below.

Behavior of the SME9x when the sensor has a short circuit

If the resistance at the connections of the KTY 84, PTC or bimetallic switch of the temperature sensor input (X5, X6) falls below 30 Ω, a sensor short circuit is detected and the SME9x reacts (see description of "Reaction").

This reaction is canceled only if the resistance value of the inputs again increases to above 60 Ω.

Behavior of the SME9x when a sensor wire is interrupted

If the resistance at the KTY 84 connections of the temperature sensor input (X5, X6) exceeds 1560 Ω, an interrupted sensor wire is detected and the SME9x reacts (see description of "Reaction").

This reaction is canceled only if the resistance value of the inputs again drops to below 1500 Ω.

The SME9x also reacts in this way if the KTY 84 senses a motor temperature above 180 °C, which corresponds to a resistance value of 1560 Ω.

Reaction

The "reaction" is initiated by the SME9x in response to states "sensor short circuit", "sensor wire interruption" and "overtemperature".

The response characteristics described below are also illustrated in the diagram "Example of timing of the input signals and output signal of the SME9x".

1. Output of a resistance value of 1340 Ω (corresponding to about 150 °C) so as to display a prewarning via the drive converter.

2. After 2 seconds, output of the trip resistance value of 1800 Ω (corresponding to about 205 °C).

As a result of the 2 second delay, the drive can be safely braked in response to the prewarning signal.

The reaction is canceled if the input of the PTC temperature sensor drops from the prewarning resistance value back down to below 1500 Ω within this 2-second period (e.g. because the motor has cooled down to within permissible limits in the meantime).

Table 3-2   Response characteristics SME9x

Temperature sensor inputs X5, X6; KTY 84	Temperature sensor inputs X5, X6; PTC	Condition	Output at interface X1
< 30 Ω	*	Short circuit at the KTY 84 input	Reaction
*	< 30 Ω	Short circuit at the input of the PTC/bimetallic switch	Reaction
30 Ω ≤ $R_{KTY\,84}$ ≤ 1560 Ω	≤ 1560 Ω	Operation, motor temperature OK	If $R_{KTY\,84}$ < 100 Ω, then output 100 Ω, otherwise output $R_{KTY\,84}$
30 Ω ≤ $R_{KTY\,84}$ ≤ 1560 Ω	> 1560 Ω	PTC/bimetallic switch tripped	Reaction
> 1560 Ω	≤ 1560 Ω	Interrupted KTY 84 sensor wire or motor overtemperature (> 180 °C)	Reaction
*	*	SME9x microprocessor failure	Output > 1800 Ω

* Value does not influence the output

t_1: Response, PTC / bimetallic switch
t_2: Motor shutdown
t_3: Motor cooled down below the motor temperature switching threshold
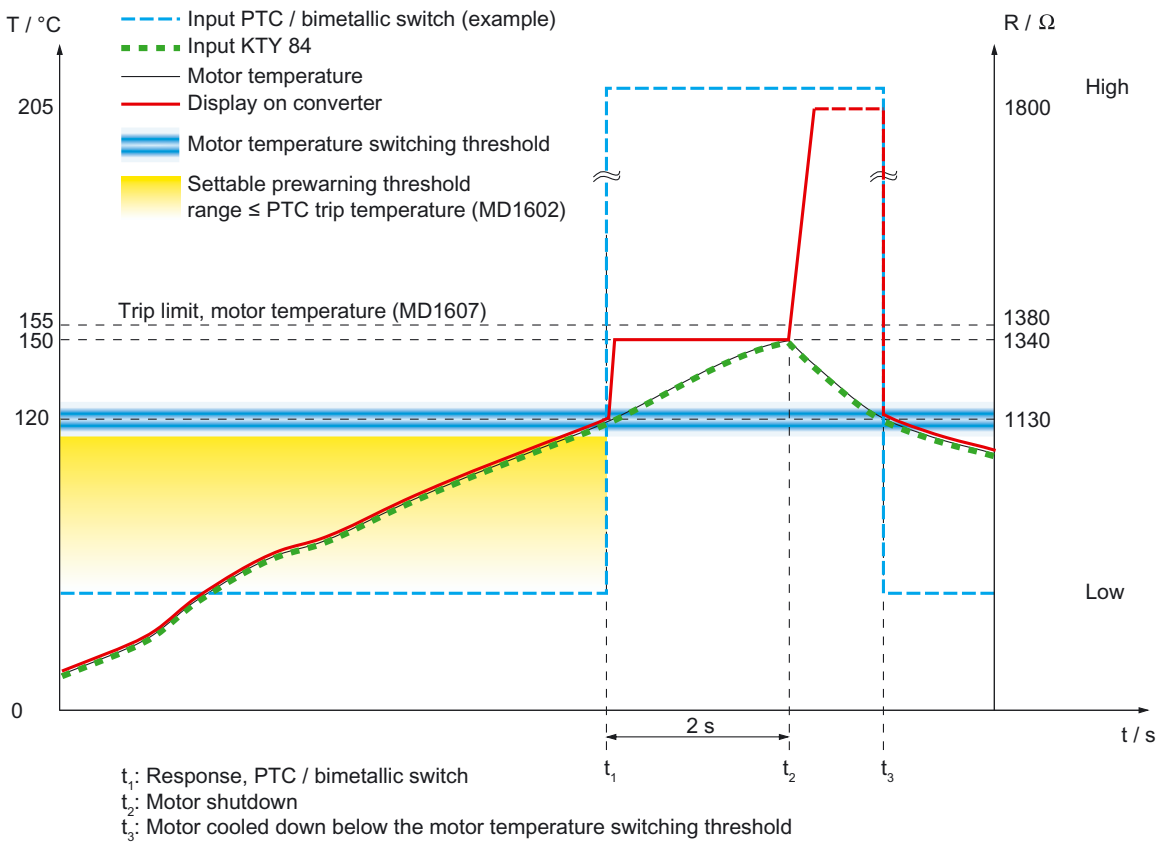
Figure 3-2   Example of the timing of the input signals and output signal of the SME9x

Note

The temperature characteristic of the KTY 84 can lag behind the actual temperature characteristic illustrated in the diagram in the event of quick temperature fluctuations.

Table 3-3   Resistance/temperature characteristic of the KTY 84 and PTC temperature sensor

KTY 84	PTC

Assembly

4
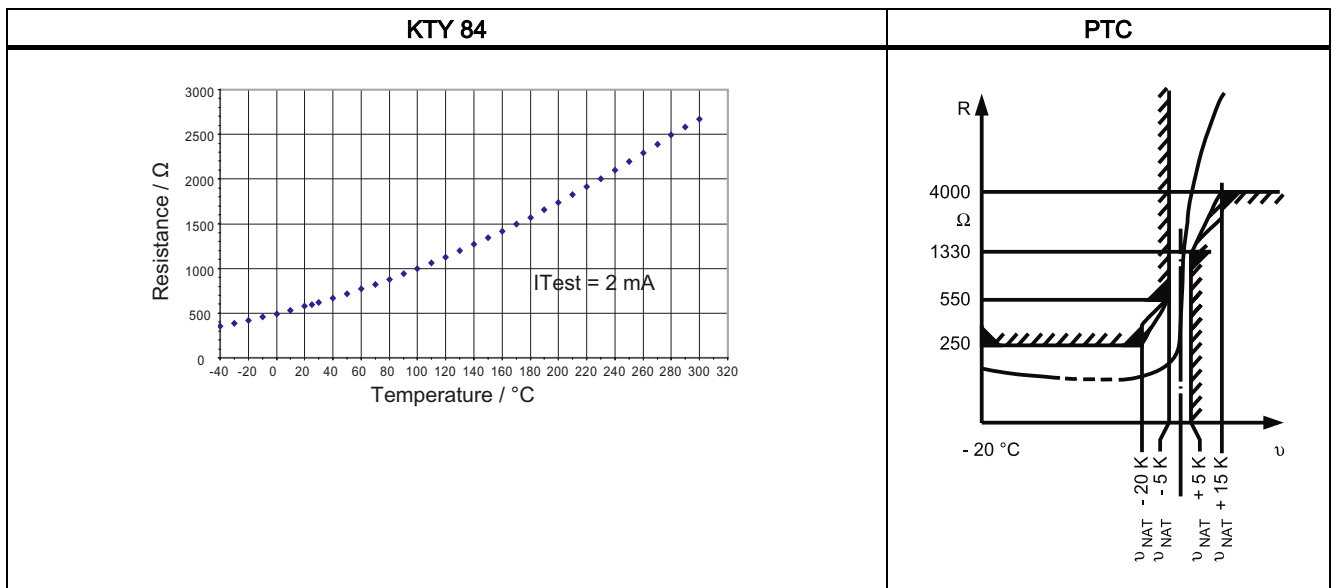
4.1 Assembly

4.1.1 Safety guidelines for assembly

⚠ WARNING
Only qualified, trained personnel that have been appropriately trained may assemble these devices. It is only permissible to operate the device after it has been securely mounted. The SME9x housing must be grounded. The minimum cross section for the grounding cable is 6 mm^2. If the Hall sensor box connection on the SME93/SME94 is not used, it must be sealed with the metal threaded plug supplied with the device to prevent moisture and pollutants from entering the unit through the connection. The connecting cable must be provided with sufficient strain relief.

⚠ WARNING
Never open the housing. This can destroy the device.

⚠ DANGER
Electrical shock hazard!
The equipment must be safely isolated from the supply before assembly work commences.

⚠ CAUTION
The performance of the SME9x may be impaired if water can collect on the isolating edges of the connector and enter the device.
If the SME9x is to be operated in a moist and humid environment, then it must be mounted so that the connector points downwards.

Figure 4-1   Correct assembly position

⚠ DANGER
Personnel and property are at risk of injury / damage if the SME9x is misused as a ladder "step". Damaged connectors can impair the performance of the SME9x.
Mount the SME9x so that nobody can misuse the SME9x as a step (connector pointing downwards).

ESDS instructions

<table>
<tr><td>

⚠ **CAUTION**

An **e**lectrostatic-**s**ensitive **d**evice (ESDS) is an individual component, integrated circuit, or module that can be damaged by electrostatic fields or discharges.

ESDS regulations for handling boards and equipment:

When handling components that can be destroyed by electrostatic discharge, it must be ensured that personnel, the workstation and packaging are well grounded!

Personnel in ESD zones with conductive floors may only touch electronic components if they are
– grounded through an ESDS bracelet and
– wearing ESDS shoes or ESDS shoe grounding strips.

Electronic boards may only be touched when absolutely necessary.

Electronic boards may not be brought into contact with plastics and articles of clothing manufactured from man-made fibers.

Electronic boards may only be placed on conductive surfaces (table with ESDS surface, conductive ESDS foam rubber, ESDS packing bag, ESDS transport containers).

Electronic boards may not be brought close to data terminals, monitors or television sets. Minimum clearance to screens > 10 cm).

Measurements may only be carried-out on electronic boards and modules if
– the measuring instrument is grounded (e.g. via a protective conductor) or
– before making measurements with a potential-free measuring device, the measuring head is briefly discharged (e.g. by touching an unpainted blank piece of metal on the control cabinet).

</td></tr>
</table>

4.1.2   Screws

Screws for assembling the device

The following are examples of screws which can be used to assemble the device:

Hexagon socket cheese head screws with thin head M4x40 according to DIN 7984 or slotted hexagon socket screws M4x40 according to DIN EN ISO 1207. The screws must be provided with locking elements.

The SME9x can be attached at various locations (e.g. mounted onto a panel, onto a machine assembly, in a control cabinet etc.). The screw material and the screw tightening torque must be selected according to the particular application.

4.1.3 Assembly procedure

PE connection:
Nut ISO 4032-M5-A2
Serrated washer DIN 6797-5.3-A2

Mounting hole
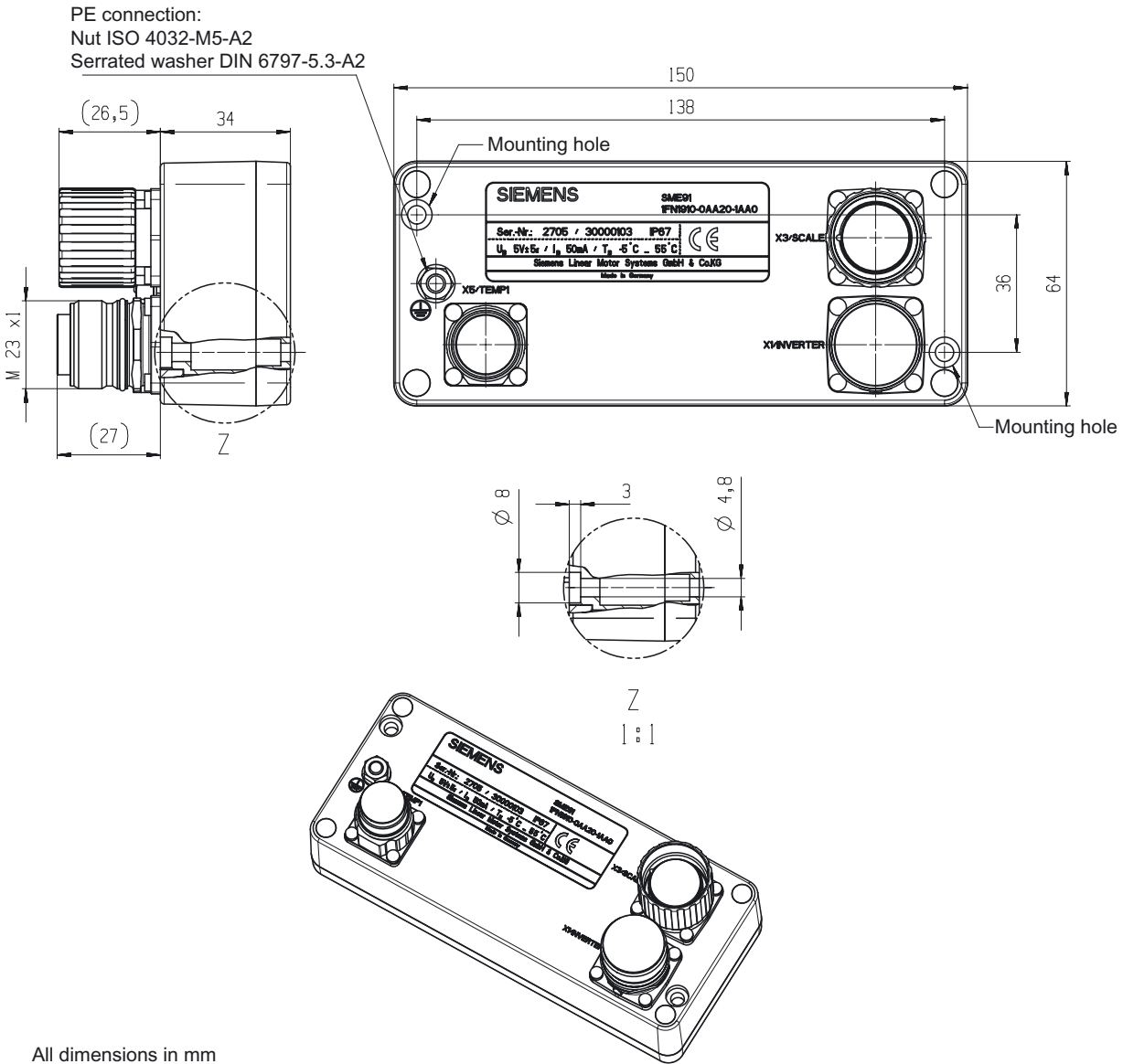
Mounting hole

All dimensions in mm

Figure 4-2   Assembly diagram SME9x

Assembly procedure

1. Mount the SME9x at the intended position. The SME9x has two mounting holes for this purpose.

2. Connect up the grounding cable.

3. Insert the connectors (connection overviews, refer to chapter "System integration (Page 33)"; interface designations, refer to chapter "Device components", section " Overview of the device design (Page 21) ").

4. Seal connections that are not used with metal threaded plugs.

5. Replace any bent or defective connectors and plug connections.

4.2   Protection of the device

> ⚠ **WARNING**
>
> The SME9x has degree of protection IP67 if all connections are made and all connectors are securely screwed in place up to the limit stop.
>
> If the Hall sensor box connection on the SME93/SME94 is not used, it must be sealed with the metal threaded plug supplied with the device

System integration 5

5.1 System requirements

5.1.1 Safety guidelines for system integration

⚠ DANGER
Components in electrical devices may be at hazardous potential. There is an electrical shock hazard!
In the event of a motor fault, a voltage up to the magnitude of the drive converter DC link voltage can be present at the temperature sensor connector (interface X5 / X6).

⚠ WARNING
The SME9x may malfunction if mobile radio equipment (e.g. cellular/mobile phones, 2-way radios) with a transmit power > 1 W are used in the immediate vicinity (<1.5 m)!

5.1.2 Drive system

| NOTICE |
|---|
| The SME9x has been designed for operation with SIMODRIVE 611 and POSMO CD/CA drive converters. Please make sure that the supply system is of the permissible type; refer to the appropriate documentation for the drive converters and the Configuration Manuals for the 1FN1 linear motors, 1FN3 linear motors and 1FW6 torque motors. |

5.1.3   Notes on cables

Note
The system integration diagrams shown below include cables for which no MLFB (order no.) is specified. These are cables which are already connected to the relevant components.

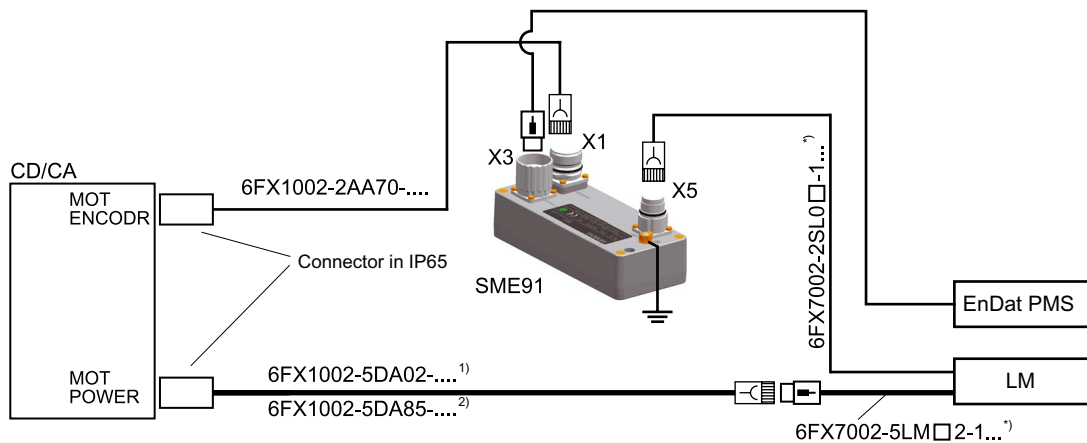## 5.1.4 Use of the SME9x for 1FN1 and 1FN3 linear motors
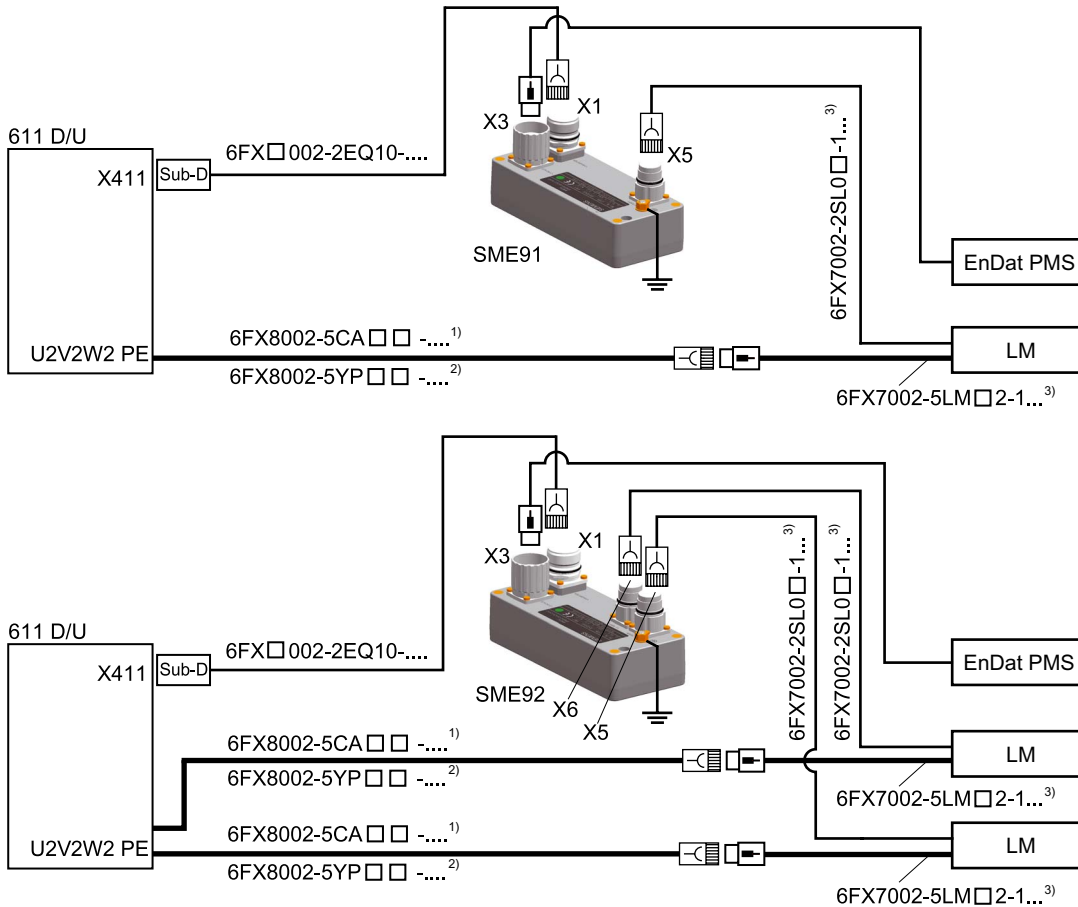
Figure 5-1 System integration of 1FN1 and 1FN3 linear motors in SIMODRIVE 611 with SME91 or SME92 (motor feeder cables with connectors)

[1] up to 10 mm² core cross section
[2] with 16 mm² core cross section

[3] Exception: Power and signal cables are permanently attached on 1FN3050

CD/CA

MOT ENCODR — 6FX1002-2AA70-....

Connector in IP65

X3 X1

X5

SME91

6FX7002-2SL0□-1...*)

EnDat PMS

MOT POWER — 6FX1002-5DA02-....[1)]
6FX1002-5DA85-....[2)]

LM

6FX7002-5LM□2-1...*)

[1)] 2.5 mm^2 core cross section
[2)] 6.0 mm^2 core cross section

*) Exception: Power and signal cables are permanently attached on 1FN3050

Figure 5-2   System integration of 1FN1 and 1FN3 linear motors in POSMO CD/CA with SME91 (motor feeder cables with connectors)

1) up to 10 mm² core cross section
2) with 16 mm² core cross section

3) Exception: Power and signal cables are permanently attached on 1FN3050

Figure 5-3   System integration of 1FN1 and 1FN3 linear motors in SIMODRIVE 611 with SME93 or SME94 (motor feeder cables with connectors)
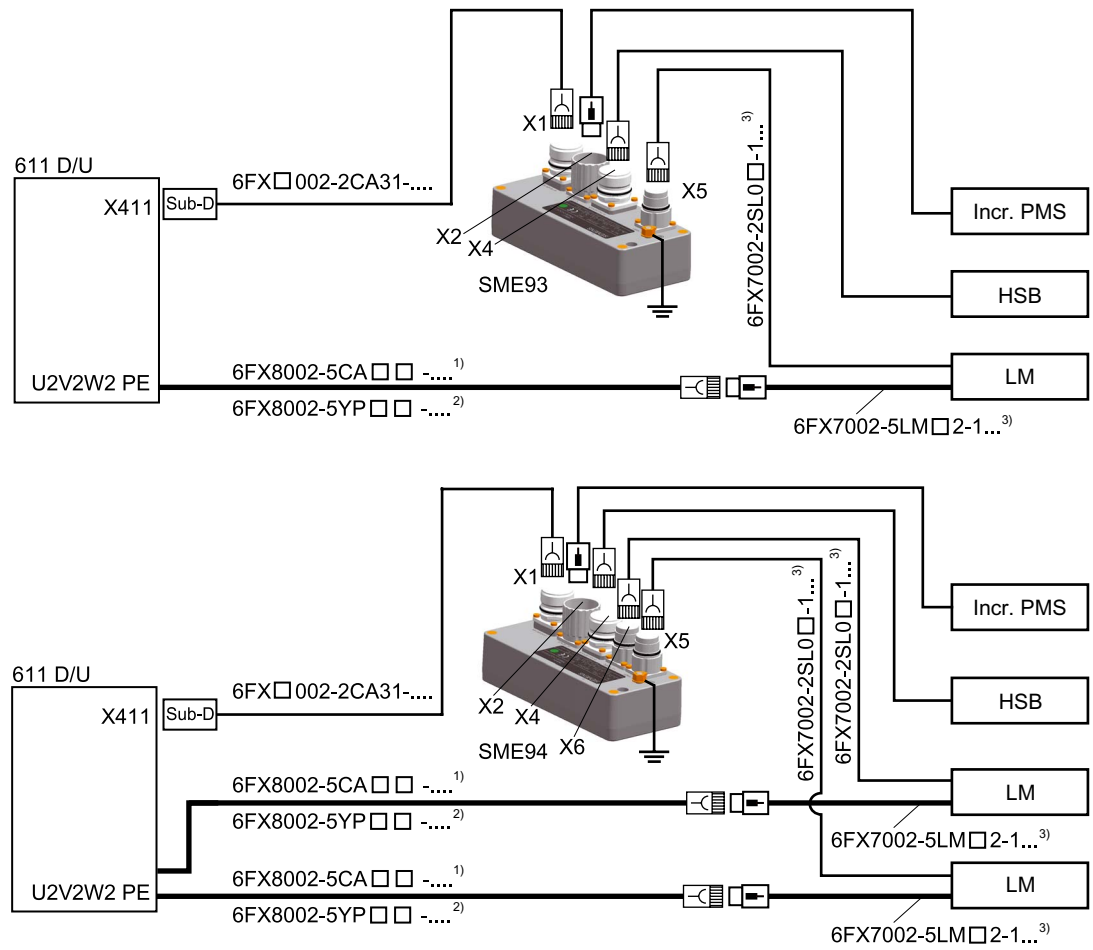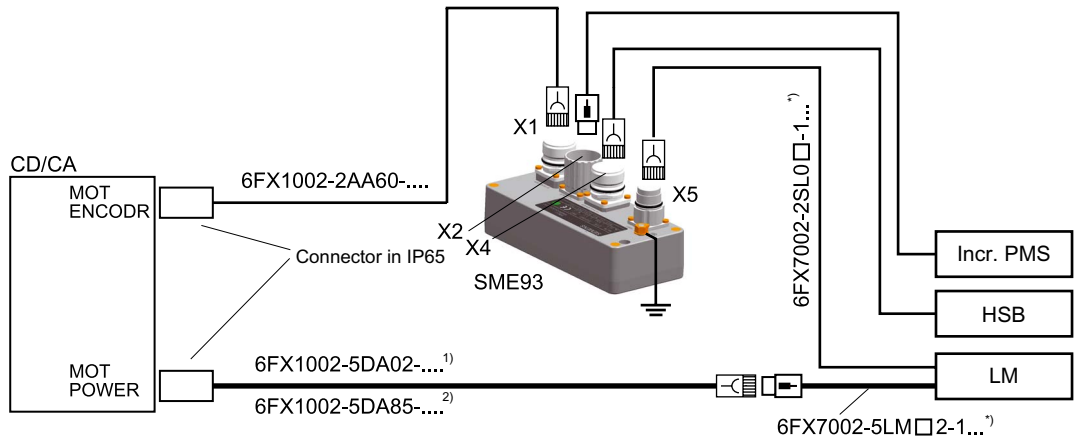
CD/CA

MOT
ENCODR

6FX1002-2AA60-....

Connector in IP65

MOT
POWER

6FX1002-5DA02-....[1]

6FX1002-5DA85-....[2]

X1

X2
X4

SME93

X5

6FX7002-2SL0☐-1...[*]

6FX7002-5LM☐2-1...[*]

Incr. PMS

HSB

LM

[1] 2.5 mm² core cross section
[2] 6.0 mm² core cross section

[*] Exception: Power and signal cables are permanently attached on 1FN3050

Figure 5-4   System integration of 1FN1 and 1FN3 linear motors in POSMO CD/CA with SME93
              (motor feeder cables with connectors)

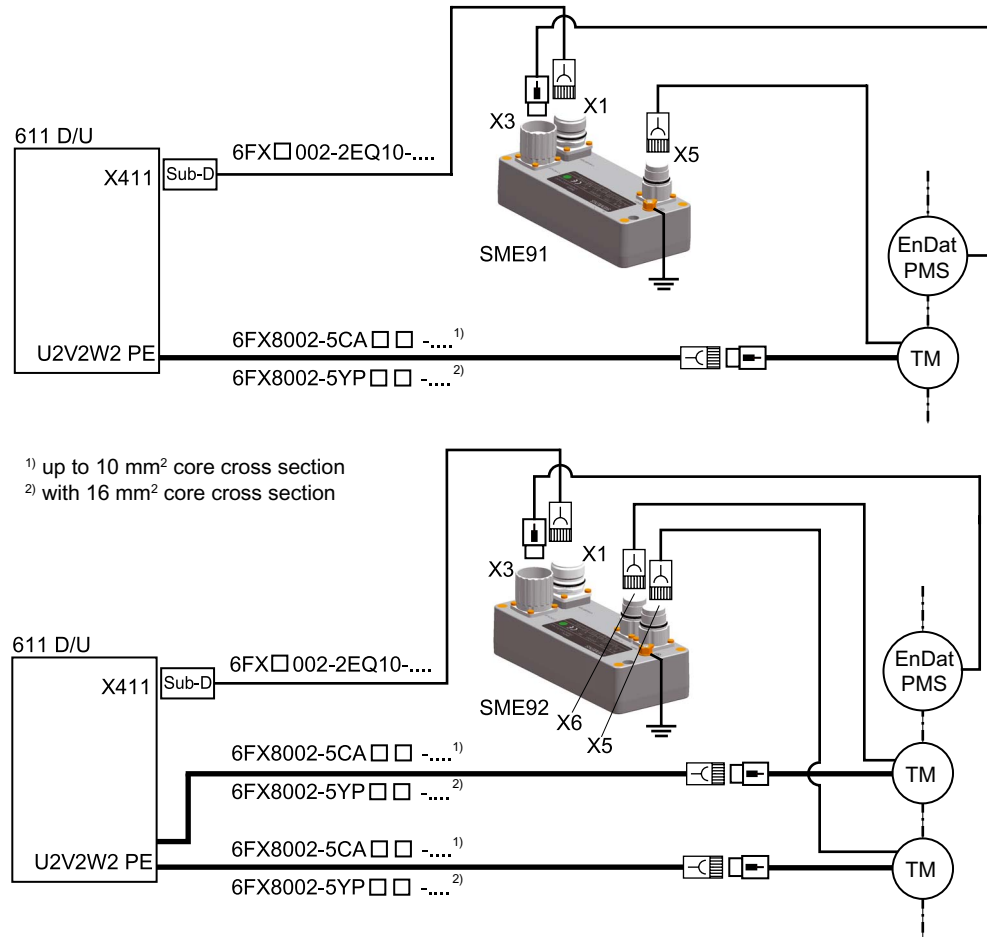## 5.1.5   Using the SME9x with 1FW6 torque motors

Figure 5-5   System integration of 1FW6 torque motors in SIMODRIVE 611 with SME91 or SME92
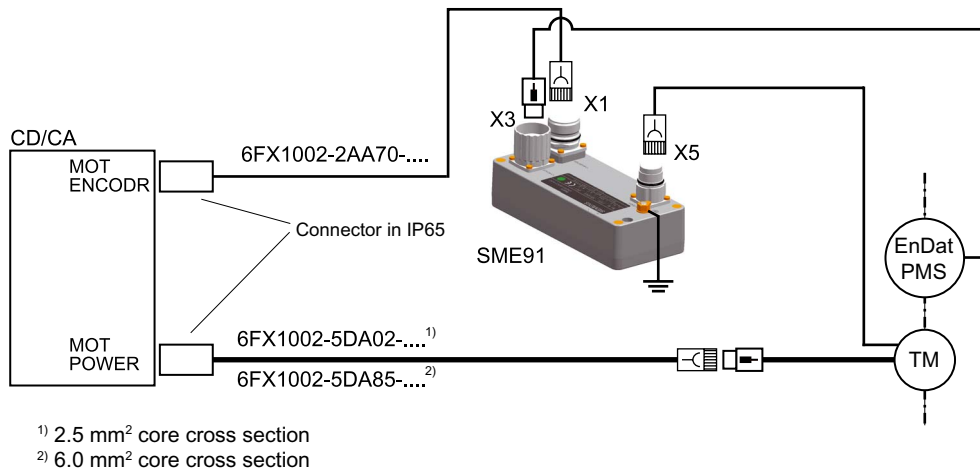
1) 2.5 mm² core cross section
2) 6.0 mm² core cross section

Figure 5-6   System integration of a 1FW6 torque motor in POSMO CD/CA with SME91

1) up to 10 mm² core cross section
2) with 16 mm² core cross section
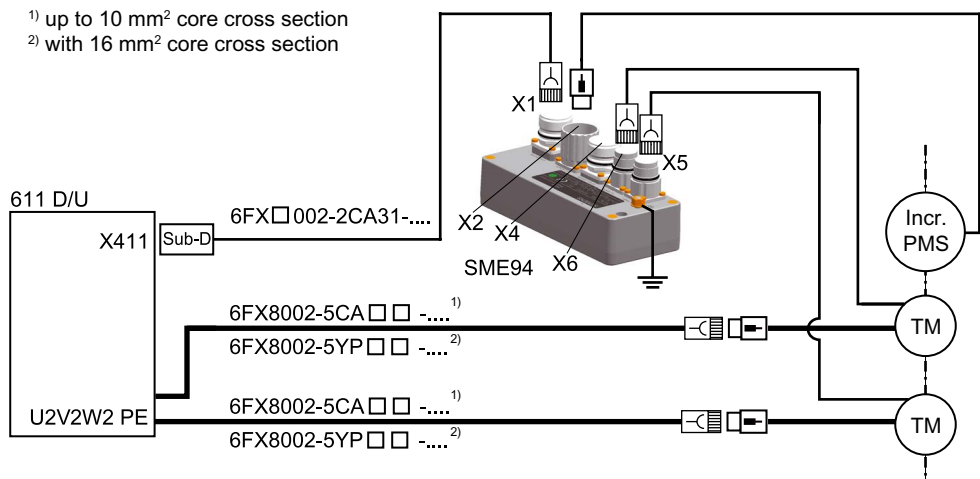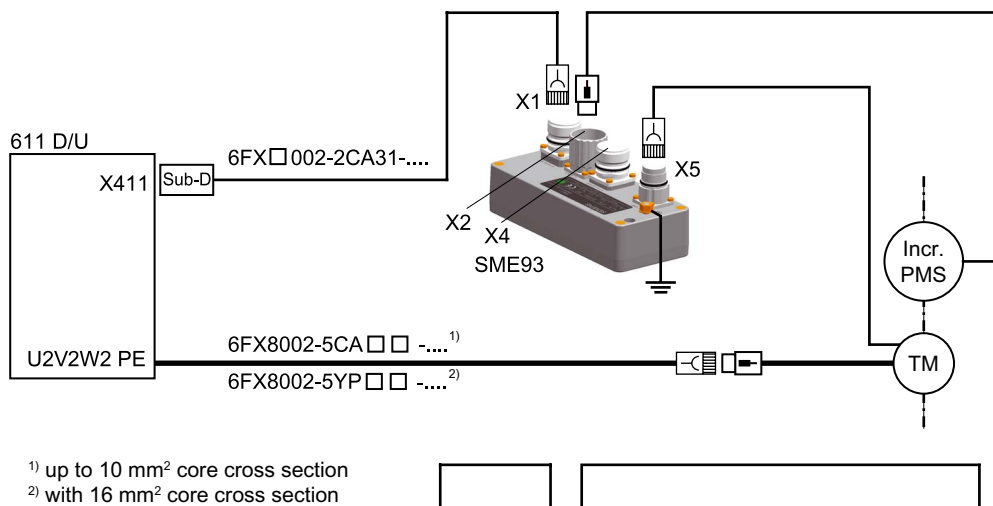
Figure 5-7   System integration of 1FW6 torque motors in SIMODRIVE 611 with SME93 or SME94

¹⁾ 2.5 mm² core cross section
²⁾ 6.0 mm² core cross section
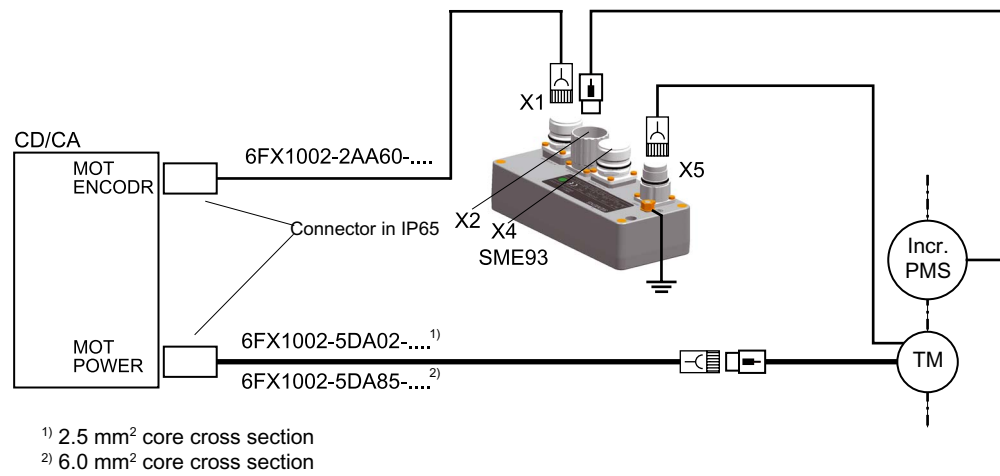
Figure 5-8   System integration of a 1FW6 torque motor in POSMO CD/CA with SME93

Interfaces

<div align="right">

6

</div>

6.1 Overview

Overview of interfaces

Please refer to chapter "Device components", section "Device models (Page 21) " with table "Device models with interface designations, system: SIMODRIVE 611 and POSMO CD/CA".

6.2 Interface X5 / X6 for temperature sensors

The connection for the temperature sensors (PTC, KTY, bimetallic thermoswitch) is a 7-pin, EMC-shielded M17 receptacle with pins and vibration protection. An M17 mating connector (MLFB 6FX2003-0SU07) is needed to connect the temperature sensors.
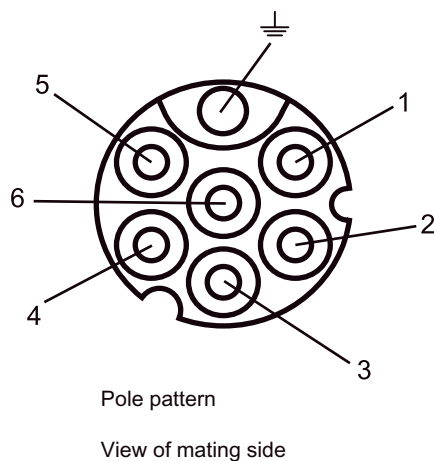

Pole pattern

View of mating side

Figure 6-1   Pole pattern for the interface between temperature sensor and SME9x

Table 6-1   SME9x interface to temperature sensors (PTC, KTY, bimetallic thermoswitch) - core and pin assignments

Core assignment for motors with signal cable without connector	Pin	Sensor contact for 1FW6	Sensor contact for 1FN3	Sensor contact for 1FN1
white	1	-1R2: KTY-	-1R2: KTY-	-1R2: KTY-
brown	2	+1R1: KTY+	+1R1: KTY+	+1R1:KTY+
green	3	1TP1: PTC 130 °C	1TP1: PTC	1TP1: Bimetallic NC contact
yellow	4	1TP2: PTC 130 °C	1TP2: PTC	
gray	5	2TP1: PTC 150 °C*)		1TP2: Bimetallic NC contact
pink	6	2TP2: PTC 150 °C*)		
green/yellow	⏚	PE	PE	PE

*) is not evaluated by the SME9x

NOTICE
Carefully note the polarity when connecting the KTY!

6.3   Interfaces to the motor encoder

Connection of an absolute PMS to SME91 and SME92

The interface to the motor encoder is provided for the connection of an EnDat PMS. It is a 17-pin, EMC-shielded M23 receptacle with socket. Shield connections are provided to both the SME9x housing and the measuring system.
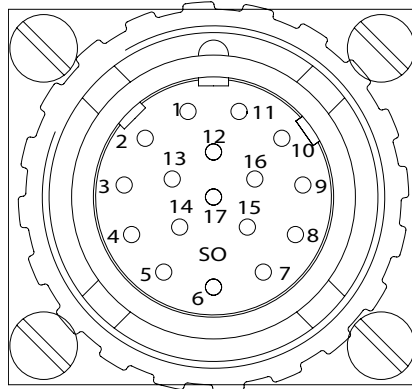
Figure 6-2   Interface from SME91 and SME92 to motor encoder with pin assignments

Table 6-2   Pin assignments on SME91 and SME92, interface X3

Signal assignments of SIMODRIVE 611 encoder interface	Signal assignments of POSMO CD/CA encoder interface	Interface X3 Pin assignments of socket for PMS
A	AP0	15
*A	AN0	16
EnDat_DAT	ENDATDA0	14
		*)
EnDat_CLK	ENDATCL0	8
		*)
M_Encoder	M	10
+Temp	TEMPP	*)
-Temp	TEMPM	*)
P encoder	PENC0	7
B	BP0	12
*B	BN0	13
*EnDat_DAT	XENDATDA0	17
*EnDat_CLK	XENDATCL0	9
0 V sense	MSENSE0	4
+5 V sense	PSENSE0	1
Inner shield	SHIELD0	11

*) Signals must not be connected to unassigned pins.

Connection of an incremental PMS to SME93 and SME94

The interface to the motor encoder is provided for the connection of an incremental PMS. It is a 12-pin, EMC-shielded M23 receptacle with socket. Shield connections are provided to both the SME9x housing and the measuring system.
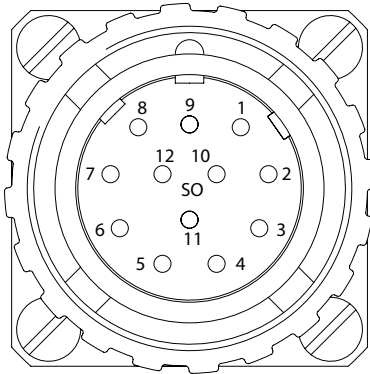

Figure 6-3   Interface from SME93 and SME94 to motor encoder with pin assignments

Table 6-3   Pin assignments on SME93 and SME94, interface X2

Signal assignments of SIMODRIVE 611 encoder interface	Signal assignments of POSMO CD/CA encoder interface	Interface X2 Pin assignments of socket for PMS
A	AP0	5
*A	AN0	6
R	RP0	3
*D	DN0	*)
C	CP0	*)
*C	CN0	*)
M_Encoder	M	10
+Temp	TEMPP	*)
-Temp	TEMPM	*)
P_Encoder	PENC0	12
B	BP0	8
*B	BN0	1
*R	RN0	4
D	DP0	*)
0 V sense	MSENSE0	11
+5 V sense	PSENSE0	2
Inner shield	SHIELD0	*)

*) Signals must not be connected to unassigned pins.

6.4   Parameter settings

Parameter settings on the drive converter

For the SME9x to function, no changes need to be made to the default parameter settings on the drive converter for temperature monitoring. The parameter setting information given below refers to the SIMODRIVE 611 and POSMO CD/CA systems.

Default settings:

MD1602 (prewarning threshold):	120 °C
MD1603 (timer, motor temperature alarm):	240 s
MD1607 (trip limit, motor temperature):	155 °C

⚠ **DANGER**

There is danger of damage to property if the drive converter is incorrectly parameterized.

Only qualified, trained personnel who have been appropriately instructed may carry out parameterization work on the drive converter.

MD1607 (trip limit, motor temperature) must be 155 °C; i.e. this parameter must not be changed.

Explanation of MD1603:

If the prewarning threshold (MD1602) is exceeded while the motor temperature continues to increase or remains static, the motor will be tripped after the "timer, motor temperature alarm" has expired (MD1603, default setting 240 s). - If the motor temperature again falls below the prewarning threshold within the timer setting, the drive converter prewarning signal is reset and the motor is not shut down.

Note

Please observe the following when parameterizing the machine data:

MD1602 (prewarning threshold) and MD1603 (timer, motor temperature alarm) can be adapted to suit the specific application. However, for 1FN1 or 1FN3 linear motors and 1FW6 torque motors, MD1602 (prewarning threshold) should not be set higher than the trip temperature of the PTC temperature sensor or bimetallic thermoswitch. For trip temperatures, refer to the Configuration Manuals of the motors.

Disposal

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The product must be disposed of in the normal recycling process in compliance with national and local regulations.

7.1 Disposing of electronic components

Electronic components must be properly disposed of as electrical waste.

7.2 Disposing of the SME9x packaging

Disposal of packaging

The packaging and packing aids we use contain no toxic materials. They can and must always be recycled.

Appendix A

A.1   Fax form for suggestions/corrections (copy template)

Should you come across any printing errors when reading this publication, please notify us on this sheet. We would also be grateful for any suggestions and recommendations for improvement.

To SIEMENS AG A&D MC MS1 P.O. Box 3180 D-91050 Erlangen Germany Fax: +49 (0) 9131 / 98 - 63315 (documentation) mailto:docu.motioncontrol@siemens.com http://www.siemens.com/automation/service&support	From Name:
	Address of your company/department
	Street:
	Zip code: City:
	Telephone: /
	Fax: /

Suggestions and/or corrections

A.2   List of abbreviations

HSB	Hall sensor box
Incr.	Incremental
LM	Linear motor
SME	Sensor Module External
TM	Torque motor
PMS	Position or angular position measuring system

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