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1 About this Documentation

1.1 Overview – target groups & product phases

The target groups, product phases and activities that can refer to this document are marked in rounded boxes in the following figure.

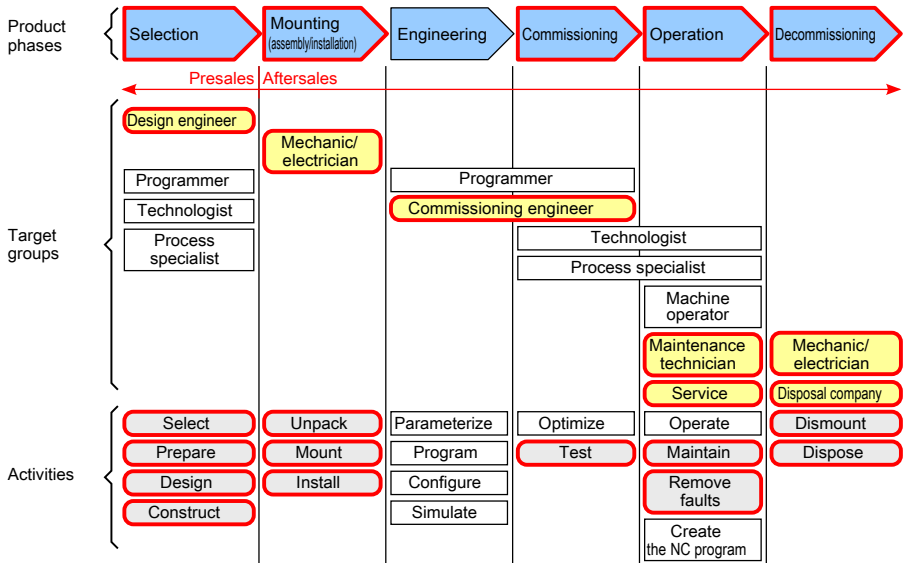


Fig. 1-1: Target groups, product phases and activities

1.2 Intended audience

This document explains **technical and service personnel of the machine builder** how to safely install the system housing mechanically and electrically. This document is not the usage manual.

1.3 Availability

These Instructions are part of the NYS04.2-ST-0x-ULNN-NY40x3 system housing product delivery (where x = 1, 2, 3, 4, 5) and must always be available for the user. If the system housing is handed over to another person, these Instructions must be handed over as well.

1.4 Included parts

Type code	Material number	Description
One of		
● NYS04.2-ST-01-ULNN-NY4013	R911172904	system housing
● NYS04.2-ST-02-ULNN-NY4023	R911172905	system housing
● NYS04.2-ST-03-ULNN-NY4033	R911172966	system housing
● NYS04.2-ST-04-ULNN-NY4043	R911172906	system housing
● NYS04.2-ST-05-ULNN-NY4053	R911172907	system housing
DOK-NY4000-SYST*40X3**-ITxx-yy-P	R911337318	Instructions

xx 2-digit version number

yy language indication

Tab. 1-1: Available system housings

Headers for 24V System, SE, DP NY4130, DP and M connectors are also included.

1.5 Variations

These Instructions apply to the NYCe 4000 system housings with the following type code:

- NYS04.2-ST-01-ULNN-NY4013
- NYS04.2-ST-02-ULNN-NY4023
- NYS04.2-ST-03-ULNN-NY4033
- NYS04.2-ST-04-ULNN-NY4043
- NYS04.2-ST-05-ULNN-NY4053

1.6 Further available documentation

The following documentation contains detailed information. Use the listed documentation or a newer version, if available.

Title and type code	Material number
Rexroth NYCe 4000 Hardware System Manual DOK-NY4000-HW***SYSTEM-PRRS-EN-E	R911337671
Rexroth NYCe 4000 Standard Housings & Accessories Manual DOK-NY4000-HOUSING*ACC-PRRS-EN-E	R911337672

Tab. 1-2: Available documentation

1.7 Additional parts

Motion Control Units, host adapter, drive modules, fan units, capacitor kits, connection cables, and more are listed in the project planning manuals or on www.boschrexroth.com.

2 Product Identification and Scope of Delivery

2.1 Product identification

All system housings have one slot for the Motion Control Unit (MCU) and the

- NYS04.2-ST-01-ULNN-NY4013 has one slot for a drive module.
- NYS04.2-ST-02-ULNN-NY4023 has 2 slots for drive modules.
- NYS04.2-ST-03-ULNN-NY4033 has 3 slots for drive modules.
- NYS04.2-ST-04-ULNN-NY4043 has 4 slots for drive modules.
- NYS04.2-ST-05-ULNN-NY4053 has 5 slots for drive modules.

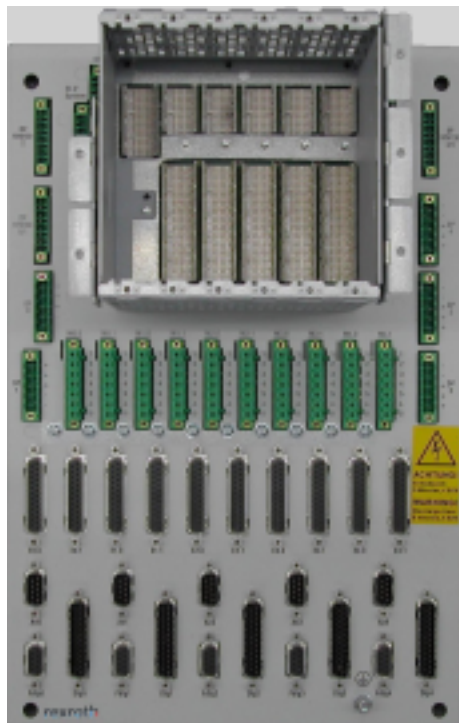


Fig. 2-1: View of the NYS04.2-ST-05-ULNN-NY4053

The Power Marking label indicates the rating of the system housing and other information.

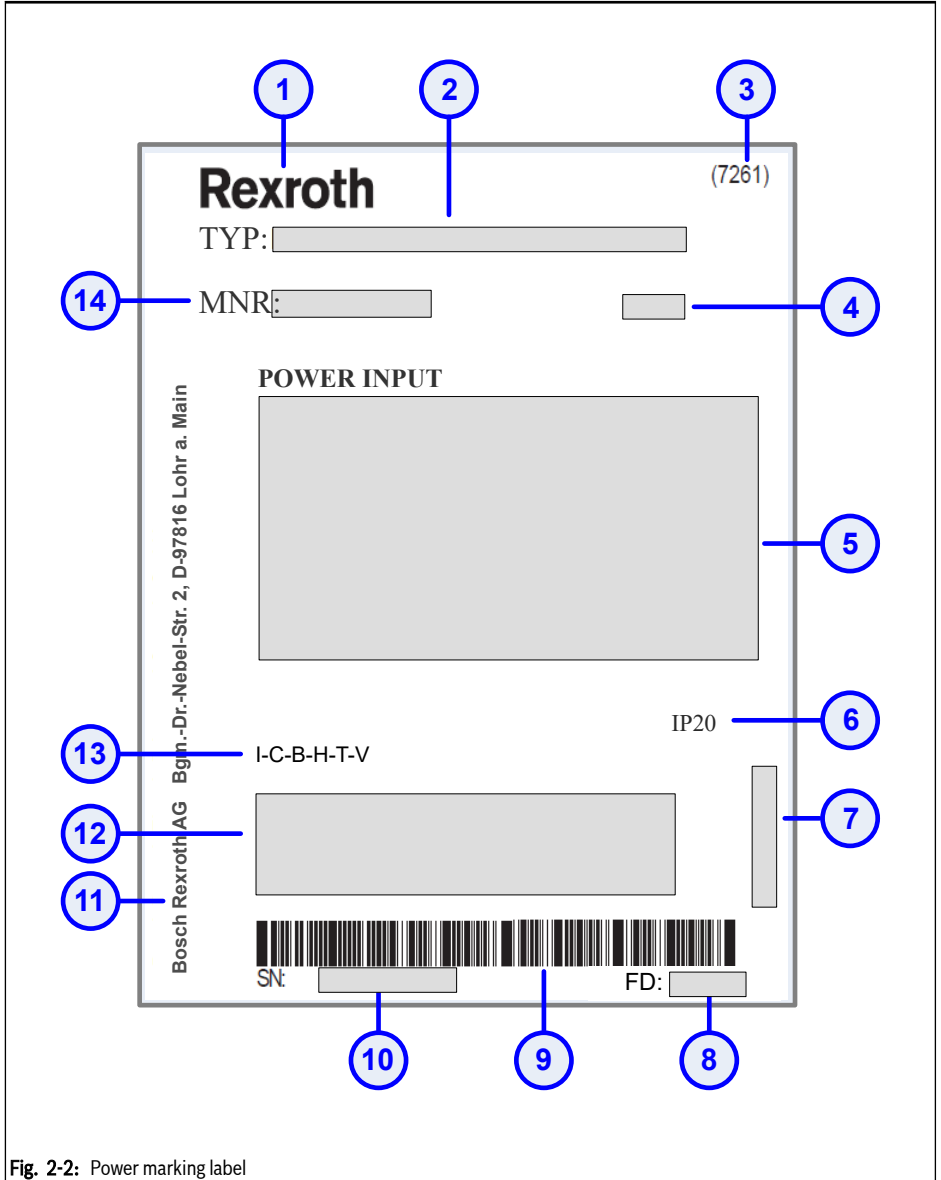


Fig. 2-2: Power marking label

1	Logotype
2	Type code
3	Division number / plant number
4	Change index

5	Rated voltages and currents
6	Degrees of protection provided by enclosure (IP code)
7	Designation of origin
8	Date of manufacture (yyWww)
9	Rexroth bar code
10	Serial number
11	Company address
12	Certification markings
13	Test markings
14	Material number

Tab. 2-1: Power marking labels and explanation



	<p>The discharge warning label warns the technician to observe a 5 minute discharge time delay to be certain that voltages are below 60 V, before undertaking any actions with the product.</p>
	<p>Consult the documentation for detailed information.</p>

Fig. 2-3: Warning label

Fig. 2-4: Documentation label

Tab. 2-2: Labels on the system housing

2.2 Scope of delivery

The product delivery consists of the following items.

- NYS04.2-ST-01-ULNN-NY4013 system housing, material number R911172904 or
NYS04.2-ST-02-ULNN-NY4023 system housing, material number R911172905

or
 NYS04.2-ST-03-ULNN-NY4033 system housing, material number R911172966
 or
 NYS04.2-ST-04-ULNN-NY4043 system housing, material number R911172906
 or
 NYS04.2-ST-05-ULNN-NY4053 system housing, material number R911172907

- DOK-NY4000-SYST*40X3**-ITxx-yy-P Instructions (where "xx" represents a 2-digit version number, and "yy" the language indication), material number R911337318.
- Cable connector parts for 24V System, SE, Drive Power and Motor connections.

3 Using the Safety Instructions

3.1 Safety instructions - structure

The safety instructions are structured as shown in the following example.

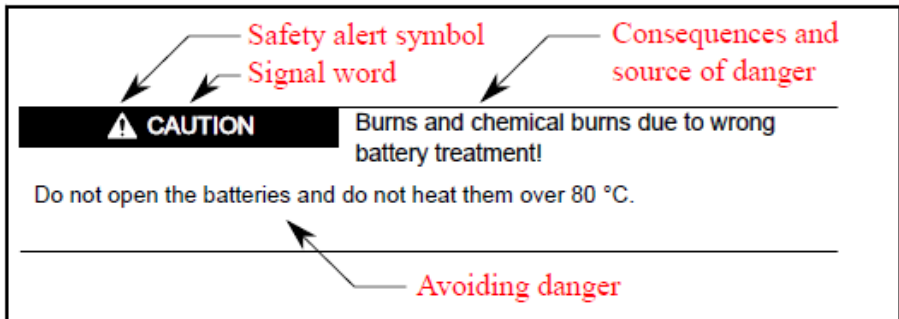


Fig. 3-1: Safety instruction lay-out

3.2 Explaining signal words and safety alert symbols

The safety instructions in this documentation contain specific signal words (danger, warning, caution, notice) and if necessary, a safety alert symbol (according to ANSI Z535.6-2011).

The signal word is meant to draw the reader's attention to the safety instruction and signifies the degree of danger. The safety alert symbol (a triangle with an exclamation point), which precedes the signal words "danger", "warning" and "caution" is used to alert the reader to personal injury hazards.

⚠ DANGER

In case of non-compliance with this safety instruction, death or serious injury will occur.

⚠ WARNING

In case of non-compliance with this safety instruction, death or serious injury can occur.

⚠ CAUTION

In case of non-compliance with this safety instruction, minor or moderate injury could occur.

NOTICE

In case of non-compliance with this safety instruction, property damage could occur.

4 Intended Use

The system housing is for indoor use only, and may only be used with parts indicated in this document. Not explicitly mentioned parts may not be installed or connected. Usage is only allowed in explicitly indicated combinations of parts.

Do not install and use this system housing before you have read all relevant documents. You must read the safety instructions and all other directions for use before you start any work or activity with this system housing.

The system housing has no certified functional safety on board. This means that all precautions for a safe operation must be ensured by external components.

5 Accessories, Spare Parts and Wear Parts

The following accessories are available for these system housings.

Type code	Material number	Description
NYA04.1-FAN-1DRV-NY4922/00	R911328062	Fan unit – 1 drive slot
NYA04.1-FAN-2DRV-NY4922/10	R911325083	Fan unit – 2 drive slots
NYA04.1-FAN-3DRV-NY4922/20	R911172220	Fan unit – 3 drive slots
NYA04.1-FAN-4DRV-NY4922/30	R911328063	Fan unit – 4 drive slots
NYA04.1-FAN-5DRV-NY4922/50	R911325084	Fan unit – 5 drive slots
NYA04.1-CAP-100V-NY4921/00	R911325079	Capacitor kit 100V
NYA04.1-CAP-200V-NY4921/10	R911325082	Capacitor kit 200V

Type code	Material number	Description
NYA04.1-COVRPL-NO-USED-NY4900	R911318964	Cover plate for non-used slots
NYA04.1-SHIELD-SUP-MOT-5PCS-NY491	R911172999	Motor cable shield and support bracket

Tab. 5-1: Accessories for system housings

The system housings do not contain any replaceable or wear parts. In case of failure, the entire system housing must be replaced.

6 Ambient Conditions

	Operating	Storage and transport
Maximum environment temperature	+5 °C .. +55 °C	-40 °C .. +85 °C
Relative Humidity	10 % .. 90 % (non-condensing)	5 % .. 95 % (non-condensing)
Mechanical strength	Vibration: IEC 60068-2-6:2007 Vibration, broad-band: IEC 60068-2-64:2008	Shock: IEC 60068-2-27:2008
Pollution degree	2	2
Overvoltage category	II	-
Maximum altitude	4000 m	

Tab. 6-1: Ambient conditions

Degrees of protection provided by enclosures: IP20.

Free air flow in vertical direction is required above and below the module holder for a distance of minimal 100 mm for forced cooled systems and 200 mm for convection cooled systems.

If convection cooling is used (instead of forced cooling) the system housing must be installed vertical to ensure sufficient free air flow through the ventilation holes.

Bend cables away from the ventilation holes of the module holder as near to the connectors as possible. Make sure that no objects or cables obstruct the ventilation holes in the bottom and top of the module holder.

7 Technical Data

7.1 General

Requirements on Mains Circuits.

- Mains Circuits of overvoltage category II up to 300 V AC rms.

7.2 24V Power supply ratings

The 24V System, 24V Fast Digital and 24V Digital input power specifications are listed in the following table.

Input power	UN	IN Fan	IN Natural convection
24V System	DC 24V	3.0A	3.0A
24V Fdigx / drive	DC 24V	0.2A	0.2A
24V Digx / drive	DC 24V	4.5A	4.5A

Tab. 7-1: 24V power supply ratings

7.3 Drive power supply ratings

The drive power specifications for the system housing are listed in the following table.

Drive power	UN	IN Fan	IN Natural convection
DPx	DC +15 .. +75V	12.0A	6.0A
	DC +48 .. +150V	6.0A	2.5A
DP NY4130 x	DC +26V/-26V	1.0A	0.5A
	DC +15V/-15V	1.7A	1.0A

Tab. 7-2: Drive power supply ratings

7.4 Motor connector ratings

The motor connector ratings for the NY4120 and NY4140 modules (DPx) are specified in the following tables.

- Motor connector Mx.0

Motor type	UN	IN Fan	IN Natural convection
BLAC motor	3x 0V .. 150V	0 .. 7Arms	0 .. 3Arms
BLDC motor	3x 0V .. 150V	0 .. 7Arms	0 .. 3Arms
Stepper motor	4x 0V .. 75V	0 .. 7Arms	0 .. 3Arms
DC motor	2x 0V .. 75V	0 .. 7Arms	0 .. 3Arms

Tab. 7-3: Motor connector Mx.0 ratings

- Motor connector Mx.1

Motor type	UN	IN Fan	IN Natural convection
BLAC motor	3x 0V .. 75V	0 .. 7Arms	0 .. 3Arms
BLDC motor	3x 0V .. 75V	0 .. 7Arms	0 .. 3Arms
Stepper motor	4x 0V .. 75V	0 .. 7Arms	0 .. 3Arms
DC motor	2x 0V .. 75V	0 .. 7Arms	0 .. 3Arms

Tab. 7-4: Motor connector Mx.1 ratings

The motor connector ratings for the NY4130 (DP NY4130 x) are specified in the following tables.

- Motor connector Mx.0

Motor type and connection	UN	IN Fan	IN Natural convection
DC motor balanced	DC +/-26V	0 .. 2Arms @ +/-15V	0 .. 1Arms @ +/-15V
		0 .. 1Arms @ +/-26V	0 .. 0.5Arms @ +/-26V

Tab. 7-5: Motor connector Mx.0 ratings

- Motor connector Mx.1

Motor type and connection	UN	IN Fan	IN Natural convection
DC motor unbalanced	DC +/-26V	0 .. 2Arms @ +/-15V	0 .. 1Arms @ +/-15V
		0 .. 1Arms @ +/-26V	0 .. 0.5Arms @ +/-26V

Tab. 7-6: Motor connector Mx.1 ratings

8 Standards

8.1 Used standards

The components of the system housing correspond to the following standard.

- IEC61010-1:2010 (Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements)
- IEC61000-6-2:2005) (Immunity for industrial environments)
- IEC61000-6-4:2018 (Emission for industrial environments)

8.2 CE marking

Declaration of Conformity



Fig. 8-1: CE logo

The system housings described in the present instructions, comply with the requirements and the target of the following EU directive and with the following harmonized European standards:

- Low Voltage Directive 2014/35/EU

This product is a built-in unit which, owing to its installation characteristics, is not able to comply with the regulations for complete apparatus, machines or installations from the outset. For this reason, it may only be used for built-in purposes. The product may only be assessed with regard to its electrical and mechanical safety as well as to environmental effects (foreign bodies, moisture) after it has been installed in the product intended for the final user. After the product has been installed, its EMC properties may change. Hence the product intended for the final user (complete apparatus, machines or installations) should be inspected with regard to its EMC properties by the manufacturer of the product intended for the final user.

- EMC Directive 2014/30/EU

Maintaining the EMC directive presuppose an EMC adapted installation of the devices within the installation of the machine. The complied limit values and standards are specified in the Rexroth Manual of associated product. The regulations for the structure and the installation in this manual must be maintained and realized. Tests were run using a typical installation in a test assembly that conforms with the standards. These Rexroth products are built-in devices for a product for the final user. The test results cannot be transferred to every state as installed in every product intended for the final user. This declaration does not therefore assure the EMC characteristics of the product for the final user.

8.3 UL certification



Fig. 8-2: UL Listed logo

The system housings

- NYS04.2-ST-01-ULNN-NY4013
- NYS04.2-ST-02-ULNN-NY4023
- NYS04.2-ST-03-ULNN-NY4033
- NYS04.2-ST-04-ULNN-NY4043
- NYS04.2-ST-05-ULNN-NY4053

are certified according to

- UL 61010-1:2012

UL file no. E353498

However, there can exist combinations with modules or accessories with limited or missing certification. Therefore, verify the registration according to the UL marking on the device.

NOTICE

Loss of UL conformity due to changes to the system housing.

The UL marking is only valid for the system housing in its delivery status. After any modification by the customer to the system housing the UL compliance is to be verified.

8.4 China RoHS 2 marking



Fig. 8-3: China RoHS 2 logo

The system housings

- NYS04.2-ST-01-ULNN-NY4013
- NYS04.2-ST-02-ULNN-NY4023
- NYS04.2-ST-03-ULNN-NY4033
- NYS04.2-ST-04-ULNN-NY4043
- NYS04.2-ST-05-ULNN-NY4053

comply with the requirements of the Administrative Measures for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products, known as China RoHS 2.

9 Interfacing

9.1 Overview

Designation on base plate	Connection type	Connection (base plate)	Connection (cable)
24V System	24V DC system power supply	3-pin male	Phoenix Contact MC 1,5/ 3-STF-3,5
SE	Service inputs	4-pin male	Phoenix Contact MC 1,5/ 4-STF-3,5
Fan	System fan unit	2-pin male	
CAP 0 CAP 1 CAP 2 CAP 3 CAP 4	Filter capacitor for each drive slot	2-pin male	
DP NY4130 0 (note 1) DP NY4130 0/1 DP NY4130 2 DP NY4130 2/3 (note 2) DP NY4130 3/4	NY4130 drive power slot 0 NY4130 drive power slot 0/1 NY4130 drive power slot 2 NY4130 drive power slot 2/3 NY4130 drive power slot 3/4	8-pin male	Phoenix Contact MC 1,5/ 8-STF-3,5
DP 0 DP 1 DP 2 DP 3 DP 4	NY4120 NY4140 drive power for each drive slot	5-pin male	Phoenix Contact MSTB 2,5/ 5-STF-5,08
M0.0 M0.1 M1.0 M1.1 M2.0 M2.1 M3.0 M3.1 M4.0 M4.1	Motor connector 2 connectors for each slot	7-pin male	Phoenix Contact IC 2,5/ 7-STF-5,08
E0.0 E0.1 E1.0 E1.1 E2.0 E2.1 E3.0 E3.1 E4.0 E4.1	Encoder connector 2 connectors for each slot	25-pin sub-D female with 4-40 UNC nuts	25-pin sub-D male with 4-40 UNC screws

Designation on base plate	Connection type	Connection (base plate)	Connection (cable)
An0 An1 An2 An3 An4	Analog I/O connector 1 connector for each slot	9-pin male 4-40 nuts	sub-D with UNC 9-pin sub-D female with 4-40 UNC screws
Fdig0 Fdig1 Fdig2 Fdig3 Fdig4	Fast digital I/O connector 1 connector for each slot	9-pin female 4-40 nuts	sub-D with UNC 9-pin sub-D male with 4-40 UNC screws
Dig0 Dig1 Dig2 Dig3 Dig4	Digital I/O connector 1 connector for each slot	25-pin male 4-40 nuts	sub-D with UNC 25-pin sub-D female with 4-40 UNC screws
	Protective earth connection	M5 threaded screw	

note 1 The text “DP NY4130 0” is only on the NYS04.2-ST-01-ULNN-NY4013.

note 2 The text “DP NY4130 2/3” is only on the NYS04.2-ST-04-ULNN-NY4043.

Tab. 9-1: System housing connections

9.2 24V System – Power supply connection

The connector "24V SYSTEM" connects the 24V power supply to the system housing for all modules in the module holder.

NOTICE

The system housing has no provisions against wrong polarity connection of the 24V System power supply.

Observe the correct polarity of the power supply connections.

Connect the minus at the power supply side of the cable to the housing and/or to protective earth (if this is not already the case). If the cable has a shield, connect the shield at the system housing side to the shield pin in the connector or the connector housing, and connect the shield on the other side of the cable to the housing of the power supply.

Make sure that the power supply cable diameter is suitable for the maximum rated current

Connector data MC 1,5/ 3-STF-3,5	minimum	maximum
Tightening torque	1,95 lbs*inch (0,22 Nm)	2,21 lbs*inch (0,25 Nm)
Wire diameter	30 AWG (0,14 mm ²)	14 AWG (1,5 mm ²)

Tab. 9-2: 24V System connector information

9.3 SE – Service connection

The connector "SE" are inputs to set the operation mode of the system to "service mode" and to execute an as fast as possible shutdown, called "stop axes"

Connector data MC 1,5/ 4-STF-3,5	minimum	maximum
Tightening torque	1,95 lbs*inch (0,22 Nm)	2,21 lbs*inch (0,25 Nm)
Wire diameter	30 AWG (0,14 mm ²)	14 AWG (1,5 mm ²)

Tab. 9-3: SE Service connector information

9.4 Fan – Fan connection

The connector "FAN" is a power supply connector for the fan unit that can be installed underneath the module holder for forced cooling.

9.5 CAP – Capacitor connections

One capacitor connection is available for each slot of the system housing.

WARNING

Voltage on the pins of this connector can be higher than 60V DC.

Do not touch the pins of this connector. Do not touch the rear side of the I/O backplane .

A capacitor may only be needed if the drive module installed in a slot is an NYM04.1-2PW-NNNN-NY4120 or NYM04.1-1HV-NNNN-NY4140.

CAUTION

Maximum drive power voltage for the installed drive module must be lower than the working voltage of the installed capacitor.

Make sure that a capacitor with correct ratings is installed.

NOTICE

The system housing has no provisions against wrong polarity connection of the capacitor.

Observe the correct polarity of the connection of the DP drive power header.

No capacitor is needed if the drive slot contains an NYM04.1-2LD-NNNN-NY4130 or NYM04.1-SE3-MAST-NY4150 module.

9.6 DP – Drive power supply connections

Two different drive power supply connectors are on the base plate of the system housing.

1. Drive power supply for drive module NYM04.1-2LD-NNNN-NY4130
Connectors: "DP NY4130 0", "DP NY4130 0/1", "DP NY4130 2", "DP NY4130 2/3", "DP NY4130 3/4". Maximum voltages: +/-29V DC.
2. Drive power supply for drive modules NYM04.1-2PW-NNNN-NY4120 and NYM04.1-1HV-NNNN-NY4140.
Connectors: "DP0", "DP1", "DP2", "DP3", "DP4". Maximum voltage: +150V DC .

⚠ DANGER

Voltage on the pins of this connector can be higher than 60V DC. When the connector is unplugged a high voltage can remain present on the pins for 5 minutes after disconnection. If the drive slot has an accompanying capacitor installed and the drive module is not installed in that slot, you must wait 30 minutes.

Do not touch the pins of this connector.

Do not touch the rear side of the I/O backplane.

NOTICE

The system housing has no provisions against wrong polarity connection of the DP and DP NY4130 power supply.

Observe the correct polarity of the drive power supply connections.

If the cable has a shield, connect the shield at the system housing side to the shield pin in the connector or the connector housing. It is recommended that the shield of the cable at the power supply side is connected to the chassis of the power supply unit, not to the PE connection.

All drive power cables must be installed with some form of a strain relief underneath the system housing. If the drive power cable has a shielding, this shielding must make a good quality electrical contact with the strain relief bracket.

Make sure that the power supply cable diameter is suitable for the maximum rated current.

If the drive power supply for the drive modules NYM04.1-2PW-NNNN-NY4120 and NYM04.1-1HV-NNNN-NY4140 is not installed near the system housing, put a warning on the connector at the drive power supply side stating that when the connector is disconnected a high voltage can remain present on the pins of the connector for 5 minutes.

A fuse must be installed between the power supply output voltage and the drive power input voltage connection. The rating of the fuse depends on the used cables and application requirements of the motion profiles.

- Fuse rating for UL fuses.

Drive module	Drive current [DC]	Fuse nominal DC current
NY4120	12A	15A
NY4130 (+26/-26V power supply)	1A	2A
NY4130 (+15/-15V power supply)	2A	3A
NY4140	6A	8A

Tab. 9-4: UL Fuse ratings

Fuses must be certified for DC rating, Fast Acting, and have to be UL recognized under CCN JDXY2/8. Secondary fuses also have to be UL certified for DC rating.

- Fuse rating for IEC fuses.

Drive module	Drive current [DC]	Fuse nominal DC current
NY4120	12A	12A
NY4130 (+26/-26V power supply)	1A	1A
NY4130 (+15/-15V power supply)	2A	2A
NY4140	6A	6A

Tab. 9-5: IEC Fuse ratings

Fuses must be certified for DC rating, Fast Acting, and have to be IEC 60127-1 certified. Secondary fuses also have to be or IEC certified for DC rating.

Wire gauge and wire diameter as a function of ambient temperature are derived from the NFPA-79:2012. Insulation temperature of wires is assumed to be 60 °C (140°F) or 75°C (167°F).

Connector data MSTB 2,5/ 5-STF-5,08	minimum	maximum
Tightening torque	4,43 lbs*inch (0,5 Nm)	5,31 lbs*inch (0,6 Nm)
Wire diameter	26 AWG (0,2 mm ²)	12 AWG (2,5 mm ²)

Tab. 9-6: DP connector information

Connector data MC 1,5/ 8-STF-3,5	minimum	maximum
Tightening torque	1,95 lbs*inch (0,22 Nm)	2,21 lbs*inch (0,25 Nm)
Wire diameter	30 AWG (0,14 mm ²)	14 AWG (1,5 mm ²)

Tab. 9-7: DP NY4130 connector information

If using wires with an AWG smaller than or equal 12, or a diameter larger than or equal 2 mm², two pins for (+) and two pins for (-) must be used on the drive power connector.

9.7 M – Motor connections

WARNING

Voltage on the pins of this connector can be higher than 60V DC.

Do not touch the pins of this connector.

Do not touch the rear side of the I/O backplane.

Always use shielded cables for motors connected to NYM04.1-2PW-NNNN-NY4120 and NYM04.1-1HV-NNNN-NY4140 drive modules. Shielded cables for motors connected to NYM04.1-2LD-NNNN-NY4130 drive modules are not mandatory, but recommended.

Make sure that the motor cable of suitable AWG marking is used, taking into account the number of separate wires in the cable and the maximum rated current.

Every motor cable must be connected on the system housing with a motor cable shield and support bracket.

Connect the shield at the system housing side to the motor cable shield and support bracket, and connect the shield at the other end to the motor housing. If the housing of the connector at the motor side is made of non-conducting material, connect the shield from the connector at the end of the cable coming from the system housing side to the metal mounting plate on which that motor is mounted.

Wire gauge and wire diameter as a function of ambient temperature are derived from the NFPA-79:2012. Insulation temperature of wires is assumed to be 60°C (140°F) or 75°C (167°F).

Connector data IC 2,5/ 7-STF-5,08	minimum	maximum
Tightening torque	4,43 lbs*inch (0,5 Nm)	5,31 lbs*inch (0,6 Nm)
Wire diameter	24 AWG (0,2 mm ²)	12 AWG (2,5 mm ²)

Tab. 9-8: M connector information

9.8 E – Encoder and HALL sensor connections

Always use shielded cables. Connect the shield at the system housing side to the connector housing. If the equipment on the other end has metal parts, connect the shield to the equipment housing. If the equipment on the other end does not have metal parts, connect the shield to the equipment ground.

- Encoder interfaces

If the encoder interface has open-collector drivers, include a pull-up resistor of for example 1 kΩ between each signal and the 5V_ENC connection.

- Encoder or HALL sensor interfaces.

If the encoder or HALL sensor interface has single-ended drivers, connect the negative input of each signal pair in the connector at the system housing to the reference voltage EncVref.

9.9 An – Analog I/O connections

Always use shielded cables. Connect the shield at the system housing side to the connector housing. If the equipment on the other end has metal parts, connect the shield to the equipment housing. If the equipment on the other end does not have metal parts, connect the shield to the equipment ground.

All external connected inputs and outputs shall be separated from hazardous live by double or reinforced insulation.

- Analog inputs

If the analog source provides a single-ended signal, connect the signal wire to the positive input at the system housing, and connect the equipment ground to the negative pin at the system housing. If the analog source provides a balanced differential signal, connect the signal wires to the corresponding input pins at the system housing. It may also be desirable to connect a termination resistor between the signal wires at the system housing. Consult the supplier's installation instructions.

- Analog outputs

If the analog input at the destination equipment accepts a differential signal (preferred), connect the positive input to the analog output at the system housing, and connect the negative input to the AGND pin in the connector at the system housing.

Make sure that at the destination equipment some resistive path is present for equalization current, for example 100 kΩ between the negative input and local ground. If this resistance or some equivalent is not included in the

equipment itself, install it in the connector at the equipment side of the cable.

If the analog input at the destination equipment only accepts a single-ended signal (not recommended), connect the input to the analog output at the system housing, and connect the ground of the destination equipment to the AGND pin in the connector at the system housing via a 100Ω resistor. Note that this resistor connects the internal ground of the system housing to the internal ground of the destination equipment. A resistor in this ground connection is recommended to prevent unwanted stray currents. However, this resistor may well influence the accuracy of the analog signal.

Never connect the GND or minus wire of these signals to other GND connections, otherwise malfunction of the module is possible.

9.10 Fdig, Dig – 24V power supply for Fast digital I/O and Digital I/O connections

The 24V SELV power supply for the fast digital I/O and all digital I/O connections are on the connectors "DIG", "FDIG" and "DIG/FDIG".

NOTICE

The system housing has no provisions against wrong polarity connection of the 24V I/O power supply voltage.

Observe proper polarity when connecting the 24V I/O power supply.

A fuse must be installed between the 24V SELV power supply output voltage and the 24V I/O power input voltage. The rating of the fuse depends on the used cables and total current.

Current [DC]	UL recognized fuse [nominal DC current]	IEC certified fuse [nominal DC current]
4.5A	6A	5A

Tab. 9-9: Fuse ratings for 24V power supply (Fast digital I/O and Digital I/O)

Fuses must be certified for DC rating, Fast Acting, and have to be UL recognized under CCN JDXY2/8 or IEC 60127-1 certified. Secondary fuses also have to be UL or IEC certified for DC rating.

Wire gauge and wire diameter as a function of ambient temperature are derived from the NFPA-79:2012. Insulation temperature of wires is assumed to be 60 °C (140 °F) or 75 °C (167 °F)

All external connected inputs and outputs shall be separated from hazardous live by double or reinforced insulation.

Shielded cables are mandatory for fast digital I/O connections. Shielded cables are recommended but not mandatory for digital I/O connections. If shielded cables are used, connect the shield at the system housing side to the connector housing. Connect the other end to a convenient metal part or leave it not connected.

For fast digital I/O signals, the cable with the signal wire(s) should also contain the return current path for every signal in the cable. It is allowed that a single wire carries the return currents for more than one signal, as long as the current rating of the wire is not exceeded. These measures are also recommended for the other digital I/O.

10 Installation and Removal

10.1 General

NOTICE

Damage to components may occur if power is applied during installation or removal.

- Make sure power supplies are switched off before installation or removal of the system housing.
- Do not apply power until the system housing is installed.

Power supplies must be switched on/off with the disconnecting device installed in the cabinet.

The system housing may only be used as build-in equipment in a cabinet, which means that the end-user must provide a suitable fire and electrical safe enclosure. The safety of any system incorporating the system housing is the responsibility of the assembler of the system.

The system housing may only be used in combination with external approved power supplies. The supply voltages 24V System, DP NY4130, 24V Dig, and 24V Fdig for the system must be separated at least by reinforced insulation from all hazardous voltages according to the standard UL61010-1 third edition.

10.2 Mechanical dimensions

The dimensions of the system housings are the following.

Type code	Width (mm)	Height (mm)	Depth (mm)
NYS04.2-ST-01-ULNN-NY4013	130	225	157.9
NYS04.2-ST-02-ULNN-NY4023	180	240	157.9
NYS04.2-ST-03-ULNN-NY4033	183	353.5	157.9

Type code	Width (mm)	Height (mm)	Depth (mm)
NYS04.2-ST-04-ULNN-NY4043	208	353.5	157.9
NYS04.2-ST-05-ULNN-NY4053	238	353.5	157.9

Tab. 10-1: System housings mechanical dimensions

You can see the dimensions of the system housings in the following views. The dimensions given in the view exclude free clearance space required for cable strain relief bracket, attached cables, accessories and cooling requirements.

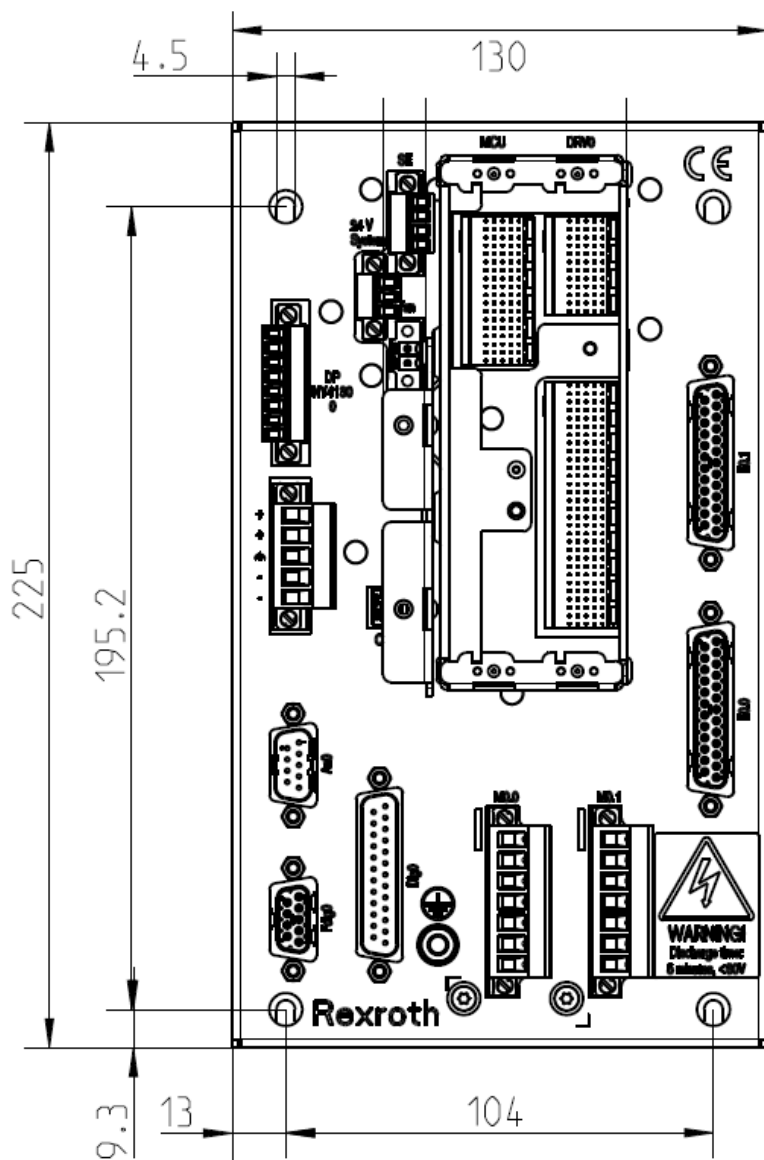


Fig. 10-1: Dimensions (front view) of the NYS04.2-ST-01-ULNN-NY4013

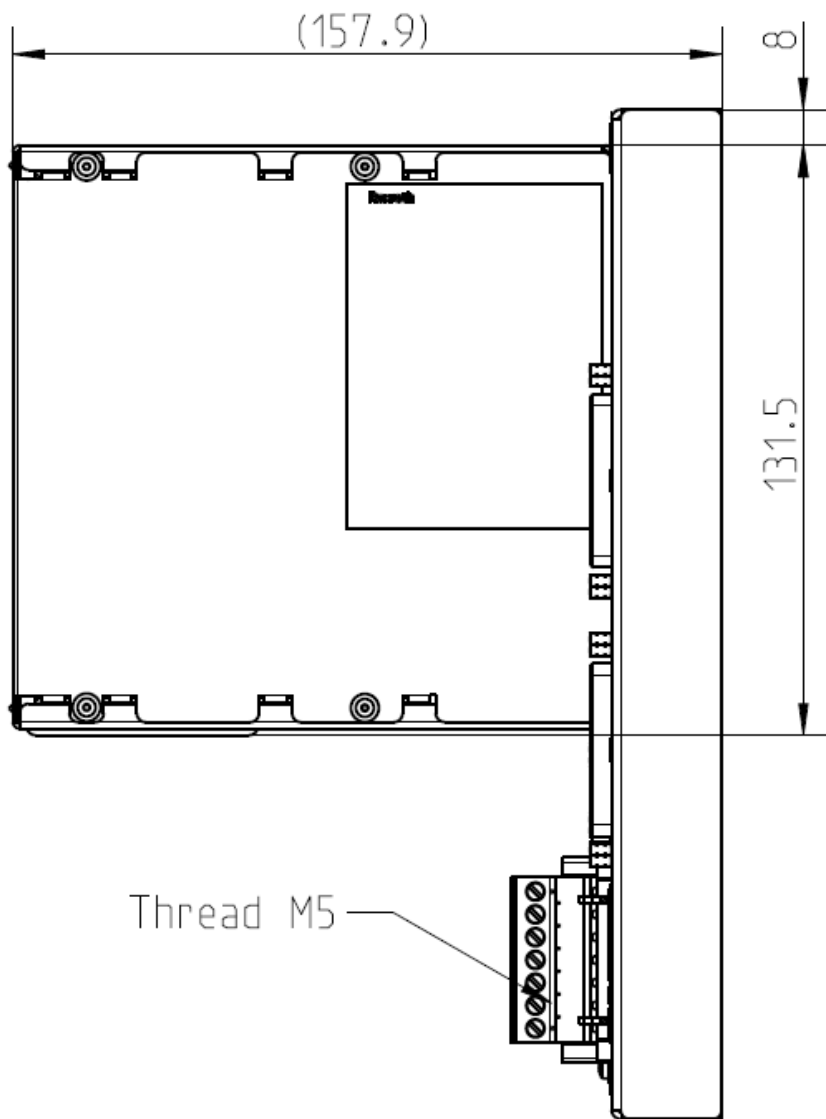


Fig. 10-2: Dimensions (side view) of the NYS04.2-ST-01-ULNN-NY4013

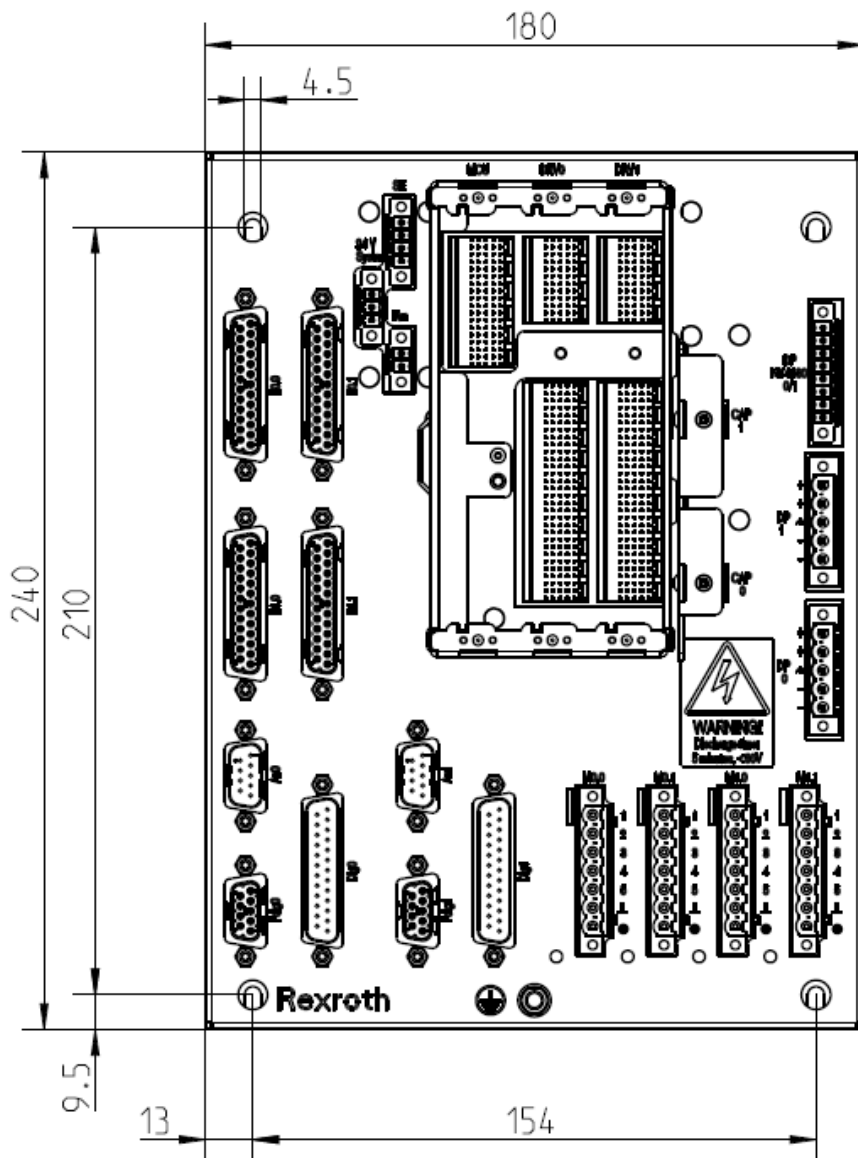


Fig. 10-3: Dimensions (front view) of the NYS04.2-ST-02-ULNN-NY4023

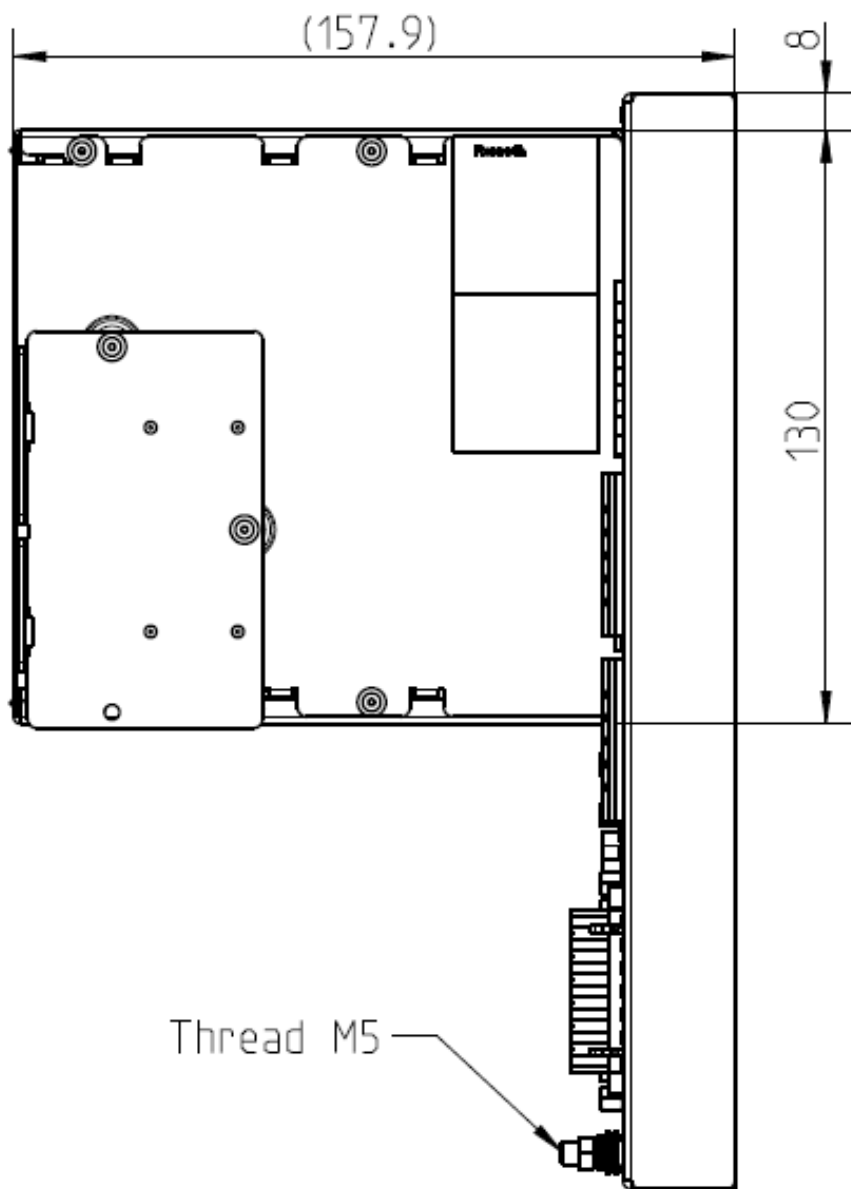


Fig. 10-4: Dimensions (side view) of the NYS04.2-ST-02-ULNN-NY4023

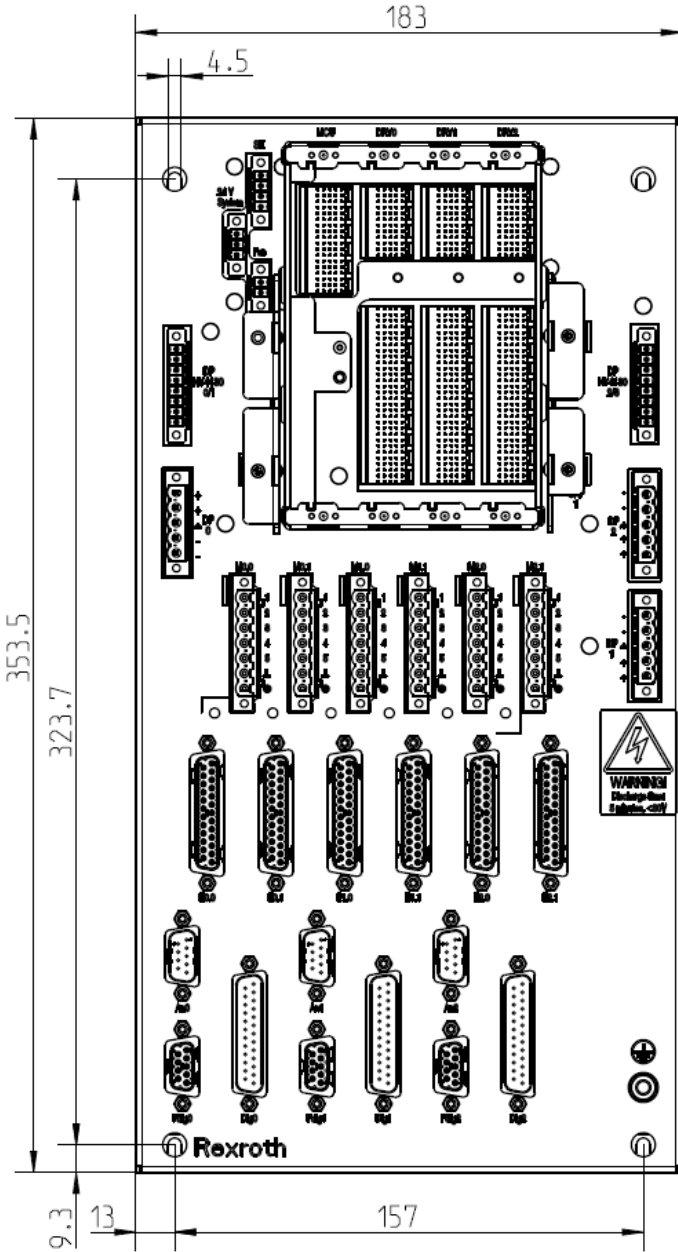


Fig. 10-5: Dimensions (front view) of the NYS04.2-ST-03-ULNN-NY4033

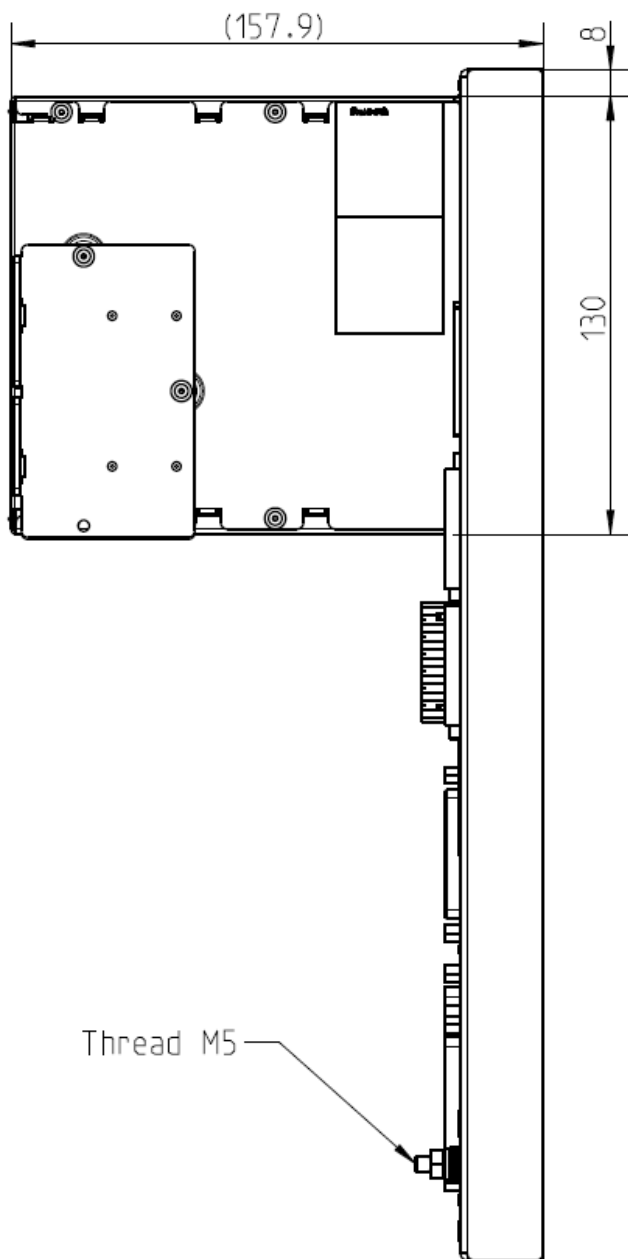


Fig. 10-6: Dimensions (side view) of the NYS04.2-ST-03-ULNN-NY4033

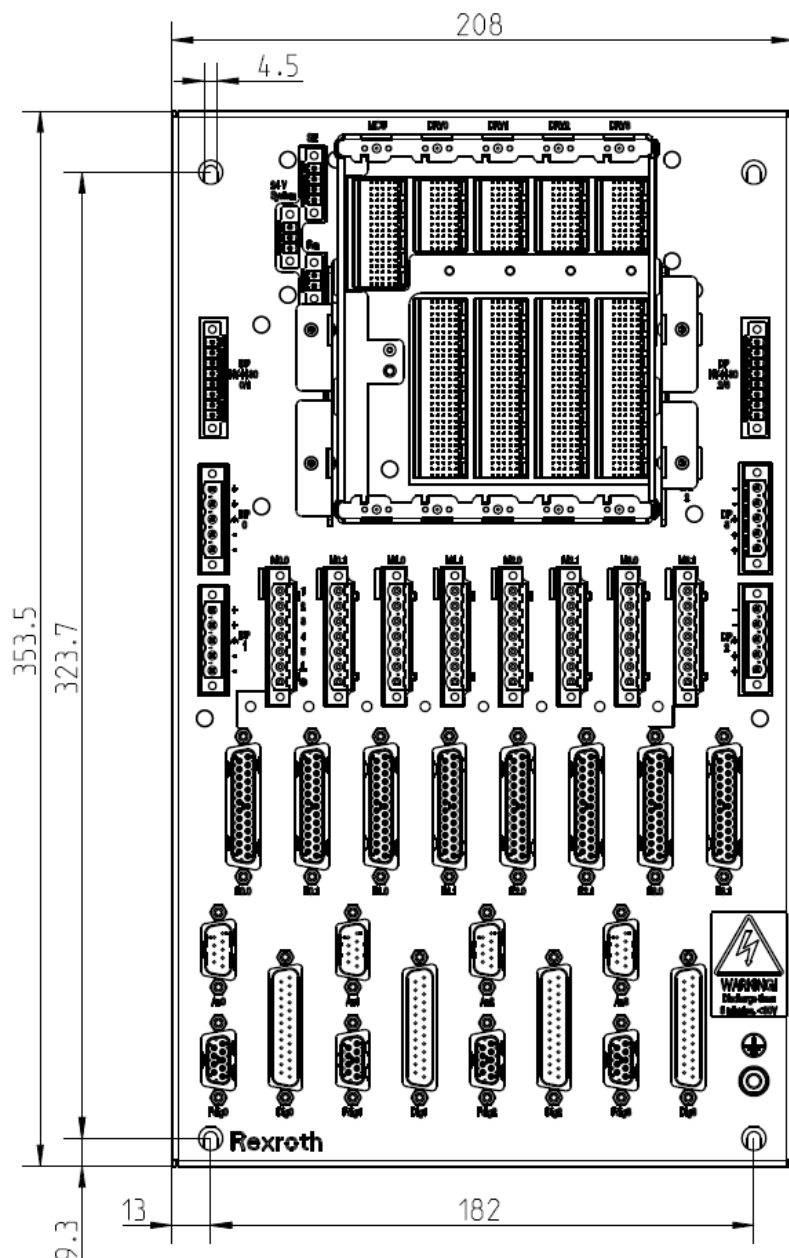


Fig. 10-7: Dimensions (front view) of the NYS04.2-ST-04-ULNN-NY4043

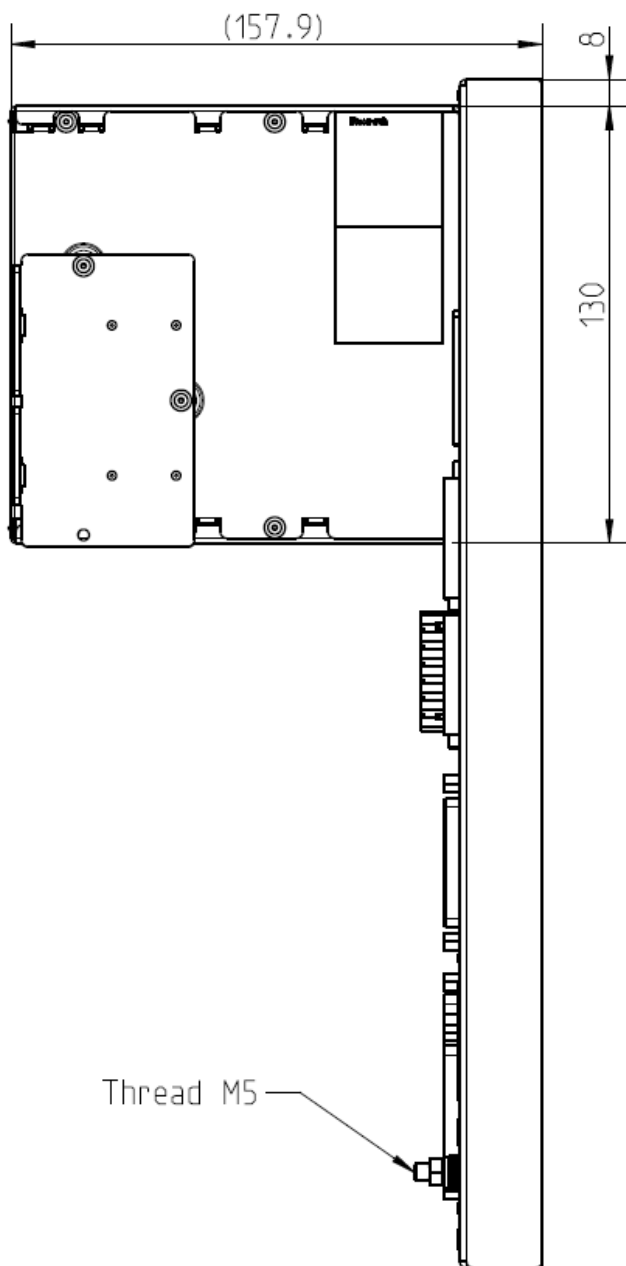


Fig. 10-8: Dimensions (side view) of the NYS04.2-ST-04-ULNN-NY4043

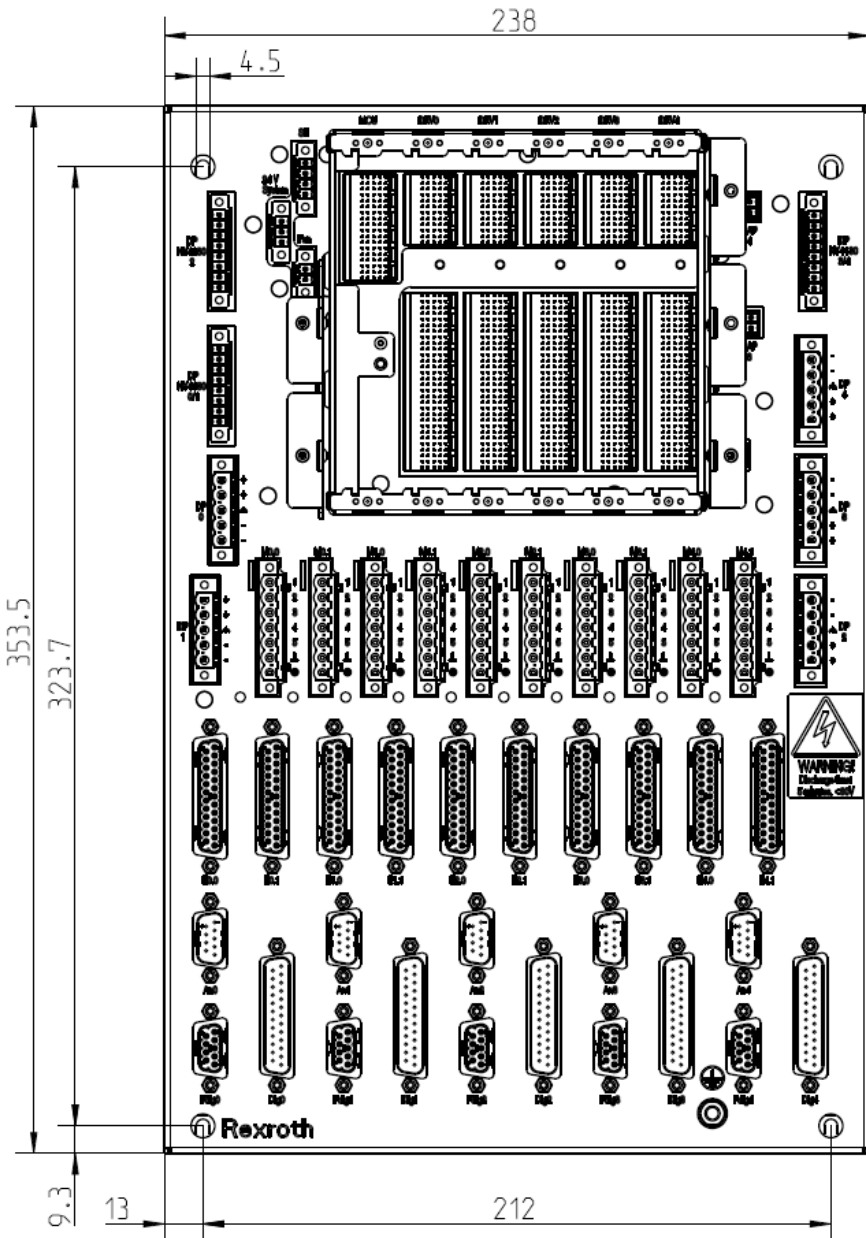


Fig. 10-9: Dimensions (front view) of the NYS04.2-ST-05-ULNN-NY4053

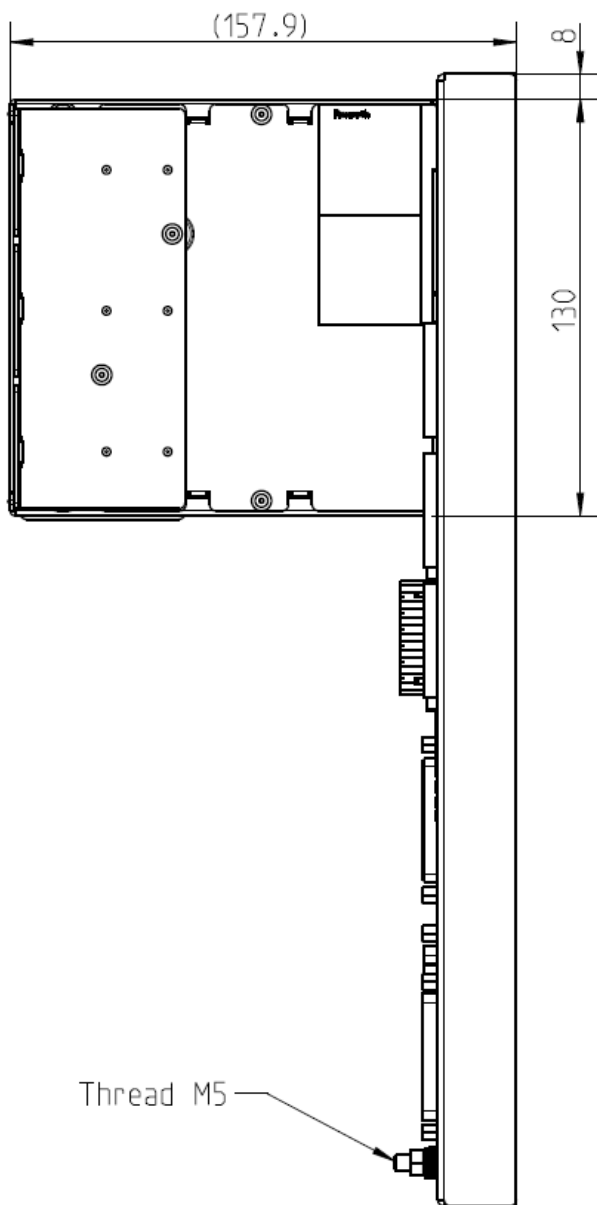
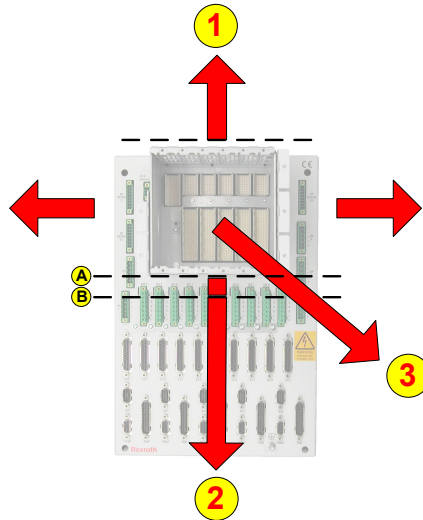


Fig. 10-10: Dimensions (side view) of the NYS04.2-ST-05-ULNN-NY4053

10.3 Mechanical installation of the system housing

Make sure that you observe the minimum ventilation space at the top, front and bottom side of the module holder, see the following picture.



- ① Above the module holder
- ② Below the module holder
- ③ In front of the module holder

Fig. 10-11: Free distances from the system housing

The minimum free distance in front of the module holder is required for the cable strain relief brackets and network cable routing.

The minimum free distance above and below the module holder is required for cooling.

Convection cooling

- Minimum distance above the module holder is 200 mm.
- Minimum distance (A) below the module holder is 200 mm.

The indication line (A) represents the bottom of the module holder for a convection cooled system.

Forced cooling

- Minimum distance above the module holder is 100 mm.
- Minimum distance (B) below the module holder is 100 mm.

The indication line (B) represents the bottom of the fan unit (not shown in the figure) for a forced cooled system.

The minimum free distance on the right and left side of the system housing must be sufficient to access the connectors at those sides.

Mounting

For convection cooled systems the system housing **must be installed vertically** to allow free air flow from bottom to the top through the module holder. For forced cooled systems, it is allowed to install the system housing horizontally.

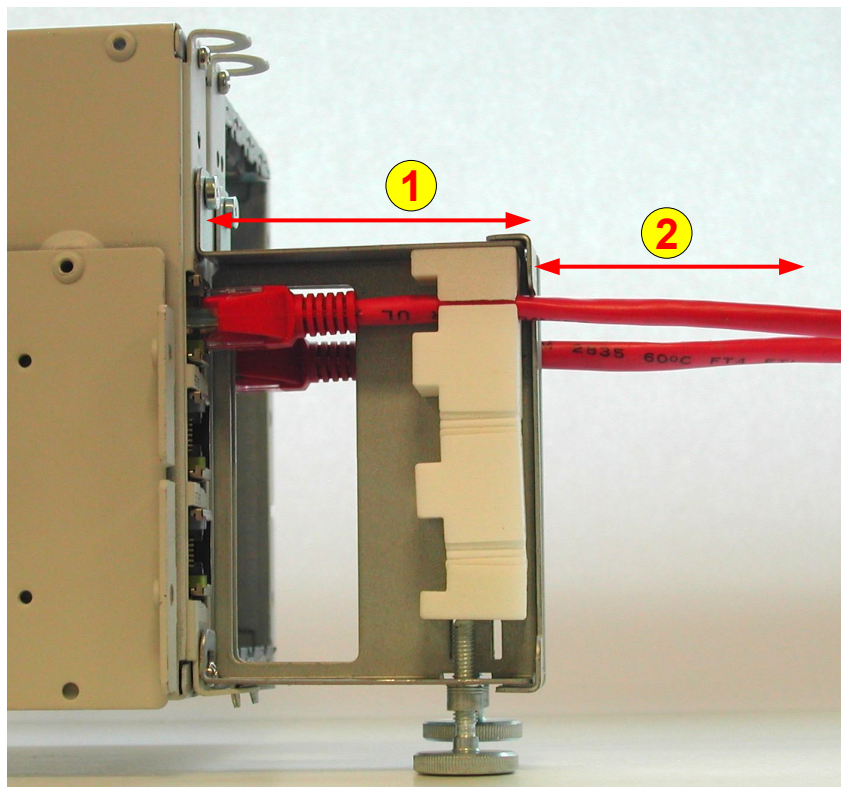
Install the system housing on a metal surface, and ensure electrical contact between the system housing and this surface, either by means of washers under the screw heads or use the protective earth post on the system housing with washers and nuts. Ensure that there is electrical contact between the system housing and the mounting base of all other equipment installed on the metal frame or mounting base.

Cable routing

Bend all cables connected on the base plate below the module holder away from the ventilation holes of the module holder as near to the connectors as possible.

Free clearance space in front of the module holder (③) is needed for the cable strain relief bracket(s) and minimum bend radius of the NYCe 4000 network connection cable(s) to the MCU, and SERCOS III cables to the NY4150, if installed.

- The depth of the NY4901 cable strain relief bracket is 55 mm.
- The depth of the NY4901/10 cable strain relief bracket is 60 mm.
- The depth of the NY4901/20 and NY4901/30 cable strain relief bracket is 65 mm.
- As a rule of thumb, 50 mm for the bend radius of the network cables is sufficient. The minimum bend radius for Cat.6 and Cat5e cable is four times the cable diameter, or approximately 25 mm.



- ① depth of the cable strain relief bracket
- ② space for bending of network cables

Fig. 10-12: Required free clearance space in front of the module holder for cable strain relief and bending of network cables

Each protective earth connection may be routed in the most convenient manner for the equipment concerned. The NYCe 4000 system puts no extra requirements on the protective earth wiring – no central earth point or similar constraint.

10.4 Protective Earth connection

For safety reasons, a protective earth connection via the threaded earth post is mandatory.

The protective earth connection must be connected before any other cables are connected to the system housing.

The protective earth connection must be realized using an as short as possible cable, or better, a braided band, with a faston at the system housing side.

The protective earth connection is fastened on the M5 threaded post on the system housing using a ring, the faston with the cable or the braided band, a spring washer and a nut, in that order. Tighten the nut with a nut spanner.

You must adhere to the installation requirements of your country.

10.5 Motor connection

Always use shielded cables for motors. All motor cables must be connected with the motor cable shield and support bracket using the following mounting instruction.

1. Strip the wires of the motor cable according to the following picture.

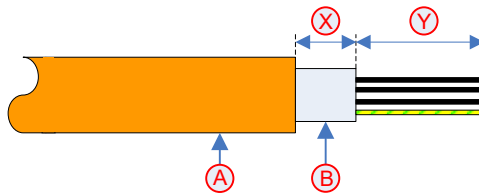


Fig. 10-13: Stripping the motor cable

Strip the cable coating (A) for a length of 50 mm.

Strip the shield (B) for a length of 40 mm.

The shield length (X) is 10 mm, the wire length (Y) is 40 mm.

2. Put the wires of the motor cable into the motor connector according to the instructions of the connector manufacturer. Keep the wires of the motor cable to the connector as short as possible (!).

Securely attach the motor cable (E) to the shield and support bracket (F).

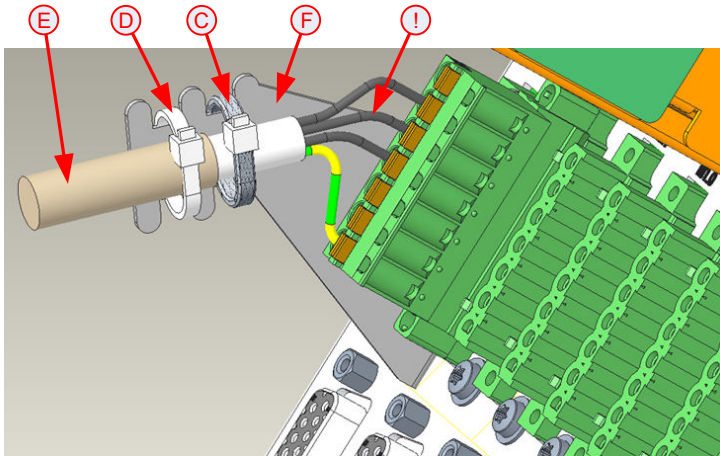


Fig. 10-14: Connecting the wires of the motor cable

Use the tie-wrap with the EMC gasket (C) to clamp the shield of the cable against the metal bracket.

Use the standard tie-wrap (D) to attach the cable firmly onto the metal bracket.

3. Put the hook of the shield and support bracket (F) into the slit at the left side of the header on the metal base of the system housing. Lock the shield and support bracket (F) onto the base plate with the screw (G).

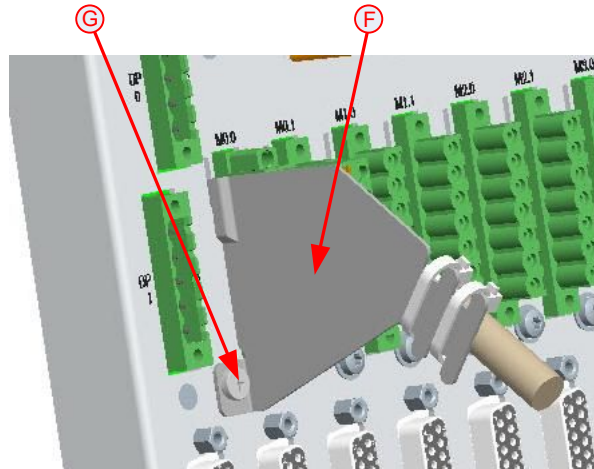


Fig. 10-15: Mounting the connector with shield and support bracket

10.6 Encoder connection

Connect the shield of the encoder cables directly to the motor housing. When an encoder with flat band cable is used, the flat band cable must be as short as possible.

10.7 Configuration

The configuration of the system housing depends on the model. The left side of the system housing is the side where the "24V System" power supply connector is located.

In all system housings the slot on the leftmost side is called "MCU" and is a slot dedicated for the installation of the Motion Control Unit (MCU).

The adjacent slots at the right side of the MCU module in the module holder are general purpose drive slots called "DRV0", "DRV1", etc. These drive slots can accept any of the following drive modules.

- NYM04.1-2PW-NNNN-NY4120
- NYM04.1-2LD-NNNN-NY4130
- NYM04.1-1HV-NNNN-NY4140

Only in drive slot 0, "DRV0", you can also install the NYM04.1-SE3-MAST-NY4150 SERCOS III master module.

10.8 Mechanical removal of the system housing

DANGER

Voltage on the pins of the “DPx” drive power connector can be higher than 60V DC. When the connector is unplugged a high voltage can remain present on the pins for 5 minutes after disconnection. If a drive slot has an accompanying capacitor installed and the drive module is not installed in that drive slot, you must wait 30 minutes.

Do not touch the pins of this connector.

Do not touch the rear side of the backplane.

Make sure that all power supplies are switched off and capacitors in the system are fully discharged before you remove the system housing.

First, disconnect all drive power supply connectors (“DP” and “DP NY4130”). Then disconnect the “24V System” power supply connector. Finally, disconnect all remaining connectors and protective earth connections.

Remove the screws that mount the system housing on the metal surface in the machine.

11 Commissioning

- Check that the system housing is mechanically solid mounted in the machine.
- Check that free airflow is guaranteed (no obstructing objects) underneath and above the module holder.
- Verify that the protective earth connection is correctly connected.
- Check that proper cabling is used.
- Check that appropriate fuses of correct rating are installed for drive power and digital I/O power supplies.
- Check that power supply cables and motor cables are installed with proper strain reliefs.
- Check that the shielding of shielded cables is correctly connected.
- Check that cables are not damaged.
- Check that the bend radius of the connected cables is according to the specification.

12 Description of the System Housing

The system housings have no indicators.

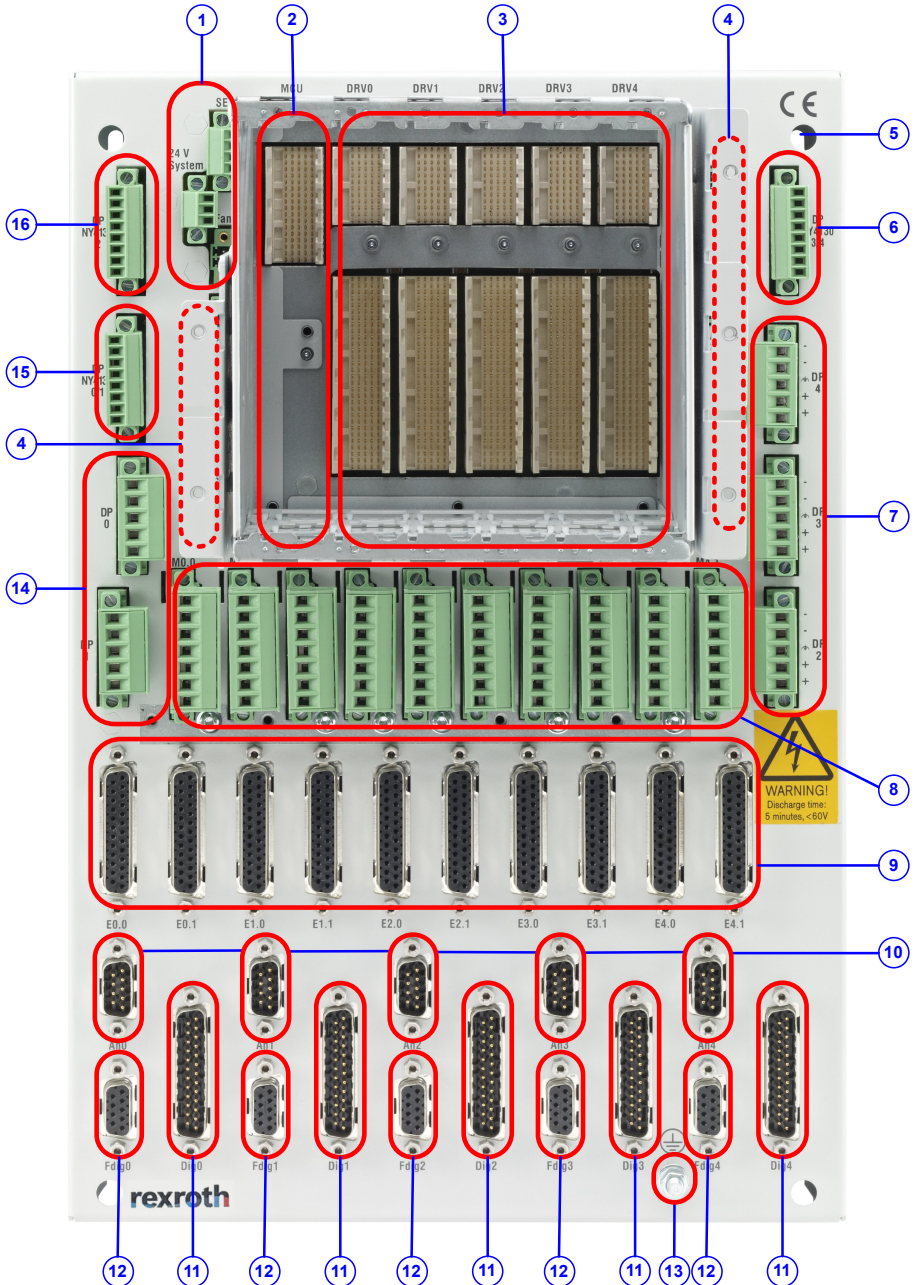


Fig. 12-1: NY4053 system housing

Identifier number	Description
1	24V System, SE and Fan connectors
2	Motion Control Unit slot
3	Drive module slots (up to 5)
4	Capacitor connectors (1 per drive slot)
5	Mounting screw opening (4)
6	NY4130 drive power connector (slot DRV3 and slot DRV4)
7	NY4120 / NY4140 drive power connectors (slot DRV2, DRV3, DRV4)
8	Motor connectors (2 per drive slot)
9	Encoder connectors (2 per drive slot)
10	Analog I/O connectors (1 per drive slot)
11	Digital I/O connectors (1 per drive slot)
12	Fast digital I/O connector (1 per drive slot)
13	Protective Earth post
14	NY4120 / NY4140 drive power connectors (slot DRV0, DRV1)
15	NY4130 drive power connector (slot DRV0 and slot DRV1)
16	NY4130 drive power connector (slot DRV2)

Tab. 12-1: NY4053 system housing identification legend

13 Diagnosis

No diagnosis is available for the system housing.

14 IT-security

The operation of installations, systems and machines requires the implementation of an integral concept for state-of-the-art IT security. Bosch Rexroth products are part of this integral concept. Bosch Rexroth product characteristics have to be taken into consideration in an integral IT security concept. The relevant characteristics are documented in the IT security guideline (R911342562).

15 Maintenance

The system housings have no special maintenance requirements.

16 Disposal

16.1 Products

Our products can be returned to us free of charge for disposal. It is a precondition, however, that the products are free of oil, grease or other dirt. In addition, when returned the products must not contain any undue foreign matter or foreign component.

Please send the products “free domicile” to the following address:

Bosch Rexroth AG
Bgm-Dr.-Nebel-Str. 2
97816 Lohr a.Main, Germany

16.2 Packaging materials

The packaging materials consist of cardboard, wood and polystyrene. They can be easily recycled. For ecological reasons you should not return the empty packages to us.

16.3 Environmental protection

- No release of hazardous substances.

Our products do not contain any hazardous substances that they can release in the case of appropriate use. Normally there are not any negative effects on the environment to be expected.

- Materials contained in the products.

Electronic devices.

Electronic devices mainly contain

- steel
- aluminum
- copper
- synthetic materials
- electronic components and modules

- Recycling.

Due to their high content of metal most of the product components can be recycled. In order to recycle the metal in the best possible way it is necessary to disassemble the products into individual modules. The metals contained in the electric and electronic modules can also be recycled by means of specific separation processes.

The synthetic materials remaining after these processes can be thermally recycled.

17 Service and Addresses

17.1 Service

Our service department at our main facility

Bosch Rexroth AG
Bgm.-Dr.-Nebel-Str. 2
97816 Lohr a. Main
Germany

is always available for information and help.

You can reach us at:

- Telephone: **+49 9352 18 0**
- Fax: **+49 9352 18 8400**
- Internet: www.boschrexroth.com/electrics

Please check the internet company addresses for hotline call numbers in other countries.

17.2 Addresses

You can find the addresses of our companies on www.boschrexroth.com.

On the website you can also find additional information for service, repair (for example supplier addresses) and training.

Please contact your nearest supplier or representative in your country first before contacting Service Deutschland, if you are outside Germany.

18 Appendix – Declaration of Conformity



EU declaration of conformity – Original

Doc. No.: DCTC-30329-101

Date: 2020-07-15

- in accordance with Machinery Directive 2006/42/EC
- in accordance with Low Voltage Directive 2014/35/EU
- in accordance with EMC Directive 2014/30/EU
- in accordance with Pressure Equipment Directive 2014/68/EU
- in accordance with ATEX Directive 2014/34/EU
- in accordance with RoHS Directive 2011/65/EU

The manufacturer

Bosch Rexroth AG
 Bgm.-Dr.-Nebel-Str. 2
 97816 Lohr am Main / Germany

hereby declares that the product below

Name: NYCe 4000
 Function: system housing
 Type: NY4013, NY4023, NY4033, NY4043, NY4053, NY4063, NY4073, NY4074, NY4078, NY4079, NY4702, NY4703, NY4705, NY4710, NY4711

Ordering code	Part number
NYS04.2-ST-01-ULNN-NY4013	R911172904
NYS04.2-ST-02-ULNN-NY4023	R911172905
NYS04.2-ST-03-ULNN-NY4033	R911172966
NYS04.2-ST-04-ULNN-NY4043	R911172906
NYS04.2-ST-05-ULNN-NY4053	R911172907
NYS04.1-ST-03-4125-NY4063	R911172218
NYS04.2-ST-02-LMSN-NY4073	R911172908
NYS04.2-ST-02-LMSN-NY4074	R911378504
NYS04.1-ST-01-LMS-SERCOS-NY4078	R911172617 *)
NYS04.1-ST-01-LMS-SERCOS-NY4079	R911378505 *)
NYS04.1-US-02-FEAP-NY4702	R911172139 *)
NYS04.1-US-05-FEDC-NY4703	R911171190 *)
NYS04.1-US-05-FEP3-NY4705	R911172622 *)
NYS04.1-US-01-FEBA-NY4710	R911171818 *)
NYS04.1-US-03-FEEN-NY4711	R911171817 *)

Trade name: Rexroth
 Year of construction: as of 2009

was developed, designed and manufactured in compliance with the above-mentioned directive(s).

This declaration of conformity is issued under the sole responsibility of the manufacturer.

*) Device with an input voltage less or equal than 30V DC. In this case the declaration of conformity is pertaining to the EMC Directive only; the Low Voltage Directive is not applied.

Standard	Title	Edition
The compliance with the abovementioned Low Voltage Directive is verified by the compliance with the applicable areas of the following harmonized European standards:		
IEC 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use- Part 1: General requirements	2010

EU declaration of conformity – Original

Page 2 / 2

DCTC-30329-101: 2020-07-15

The compliance with the abovementioned EMC Directive is verified by the compliance with the applicable areas with the following harmonized European standards:

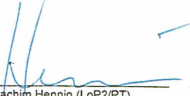

IEC 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments	2005
IEC 61000-6-4	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments	2018

The compliance with the abovementioned RoHS Directive was stated with the procedure in accordance with the standard below and was documented in the material master records file.

IEC 63000	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances	2016
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Further explanations:

The assembling and installation instructions according to the manual have to be followed.

<u>Lohr am Main</u>	<u>2020-07-15</u>	<u>ppa.</u>	<u></u>	<u>i.V.</u>	<u></u>
Place	Date		Joachim Hennig (LoP2/PT) Plant Manager		Bas Verhelst (DC-AE/ESW5) Director Product Development

We reserve the right to make changes to the content of the EU Declaration of Conformity. Current issue on request.

Fig. 18-2: EU Declaration of conformity - page 2

Notes

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R911337318