

ACOPOSInverter X64

Variable speed drives for
asynchronous motors

Installation Manual

Version: 0.20 (April 2011)
Model number: MAXxxxxxx-ENG



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Manual history

Version	Date	Comment
0.20	April 2011	Modifications of descriptions
0.12	December 2010	Editorial modifications
0.11	August 2010	Editorial modifications
0.10	June 2009	First edition

Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, **will result** in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, **can result** in death, serious injury or equipment damage.

CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result** in injury or equipment damage.

CAUTION

CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result** in equipment damage.

PLEASE NOTE

The word "drive" as used in this manual refers to the controller portion of the adjustable speed drive as defined by NEC.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by B&R for any consequences arising out of the use of this product.

Before you begin

Read and understand these instructions before performing any procedure with this drive.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this manual before installing or operating the ACOPOSinverter X64 drive. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.
- The user is responsible for compliance with all international and national electrical code requirements with respect to grounding of all equipment.
- Many parts of this drive, including the printed circuit boards, operate at the line voltage. DO NOT TOUCH. Use only electrically insulated tools.
- DO NOT touch unshielded components or terminal strip screw connections with voltage present.
- DO NOT short across terminals PA/+ and PC/- or across the DC bus capacitors.
- Before servicing the drive:
 - Disconnect all power, including external control power that may be present.
 - Place a "DO NOT TURN ON" label on all power disconnects.
 - Lock all power disconnects in the open position.
 - WAIT 15 MINUTES to allow the DC bus capacitors to discharge. Then follow the "DC bus voltage measurement procedure" page 17 to verify that the DC voltage is less than 42 V. The drive LEDs are not indicators of the absence of DC bus voltage.
- Install and close all covers before applying power or starting and stopping the drive.

Failure to follow these instructions will result in death or serious injury.

DANGER

UNINTENDED EQUIPMENT OPERATION

- Read and understand this manual before installing or operating the ACOPOSinverter X64 drive.
- Any changes made to the parameter settings must be performed by qualified personnel.

Failure to follow these instructions will result in death or serious injury.

WARNING

DAMAGED DRIVE EQUIPMENT

Do not operate or install any drive or drive accessory that appears damaged.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.^a

Failure to follow these instructions can result in death, serious injury, or equipment damage.

a. For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems."

Before you begin

CAUTION

INCOMPATIBLE LINE VOLTAGE

Before turning on and configuring the drive, ensure that the line voltage is compatible with the supply voltage range shown on the drive nameplate. The drive may be damaged if the line voltage is not compatible.

Failure to follow these instructions can result in injury or equipment damage.

CAUTION

RISK OF DAMAGE TO THE MOTOR

The use of external overload protection is required under the following conditions:

- Repowering up the product since there is no motor thermal state memory.
- Running multiple motors.
- Running motors rated at less than 0.2 times the nominal drive current.
- Using motor switching.

Failure to follow these instructions can result in equipment damage

INSTALLATION

1. Receive and inspect the drive

- ☐ Check that the catalog number printed on the label is the same as that on the purchase order.
- ☐ Remove the ACOPOSinverter from its packaging and check that it has not been damaged in transit.

2. Check the line voltage

- ☐ Check that the voltage range of the drive is compatible with the line voltage (see pages [10](#) and [11](#)).

3. Mount the drive

- ☐ Mount the drive in accordance with the instructions in this document (see page [15](#)).
- ☐ Install any options required (see option documentation).

4. Wire the drive (see page [18](#))

- ☐ Connect the motor, ensuring that its connections correspond to the voltage.
- ☐ Connect the line supply, after making sure that the power is off.
- ☐ Connect the control part.

Steps 2 to 4 must be performed with the **power off**.



PROGRAMMING

5. Please refer to the programming manual.

Setup - Preliminary recommendations

Prior to switching on the drive

DANGER

UNINTENDED EQUIPMENT OPERATION

Ensure that all logic inputs are inactive to help prevent an accidental startup.

Failure to follow these instructions will result in death or serious injury.

Prior to configuring the drive

DANGER

UNINTENDED EQUIPMENT OPERATION

- Read and understand this manual before installing or operating the ACOPOSinverter X64 drive.
- Any changes made to the parameter settings must be performed by qualified personnel.
- Ensure that all logic inputs are inactive to help prevent an accidental startup when modifying parameters.

Failure to follow these instructions will result in death or serious injury.

Line contactor

CAUTION

RISK OF DAMAGE TO THE DRIVE

- Avoid operating the contactor frequently to avoid premature aging of the filter capacitors.
- Power cycling must be more than 60 seconds.

Failure to follow these instructions can result in equipment damage.

Drive ratings

Single phase supply voltage: 200...240 V 50/60 Hz

For three phase output 200/240 V motors

Motor		Line supply (input)					Drive (output)		Reference (5)	Size
Power indicated on plate (1)		Max. current line (2)		Apparent power	Max. inrush current (3)	Power dissipated at nominal current	Nominal current (1)	Max. transient current (1) (4)		
		at 200 V	at 240 V				at 240 V			
kW	HP	A	A	kVA	A	W	A	A		
0.18	0.25	3.0	2.5	0.6	10	24	1.5	2.3	8I64S200018.00X-1	3
0.37	0.5	5.3	4.4	1.0	10	41	3.3	5.0	8I64S200037.00X-1	3
0.55	0.75	6.8	5.8	1.4	10	46	3.7	5.6	8I64S200055.00X-1	4
0.75	1	8.9	7.5	1.8	10	60	4.8	7.2	8I64S200075.00X-1	4
1.1	1.5	12.1	10.2	2.4	19	74	6.9	10.4	8I64S200110.00X-1	6
1.5	2	15.8	13.3	3.2	19	90	8.0	12.0	8I64S200150.00X-1	6
2.2	3	21.9	18.4	4.4	19	123	11.0	16.5	8I64S200220.00X-1	7

Three phase supply voltage: 200...240 V 50/60 Hz

For three phase output 200/240 V motors

Motor		Line supply (input)					Drive (output)		Reference (5)	Size
Power indicated on plate (1)		Max. current line (2)		Apparent power	Max. inrush current (3)	Power dissipated at nominal current	Nominal current (1)	Max. transient current (1) (4)		
		at 200 V	at 240 V				at 240 V			
kW	HP	A	A	kVA	A	W	A	A		
0.18	0.25	2.1	1.9	0.7	10	23	1.5	2.3	8I64T200018.00X-1	1
0.37	0.5	3.8	3.3	1.3	10	38	3.3	5.0	8I64T200037.00X-1	1
0.55	0.75	4.9	4.2	1.7	10	43	3.7	5.6	8I64T200055.00X-1	2
0.75	1	6.4	5.6	2.2	10	55	4.8	7.2	8I64T200075.00X-1	2
1.1	1.5	8.5	7.4	3.0	10	71	6.9	10.4	8I64T200110.00X-1	5
1.5	2	11.1	9.6	3.8	10	86	8.0	12.0	8I64T200150.00X-1	5
2.2	3	14.9	13.0	5.2	10	114	11.0	16.5	8I64T200220.00X-1	6
3	3	19.1	16.6	6.6	19	146	13.7	20.6	8I64T200300.00X-1	7
4	5	24	21.1	8.4	19	180	17.5	26.3	8I64T200400.00X-1	7
5.5	7.5	36.8	32.0	12.8	23	292	27.5	41.3	8I64T200550.00X-1	8
7.5	10	46.8	40.9	16.2	23	388	33.0	49.5	8I64T200750.00X-1	8
11	15	63.5	55.6	22.0	93	477	54.0	81.0	8I64T201100.00X-1	9
15	20	82.1	71.9	28.5	93	628	66.0	99.0	8I64T201500.00X-1	9

(1) These power ratings and currents are for a maximum ambient temperature of 50°C and a switching frequency of 4 kHz in continuous operation. The switching frequency is adjustable from 2 to 16 kHz.

Above 4 kHz, the drive will reduce the switching frequency in the event of excessive temperature rise. The temperature rise is controlled by a sensor in the power module. Nonetheless, the nominal drive current should be derated if operation above 4 kHz needs to be continuous.

Derating curves are shown on page 16 as a function of switching frequency, ambient temperature and mounting conditions.

(2) Current on a line supply with the "Max. prospective line I_{sc}" indicated.

(3) Peak current on power-up, for the max. voltage (240 V + 10%).

(4) The maximum transient current for 60 s corresponds to 150% of the maximum nominal current I_n, followed by at most nominal current for 9 min.

(5) Reference of the drive with communication interface, e. g. 8I64S200018.00X-1 consists of 8I64S200018.000-1 (drive) and 8I0IF109.200-1 (interface).

Drive ratings (continued)

Three phase supply voltage: 380...500 V 50/60 Hz

For three phase output 380/500 V motors

Motor		Line supply (input)					Drive (output)		Reference (5)	Size
Power indicated on plate (1)		Max. current line (2)		Apparent power	Max. inrush current (3)	Power dissipated at nominal current	Nominal current (1)	Max. transient current (1) (4)		
		at 380 V	at 500 V				at 500 V			
kW	HP	A	A	kVA	A	W	A	A		
0.37	0.5	2.2	1.7	1.5	10	32	1.5	2.3	8I64T400037.00X-1	6
0.55	0.75	2.8	2.2	1.8	10	37	1.9	2.9	8I64T400055.00X-1	6
0.75	1	3.6	2.7	2.4	10	41	2.3	3.5	8I64T400075.00X-1	6
1.1	1.5	4.9	3.7	3.2	10	48	3.0	4.5	8I64T400110.00X-1	6
1.5	2	6.4	4.8	4.2	10	61	4.1	6.2	8I64T400150.00X-1	6
2.2	3	8.9	6.7	5.9	10	79	5.5	8.3	8I64T400220.00X-1	7
3	3	10.9	8.3	7.1	10	125	7.1	10.7	8I64T400300.00X-1	7
4	5	13.9	10.6	9.2	10	150	9.5	14.3	8I64T400400.00X-1	7
5.5	7.5	21.9	16.5	15.0	30	232	14.3	21.5	8I64T400550.00X-1	8
7.5	10	27.7	21.0	18.0	30	269	17.0	25.5	8I64T400750.00X-1	8
11	15	37.2	28.4	25.0	97	397	27.7	41.6	8I64T401100.00X-1	9
15	20	48.2	36.8	32.0	97	492	33.0	49.5	8I64T401500.00X-1	9

(1) These power ratings and currents are for a maximum ambient temperature of 50°C and a switching frequency of 4 kHz in continuous operation. The switching frequency is adjustable from 2 to 16 kHz.

Above 4 kHz, the drive will reduce the switching frequency in the event of excessive temperature rise. The temperature rise is controlled by a sensor in the power module. Nonetheless, the nominal drive current should be derated if operation above 4 kHz needs to be continuous.

Derating curves are shown on page 16 as a function of switching frequency, ambient temperature and mounting conditions.

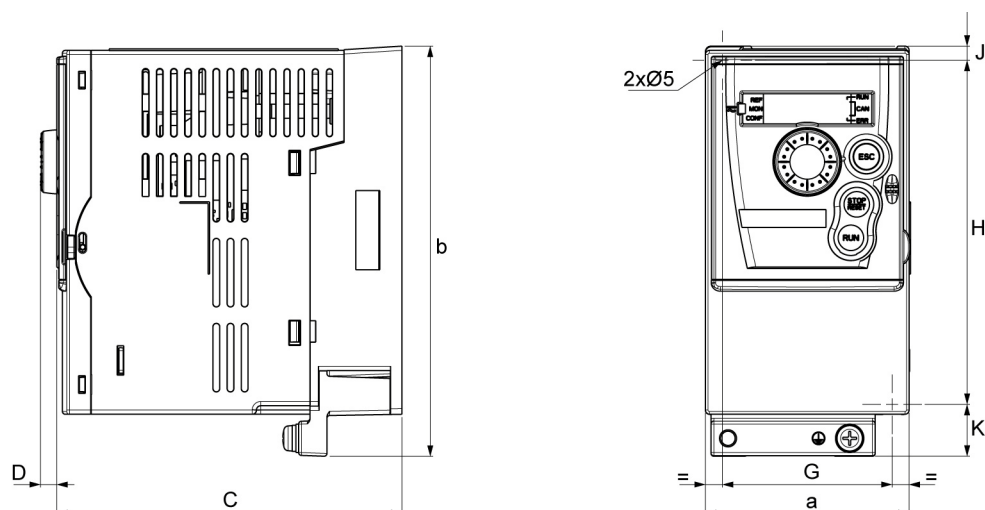
(2) Current on a line supply with the "Max. prospective line I_{sc} " indicated.

(3) Peak current on power-up, for the max. voltage (500 V + 10%, 600 V + 10%).

(4) The maximum transient current for 60 s corresponds to 150% of the maximum nominal current I_n , followed by at most nominal current for 9 min.

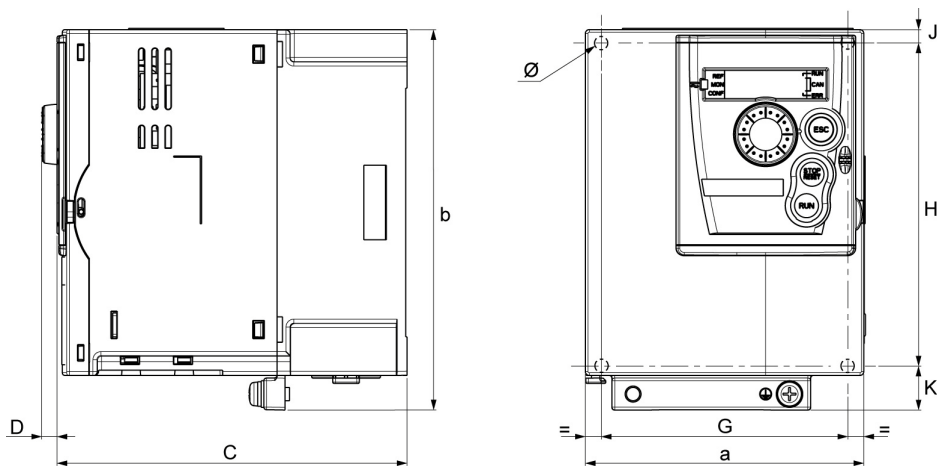
(5) Reference of the drive with communication interface, e. g. 8I64S200018.00X-1 consists of 8I64S200018.000-1 (drive) and 8I0IF109.200-1 (interface).

Dimensions and weights



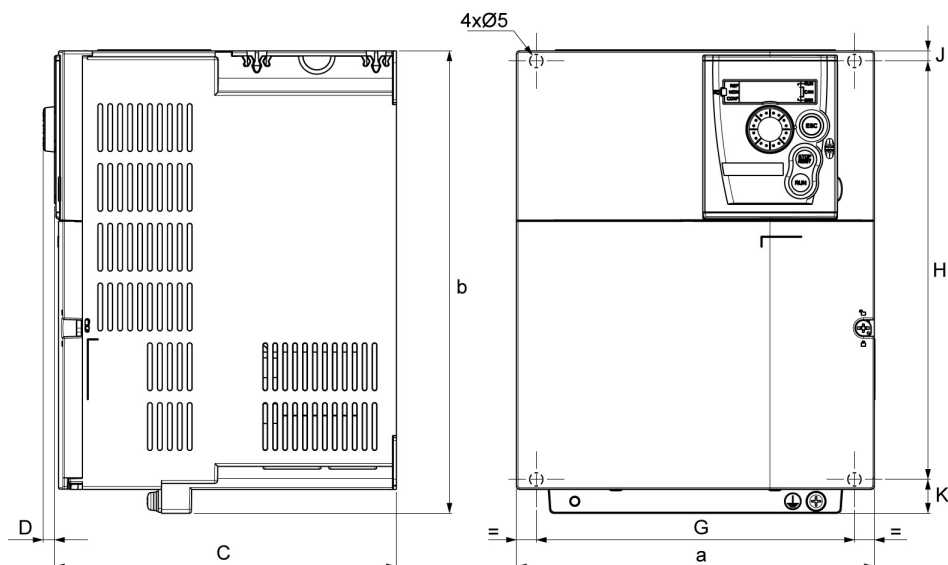
	a	b	c	d	G	H	J	K	Ø	Weight
	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	kg (lb)
8I64T200018.00X-1	72	145	122	6	60	121.5	2 x 5	18.5	2 x 5	0.9
8I64T200037.00X-1	(2.83)	(5.70)	(4.80)	(0.24)	(2.36)	(4.76)	(2x0.2)	(0.73)	(2x0.2)	(1.98)
8I64T200055.00X-1	72	145	132	6	60	121.5	2 x 5	18.5	2 x 5	0.9
8I64T200075.00X-1	(2.83)	(5.70)	(5.19)	(0.24)	(2.36)	(4.76)	(2x0.2)	(0.73)	(2x0.2)	(1.98)
8I64S200018.00X-1	72	145	132	6	60	121.5	2 x 5	18.5	2 x 5	1.05
8I64S200037.00X-1	(2.83)	(5.70)	(5.19)	(0.24)	(2.36)	(4.76)	(2x0.2)	(0.73)	(2x0.2)	(2.31)
8I64S200055.00X-1	72	145	142	6	60	121.5	2 x 5	18.5	2 x 5	1.05
8I64S200075.00X-1	(2.83)	(5.70)	(5.59)	(0.24)	(2.36)	(4.76)	(2x0.2)	(0.73)	(2x0.2)	(2.31)

Dimensions and weights (continued)

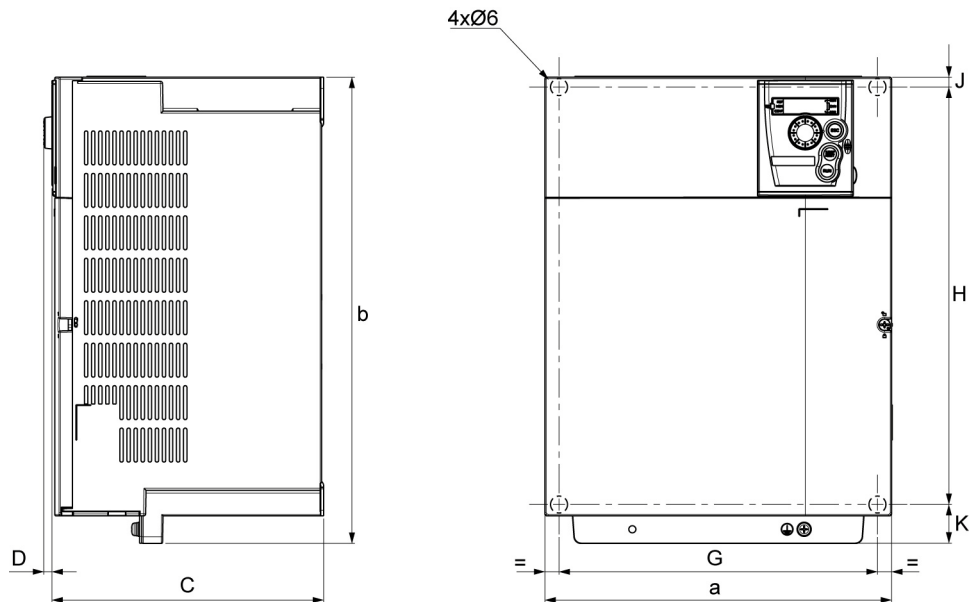


	a	b	C	D	G	H	J	K	Ø	Weight
	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	mm (in.)	kg (lb)
8I64T200110.00X-1	105	143	132	6	93	121.5	5	16.5	2 x 5	1.25
8I64T200150.00X-1	(4.13)	(5.63)	(5.19)	(0.24)	(3.66)	(4.76)	(0.2)	(0.65)	(2x0.2)	(2.76)
8I64S200110.00X-1										
8I64S200150.00X-1										
8I64T200220.00X-1										
8I64T400037.00X-1	107	143	152	6	93	121.5	5	16.5	2 x 5	1.35
8I64T400055.00X-1	(4.21)	(5.63)	(5.98)	(0.24)	(3.66)	(4.76)	(0.2)	(0.65)	(2x0.2)	(2.98)
8I64T400075.00X-1										
8I64T400110.00X-1										
8I64T400150.00X-1										
8I64S200220.00X-1										
8I64T200300.00X-1										
8I64T200400.00X-1	142	184	152	6	126	157	6.5	20.5	4 x 5	2.35
8I64T400220.00X-1	(5.59)	(7.24)	(5.98)	(0.24)	(4.96)	(6.18)	(0.26)	(0.81)	(4x0.2)	(5.18)
8I64T400300.00X-1										
8I64T400400.00X-1										

Dimensions and weights (continued)



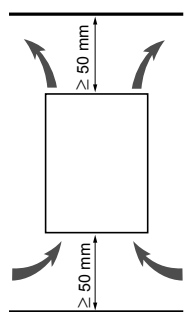
	a mm (in.)	b mm (in.)	C mm (in.)	D mm (in.)	G mm (in.)	H mm (in.)	J mm (in.)	K mm (in.)	Ø mm (in.)	Weight kg (lb)
8I64T200550.00X-1										
8I64T200750.00X-1	180	232	172	6	160	210	5	17	4 x 5	4.70
8I64T400550.00X-1	(7.09)	(9.13)	(6.77)	(0.24)	(6.30)	(8.27)	(0.2)	(0.67)	(4x0.2)	(10.36)
8I64T400750.00X-1										



	a mm (in.)	b mm (in.)	C mm (in.)	D mm (in.)	G mm (in.)	H mm (in.)	J mm (in.)	K mm (in.)	Ø mm (in.)	Weight kg (lb)
8I64T201100.00X-1										
8I64T201500.00X-1	245	329.5	192	6	225	295	7	27.5	4 x 6	9
8I64T401100.00X-1	(9.65)	(12.97)	(7.56)	(0.24)	(8.86)	(11.61)	(0.28)	(1.08)	(4x0.24)	(19.84)
8I64T401500.00X-1										

Mounting

Mounting and temperature conditions



Install the unit vertically, at $\pm 10^\circ$.

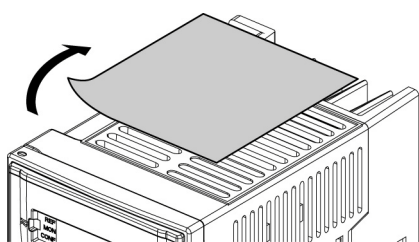
Do not place it close to heating elements.

Leave sufficient free space so that the air required for cooling purposes can circulate from the bottom to the top of the unit.

Free space in front of unit: 10 mm (0.39 in.) minimum.

When IP20 protection is adequate, we recommend that the vent cover on the top of the drive be removed, as shown below.

Removing the vent cover

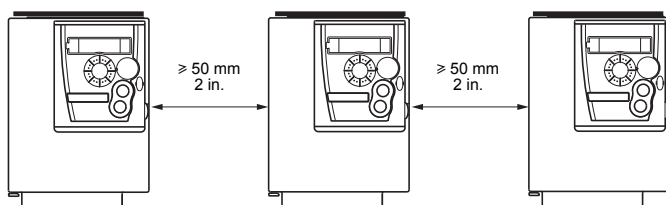


Example 8I64T200110.00X-1

Mounting types

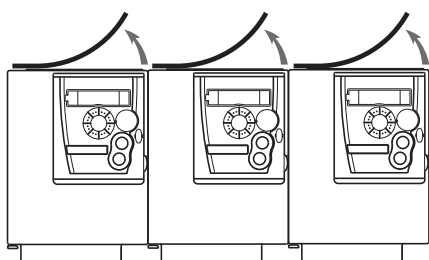
3 types of mounting are possible:

Type A mounting:



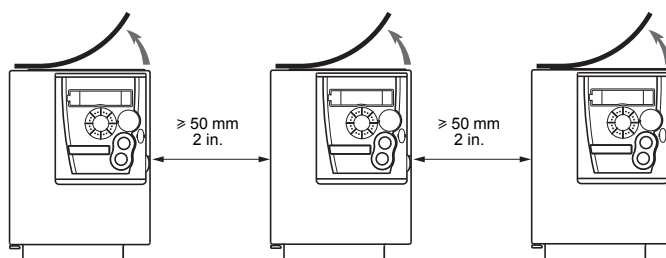
Free space ≥ 50 mm (2 in.) on each side, with vent cover fitted. Mounting type A is suitable for drive operation at surrounding air temperature less or equal to 50°C (122°F).

Type B mounting:



Drives mounted side-by-side, vent cover should be removed (the degree of protection becomes IP20).

Type C mounting:



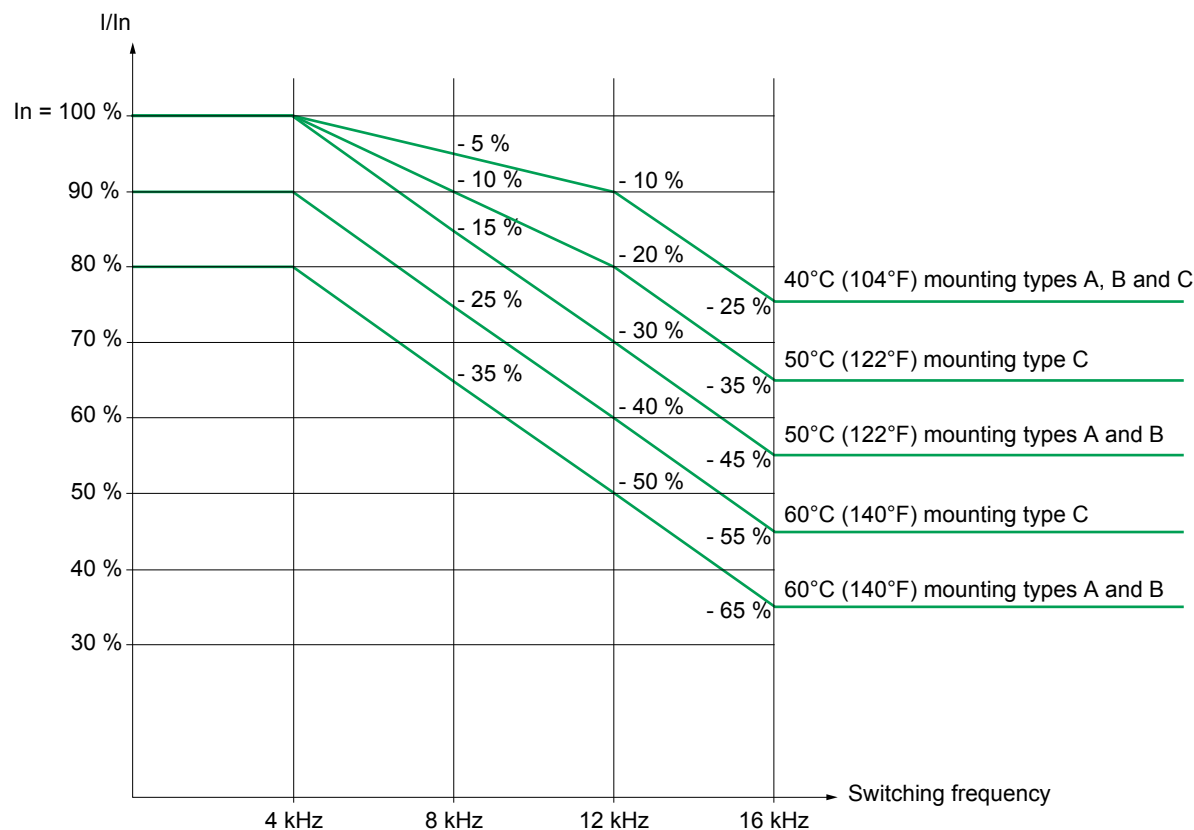
Free space ≥ 50 mm (2 in.) on each side. Vent cover should be removed for operation at surrounding air temperature above 50°C (122°F). The degree of protection becomes IP20

Note: For switching frequencies above 4 kHz and derating conditions, please refer to the derating curves for guidelines.

Mounting (continued)

Derating curves

Derating curves for the drive current I_n as a function of the temperature, switching frequency and type of mounting.



For intermediate temperatures (e.g. 55°C; 131 °F), interpolate between 2 curves.

Flow of air

If you are installing the drives in enclosures, make provision for a flow of air at least equal to the value given in the table below for each drive.

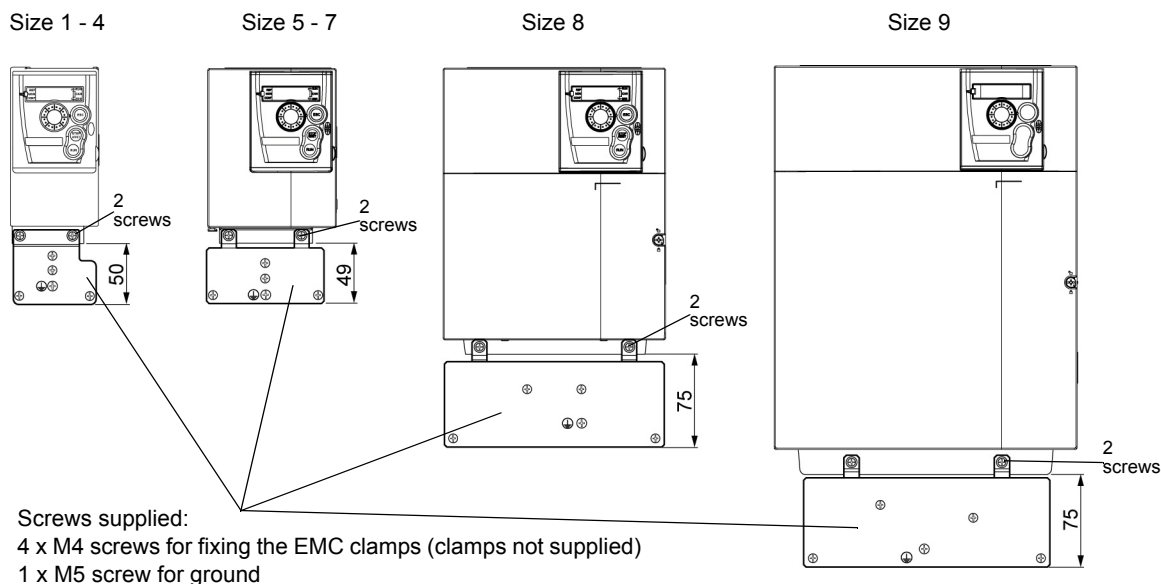
	Flow rate	
	m ³ /hour	ft ³ /min
8I64S200018.00X-1, 8I64S200037.00X-1, 8I64S200055.00X-1 8I64T200018.00X-1, 8I64T200037.00X-1, 8I64T200055.00X-1 8I64T400037.00X-1, 8I64T400055.00X-1, 8I64T400075.00X-1, 8I64T400110.00X-1	18	11
8I64S200075.00X-1, 8I64S200110.00X-1, 8I64S200150.00X-1 8I64T200075.00X-1, 8I64T200110.00X-1, 8I64T200150.00X-1 8I64T400150.00X-1, 8I64T400220.00X-1	33	19
8I64S200220.00X-1 8I64T200220.00X-1, 8I64T200300.00X-1, 8I64T200400.00X-1 8I64T400300.00X-1, 8I64T400400.00X-1	93	55
8I64T200550.00X-1 8I64T400550.00X-1, 8I64T400750.00X-1	102	60
8I64T200750.00X-1, 8I64T201100.00X-1 8I64T401100.00X-1, 8I64T401500.00X-1	168	99
8I64T201500.00X-1	216	127

Mounting (continued)

Installing the EMC plates

EMC mounting plate: Supplied with the drive

Fix the EMC equipotentiality mounting plate to the holes in the ACOPOSinverter X64 heatsink using the 2 screws supplied, as shown in the drawings below.



	Size
8I64T200018.00X-1, 8I64T200037.00X-1	1
8I64T200055.00X-1, 8I64T200075.00X-1	2
8I64S200018.00X-1, 8I64S200037.00X-1	3
8I64S200055.00X-1, 8I64S200075.00X-1	4
8I64T200110.00X-1, 8I64T200150.00X-1	5
8I64S200110.00X-1, 8I64S200150.00X-1 8I64T200220.00X-1, 8I64T400037.00X-1 8I64T400055.00X-1, 8I64T400075.00X-1 8I64T400110.00X-1, 8I64T400150.00X-1	6

	Size
8I64S200220.00X-1, 8I64T200300.00X-1 8I64T200400.00X-1, 8I64T400220.00X-1 8I64T400300.00X-1, 8I64T400400.00X-1	7
8I64T200550.00X-1, 8I64T200750.00X-1 8I64T400550.00X-1, 8I64T400750.00X-1	8
8I64T201100.00X-1, 8I64T201500.00X-1 8I64T401100.00X-1, 8I64T401500.00X-1	9

DC bus voltage measurement procedure

⚡ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Read and understand the precautions in "Before you begin" page 6 before performing this procedure.

Failure to follow these instructions will result in death or serious injury.

The DC bus voltage can exceed 933 Vdc. Use a properly rated voltage-sensing device when performing this procedure. To measure the DC bus voltage:

1. Disconnect all power.
2. Wait 15 minutes to allow the DC bus to discharge.
3. Measure the voltage of the DC bus between the PA/+ and PC/- terminals to ensure that the voltage is less than 42 Vdc.
4. If the DC bus capacitors do not discharge completely, contact your local B&R office. Do not repair or operate the drive.

Wiring

Recommendations

Power and circuit protection

The drive must be grounded to conform with the regulations concerning high leakage currents (over 3.5 mA).

Where local and national codes require upstream protection by means of a residual current device, use a type A device for single-phase drives and a type B device for three-phase drives as defined in the IEC Standard 60755.

Choose a suitable model integrating:

- High frequency current filtering,
- A time delay that helps to prevent tripping caused by the load from stray capacitance on power-up.
The time delay is not possible for 30 mA devices; in this case, choose devices with immunity against nuisance tripping.

If the installation includes several drives, provide one "residual current device" per drive.

Keep the power cables separate from circuits in the installation with low-level signals (detectors, PLCs, measuring apparatus, video, telephone).

If you are using cables longer than 50 m (164 ft) between the drive and the motor, add output filters.

Control

Keep the control circuits away from the power cables. For control and speed reference circuits, we recommend using shielded twisted cables with a pitch of between 25 and 50 mm (1 and 2 in.), connecting the shielding to ground at each end.

Equipment Grounding

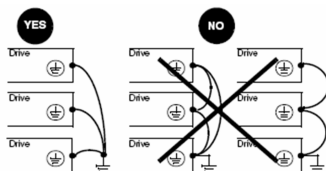
Ground the drive according to local and national code requirements. A minimum wire size of 10 mm² (6 AWG) may be required to meet standards limiting leakage current.

⚡ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- The drive panel must be properly grounded before power is applied.
- Use the provided ground connecting point as shown in the figure below.
- Do not loop the ground cables of mains supply and grounding connection point on the bottom of the drive.

Failure to follow these instructions will result in death or serious injury.



- Ensure that the resistance of the ground is one ohm or less.
- When grounding several drives, you must connect each one directly, as shown in the figure to the left.
- Do not loop the ground cables or connect them in series.

⚠ WARNING

IMPROPER WIRING PRACTICES

- The ACOPOSinverter X64 drive will be damaged if input line voltage is applied to the output terminals (U/T1,V/T2,W/T3).
- Check the power connections before energizing the ACOPOSinverter X64 drive.
- If replacing another drive, verify that all wiring connections to the ACOPOSinverter X64 drive comply with wiring instructions in this manual page [33](#).

Failure to follow these instructions can result in death, serious injury, or equipment damage.

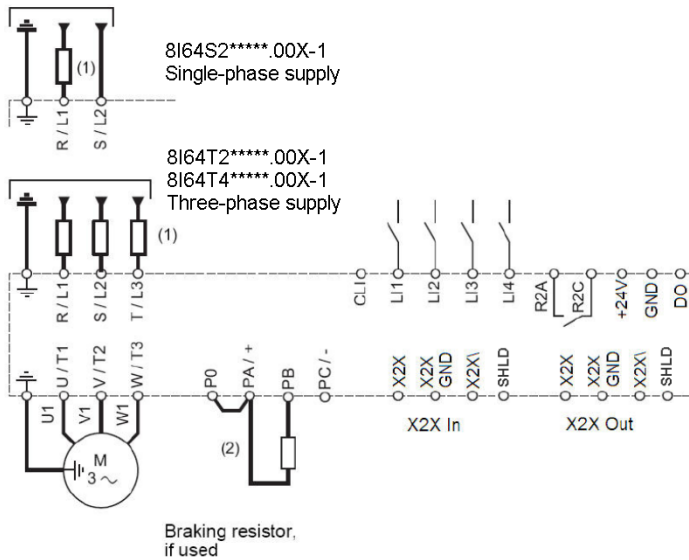
⚠ WARNING

INADEQUATE OVERCURRENT PROTECTION

- Overcurrent protective devices must be properly coordinated.
- The Canadian Electrical Code and the National Electrical Code require branch circuit protection. Use the fuses recommended in the installation manual.
- Do not connect the drive to a power feeder whose short-circuit capacity exceeds the drive short-circuit current rating listed in this manual page [33](#).

Failure to follow these instructions can result in death, serious injury, or equipment damage.

General wiring diagram



(1) Line choke, if used (single phase or 3-phase)

(2) If a braking resistor is connected, set [\[Dec ramp adapt.\]](#) (brA) parameter to yes (refer to the programming manual).

Note 1: Use interference suppressors on all inductive circuits near the drive or coupled to the same circuit (relays, contactors, solenoid valves, etc).

Note 2: This diagram is for the standard ACOPOSinverter X64 products. Optional communication cards may change the control wiring of the product.

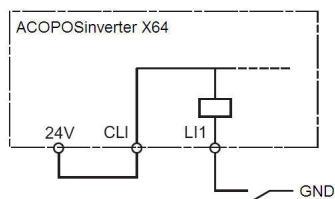
Please see the associated documentation for the option cards for details.

Choice of associated components:

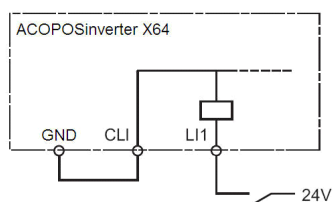
Please refer to the catalogue.

Logic input common

The Logical input common (CLI) assigns the logical inputs to sink or source operation:



Source operation



Sink operation

(1) See page 25 to locate the switch on the terminal board.

DANGER

UNINTENDED EQUIPMENT OPERATION

- Prevent accidental grounding of logic inputs configured for sink logic. Accidental grounding can result in unintended activation of drive functions.
- Protect the signal conductors against damage that could result in unintentional conductor grounding.
- Follow NFPA 79 and EN 60204 guidelines for proper control circuit grounding practices.

Failure to follow these instructions will result in death or serious injury.

Power terminals

Access to the power terminals

To access the terminals the front door has to be opened. Before opening and maintaining the drive, take care of the ESD details below.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.

Replace the cover plate on the terminals and close the door before applying power.

Failure to follow these instructions will result in death or serious injury.

CAUTION

Before maintaining the drive, take care of the following ESD details:

- Do not touch the connector contacts on connected cables.
- Do not touch the contact tips on the circuit boards
- Any persons handling electrical components or devices that will be installed in the electrical components must be grounded
- Components can only be touched on the small sides or on the front plate
- Components should always be stored in a suitable medium (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable storage surfaces!
- Electrostatic discharges should be avoided on the components (e.g. through charged plastics)
- A minimum distance of 10 cm must be kept from monitors and TV sets
- Measurement devices and equipment must be grounded
- Measurement probes on potential-free measurement devices must be discharged on sufficiently grounded surfaces before taking measurements

Failure to follow these instructions can result in equipment damage

Wiring (continued)

Functions of the power terminals

Terminal	Function	For ACOPOSinverter X64
\perp	Ground terminal	All ratings
R/L1 - S/L2	Power supply	8I64S2****.00X-1
R/L1 - S/L2 - T/L3		8I64T2****.00X-1 8I64T4****.00X-1
PO	DC bus + polarity	All ratings
PA/+	Output to braking resistor (+ polarity)	All ratings
PB	Output to braking resistor	All ratings
PC/-	DC bus - polarity	All ratings
U/T1 - V/T2 - W/T3	Outputs to the motor	All ratings

Arrangement and characteristics of the power terminals

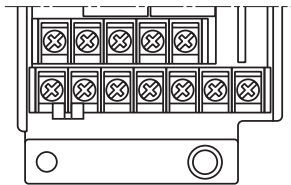
CAUTION

RISK OF DAMAGE TO THE DRIVE

- Never remove the link between PO and PA/+.
- The PO and PA/+ terminal screws must always be fully tightened as a high current flows through the link.

Failure to follow these instructions can result in equipment damage

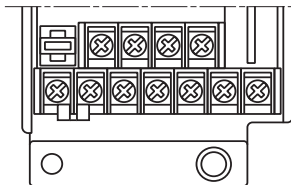
8I64T200018.00X-1 to 8I64T200075.00X-1



\perp	\perp	R/L1	S/L2	T/L3			
P0	PA/+	PB	PC/-	U/T1	V/T2	W/T3	

	Applicable wire size (1) mm ² (AWG)	Recommended wire size (2) mm ² (AWG)	Tightening torque N·m (lb.in)
8I64T200018.00X-1			
8I64T200037.00X-1	2.5	2.5	0.8
8I64T200055.00X-1	(14)	(14)	(7.1)
8I64T200075.00X-1			

8I64S200018.00X-1 to 8I64S200075.00X-1



\perp	\perp	R/L1	S/L2				
P0	PA/+	PB	PC/-	U/T1	V/T2	W/T3	

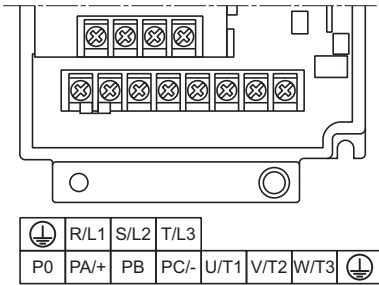
	Applicable wire size (1) mm ² (AWG)	Recommended wire size (2) mm ² (AWG)	Tightening torque N·m (lb.in)
8I64S200018.00X-1			
8I64S200037.00X-1	2.5	2.5	0.8
8I64S200055.00X-1	(14)	(14)	(7.1)
8I64S200075.00X-1			

(1) The value in bold corresponds to the minimum wire gauge to permit secureness.

(2) 75°C (167 °F) copper cable (minimum wire size for rated use).

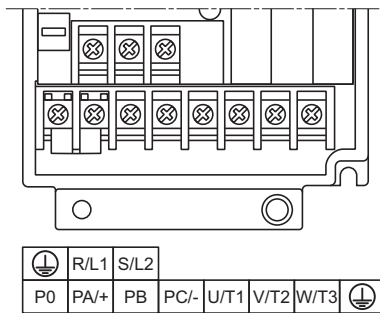
Wiring (continued)

8I64T200110.00X-1 to 8I64T200400.00X-1 8I64T400037.00X-1 to 8I64T400400.00X-1



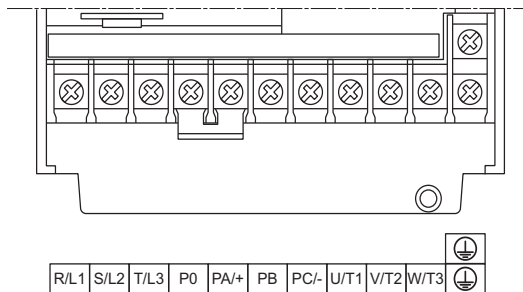
	Applicable wire size (1) mm ² (AWG)	Recommended wire size (2) mm ² (AWG)	Tightening torque N·m (lb.in)
8I64T200110.00X-1 8I64T200150.00X-1 8I64T400037.00X-1 8I64T400055.00X-1 8I64T400075.00X-1 8I64T400110.00X-1 8I64T400150.00X-1	2.5 to 6 (14 to 10)	2.5 (14)	0.8 (7.1)
8I64T200220.00X-1	2.5 to 6 (14 to 10)	3.5 (12)	1.2 (10.7)
8I64T200300.00X-1 8I64T200400.00X-1	6 (10)	6 (10)	1.2 (10.7)
8I64T400220.00X-1 8I64T400300.00X-1	2.5 to 6 (14 to 10)	2.5 (14)	1.2 (10.7)
8I64T400400.00X-1	4 to 6 (12 to 10)	4 (12)	1.2 (10.7)

8I64S200110.00X-1 to 8I64S200220.00X-1



	Applicable wire size (1) mm ² (AWG)	Recommended wire size (2) mm ² (AWG)	Tightening torque N·m (lb.in)
8I64S200110.00X-1 8I64S200150.00X-1	2.5 to 6 (14 to 10)	3.5 (12)	1.2 (10.7)
8I64S200220.00X-1	4 to 6 (12 to 10)	4 (12)	1.2 (10.7)

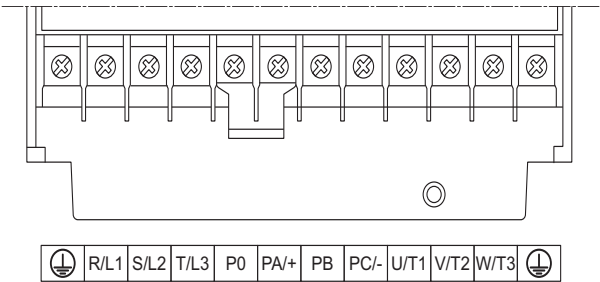
8I64T200550.00X-1, 8I64T200750.00X-1 8I64T400550.00X-1, 8I64T400750.00X-1



	Applicable wire size (1) mm ² (AWG)	Recommended wire size (2) mm ² (AWG)	Tightening torque N·m (lb.in)
8I64T200550.00X-1	10 to 16 (8 to 6)	10 (8)	2.5 (22.3)
8I64T200750.00X-1	16 (6)	16 (6)	2.5 (22.3)
8I64T400550.00X-1	6 to 16 (10 to 6)	6 (10)	2.5 (22.3)
8I64T400750.00X-1	10 to 16 (8 to 6)	16 (6)	2.5 (22.3)

- (1) The value in bold corresponds to the minimum wire gauge to permit secureness.
(2) 75°C (167 °F) copper cable (minimum wire size for rated use).

8I64T201100.00X-1, 8I64T201500.00X-1
8I64T401100.00X-1, 8I64T401500.00X-1



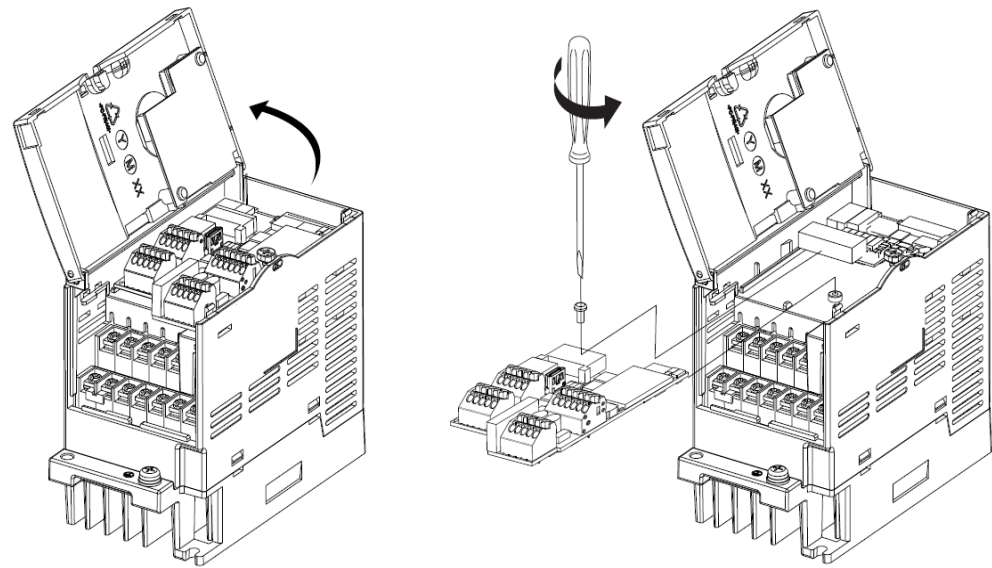
	Applicable wire size (1) mm² (AWG)	Recommended wire size (2) mm² (AWG)	Tightening torque N·m (lb.in)
8I64T201100.00X-1	10 to 25 (8 to 4)	25 (4)	4.5 (40.1)
8I64T201500.00X-1 8I64T401500.00X-1	10 to 25 (8 to 4)	16 (6)	4.5 (40.1)
8I64T401100.00X-1	10 to 25 (8 to 4)	10 (8)	4.5 (40.1)

(1) The value in bold corresponds to the minimum wire gauge to permit secureness.
(2) 75°C (167 °F) copper cable (minimum wire size for rated use).

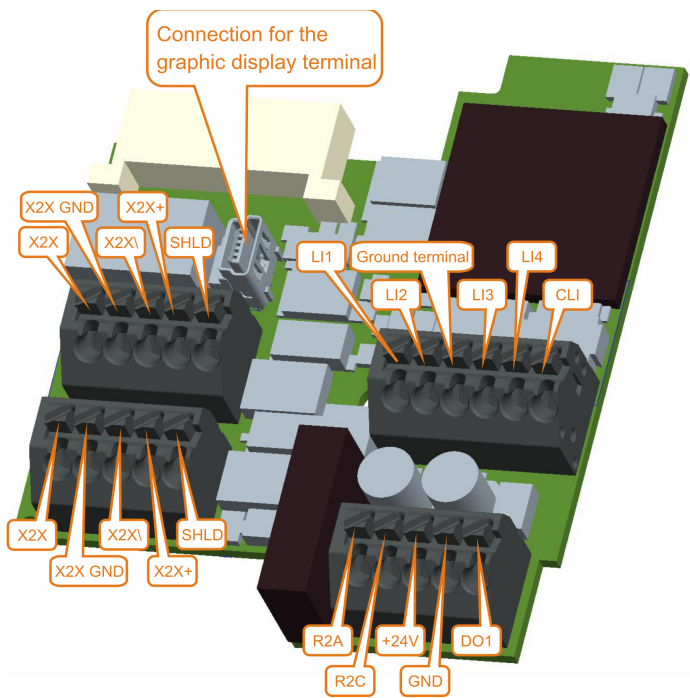
Control terminals

Access to the control terminals

To access the terminals the front door has to be opened. Before opening and maintaining the drive, take care of the ESD details below.



Arrangement of the control terminals



ACOPOSinverter X64 Control terminals	Applicable wire size (1) mm² (AWG)
All terminals	0.5 to 1.5 (20 to 16)

(1) The value in bold corresponds to the minimum wire gauge to permit secureness.

DANGER

UNINTENDED EQUIPMENT OPERATION

- Do not plug or unplug the terminal board while drive is powered.
- Check the tightening of the fixing screw after any manipulation on the terminal board.

Failure to follow these instructions will result in death or serious injury.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not touch the terminal board before :

- removing power on the drive,
- removing any voltage on input and output terminals.

Failure to follow these instructions will result in death or serious injury.


CAUTION

Before maintaining the drive, take care of the following ESD details:

- Do not touch the connector contacts on connected cables.
- Do not touch the contact tips on the circuit boards
- Any persons handling electrical components or devices that will be installed in the electrical components must be grounded
- Components can only be touched on the small sides or on the front plate
- Components should always be stored in a suitable medium (ESD packaging, conductive foam, etc.). Metallic surfaces are not suitable storage surfaces!
- Electrostatic discharges should be avoided on the components (e.g. through charged plastics)
- A minimum distance of 10 cm must be kept from monitors and TV sets
- Measurement devices and equipment must be grounded
- Measurement probes on potential-free measurement devices must be discharged on sufficiently grounded surfaces before taking measurements

Failure to follow these instructions can result in equipment damage

Characteristics and functions of the control terminals

Terminal	Function	Electrical characteristics
R2A R2C	N/O contact of programmable relay R2	<ul style="list-style-type: none"> • Min. switching capacity: 10 mA for 5 V --- • Max. switching capacity on resistive load ($\cos \varphi = 1$ and $L/R = 0$ ms): 2 A for 250 V \sim and 30 V --- • Max. switching capacity on inductive load ($\cos \varphi = 0.4$ and $L/R = 7$ ms): 1.5 A for 250 V \sim and 30 V --- • Sampling time: 8 ms • Service life: 100,000 operations at max. switching power
+24V	Power supply for X2X interface	MANDATORY <ul style="list-style-type: none"> • +24 VDC (min. 18 V, max. 30 V) • Power: 1.6 W at 24 VDC
GND	Common	GND for 24 VDC power supply
DO1	Digital Output	<ul style="list-style-type: none"> • Switching voltage: 18 to 30 VDC • Diagnostic status: Output monitoring with 100 μs delay • Leakage current when switched off: 3 μA • Residual voltage: <0.3 V @ 0.5 A rated current • Short circuit peak current: <35 A • Switching on after overload or short circuit cutoff: <20 μs • Switching delay: <ul style="list-style-type: none"> 0 \rightarrow 1: <100 μs 1 \rightarrow 0: <300 μs • Switching frequency at resistive load: max. 100 Hz • Output circuit: Source X2X datapoint
LI1 LI2	Logic inputs	<ul style="list-style-type: none"> • + 24 V power supply (max. 30 V) • Impedance: 12.1 kΩ • State 0 if <5 V, state 1 if >15 V (voltage difference between LI- and CLI) • Sampling time: 4 ms
	Ground terminal	Recommended wire cross section 1.5 mm ² (16 AWG); The ground terminal connection has to be connected to the EMC plate.
LI3 LI4	Depending on I/O configuration LI3 and LI4 can be used as: - Logical inputs or - Counter Inputs	Same characteristics as LI1 and LI2 Event counter, gate, frequency and period measurement (LI3 and LI4 can not be used for ACP10SDC library because there is no wire breakage detection possible) Event counter operation: <ul style="list-style-type: none"> • Counter size: 32-bit • Max. input frequency: 100 kHz Gate measurement: <ul style="list-style-type: none"> • Counter size: 32-bit (16-bit with active overflow recognition) • Max. input frequency: 100 kHz • Counter frequency: internal 4 MHz or 31.25 kHz, external max. 100 kHz • Max. discrepancy with 24 V: ± 4 μs Period measurement: <ul style="list-style-type: none"> • Counter size: 32-bit (16-bit with active overflow recognition) • Max. input frequency: 100 kHz • Counter frequency: internal 4 MHz or 31.25 kHz, external max. 100 kHz AB counter operation: <ul style="list-style-type: none"> • Counter size: 32-bit • Max. input frequency: 20 kHz X2X datapoint

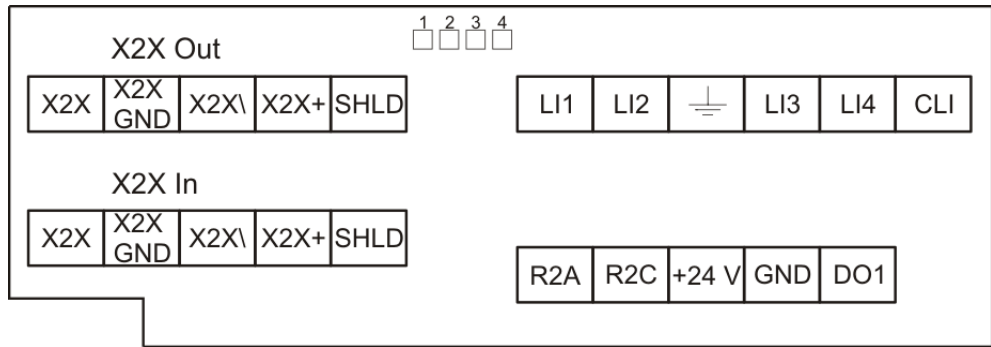
Note:

- Below HW revision B5 the max. counter input frequency is 5 kHz.
- Below HW revision B0 the counter inputs are changed. Counter01 (LI3) and Counter02 (LI4).

Wiring (continued)

CLI	Logical inputs common	Source: connect CLI to 24 VDC Sink: connect CLI to GND LI3 and LI4 in counter operation only with sink connection possible
X2X X2X GND X2X\ SHLD	X2X In	
X2X X2X GND X2X\ SHLD	X2X Out	
X2X+		X2X+ not used internally connected from X2X+ In to X2X+ Out)
USB- Connector	Connection for the graphic display terminal	

LED status



LED status - X2X Link		
Red (1)	Green (2)	Description
Off	On	X2X Link supplied, communication is working
On	Off	X2X communication is not working
On	On	Preoperational: X2X Link supplied, module not initialized

LED status - module function		
LED	Status	Description
Green (3)	Off	Module not supplied
	Single flash	Reset mode
	Double flash	Firmware update
	Blinking	Preoperational
	On	Run mode
Red (4)	Off	Module not supplied or everything is OK
	On	Error or reset state

Counter settings

AB counter operation

If the counter input configuration is set to AB counter then the LI3 and LI4 is a 32-bit AB counter whose actual value is found in the I/O mapping under the counter 01.

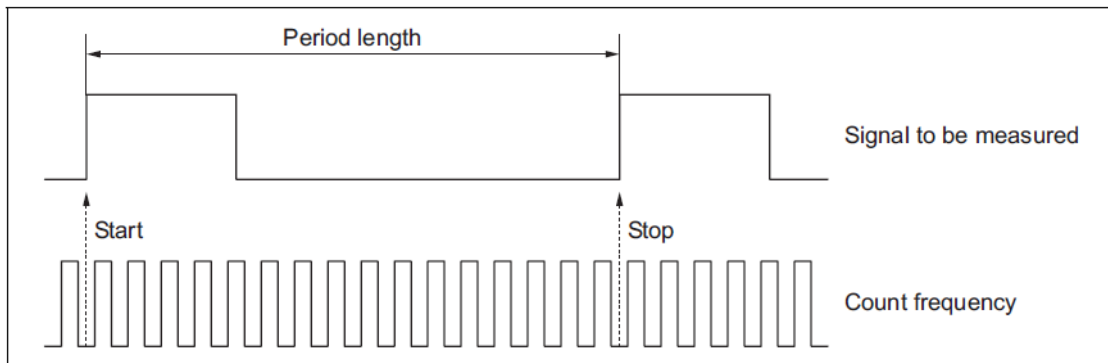
- A = LI4
- B = LI3

Event counter operation

If the counter input configuration is on and the channel mode is set to event counter, two 32-bit counters are available. The measurement can be begin at the decreasing or increasing edge depending on the channel mode.

- Counter 1 = LI4
- Counter 2 = LI3

Period measurement

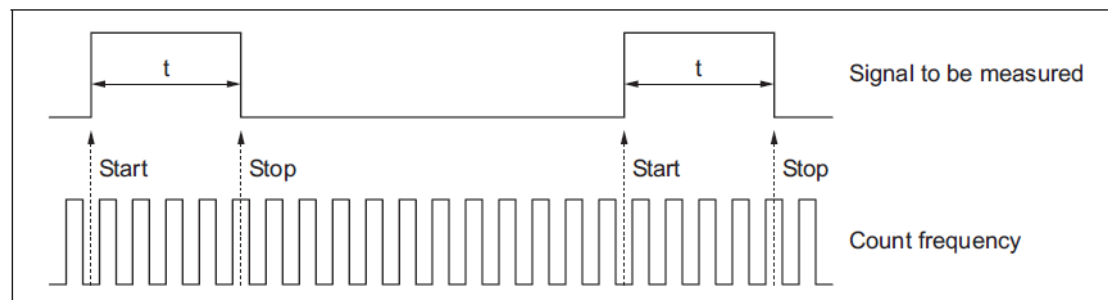


The measurement can be begin at the decreasing or increasing edge depending on the channel mode. The counter frequency can be set in two steps (4 MHz or 31.25 kHz) or with an external frequency. The external frequency must however be less than 100 kHz. The measured counter state is a 32-bit value and is displayed in counter 1 or counter 2.

The frequency of the signal to be measured can be a maximum of 100 kHz.

- Counter 1 = LI4
- Counter 2 = LI3
- Ext. Counting frequency = LI3

Gate measurement



The measurement can be begin at the decreasing or increasing edge depending on the channel mode. Measurement always occurs up to the next edge. The counter frequency can be set to one of two levels (4 MHz or 31.25 kHz) or with an external frequency. The external frequency must however be less than 100 kHz. The measured counter state is a 32-bit value and is displayed in counter 1 or counter 2.

The frequency of the signal to be measured can be a maximum of 100 kHz.

- Counter 1 = LI4
- Counter 2 = LI3
- Ext. Counting frequency = LI3

Electromagnetic compatibility (EMC)

IMPORTANT: The high frequency equipotential ground connection between the drive, motor, and cable shielding does not eliminate the need to connect the ground (PE) conductors (green-yellow) to the appropriate terminals on each unit.

Principle and precautions

- Grounds between the drive, motor, and cable shielding must have high frequency equipotentiality.
- When using shielded cable for the motor, use a 4-conductor cable so that one wire will be the ground connection between the motor and the drive. Size of the ground conductor must be selected in compliance with local and national codes. The shield can then be grounded at both ends. Metal ducting or conduit can be used for part or all of the shielding length, provided there is no break in continuity.
- When using shielded cable for Dynamic Brake (DB) resistors, use a 3-conductor cable so that one wire will be the ground connection between the DB resistor assembly and the drive. The size of the ground conductor must be selected in compliance with local and national codes. The shield can then be grounded at both ends. Metal ducting or conduit can be used for part or all of the shielding length, provided there is no break in continuity.
- When using shielded cable for control signals, if the cable is connecting equipment that is close together and the grounds are bonded together, then both ends of the shield can be grounded. If the cable is connected to equipment that may have a different ground potential, then ground the shield at one end only to prevent large currents from flowing in the shield. The shield on the ungrounded end may be tied to ground with a capacitor (for example: 10 nF, 100 V or higher) in order to provide a path for the higher frequency noise. Keep the control circuits away from the power circuits. For control and speed reference circuits, we recommend using shielded twisted cables with a pitch of between 25 and 50 mm (1 and 2 in.) Keep the control circuits away from the power circuits. For control and speed reference circuits, we recommend using shielded twisted cables with a pitch of between 25 and 50 mm (1 and 2 in.)
- Ensure maximum separation between the power supply cable (line supply) and the motor cable.
- The motor cables must be at least 0.5 m (20 in.) long.
- Do not use surge arresters or power factor correction capacitors on the variable speed drive output.
- If using an additional input filter, it should be mounted as closed as possible to the drive and connected directly to the line supply via an unshielded cable. Link 3 on the drive is via the filter output cable.
- For installation of the optional EMC plate and instructions for meeting IEC 61800-3 standard, refer to the section entitled "Installing the EMC plates" and the instructions provided with the EMC plates.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

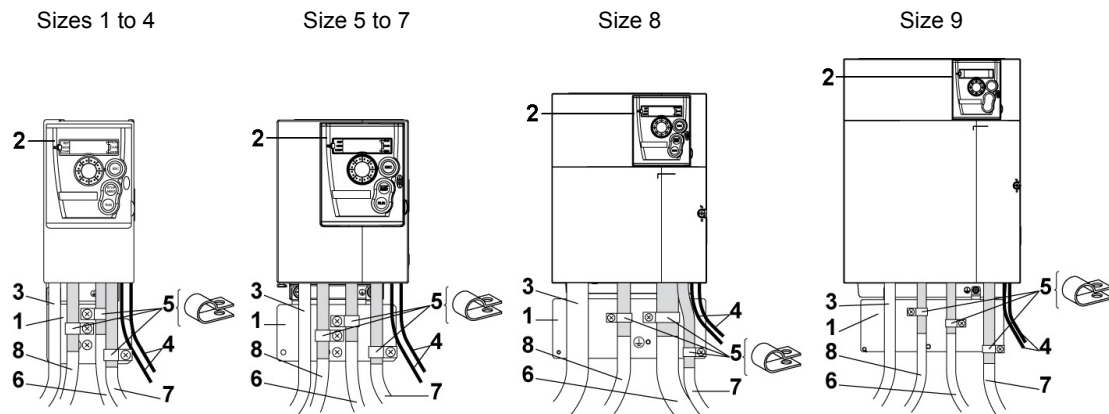
- Do not expose cable shielding except where connected to ground at the metal cable glands and underneath the grounding clamps.
- Ensure that there is no risk of the shielding coming into contact with live components.

Failure to follow these instructions will result in death or serious injury.

Optional EMC plate installation diagram and instructions (examples)

Installation depends on the drive size. The table below gives the size according to the reference.

Size 1	Size 2	Size 3	Size 4	Size 5
8I64T200018.00X-1 8I64T200037.00X-1	8I64T200055.00X-1 8I64T200075.00X-1	8I64S200018.00X-1 8I64S200037.00X-1	8I64S200055.00X-1 8I64S200075.00X-1	8I64T200110.00X-1 8I64T200150.00X-1
Size 6	Size 7	Size 8	Size 9	
8I64S200110.00X-1 8I64S200150.00X-1 8I64T200220.00X-1 8I64T400037.00X-1 8I64T400055.00X-1 8I64T400075.00X-1 8I64T400110.00X-1 8I64T400150.00X-1	8I64S200220.00X-1 8I64T200300.00X-1 8I64T200400.00X-1 8I64T400220.00X-1 8I64T400300.00X-1 8I64T400400.00X-1	8I64T200550.00X-1 8I64T200750.00X-1 8I64T400550.00X-1 8I64T400750.00X-1	8I64T201100.00X-1 8I64T201500.00X-1 8I64T401100.00X-1 8I64T401500.00X-1	



- 1.** EMC plate supplied with the drive, to be installed as indicated on the diagram.
- 2.** ACOPOSinverter X64
- 3.** Non-shielded power supply wires or cable
- 4.** Non-shielded wires for relay contacts
- 5.** Attach and ground the shielding of cables **6**, **7** and **8** as close as possible to the drive:
 - Strip the shielding.
 - Use stainless steel cable clamps of an appropriate size on the parts from which the shielding has been stripped, to attach them to the plate **1**.

The shielding must be clamped tightly to the metal plate to improve electrical contact.
- 6.** Shielded cable for motor connection with shielding connected to ground at both ends.

The shielding must be continuous and intermediate terminals must be in EMC shielded metal boxes.

For 0.18 to 1.5 kW drives, if the switching frequency is higher than 12 kHz, use cables with low linear capacitance: max. 130 pF (picoFarads) per meter.
- 7.** Shielded cable for connecting the control/signalling wiring.

For applications requiring several conductors, use cables with a small cross-section (0.5 mm², 20 AWG).

The shielding must be connected to ground at both ends. The shielding must be continuous and intermediate terminals must be in EMC shielded metal boxes.
- 8.** Shielded cable for connecting braking resistor (if used).

The shielding must be continuous and intermediate terminals must be in EMC shielded metal boxes.

Note:

- If using an additional input filter, it should be mounted under the drive and connected directly to the line supply via an unshielded cable. Link 3 on the drive is then via the filter output cable.
- The HF equipotential ground connection between the drive, motor and cable shielding does not remove the need to connect the PE ground conductors (green-yellow) to the appropriate terminals on each unit.

Operation on an IT system

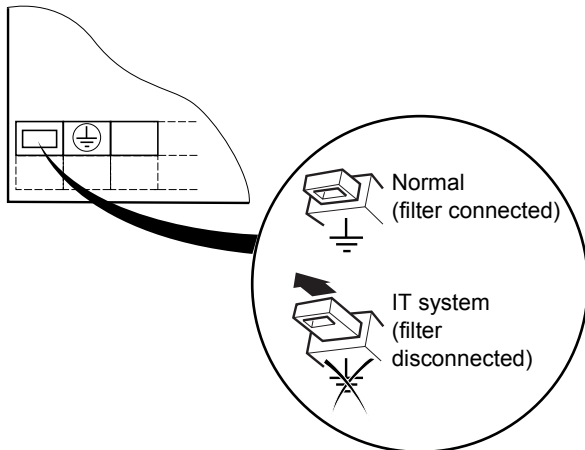
IT system: Isolated or impedance earthed neutral.

8I64S2****.00X-1 and 8I64T4****.00X-1 drives have a built-in EMC filter. As a result they exhibit leakage current to ground. If the leakage current creates compatibility problems with your installation (residual current device or other), then you can reduce the leakage current by opening the IT jumper. In this configuration EMC compliance is not guaranteed.

Use a permanent insulation monitor compatible with non-linear loads.

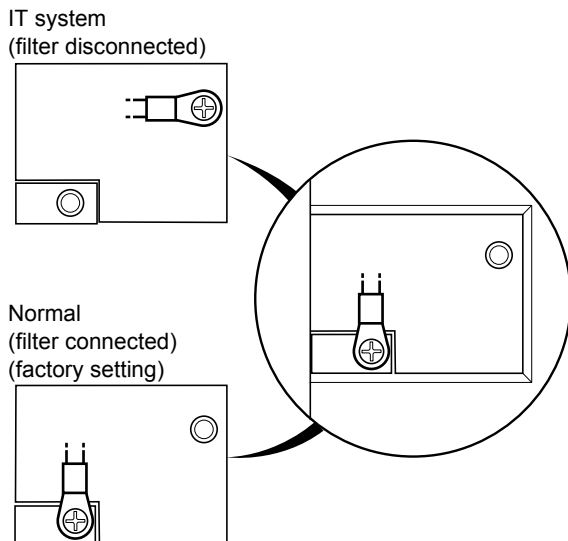
8I64S200018.00X-1 to 8I64S200220.00X-1 and 8I64T400037.00X-1 to 8I64T400400.00X-1:

Pull out the jumper on the left of the ground terminal as illustrated below.



8I64T400550.00X-1 to 8I64T401500.00X-1:

Move the cable tag on the top left of the power terminals as illustrated below (example: 8I64T400550.00X-1):



Check list

Read carefully the safety information in programming and installation manuals and the catalogue. Before starting up the drive, please check the following points regarding mechanical and electrical installations, then use and run the drive.
For complete documentation, refer to www.br-automation.com.

1. Mechanical installation

- For drive mounting types and recommendations on the ambient temperature (see the Mounting instructions on page [15](#)).
- Mount the drive vertically as specified (see the Mounting instructions on page [15](#)).
- The use of the drive must be in agreement with the environments defined by the standard 60721-3-3 and according to the levels defined in the catalogue.
- Mount the options required for your application (see catalogue).

2. Electrical installation

- Connect the drive to the ground (see Equipment Grounding on page [18](#)).
- Ensure that the input power voltage corresponds to the drive nominal voltage and connect the line supply as shown on the drawing on page [19](#).
- Ensure to use appropriate input power fuses and circuit breaker.
- Wire the control terminals as required (see Control terminals on page [25](#)). Separate the power cable and the control cable according to EMC compatibility rules.
- The range 8I64S2****.00X-1 and 8I64T4****.00X-1 integrates EMC filter. The leakage current can be reduced using the IT jumper as explained in the paragraph Operating on an IT system on page [32](#).
- Ensure that motor connections correspond to the voltage (star, delta).

3. Use and run the drive (see programming manual)

- Start the drive and you will see [\[Standard mot. freq\] \(bFr\)](#) at the first power on. Check that the frequency defined by the frequency [b F r](#) (the factory setting is 50 Hz) is in accordance with the frequency of the motor.
- On first power-up parameters [\[Ref.1 channel\] \(Fr1\)](#) and [\[2/3 wire control\] \(tCC\)](#) appear after [b F r](#). These parameters should be set if you want to control the drive locally, see page «How to control the drive locally» in the programming manual.
- On subsequent power-up, [r d y](#) will be displayed on the HMI.
- The [\[Restore config.\] \(FCS\)](#) function, permits you to reset the drive with factory settings.

Maintenance

Servicing

The ACOPOSinverter X64 does not require any preventive maintenance. However, it is advisable to perform the following checks regularly:

- The condition and tightness of connections.
- Ensure that the temperature around the unit remains at an acceptable level and that ventilation is effective. Average service life of fans: 10 years.
- Remove any dust from the drive.
- Ensure proper fan operation.
- Physical damage to covers.

Assistance with maintenance, detected fault display

If a problem arises during setup or operation, ensure that the recommendations relating to the environment, mounting and connections have been observed.

The first fault detected is stored and displayed, flashing, on the screen.

Clearing the detected fault

Disconnect the drive power supply in the event of a non-resettable fault.

Wait for the display to go off completely.

Find the cause of the detected fault and correct it.

Restore power to the drive.

The detected fault will no longer be present if its cause has been corrected.

In the event of a non resettable detected fault:

- Remove/cut the power to the drive.
- WAIT 15 MINUTES to allow the DC bus capacitors to discharge. Then follow the "DC bus voltage measurement procedure" page [17](#) to verify that the DC voltage is less than 42 V. The drive LEDs are not indicators of the absence of DC bus voltage.
- Find and correct the detected fault.
- Restore power to the drive to confirm the detected fault has been rectified.

Certain detected faults can be programmed for automatic restart after the cause has disappeared.

These detected faults can also be reset by cycling power to the drive or by means of a logic input or control bit.

Display menu

Use the display menu to show the status of the drive and its current values as an aid for finding the causes of detected faults.

Spares and repairs

Serviceable product: replacement of spares following the catalog.

Procedure after a long time storage

WARNING

RISK OF EXPLOSION AT THE POWER UP

The capacitors after a long time storage can have issues. Following a storage time between 2 and 3 years:

- Use one AC supply variable connected between L1, L2 and L3
- Increase AC supply voltage to have:
 - 25% of rated voltage during 30min
 - 50% of rated voltage during 30min
 - 75% of rated voltage during 30min
 - 100% of rated voltage during 30min

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Short-circuit rating and branch circuit protection

Recommended fuse ratings for UL and CSA requirements

Reference	Voltage (Y)	Input withstand rating (1)	Output interrupt rating (X)(2)	Enclosure Containment rating (3) (Type 1)	Branch Circuit protection (Z1)	Rating (Z2)
8I64S200018.00X-1	200-240	1	22		Class J Fuse	6
8I64S200037.00X-1	200-240	1	22		Class J Fuse	10
8I64S200055.00X-1	200-240	1	22		Class J Fuse	10
8I64S200075.00X-1	200-240	1	22		Class J Fuse	15
8I64S200110.00X-1	200-240	1	22		Class J Fuse	20
8I64S200150.00X-1	200-240	1	22		Class J Fuse	20
8I64S200220.00X-1	200-240	1	22		Class J Fuse	30
8I64T200018.00X-1	200-240	5	22	22	Class J Fuse	3
8I64T200037.00X-1	200-240	5	22	22	Class J Fuse	6
8I64T200055.00X-1	200-240	5	22	22	Class J Fuse	10
8I64T200075.00X-1	200-240	5	22	22	Class J Fuse	10
8I64T200110.00X-1	200-240	5	22	22	Class J Fuse	15
8I64T200150.00X-1	200-240	5	22	22	Class J Fuse	15
8I64T200220.00X-1	200-240	5	22	22	Class J Fuse	20
8I64T200300.00X-1	200-240	5	22	22	Class J Fuse	25
8I64T200400.00X-1	200-240	5	22	22	Class J Fuse	35
8I64T200550.00X-1	200-240	22	22	22	Class J Fuse	50
8I64T200750.00X-1	200-240	22	22	22	Class J Fuse	60
8I64T201100.00X-1	200-240	22	22	22	Class J Fuse	80
8I64T201500.00X-1	200-240	22	22	22	Class J Fuse	110
8I64T400037.00X-1	380-500	5	22	100	Class J Fuse	3
8I64T400055.00X-1	380-500	5	22	100	Class J Fuse	6
8I64T400075.00X-1	380-500	5	22	100	Class J Fuse	6
8I64T400110.00X-1	380-500	5	22	100	Class J Fuse	10
8I64T400150.00X-1	380-500	5	22	100	Class J Fuse	10
8I64T400220.00X-1	380-500	5	22	100	Class J Fuse	15
8I64T400300.00X-1	380-500	5	22	100	Class J Fuse	15
8I64T400400.00X-1	380-500	5	22	100	Class J Fuse	20
8I64T400550.00X-1	380-500	22	22	100	Class J Fuse	30
8I64T400750.00X-1	380-500	22	22	100	Class J Fuse	35
8I64T401100.00X-1	380-500	22	22	100	Class J Fuse	50
8I64T401500.00X-1	380-500	22	22	100	Class J Fuse	70

Suitable For Use On A Circuit Capable Of Delivering Not More Than ___X___ rms Symmetrical Amperes, ___Y___ Volts Maximum, When Protected by ___Z 1___ with a Maximum rating of ___Z 2___.

(1) Input withstand rating is that for which the product has been designed thermally. Installation on a supply greater than this level will require additional inductance to satisfy this level.

(2) Output interrupt rating relies on Integral solid state short circuit protection. This does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes. This is dependant on the type of installation.

(3) Enclosure Containment Rating is the maximum input short-circuit current at the drive input terminals with the specific branch Circuit Protection present for which any internal component breakdown, will not create a shock, flame, fire or expulsion hazard outside a specific enclosure structure. The various combinations are indicated in supplementary documents.