

**Safety**



All operations must be carried out by appropriately trained personnel. Use all lifting facilities provided e.g. both lifting points, if fitted, or single lifting point, if fitted\*.

Vertical lifting - Prevent uncontrolled rotation.

Lift machine - Do not lift other equipment with motor lifting points only.

Before installation check for fan cover damage, shaft damage, foot/mounting damage, and loose fasteners. Check nameplate details.

Ensure level mounting surface, balanced mounting, not misaligned.

Gaskets, and/or sealants, and guards must be correctly fitted.

Correct belt tension.

Please observe derating rules, see Design Guide

\*Note: maximum hand lift is 20 kg below shoulder, but above ground level.

Max. weights:

- Frame size 80: 15 kg
- Frame size 90 & 100: 30 kg
- Frame size 112: 65 kg



The voltage on the VSM unit is dangerous when it is connected to the mains. Incorrect installation of the VSM unit may lead to material damage or serious injury or it may be fatal.

Consequently, the instructions in this Quick Setup as well as national and local rules and safety regulations must be complied with.

Touching the electrical parts may be fatal, even after the mains supply has been disconnected. Wait at least 4 minutes.

- Installation must be fused and isolated correctly.

- Covers and cable entries must be fitted



**NBI**

It is the user's or certified electrician's responsibility to ensure correct earthing and protection in accordance with applicable national and local requirements and standards.

**Safety regulations**

1. The VSM unit must be disconnected from mains if repair work is to be carried out. Check that the mains supply has been disconnected and that the necessary time has passed (4 minutes).

2. Correct protective earthing of the equipment must be established, the user must be protected against supply voltage, and the VSM unit must be protected against overload in accordance with applicable national and local regulations.

RCD's (ELCB relays), multiple protective earthing or earthing can be used as extra protection, provided that local safety regulations are complied with.

In case of an earth fault, a DC content may develop in the fault current.

If RCD's are used, local regulations must be observed. Relays must be suitable for protection of 3-phase equipment with a bridge rectifier and for a brief discharge on power-up.

3. The earth leakage currents are higher than 3.5 mA (approx. 7 mA). This means that the VSM unit requires a fixed, permanent installation as well as reinforced protective earthing.

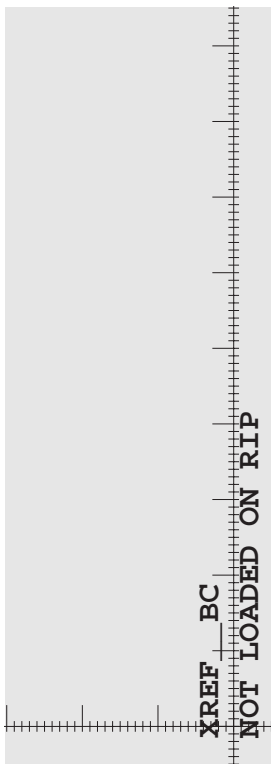
**Warning against unintended start**

1. The VSM unit can be brought to a stop by means of digital commands, bus commands, or references, whilst connected to the mains.

If personal safety considerations make it necessary to ensure that no unintended start occurs, these stop functions are not sufficient.

2. While parameters are being changed, the motor may start.

3. A VSM unit that has been stopped may start if faults occur in the electronics, or if a temporary overload or a fault in the supply mains or the motor connection ceases.



# Variable Speed W Motor Quick Setup

This Quick Setup gives information on safety and helps you to get your VSM unit installed and running in factory setting, see fig. 1. For additional information, please see the Design Guide.

Before you start, please read the safety instructions on the back of this Quick Setup.

**Tools for installation**

- 1 cross-point screwdriver
- 1 large screwdriver
- 1 small screwdriver
- Min. 2 glands:

*Gland sizes*

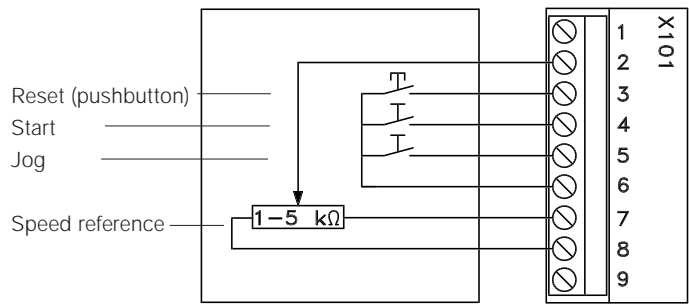
VSM 005-030	3 X PG16
VSM 040-075	1 X PG21, 2 X PG16

- 1 mains cable
- 1 control cable

*Max. cable cross section*

Mains supply cable	4.0 mm <sup>2</sup> /10 AWG
Control cable	1.5 mm <sup>2</sup> /16 AWG
Serial communication cable	1.5 mm <sup>2</sup> /16 AWG

Factory setting



- *Reset* to be closed short time for resetting fault trips
- *Start* to be closed for changing to *run mode*
- *Jog* will run at fixed speed while closed (10 Hz)
- *Speed reference* (0-10 V) determines speed while in *run mode*

- Terminals*
- 1: Analogue input
  - 2: Analogue input
  - 3: Digital input
  - 4: Digital input
  - 5: Digital input
  - 6: 24 V DC supply
  - 7: 10 V DC supply
  - 8: 0 V
  - 9: Output

Fig. 1

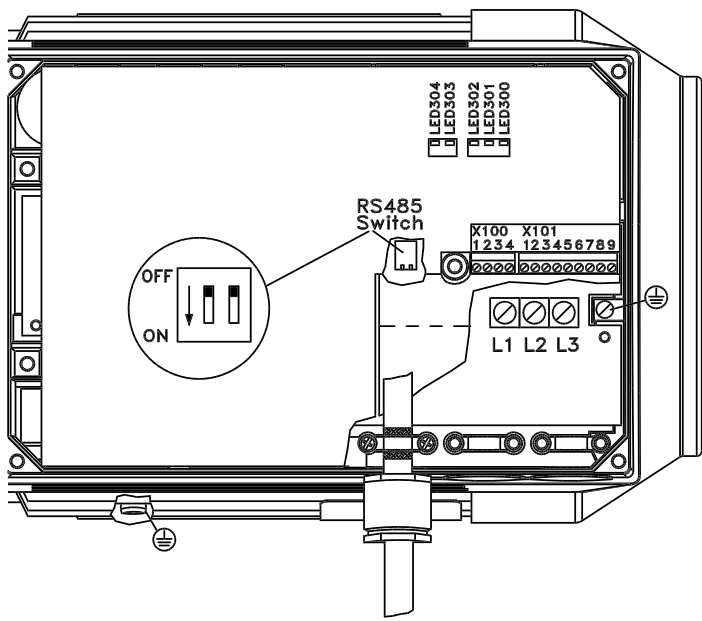


Fig. 2 The control cables must be screened cables.

X100: Terminal block for data communication

Terminal No.	Function
1	P RS 485 for connection to bus or PC
2	N RS 485
3	5 V DC Supply for RS 485 bus
4	0 V DC

Table A

X101: Terminal block for analog/digital control signals

Terminal No.	Function	Example
1	Analog input (0-20 mA)	Feedback signal
2	Analog (0-10 V)/digital input 2	Speed reference
3	Digital input (or pulse) 3	Reset
4	Digital input (or precise stop) 4	Start
5	Digital input (other) 5	Jog (fixed speed)
6	24 V DC supply for digital inputs (max. 50 mA)	
7	10 V DC supply for potentiometer (max. 15 mA)	
8	0 V for terminals 1-7 and 9	
9	Analog (0-20 mA)/digital output	Fault indication

Table B

**1 Mechanical installation**

Install the VSM unit with adequate access for routine maintenance. Adequate space, particularly at the fan inlet (50 mm), is necessary to facilitate airflow.

Where several VSM units are installed in close proximity, care must be taken to ensure that there is no recirculation of exhausted warm air.

**NBI Ambient temperature**

To avoid the FC part getting overheated, the ambient temperature is not to exceed 40°C and the 24-hour average temperature is not to exceed 35°C. If the ambient temperature is in the range of 40°C - 55°C, a reduction of the service life of the FC part is to be expected. For further information, please see the section on derating in the Design Guide.

**2 Electrical connections**

Remove the inverter box cover, which is held by four screws, to obtain access to the terminals.

Remove the detachable terminal plugs from the terminal blocks X100 and X101 to obtain access to the mains terminals.

Lift only the corner of the black plastic cover by the cable entries to expose the mains terminals L<sub>1</sub>, L<sub>2</sub> and L<sub>3</sub> (see fig. 2).

**NBI** Do not lift or remove the entire plastic cover. The voltage on the VSM unit is dangerous and may lead to material damage, serious injury or it may be fatal.

**NBI Mains terminals L<sub>1</sub>, L<sub>2</sub> and L<sub>3</sub>:** Make sure that your mains supply corresponds to the voltage required by the VSM unit (see inverter label), TT and NT mains.

Remove the gland plug furthest from the drive end of the motor and feed the mains cable through the hole.

Connect the three mains phases to terminals L<sub>1</sub>, L<sub>2</sub> and L<sub>3</sub> and the earth to the separate terminal provided.

Remove the gland plug nearest to the drive end of the motor and feed the control cable through the hole.

Terminal arrangement in fig. 1. The control cables must be screened cables. The middle hole is provided if further mains cables or control cables are required (eg in the case of parallel connection). See above for correct cable and gland sizes.

**3 Start the VSM unit**

Connect mains. LED 302 (green) lights up to indicate that the power is on. In Profibus versions, LED 303 will flash. For further information on Profibus, please see the Profibus manual.

Connect terminal 4 and 6 to the start button (see fig. 1).

Connect terminal 2, 7 and 8 to the potentiometer (see fig. 1).

Use the start button to start the VSM unit and adjust the speed by means of the potentiometer.

**NBI Bearings**

Ball and roller bearings are despatched from the works fully charged with grease. Shielded bearings have sufficient grease for an operating life of at least two years in normal ambient temperatures, providing there is little or no leakage.

**Warning:** Tapping of fittings onto the motor shaft, with a hammer or mallet, causes bearing damage. This results in increased bearing noise and a significant reduction in bearing life.

**NBI** You cannot change the rotation direction of the motor by shifting around the phases. The direction of rotation is clockwise by default. Another direction of rotation can be programmed, see the Design Guide.

**Prefuses Max. 25 A**

**Control terminals** For information on terminal blocks X100 and X101, please see table A and B.

**RS 485 switch** For terminating an RS 485 interface serial communication, the bus must be terminated by a resistor network at both ends. This is provided by setting both switches to ON.

**LEDs** The VSM unit has five LEDs which indicate the status of the VSM unit:

LED 300 (red):	Fault trip
LED 301 (yellow):	Warning
LED 302 (green):	Power on
LED 303-304 (green):	Communication

**EMC-correct installation** The control cables must be screened cables to ensure EMC-correct electrical installation.

Connect the screen to earth at both ends.

Avoid installation with twisted screen ends (pigtailed), since this ruins the screening effect at high frequencies. Use cable clamps instead.

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