



Emotron FDU and VFX AC drives

Emotron VFX/FDU48-2P5-2Y to 032-2Y



Quick Start Guide
English

Contents

Safety Instructions	3
1. General	6
1.1 Model Explanation	6
1.1.1 Model Type code number	7
2. Electrical specifications	9
2.1 Electrical specifications related to model	11
2.2 Brake resistor	15
2.3 Fuses and input current	16
2.3.1 According to IEC ratings	16
2.4 Mounting	17
2.4.1 Cooling /cabinet mounting	17
2.5 Remove dust cover	19
2.6 Remove Keypad and Cover	20
2.6.1 Remove the keypad	20
2.6.2 Open the Cover	21
3. Cable connections	22
3.1 Mains and motor cables	22
3.1.1 Cable connection data for mains, motor and PE cables according to IEC ratings	22
3.1.2 Mains and motor cables connection	23
3.2 Connecting the Control Signals	26
3.2.1 Cables	26
3.2.2 Terminal connections	28
4. Inputs configuration with the jumpers	30
5. Mount the cover	31
5.1 Mount the keypad	32
6. Getting started	33
6.0.1 Control connection example, remote control	33
6.1 Using the function keys	34

6.2	Remote control	35
6.2.1	Default toggle loop	36
6.2.2	Overview of the main menu	37

Safety Instructions

Handling the AC drive

Installation, commissioning, demounting, taking measurements, etc. of or on the AC drive may only be carried out by personnel technically qualified for the task.

A number of national, regional and local regulations govern handling, storage and installation of the equipment. Always observe current rules and legislation.

Opening the AC drive



WARNING!

Always switch off the mains voltage before opening the AC drive and wait at least 10 minutes to allow the capacitors to discharge.

Always take adequate precautions before opening the AC drive. Although the connections for the control signals and the switches are isolated from the main voltage, do not touch the control board when the AC drive is switched on.

Precautions to be taken with a connected motor

If work must be carried out on a connected motor or on the driven machine, the mains voltage must always be disconnected from the AC drive first. Wait at least 10 minutes before starting work.

Earthing

The AC drive must always be earthed via the mains safety earth connection.

Earth leakage current

**CAUTION!**

This AC drive has an earth leakage current which does exceed 3.5 mA AC. Therefore the minimum size of the protective earth conductor must comply with the local safety regulations for

high leakage current equipment which means that according to the standard IEC61800-5-1 the protective earth connection must be assured by one of following conditions:

PE conductor cross-sectional area for cable size $\leq 16 \text{ mm}^2$ must be equal to the used phase conductors, for cable size above 16 mm^2 but smaller or equal to 35 mm^2 the PE conductor cross-sectional area shall be at least 16 mm^2 . For cables $>35 \text{ mm}^2$ the PE conductor cross-sectional area must be at least 50 % of the used phase conductor.

When the PE conductor in the used cable type is not in accordance with the above mentioned cross-sectional area requirements, a separate PE conductor should be used to establish this.

Residual current device (RCD) compatibility

This product causes a DC current in the protective conductor. Where a residual current device (RCD) is used for protection in case of direct or indirect contact, only a Type B RCD is allowed on the supply side of this product. Use RCD of 300 mA minimum.

EMC Regulations

In order to comply with the EMC Directive, it is absolutely necessary to follow the installation instructions. All installation descriptions in this manual follow the EMC Directive.

Voltage tests (Megger)

Do not carry out voltage tests (Megger) on the motor, before all the motor cables have been disconnected from the AC drive.

Condensation

If the AC drive is moved from a cold (storage) room to a room where it will be installed, condensation can occur. This can result in sensitive components becoming damp. Do not connect the mains voltage until all visible dampness has evaporated.

Incorrect connection

The AC drive is not protected against incorrect connection of the mains voltage, and in particular against connection of the mains voltage to the motor outlets U, V and W. The AC drive can be damaged in this way.

Power factor capacitors for improving $\cos\phi$

Remove all capacitors from the motor and the motor outlet.

Precautions during Autoreset

When the automatic reset is active, the motor will restart automatically provided that the cause of the trip has been removed. If necessary take the appropriate precautions.

Transport

To avoid damage, keep the AC drive in its original packaging during transport. This packaging is specially designed to absorb shocks during transport.

IT Mains supply

The AC drives can be modified for an IT mains supply, (non-earthed neutral), please contact your supplier for details.

Alarms

Never disregard an alarm. Always check and remedy the cause of an alarm.

DC-link residual voltage



WARNING!

After switching off the mains supply, dangerous voltage can still be present in the AC drive. When opening the AC drive for installing and/or commissioning activities, wait at least 10 minutes. In case of malfunction a qualified technician should check the DC-link or wait for one hour before dismantling the AC drive for repair.

1. General

Congratulations for choosing a product from CG Drives & Automation!

This is a Quick Start Guide providing brief information about how to install this AC drive. Before you start mounting and installation, please read and consider the Safety chapter first.

The main instruction manual you will find on the CD-ROM or USB stick in the box. In the main instruction manual you will find detailed information for setting up and running this AC drive.

Instruction manuals for optional boards are also found on the CD-ROM or USB stick.

All documentation is available on www.emotron.com.

1.1 Model Explanation

The Model shown on product label indicates the series name, applicable type of power supply, power class and hardware, etc. via the combination of numbers, symbols and letters.

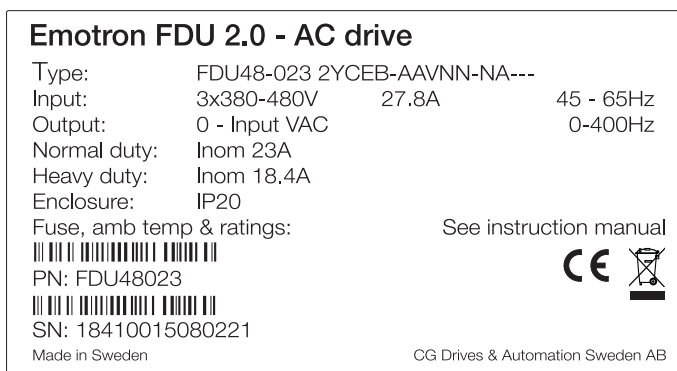


Fig. 1 Product label

1.1.1 Model Type code number

Fig. 2 gives an example of the type code numbering used on all AC drives. With this code number the exact type of the drive can be determined. This identification will be required for type specific information when mounting and installing. The code number is located on the product label, on the AC drive see Fig. 1.

Type code	FDU	48	-023	-2Y	C	E	B	-	A	A	V	N	N	-	N	A	-	-	-
Position No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Fig. 2 Type code number

Table 1 Type code explanation

Position	Configuration	
1	AC drive type	FDU VFX
2	Supply voltage	48=480 V mains
3	Rated current (A) continuous	-2P5=2.5 A - -032=32 A
4	Protection class	2Y=IP20
5	Control panel	C=Standard panel
6	EMC option	E=Standard EMC (2 nd Environment, Category C3) I=IT-Net
7	Brake chopper option	B=Chopper built in, standard
8		--=Not used
9	Brand label	A=Standard
10	Painted AC drive	A=Standard paint
11	Coated boards, option	V=Coated boards, standard
12	Option position 1	N=No option E=Encoder- 2Y (micro) max 1 P=PTC-2Y (micro), max 1 S=Safe Stop-2Y (micro), max 1 R=RS232/485-2Y (micro), max 1
13	Option position 2	

Table 1 Type code explanation

Position	Configuration	
14		-- Not used
15	Option position, communication	N=No option D=DeviceNet P=Profibus S=RS232/485 M=Modbus/TCP E= EtherCAT A=Profinet IO 1-port B=Profinet IO 2-port G=EtherNet/IP 2-port
16	Software type	A=Standard
17		-- Not used
18		-- Not used
19	Approval/certification	--CE approved

2. Electrical specifications

General	
Mains voltage:	3 phase 230 - 480 V +10/-15 % (-10 % at 230 V)
Mains frequency:	45 to 65 Hz
Input power factor:	0.7 - 0.8
Output voltage:	0–Mains supply voltage:
Output frequency:	0–400 Hz
Output switching frequency:	3 kHz (FDU adjustable 1,5-6 kHz)
Efficiency at nominal load:	≥93 % for frame sizes A3 and B3 ≥95 % for frame size C3
Control signal inputs: Analogue (differential)	
Analogue Voltage/current:	0±10 V/0-20 mA via switch
Max. input voltage:	+30 V/30 mA
Input impedance:	20 kOhm (voltage) 250 kOhm (current)
Resolution:	11 bits + sign
Hardware accuracy:	1% type + 1 ½ LSB fsd
Non-linearity	1½ LSB
Digital:	
Input voltage:	High: >9 VDC, Low: <4 VDC
Max. input voltage:	+30 VDC
Input impedance:	<3.3 VDC: 4.7 kOhm ≥3.3 VDC: 3.6 kOhm
Signal delay:	≤8 ms
Control signal outputs: Analogue	
Output voltage/current:	0-10 V/0-20 mA via software setting
Max. output voltage:	+15 V @5 mA cont.
Short-circuit current (∞):	+15 mA (voltage), +140 mA (current)
Output impedance:	10 Ohm (voltage)
Resolution:	10 bit
Maximum load impedance for current	500 Ohm
Hardware accuracy:	1.9% type fsd (voltage), 2.4% type fsd (current)
Offset:	3 LSB
Non-linearity:	2 LSB
Digital	
Output voltage:	High: >20 V _{DC} @50 mA, >23 V _{DC} open Low: <1 V _{DC} @50 mA
Shortcircuit current(∞):	100 mA max (together with +24 V _{DC})

Relays	
Contacts	0.1 – 2 A/Umax 250 V _{AC} or 42 V _{DC}
References	
+10 VDC	+10 V _{DC} @10 mA Short-circuit current +30 mA max
-10 VDC	- 10 V _{DC} @10 mA
+24 VDC	+24 V _{DC} Short-circuit current +100 mA max (together with Digital Outputs)

2.1 Electrical specifications related to model

Emotron VFX

Table 2 Typical motor power at mains voltage 400 V. AC drive main voltage range 380 - 480 V.

Model	Max. output current [A]*	Normal duty (120%, 1 min every 10 min)		Heavy duty (150%, 1 min every 10 min)		Frame size
		Power @400 V [kW]	Rated current [A]	Power @400 V [kW]	Rated current [A]	
VFX48-2P5-2Y	3.8	0.75	2.5	0.55	2.0	A3
VFX48-3P4-2Y	5.1	1.1	3.4	0.75	2.7	
VFX48-4P1-2Y	6.2	1.5	4.1	1.1	3.3	
VFX48-5P6-2Y	8.4	2.2	5.6	1.5	4.5	
VFX48-7P2-2Y	10.8	3.0	7.2	2.2	5.8	
VFX48-9P5-2Y	14.3	4.0	9.5	3.0	7.6	
VFX48-012-2Y	18.0	5.5	12	4.0	9.6	
VFX48-016-2Y	24	7.5	16	5.5	12.8	B3
VFX48-023-2Y	34.5	11	23	7.5	18.4	
VFX48-032-2Y	46.5	15	31	11	24.8	C3

* Available during limited time and as long as allowed by drive temperature.

Table 3 Typical motor power at mains voltage 460 V. AC drive main voltage range 380 - 480 V.

Model	Max. output current [A]*	Normal duty (120%, 1 min every 10 min)		Heavy duty (150%, 1 min every 10 min)		Frame size
		Power @460 V [hp]	Rated current [A]	Power @460 V [hp]	Rated current [A]	
VFX48-2P5-2Y	3.8	1	2.5	0.75	2.0	A3
VFX48-3P4-2Y	5.1	1.5	3.4	1	2.7	
VFX48-4P1-2Y	6.2	2	4.1	1.5	3.3	
VFX48-5P6-2Y	8.4	3	5.6	2	4.5	
VFX48-7P2-2Y	10.8	4	7.2	3	5.8	
VFX48-9P5-2Y	14.3	5	9.5	4	7.6	
VFX48-012-2Y	18.0	7.5	12	5	9.6	B3
VFX48-016-2Y	24	10	16	7.5	12.8	
VFX48-023-2Y	34.5	15	23	10	18.4	C3
VFX48-032-2Y	46.5	20	31	15	24.8	

* Available during limited time and as long as allowed by drive temperature.

Emotron FDU

Table 4 Typical motor power at mains voltage 400 V. AC drive main voltage range 380 - 480 V.

Model	Max. output current [A]*	Normal duty (120%, 1 min every 10 min)		Heavy duty (150%, 1 min every 10 min)		Frame size
		Power @400 V [kW]	Rated current [A]	Power @400 V [kW]	Rated current [A]	
FDU48-2P5-2Y	3.0	0.75	2.5	0.55	2.0	A3
FDU48-3P4-2Y	4.1	1.1	3.4	0.75	2.7	
FDU48-4P1-2Y	4.9	1.5	4.1	1.1	3.3	
FDU48-5P6-2Y	6.7	2.2	5.6	1.5	4.5	
FDU48-7P2-2Y	8.6	3.0	7.2	2.2	5.8	
FDU48-9P5-2Y	11.4	4.0	9.5	3.0	7.6	
FDU48-012-2Y	14.4	5.5	12	4.0	9.6	
FDU48-016-2Y	19.2	7.5	16	5.5	12.8	B3
FDU48-023-2Y	27.6	11	23	7.5	18.4	
FDU48-032-2Y	37.2	15	31	11	24.8	C3

* Available during limited time and as long as allowed by drive temperature.

Table 5 Typical motor power at mains voltage 460 V. AC drive main voltage range 380 - 480 V.

Model	Max. output current [A]*	Normal duty (120%, 1 min every 10 min)		Heavy duty (150%, 1 min every 10 min)		Frame size
		Power @460 V [hp]	Rated current [A]	Power @460 V [hp]	Rated current [A]	
FDU48-2P5-2Y	3.0	1	2.5	0.75	2.0	A3
FDU48-3P4-2Y	4.1	1.5	3.4	1	2.7	
FDU48-4P1-2Y	4.9	2	4.1	1.5	3.3	
FDU48-5P6-2Y	6.7	3	5.6	2	4.5	
FDU48-7P2-2Y	8.6	4	7.2	3	5.8	
FDU48-9P5-2Y	11.4	5	9.5	4	7.6	
FDU48-012-2Y	14.4	7.5	12	5	9.6	
FDU48-016-2Y	19.2	10	16	7.5	12.8	B3
FDU48-023-2Y	27.6	15	23	10	18.4	
FDU48-032-2Y	37.2	20	31	15	24.8	C3

* Available during limited time and as long as allowed by drive temperature.

2.2 Brake resistor

These AC drives are as standard equipped with built in Brake chopper and connection for DC+/DC-. The brake resistor must be mounted outside the AC drive.

Table 6 Minimum resistance depending on drive size and supply voltage.

Type	Rmin if supply 380–415 V _{AC} [Ohm]	Rmin if supply 440–480 V _{AC} [Ohm]
VFX/FDU48-2P5-2Y	120	150
-3P4-2Y	120	150
-4P1-2Y	120	150
-5P6-2Y	91	120
-7P2-2Y	91	120
-9P5-2Y	68	91
-012-2Y	51	68
-016-2Y	36	51
-023-2Y	27	33
-032-2Y	18	24

2.3 Fuses and input current

2.3.1 According to IEC ratings

Use mains fuses of the type gL/gG conforming to IEC 269 or breakers with similar characteristics. Check the equipment first before installing the glands.

Max. Fuse = maximum fuse value that still protects the AC drive and upholds warranty.

NOTE: The dimensions of fuse and cable cross-section are dependent on the application and must be determined in accordance with local regulations.

Table 7 Fuses and input current

Model	Nominal input current		Maximum value fuse [A]
	with DC Choke [A]	without DC Choke [A]	
VFX/FDU48-2P5-2Y	2.0	3.5	10
-3P4-2Y	2.5	4.5	10
-4P1-2Y	2.7	4.7	10
-5P6-2Y	4.5	6.1	16
-7P2-2Y	6.0	9.0	16
-9P5-2Y	8.1	11.0	25
-012-2Y	10.2	15.3	25
-016-2Y	14.0	20.0	32
-023-2Y	20.4	27.8	40
-032-2Y	27.0	37.0	63

2.4 Mounting

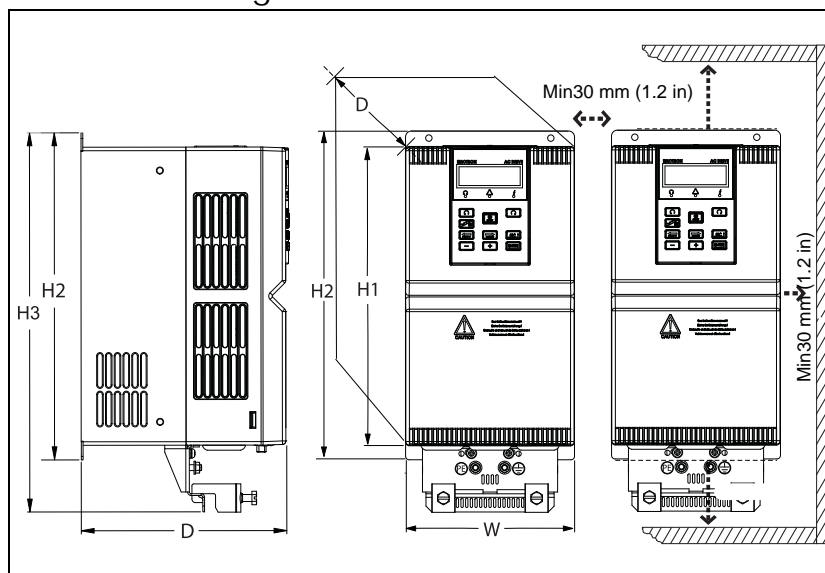


Fig. 3 Dimensions

Table 8 Dimensions

Frame size	Dim. H1/H2/H3 x W x D mm	Dim. H1/H2/H3 x W x D in	Weight kg (lbs)
A3	220/245/287 x 120 x 169	8.7/9.6/11.3 x 4.7 x 6.7	2.6 (5.7)
B3	255/280/325 x 145 x 179	9.8/11/12.8 x 5.7 x 7	3.9 (8.6)
C3	335/365/407 x 190 x 187	13.2/14.4/16 x 7.5 x 7.4	5 (11)

2.4.1 Cooling /cabinet mounting

If the AC-drive is installed in a cabinet, the rate of airflow supplied by the cooling fans must be taken into consideration.

Frame size	Emotron AC drive model	Flow rate m ³ /hour
A3	-2P5 to -012	39
B3	-016 to -023	89
C3	-032 to -038	177

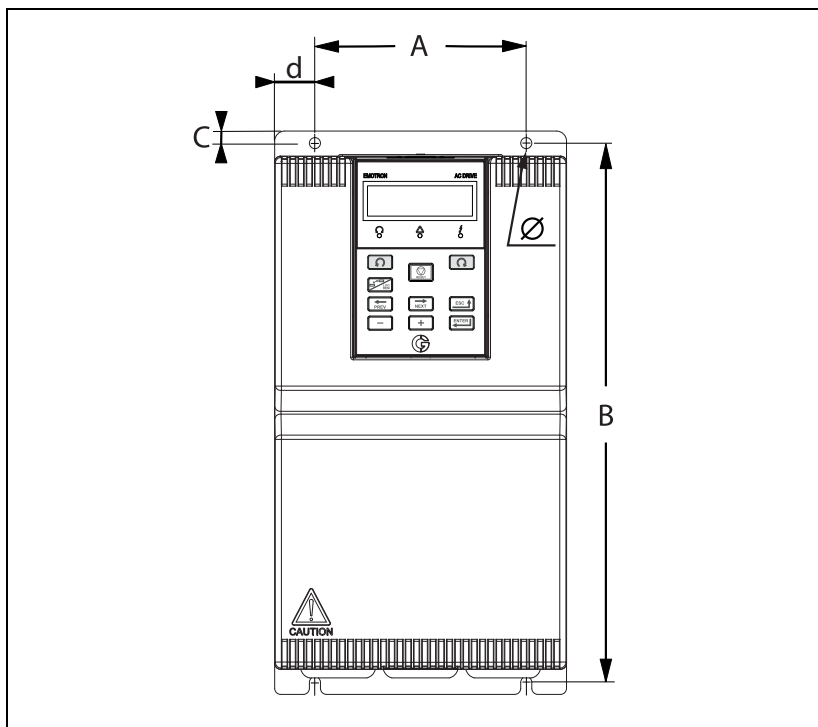


Fig. 4 Mounting dimensions.

Table 9 Mounting dimensions

Frame size	A mm (in)	B mm (in)	C mm (in)	D mm (in)	Ø mm (in)
A3	80 (3.15)	233 (9.17)	6 (0.24)	20 (0.79)	5.5 (0.20)
B3	105 (4.13)	268 (10.55)	6 (0.24)	20 (0.79)	5.5 (0.20)
C3	120 (4.72)	353 (13.89)	6 (0.24)	35 (1.38)	6 (0.24)

2.5 Remove dust cover

Remove the dust cover when installing the AC drive in a cabinet, see Fig. 5.

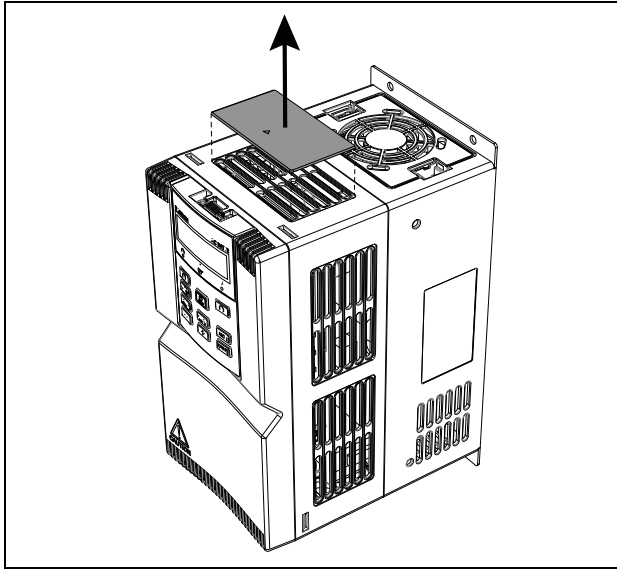


Fig. 5 Remove the dust cover

2.6 Remove Keypad and Cover

In order not to damage the keypad terminal plug, remove the keypad before you remove the front cover.

2.6.1 Remove the keypad

Press the quick-release latch of keypad as indicated by number "1" in Fig. 6, then pull the keypad out to release as indicated by "2".

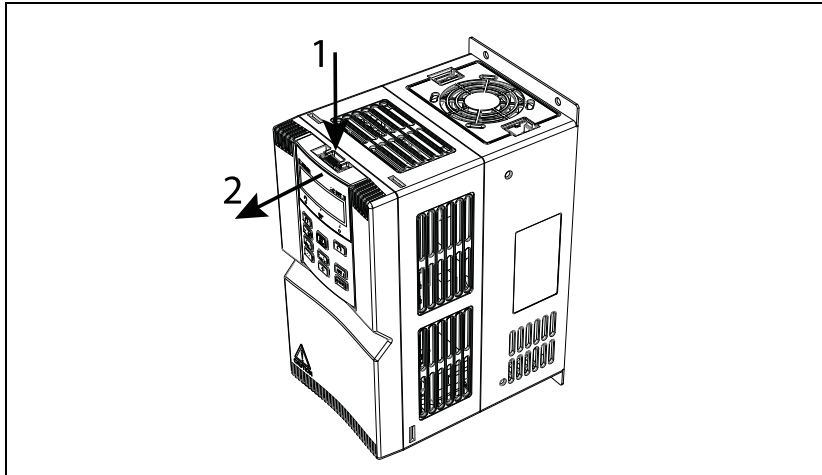


Fig. 6 Remove the keypad

2.6.2 Open the Cover

First remove the keypad according to Figure 6.

Frame size A3 and B3

Use a flat screwdriver to press in the quick-release latches at the bottom of the cover to easily remove the cover, as indicated by "2", pull the cover out to release, as indicated by number "3".

Frame size C3

Loosen the captive cover screw with your fingers, as indicated by number "1" in Fig. 7 . Then use a flat screwdriver to press in the quick-release latches at the bottom of the cover to easily remove the cover, as indicated by "2", pull the cover out to release, as indicated by number "3".

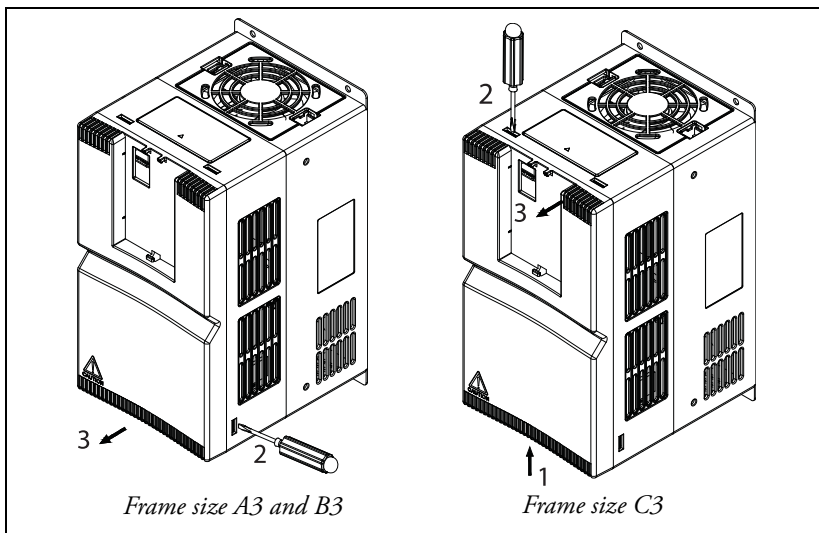


Fig. 7 Open the cover.

3. Cable connections

3.1 Mains and motor cables

Dimension the mains and motor cables according to local regulations. The cable must be able to carry the AC drive load current.

3.1.1 Cable connection data for mains, motor and PE cables according to IEC ratings

Table 10 Cable connector range and tightening torque according to IEC ratings.

Model VFX/FDU48	Frame size	Cable cross section connector range			Cable type
		Mains, motor, brake and PE			
		Cable area mm ² /AWG	Screw	Tightening torque Nm /Lb-In	
-2P5-2Y	A3	2.5 / 13	M3.5	0.8/7	Copper (Cu) 75°C
-3P4-2Y					
-4P1-2Y		2.5 / 13	M4	1.4/12	
-5P6-2Y					
-7P2-2Y					
-9P5-2Y					
-012-2Y	4 / 11				
-016-2Y	B3	6 / 9			
-023-2Y					
-032-2Y	C3	6 / 9	M5	2.7/24	

3.1.2 Mains and motor cables connection

Connect the mains and motor cables according to Fig. 8. Secure the cables with the EMC/strain relief clamps.

There are two Ferrites included in delivery, one ferrite for Mains wires and the other ferrite for the motor wires.

Lead the PE/earth wires directly to the Earth connection screws (not through the ferrites).

Mains cable

- Use one ferrite for Mains wires L1, L2, L3. Wind the wires once around the ferrite. Connect the wires to the terminals R/L1, S/L2 and T/L3.

Motor cable

- Connect the motor cable screen to the clamp according to Fig. 8.
- Use the other ferrite for the motor wires U, V and W, let the wires go straight through the ferrite. Connect the wires to the terminals U/T1, V/T2 and W/T3.

Secure all other cables such as DC or brake cables with tie wraps by using the slots.

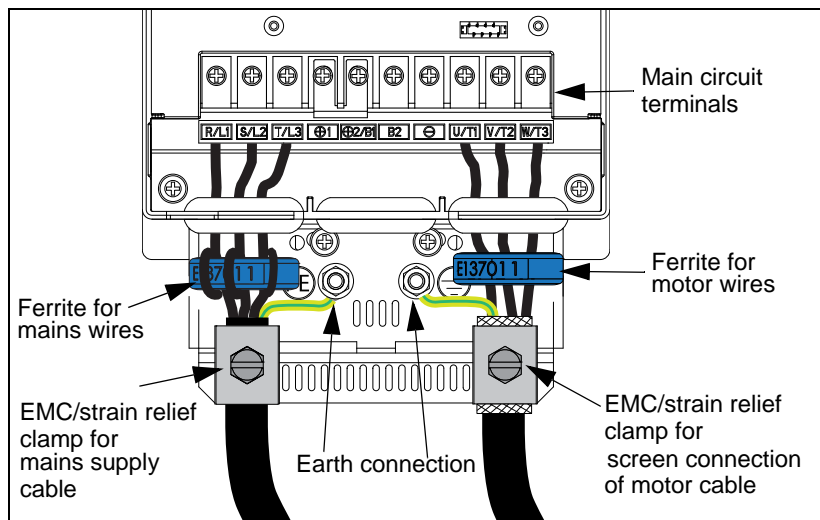


Fig. 8 Mains and motor cable connections

Main Circuit Terminals

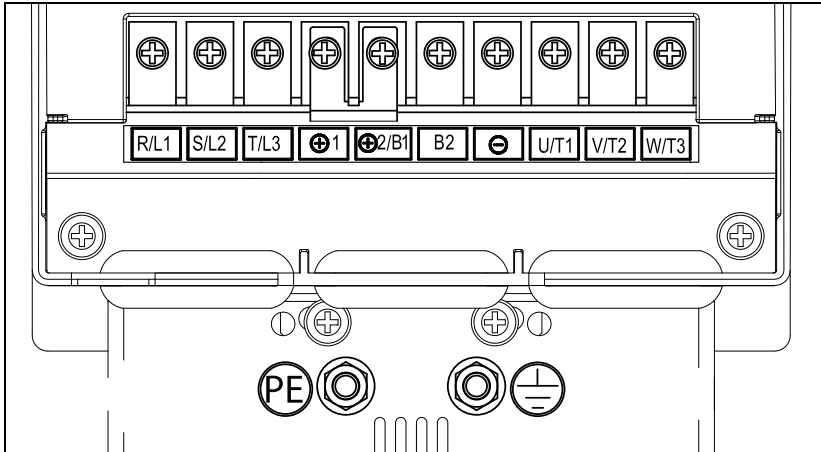


Fig. 9 Main circuit terminals.

Table 11 Terminal markings

Terminal marks	Designation and function of terminals
R/L1, S/L2, T/L3	Three-phase AC input terminals.
⊕1, ⊕2/B1	DC reactor connection terminals. Connected to +2/B1 with a jumper as factory default
⊕2/B1, B2	Braking resistor connection terminals
B2, ⊖	DC input terminals of externally mounted brake unit
⊕1, ⊖	DC power supply input terminals
U/T1, V/T2, W/T3	Three-phase AC output terminals
PE ⊕	Ground terminals, PE

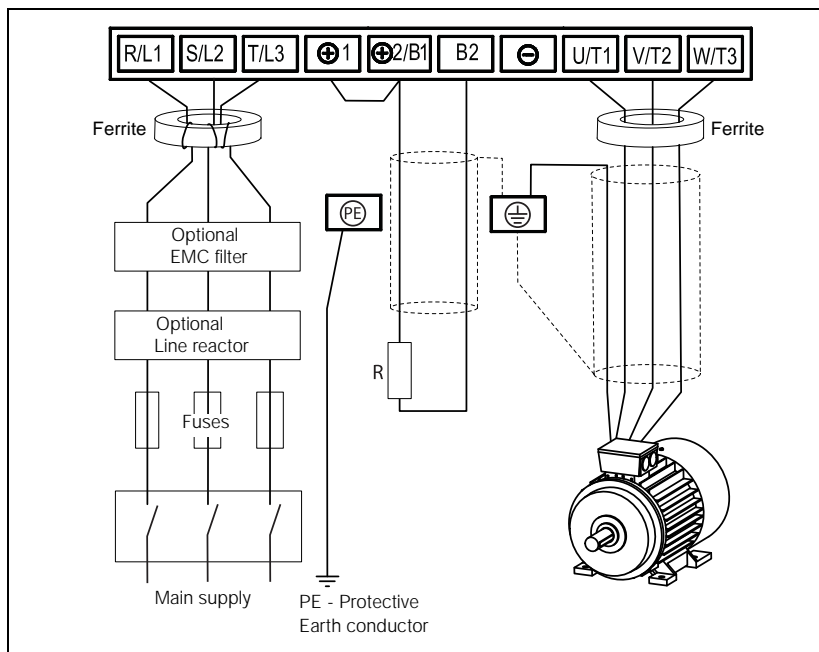


Fig. 10 Typical wiring example for 3-phase Mains supply



WARNING!

In order to work safely, the mains earth must be connected to PE and the motor earth to \perp .

3.2 Connecting the Control Signals

3.2.1 Cables

Always use screened control signal cables. The standard control signal connections are suitable for stranded flexible wire up to 1.5 mm² (AWG15) and for solid wire up to 2.5 mm²(AWG13).

Table 12 Cable connector range and tightening torque

Cable cross section connector range mm ² / AWG	Screw	Tightening torque (Nm/Lb-In)
1.5 - 2.5 / 15-13	M3	0.5 / 4.4

Screening

Connect the cable screen to the Earthing planes and secure it with a cable tie see Fig. 11.

For all signal cables the best results are obtained if the screen is connected to both ends: the AC drive side and at the source (e.g. PLC, or computer).

It is strongly recommended that the signal cables be allowed to cross mains and motor cables at a 90° angle. Do not let the signal cable go in parallel with the mains and motor cable.

NOTE: The screening of control signal cables must comply with the immunity levels given in the EMC Directive (reduction of noise level).

NOTE: The control cables must be separated from motor and mains cables.

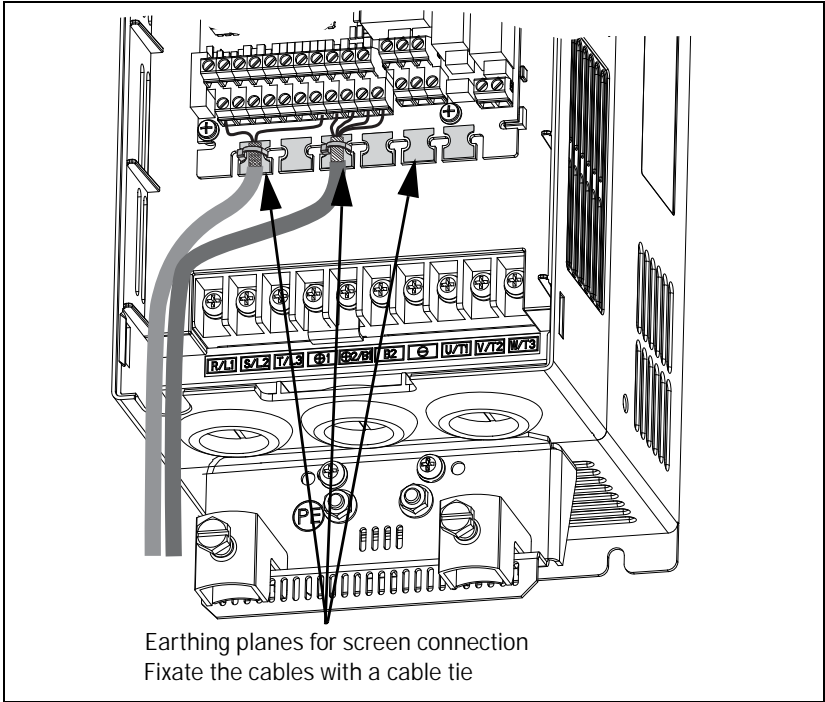


Fig. 11 Connecting the control signals and screen connection.

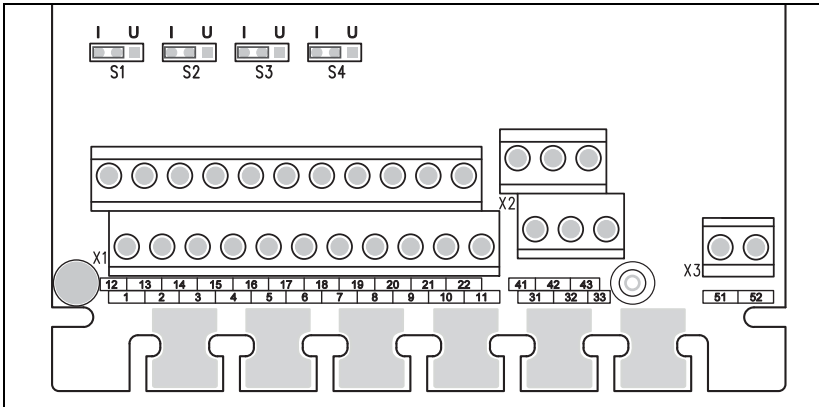


Fig. 12 Terminals for control signal connections and Jumpers S1 - S4,

3.2.2 Terminal connections

Table 13 describes the default functions for the signals. The inputs and outputs are programmable for other functions as described in the main instruction manual.

NOTE: The maximum total combined current for outputs 11, 20 and 21 is 100 mA.

NOTE: It is possible to use external 24 V DC if connection to Common (15).

Table 13 Control signals default functions

Terminal	Name	Function (Default)
Outputs		
1	+10 V	+10 V _{DC} supply voltage
6	-10 V	-10 V _{DC} supply voltage
7	Common	Signal ground
11	+24 V	+24 V _{DC} supply voltage
12	Common	Signal ground
15	Common	Signal ground
Digital inputs		
8	DigIn 1	RunL (reverse)
9	DigIn 2	RunR (forward)
10	DigIn 3	Off
16	DigIn 4	Off
17	DigIn 5	Off
18	DigIn 6	Off
19	DigIn 7	Off
22	DigIn 8	RESET

Table 13 Control signals default functions

Terminal	Name	Function (Default)
Digital outputs		
20	DigOut 1	Ready
21	DigOut 2	No trip - FDU Brake - VFX
Analogue inputs		
2	AnIn 1	Process Ref
3	AnIn 2	Off
4	AnIn 3	Off
5	AnIn 4	Off
Analogue outputs		
13	AnOut 1	Min speed to max speed
14	AnOut 2	0 to max torque
Relay outputs		
31	N/C 1	Relay 1 output Trip, active when the AC drive is in a TRIP condition.
32	COM 1	
33	N/O 1	
41	N/C 2	Relay 2 output Run, active when the AC drive is started.
42	COM 2	
43	N/O 2	
51	COM 3	Relay 3 output Off
52	N/O 3	

NOTE: N/C is opened when the relay is active and N/O is closed when the relay is active.



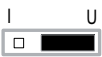







WARNING!

The relay terminals 31-52 are single isolated. Do NOT mix SELV voltage with e.g. 230 V_{AC} on these terminals.

4. Inputs configuration with the jumpers

The jumpers S1 to S4 are used to set the input configuration for the 4 analogue inputs AnIn1, AnIn2, AnIn3 and AnIn4 as described in table 14. See Fig. 12 for the location of the jumpers.

Table 14 Jumper settings

Input	Signal type	Jumper
AnIn1	Voltage	S1 
	Current (default)	S1 
AnIn2	Voltage	S2 
	Current (default)	S2 
AnIn3	Voltage	S3 
	Current (default)	S3 
AnIn4	Voltage	S4 
	Current (default)	S4 

5. Mount the cover

Frame size A3 and B3

On the completion of wiring, insert the quick-release latches at the upper part of the cover into the grooves in the centre housing as indicated by number "1" in Fig. 13, then push in the lower part of the cover as indicated by "2". A clicking noise indicates that the cover is correctly attached.

Frame size C3

On the completion of wiring, insert the quick-release latches at lower part of the cover, fitting the screw and the quick-release latches into the grooves in the centre housing as indicated by number "1" in Fig. 13, then push in the upper part of the cover as indicated by "2". A clicking noise indicates that the cover is correctly attached. Tighten the screw with your fingers (at position 1).

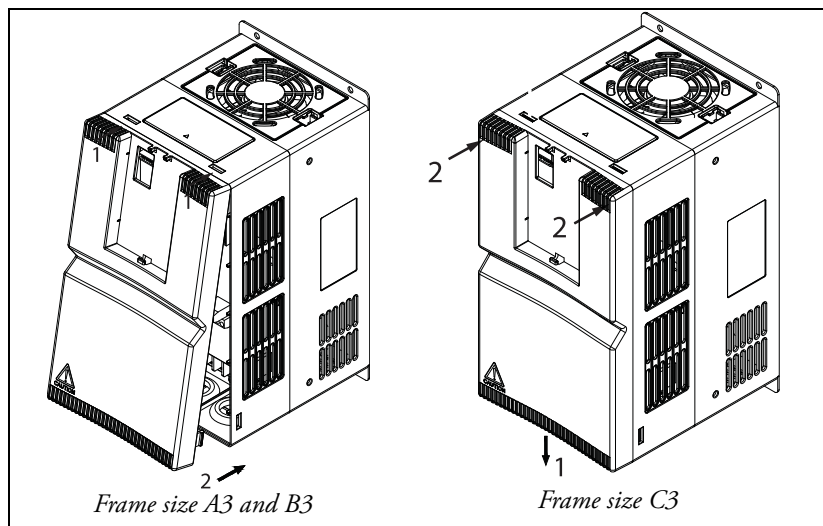


Fig. 13 Mount the cover.

5.1 Mount the keypad

Slightly tilt the keypad in the direction as indicated by number "1" in Fig. 6 and align it to quick-release latches at lower part of keypad bracket, then press it in as indicated by "2". A clicking noise indicates that the cover is correctly attached.

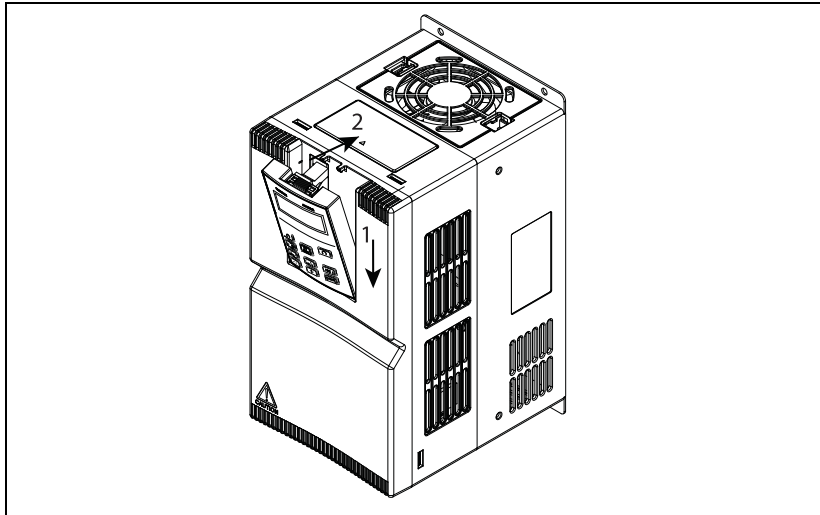


Fig. 14 Mount the keypad

6. Getting started

6.0.1 Control connection example, remote control

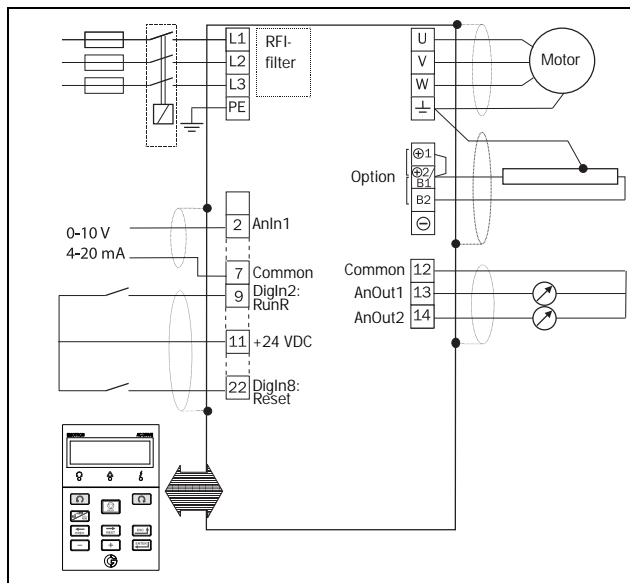


Fig. 15 Connection example for remote control.

Table 15 Description of used terminals.

Terminal	Name	Function (Default)
2	AnIn 1	Process reference, default: speed
7	Common	Signal ground
9	DigIn 2	RunR; rotation right
11	+24V	+24VDC Supply voltage
12	Common	Signal ground (If desired)
13	AnOut 1	Min speed to max speed (If desired)
14	AnOut 2	0 to max torque (If desired)
22	DigIn 8	Reset

6.1 Using the function keys

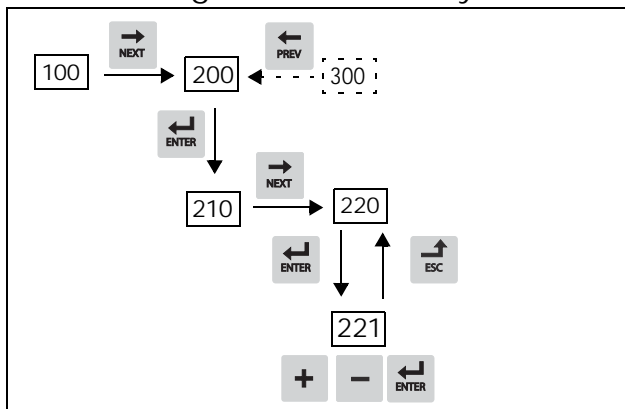


Fig. 16 Example of menu navigation when entering motor voltage



step to lower menu level or confirm changed setting



step to higher menu level or ignore changed setting



step to next menu on the same level



step to previous menu on the same level



increase value or change selection



decrease value or change selection



Toggle between menus in the toggle loop
Change the sign of a value
Switching between local and remote control

6.2 Remote control

In this example external signals are used to control the AC drive/motor.

A standard 4-pole motor for 400 V, an external start button and a reference value will also be used.

Switch on the mains









Once the mains is switched on, the internal fan in the AC drive will run for 5 seconds (In frame size A3 the fan runs continuously).


Set the Motor Data

Enter correct motor data for the connected motor. The motor data is used in the calculation of complete operational data in the AC drive.

Change settings using the keys on the control panel.

Menu [100], Preferred View is displayed when started.

1. Press  to display menu [200], Main Setup.
2. Press  and then  to display menu [220], Motor Data.
3. Press  to display menu [221] and set motor voltage.
4. Change the value using the  and  keys. Confirm with .
5. Set motor frequency [222].
6. Set motor power [223].
7. Set motor current [224].
8. Set motor speed [225].
9. Set power factor ($\cos \phi$) [227].
10. Select supply voltage level used [21B]
11. Set Motor type [22I]
12. [229] Motor ID run: Choose Short, confirm with ENTER and give start command .

The AC drive will now measure some motor parameters. The motor makes some beeping sounds but does not rotate. When the ID run is finished after about one minute ("Test Run OK!" is displayed), press  to continue.

13. Use AnIn1 as input for the reference value. The default range is 4-20 mA. If you need a 0-10 V reference value, change switch (S1) on control board.

14. Switch off power supply.
15. Connect digital and analogue inputs/outputs as in figure below.

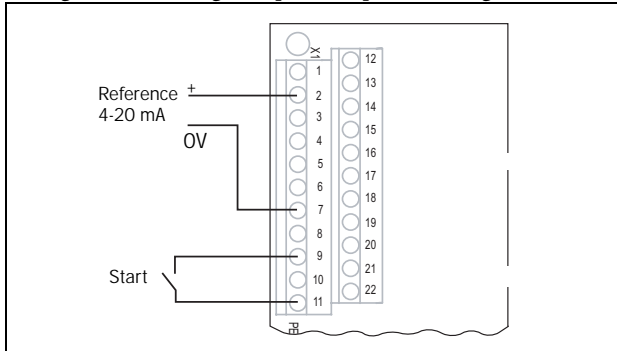


Fig. 17 Connecting reference signal

16. Ready!
17. Switch on power supply.

Run the AC drive

Now the installation is finished, and you can press the start button to start the motor. This test run will show that the main connections are OK and that the motor will run with the load.

6.2.1 Default toggle loop

Figure 18 shows the default toggle loop. This loop contains the necessary menus that need to be set before starting. Press Toggle to enter menu [211] then use the Next key to enter the sub menus [212] to [21A] and enter the parameters. When you press the Toggle key again, menu [221] is displayed.

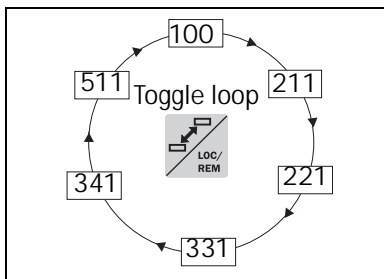


Fig. 18 Default toggle loop

6.2.2 Overview of the main menu

[100]	Preferred view. Displayed at power-up. Shows actual values (default: speed and torque).
[200]	Main Setup. Main settings to get the inverter operable e.g. motor data, autoreset and language.
[300]	Process and Application parameters. Settings more relevant to the application such as Reference Speed, torque limitations, PID control settings, etc.
[400]	Shaft power monitor and process protection. The monitor function enables the AC drive to be used as a load monitor to protect machines and processes against mechanical overload and under-load.
[500]	Inputs/outputs and virtual connections. All settings for analogue and digital inputs and outputs.
[600]	Logical functions and timers. All settings for conditional signals are entered here.
[700]	View operation and status. Viewing all the operational data like frequency, load, power, current, etc.
[800]	View Trip log. Viewing the last 10 trips in the trip memory.
[900]	Service information and AC drive data. Electronic type label for viewing the software version and AC drive type.

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