EN7486827-03

09 - 2022

FREQUENCY INVERTER

Instruction manual

CIAT

CONTENTS

Translation of the original document

1 - SAFETY INSTRUCTION

1.1 - General information

Installation, start-up and maintenance operations for this equipment may be dangerous if certain factors particular to this installation (such as the presence of electrical and live components and the installation location, etc.) are not taken into account.

Only authorised, qualified installers and technicians, who have undergone specific training on the product in question, are permitted to install and start up this equipment.

During any servicing operation, all the recommendations and instructions given in the maintenance brochures, on the labels or in the instructions accompanying the equipment must be observed, along with any other applicable safety instructions.

- Observe all the regulations in the safety codes.
- Wear suitable personal protective equipment
- Handle heavy or bulky equipment with care when lifting, moving and setting down.

1.2 - Protection against electrocution

Only personnel qualified in accordance with the IEC (International Electrotechnical Commission) recommendations must be allowed to access the electrical components. It is particularly recommended that all the electrical supplies to the unit are switched off before any work is carried out. Cut the main power supply using the disconnect switch or circuit breaker.

Important: the control system includes electronic components. These may cause or be subject to electromagnetic disturbance if they are not installed and used in accordance with these instructions.

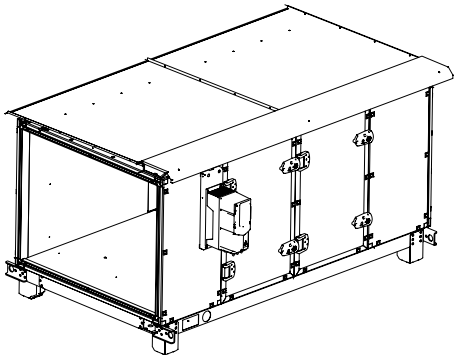
1.3 - Use

This appliance is not designed to be used by persons (including children) with limited physical, sensory or mental capabilities, or by persons with insufficient experience or knowledge, unless they are being supervised by a person responsible for their safety or have received instructions on the use of the appliance from such a person.

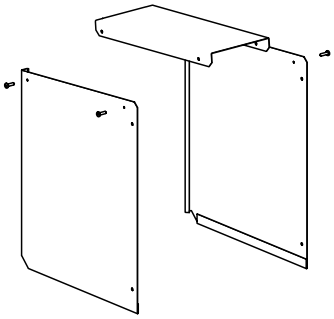
Children should be supervised to ensure that they do not play with the appliance.

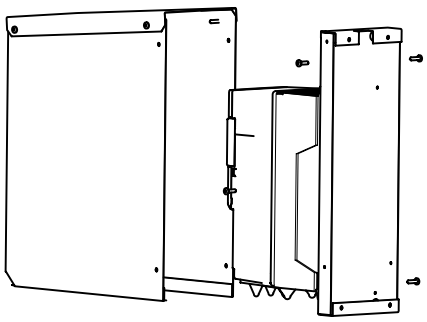
2.1 - Inverter fitted on the unit

Due to transport limitations, the frequency inverter is not fitted on the unit front when delivered. The vertical support was pre-installed at the factory (optional). Fit the inverter to this support as shown in the figure below.



External unit: assemble the protection cap provided for this purpose, supplied as a kit (optional), as shown below
Protecting the inverter against weather and UV is mandatory.

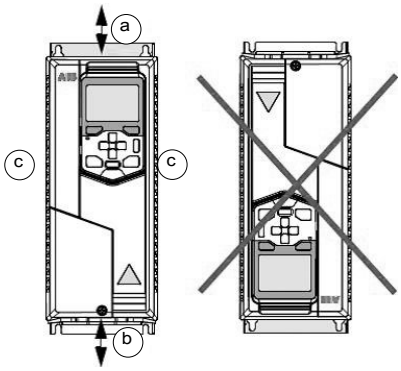




1) Assemble the upper section with the sides using four screws.
2) Position the cap on the vertical support and fix it in place using four screws ensuring it is correctly adjusted on the unit front.

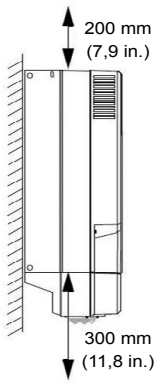
2.2 - Remote inverter (not fitted on the unit, the air heater or the ventilation device)

If the factory assembly aid is not used, note the assembly and clearance recommendations below:



Sizes	a	b	c
	mm	mm	mm
R0 to R4	200	200	0
R5	200	300	0

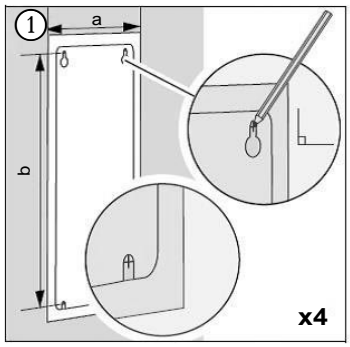
The clearance below the appliance (b) is measured from the bottom of the radiator, not from the cable input enclosure.



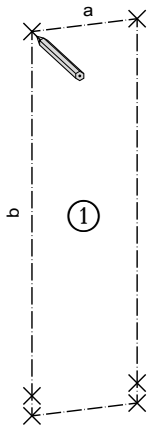
- Assemble on a vertical surface that does not give off heat, in a location that is suitably ventilated or cooled to remove the heat dissipated by the inverter
- Note the inverter operating ranges (see paragraph 3.3)
- The inverter support must be made from inflammable material and sufficiently solid to support the weight of the appliance
- The surface (ground) below the inverter must be made from inflammable material.

Inverter power	kW	0,75	1,1	1,5	2,2	3,0	4,0	5,5	7,5	11,0	15,0	18,5	22,0	30	37	45	55
Inverter size		R1	R1	R1	R1	R1	R1	R1	R2	R2	R3	R3	R3	R4	R4	R5	R5
Dissipated power	W	45	55	66	84	106	133	174	228	322	430	525	619	835	1024	1240	1510

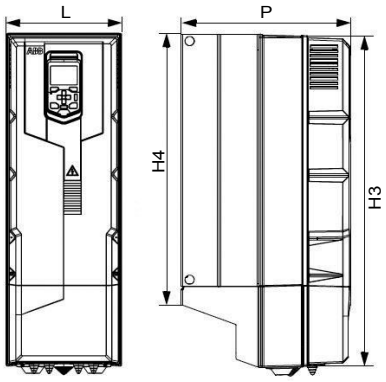
2 - INSTALLATION



R0...R4



R5



H3 = Front face height
H4 = Rear face height

Inverter size	Drilling template		Inverter dimensions				Weight
	a	b	H3	H4	L	P	kg
	mm	mm	mm	mm	mm	mm	
R1	98	317	403	331	128	233	4,8
R2	98	417	503	432	128	239	6,8
R3	160	473	456	490	206	237	13,0
R4	160	619	600	636	203	265	20,0
R5	160	581/611,5	732	633	203	320	29,0

3 - POWER CONNECTIONS

3.1 - Safety instructions

Before carrying out any work on the frequency inverter, disconnect the supply and ensure there is no supply voltage. After disconnecting the supply, you must wait 5 minutes before starting work (necessary for the capacitors to discharge).

Any work carried out on the appliance must be carried out by qualified personnel.

3.2 - 3.2 Checking the capacitors

Check the serial number on the inverter name plate. The number is formatted as follows: MYYWWRXXXXX, where YY and WW indicate the year and week of manufacture respectively

If the inverter has been deactivated:

- For less than a year, no specific action required.
- Between 1 and 2 years, reactivate the capacitors by activating the inverter without starting the motor, then wait 2 hours for the capacitors to regenerate.
- For more than 2 years, replace the inverter.

3.3 - 3.3 Power connection

If the frequency inverter is supplied as part of a unit fitted with our control unit ex-works, all power and control cables are supplied pre-cabled below the outputs. The protection and disconnection components are also included in the electrics box supplied with the unit.

If only the frequency inverter is supplied, the inverter supply cable (3 phases + ground), the cable between the inverter and motor (3 phases + shielding + ground) and control cables are not included.

A manual disconnect switchgear that you provide must be installed upstream of the inverter on its supply. It must be locked in the open position for the entire duration of the installation and maintenance operations. This disconnect switch must comply with current local regulations relating to safety. For the European Union, the disconnect switch must meet the requirements stipulated in standard EN 60204-1 and match one of the following types:

- Disconnect switch from the AC-23B class (EN 60947-3);
- Disconnect switch featuring an auxiliary contact that causes the power to be cut before opening the disconnect switch (EN60947-3)
- Circuit breaker able to interrupt currents EN 60947-2.

Choosing power cables and inverter protection cables

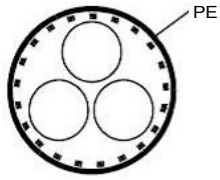
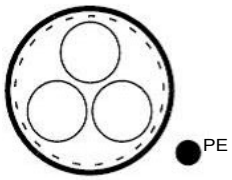
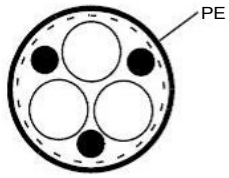
The power cables must be chosen based on the local regulations for supporting the nominal current indicated on the inverter name plate. The PE conductor must be sized to withstand the assumed short-circuit holding currents, and must comply with the minimum sections described on page 6.The cable must be able to withstand a temperature of 70°C in continuous operation. For the cable between the inverter and motor, use a shielded 600 V AC cable, with a shielding connection at 360° (the connection must be handled carefully to avoid bearing currents, "curly" shielding connection not permitted).

Features of the inverter power terminals and cable grommets:

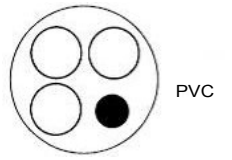
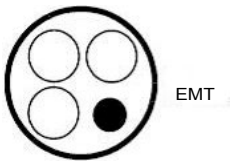
Inverter size	Max. cable diameter	Terminal max cross section Rigid/flexible cable	Tightening torque
	mm	mm²	Nm
R0	30	6/4	0,5....0,6
R1	30	6/4	0,5....0,6
R2	30	16/16	1,2....1,5
R3	30	35/25	2,5....4,4
R4	45	50	4,0
R5	45	70	5,6

3 - POWER CONNECTIONS

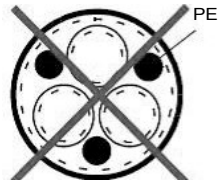
Recommended power cable types

	Shielded symmetrical cable with three phase conductors and one coaxial PE conductor to provide shielding. The shielding must meet the requirements stipulated in standard CEI 60439-1. You must ensure compliance with the local, national or federal electrical regulations currently in force.
	Shielded symmetrical cable with three phase conductors and one coaxial PE conductor to provide shielding. The separate PE conductor is required if the shielding does not meet the requirements stipulated in standard CEI 61439-1.
	Shielded symmetrical cable with three phase conductors and symmetrical PE conductor, and shielding. The PE conductor must meet the requirements stipulated in standard CEI 61439-1

Power cable types with restricted usage

	A cable with four conductors (three phase conductors and one protective conductor in a cable raceway) **is not permitted for the motor cables** (permitted for the connection to the network).
	A cable with four conductors (three phase conductors and one PE conductor in a PVC conduit) is permitted for the network cables where the phase conductor cross-section is smaller than **10 mm² (8 AWG) or the motors ≤ 30 kW (40 hp).** Not permitted in the United States.
	A ribbed cable or EMT with three phase conductors and one protective conductor is permitted for the motor cables where the phase conductor cross-section is smaller than 10mm² (8 AWG) or the motors ≤ 30 kW (40 hp).

Incompatible power cable type

	You cannot use shielded symmetrical cables with individual shielding for each phase conductor.

Our frequency inverter integrates an RFI filter, which makes it possible to respond to the requirements of industrial environments. To respond to the emissions requirements relating to residential environments (EN61000-6-3), it is necessary to provide an additional filter (not supplied) that is connected to the inverter supply.

Inverter power kW	Inverter size	Residential environment filter
0,75	R1	Schaffner FN 3268-7-44
1,1	R1	Schaffner FN 3268-7-44
1,5	R1	Schaffner FN 3268-7-44
2,2	R1	Schaffner FN 3268-7-44
3,0	R1	Schaffner FN 3268-16-44
4,0	R1	Schaffner FN 3268-16-44
5,5	R1	Schaffner FN 3268-16-44
7,5	R2	Schaffner FN 3268-30-33
11,0	R2	Schaffner FN 3268-30-33
15,0	R3	Schaffner FN 3268-42-33
18,5	R3	Schaffner FN 3268-42-33
22,0	R3	Schaffner FN 3268-55-34
30	R4	Schaffner FN 3268-75-34
37	R4	Schaffner FN 3268-75-34
45	R5	Schaffner FN 3268-100-35
55	R5	Schaffner FN 3268-130--35

Respect the maximum lengths of the motor cables (for a switching frequency of up to 4 kHz) in relation to the installation environment:

Inverter size	To conform in an industrial environment	To conform in a residential environment
R0 to R5	100 metres	10 metres

When using two motors on a single inverter, it is necessary to add the lengths of the two motor power cables together and ensure that the total does not exceed the limits specified above.

The inverter is designed to be used with type-B differential protection devices.

The inverter's RFI filter includes capacitors connected between the power stage and the casing. As well as using very long motor cables, these capacitors increase earth leakage currents and may trigger the differential circuit breakers.

If the inverter's leakage current is greater than 3.5 mA AC, a reinforced protective earth connection (PE) is required. To do this:

- Add a second cross-sectional PE conductor that is identical to the original PE conductor.

or

- Provide a PE conductor with a minimum cross-section of 10 mm^2 Cu or 16 mm^2 Al,

or

- Install an automatic supply disconnect device in the event of a PE conductor fault.

PE protective conductor cross-section

Conductor cross-section S (mm^2)	Minimum corresponding protective conductor cross-section Sp (mm^2)
$S \leq 16$	S
$16 < S \leq 35$	16
$35 < S$	S/2

3 - POWER CONNECTIONS

The inverter and supply cable must be protected against short circuits.

Examples of fuse protection (for a three-phase 400V power supply)

				gG fuse			uR or aR fuse		
Inverter power	Inverter size	Nominal input current	Maximum input current	Nominal current	Energy limitation I^2t (1)	Nominal voltage	Nominal current	Energy limitation I^2t (1)	Nominal voltage
kW		A	A	A	A^2s	V	A	A^2s	V
0,75	R1	2,6	3,2	4	55	500	25	130	690
1,1	R1	3,3	4,7	6	110	500	25	130	690
1,5	R1	4,0	5,9	6	110	500	25	130	690
2,2	R1	5,6	7,2	10	360	500	25	130	690
3,0	R1	7,2	10,1	10	360	500	25	130	690
4,0	R1	9,4	13,0	16	740	500	25	130	690
5,5	R1	12,6	14,1	16	740	500	25	130	690
7,5	R2	17,0	22,7	25	2500	500	40	460	690
11,0	R2	25,0	30,6	32	4000	500	40	460	690
15,0	R3	32,0	44,3	40	7700	500	63	1450	690
18,5	R3	38,0	56,9	50	16000	500	63	1450	690
22,0	R3	45,0	67,9	63	20100	500	80	2550	690
30	R4	62	76	80	37500	500	100	4650	690
37	R4	73	104	100	65000	500	125	8500	690
45	R5	88	122	100	65000	500	160	16000	690
55	R5	106	148	125	103000	500	200	15000	690

(1) I^2t is the energy that the fuse allows through in case of overload. In relation to the presumed on-site short circuit current, check the time-current curve to ensure that the fuse's operating time is shorter than 0.5 seconds.

The inverter, its supply cable and the motor cables are protected against thermal overloads provided that the cables are correctly dimensioned in accordance with the nominal inverter current, the ambient conditions and the motor PTC connection on the inverter.

No additional heat protection device is required if these conditions are met.

Inverter operating range:

- IP55 protection rating
- Relative humidity: 5 to 95%. Condensation prohibited. Maximum permitted relative humidity in case of corrosive gas: 60%.
- Input voltage 3 ~ 380…415 V AC: normal operation
- Input voltage 3 ~ 440…480 V AC: decrease the nominal current of the inverter by 15% on average (can vary according to the model; contact us for more details)
- Network imbalance max. ± 3% of the nominal input voltage between phases
- Altitude:

  0 to 1000m: normal operation

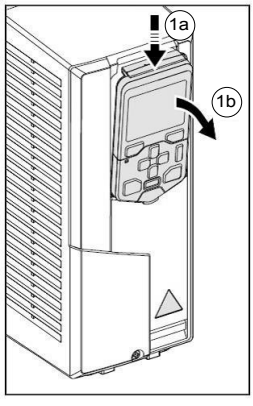
  1000 to 4000 m: decrease the nominal current of the inverter by 1% for every 100 m above 1000 m (example: at 2000 m, decrease the nominal current of the inverter by 10%)
- Ambient temperature:

  15 to +40°C: normal operation

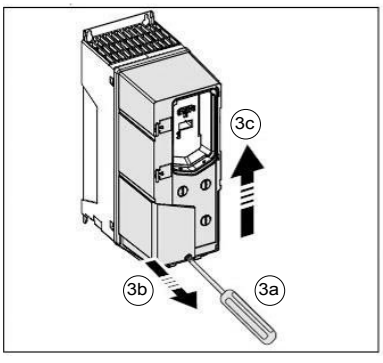
  +40 to +50°C: decrease the nominal current of the inverter by 1% for every °C above 40°C (example: for a temperature of 50°C, decrease the nominal current of the inverter by 10%)

Connecting the power cables:

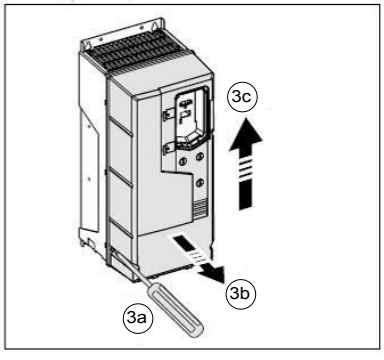
After having installed the inverter on its vertical support, remove the control panel and remove the front cover.



IP55, R0...R2

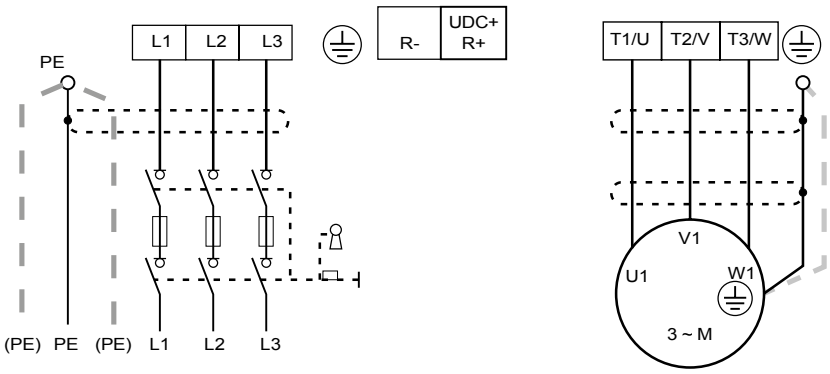


IP55, R3...R5

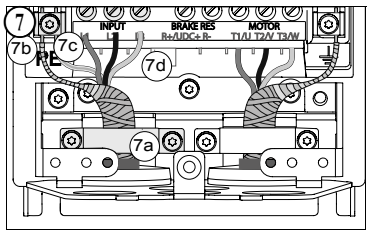


3 - POWER CONNECTIONS

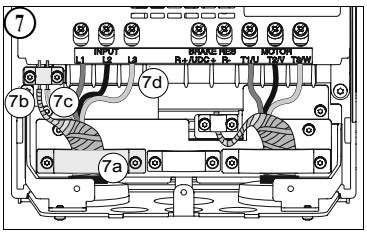
- Pierce the cable grommets at the rear of the inverter based on the diameter of the cables chosen.
- Prepare the ends of the power cables in order to ensure the cable is shielded fully.
- Lay the electric cabling as per the draft below, ensuring the cables are fully shielded (reference 7a), and the shielding and the PE conductor are connected correctly (reference 7b and 7c). If the inverter drives two motors, connect these two motors in parallel on terminals T1/U, T2/V, T3/W and the ground terminal. Ensure both cables are fully shielded. If you have asked us to provide these cables, they normally bear reference numbers W1-58 and W1-64 for intake motors, and W1-69 and W1-75 for exhaust motors.
- Respect the tightening torques indicated on the diagrams.



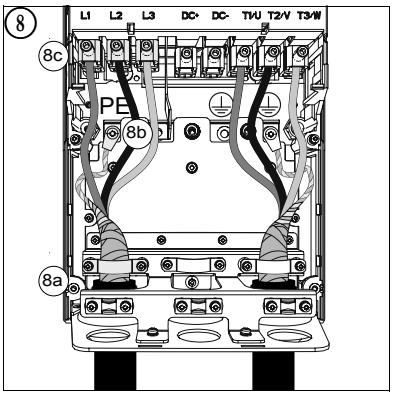
R0…R2



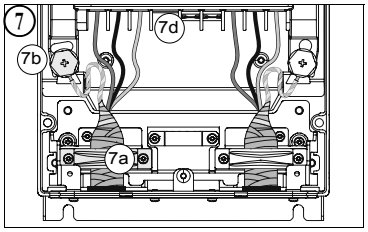
R3



R5



R4



Frame size	R0…R1		R2	
	N·m	lbf·ft	N·m	lbf·ft
L1, L2, L3	0,5…0,6	0,4	1,2…1,5	1,1
PE, ⏚	1,5	1,1	1,5	1,1
	TBA	TBA	TBA	TBA

Frame size	R3		R2	
	N·m	lbf·ft	N·m	lbf·ft
L1, L2, L3	2,5…4,5	3,3	4,0	3,0
PE, ⏚	1,5	1,1	2,9	2,1
	1,2	0,9	TBA	TBA

Frame size	R5		PE, ⏚				
	N·m	lbf·ft	M	N·m	lbf·ft	N·m	lbf·ft
R5	5,6	4,1	M5	4,5	3,3	4,5	3,3

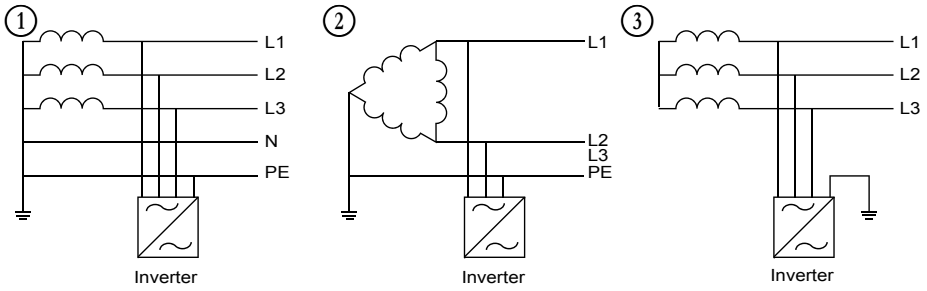
Particular precautions for the networks on diagram IT and TN:

Note that it is not permitted to connect a frequency inverter fitted with an internal RFI filter to a network in diagram IT (neutral is isolated or impeded) or in diagram TN (asymmetrical grounding). Disconnect the RFI filters first, before connecting the inverter to the network: see the draft below.

Furthermore, the phase-ground varistor is not suitable for use in a network in diagram IT (neutral is isolated or impeded). You must disconnect the varistor before connecting the inverter to the network.

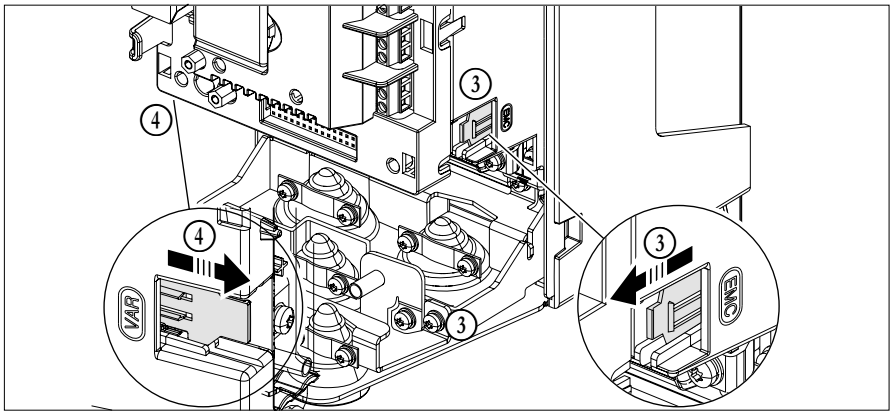
N.B.: By disconnecting the internal RFI filter, you are increasing the emissions and considerably lowering the inverter's conformity with CEM standards.

Sizes	RFI filter EMC	Phase-ground varistor VAR	Network in diagram TN symmetrical (TN-S) Figure1	Network in diagram TN asymmetrical Figure2	Network in diagram IT (neutral is isolated or impeded [>30 ohms]) Figure3
R0.....R3	1 x EMC	-	Do not disconnect	Disconnect	Disconnect
	-	1 x VAR	Do not disconnect	Do not disconnect	Disconnect
R4...R5	2 x EMC	-	Do not disconnect	Sizes R4 and R5 are not compatible with the network TN asymmetrical.	Disconnect
		1 x VAR	Do not disconnect		Disconnect

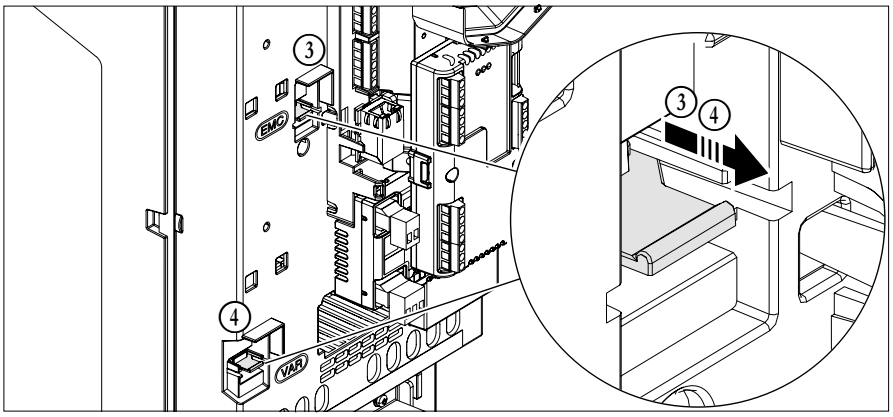


Disconnecting the RFI filter (reference 3) and varistor (reference 4)

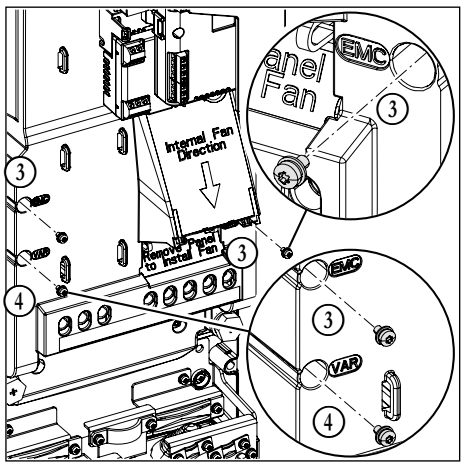
R0...R2



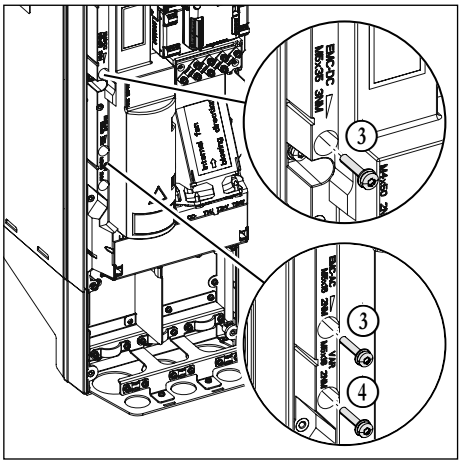
R3



R4



R5



4 - CONTROL CONNECTIONS

Inputs/outputs:

X1 Analogue inputs/outputs

1	**SCR**	Shared control cable shielding
2	**AI1**	Pressure sensor input (can be set in 0/10 V or 4/20 mA)
3	**AGND**	Shared analogue inputs
4	**+10V**	Reference voltage +10 V DC, max. 20 mA
5	**AI2**	Setpoint input (can be set in 0/10 V or 4/20 mA)
6	**AGND**	Shared analogue inputs
7	**AO1**	Motor frequency output (0/10 V)
8	**AO2**	Motor current output (4/20 mA)
9	**AGND**	Shared analogue outputs

X2 & X3 Auxiliary voltage output and digital inputs

10	**+24V**	Auxiliary voltage output +24 V DC, max. 250 mA
11	**DGND**	Shared auxiliary output, 24 V
12	**DCOM**	Shared digital inputs
13	**DI1**	Stop (0) / Start-up (1)
14	**DI2**	Digital setpoint 1
15	**DI3**	Digital setpoint 2
16	**DI4**	Digital setpoint 3
17	**DI5**	External fault input
18	**DI6**	Motor PTC input (for an inverter controlling 2 motors, connect the motor PTCs in series on DI6)

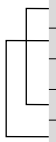
X6, X7, X8 Relay outputs

19	**RO1C**	Motor ready to start 250 V AC/30 V DC 2A
20	**RO1A**	
21	**RO1B**	
22	**RO2C**	Motor running 250 V AC/30 V DC 2A
23	**RO2A**	
24	**RO2B**	
25	**RO3C**	Motor or inverter fault 250 V AC/30 V DC 2A
26	**RO3A**	
27	**RO3B**	

X5 RTU RS485 modbus protocol

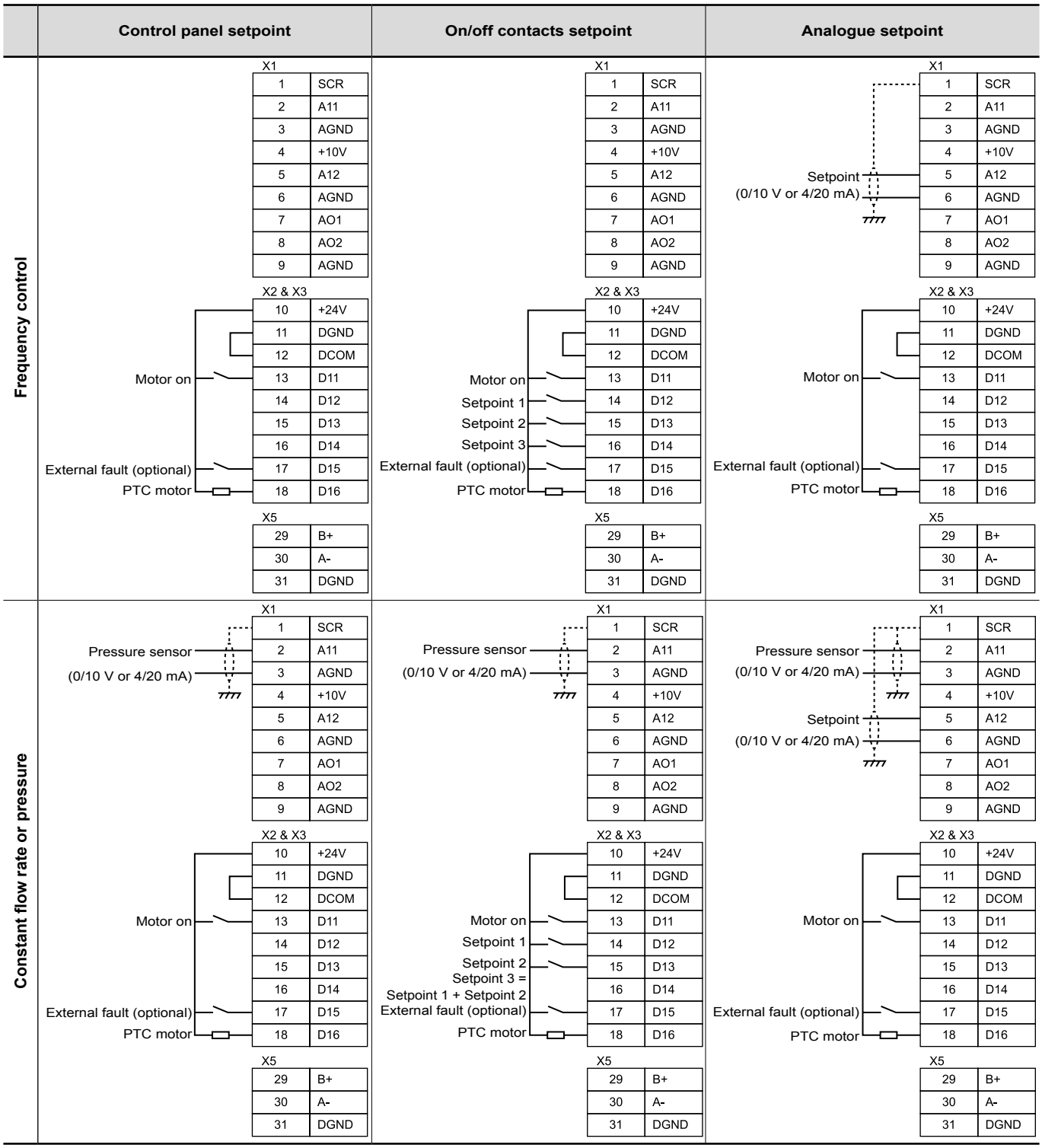
29	**B+**	RTU RS485 modbus protocol
30	**A-**	
31	**DGND**	
S4	**TERM**	Switch for activating the end-of-line resistance integrated in the inverter
S5	**BIAS**	Switch for activating the bus polarisation

X4 Emergency stop function



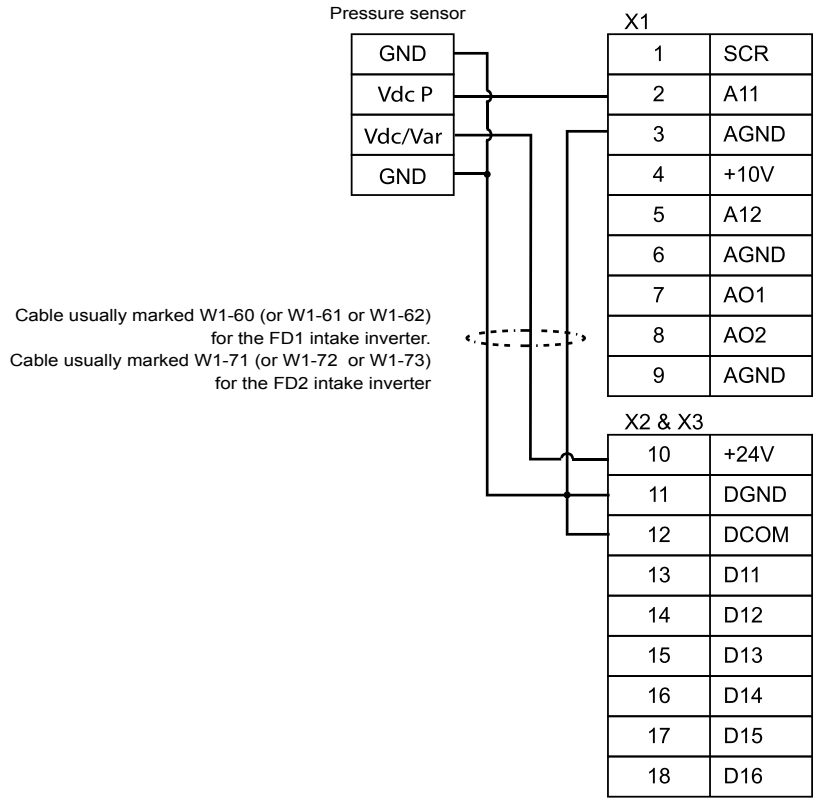
34	**OUT1**	Safe torque off. Function not used: the two circuits must be shunted for the inverter start-up to be authorised.
35	**OUT2**	
36	**SGND**	
37	**IN1**	
38	**IN2**	

4 - CONTROL CONNECTIONS

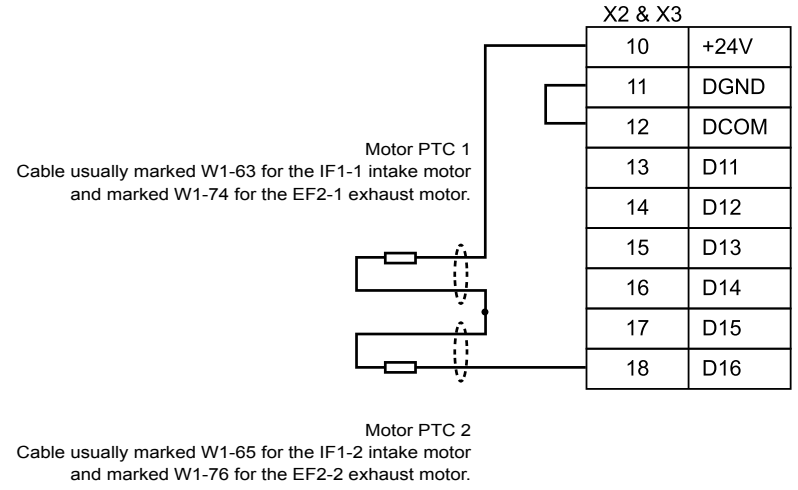


(*) For control cables, use a paired twisted cable. If the cable is longer than 10 metres, (with a maximum of 30 metres for a 0/10V signal, and 300 metres for a 4/20mA signal) use a shielded twisted pair cable, with the shielding connected to earth at least one end (ideally, it should be connected to earth at both ends).

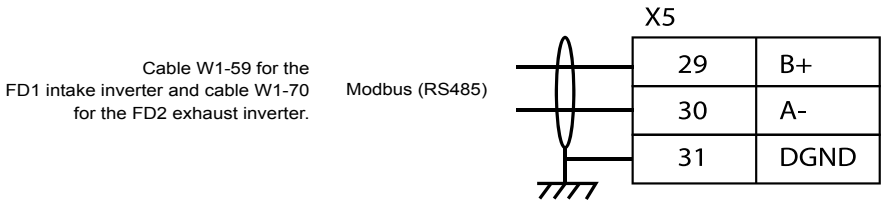
Connecting the pressure sensor (if supplied ex-works)



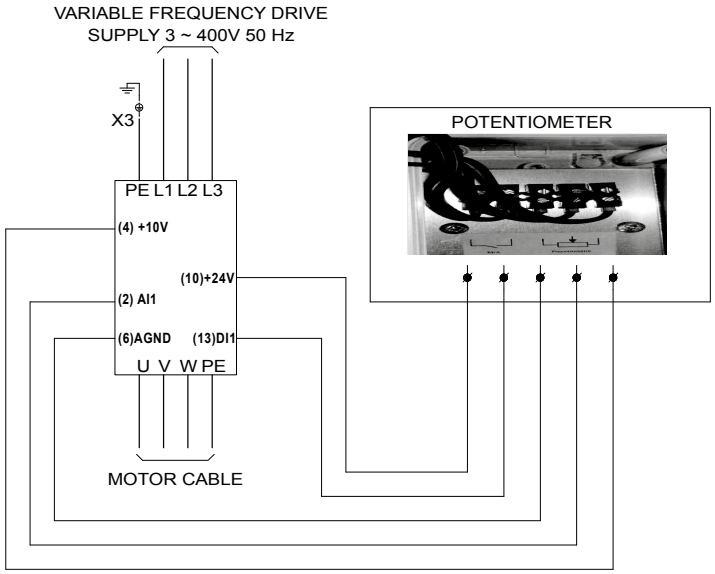
PTC connections on an inverter driving 2 motors



ModBus connection (if inverter controlled by the control PLC via ModBus)

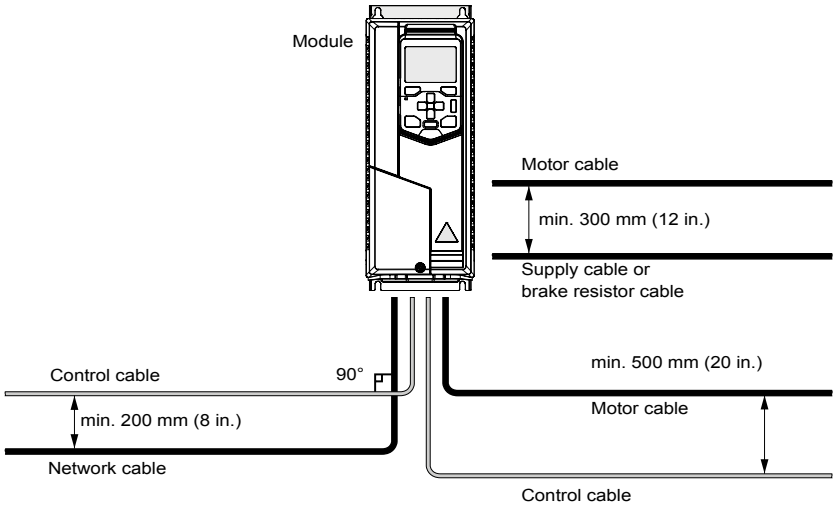


Specific connection to the air heaters, smoke extraction roof ventilators and extraction or supply fans



Cable routing

Never combine command and power signals in the same cable, and never route power and command cables in parallel.
Motor cables from multiple inverters can be routed in parallel one beside the other.
If the control cables must cross the power cables, the crossing angle must be as close to 90° as possible.
The cables must be correctly routed electrically in respect of one another, and must be grounded.



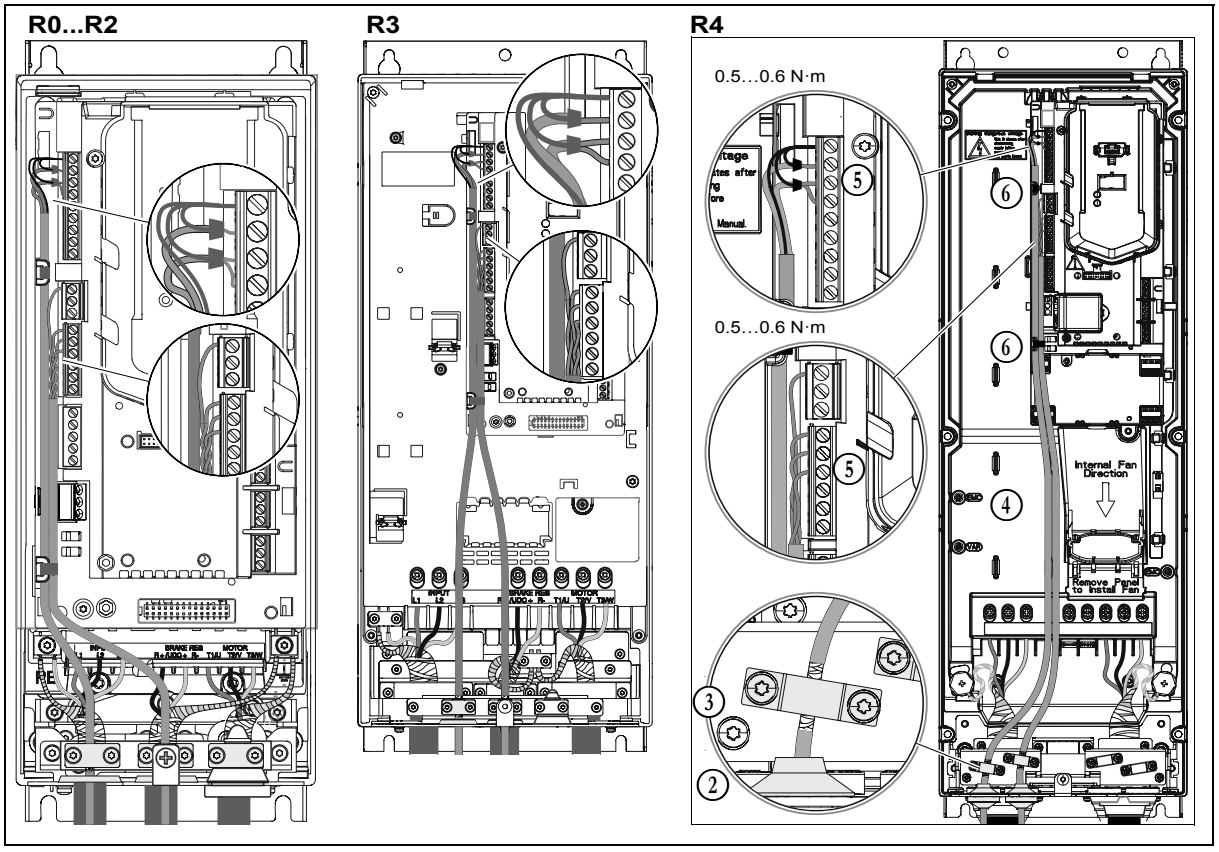
Characteristics of inverter control terminals and grommets:

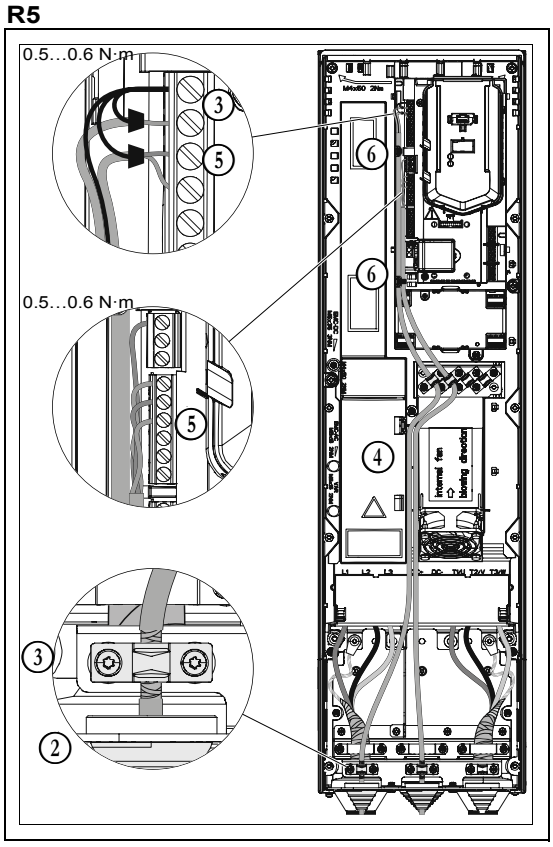
Inverter size	Max. cable diameter	Terminals +24 V, DCOM, DGND		Terminals DI, AI, AO, RO	
		Cable cross-section	Tightening torque	Cable cross-section	Tightening torque
	mm	mm²	Nm	mm²	Nm
R0 to R5	17	0,2....2,5	0,5...0,6	0,14...1,5	0,5...0,6

4 - CONTROL CONNECTIONS

Connection:

- Pierce the cable grommets at the rear of the inverter based on the diameter of the cables chosen
- Prepare the ends of the control cables in order to ensure the cable is shielded fully
- Lay the electric cabling as per the draft below, ensuring the cables are fully shielded and the cable routing is correct
- Note the tightening torques (0.5 to 0.6 Nm)

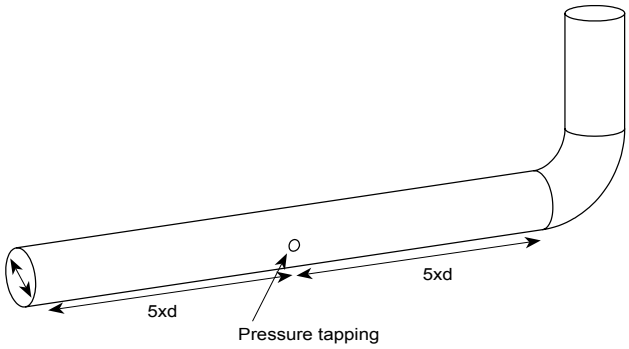


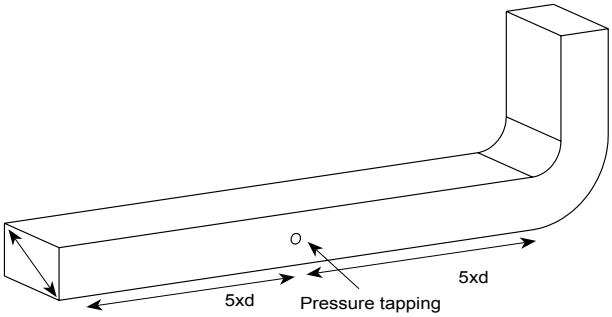


Connection for the constant air flow or constant duct pressure control without a regulating controller.

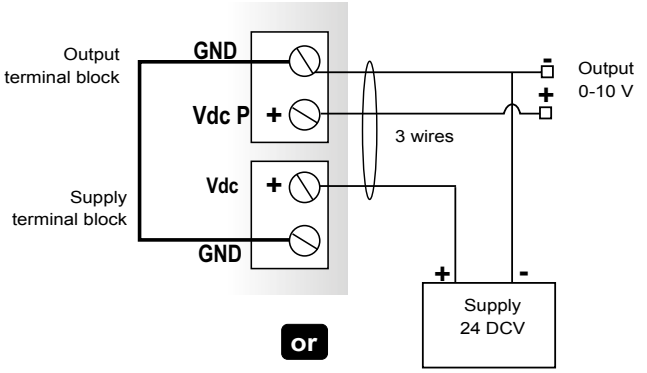
If the frequency inverter is supplied as part of a control system for constant flow ventilation, the differential pressure sensor required to measure the flow rate must be installed on the fan partition. The black pressure tapping on the sensor must be connected to the pressure tapping on the fan inlet cone. The red pressure tapping on the sensor must be connected upstream of the fan partition and positioned perpendicular to the flow of air.

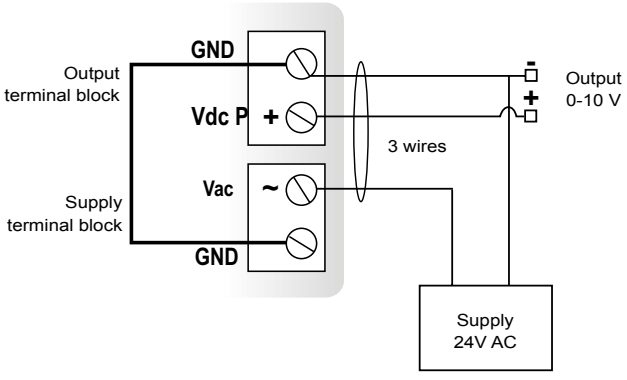
If the frequency inverter is supplied as part of a control system for constant ventilation pressure control in the duct, the differential pressure sensor required to measure the duct pressure is supplied as a kit – you must fit and connect it. The duct pressure sensor must be positioned in a straight section. It must be positioned away from any angled sections (to prevent disturbance), at a minimum distance of 5 times the duct's diameter or diagonal. The black pressure tapping on the sensor must remain free (atmospheric pressure). The red pressure tapping on the sensor must be connected to the ducted pressure tapping, positioned perpendicular to the flow of air and centred along the height of the duct.





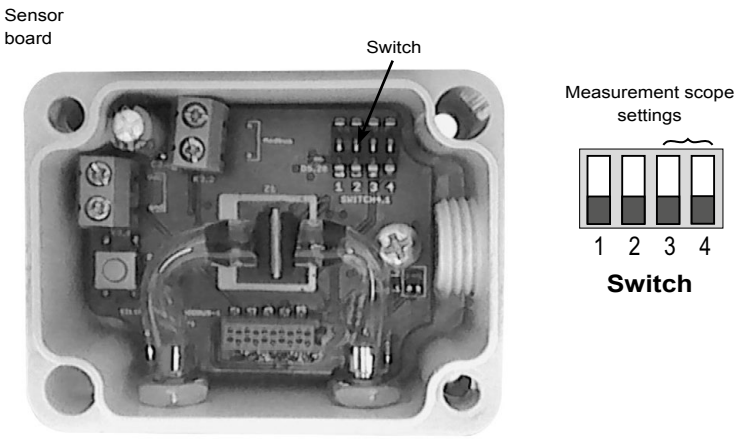
To configure and connect the pressure sensor, remove the two screws from the box, then open it





Configuring the sensor measuring range (Before 01/2022) :

Identifying the switch on the card



To configure your device, switch it off and enter the desired settings using the switches as shown in the tables. Once configured, switch the sensor back on.

Ensure the combinations provided below are correctly reproduced on the sensor switches. If a combination is incorrect, it is necessary to disconnect the appliance from the power supply, rearrange the switches correctly and then reconnect it to the power supply.

To set a range for sensor measurement, position switches 3 and 4 of the units as shown opposite:

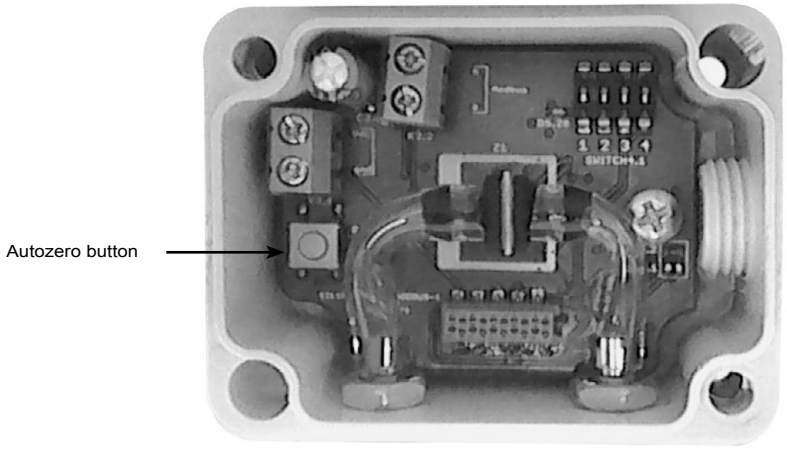
Combination / Units	1 2 3 4	1 2 3 4	1 2 3 4
PA	1000	2500	5000

5.1 - Calibrating the differential pressure sensor (when functioning as part of a constant flow or constant duct pressure) (Before 01/2022)

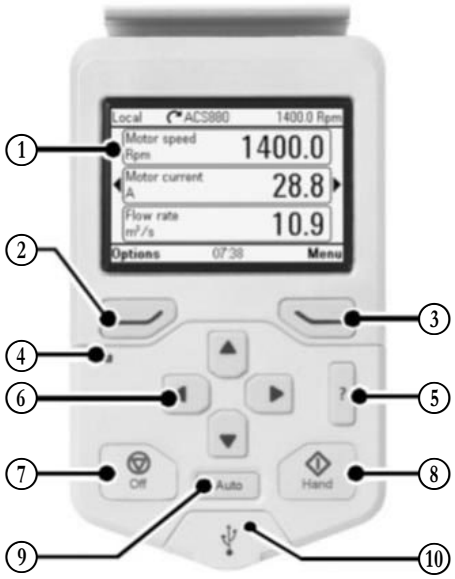
Before calibrating the pressure sensor, ensure that it has been installed and connected in accordance with the recommendations listed in previous chapters.

Power up the sensor, ensuring that the fan is at a complete standstill and the air flow rate is zero. Disconnect the pipes from the 2 pressure tappings, marking the positions and press the "Autozero" button located inside the sensor. Return the two pressure pipes to their respective positions.

Once the sensor is in position, switch it on and carry out the autozero procedure to ensure the sensor operates correctly in any position.



5.2 - Introducing the control panel

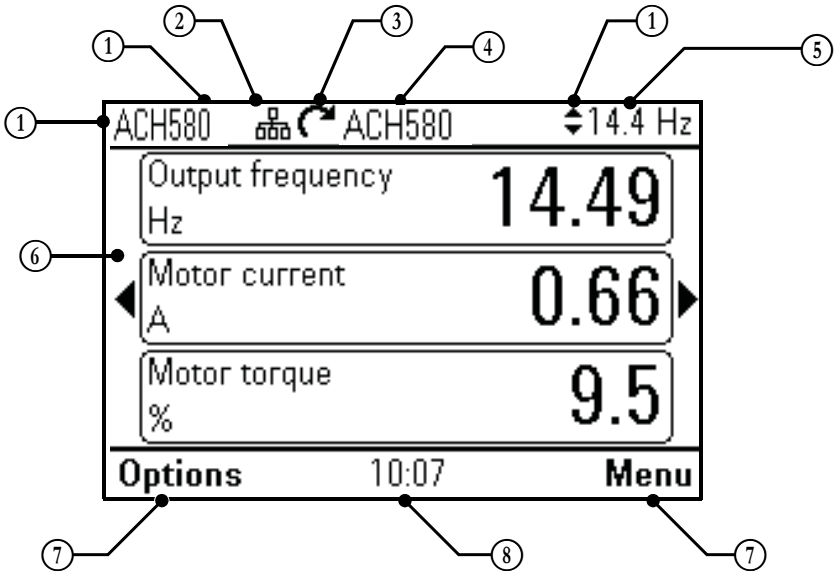


1. Control panel screen
2. The function of these two buttons is specified on the last line of the screen
3. The function of these two buttons is specified on the last line of the screen
4. Status LED (see table below)
5. Button to open a contextual help page relating to the parameter or menu selected
6. Arrows for navigating through menus and setting parameters
7. Stop override button
8. Run override button
9. Button to return to automatic mode
10. USB port

Intelligent LED control panel, on the left-hand side of the control panel:

LED off	LED on		LED flashing normally/quickly	
Control panel switched off	Green	Normal operation or connection between the inverter and control panel lost, or inverter and control panel incompatible.	Green	Normal flashing: Active warning on the inverter Flashing rapidly: data currently being transferred between the PC tool and the inverter via the control panel USB connection.
	Red	See the screen to find out the source of the fault. - Inverter tripping fault Reset the fault.	Red	Inverter tripping fault. To reset the fault, deactivate the inverter then reactivate it.

Refer to the chapter on faults and warnings for more information.



1. Indicates whether the inverter is in AUTO mode or manual override
2. Indicates that several inverters are connected to this microconsole. To change the active inverter, open the Options menu → Inverter selection.
3. Indicates the motor status (see table below)
4. Inverter name
5. Current setpoint
6. Current page
7. Functions associated with buttons and
8. Current time

Status icon	Movement	Inverter status
	-	Stopped
	-	Stopped, start-up not permitted
	Flashing	Stopped, start-up command given but start-up not permitted, see Menu - Diagnostics on the control panel.
	Flashing	Fault
	Flashing	Running, but setpoint = 0
	Rotating	Running, but setpoint not reached
	Rotating	Running, setpoint reached

Start-up wizard:

Before starting the motor and commissioning the inverter, ensure that they have been installed and connected in accordance with the recommendations listed in previous chapters. Ensure there are no obstacles blocking the fan rotation or the air flow.

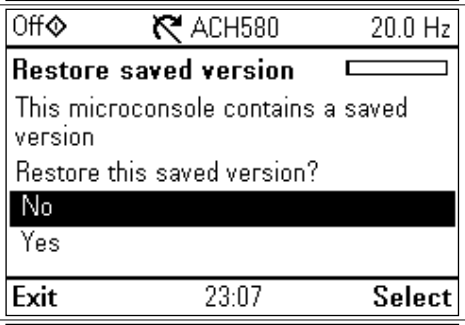
The start-up wizard launches automatically at the "System start-up" access level when it is first powered up. The wizard can be relaunched at a later stage, however the procedure varies depending on the software version of the inverter:

- From v2.x.x.x onwards, the wizard can be accessed directly from the "Basic settings" menu provided it is connected at level 2 or above (system start-up);
- In v1.x.x.x, restart the wizard by selecting "Basic settings"/"Recover presettings"/"Reset start-up wizard", then relaunch the wizard from the main menu.

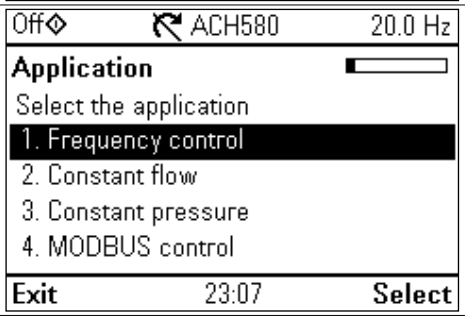
Relaunching the start-up wizard will result in all inverter settings being reset other than those controlled by the wizard.

When it is first powered up, select the language required. In future, you can change this language using parameter 96.01.
Only French, English, Spanish, Italian, German, Dutch and Russian are available. Do not select other languages.

To continue the configuration, you must have level 2 access rights as a minimum. If this is not the case, you will be asked to enter a password.
If a configuration was first saved on the inverter, you can restore this configuration by selecting Yes. By selecting No, you will access the start-up wizard to create a new configuration.
When it is first powered up, the inverter does not have a saved configuration and the wizard automatically moves to the following screen.



Four applications are predefined in the inverter:
- Fixed frequency: the inverter does not provide a control function. The frequency to be applied to the motor must be regulated manually from the control panel, i.e. provided by an external signal
- Constant flow: the inverter autonomously ensures the unit's constant flow is regulated. This application requires the use of a differential pressure sensor that must be fitted on the fan's intake section and must be connected to input AI1.
- Pressure: the inverter autonomously ensures that the constant duct pressure is regulated. This application requires the use of a differential pressure sensor that must be fitted on the supply air duct and connected to input AI1.
- Modbus: this application is reserved for operating under factory settings, refer to the regulation manual

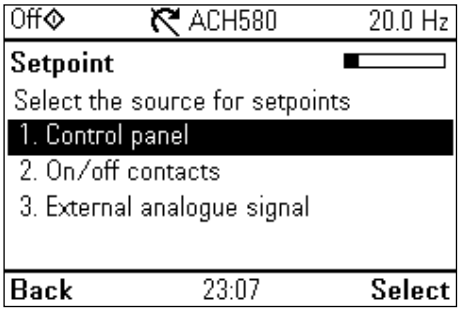


Selecting the setpoint source:
- Microconsole: setpoint controlled manually from the control panel welcome page
- On/off contacts: setpoint selected by potential-free contacts connected to digital inputs DI2 to DI4.

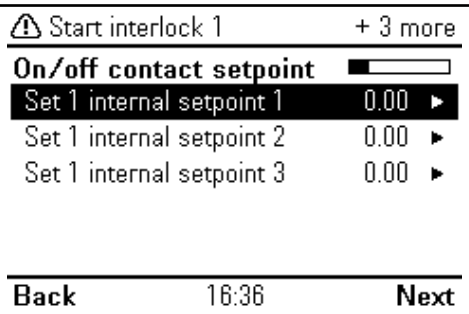
If you have selected fixed frequency operation, input DI2 will be allocated to setpoint 1, input DI3 to setpoint 2 and input DI4 to setpoint 3.

Note: it is possible to manage the three setpoints from inputs DI2 and DI3 only. To activate setpoint 3, you need to activate inputs DI2 and DI3 simultaneously. To enable this function, set parameter 28.21 (constant frequency mode) to 1 (compressed) after exiting the start-up wizard.

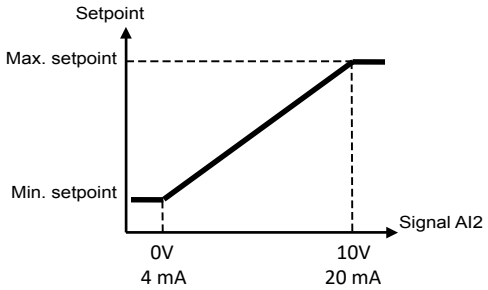
If you have selected constant flow or constant pressure operation, input DI2 will be allocated to setpoint 1, input DI3 to setpoint 2, and to use setpoint 3, you must activate inputs DI2 to DI4 simultaneously (cannot be configured)
- External analogue signal: setpoint defined by the analogue signal connected to input AI2

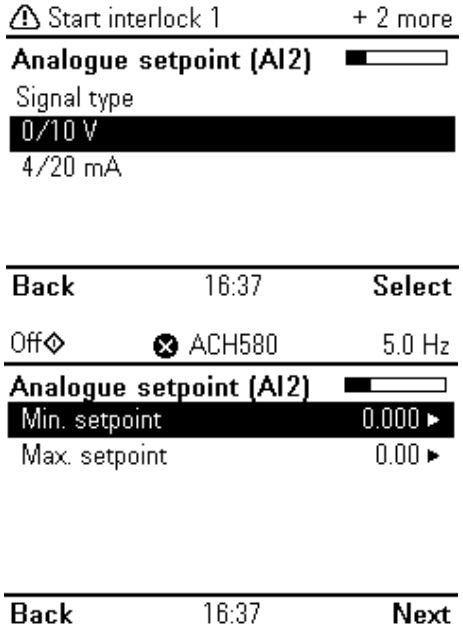


If you have previously selected an on/off contact setpoint, you must enter the three assigned setpoints into the digital input fields in the screen opposite.

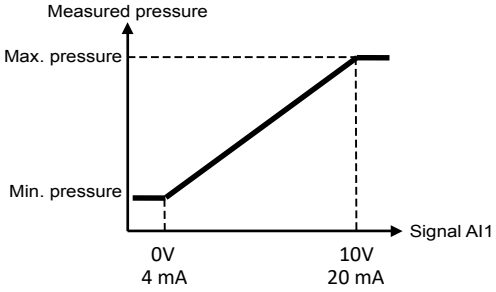


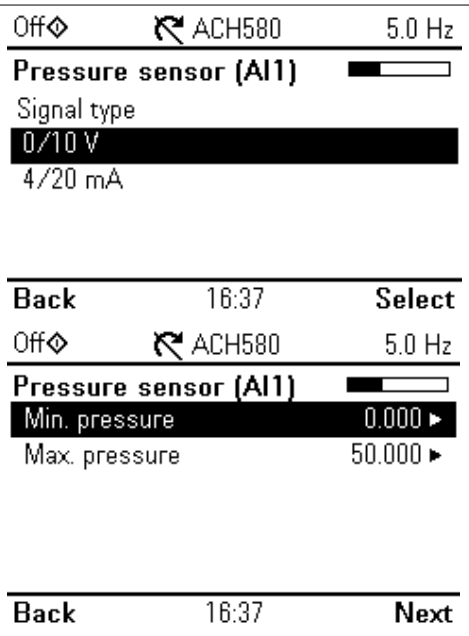
If you have previously selected an analogue setpoint, you must specify the type of signal you want (0/10 V or 4/20 mA) then the minimum and maximum setpoints assigned to this signal in accordance with the chart below.



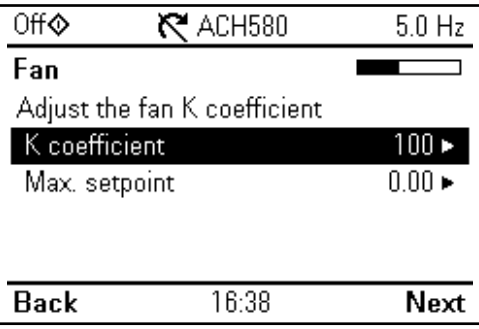


If you have previously selected a constant flow application or a constant pressure application, you must enter the pressure sensor specifications into the screen opposite.





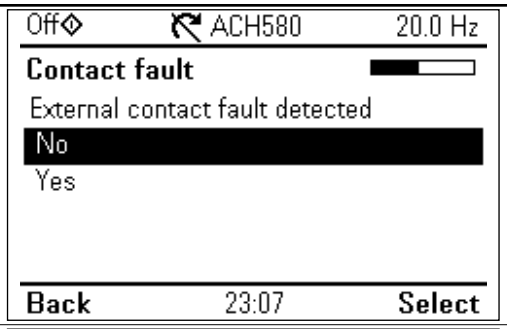
If you have previously selected a constant flow application, enter the fan's K coefficient based on the table below.



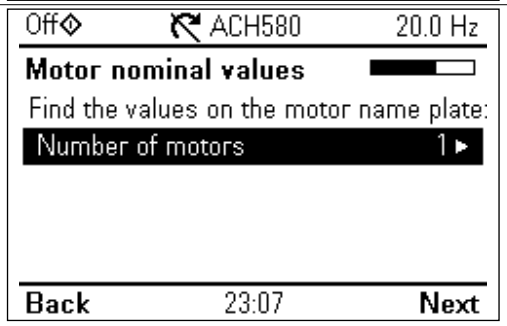
K coefficients for the plug fans controlled by the frequency inverter

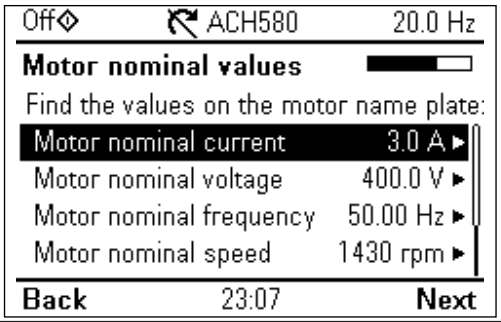
Plug fan dia.	200	225	250	280	315	355	400	450	500	560	630	710	800	900	1000	1120
NPL	31	40	49	60	74	100	139	178	218	268	349	455	566	700	859	1074
NPA	-	-	64	80	101	134	173	192	259	329	413	558	683	878	1138	1283

If you would like to connect an external fault contact, select Yes. You must then teach in this contact's action direction (normally open or normally closed) and its action: fault (stop the motor) or warning (just information, the motor is not stopped)
This contact must be potential-free and connected to input DI5.

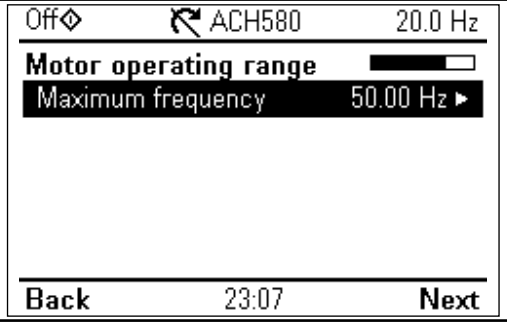


Teach in the number of motors driven by the frequency inverter, then teach in the motor name plate connected to the inverter (if there are two motors, only teach in the data for one motor). We cannot be held responsible in the event of any issues caused by a motor data entry error.

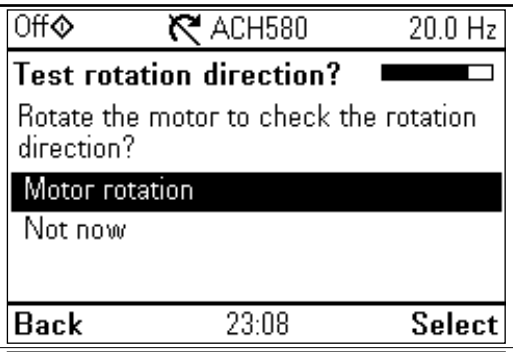




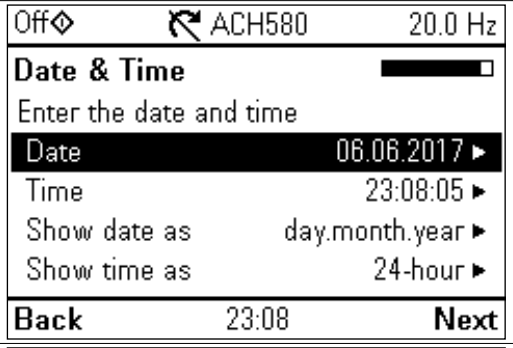
Teach in the maximum frequency permitted by the motor.
The minimum frequency is set to 20 Hz by default.
Refer to your order to determine the maximum frequency.
We shall not be liable should these recommendations not be taken into consideration.



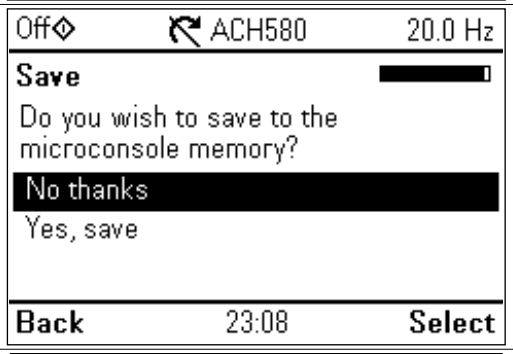
Follow the instructions in order to check (and modify if necessary) the fan direction. We cannot be held liable in the event of any issues caused by the fan rotating in the wrong direction.



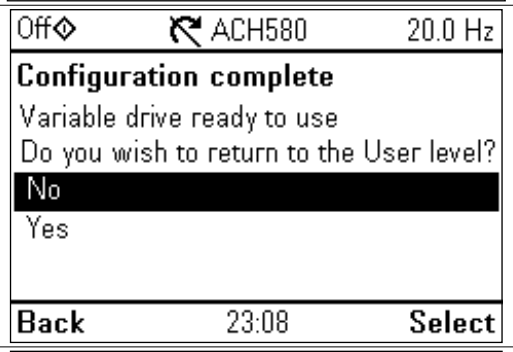
Set the time in order to benefit from time stamping on faults and warnings.



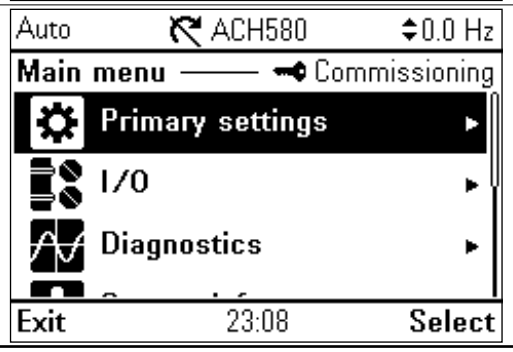
During the last step in the start-up wizard, you can choose to save the configuration. In the event of subsequent problems, this will allow you to find your original configuration without having to re-use the start-up wizard.



Your inverter is now ready to use.
Remember to return to the user level if you do not need to adjust any further settings.



On exiting the wizard, the inverter returns to the main menu and you will be reminded of the access level selected in the top right-hand corner.
You can also adjust additional parameters by selecting "Parameters".
Remember to return to the user access level (parameter 96.02 = 1).
Select "Exit" (in the bottom left-hand corner of the screen) to return to the main screen.
Remember to return the inverter to automatic mode to allow it to be started up once the application has been configured.



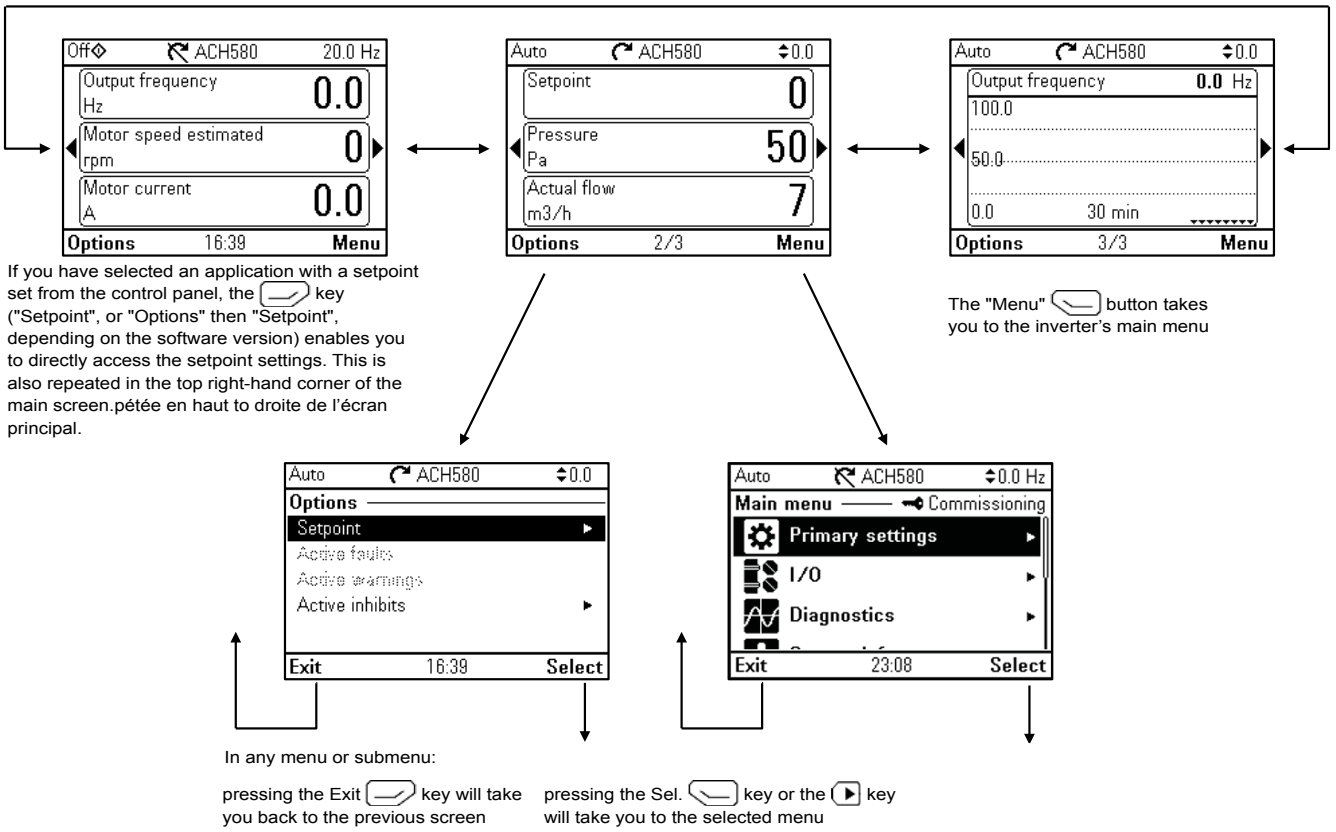
6.1 - Main screen and navigating through the menus

The main screen consists of three pages.

The first page allows you to view the frequency, speed and motor current.

The second page relates to the "constant flow" and "constant pressure" applications. This provides you with an overview of the current setpoint, pressure measured by the sensor and the calculated flow rate (if the application is set to constant flow).

The third page provides a visual log of the inverter's output frequency during the last 30 minutes.



Main menu:

Basic settings

I/O

Diagnosis

System info

Energy efficiency

Back-ups

Parameters

For more information on the main menu, refer to the following section

6.2 - Main menu

Basic settings

The setup of the menu varies depending on the software version of the inverter. To find out which version is being used, check the System info/Inverter/FW version menu.

Software versions v1.x.x.x

This menu enables you to restart the start-up wizard via the submenu "Recover presettings"/"Reset start-up wizard", then relaunch the wizard from the main menu.

Do not use the other submenus on this version.

Software versions from v2.x.x.x

This menu enables you to quickly access your application's basic settings. Among other features, it allows you to change the access level, relaunch the start-up wizard, adjust the inverter operating limits, define the start-up and shut-down ducts and, if necessary, to define the critical frequency hopping. For more advanced settings, please refer to the Parameters menu.

Basic settings

- Pass code
- Start-up wizard *
- Ducts *
- Limit settings *
- Critical frequencies *
- Advanced functions *
  - Monitoring *
  - Schedule *
- Timer, region, display
  - Language
  - Date & Time
  - Units
  - Inverter name
  - Display settings

* To access these settings, a minimum access level of 2 is required (system start-up).

I/O

This menu provides a summary of the assignments and state of each of the inverter's inputs and outputs. These assignments are set automatically by the selected application via the start-up wizard. If any assignments are incorrect, relaunch the start-up wizard.

Diagnosis

This menu can be used to display, check and confirm the log of the most recent events, faults or warnings registered by the inverter. Refer to section 8 "Faults and warnings" for more details.

It also allows you to view the state of the inverter's main variables.

System info

This menu can be used to check the hardware and software versions of the inverter and its control panel.

Energy efficiency

This menu is a control panel showing the inverter's electrical consumption over the last hour, the last day and the last month.

Back-ups

This menu can be used to produce up to three different back-up copies of the inverter parameters.

In the event of an operational problem, this menu can be used to select one of these back-up copies in order to restore the parameters in the inverter.

Parameters

This menu provides access to the inverter parameters in order to adjust the advanced settings. Refer to section 7 "Parameters" for more details.

7 - PARAMETERS

The parameters are accessible via the "Parameters/Complete list" menu.

They are classed by numbered groups from 1 to 99.

Groups 01 to 09 are read-only parameters.

Some parameters are not always visible and depend on the machine's configuration. Three access levels are defined: user (level 1), system start-up (level 2) and manufacturer (level 3).

01 Actual values	Basic signals used to follow up the inverter operation
03 Input references	Setpoint values received from various sources
04 Warnings and faults	Information on the latest faults and warnings that have occurred
05 Diagnostics	Various counters and operation-hour measures for maintenance purposes
07 System info	Information on installing and operating the inverter
10 Standard DI, RO	Configuration for logic inputs and relay outputs
12 Standard AI	Configuration for analogue inputs
13 Standard AO	Configuration for analogue outputs
19 Operation mode	Selecting external command sources and operating modes
20 Start/stop/direction	Selecting external command sources for start/stop/direction
21 Start/stop mode	Start and stop modes; selecting the source of the signals
28 Frequency reference chain	Logic settings for the frequency reference
30 Limits	Motor operating limit values
31 Fault functions	Configuring external events; selecting the inverter behaviour in the event of a fault.
32 Supervision	Configuring supervision functions
34 Timed functions	Configuring timed functions
35 Motor thermal protection	Setting the motor heat protection
36 Load analyzer	Peak value batteries and amplitude batteries
40 Process PID	Parameters values for the PID control
45 Energy efficiency	Setting the energy-efficiency calculators
47 Data storage	Data storage for the start-up wizard
58 Embedded fieldbus	Configuring the RS485 interface
80 Flow calculation	Calculating and visualising the air flow
95 HW configuration	Setting different material functions
96 System	Language selection; access levels; restarting the control unit; unit selection…
97 Motor control	Switching frequency; slip compensation
99 Motor data	Motor name plate settings

01 Actual values – read-only			Access level
01.02	Motor speed estimated	Motor speed estimated in rpm	1
01.06	Output frequency	Inverter estimated output frequency in Hz	1
01.07	Motor current	Motor current (absolute) measured in A	1
01.08	Motor current % of motor nom	Motor current (inverter output current) as a % of the motor nominal current	1
01.09	Motor current % of drive nom	Motor current (inverter output current) as a % of the inverter nominal current	1
01.10	Motor torque	Motor torque as a % of the motor nominal torque	1
01.11	DC voltage	Internal DC voltage at the inverter in V	1
01.13	Output voltage	Motor voltage in V	1
01.14	Output power	Inverter output power. The unit is selected via parameter 96.16 "Unit selection"	1
01.15	Output power % of motor nom	Useful power as a percentage of the nominal motor power	1
01.16	Output power % of drive nom	Useful power as a percentage of the nominal inverter power	1
01.17	Motor shaft power	Estimated mechanical power at the motor shaft	1
01.18*	Inverter GWh counter	Energy having circulated in the inverter (in both directions) in gigawatt hours	1
01.19*	Inverter MWh counter	Energy having circulated in the inverter (in both directions) in megawatt hours. 01.18 Inverter GWh counter increases, whereas the 01.19 counter restarts from zero	1
01.20*	Inverter kWh counter	Energy having circulated in the inverter (in both directions) in kilowatt hours 01.19 Inverter MWh counter increases, whereas the 01.20 counter restarts from zero	1
01.30	Nominal torque scale	Scale corresponds with 100% of the motor nominal torque. The unit is selected via parameter 96.16. This value is calculated based on the motor data entered in group 99	1
01.50	Current hour kWh	Energy consumption over the last hour. This is based on the energy consumed during the last 60 minutes (not necessarily continuous) that the inverter has been running, and not the energy consumed during the last calendar hour. When the inverter restarts, it resumes the value from the end of the preceding cycle.	1
01.51	Previous hour kWh	Energy consumption over the previous hour. This parameter registers the value of 01.50 current hour kWh when 60 cumulative minutes have elapsed. When the inverter restarts, it resumes the value from the end of the preceding cycle.	1
01.52	Current day kWh	Energy consumption over the last day. This is based on the energy consumed during the last 24 hours (not necessarily continuous) that the inverter has been running, and not the energy consumed during the last calendar day. When the inverter restarts, it resumes the value from the end of the preceding cycle.	1
01.53	Previous day kWh	Energy consumption over the day before last. This parameter registers the value of 01.52 current day kWh when 24 cumulative hours have elapsed. When the inverter restarts, it resumes the value from the end of the preceding cycle.	1
01.54	Inverter cumulative energy	Energy having circulated in the inverter (in both directions) in kilowatt hours.	1

* Parameters 01.18, 01.19 and 01.20 replaced by parameter 01.54 from software version 2.x.x.x onwards.

03 Input references (setpoints) – read-only			Access level
03.01	Panel reference	Setpoint specified by the control panel in local mode (manual)	1
03.02	Remote panel reference	Setpoint specified by the control panel in remote mode (auto)	1
03.09	EFB reference 1	Scaling setpoint received from the MODBUS interface	1

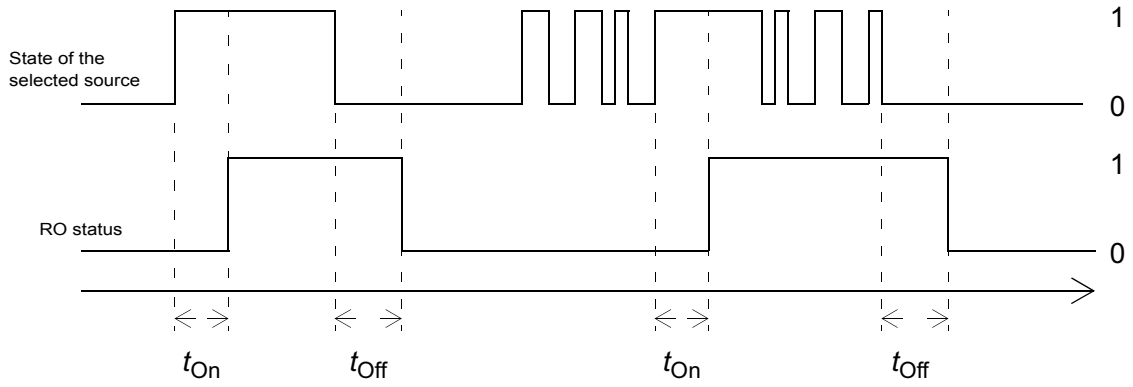
04 Warnings and faults – read-only			Access level
04.01	Tripping fault	Code of first tripping fault (that has caused the current trigger)	1
04.02	Active fault 2	Code of second tripping fault	1
04.03	Active fault 3	Code of third tripping fault	1
04.06	Active warning 1	Code of the first active warning	1
04.07	Active warning 2	Code of the second active warning	1
04.08	Active warning 3	Code of the third active warning	1
04.11	Latest fault	Code of the first registered fault (inactive)	1
04.12	2nd latest fault	Code of the second registered fault (inactive)	1
04.13	3rd latest fault	Code of the third registered fault (inactive)	1
04.16	Latest warning	Code of the first registered warning (inactive)	1
04.17	2nd latest warning	Code of the second registered warning (inactive)	1
04.18	3rd latest warning	Code of the third registered warning (inactive)	1

05 Diagnostics – read-only			Access level
05.01	On-time counter	On-time counter. This counter increases when the inverter is on.	1
05.02	Run-time counter	Motor run-time counter. The counter increases while the inverter is supplying the motor.	1
05.04	Fan on-time counter	On-time counter for the inverter cooling fan. This counter can be reset from the control panel by pressing and holding the "Reset" button for more than 3 seconds.	1
05.10	Control board temperature	Measured control board temperature	1
05.11	Inverter temperature	Estimated inverter temperature as a % of the fault limit. The fault limit varies depending on the inverter type. 0.0% = 0 °C (32 °F) 100.0% = fault limit	1

07 System info – read-only			Access level
07.03	Drive rating id	Frequency inverter type	1
07.04	Firmware name	Basic program name	1
07.05	Firmware version	Basic program version	1
07.11	Cpu usage	Microprocessor load in %	1
07.25	Customization package name	Manufacturer program name	1
07.26	Customization package version	Manufacturer program version	1

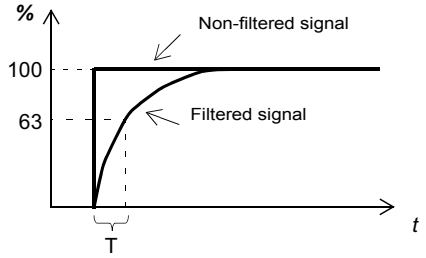
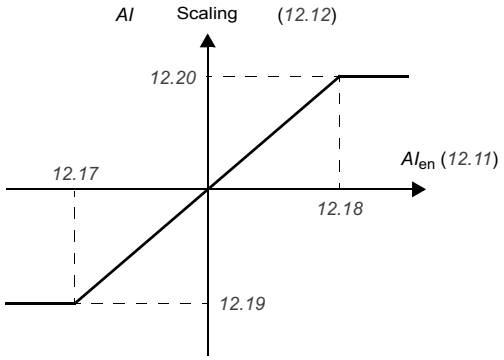
10 Standard DI, RO			Access level
10.02	DI delayed status	Displaying the status of the logic inputs DI1 to DI6. This word is only updated once the activation/deactivation time has elapsed. Bits 0 to 5 correspond with the delayed status of DI1 to DI6. Read-only parameter	1
10.03	DI force selection	The logic input statuses can be forced in order to carry out tests, for example. Each logic input is controlled by one bit from parameter 10.04, only if the bit corresponding with parameter 10.03 is set to 1.	3
10.04	DI forced data	Allows a logic input value to be forced from 0 to 1. Only the validated inputs on parameter 10.03 can be forced.	3

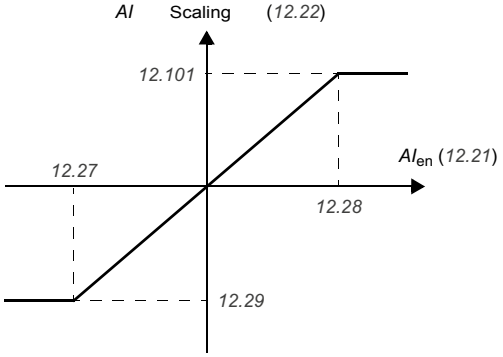
10 Standard DI, RO			Access level
10.21	RO status	Status of relay outputs RO3-RO1. Read-only parameter	1
10.22	RO force selection	The relay outputs can be forced in order to carry out tests, for example. Each relay output is controlled by one bit from parameter 10.23, only if the bit corresponding with parameter 10.03 is set to 1. **N.B.: Restarting the inverter reinitialises the forced selections (parameters 10.22 and 10.23).**	3
10.23	RO forced data	Values forced on the relay outputs. Only the validated outputs on parameter 10.22 can be forced.	3
10.24	RO1 source	Function of the relay output RO1	2
10.25	RO1 ON delay	Activation delay for the relay output RO1 (see graphic below)	2
10.26	RO1 OFF delay	Deactivation delay for the relay output RO1 (see graphic below)	2
10.27	RO2 source	Function of the relay output RO2	2
10.28	RO2 ON delay	Activation delay for the relay output RO2 (see graphic below)	2
10.29	RO2 OFF delay	Deactivation delay for the relay output RO2 (see graphic below)	2
10.30	RO3 source	Function of the relay output RO3	2
10.31	RO3 ON delay	Activation delay for the relay output RO3 (see graphic below)	2
10.32	RO3 OFF delay	Deactivation delay for the relay output RO3 (see graphic below)	2
10.101	RO1 toggle counter	Displaying the number of status changes for the relay output RO1. Read-only parameter	1
10.102	RO2 toggle counter	Displaying the number of status changes for the relay output RO2. Read-only parameter	1
10.103	RO3 toggle counter	Displaying the number of status changes for the relay output RO3. Read-only parameter	1

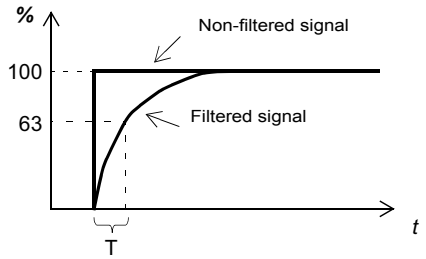


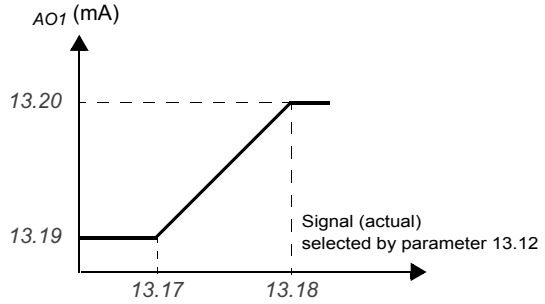
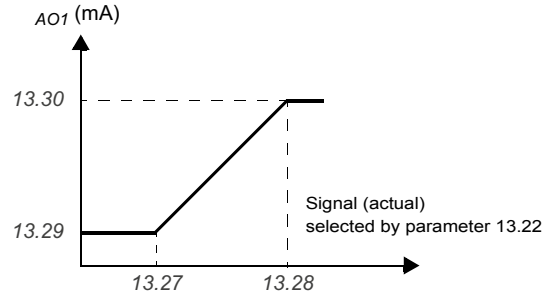
t_{On} = 10.25 or 10.28 or 10.31
t_{Off} = 10.26 or 10.29 or 10.32

12 Standard AI			Access level
12.02	AI force selection	The analogue input values can be forced in order to carry out tests, for example. The AI1 input can be forced to the value of parameter 12.13 and the AI2 input forced to the value of parameter 12.23, only if the bit corresponding to parameter 12.02 is 1. **N.B.: Restarting the inverter reinitialises the forced selections (parameter 12.02).**	3
12.11	AI1 actual value	Displaying the analogue input value AI1 in mA or V (in relation to parameter 12.15). Read-only parameter.	1
12.12	Scale pressure AI1	Displaying the analogue input value AI1 after scaling. See parameters 12.19 and 12.20. Read-only parameter.	1
12.13	AI1 forced value	Forced value on the AI1 input. Only applies if the override mode is validated on parameter 12.02.	3
12.15	AI1 unit selection	Selecting the unit (V or mA) for the analogue input AI1. **N.B.: This setting is adjusted automatically by the start-up wizard. We do not recommend modifying this value without returning to the wizard.**	2

12 Standard AI			Access level
12.16	AI1 filter time	Setting the filter time constant for the analogue input AI1  $O = I \times (1 - e^{-t/T})$ I = filter input (step) O = filter output t = time T = filtering time constant **N.B.: The signal is also filtered by the signals' interface circuits (time constant of approx. 0.25 ms). No parameter allows this value to be modified.**	2
12.17	AI1 min	Setting the min. value (in V or mA) of the signal on the analogue input AI1. See figure for parameter 12.19. **N.B.: This setting is adjusted automatically by the start-up wizard.**	2
12.18	AI1 max	Setting the max. value (in V or mA) of the signal on the analogue input AI1. See figure for parameter 12.19. **N.B.: This setting is adjusted automatically by the start-up wizard.**	2
12.19	Scale min. pressure AI1	Setting the actual internal value corresponding to the min. value of the analogue input AI1.  **N.B.: This setting is adjusted automatically by the start-up wizard. We do not recommend modifying this value without returning to the wizard.**	2
12.20	Scale max. pressure AI1	Setting the actual internal value corresponding to the max. value of the analogue input AI1. See figure for parameter 12.19. **N.B.: This setting is adjusted automatically by the start-up wizard. We do not recommend modifying this value without returning to the wizard.**	2
12.21	AI2 actual value	Displaying the analogue input value AI2 in mA or V (in relation to parameter 12.25). Read-only parameter.	1
12.22	Ana setpoint (scale AI2)	Displaying the analogue input value AI2 after scaling. See parameters 12.29 and 12.30. Read-only parameter.	1
12.23	AI2 forced value	Forced value on the AI2 input. Only applies if the override mode is validated on parameter 12.02.	3
12.25	AI2 unit selection	Selecting the unit (V or mA) for the analogue input AI2. **N.B.: This setting is adjusted automatically by the start-up wizard. We do not recommend modifying this value without returning to the wizard.**	2
12.26	AI2 filter time	Setting the filter time constant for the analogue input AI2 See figure for parameter 12.16	2
12.27	AI2 min	Setting the min. value (in V or mA) of the signal on the analogue input AI2. See figure for parameter 12.29. **N.B.: This setting is adjusted automatically by the start-up wizard.**	2

12 Standard AI			Access level
12.28	AI2 max	Setting the max. value (in V or mA) of the signal on the analogue input. AI2. See figure for parameter 12.29. **N.B.: This setting is adjusted automatically by the start-up wizard.**	2
12.29	Min. setpoint (scaled at AI2 min.)	Setting the actual internal value corresponding to the min. value of the analogue input AI2.  **N.B.: This setting is adjusted automatically by the start-up wizard. We do not recommend modifying this value without returning to the wizard.**	2
12.30	Max. scaled setpoint AI1	Setting the actual internal value corresponding to the max. value of the analogue input AI2. See figure for parameter 12.29. **N.B.: This setting is adjusted automatically by the start-up wizard. We do not recommend modifying this value without returning to the wizard.**	2
12.101	Percentage AI1	Analogue input value AI1 as a percentage of the scaled value (12.18 - 12.17)	1
12.102	Percentage AI2	Analogue input value AI2 as a percentage of the scaled value (12.28 - 12.27)	1

13 Standard AO			Access level
13.02	AO force selection	The analogue output values can be forced in order to carry out tests, for example. The AO1 output can be forced to the value of parameter 13.13 and the AO2 output forced to the value of parameter 13.23, only if the bit corresponding to parameter 13.02 is 1. **N.B.: Restarting the inverter reinitialises the forced selections (parameter 13.02).**	3
13.11	AO1 actual value	Displaying the analogue input value AO1 in mA or V (in relation to parameter 13.15). Read-only parameter.	1
13.12	AO1 source	Function of the AO1 analogue output. Parameter accessible in read mode at level 1.	2
13.13	AO1 forced value	Forced value on the output AO1. Only applies if the override mode is validated on parameter 13.02.	3
13.15	AO1 unit selection	Selecting the unit (V or mA) for the analogue output AO1. You need to reset the control card (by setting the parameter 96.08 to reboot, or by disconnecting the inverter) for this change to take effect.	2
13.16	AO1 filter time	Setting the filter time constant for the analogue output AO1  $O = I \times (1 - e^{-t/T})$ I = filter input (step) O = filter output t = time T = filtering time constant	2

13 Standard AO			Access level
13.17	AO1 source min	Setting the actual internal value of the signal corresponding to the min. value of the analogue output AO1. 	2
13.18	AO1 source max	Setting the actual internal value of the signal corresponding to the max. value of the analogue output AO1. See figure for parameter 13.17.	2
13.19	AO1 out at AO1 src min	Function of the AO1 analogue output	2
13.20	AO1 out at AO1 src max	Setting the max. value (in V or mA) of the signal on the analogue output AO1. See figure for parameter 13.17.	2
13.21	AO2 actual value	Displaying the value of the analogue output AO2 in mA. Read-only parameter	1
13.22	AO2 source	Function of the AO2 analogue output. Parameter accessible in read-only at level 1	2
13.23	AO2 forced value	Forced value on the output AO2. Only applies if the override mode is validated on parameter 13.02.	3
13.26	AO2 filter time	Setting the filter time constant for the analogue output AO2. See figure for parameter 13.16	2
13.27	AO2 source min	Setting the actual internal value of the signal corresponding to the min. value of the analogue output AO2. 	2
13.28	AO2 source max	Setting the actual internal value of the signal corresponding to the max. value of the analogue output AO2. See figure for parameter 13.27.	2
13.29	AO1 out at AO1 src min	Setting the min. value (in V or mA) of the signal on the analogue output AO2. See figure for parameter 13.27.	2
13.30	AO1 out at AO1 src max	Setting the max. value (in V or mA) of the signal on the analogue output AO2. See figure for parameter 13.27.	2

19 Operation mode			Access level
19.01	Actual operation mode	Motor actuation mode (must always indicate a scalar mode). This parameter is read-only.	2
19.17*	Local control disable	Enabling/disabling the manual control panel command (Start and Stop buttons). **WARNING! If you enable the manual command, never manually stop a running motor. Stop the motor via the automatic command to always ensure post-ventilation. Only switch to manual mode when the motor has stopped. We shall not be liable should this safety regulation not be respected. Parameter accessible in read-only at level 2**	3
19.18	Disabling the source HAND/OFF	Enabling/disabling the manual control panel command (Start and Stop buttons). **WARNING! If you enable the manual command, never manually stop a running motor. Stop the motor via the automatic command to always ensure post-ventilation. Only switch to manual mode when the motor has stopped. We shall not be liable should this safety regulation not be respected. Parameter accessible in read-only at level 2**	3
19.19	Disabling the action HAND/OFF	Selecting the disabled manual commands.	3

* Parameter 19.17 replaced by parameters 19.18 and 19.19 from software version 2.x.x.x onwards.

20 Start/stop/direction			Access level
20.01	Ext1 commands	Selecting the source of the start and stop commands when in automatic mode. 1 = contact defined by parameter 20.03 14 = command by MODBUS RS485	2
20.02	Ext1 start trigger type	Detection mode for the start and stop signal: 0 = on the front 1 = on the level (adjustment recommended)	2
20.03	Ext1 in1 source	Selecting the source of the start and stop commands when 20.01 = 1	2
20.40	Run permissive	Selecting the source of the operation feedback contact 1 = No operation feedback 2 to 6 = DI1 to DI5 input normally closed 8 to 12 = DI1 to DI5 input normally open Do not use input DI6 (7 and 13), reserved for the PTC motor	2
20.41	Start interlock	Selecting the source of the start interlock contact. This function is equivalent to adding a contact in series to the start order: 1 = no start interlock 2 to 6 = DI1 to DI5 input normally closed 8 to 12 = DI1 to DI5 input normally open Do not use input DI6 (7 and 13), reserved for the PTC motor	2
20.45	Start interlock stop mode	Stop mode in case start authorisation signal is lost as defined in 20.41 1 = Coasting (adjustment recommended) 2 = Ramp	2

21 Start/stop mode			Access level
21.03	Stop mode	Selecting the motor stop mode upon receiving a stop command 0 = Coasting (adjustment recommended) 1 = Ramp	2
21.14	Pre-heating input source	Selecting the source for triggering the motor pre-heating. **N.B.:** - **The heating function requires the run enable, interlock and STO signals to be activated.** - **It also requires the inverter to be running faultlessly.** - **Pre-heating uses the DC hold to produce current.**	2
21.16	Pre-heating current	Setting the continuous current used for heating the motor 0-30%	2
21.18	Auto restart time	The automatic restart function allows the motor to be restarted automatically following a brief power cut. Automatic restarting is disabled if this parameter is set to 0.0 seconds. The other setting values determine the maximum duration of the power cut before an automatic restart is attempted (max. duration = 10 s)	2

<table>
<tr><th colspan="2">28 Start/stop mode</th><th>Access level</th></tr>
<tr><td>28.01</td><td>Frequency ref ramp input</td><td>Frequency setpoint before applying the ramp
This parameter is read-only</td><td>1</td></tr>
<tr><td>28.02</td><td>Frequency ref ramp output</td><td>Frequency setpoint after applying the ramp
This parameter is read-only</td><td>1</td></tr>
<tr><td>28.11</td><td>Ext1 frequency ref1</td><td>Selecting the source for the frequency setpoint
This setting is adjusted automatically by the start-up wizard. We do not recommend modifying this value without returning to the wizard.</td><td>2</td></tr>
<tr><td>28.21</td><td>Constant frequency function</td><td>Selection mode for the frequency setpoint if controlled by digital inputs:
Bit 0 = 0: use separated by each input, 1 input = 1 setpoint
Bit 0 = 1: use combining inputs, 3 inputs = 7 setpoints
<table>
<tr><th>Input defined by 28.22</th><th>Defined input by 28.23</th><th>Defined input by 28.24</th><th>Active setpoint</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>Off</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>Setpoint 1 (28.26)</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>Setpoint 2 (28.27)</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>Setpoint 3 (28.28)</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>Setpoint 4 (28.29)</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>Setpoint 5 (28.30)</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>Setpoint 6 (28.31)</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>Setpoint 7 (28.32)</td></tr>
</table>
Bit 1: Always leave set to 0</td><td>2</td></tr>
<tr><td>28.22</td><td>Constant frequency sel1</td><td>Selecting the input for setpoint 1 (if 28.21 bit 0 = 0) or for the first setpoint selection input (if 28.21 bit 0 = 1)</td><td>2</td></tr>
<tr><td>28.23</td><td>Constant frequency sel2</td><td>Selecting the input for setpoint 2 (if 28.21 bit 0 = 0) or for the second setpoint selection input (if 28.21 bit 0 = 1)</td><td>2</td></tr>
<tr><td>28.24</td><td>Constant frequency sel3</td><td>Selecting the input for setpoint 3 (if 28.21 bit 0 = 0) or for the third setpoint selection input (if 28.21 bit 0 = 1)</td><td>2</td></tr>
<tr><td>28.26</td><td>Constant frequency 1</td><td>Frequency setpoint 1</td><td>1</td></tr>
<tr><td>28.27</td><td>Constant frequency 2</td><td>Frequency setpoint 2</td><td>1</td></tr>
<tr><td>28.28</td><td>Constant frequency 3</td><td>Frequency setpoint 3</td><td>1</td></tr>
<tr><td>28.29</td><td>Constant frequency 4</td><td>Frequency setpoint 4</td><td>1</td></tr>
<tr><td>28.30</td><td>Constant frequency 5</td><td>Frequency setpoint 5</td><td>1</td></tr>
<tr><td>28.31</td><td>Constant frequency 6</td><td>Frequency setpoint 6</td><td>1</td></tr>
<tr><td>28.32</td><td>Constant frequency 7</td><td>Frequency setpoint 7</td><td>1</td></tr>
<tr><td>28.51</td><td>Critical frequency function</td><td>Bit 0: Activating/deactivating the critical frequency function.
Critical frequencies (or frequency ranges to be skipped) can be set to prevent mechanical resonance problems. When a frequency setpoint enters a critical range, the frequency applied to the motor remains at its previous value until the setpoint exits this range.
Bit 1: Always leave set to 0</td><td>2</td></tr>
<tr><td>28.52</td><td>Critical frequency 1 low</td><td>Setting the lower limit for critical frequency 1.
N.B.: This value must be less than or equal to the value of parameter 28.53.</td><td>2</td></tr>
<tr><td>28.53</td><td>Critical frequency 1 high</td><td>Setting the upper limit for critical frequency 1.
N.B.: This value must be greater than or equal to the value of parameter 28.52.</td><td>2</td></tr>
<tr><td>28.54</td><td>Critical frequency 2 low</td><td>Setting the lower limit for critical frequency 2.
N.B.: This value must be less than or equal to the value of parameter 28.55.</td><td>2</td></tr>
<tr><td>28.55</td><td>Critical frequency 2 high</td><td>Setting the upper limit for critical frequency 2.
N.B.: This value must be greater than or equal to the value of parameter 28.54.</td><td>2</td></tr>
<tr><td>28.56</td><td>Critical frequency 3 low</td><td>Setting the lower limit for critical frequency 3.
N.B.: This value must be less than or equal to the value of parameter 28.57.</td><td>2</td></tr>
<tr><td>28.57</td><td>Critical frequency 3 high</td><td>Setting the upper limit for critical frequency 3.
N.B.: This value must be greater than or equal to the value of parameter 28.56.</td><td>2</td></tr>
<tr><td>28.72</td><td>Freq acceleration time 1</td><td>Setting the acceleration ramp, i.e. the time required to go from zero frequency to 200 Hz. When the inverter reaches this frequency, it continues to accelerate at the same speed until it reaches the value set at parameter 30.14 (maximum frequency).</td><td>2</td></tr>
<tr><td>28.73</td><td>Freq deceleration time 1</td><td>Setting the deceleration ramp, i.e. the time required to go from 200 Hz to zero frequency.</td><td>2</td></tr>
</table>

30 Limits			Access level
30.13	Minimum frequency	Setting the minimum permitted frequency **WARNING! This value must not exceed 30.14, and must be 20 Hz as a minimum. We shall not be liable should the threshold of 20 Hz not be respected.**	2
30.14	Maximum frequency	Setting the maximum permitted frequency **WARNING! This value must not be below 30.13. Never exceed the max. permissible turbine speed indicated on our commercial description. We shall not be liable if this max. threshold is exceeded.**	2
30.17	Maximum current	Setting the max. permissible motor current. This value may be greater than the nominal value listed on the motor to prevent the motor from stopping in the event of temporary overloading. This parameter does not have any effect on the motor heat protection provided by the inverter starting from the intensity set on 99.06	2

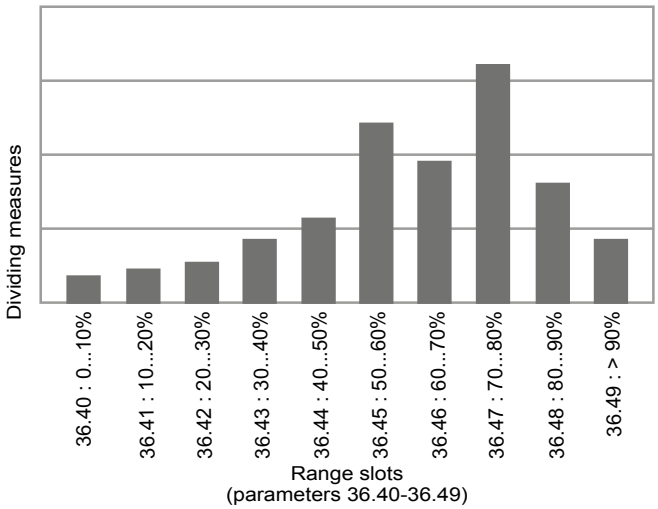
31 Fault functions			Access level
31.01	External event 1 source	Selecting the allocated digital input on the external fault contact **N.B.: This setting is adjusted automatically by the start-up wizard. We do not recommend modifying this value without returning to the wizard.**	2
31.02	Role of the contact (external event type 1)	Selecting the severity rate of the external fault 0 = dangerous fault (stop the motor) 1 = maintenance fault warning (do not stop the motor)	2
31.11	Fault reset selection	Selecting the source of the external signal for resetting faults. This signal resets the inverter after a fault has been triggered if the source of the fault disappears 0 = manual reset from the control panel 1 = automatic reset 2 to 5 = input DI1 to DI5 Do not use DI6, reserved for the motor PTC	2
31.12	Autoreset selection	Selecting the faults that are automatically reset. The parameter is a word of 16 bits corresponding to a type of fault. When the bit is at "1", the fault is automatically reset.	2
31.13	Selectable fault	Choice of fault that will be automatically reset via bit 10 of parameter 31.12	2
31.14	Number of trials	Defining the number of automatic resets carried out by the inverter during the time set under parameter 31.15	2
31.15	Total trials time	Setting the duration during which the automatic reset function will try to reset the inverter. The number of automatic reset attempts is defined under parameter 31.14	2
31.19	Motor phase loss	Selecting the inverter behaviour upon detecting a loss of motor phase	2
31.20	Earthing fault	Selecting the inverter behaviour upon detecting an earthing fault or a current imbalance in the motor or motor cable	2
31.21	Loss of network phase	Selecting the inverter behaviour upon detecting a loss of network phase	2
31.23	Wiring or earth leakage	Selecting the inverter behaviour if a connection error occurs between the network and motor cables (e.g., network cable connected to the inverter motor terminals)	2
31.24	Stall function	Selecting the inverter operation mode in the event of the rotor being blocked.	2

32 Supervision You can define six values to supervise. If the predefined limits are exceeded, a warning or fault is signalled. These parameters can also be accessed via the menu "Basic settings"/"Advanced functions"/"Supervision".			Access level
32.01	Supervision status	Word for signal supervision status. It indicates if the values supervised by the signal supervision functions have reached their limits or not. This parameter is read-only	1
32.05	Supervision 1 function	Selecting the type of threshold (high, low, high and low) used by the supervision 1 function.	2
32.06	Supervision 1 action	Selecting the inverter behaviour (fault, warning or no action) when the supervision 1 signal exceeds its limits.	2
32.07	Supervision 1 signal	Selecting the signal to be supervised by the supervision 1 function.	2
32.08	Supervision 1 filter time	Setting a filter time constant for the signal supervised by signal supervision 1.	2
32.09	Supervision 1 low	Setting the lower limit for the supervision 1 function	2
32.10	Supervision 1 high	Setting the upper limit for the supervision 1 function	2
32.11	Supervision 1 hysteresis	Setting the hysteresis for the signal supervised by the supervision 1 function	2

Five other signals can be supervised and are set following the same principle using parameters 32.15 to 32.61.

34 Timed function **The timer function can also be accessed via the menu "Basic settings"/"Advanced functions"/"Timer functions".** **If the inverter is not driven by a controller, it is possible to define three time programs (called combined timers) within the inverter:** **- 12 time slots (called timers within the inverter) can be set (parameters 34.12 to 34.46) and are defined by the inverter start time and the operating time.** **- 4 seasons can be defined: parameters 34.60 to 34.63** **- 3 exception periods can be set, where the duration can vary from 1 to 60 days: they can be defined as a stop day (non-working day) or a run day (working day): parameters 34.70 to 34.78** **- 13 additional exception days can be set: parameters 34.79 to 34.90** **- For each time slot, it is possible to choose the days of the week, the seasons, the exception periods and days during which the slot should be activated: parameter 34.11 for time slot 1, parameter 34.14 for time slot 2, etc.** **- Each timed program (combined timer) is defined by the time slots specified in this program (parameters 34.100 to 34.102)** **- To use a timed program as the inverter start/stop function:** **• In place of contact DI1: select the desired program (18, 19 or 20) in parameter 20.03** **• To supplement run contact DI1 (ET function between DI1 and the timed program), in parameter 20.41, select "Other" followed by 34.01 followed by the desired program.** **• In both cases, activate the timed program by setting 1 in parameter 34.10**			**Access level**
34.01	Combined timer status	Status of combined timers (timed programs). The status of a combined timer is the result of the OR logic function applied to all timers declared within this timed program. Read-only parameter.	1
34.02	Timer status	Status of timers 1-12. Read-only parameter.	1
34.04	Season/exception day status	Status of seasons 1-4 and exceptions for working days and non-working days. Only one season can be active at a time. A day can be a working day and a non-working day at the same time. Read-only parameter.	1
34.10	Active timed functions	Activating the timed program function. 0 = Deactivated. 1 = Activated.	1
34.11 to 34.46	Timer x configuration	Selecting the days of the week, seasons and exception days applicable to timer x.	1
	Timer x start time	Setting the daily start time for timer x. The setting increments are one second.	1
	Timer x duration	Setting the duration of timer x. The setting increments are one minute.	1
34.60 to 34.63	Season y start date	Setting the start date for season y in the format dd.mm, where dd = day number and mm = month number. Seasons change at midnight. Only one season can be active at a time. The timers start during exception days even if they are not within the active season. The start dates for seasons 1 to 4 must be listed in chronological order to use all the seasons. None of the seasons are pre-configured ex-works. If the parameter is not set to its factory setting and the season start dates are not in chronological order, the inverter signals a season configuration warning.	1
34.70	Number of active exceptions	Setting the number of active exceptions. Exceptions 1 to 3 are the adjustable duration periods whereas exceptions 4 to 16 are days (duration of 24 hours).	1
34.71	Exception types	For each exception period, set the type of exception: 0 = working day 1 = non-working day	1
34.72 34.74 34.76	Start of exception x	Setting the start date for the exception period in the format dd.mm, where dd = day number and mm = month number. One day may be a working day for one timer and a non-working day for another timer at the same time. In this case, it is necessary to declare two exception periods on the same date.	1
34.73 34.75 34.77	Duration of exception x	Duration (in days) of the exception period. An exception period is considered to be several consecutive exception days.	1
34.78 to 34.90	Exception day y	Setting the date of exception day y. A timer started on an exception day stops automatically at 23:59:59, even if the duration has not finished.	1
34.100 to 34.102	Combined timer z	Selecting the timers that apply to the timer program z 0 = Timer not used 1 = Timer used	1

35 Thermal protection			**Access level**
35.11	Temperature 1 source	Selecting the source and the type of sensor for the motor heat protection. This parameter is read-only. It must always show PTC DI6.	**2**

36 Load analyzer This parameter group allows you to select a signal to be supervised. Each time this signal exceeds the defined peak value, a timestamped message is added to the event log. The motor current, continuous voltage and motor speed at the time when the threshold was exceeded are also saved.			Access level
36.01	PVL signal source	Selecting the signal to be set in the peak value log. The signal is filtered using the filtering time specified under parameter 36.02. The peak value is stocked, as well as the other pre-selected signals at the same time, under parameters 36.10 to 36.15. You can reset the peak value log to zero using parameter 36.09. The date and time when it was last reset to zero are recorded under parameters 36.16 and 36.17 respectively. Read-only parameter at access level 1	2
36.02	PVL filter time	Filter time for the peak value log	2
36.06	AL2 signal source	Selecting the signal to be supervised by the range log 2. The signal is sampled every 200 ms. The results are recorded under parameters 36.40 to 36.49. Each parameter represents a range slot and indicates the sample portion that is within the slot. The signal value corresponding with 100% is defined under parameter 36.07. You can reset the range log 2 to zero using parameter 36.09. The date and time when it was last reset to zero are recorded under parameters 36.50 and 36.51 respectively.  Range log 1 always registers the motor current values. Its content cannot be reset to zero. In this log, 100% corresponds to the maximum inverter output current. The measured current is recorded continuously. The sample distribution is recorded under parameters 36.20 to 36.29.	2
36.07	AL2 signal scaling	Setting the signal value corresponding with a range of 100% for the range log 2 (see parameter 36.06)	2
36.09	Reset loggers	Resetting the peak value log and/or the range log 2 to zero (range log 1 cannot be reset to zero).	2
36.10	PVL peak value	Maximum peak value registered in the peak value log (see parameter 36.01).	2
36.11	PVL peak date	Date (format dd.mm.yy) when the peak value for parameter 36.10 was recorded	2
36.12	PVL peak time	Hour (format hh.mm.ss) when the peak value for parameter 36.10 was recorded	2
36.13	PVL current at peak	Motor current at the time of recording the peak value of parameter 36.10	2
36.14	PVL DC voltage at peak	Internal inverter DC circuit voltage at the time of recording the peak value of parameter 36.10	2
36.15	PVL speed at peak	Motor speed at the time of recording the peak value of parameter 36.10	2
36.16	PVL reset date	Date when parameter 36.10 was last reset to zero	2
36.17	PVL reset time	Time when parameter 36.10 was last reset to zero	2
36.20 to 36.29	AL1 xx-yy%	Dividing current measures, in increments of 10% (see parameter 36.06)	2
36.40 to 36.49	AL2 xx-yy%	Dividing range log 2 measures, in increments of 10% (see parameter 36.06)	2
36.50	AL2 reset date	Date when the range log 2 was last reset to zero	2
36.51	AL2 reset time	Time when the range log 2 was last reset to zero	2

<table>
<tr><th colspan="2">40 Process PID set 1</th><th>Access level</th></tr>
<tr><td>40.01</td><td>Process PID output actual</td><td>Displaying the PID regulator output (in %).
Read-only parameter.</td><td>1</td></tr>
<tr><td>40.02</td><td>Process PID feedback actual</td><td>Displaying the PID return value (duct pressure or flow rate, based on the application selected)
Read-only parameter.</td><td>1</td></tr>
<tr><td>40.03</td><td>Process PID setpoint actual</td><td>Displaying the PID setpoint value (duct pressure or flow rate, based on the application)
Read-only parameter</td><td>1</td></tr>
<tr><td>40.08</td><td>Set 1 feedback 1 source</td><td>Selecting the source of the PID return.
N.B.: This setting is adjusted automatically by the start-up wizard. We do not recommend modifying this value without returning to the wizard.</td><td>2</td></tr>
<tr><td>40.09</td><td>Set 1 feedback 2 source</td><td>Selecting the second source of the PID return. The second source is only used if the setpoint function requires two inputs.</td><td>2</td></tr>
<tr><td>40.10</td><td>Set 1 feedback function</td><td>PID return calculation mode starting from the two return sources selected on parameters 40.08 and 40.09</td><td>2</td></tr>
<tr><td>40.11</td><td>Set 1 feedback filter time</td><td>Setting the filter time constant for the PID return</td><td>2</td></tr>
<tr><td>40.14</td><td>Max. setpoint (Set 1 setpoint scaling)</td><td>Maximum setpoint (as a flow rate or pressure depending on the application selected) at the PID regulator input. (Allows the PID input signal to be recalibrated in combination with parameter 40.15)</td><td>2</td></tr>
<tr><td>40.15</td><td>Set 1 output scaling</td><td>Output frequency corresponding with the maximum flow rate set at parameter 40.15. In principle, this parameter should be set to the same value as the maximum frequency set for parameter 30.14.</td><td>2</td></tr>
<tr><td>40.16</td><td>Set 1 setpoint 1 source</td><td>Selecting the first source for the PID setpoint.</td><td>2</td></tr>
<tr><td>40.17</td><td>Set 1 setpoint 2 source</td><td>Selecting the second source for the PID setpoint. The second source is only used if the setpoint function requires two inputs.</td><td>2</td></tr>
<tr><td>40.18</td><td>Set 1 setpoint function</td><td>Applying a function to setpoint sources chosen at parameters 40.16 and 40.17</td><td>2</td></tr>
<tr><td>40.19</td><td>Select setpoint int 1
Set 1</td><td>Selecting the first PID setpoint input if driven by digital inputs, 2 inputs allow 3 setpoints to be managed:
<table>
<tr><th>Defined input by 40.19</th><th>Defined input by 40.20</th><th>Active setpoint</th></tr>
<tr><td>0</td><td>0</td><td>Off</td></tr>
<tr><td>1</td><td>0</td><td>Setpoint 1 (40.21)</td></tr>
<tr><td>0</td><td>1</td><td>Setpoint 2 (40.22)</td></tr>
<tr><td>1</td><td>1</td><td>Setpoint 3 (40.23)</td></tr>
</table>
0 = function not used (setpoint from the control panel or analogue input)
2 to 6 = input DI1 to DI5
Do not use DI6, reserved for the motor PTC</td><td>2</td></tr>
<tr><td>40.20</td><td>Select setpoint int 2
Set 1</td><td>Selecting the second PID setpoint input if driven by digital inputs (see parameter 40.19)</td><td>2</td></tr>
<tr><td>40.21</td><td>Set 1 internal setpoint 1</td><td>Setpoint 1</td><td>1</td></tr>
<tr><td>40.22</td><td>Set 1 internal setpoint 2</td><td>Setpoint 2</td><td>1</td></tr>
<tr><td>40.23</td><td>Set 1 internal setpoint 3</td><td>Setpoint 3</td><td>1</td></tr>
<tr><td>40.26</td><td>Set 1 setpoint min</td><td>Minimum setpoint (as a flow rate or pressure depending on the application selected)</td><td>2</td></tr>
<tr><td>40.27</td><td>Set 1 setpoint max</td><td>Maximum setpoint (as a flow rate or pressure depending on the application selected) at the PID regulator input. In principle, this parameter should be controlled using the same value as parameter 40.14.</td><td>2</td></tr>
<tr><td>40.32</td><td>Set 1 gain</td><td>Setting the proportional gain of the PID regulator
Proportional band = 1/gain</td><td>2</td></tr>
<tr><td>40.33</td><td>Set 1 integration time</td><td>Setting the integral time of the PID regulator. This time must have the same order of magnitude as the reaction time of the driven process in order to prevent any instability. Setting it to 0 deactivates the integral action.</td><td>2</td></tr>
<tr><td>40.34</td><td>Set 1 derivation time</td><td>Setting the derivation time of the PID regulator. Setting it to 0 deactivates the derived action.</td><td>2</td></tr>
<tr><td>40.35</td><td>Set 1 derivation filter time</td><td>Setting the filter time constant of the first degree which smooths the action derived from the PID regulator</td><td>2</td></tr>
<tr><td>40.36</td><td>Set 1 output min</td><td>Minimum frequency at the PID output.</td><td>2</td></tr>
<tr><td>40.37</td><td>Set 1 output max</td><td>Maximum frequency at the PID output. In principle, this parameter should be set to the same value as the maximum frequency set for parameter 30.14.</td><td>2</td></tr>
<tr><td>40.89</td><td>Set 1 setpoint multiplier.</td><td>Multiplier coefficient applied to the calculation result defined by parameter 40.18.</td><td>2</td></tr>
<tr><td>40.90</td><td>Set 1 return k multiplier</td><td>Coefficient for calculating the flow rate.
This parameter has been replaced by 80.14 from software version 2.x.x.x onwards.
Warning! This coefficient takes into account the correction function of the number of motors and is therefore different from the K coefficient of the fan.
Parameter 40.90 = fan K coefficient X number of motors X 1.291.
We recommend restarting the start-up wizard to modify this coefficient.</td><td>2</td></tr>
</table>

45 Energy efficiency			Access level
45.04	Saved kW hours	Energy saved in kWh in relation to a direct start-up motor (see parameter 45.19). Parameter in read-only, it can be reset to zero using the parameter 45.21.	1
45.07	Savings	Financial savings made in relation to a direct start-up motor. This value is equal to the product of energy saved in kWh (parameter 45.04) and the unit price of a kWh (parameter 45.12). Parameter in read-only, it can be reset to zero using the parameter 45.21.	1
45.10	Total saved CO_2	Reduction of CO_2 emissions in tonnes in relation to a direct start-up motor. This value is calculated by multiplying the energy savings in MWh by the value of parameter 45.18 (pre-set: 0.5 tonne/MWh). Parameter in read-only, it can be reset to zero using the parameter 45.21.	1
45.11	Energy optimizer	Activating/deactivating the optimisation function of the energy consumption. This function optimises the flux in order to reduce the total energy consumption and the motor sound level while the inverter functions as part of the nominal load regime. The overall efficiency of the drive (motor + inverter) can be improved by 1 to 20% based on the speed and the load torque.	1
45.12	Energy tariff 1	Setting the unit price of a kWh. The currency is set under parameter 45.17. **N.B.: The prices are only read upon selection and cannot be applied retroactively.**	2
45.18	CO_2 conversion factor	Setting the conversion factor in CO_2 emissions (kg/kWh or tn/MWh).	2
45.19	Comparison power	Power absorbed by the motor if it is operating in direct start-up. This value is used as a reference value for calculating the energy savings. **N.B.: How precise the energy saving calculation is depends directly on how precise this value is. If this parameter is left blank, the calculation uses the motor's nominal power, which may artificially inflate the energy savings seeing as numerous motors do not absorb their nominal power.**	2
45.21	Energy calculations reset	Reinitialising energy counter parameters	2

47 Data storage This group is used to store the settings issued by the start-up wizard. Do not modify these parameters. Restart the start-up wizard if you want to make any changes			Access level
47.01	Min. setpoint	Minimum flow rate setpoint provided by the analogue input AI2. Restart the start-up wizard to change this value	2
47.21	K coefficient	K coefficient of the fan Restart the start-up wizard to change this value	2
47.22	Number of motors	Read-only parameter. Restart the start-up wizard to change this value	2

58 Embedded fieldbus (RS485 output)			Access level
58.01	Protocol enable	Enabling/disabling the RS485 connection used to communicate with the air handling unit controller. Parameter in read-only at level 1.	2
58.02	Protocol ID	Displaying the ID revision and protocol. Read-only parameter.	3
58.03	Node address	Defining the inverter node address. For our controller to work correctly, the following node addresses must be used 100 = intake inverter 150 = exhaust inverter Parameter in read-only at level 1 This setting will only take effect once the parameter 58.06 has been set to 1	2
58.04	Baud rate	Selecting the flow rate on the RS485 connection This setting will only take effect once the parameter 58.06 has been set to 1	2
58.05	Parity	Selecting the parity bit type and the number of stop bits. This setting will only take effect once the parameter 58.06 has been set to 1. Read-only parameter at levels 1 and 2	2
58.06	Communication control	Activating changes made on the series connection. 0 = Normal operation 1 = Taking changes 58.01-58.05, 58.14-58.17, 58.25 into account	2
58.07	Communication diagnostics	Displaying the series communication status. Read-only parameter.	2
58.08	Received packets	Displaying the number of valid tokens sent to the inverter. When functioning normally, this number will continue to increase. This counter can be reset from the control panel by pressing and holding the "Reset" button for more than 3 seconds.	2
58.09	Packets sent	Displaying the number of valid tokens sent by the inverter. When functioning normally, this number will continue to increase. This counter can be reset from the control panel by pressing and holding the "Reset" button for more than 3 seconds.	2
58.10	All packets	Displaying the number of valid tokens sent to any equipment on the bus. When in normal operation, this value increases continuously. This counter can be reset from the control panel by pressing and holding the "Reset" button for more than 3 seconds.	2
58.11	UART errors	Displaying the number of character errors received by the inverter. If this value increases, it indicates a configuration problem on the bus. This counter can be reset from the control panel by pressing and holding the "Reset" button for more than 3 seconds.	2
58.12	CRC errors	Displaying the number of valid tokens with a CRC error received by the inverter. If this value increases, it indicates interference on the bus. This counter can be reset from the control panel by pressing and holding the "Reset" button for more than 3 seconds.	2
58.14	Communication loss action	Selecting the inverter operation mode in the event of the series communication breaking down. This setting will only take effect once the parameter 58.06 has been set to 1	3
58.15	Communication loss mode	Selecting the message type that reinitialises the time delay counter for detecting series communication losses. This setting will only take effect once the parameter 58.06 has been set to 1.	3
58.16	Duration of communication loss	Setting a time delay for the series communication. If there is a communication loss that exceeds this time delay, the action defined under parameter 58.14 is carried out. This setting will only take effect once the parameter 58.06 has been set to 1.	3
58.18	EFB control word	Displaying the raw command word (untreated) for debugging purposes. Read-only parameter.	3
58.19	EFB status word	Displaying the raw status word (untreated) for debugging purposes. Read-only parameter.	3
58.25	Control profile	Selecting the communication profile used by the protocol. Read-only parameter.	3

80 Flow calculation			Access level
80.01	Actual flow	Displaying the calculated air flow rate Read-only parameter	1
80.10	Flow calculation mode	Activating the flow rate calculation function Read-only parameter. Restarting the start-up wizard to activate the function.	2
80.11	Source of return flow rate	Selecting the source for the pressure sensor value for calculating the flow rate. **N.B.: This setting is adjusted automatically by the start-up wizard. We do not recommend modifying this value without returning to the wizard.**	2
80.13	Function of return flow rate	Method of calculating flow rate	2
80.14	Return flow rate multiplier	Coefficient for calculating the flow rate. This parameter replaces 40.90 from software version 2.x.x.x onwards. **Warning! This coefficient takes into account the correction function of the number of motors and is therefore different from the K coefficient of the fan.** Parameter 80.14 = fan K coefficient X number of motors X 1.291. We recommend restarting the start-up wizard to modify this coefficient.	2

* Parameter 80.10 withdrawn from software version 2.x.x.x onwards and replaced by parameters 80.13 and 80.14

95 HW configuration			Access level
95.01	Supply voltage	Setting the supply voltage slot. This parameter allows the inverter to determine the nominal network voltage. **WARNING! Inappropriate settings may cause the motor to surge.** By setting this parameter to 0, the supply voltage will be automatically estimated by the inverter (see parameter 95.03).	2
95.03	Estimated AC supply voltage	Supply voltage estimated by the inverter Read-only parameter	1

96 System			Access level
96.01	Language	Selecting the control panel language. Only French, English, Spanish, Italian, German, Dutch and Russian are available. Do not select other languages.	1
96.02	Pass code	Enter the pass code for the desired level. Contact your agency if necessary	1
96.03	Access level status	Current access level Read-only parameter	1
96.05	Macro active	Displaying the current application. Read-only parameter, restart the start-up wizard to modify this application.	1
96.08	Control board boot	Resetting the control unit (the same as interrupting the inverter supply). At the end of the reset, this parameter returns to 0 automatically.	1
96.16	Unit selection	Selecting the unit for the power, temperature and torque parameters.	1
96.51	Clear the fault and event log	Deleting the fault and warning log	3

97 Motor control			Access level
97.01	Switching frequency reference	Setting the switching frequency used by the inverter with a lack of overheating. A raised switching frequency reduces the noise but results in the motor being declassified (contact us). We recommend retaining the factory settings (with 2 motors, it is imperative that the factory settings are retained). Parameter accessible in read-only at level 2.	3
97.02	Minimum switching frequency	The lowest permissible switching frequency. This value depends on the inverter size. We recommend retaining the factory settings. Parameter accessible in read-only at level 2.	3
97.03	Slip gain	Setting the gain for the slip compensation (used to improve the estimated motor speed). 100% corresponds to complete slip compensation and 0% corresponds to no slip compensation. The factory setting is 100%. Other values can be used if a static speed error is detected despite complete slip compensation. Example (at a nominal load and nominal slide of 40 rpm): a constant speed reference of 1000 rpm is seen on the inverter. Despite complete slip compensation (= 100%), a speed of 998 rpm is measured on the motor shaft with a manual speedometer. The static speed error is 1000 rpm - 998 rpm = 2 rpm. The slip gain should be set to 105% (2 rpm / 40 rpm = 5%)	2
97.09	Frequency switching mode	Selecting the frequency switching mode (normal or reduced noise optimisation). **Caution, selecting reduced noise optimisation declassifies the inverter (reduction in maximum intensity). Contact us first.** Parameter accessible in read-only at level 2.	3

99 Motor data			Access level
99.03	Motor type	The motor must always be an asynchronous motor Read-only parameter	3
99.06	Motor nominal current	Setting for the motor nominal current. This value must be identical to the motor name plate. If several motors are connected to the inverter, you must calculate the total current of the motors (or launch the start-up wizard, which will carry out this operation itself) This parameter cannot be modified when the motor is in operation. Parameter accessible in read-only at level 1	2
99.07	Motor nominal voltage	Setting for the motor nominal voltage. This value must be identical to the motor name plate. This parameter cannot be modified when the motor is in operation. Parameter accessible in read-only at level 1.	2
99.08	Motor nominal frequency	Setting for the motor nominal frequency. This value must be identical to the motor name plate. This parameter cannot be modified when the motor is in operation. Parameter accessible in read-only at level 1	2
99.09	Motor nominal speed	Setting for the motor nominal speed. This value must be identical to the motor name plate. This parameter cannot be modified when the motor is in operation. Parameter accessible in read-only at level 1	2
99.10	Motor nominal power	Setting for the motor nominal power. This value must be identical to the motor name plate. If several motors are connected to the inverter, you must calculate the total power of the motors (or launch the start-up wizard, which will carry out this operation itself) This parameter cannot be modified when the motor is in operation. Parameter accessible in read-only at level 1	2
99.11	Motor nominal cos φ	Setting for the motor nominal power factor (cos phi). Refer to the motor name plate. This value is optional. This parameter cannot be modified when the motor is in operation. Parameter accessible in read-only at level 1	2
99.15	Motor polepairs calculated	Number of motor pole pairs calculated Read-only parameter	2
99.16	Motor phase order	Reversed motor direction. This parameter allows you to correct the motor direction (for example, in case of an error in the order of the motor cable phases) without modifying the cabling.	2

7 - PARAMETERS

In the event of a unit fitted ex works with a control controlling the frequency inverter via ModBus, the following parameters are accessible from the main unit controller of the AHU (Intake FMA inverter and Exhaust FMA inverter menu):

Inverter parameter	Name of inverter parameter	Description	Controller parameter (intake FMA inverter)	Controller parameter (exhaust FMA inverter)
01.02	Motor speed estimated	Motor speed estimated in rpm	1102	2102
01.06	Output frequency	Inverter estimated output frequency in Hz	1101	2101
01.07	Motor current	Motor current (absolute) measured in A	1105	2105
01.13	Output voltage	Motor voltage in V	1104	2104
01.14	Output power	Inverter output power. The unit is selected via parameter 96.16. Unit selection	1106	2106
01.18	Inverter GWh counter	Energy having circulated in the inverter (in both directions) in gigawatt hours	1107	2107
01.19	Inverter MWh counter	Energy having circulated in the inverter (in both directions) in megawatt hours 01.18 Inverter GWh counter increases, whereas the 01.19 counter restarts from zero		
01.20	Inverter kWh counter	Energy having circulated in the inverter (in both directions) in whole kilowatt hours 01.19 Inverter MWh counter increases, whereas the 01.20 counter restarts from zero.		
05.10	Control board temperature	Measured control board temperature	1120	2120
05.11	Inverter temperature	Estimated inverter temperature as a % of the fault limit. The fault limit varies depending on the inverter type. 0.0% = 0 °C (32 °F) 100.0% = fault limit	1121	2121
07.03	Drive rating id	Frequency inverter type	1147	2147
07.05	Firmware version	Basic program version	1149	2149
28.72	Freq acceleration time 1	Setting the acceleration ramp, i.e. the time required to go from zero frequency to 200 Hz. When the inverter reaches this frequency, it continues to accelerate at the same speed until it reaches the value set at parameter 30.14 (maximum frequency).	1004	2004
28.73	Freq deceleration time 1	Setting the deceleration ramp, i.e. the time required to go from 200 Hz to zero frequency.	1005	2005
30.13	Minimum frequency	Setting the minimum permitted frequency **WARNING! This value must not exceed 30.14, and must be 20 Hz as a minimum. We shall not be liable should the threshold of 20 Hz not be respected.**	1002	2002
30.14	Maximum frequency	Setting the maximum permitted frequency **WARNING! This value must not be below 30.13. Never exceed the max. permissible turbine speed indicated on our commercial description. We shall not be liable if this max. threshold is exceeded.**	1003	2003
99.06	Motor nominal current	Setting for the motor nominal current. **Note that the value entered on the AHU controller matches the motor's nominal value, whereas the inverter parameter matches the sum of the nominal values of all the motors connected to the inverter. The controller automatically calculates these values using the number of motors connected to parameter 1000 or 2000.**	1011	2011
99.07	Motor nominal voltage	Setting for the motor nominal voltage.	1010	2010
99.08	Motor nominal frequency	Setting for the motor nominal frequency.	1012	2012
99.09	Motor nominal speed	Setting for the motor nominal speed.	1013	2013
99.10	Motor nominal power	Setting for the motor nominal power. **Note that the value entered on the AHU controller matches the motor's nominal value, whereas the inverter parameter matches the sum of the nominal values of all the motors connected to the inverter. The controller automatically calculates these values using the number of motors connected to parameter 1000 or 2000.**	1014	2014
99.11	Motor nominal cos φ	Setting for the motor nominal power factor (cos phi).	1015	2015

8 - FAULTS AND WARNINGS

The faults and warnings signal that the inverter is not functioning correctly.

The warnings do not stop the motor. They are acknowledged automatically if the warning cause disappears.

However, faults stop the motor. It is necessary to manually reset the inverter if the fault cause disappears.

There are also events which are simply saved in the inverter's event log without generating an alarm or fault.

All warning and fault messages are registered in the event log, specifying the time, date and any other information. The event log registers:

- The last 8 fault events (fault triggers or resets);
- The latest 10 warnings or simple events that have occurred.

The tripping faults, active warnings and fault/event logs are accessible via the Diagnostics menu.

8.1 - Warning and event messages

Code (hex)	Warning/aux. code	Probable source	Recommended action
64FF	Fault reset	Fault reset from the control panel, PC Drive composer tool, serial link or the inputs/outputs.	Event solely for information.
A2B1	Overcurrent	The output current exceeds the maximum internal fault limit. This situation may be caused by overcurrent but also by an earthing fault or a network loss of phase.	Check the motor load. Check the acceleration time of the parameter group 28 "Frequency reference chain". Check the motor and cabling (including the order of the phases and the triangle/star coupling). Check there are no ground faults on the motor or cabling by measuring the motor and cabling insulation resistance. Check that the data in the parameter group 99 "Motor data" matches the values on the motor name plate.
A2B3	Earth leakage	The inverter has detected a load imbalance, generally due to an earthing fault in the motor or cabling.	Check there are no ground faults on the motor or cabling by measuring the motor and cabling insulation resistance. If an earthing fault is detected, repair or change the motor cable and/or motor. If there are no ground faults detected, contact us.
A2B4	Short circuit	Short circuit in the motor cable(s) or motor	Check there are no cabling errors in the motor cable and the motor itself. Check the motor and cabling (including the order of the phases and the triangle/star coupling). Check there are no ground faults on the motor or cabling by measuring the motor and cabling insulation resistance.
A2BA	IGBT overload	Excess temperature in the IGBT junction box. This alarm protects the IGBT(s) and may be triggered by a short circuit in the motor cable.	Check the motor cable. Check the ambient conditions. Check the cooling air circulation and ensure the fan is working correctly. Check the radiator fin fouling level. Check the compatibility of the motor power and the inverter power.
A3A1	DC bus overvoltage	Excess DC voltage on the intermediate circuit (when the inverter is stopped).	Check the supply voltage settings (parameter 95.01 "Supply voltage"). Inappropriate settings may cause the motor to surge, or the brake chopper or resistor to overload. Check the network voltage. If the problem continues, contact us.
A3A2	DC link undervoltage	Insufficient DC voltage on the intermediate circuit (when the inverter is stopped).	
A3AA	DC not charged	The intermediate DC circuit voltage has not yet reached the operating threshold.	
A491	Motor PTC temperature.	The temperature measured by the motor PTC has exceeded the warning threshold.	Check the motor cooling
A4A1	IGBT overtemperature	Excess estimated IGBT temperature	Check the ambient conditions. Check the cooling air circulation and ensure the fan is working correctly. Check the radiator fin fouling level. Check the compatibility of the motor power and the inverter power.
A4A9	Cooling	Excess inverter module temperature	Check the room temperature. If it exceeds 40 °C/104 °F (size R5) or 50 °C/122 °F (sizes R0-R4), ensure that the load current is not greater than the downgraded inverter load capacity. Check the cooling air circulation in the inverter module and ensure the fan is working correctly. Check the cleanliness of the box and the fouling level of the inverter module radiator. Clean if necessary.

Code (hex)	Warning/aux. code	Probable source	Recommended action
A4B0	Excess temperature	Power unit excess temperature	Check the ambient conditions. Check the cooling air circulation and ensure the fan is working correctly. Check the radiator fin fouling level. Check the compatibility of the motor power and the inverter power.
A4B1	Excess temperature difference	Big temperature difference between the IGBT of different phases.	Check the motor cabling. Check the cooling of the inverter module(s).
A4F6	IGBT temperature	Excess inverter IGBT temperature.	Check the ambient conditions. Check the cooling air circulation and ensure the fan is working correctly. Check the radiator fin fouling level. Check the compatibility of the motor power and the inverter power.
A580	PU communication	Detects communication errors between the inverter control unit and the power unit	Check the connections between the control unit and the power unit.
A5A0	STO function	Safe torque off (STO) function triggered: loss of safety circuit signal(s) connected to the STO.	Check the safety circuit connections.
A5EA	Measurement circuit temperature	Problem measuring the internal inverter temperature	Contact us
A5EB	PU board powerfail	Power unit loss of supply	Contact us
A5EC	Internal PU communication error	Detects communication errors between the inverter control unit and the power unit	Check the connections between the control unit and the power unit
A5ED	Measurement circuit ADC	Measurement circuit fault	Contact us
A5EE	Measurement circuit DFF	Measurement circuit fault	Contact us
A5EF	PU state feedback	The state returned by the output phases does not match the control signals.	Contact us
A5F0	Charging feedback	No charging feedback signal	Check the feedback signal issued by the charging system.
A6A4	Motor nominal value	Motor parameters have been set incorrectly	Check the motor configuration parameter settings for group 99.
		Inverter incorrectly sized	Check that the inverter is correctly sized for the motor.
A6A5	No motor data	The parameters for group 99 have not been set.	Check that all the necessary parameters for group 99 have been set. **N.B.: It is normal for this warning to appear during commissioning since the motor data has not yet been entered.**
A6A6	Voltage category unselected	The voltage category has not been defined.	Set it under parameter 95.01 "Supply voltage".
A6E5	AI parametrization	The physical settings for the current/ voltage if an analogue input does not match the configuration.	Check the event log to find out the auxiliary code. The code indicates which analogue input features the conflicting setting. Change the physical setting (on the inverter control unit) or parameter 12.15/12.25. **N.B.: You must reset the control card (by deactivating the equipment and then reactivating it, or by using parameter 96.08 "Control board boot") for the HW configuration changes to take effect.**
A780	Configurable warning for motor stall: 31.24 Stall function	The motor works in the rotor stall range as a result of an overload or insufficient power, for example.	Check the motor load and the inverter nominal values. Check the parameter settings for the fault functions.
A7CE	EFB communication loss Configurable warning: 58.14 Communication loss action	Loss of communication on the MODBUS protocol.	Check the status of the master connection (online/ offline/error, etc.). Check the cable connections at terminals 29, 30 and 31 (EIA-485/X5) on the control unit.
A7EE	Control panel loss	Interrupted communication with the control panel or PC program selected as an active command device.	Check the control panel connection. Disconnect and reconnect the control panel.
A8A0	AI supervision	An analogue signal is outside the limits specified for the analogue input.	Check the signal level on the analogue input. Check the input cabling. Check the minimum and maximum input limits on the 12 standard AI parameter group.
A8A1	RO Life Warning	The relay has exceeded the number of recommended status changes.	Replace the control card or the stop using the relay output.
	0001	Relay output 1	Replace the control card or do not use relay output 1.
	0002	Relay output 2	Replace the control card or do not use relay output 2.
	0003	Relay output 3	Replace the control card or do not use relay output 3.

Code (hex)	Warning/aux. code	Probable source	Recommended action
A8A2	RO Toggle Warning	The relay's change of state speed is faster than recommended, e.g. if a rapid change frequency signal is connected to it. The relay will soon exceed its theoretical service life.	Replace the signal connected to the relay output source with a slower change frequency signal.
	0001	Relay output 1	Choose a different signal via the parameter 10.24 "RO1 source".
	0002	Relay output 2	Choose a different signal via the parameter 10.27 "RO2 source".
	0003	Relay output 3	Choose a different signal via the parameter 10.30 "RO3 source".
A8B0 A8B1 A8B2 A8B3 A8B4 A8B5	Signal supervision (Message text can be changed) Configurable warning: 32.06 Supervision 1 action 32.16 Supervision 2 action 32.26 Supervision 3 action 32.36 Supervision 4 action 32.46 Supervision 5 action 32.56 Supervision 6 action	Warning generated by a signal supervision function	Check the warning source (parameter 32.07, 32.17, 32.27, 32.47 or 32.57).
A981	External warning 1 (Message text can be changed) Configurable warning: 31.01 External event 1 source 31.02 External event 1 type	Fault found in external device 1	Check the external device. Check the settings of parameter 31.01 External event 1 source.
AF88	Season configuration warning	You have configured a season that starts before the previous season.	The season start dates must be ordered chronologically; see parameters 34.60 "Season 1 start date" to 34.63 "Season 4 start date".
AFAA	Autoreset	A fault is reset automatically.	Warning simply for information. See settings for the parameter group 31 Fault functions.
AFE1	Emergency stop (off2)	The inverter received an emergency stop command (off2 mode selected).	Check that the drive can continue to function safely. Then return the emergency stop button to its normal position. Restart the inverter.
AFE2	Emergency stop (off1 or off3)	The inverter received an emergency stop command (off1 or off3 mode selected).	
B5A0	STO event	Function of the safe torque off (STO) triggered: loss of safety circuit signal(s) connected to the XSTO.	Check the safety circuit connections.

8.2 - Fault messages

Code (hex)	Fault/auxiliary code.	Probable source	Recommended action
1080	Save/restore delayed	Communication failure between the inverter and the control panel or the PC tool when creating or restoring the saved version.	Restart the save or restore command.
1081	Rating ID fault	The inverter software cannot read the inverter identifier.	Reset the fault to restart the attempt the read the inverter identifier. If the fault reappears, stop and restart the inverter. Restart if necessary. If the fault is still present, please contact us.
2310	Overcurrent	The output current exceeds the maximum internal fault limit. This fault may be caused by overcurrent but also by an earthing fault or a network phase loss.	Check the motor load. Check the acceleration time of the parameter group 28. Check the motor and cabling (including the order of the phases and the triangle/star coupling). Check that the initial data in parameter group 99 matches the values on the motor name plate. Check there are no ground faults on the motor or cabling by measuring the motor and cabling insulation resistance.
2330	Earth leakage Programmable fault: 31.20 Earthing fault	The inverter has detected a load imbalance, generally due to an earthing fault in the motor or cabling	Check there are no ground faults on the motor or cabling by measuring the motor and cabling insulation resistance. If there are no ground faults detected, contact us.
2340	Short circuit	Short circuit in the motor cable(s) or motor	Check there are no cabling errors in the motor cable and the motor itself. Deactivate the inverter then reactivate it.
2381	IGBT overload	Excess temperature in the IGBT junction box. This fault protects the IGBT(s) and may be triggered by a short circuit in the motor cable.	Check the motor cable. Check the ambient conditions. Check the cooling air circulation and ensure the fan is working correctly. Check the radiator fin fouling level. Check the compatibility of the motor power and the inverter power.
3130	Input phase loss Programmable fault: 31.21 Loss of network phase	Oscillation of the intermediate circuit voltage. Possible source: missing network phase or blown fuse.	Check the network fuses. Check the power cable connections are sufficiently tightened. Check to see if the supply voltage is imbalanced.
3181	Wiring or earth leakage Programmable fault: 31.23 Wiring or earth leakage	Fault on the network cable and motor cable connection (e.g., the network cable is connected to the inverter output terminals).	Check the network connections.
3210	DC link overvoltage	Excess DC voltage on the intermediate circuit	Check that the supply voltage matches the inverter's nominal supply voltage. Check to see if there are any static or transient overvoltages within the network. Check the deceleration time Use the coasting stop function (if necessary)
3220	DC link undervoltage	DC bus voltage too low. Possible source: missing network phase, blown fuse or bridge rectifier fault.	Check the network cables, fuses and switchgear.
3381	Loss of output phase Programmable fault: 31.19 Motor phase loss	Motor circuit connection fault (the three phases are not connected)	Correctly reconnect the motor cable.
4110	Control board temperature	Control board temperature too high.	Check the inverter cooling. Check the auxiliary cooling fan.
4210	IGBT overtemperature	Excess estimated IGBT temperature	Check the ambient conditions. Check the cooling air circulation and ensure the fan is working correctly. Check the radiator fin fouling level. Check the compatibility of the motor power and the inverter power.
4290	Cooling	Excess inverter module temperature	Check the room temperature. If it exceeds 40 °C/104 °F (size R5) or 50 °C/122 °F (sizes R0-R4), ensure that the load current is not greater than the downgraded inverter load capacity. Check the cooling air circulation in the inverter module and ensure the fan is working correctly. Check the cleanliness of the box and the fouling level of the inverter module radiator. Clean if necessary.
42F1	IGBT temperature	Excess inverter IGBT temperature.	Check the ambient conditions. Check the cooling air circulation and ensure the fan is working correctly. Check the radiator fin fouling level. Check the compatibility of the motor power and the inverter power.

Code (hex)	Fault/auxiliary code.	Probable source	Recommended action
4310	Excess temperature	Power unit excess temperature	Check the ambient conditions. Check the cooling air circulation and ensure the fan is working correctly. Check the radiator fin fouling level. Check the compatibility of the motor power and the inverter power.
4380	Excess temperature difference	Big temperature difference between the IGBT of different phases.	Check the motor cabling. Check the cooling of the inverter module(s).
4981	Motor temp. PTC	The temperature measured by the motor PTC has exceeded the fault threshold.	Check the motor cooling.
5081	Auxiliary fan broken	An auxiliary cooling fan (connected to the control unit connectors) is blocked or disconnected.	Check the auxiliary fan(s) and the connections. Replace the fan if it is faulty. Check that the cover in front of the inverter module is correctly positioned and tightened. Restart the control unit (by using parameter 96.08 "Control board boot" or by deactivating the equipment and then restarting it).
5090	STO hardware failure	The STO diagnostics function has detected an equipment fault.	Contact us to replace the faulty equipment.
5091	STO function	Safe torque off (STO) function triggered: loss of safety circuit signal(s) connected to the STO when starting up or operating	Check the safety circuit connections.
5092	PU logic error	Power unit memory erased	Contact us.
5093	Rating ID mismatch	The inverter does not match the information recorded in the memory. Possible source: software update.	Deactivate the inverter then reactivate it. Restart if necessary.
5094	Measurement circuit temperature	Problem measuring the internal inverter temperature	Contact us.
50A0	Fan	Cooling fan blocked or disconnected	Check the fan operation and connection. Replace the fan if it is faulty.
5681	PU communication	Detects communication errors between the inverter control unit and the power unit	Check the connections between the control unit and the power unit.
5682	Loss of power unit	Connection fault between the inverter control unit and the power unit	Check the connections between the control unit and the power unit.
5690	Internal PU communication error	Internal communication error	Contact us.
5691	Measurement circuit ADC	Measurement circuit fault	Contact us.
5692	PU board powerfail	Power unit loss of supply	Contact us.
5693	Measurement circuit DFF	Measurement circuit fault	Contact us.
5696	PU state feedback	The state returned by the output phases does not match the control signals.	Contact us.
5697	Charging feedback	No charging feedback signal	Check the feedback signal issued by the charging system.
6181	FPGA version incompatible	Incompatible firmware and FBGA versions.	Restart the control unit (by deactivating the equipment and then reactivating it, or by using parameter 96.08 "Control board boot"). If the problem continues, contact us.
6481	Task overload	Internal fault	Restart the control unit (by deactivating the equipment and then reactivating it, or by using parameter 96.08 "Control board boot"). If the problem continues, contact us.
6487	Capacity exceeded	Internal fault	Restart the control unit (by deactivating the equipment and then reactivating it, or by using parameter 96.08 "Control board boot"). If the problem continues, contact us.
64A1	Internal file load	File read error	Restart the control unit (by deactivating the equipment and then reactivating it, or by using parameter 96.08 "Control board boot"). If the problem continues, contact us.
64B2	User set fault	Failure to load the user macro program. Reason: - The requested macro program does not exist; - It is not compatible with the control program; - The inverter was deactivated when loading the program.	Check that there is a valid user macro program. Restart the start-up wizard in case of doubt.
64E1	Operating system error	Operating system error	Reset the control unit (by deactivating the unit and then reactivating it, or by using parameter 96.08 "Control board boot"). If the problem continues, contact us.
6581	Parameter system	The parameters have failed to load or save.	Force a save using parameter 96.07 Parameter save manually. Try again.

Code (hex)	Fault/auxiliary code.	Probable source	Recommended action
6681	EFB communication loss Programmable fault: 58.14 Communication loss action	Loss of communication on the MODBUS protocol	Check the status of the master connection (online/ offline/error, etc.). Check the cable connections at terminals 29, 30 and 31 (EIA-485/X5) on the control unit.
6682	EFB configuration file	Failed to read the EFB configuration file.	Contact us.
6683	Invalid EFB configuration	The setting for the ModBus parameters is incompatible or inconsistent with the protocol selected.	Check the settings for the parameter group 58 Embedded fieldbus.
6684	EFB load fault	The firmware for the MODBUS has failed to load	Contact us.
		The MODBUS protocol firmware and the inverter firmware are not compatible	
6685	EFB fault 2	Fault reserved for the application of the MODBUS protocol.	Check the protocol documentation.
6686	EFB fault 3	Fault reserved for the application of the MODBUS protocol	Check the protocol documentation.
6882	Text 32-bit table overflow	Internal fault	Reset the fault. If it continues, contact us.
6885	Text file overflow	Internal fault	Reset the fault. If it continues, contact us.
7081	Control panel loss	Interrupted communication with the control panel or PC program selected as an active command device.	Check the control panel connection. Disconnect and reconnect the control panel.
7121	Motor stall Programmable fault: 31.24 Stall function	The motor works in the rotor stall range as a result of an overload or insufficient power, for example.	Check the motor load and the inverter nominal values. Check the parameter settings for the fault functions.
80A0	AI supervision	An analogue signal is outside the limits specified for the analogue input.	Check the signal level on the analogue input. Check the input cabling. Check the minimum and maximum input limits on the 12 standard AI parameter group.
80B0 80B1 80B2 80B3 80B4 80B5	Signal supervision (Message text can be changed) Programmable fault: 32.06 Supervision 1 action 32.16 Supervision 2 action 32.26 Supervision 3 action 32.36 Supervision 4 action 32.46 Supervision 5 action 32.46 Supervision 6 action	Fault generated by a signal supervision function	Check the fault source (parameter 32.07, 32.17, 32.27, 32.37 or 32.47 and 32.57).
9081	External fault 1 (message text can be changed) Programmable fault: 31.01 External event 1 source 31.02 External event 1 type	Fault found in external device 1	Check the external device. Check the settings of parameter 31.01 External event 1 source.
FA81	Safe torque off 1	Safe torque off (STO) function triggered: loss of STO 1 circuit.	Check the safety circuit connections
FA82	Safe torque off 2	Safe torque off (STO) function triggered: loss of STO 2 circuit.	
FF8E	EFB force trip	Fault triggering command received via the MODBUS interface	Check the status of the controller in the main AHU box.

9 - MAINTENANCE

In order to ensure the frequency inverter functions optimally, we recommend adhering to the following preventative maintenance calendar:

Element	Checking frequency	Replacement frequency
Main cooling fan	1 year	3 to 6 years depending on the environment
Auxiliary cooling fan for the electronic card	1 year	3 to 6 years depending on the environment
Control panel coil	1 year	9 years
Check the tightening torques	1 year	
Clean the radiator	1 year	
Check the calibration of the pressure sensor (if present)	1 year	

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