TAKEDO® - 3VF NXP

For asynchronous motors or Permanent Magnets Synchronous Motors

USER MANUAL

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REV.	SOFTWARE	DATE	R.T. Check and Approval

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A

QUICK GUIDE TO PUTTING ON DUTY OPEN LOOP ASYNCHRONOUS MOTORS (without encoder)

1) Make all connections as indicated in the manual.

2) Check the following parameters:

Parameter	Description	Unit	SMS setting	Value to be set	Value
S6.1	Language		Italian	Select according to country of use	
S6.2	Application		AsynchMotor	AsynchMotor	

3) Enter data in the following parameters:

Parameter	Description	Unit	SMS setting	Value to be set	Value
P2.1.2	Motor Nominal Voltage	V	400	Motor rating plate data	
P2.1.3	Motor Nominal Frequency	Hz	50	Motor rating plate data	
P2.1.4	Motor Nominal Speed	RPM	1440	Motor rating plate data	
P2.1.5	Motor Nominal Current	A	I Inverter	Motor rating plate data	
P2.1.6	Motor Cos Phi		0.82	Motor rating plate data	
P2.1.7.1	Lift Rated Speed	m/sec	0.70	LIFT data	
P2.1.7.2	Pulley Diameter	mm	520	LIFT data	
P2.1.7.3	Gear Ratio		1.58	LIFT data	
P2.1.7.4	Ropes Ratio		1:1	LIFT data	
P2.1.7.5	Update Data		No	Yes	

4) Run IDENTIFICATION Routine:
   - Set parameter **P2.1.8** to "**ID No Run"** and make a call command: the contactors energizes, the brake doesn't open, and "RUN" lights up.
   - When the "RUN" light goes off, "STOP" appears and parameter P2.1.8 automatically turns to "**No Action**", deactivate the call (e.g. by opening the operation valve).

5) If it does not work perfectly, see the full MANUAL.

B

QUICK GUIDE TO PUTTING ON DUTY CLOSED LOOP ASYNCHRONOUS MOTORS (with encoder)

1) Make all connections as indicated in the manual.

2) Check the following parameters:

Parameter	Description	Unit	SMS setting	Value to be set	Value
S6.1	Language		Italian	Select according to country of use	
S6.2	Application		AsynchMotor	AsynchMotor	

3) Enter data in the following parameters:

Parameter	Description	Unit	SMS setting	Value to be set	Value
P2.1.2	Motor Nominal Voltage	V	400	Motor rating plate data	
P2.1.3	Motor Nominal Frequency	Hz	50	Motor rating plate data	
P2.1.4	Motor Nominal Speed	RPM	1440	Motor rating plate data	
P2.1.5	Motor Nominal Current	A	I Inverter	Motor rating plate data	
P2.1.6	Motor Cos Phi	m/sec	0.82	Motor rating plate data	
P2.1.7.1	Lift Rated Speed	m/sec	0.70	LIFT data	
P2.1.7.2	Pulley Diameter	mm	520	LIFT data	
P2.1.7.3	Gear Ratio		1.58	LIFT data	
P2.1.7.4	Ropes Ratio		1:1	LIFT data	
P2.1.7.5	Update Data		No	Yes	
P2.1.12	Encoder Type		Incremental	Incremental	
P2.1.13	Encoder Direction		Not inverted	Not inverted if motor is going up Inverted if motor is going up	
P2.5.1	Motor Control Mode		Open loop	Closed Loop	
P2.5.4.1	Magnetizing Current	A	0.5 * I Inverter	If unknown: - for 1/2 speed motors for lifts, enter 1/3 of value in P2.1.5 - for motors with inverters, enter 2/3 of value in P2.1.5	
P7.3.1.1	Pulse/revolution (Number of encoder pulses)		1024	Number of pulses / revolution of installed encoder	

4) If it does not work perfectly, see the full MANUAL.

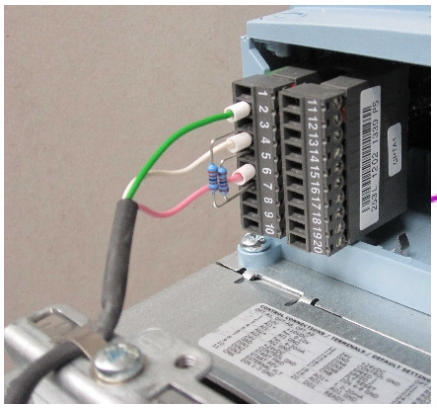
5) For other accessory functions such as POWER LIMIT, ONE FLOOR TRAVEL ONLY, DIRECT FLOOR ARRIVAL etc. see the full manual.

C

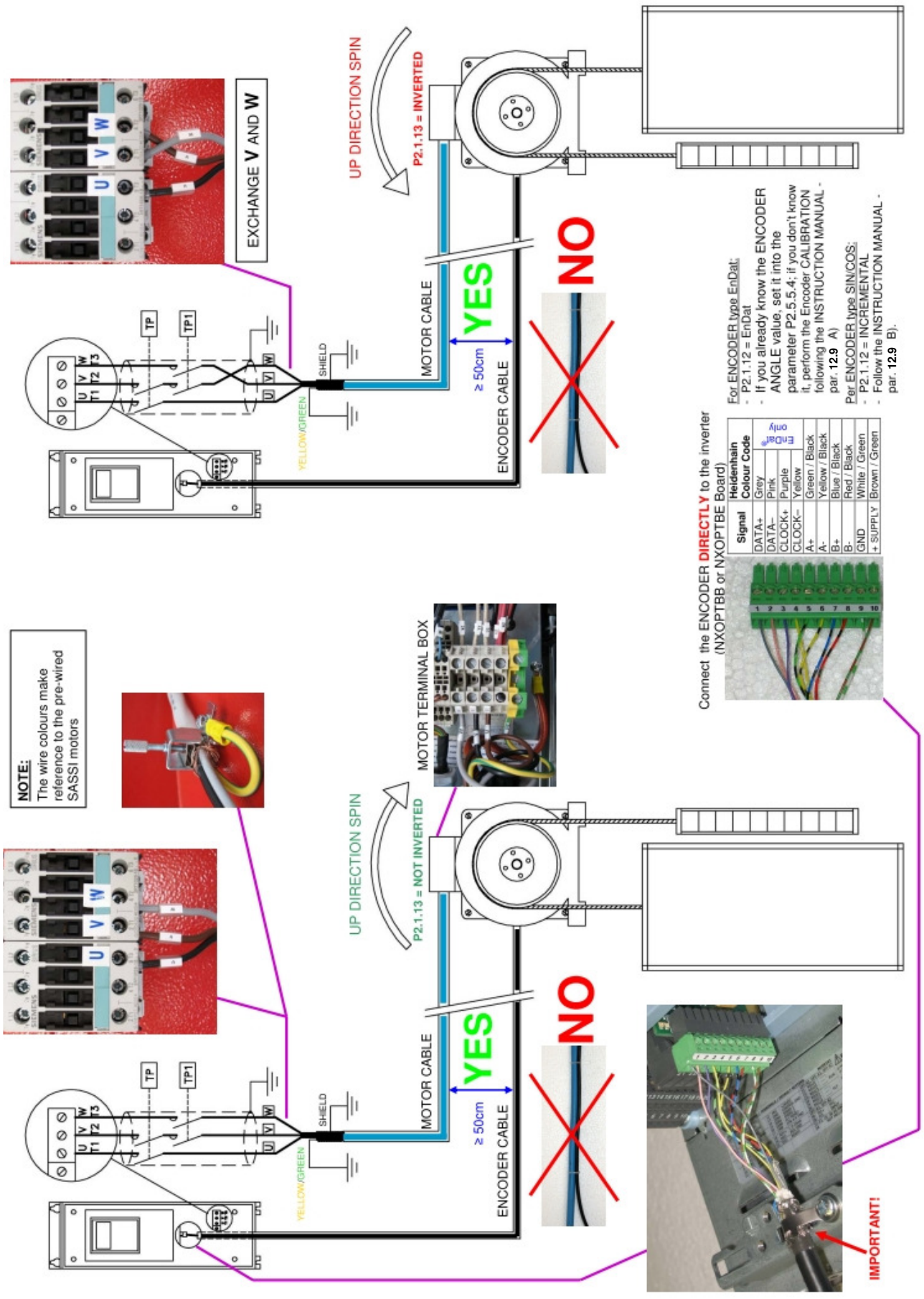
QUICK GUIDE TO PUTTING ON DUTY PERMANENT MAGNET SYNCHRONOUS MOTORS

FREE MOTOR, NO CABLES

1 – BRAKE AND BRAKE CONTROL MICRO-SWITCH CONNECTION (see TAKEDO-3VF NXP Manual and the Amendment 3)



2 – MOTOR AND ENCODER CONNECTION (MAKE EARTH CONNECTIONS AS SHOWN IN THE PHOTOS)



3) Check the following parameters:

Parameter	Description	Unit	SMS setting	Value to be set	Value
S6.1.2	Language		Italian	Select according to country of	
S6.2.2	Application		AsynchMotor	PermMagnSync	

4) Enter data in the following parameters:

Parameter	Description	Unit	SMS setting	Value to be set	Value
P2.1.2	Motor Nominal Voltage	V	400	Motor rating plate data	
P2.1.3	Motor Nominal Frequency	Hz	8.00	Motor rating plate data	
P2.1.4	Motor Nominal Speed	RPM	60	Motor rating plate data	
P2.1.5	Motor Nominal Current	A	I Inverter	Motor rating plate data	
P2.1.6	Motor Cos Phi		0.90	Motor rating plate data	
P2.1.7.1	Lift Rated Speed	m/sec	1.00	LIFT data	
P2.1.7.2	Pulley Diameter	mm	320	LIFT data	
P2.1.7.3	Gear Ratio		1.01	LIFT data	
P2.1.7.4	Ropes Ratio		1:1	LIFT data	
P2.1.7.5	Update Data		No	Yes	
P2.1.12	Encoder Type		Incremental	Encoder Type: Incremental or EnDat	
P2.1.13	Encoder Direction		Not inverted	Not inverted if motor  is going up Inverted if motor is going up	
P2.1.14	Calculated Poles		0	Make sure the number of poles calculated matches the number for the motor	
P2.1.16	Motor Rs		0	If motor rating is unknown, leave at 0	
P2.1.17	Motor Xs		0	If motor rating is unknown, leave at 0	
P7.3.1.1	Pulse/revolution (Number of encoder pulses)		2048	Number of pulses / revolution of installed encoder	

5) If the encoder is an EnDat type, follow the procedure illustrated in paragraph **12.9 A)** of the full MANUAL step by step.

6) If the encoder is an incremental type, follow the procedure illustrated in paragraph **12.9 B)** of the full MANUAL step by step.

7) If it does not work perfectly, see the full MANUAL.

8) For other accessory functions such as POWER LIMIT, ONE FLOOR TRAVEL ONLY, DIRECT FLOOR ARRIVAL etc. see the full manual.

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1 – INTRODUCTION

The TAKEDO**–3VF NXP is an inverter drive** with built-in EMC filter and smoothing choke, responding to Council Directives 3/89/CEE (electromagnetic compatibility) 336/73/CEE (low voltage equipment).
To ensure compliance with EN12015 regarding low frequency harmonics, a further 3% inductance is required.
The drive can operate both in open loop and closed loop modes. For operation in closed loop mode, an optional circuit board is required, and an encoder as described in the following pages.

This manual provides you with the necessary information about the starting up and operation of the NXP frequency converter. You can find further information about application and installation in a lift control panel in the **ANNEX NXP FOR PANEL WIRING SPECIALISTS , available in electronic edition on our website: www.sms.bo.it.**

2 – SAFETY WARNINGS AND PRECAUTIONS

Full details are available in the original VACON manual (NXP range inverters) which can be consulted at www.it.vacon.com.

Read this manual in its entirety before powering up the equipment, following the procedures step by step. In detail, please read the following chapters carefully:
5.4 – ACTIVE FAULTS AND ALARMS
6 – ADJUSTMENT PROCEDURE

2.1 SAFETY WARNINGS

Follow the procedures indicated below with due care, so as to avoid any risk of serious accident.

1- **The leakage current from the inverter to ground is greater than 30mA**, and accordingly, the power circuit must incorporate a differential circuit breaker with **Id not less than 300mA, type B or type A (type B is preferable)**. Under European directives, the ground connection must use a cable of not less than 10 mm² section.
2- If the parameters used to program the drive are incorrect, the motor may rotate faster than synchronous speed. Do not run the motor beyond its specified electrical and mechanical limits. The installer is responsible for ensuring that movements are generated in conditions of safety, without exceeding specified operating limits.
3- Risk of electrocution. Power up the inverter only with the front cover fitted. **NEVER** remove the cover during operation. Before carrying out any operation on the equipment, isolate from the electrical power supply and wait a few minutes for the internal capacitors to discharge.
4- The external braking resistor heats up during operation. Do not install it close to or in contact with inflammable materials. To improve heat dissipation it is good practice to fix the resistor to a metal plate. Ensure it is properly protected and cannot be touched.
5- The inverter must always be connected to the mains supply. In case of interruption wait 1 minute at least before restoring the supply. **TOO NEAR INSERTIONS OF THE MAINS CAN CAUSE A PERMANENT DAMAGE OF THE INVERTER**

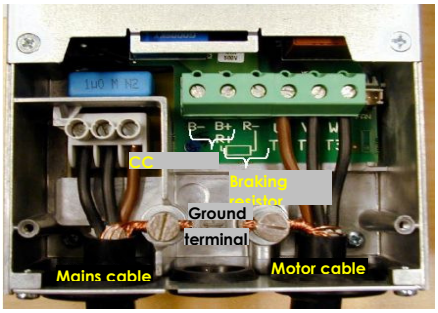
2.2 PRECAUTIONS

Follow the procedures indicated in the manual with care so as to avoid the risk of damaging or destroying the drive.

1- Do not connect the equipment to a voltage higher than the permissible input voltage. An excessive voltage can cause irreparable damage to internal components.
2- Check the fan regularly: check the air flow is constant and remove and built-up dust.
3- To avoid the risk of damaging the drive in case it stays not working without power supply for a long time, you should follow these precautions:
   - **If the inverter doesn't work since several months, before starting the operation, regenerate the bus capacitors powering up the drive at least for 1 hour preventing it can operate.**
   - **If the inverter doesn't work since one year or more, to regenerate the bus capacitors power up the drive, preventing it can operate, for 1 hour at an input voltage less than 50% the rated voltage, then for 1 hour at the rated input voltage.**
4- Do not connect capacitors to the inverter outputs.
5- If the drive protection functions trip, do not reset the fault before having analysed and removed the cause of the fault.
6- The lift system should be counterweighted at 50%, if counterweighted at 40% the current in up direction with full load is greater and requires a larger capacity inverter to that normally necessary, with consequent greater cost.
7- Use a drive having rated current equal to or greater than the motor rated current .
8- **The braking resistor have to be connected between B+ and R-.**
If connected between B+ and B-, the inverter will be permanently damaged.

3 – CONNECTING THE POWER CIRCUIT

L1;L2;L3	A.C. mains power input	Connect the three phases of the power supply to any three terminals, in any order
L1;L2	D.C. power input	Connect the batteries in the event of emergency operation (evacuation)
U;V;W	Inverter output	Connect the three output phases to the contactors, then to the motor.
B+;R-	External braking resistor	Connect the external braking resistor
⏚	Ground	Connect to the ground system



example of power circuit connection

3.1 SAFETY WARNINGS

1- Ground the unit before powering it.

2- To increase the protection of the internal diodes and connecting wires (especially against the overvoltage due for example to atmospheric phenomena), you should connect three fast-acting fuses (one for each phase) in series with the a.c. power input terminals; fuses must be rated to match the different size designations as indicated in
TABLE – Recommended braking resistors and fuses.
The fuse kit, complete with box, is available on request.

3- To avoid irreparable damage to the inverter, **do not connect braking resistors with resistance or power ratings lower than those indicated in TABLE**. For long run lifts or high reverse gain gears, install the braking resistor with oversized power but with the same value in ohms (if needed, contact SMS for advice!).

4- The inverter drive is connected <<up line>> of the power contactors. The drive is able to pilot operation of the motor in two directions, accordingly, the system can incorporate only two power contactors to switch the inverter – motor line, as prescribed in safety regulations.

5- The external braking resistor heats up during operation. Do not install it close to or in contact with inflammable materials. Ensure it is properly protected and cannot be touched.

6- Wire and bond ground connections in accordance with professional standards (as indicated under heading 3.2) to avoid problems with EMC interference.

7- Take particular care over the power connections. If the input and output connections are reversed, **the inverter will be inevitably damaged.**

INVERTER 400 VOLT (380-500V) SERIES							
MOTOR RATED CURRENT (A)	CODE	DIMENSIONS LxHxW (mm)	FAST ACTING FUSES (A)	BRAKING RESISTOR			
				SUPPLIED BY SMS (Geared motor)	SUPPLIED BY SMS (Gearless motor)	MINIMUM VALUE (Ω)	DIMENSIONS LxWxH (mm)
14	TKP00145	128x292x190	16	Ask SMS	50Ω 1500W	42Ω	445x110x140
20	TKP00205	144x391x214	35	Ask SMS	2x50Ω 1500W	42Ω	445x110x140(*)
27	TKP00275	144x391x214	35	Ask SMS	2x50Ω 1500W	21Ω	445x110x140(*)
35	TKP00355	195x519x237	50	Ask SMS	2x50Ω 1500W	21Ω	445x110x140(*)
46	TKP00465	195x519x237	63	Ask SMS	3x50Ω 1500W	14Ω	445x110x140(*)
61	TKP00615	237x591x257	80	4x50Ω 1500W	4x50Ω 1500W	6,5Ω	445x110x140(*)
72	TKP00725	237x591x257	100	5x50Ω 1500W	5x50Ω 1500W	6,5Ω	445x110x140(*)
87	TKP00875	237x591x257	125	8x50Ω 1500W	8x50Ω 1500W	6,5Ω	445x110x140(*)
105	TKP01055	291x758x344	160	10x50Ω 1500W	10x50Ω 1500W	3,3Ω	445x110x140(*)
140	TKP01405	291x758x344	200	12x50Ω 1500W	12x50Ω 1500W	3,3Ω	445x110x140(*)

(**) Full dimension is the one indicated multiplied by the number of resistors.

***TABLE** – Fuses and recommended braking resistors*

For higher powers and voltages, or advice on application, contact SMS.

IMPORTANT: For high travel (>30m) or gear with high inverse efficiency, install the braking resistor recommended as value in ohm, but power corresponding to the next higher size, or install the TAKEDO ENERGY, which allows for the regeneration of the energy dissipated by the braking resistor, with subsequent energy saving.

IMPORTANT:

In case of motor operating frequency lower than 25Hz, the motor nominal current which can be applied must be derated according to the following GIUDE TABLE.

INVERTER SELECTION GUIDE

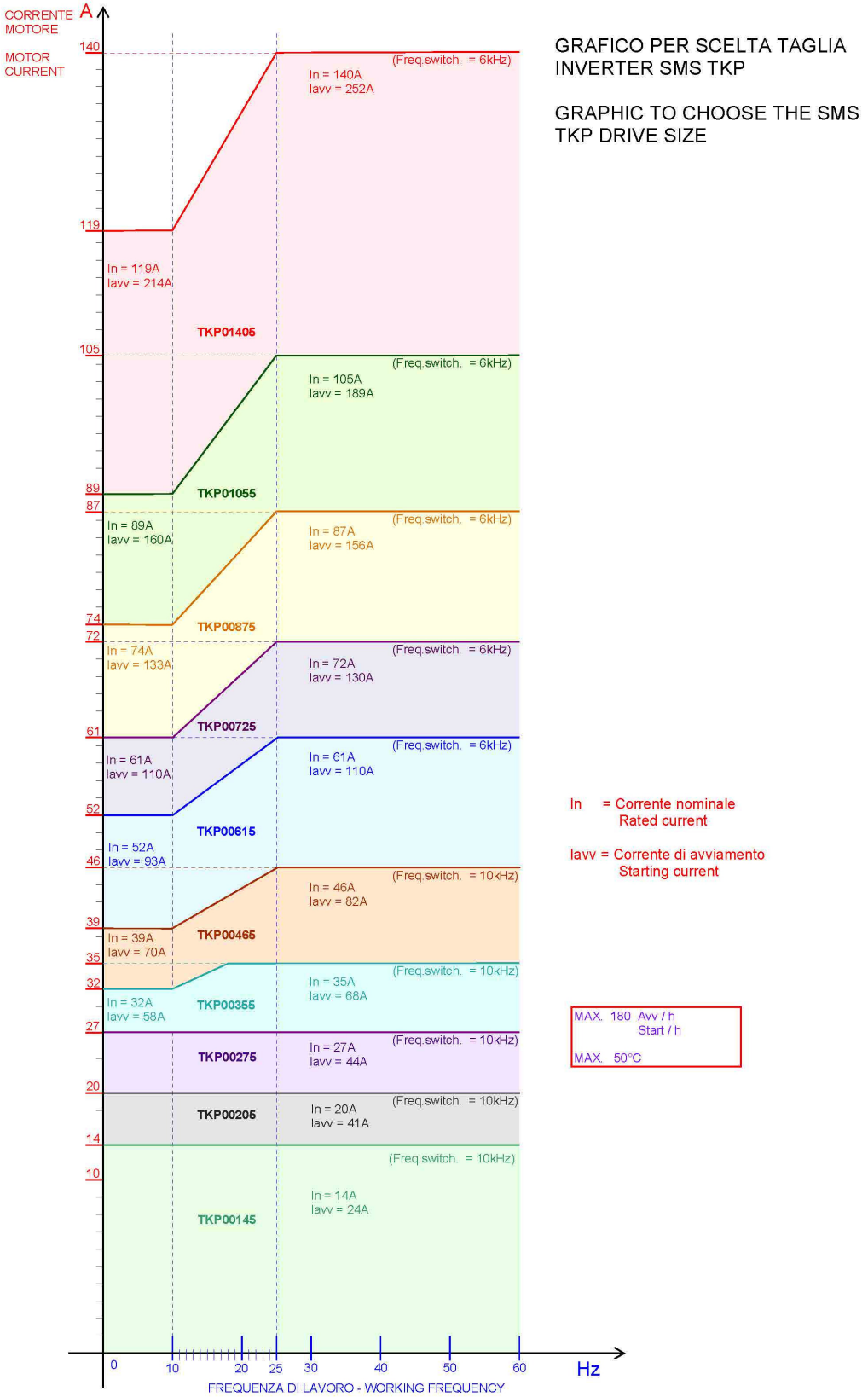


GRAFICO PER SCELTA TAGLIA INVERTER SMS TKP

GRAPHIC TO CHOOSE THE SMS TKP DRIVE SIZE

In = Corrente nominale
Rated current

Iavv = Corrente di avviamento
Starting current

MAX. 180 Avv / h
Start / h

MAX. 50°C

170711_Scelta Inverter_04

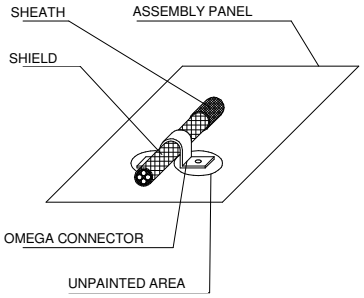
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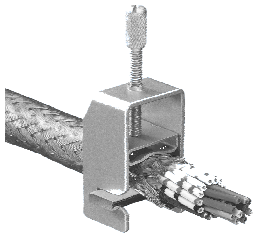
3.2 INVERTER/MOTOR CABLING RULES TO ASSURE EMC CONFORMITY

The correct INVERTER – MOTOR cabling must follow the rules below:

1- The building ground plant must be connected to both the inverter and motor.

2- The inverter/contactor and contactor/motor cable runs must be as short as possible, shielded with four poles (three phases plus yellow/green ground wire), or four unshielded wires bound together running in a duct or grounded metal tube. In other words, in the same cable or tube there must be a ground wire running as close as possible to the power cables. In the case of a shielded cable the shield must be unbroken between the inverter/contactor and contactor/motor.
The shield have to be grounded at both ends with a 360° clamp (Fig. 1), or with special terminals





If the shield cannot be grounded with a 360° clamp on the motor terminal block itself, the shield must be grounded on the motor casing before the cable enters the terminal box.

3- Use a shielded cable also for the inverter input power line to avoid radiated EMC emissions in the system. The mains input power cables and inverter output cables MUST NOT be run in the same duct and their runs must be as far apart as possible (at least 50 cm. 50 cm.).

4- The power and control cables must be run as far apart as possible and not parallel to each other, even if they are shielded; if the cable runs cross they must do so at an angle of 90°.

5- Independently of the connection to the building grounding plant, the motor casing MUST be connected both to the cable shield and to the yellow/green ground wire inside the shielded cable.

6- The inverter emits electromagnetic radiation which can be captured and transmitted by cables, in particular by the flexible cables in the shaft.
To avoid this problem, use shielded cables for the control panel logic / inverter connections, with the shield grounded at both ends. DO NOT use shielded cables without grounding the shields: this leads to higher levels of EMC disturbance than if unshielded cables are used. Any wire in a multi-pole cable which is not in use must be grounded at both ends .

7- Any cable, whether control and external shaft or car connections, must never run parallel/near to the power cable, even if shielded; if they must be parallel for any reason, they should be run through separate metal ducts.

8- The pulse generator cable must be shielded and **the shield grounded at the inverter end, as far as possible from the motor cable**. The motor/pulse generator coupling must be isolated to avoid parasitic currents looping through the pulse generator. As for all other shields, the ground connection must be via a 360° clamp.

9- All ground connections should be as short as possible and wide .

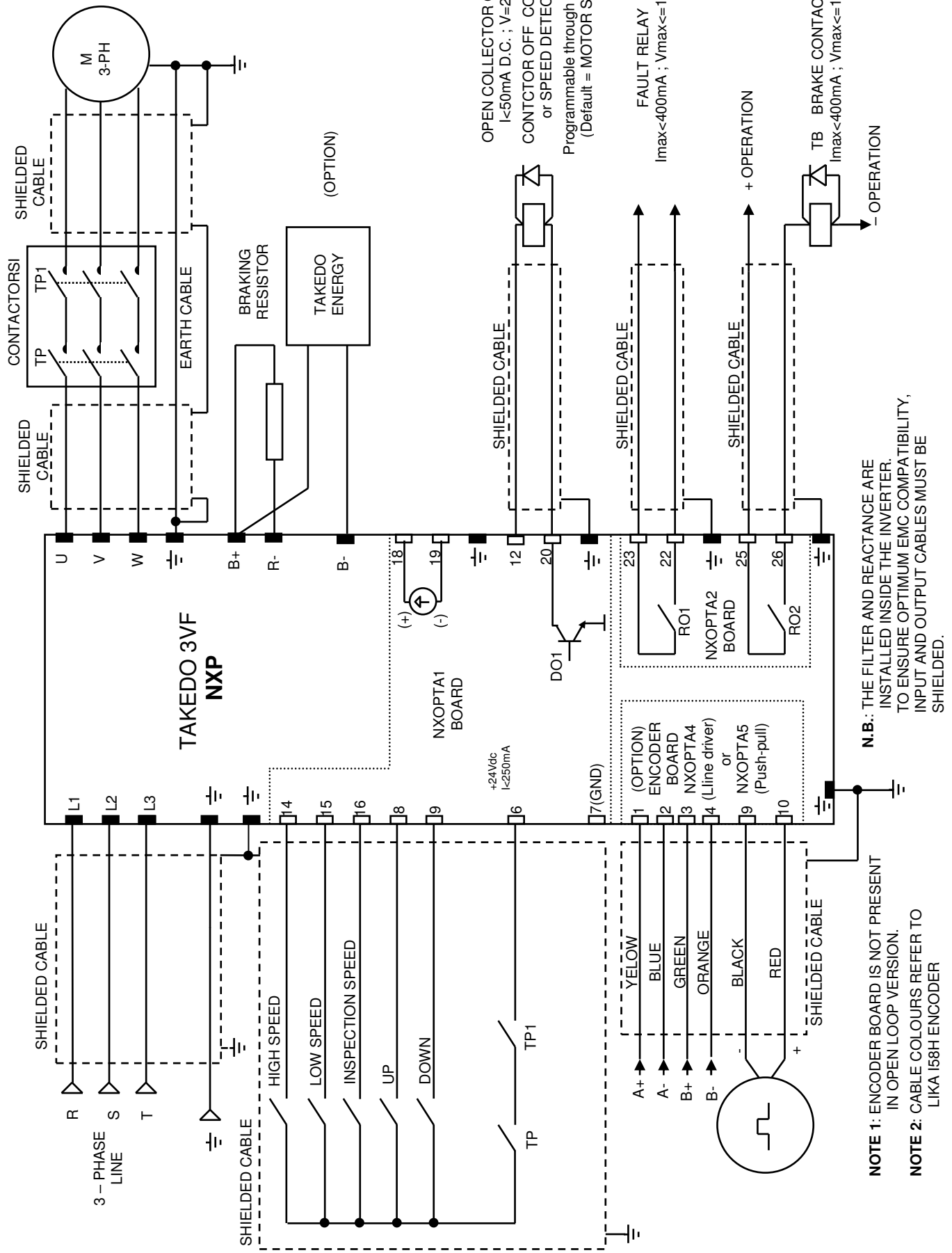


Copper braid (a) is better than wire (b).

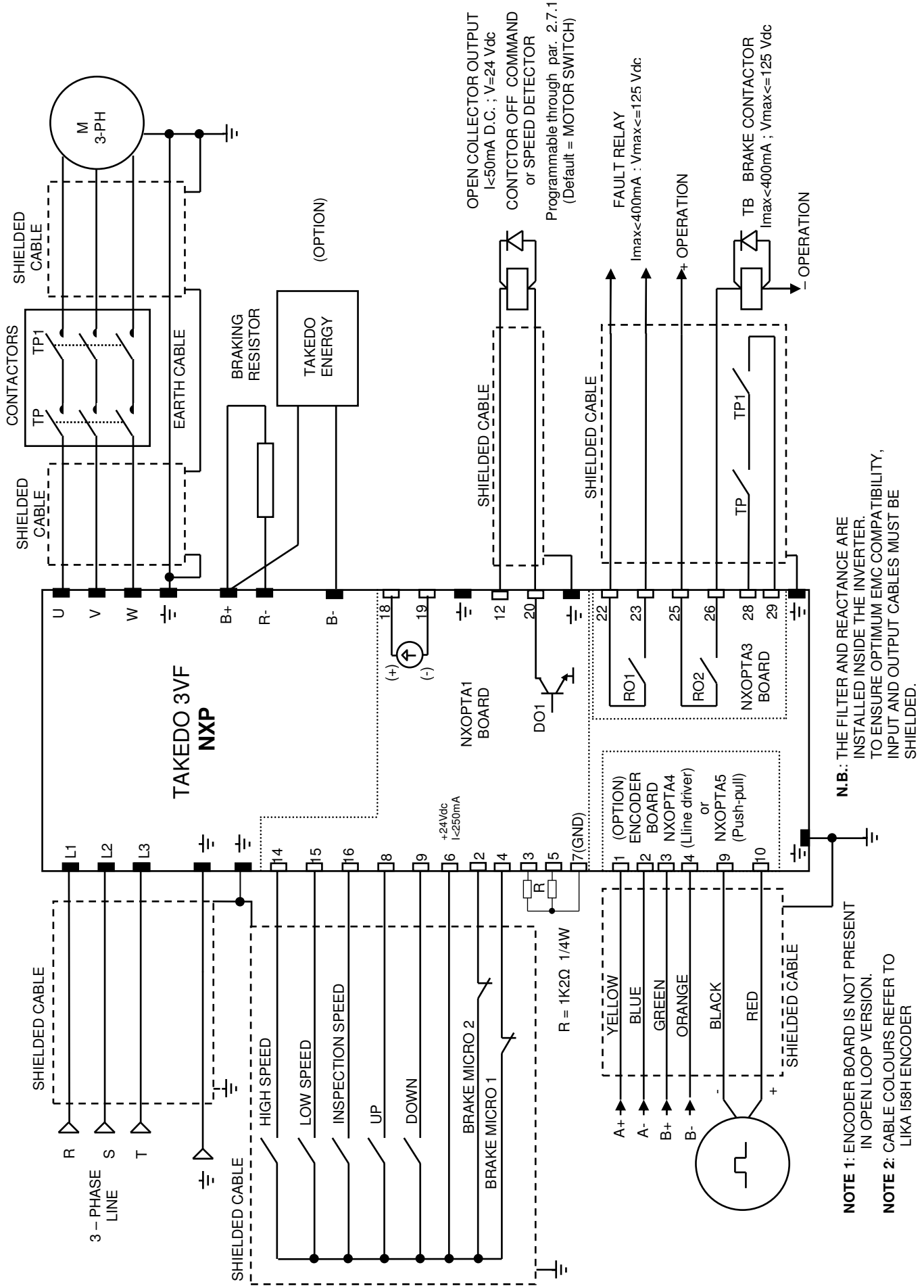
10- To avoid unintentional tripping of the differential circuit breakers take the following steps:
make the power cable runs as short as possible.
Use circuit breakers designed for harmonics (type B or type A, with tripping current 300mA).
Reduce the inverter carrier frequency (if possible); the lower the frequency the noisier the motor will be but the smaller the grounding currents and EMC phenomena; motor windings will be less stressed.

4 – BASIC APPLICATION DIAGRAMS

4.1 – ASYNCHRONOUS MOTOR WITHOUT ENABLE LOGIC



4.2 – ASYNCHRONOUS MOTOR WITH ENABLE LOGIC AND BRAKE MICRO CONTROL IN COMPLIANCE WITH AMENDMENT 3



5 – KEYPAD AND PROGRAMMING

The control and programming keypad is included in the TAKEDO-3VF NXP. For the instructions for use, please refer to the original Vacon manual, available on the website: www.vacon.com.

Sub-menus are accessible from the main menu using the key. The **M** on the first line of the text indicates the **main menu**. It is followed by a number designating the relative **sub-menu**. The arrow **(→)** in the bottom right corner of the display indicates an additional **sub-menu** that can be retrieved by pressing the key. To go back to the **main menu** from the sub-menu, just press the key.
Data are split into menus and submenus on the keypad. Each main menu has seven levels M1 - M7.
Press the or keys to go to another menu.

M1=Monitor	**M5**=Fault History
M2=Parameters	**M6**=System Menu
M4=Active Faults	**M7**=Expander Boards

Each menu contains submenus, which can also be on several levels. To access the submenus, press the key, then use the +/- keys to show the various quantities; to quit the submenu, press the key.

KEY TO SYMBOLS CONTAINED IN MENUS AND SUBMENUS:

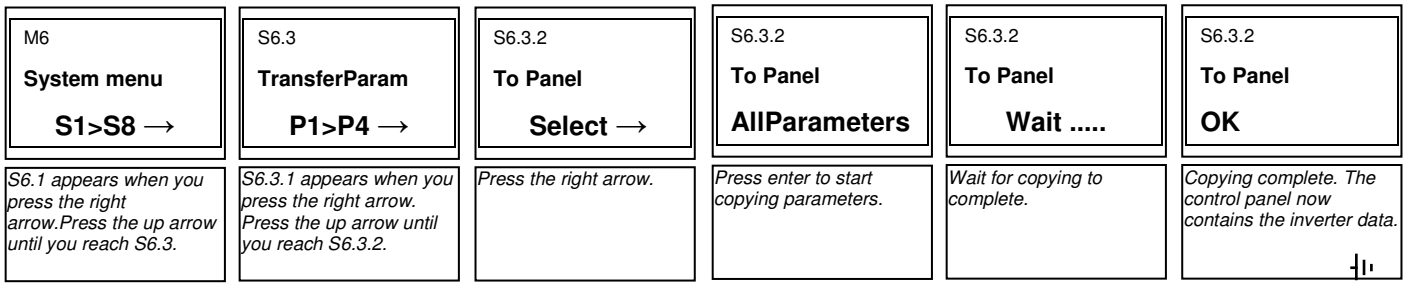
M= Menu (internal modes G,V,P,H,F)
G= Group (internal modes V,P)
P= Modifiable parameter
V= Read only
H= Fault history
F= Active faults

5.0 COPYING PARAMETERS USING THE KEYPAD

The programming keypad can also be used to copy parameters to or from the inverter. This function **is very useful when you need to transfer the optimal parameter set found for a lift on another lift of the same type, but YOU CAN ONLY USE IT TO COPY PARAMETERS BETWEEN INVERTERS EQUIPPED WITH THE SAME APPLICATION SOFTWARE RELEASE** (the Application software release is written on a label under the keypad).

5.0.1 – COPYING FROM INVERTER TO KEYPAD

Press the left arrow until "M" appears in the top left followed by the menu number (eg. M2).
Press the up or down arrow keys to reach M6. Follow the instructions on the display:



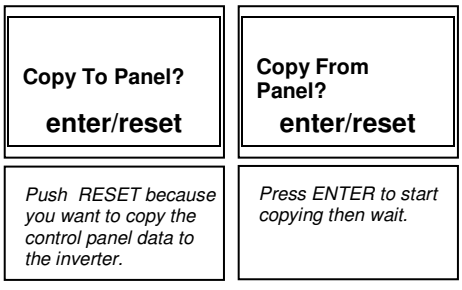
5.0.2 – COPYING FROM KEYPAD TO INVERTER

The same method as described above applies.
Selecting S6.3.3 instead of S6.3.2 results in "From the panel" instead of "To the Panel" being shown on the display. Then continue as before.

Note: During the copy from keypad to inverter some data copy will appear as “Locked” . This happens because there are fixed parameters that are not modifiable (reserved). If the Enter key is pressed at any time, “Locked” appears (about 6-7 times), copy continues and “OK” will be displayed.

Attention: Copy from a keypad when its data comes from an inverter of the same size of the one you are copying into.

Connecting the keypad to the inverter in which you want to copy the data , it will appear:



6.1 M1 = MONITOR

This menu displays values and data during inverter operation and it is split into 4 different sub-menus. The caption V1→Vn appears under the name of the menu. This means 'n' quantities can be monitored.

Contents	Description	Content	Description
G1.1 Drive – Motor			
V1.1.1	Output frequency	V1.1.8	DC-link Voltage
V1.1.2	FreqReference	V1.1.9	Unit temperature
V1.1.3	Motor Speed	V1.1.10	Advan Cont Memory
V1.1.4	Motor Torque	V1.1.11	Motor Power (absorbed)
V1.1.5	Motor power	V1.1.12	Overload Number
V1.1.6	Motor Current	V1.1.13	Current Limit Number
V1.1.7	Motor Voltage		
G1.2 Input – Output			
V1.2.1	DIN1 DIN2 DIN3 Up Down Emergency	V1.2.4	Programmable outputs: DO1 R01 R02 Contactors Fault Brake
V1.2.2	DIN4 DIN5 DIN6 High Low Inspection	V1.2.5	NXOPTB5 board programmable outputs: RE1 RE2 RE3 Contactors Motor Block Speed Detector
V1.2.3 **with NXOPTA2 board**	DIN7 DIN8 Run Enable Micro Brake (term. 2) (term. 4)	V1.2.6	Analog output / Analog Iout
V1.2.3 **with NXOPTA3 board**	DIN7 DIN8 DIN9 Brake Micro 2 Brake Micro 1 Run Enable (term. 2) (term. 4) (term. 28-29/A3)		
G1.3 Ride Values			
V1.3.1	Lift Speed m/s	V1.3.5	LowSpeedDistan (mm) (Low speed distance)
V1.3.2	Encoder Freq (Hz) (+ upward, - downward)	V1.3.6	FinalStopDistan (mm) (Stop distance)
V1.3.3	TotalStopDistan (mm)	V1.3.7	Total Rope Rides
V1.3.4	Slowing Distan (mm) (Slowing-down distance)	V1.3.8	Partial Rope Rides
G1.4 Braking A3			
V1.4.1	Braking Space (mm)		
V1.4.2	Mechanical Braking Space (mm)		
V1.4.3	Steady Lift Space (mm)		

Another very useful display is in menu M6 - **S6.11.1 = POWER MULTI-MONITOR** - pressing this ▶ key displays motor current for **each phase**.

5.2 M2 = PARAMETERS

Full list of parameters with associated descriptions is in the paragraph "14 – PARAMETERS LIST".

5.4 M4 = ACTIVE FAULTS AND WARNINGS

Listed below are the most common fault messages. Be careful not to reset the alarm or fault without first having investigated the problems that caused the protection mechanism to cut in.
Always deselect the run command before resetting any fault.

Code	Description	Remedies / Indications
1	**Overcurrent**: current 4 times the nominal value detected at the inverter output.	Check the condition of cables and motor, also the size of the inverter drive.
2	**Overvoltage**: bus voltage is too high.	Increase the deceleration time, check the value of the braking resistor.
5	**Charge switch:** The charge switch is open when the drive is in running.	Reset the fault and restart . If the fault happens again, contact SMS.
7	**Saturation trip:** several potential causes, including a faulty component.	Cannot be reset from the keypad. Switch off power. DO NOT RE-CONNECT POWER! Contact manufacturer. If this fault appears simultaneously with Fault 1, check motor cables and motor.

Code	Description	Remedies / Indications
8	**System error:** -component damaged -malfunction -Verify data register, see 7.3.4.3.	Reset the fault and restart . If the fault happens again, contact SMS.
9	**Undervoltage**: BUS voltage is too low.	Check that the voltage input to the inverter drive is correct and steady. If the fault occurs during acceleration, increase the acceleration time.
3 **10** **11**	**Power stage faults** : detection of fault in power connections (input or output phase missing, earth fault, etc)	Check the power cables on the input/output sides and/or the motor insulation .
12	**Braking fault**: fault affecting braking resistor or chopper.	Check the connection and/or the size of the resistor.
13 **14** **16**	Temperature inverter undertemperature (-10°C) inverter overtemperature (+90°C) motor overtemperature	Make certain the air flow around the drive is sufficient to cool the heat sink and/or check for possible motor overload.
15	**Motor stall**: the motor has not started while the inverter has already reached 90% of the limit current settled in P2.1.1.	Check the brake or the counterweight if the stall happens in down run without load.
17	**Motor underload**	Make certain the motor is not too small for the rated power of the drive.
22 **23**	**EEPROM "Checksum" error:** - Parameter recovery failed - Damaged or malfunctioning component	Reset the fault and restart . If the fault happens again, contact SMS.
25	**Microprocessor watch-dog error:** - operational fault - component failure	Reset the fault and restart. If the fault happens again, contact SMS.
26	**Start up prevented:** Start-up of the inverter has been impeded.	Cancel prevention of inverter start-up.
32	**Fan not working**	Contact SMS.
36	**Control unit:** The control unit can't control the power unit and vice versa.	Replace the control unit.
37	**Device changed:** Optional board or control unit changed.	Reset
38	**Device added:** An optional board or power unit with different nominal rating has been added.	Reset
39	**Remove device:** An optional board or p. ower unit has been removed.	Reset
40	**Device unknown:** Unknown optional board or drive.	
41	**IGBT temperature:** IGBT Inverter Bridge overtemperature protection has detected a short term too high overload current.	Check loading. Check motor size. Check brake opening. Check torque at low revs (see paragraph 7.7.1).
43	**Encoder error**	Channels inverted (modify parameter P2.1.13 "EncoderDirection"); no/faulty connection, or faulty encoder. **SUBCODE S6** – in case of PMSM, it means wrong or missing connection to terminals 1-2-3-4, when the encoder type is set to ABSOLUTE (ENDAT) **SUBCODE S7** – wrong or missing channel connection **SUBCODE S9** – angle identification error in PMSM
52	**Keypad communication error:** The connection between the control keypad and the frequency converter is broken.	Check keypad connection and possible keypad cable.
54	**Slot error:** Optional board or connection slot faulty.	Check board and slot Contact SMS. .
56	**Speed Error**	Channels inverted (modify the parameter P2.1.13 "EncoderDirection") or the motor doesn't follow the speed curve set by the inverter because of a wrong setting.
57	**Over Torque**	Motor limit torque exceeded. Verify the working current and the correct brake opening.

Code	Description	Remedies / Indications
59	**Wrong run**	The run direction (up or down) has been activated for more than 5 seconds without a speed level. Check the control panel commands.
60	**Levelling**	Low speed input falls during slow-down, before the motor has reached the steady low speed level
61	**Low current**	The inverter doesn't open the brake because current doesn't reach the value set in P2.3.1.1 for open loop or in P2.3.2.1 for closed loop.
62	**Emergency**	Emergency input signal falls during the emergency run.
63	**Output phases**	No current in one phase or unbalanced current in the output phases.
64	**Low reference**	The active speed level has a frequency reference which is lower than the DC electrical braking start frequency (open loop only).
67	**Overspeed**	The inverter has gone over maximum frequency.
68	**AdvanceContact (Please see the "Alarm 68 NOTE").**	Direction commands, and therefore also the contactors between the inverter and motor, open before the inverter switch-off.
69	**No Enable**	If you use the ENABLE START input (terminal 2), it indicates that the contactor closed signal was not given within 2 seconds of the contactor command.
70	**Invalid LicKey**	After the SMS application software download , the licence code is not entered correctly.
71	**Identification Error**	The motor identification or the rotor angle identification for PMSM has not come correctly to an end..
72	**Brake Open NOK**	One safety brake input control has not detected the brake opening after the P2.3.4 time.
73	**Brake Close NOK**	One safety brake input control has not detected the brake closing after the P2.3.5 time.
74	**SM Angle Id NOK**	In case of PMSM, the brake doesn't open because the encoder angle identification at start is not correct.
75	**SM Phase NOK**	In case of PMSM, the brake doesn't open because there is no good feedback to the initial current pulse (maybe a phase is open or the identified angle is not correct)
76	**Max Brake Space**	During emergency stop with car at speed, the braking distance is wider than the one set in P2.3.8. Check the braking force of the safety brake.
77	**Max Stop Space**	When the inverter was not operated, the motor travelled at a distance greater than P2.3.9.
78	**Time Out Enable**	The input RUN ENABLE is active, without direction and speed commands.
79	**Max P: wait 10s**	In "Safety gear unlocking" mode, the motor did not move within 5 seconds (it automatically resets after 10 seconds).
80	**Replace Ropes**	The limit of rides set in P2.1.19 has been exceeded.
81	**Floor Level NOK**	During releveling, the motor executed an abnormal stopping procedure because of an incorrect command sequence.
If other types of fault should occur, please contact SMS.		

Alarm 68 NOTE After 20 trips of this alarm, the drive goes out of service and you need to use RESET key to resume the operation.
To check the total amount of the Alarm 68 trips, please see the Menu M1 MONITOR – V1.1.10.



Eliminate the malfunction by delaying director command and hence also contactor opening. If you can't do this (for example, in lifts with manual doors, where people open the car door once the car has stopped), set parameters P2.3.1.5 and P2.3.1.2 to 0.
If the fault persists, please contact SMS ..

EARLY OPENING OF MOTOR CONTACTOR SHORTENS INVERTER LIFE. INVERTER LIFE

5.5 M5 = FAULT HISTORY

The caption H1→Hx appears under the menu. This indicates how many faults are memorized. Up to 30 faults can be memorized and displayed chronologically in reverse order (most recent fault displayed first). Pressing the key when viewing the fault code opens the "Instant fault data register", in which the values of several key variables are saved (e.g. output frequency, motor current, motor torque, etc.) as they occur. Press the or keys to scroll this register.

To reset faults, the (ENTER) key must be pressed and held for at least 3 seconds.

5.6 M6 = SYSTEM MENU

The caption S1→Sn appears under the menu. This means there are "n" submenus.

S6.1 Language Setting: ITALIAN / ENGLISH / FRENCH / GERMAN.

S6.2 Application Setting: AsynchMotor / PermMagnSync

SMS advises against modifying other parameters relative to this MENU.
If necessary, contact SMS or use the original manual available at www.vacon.com.

5.7 M7 = EXPANDER BOARDS

The caption G1→Gn appears under the menu. This means there can be up to "n" submenus. The number of submenus depends on the number of optional circuit boards connected.

G7.1 NXOPTA1 G1→G2 (Board on Slot A)
SMS advises against modifying the parameters relative to this submenu.

G7.2 NXOPTA2 G1→G1 (No. 2 digital relay outputs, slot B)

G7.2.1 I/O monitor V1→V2

Parameter	Description	UM	Def.	Value
V7.2.1.1	DigOUT:B1 (Digital output B.1)		-	
V7.2.1.2	DigOUT:B2 (Digital output B.2)		-	

G7.2 NXOPTA3 G1→G1 (No. 2 digital relay outputs + No. 1 input, slot B)

G7.2.1 Monitor I/O V1→V3

Par.	Description	m. u.	Def.	Value
V7.2.1.1	DigIN:B1 (Inlet B.1)		-	
V7.2.1.2	DigOUT:B1 (Digital output B.1)		-	
V7.2.1.3	DigOUT:B2 (Digital output B.2)			

G7.4 NXOPTB5 G1→G1 (No. 3 digital relay outputs, slot D) (OPTIONAL)

G7.3.1 I/O Monitor V1→V3

Par.	Descrizione	u.d.m.	Def.	Valore
V7.4.1.1	DigOUT:D1 (Digital output D.1)		-	
V7.4.1.2	DigOUT:D2 (Digital output D.2)		-	
V7.4.1.3	DigOUT:D3 (Digital output D.3)		-	

Menus for ENCODER boards are illustrated in the section on CLOSED LOOP application and for SYNCHRONOUS MOTORS.

6 - ADJUSTMENT PROCEDURE

There is a guided procedure in order to set the basic parameters of the motor (SET UP) which starts automatically at the very first switch-on of the drive, or when you modify the Application type (SYSTEM MENU S6.2).
Care should be taken however, as the SET UP procedure restores default values of all parameters, cancelling any programmed speed levels or customized input/output configurations that the switchboard engineer may have been set.

Before starting to change any parameter or regulation, proceed in this way :

6.1 – Go to the System Menu M6 and check that the right Application is set in S6.2, i.e. referring to the motor you are going to control (Asynchronous Motor or Permanent Magnet Synchronous Motor).

If necessary, change the type of application which will start the SET UP tool. On completion, skip straight to point **6.1 - b)**.

If the right type of application has been set, continue as follows:

6.1 – a) ENTER MOTOR RATINGS DATA IN PARAMETERS P2.1.2 / 3 / 4 / 5 / 6

If the motor rpm at nominal load is not known, or if the nominal value on data plate is 1500 rpm:
- if the motor is 1 or 2 speed, or for conventional ACVV regulator, set 1350/1380 rpm
- if it is for a VVVF speed regulator, set 1440 rpm.

If the cos phii value is not known:
- if the motor is 1 or 2 speed, or for conventional ACVV regulator, set 0.76
- if it is for a VVVF speed regulator, set 0.82.

6.1 – b) ENTER LIFT SYSTEM RATINGS DATA IN PARAMETERS P2.1.7.1 / 2 /3 / 4 (speed, pulley diameter, gear ratio, ropes ratio).

If parameter P2.1.7.5 (Update Data) is set to "Yes", the maximum frequency (P2.2.1) will be calculated automatically, as well as the various speed levels (high, low, inspection, etc. from P2.2.7 to P2.2.13) and the speed value for one floor travel only (P2.2.20).

IMPORTANT
Speeds are expressed in frequency (Hz): if you want to see the car speed in m/s for a given frequency, press and release the START key.
This check allows you to verify if the lift is set to the required speed.

6.2 – PLACE THE DECELERATION COMMANDS AT A DISTANCE FROM FLOOR AS INDICATED IN THE TABLE

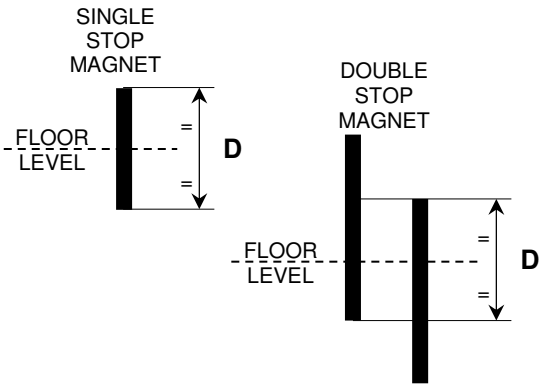
DECELERATION DISTANCE TABLE							
Nominal lift speed (m/s)	**0.6 - 0.8**	**1.0**	**1.2**	**1.4**	**1.6**	**1.8**	**2.0**
Deceleration distances (mm)	**1000**	**1400**	**1700**	**2000**	**2200**	**2600**	**2800**

If the distance is greater than the one shown in the Table, the lift system will operate more smoothly.

You can check the actual deceleration distance (distance between the deceleration switch and the stop switch) through the menu M1 MONITOR – V1.3.3 (TotalStopDistance), but this works only if the parameters “Maximum frequency” P2.2.1 and “Lift nominal speed” P2.2.2, corresponding to the maximum frequency, are set in the right way.

Also, place the stop switch in the middle position in relation to the floor:

The STOPPING DISTANCE TABLE shows guideline values to consider in order to define activation distance of the stop switch (or switches):



STOPPING DISTANCE TABLE		
Nominal lift speed (m/s)	**0.6 – 0.8**	**> 1.0**
Total stopping distance (D) (mm)	**60**	**80**
= , = means to center the magnet of length ‘D’ at floor level		

To enable the DIRECT ARRIVAL AT FLOOR FUNCTION (only available in CLOSED LOOP mode) see paragraphs 9.1 and 13.2, with D ≥ 200mm.

6.3 – SET THE MOTOR CONTROL TYPE : OPEN LOOP OR CLOSED LOOP.

6.4 – IDENTIFICATION (OPEN LOOP ONLY)

After entering the correct motor data, **you must run the IDENTIFICATION procedure**:

- Set parameter **P2.1.8** to "No Run" and run a call command: the contactors energizes, the brake doesn't open, and "RUN" lights on.
- When the "RUN" light goes off, "STOP" appears and parameter P2.1.8 goes to "No Action", deactivate the call (e.g. by opening the operation valve).
- Torque parameters are now optimized at low revs if an inverter type motor is actually being used; if it is not, you will often have to manually alter parameter P2.5.3.4 (Intermediate Voltage V/f) to obtain the right torque.

Modifying any motor data, it is essential to perform the IDENTIFICATION routine again.

7.5 – FAN CONTROL

Set parameter **P2.1.9** (fan control) as desired:

0 = Continuous
1 = Start - Runs the fan for 1 further minute after stopping.
2 = Temperature - only works if the inverter reaches a temperature of 45°C.
3 = Speed Cntrl - the fan runs during operation and for 1 minute after stopping, at 3 different speed levels, depending on the heatsink temperature. (< 40°C, between 40 and 50°C, > 50°C)

SMS advises not to modify fan operation from the default value (speed control), in order to assure a good cooling of the power part at each run of the lift.

6.6 – SPECIAL FEATURES

6.6.1 POWER LIMIT

The maximum power absorbed by the motor for any load condition can be set.

If the maximum power available is less than the maximum power required by the motor, the inverter will reduce speed to get the required result.
Obviously arrival at the floor and distance travelled at low speed remain the same whatever the car speed.

The parameters that enable this kind of movement are **P2.1.18** and **P2.4.6**.

P2.1.18 **MAXIMUM POWER** When set to 200% (default) it will have no effect.
If set to a value less than 100%, power draw will be limited to a set value, as a percentage of the power drawn by the motor at nominal voltage (P2.1.2), nominal current (P2.1.5) and nominal cosφ (P2.1.6).
The actual power absorbed from the mains is shown on M1 MONITOR - V.1.1.11.

P2.4.6 When the power limit is enabled (P2.1.18 < 100%) , first the motor accelerates then slows down to stay within the maximum allowed power, set P2.4.6 to a value below the default one until optimum function is obtained.

6.6.2 MAXIMUM CABLE BENDING CYCLES

When the pulley diameter is shorter than 40 times the ropes diameter, it is necessary to replace the latter with CERTIFIED ropes.
The Certification provides information on the maximum number of bending cycles a cable can withstand in its lifetime.

EXAMPLE: Let's suppose that in a system with a ropes ratio of 2:1 a cable is used that, due to its diameter and to the diameter of the various pulleys, can withstand a maximum number of bending cycles equal to 4.000.000 (four million).
Given that in a complete run the rope is subject to 4 bending cycles (1 per pulley), the maximum number of rides is 1.000.000.

However, it is necessary to consider that if the system does not carry out a complete ride and reverses direction instead, a section of the rope will be subject to more bending cycles.
For the aforesaid reasons, the number of reverse cycles is counted instead of the number of rides.

In the inverter, the **maximum number of reverse cycles is set in** parameter **P2.1.19** (it is necessary to press the RIGHT ARROW for at least 2 seconds).

The counter displayed in **V1.3.8** is set to P2.1.19 value and is decreased at every reverse cycle.

When the count reaches 10% of the set value, the **ALARM 80 – REPLACE ROPES appears**, which does not block the system as it is just an “alarm”.
If the count reaches 0 (zero), the inverter is blocked due to **FAULT 80**.

The ropes have to be replaced. Subsequently, the maximum number of bending cycles that the new ropes allow has to be set in P2.1.19.

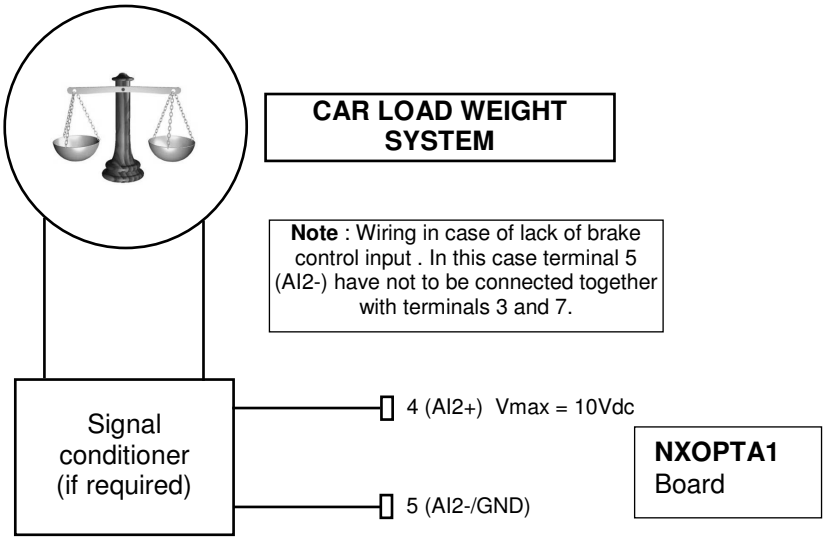
The counter displayed in **V1.3.7** instead, is a count of the reverse cycles that is increased and cannot be reset.
This allows the maintenance operator to control at any time the total number of reverse cycles and, therefore, the bending cycles undergone by the ropes.

THE ROPES REPLACEMENT SHALL BE NOTED DOWN ON THE SYSTEM BOOKLET.

6.6.3 USE OF THE WEIGHING SYSTEM

Takedo 3VF-NXP can read and control an analog input which comes from the system used to weight the car load so as to optimize the startup torque and avoid counter-rotations at start or noise of the motor at the brake opening.
The parameters for the management of the weighing system are in group **G11 – STARTUP TORQUE**.
The “STARTUP TORQUE” mode is available for CLOSED LOOP adjustment, both for asynchronous motors and permanent magnet synchronous motors.

CONNECTION EXAMPLE



GROUP G2.11 PARAMETERS - STARTUP TORQUE

P2.11.1: Starting Torque

It can be set as follows:

– **Not used** (default)

– **Parameters**
The starting torque is fixed, adjusted through parameters P2.11.3 and P2.11.4, according to the run direction.
The torque is maintained for the time set in P2.11.2.
Once this time frame has expired, the torque is gradually set to the value required by the regulator.

– **Load Measurement**
The torque reference is acquired by the analog input defined in P2.11.5, connected to the car load cell (or car weight detector).
P2.11.6, P2.11.7 and P2.11.8 represent the value of the electrical signal at full load, no load and balanced load.
P2.11.9 and P2.11.10 represent the torque required by the motor at full load and with no load. The torque is linearly interpolated according to the signal.

P2.11.2: Starting Torque Time

The time starts with the activation of the reference speed and gradually reaches the value required by the system.

P2.11.3: Torque in up direction

P2.11.4: Torque in down direction

Torque values applied if P2.11.1 = “Parameters”.
Positive values indicate the torque in up direction, negative values indicate the torque in the opposite direction.

P2.11.5: Selection of Reference Torque

Selection of the analog signal used if P2.11.1 = “Load Weight”.

- **Not used** (default)
- **AI1:** Analog input available in terminals 2 and 3 of NXOPTA1 board (Slot A)
- **AI2:** Analog input available in terminals 4 and 5 of NXOPTA1 board (Slot A)

P2.11.6: Full Load Level (value of the signal with full car)

P2.11.7: No load Level (value of the signal with empty car)

P2.11.8: Balance Level (value of the signal with balanced car)

The aforesaid parameters indicate the load level expressed as a percentage of the maximum load.
The signal levels can be displayed on the monitor of NXOPTA1 board, in menu M7.
The signal is detected when a run command of the inverter is active, before the brake opening, and it is expressed in Volts: 100% of the load equals 10V, therefore if the value detected at full load is 8V, P2.11.6 will be set at 80%.

P2.11.9: Full load torque

P2.11.10: No load torque

Maximum torque value required by the motor in full load conditions.

P2.11.11: Torque Rise Time

It is the time the torque needs to rise from 0 to the value required by P2.11.3. and .4.
Excessively short time frames cause noise, whereas excessively long times caused delayed start.
Most motors do not produce noise with a torque rise time equal to 0.2 ÷ 0.5 seconds.

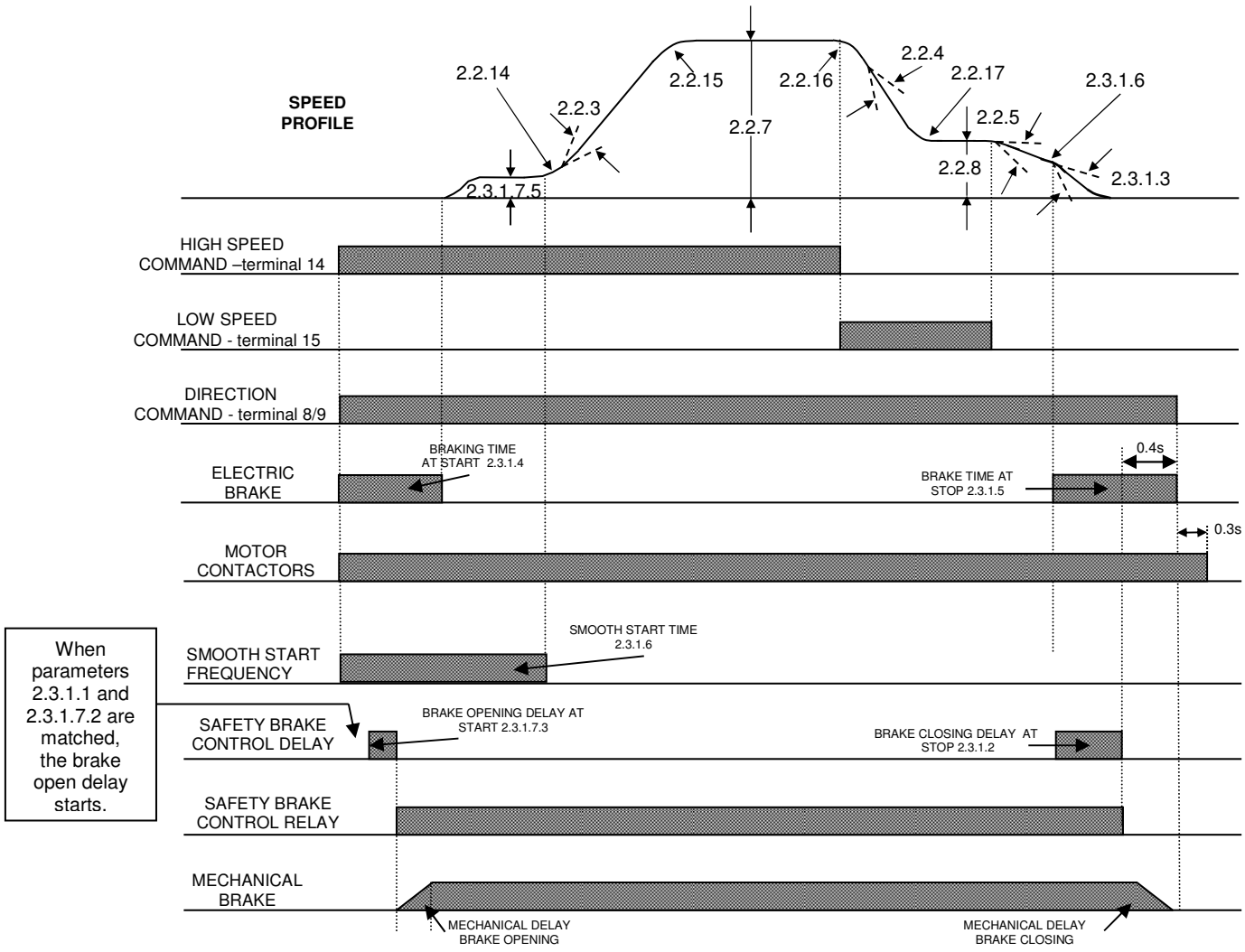
P2.11.12: Starting Torque Limit

It is the torque limit of the motor during starting phase.

6.6.4 SAFETY GEAR UNLOCKING

This operation is only available with the encoder (CLOSED LOOP).
In the output phase the inverter releases the maximum possible current so as to unlock the car should this be stopped by an intervention of the safety gear.
To activate this function it is necessary to press the START button for at least 2 seconds; to switch it off it is necessary to press the STOP button for 2 seconds.
This operation automatically stops if the inverter does not detect any movement through the encoder reading within 5 seconds from the command activation (FAULT 79).

6.7 – OPEN LOOP ADJUSTMENTS



After completing what was indicated at points 7.1/2/3/4/5/6/7/8 , proceed as follows:

IMPORTANT: Parameters have to be changed ALWAYS ONCE AT A TIME.

1 - Adjust the starting with brake control parameters

		JERK	BACK ROTATION
2.3.1.7.3	Brake open delay	▼	▲
2.3.1.7.5	Smooth start frequency.	▼	=
2.3.1.7.6	Smooth start time.	▲	=

Starting comfort has to be 'soft', without jerks nor back rotations.

- If a higher torque is needed at the start, increase the value in parameter P2.5.3.4 V/f Intermediate Voltage by one or two units; you must check however afterwards that motor current at start up does not reach the limit set in P.2.2.1 and that current at low speed does not exceed the nominal rated current of the motor and/or inverter.
- If the lift does not work as required, contact SMS technical assistance..

2 - During the **high speed run,** the rpm of the motor must reach the required rpm value, and the speed of the lift has to be constant.
If it is not constant (oscillating), increase or decrease the value of the parameter P2.1.4 (Motor speed), increasing the number of revolutions.

3 - Check now that when **slowing down**, the lift reaches the floor running for a short space at constant speed (10cm max.) without oscillations or vibrations, with the same speed for both up and down directions and in any load condition.
If speed drops under load, decrease the value of P.2.1.4.
Adjust the space travelled at low speed with parameter 2.2.4 (Deceleration ramp).

4 - **If at floor arrival,** the car is not perfectly aligned at floor, the parameters to be adjusted are:

		It stops BEFORE	It stops AFTER
2.2.5	Final deceleration ramp	▲	▼
2.2.8	Low speed level	▲	▼
2.3.1.6	Stop DC braking current	▼	▲

IMPORTANT
For low speed frequency, a value of 1/10 of the rated frequency is suggested:
Example – low speed set at 5Hz if motor rated frequency is equal to 50 Hz.

6.8 – SINGLE FLOOR TRAVEL

The single floor travel function will only be effective if the sequence of commands used in paragraphs 6.7, 9 and 13 is followed, i.e. the normal logic of a 2-speed control board is applied: HIGH SPEED start with input 14 active, then switch to LOW SPEED activating input 15 and disabling 14.
TWO SPEED LEVELS MUST NEVER BE INSERTED AT THE SAME TIME.

When the desired starting and stopping comfort has reached and, running between far floors, the space travelled at low speed is the same for any floor for both up and down direction, you have to set the slowing distance, especially useful for one floor travel, with parameter P2.2.19 as follows:

- Set parameter P2.2.18 to 1.
- Make a car call for 2 floors at least.
- When the lift reaches a low speed, P2.2.18 will return automatically to 0, while the distance travelled on switching from high to low speed will be saved in P2.2.19 and displayed in V1.3.4.
- Make a car call for one floor only, verify comfort, and check that the space travelled at low speed is the same as a travel between far floors .

To increase comfort further, decrease parameter P2.2.20 (Half floor frequency).

6.9 – MOTOR NOISE

In case of motor noise , increase switching frequency P2.5.2, considering that higher is the frequency, higher are EMC emissions.
In addition, the motor insulation and the inverter power components are more “stressed”.

There is function, that is P2.5.4.9.14, which allows for the elimination of the motor noise at low revolutions. However, in this case the motor isolation stress increases.

6.10 – PARAMETERS ONLY EFFECTIVE FOR EMERGENCY OPERATION
(BATTERIES OR AUXILIARY POWER SUPPLY, 230/400Vac, SINGLE PHASE/3-PHASE)

The emergency operation is activated by enabling input 10 (NXOPTA1 board); through the keypad the monitor is positioned on V1.3.1 to display the direction and speed of the car during the emergency maneuver.

The minimum voltage of the batteries is 48V.

ASYNCHRONOUS motors, with selection of the favorable run direction, work with a rather low voltage (48V / 60V).

SYNCHRONOUS motors need higher voltage, also with selection of favorable torque.
It is necessary to ask the manufacturer what is the minimum voltage to keep the motor idle with the nominal load.
If the minimum voltage is, for example, 100V, the voltage of the batteries must be higher than:

100Vac x 1,41 = 141Vdc

That is to say that twelve 12V batteries have to be used (144Vdc).

The parameters for the management of emergency operation are in **GROUP G10 – EMERGENCY**:

P2.10.1: Emergency operation

It can be set as follows:

– **Not used** (emergency operation excluded)

– **Manual** (does not select the favorable run direction)
The motor follows the run direction the inverter is commanded for.

– **Automatic** (selects the favorable run direction)
The inverter allows for the quick rotation of the motor in both run directions and then chooses the most favorable run direction.

– **Torque Measure**
It is used for gearless motors: the brake opens and for a few seconds the motor remains idle (P2.10.13.2), the inverter detects the favorable torque direction and drives the motor towards that direction, whatever said direction is.

– **Battery Saving**
It is used for gearless motors:
The inverter does not enable the power stage, keeps the short-circuit contactor closed and checks, through the encoder, the motor speed which shall never exceed the value set in P2.10.10.
When the speed reaches this value, the brake closes and then opens again, etc.
If the load in the car is balanced and the speed does not reach the value set in P2.10.11, after the time set in P2.10.12 the brake closes, the short-circuit contactor is activated to eliminate the short-circuit between the motor phases, power and motor are fed by rotating in the favorable run direction thus bringing the car to the desired floor.

CONSTANT PRESSURE PUSH BUTTON EMERGENCY CONTROL

Regardless of the value set in P2.10.1, for the synchronous motors, you can enable an other type of emergency operation, the CONSTANT PRESSURE PUSH BUTTON EMERGENCY.
To execute this operation it is necessary to set parameter P2.10.10 (see below) at a value other than 0, fed only the control stage of the inverter (and not the power stage), activate the emergency input and, subsequently, enable both up and down commands.

The inverter will activate the brake command output only, while the control panel must supply the brake circuit with the proper voltage and make a by-bass on the main motor contactors in the brake circuit.
These operations enables the brake opening so that the car runs in the direction where the motor is pulled by the load; the TBM contactor, which makes a short-circuit between the motor windings at stop, doesn't energize, so that the car runs at reduced speed.
Moreover, the inverter checks the car speed doesn't exceed the speed limit set in P2.10.10:
in case the car speed goes over this limit, the inverter makes the brake to close, then makes it to open again after a few seconds, and goes on this way, with a jogging operation, until the up/down commands stay on, allowing the car to stop at a floor level without reaching a dangerous speed.

The control panel manufacturer should provide the appropriate audio-visual signalizations, to give warning the car has reached the floor.

P2.10.3: Maximum Emergency Speed:

It is the maximum speed of the motor, whatever the speed level activated (high, low, inspection, etc.).

P2.10.9: Switching Frequency (maintain the default value).

2.10.10 Maximum Emergency Speed in "Battery Saving" or "Constant Pressure Push-button"

It is the speed, expressed in m/sec, that the car shall not exceed during "Battery Saving" or "Constant Pressure Push-button" operation. It can be adjusted from 0 to the rated speed set in P2.2.2.
If set to 0, the "Constant Pressure Push-button" emergency operation is DISABLED.

P2.10.11 Minimum Emergency Speed

P2.10.12 Minimum Speed Time

It is effective only in "Battery Saving" operation (see above).

P2.10.13.1 Motor Control Mode : (Frequency, Open Loop, Closed Loop)

If the input supply voltage is lower than 96V, "Frequency" control is the preferred mode in an evacuation situation; for PM synchronous motors you must always select the "Closed Loop" control.

P2.10.13.2 Current Control Delay

It is the delay of the inverter in reading current and/or torque when choosing the favorable run direction.

P2.10.13.3 Counter-rotation Gain in Emergency Operation

It is expressed in % of the counter-rotation gain in normal operation and 0 is the recommended value.

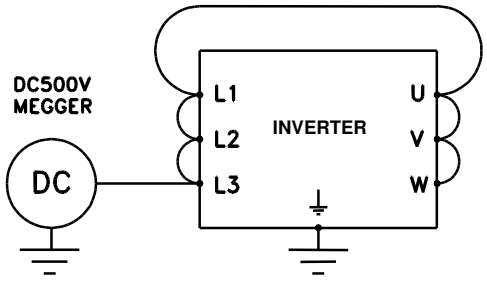
7 – CHECKS AND MAINTENANCE

To ensure long service life and smooth operation of the drive, carry out the following checks at regular intervals. Always isolate the drive from the power supply and make certain the keypad is off before proceeding.

1- Remove the dust that collects on the cooling fans and on the control circuit board, preferably by means of compressed air or using a vacuum cleaner.
2- Check that there are no screws loose at the power or control terminals.
3- Check that inverter function is <<normal>> and there is no abnormal overheating.

7.1 MEGGER TEST

When performing insulation tests using a Megger tester on the input/output cables or on the motor, remove all the connections to all terminals of the drive and perform the test only on the power circuit, in accordance with the adjacent diagram.
Do not Megger test the control circuits.



ASYNCHRONOUS MOTORS

CLOSED LOOP

8 – CONNECTION AND ENCODER TYPES FOR ASYNCHRONOUS MOTORS

When operating in closed-loop mode, the inverter drive requires a feedback signal provided by an industrial encoder, resolution 1024 pulse/rev (encoders with other resolutions can also be used), of type :
Line driver powered at 5Vdc or
Push-pull powered at 15 or 24 V.

Depending on the type of encoder used, the relative board must be inserted inside the inverter:

For LINE DRIVER 5V encoders with board NXOPTA4

For PUSH-PULL 15 / 24V) encoders with board NXOPTA5

The board must be inserted in the 3rd connector from the left (slot C)

SMS can supply a **LIKA I581024H** encoder, 1024 pulse/rev , that works with both NOXOPTA4 and NXOPTA5 boards , working in line driver mode if powered at 5Vdc , push-pull mode if powered at 24 Vdc.

TERMINAL NXOPTA4/5	SIGNAL	LIKA I581024H ENCODER
terminal 01	A+	YELLOW
terminal 02	A-	BLUE
terminal 03	B+	GREEN
terminal 04	B-	ORANGE
terminal 09	– Power supply	BLACK
terminal 10	+ Power supply	RED

As alternative, the encoder **ELAP, type EM521-C-1024-5/24-R-8-LDX55** or **REC531-C-1024-5/24-R-11-LDX55** can be supplied.

TERMINAL NXOPTA4/5	SIGNALI	ELAP ENCODER EM521-C-1024-5/24-R-8-LDX55 REC531-C-1024-5/24-R-11-LDX55
term. 01	C1	YELLOW
term. 02	C1 negative	BLUE
term. 03	C2	GREEN
term. 04	C2 negative	PINK
----	C0	WHITE
----	C0 negative	GREY
term. 09	– Supply Voltage	BLACK
term. 10	+ Supply Voltage	RED

NOTE: Before connecting the encoder to the inverter, you must check the label placed on the encoder, because modifications to the above colour table can occur without any notice by the encoder manufacturer.

ADVICE FOR ALL THE ENCODER TYPES

The encoder cable must be shielded, and the shield connected (as indicated in paragraph 3.2) to the inverter ground terminal. In any event, the encoder should have a shielded cable of length sufficient to allow connection direct to the inverter, following the shortest possible run and located WELL AWAY FROM THE POWER CABLES. Remaining wires have to be isolated one by one and left unconnected.

MENU M7 = EXPANSION BOARD for ENCODER BOARDS NXOPTA4 and NXOPTA5

G7.3 NXOPTA4 G1→G2 (5V line driver encoder) or NXOPTA5 G1→G2 (push-pull encoder) (Slot C)

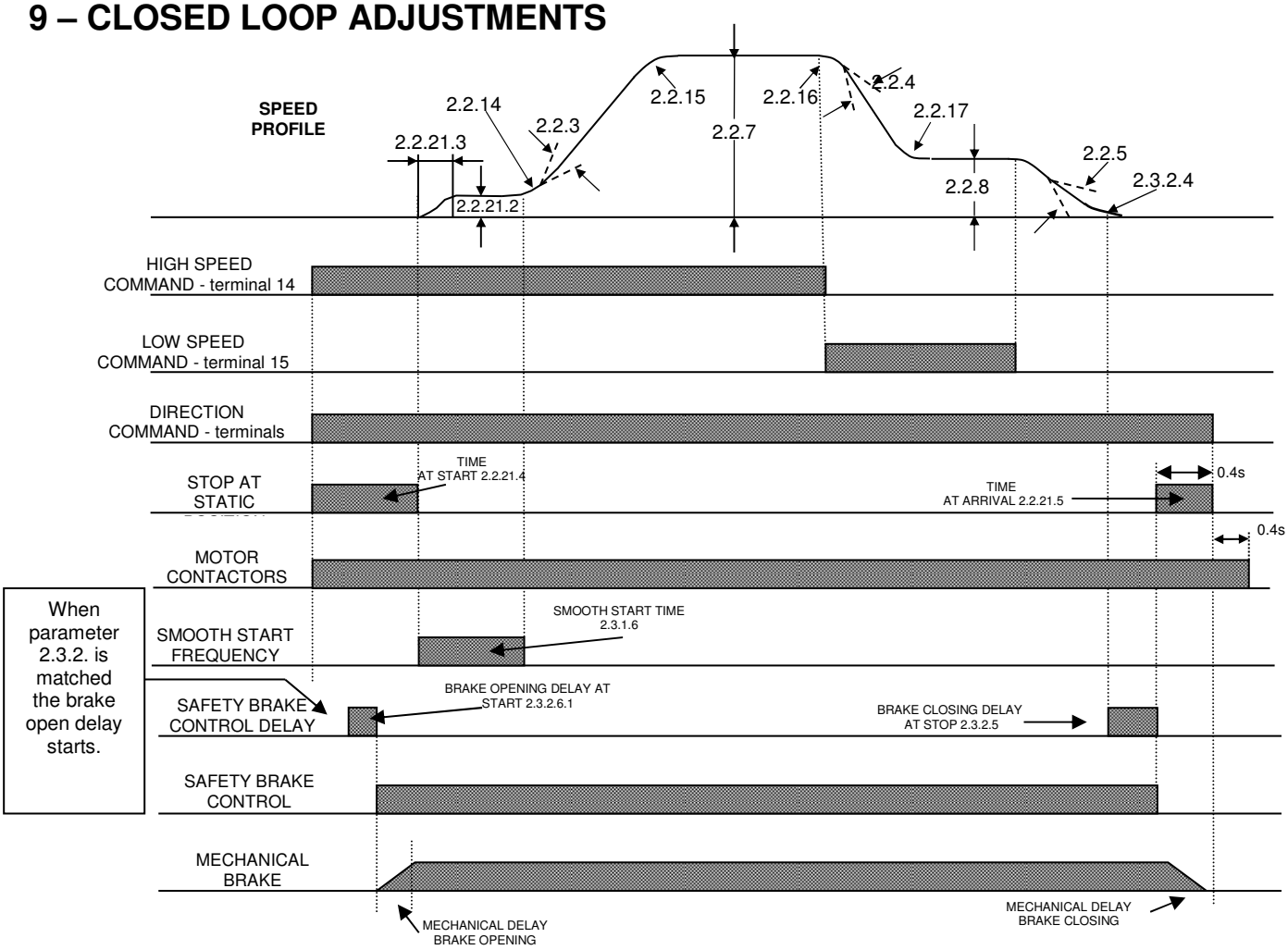
G7.3.1 Parameters P1→P3

Parameter	Description	UM	Def.	Value
P7.3.1.1	Pulse/revolution (Number of encoder pulses)		1024	
P7.3.1.2	Invert direction (Encoder direction)		No	
P7.3.1.3	Reading rate (Encoder sampling)	ms	5	

G7.3.2 Monitor V1→V2

Parameter	Description	UM	Def.	Value
V7.3.2.1	Encoder frequency	Hz		
V7.3.2.2	Encoder speed	rpm		

9 – CLOSED LOOP ADJUSTMENTS



1 - For closed loop, main important parameters are: Motor RPM P2.1.4, Motor magnetizing current P2.5.4.1. If these value are available put them in the inverter parameters. If they are not available or you are not sure of the value on motor plate, inverter can automatically learn these parameter and set them automatically. To do this follows the line hereunder.
Car at topmost floor, elevator balanced according to plan, set parameter P2.1.5 Inverter nominal current, with empty car and lift working in closed loop, do the following:
RPM reading- Set parameter P2.2.23 = Yes, make a call in down direction (inverter must reach full speed), inverter reads Motor RPM and write the value in P2.1.4.
Mag. current reading- Set parameter P2.2.24 = Yes, make a call in up direction (inverter must reach full speed), inverter reads Motor Magnetizing current and write the value in P2.5.4.1

2 - Adjust **starting** comfort with the following parameters :

		JERK	BACK ROTATION
2.2.21.3	Initial acceleration ramp	▲	--
2.2.21.4	Hz time at start (about 0.7")	▲	▲
2.3.2.6.1	Brake open delay (min. 0.5")	▼	▲
2.5.4.9.7	RollBack Control Gain	--	▲

Starting comfort has to be 'soft', with no jerks or vibrations, or roll back.
Check the RollBack Control Gain (P2.5.4.9.7 and 8) (generally, the default value works very well).

3 - If during the **acceleration** or during high speed travel motor has vibrations, check the parameters :

2.5.4.6	Speed control KP2	▼
2.5.4.7	Speed Control TI2	▲

Check also that the encoder connections have been made as indicated in paragraphs 3.2.8 and 10. **The encoder cable must be separated from the power cable and distant 50 cm at least from the motor cable. It should be connected with a single cable, with no added terminals, and with the shield connected to earth at the inverter side.** Encoder pulses per revolution must match the relative parameter of the Encoder Board. Check that parameter P7.3.1.3 is set to 5ms for incremental encoder (NXOPTA4/A5) and that there is a good mechanical coupling between encoder and the fast motor shaft (joint, alignment, tight screws etc.)

4 - Check the slowing phase. The lift must reach the floor in a very small space (few centimetres) , at constant speed without oscillations or vibrations, both for up and down directions. Adjust the space travelled at low speed with parameter 2.2.4 (Deceleration ramp).

IMPORTANT: Considering the high precision of the inverter, it is important to set the position of the slowing command with the best possible accuracy, to have the same space travelled at low speed for any floor.

5 - If, **at floor arrival**, the car is not perfectly aligned with the floor, even if the stop switches are centred to the floor, the parameters to be adjusted are:

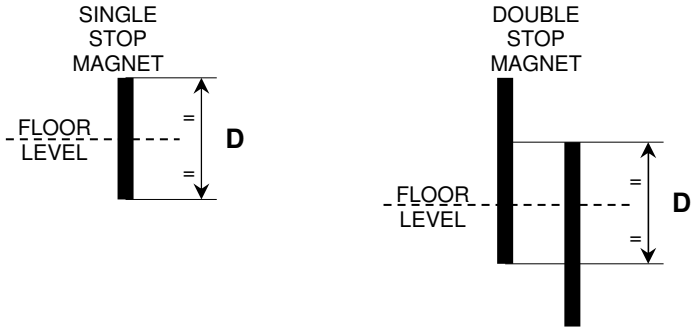
		If it stops BEFORE	If it stops AFTER
2.2.5	Final deceleration ramp	▲	▼
2.2.8	Low speed level	▲	▼

A very good comfort can be obtained (for a 50 Hz rated frequency lift motor) with a 3Hz low speed and a 0,8 seconds final deceleration(P2.2.5).

9.1 – DIRECT ARRIVAL AT FLOOR FUNCTION

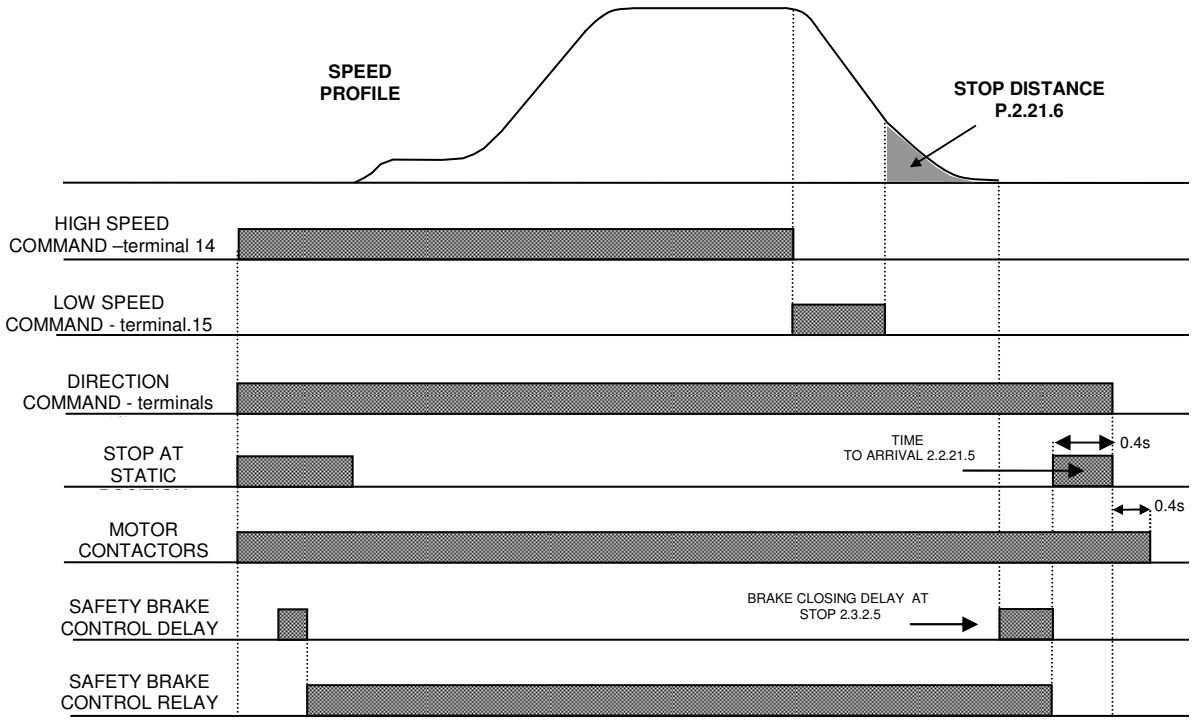
This function is available for all types of motor, for CLOSED LOOP configuration.

To enable it, parameter P.2.2.21.6 "stop distance" must be set at a value different from 0 and equal to the stopping distance (distance **½ D -** see figure below).



Recommended value ½ **D** is about 100 mm 100 - 150 mm (D = 200 - 300 mm.). Longer or shorter distances are possible depending on the lift speed.

The correct sequence of commands is given below:



To obtain a precise arrival to any floor proceed as follows:

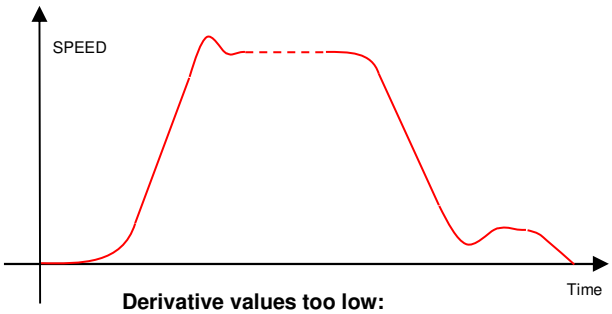
1) Put the stop magnets as indicated.
2) Set the deceleration points like described in the table in paragraph 6.2.
3) Set P2.2.4 (deceleration time) at 1.5 sec.
4) Set P2.2.21.6 (Stop distance) to 0
5) Execute a call command: the car has to arrive at floor at low speed and stop with a big distance from the floor level.
6) Set P2.2.4 in order to have a low speed distance of a few centimetres and equal for any floor both for up and down direction.
7) Set **P2.2.21.6 to** ½ D of the stop magnet, less about 20 mm.
   E.g. with **½ D** magnet = 150 mm, enter 130 mm.
8) Execute another call command. At the arrival into the stop magnet, the car will run slowly to reach the floor position.
9) Check the stopping accuracy at floor. If the car stops before the floor level, increase P2.2.21.6 (stop distance), otherwise decrease the value.
10) Increase P2.2.4 in order to have the desired arrival. Increasing P2.2.4, a faster arrival at floor can be obtained.
11) If the car does not stop at the floor smoothly enough, verify parameters:
    a) P2.2.21.7: the higher this value is, the "stronger" the stop.
    b) P2.2.21.8: the higher this value is, the 'smoother' the stop .
    c) P2.2.4: the higher this value is, the 'stronger' the stop.
    d) P2.3.2.5: the brake closing delay must be set so that the brake closes when the motor is already stopped.
    e) If you notice a vibration in the final run reaching the floor, decrease Kp1 (P2.5.4.4) and increase P2.5.4.2 and P2.5.4.3.

9.2 – SPECIAL PARAMETERS

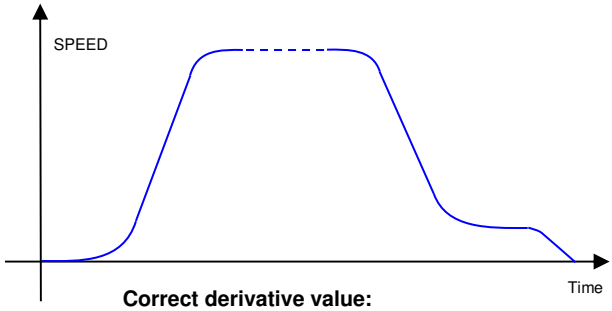
P2.5.4.9.1/2/3/4 These parameters should only be modified when advised by SMS.

P2.5.4.9.5: Speed derivative
P2.5.4.9.6: Derivative filter time

These are the parameters of the derivative gain used to adjust the speed transitions, to avoid, for example, the stop and restart of the motor at the end of the deceleration, or the speed overshoot at the end of the acceleration that can cause undesired over-speed, more than the lift specifications.
Values have to be set proportionally to the system's inertia. The higher the inertia, the higher values have to be set.



Derivative values too low:
Speed profile



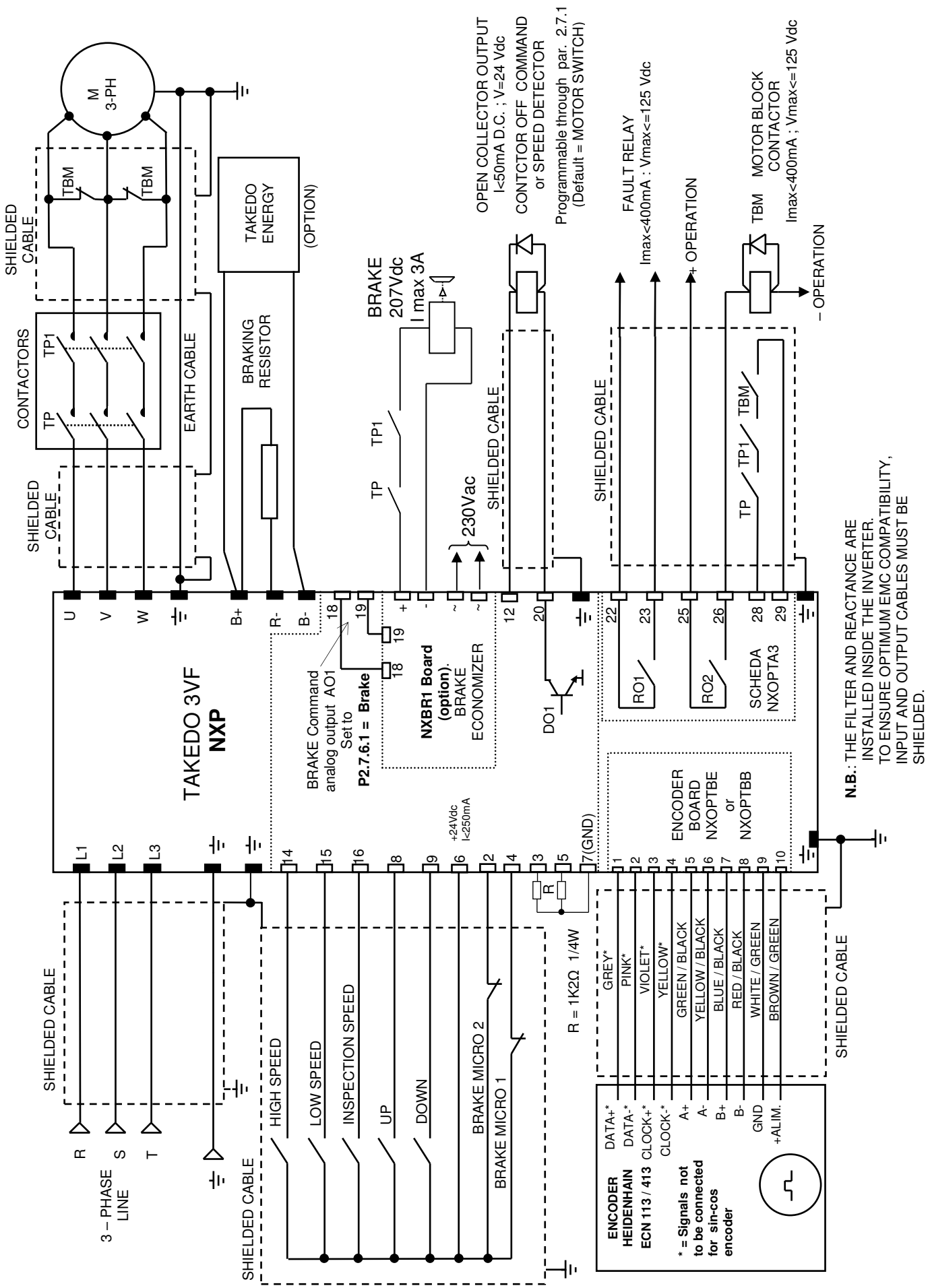
Correct derivative value:
Speed profile

P2.5.4.9.7: RollBack Control Gain
P2.5.4.9.8: RollBack Treshold

These parameters are useful to avoid the "rollback" of the motor at starting, when the brake opens.
Generally the default values work fine: too high values can cause noises and jerks at starting, too low values can cause an undesired "rollback".

PERMANENT MAGNET SYNCHRONOUS MOTORS

10 – APPLICATION DRAWING FOR SYNC. MOTOR WITH ENABLE LOGIC AND BRAKE MICRO CONTROL IN COMPLIANCE WITH AMENDMENT 3



11 – CONNECTION AND ENCODER TYPES FOR SYNCHRONOUS MOTORS

PERMANENT MAGNET SYNCHRONOUS MOTORS (PMSM) will only work in closed loop.

EnDat® absolute or incremental sine-cos type, 2048 pulse/rev. encoders fitted to the motor shaft are normally recommended for synchronous motors.

The encoder board must be inserted inside the inverter: **NXOPT-BE or NXOPT-BB**

The board must be inserted in the 3rd connector from the left (slot C)

To connect the ECN 113 or ECN 413 Heidenhain encoder to the inverter, use the following table.

To connect sine-cos encoders (for example Heidenhain ERN1387), use the following table as well, but ignore the first 4 connections (DATA+,DATA-,CLOCK+,CLOCK-) because they don't exist in this kind of encoder.

Terminal X6

Terminal number	Signal	Heidenhain color code ECN 113 / ECN 413
1	DATA+	Grey (for EnDat® only)
2	DATA–	Pink (for EnDat® only)
3	CLOCK+	Violet (for EnDat® only)
4	CLOCK–	Yellow (for EnDat® only)
5	A+	Green / Black
6	A-	Yellow / Black
7	B+	Blue / Black
8	B-	Red / Black
9	GND	White / Green
10	Encoder power supply	Brown / Green

In special circumstances, an incremental PUSH-PULL type encoder can be used; see paragraph 10 for instructions on how to connect it.
The encoder must have a high number of pulse/revs, such as 10,000 for example.

ADVICE FOR ALL THE ENCODER TYPES

The encoder cable must be shielded, and the shield connected (as indicated in paragraph 3.2) to the inverter ground terminal. In any event, the encoder should have a shielded cable of length sufficient to allow connection direct to the inverter, following the shortest possible run and located WELL AWAY FROM THE POWER CABLES. Remaining wires have to be isolated one by one and left unconnected.

MENU M7 = EXPANSION BOARD for ENCODER BOARDS NXOPTBE and NXOPTBB

G7.3 NXOPTBE G1→G2 (ENDAT, SSI, SIN/COS encoder board for synchronous motor, Slot C)

G7.3.1 →Parameters P1P8

Parameter	Description	UM	Def.	Value
P7.3.1.1	Operate Mode		SineCos	
P7.3.1.2	Pulses/revolution		2048	
P7.3.1.3	Invert direction		0 / No	
P7.3.1.4	Reading rate	ms	1	
P7.3.1.5	Interpolation		1 / Yes	
P7.3.1.6	SSI data coding			
P7.3.1.7	SSI total bits		13	
P7.3.1.8	SSI rev bits		0	

G7.3.2 Monitor V1→V6

Parameter	Description	UM	Def.	Value
V7.3.2.1	Encoder freq	Hz		
V7.3.2.2	Encoder speed	rpm		
V7.3.2.3	Comm. Counter			
V7.3.2.4	Revolution Counter			
V7.3.2.5	High Pos Posit/Rev			
V7.3.2.6	Abs pos Lo word			

G7.3 NXOPTBB G1→G2 (ENDAT and SINE/COS encoder board for synchronous motor, Slot C)

G7.3.1 Parameters P1→P4

Parameter	Description	UM	Def.	Value
P7.3.1.1	Invert direction		0 / No	
P7.3.1.2	Reading rate	ms	1	
P7.3.1.3	Interpolation		1 / Yes	
P7.3.1.4	Pulses/revolution		2048	

G7.3.2 Monitor V1→V7

Parameter	Description	UM	Def.	Value
V7.3.2.1	Encoder freq	Hz		
V7.3.2.2	Encoder speed	rpm		
V7.3.2.3	Encoder Pos			
V7.3.2.4	EncRevolution			
V7.3.2.5	EncAlarm			
V7.3.2.6	EncWarning			
V7.3.2.7	EncMessages			

12 - PUTTING ON DUTY SYNCHRONOUS MOTORS

THIS MUST BE DONE WITH THE **MOTOR FREE , WITH NO CABLES,** because a synchronous motor can work with no feedback signal (which is needed for some preliminary encoder checks) ONLY IN NO-LOAD CONDITION, which means WITHOUT CABLES or WITH A PERFECTLY BALANCED LOAD.

1) Make the connections as indicated in "QUICK GUIDE TO PUTTING ON DUTY SYNCHRONOUS MOTORS", taking the following advice into consideration:
   - Follow Inverter – Motor connections:
     U inverter output terminal to motor terminal U or L1
     V inverter output terminal to motor terminal V or L2
     W inverter output terminal to motor terminal W or L3
     In this way, the motor pulley will rotate clockwise with an UP direction command (terminal 8 – DIN1=ON) (looking at the motor from the pulley side).
     If the pulley must rotate anti-clockwise in up direction, exchange the output phase V with W, do NOT move the U phase.
   - Connect the encoder as shown in paragraphs 11 and QUICK GUIDE.
     Pay special attention when connecting the shield to the inverter ground and place the encoder cable at least 50cm from the power cable.
2) Check that in the System Menu M6, in S6.2 is set the SYNCHRONOUS MOTOR Application ("SMSLift Sync").
3) ENTER MOTOR RATINGS IN PARAMETERS P2.1.2 / 3 / 4 / 5 / 6
4) ENTER LIFT SYSTEM RATINGS DATA IN PARAMETERS P2.1.7.1 / 2 / 3 / 4:
   speed, pulley diameter, reduction ratio (1.01 for gearless), cable pull (e.g. 1:1 or 2:1).

   If parameter P2.1.7.5 (data recalculation) is set to "Yes", the maximum frequency (P2.2.1) will be calculated automatically for the various speed levels (high, low, inspection, etc. from P2.2.7 to P2.2.13) as well as the speed value for one floor travel only (P2.2.20). In particular, inspection speed must not exceed 0.63 m/sec.

   IMPORTANT
   Speeds are expressed in frequency (Hz): if you want to see the car speed in m/s for a given frequency, press and release the START key.
   This check allows you to verify if the lift is set to the required speed.
5) Pay attention to the pole pair number, which the inverter calculates as follows:

$$\text{number of poles} = \frac{\text{nominal frequency (P2.1.3)} * 60}{\text{nominal speed (P2.1.4)}} \times 2$$

   The resulting value must be a full-value (without decimal units) and it's displayed in P2.1.14.

6) ENTER the motor resistance and phase inductance in PARAMETERS P2.1.16 and P2.1.17 respectively.
   If these values are unknown, leave the default values.
7) If necessary, set in P2.1.19 the maximum number of bending cycles the ropes can withstand (see par. 7.6.2), otherwise let the default value (0) unchanged.
8) Set parameter P2.5.1 (Motor Control Mode) = Frequency, check that the motor is free (no cables).
9) The procedure to start up depends on the type of encoded installed:

   A) ABSOLUTE ENCODER type ENDAT (ECN 113, ECN 413 or equivalent)

   - Set parameter P2.1.12 (Encoder Type) = EnDat
   - Go to the parameter V1.3.2 in the del Menu M1 – MONITOR to display the motor speed read by the encoder.
   - Give a run command through the inspection control box.
   - Check that the speed in Hz is POSITIVE in UP direction (check V1.2.1, DIN1=ON) and NEGATIVE in DOWN direction (DIN2=ON), checking that the motor rotating direction is correct.. If the rotating direction is wrong, exchange the output phase V with W.

- If the speed read by the encoder is NEGATIVE in UP direction, change the parameter P2.1.13 "Invert Direction":
  - if it is "Not Inverted", set it to "Inverted"
  - if it is "Inverted", set it to "Not Inverted"
- Check again the speed read by the encoder, it should have the correct sign in up and down direction, and the Hz value equal to the set speed: for example, if inspection speed is 4Hz, in the MONITOR menu in V1.3.2 the speed must be +4Hz going up and -4Hz going down, save some small differences in the second decimal figure.
- Change parameter P2.5.1 from "Frequency" to "Closed Loop".
- If you already know the ENCODER ANGLE (supplied by the motor manufacturer), set it into the parameter P2.5.5.4 (Encoder Angle)

  If you don't know the ENCODER ANGLE, read it by setting:
  P2.5.5.8 (Angle Identification at Start) = Enabled
  P2.5.5.3 (Encoder Calibration) = 1

  Give a run command within 20 seconds.

  When P2.5.5.3 goes automatically to 0 after the current injection into the motor windings (which takes a few seconds), the encoder angle is identified and written in the parameter P2.5.5.4 (Check the value!).

  Set again P2.5.5.8 = Disabled.
- Switch the power off, wait for the inverter to switch off, and switch the power on again.

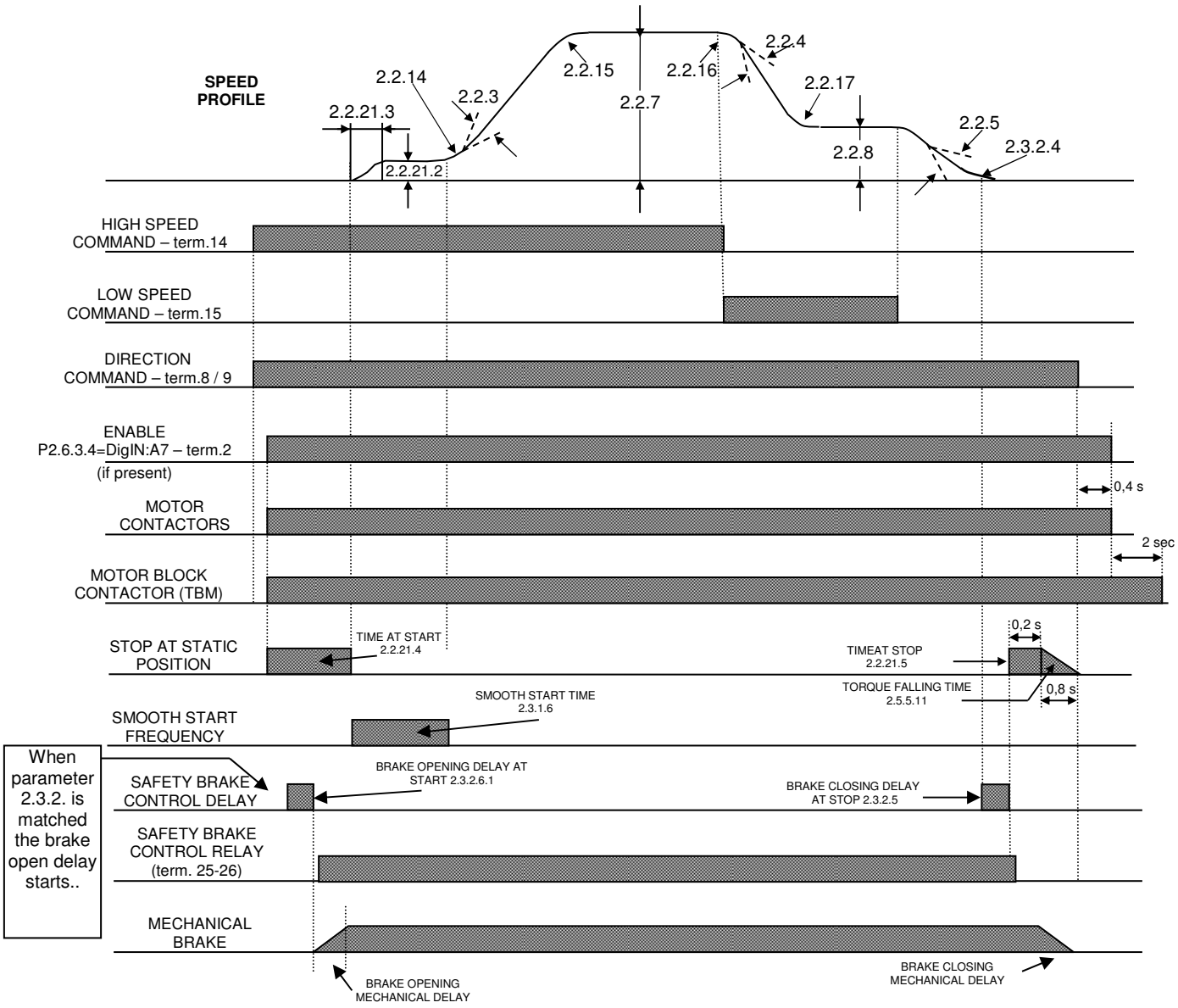
NOW THE MOTOR SHOULD WORK PROPERLY.
Check that there are no vibrations, noises or other anomalies, that the motor current displayed in V1.1.6 is about 0,1 – 0,2A.

B) INCREMENTAL ENCODER type SIN-COS (ERN1387, ERN487 or equivalent)

- Set parameter P2.1.12 (Encoder Type) = Incremental and set parameter "Pulse/Revolution" to the encoder pulse/revolution number, usually 2048 (P7.3.1.2 in case of NXOPTBE Board and P7.3.1.4 in case of NXOPTBB Board).
- Set parameter P2.5.1 (Motor Control Mode) = Frequency.
- Go to the parameter V1.3.2 in the del Menu M1 – MONITOR to display the motor speed read by the encoder.
- Give a run command through the inspection control box.
- Check that the speed in Hz is POSITIVE in UP direction (check V1.2.1, DIN1=ON) and NEGATIVE in DOWN direction (DIN2=ON), checking that the motor rotating direction is correct.. If the rotating direction is wrong, exchange the output phase V with W.
- If the speed read by the encoder is NEGATIVE in UP direction, change the parameter P2.1.13 "Invert Direction":
  - if it is "Not Inverted", set it to "Inverted"
  - if it is "Inverted", set it to "Not Inverted"
- Check again the speed read by the encoder, it should have the correct sign in up and down direction, and the Hz value equal to the set speed: for example, if inspection speed is 4Hz, in the MONITOR menu in V1.3.2 the speed must be +4Hz going up and -4Hz going down, save some small differences in the second decimal figure.
- Change parameter P2.5.1 from "Frequency" to "Closed Loop".
- Switch the power off, wait for the inverter to switch off, and switch the power on again.

NOW THE MOTOR SHOULD WORK PROPERLY.
Check that there are no vibrations, noises or other anomalies.
At the first start-up, you notice the encoder angle identification current injection, which will be made each time you switch the power off and on again, and each time it is started up after an incorrect stopping sequence, such as when stopped for inspection or due to the opening of a safety guard (if P2.5.5.16 = Yes) and then every 200 journeys (default value of parameter P2.5.5.9, modifiable).
Check that the motor current displayed in V1.1.6 is about 0,1 – 0,2A.

13 – SYNCHRONOUS MOTOR SETTINGS



1) Tension the lift, inserting the cables on the pulley;
set deceleration time in P2.2.4 to about 1.5”and put the slowing switches as indicated in the ”DECELERATION DISTANCE” table provided in this instruction manual in the “ADJUSTMENT PROCEDURE" PARAGRAPH.

2) Set P2.2.7 High speed at 20% of the rated value and verify the good functioning. Increase gradually the speed up to the rated value.
Check that starting and stop are good, check the distance in low speed (levelling) and ad just the parameters as per the asynchronous motor, following the Instruction Manual.

3) Load the counterweight up to obtain the required lift balance (normally 50% of the car load).
IMPORTANT:
If the lift balance is lower than 50% (for example 40%), check the functioning in the maximum load condition, that means in UP direction with full car. This test is important because the functioning performances of a PMSM are particularly dependent from load conditions.

4) Tips and tricks (please modify parameters once at a time):
   a) Back-rotation of motor at start :
      - Increase RollBackCtrGain (P2.5.4.9.7)
      - Increase the 0Hz Start Time (P2.2.21.4)

b) Rips of the motor at start: modify parameters P2.2.21.1,P2.2.21.4,P2.3.2.6.1 as described in “Closed Loop Adjustments” (as per asynchronous motor)

c) Motor vibrations during high speed travel:
   - Decrease Kp2 Speed Gain (P2.5.4.6)
   - Increase Ti2 Integral Speed Gain Time (P2.5.4.7)
   - Modify Current Regulator Kp (P2.5.4.9.1).
     It may be increased or decreased (any motor and any lift system has different torque, load, inertia characteristics). The regulator response may change also depending on the load condition, so an inadequate value can cause vibrations.

d) Motor stops and restarts at the end of the slowing down:
   - Increase the Speed Derivative time (P2.5.4.9.5)
   - Decrease the Derivative Filter time (P2.5.4.9.6)

e) If the motor counter-rotates or “runs away” pulled by the load at stopping:- increase the Torque Fall time (P2.5.5.11) and the 0Hz Stop time (P2.2.21.5).
   Verify that the opening of the direction commands and contactors happens with a sufficient delay after the opening of the brake contactor.

At the end of adjustments, with the lift stopped, power off the drive, wait 15-20 seconds and power it on again. This operation ensures that the modified parameters are stored definitively in memory.

13.1 – SINGLE FLOOR TRAVEL

The single floor travel function will only be effective if the sequence of commands used in paragraphs 6.7, 9 and 13 is followed, i.e. the normal logic of a 2-speed control board is applied: HIGH SPEED start with input 14 active, then switch to LOW SPEED activating input 15 and disabling 14.
TWO SPEED LEVELS MUST NEVER BE INSERTED AT THE SAME TIME.

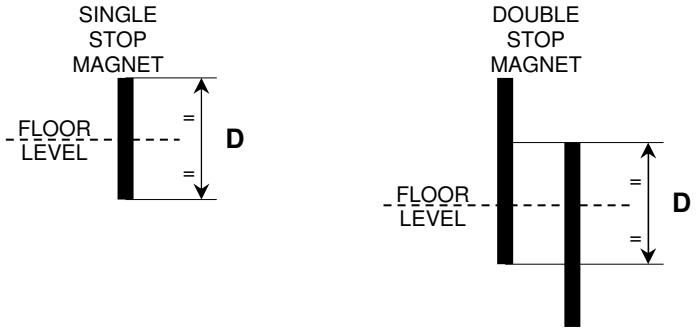
When the desired starting and stopping comfort has reached and, running between far floors, the space travelled at low speed is the same for any floor for both up and down direction, you have to set the slowing distance, especially useful for one floor travel, with parameter P2.2.19 as follows:

- Set parameter P2.2.18 to 1.
- Make a car call for 2 floors at least.
- When the lift reaches a low speed, P2.2.18 will return automatically to 0, while the distance travelled on switching from high to low speed will be saved in P2.2.19 and displayed in V1.3.4.
- Make a car call for one floor only, verify comfort, and check that the space travelled at low speed is the same as a travel between far floors .

To increase comfort further, decrease parameter P2.2.20 (Half floor frequency).

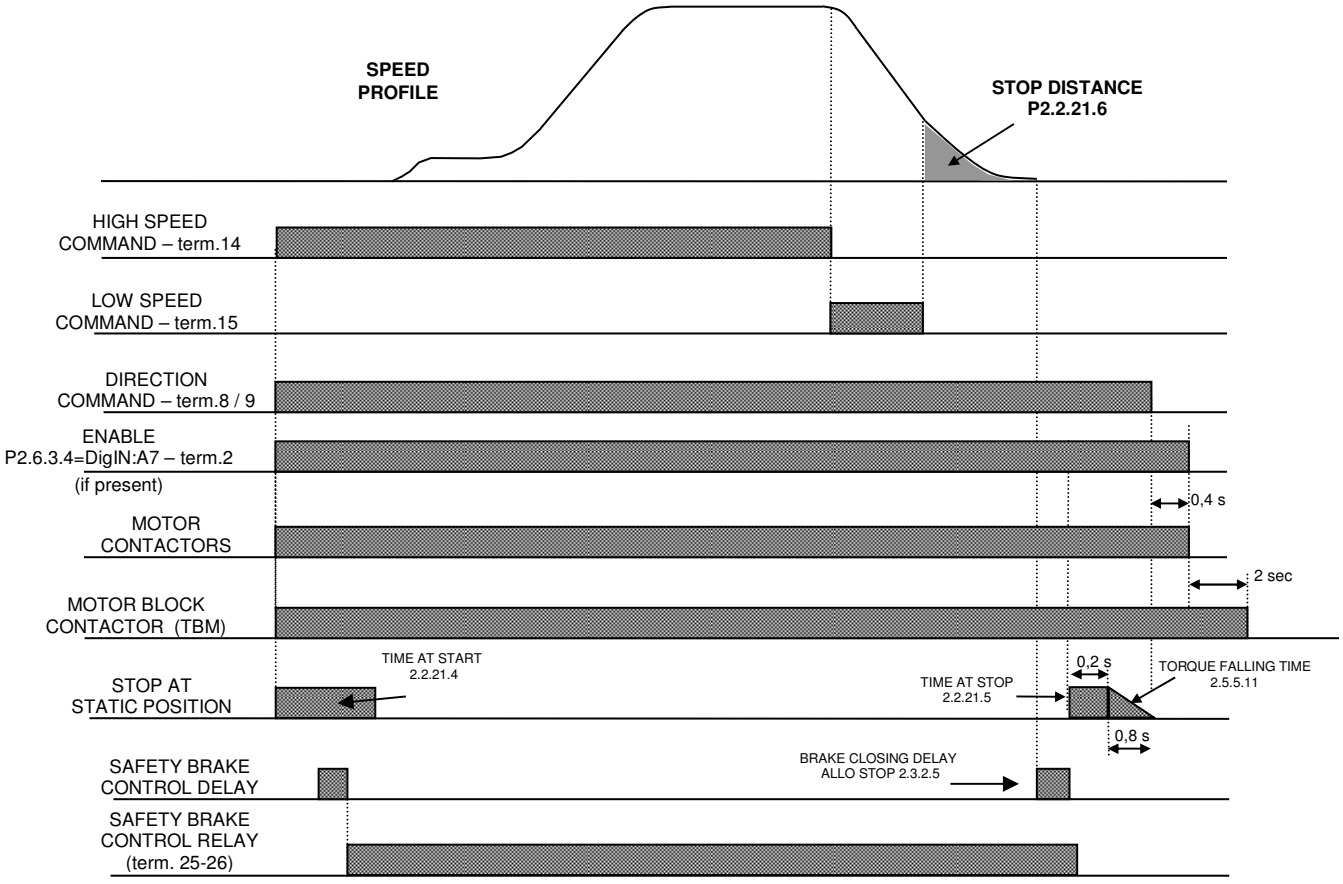
16.2 – DIRECT ARRIVAL AT FLOOR FUNCTION

To enable this function, parameter P.2.2.21.6 "stop distance" must be set at a value different from 0 and equal to the stopping distance (distance **½ D -** see figure below).



Recommended value ½ **D** is about 100 mm 100 - 150 mm. (D = 200 - 300 mm.). Longer or shorter distances are possible depending on the lift speed.

The correct sequence of commands is given below:



To obtain a precise arrival to any floor proceed as follows:

12) Put the stop magnets as indicated.
13) Set the deceleration points like described in the table in paragraph 7.2.
14) Set P2.2.4 (deceleration time) at 1.5 sec.
15) Set P2.2.21.6 (Stop distance) to 0
16) Execute a call command: the car has to arrive at floor at low speed and stop with a big distance from the floor level.
17) Set P2.2.4 in order to have a low speed distance of a few centimetres and equal for any floor both for up and down direction.
18) Set **P2.2.21.6 to** ½ D of the stop magnet, less about 20 mm.
E.g. with **½ D** magnet = 150 mm, enter 130 mm.
19) Execute another call command. At the arrival into the stop magnet, the car will run slowly to reach the floor position.
20) Check the stopping accuracy at floor. If the car stops before the floor level, increase P2.2.21.6 (stop distance), otherwise decrease the value.
21) Increase P2.2.4 in order to have the desired arrival. Increasing P2.2.4, a faster arrival at floor can be obtained.
22) If the car does not stop at the floor smoothly enough, verify parameters:
    a) P2.2.21.7: the higher this value is, the "stronger" the stop.
    b) P2.2.21.8: the higher this value is, the 'smoother' the stop .
    c) P2.2.4: the higher this value is, the 'stronger' the stop.
    d) P2.3.2.5: the brake closing delay must be set so that the brake closes when the motor is already stopped.
    e) If you notice a vibration in the final run reaching the floor, decrease Kp1 (P2.5.4.4) and increase P2.5.4.2 and P2.5.4.3.

13.3 – SPECIAL PARAMETERS

P2.5.4.9.1 / **2** / **3** / **4** / **5** / **6** / **9** / **10** / **11** / **12** / **13** / **15**
These parameters should only be modified when advised by SMS.

P2.5.4.9.7: RollBack Control Gain
P2.5.4.9.8: RollBack Treshold
These parameters are useful to avoid the "rollback" of the motor at starting, when the brake opens.
Generally the default values work fine: too high values can cause noises and jerks at starting, too low values can cause an undesired "rollback".

P2.5.4.9.14: Low Noise Mode
If enabled (= Yes), the motor produces less noise at low revolutions.

P2.5.4.9.15: Maximum Voltage
It is the maximum voltage the inverter can supply to the motor, expressed in % of the motor rated voltage in P2.1.2.

P2.5.5.3 : Encoder calibration (see description at Par. 15.8 – A)

P2.5.5.4 : Encoder angle (see description in paragraph 15.8 – A)

P2.5.5.5 Flux current Kp
P2.5.5.6 Flux current Ti
These are the flux regulator proportional and integral gains.
Please contact SMS Technical Support before changing them.

P2.5.5.7 Modulator Type (Space Vector - DO NOT MODIFY)

P2.5.5.8 Angle Identification at Start (see description in paragraph 15.8 – DO NOT MODIFY)

P2.5.5.9 Rides Angle Identification Refresh
After this run number, the angle identification is automatically performed again, for SIN-COS encoder only.
The default value is 200.

P2.5.5.10 Start Angle Current
The lower this value, the more silent the motor, but for several motors, a problem can occur during identification if the current value is too low.

P.2.5.5.11 : Torque Falling Time
During the stop, if the current to the motor goes off instantly, a strong jump is perceived inside the car, like a stop with the brake with motor already running: the current from the inverter to the motor must go off gradually. Normally a 'soft stop' can be obtained setting a 0.8 sec. torque fall time".

P2.5.5.12 Speed limit
If for any reason the motor does not reach the speed set (due to an excessive load, or low voltage or because the motor is too hot), the inverter will signal an alarm.
If this function is enabled however, the inverter will automatically lower speed to a compatible value.

P2.5.5.13 Speed Limit Factor
If the correct speed is reached, a faster or slower speed can be obtained by modifying P2.5.5.13.
IMPORTANT Even if travel speed is reduced, arrival at the floor will be the same as under normal speed.

P2.5.5.14 Max. Synchronism Error
This is the maximum error between speed set and actual speed that the motor can have during acceleration and slowing.

P2.5.5.15 / **16** / **17** / **18**
These parameters should only be modified when advised by SMS.

IMPORTANT: Parameters with a grey background should only be modified when advised by SMS!

14 – PARAMETER LIST (M2 Menu)

Contents	Description	SMS settings (AsynchMotor)	SMS settings (PermMagnSync)	User setting	Unit
G2.1 BASIC PARAMETERS					
P 2.1.1	Current Limit	1.8 * I Inverter	**1.8 * I Inverter**		A
P 2.1.2	Motor Nom Voltg	380	**400**		V
P 2.1.3	Motor Nom Freq	50	**8.00**		Hz
P 2.1.4	Motor Nom Speed	1440	**60**		rpm
P 2.1.5	Motor Nom Currnt	I Inverter	**I Inverter**		A
P 2.1.6	Motor Cos Phi	0.82	**0.9**		
G2.1.7 LIFT DATA					
P 2.1.7.1	Lift Rated Speed	0.70	**1,00**		m/s
P 2.1.7.2	Pulley Diameter	520	**320**		mm
P 2.1.7.3	Gear Ratio	1.58	**1.01**		
P 2.1.7.4	Ropes Ratio	1:1	**1:1**		
P 2.1.7.5	Update Data	No	**No**		
P 2.1.8	Identification	0	**0**		
P 2.1.9	Fan control	3 / Speed control	**3 / Speed control**		
P 2.1.10	ParEditPassword	0	**0**		
P 2.1.11	Motor Type	0 / Async Induct	**1 / PMSM**		
P 2.1.12	Encoder Type	0 / Incremental	**0 / Incremental**		
P 2.1.13	EncoderDirection	Not Inverted	**Not Inverted**		
P 2.1.14	Calculated Poles	4	**16**		
P 2.1.15	ForcedPolesNum	0	**0**		
P 2.1.16	Motor Rs	0,00	**0,00**		Ohm
P 2.1.17	Motor Xs	0,00	**0,00**		Ohm
P 2.1.18	Max Power	300,0	**300,0**		%
P 2.1.19	RopeRidesInit	0	**0**		
G2.2 RUN CONFIGURATION					
P 2.2.1	Max Frequency	50	**8.00**		Hz
P 2.2.2	NominalLinSpeed	0.70	**1.00**		m/s
P 2.2.3	Acceleration ramp	2.50	**2.50**		s
P 2.2.4	Deceleration ramp	2.00	**2.00**		s
P 2.2.5	Final Decelerat.	0.50	**0.80**		s
P 2.2.6	v0 000 zero	0,00	**0,00**		Hz
P 2.2.7	v1 100 high	50	**8.00**		Hz
P 2.2.8	v2 010 low	5.00	**0.80**		Hz
P 2.2.9	v3 110 high+low	25.00	**4.00**		Hz
P 2.2.10	v4 001 inspect.	25.00	**4.00**		Hz
P 2.2.11	v5 101 high+insp	25.00	**4.00**		Hz
P 2.2.12	v6 011 low+insp	25.00	**4.00**		Hz
P 2.2.13	v7 111 hi+lo+ins	25.00	**4.00**		Hz
P 2.2.14	Acc Inc Jerk	2.00	**1.20**		s
P 2.2.15	Acc Dec Jerk	0.6	**0.6**		s
P 2.2.16	Dec Inc Jerk	0.6	**0.6**		s
P 2.2.17	Dec Dec Jerk	1.20	**1.20**		s
P 2.2.18	Auto HalfF Dist	0	**0**		
P 2.2.19	Half Floor Dist	1000	**1000**		mm
P 2.2.20	Half Floor Freq	25.00	**4.00**		Hz
G2.2.21 CLOSED LOOP					
P 2.2.21.1	SmoothStartTime	0,00	**0.00**		s
P 2.2.21.2	SmoothStartFreq	0.30	**0.10**		Hz
P 2.2.21.3	Initial Acceler.	0.50	**0.50**		s
P 2.2.21.4	0 Hz TimeAtStart	0.700	**1.00**		s
P 2.2.21.5	0 Hz TimeAtStop	0.400	**0.200**		s
P 2.2.21.6	Stop Distance	0	**0**		mm
P 2.2.21.7	Final Stop Speed	0.50	**0.10**		Hz
P 2.2.21.8	Final Stop Time	0.050	**0.20**		s
P 2.2.21.9	Initial Speed	0	**0**		Hz
P 2.2.21.10	TotalDecDistance	0	**0**		mm
P 2.2.21.11	OptimStopSpeed	0	**0**		Hz
P 2.2.21.12	Test Mode	0 / No	**0 / No**		

Contents	Description	SMS settings (AsynchMotor)	SMS settings (PermMagnSync)	User setting	Unit
P 2.2.22	FloorLevelSpeed	0 / Not used	**0 / Not used**		
P 2.2.23	Downward Tuning	No	**Not present**		
P 2.2.24	Upward Tuning	No	**Not present**		
G2.3 BRAKE CONTROL					
G2.3.1 OPEN LOOP					
P 2.3.1.1	MinCurrBrakeOpen	10.0	**2.0**		%
P 2.3.1.2	BrakeCloseDelay	0.30	**0.30**		s
P 2.3.1.3	DC-Brake Current	0.7 * I Inverter	**0.7 * I Inverter**		A
P 2.3.1.4	Start DC-BrakeTm	0.000	**0.000**		s
P 2.3.1.5	Stop DC-BrakeTm	0.400	**0.400**		s
P 2.3.1.6	Stop DC-BrakeFr	1.50	**0.20**		Hz
G2.3.1 ADVANCED FUNCTIONS					
P 2.3.1.7.1	Reserved	0	**0**		
P 2.3.1.7.2	MinFreqBrakeOpen	0,00	**0,00**		Hz
P 2.3.1.7.3	BrakeOpenDelay	0.00	**0.00**		s
P 2.3.1.7.4	MinFreBrakeClose	0.50	**0.10**		Hz
P 2.3.1.7.5	SmoothStartFreq	0.30	**0.00**		Hz
P 2.3.1.7.6	SmoothStartTime	0.30	**0.00**		s
G2.3.2 CLOSED LOOP					
P 2.3.2.1	MinCurrBrakeOpen	10.0	**0.00**		%
P 2.3.2.2	Reserved	0	**0**		
P 2.3.2.3	MinFreqBrakeOpen	0.00	**0.00**		Hz
P 2.3.2.4	MinFreBrakeClose	0.50	**0.10**		Hz
P 2.3.2.5	BrakeCloseDelay	0.30	**0,00**		s
G2.3.2.6 ADVANCED FUNCTIONS					
P 2.3.2.6.1	BrakeOpenDelay	0.50	**0.00**		s
P 2.3.2.6.2	MaxFreq If Close	0.15	**0.15**		Hz
Following G2.3 BRAKE CONTROL					
P 2.3.3	BrakeExt SuperV1	0 / Not Used	**2 / Not Used**		
P 2.3.4	MaxOpenTime	2.00	**2.00**		s
P 2.3.5	MaxCloseTime	2.00	**2.00**		s
P 2.3.6	BrakeExt SuperV2	0 / Not used	**2 / Not used**		
P 2.3.7	BrakeSpace Test	0 / None	**0 / None**		
P 2.3.8	MechBrakingSpace	500	**500**		
P 2.3.9	SteadyLiftSpace	50	**50**		
G2.4 DRIVE CONTROL					
P2.4.1	Brake Chopper	2 / Run Test	**2 / Run Test**		
P 2.4.2	Reserved	0	**0**		
P 2.4.3	Undervolt Contr	0 / Off	**0 / Off**		
P 2.4.4	SpecialPowerUnit	0 / No	**0 / No**		
P 2.4.5	SPU Overload	180	**180**		%
P 2.4.6	Power Meas. %	80	**80**		%
G2.5 MOTOR CONTROL					
P 2.5.1	Motor Ctrl Mode	1 / Open Loop	**2 / Closed Loop**		
P 2.5.2	Switching Freq	10.0	**8.0**		kHz
G2.5.3 OPEN LOOP					
P 2.5.3.1	U/f Optimization	1 / AutoTorqBoost	**0 / None**		
P 2.5.3.2	U/f Ratio Select	2 / Programmable	**0 / Linear**		
P 2.5.3.3	U/f Mid Freq	1.75	**0**		Hz
P 2.5.3.4	U/f Mid Voltg	5.00	**0**		%
P 2.5.3.5	Zero Freq Voltg	3.50	**0**		%
G2.5.3.6 ADVANCED FUNCTIONS					
P 2.5.3.6.1	Field WeakngPnt	50	**8.00**		Hz
P 2.5.3.6.2	Voltage at FWP	100	**100**		%
P 2.5.3.6.3	VoltStabGain	100	**100**		
P 2.5.3.6.4	VoltStabDamp	900	**900**		
P 2.5.3.6.5	TorqStabGain	100	**100**		
P 2.5.3.6.6	TorqStabDamp	800	**980**		
P 2.5.3.6.7	MotorBoostGain	67	**67**		%

Contents	Description	SMS settings (AsynchMotor)	SMS settings (PermMagnSync)	User setting	Unit
P 2.5.3.6.8	GeneratBoostGain	50	**50**		%

NOTE: Parameters in groups G2.4, G2.6, G2.8 are only visible if the right password is entered in parameter P2.1.10.

G2.5.3.7 ADVANCED FUNCTIONS 1					
P 2.5.3.7.1	Speed Control Kp	3000	**3000**		
P 2.5.3.7.2	Speed Control Ki	300	**300**		
P 2.5.3.7.3	LowSp.SwitchFreq	6.0	**6.0**		kHz
P 2.5.3.7.4	LowSp. Level	5.00	**0.80**		Hz
P 2.5.3.7.5	Current at 0Hz	50	**50**		%
P 2.5.3.7.6	RsVoltDrop	Different from 0, it depends on the size	**Different from 0, it depends on the size**		
P 2.5.3.7.7	LsdVoltDrop	”	”		
P 2.5.3.7.8	LsqVoltDrop	”	”		
G2.5.4 CLOSED LOOP					
P 2.5.4.1	MagnCurrent	0.5 * I Inverter	**0**		A
P 2.5.4.2	Adaptive Lim 1	3.50	**3.50**		Hz
P 2.5.4.3	Adaptive Lim 2	4.00	**4.00**		Hz
P 2.5.4.4	Speed Cntrl Kp 1	40	**10**		
P 2.5.4.5	Speed Cntrl Ti 1	40.0	**40.0**		ms
P 2.5.4.6	Speed Cntrl Kp 2	20	**10**		
P 2.5.4.7	Speed Cntrl Ti 2	40.0	**40.0**		ms
P 2.5.4.8	Encoder1FiltTime	0	**0**		ms
G2.5.4.9 ADVANCED FUNCTIONS					
P 2.5.4.9.1	CurrentControlKp	40	**100**		%
P 2.5.4.9.2	CurrentControlTi	2.5	**2.5**		ms
P 2.5.4.9.3	LoadDrooping	0,00	**0,00**		%
P 2.5.4.9.4	Droop time const	0,000	**0,000**		s
P 2.5.4.9.5	SpeedDerivative	1.00	**0.50**		s
P 2.5.4.9.6	DerivatFilterTime	0	**50**		ms
P 2.5.4.9.7	RollBackCtrGain	300	**300**		
P 2.5.4.9.8	RollBackThresh	0,30	**0,30**		
P 2.5.4.9.9	DC Ripple Compen	Enabled	**Enabled**		
P 2.5.4.9.10	DC RippleC Gain	0	**0**		
P 2.5.4.9.11	Encoder Multipl	1	**1**		%
P 2.5.4.9.12	Encoder Divider	1	**1**		
P 2.5.4.9.13	AntiRBMode	0 / BrakeOpen	**0 / BrakeOpen**		
P 2.5.4.9.14	LowNoiseModul	0 / No	**0 / No**		
P 2.5.4.9.15	Max Voltage	150	**150**		%
P 2.5.4.9.16	Slip Adjust	70%	**Not present**		%
P 2.5.4.9.17	HotSlipAdjust	100%	**Not present**		%
G2.5.5 PMSM (Permanent Magnet Synchronous Motor)					
P 2.5.5.1	Reserved	0	**0**		
P 2.5.5.2	Reserved	0	**0**		
P 2.5.5.3	EncoderCalibrat	0	**0**		
P 2.5.5.4	Encoder Angle	0	**0 (To be calibrated for EnDat, leave 0 for sin-cos)**		
P 2.5.5.5	Flux Current Kp	3,00	**3.00**		%
P 2.5.5.6	Flux Current Ti	20.0	**20.0**		ms
P 2.5.5.7	Modulator type	0 / ASIC	**1 / SpaceVector**		
P 2.5.5.8	Angl id at Start	0 / Disabled	**0 / Disabled for EnDat, 1 / Enabled for sin-cos**		
P 2.5.5.9	RidesAngleIdRefr	200	**200**		
P 2.5.5.10	StartAngleCurren	50	**50**		%
P 2.5.5.11	Torque Fall Time	0.6	**0.80**		s
P 2.5.5.12	Speed limit	0 / Disabled	**0 / Disabled**		
P 2.5.5.13	Speed Lim factor	100.0	**100.0**		%
P 2.5.5.14	Max Synchro Err	10.0	**10.0**		%
P 2.5.5.15	RotorPositCorrec	0 / No	**0 / No**		
P 2.5.5.16	Repeat ID Emerg	1 / Yes	**1 / Yes**		
P2.5.5.17	RotorPosCorrGain	900	**900**		
P2.5.5.18	AngleIdentMode	0	**0**		
G2.6 INPUT SIGNALS					

Contents	Description	SMS settings (AsynchMotor)	SMS settings (PermMagnSync)	User setting	Unit
P 2.6.1.8	Start/StopLogic	0 / Fwd-Back	**0 / Fwd-Back**		
G2.6.2 SPEED SEL INPUTS					
P 2.6.2.1	Speed Sel Input1	DigIN:A.4	**DigIN:A.4**		
P 2.6.2.2	Speed Sel Input2	DigIN:A.5	**DigIN:A.5**		
P 2.6.2.3	Speed Sel Input3	DigIN:A.6	**DigIN:A.6**		
P 2.6.2.4	StableDinTime	300	**300**		ms
G2.6.3 FUNCTIONS					
P 2.6.3.1	Ext Fault Close	DigIN:0.1	**DigIN:0.1**		
P 2.6.3.2	Ext Fault Open	DigIN:0.1	**DigIN:0.1**		
P 2.6.3.3	Fault Reset	DigIN:0.1	**DigIN:0.1**		
P 2.6.3.4	Run Enable	DigIN:0.1	**DigIN:A.9**		
P 2.6.3.5	BrakeExt SuperV1	DigIN:0.1	**DigIN:A.8**		
P 2.6.3.6	BrakeExt SuperV2	DigIN:0.1	**DigIN:A.7**		
G2.7 OUTPUT SIGNALS					
P 2.7.1	DO1 Content	15 / Contactor	**15 / Contactor**		
P 2.7.2	DO1 Inversion	0 / Off	**0 / Off**		
P 2.7.3	DO1 Delay	0.00	**0,00**		s
P 2.7.4	FreqSupervLimit	1 / Low Limit	**1 / Low Limit**		
P 2.7.5	FreqSupervValue	30	**5.00**		Hz
G2.7.6 ADVANCED FUNCTIONS					
P 2.7.6.1	Iout Content	12 / Brake	**12 / Brake**		
P 2.7.6.2	Iout Filter Time	0.00	**0.00**		s
P 2.7.6.3	Iout Invert	0 / Not inverted	**0 / Not inverted**		
P 2.7.6.4	Iout Minimum	0 / 0 mA	**0 / 0 mA**		
P 2.7.6.5	Iout Scale	100	**100**		%
P 2.7.6.6	RO1 Content	4 / FaultInvert	**4 / FaultInvert**		
P 2.7.6.7	RO1 Inversion	0 / Off	**0 / Off**		
P 2.7.6.8	RO1 Delay	0.00	**0.00**		s
P 2.7.6.9	RO2 Content	13 / Brake	**13 / Brake**		
P 2.7.6.10	RO2 Inversion	0 / Off	**0 / Off**		
P 2.7.6.11	MotorTorqSuperV	200.0	**200.0**		%
P 2.7.6.12	GenerTorqSuperV	200.0	**200.0**		%
G2.7.7 OPTIONAL OUTPUTS					
P 2.7.7.1	Opt RO1 Content	15 / Contactor	**15 / Contactor**		
P 2.7.7.2	Opt RO2 Content	16 /	**16 /**		
P 2.7.7.3	Opt RO3 Content	11 / Vel Supervis	**11 / Vel Supervis**		
P 2.7.7.4	FreqSupervLimit	1 / Low Limit	**1 / Low Limit**		
P 2.7.7.5	FreqSupervValue	30	**5.00**		Hz
G2.8 PROTECTIONS					
P 2.8.1	External Fault	2 / Fault	**2 / Fault**		
P 2.8.2	Input Phase Supv	2 / Fault	**2 / Fault**		
P 2.8.3	UVolt Fault Resp	1 / Not saved	**1 / Not saved**		
P 2.8.4	OutputPh. Superv	0 / None	**0 / None**		
P 2.8.5	Earth fault	2 / Fault	**2 / Fault**		
P 2.8.6	Motor Therm Prot	2 / Fault	**0 / None**		
P 2.8.7	MTP AmbTempFact	0.0	**0.0**		%
P 2.8.8	MTP 0Hz Cooling	40.0	**40.0**		%
P 2.8.9	MTP MotTimeConst	45	**45**		min
P 2.8.10	MTP MotDutyCycle	100	**100**		%
P 2.8.11	Stall Protection	2 / Fault	**0 / None**		
P 2.8.12	Stall Current	1.8 * I Inverter	**1.8 * I Inverter**		A
P 2.8.13	Stall Time Lim	6.00	**6.00**		s
P 2.8.14	Stall Freq Lim	6.00	**6.00**		Hz
P 2.8.15	Reserved	0	**0**		
P 2.8.16	Reserved	0	**0**		
P 2.8.17	Reserved	0	**0**		
P 2.8.18	Reserved	0	**0**		
P 2.8.19	ThermistorF.Resp	0 / None	**0 / None**		

Contents	Description	SMS settings (AsynchMotor)	SMS settings (PermMagnSync)	User setting	Unit
P 2.8.20	Reserved	0	**0**		
P 2.8.21	SlotComFaultResp	2 / Fault	**2 / Fault**		
P 2.8.22	Reserved	0	**0**		
P 2.8.23	Speed Fault	2 / Fault	**2 / Fault**		
P 2.8.24	Speed Error Lim	2/10 nom. motor freq.	**2/10 nom. motor freq.**		Hz
P 2.8.25	Speed Error Time	2.00	**2.00**		s
P 2.8.26	Over Torq Fault	0 / None	**0 / None**		
P 2.8.27	Torq SuperV time	0,00	**0,00**		s
P 2.8.28	RunErrorResponse	1 / Alarm	**1 / Alarm**		
P 2.8.29	LowCurrResponse	1 / Alarm	**1 / Alarm**		
P 2.8.30	LevellingRespons	1 / Alarm	**1 / Alarm**		
P 2.8.31	UnitTemperatSens	0 / Active	**0 / Active**		
P 2.8.32	Max Overspeed	110.0	**110.0**		%
P 2.8.33	AdvancContFault	20	**20**		
P 2.8.34	LowRefResponse	2 / Fault	**2 / Fault**		
P 2.8.35	EncoderSupervis	1 / Disabled	**0 / Enabled for EnDat encoder 1 / Disabled for sine-cos encoder**		
P 2.8.36	PMSM Phase Check	30.0	**30.0**		%
G2.10 EVACUATION					
P 2.10.1	Evacuation Mode	2 / Automatic	**2 / Torque Test**		
P 2.10.2	Evacuation Input	DigIN:A.3	**DigIN:A.3**		
P 2.10.3	MaxSpeedInEva	5.00	**0.80**		Hz
P 2.10.4	U/f Optimization	1 / AutoTorqBoost	**1 / AutoTorqBoost**		
P 2.10.5	U/f Mid Freq	1.75	**0.00**		Hz
P 2.10.6	U/f Mid Voltg	5.00	**0.00**		%
P 2.10.7	Zero Freq Voltg	3.50	**0.00**		%
P 2.10.8	MagnCurrent	0.5 * I Inverter	**0**		A
P 2.10.9	Switching Freq	3.0	**3.0**		kHz
P 2.10.10	Man MaxSpeed	0,00	**0.00**		m/s
P 2.10.11	Min EmergSpeed	0,50	**0,50**		m/s
P 2.10.12	MinSpeed Time	5,0	**5,0**		s
G2.10.13 ADVANCED FUNCTIONS					
P 2.10.13.1	Motor Ctrl Mode	0 / Frequency	**2 / Closed Loop**		
P 2.10.13.2	CurrentReadDelay	2.0	**3.0**		s
P 2.10.13.3	RollBackCtrlGain	50.0	**50.0**		%
G2.11 STARTUP TORQUE					
P2.11.1	StartUp Torque	0 / Not used	**0 / Not used**		
P2.11.2	StartUpTorque Time	500	**500**		ms
P2.11.3	StartUp Torq Up	-20.0	**-20.0**		%
P2.11.4	StartUp Torq Dw	-20.0	**-20.0**		%
P2.11.5	Torq Ref Select	1 / AI1	**1 / AI1**		
P2.11.6	Full LoadLevel	100.00	**100.00**		%
P2.11.7	No Load Level	0.00	**0.00**		%
P2.11.8	Balance Level	50.00	**50.00**		%
P2.11.9	Full Load Torque	80.0	**80.0**		%
P2.11.10	No Load Torque	80.0	**80.0**		%
P2.11.11	Torque Incr Time	0.20	**0.20**		%
P2.11.12	TorqueLimitStart	250.0	**250.0**		%

For further information and advice contact:

S M S S.R.L. (Gruppo SASSI HOLDING)

E-mail: sms@sms.bo.it • **Website:** www.sms-lift.com • **Tel:** +39 051 969037 • **Address:** Via Guido Rossa 46-48-50 Loc. Crespellano 40053 Valsamoggia - Bologna - Italy

E-mail Technical Assistance: assistenzatecnica@sms.bo.it • **Tel. Technical Assistance:** +39 051 6720710

Danfoss A/S
DK-6430 Nordborg
Denmark
CVR nr.: 20 16 57 15

Telephone: +45 7488 2222
Fax: +45 7449 0949

EU DECLARATION OF CONFORMITY

Danfoss A/S

Vacon Ltd

declares under our sole responsibility that the

Product(s) VACON® NXS/P AC drive

Type(s) VACON® NXS/P 0003 2...0300 2
VACON® NXS/P 0003 5...1030 5
VACON® NXS/P 0004 6...0820 6

Covered by this declaration is in conformity with the following directive(s), standard(s) or other normative document(s), provided that the product is used in accordance with our instructions.

Safety: EN 61800-5-1:2007
EN 60204-1:2006+A1:2009 (as relevant)

EMC: EN 61800-3:2004+A1:2012

RoHS: EN 50581:2012

and conforms to the relevant safety provisions of Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU and RoHS Directive 2011/65/EU.

The year the CE marking was affixed: 2002

Date:	Issued by	Date:	Approved by
27/10 2017	Signature Name: **Michael Quitzau** Title: **Head of Standard & Decentral Drives**	27/10 2017	Signature Name: **Timo Kasi** Title: **VP, Design Center Finland and Italy**

Danfoss only vouches for the correctness of the English version of this declaration. In the event of the declaration being translated into any other language, the translator concerned shall be liable for the correctness of the translation.

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