



Open Loop Mode Setup Guide

Elevator Drive

Induction motors

Part Number: 0479-0041-01 Issue: 1

Original Instructions

For the purposes of compliance with the EU Machinery Directive 2006/42/EC, the English version of this manual is the Original Instructions. Manuals in other languages are Translations of the Original Instructions.

Documentation

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1 Safety information

1.1 Warnings, Cautions and Notes



A Warning contains information which is essential for avoiding a safety hazard.



A Caution contains information which is necessary for avoiding a risk of damage to the product or other equipment.

NOTE

A Note contains information which helps to ensure correct operation of the product.

1.2 Important safety information. Hazards. Competence of designers and installers

This guide applies to products which control electric motors either directly (drives) or indirectly (controllers, option modules and other auxiliary equipment and accessories). In all cases the hazards associated with powerful electrical drives are present, and all safety information relating to drives and associated equipment must be observed.

Specific warnings are given at the relevant places in this guide.

Drives and controllers are intended as components for professional incorporation into complete systems. If installed incorrectly they may present a safety hazard. The drive uses high voltages and currents, carries a high level of stored electrical energy, and is used to control equipment which can cause injury. Close attention is required to the electrical installation and the system design to avoid hazards either in normal operation or in the event of equipment malfunction.

System design, installation, commissioning/start-up and maintenance must be carried out by personnel who have the necessary training and competence. They must read this safety information and this guide carefully.

1.3 Responsibility

It is the responsibility of the installer to ensure that the equipment is installed correctly with regard to all instructions given in this guide. They must give due consideration to the safety of the complete system, so as to avoid the risk of injury both in normal operation and in the event of a fault or of reasonably foreseeable misuse.

The manufacturer accepts no liability for any consequences resulting from inappropriate, negligent or incorrect installation of the equipment.

1.4 Compliance with regulations

The installer is responsible for complying with all relevant regulations, such as national wiring regulations, accident prevention regulations and electromagnetic compatibility (EMC) regulations. Particular attention must be given to the cross-sectional areas of conductors, the selection of fuses or other protection, and protective ground (earth) connections.

This guide contains instructions for achieving compliance with specific EMC standards.

All machinery to be supplied within the European Union in which this product is used must comply with the following directives:

2006/42/EC Safety of machinery.

2014/30/EU: Electromagnetic Compatibility.

1.5 Electrical hazards

The voltages used in the drive can cause severe electrical shock and/or burns, and could be lethal. Extreme care is necessary at all times when working with or adjacent to the drive. Hazardous voltage may be present in any of the following locations:

- · AC and DC supply cables and connections
- Output cables and connections
- Many internal parts of the drive, and external option units

Unless otherwise indicated, control terminals are single insulated and must not be touched.

The supply must be disconnected by an approved electrical isolation device before gaining access to the electrical connections.

The STOP and Safe Torque Off functions of the drive do not isolate dangerous voltages from the output of the drive or from any external option unit.

The drive must be installed in accordance with the instructions given in this guide. Failure to observe the instructions could result in a fire hazard.

1.6 Stored electrical charge

The drive contains capacitors that remain charged to a potentially lethal voltage after the AC supply has been disconnected. If the drive has been energized, the AC supply must be isolated at least ten minutes before work may continue.

1.7 Mechanical hazards

Careful consideration must be given to the functions of the drive or controller which might result in a hazard, either through their intended behaviour or through incorrect operation due to a fault. In any application where a malfunction of the drive or its control system could lead to or allow damage, loss or injury, a risk analysis must be carried out, and where necessary, further measures taken to reduce the risk for example, an over-speed protection device in case of failure of the speed control, or a fail-safe mechanical brake in case of loss of motor braking.

With the sole exception of the Safe Torque Off function, none of the drive functions must be used to ensure safety of personnel, i.e. they must not be used for safety-related functions.

The Safe Torque Off function may be used in a safety-related application. The system designer is responsible for ensuring that the complete system is safe and designed correctly according to the relevant safety standards.

The design of safety-related control systems must only be done by personnel with the required training and experience. The Safe Torque Off function will only ensure the safety of a machine if it is correctly incorporated into a complete safety system. The system must be subject to a risk assessment to confirm that the residual risk of an unsafe event is at an acceptable level for the application.

1.8 Access to equipment

Access must be restricted to authorized personnel only. Safety regulations which apply at the place of use must be complied with.

1.9 Environmental limits

Instructions in this guide regarding transport, storage, installation and use of the equipment must be complied with, including the specified environmental limits. This includes temperature, humidity, contamination, shock and vibration. Drives must not be subjected to excessive physical force.

1.10 Hazardous environments

The equipment must not be installed in a hazardous environment (i.e. a potentially explosive environment).

Safety information	Introduction	Elevator Drive Keypad	Open Loop Setup, Configuration	User Menu A	Diagnostics	Connection Diagram	Timing Diagram	Re-Configuring Control Terminals

1.11 Motor

The safety of the motor under variable speed conditions must be ensured.

To avoid the risk of physical injury, do not exceed the maximum specified speed of the motor.

Low speeds may cause the motor to overheat because the cooling fan becomes less effective, causing a fire hazard. The motor should be installed with a protection thermistor. If necessary, an electric forced vent fan should be used.

The values of the motor parameters set in the drive affect the protection of the motor. The default values in the drive must not be relied upon. It is essential that the correct value is entered in the Motor Rated Current parameter.

1.12 Mechanical brake control

Any brake control functions are provided to allow well co-ordinated operation of an external brake with the drive. While both hardware and software are designed to high standards of quality and robustness, they are not intended for use as safety functions, i.e. where a fault or failure would result in a risk of injury. In any application where the incorrect operation of the brake release mechanism could result in injury, independent protection devices of proven integrity must also be incorporated.

1.13 Adjusting parameters

Some parameters have a profound effect on the operation of the drive. They must not be altered without careful consideration of the impact on the controlled system. Measures must be taken to prevent unwanted changes due to error or tampering.

1.14 Electromagnetic compatibility (EMC)

Installation instructions for a range of EMC environments are provided in the E300 Elevator drive Installation and System Design guide. If the installation is poorly designed or other equipment does not comply with suitable standards for EMC, the product might cause or suffer from disturbance due to electromagnetic interaction with other equipment. It is the responsibility of the installer to ensure that the equipment or system into which the product is incorporated complies with the relevant EMC legislation in the place of use.

Safety information	Introduction	Elevator Drive Keypad	Open Loop Setup, Configuration	User Menu A	Diagnostics	Connection Diagram	Timing Diagram	Re-Configuring Control Terminals

2 Introduction

Before reading this Setup guide it is assumed that the user is familiar with the Elevator drive and user documentation Installation and System Design Guide and Parameter Reference Guide. This Setup guide contains the required detail for setup and commissioning of the Elevator drive for Open loop mode operation within a geared Lift system. Detail does not include detailed parameter listings, for full descriptions refer to the Installation and System Design Guide, Parameter Reference Guide.

Re-Configuring Control Terminals

3 **Elevator Drive Keypad**

For setting the Elevator drive parameters there are the following options

- Parameters can be setup directly on the Elevator drive using the LCD keypad. The LCD Keypad can be fitted or removed with the drive powered up and operating. The Elevator drive can also be operated without the LCD keypad.
- It is also possible to setup the Elevator drive using serial communications and Elevator Connect. The parameters can also be displayed on the LCD keypad of the drive if required.

3.1 Elevator Drive Display

The parameter display on the Elevator drives LCD keypad is as follows.

Figure 3-1 LCD Keypad



Figure 3-2 Elevator drive LCD keypad display

1. Escape button - Used to exit from parameter edit or view mode In edit mode, if parameter values are edited and exit button pressed, the value will be restored to the value it had on entry to edit mode.

2. Start reverse (Auxiliary) button - Not used.

3. Start forward button - Not used.

4. Navigation keys (x4) - Used to navigate through menu and parameters and edit values.

5. Reset button - Used to Reset the drive.

6. Enter / Mode button - Used to toggle between parameter edit and view mode

The Elevator drive has a full set of menus from Menu A up to Z. Menus and parameters are defined as, Menu number = mm, Parameter number = nnn

Table 3-1 Elevator drive LCD keypad functions

Key	Function in Display Mode (Static display	Function in Edit Mode (Blinking number)
	Drive State	:
М	Change to Edit Mode	Change to Display Mode
↑	Increase Parameter number	Increase Parameter value
\Downarrow	Decrease Parameter number	Decrease Parameter value
\Leftrightarrow	Decrease Menu number	Increase Decimal place
⇒	Increase Menu number	Decrease Decimal place

Four display modes can be seen during operation as shown following:

1. Parameter view mode

Menu and parameter view mode, read write (RW) or read only (RO) 2. Status mode

If the drive is OK and parameters are not being edited or viewed, the upper row of the display will show one of the following Inhibit or Run.

3. Trip status mode

When the drive is in a trip condition the upper row of the display will indicate that the drive has tripped and the lower row of the display will show the trip code.

4. Alarm status mode

During an 'alarm' condition the upper row of the display flashes between the drive status Inhibit or Run (drive not in parameter view or edit mode) and the alarm condition



Introduction

4 Open Loop Setup, Configuration

4.1 SMARTCARD, NV Media Card Setup

The most effective was to setup the Elevator drive parameter set is to use the SMARTCARD, NV Media Card as follows with the required parameter set defined.

Figure 4-1 Elevator drive, Fitting SMARTCARD, NV Media Card



Figure 4-2 Elevator drive programming from SMARTCARD, NV Media Card



Figure 4-3 Elevator drive Boot and Auto save with SMARTCARD, NV Media Card



If a **Card Rating** trip (186) occurs parameters are being transferred from the SMARTCARD, NV Media Card, however the current and/or voltage ratings are different between source and destination drives.

This trip also applies if a compare (using Parameter **mm.000** = 8yyy) is attempted between the data block on a SMARTCARD, NV Media Card and the drive. The **Card Rating** trip (186) does not stop the data transfer but is a warning that rating specific parameters with the RA attribute may not be transferred to the destination drive.

Recommended actions

Reset the drive to clear the trip

Ensure that the drive rating dependent parameters have transferred correctly

After SMARTCARD, NV Media Card operation the setup can be continued with ... 5.3 First Start

4.2 Manual Setup

4.2.1 Selecting Motor Type

The default operating mode for the Elevator drive is A02 (B01) = RFC-S. To change to Open-loop operation set:

- mm.000 = 1253
- A02 (B01) = Open-loop
- Confirm change: = Reset button

When selecting Open-loop mode the drive by default operates in open loop vector control where **A23 (B09)** = Ur I, this can be changed if required to **A23 (B09)** = Fixed for fixed boost control

4.2.2 Selecting Interface control input mode

The control input mode can be selected as follows to suit the Lift (Elevator) controller, also refer section 7 *Connection Diagram*.

A10 (H11)	= Analog Run Permit	(0)
A10 (H11)	= Analog 2 Directions	(1)
A10 (H11)	= 1 Direction Priority	(2)
A10 (H11)	= 1 Direction Binary	(3)
A10 (H11)	= 2 Directions Priority	(4)
A10 (H11)	= 2 Directions Binary	(5)
A10 (H11)	= Control word, Modbus	(6)
A10 (H11)	= DCP 3	(7)
A10 (H11)	= DCP 4	(8)

Save operating mode

• mm.000 = Save parameters

• Confirm change: = Reset button

4.2.3 Motor Data Setting

The following provides the default Motor settings for the induction Motor in open-loop for the Elevator drive. These parameters should be setup for the application with settings from the Motor datasheet, nameplate.

From default a Motor *Thermistor* trip will be present if no Motor thermistor is connected to the drives Analog input 3 this trip can be disabled setting F74 = No Thermistor (0)

Table 4-1 Default Elevator drive Motor settings required for setup

Parameter	Description	Setting
A18 (B02)	Motor nominal current	A
A19 (B03)	Motor nominal voltage	V
B04	Motor power factor	0.850
A20 (B05)	Motor pole count	Automatic
A21 (B06)	Motor rated frequency	50 Hz
A22 (B07)	Motor nominal speed	1500 rpm
A23 (B09)	Open-loop control mode	Ur I
B10	Slip compensation enable	On (1)
A24 (B16)	Symmetrical current limit	165.0 %
A25 (B13)	Drive switching frequency	8 kHz
B12	Low frequency boost	3.0 %
A26 (B11)	Motor auto-tune	None

The default switching frequency for the Elevator drive is 8 kHz with the highest switching frequency being 16 kHz.

Safety information	Introduction	Elevator Drive Keypad	Open Loop Setup, Configuration	User Menu A	Diagnostics	Connection Diagram	Timing Diagram	Re-Configuring Control Terminals
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4.2.4 Adjusting Symmetrical Current Limit

The final setting for **A24 (B16)** Symmetrical Current Limit (default = 165 %) will be dependent upon a number of factors including the Motor, Drive rating, and Lift system profile.

Symmetrical current limit: A24 (B16) = ... %

4.2.5 Auto-tune

Rotating Auto-tune

NOTE

From default the Elevator drive has a Fast disable **B27** configured, if this is not required disable setting **F21** T27 Dig Input 4 = **A00**

When carrying out a Stationary (1) or Rotating (2) auto-tune to setup the Motor, (Motor Auto-tune **A26 (B11)**) the following tests will be carried out and parameters automatically setup. For a Rotating (2) auto-tune the Motor should be unloaded and de-roped.

Parameter	Description	Auto-tune
B04	Motor Rated Power Factor	Rotating (2)
B35	Stator Inductance	
B33	Transient Inductance	
B34	Drive switching frequency	Stationary (1)
B46	Low frequency boost	Rotating (2)
B47	Motor auto-tune	,

NOTE

A rotating auto-tune will accelerate the Motor with the fixed acceleration rate of 5 s/100 Hz to a frequency of Motor Rated Frequency **B06** x 2/3, where the frequency is maintained for 4 s.

Stationary Auto-tune

Stationary auto tune setting up current loop gains. During this test the Motor will not rotate and the Motor brakes are not released

- A26 (B11) = Stationary (1)
- Inspection start and hold until complete (40 s)
- A26 (B11) = None (0) Inspection stop

Check auto-tune results for Motor data

Parameter	Description	Auto-tune
B33	Transient Inductance	
B34	Stator Resistance	
B46	Maximum Deadtime Compensation	Stationary (1)
B47	Current at Maximum Deadtime Compensation	

By default the Start and Run gains are used and it is recommended that the calculated gains are used unless the Motor becomes acoustically noisy in which case the current loop Kp can be reduced by up to 40 %.

Auto-tune Diagnostics

If a drive trip occurs during an auto-tune this could be due to a number of reasons e.g. the rotation of the Motor phases, the control signals to the drive during the auto-tune or the Motor characteristics. Refer to the following brief descriptions and diagnostics section for further details on drive auto-tune trips

Where the Motor phase rotation may be incorrect this can be rotated with parameter Reverse Motor Phase Sequence **B26**

- Auto tune 1 The Motor did not reach the required speed during the rotating auto-tune
- Auto tune No Dir A direction signal was not given while attempting to perform an auto-tune. A direction signal must be given within 6 s of enabling the drive to prevent this trip while attempting to auto-tune

- Auto tune Stopped The drive was prevented from completing an auto-tune, because either the Drive enable or the Drive run signal was removed.
- **Resistance** This trip indicates that either the value being used for Motor stator resistance is too high or that an attempt to measure the Motor stator resistance has failed. If the value is the result of a measurement made by the drive then sub-trip 1 is applied, or if it is because the parameter has been changed by the user then subtrip 3 is applied. During the stator resistance section of auto-tuning an additional test is performed to measure the drive inverter characteristics to provide the compensation necessary for deadtimes. If the inverter characteristic measurement fails then sub-trip 2 is applied.

The stator resistance is required for operation in Ur I open loop vector mode A23 (B09).

4.2.6 Motor and Profile Speed, Mechanical Data

Speeds, acceleration and distance can be set in normal units (mm/s, mm, mm/s2). The scaling of these settings is done by setting the Mechanical data in the following parameters

Parameter	Description	Setting
A28 (E01)	Nominal Elevator speed mm/s	1000 mm/s
A29 (E02)	Sheave diameter	400 mm
A30 (E03)	Roping	1:1 (1)
A31 (E04)	Gear ratio numerator	31
A32 (E05)	Gear ratio denominator	1
A33 (E07)	Nominal Elevator speed rpm	rpm
E09	Over Speed Threshold	0.0 Hz

If mechanical data is not available adjust A33 (E07) with the data sheet value or the Motor nominal rpm

The setting of Over Speed Threshold **E09** = 0.0 Hz equates to 1.2 xMotor rated frequency **A21 (B06)** which is suitable for most applications.

4.2.7 Motor Maximum Frequency Clamp

Motor Maximum Frequency Clamp A34 (E08) is automatically limited internally for both the speed set-point and Nominal Elevator Speed A33 (E07). This is calculated to be the equivalent of 110 % of the nominal Elevator speed.

4.2.8 Direction Invert

By activating the control input to the drive, Direction Input Invert **A11** (**H12**) the travel direction can be inverted without wiring changes

- Direction Input Invert
- A11 (H12) = Off (0) or On (1)

In addition the following parameter is also available to invert the output Motor phase rotation.

- Reverse Motor phase sequence
- A27 (B26) = Off (0) or On (1)

4.2.9 Speeds Reference Settings

The Elevator control software offers up to a maximum of 10 speed selections. V1 Speed Reference is the default Creep Speed (G52)

Parameter	Description	Setting
A43 (G01)	V1 Speed Reference	50 mm/s
A44 (G02)	V2 Speed Reference	400 mm/s
A45 (G03)	V3 Speed Reference	600 mm/s
A46 (G04)	V4 Speed Reference	10 mm/s
G05	V5 Speed Reference	100 mm/s
G06	V6 Speed Reference	100 mm/s
G07	V7 Speed Reference	1000 mm/s

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4.2.10 Start Optimiser, Boost

Start Optimiser

This feature can be used to overcome starting friction for Elevators fitted with a gearbox, or systems fitted with guide rail pads rather than rollers resulting in a jerk during the start. For Open-loop operation only the speed is adjustable by the user.

Parameter	Description	Setting
N/A	Start optimiser time	500 ms
N/A Start optimiser jerk		10 mm/s³ x 10
A60 (G46)	Start optimiser speed	100 mm/s
N/A Start optimiser enable		On (1)

During operation in Open-loop mode the Motor brake will not be released if Start Optimizer Speed **G46** < Brake Release Frequency **D08**. For adjustment of Start Optimizer Speed **G46** the following calculation can be used:

G46 > (Nominal Elevator Speed / Motor Rated Frequency) x Brake Release Frequency

G46 > (E01 / B06)	x D08
G46 > (1000 / 50)	x 1.0 = 20 mm/s

Fixed boost operation, Low speed boost

If during the start there is roll back in Fixed boost mode **A23 (B09)** = Fixed and on brake release Low Frequency Voltage Boost **B12** can be optimised.

Motor rated speed, slip frequency

It is assumed that the correct Motor Rated Speed **A22 (B07)**, slip frequency has been setup for the Motor being used ensuring maximum torque is generated for both a Hot and Cold Motor.

4.2.11 Profile Parameters

For the Elevator system profile there are a number of different settings including acceleration, deceleration and jerk settings along with Creep stop deceleration and jerk as detailed following. These settings are typically defined by the Lift system

Parameter	Description	Setting
A40 (G11)	Acceleration rate	800 mm/s²
A41 (G12)	Deceleration rate	500 mm/s ²
A35 (G13)	Run jerk 1	50 mm/s³ x 10
A36 (G14)	Run jerk 2	100 mm/s³ x 10
A37 (G15)	Run jerk 3	100 mm/s³ x 10
A38 (G16)	Run jerk 4	50 mm/s³ x 10
A42 (G17)	Creep stop deceleration rate	1000 mm/s ²
A39 (G18)	Creep stop jerk	1000 mm/s³ x 10

4.2.12 Brake Control

Using the drives adjustable brake control delays the brake operation can be optimized. The target is to have a continuous and fast transition from standstill to travel and onto stop without any jerk impacting on the ride quality during start and stop

Parameter	Description	Setting		
D08	Brake Release Frequency	1.0 Hz		
D06	Upper Current Threshold	10 %		
A47 (D04)	A47 (D04) Brake control release delay			
D09	Brake Apply Frequency	2.0 Hz		
D07	D07 Lower Current Threshold 10			
A48 (D05)	Brake control apply delay	500 ms		

Brake release

Optimise the brake control to achieve a smooth start where the Motors brake is opened on-time, not too early, or too late for both generating torque at the Motor and lifting the Motor brakes without a jerk and roll back

 Adjust the Brake Release Frequency D08 > Motor rated slip where maximum torque can be generated. Setting D08 < Motor rated slip will result in limited torque on brake release

Optimise Brake Control Release Delay A47 (D04) to ensure a smooth start

- Motor Magnetized **D01** = On (1)
- Torque Producing Current J24 is generated to overcome Lift system load
- Ensure brake control release delay is not excessive as this can lead to a jerk on brake release where tension builds against the brake

Ensure Start Optimizer Speed G46 > Brake Release Frequency D08

Brake apply

Optimise the brake control to achieve stopping at floor where the Motors brake is closed on-time, not too early resulting in a harsh stop, or too late resulting in roll back

 Adjust the Brake Apply Frequency D09 > Motor rated slip where maximum torque is available to bring the Motor to stop with the car at floor. Setting D08 < Motor rated slip will result in limited torque and roll back or overshooting the floor level

Optimise Brake Control Apply Delay A48 (D05) to ensure a smooth stop

- Adjust Lower Current Threshold **D07** to ensure sufficient current is present for the Motor brake apply
- Ensure brake control apply delay is not excessive as this can lead to roll back or overshooting the floor level due to insufficient Torque Producing Current J24 nearing zero speed

In addition to the brake control release and apply delays above there is an additional parameter which defines the time taken to build torque during the start (prior to brake release), and release torque during the stop (following brake apply). The torque ramps manage the transfer of load between the Motor and mechanical brakes.

Parameter	Description	Setting
D02	Motor torque ramp time	100 ms
D32	Motor torque ramp down time	100 ms

4.2.13 Current Control Loop Gains

The current loop normally operates with an integral I gain only. The proportional P gain is inherent in the current loop.

- The integral I gain should be increased enough to counter the effect of the profile ramp which is active in current limit.
- If the integral I gain is increased too far signs of instability will occur, this instability can be reduced by increasing the proportional P gain.

Parameter	Description	Setting
103	Start Current Loop Kp	20
104	Start Current Loop Ki	40
108	Run Current Loop Kp	20
109	Run Current Loop Ki	40

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4.3 First Test

NOTE

For applications where induced noise may affect the control signals to the drive, a filter is available for the speed and direction input signals through with parameter **F68**.

To check the control of the Lift and the direction of movement of the Lift car carry out a travel with Inspection speed, or a suitable low speed and observe the direction of movement

- Display J23 Percentage load Start Inspection travel Check D01 Motor magnetised = On (1) Check J23 Percentage load > 0 Check correct direction of Motor and Lift car
- Display "Run" does not occur Check speed selection on either control terminal T29 (F08), T26 (F05), T7 (F36), T5 (F35)
 Check direction input on control terminal T28 (F0&)
 Check T31 (F10) Safe Torque Off (STO), Drive enable input Check control interface to Elevator drive and settings

No movement of the Motor during the start

- Check J09 Reference parameter selected
 J09 Reference parameter selected = 0
 No reference selected
 Check control interface to Elevator drive and settings
 Ensure Start Optimizer Speed G46 > Brake Release Frequency D08
- Percentage load J23 = 0 Check output Motor contactor control from the Elevator drive (B31) or Lift (Elevator controller
- Elevator drive trips Motor Too Hot (20)
 Check Motor load, balance

If Motor rotates in the opposite direction with respect to the direction demanded for the travel

• Set Direction input invert A11 (H12) = Off (0) or On (1)

For Elevator drive trips refer to the diagnostics section. If no Elevator drive trips are generated with stable operation in the correct direction at the selected speed continue with optimisation of the Elevator drive

Diagnostic Parameters which are available for the first test

Parameter	Description	Setting
G39	Direction input 1	Off (0) or On (1)
G40	Direction input 2 (Dual direction inputs)	Off (0) or On (1)
J09	Reference parameter selected	V1 – V7
F10	F10 Safe Torque Off (STO), Drive enable	
J25	Magnetising current	A
D03	Brake control output	Off (0) or On (1)
G01 to G10	V1 to V10 speed reference	mm/s
A06 (J39)	Profile speed	mm/s
A06 / J40	Actual speed	mm/s
J22	Total output current	A
A08 (J60)	Output frequency	Hz
A09 (J61)	Output voltage	V
L15	Current limit reached	Off (0) or On (1)
B16	Symmetrical current limit	%
J03	Software State	0 - 14

Tests should be carried out with a range of travels, including single and multiple floors with both an empty and full Lift car.

4.3.1 Further Optimisation

Further optimisation can be carried out to achieve a fast, smooth travel meeting the ride quality of the customer based upon their Lift system. Measurements can be carried out using an Accelerometer (PMT) and CT Scope to further examine the Elevator travel and control.

4.3.2 Current Loop Gains, Current Limit Operation

The current loop normally operates with an integral I gain only. The proportional P gain is inherent in the current loop.

- The integral I gain should be increased enough to counter the effect of the profile ramp which is active in current limit.
- If the integral I gain is increased too far signs of instability will occur, this instability can be reduced by increasing the proportional P gain.

Parameter	Description	Setting
103	Start Current Loop Kp	20
104	Start Current Loop Ki	40
108	Run Current Loop Kp	20
109	Run Current Loop Ki	40

4.3.3 Brake Release & Controlled Start

Jerk during start following Motor brake release

- Decrease A35 (G13) Run Jerk 1 to introduce a softer, slower start profile.
- If the profile has starting against the Motors brakes, increase A47 (D04) Brake Control Release Delay.
- If the Motor is at standstill following the Motor brake release reduce A47 (D04) Brake Control Release Delay
- The Brake Release Frequency D08 for optimum operation should be
 above the slip frequency of the Motor

4.3.4 Start Optimiser

This feature can be used to overcome starting friction for Elevators with a gearbox, or systems fitted with guide rail pads rather than rollers resulting in a jerk during the start. For Open-loop operation only the speed is adjustable by the user.

Parameter	Description	Setting
N/A	Start optimiser time	500 ms
N/A	Start optimiser jerk	10 mm/s³ x 10
A60 (G46)	Start optimiser speed	100 mm/s
N/A	Start optimiser enable	On (1)

During operation in Open-loop mode the Motor brake will not be released if Start Optimizer Speed **G46** < Brake Release Frequency **D08**. For adjustment of Start Optimizer Speed **G46** the following calculation can be used:

G46 > (Nominal Elevator Speed / Motor Rated Frequency) x Brake Release Frequency

G46 > (E01 / B06) x D08

G46 > (1000 / 50) x 1.0 = 20 mm/s

To increase breakaway torque where the Motor gearbox and mechanical system result in high levels of stiction resulting in a jerk on start

• Increase the Start Optimizer Speed **G46** in steps of 5

To soften the breakaway on Motor brake release for low stiction applications

- Reduce Start Optimizer Speed G46 in steps of 5
- Ensure Start Optimizer Speed G46 > Brake Release Frequency D08 using the above calculation

Fixed boost operation, Low speed boost

If during the start there is roll back in Fixed boost mode (**A23 (B09)** = Fixed) and on brake release optimise the following

• Low Frequency Voltage Boost **B12** can be optimized to generate a higher level of torque on brake release

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Modifying the profile parameters during further optimisation can lead to the Lift not reaching maximum speed or overshooting the floor levels and reaching the limit switches, end stops.

4.3.5 Start & Acceleration

Overshoot or undershoot following start to acceleration to profile speed

- Decrease A36 (G14) Run Jerk 2 for a soft controlled transition from acceleration to end of acceleration and travel.
- Increase A36 (G14) Run Jerk 2 for a harder transition from acceleration to end of acceleration and travel.

Vibrations during constant acceleration

Check to see if the drive is operating in current limit, L15 Current • Limit Reached = On (1)

If the drive is operating in current limit

- Increase A24 (B16) Symmetrical Current Limit where to low and still possible to increase
- Reduce acceleration rate in A40 (G11) Acceleration Rate

Optimise Motor Rated Speed A22 (B07)

- Ensure correct slip frequency for maximum torque where Enable Slip Compensation **B10** = On (1)
- Adjust slip by the running lift under constant load, with a long travel, optimising E07 Elevator speed rpm to get the maximum Torque producing current in J24

4.3.6 **Constant Speed**

Vibrations present in the Lift car during constant speed, travel with full load up to deceleration

Optimise Motor Rated Speed A22 (B07) ensuring correct slip, and maximum torque for Motor where Enable Slip Compensation B10 = On (1)

4.3.7 Deceleration

Adjusting the deceleration distance to achieve floor accuracy

Increase the deceleration distance by

- Reducing A40 (G11) Acceleration Rate to be slower
- And/or reduce A36 (G14) Run Jerk 2 to be softer

Decrease deceleration distance by

- Increasing A40 (G11) Acceleration Rate to be faster
- And/or reduce A36 (G14) Run Jerk 2 to be harder

4.3.8 Approaching Stop

Stopping with a jerk at the end of the profile

Reduce A38 (G16) Run Jerk 4 to provide a softer transition to stop at the end of travel

Movement of the Motor sheave during stopping and Motor brake apply

Check the drives enable state in the Lift (Elevator) controller and ensure this is not being removed too soon

L06 Drive Active

Increase A48 (D05) Brake Control Apply Delay to maintain Motor torque whilst Motor brakes are fully closing

Brake Apply Frequency D09

• Adjust to ensure the output frequency is greater than the Motors slip frequency when the brake apply begins

BC Lower Current Threshold D07

Adjust to ensure the output current is sufficient to control the Motor to a stop during brake apply

Current limit (Current Limit Reached L15 = On (1)) during transient operation

- Increase A24 (B16) Symmetrical Current Limit where to low and still possible to increase
- Optimise Motor Rated Speed A22 (B07) ensuring correct slip, and maximum torque for Motor where Enable Slip Compensation B10 = On (1)

4.4 Save Parameter Settings

4.4.1 Save Elevator Drive Parameter Settings

To save parameters in the Elevator drive use the following procedure Save parameter settings

mm.000

- = Save parameters Confirm change: = Reset button
- ... or alternatively
- mm.000 = 1001
- Confirm change: = Reset button

4.4.2 Save Elevator Drive Parameter Settings to SMARTCARD, NV Media Card

To save the Elevator drive parameters to the SMARTCARD, NV Media Card the following two options are available

A save can be carried out setting

A03 (N01) Cloning = Program Confirm change: = Reset button



An Auto save can be carried out setting

- A03 (N01) Cloning = Auto
- Confirm change:
- = Reset button



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5 User Menu A

Para	meter	Parameter Description	Range	Comments
A00		Parameter 00 for code entry	No Action (0), Save parameters (1), Load file 1 (2), Save to file 1 (3), Load file 2 (4), Save to file 2 (5), Load file 3 (6), Save to file 3 (7), Show non-default (8), Destinations (9), Reset 50 Hz defs (10), Reset 60 Hz defs (11), Reset modules (12), Read enc. NP P1 (13), Read enc. NP P2 (14)	
A01	H02	User Security Status	Menu A (0), All Menus (1), Read-only Menu A (2), Read-only (3), Status-only (4), No-Access (5)	
A02	B02	Drive Control Mode	Open loop (1), RFC-A (2), RFC-S (3)	
A03	N01	Parameter Cloning	None (0), Read (1), Program (2), Auto (3), Boot (4)	
A04	J22	Total Output Current	± VM_DRIVE_CURRENT_UNIPOLAR A	
A05	J23	Percentage Load	± VM_USER_CURRENT %	
A06	J39	Profile Speed	0 to 1000 mm/s	
A07	J59	Output Power	± VM_POWER kW	
A08	J60	Output Frequency	± VM_SPEED_FREQ_REF Hz	
A09	H11	Control Input Mode	Analog Run Prmit (0), Analog 2 Dir (1), Priority 1 Dir (2), Binary 1 Dir (3), Priority 2 Dir (4), Binary 2 Dir (5), Control Word (6), DCP3 (7), DCP4 (8)	DCP4 not available in Open loop mode
A11	H12	Direction Input Invert	Off (0) or On (1)	
A16	B10	Enable Slip Compensation	Off (0) or On (1)	
A17	B12	Low Frequency Voltage Boost	0.0 % to 25.0 %	Default setting = 3.0 % high values will result in Motor heating during start, low speed
A18	B02	Motor Rated Current	± VM_RATED_CURRENT A	
A19	B03	Motor Rated Voltage	± VM_AC_VOLTAGE_SET V	
A20	B05	Number Of Motor Poles	Automatic (0) to 480 Poles (240)	
A21	B06	Motor Rated Frequency	0.0 to 550.0 Hz	
A22	B07	Rated Speed	0.00 to 33000.00 rpm	accurate values of Motor rated speed should be used
A23	B09	Open-loop Control Mode	Ur S (0), Ur (1), Fixed (2), Ur Auto (3), Ur I (4)	Only Fixed (2) and Ur I (4) options for Elevator
A24	B16	Symmetrical Current Limit	± VM_MOTOR1_CURRENT_LIMIT %	
A25	B13	Maximum Switching Frequency	3 kHz (1), 4 kHz (2), 6 kHz (3), 8 kHz (4), 12 kHz (5), 16 kHz (6)	Default 8 kHz
A26	B11	Motor Auto tune	None (0), Static (1), Rotating (2)	For rotating auto-tune de-rope the Motor
A27	B26	Reverse Motor Phase Sequence	Off (0) or On (1)	
A28	E01	Nominal Elevator Speed mm/s	0 to 4000 mm/s	
A29	E02	Sheave Diameter	1 to 32,767 mm	
A30	E03	Roping Coor Potio Numerator	1:1 (1), 2:1 (2), 3:1 (3), 4:1 (4)	
A31 A32	E04	Gear Ratio Numerator	1 to 32767	
A32 A33	E03	Nominal Elevator Speed rom	1 00 to 4000 00 rpm	
A34	E08	Motor Maximum Frequency Clamp	= 1.1 x A33 (E07)	
A35	G13	Run Jerk 1	1 to 65535 mm/s ³ x10	
A36	G14	Run Jerk 2	1 to 65535 mm/s³ x10	
A37	G15	Run Jerk 3	1 to 65535 mm/s³ x10	
A38	G16	Run Jerk 4	1 to 65535 mm/s ³ x10	
A39	G18	Creep Stop Jerk	1 to 65535 mm/s ³ x10	
A40	G11	Acceleration Rate	0 to 10000 mm/s ²	
A41	G12	Deceleration Rate	0 to 10000 mm/s ²	
A42	G17	Creep Stop Deceleration	0 to 10000 mm/s ²	
A43	G01	V1 Speed Reference	0 to Nominal Elevator Speed A28 (E01)	
A44	G02	V2 Speed Reference	U to Nominal Elevator Speed A28 (E01)	
A45	G03	V3 Speed Reference	U to Nominal Elevator Speed A28 (E01)	
A46	G04	V4 Speed Relevence	0 to Norninal Elevator Speed A28 (EU1)	
A4/ Δ/2	D04	Brake Control Apply Delay	0 to 10000 ms	
Δ40 Δ60	G46	Start Ontimiser Speed	0 to 10000 mm/s	
A00	0+0	Lotart Optimiser Opeeu		

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6 Diagnostics

6.1 Trip Codes & Corrective Actions

The Elevator protects itself, the control environment and Motor by many monitoring functions and operating levels. If the monitor system detects a problem, a trip is initiated. To identify the causes of a trip refer to the following diagnostics section and the Installation and System Design Guide for further detailed information.

Trip	Description / Recommended action							
An Input 1 Loss	Analog input 1 current loss							
	An Input 1 Loss trip indicates that a current loss was detected in current mode on Analog input 1 (T5, T6). In 4-20 mA and 20-4 mA modes loss of input is detected if the current < 3 mA.							
	Recommended actions:							
28	Check control wiring is correct.							
	Check control wiring is undamaged.							
	Check the Analog Input 1 Mode F38.							
An Input 2 Loop	Current signal is present and greater than 5 mA.							
An input 2 Loss	Analog input 2 current loss							
	an input 2 Loss indicates that a current loss was detected in current mode on Analog input 2 (17). In 4-20 mA and 20-4 mA modes loss of input is detected if the current < 3 mA							
	Becommended actions:							
29	Check control wiring is correct							
-	Check control wiring is conect. Check control wiring is undamaged							
	Check the Analog Input 2 Mode F45 .							
	Current signal is present and greater than 3 mA.							
An Output Calib	Analog input 2 current loss							
	The zero offset calibration of one or both the Analog outputs has failed. This indicates that the drive hardware has failed or a voltage has been applied to the output via low impedance.							
	Sub-trip Reason							
20	1 Output 1 failed							
29	2 Output 2 failed							
	Becommanded actions:							
	Check the wiring appeciated with Analog outputs							
	Remove all the wiring that is connected to Analog outputs and perform the calibration							
Analog No Dir	Run signal not received when starting in Analog control input mode							
	A direction signal or run permit was not provided within 1 s of the brake release time elapsing in Analog control input mode.							
	Control Input Mode H11 = Analog Run Prmit (0) or Analog 2 Dir (1).							
70	Recommended actions:							
79	Check Direction Input 1 G39 and Direction Input 2 G40 ensuring a direction signal is received.							
	Check control wiring is correct.							
	Check control wiring is undamaged.							
Autotune 1	Required speed could not be reached							
	The drive has tripped during a rotating auto tune.							
11	Recommended actions:							
	Ensure the Motor is free to turn i.e. mechanical brake was released.							
Autotune No Dir	Direction signal not received when starting an auto tune							
	Direction signal not given while attempting to perform auto tune. A direction signal must be given within 6 s of drive enable.							
	Recommended actions:							
78	Check Direction Input 1 G39 and Input 2 G40 ensuring a direction signal is received.							
	Check control wiring is correct.							
	Check control wining is undamaged. Check control sequence from Lift (Elevator) controller							
Autotune Stopped	Auto tune test stopped before completion							
	The drive was prevented from completing an auto tune test, because the Safe Torque Off (STO). Drive enable. Fast Disable							
	or the Run command were removed.							
18	Recommended actions:							
	Check the Safe Torque Off (STO), Drive enable signal on T31 is active F10.							
	Check the Fast stop is active, where used. Check the direction accurately active act							
	Cneck the direction command is active G39, G40.							

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Trip	Description / Recommended action
Brk Ctrl Release	Conditions not met for Motor brake release during start
	The brake release control conditions were not met within 6 s to transition from state 3 to 4.
68	 Recommended actions: Check Motor torque ramp time in Motor Torque Ramp Time D02. Check correct Motor map settings. Check Motor Magnetized Indication D01. Check Motor contactor control. Check Motor electrical connections. Check the Brake release threshold set by Upper Current Threshold D06, Lower Current Threshold D07 and Brake Release Frequency D08. Check Start Optimiser Speed G46 this should be > Brake Release Frequency D08 for Open Loop operation.
Brake Contact	Motor brake contacts detected in the incorrect state
	This trip indicates that there has been a brake contact error. This trip can only happen when brake monitoring is enabled, where Brake contact monitoring select $D11$ > None (0). This trip is detected where the brake monitoring feedback does not follow the Brake Control Output $D03$ for the Brake Contact Monitoring Time $D14$ seconds. This is a delayed trip where the travel will complete before the drive trips where possible. If a fault has been detected during travel Global Warning $L04 = On$ (1) indicating the delayed trip at end of the travel.
72	Once a Brake Contact trip has occurred and Brake Contact Monitoring has been selected for Unintended Car Movement (UCM) Brake Contact Monitoring Select D11 = 1 + UCM to 1, 2, 3 & 4 + UCM the trip can only be cleared by setting mm.000 to 1298 in line with the requirements of EN 81-20 and EN 81-50.
	Recommended actions:
	 Check Motor brake contact feedback is connected as required from inputs 1 to 4. Check monitoring is configured correctly in Brake Contact Monitoring Select D11. Check correct Motor brake contact operation at Motor brakes. Check operating times for Motor brake contacts, Brake Contact Monitoring Time D14.
Brake R Too Hot	Braking resistor overload timed out (I ² t)
19	 The Brake R Too Hot indicates that braking resistor overload has timed out. The value in Braking Resistor Thermal Accumulator D17 is calculated using Braking Resistor Rated Power D15, Braking Resistor Thermal Time Constant D16 and Braking Resistor Resistance D18. The Brake R Too Hot trip is initiated when Braking Resistor Thermal Accumulator D17 reaches 100 %. Recommended actions: Ensure the values entered are correct If an external thermal protection device is being used and the braking resistor software overload protection is not
	required, set D15 , D16 or D18 = 0 to disable the function.
Card Access	NV Media Card Write fail
185	The Card Access trip indicates that the drive was unable to access the NV Media Card. If the trip occurs during the data transfer to the card the file being written may be corrupted. If the trip occurs when the data is being transferred to the drive the data transfer may be incomplete. If a parameter file is transferred to the drive and this trip occurs during the transfer, the parameters are not saved to non-volatile memory, and so the original parameters can be restored by powering the drive down and up again.
	Check NV Media Card is installed / located correctly. Replace the NV Media Card.
Card Data Exists	NV Media Card data location already contains data
179	 The Card Data Exists trip indicates that an attempt has been made to store data on a NV Media Card in a data block which already contains data. Recommended actions: Erase the data in data location. Write data to an alternative data location.
Card Compare	NV Media Card file/data is different to the one in the drive
188	A compare has been carried out between a file on the NV Media Card, a Card Compare trip is initiated if the parameters on the NV Media Card are different to the drive.
	 Set parameter mm.000 = 0 and Reset the trip Check to ensure the correct data block on the NV Media Card has been used to compare.

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Trip	Description / Recommended action
Card Drive Mode	NV Media Card parameter set not compatible with current drive mode
	The Card Drive Mode trip is produced during a compare if the drive mode in the data block on the NV Media Card is different from the current drive mode. This trip is also produced if an attempt is made to transfer parameters from a NV Media Card to the drive if the operating mode in the data block is outside the allowed range of operating modes.
187	Recommended actions:
	 Ensure the destination drive supports the drive operating mode in the parameter file. Clear the value in parameter mm.000 and Reset the drive. Ensure destination drive operating mode is the same as the source parameter file.
Card Full	NV Media Card full
	The Card Full trip indicates that an attempt has been made to create a data block on a NV Media Card, but there is not enough space left on the card.
184	Recommended actions:
	 Delete a data block or the entire NV Media Card to create space Use a different NV Media Card.
Card No Data	NV Media Card data not found
402	The Card No Data trip indicates that an attempt has been made to access non-existent file or block on a NV Media Card.
183	Recommended actions:
Card Product	Ensure data block number is correct. NV Modia Card data blocks are not compatible with the drive derivative
	The Card Product trip is initiated either at power-up or when the card is accessed. If Drive Derivative .196 is different
475	between the source and target drives. This trip can be reset and data can be transferred in either direction between the drive and the card.
175	Recommended actions:
	Use a different NV Media Car
Cord Dating	Inis trip can be suppressed by setting parameter mm.000 to 9666 and Reset the drive.
Card Rating	The Card Rating trip indicates that parameter data is being transferred from a NV Media Card to the drive, but the current
186	and, or voltage are different between source and destination drive. This trip also applies if a compare (using parameter mm.000 set to 8yyy) is attempted between the data block on a NV Media Card and the drive. The Card Rating trip does not stop the data transfer but is a warning that rating specific parameters with the RA attribute may not be transferred to the destination drive.
	Recommended actions:
	Reset the drive to clear the trip.
	Ensure that the drive rating dependent parameters have transferred correctly.
Card Read Only	NV Media Card has the Read Only bit set. The Card Read Only trip indicates that an attempt has been made to medify a read only NV Media Card or a read only data.
181	block. An NV Media Card is RO when the RO flag is set.
101	 Clear the read only flag by setting parameter mm.000 to 9777 and Reset the drive. This will clear the read-only flag for
	all data blocks in the NV Media Card.
Current On Stop	Current flowing at drives output at end of travel, prior to opening Motor contactors
	The current at the drives output has not decayed after a stop. Total Output Current $J22 \ge 25$ % of the Motor rated current after 4 s in State 14 (end of travel and Motor contactor control).
67	Recommended actions:
	 Check control signals from Elevator controller to Elevator drive ensuring travel complete. Check Motor brakes applied as requested, correct Motor brake operation.
Destination	Direction signal not received when starting an auto tune
	The Destination trip indicates that multiple parameters are writing to the same parameter.
190	Recommended actions:
150	• Set parameter mm.000 to 'Destinations' or 12001 and check all visible parameters in all menus for parameter write
	conflicts.
Dir Changed	Direction signal from elevator controller changed during travel
	controlled stop occurs. This is a delayed trip where the travel will complete. If a delayed trip has been scheduled during travel then Global Warning L04 = On (1) indicating a trip will be generated on travel complete.
76	Recommended actions:
	 Check drive control connections and sequence from Lift (Elevator) controller to Elevator drive. Check control from Lift (Elevator) controller to Elevator drive during operation. Check correct setup of the drive control for the Lift (Elevator) controller, Control Input Mode H11.

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Trip				Description	/ Recommende	ed action					
Fast Disable Err	Fast disabl	le control s	sequence error								
65	The Fast dia apply and a Off (STO), I Recomment Check t Check 7	 I he Fast disable input sequence is incorrect i.e. the Fast disable input does not become active, On (1) following brake apply and after 4 s, or the Fast disable input failed to turn Off (0) after 6 s during the start whilst waiting for the Safe Torque Off (STO), Drive enable. Recommended actions: Check the control wiring arrangement (default T27) Fast disable input. Check T27 Digital Input 04 State F06 during operation and sequence Off (0) or On (1). Disable the Fast disable input by setting Fast Disable B27 to A00. 									
Freeze Protect	Freeze pro	tection lim	it exceeded								
60	Freeze Prot zero temper scheduled of Recommer Check t Check t Provide	 Freeze Protection Threshold H28 has been exceeded. This parameter is provided to prevent operation of the drive is sub- zero temperatures. This is a delayed trip, where the travel will complete before the drive will trip. If a delayed trip has been scheduled during the travel Global Warning L04 = On (1) indicating trip scheduled at end of travel. Recommended actions: Check the temperature setting in Freeze Protection Threshold H28. Check the actual temperature in Monitored Temperature 3 J73. Provide beating air conditioning ventilation to support allowable operating temperature. 									
I Limit Timeout	Drive has b	been in cur	rrent limit (Open	i-loop mode) fo	or an excessive	time					
82	In Open loo Mechanical Recommer • Check t • Check t • Check t	 In Open loop mode the drive has exceeded Maximum Time In Current Limit H50 ms. This could be the result of a Mechanical fault, Excessive Elevator system load or Motor brake fault. Recommended actions: Check that the Elevator car is free to move and there are no mechanical issues. Check the Motor brakes are releasing during start and not applying during operation. Check the elevator system is correctly balanced (counter balance is correct) and the drive is not being forced into current limit 									
I/O Overload	Digital outp	out overloa	ad								
26	 The I/O Overload trip indicates the total current drawn from 24 V user supply or the digital output has exceeded the limit. A trip is initiated if one or more of the following conditions is true: Date Code < 1724 Maximum output current from one digital output is > 100 mA. The combined maximum output current from outputs 1 and 2 is > 100 mA. The combined maximum output current from output 3 and +24 V output is > 100 mA. Date Code ≥ 1724 Maximum output current from one digital output is > 200 mA. The combined maximum output current from outputs 1 and 2 is > 200 mA. The combined maximum output current from outputs 1 and 2 is > 200 mA. The combined maximum output current from outputs 1 and 2 is > 200 mA. The combined maximum output current from outputs 1 and 2 is > 200 mA. The combined maximum output current from outputs 3 and +24 V output is > 200 mA. Check total loading on digital circuit supplied from drives 24 V user supply. Check control configuration is correct along with drive setup.							eded the limit.			
Motor Contactor	Motor cont	actor	iat thing is term		and and and goo						
70	 The Motor contactors have been detected open or closed when they should be closed or open using the Motor contactor monitoring when enabled, and the feedback is connected to the drive from the Motor contactors. This is a delayed trip, where travel will complete and then the drive will trip. If a delayed trip has been scheduled during a travel Global Warni L04 = On (1) indicating a delayed trip when travel completes. Recommended actions: Check control wiring from Motor contactor monitoring to the drives control terminal. Check correct signal from Motor feedback during operation (Default configuration, Motor contactors open, feedback + 24 V, Motor contactors closed feedback = 0 V). Disable Motor contactor monitoring with Motor Contactor Monitoring Enable B29 							Votor contactor delayed trip, Global Warning pen, feedback =			
Motor Too Hot	Output cur	rent overlo	oad timed out (l ²	² t)							
20	Output current overload timed out (l ² t) The Motor Too Hot trip indicates Motor thermal overload based on the Rated Current B02 and Motor Thermal Time Constant B20. J26 displays the Motor temperature as a percentage of maximum value. The drive will trip when Motor To Hot J26 reaches 100 %. Recommended actions: • Ensure there is no mechanical issue resulting in stiction or increased loading. • Check the load on the Motor has not changed. • If seen during an auto-tune ensure the Motor Rated Current in B02 ≤ Heavy duty current rating of the drive. • Optimise the Motor Rated Speed B07. • Ensure the Motor rated current is not zero.										
	CHECK L			in mode setting							

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Trip		Description / Recommended action									
OHt Control	Contr	ol stage over f	empera	ature		-					
	This C Therm	This OHt Control trip indicates that a control stage over-temperature has been detected. From the sub-trip 'xx y zz', the Thermistor location is identified by 'zz'.									
		Source xx y zz Description									
	Co	ntrol system	00	0	01	Control b	oard thermistor	1 over temperature	е		
	Co	ntrol system	00	0	02	Control b	oard thermistor	2 over temperature	9		
23	Co	ntrol system	00	0	03	I/O board	I thermistor ove	er temperature			
	Recor • Cł	nmended action neck enclosure neck enclosure neck enclosure crease ventilation educe the drive heck ambient te	ons: / drive f ventilat door filf on. switchi emperat	fans are ion paths ters. ing freque ture.	still fund s. ency.	ctioning co	rrectly.				
OHt DC Bus	DC bu	is over temper	rature			<u> </u>		<u>.</u>			
27	The O the ou param Recor Ch Ch Ref • Ch	 The only do bus trip indicates a DC bus over temperature based on a software thermal model. This includes the effects of the output current and DC bus ripple. The estimated temperature is displayed as a percentage of the trip level in J78. If this parameter reaches 100 % then an OHt dc bus trip with sub-trip 200 is initiated. Recommended actions: Check the AC supply voltage balance and levels. Check DC bus ripple level. Reduce duty cycle. Reduce Motor load. Check the output current stability. If unstable; Check Motor map settings with nameplate (B06, B02, B07, B03, B04, B05), all modes Disable slip compensation B10 = 0 Select fixed boost B09 = Fixed, Open loop 									
OHt Inverter	Invert	er over tempe	rature l	based or	h therm	nal model					
	This tr trip inc	ip indicates that dicates which m	it an IGE nodel ha	3T junctio as initiate	on over d the tr	-temperatu	ire has been de rm xx y zz as g	etected based on a siven below:	software therma	I model. The sub-	
		Source xx y zz Description									
	Co	Control system 00 1 00 Inverter thermal model									
	Co	Control system 00 3 00 Braking IGBT thermal model									
21	Recor • Ch • Ch • Ch	 Recommended actions with sub-trip 100: Check and ensure extended operation is not carried out at zero speed e.g. crash stop. Check Motor loading, reduce if excessive. 									
	 Ci Re Inv Re Re Ci Ci Er 	 Check counter balance loading. Reduce maximum drive switching frequency. Increase acceleration / deceleration rates. Reduce settings for Run and Creep Stop Jerks. Reduce duty cycle. Check DC bus ripple. Ensure all three input phases are present and balanced. 									
	• Re	educe the braki	ng load		ip 500.						
OI ac	Instan	itaneous outpr	ut over	current	detect	ed					
	The in after the the after the second	stantaneous dr he trip was initia	ive outp ated.	out currer	nt has e	exceeded \	/M_DRIVE_CU	RRENT [MAX]. Thi	s trip cannot be	reset until 10 s	
3	Recor • If : • Ch • Ch	nmended actions seen during autheck for short check integrity of the short of the s	ons: to-tune i ircuit or f the Mc	reduce th 1 the outp ptor insul	ne volta out cabl ation us	ige boost. ing. sing an insi	ulation tester.				

Safety information	Introduction	Elevator Drive Keypad	Open Loop Setup, Configuration	User Menu A	Diagnostics	Connection Diagram	Timing Diagram	Re-Configuring Control Terminals

Trip	Description / Recommended action									
Ol Brake	Braking IGBT over current: short circuit protection for the braking IGBT activated									
	OI Brake trip indicates an over current detected in the braking IGBT or braking IGBT protection has been activated. This trip cannot be reset until 10 s after the trip was initiated.									
4	Recommended	actions	:							
-	Check brake resistor wiring. Check braking resistor value is greater than or equal to the minimum resistance value									
	Check brakir	Check braking resistor value is greater than or equal to the minimum resistance value. Check braking resistor insulation.								
Oldo	Check brakin	ig resis	or insulation.	onitoring						
Orde	An OI de trip indi	cates s	port circuit protection for the inverter stage has	been activated						
	An OI do trip indicates short circuit protection for the inverter stage has been activated.									
109	 Disconnect t Check and e enabled. 	 Disconnect the Motor from the drive, and check both Motor and cable insulation. Check and ensure any output Motor contactor shorting contactor is not being applied whilst the Elevator drive is enabled. 								
Out Dhoos Loss	Replace the	arive.	4 d							
Out Phase Loss	Output phase lo	oss det	ected							
	phases to the Mo physical output p	trip indi otor U, N hase W	Cates a Motor phase loss detected. If Reverse (/, W are reversed, and so sub-trip 3 refers to ph /.	Output Phase Sequence B26 = On (1) the output hysical output phase V and sub-trip 2 refers to						
	Sub-trip		Reaso	n						
	1	U phas	e detected as disconnected when drive enable	d to run.						
98	2	V phas	hase detected as disconnected when drive enabled to run.							
	3	W phase detected as disconnected when drive enabled to run.								
	4	Output phase loss detected when the drive is running.								
	 Recommended actions: Check Motor and drive connections. To disable the trip set Output Phase Loss Detection Enable H06 = Disabled (0). 									
Over Speed	Notor speed has exceeded the over speed threshold									
	In open loop mod direction an Ove	In open loop mode, if Output Frequency J60 exceeds the threshold set in Motor Over Speed Threshold E09 in either direction an Over speed trip is produced.								
7	Recommended	actions	:							
	Check the M	otor is r	not being driven by another part of the system.							
Over Velte	Check drive	selectio	n and operation in current limit, unable to delive	er required torque.						
Over volts	UC bus voltage has exceeded the peak level or maximum continuous level for 15 s									
	varies based on	drive vo	Itage rating as below.							
	Voltage rati	ina	VM DC VOLTAGEIMAX1	VM DC VOLTAGE SETIMAX1						
	200		415	410						
	400		830	815						
	575		990	970						
	690		1190	1175						
2										
	 Recommended actions: Check the AC power supply and disturbances which could cause the DC bus to rise. Check external braking resistor circuit is connected. Check operation of external braking resistor protection. Check Elevator balanced correctly. Decrease the braking resistor value staying above the minimum value for drive model). Increase the deceleration rate. Check Motor insulation using a insulation tester. 									

Safety information Introduction Elevator Drive Open Loop Setup, Keypad Configuration User Menu A Diag	Safety information	Introduction	Elevator Drive Keypad	Open Loop Setup, Configuration	User Menu A	Diagnosti
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Connection Diagram

Timing Diagram

Trip	Description / Recommended action								
Phase Loss	Supply phase lo	SS							
	The Phase Loss trip indicates that the drive has detected an input phase loss or large supply imbalance. Phase loss can be detected directly from the supply where the drive has a thyristor based charge system (Frame size 8 and above). If phase loss is detected using this method the drive trips immediately and the xx part of the sub-trip is set to 01.								
	In all sizes of driv attempts to stop the sub-trip is ze	ve phase los before trippi ro.	ss is also detected by m ing. When phase loss is	onitoring the ripple in the DC bus voltage in which case the drive detected by monitoring the ripple in the DC bus voltage the xx part of					
	Input phase loss Loss Detection N	detection ca lode H08 .	an be disabled when the	drive is operating from a DC supply or single phase UPS Input Phase					
32	Source	ХХ	У	ZZ					
	Control syste	m 00	0	00: Phase loss detected based on control system feedback.					
	Power system	n 01	Rectifier number	UC: Phase loss has been detected by the rectifier module.					
	 Recommended actions: Check the AC supply voltage balance and level at full load. Check the DC bus ripple level with an isolated oscilloscope. Check the output current stability. Check for mechanical resonance with the load. Reduce the duty cycle. Reduce the Motor load. 								
PSU 24	24V internal por	ver supply	overload	pave exceeded the internal user ± 24 V newer supply limit. The user					
	load consists of t	he drive dig	ital outputs.	lave exceeded the internal user + 24 v power supply limit. The user					
	Recommended	actions:							
9	 Reduce the it Remove con 	iser load an trol connect	d Reset the drive.	perform a Reset.					
	Remove any	option mod	ules and perform a Res	et.					
	 Provide an e Permanent ti 	xternal + 24 ip, hardwar	V power supply on Cor e fault within the drive –	return the drive to the supplier.					
Resistance	Measured resis	ance has e	exceeded the paramete	or range					
33	The Resistance to value allowable for higher than the m Current Kc J06 , Recommended • Check the value • Ensure the so • Check the M	rip indicates or the drive naximum va where VFS actions: Ilue entered tator resista otor cable /	s that the measured Mot in Stator Resistance B3 lue that can be used in is the full scale DC bus in Stator resistance B3 nce of the Motor falls w connections.	 or stator resistance during an auto-tune has exceeded the maximum 4. The maximum for the stator resistance parameters is generally the control algorithms. If the value exceeds (VFS / v2) / Full Scale voltage then this trip is initiated. 4. thin the allowable range of the drive model. 					
	 Check the M Check the M 	otor phase t otor phase t	o phase resistance at the phas	ne drive terminals, including Motor cables. The Motor terminals.					
	Check the in	egrity of the	Motor stator winding u	sing a insulation tester.					
	 Select fixed Replace the 	boost mode. Motor.	, BU9 = Fixed and verify	output current waveforms with oscilloscope.					
SlotX Different	Option module	fitted in Slo	ot X has changed betw	een power cycles					
	If the option mod trip is produced. parameters must	ule fitted in The sub-trip be saved to	option module Slot X is number gives the ident p prevent this trip on the	different to the option module present at the last power-down then this ification code of the option module that was originally fitted. Drive user next power-up if the module has changed.					
	Sub-trip			Reason					
	1	No option n	nodule was fitted previo	usly.					
	2	An option n default para	ameters have been load	ed for this menu.					
204 209 214	3	An option n been chang	nodule with the same id ged, and so default para	entifier is fitted, but the applications menu for this option slot has meters have been loaded for this menu.					
	4	An option n changed, a	nodule with the same identify not so default parameter	entifier is fitted, but the set-up and applications menu have been s have been loaded for these menus.					
	>99	Shows the	identifier of the module	previously fitted.					
	 Recommended actions: Turn off the power, ensure correct option module installed and re-apply power. Confirm currently installed option module is correct, ensure option module parameters are set correctly and perform a user save in mm.000. 								

Safety information	Introduction	Keypad	Configuration	User Menu A	Diagnostics	Connection Diagram	Timing Diagram	Control Terminals		
Trip				Description	/ Recommend	ed action				
SlotX Erro	or Slot 2	X option mod	lule error							
202 207 212	The c sub-ti modu Reco • S	The option module in Slot X has indicated an error. The option module can give the reason for the error and is shown in the sub-trip number. As default the sub-trip number is shown as a number on the display, however it is possible for the option module to supply sub-trip number strings which will be displayed instead of the number if available. Recommended actions: • See relevant Option Module User Guide for details of the trip.								
SlotX HF	Optio	on module in	Slot X has Hardwa	re fault	·					
	This t The p	trip indicates t	hat there is a fault we hat there is a fault we have a factor of the trip are give	vith the option mo en by the sub-trip	odule in option s o value.	Slot X that means t	hat this module	cannot operate.		
	S	ub-trip			Reaso	on				
		1 1	he option module ca	tegory cannot be	e identified.		<u></u>			
		2 A	If the required custor prrupt.	misable menu ta	ble information	has not been supp	lied or the tables	supplied are		
		3 In	sufficient memory a	vailable to alloca	ate the comms b	ouffers for this mod	ule.			
		4 O	ption module has no	ot indicated it is r	unning correctly	y during drive powe	er-up.			
200		5 Ti th	The option module has been removed after power-up or it has ceased to indicate to the drive processor that it is still active.							
205 210		6 TI m	The option module has not indicated that it has stopped accessing drive parameters during a drive mode change.							
		7 ^{TI} pi	The option module has failed to acknowledge that a request has been made to reset the drive processor.							
		8 D	rive failed to read th	e menu table fro	m the option mo	odule during power	-up.			
		9 D	rive failed to upload	menu tables from	m option module	e and timed-out (5	s).			
		10 M	enu table CRC inva	lid.						
	Reco • Т • С и	mmended ac iurn off the por confirm curren ser save in m	tions: wer, ensure correct tly installed option n m.000.	option module in nodule is correct	stalled and re-a , ensure option	pply power. module parameters	s are set correct	ly and perform a		
SIOTA NOT FI	Lited Optic	on module in	Slot X no longer fi	tted	wor up and the	option fitted is stor	ad by the drive i	n ite non volatilo		
203 208 213	been Slot3	Each option module fitted in the drive is identified at power-up and the option fitted is stored by the drive in its non-volatile memory. If an option module was fitted in Slot X at power-down, but that option module has subsequently been removed before power up then this trip is produced. The sub-trip number gives the identification code of the option module that has been removed. The priority order for the option module not fitted trips is Slot1 Not Fitted highest, then Slot2 Not Fitted. Drive user parameters must be saved to prevent this trip on the next power-up.								
215	Reco	insure the opt	ion module is install	ed correctly in S	lot 4					
	• R	Re-install the opt	ption module.		014.					
	• T	 To confirm removed option module is no longer required perform save in mm.000. 								
Soft Star	Soft s	start relay fai	ult							
000	This t circui	rip indicates t t has failed.	hat the soft start rela	y in the drive (Dr	ive frame sizes	3 to 6) has failed to	close or the sof	t start monitoring		
226	Reco • H	mmended ac	tions: - contact the supplie	er of the driver.						
			r F							

Safety information

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Timing Diagram

Trip		Description / Recommended action						
Spd / Dir Select	Control sequer	nce speed and direction signals to the Elevator drive						
	This trip is relate	ed to speed reference or direction selection timing issues:						
	Sub-trip	Reason						
	1	 There is no speed reference or direction selected at the end of State 4 Release Motor Brakes. There is a 3 s delay after Brake Control Release Delay D04 to activate this trip. There is no speed reference or direction selected in the end of State 5 Load Measurement when Load measurement time O04 > 0 ms. There is a 3 s delay after Load measurement time O04 to activate this trip. 						
81	2	 The direction and speed are still selected at the end of travel in State 14 Contactor Control after 4 s. Remove the speed or direction signals to Reset the trip. When Control Input mode H11 = Analog Run Prmit (0), the Run Permit signal using Direction Input 1 G39 must be removed at the end of travel. When Control Input mode H11 = Analog 2 Dir (0), Priority 2 Dir (4) or Binary 2 Dir (5) the direction signals (Direction Input 1 G39 or Direction Input 2 G40) OR the speed selection (Reference Select Bit 0 Input G32 to Reference Select Bit 6 Input G38) must be removed at the end of travel. When Control Input mode H11 = Priority 1 Dir (2) or Binary 1 Dir (3) the speed selection (Reference Select Bit 0 Input G32 to Reference Select Bit 6 Input G38) must be removed at the end of travel. When Control Input mode H11 = Control Word (6), the direction signals (Control Word G51 Bit 10 or Bit 11) OR the speed selection (Control Word G51 Bit 0 to Bit 9) must be removed at the end of travel. 						
	RecommendedCheck contrCheck contr	 Recommended actions: Check control sequence from Lift (Elevator) controller and drive setup (Control mode selection and control input logic) Check control wiring from Lift (Elevator) controller to drive, and through external components. 						
Speed Err	Excessive follo	Excessive following speed error						
	For Open loop n in current limit for prior to the trip b travel is displaye to 0 at each star	For Open loop mode excessive following speed error is detected, and a trip generated, when the drive enters and operates in current limit for the time defined in Maximum Speed Error Threshold H15 , the allowable time to operate in current limit prior to the trip being generated, selecting very high values disables the Speed err detection. The speed error during a travel is displayed in Maximum Speed Error J57 independent of the activation of the speed error detection and this is reset to 0 at each start.						
	Recommended actions:							
62	Possible causes for the speed error trip can be due to the following Motor Check Motor power connections and phase rotation Check Motor brake control							
	Check L	ift safety gear						
	Check M Increase the Maximum S 	 Check Motor details and parameter set-up, including current limit Increase the Maximum Speed Error Threshold H15. Maximum Speed Error Threshold H15 = 0 disables speed error detection. 						
STO Ctrl Err	Safe Torque Of	f (STO), Drive enable control sequence error						
	The Safe Torque Off (STO), Drive enable input sequence is incorrect i.e. the Safe Torque Off (STO), Drive enable wa removed at the end of the travel following Motor contactor control and within 4 s, or applied during the start following to contactor control and within 6 s.							
66	 Check contr Check paral during start Check corre Check Oper Check Moto 	ol connection of Safe Torque Off (STO), Drive enable to T31 on the drive. meter T31 STO Input 1 State F10 the Safe Torque Off (STO), Drive enable input for the correct sequence / stop. .ct operation of output Motor contactors and auxiliary contacts. h / Close delay time of output Motor contactors. r contactor delay in Motor Contactor Measured Delay Time B32 .						

Safety information	Introduction	Elevator Drive Keypad	Open Loop Setup, Configuration	User Menu A	Diagnostics	Connection Diagram	Timing Diagram	Re-Configuring Control Terminals		
Trip		Description / Recommended action								
Temp Feedbac	ck Elevat	or drive interr	al temperature fee	edback error						
	This tr	ip indicates an	internal drive therm	istor fault (i.e. ope	en circuit or	short circuit).				
		Source	xx	У	zz					
	Co	ontrol board	01	00	01: Cont 02: Cont 03: I/O b	rol board thermisto rol board thermisto poard thermistor	r 1 r 2			
218	Po	wer system	Power module number	0	Zero ten 22 and 2	Zero temperature feedback via power system comms 21, 22 and 23 for direct ELV temperature feedback.				
	Po	wer system	01	Rectifier numbe	er Always z	zero.				
	Recor	nmended actio	ons:							
	• Ha	rdware fault - o	contact the supplier	of the drive.						
Th Brake Res	s Brake	resistor over	temperature							
	If hard	ware based bra	aking resistor thermation the the the the terms of term	al monitoring is pr	rovided and ed with bit 3	the resistor overheat of Action On Trip D	ats this trip is init retection H45	tiated. If the		
40	Recor	nmended actio	ons:							
10	• Cr	eck braking re	sistor wiring.							
	Ch	eck braking re	sistor value is great	er than or equal to	o the minimu	im resistance value				
TH Short Circu	uit Motor	thermistor sh	ort circuit							
	This tr	ip indicates tha	t a temperature sen	sor connected to	an Analog ii	nput 3 or Terminal 1	5 on the positio	n feedback		
	interfa	ce has a low in	pedance (i.e. < 50	Ω). The cause of	the trip can	be identified by the	sub-trip number			
	Su	ıb-trip			Reas	on				
		3 Resistance of thermistor on Analog input 3 is < 50 Ω .								
25		4 Res	istance of thermisto	r on drive position	n feedback ir	nterface is < 50 Ω.				
	Recor	nmended actio	ons:							
	• Ch	eck thermistor	connection at drive	control terminal,	encoder por	t connection.				
	• Cr • Re	eck thermistor	wiring, continuity ai Motor thermistor.	nd signs of damag	ge.					
Thermistor	Motor	thermistor ov	er-temperature							
	This tr	p indicates tha	t a temperature sen	sor connected to	Analog inpu	t 3 or Terminal 15 o	n the position fe	edback interface		
	Therm	istor Input Sele	ect F74 . This is a de	layed trip where the	he travel coi	npletes followed by	a drive trip. If a	delayed trip has		
	been s	cheduled durin	ig the travel Global	Warning L04 = Or	n (1).					
	Su	ıb-trip			Reas	on				
24		1 Trip	initiated from therm	istor connected to	position fe	edback interface.				
		2 Trip	initiated from therm	listor connected to	o Analog inp	ut 3.				
	Recor	nmended actio	ons:							
	Ch	eck Motor ther	mistor wiring conne	ctions and continu	uity.					
	• Ch	eck Motor ven	tilation, provide add	itional forced cool	ling.					
	• Re	place Motor / N	Notor thermistor.					_		
User 24V	User 2	24 V supply is	not present on Co	ntrol terminals 1	(0 V) and 2	(24 V)	rol DCP and no	upper 24 V oupply		
	is pres	ent on Control	terminals 1 and 2.		1(1)101 24 V	backup of the cont		usei 24 v suppiy		
91	Recor	nmended actio	ons:							
	• Er	• Ensure a + 24 V supply is connected to Control terminals 1 (0 V) and 2 (24 V).								
	• Di:	sable User Sup	oply Select O10 = O	ff (0) if not require	e + 24 v use ed.		•			
User Save	User S	Save error / no	t completed							
	This tr	p indicates tha	t an error has been	detected in the us	er save para	ameters saved in no	n-volatile memo	ory. For example,		
36	Recor	nmended acti	ons:				anieteis weie De	sing saveu.		
	• Pe	rform a user sa	ave in mm.000 to er	nsure trip doesn't	occur on ne	xt power up.				
	• Er	Ensure the drive has enough time to complete the save before removing power.								

Safety information	Introduction	Elevator Drive Keypad	Open Loop Setup, Configuration	User Menu A	Diagnostics	Connection Diagram	Timing Diagram	Re-Configuring Control Terminals

Trip	Description / Recommended action
Watchdog	Control word watching not serviced and timed out
	This trip indicates that the control word watchdog has been enabled and has timed out. Watchdog bit must be set = 1 at least every 500 ms or less during operation.
30	A 10 s delay is implemented before calling a Ctrl Watchdog trip during power up and on enabling the Control Word function. If a travel is in progress when the fault occurs the Elevator drive will perform a controlled Stop and then trip.
	Recommended actions:
	Check setting on Elevator controller to ensure Control word watchdog bit 12 is serviced.
550Hz Limit	Drive output frequency exceeded the maximum allowed operating frequency
	The values used to configure the drive in the mechanical menu parameters E01 to E05 and motor map settings have resulted in the maximum output frequency being > 550 Hz which is not allowed.
83	Recommended actions:
	 Adjust E01 to E05 mechanical system data to the correct settings to limit the output frequency. Ensure motor map settings are correct to prevent excessive output frequencies.

6.2 Auto-Reset

The Auto- Reset function can be used to clear Elevator drive trips automatically.

The Auto- Reset is only active, if parameter H46 Number Of Auto-reset Attempts > None (0) and parameter H47 Auto-reset Delay is setup correctly. If the Auto-reset function is active, an attempt is made following every Elevator drive trip to reset the trip after the reset delay, which can range from its default of 1.0 s up to a maximum of 600.0 s

Value	Text
0	None
1	1
2	2
3	3
4	4
5	5
6	Infinite

If repeated trips occur, the reset will be repeated up to a maximum number of times as defined in H46 Number Of Auto-reset Attempts (None (0) to Infinite (6)) using the programmed delay between the attempted trip resets as defined in H47 Auto-reset Delay. If H46 Number Of Auto-reset Attempts reaches the maximum where H46 = 1 (1) 2 (2) 3 (3) 4 (4) or 5 (5), the next trip will not be reset.

If no Elevator drive trip occurs for 5 minutes, the trip counter for H46 Number Of Auto-reset Attempts will be cleared, or when a manual Elevator drive trip reset is carried out the auto-reset counter is also cleared.

Auto reset will not occur after any trips with priority levels 1, 2 or 3.

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Table 6-1 Trip categories Priority Category Trips Comments These indicate internal problems and cannot be reset. All drive features Internal faults HFxx are inactive after any of these trips occur. If a Keypad is installed it will 1 show the trip, but the Keypad will not function. This trip cannot be cleared unless 1299 is entered into parameter {Stored HF} 1 Stored HF trip (mm.000) and a reset is initiated. Trip numbers 218 to 247, 2 Non-resettable trips {Slot1 HF}, {Slot2 HF}, These trips cannot be reset. {Slot3 HF} or {Slot4 HF} This can only be reset if Parameter mm.000 is set to 1233 or 1244, or if 3 Volatile memory failure {EEPROM Fail} Default Drive (H04) is set to a non-zero value. Trip numbers 174, 175 and 4 NV Media Card trips These trips are priority 5 during power-up. 177 to 188 Internal 24V and position 4 feedback interface power {PSU 24V} and {Encoder 1} These trips can override {Encoder 2} to {Encoder 6} trips. supply Trips with extended reset {OI ac}, {OI Brake}, and 5 These trips cannot be reset until 10 s after the trip was initiated. times {OI dc} The drive will attempt to stop the Motor before tripping if a {Phase Loss} Phase loss and d.c. link {Phase Loss} and 000 trip occurs unless this feature has been disabled (see Action On Trip 5 power circuit protection {Oht dc bus} Detection (H46). The drive will attempt to finish the travel before tripping if an {Oht dc bus} occurs.

5

Standard trips

All other trips

Keypad

Timing Diagram

7 **Connection Diagram**



Timin	a Dia	adr	ar	n									
-		·9·	u i	••									
Open	loop o	per	ati	on									
						G	02 V2 Speed refe	erence to G1	0 V10 Spe	ed reference			
L	5			lay					· · · · ·			>	
	n filte	trol	ime	e de		eeq	G14 jerk	Run (2 j	G15 Run N erk 3	\backslash		dela ime	trol
	ctio	con	np ti	leas		er sp				\backslash		pply mn t	con
	sele	ctor	e rar	ol re		mise	G11 Accolor	ation a			stop n rat	e at	ictor
	eed	onta	rque	ontro		optii	rate	ra	ate	ration	eep atio	ontr	onta
	t sp	orce	orto	o O		tart				C16 Due	7 Cr eler	ke c	
	Star	Mot	Mot	Bral		le s				jerk 4	Ge 6 .	Bra	Mot
	.68	331	02	004		G13 R	ın ierk 1			G01 V1 Cree	n speed 5	205	331
	Ľ										p opood		
J22 Total output cu	rrent						Magnetisation	current, Ind	luction mot	or			····
D01 Motor magnet	sed												
Speed selection	-								111				
Creep Speed	-												
F10 STO Drive en	able												
B27 Fast disable	-												
L06 Drive active	-												
D03 Brake control	- output		-										
D06 Brake control	release upper		-										
current threshold	apply lower										_		
current threshold													
D08 Brake control	release												
D09 Brake control	apply [
frequency	concord												
102 Start ourrent lo	speeu _												
	эр г уант _												
104 Start current lo	pigain _												
108 Run current loc	p P gain _												
109 Run current loc	pIgain _											1	
J03 Elevator softwa	are state 0	1 - 2	3	4	5	6	7 -	8		9 - 10	11 [·]	12 1	3 14

9 Re-Configuring Control Terminals

The default control terminal configuration for the Elevator drive is as follows. All of the control terminals are user configurable.

Terminal No	Function	IO Default Destination-Source	IO State	IO Invert
05	Input	F41 = G35 Speed select Bit 3 input	F35	F40
07	Input	F48 = G33 Speed select Bit 1 input	F36	F47
09	Input	F55 = A00 Unassigned	F37	F54
24	Input / Output F24	F18 = J48 Velocity threshold 1 output	F03	F12
25	Input / Output F25	F19 = D03 Brake output	F04	F13
26	Input / Output F26	F20 = G34 Speed select Bit 2 input	F05	F14
27	Input	F21 = B27 Fast disable input	F06	F15
28	Input	F22 = G39 Direction input 1	F07	F16
29	Input	F23 = G32 Speed select Bit 0 input	F08	F17
41, 42	Relay output	F27 = L05 Drive OK output	F09	F28

Control Mode		Description
H11 = 0	Analog Run Permit	Analog speed reference (T07 Analog input 1) with run permit, Direction Input 1 G39 = On (1) to start the profile
H11 = 1	Analog 2 Dir	Analog speed reference (T07 Analog input 1) with dual direction inputs G39 and G40
H11 = 2	Priority 1 Dir	Priority speed selection with single direction input G39
H11 = 3	Binary 1 Dir	Binary speed selection with single direction input G39
H11 = 4	Priority 2 Dir	Priority speed selection with dual direction inputs G39 and G40
H11 = 5	Binary 2 Dir	Binary speed selection with dual direction inputs G39 and G40
H11 = 6	Control Word	Control over on-board 485 Modbus port using Control word G51 and Status Word L74

Binary Speed Selection	Bit 0 G32	Bit 1 G33	Bit 2 G34	Bit 3 G35	Speed reference
V0	-	-	-	-	-
V1	1	-	-	-	G01
V2	-	1	-	-	G02
V3	1	1	-	-	G03
V4	-	-	1	-	G04
V5	1	-	1	-	G05
V6	-	1	1	-	G06
V7	1	1	1	-	G07
V8	-	-	-	1	G08
V9	1	-	-	1	G09
V10	-	1	-	1	G10

Priority Speed Selection	Bit 0 G32	Bit 1 G33	Bit 2 G34	Bit 3 G35	Bit 4 G36	Bit 5 G37	Bit 6 G38	Speed reference
V0	-	-	-	-	-	-	-	-
V1	1	-	-	-	-	-	-	G01
V2	-	1	-	-	-	-	-	G02
V3	-	-	1	-	-	-	-	G03
V4	-	-	-	1	-	-	-	G04
V5	-	-	-	-	1	-	-	G05
V6	-	-	-	-	-	1	-	G06
V7	-	-	-	-	-	-	1	G07

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Control Word G51		Status W	/ord L74	
Bit	Description	Priority	Bit	Description
0	V1 speed reference by default Creep Speed (G52)	10 (Lowest)	0	Drive OK (L05)
1	V2 speed reference	9	1	Drive Active (L06)
2	V3 speed reference	8	2	At Zero Speed (L08)
3	V4 speed reference	7	3	Reserved
4	V5 speed reference	6	4	Reserved
5	V6 speed reference	5	5	Reserved
6	V7 speed reference	4	6	Reserved
7	V8 speed reference	3	7	Rated Load Reached (L13)
8	V9 speed reference	2	8	Current Limit Reached (L15)
9	V10 speed reference	1 (Highest)	9	Regenerating (L14)
10	Direction input 1 CCW		10	Braking IGBT Active (L16)
11	Direction input 2 CW		11	Braking Resistor Alarm (L17)
12	Watchdog bit Must be set to 1 at least every 500 ms. Failure to do so Ctrl Watchdog fault.	will result in a	12	Reverse Direction Commanded (L27)
13	Control Word enable Must be set to 1 to allow travel. For is set to 1 when travel is requested i.e. following Speed set to 0 when the travel has completed.	r a normal travel this bit / Direction / Enable and	13	Reverse Direction Running (L28)
14	Reserved		14	Reserved
15	Reserved	N/A	15	N/A

Configuration Options		Notes		
B31	Motor contactor control output	Can be routed via a digital output to the Elevator control system for control of the output motor contactors		
D01	Motor magnetised indication, output	This motor magnetised indication can be routed via a digital output to the Elevator controller as an indication of when the motors brakes can be released		
G39	Direction input 1 CCW	Direction counter clock wise		
G40	Direction input 2 CW	Direction clock wise		
E11	Load cell compensation input	The external load cell compensation uses the Elevator car load cell to generate a torque feed forward reference. Also refer to setup parameters E10 Enable E12 Filter E13 Reference E19 Offset and E20 Scaling		
H26	FAST stop enable	A FAST stop can be carried out using either Speed control or Direction control (dual direction inputs), once the FAST stop mode is enabled. Also refer to G29 Deceleration rate		

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