Addendum for L1000A QSG

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1 General Overview

◆ Scope

This documentation is valid for drives with the following model codes:

- CIMR-LC□F□□□□□□□□-913□

◆ About this Document

This manual is an addendum to the L1000A Quick Start Guide.

Always heed Safety Instructions as given in the Quick Start Guide when replacing a drive or performing installation and setup steps described here.

All conditions mentioned in the L1000A Quick Start Guide apply.

2 A3 Interface

◆ Overview

According to EN81-20:2014, new lifts must be equipped with a system independent of the drive control to prevent unintended car movement (UCM) away from the stop with open doors. This protection device has three functions:

- Recognition
- Tripping
- Braking

With gearless PM motors, the applied brake can be used as the “braking” part of the UCM-device. In this case, the brake function has to be monitored. With a certified brake response monitor function, the motor brake and the drive can act as parts of the UCM protective device.

■ Specification for Brake Response Monitor (BRM) Function

The brake monitor status function supports:

- Checking the status of the brakes at every run command
- Checking the correct switching of the brake within a defined time
- Locking the system if failure is detected

The Brake Response Monitor function is certified according to the normative requirements.

■ Checking the Status of the Brakes

The Brake Response Monitor (BRM) function checks the status of the brakes with every run command.

Setting 79h:“Brake Feedback” (N.O. signal)
Setting 5Bh:“Brake Feedback” (N.C. signal)

To comply with the EN81-20:2014 norm, the Brake Feedback function must be selected for two digital inputs simultaneously (e.g.: H1-07 = 79h & H1-08 = 79h).

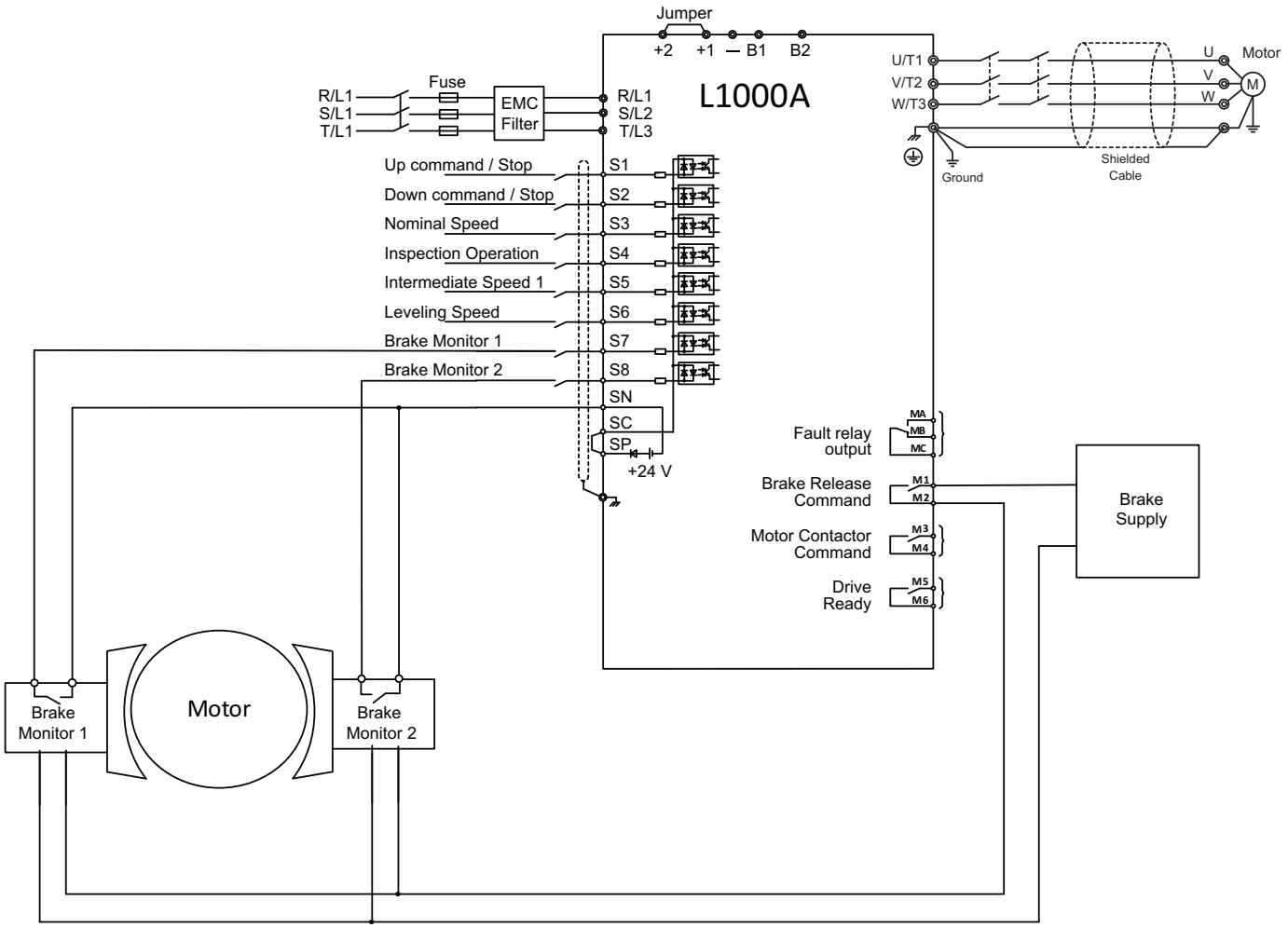
Selecting the Brake Feedback function once or more than twice, or mixing the functions (selecting 79h & 5Bh) triggers an OPE03 fault if the Brake Response Monitor function is enabled (S6-17 = 1).

◆ Wiring

The motor is equipped with two brakes. In the figure below the brakes have two Normally Open (N.O.) switches, but Normally Closed (N.C.) operation is also possible.

When the motor brakes close, the switches close as well. This causes the digital inputs used for brake monitoring (e.g. S7 and S8) to change their logic state and unlock the drive allowing the run sequence to start.

The figure below shows how to wire the drive and motor brakes.



◆ Activation/Deactivation

The following table provides an overview of the parameters necessary for the Brake Response Monitor.

Parameter Number	Parameter Name	Setting Range
H1-□□	Brake Feedback 1	79h (N.O.)
	Brake Feedback 2	5Bh (N.C.)
S6-17	Brake Response Monitor	0 = Deactivated (Default) 1 = BRM Function Active
S6-05	Brake Response Error (SE4) Detection Time	Default 500 ms Min. 0 ms- Max. 60,000 ms
S6-06	Brake Response Error (SE4) Detection Time During Run	Default 500 ms Min. 0 ms - Max. 60,000 ms
S6-18	SE4 Fault Reset	0 = No reset (Default) 1 = Reset SE4 Fault

The Brake Response Error Time is adjustable in parameter S6-05. Default detection time is 500 ms. If S6-05 is set to 0 the SE4 fault detection during Start/Stop is disabled.

The Brake Response Error Time During Run is adjustable in parameter S6-06. Default detection time is 500 ms. If S6-06 is set to 0 the SE4 fault detection during Run is disabled.

■ Activation

The Brake Response Monitor (BRM) function is not active by default. The Brake Feedback function must be programmed to two digital inputs of the drive.

To activate the BRM function, perform the following steps:

- Set Parameter S6-17 = 1.
- Program the Brake Feedback function to two digital inputs of the drive.
  For example:
  - Input S7 -> H1-07 = 79h
  - Input S8 -> H1-08 = 79h

If S6-17 = 0, but Brake Feedback 1 and Brake Feedback 2 are wired and Brake Control (H2-□□ = 50h) is used, the L1000A Brake Feedback Function is active, but the mode of operation is not A3-conform. This Brake Feedback function is just monitoring the brake operation and issues a fault if the brake's status does not match the brake command.

■ Deactivation

To deactivate the Brake Response Monitor (BRM) function, perform the following steps:

- Set Parameter S6-17 = 0.

The function is disabled.

◆ Fault Detection/Fault Reset

■ Fault Detection

If during the start or stop process Brake Feedback 1 and/or Brake Feedback 2 do not change their logic state within the time limit specified in S6-05 (Brake Response Error (SE4) Detection Time), an SE4 fault will be triggered and the drive will be locked.

If during Run Brake Feedback 1 or Brake Feedback 2 change their logic state for a time longer than S6-06 (Brake Response Error (SE4) Detection Time During Run), an SE4 fault will be triggered and the drive will be locked.

■ SE4 Fault Reset

With the Brake Response Monitor function enabled (S6-17 = 1), an SE4 fault cannot be reset by:

- Using the Reset button
- Power cycling the drive or installation
- Using the "Automatic Fault Reset" function (L5-□□)

The SE4 fault can be reset only by setting parameter S6-18 = 1.

With the Brake Response Monitor (BRM) function disabled (S6-17 = 0), an SE4 fault can be reset using the standard procedure.

■ Brake Feedback

Standard Behavior of Brake Feedback

After the Brake Release Command is set (brake open) during start procedure the drive starts a timer with the value set in parameter S6-05. If Brake Feedback function 79h is selected, both of the Brake Feedback Inputs must be set within the time set in S6-05. If Brake Feedback function 5Bh is selected, they must be reset within the time set in S6-05.

After the Brake Release Command is reset (brakes closed) during stop procedure the drive starts a timer with the value set in parameter S6-05. If Brake Feedback function 79h is selected, both of the Brake Feedback Inputs must be set within the time set in S6-05. If Brake Feedback function 5Bh is selected, they must be reset within the time set in S6-05.

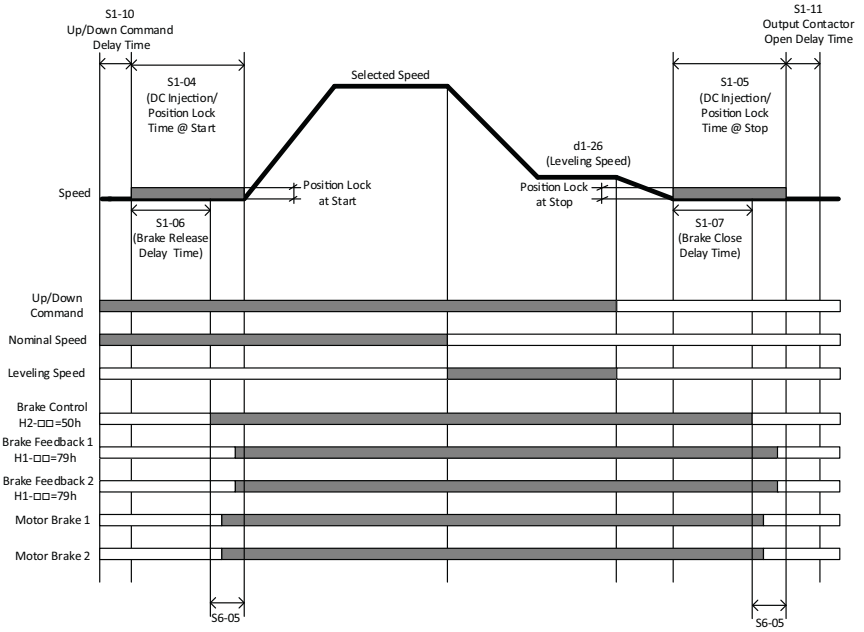


Figure 1 Normal Operation with MFDOs set to 79h (N.O.)

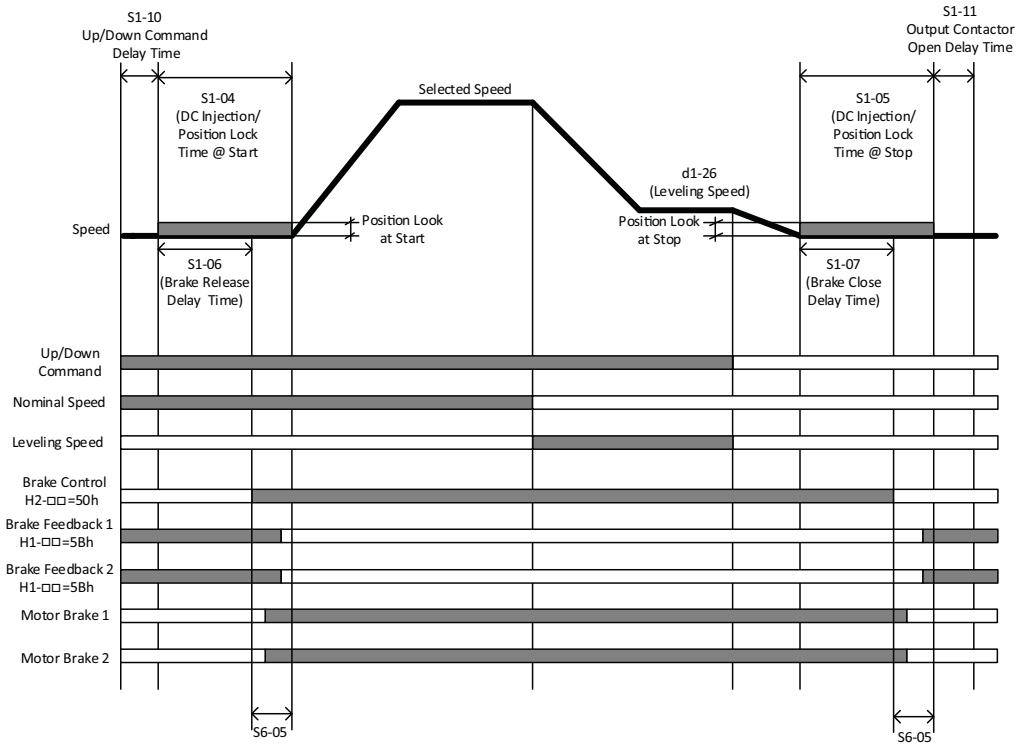


Figure 2 Normal Operation with MFDOs set to 5Bh (N.C.)

Fault during Start or Stop

If both Brake Feedback Inputs do not change their logic state within the time set in parameter S6-05, the drive stops the start/stop sequence and triggers an SE4 (Brake Response Error) fault.

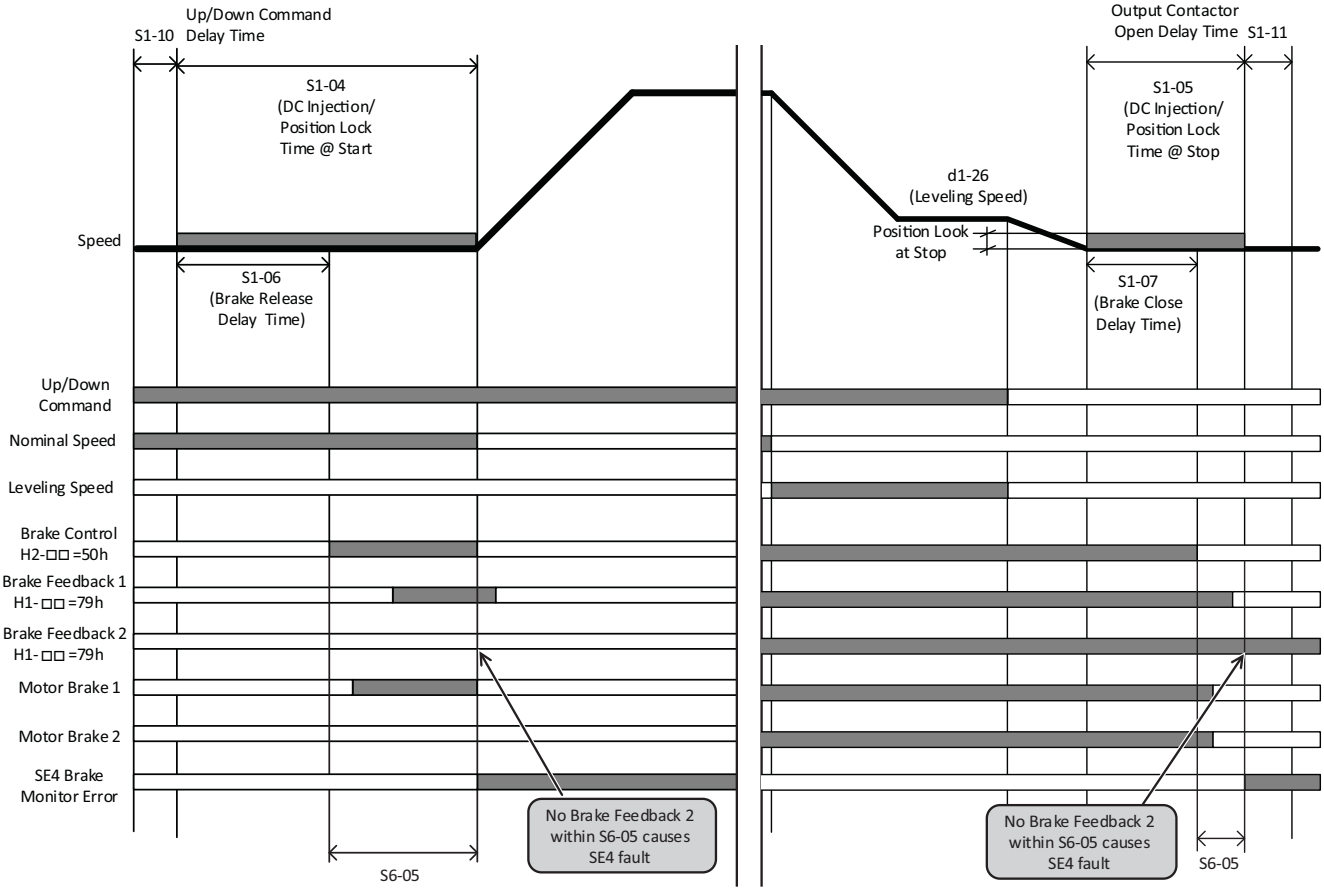


Figure 3 Fault during Start (left) and Fault during Stop (right)

Fault Behavior during Run

If at any point during Run the logic state of one of the Brake Feedback inputs changes unexpectedly, a countdown timer with the value of parameter S6-06 will be initiated. If the timer expires without change of Brake Feedback status to its expected state an SE4 Fault will be triggered and the fault message “Brake Response Error (SE4)” will be displayed.

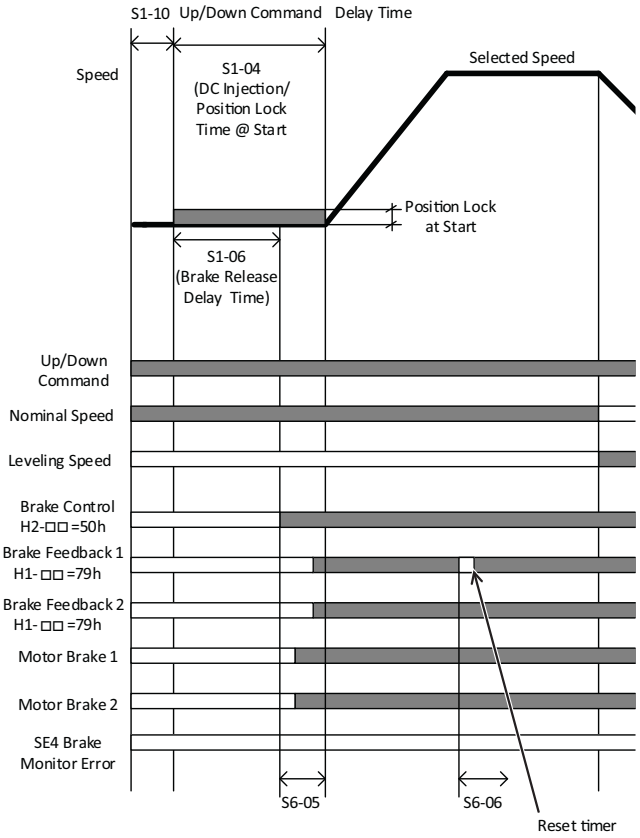


Figure 4 Short Disruption of Brake Feedback 1 Input during Run

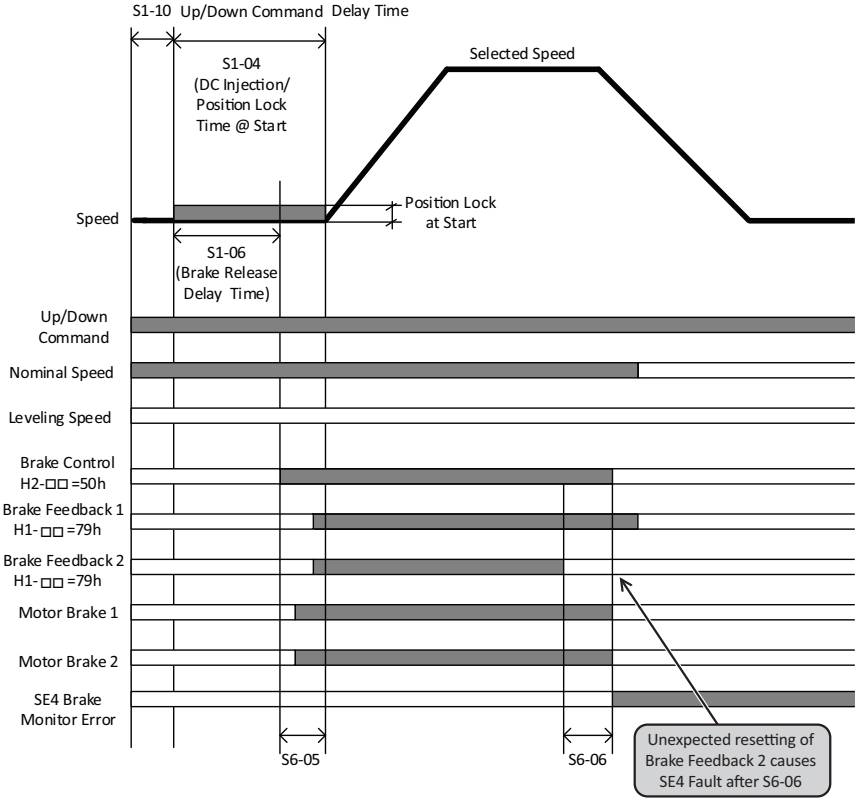


Figure 5 Fault during Run

◆ Function Test

Selecting the Brake Feedback function on only one or more than two digital inputs, or mixing the functions (selecting 79h & 5Bh) triggers an oPE03 fault if the Brake Response Monitor function is enabled (S6-17 = 1).

In case of an oPE03 fault, check if two inputs have been programmed as Brake Feedback and if they are both programmed to the same function.

For example:

H1-07 = 79h & H1-08 = 79h

or

H1-07 = 5Bh & H1-08 = 5Bh

If the Brake Response Monitor function is enabled (S6-17 = 1) and the SE4 fault appears, the Brake Monitor Function must be verified before the SE4 fault can be reset.

■ Function Test NPN Logic

The following steps have to be performed for the functional test after commissioning when using NPN logic:

1. Disconnect the signal Brake Feedback 1 (e.g. input S7).
2. Execute test travel.
3. During start an SE4 fault should be triggered and the drive should immediately stop.
4. The drive should be blocked and no further travel should be possible even after power cycle.
5. Reconnect the signal Brake Feedback 1.
6. Execute test travel.
7. The drive should be blocked and no further travel should be possible even after power cycle.
8. Unlock the drive by setting S6-18 to 1.
9. Execute test travel.
10. The drive should operate normally.

Repeat this NPN logic procedure for Brake Feedback 2 (e.g. input S8).

■ Function Test PNP Logic

The following steps have to be performed for the functional test after commissioning when using PNP logic:

1. Connect 24 V to Brake Feedback 1 (e.g. input S7).
2. Execute test travel.
3. During start an SE4 fault should be triggered and the drive should immediately stop.
4. The drive should be blocked and no further travel should be possible even after power cycle.
5. Disconnect 24 V on Brake Feedback 1.
6. Execute test travel.
7. The drive should be blocked and no further travel should be possible even after power cycle.
8. Unlock the drive by setting S6-18 to 1.
9. Execute test travel.
10. The drive should operate normally.

Repeat this PNP logic procedure for Brake Feedback 2 (e.g. input S8).

■ Brake Feedback

The following steps have to be performed to ensure correct operation of the Brake Feedback switches and function.

Brake Monitor 1

- Check if Motor Brake 1 operates correctly.
- Check status of Motor Switch in Brake 1.
- Check if the logic changes like specified.
- Check if Digital Input Brake Monitor 1 works correctly.
- Check in Monitor Parameter U1-10 if input change the status.

Brake Monitor 2

- Check if Motor Brake 2 operates correctly.
- Check status of Motor Switch in Brake 2.
- Check if the logic changes like specified.
- Check if Digital Input Brake Monitor 2 works correctly.
- Check in Monitor Parameter U1-10 if input change the status.

3 DI-A3 Option Multi-Functional Support

The DI-A3 option can be used to increase the number of digital inputs. To use this function, set parameter F3-01 = 8 *[DI-A3 Option Input Selection = Multi-Functional]*. All standard functions can be assigned to the option terminals D0 to D7 by using parameters F3-04 to F3-11 *[Terminal D□ Function Selection]*. If faults and alarms are set to terminals D0 to D7, the display messages „OEF0“ to „OEF7“ [*DI-A3 Ext Faultx*] will be shown. If no DI-A3 option card is installed, parameters F3-04 to F3-11 are not displayed.

Parameters F3-04 to F3-11 are displayed only when F3-01 = 8.

◆ Added and Modified Parameters for DI-A3 Multi-Functional Support

Parameter	MEMOBUS Address (Hex.)	Operator Display *[Parameter Name]*	Description	Range [Default]
F3-01	390	DI-A3 Opt InpSel *[DI-A3 Option Input Selection]*	Option Card Input Selection Selects the method to input the option card data. 0: BCD 1% unit 1: BCD 0.1% unit 2: BCD 0.01% unit 3: BCD 1 Hz unit 4: BCD 0.1 Hz unit 5: BCD 0.01 Hz unit 6: BCD custom setting (5 digit input), 0.02 Hz units 7: Binary input 8: Multi-Functional	0 - 8 [8]
F3-04	619	DI-A3 D0 FuncSel *[Terminal D0 Function Selection]*	Terminal function selection for DI-A3 option input. Same setting range as H1-03 to H1-08.	0 - 79 (Hex.) [0F (Hex.)]
F3-05	61A	DI-A3 D1 FuncSel *[Terminal D1 Function Selection]*		
F3-06	613	DI-A3 D2 FuncSel *[Terminal D2 Function Selection]*		
F3-07	614	DI-A3 D3 FuncSel *[Terminal D3 Function Selection]*		
F3-08	615	DI-A3 D4 FuncSel *[Terminal D4 Function Selection]*		
F3-09	616	DI-A3 D5 FuncSel *[Terminal D5 Function Selection]*		
F3-10	617	DI-A3 D6 FuncSel *[Terminal D6 Function Selection]*		
F3-11	618	DI-A3 D7 FuncSel *[Terminal D7 Function Selection]*		

◆ Added Faults and Alarms for DI-A3 Option

Fault	Alarm Code (Hex.)	Alarm Display [Alarm Name]	Description
OEF0 - OEF3	3C - 3F	DI-A3 Ext Fault0 - 3 *[DI-A3 External Fault 0 - 3]*	Digital Input Option DI-A3 External Fault An external fault has been triggered on an input terminal (D0 - D7) of the DI-A3 option.
OEF4 - OEF7	64 - 67	DI-A3 Ext Fault4 - 7 *[DI-A3 External Fault 4- 7]*	

Alarm	Alarm Code (Hex.)	Alarm Display [Alarm Name]	Description
OEF0 - OEF3	2C - 2F	DI-A3 Ext Fault0 - 3 *[DI-A3 External Fault 0 - 3]*	Digital Input Option DI-A3 External Alarm An external alarm has been triggered on an input terminal (D0 - D7) of the DI-A3 option.
OEF4 - OEF7	49 - 4C	DI-A3 Ext Fault4 - 7 *[DI-A3 External Fault 4- 7]*	

4 Advanced Light Load Search

The Advanced Light Load Search function (S4-01 = 3) detects the load condition during normal travel operation. Unlike search methods 1 and 2, this function does not move the car up and down when detecting the light load direction.

This function is also useful in applications where an excessive discharge of UPS during Light Load Search operation shall be avoided.

◆ Changed Parameters for Advanced Light Load Search

Available for all control methods.

Parameter	MEMOBUS Address (Hex.)	Operator Display *[Parameter Name]*	Description	Range [Default]
S4-01	6A6	LightLoad Search *[Light Load Direction Search Selection]*	0: Disabled 1: Enabled 2: Enabled for Motor 1 only 3: Advanced Search	0 - 3 [0]

Yaskawa recommends a full up/down travel with empty car for calibration.

To reset the calibration, set parameter S4-01 = 0.

5 Output Phase Loss Protection

Enables or disables the output phase loss detection which is triggered when the output current falls below 5% of the drive rated current.

◆ Changed Parameters for Output Phase Loss Protection

Available for all control modes.

Parameter	MEMOBUS Address (Hex.)	Operator Display *[Parameter Name]*	Description	Range [Default]
L8-07	4B3	OutPhLoss *[Output Phase Loss Protection Selection]*	0: Disabled 1: Triggered by a single phase loss 2: Triggered when two phases are lost 3: Fault at phase loss at start and during RUN	0 - 3 [0]

Setting 0: Disabled

Setting 1: Triggered by a single phase loss

An output phase loss fault (LF) is triggered when one output phase is lost. The output shuts off and the motor coasts to stop.

Setting 2: Triggered when two phases are lost

An output phase loss fault (LF) is triggered when two output phases are lost. The output shuts off and the motor coasts to stop.

Setting 3: Fault at phase loss at start and during RUN

An output phase loss fault (LF) is triggered when one or more phases are lost at motor start (before the brake opens) and when motor is moving. When LF has been detected, the motor coasts to stop.

When setting L8-07 = 3, set parameters S1-02 (only OLV and V/f) and S1-04 as follows.

- Set S1-02 (DC Injection Current at Start) to a value greater than 15%.
- Set S1-04 (DC Injection/Position Lock Time at Start) to a value greater than 100 ms.

An incorrect setting may result in poor performance or nuisance faults or alarms.

6 DCP Interface

◆ Network Cable Connection

- With the power shut off, connect the communications cable to the drive and the master. Use terminals R+/S+ and R-/S- for DCP.
- Set DIP switch S2 to ON position.

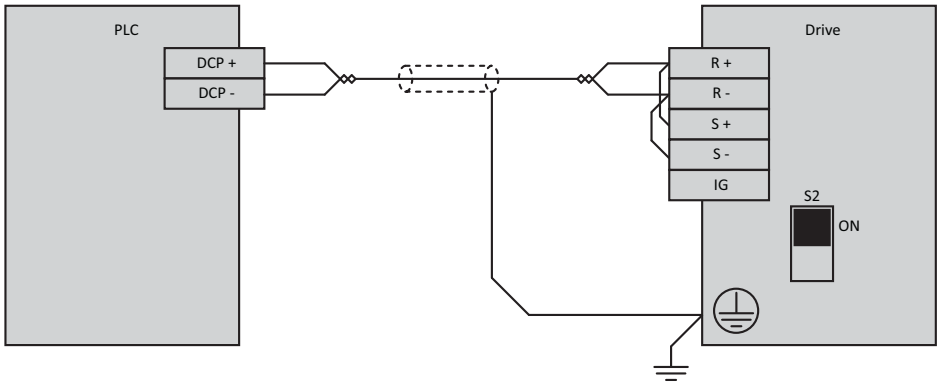


Figure 6 RS-485 DCP Connection

Note: **1.** Turn on the DIP switch on the drive that is located at the end of the network. All other slave devices must have this DIP switch set to OFF position.
2. Set H5-07 = 1 when using the RS-485 interface.
3. Cycle power to apply the H5-07 change.

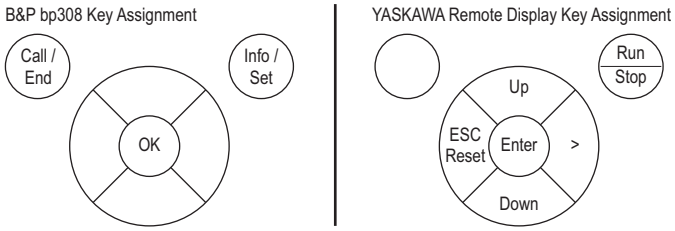
◆ Introduction

The DCP protocol distinguishes two modes:

- DCP3 for lift controllers without absolute encoder system in the shaft
- DCP4 for lift controllers with absolute encoder system in the shaft

◆ Key Assignments for Remote Keypad Control

B&P lift controller bp308:

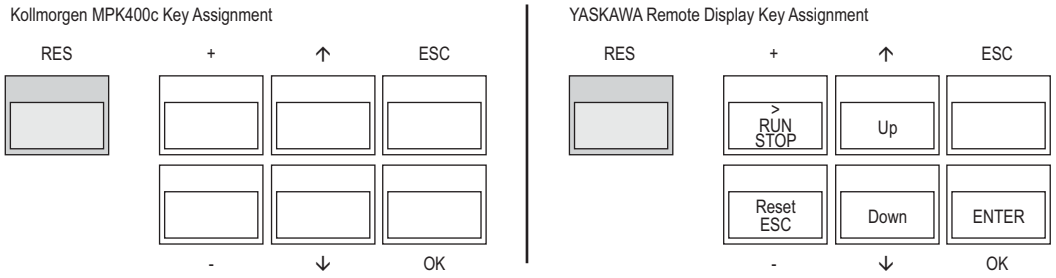


The button "ESC/Reset" functions like "ESC" in the programming menu, and like "Reset" in the fault display. The button "Run/Stop" issues a RUN command when not during RUN, and issues a STOP command when during RUN.

Schneider Steuerungstechnik GmbH Lisa20:

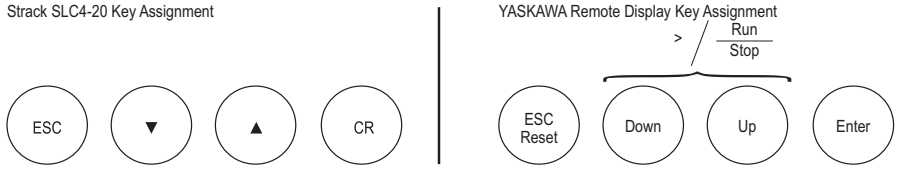
The button "ESC/Reset" functions like "ESC" in the programming menu, and like "Reset" in the fault display. The button "Run/Stop" issues a RUN command when not during RUN, and issues a STOP command when during RUN.

Kollmorgen lift controller MPK400c:



The button "ESC/Reset" functions like "ESC" in the programming menu, and like "Reset" in the fault display. The button "Run/Stop" issues a RUN command when not during RUN, and issues a STOP command when during RUN.

Strack Lift Automation SLC4-20:



The button "ESC/Reset" functions like "ESC" in the programming menu, and like "Reset" in the fault display. The button "Run/Stop" issues a RUN command when not during RUN, and issues a STOP command when during RUN. To use the functions ">" or "RUN/STOP" press the buttons "Down" and "Up" at the same time.

■ Manufacturer Codes

Lift Controller Manufacturer		Drive Controller Manufacturer	
Name	**ID**	**Name**	**ID**
Böhnke + Partner GmbH	BP	MagneTek (UK) Ltd.	MT
Kollmorgen Steuerungstechnik GmbH	KN	Yaskawa Europe GmbH	YE
Schneider Steuerungstechnik GmbH	LI		
Strack Lift Automation GmbH	ST		

◆ Related Parameters and Functions

■ Added Standard Parameters

Parameter	Operator Display	Description	Value Range	Default Value
H5-13	Serial Comm Mode	0: DCP Communication Channel 1: Memobus/Modbus 3: DCP3 4: DCP4 5: CANopen-Lift Perform a power cycle when changing the Serial Communication Mode (H5-13)	0, 1, 3, 4, 5	1

■ Added Parameters for Positioning Mode (H5-13 ≥ 4)

This table applies for DCP4 and CANopen-Lift in Profile Position mode.

Parameter	Operator Display	Description	Value Range	Default Value
S7-13	Shft Output Gain	Sets the output gain of the Shaft Encoder position controller.	0.00 ... 100.00	2.00
S7-30	Shaft Pos Trim	Trims the final shaft position by some mm by adding this value to the actual lift car position feedback.	o1-12 = 0: -10 to 10 mm	o1-12 = 0: 0 mm
			o1-12 = 1: -0.39 .. 0.39 in	o1-12 = 1: 0.00 in
S7-32	ShD Auto-Tuning	Enables Sheave Diameter Auto-Tuning. After every profile positioning drive, o1-20 is adapted stepwise minimizing U4-53/U4-54. The parameter is automatically reset after 6 travels. To insure proper tuning, always drive the longest distance occurring in the lift installation.	0 - 1	0

■ Modified Standard Parameters

Only modified parameters are listed in this table. If parameter H5-13 = 3 or 4 or 5, the following changes apply:

Parameter	Operator Display	Description	Value Range	Default Value
o1-20	Traction Sheave Diameter	Sets the traction sheave diameter. **Note:** If H5-13 ≥ 4 parameter o1-12 has one additional decimal place.	H5-13 < 4: o1-12 = 0: 100 - 2000 mm o1-12 = 1: 3.94 - 78.74 in	H5-13 < 4: o1-12 = 0: 400 mm o1-12 = 1: 15.75 in
			H5-13 ≥ 4: o1-12 = 0: 100.0 - 1660.0 mm o1-12 = 1: 3.937 - 65.354 in	H5-13 ≥ 4: o1-12 = 0: 400.0 mm o1-12 = 1: 15.748 in

■ Added Standard Monitors

Monitor	Operator Display	Description	Analog Output Scaling (H4-☐☐ selection)	Unit
U4-50	Rem Distance	Remaining Distance Shows the remaining distance until the commanded distance is reached (value originating from lift controller, contains distance prolongations)	10 V: 65.535 m	o1-12 = 0: 0.001 m
			10 V: 2580 in	o1-12 = 1: 0.01 in
U4-51	Braking Distance	Braking Distance Shows the braking distance for a currently driven speed (matches the remaining distance at the time of deceleration)	10 V: 65.535 m	o1-12 = 0: 0.001 m
			10 V: 2580 in	o1-12 = 1: 0.1 in
U4-52	Int Dist Cmd	Internal Distance Command Shows the total commanded distance including prolongations (calculated from remaining distance)	10 V: 100.00 m	o1-12 = 0: 0.01 m
			10 V: 3937 in	o1-12 = 1: 0.1 in
U4-53	UpLinLimTime	Upper Linear Limit Time Applies an upper linear limit during C2-04 deceleration part. In case the positioning parameters are not set properly, this limit avoids jumps of the lift car at the beginning of C2-04 time	-	ms
U4-54	DownLinLimTime	Lower Linear Limit Time Applies a lower linear limit during C2-04 deceleration part. In case the positioning parameters are not set properly, this limit avoids jumps of the lift car at the beginning of C2-04 time	-	ms

■ Added Standard Parameter Dependencies (Defaults)

H5-13 = ☐	0	1	3	4	5	3, 4	0, 1, 5
Parameter	Default Value					Parameter Texts	
C1-01	3.00 s	1.50 s	3.00 s			-	-
C1-02	3.00 s	1.50 s	3.00 s			-	-
d1-01	0.00%		100.00%		0.00%	V4 Speed	Reference 1
d1-02	0.00%		64.00%		0.00%	V3 Speed	Reference 2
d1-03	0.00%		40.00%		0.00%	V2 Speed	Reference 3
d1-04	0.00%					V1 Speed	Reference 4
d1-05	0.00%					V7 Speed	Reference 5
d1-06	0.00%					V6 Speed	Reference 6
d1-07	0.00%					V5 Speed	Reference 7
d1-23	0.00%		1.00%		0.00%	VN Speed	Releveling Speed
d1-24	50.00%		25.00%		50.00%	VI Speed	Inspect Oper Spd
d1-26	8.00%		4.00%		8.00%	V0 Speed	Leveling Speed

■ Added Faults and Modified Errors

Added DCP Faults

Fault	Fault Code (Hex.)	Fault Display	Description	Cause	Countermeasure
DCE1	61	DCP CRC Error	Drive Control Position Cyclic Redundancy Check Error A CRC8 check failed 10 times consecutively during RUN	EMC, bad serial link	Shield serial link. Check serial RS-485 connection (Termination Resistance switched by S2)
DCE2	62	DCP Init Error	Drive Control Position Initialization Error A Run command was given although no valid initialization command ('I','1') was received	EMC, bad serial link	Check if lift controller sends valid initialization command
DOE1	63	DCP OPE	Drive Control Position Operation Error A Run command was given although the inverter was in Alarm state	Alarm	Remove alarm condition. Lift controller must not give Run during Alarm state

◆ Adjustment Procedures

■ General Tuning Requirements for Profile Position Mode

1. Select inverter control mode (CLV or PM CLV; requires pulse counter (PG) feedback)
2. Perform Auto-tuning
3. Set H5-13 to 4 (profile positioning is performed with setting 4)
4. Tune complete ASR, i.e. C5-01/C5-03/C5-13, C5-02/C5-04/C5-14.
   It is very important to have a low ASR response time in order to obtain good leveling results.
   This is mainly achieved when C5-02/C5-04/C5-14 have low values (< 80ms). Higher C5-01/C5-03/C5-13 values (ASR gains) are also recommended.
5. Set o1-20, o1-21, o1-22 values, especially o1-20 as precise as possible (set the sheave diameter from rope-center to rope-center if possible).
6. Set a high C2-04 value at the beginning (C2-04 ≥ 2.00 sec).
7. Compare speeds of lift controller and drive controller using inspection speed.
   These values should be similar with a tolerance of about 3%. If deviations are bigger, adjust o1-20.
   Recommendation: Switch drive controller units to m/s (o1-03 = 4).
8. Perform a DCP4 positioning travel one floor up or down.
9. Minimize U4-53 and U4-54 by adjusting o1-20.
10. Repeat steps 8 and 9 until either U4-53 or U4-54 reach values below 300 ms.
11. Perform Sheave diameter auto-tuning by setting S7-32 to 1.
12. Perform DCP4 positioning travels with the maximum possible drive distance of the lift 3 times up, 3 times down.
    The drive controller adjusts o1-20 automatically.
    After these 6 travels, S7-32 is set to 0 and no further adaption of o1-20 occurs.
13. If necessary, adjust shaft controller gains.
    Input gain: S7-09; Output gain: S7-13

Note: Proper positioning operation is not performed when C2-04 is 0 or short.

Sheave Diameter Auto-Tuning

After each successful position mode travel, the Sheave Diameter Auto-Tuning function adapts o1-20 settings automatically using tuning monitors U4-53 and U4-54. After 8 travels, the tuning stops and S7-32 is reset automatically. If o1-20 values still change by some 0.1 mm, the tuning can be repeated by setting S7-32 to 1 again. Note that one 8-travel tuning cycle can correct o1-20 by roughly up to 10.0 mm only.

Shaft Controller Tuning

The shaft controller compares the remaining distance to travel with the remaining distance based on motor PG. In some cases, especially with high pulse count PGs, it is necessary to reduce the shaft controller output gain (S7-13).

Optional: Shaft Position Trimming

The DCP specification does not allow the lift controller to transfer negative remaining distance values to the inverter. This can lead to overruns by about +0...4 mm due to control impairment. To overcome this restriction, parameter S7-30 can be used to trim an earlier termination of the overall profile by some millimeters. For example, a lift tending to overrun by +0…4 mm can be trimmed to reach the level with -2…+2 mm deviation. In this example, set S7-30 to -2 mm (systematic error correction amount).

7 CANopen-Lift

Yaskawa CANopen-Lift implementation refers to CiA-417: Profile for Lift Control Systems. Supported operation modes are Profile Velocity mode and Profile Position mode. The Yaskawa CANopen-Lift fieldbus option card is required.

To enable CANopen-Lift functionality, set parameter H5-13 = 5, b1-01 and b1-02 = 6, and perform a power-cycle. Some parameters will be changed automatically. *Refer to Added Standard Parameter Dependencies (Defaults) on page 15*.

Parameter groups are commonly used in CANopen-Lift and in DCP mode. Therefore the following descriptions refer to DCP parameter and monitor tables.

◆ Characteristics of CANopen-Lift Interface

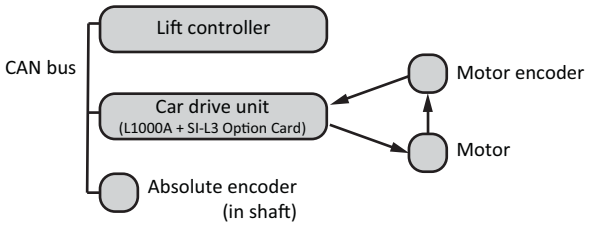


Figure 7 Connection using CANopen-Lift

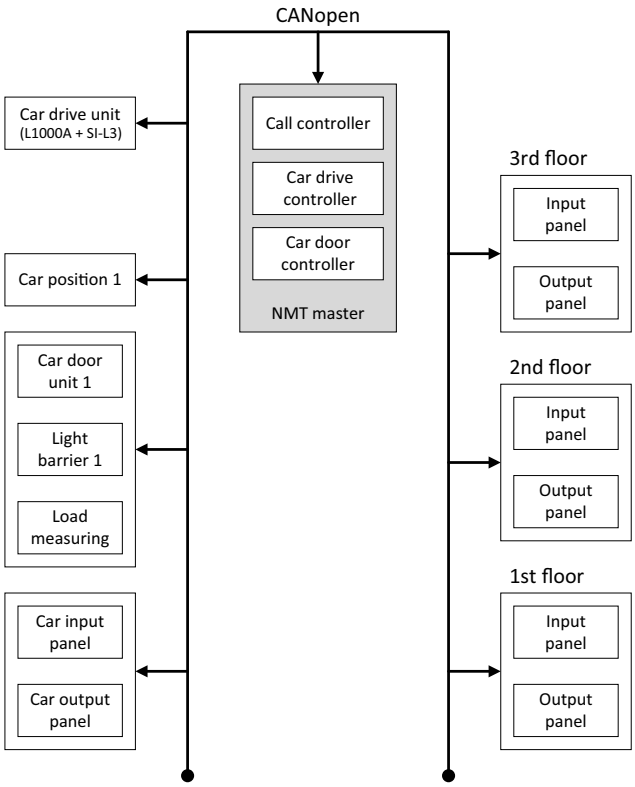


Figure 8 Example for a single network architecture for a single-shaft lift control system

8 Ripple Compensation

Only available for PM CLV control method.

This function is intended for use when compensating n*f torque ripple on the motor shaft.

◆ Special Functions

Function	Description
Calculation of car inertia	The total car inertia (J) is calculated as follows: [System Inertia] = ([S8-08] + [S8-09] + [S8-10] + [S8-11] + [S8-12]/2) * ([o1-20] / 4000)² J = [S8-04] + [S8-06] + [S8-07] + [System Inertia]

◆ Function Description

Set the Kt value (S8-02) from motor data sheet or motor name plate.

Unit of Kt is Nominal Torque [Nm] / Nominal Current [A].

◆ Example

Elevator					
Parameter		**Symbol**	**Value**	**Unit**	**Value from:**
S8-08	Weight Cage	m_{Car}	1050	kg	Lift builder
S8-09	Weight Counter Weight	m_{Cwt}	1550	kg	Lift builder
S8-10	Weight Rope	m_{Rope}	70	kg	Lift builder
S8-11	Weight Pulley	m_{Pulley}	20	kg	Lift builder
S8-12	Maximum Load Weight	m_{Load}	0	kg	Lift builder

Motor: MSYP160					
Parameter		**Symbol**	**Value**	**Unit**	**Value from:**
S8-04	Motor Inertia	J_{Mot}	1.110	kgm²	Motor manufacturer
S8-06	Pulley Inertia	J_{Pulley}	0.375	kgm²	Lift builder
S8-07	Sheave Inertia	J_{Ts}	0.500	kgm²	Motor manufacturer
	Roping Ratio		2:1	-	Motor manufacturer
	Rated Speed		1	m/s	Motor manufacturer
o1-20	Sheave Diameter		Ø 240	mm	Motor manufacturer

J = (1050 + 1550 + 70 + 20 + 0/2) kg * ((240 / 4000) mm)² + 1.110 kgm² + 0.375 kgm² + 0.500 kgm²

J = 11.669 kgm²

◆ Added Parameters for Ripple Compensation

Only available for PM CLV control method.

Parameter	MEMOBUS Address (Hex.)	Operator Display *[Parameter Name]*	Description	Range [Default]
S8-01	620	Ripple Compens. *[Activate Ripple Compensation]*	0: Disable 1: Enable	0, 1 [0]
S8-02	621	Kt value	Set the Kt value (Torque parameter) in Nm/A Unit of Kt is Nominal Torque [Nm] / Nominal Current [A].	0.00 - 200.00 [1.00]
S8-03	622	Tripple gain	Set the T_{ripple} gain	0.00 - 20.00 [0.30]
S8-04	623	Set mtr inertia *[Jm (motor inertia)]*	Set the motor inertia in kgm²	0.000 - 60.000 [0.000]
S8-06	625	Set pull inertia *[Jm (motor inertia)]*	Set the pulley inertia in kgm²	0.000 - 60.000 [0.000]
S8-07	626	Set shv inertia *[JST (sheave inertia)]*	Set the sheave inertia in kgm²	0.000 - 60.000 [0.000]
S8-08	627	Weight Cage	Set the weight of the cage in kg	0 - 60,000 [0]
S8-09	628	Weight Cweight *[Weight counter weight]*	Set the weight of the counter weight in kg	0 - 60,000 [0]
S8-10	629	Weight Rope	Set the weight of the rope in kg	0 - 60,000 [0]
S8-11	62A	Weight Pulley	Set the weight of the pulley in kg	0 - 60,000 [0]
S8-12	62B	Max Load Weight *[Maximum Load Weight]*	Set the maximum load weight in kg	0 - 60,000 [0]

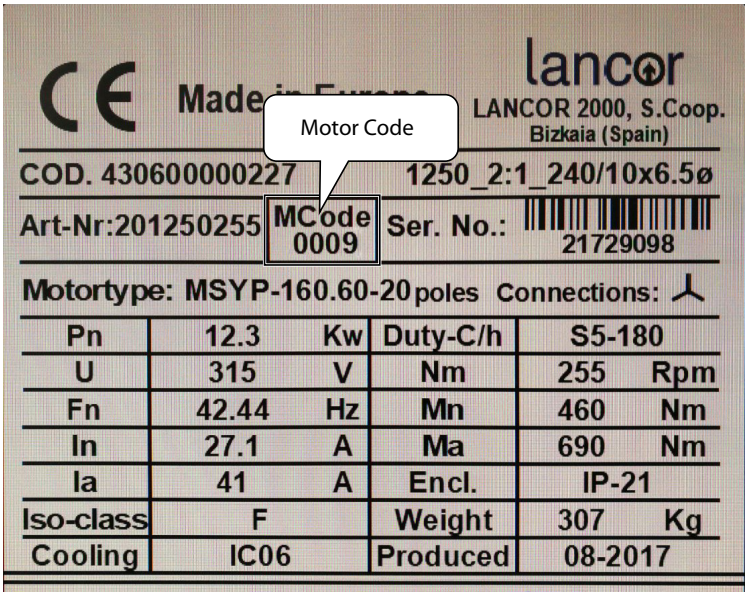
◆ Added Monitors for Ripple Compensation

Only available for PM CLV control method.

Monitor	MEMOBUS Address (Hex.)	Operator Display *[Monitor Name]*	Description	Analog Output Scaling
U4-60	862	RippleMon [%/Tn]	Estimated ripple [100%/Tn] in 0.1%	10 V: 100% Nominal Torque*
U4-61	863	Ripple Mon [N]	Estimated ripple [0.1 Nm] in 0.1 Nm	-
*Nominal torque is based on E1-06, E5-02, and E5-04				

9 PM Play

When using the Yaskawa motors for Lifts, MSYP series, the function "PM Play"makes commissioning of lift installation easier. Just set parameter E5-01 using the motor code provided on the motor name plate. The Lift Inverter Drive will automatically adjust other parameters.



Parameters and constants modified by setting the parameter E5-01 are not displayed in the list "Modified Parameters & Constants".

10 Replacement Instructions for Smart Controller Drives

◆ Scope

The following describes how to replace the drive in Schindler Smart controllers with a YASKAWA L1000A inverter. This solution has been developed to replace drives used in Smart MRL 001 / 002 controllers.

◆ Requirements

The L1000A can almost directly replace existing drives. The only additional component needed is an external relay to control the brake.

YASKAWA recommends a relay from the 46.52 series made by Finder. When other relays are used it should be selected so that the excitation current of the coil does not exceed the specifications of the output M2 on the L1000A drive. Generally the relay should be selected so that the excitation current is as low as possible.

Figure 9 Finder relay

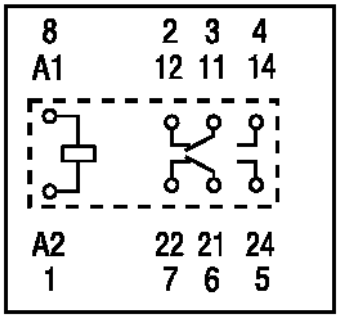


Figure 10 Circuit of the Relay

Table 1 DC Coil Data

Nominal Voltage	Coil Code	Operating Range		Resistance	Rated Coil Consumption
U_N [V]		Umin [V]	Umax [V]	R [Ohm]	I at U_N [mA]
24	9.024	17.5	26.4	1,200	20

◆ Wiring of the YASKAWA L1000 Inverter Drive

The following figure shows the wiring between the controller (connector XFCL) and the drive terminals.

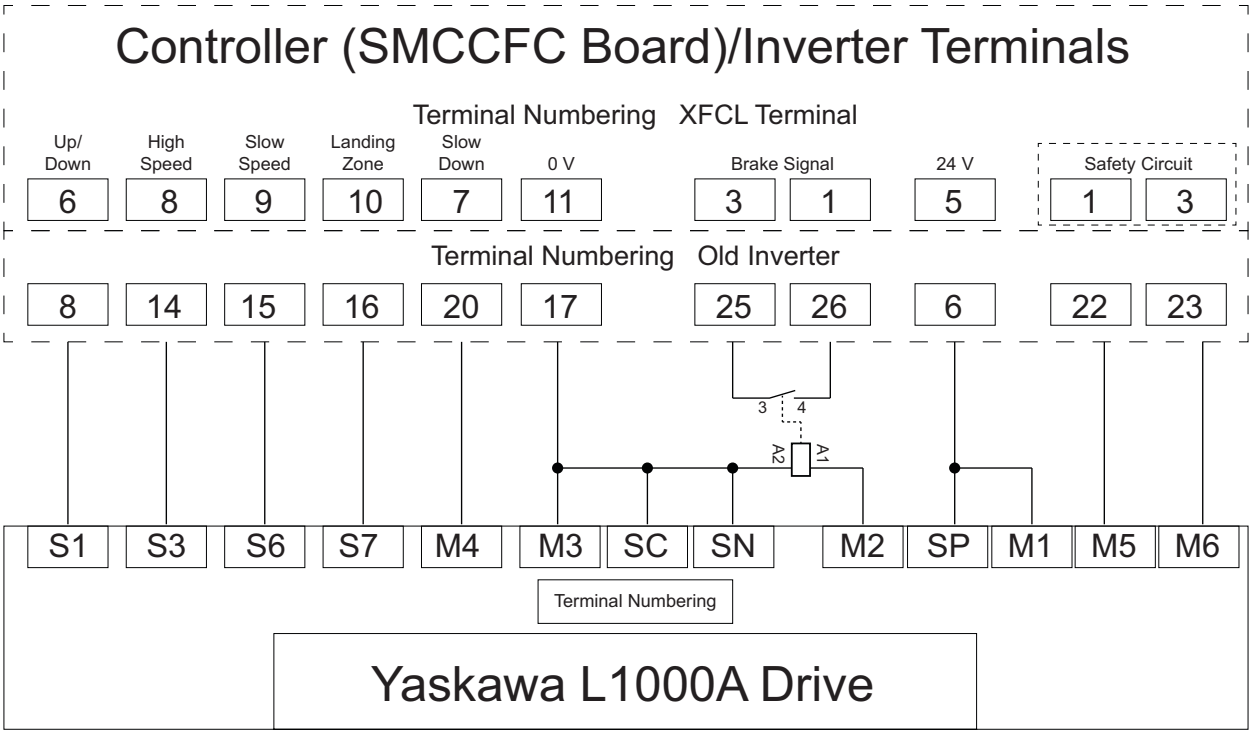


Figure 11 Wiring between Controller and Drive Terminals

The following table summarizes the terminal connections in the old and new configurations.

Table 2 Terminal Connections

Controller SMCCFC Terminal	Vacon Drive Terminal	YASKAWA L1000A Terminal	Brake Relay	Function
-		M2	A1	Connection for Brake Relay
1	26	-	4	
3	25	-	3	
5	6	SP, M1	-	-
6	8	S1	-	Direction / Run
7	20	M4	-	-
8	14	S3	-	Nominal /Fast speed
9	15	S6	-	Inspection / Leveling
10	16	S7	-	Landing Zone
11	17	SC, SN, M3 A2 (Relay Coil)	-	Connection for Brake Relay
1	22	M5	-	Safety Circuit
3	23	M6	-	

◆ Start Up

After wiring, power on the drive and follow these steps:

1. Enter the programming mode of the L1000A.
2. Set parameter d1-18 to 4 (Smart Replacement).
   This operation sets I/O's to operate with the Smart controller.
   The next step is to enter motor data to the drive.
3. Set drive parameters.
   Table 3 and 4 show a typical example of a 6.7 kW machine and the appropriate setting values for drive parameters.

Table 3 Motor Nameplate (Example)

U = Δ / Y 400 ΔV	f = 33 Hz	cos φ 0,85
P = 6,7 kW	I = 13,5 A	RPM = 950 min-1
		Starting Torque = TA/TN 2,75
S5 240, F/h 50 % ED		Inertia = I mot 0,32 kgm²
IEC34 - 1	Protection degree = IP21	Insulation = KI F

Table 4 Recommended Parameters (Example)

Parameter Name		Setting Value
E1-04	Maximum Output Frequency	33 Hz*
E1-05	Maximum Voltage	400 V*
E1-06	Base Frequency	33 Hz*
E1-09	Minimum Output Frequency	0.1 Hz*
E2-01	Motor Rated Current	13.5 A*
E2-02	Motor Rated Slip	1.30 Hz*
E2-03	Motor No Load Current	6 A*
E2-11	Motor Rated Power	6.7 kW*
S1-07	Brake Close Delay Time	0.3 sec
S1-10	Run Command Delay Time	0.4 sec
S6-02	Starting Current Error (SE2) Detection Delay Time	500 ms
S6-03	SE2 Detect Current Level	35 %
S6-04	Output Current Error (SE3) Detection Delay Time	500 ms

* According to the (Example) Motor Nameplate

4. Enter the Auto-Tuning menu.
5. Set parameter T1-01 to 2 for “Stationary Auto-Tuning for Line-to-Line Resistance”.
6. Enter the nameplate data in the Auto-Tuning menu.
   - T2-02 = Motor Power (kW)
   - T2-04 = Motor Current (Amps)

7. After entering the data listed on the motor nameplate, press the UP-button until the following message is displayed: “0.00 Hz/0.00 A Tuning Ready? Press RUN key”.

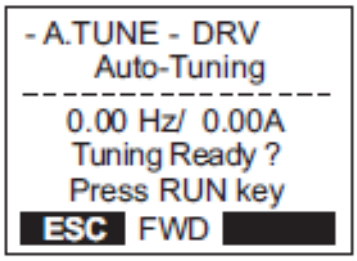


Figure 12 Tuning ready?

8. Make sure the motor contactors SR-D and SH-1 or SR-U and SH-1 are closed before starting the Auto-Tuning procedure.

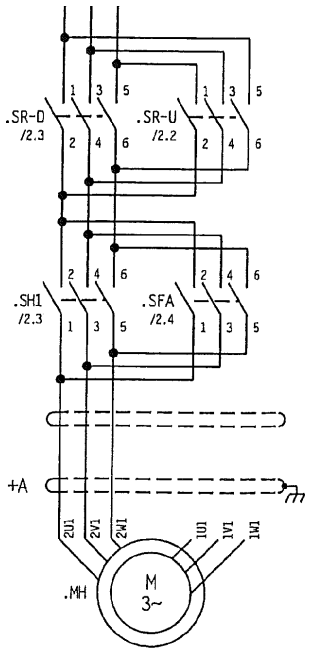


Figure 13 Motor Contactors

9. Press the RUN-button to start the Auto-Tuning procedure.
   The message “Tune Proceeding” is displayed.

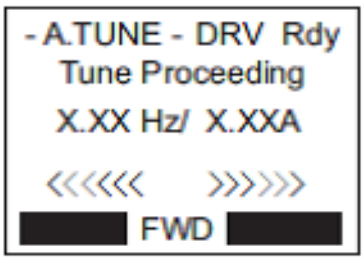


Figure 14 Auto-Tuning Proceeding

The drive begins by injecting current into the motor for about 1 minute.
The tuning process is completed, as soon as the drive displays the message “End Tuning Successful”.

10.Open the motor contactors.

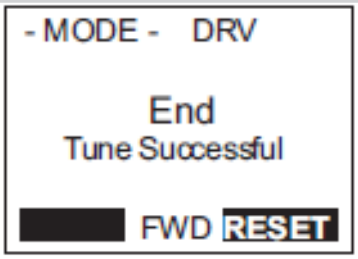


Figure 15 Tune Successful

Now the system is ready to run in normal operation.

11.Fine tune acceleration and jerk using the following parameters.

Parameter Value	Description
C1-XX	Acceleration
C2-XX	Jerk

The system will start with the learning run. This sequence is done by the controller without intervention from the user.

11 Appendix

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TYPE EXAMINATION CERTIFICATE

FOR LIFTCOMPONENTS

Issued by Liftinstituut B.V.

Certificate no.	: NL13-400-1002-184-01	Revision no.: 3
Description of the product	: Brake monitoring as part of the protection against unintended car movement and/or ascending car overspeed means	
Trademark, type	: Yaskawa, CIMR-LCxAxxxxxxx – 910x and CIMR-LCxFxxxxxxx – 91xx	
Name and address of the Manufacturer	: Yaskawa Electric UK LTD 1 Hunt Hill Orchardton Woods Cumbernauld G68 9LF United Kingdom	Yaskawa Electric Corporation 2-13-1-Nishimiyaichi Yukuhashi-City Fukuoka 824-8511 Japan
Name and address of the certificate holder	: Yaskawa Europe GmbH Hauptstr. 185 D-65760 Eschborn Germany	
Certificate issued on the following requirements	: Lifts Directive 2014/33/EU	
Certificate based on the following standard	: EN 81-20:2014 clause 5.6.6.2 and 5.6.7.3	
Test laboratory	: None	
Date and number of the laboratory report	: None	
Date of type examination	: June 13, 2017	
Additional document with this certificate	: Report belonging to the type examination certificate no.: NL13-400-1002-184-01 rev.3	
Additional remarks	: None	
Conclusion	: The lift component meets the requirements referred to in this certificate taking into account any additional remarks mentioned above.	

Amsterdam

Date : 27-06-2017
Valid until : 30-03-2020

ing. J.L. van Vliet
Managing Director

Certification decision by

CERTOSP

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F23-02-22-v16.0

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Report type-examination

Report belonging to type-examination certificate no.	:	NL13-400-1002-184-01
Date of issue of original certificate	:	June 25, 2012
Concerns	:	Lift component
No. and date of revision	:	3; June 27, 2017
Requirements	:	Lifts Directive 2014/33/EU Standard: EN 81-20:2014 clause 5.6.6.2 and 5.6.7.3
Project no.	:	P170177

1. General specifications

Name and address manufacturer	:	Yaskawa Electric UK LTD 1 Hunt Hill Orchardton Woods Cumbernauld G68 9LF United Kingdom and Yaskawa Electric Corporation 2-13-1-Nishimiyaichi Yukuhashi-City Fukuoka 824-8511 Japan
Description of lift component	:	Brake monitoring as part of the protection against unintended car movement and/or ascending car overspeed means
Type	:	Yaskawa, CIMR-LCxAxxxxxxx – 910x and CIMR-LCxFxxxxxxx – 91xx
Laboratory	:	-
Address of examined lift component	:	-
Data of examination	:	June 2013, June 2017
Examination performed by	:	A. v/d Burg, P.J. Schaareman

Template F4-47 version 12.0
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2. Description lift component

The brake monitoring described in this report shall be used in combination with a suitable detection system and a suitable brake to build an unintended car movement protection and/or ascending car overspeed means for lifts.
The monitoring function that is integrated in the frequency inverter becomes effective after parameter S6-17 is set to 1.
Two inputs can be programmed to monitor the correct opening and closing of brakes, it can be done with both normally closed or both normally open contacts.
The activated system will stop the lift when at least one programmed brake monitoring inputs detects one of the following situations:

- When the brake monitoring signal changes status for a time period longer than set with parameter "S6-06" during a trip (Default 500 ms, range 0-60 sec.) (This function is optional).
- When the brake monitoring signal does not change status within a time period set with parameter "S6-05" after the brake is ordered to open during a trip (Default 500 ms, range 0-10 sec.).
- When the brake monitoring signal does not change status within a time period set with parameter "S6-05" after the brake is ordered to close after a trip (Default 500 ms, range 0-10 sec.).

After detection of brake malfunction, the lift remains out of service, also after switching off- and on the supply power or using the "reset" button.
Resetting of the system is only possible by setting the parameter "S6-18 = 1".

Technical data of the inputs:

Voltage	: +24 VDC
Switching level low/high	: typ. 11,85 VDC
Input current at 24 V	: typ. 12,6 mA

3. Examinations and tests

The examination covered a check whether compliance with the Lift Directive 2014/33/EU is met, based on the harmonized product standard EN 81-20:2014. Issues not covered by or not complying these Standards are directly related to the above mentioned essential requirements based on the risk assessment, where applicable with the aid of harmonized A-and B-standards.

The examination included:

- Examination of the technical file (See annex 2):
- Examination of the representative model in order to establish conformity with the technical file.

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4. Results

After the final examination the product and the technical file were found in accordance with the requirements.

5. Conditions

On the type-examination certificate the following conditions apply:

- Before taking the lift into service and after each change in the software of the Yaskawa, CIMR-LCxAxxxxxxx – 910x or CIMR-LCxFxxxxxxx – 91xx the proper functioning of the brake monitoring must be checked. The checking shall be done by disconnecting and short circuiting the brake monitoring switches one by one. Each time after a command is given, the manipulation shall be detected by the system and a reset shall be necessary to bring the lift back into operation.

6. Conclusions

Based upon the results of the type-examination Liftinstituut B.V. issues a type-examination certificate.

The type-examination certificate is only valid for products which are in conformity with the same specifications as the type certified product. The type-examination certificate is issued based on the requirements that are valid at the date of issue. In case of changes of the product specifications, changes in the requirements or changes in the state of the art the certificate holder shall request Liftinstituut B.V. to reconsider the validity of the type-examination certificate.

Prepared by:

Certification decision by:

P.J. Schaareman
Product Specialist Certification
Liftinstituut B.V.

 NL13-400-1002-184-01 rev. 3 Date: 27-06-2017 Page 3 of 5

Template F4-47 version: 12.0

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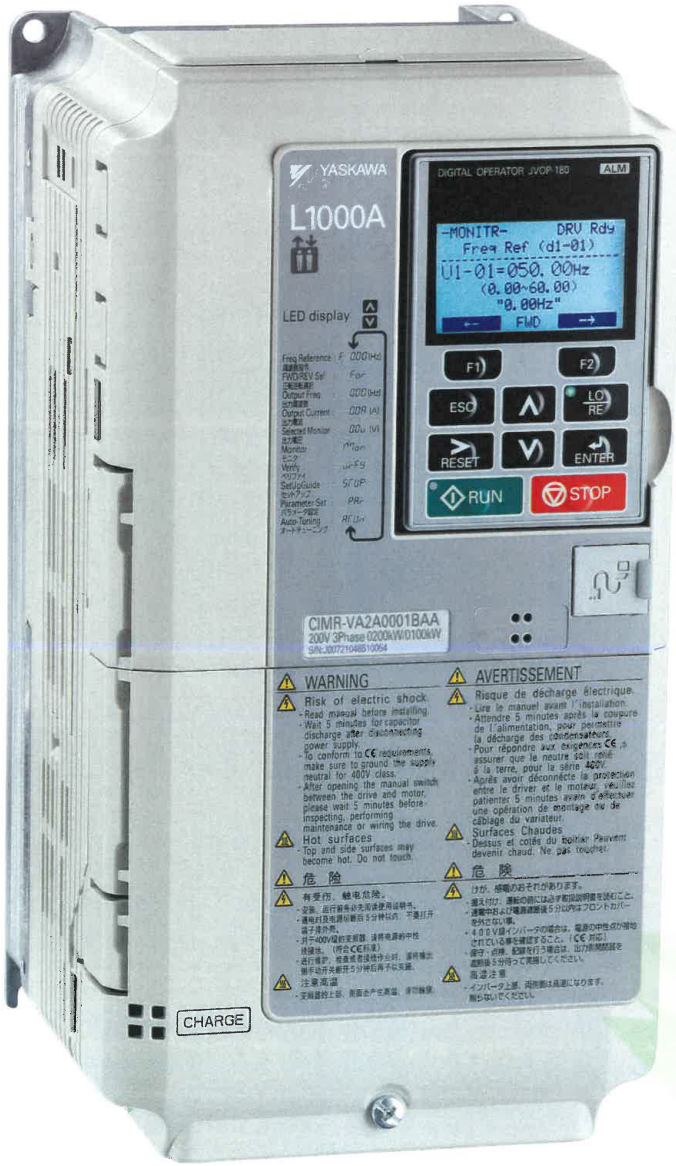
Annexes

Annex 1 : Impression Yaskawa frequency inverter



 NL13-400-1002-184-01 rev. 3 Date: 27-06-2017

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Annex 2: Documents of the Technical File which were subject of the examination

Title	Date
Software Functional Specification.docx	13-03-2013
Software Functional Specification.docx rev.1	09-04-2013
Brake Status Monitor Operation Manual	13-06-2013

Annex 3: Reviewed deviations from the standards

EN xx-x par.	Requirement	Accepted design
x.x.x	-	-

Annex 4 Revision overview

Rev.:	Date	Summary of revision
-	25-06-2013	Original
1	10-09-2013	Product name changed
2	30-03-2015	Addition of CIMR-LCxFxxxxxxx – 91xx
3	27-06-2017	Addition of brake monitoring application for ascending car overspeed means and update to new Lifts Directive 2014/33/EU

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◆ Revision History

Date of Publication	Revision	Section	Revised Content
March 2018	F	2, Appendix	Revision: Updated Certificate and Norm
July 2017	E	All	Revision: Document Structure; Document Title Addition: DI-A3 Option Multi-functional Support; 6F Ripple Compensation; Advanced Light Load Search; Output Phase Loss Protection
February 2016	D	4	Addition: Replacement instructions Revision: Document structure
April 2015	C	1, Appendix	Revision: Standards; Scope Revision: Certificate
May 2014	B	All	Revision: Document structure Addition: DCP3 interface
October 2013	A	-	First edition