L1000A QSG Addendum for A3 and DCP3

Table of Contents

1   General Overview

◆ Scope

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

- CIMR-LC□A□□□□□□□-910□
- CIMR-LC□F□□□□□□□-913□

◆ About this Document

This manual is an addendum to the L1000A Quick Start Guide and Technical Manual. It describes steps required for setting up L1000A:

- to perform brake supervision in order to prevent uncontrolled movement of the car according to EN81-1:1998+A3:2009 and EN81-20:2014.
- for serial communication with a Lift controller using the DCP3 protocol.

Always heed Safety Instructions as given in the Quick Start Guide and Technical Manual when performing installation and setup steps described here.

2   A3 Interface

◆ Overview

According to EN81-1:1998+A3:2000 and 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 EN 81-1/2 A3 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.
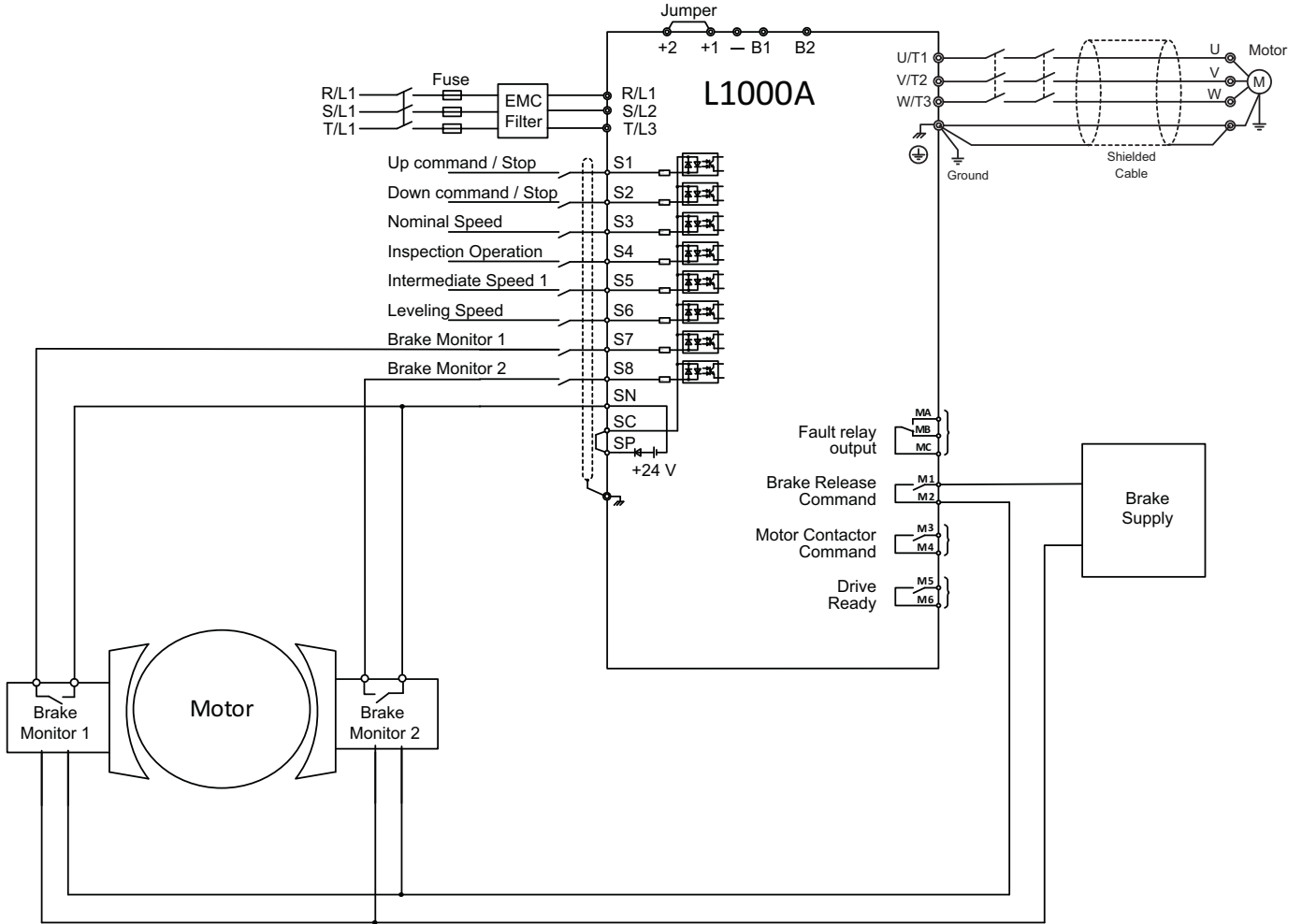
◆ Activation/Deactivation

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

Note: 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.
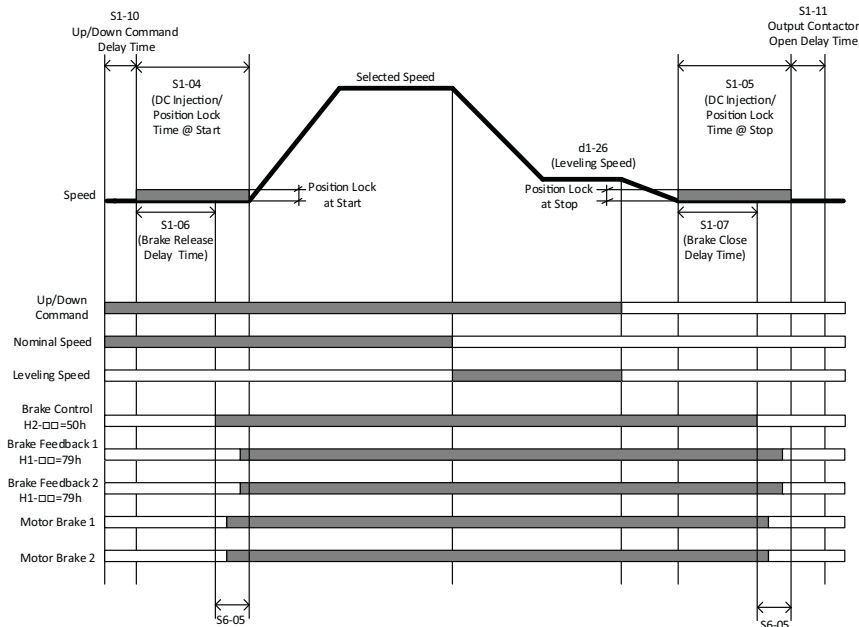

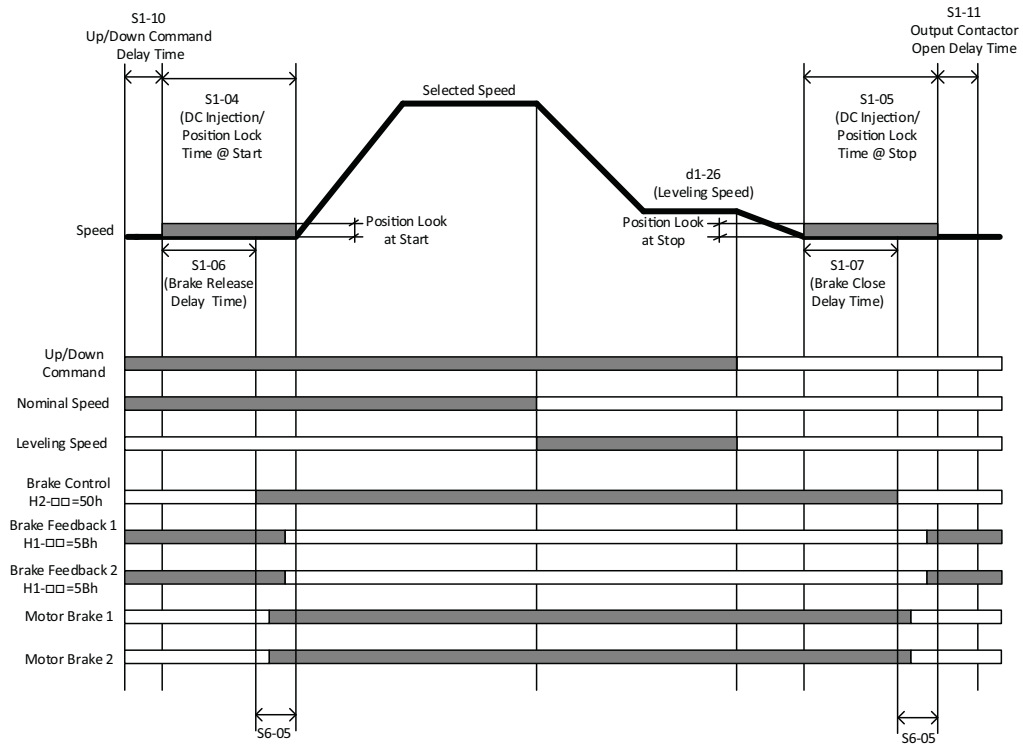**Figure 1 Normal Operation with MFDOs set to 79h (N.O.)**

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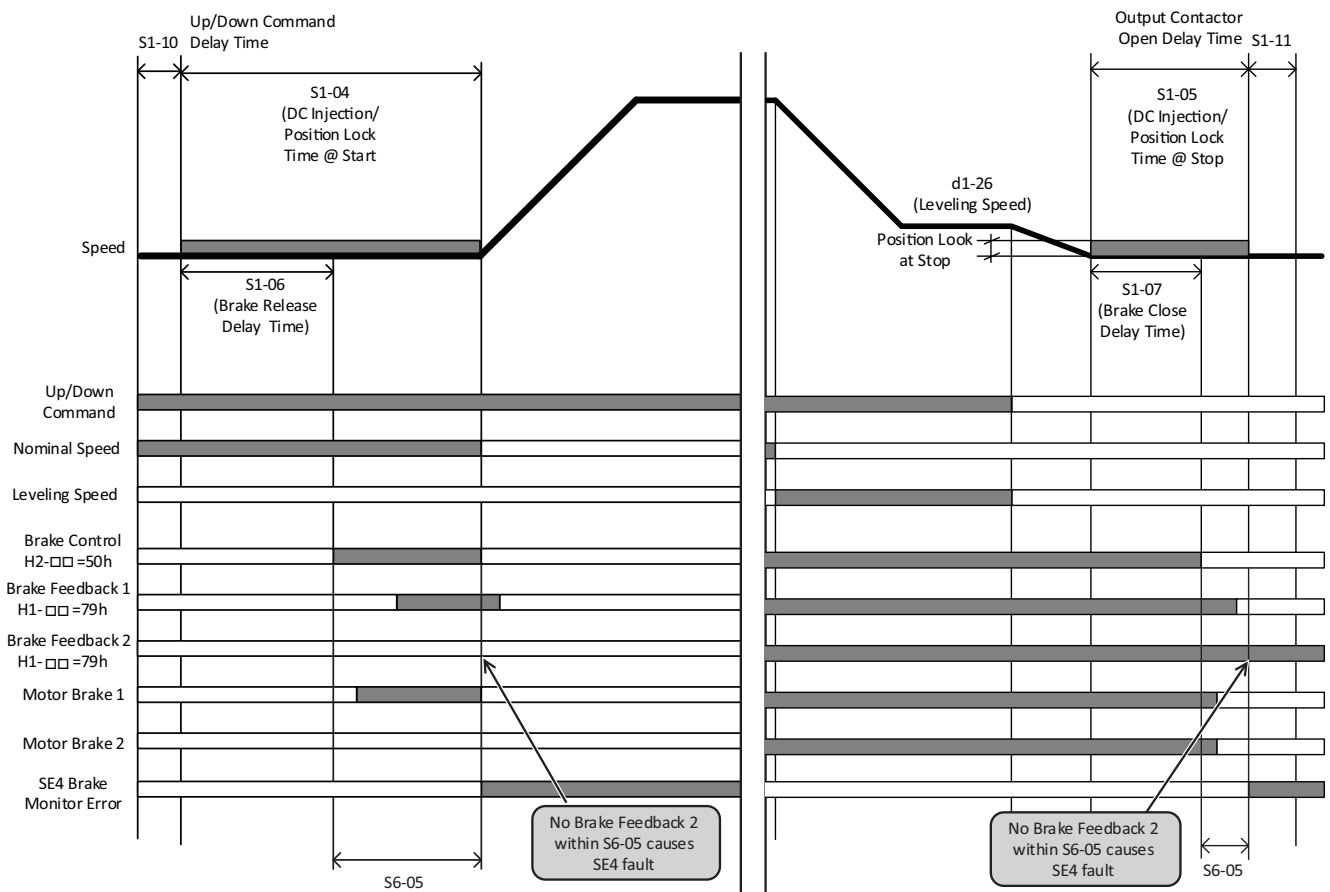
Figure 3 Fault during Start (left) and Fault during Stop (right)

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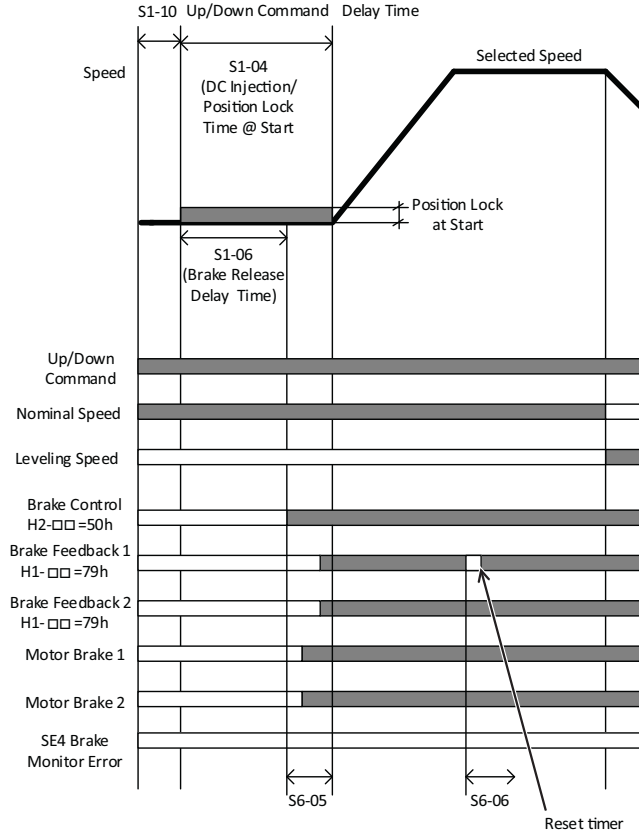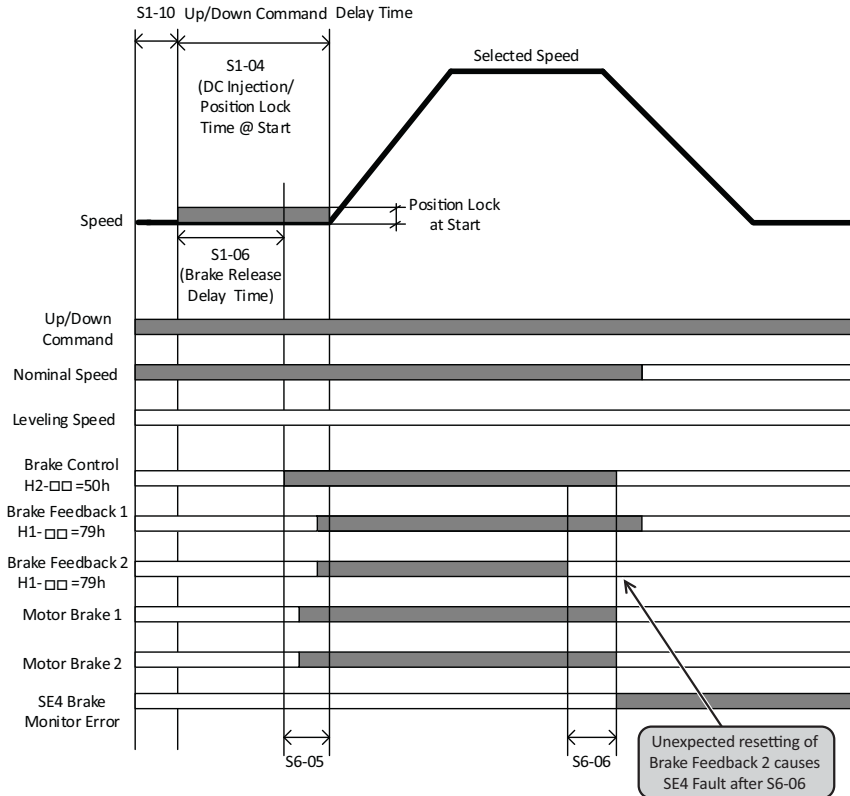
In case of an oPE03 fault, check if two inputs have been programmed as Brake Feedback and if they are both programmed to the same function.

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   DCP Interface

The DCP is a point-to-point link between drive controller and lift controller. The two devices are linked via an RS-485 interface in semi-duplex mode.

• Baud rate: 38,400 Baud
• Parity: none
• Data bits: 8
• Stop bits: 1

◆ Architecture

In DCP3 mode a Master-Slave-architecture is used. The lift controller is the master device, the drive controller is the slave. Messages for communication between the devices are sent in a 15 ms cycle.
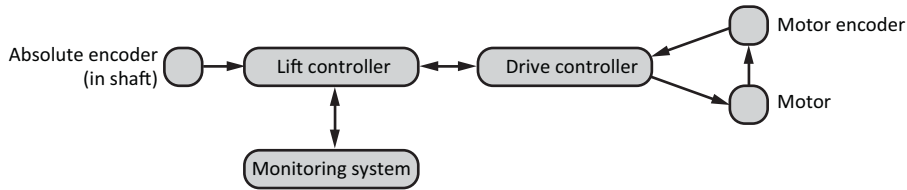
Figure 6 Connection via DCP

◆ Supported Features

The L1000A supports DCP3 with the following features:

• Speeds: V0, VN, V1, VI, V2, V3, V4, V5, V6, V7
• Fast Start Function/Fast Stop Function
• Remote Control according to DCP specification
• Error and Fault signalization according to DCP specification
• Processing control/status data bytes according to DCP specification (remote display transfer to PLC only with connected LCD operator [JVOP-180])
    • Extended status

◆ 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 DCP3.
• Set DIP switch S2 to ON position.

Figure 7 RS-485 DCP Connection

◆ Activation

The DCP3 function is not active by default. The DCP3 function must be activated manually.

To activate the DCP3 function, perform the following steps:

- Switch the power on.
- Set parameter H5-13 to 3 "DCP3" using the digital operator.
  The parameters b1-01 and b1-02 are automatically set to 6 "DCP".
- Shut the power off and wait until the display on the digital operator goes out completely.
- Turn the power back on.
- The drive is now ready to begin communication with the master.

The following table provides an overview of the parameters that are automatically changed when activating DCP3.

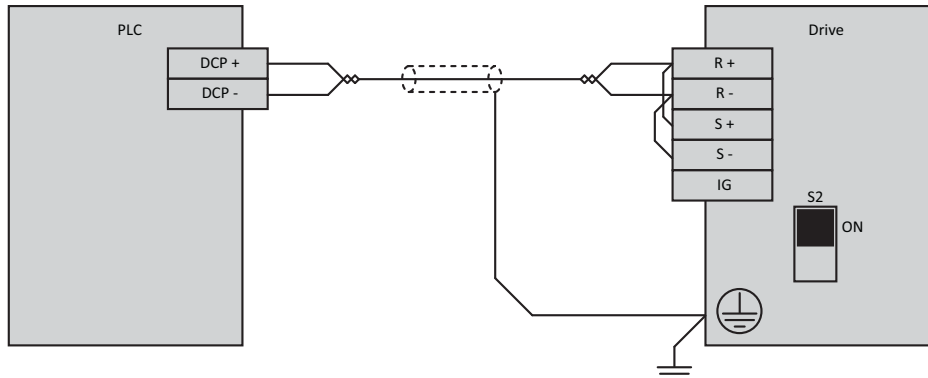| Parameter	H5-13 Settings		
	0 (DCP Com Channel)	1 (Memobus/Modbus)	3 (DCP3)
H5-02	5 (38,400 Baud)	3 (9,600 Baud)	5 (38,400 Baud)
H5-11	1 (Enter Command not necessary)	0 (Enter Command necessary)	1 (Enter Command not necessary)
b1-01	0 (Operator Keypad)		6 (DCP)
b1-02	1 (Control Circuit Terminal)		6 (DCP)
C1-01	1.50 sec		3.00 sec
C1-02	1.50 sec		3.00 sec

◆ DCP Speed Mode

The following table shows the parameters and designations for DCP3.

L1000A Parameter	DCP Text	Default DCP Settings
d1-26	V0 Speed	4.00%
d1-23	VN Speed	1.00%
d1-04	V1 Speed	0.00%
d1-24	VI Speed	25.00%
d1-03	V2 Speed	40.00%
d1-02	V3 Speed	64.00%
d1-01	V4 Speed	100.00%
d1-07	V5 Speed	0.00%
d1-06	V6 Speed	0.00%
d1-05	V7 Speed	0.00%

When changing the parameter H5-13 to 3 "DCP", the values of Default DCP Settings are set automatically.

The use of speed modes V7, V6, V5, V2, and V1 depends on the required speeds for the specific lift installation.

◆ Additional Parameters for DCP Operation

The following table shows the parameters that are used for the configuration of DCP3 operation.

Parameter	Operator Display	Description	Value Range	Default Value
d1-30	Border Speed	If inverter speed exceeds this speed, bit 1 of DCP extended status is set.	0.00 ... 150.00%	120.00%
d1-31	Over Speed	If inverter speed exceeds this speed, bit 2 of DCP extended status is set.	0.00 ... 150.00%	120.00%
H5-13	Serial Comm Mode	0: DCP Communication Channel *[DCPComChan]* 1: Memobus/Modbus *[Memobus/Modbus]* 3: DCP3 *[DCP3]* Perform a power cycle when changing the Serial Communication Mode (H5-13)	0, 1, 3	1

◆ DCP Faults and Errors

■ Faults

Digital Operator Display		Fault Name
dCE1	DCE1	Drive Control Position Cyclic Redundancy Check Error
		A CRC8 check failed 10 times consecutively during RUN.
Cause		**Possible Solution**
Faulty serial link or EMC issue.		• Shield serial link. • Check serial RS-485 connection (Termination Resistance switched by S2).
Digital Operator Display		**Fault Name**
dCE2	DCE2	Drive Control Position Initialization Error
		A RUN command was given although no valid initialization command was received.
Cause		**Possible Solution**
Faulty serial link or EMC issue.		• Check if lift controller sends valid initialization command.
Digital Operator Display		**Fault Name**
doE1	DOE1	Drive Control Position Operation Error
		A RUN command was given although the inverter drive was in Alarm state.
Cause		**Possible Solution**
Faulty Alarm status.		• Remove alarm condition. • Lift controller must not send RUN command during Alarm state.

■ Operator Programming Errors

Digital Operator Display		Error Name
oPE18	oPE18	Parameter Setting Fault
Cause		**Possible Solutions**
One of the parameters b1-01 and b1-02 is not set to 6 "DCP".		Set b1-01 and b1-02 to 6.

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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
No. and date of revision of certificate and report	: 2; March 30, 2015
Concerns	: lift component
Revision concerns	: - . -
Requirements	: Lifts Directive 95/16/EC
	EN 81-1:1998+A3:2009
	EN 81-20:2014
Project no.	: P130151-01

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 protection against unintended car movement.
Type	: Yaskawa, CIMR-LCxAxxxxxxx – 910x and CIMR-LCxFxxxxxxx – 91xx
Laboratory	: -
Address of examined lift	: -
Date / data of examination	: June 2013
Examination performed by	: A. van den Burg

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 for lifts.

BRL10E

LIFTINSTITUUT

TYPE-EXAMINATION CERTIFICATE
FOR LIFTCOMPONENTS

Issued by Liftinstituut B.V.

Certificate nr.	: NL13-400-1002-184-01 Revision nr.: 2
Description of the product	: Brake monitoring as part of protection against unintended car movement.
Trademark, type	: Yaskawa, CIMR-LCxAxxxxxxx – 910x and CIMR-LCxFxxxxxxx – 91xx
Name and address of the manufacturers	: Yaskawa Electric UK LTD Yaskawa Electric Corporation
	1 Hunt Hill Orchardton Woods 2-13-1-Nishimiyaichi
	Cumbernauld G68 9LF Yukuhashi-City
	United Kingdom 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 95/16/EG,
	EN 81-1:1998+A3:2009 and EN 81-20:2014
Test laboratory	: None
Date and number of the laboratory report	: None
Date of type-examination	: June 2013
Annexes with this certificate	: Report belonging to the type-examination certificate nr.: NL13-400-1002-184-01 Rev.2
Additional remarks	: None
Conclusion	: The lift component meets the requirements referred to in this certificate taking into account any additional remarks mentioned above.

ing. A.J. van Ommen   Certification decision by
Manager Business
Unit Certification

Issued in Amsterdam	
Date of issue	: March 30, 2015
Valid until	: March 30, 2020

F23-02-22-v2.0

CERT05P

The monitoring function that is integrated in the frequency converter 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

The examination covered a check whether compliance with the Lift Directive 95/16/EC is met. The model is examined based on the Standards EN 81-1:1998+A3:2009 and EN 81-20:2014. Issues not covered by or not complying these Standards are directly related to the essential requirements of the Lift Directive. The examination included:
- Examination of the technical file Software Functional Specification.docx 13-mar-2013, Rev. 1, 9-april-13
- Brake Status Monitor Operation Manual.

3.   Results

After the final examination, the technical file was found in accordance with the requirements.

4.   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-LCxAxxxxxx – 910x or CIMR-LCxFxxxxxx – 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.

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NL.13-400-1002-184-01   rev.2 date: March 30, 2015   Page 2 of 3
version: 4.0
L I F T I N S T I T U U T   B . V .   –   S A F E T Y   A N D   Q U A L I T Y   M A N A G E M E N T
Buikslotermeerplein 381 | P.O. Box 36027 | Tel. +31 20 - 435 06 06 | www.liftinstituut.nl | VAT number:
NL - 1025 XE Amsterdam | NL - 1020 MA Amsterdam | Fax +31 20 - 435 06 26 | contact@liftinstituut.nl | NL 810399441 B01
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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.

5.   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. Products deviating of these specifications need additional examination by Liftinstituut B.V. in order to determine whether a new type-examination certificate is necessary. Additional examination shall be requested by the certificate holder.
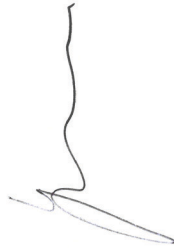
The type-examination certificate is issued based on the requirements that are valid at the date of issue. The manufacturer shall request from Liftinstituut B.V. the review of the validity of the type-examination certificate, taking into account the changes in the requirements or changes in the state of the art of the product, every 5 years.

Prepared by: Certification decision by:

A. van den Burg
Senior Specialist
Liftinstituut B.V.

Annex 1   :   Overview of previous revisions of certificate(s) and report(s)

REVISIONS OF CERTIFICATE

Rev.:	Date	Summary of revision
-	June 25, 2013	Original
1	September 10, 2013	Product name changed
2	March 30, 2015	Addition of CIMR-LCxFxxxxxx – 91xx

REVISIONS OF REPORT, BELONGING TO THE CERTIFICATE

Rev.:	Date	Summary of revision
-	June 25, 2013	Original
1	September 10, 2013	Product name changed
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NL.13-400-1002-184-01   rev.2 date: March 30, 2015   Page 3 of 3
version: 4.0
L I F T I N S T I T U U T   B . V .   –   S A F E T Y   A N D   Q U A L I T Y   M A N A G E M E N T
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NL - 1025 XE Amsterdam | NL - 1020 MA Amsterdam | Fax +31 20 - 435 06 26 | contact@liftinstituut.nl | NL 810399441 B01
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◆ Revision History

Date of Publication	Revision	Section	Revised Content
April 2015	C	1, Appendix	Revision: Standards; Scope Revision: Certificate
May 2014	B	All	Revision: Document structure Addition: DCP3 interface
October 2013	-	-	First edition