User Manual

MOVEKET V-MOTION 30/30E/40/40E/55/55E/75/75E

(Translation)

Control system for kinetic drives

in accordance to DGUV V17 and DGUV V54, IGVW SQ P2
as well as EN 61508 SIL 3

Safety first – made in Germany

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1. Safety instructions, intended use

The safety instructions apply to the software as well as to the entire system.

1.1. General

- Observe the operating instructions of the system and the safety information listed there.
- This system is designed to control professional kinetic stage systems. Use for other purposes is prohibited. It must only be operated by experienced system operators trained by the manufacturer.
- Read the instructions in this manual carefully, as they contain important information about installation, operation, and, in particular, safety.
- This manual is to be used without fall in the event of sale, transfer or instruction of additional operators to ensure that new users of the system are fully informed on the operation and safety instructions.
- The system may only be put into operation by persons of legal age. Minors may not handle this system in any way.
- Electrical work required for installation and maintenance of the plant must be performed by a qualified technician/electrician or by properly trained personnel.
- The system must be protected from moisture, dust and high temperatures:
    - Prevention of ambient temperatures of 40° C and above
    - Protection against penetration of liquids or metallic objects and dust
    - Care during closure of system parts such as control cabinets, panels and terminal boxes
- In the event of severe malfunctions, the system is to be shut down or brought into to a safe state. In this case, it is essential to contact the manufacturer's service.
- Devices must not be opened. There are no internal parts that can be repaired by the user.
- Equipment must not be disassembled or modified.
- Never attempt to repair equipment yourself.

1.2. System safety

The control system in conjunction with the I-MOTION-Software and the V-MOTION, V-MOTION-E, NDB, NMB, EXPERT-T II und BASIC/-S/-C system components fulfil the standards of EN 61508, SIL 1 to SIL 3 (depending on the technical equipment), and is therefore also suitable for scenic, kinetic movements over people when the stage is fully extended. Since the control with the connected drives, controllers and networking components makes up a system, it is essential that all connected components are tested according to their purpose and the specifications and output all signals required by the I-Motion software. If this is not the case, then the entire system, and thus the control, is not to be considered as a safety-related system in accordance with the provisions of EN 61508 and the corresponding SIL level (1-3).

Rule: the weakest link in the chain determines the level of security classification.

Accordingly, all slings and suspension points used are to be considered. The selection and design of all supporting elements (e.g. suspension points, beam clamps, shackles, steel wire ropes, slings, trusses, etc.) in the flux must be done under consideration of the hazards and stresses occurring in each case (see BGI 810-3). In addition, dynamic factors, particularly in high-speed drives (>10 m/min) are to be observed and used in calculations.

NB:

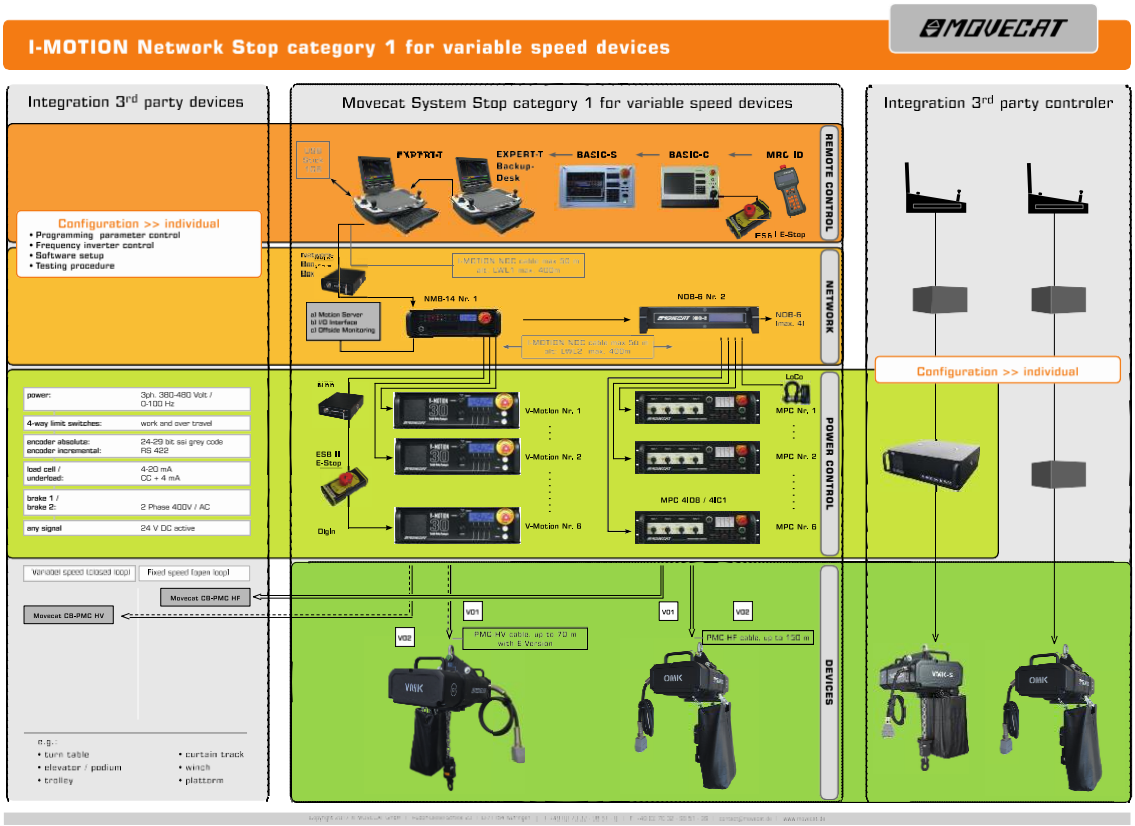
The operator always has the overall responsibility for the system he or she operates. He or she has to familiarize him- or herself with the relevant and applicable guidelines and comply with them. Therefore, we recommend creating a risk assessment for each system configuration used, and accordingly, determining the necessary safety standards for the individual components, the entire system and also for the movement parameters to be programmed and recording these in writing.

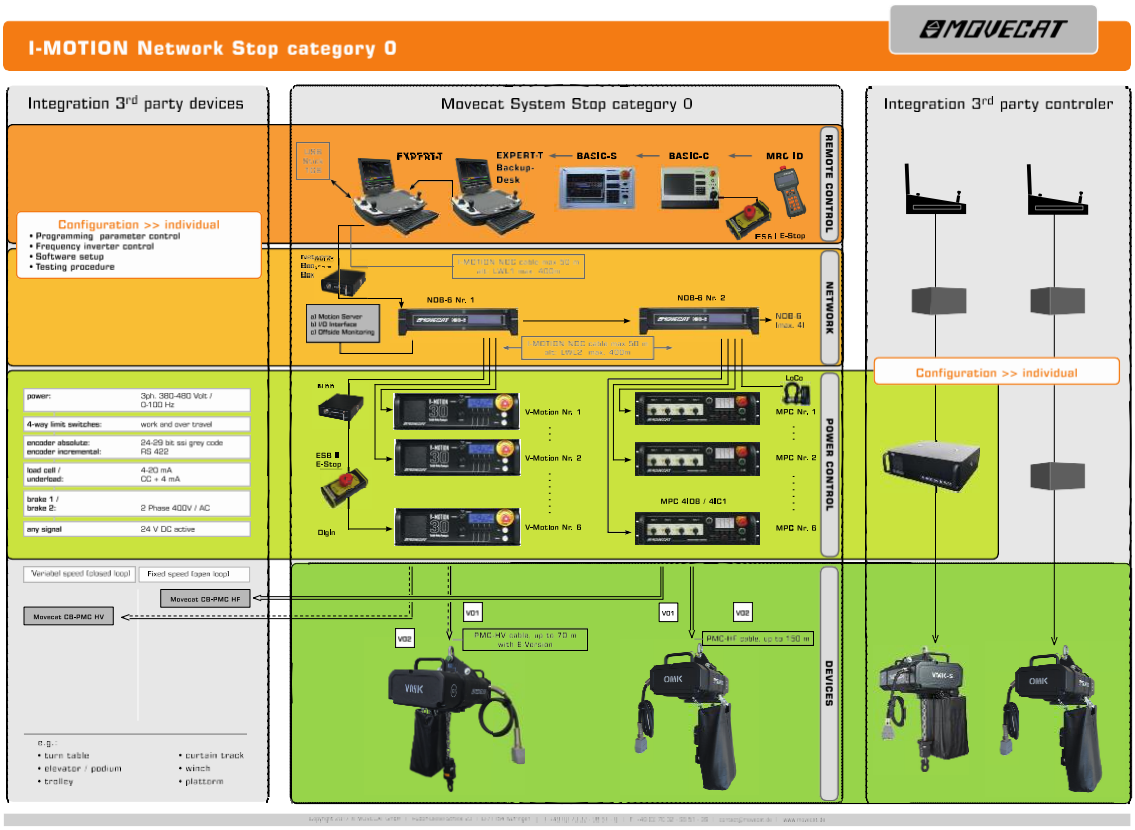
- DGUV V17/18 (BGV C1 / GUV-V C1)
- DIN 56950-3:2015-12
- DGUV V54 (BGV D8 / GUV-V D8)
- igvw SQ P2
- DIN EN 61058 SIL 1 to SIL 3
- DIN EN ISO 13849-1
- DIN EN 60204-32
- BGI 810-0 – Sicherheit bei Produktionen und Veranstaltungen - Leitfaden
- BGI 810-3 – Sicherheit bei Produktionen und Veranstaltungen – Lasten über Personen
- GUV-I 8636 – Fliegen von Personen bei szenischen Darstellungen

The basis for the assembly and disassembly and operation are always based on the degree of hazard (risk analysis) which is created by the operator.

Furthermore, all specific country regulations and planning requirements are to be observed.

1.3. System configuration of I-Motion-Network




I-MOTION Network Stop category 0
MOVECAT
Integration 3rd party devices
Movecat System Stop category 0
Integration 3rd party controler
Configuration >> individual
• Programming parameter control
• Frequency inverter control
• Software setup
• Testing procedure
EXPERT-T
EXPERT-T Backup-Desk
BASIC-S
BASIC-C
MRC ID
ESB I E-Stop
REMOTE CONTROL
NETWORK
NOB-6 Nr. 1
NOB-6 Nr. 2
NOB 6 max. 4l
power:
3ph. 380-480 Volt / 0-100 Hz
4-way limit switches:
work and over travel
encoder absolute:
encoder incremental:
24-29 bit, ssi grey code
RS 422
load cell / underload:
4-20 mA
DC + 4 mA
brake 1 / brake 2:
2 Phase 400V / AC
any signal
24 V DC active
V-Motion Nr. 1
V-Motion Nr. 2
V-Motion Nr. 6
MPC Nr. 1
MPC Nr. 2
MPC Nr. 6
MPC 4IDB / 4IC1
POWER CONTROL
Configuration >> individual
Movecat CB-PMC HV
Movecat CB-PMC HF
V01
V02
DEVICES
• turn table
• elevator / podium
• trolley
• curtain track
• winch
• platform

1.4. Deployment and usage of lifting devices / point hoists according to DGUV V17/18 and DIN 56950-3:2015-12

Please check first which kind of stop category is required according the individual risk analysis (which depends on the specific application).

1.4.1. Stop-Category in case of Emergency-Stop

In accordance to DIN 56950 there are two different categories for emergency-stops.

Stop-Category 0 in accordance to EN 60204-1 – done with Movecat I-Motion NDB-6

Stopping all devices at once by taking of power, all brakes (or other mechanical features) fall in suddenly.

This is used to all fixed speed as well to all variable speed devices in one common network system without retarded emergency stop signal.

Stop-Category 1 in accordance to EN 60204-1 – done with Movecat I-Motion NMB-14

A controlled stop mechanism is provided, power supply to all devices is guaranteed to ensure controlled stop situation. Power supply is switched off after all devices stopped.

Variable speed hoists can do a deceleration ramp, in case of emergency stop this deceleration ramp is shortened and controlled by at least one NMB (Network-Master-Box with integrated retarding modul) in the network, positioned in master-position in combination with V-Motions. After this controlled emergency stop done by deceleration ramp the power supply is taken off.

NB: The maximum accident factor (maximum dynamic factor) is caused by lowering the load with full speed and having a power off situation!

2. Use of V-MOTION (variable speed motion control – all motor sizes)

2.1. General

Before using any V-MOTION please ensure:

- Proper configuration of ICU-file (configuration file containing all parameters of drive)
- Proper configuration of FU-file (file for frequency converter)
- Proper power supply
- Cable length to device not longer than 30m (standard version) or not longer than 70m (E-Version)
- Connection to NDB-6 or NMB-14
- Setup of individual ID at each V-Motion

If you cannot approve the above requested aspects please contact a SUPER USER or ADMINISTRATOR or book a training to achieve SUPER USER privileges.

Please note: Avoid any loose of power during boot procedure (appr. 1-2 seconds after turning on power)

2.2. Backside – connecting V-MOTION

INET: connect to any kind of NMB or NDB-6 (any output)

for local mode use termination plug to close emergency stop chain

CEE connector: connect to power distribution box or the next V-Motion beside

CEE OUTPUT: for power link to next V-Motion

DIG-IN: external additional input for digital signals
(option: special icu required – please contact MOVEKET support)

FC-DATA: Input to programme frequency converter (special tools and knowledge required!)

MAIN: Switch to power on / off V-Motion

MOTOR: PMC HV connector to connect devices or 3rd party devices via CB connection boxes

Please note: You need power supply with special all-sensitive RCDs (made for frequency converters) as well
with anti-surge fuses

Please note: Do not link more than 4 pcs. V-Motion 30 or not more than 3 pcs. V-Motion 40
(always depending on motor size)

2.3. Front side

2.3.1. Elements

SWITCH:	remote = devices controlled by remote control (connection to NMB/NDB required)
	local = device controlled by internal up/down buttons (closed emergency stop chain required)
	bypass = required to check limit switch (emergency stop positions)
E-STOP:	emergency stop button = emergency stop chain of all connected devices (via INET) gets interrupted
ENCODER:	speed ratio for local mode
UP / DOWN:	control buttons for local mode
BUTTONS (black):	4 functions – see interpretation of display

2.3.2. Interpretation of display: First page after switching on the device

First row:	P1 =	Position value no.1 = absolute encoder
	S00 =	State of icu, (state description see annexe)
Second row:	P2 =	Position value no.2 = incremental encoder
	S00 =	State of sfu, security function unit (state description see annexe)
Third row:	bin =	Binary value of the absolute encoder position (0mm = 100000bin)
	L =	Load in percentage of nominal load (= 100% nominal + 21% own load + 20% headroom for overload)
Fourth row:	MENU =	Step through menus
	SAVE =	Change settings by pressing SAVE (first) AND MENU (in addition)

Arrows up/down: select values in corresponding menus

2.3.3. Interpretation of display: Second page after pressing MENU

First row:	UDP =	UPD available
	CAN =	CAN available
	232 =	internal RS232 interface available (SFU is up)

Second & Third row: just internal interpretation for diagnostics

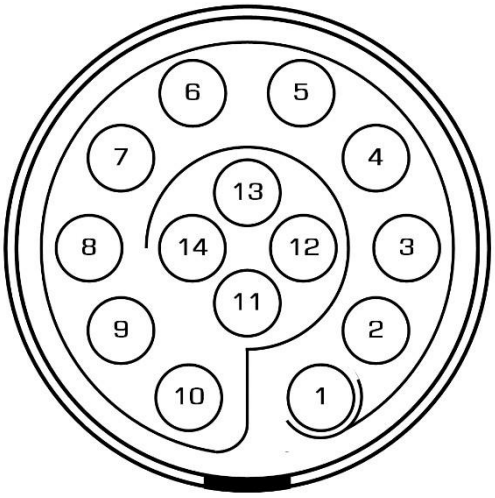
2.3.4. Interpretation of display: Third page after pressing MENU

First row:	icu configuration =	e.g. 0500A250 loaded
Second row:	software version =	e.g. V132
Third row:	Device-ID address =	e.g. IP 128 = ID 1

To change ID press UP or DOWN, to save press and hold SAVE,
then press MENU (V-Motion is rebooting – connection to NMB/NDB required, switch has to point to REMOTE)

3. Annexe

3.1. NDC (network data cable) pin allocation



PIN	Colour	Signal
1	red	P24
2	black	GND
3	white	ESTOPIN 1
4	brown	ESTOPIN 2
5	green	ESTOPOUT1
6	yellow	ESTOPOUT2
7	white/blue	GO1
8	blue	GO2
9	white/brown	CANH
10	brown	CANL
11	white/orange	RX+
12	orange	RX-
13	white/green	TX+
14	green	TX-

3.2. PMC-HV (power multicore hybrid cable variable speed) pin allocation

Harting plug MX	Pin	Signal
1	brown (1,5mm²)	U (Motor)
2	black (1,5mm²)	V (Motor)
3	grey (1,5mm²)	W (Motor)
PE	Screen (only HV)	screen/PE
4	black 1 (0,5mm²)	U (brake rectifier)
5	black 2 (0,5mm²)	V (brake rectifier)
6	black 3 (0,5mm²)	W (brake rectifier)
7	black 4 (0,5mm²)	Br2DCin
8	black 5 (0,5mm²)	Br2DCout
PE	green-yellow (1,5mm²)	PE
9	white	MPS_ON1
10	brown	BEo signal
11	red (0,5mm²)	P24
12	blue (0,5mm²)	GND
13	green	Ready
14	yellow	BEu signal
15	black	A1
16	violett	A1 inv.
17	grey	UI Signal
18	rosa	NEo signal
19	grey-rosa	B1
20	red-blue	B1 inv.
21	blue	AUF ready
22	red	NEu signal
23	white / green	Clk+
24	brown / green	Clk-
25	white / grey	AB ready
26	grey / brown	Temp Signal
27	white / yellow	Data+
28	yellow / brown	Data-
29	white / rosa	Brake gap control 2
30	rosa / brown	Brake gap control 1
31	white / blue	Load signal
32	brown / blue	Load check
	All screens	Screen/PE

3.3. Description of states

0 = all off

1 = sync ok

2 = power on

3 = ready

4 = reference values ok

5 = selected

6 = up command

7 = down command

8 = active (inverter)

9 = run (brakes open)

A = normal stop

B = calm down

C = wait for stop signals

D = internal E-STOP (off)

E = add. conditions for up direction

F = add. conditions for down direction