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You can read the recommendations in the user guide, the technical guide or the installation guide for OMRON VARISPEED F7. You'll find the answers to all your questions on the OMRON VARISPEED F7 in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

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Cat. No. 66E1E01

VARISPEED F7
The Industrial Workhorse
Model: CIMR-F7Z
200V Class 3-phase 0.4 to 110 kW
400V Class 3-phase 0.4 to 300 kW

QUICK START GUIDE

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Manual abstract:

No. @@@@EN-6 Mechanical Installation

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..... EN-6 Electrical Connection

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.... EN-8 Wiring Main Circuit Inputs .

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.. EN-12 Keypad Operation ...

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..... EN-14 Digital Operator Display (optional)

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... EN-24 1 Warnings CAUTION CAUTION Cables must not be connected or disconnected, nor signal tests carried out, while the power is switched on. The Varispeed F7 DC bus capacitor remains charged even after the power has been switched off. To avoid an electric shock hazard, disconnect the frequency inverter from the mains before carrying out maintenance. Then wait for at least 5 minutes after all LEDs have gone out. Do not perform a withstand voltage test on any part of the Varispeed. The frequency inverter contains semiconductors, which are not designed for such high voltages. Do not remove the digital operator while the mains supply is switched on.

The printed circuit board must also not be touched while the inverter is connected to the power. Never connect general LC/RC interference suppression filters, capacitors or overvoltage protection devices to the inverter input or output. To avoid unnecessary overcurrent faults, etc. being displayed, the signaling contacts of any contactor or switch fitted between inverter and motor must be integrated into the inverter control logic (e.g. baseblock). This is absolutely imperative! This manual must be read thoroughly before connecting and operating the inverter. All safety precautions and instructions for use must be followed. The inverter may must be operated with the appropriate line filters, following the installation instructions in this manual and with all covers closed and terminals covered. Only then will adequate protection be provided.

Please do not connect or operate any equipment with visible damage or missing parts. The operating company is responsible for any injuries or equipment damage resulting from failure to heed the warnings in this manual. EN-2 Safety Precautions and Instructions General Please read these safety precautions and instructions for use thoroughly before installing and operating this inverter. Also read all of the warning signs on the inverter and ensure they are never damaged or removed. Live and hot inverter components may be accessible during operation.

Removal of housing components, the digital operator or terminal covers runs the risk of serious injuries or damage in the event of incorrect installation or operation. The fact that frequency inverters control rotating mechanical machine components can give rise to other dangers. The instructions in this manual must be followed. Installation, operation and maintenance may only be carried out by qualified personnel. For the purposes of the safety precautions, qualified personnel are defined as individuals who are familiar with the installation, starting, operation and maintenance of frequency inverters and have the proper qualifications for this work.

Safe operation of these units is only possible if they are used properly for their intended purpose. The DC bus capacitors can remain live for about 5 minutes after the inverter is disconnected from the power. It is therefore necessary to wait for this time before opening its covers. All of the main circuit terminals may still carry dangerous voltages. Children and other unauthorized persons must not be allowed access to these inverters. Keep these Safety Precautions and Instructions for Use readily accessible and supply them to all persons with any form of access to the inverters. Intended Use Frequency inverters are intended for installation in electrical systems or machinery. Their installation in machinery and systems must conform to the following product standards of the Low Voltage Directive: EN 50178, 1997-10, EN 60204-1, 1997-12 Equipping of Power Systems with Electronic Devices Machine Safety and Equipping with Electrical Devices Part 1: General Requirements (IEC 60204-1:1997)/ Please note: Includes Corrigendum of September 1998 EN 61010-1, A2, 1995 Safety Requirements for Information Technology Equipment (IEC 950, 1991 + A1, 1992 + A2, 1993 + A3, 1995 + A4, 1996, modified) CE marking is carried out to EN 50178, using the line filters specified in this manual and following the appropriate installation instructions. Transportation and storage The instructions for transportation, storage and proper handling must be followed in accordance with the technical data. Installation Install and cool the inverters as specified in the documentation.

The cooling air must flow in the specified direction. The inverter may therefore only be operated in the specified position (e.g. upright). Maintain the specified clearances. Protect the inverters against impermissible loads. Components must not be bent nor insulation clearances changed. To avoid damage being caused by static electricity, do not touch any electronic components or contacts. EN-3 Electrical Connection Carry out any work on live equipment in compliance with the national safety and accident prevention regulations. Carry out electrical installation in compliance with the relevant regulations. In particular, follow the installation instructions ensuring electromagnetic compatibility (EMC), e.g. shielding, grounding, filter arrangement and laying of cables. This also applies to equipment with the CE mark. It is the responsibility of the manufacturer of the system or machine to ensure conformity with EMC limits.

Your supplier or Omron Yaskawa Motion Control representative must be contacted when using leakage current circuit breaker in conjunction with frequency inverters. In certain systems it may be necessary to use additional monitoring and safety devices in compliance with the relevant safety and accident prevention regulations. The frequency inverter hardware must not be modified. Notes The Varispeed F7 frequency inverters are certified to CE, UL, and cUL EMC Compatibility Introduction This manual was compiled to help system manufacturers using OMRON YASKAWA Motion Control (OYMC) frequency inverters design and install electrical switch gear. It also describes the measures necessary to comply with the EMC Directive.

The manual's installation and wiring instructions must therefore be followed. Our products are tested by authorized bodies using the standards listed below. Product standard: EN 61800-3:1996 EN 61800-3; A11:2000 Measures to Ensure Conformity of OYMC Frequency inverters to the EMC Directive OYMC frequency inverters do not necessarily have to be installed in a switch cabinet. It is not possible to give detailed instructions for all of the possible types of installation. This manual therefore has to be limited to general guidelines. All electrical equipment produces radio and line-borne interference at various frequencies.



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The cables pass this on to the environment like an aerial. Connecting an item of electrical equipment (e.g. drive) to a supply without a line filter can therefore allow HF or LF interference to get into the mains.

The basic countermeasures are isolation of the wiring of control and power components, proper grounding and shielding of cables. A large contact area is necessary for low-impedance grounding of HF interference. The use of grounding straps instead of cables is therefore definitely advisable. Moreover, cable shields must be connected with purpose-made ground clips. EN-4 Laying Cables Measures Against Line-Borne Interference: Line filter and frequency inverter must be mounted on the same metal plate. Mount the two components as close to each other as possible, with cables kept as short as possible. Use a power cable with well-grounded shield. For motor cables up to 50 meters in length use shielded cables. Arrange all grounds so as to maximize the area of the end of the lead in contact with the ground terminal (e.g.

metal plate). Shielded Cable: Use a cable with braided shield. Ground the maximum possible area of the shield. It is advisable to ground the shield by connecting the cable to the ground plate with metal clips (see following figure). Ground Clip Ground Plate Fig 1 Earthing the cable shield with metal clips The grounding surfaces must be highly conductive bare metal.

Remove any coats of varnish and paint. Ground the cable shields at both ends. Ground the motor of the machine. EN-5 Installation Mechanical Installation Unpacking the Inverter Check the following items after unpacking the inverter. Item Has the correct Inverter model been delivered? Is the Inverter damaged in any way? Are any screws or other components loose? Method Check the model number on the nameplate on the side of the Inverter.

Inspect the entire exterior of the Inverter to see if there are any scratches or other damage resulting from shipping. Use a screwdriver or other tools to check for tightness. If any irregularities in the above items are found, contact the agency from which the Inverter was purchased or your Omron Yaskawa Motion Control representative immediately. Checking the Installation Site Protection covers are attached to the top and bottom of the NEMA 1 / IP20 Inverters. Be sure to remove the top cover before operating a 200 or 400 V Class Inverter with a capacity of 18.5 kW or less inside a panel. Observe the following precautions when mounting the Inverter: Install the Inverter in a clean location which is free from oil mist and dust. It can be installed in a totally enclosed panel that is completely shielded from floating dust. When installing or operating the Inverter, always take special care so that metal powder, oil, water, or other foreign matter does enter the Inverter. Do not install the Inverter on combustible material, such as wood.

Install the Inverter in a location free from radioactive materials and combustible materials. Install the Inverter in a location free from harmful gasses and liquids. Install the Inverter in a location without excessive oscillation. Install the Inverter in a location free from chlorides. Install the Inverter in a location without direct sunlight. EN-6 Installation Orientation Install the Inverter vertically so as not to reduce the cooling effect. When installing the Inverter, always provide the following installation space to allow normal heat dissipation. A B Air A B 200V class inverter, 0.55 to 90 kW 50 mm 120 mm 400V class inverter, 0.55 to 132 kW 200V class inverter, 110 kW 120 mm 120 mm 400V class inverter, 160 to 220 kW 400V class inverter, 300 kW 300 mm 300 mm 50mm min. 30mm min. 30mm min. 120mm min. Air Horizontal Space Vertical Space Fig 2 Installation space 1. The same space is required horizontally and vertically for IP00, IP20 and NEMA 1 Inverters.

2. Always remove t run when ON; stopped when OFF. Fault when ON. Reset when ON S4 S5 S6 S7 SC SN SP +V 24 VDC, 8 mA Photocoupler isolation Functions are Auxiliary frequency ref*1 selected by setence when ON. (Master/auxiliary switch) ting H1-01 to Multi-step speed reference 2 Multi-step speed 2 H1-05.

*1 when ON. Multi-step speed reference 1 Jog frequency reference *1 Jog frequency when ON. +24VDC power supply for digital inputs 24 VDC, 250 mA max. *2 Digital input common Digital Input Neutral Digital Input Power Supply 15 V power output Frequency reference Auxiliary Frequency Reference 15 V power output Analog reference common Shield wire, optional ground line connection point 15 V power supply for analog references 15 V (Max. curr.: 20mA) 0 to +10 V/100% Auxiliary analog frequency reference; 4 to 20 mA (250) 10 to +10 V (20 k) 0 to +10 V (20 k) Function is 4 to 20 mA (250) selected by set-0 V to +10 V (20 k) ting H3-09. 0 to 20 mA (250) Analog input signals A1 A2 -V AC E(G) 15 V power supply for analog references EN-9 Type No. Signal Name Function Signal Level M1 M2 Digital output signals During run (NO) Closed during Run Function selected by Relay contacts H2-01 to H2-03 Contact capacity: 1 A max. at 250 VAC Within 2 Hz of set fre 1 A max. at 30 VDC*3 quency when ON Closed across MA and MC during faults Open across MB and MC during faults Analog output frequency signal; 0 to 10 V; 10V=FMAX Analog output power signal; 0 to 10V; 10V=max.

appl. motor capacity Function selected by H4-04 Function selected by H4-01 Closed when output frequency at zero level (b2-01) or below M3 M4 M5 M6 MA MB MC Fault output signal Zero speed (NO) Speed agreement detection (NO) Analog output signals FM AC AM Output frequency Analog common Inverter output power 0 to +10 V max. 5% 2 mA max. 10 to +10 V max. 5% 2 mA max 4 to 20 mA 0 to 32 kHz (3k) High level voltage 3.5 to 13.2 V 0 to 32 kHz +15 V output (2.2k) Differential input, PHC isolation Differential input, PHC isolation Pulse I/O RP MP R+ Pulse Input Pulse Output H6-01 (Frequency reference input) *4 H6-06 (Output frequency) RS-485/422 RS+ SIG MEMOBUS communications input For 2-wire RS-485, short R+ and S+ MEMOBUS communications as well as R- and S-. output Signal common *1. The default settings are given for terminals S3 to S7.

For a 3-wire sequence, the default settings are a 3-wire sequence for S5, multistep speed setting 1 for S6 and multi-step speed setting 2 for S7. *2. Do not use this power supply for supplying any external equipment. *3. When driving a reactive load, such as a relay coil with DC power supply, always insert a flywheel diode as shown in Fig 6 *4.

Pulse input specifications are given in the following table: Low level voltage High level voltage H duty Pulse frequency 0.0 to 0.8 V 3.5 to 13.2 V 30% to 70% 0 to 32 kHz Flywheel diode External power: 30 VDC max.

Coil 1 A max. The rating of the flywheel diode must be at least as high as the circuit voltage. Fig 6 Flywheel Diode Connection 1. In Fig 4 the wiring of the digital inputs S1 to S7 is shown for the connection of contacts or NPN transistors (0V common and sinking mode).



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ALARM: Lights up when an error or alarm has occurred.

Data Display Displays monitor data, parameter numbers, and settings. Mode Display (displayed at the upper left of the data display DRIVE: Lights up in Drive Mode. QUICK: Lights up in Quick Programming Mode. ADV: Lights up in Advanced Programming Mode. VERIFY: Lights up in Verify Mode. A. TUNE: Lights up in Autotuning Mode. Keys Execute operations such as setting user parameters, monitoring, jogging, and autotuning. Digital Operator Keys Key Name LOCAL/REMOTE Key Function Switches between operation via the Digital Operator (LOCAL) and the settings in b1-01 and b1-02 (REMOTE). This key can be enabled or disabled by setting parameter o2-01.

Selects the modes. Returns to the status before the DATA/ENTER Key was pressed. Enables jog operation when the Inverter is being operated from the Digital Operator. Selects the rotation direction of the motor when the Inverter is being operated from the Digital Operator. Sets the active digit when programming user parameters. Also acts as the Reset key when a fault has occurred. Selects user parameter numbers and increments parameter settings. Used to move to the next item or data. Selects user parameter numbers and decrements parameter settings. Used to move to the previous item or data.

Enters menus and parameters and validates parameter settings. Starts operation when the Inverter is being controlled by the Digital Operator (LOCAL Mode). Stops Inverter operation (LOCAL and REMOTE Mode). This key can be enabled or disabled when operating from a source different than the operator by setting parameter o2-02. MENU Key ESC Key JOG Key FWD/REV Key Shift/RESET Key Increment Key Decrement Key DATA/ENTER Key RUN Key STOP Key EN-14 Power Up and Basic Parameter Setup Start Up Procedure START Installation Wiring Set power supply voltage jumper *1 Turn ON power Confirm status Select control method.

Basic settings (Quick programming mode) NO V/f control YES PG? NO V/f control Set E1-03. V/f default: 200V/50Hz (400V/50Hz) Settings according to control mode Motor operation possible during autotuning? *3 YES Vector Control (A1-02 = 2 or 3) *5 YES V/f Control with PG (A1-02 = 1 Set E1-03, E2-04 and F1-01. *2 V/f default: 200V/50Hz (400V/50Hz) NO Non-rotating autotuning for line-to-line resistance *4 Rotating autotuning *6 Non-rotating *6 autotuning Application settings (Advanced programming mode) No-load operation Loaded operation Optimum adjustments and parameter settings Check/record parameter settings END 1. Set for 400 V Class Inverter for 75 kW or more. 2.

If there is a reduction gear between the motor and PG, set the reduction ratio in F1-12 and F1-13 in advanced programming mode. 3. Use rotational autotuning to increase autotuning accuracy whenever it is okay for the motor to be operated. 4. If the motor cable changes to 50 m or longer for the actual installation, perform non-rotating autotuning for the line-to-line resistance only on site. 5. The default control mode is Open Loop Vector control (A1-02=2). 6. If the maximum output frequency and the base frequency are different, set the maximum output frequency (E1-04) after autotuning. Fig 8 Trial Operation Flowchart EN-15 Before Power Up The following points should be checked carefully before the power is switched on.

Check if the power supply meets the inverter specification. Check if the power supply cables are tightly connected to the right terminals (L1, L2, L3). Check if the motor cables are tightly connected to the right terminals on the inverter side (U, V, W) as well as on the motor side. Check if the braking unit / braking resistor is connected correctly. Check if the Inverter control circuit terminal and the control device are wired correctly. Set all Inverter control circuit terminals to OFF. When a PG card is used, check if it is wired correctly. Display after Power Up After normal power up without any problems the operator display shows the following messages Display for normal operation -DRIVERdy Frequency Ref U1- 01=50.00Hz U1-02=50.00Hz U1-03=10.

05A The frequency reference monitor is displayed in the data display section. When a fault has occurred or an alarm is active a fault or alarm message will appear. In this case, refer to page 21, Troubleshooting. -DRIVE- Display for fault operation UV DC Bus Undervolt A fault or alarm message is shown on the display. The example shows a low voltage alarm.

Autotuning Autotuning sets motor parameters automatically when using Open Loop or Closed Loop Vector control, when the cable length is long or the installation has changed. Setting the Autotuning Mode One of the following three autotuning modes can be set. Rotating autotuning Non-rotating autotuning Non-rotating autotuning for line-to-line resistance only Rotating Autotuning (T1-01 = 0) Rotating autotuning is used for Open Loop and Closed Loop Vector control only. Set T1-01 to 0, input the data from the motor nameplate, and then press the RUN key on the Digital Operator. The Inverter will operate the motor for approximately 1 minute and set the required motor parameters automatically.

Non-rotating Autotuning (T1-01 = 1) Non-rotating autotuning is used for Open Loop and Closed Loop Vector control only. Set T1-01 to 1, input the data from the motor nameplate, and then press the RUN key on the Digital Operator. The inverter will supply power to the non-rotating motor for approximately 1 minute and some of the EN-16 motor parameters will be set automatically. The remaining motor parameters will be set automatically during the first time operation. Non-rotating Autotuning for Line-to-Line Resistance (T1-01 = 2) Non-rotating autotuning for line-to-line resistance can be used in any control mode. This is the only possible autotuning for V/f control and V/f control with PG. It can be used to improve the performance when the motor cable is long, the cable length has changed or when the motor and inverter have different capacities. To perform autotuning in V/f control or V/f control with PG, set T1-02 (Motor rated power) and T1-04 (Motor rated current) and then press the RUN key on the Digital Operator. The Inverter will supply power to the non-rotating motor for approximately 20 seconds and the Motor line-to-line resistance and cable resistance will be automatically measured. IMPORTANT 1.

Power will be supplied to the motor during autotuning but the motor will not turn. Do not touch the motor until autotuning has been completed. 2. Ensure that all motor contactors are closed before the autotuning is started. 3. To cancel autotuning press the STOP key on the Digital Operator. Other Alarms and Faults During Autotuning For an overview of possible autotuning alarms or faults and corrective actions refer to page 24, Autotuning Faults. EN-17 User Parameter Parameter Number Name Description Parameter Number Name Description Initialize Data Language selection for Digital Operator display(JVOP160-OY only) 0:English 2: German 3: French 4: Italian 5: Spanish 6: Portuguese 0:Monitoring only (Monitoring drive mode and setting A1-01 and A1-04.



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) 1: Used to select user parameters (Only parameters set in A2-01 to A2-32 can be read and set.) 2: Advanced (Parameters can be read and set in both, quick programming mode (Q) and advanced programming mode (A).

Motor Slip Compensation (not available in V/f with PG) C3-01 Used to improve speed accuracy Slip compensa- Increase if output frequency is too low tion gain Decrease if output frequency is too high. Sets the slip compensation delay time Slip compensa Increase if output frequency is not tion delay time stable (only available Decrease setting when slip compenin V/f and OLV) sation responsiveness is low. A1-00 C3-02 A1-01 Parameter access level Speed Control (ASR) (only available in V/f with PG and CLV) C5-01 C5-02 ASR proportional gain 1 ASR integral time 1 ASR proportional gain 2 ASR integral time 2 Sets the proportional gain of the speed loop (ASR) Sets the integral time of the speed loop (ASR) P,I P = C5-01 I = C5-02 P = C5-03 I = C5-04 0 E1-04 A1-02 0:V/f control Control method 1: V/f control with PG 2: Open loop vector control selection 3: Closed loop vector control 0: No initializing 1110: Initializes using the user parameters 2220: Initializes using a two-wire sequence. (Initializes to the factory setting.) 3330: Initializes using a three-wire sequence. Sets the frequency reference input method. 0:Digital Operator 1: Control circuit terminal (analog input) 2: Serial communication (RS422 / 485) 3: Option Card Sets the run command input method. 0:Digital Operator 1: Control circuit terminal (digital inputs) 2: Serial communication (RS422 / 485) 3: Option Card Selects the stopping method when the Run signal is removed 0:Deceleration to stop 1: Coast to stop 2: DC injection to stop 3: Coast to stop with timer (New Run commands are disregarded while coasting.) 0:Reverse enabled 1: Reverse disabled 2: Output Phase Rotation (both rotational directions are enabled) 3: Output Phase Rotation with Reverse disabled. Sets the time to accelerate/decelerate from 0 Hz to the maximum output frequency. C5-03 A1-03 Initialize C5-04 Motor speed (Hz) C5-06 ASR delay time Sets the ASR filter time constant. (only CLV) ASR switching frequency (only CLV) ASR integral limit (only CLV) Sets the frequency for switching between ASR gain 1, 2 and ASR integral time 1, 2 Sets the limit for the integral part of the ASR controller. Sequence / Reference Source Reference source selection C5-07 b1-01 C5-08 Carrier Frequency C6-01 Heavy/Normal duty selection 0:Heavy Duty 1: Normal Duty 1 2: Normal Duty 2 Selects the carrier frequency (factory setting depends on Inverter capacity) 0: Low noise, low carrier 1: 2.0 kHz 2: 5.0 kHz 3: 8.0 kHz 4: 10.0 kHz 5: 12.5 kHz 6: 15.0 kHz F: Programmable pattern b1-02 RUN command source selection b1-03 Stopping method selection C6-02 Carrier frequency selection Speed Settings d1-01 to d1-16 d1-17 Multi speed references 1 to 16 Jog frequency reference Torque control selection Speed/torque control switch over timer 0:Speed control 1: Torque control Sets the delay from inputting a "speed/torque control change" signal (by digital input) until the control is acutally changed This setting is used as a reference value for protection functions. b1-04 Prohibition of reverse operation Sets the multi-step speed references.

Acceleration / Deceleration Settings C1Acceleration/ Deceleration times S-curve characteristic time at acceleration Torque Control (only available in CLV) d5-01 S-Curve Settings C2Sets the S-curve characteristic at acceleration start and end. d5-06 V/f Pattern Settings E1-01 Input voltage setting EN-18 Parameter Number Name Description Parameter Number Name Description Max. output E1-04 frequency (FMAX) Max. output E1-05 voltage (VMAX) Output Voltage (V) H3-13 Terminal A1/ A2 switching Selects on which terminal the main frequency reference can be input. 0:Use analog input 1 on terminal A1 for main frequency reference. 1:Use analog input 2 on terminal A2 for main frequency reference. Frequency (Hz) Base freE1-06 quency (FA) E1-13 Base Voltage (VBASE) To set V/f characteristics in a straight line, set the same values for E1-07 and E1-09. In this case, the setting for E1-08 will be disregarded. Always ensure that the four frequencies are set in the following order: E1-04 (FMAX) E1-06 (FA) > E1-07 (FB) E1-09 (FMIN) Terminal FM H4-01 monitor selecSets the number of the monitor tion item to be output (U1) at terminal Terminal AM FM/AM. H4-04 monitor selection Pulse Train I/O Pulse train H6-01 input function selection H6-02 Pulse train input scaling Selects the pulse train input function 0:Frequency reference 1:PID feedback value 2:PID target value Sets the number of pulses in Hz that is equivalent to 100% of the input item selected in H6-01.

Motor Data Settings E2-01 E2-02 E2-03 E2-04 Motor rated current Motor rated slip Motor no-load current Number of motor poles Sets the motor data. Pulse train Selects the pulse train monitor output H6-06 monitor selecitem (U1) tion H6-07 Pulse monitor scaling Sets the number of pulses output in Hz when the monitor item is 100%. 0:Disabled (Acceleration as set. With a heavy load, the motor may stall.) 1:Enabled (Acceleration stopped when L3-02 level is exceeded. Acceleration starts again when the current has fallen below the stall prevention level). 2:Intelligent acceleration mode (Using the L3-02 level as a basis, acceleration is automatically adjusted. Set acceleration time is disregarded.) 0:Disabled (Deceleration as set. If deceleration time is too short, a DC bus overvoltage may result.) 1:Enabled (Deceleration is stopped when the DC bus voltage exceeds the stall prevention level. Deceleration restarts when the voltage falls below the stall prevention level again.) 2:Intelligent deceleration mode (Deceleration rate is automatically adjusted so that the Inverter can decelerate in the shortest possible time. The set deceleration time is disregarded.) 3:Enabled with braking resistor Sets the number of auto restart attempts. Automatically restarts after a fault and conducts a speed search from the run frequency. Sets whether a fault relay is activated during fault restart. 0:No output (Fault relay is not activated.) 1:Output (Fault relay is activated.) Stall Prevention Motor E2-09 mechanical losses E2-11 Motor rated output power Sets the number of PG pulses per revolution 0:Phase A leads with forward run command 1:Phase B leads with forward run command PG Option Setup F1-01 PG constant Stall prevention selection L3-01 during accel (not available in CLV) F1-05 PG rotation Digital I/O Settings H1-01 Terminal S3 to Refer to page 20, Digital Input Function Selections (H1-01 to H1-05) for a S7 function to H1-05 selection list of selections Terminal M1H2-01 M2 and M3and H2-02 M4 function selection Refer to page 20, Digital Output Function Selections for a list of selections Stall prevenL3-04 tion selection during decel Analog I/O Settings Selects the signal level input at multifunction analog input A2.



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Analog input 0:0 to +10 V (11 bit). H3-08 A2 signal level 1:-10 to +10 V 2:4 to 20 mA (9-bit input). selection Ensure to switch S1-2 to "V" before using a voltage input. Analog input H3-09 A2 function selection. Selects the multi-function analog input function for terminal A2. Fault Restart Number of L5-01 auto restart attempts Auto restart L5-02 operation selection EN-19 Parameter Number Name Description Parameter Number Name Description Torque Limit (only OLV and CLV) Forward drive L7-01 torque limit Reverse drive L7-02 torque limit Forward L7-03 regenerative torque limit Reverse L7-04 regenerative torque limit Sets the torque limit value as a percentage of the motor rated torque. Four individual regions can be set. Output torque Positive torque 0 No. motor rotations Regen. Fault Trace Data U2-01 Current fault U2-02 Last fault U2-03 Reference frequency at fault U2-04 Output frequency at fault U2-05 Output current at fault U2-07 Output voltage reference at fault U2-08 DC bus voltage at fault U2-09 Output power at fault Negative torque Reverse Regen. Forward U2-11 Input terminal status at fault U2-12 Output terminal status at fault U2-13 Operation status at fault U2-14 Cumulative operation time at fault Monitor Data U1-01 Frequency reference in Hz / rpm U1-02 Output frequency in Hz / rpm U1-03 Output current in A U1-06 Output voltage in VAC U1-07 DC bus voltage in VDC U1-08 Output power in kW U1-09 Torque reference Shows input ON/OFF status. Fault History Data U3-01 to Last fault to fourth last fault U3-04 U3-05 to Cumulative operation time at fault 1 to 4 U3-08 U3-09 to Fifth last to tenth last fault U3-14 U3-15 to Accumulated time of fifth to tenth fault U3-20 * The following faults are not recorded in the error log: CPF00, 01, 02, 03, UV1, and UV2. U1-10 = 1: FWD command (S1) is ON 1: REV command (S2) is ON 1: Multi input 1 (S3) is ON 1: Multi input 2 (S4) is ON 1: Multi input 3 (S5) is ON 1: Multi input 4 (S6) is ON 1: Multi input 5 (S7) is ON U1-10 Input terminal status Digital Input Function Selections (H1-01 to H1-05) 3 4 5 6 Multi-step speed reference 1 Multi-step speed reference 2 Multi-step speed reference 3 Jog frequency command (higher priority than multistep speed reference) Accel/decel time selection 1 Not used (Set when a terminal is not used) Fault reset (Reset when turned ON) PI control disable External fault; Input mode: NO contact/NC contact, Detection mode: Normal/during operation Speed/torque control change (ON: Torque control) Speed control (ASR) gain switching (ON: C5-03) Shows output ON/OFF status. U1-11 = 1: Multi-function contact output 1 (M1-M2) is ON 1: Multi-function contact output 2 (M3-M4) is ON 1: Multi-function contact output 3 (M5-M6) is ON Not used (Always 0). 1: Error output (MA/MB-MC) is ON 7 F 14 19 20 to 2F 71 77 U1-11 Output terminal status Inverter operating status. U1-12 = Run 1: Zero speed Digital Output Function Selections (H2-01 and H2-02) 0 6 F 10 1A 1F 30 32 During run 1 (ON: run command is ON or voltage is being output) Inverter operation ready; READY: After initialization or no faults Not used. (Set when the terminal is not used.) Minor fault (Alarm) (ON: Alarm displayed) During reverse run (ON: During reverse run) Motor overload (OL1, including OH3) pre-alarm (ON: 90% or more of the detection level) During torque limit (current limit) (ON: During torque limit) Activated if the ASR is operating for torque limit. The ASR output becomes the torque reference, the motor is rotating at the speed limit. U1-12 Operation status 1: Reverse 1: Reset signal input 1: Speed agree 1: Inverter ready 1: Minor fault 1: Major fault U1-13 Cumulative operation time in hrs. U1-21 ASR input U1-22 ASR output U1-34 OPE fault parameter U1-40 Cooling fan operating time in hrs. EN-20 Troubleshooting General Faults and Alarms Faults and Alarms indicate unusual inverter / application conditions. An alarm does not necessarily switch off the inverter but a message is displayed on the keypad (i.e. a flashing alarm code) and an alarm output can be generated at the multi-function outputs (H2-01 and H2-02) if programmed. An alarm automatically disappears if the alarm condition is not present anymore. A fault switches the inverter output off immediately, a message is displayed on the keypad and the fault output is switched. The fault must be reset manually after the cause and the RUN signal have been removed. The following table shows a list of faults and alarms with their corrective actions. Display BUS Option Com Err Alarm Fault Meaning Corrective Actions Option Card Communication Alarm Check the connections and all user-side software After initial communication was established, the ware configurations.

connection was lost. Control Fault A torque limit was reached continuously for 3 Check the motor parameters seconds or longer during a deceleration stop in Open Loop Vector control Digital Operator Communication Fault I/2 Communication fault between Operator and Inverter CPU External RAM Fault CPF02 Fault Baseblock circuit error CPF03 EEPROM error CPF04 CPU Internal A/D Converter Fault Disconnect the Digital Operator and then connect it again. Cycle the Inverter power supply. Replace the Inverter. CF Out of Control CPF00 COMERR(OP&INV) CPF01 COMERR(OP&INV) CPF02 BB Circuit Err CPF03 EEPROM Error CPF04 Internal A/D Err Perform an initialization to factory defaults. Cycle the Inverter power supply. Replace the Inverter. DEV Speed Deviation F1-04 = 0, 1 or 2 and A1-02 = 1 or 3 Reduce the load. The speed deviation has been greater than the Lengthen the acceleration and deceleration setting in F1-10 for a time longer than the setting time F1-11. Check the mechanical system Check the settings of F1-10 and F1-11 F1-04 = 3 and A1-02 = 1 or 3 The speed deviation has been greater than the Check the sequence and if the brake is opened when the inverter starts to increase setting in F1-10 for a time longer than the setting the speed.

F1-11. Forward/Reverse Run Commands Input Together Check external sequence logic, so that only Both the forward and the reverse run commands one input is activated at a time. are input simultaneously for 500ms or more. This alarm stops the motor. External fault input from Communications Option Card Check for an external fault condition.

Verify the parameters. Verify communication signals EF External Fault EF0 Opt External Flt EFx Ext Fault Sx Ext Run Active Cannot Reset External fault at terminal Sx (x stands for termi- Eliminate the cause of the external fault connals S3 to S7) dition. Detected after a fault when a RESET command Remove the RUN signal first and reset the is input while the RUN command is still active error. Remove the motor and run the Inverter without the motor. Check the motor for a phase to ground Ground Fault short.

The ground current at the Inverter output exceeded 50% of the Inverter rated output cur- Check the output current with a clampmeter to verify the DCCT reading.



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rent and L8-09=1 (Enabled). Check the control sequence for wrong motor contactor signals. GF Ground Fault EN-21 Display Alarm Fault OC Over Current
Corrective Actions Remove the motor and run the Inverter without the motor. Check the motor for a phase-to-phase Over Current The Inverter's output
current exceeded the over- short. Verify the accel/decel times (C1). current detection level. Check the Inverter for a phase-to-phase short at the output.
Heatsink Overheat Check for dirt build-up on the fans or heatL8-03 = 0,1 or 2 and the temperature of the sink. Inverter's cooling fin exceeded the L8-02
value.

Reduce the ambient temperature around Inverter's Cooling Fan Stopped the drive. L8-03 = 3 or 4 and the temperature of the Replace the cooling fan(s).
Inverter's cooling fin exceeded the L8-02 value. Heatsink Overheat The temperature of the Inverter's heatsink exceeded 105 C. Inverter's Cooling Fan
Stopped Check for dirt build-up on the fans or heatsink. Reduce the ambient temperature around the drive. Replace the cooling fan(s). Meaning OH Heatsnk
Overtemp OHI Heatsink Max Temp OL1 Motor Overload Motor Overload Detected when L1-01 is set to 1,2 or 3 and the Recheck the cycle time and the size
of the Inverter's It value exceeded the motor overload load as well as the accel/decel times curve. (C1). The overload curve is adjustable using parame Check
the V/f characteristics (E1).

ter Check the setting of Motor Rated Current E2-01 (Motor Rated Current), L1-01 (Motor ProSetting (E2-01). tectio Selection) and L2-02 (Motor Protection
Time Constant) Recheck the cycle time and the size of the load as well as the accel/decel times Inverter Overload (C1). The Inverter output current exceeded
the Invert Check the V/f Characteristics (E1). ers's overload capability Check if the inverter rated current matches the motor rated current. F1-03 = 0, 1 or 2
and A1-02 = 1 or 3 The motor speed feedback (U1-05) exceeded the setting in F1-08 for a time longer than the setting of F1-09 F1-03 = 3 and A1-02 = 1 or 3
The motor speed feedback (U1-05) exceeded the setting in F1-08 for a time longer than the setting of F1-09 OL2 Inv Overload OS Overspeed Det.

Adjust the ASR settings in the C5 parameter group Check the reference circuit and reference gain. Check the settings in F1-08 and F1-09 OV DC Bus
Overvolt (only in stop conditio) Increase the deceleration time (C1-02/04) The DC bus voltage has exceeded the overvoltage connect a braking option. age
detection level. Check the power supply and decrease the Default detection levels are: voltage to meet the inverter's specifica200 V class: 410 VDC tions. 400
V class: 820 VDC Check the braking chopper / resistor.

Input Phase Loss Too big DC bus voltage ripple. Only detected when L8-05=1 (enabled) Tighten the input terminal screws Check the power supply voltage
PF Input Phase Loss PGO PG Open PG Disconnection Detected when F1-02 = 0, 1 or 2 and A1-02 = 1 or 3. Fix the broken/disconnected wiring. Detected
when no PG (encoder) pulses have Supply power to the PG properly. been received for a time longer than the setting Check the sequence and if the brake is in
F1-14. opened when the inverter starts to increase PG Disconnection the speed. Detected when F1-02 = 3 and A1-02 = 1 or 3. PG (encoder) pulses have not
been received for a time longer than the setting in F1-14. EN-22 Display PUF DC Bus Fuse Open Alarm Fault Meaning Corrective Actions Check the motor
and the motor cables for DC Bus Fuse Open short circuits or insulation failures (phaseThe fuse in the main circuit is blown. to-phase).

Warning: PG (encoder) pulses have not been received for Replace the inverter after correcting the fault. a time longer than the setting in F1-14. Dynamic
Braking Transistor The built-in dynamic braking transistor failed The DC bus voltage is below the Undervoltage Detection Level (L2-05). The default settings
are: 200V class: 190 VDC 400 V class: 380 VDC Main Circuit MC Operation Failure No MC response during Inverter operation. Control Power Supply
Undervoltage Undervoltage of the control circuit while the Inverter was running. Cycle power to the inverter. Replace the inverter. Check the input voltage.
Check the wiring of the input terminals. Check the input voltage and the wiring of the input terminals.

Extend the settings in C1-01/03 Replace the Inverter. Remove all connection to the control terminals and cycle the power to the Inverter. Replace the Inverter.
RR DynBrk Transistr (only in UV1 stop DC Bus Undervolt conditio) UV2 CTL PS Undervolt Operator Programming Errors An Operator Programming Error
(OPE) occurs when two or more parameter related to each other are set inappropriately or an individual parameter setting is incorrect. The Inverter does not
operate until the parameter setting is corrected; however, no other alarm or fault output will occur.

If an OPE occurs, change the related parameter by checking the cause shown in the table below. When an OPE error is displayed, press the ENTER key to see
U1-34 (OPE Detected). This monitor displays the parameter that is causing the OPE error. Display OPE01 kVA Selection OPE02 Limit Meaning Inverter
kVA Setting Error Parameter setting is out of its range Corrective Actions Enter the correct kVA setting in o2-04. Verify the parameter settings.

OPE03 Terminal One of the following errors has been made in the multifunction input (H1-01 to H1-05) settings: Duplicate functions were selected.
UP/DOWN Command(10 and 11) were not selected simultaneously. The up/down commands (10 and 11) and Accel/ Decel Ramp Hold (A) were selected at
the same time. More than one of the Speed Search inputs (61, 62, 64) were set simultaneously. Verify the parameter settings in H1 External Baseblock NO (8)
and External Baseblock NC (9) were selected at the same time. The up/down commands (10 and 11) were selected while PID Control was enabled. The
Emergency Stop Command NO (15) and NC(17) are set simultaneously. PID is enabled and UP and/or DOWN (10 / 11) command are set. HSB (68) and KEB
(65/66) command are set simultaneously. RUN/Reference Command Selection Error Verify that the board is installed.

Remove the power The Reference Source Selection b1-01 and/or the RUN OPE05 supply and re-install the option board again Sequence Select Source
Selection parameter b1-02 are set to 3 (option Recheck the setting of b1-01 and b1-02 board) but no option board is installed. OPE06 PG Opt Missing
Control Method Selection Error Verify the control method selection in parameter A1-02 One of the control methods needing a PG feedback was selected
(A1-02 = 1 or 3), but a PG option board is and/or the installation of the PG option board. not installed. EN-23 Meaning Corrective Actions Function
Selection Error A setting has been made that is applicable with the curOPE08 Verify the control method and the function. rent control method. Constant
Selection Example: A function used only with open loop vector control was selected for V/f control.



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OPE010 V/f Ptn Setting V/f Parameter Setting Error Check parameters (E1). A frequency/voltage value may be set higher than the maximum frequency/voltage. Display Autotuning Faults Autotuning faults are shown below. When the following faults are detected, the fault is displayed on the digital operator and the motor coasts to stop.

No fault or alarm outputs will be operated. Display Er-01 Fault Motor data fault Meaning Corrective Actions Check the input data. Check the Inverter and motor capacity. Check the motor rated current and no-load current setting. Check the input data.

Check wiring and the machine. Check the load. - Er-02 Minor Fault Er-03 STOP key Er-04 Resistance Alarm STOP key input Line-to-Line Resistance Fault Autotuning result is outside the parameter setting range. No-Load Current Fault Er-05 Autotuning result is outside the parameter setting No-Load Current range. Er-08 Rated slip Er-09 Accelerate Rated Slip Fault Autotuning result is outside the parameter setting range.

Acceleration Fault (Rotating autotuning only) The motor did not accelerate in the specified time (C1-10+10sec.) Check the input data. Check the motor wiring. If the motor is connected to the machine, disconnect it. If the setting of T1-03 is higher than the Inverter input power supply voltage (E1-01), change the input data. Increase C1-01(Acceleration time) Increase L7-01 and L7-02 (Torque limits) If the motor is connected to the machine, disconnect it. Er-11 Motor Speed If the motor is connected to the machine, disconnect it. Motor Speed Fault (Rotating autotuning only) The torque reference exceeded 100% during accel- Increase C1-01 eration. Deteced only when AI-02 = 2 or 3 (Vector Check the input data (particularly the number of PG pulses and the number of motor poles) control modes). Current Detection Fault The current exceeded the motor rated current.

Any of U/T1, V/T2 and W/T3 has open-phase. Leakage Inductance Fault Autotuning result is outside the parameter setting range. Check wiring of the Inverter and the mounting. Er-12 I-det. Circuit Er-13 Leakage Inductance Fault End-1 V/f Over Setting Check motor wiring. Rated Current Setting Alarm Displayed after auto-tuning is complete Check the motor rated current value. During auto-tuning, the measured value of motor rated current (E2-01) was higher than the set value. Motor Core Saturation Alarm (only for rotating autotuning) Check the input data Check the motor wiring. If the motor is connected to the machine, disconnect it. End-2 Saturation End-3 Rated FLA Alm Rated Current Setting Alarm During autotuning the measured value of motor rated Check the motor rated current value current (E2-01) was greater than the set value.

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..... DE-24 1 Warnhinweise ACHTUNG ACHTUNG Solange die Versorgungsspannung eingeschaltet ist, dürfen weder Kabel an- oder abgeklemmt werden, noch dürfen Signalprüfungen durchgeführt werden. Der Zwischenkreis des Varispeed F7 bleibt auch dann geladen, wenn die Spannungsversorgung unterbrochen wurde. Trennen Sie den Frequenzumrichter vor Ausführung von Wartungsarbeiten von der Spannungsversorgung, um einen elektrischen Schlag zu vermeiden. Warten Sie anschließend mindestens 5 Minuten, bis alle LEDs erloschen sind.

Führen Sie an keinem Teil des Varispeed Spannungsfestigkeitstests durch. Der Frequenzumrichter enthält Halbleiter, die für derart hohe Spannungen nicht ausgelegt sind. Die digitale Bedienkonsole darf nicht bei eingeschalteter Spannungsversorgung abgebaut werden. Berühren Sie keine Platinen, wenn der Frequenzumrichter an die Spannungsversorgung angeschlossen ist. Schließen Sie niemals LC/RC-Entstörfilter, Kondensatoren oder Überspannungsschutzgeräte an den Ein- oder Ausgang des Frequenzumrichters an, die nicht speziell für den Frequenzumrichter vorgesehen sind. Um unnötige Berührungsfehler usw. zu vermeiden, müssen die Signalkontakte aller Schütze oder Schalter, die zwischen Frequenzumrichter und Motor geschaltet sind, in die Steuerungslogik (z. B. Endstufensperre) eingebunden sein. Das ist zwingend erforderlich! Dieses Handbuch muss vor Anschluss und Inbetriebnahme des Frequenzumrichters sorgfältig durchgelesen werden. Alle Sicherheitshinweise und Anleitungen müssen beachtet werden. Der Frequenzumrichter muss gemäß Installationsanleitungen in diesem Handbuch mit geeigneten Netzfiltern betrieben werden. Zudem müssen alle Abdeckungen geschlossen und alle Klemmen abgedeckt sein. Nur dann ist ein angemessener Schutz gesichert. Geräte mit sichtbaren Beschädigungen oder fehlenden Teilen dürfen nicht angeschlossen oder in Betrieb genommen werden. Der Betreiber der Anlage ist für alle Verletzungen oder Geräteschäden verantwortlich, die aus Nichtbeachtung der Warnhinweise in diesem Handbuch entstehen. DE-2 Sicherheitshinweise und Anleitungen Allgemein Lesen Sie diese Sicherheitshinweise und Anleitungen vor Installation und Inbetriebnahme dieses Frequenzumrichters. Lesen Sie auch alle Warnhinweise, die auf dem Frequenzumrichter angebracht sind, und achten Sie darauf, dass diese nicht beschädigt oder entfernt werden. Während des Betriebs können unter Spannung stehende oder heiße Bauteile zugänglich sein. Durch Entfernen von Verkleidungsteilen, der

digitalen Bedienkonsole oder Klemmenabdeckungen besteht im Falle einer fehlerhaften Installation oder Bedienung das Risiko von ernsthaften Verletzungen.

Durch die Tatsache, dass Frequenzumrichter drehende mechanische Teile von Maschinen steuern, können weitere Gefahren entstehen. Den Anleitungen in diesem Handbuch muss Folge geleistet werden. Installation, Bedienung oder Wartung darf nur durch qualifiziertes Personal erfolgen. Aus Sicherheitsgründen sind als qualifizierte Mitarbeiter nur solche anzusehen, die mit der Installation, dem Starten, der Bedienung und der Wartung von Frequenzumrichtern vertraut sind und für diese Arbeiten entsprechende Qualifikationen besitzen. Ein sicherer Betrieb dieser Geräte ist nur möglich, wenn diese auch für den vorgesehenen Zweck eingesetzt werden. Der Zwischenkreis kann nach Abschalten der Versorgungsspannung des Frequenzumrichters noch ca. 5 Minuten lang unter Spannung stehen. Aus diesem Grund muss diese Zeitspanne vor dem Öffnen von Geräteabdeckungen abgewartet werden. Alle Klemmen des Hauptstromkreises können noch gefährliche Spannungen führen. Kinder und andere nicht autorisierte Personen dürfen keinen Zugang zu Frequenzumrichtern haben.



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Bewahren Sie diese Sicherheitshinweise und Anleitungen griffbereit auf, und lassen Sie sie allen Personen zukommen, die Zugang zu den Frequenzumrichtern haben. Vorgesehener Verwendungszweck Frequenzumrichter sind für den Einbau in elektrische Systeme oder Maschinen gedacht. Ihr Einbau in Maschinen oder Systeme muss folgenden Produktstandards der Niederspannungsrichtlinie entsprechen: EN 50178, 1997-10, EN 60204-1, 1997-12 Ausrüstung von Starkstromanlagen mit elektronischen Betriebsmitteln Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen Teil 1: Allgemeine Anforderungen (IEC 60204-1: 1997)/ Bitte beachten Sie Folgendes: Enthält Ergänzungen von September 1998 EN 61010-1, A2, 1995 Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgerte (IEC 950, 1991 + A1, 1992 + A2, 1993 + A3, 1995 + A4, 1996, modifiziert) Die CE-Kennzeichnung erfolgt gemäß EN 50178 bei Verwendung der in diesem Handbuch spezifizierten Netzfilter und dem Befolgen der entsprechenden Installationsanleitungen. Transport und Lagerung Die Anleitungen für Transport, Lagerung und richtige Handhabung müssen unter Beachtung der technischen Daten befolgt werden. Installation Installieren und wählen Sie Frequenzumrichter wie in der Dokumentation spezifiziert.

Die Kühlluft muss in der angegebenen Richtung strömen. Der Frequenzumrichter darf dementsprechend nur in der spezifizierten Position (z. B. aufrecht) betrieben werden. Halten Sie die angegebenen Freiräume ein.

Schützen Sie die Frequenzumrichter vor unzulässigen Lasten. Bauteile dürfen nicht verbogen werden. Isolationsabstände dürfen nicht geändert werden. Berühren Sie keine elektronischen Bauteile oder Kontakte, um Beschädigungen durch statische Elektrizität zu vermeiden. DE-3 Elektrischer Anschluss Führen Sie jegliche Arbeiten an unter Spannung stehenden Geräten gemäß der gültigen Sicherheits- und Unfallverhütungsvorschriften durch. Führen Sie die elektrische Installation in Übereinstimmung mit den geltenden Vorschriften durch. Insbesondere müssen Sie die Anweisungen zur Sicherstellung der elektromagnetischen Verträglichkeit (EMV), z. B. Abschirmung, Erdung, Filteranordnung und Verlegung von Kabeln, beachten. Das gilt auch für Geräte, die das CE-Zeichen tragen.

Es liegt in der Verantwortung des Herstellers von System oder Maschine, die Konformität mit den EMV-Richtlinien zu gewährleisten. Wenden Sie sich an Ihren Lieferanten oder die Omron Yaskawa Motion Control-Vertretung, wenn Fehlerstrom-Schutzschalter in Verbindung mit Frequenzumrichtern Verwendung finden. Für bestimmte Systeme kann es erforderlich sein, gemäß den gültigen Sicherheits- und Unfallverhütungsvorschriften zusätzliche Überwachungs- und Sicherheitseinrichtungen zu verwenden. An der Hardware des Frequenzumrichters dürfen keine Änderungen vorgenommen werden. Hinweis Die Frequenzumrichter Varispeed F7 sind gemäß CE, UL und cUL zertifiziert. Elektromagnetische Verträglichkeit Einführung Dieses Handbuch wurde erstellt, um Systemhersteller, die OMRON YASKAWA Motion Control (OYMC)-Frequenzumrichter verwenden, bei der Konstruktion und Installation von elektrischen Schaltgeräten zu unterstützen. Zudem werden die zur Einhaltung der EMV-Richtlinie erforderlichen Maßnahmen beschrieben. Die Anleitungen zur Installation und Verdrahtung in diesem Handbuch müssen deshalb befolgt werden. Unsere Produkte sind durch autorisierte Stellen unter Anwendung der nachstehend aufgelisteten Normen getestet. Produktnorm: EN 61800-3:1996 EN 61800-3; A11:2000 Maßnahmen zur Sicherstellung der Konformität von OYMC-Frequenzumrichtern mit der EMV-Richtlinie OYMC-Frequenzumrichter müssen nicht unbedingt in einem Schaltschrank eingebaut werden.

Detaillierte Anleitungen für alle möglichen Installationsarten können nicht gegeben werden. Dieses Handbuch muss daher auf allgemeine Leitlinien begrenzt bleiben. Alle elektrischen Geräte produzieren Funkstrahlungen und leitungsgeführte Strahlungen mit unterschiedlichen Frequenzen. Die Kabel leiten diese Strahlungen wie eine Antenne an die Umgebung weiter. Der Anschluss eines elektrischen Geräts (z.

B. Frequenzumrichter) ohne Netzfilter an ein Stromnetz kann deshalb bewirken, dass HF- oder NF-Strahlungen in das Stromnetz gelangen. Die grundlegenden Gegenmaßnahmen sind die räumliche Trennung der Kabel von Steuer- und Leistungskomponenten, ordnungsgemäße Erdung sowie die Abschirmung von Kabeln. Für eine Niedrigimpedanz-Erdung von HF-Strahlungen ist eine große Kontaktfläche erforderlich. Die Verwendung von Erdungsbindern anstelle von Kabeln wird ausdrücklich empfohlen.

Des Weiteren müssen Kabelabschirmungen mit entsprechenden Erdungsschellen verbunden werden. DE-4 Verlegen von Kabeln Maßnahmen gegen leitungsgebundene Strahlungen: Netzfilter und Frequenzumrichter müssen auf dieselbe Metallplatte montiert werden. Montieren Sie die beiden Bauteile so nah wie möglich nebeneinander, und halten Sie die Kabel so kurz wie möglich. Verwenden Sie ein Netzkabel mit guter geerdeter Abschirmung. Verwenden Sie ein abgeschirmtes Motorkabel. Ordnen Sie alle Erdungen so an, dass die Fläche des Kabelendes, die mit der Erdungsklemme in Kontakt ist (z. B. Metallplatte), möglichst groß ist. Abgeschirmtes Kabel: Verwenden Sie ein Kabel mit geflochtener Abschirmung. Erden Sie die größtmögliche Fläche der Abschirmung.

Es ist ratsam, die Abschirmung durch Verbinden des Kabels mit der Erdungsplatte durch Metallschellen (siehe nachfolgende Abbildung) zu erden. Erdungsschelle Erdungsplatte Abb 1 Erdung der Kabelabschirmung mit Metallschellen Die Erdungsflächen müssen aus hoch leitfähigem, blankem Metall bestehen. Entfernen Sie Lack- und Farbbeschichtungen. Erden Sie die Kabelabschirmungen an beiden Enden. Erden Sie den Motor an der Maschine. DE-5 Installation Mechanische Installation Auspacken des Frequenzumrichters überprüfen Sie nach dem Auspacken des Frequenzumrichters folgende Punkte. Eigenschaft Wurde das richtige Frequenzumrichtermodell geliefert? Ist der Frequenzumrichter irgendwie beschädigt? Sind Schrauben oder andere Bauteile lose? Vorgehensweise Prüfen Sie die Modellnummer auf dem Typenschild an der Seite des Frequenzumrichters. überprüfen Sie das gesamte Gehäuse des Frequenzumrichters auf Kratzer oder sonstige Transportschäden. Verwenden Sie einen Schraubendreher oder andere Werkzeuge, um alle Schrauben und Bauteile auf festen Sitz zu prüfen. Wenn Sie bei den oben genannten Punkten Unregelmäßigkeiten finden, teilen Sie dies sofort Ihrem Händler oder Ihrer Omron Yaskawa Motion Control-Vertretung mit.

Überprüfen Sie den Installationsort An Ober- und Unterseite der NEMA 1- und IP20-Frequenzumrichter sind Schutzabdeckungen angebracht. Achten Sie darauf, dass vor dem Betrieb eines Frequenzumrichters der 200- oder 400-V-Klasse mit einer Ausgangsleistung bis zu 18,5 kW in einen Schaltschrank die obere Schutzabdeckung entfernt wird. Beachten Sie bei der Installation des Frequenzumrichters die folgenden Sicherheitshinweise: Installieren Sie den Frequenzumrichter an einem sauberen Ort, der frei von Nebeln und Staub ist. Er kann in einem vollständig geschlossenen und staubdichten Schaltschrank installiert werden.



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