

Frequency Converters

Instruction Manual (UL)
R912004711

Edition 12



Record of Revision

Edition	Release Date	Notes
DOK-RCON01-REX*F*UL***-IN03-EN-P	2013/10	Added applicable range
DOK-RCON01-REX*F*UL***-IN04-EN-P	2014/03	Type code definition clarification
DOK-RCON01-REX*F*UL***-IN05-EN-P	2014/11	Added applicable range
DOK-RCON01-REX*F*UL***-IN06-EN-P	2016/03	Added applicable range
DOK-RCON01-REX*F*UL***-IN07-EN-P	2016/06	Amended the cable size data
DOK-RCON01-REX*F*UL***-IN08-EN-P	2017/01	Updated the type code and wiring diagram
DOK-RCON01-REX*F*UL***-IN09-EN-P	2017/06	Added applicable range
DOK-RCON01-REX*F*UL***-IN10-EN-P	2017/12	Added applicable range
DOK-RCON01-REX*F*UL***-IN11-EN-P	2019/04	Added applicable range
DOK-RCON01-REX*F*UL***-IN12-EN-P	2023/06	Added applicable range

Purpose of Documentation

This documentation provides information on the installation and operation of the described products, by persons trained and qualified to work with electrical installations.

For documentations available in other type or language, please consult your local sales partner or check the following websites:

Rexroth Frequency Converter EFC x610: www.boschrexroth.com/efcx610

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D Deutsch	USA English	F Français
<p>⚠️ WARNUNG Lebensgefahr bei Nichtbeachtung der nachstehenden Sicherheitshinweise!</p> <p>Nehmen Sie die Produkte erst dann in Betrieb, nachdem Sie die mit dem Produkt gelieferten Unterlagen und Sicherheitshinweise vollständig durchgelesen, verstanden und beachtet haben.</p> <p>Sollten Ihnen keine Unterlagen in Ihrer Landessprache vorliegen, wenden Sie sich an Ihren zuständigen Rexroth-Vertriebspartner.</p> <p>Nur qualifiziertes Personal darf an Antriebskomponenten arbeiten.</p> <p>Nähere Erläuterungen zu den Sicherheitshinweisen entnehmen Sie Kapitel 1 dieser Dokumentation.</p>	<p>⚠️ WARNING Danger to life in case of non-compliance with the below-mentioned safety instructions!</p> <p>Do not attempt to install or put these products into operation until you have completely read, understood and observed the documents supplied with the product.</p> <p>If no documents in your language were supplied, please consult your Rexroth sales partner.</p> <p>Only qualified persons may work with drive components.</p> <p>For detailed explanations on the safety instructions, see chapter 1 of this documentation.</p>	<p>⚠️ AVERTISSEMENT Danger de mort en cas de non-respect des consignes de sécurité figurant ci-après !</p> <p>Ne mettez les produits en service qu'après avoir lu complètement et après avoir compris et respecté les documents et les consignes de sécurité fournis avec le produit.</p> <p>Si vous ne disposez pas de la documentation dans votre langue, merci de consulter votre partenaire Rexroth.</p> <p>Seul un personnel qualifié est autorisé à travailler sur les composants d'entraînement.</p> <p>Vous trouverez des explications plus détaillées relatives aux consignes de sécurité au chapitre 1 de la présente documentation.</p>
<p>⚠️ WARNUNG Hohe elektrische Spannung! Lebensgefahr durch elektrischen Schlag!</p> <p>Betreiben Sie Antriebskomponenten nur mit fest installiertem Schutzleiter.</p> <p>Schalten Sie vor Zugriff auf Antriebskomponenten die Spannungsversorgung aus.</p> <p>Beachten Sie die Entladezeiten von Kondensatoren.</p>	<p>⚠️ WARNING High electrical voltage! Danger to life by electric shock!</p> <p>Only operate drive components with a permanently installed equipment grounding conductor.</p> <p>Disconnect the power supply before accessing drive components.</p> <p>Observe the discharge times of the capacitors.</p>	<p>⚠️ AVERTISSEMENT Tensions électriques élevées ! Danger de mort par électrocution !</p> <p>N'exploitez les composants d'entraînement que si un conducteur de protection est installé de manière permanente.</p> <p>Avant d'intervenir sur les composants d'entraînement, coupez toujours la tension d'alimentation.</p> <p>Tenez compte des délais de décharge de condensateurs.</p>
<p>⚠️ WARNUNG Gefahrbringende Bewegungen! Lebensgefahr!</p> <p>Halten Sie sich nicht im Bewegungsbereich von Maschinen und Maschinenteilen auf.</p> <p>Verhindern Sie den unbeabsichtigten Zutritt für Personen.</p> <p>Bringen Sie vor dem Zugriff oder Zutritt in den Gefahrenbereich die Antriebe sicher zum Stillstand.</p>	<p>⚠️ WARNING Dangerous movements! Danger to life!</p> <p>Keep free and clear of the ranges of motion of machines and moving machine parts.</p> <p>Prevent personnel from accidentally entering the range of motion of machines.</p> <p>Make sure that the drives are brought to safe standstill before accessing or entering the danger zone.</p>	<p>⚠️ AVERTISSEMENT Mouvements entraînant une situation dangereuse ! Danger de mort !</p> <p>Ne séjournez pas dans la zone de mouvement de machines et de composants de machines.</p> <p>Évitez tout accès accidentel de personnes.</p> <p>Avant toute intervention ou tout accès dans la zone de danger, assurez-vous de l'arrêt préalable de tous les entraînements.</p>

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<p>▲ WARNUNG Elektromagnetische / magnetische Felder! Gesundheitsgefahr für Personen mit Herzschrittmachern, metallischen Implantaten oder Hörgeräten!</p> <p>Zutritt zu Bereichen, in denen Antriebskomponenten montiert und betrieben werden, ist für o.g Personen untersagt bzw. nur nach Rücksprache mit einem Arzt erlaubt.</p>	<p>▲ WARNING Electromagnetic / magnetic fields! Health hazard for persons with heart pacemakers, metal implants or hearing aids!</p> <p>The above-mentioned persons are not allowed to enter areas in which drive components are mounted and operated, or rather are only allowed to do this after they consulted a doctor.</p>	<p>▲ AVERTISSEMENT Champs électromagnétiques / magnétiques ! Risque pour la santé des porteurs de stimulateurs cardiaques, d'implants métalliques et d'appareils auditifs !</p> <p>L'accès aux zones où sont montés et exploités les composants d'entraînement est interdit aux personnes susmentionnées ou bien ne leur est autorisé qu'après consultation d'un médecin.</p>
<p>▲ VORSICHT Heiße Oberflächen (> 60 °C)! Verbrennungsgefahr!</p> <p>Vermeiden Sie das Berühren von metallischen Oberflächen (z. B. Kühlkörpern). Abkühlzeit der Antriebsskomponenten einhalten (mind. 15 Minuten).</p>	<p>▲ CAUTION Hot surfaces (> 60 °C)! Risk of burns!</p> <p>Do not touch metallic surfaces (e.g. heat sinks). Comply with the time required for the drive components to cool down (at least 15 minutes).</p>	<p>▲ ATTENTION Surfaces chaudes (> 60 °C)! Risque de brûlure !</p> <p>Évitez de toucher des surfaces métalliques (p. ex. dissipateurs thermiques). Respectez le délai de refroidissement des composants d'entraînement (au moins 15 minutes).</p>
<p>▲ VORSICHT Unsachgemäße Handhabung bei Transport und Montage! Verletzungsgefahr!</p> <p>Verwenden Sie geeignete Montage- und Transporteinrichtungen.</p> <p>Benutzen Sie geeignetes Werkzeug und persönliche Schutzausrüstung.</p>	<p>▲ CAUTION Improper handling during transport and mounting! Risk of injury!</p> <p>Use suitable equipment for mounting and transport.</p> <p>Use suitable tools and personal protective equipment.</p>	<p>▲ ATTENTION Manipulation incorrecte lors du transport et du montage ! Risque de blessure !</p> <p>Utilisez des dispositifs de montage et de transport adéquats.</p> <p>Utilisez des outils appropriés et votre équipement de protection personnel.</p>

E Español	P Português	I Italiano
<p>⚠ ADVERTENCIA ¡Peligro de muerte en caso de no observar las siguientes indicaciones de seguridad!</p> <p>Los productos no se pueden poner en servicio hasta después de haber leído por completo, comprendido y tenido en cuenta la documentación y las advertencias de seguridad que se incluyen en la entrega.</p> <p>Si no dispusiera de documentación en el idioma de su país, diríjase a su distribuidor competente de Rexroth.</p> <p>Solo el personal debidamente cualificado puede trabajar en componentes de accionamiento.</p> <p>Encontrará más detalles sobre las indicaciones de seguridad en el capítulo 1 de esta documentación.</p>	<p>⚠ ATENÇÃO Perigo de vida em caso de inobservância das seguintes instruções de segurança!</p> <p>Utilize apenas os produtos depois de ter lido, compreendido e tomado em consideração a documentação e as instruções de segurança fornecidas juntamente com o produto.</p> <p>Se não tiver disponível a documentação na sua língua, dirija-se ao seu parceiro de venda responsável da Rexroth.</p> <p>Apenas pessoal qualificado pode trabalhar nos componentes de acionamento.</p> <p>Explicações mais detalhadas relativamente às instruções de segurança constam no capítulo 1 desta documentação.</p>	<p>⚠ AVVERTENZA Pericolo di morte in caso di inosservanza delle seguenti indicazioni di sicurezza!</p> <p>Mettere in funzione i prodotti solo dopo aver letto, compreso e osservato per intero la documentazione e le indicazioni di sicurezza fornite con il prodotto.</p> <p>Se non dovesse essere presente la documentazione nella vostra lingua, siete pregati di rivolgervi al rivenditore Rexroth competente.</p> <p>Solo personale qualificato può eseguire lavori sui componenti di comando.</p> <p>Per ulteriori spiegazioni riguardanti le indicazioni di sicurezza consultare il capitolo 1 di questa documentazione.</p>
<p>⚠ ADVERTENCIA ¡Alta tensión eléctrica! ¡Peligro de muerte por descarga eléctrica!</p> <p>Active sólo los componentes de accionamiento con el conductor protector firmemente instalado.</p> <p>Desconecte la alimentación eléctrica antes de manipular los componentes de accionamiento.</p> <p>Tenga en cuenta los tiempos de descarga de los condensadores.</p>	<p>⚠ ATENÇÃO Alta tensão elétrica! Perigo de vida devido a choque elétrico!</p> <p>Opere componentes de accionamento apenas com condutores de proteção instalados.</p> <p>Desligue a alimentação de tensão antes de aceder aos componentes de accionamento.</p> <p>Respeite os períodos de descarga dos condensadores.</p>	<p>⚠ AVVERTENZA Alta tensione elettrica! Pericolo di morte in seguito a scosse elettriche!</p> <p>Mettere in esercizio i componenti di comando solo con conduttore di messa a terra ben installato.</p> <p>Staccare l'alimentazione prima di intervenire sui componenti di comando.</p> <p>Osservare i tempi di scarica del condensatore.</p>
<p>⚠ ADVERTENCIA ¡Movimientos peligrosos! ¡Peligro de muerte!</p> <p>No permanezca en la zona de movimiento de las máquinas ni de sus piezas.</p> <p>Impida el acceso accidental de personas.</p> <p>Antes de acceder o introducir las manos en la zona de peligro, los accionamientos se tienen que haber parado con seguridad.</p>	<p>⚠ ATENÇÃO Movimentos perigosos! Perigo de vida!</p> <p>Não permaneça na área de movimentação das máquinas e das peças das máquinas.</p> <p>Evite o acesso involuntário para pessoas.</p> <p>Antes de entrar ou aceder à área perigosa, imobilize os accionamentos de forma segura.</p>	<p>⚠ AVVERTENZA Movimenti pericolosi! Pericolo di morte!</p> <p>Non sostare nelle zone di manovra delle macchine e delle loro parti.</p> <p>Impedire un accesso non autorizzato per le persone.</p> <p>Prima di accedere alla zona di pericolo, arrestare e bloccare gli azionamenti.</p>

E Español	P Português	I Italiano
<p>⚠ ADVERTENCIA ¡Campos electromagnéticos/magnéticos! ¡Peligro para la salud de las personas con marcapasos, implantes metálicos o audífonos!</p> <p>El acceso de las personas arriba mencionadas a las zonas de montaje o funcionamiento de los componentes de accionamiento está prohibido, salvo que lo autorice previamente un médico.</p>	<p>⚠ ATENÇÃO Campos eletromagnéticos / magnéticos! Perigo de saúde para pessoas com marcapassos, implantes metálicos ou aparelhos auditivos!</p> <p>Acesso às áreas, nas quais os componentes de acionamento são montados e operados, é proibido para as pessoas em cima mencionadas ou apenas após permissão de um médico.</p>	<p>⚠ AVVERTENZA Campi elettromagnetici / magnetici! Pericolo per la salute delle persone portatrici di pacemaker, protesi metalliche o apparecchi acustici!</p> <p>L'accesso alle zone in cui sono installati o in funzione componenti di comando è vietato per le persone sopra citate o consentito solo dopo un colloquio con il medico.</p>
<p>⚠ ATENCIÓN ¡Superficies calientes (> 60 °C)! ¡Peligro de quemaduras!</p> <p>Evite el contacto con las superficies calientes (p. ej., disipadores de calor). Observe el tiempo de enfriamiento de los componentes de accionamiento (mín. 15 minutos).</p>	<p>⚠ CUIDADO Superfícies quentes (> 60 °C)! Perigo de queimaduras!</p> <p>Evite tocar superficies metálicas (p. ex. radiadores). Respeite o tempo de arrefecimento dos componentes de accionamiento (mín. 15 minutos).</p>	<p>⚠ ATTENZIONE Superfici bollenti (> 60 °C)! Pericolo di ustioni!</p> <p>Evitare il contatto con superfici metalliche (ad es. dissipatori di calore). Rispettare i tempi di raffreddamento dei componenti di comando (almeno 15 minuti).</p>
<p>⚠ ATENCIÓN ¡Manipulación inadecuada en el transporte y montaje! ¡Peligro de lesiones!</p> <p>Utilice dispositivos de montaje y de transporte adecuados.</p> <p>Utilice herramientas adecuadas y equipo de protección personal.</p>	<p>⚠ CUIDADO Manejo incorreto no transporte e montagem! Perigo de ferimentos!</p> <p>Utilize dispositivos de montagem e de transporte adequados.</p> <p>Utilize ferramentas e equipamento de proteção individual adequados.</p>	<p>⚠ ATTENZIONE Manipolazione inappropriata durante il trasporto e il montaggio! Pericolo di lesioni!</p> <p>Utilizzare dispositivi di montaggio e trasporto adatti.</p> <p>Utilizzare attrezzi adatti ed equipaggiamento di protezione personale.</p>

S Svenska	DK Dansk	NL Nederlands
<p>⚠️ VARNING Livsfara om följande säkerhetsanvisningar inte följs!</p> <p>Använd inte produkterna innan du har läst och förstått den dokumentation och de säkerhetsanvisningar som medföljer produkten, och följ alla anvisningar.</p> <p>Kontakta din Rexroth-återförsäljare om dokumentationen inte medföljer på ditt språk.</p> <p>Endast kvalificerad personal får arbeta med drivkomponenterna.</p> <p>Se kapitel 1 i denna dokumentation för närmare beskrivningar av säkerhetsanvisningarna.</p>	<p>⚠️ ADVARSEL Livsfare ved manglende overholdelse af nedenstående sikkerhedsanvisninger!</p> <p>Tag ikke produktet i brug, før du har læst og forstået den dokumentation og de sikkerhedsanvisninger, som følger med produktet, og overhold de givne anvisninger.</p> <p>Kontakt din Rexroth-forhandler, hvis dokumentationen ikke medfølger på dit sprog.</p> <p>Det er kun kvalificeret personale, der må arbejde på drive components.</p> <p>Nærmere forklaringer til sikkerhedsanvisningerne fremgår af kapitel 1 i denne dokumentation.</p>	<p>⚠️ WAARSCHUWING Levensgevaar bij niet-naleving van onderstaande veiligheidsinstructies!</p> <p>Stel de producten pas in bedrijf nadat u de met het product geleverde documenten en de veiligheidsinformatie volledig gelezen, begrepen en in acht genomen heeft.</p> <p>Mocht u niet beschikken over documenten in uw landstaal, kunt u contact opnemen met uw plaatselijke Rexroth distributiepartner.</p> <p>Uitsluitend gekwalificeerd personeel mag aan de aandrijvingscomponenten werken.</p> <p>Meer informatie over de veiligheidsinstructies vindt u in hoofdstuk 1 van deze documentatie.</p>
<p>⚠️ VARNING Hög elektrisk spänning! Livsfara genom elchock!</p> <p>Använd endast drivkomponenterna med fastmonterad skyddsledare.</p> <p>Koppla bort spänningsförsörjningen före arbete på drivkomponenter.</p> <p>Var medveten om kondensatorernas urladdningstid.</p>	<p>⚠️ ADVARSEL Elektrisk højspænding! Livsfare på grund af elektrisk stød!</p> <p>Drive components må kun benyttes med et fast installeret jordstik.</p> <p>Sørg for at koble spændingsforsyningen fra, inden du rører ved drive components.</p> <p>Overhold kondensatorernes afladningstider.</p>	<p>⚠️ WAARSCHUWING Hoge elektrische spanning! Levensgevaar door elektrische schok!</p> <p>Bedien de aandrijvingscomponenten uitsluitend met vast geïnstalleerde aardleiding.</p> <p>Schakel voor toegang tot aandrijvingscomponenten de spanningsvoorziening uit.</p> <p>Neem de ontladtidjen van condensatoren in acht.</p>
<p>⚠️ VARNING Farliga rörelser! Livsfara!</p> <p>Uppehåll dig inte inom maskiners och maskindelar rörelseområde.</p> <p>Förhindra att obehöriga personer får tillträde.</p> <p>Innan du börjar arbeta eller vistas inom drivsystemets riskområde måste maskinen vara stillastående.</p>	<p>⚠️ ADVARSEL Farlige bevægels-er! Livsfare!</p> <p>Du må ikke opholde dig inden for maskiners og maskindeles bevægelsesradius.</p> <p>Sørg for, at ingen personer kan få utilsigtet adgang.</p> <p>Standts drevene helt, inden du rører ved drevene eller træder ind i deres fareområde.</p>	<p>⚠️ WAARSCHUWING Risicovolle bewegingen! Levensgevaar!</p> <p>Houdt u niet op in het bewegingsbereik van machines en machineonderdelen.</p> <p>Voorkom dat personen onbedoeld toegang verkrijgen.</p> <p>Voor toegang tot de gevaarlijke zone moeten de aandrijvingen veilig tot stilstand gebracht zijn.</p>

S Svenska	DK Dansk	NL Nederlands
<p>⚠ VARNING Elektromagnetiska/magnetiska fält! Hälsofara för personer med pacemaker, implantat av metall eller hörapparat!</p> <p>Det är förbjudet för ovan nämnda personer (eller kräver överläggning med läkare) att beträda områden där drivkomponenter är monterade och i drift.</p>	<p>⚠ ADVARSEL Elektromagnetiske/magnetiske felter! Sundhedsfare for personer med pacemakere, metalliske implantater eller høreapparater!</p> <p>For disse personer er der adgang forbudt eller kun adgang med tilladelse fra læge til de områder, hvor drive components monteres og drives.</p>	<p>⚠ WAARSCHUWING Elektromagnetische / magnetische velden! Gevaar voor de gezondheid van personen met pacemakers, metalen implantaten of hoorapparaten!</p> <p>Toegang tot gebieden, waarin aandrijvingscomponenten worden gemonteerd en bediend, is verboden voor voornoemde personen of uitsluitend toegestaan na overleg met een arts.</p>
<p>⚠ OBSERVERA Varma ytor (> 60 °C)! Risk för brännskador!</p> <p>Undvik att vidröra metallytor (t.ex. kylelement). Var medveten om att det tar tid för drivkomponenterna att svalna (minst 15 minuter).</p>	<p>⚠ FORSIGTIG Varme overflader (> 60 °C)! Risiko for forbrændinger!</p> <p>Undgå at berøre metaloverflader (f.eks. køleelementer). Overhold drive components nedkølingstid (min. 15 min.).</p>	<p>⚠ VOORZICHTIG Hete oppervlakken (> 60 °C)! Verbrandingsgevaar!</p> <p>Voorkom contact met metalen oppervlakken (bijv. Koellichamen). Afkoeltijd van de aandrijvingscomponenten in acht nemen (min. 15 minuten).</p>
<p>⚠ OBSERVERA Felaktig hantering vid transport och montering! Skaderisk!</p> <p>Använd passande monterings- och transportanordningar.</p> <p>Använd lämpliga verktyg och personlig skyddsutrustning.</p>	<p>⚠ FORSIGTIG Fejlhåndtering ved transport og montering! Risiko for kvæstelser!</p> <p>Benyt egnede monterings- og transportanordninger.</p> <p>Benyt egnet værktøj og personlig sikkerhedsudstyr.</p>	<p>⚠ VOORZICHTIG Onjuist gebruik bij transport en montage! Letselgevaar!</p> <p>Gebruik geschikte montage- en transportinrichtingen.</p> <p>Gebruik geschikt gereedschap en een persoonlijke veiligheidsuitrusting.</p>

FIN Suomi	PL Polski	CZ Český
<p>VAROITUS Näiden turvaohjeiden noudattamatta jättämisestä on seurauksena hengenvaara!</p> <p>Ota tuote käyttöön vasta sen jälkeen, kun olet lukenut läpi tuotteen mukana toimitetut asiakirjat ja turvallisuu-sohjeet, ymmärtänyt ne ja ottanut ne huomioon.</p> <p>Jos asiakirjoja ei ole saatavana omalla äidinkielelläsi, ota yhteys asianomaiseen Rexrothin myyntiedustajaan.</p> <p>Käyttölaitteiden komponenttien parissa saa työskennellä ainoastaan valtuutettu henkilöstö.</p> <p>Lisätietoa turvaohjeista löydät tämän dokumentaation luvusta 1.</p>	<p>OSTRZEŻENIE Zagrożenie życia w razie nieprzestrzegania poniższych wskazówek bezpieczeństwa!</p> <p>Nie uruchamiać produktów przed uprzednim przeczytaniem i pełnym zrozumieniem wszystkich dokumentów dostarczonych wraz z produktem oraz wskazówek bezpieczeństwa. Należy przestrzegać wszystkich zawartych tam zaleceń.</p> <p>W przypadku braku dokumentów w Państwa języku, prosimy o skontaktowanie się z lokalnym partnerem handlowym Rexroth.</p> <p>Przy zespołach napędowych może pracować wyłącznie wykwalifikowany personel.</p> <p>Blizsze objaśnienia wskazówek bezpieczeństwa znajdują się w Rozdziale 1 niniejszej dokumentacji.</p>	<p>VAROVÁNÍ Nebezpečí života v případě nedodržení níže uvedených bezpečnostních pokynů!</p> <p>Před uvedením výrobků do provozu si přečtěte kompletní dokumentaci a bezpečnostní pokyny dodávané s výrobkem, pochopte je a dodržujte.</p> <p>Nemáte-li k dispozici podklady ve svém jazyce, obraťte se na příslušného obchodního partnera Rexroth.</p> <p>Na komponentách pohonu smí pracovat pouze kvalifikovaný personál.</p> <p>Podrobnější vysvětlení k bezpečnostním pokynům naleznete v kapitole 1 této dokumentace.</p>
<p>VAROITUS Voimakas sähköjännite! Sähköiskun aiheuttama hengenvaara!</p> <p>Käytä käyttölaitteen komponentteja ainoastaan maadoitusjohtimen ollessa kiinteästi asennettuna.</p> <p>Katkaise jännitteensyöttö ennen käyttölaitteen komponenteille suoritettavien töiden aloittamista.</p> <p>Huomioi kondensaattoreiden purkautumisen.</p>	<p>OSTRZEŻENIE Wysokie napięcie elektryczne! Zagrożenie życia w wyniku porażenia prądem!</p> <p>Zespoły napędu mogą być eksploatowane wyłącznie z zainstalowanym na stałe przewodem ochronnym.</p> <p>Przed uzyskaniem dostępu do podzespołów napędu należy odłączyć zasilanie elektryczne.</p> <p>Zwracaj uwagę na czas rozładowania kondensatorów.</p>	<p>VAROVÁNÍ Vysoké elektrické napětí! Nebezpečí života při zasažení elektrickým proudem!</p> <p>Komponenty pohonu smí být v provozu pouze s pevně nainstalovaným ochranným vodičem.</p> <p>Než začnete zasahovat do komponent pohonu, odpojte je od elektrického napájení.</p> <p>Dodržujte vybíjecí časy kondenzátorů.</p>
<p>VAROITUS Vaarallisia liikkeitä! Hengenvaara!</p> <p>Älä oleskele koneiden tai koneenosien liikealueella.</p> <p>Pidä huolta siitä, ettei muita henkilöitä pääse alueelle vahingossa.</p> <p>Pysäytä käyttölaitteet varmasti ennen vaara-alueelle koskemista tai menemistä.</p>	<p>OSTRZEŻENIE Niebezpieczne ruchy! Zagrożenie życia!</p> <p>Nie wolno przebywać w obszarze pracy maszyny i jej elementów.</p> <p>Nie dopuszczaj osób niepowołanych do obszaru pracy maszyny.</p> <p>Przed dotknięciem urządzenia/maszyny lub zbliżeniem się do obszaru zagrożenia należy zgodnie z zasadami bezpieczeństwa wyłączyć napędy.</p>	<p>VAROVÁNÍ Nebezpečné pohyby! Nebezpečí života!</p> <p>Nezdružujte se v dosahu pohybu strojů a jejich součástí.</p> <p>Zabraňte náhodnému přístupu osob.</p> <p>Před zásahem nebo vstupem do nebezpečného prostoru bezpečně zastavte pohony.</p>

FIN Suomi	PL Polski	CZ Český
<p>▲VAROITUS Sähkömagneettisia/magneettisia kenttiä! Terveystieteiden haittojen vaara henkilöille, joilla on sydämentahdistin, metallinen implantti tai kuulolaite!</p> <p>Yllä mainituilta henkilöiltä on pääsy kielletty alueille, joilla asennetaan tai käytetään käyttölaitteen komponentteja, tai heidän on ensin saatava tähän suostumus lääkäriltään.</p>	<p>▲OSTRZEŻENIE Pola elektromagnetyczne / magnetyczne! Zagrożenie zdrowia dla osób z rozrusznikiem serca, metalowymi implantami lub aparatami słuchowymi!</p> <p>Wstęp na teren, gdzie odbywa się montaż i eksploatacja napędów jest dla ww. osób zabroniony względnie dozwolony po konsultacji z lekarzem.</p>	<p>▲VAROVÁNÍ Elektromagnetická/magnetická pole! Nebezpečí pro zdraví osob s kardiostimulátory, kovovými implantáty nebo naslouchadly!</p> <p>Výše uvedené osoby mají zakázán přístup do prostorů, kde jsou montovány a používány komponenty pohonu, resp. ho mají povolen pouze po poradě s lékařem.</p>
<p>▲HUOMIO Kuumia pintoja (> 60 °C)! Palovammojen vaara!</p> <p>Vältä metallipintojen koskettamista (esim. jäähdytyslevyt). Noudata käyttölaitteen komponenttien jäähtymisaikoja (väh. 15 minuuttia).</p>	<p>▲PRZESTROGA Gorące powierzchnie (> 60 °C)! Niebezpieczeństwo poparzenia!</p> <p>Unikać kontaktu z powierzchniami metalowymi (np. radiatorami). Przestrzegać czasów schładzania podzespołów napędów (min. 15 minut).</p>	<p>▲UPOZORNĚNÍ Horké povrchy (> 60 °C)! Nebezpečí popálení!</p> <p>Nedotýkejte se kovových povrchů (např. chladicích těles). Dodržujte dobu ochlazení komponent pohonu (min. 15 minut).</p>
<p>▲HUOMIO Epäasianmukainen käsittely kuljetuksen ja asennuksen yhteydessä! Loukkaantumisaara!</p> <p>Käytä soveltuvia asennus- ja kuljetuslaitteita.</p> <p>Käytä omia työkaluja ja henkilökohtaisia suojavarusteita.</p>	<p>▲PRZESTROGA Niewłaściwe obchodzenie się podczas transportu i montażu! Ryzyko urazu!</p> <p>Stosować odpowiednie urządzenia montażowe i transportowe.</p> <p>Stosować odpowiednie narzędzia i środki ochrony osobistej.</p>	<p>▲UPOZORNĚNÍ Nesprávné zacházení při přepravě a montáži! Nebezpečí zranění!</p> <p>Používejte vhodná montážní a dopravní zařízení.</p> <p>Používejte vhodné nářadí a osobní ochranné vybavení.</p>

SLO Slovensko	SK Slovenčina	RO Română
<p>⚠ OPOZORILO Življenjska nevarnost pri neupoštevanju naslednjih napotkov za varnost!</p> <p>Izdelke začnite uporabljati šele, ko v celoti preberete, razumete in upoštevate izdelkom priloženo dokumentacijo in varnostne napotke.</p> <p>Če priložena dokumentacija ni na voljo v vašem maternem jeziku, se obrnite na pristojnega distributerja Rexroth.</p> <p>Samo kvalificirano osebje sme delati na pogonskih komponentah.</p> <p>Podrobnejša pojasnila o varnostnih navodilih najdete v poglavju 1 v tej dokumentaciji.</p>	<p>⚠ VAROVANIE Nebezpečnostvo ohrozenia života pri nedodržívaní nasledujúcich bezpečnostných pokynov!</p> <p>Výrobky uvádzajte do prevádzky až potom, čo ste úplne prečítali, pochopili a zobrali do úvahy podklady a bezpečnostné pokyny dodané s výrobkom.</p> <p>Ak by ste nemali k dispozícii žiadne podklady v jazyku svojej krajiny, obráťte sa prosím na svojho príslušného predajcu Rexroth.</p> <p>Na komponentoch pohonu smie pracovať iba kvalifikovaný personál.</p> <p>Bližšie vysvetlenia k bezpečnostným pokynom zistíte z kapitoly 1 tejto dokumentácie.</p>	<p>⚠ AVERTIZARE Pericol de moarte în cazul nerespectării următoarelor instrucțiuni de siguranță!</p> <p>Punerea în funcțiune a produselor trebuie efectuată după citirea, înțelegerea și respectarea documentelor și instrucțiunilor de siguranță, care sunt livrate împreună cu produsele.</p> <p>În cazul în care documentele nu sunt în limba dumneavoastră maternă, vă rugăm să contactați partenerul de vânzări Rexroth.</p> <p>Numai un personal calificat poate lucra cu componentele de acționare.</p> <p>Explicații detaliate privind instrucțiunile de siguranță găsiți în capitolul 1 al acestei documentații.</p>
<p>⚠ OPOZORILO Visoka električna napetost! Življenjska nevarnost zaradi električnega udara!</p> <p>Pogonske komponente uporabljajte samo s fiksno nameščenim zaščitnim vodnikom.</p> <p>Pred dostopom do pogonske komponente odklopite napajanje.</p> <p>Upoštevajte čase praznjenja kondenzatorjev.</p>	<p>⚠ VAROVANIE Vysoké elektrické napätie! Nebezpečnostvo ohrozenia života v dôsledku zásahu elektrickým prúdom!</p> <p>Komponenty pohonu prevádzkujte iba s pevne nainštalovaným ochranným vodičom.</p> <p>Pred prístupom na komponenty pohonu odpojte zdroj napätia.</p> <p>Rešpektujte časy vybitia kondenzátorov.</p>	<p>⚠ AVERTIZARE Tensiune electrică înaltă! Pericol de moarte prin electrocutare!</p> <p>Exploatați componentele de acționare numai cu împământarea instalată permanent.</p> <p>Înainte de intervenția asupra componentelor de acționare, deconectați alimentarea cu tensiune electrică.</p> <p>Țineți cont de timpii de descărcare ai condensatorilor.</p>
<p>⚠ OPOZORILO Nevarni premiki! Življenjska nevarnost!</p> <p>Ne zadržujte se v območju delovanja strojev.</p> <p>Preprečite nenadzorovan dostop oseb.</p> <p>Pred prijemom ali dostopom v nevarno območje varno zaustavite vse gnane dele.</p>	<p>⚠ VAROVANIE Pohyby prinášajúce nebezpečnostvo! Nebezpečnostvo ohrozenia života!</p> <p>Nezdržíavajte sa v oblasti pohybu strojov a častí strojov.</p> <p>Zabráňte nepovolanému prístupu osôb.</p> <p>Pred zásahom alebo prístupom do nebezpečnej oblasti uved'te pohony bezpečne do zastavenia.</p>	<p>⚠ AVERTIZARE Mișcări periculoase! Pericol de moarte!</p> <p>Nu staționați în zona de mișcare a mașinilor și a componentelor în mișcare a mașinilor.</p> <p>Împiedicați accesul neintenționat al persoanelor în zona de lucru a mașinilor.</p> <p>Înainte de intervenția sau accesul în zona periculoasă, opriți în siguranță componentele de acționare.</p>

(SLO) Slovensko	(SK) Slovenčina	(RO) Română
<p>⚠ OPOZORILO Elektromagnetna / magnetna polja! Nevarnost za zdravje za osebe s spodbujevalniki srca, kovinskimi vsadki ali slušnimi aparati!</p> <p>Dostop do območij, v katerih so nameščene delujoče pogonske komponente, je za zgoraj navedene osebe prepovedan oz. dovoljen samo po posvetu z zdravnikom.</p>	<p>⚠ VAROVANIE Elektromagnetické/magnetické polia! Nebezpečenstvo pre zdravie osôb s kardiostimulátormi, kovovými implantátmi alebo načúvacími prístrojmi!</p> <p>Prístup k oblastiam, v ktorých sú namontované a prevádzkujú sa komponenty pohonu, je pre hore uvedené osoby zakázaný resp. je dovolený iba po konzultácii s lekárom.</p>	<p>⚠ AVERTIZARE Câmpuri electromagnetice / magnetice! Pericol pentru sănătatea persoanelor cu stimulatoare cardiace, implanturi metalice sau aparate auditive!</p> <p>Intrarea în zone, în care se montează sau se exploatează componente de acționare, este interzisă pentru persoanele sus numite respectiv este permisă numai cu acordul medicului.</p>
<p>⚠ POZOR Vroče površine (> 60 °C)! Nevarnost opeklin!</p> <p>Izogibajte se stiku s kovinskimi površinami (npr. hladilnimi telesi). Upoštevajte čas hlajenja pogonskih komponent (najm. 15 minut).</p>	<p>⚠ UPOZORNENIE Horúce povrchy (> 60 °C)! Nebezpečenstvo popálenia!</p> <p>Zabráňte kontaktu s kovovými povrchmi (napr. chladiacimi telesami). Dodržiavajte čas vychladenia komponentov pohonu (min. 15 minút).</p>	<p>⚠ ATENȚIE Suprafețe fierbinți (> 60 °C)! Pericol de arsuri!</p> <p>Nu atingeți suprafețele metalice (de ex. radiatoare de răcire). Respectați timpii de răcire ai componentelor de acționare (min. 15 minute).</p>
<p>⚠ POZOR Nestrokovno ravnanje med transportom in namestitvijo! Nevarnost poškodb!</p> <p>Uporablajte ustrezne pripomočke za nameščanje in transport.</p> <p>Uporabite ustrezno orodje in osebno zaščitno opremo.</p>	<p>⚠ UPOZORNENIE Neodborná manipulácia pri transporte a montáži! Nebezpečenstvo poranenia!</p> <p>Používajte vhodné montážne a transportné zariadenia.</p> <p>Používajte vhodné náradie a osobné ochranné prostriedky.</p>	<p>⚠ ATENȚIE Manipulare necorespunzătoare la transport și montaj! Pericol de vătămare!</p> <p>Utilizați dispozitive adecvate de montaj și transport.</p> <p>Folosiți instrumente corespunzătoare și echipament personal de protecție.</p>

H Magyar	BG Български	LV Latviski
<p>▲ FIGYELMEZTETÉS! Az alábbi biztonsági útmutatások figyelmen kívül hagyása életveszélyes helyeztethez vezethet!</p> <p>Üzembe helyezés előtt olvassa el, értelmezze, és vegye figyelembe a csomagban található dokumentumban foglaltakat és a biztonsági útmutatásokat.</p> <p>Amennyiben a csomagban nem talál az Ön nyelvén írt dokumentumokat, vegye fel a kapcsolatot az illetékes Rexroth-képviselővel.</p> <p>A hajtás alkatrészein kizárólag képzett személy dolgozhat.</p> <p>A biztonsági útmutatókkal kapcsolatban további magyarázatot ennek a dokumentumnak az első fejezetében találhat.</p>	<p>▲ ПРЕДУПРЕЖДЕНИЕ Опасност за живота при неспазване на посочените по-долу инструкции за безопасност!</p> <p>Използвайте продуктите след като сте се запознали подробно с приложената към продукта документация и указания за безопасност, разбрали сте ги и сте се съобразили с тях.</p> <p>Ако текстът не е написан на Вашия език, моля обърнете се към Вашия компетентен търговски представител на Rexroth.</p> <p>Със задвижващите компоненти трябва да работи само квалифициран персонал.</p> <p>Подробни пояснения към инструкциите за безопасност можете да видите в Глава 1 на тази документация.</p>	<p>▲ BRĪDINĀJUMS Turpinājumā doto drošības norādījumu neievērošana var apdraudēt dzīvību!</p> <p>Sāciet lietot izstrādājumu tikai pēc tam, kad esat pilnībā izlasījuši, sapraţuši un ņēmuši vērā kopā ar izstrādājumu piegādātos dokumentus.</p> <p>Ja dokumenti nav pieejami Jūsu valsts valodā, vērsieties pie pilnvarotā Rexroth izplatītāja.</p> <p>Darbus pie piedziņas komponentiem drikst veikt tikai kvalificēts personāls.</p> <p>Detalizētus paskaidrojumus attiecībā uz drošības norādījumiem skatiet šī dokumenta 1. nodaļā.</p>
<p>▲ FIGYELMEZTETÉS! Magas elektromos feszültség! Életveszély áramütés miatt!</p> <p>A hajtás alkatrészeit csak véglegesen telepített védővezetővel üzemeltesse!</p> <p>Mielőtt hozzányúl a hajtás alkatrészeihez, kapcsolja ki az áramellátást.</p> <p>Ügyeljen a kondenzátorok kisülési idejére!</p>	<p>▲ ПРЕДУПРЕЖДЕНИЕ Високо електрическо напрежение! Опасност за живота от удар от електрически ток!</p> <p>Работете със задвижващите компоненти само при здраво закрепен заземяващ проводник.</p> <p>Преди работа по задвижващите компоненти, изключете захранващото напрежение.</p> <p>Обърнете внимание на времето за разреждане на кондензаторите.</p>	<p>▲ BRĪDINĀJUMS Augsts elektriskais spriegums! Dzīvības apdraudējums elektriskā trieciena dēļ!</p> <p>Piedziņas komponentus darbiniet tikai ar fiksēti uzstādītu zemējumvadu.</p> <p>Pirms darba pie piedziņas komponentiem atslēdziet elektroapgādi.</p> <p>Nemiet vērā kondensatoru izlādes laikus.</p>
<p>▲ FIGYELMEZTETÉS! Veszélyes mozgás! Életveszély!</p> <p>Ne tartózkodjon a gépek és a gépalkatrészek mozgási területén belül!</p> <p>Illetéktelen személyeket ne engedjen a gép közelébe!</p> <p>Mielőtt beavatkozik, vagy a veszélyes zónába belép a hajtásokat biztonságosan állítsa le.</p>	<p>▲ ПРЕДУПРЕЖДЕНИЕ Опасни движения! Опасност за живота!</p> <p>Не стойте в обсега на движение на машините и частите на машините.</p> <p>Не допускайте непреднамерен достъп на хора.</p> <p>Преди работа или влизане в опасната зона, спрете надеждно приводния механизъм.</p>	<p>▲ BRĪDINĀJUMS Bīstamas kustības! Dzīvības apdraudējums!</p> <p>Neuzturieties mašīnu un mašīnas detaļu kustību zonā.</p> <p>Novērsiet nepiederošu personu piekļūšanu.</p> <p>Pirms darba bīstamajās zonās pilnībā apstādiniet piedziņu.</p>

H Magyar	BG Български	LV Latviski
<p>▲ FIGYELMEZTETÉS! Elektromágneses / mágneses mező! Káros hatással lehet a szívritmus-szabályozó készülékkel, fémbeültetéssel vagy hallókészülékkel rendelkezők egészségére!</p> <p>Azokra a területekre, ahol hajtások alkatrészeit szerelik és üzemeltetik, a fent említett személyeknek tilos a belépés, illetve csak orvosi konzultációt követően szabad az adott területekre lépniük.</p>	<p>▲ ПРЕДУПРЕЖДЕНИЕ Електромагнитни / магнитни полета! Опасност за здравето на хора със сърдечни стимулатори, метални импланти или слухови апарати!</p> <p>Достъпът за гореспоменатите лица до зони, в които ще се монтират и ще работят задвижващи компоненти се забранява, или разрешава само след консултация с лекар.</p>	<p>▲ BRĪDINĀJUMS Elektromagnētiskais / magnētiskais lauks! Veselības apdraudējums personām ar sirds stimulatoriem, metāliskiem implantiem vai dzirdes aparātiem!</p> <p>Tuvošanās zonām, kurās tiek montēti un darbināti piedziņas komponenti, iepriekš minētajām personām ir aizliegta, respektīvi, atļauta tikai pēc konsultēšanās ar ārstu.</p>
<p>▲ VIGYÁZAT! Forró felületek (> 60 °C)! Égésveszély!</p> <p>Ne érjen hozzá fémfelületekhez (pl. hűtőtestekhez)! Vegye figyelembe a hajtás alkatrészeinek kihűlési idejét (min. 15 perc)!</p>	<p>▲ ВНИМАНИЕ Горещи повърхности (> 60 °C)! Опасност от изгаряне!</p> <p>Не докосвайте метални повърхности (например радиатори). Съблюдавайте времето на охлаждане на задвижващите компоненти (мин. 15 минути).</p>	<p>▲ UZMANĪBU Karstas virsmas (> 60 °C)! Apdedzināšanās risks!</p> <p>Neskarieties pie metāliskām virsmām (piemēram, dzesētāja). Ļaujiet piedziņas komponentiem atdzist (min. 15 minūtes).</p>
<p>▲ VIGYÁZAT! Szakszerűtlen kezelés szállításkor és szereléskor! Sérülésveszély!</p> <p>A megfelelő beszerelési és szállítási eljárásokat alkalmazza!</p> <p>Használjon megfelelő szerszámokat és személyes védőfelszerelést!</p>	<p>▲ ВНИМАНИЕ Неправилно боравене по време на транспорт и монтаж! Опасност от нараняване!</p> <p>Използвайте подходящо монтажно и транспортно оборудване.</p> <p>Използвайте подходящи инструменти и лични предпазни средства.</p>	<p>▲ UZMANĪBU Nepareizi veikta transportēšana un montāža! Traumu gūšanas risks!</p> <p>Izmantojiet piemērotas montāžas un transportēšanas ierīces.</p> <p>Izmantojiet piemērotus instrumentus un individuālos aizsardzības līdzekļus.</p>

LT Lietuviškai	EST Eesti	GR Ελληνικά
<p>▲ ISPĖJIMAS Pavojus gyvybei nesilaikant toliau pateikiamų saugumo nurodymų!</p> <p>Naudokite gaminį tik kruopščiai perskaitę prie jo pridėtus aprašus, saugumo nurodymus. Susipažinkite su jais ir vadovaukitės naudodami gaminį.</p> <p>Jei Jūs negavote aprašo gimtąja kalba, kreipkitės į įgaliotus Rexroth atstovus.</p> <p>Prie pavaros komponentų leidžiama dirbti tik kvalifikuotam personalui.</p> <p>Išsamesnius saugumo nurodymų paaiškinimus rasite šios dokumentacijos 1 skyriuje.</p>	<p>▲ HOIATUS Alljärgnevate ohutusjuhiste eiramine on eluootlik!</p> <p>Võtke tooted kaiku alles siis, kui olete toodetega kaasasolevad materjalid ning ohutusjuhised täielikult läbi lugenud, neist aru saanud ja neid järginud.</p> <p>Kui Teil puuduvad emakeelsed materjalid, siis pöörduge Rexrothi kohaliku müügiesinduse poole.</p> <p>Ajamikomponentidega tohib töötada üksnes kvalifitseeritud personal.</p> <p>Täpsemaid selgitusi ohutusjuhiste kohta leiate käesoleva dokumentatsiooni peatükist 1.</p>	<p>▲ ΠΡΟΕΙΔΟΠΟΙΗΣΗ Κίνδυνος θανάτου σε περίπτωση μη συμμόρφωσης με τις παρακάτω οδηγίες ασφαλείας!</p> <p>Θέστε το προϊόν σε λειτουργία αφού διαβάσετε, κατανοήσετε και λάβετε υπόψη το σύνολο των οδηγιών ασφαλείας που το συνοδεύουν.</p> <p>Εάν δεν υπάρχει τεκμηρίωση στη γλώσσα σας, απευθυνθείτε σε εξουσιοδοτημένο αντιπρόσωπο της Rexroth.</p> <p>Μόνο εξειδικευμένο προσωπικό επιτρέπεται να χειρίζεται στοιχεία μετάδοσης κίνησης.</p> <p>Περαιτέρω επεξηγήσεις των οδηγιών ασφαλείας διατίθενται στο κεφάλαιο 1 της παρούσας τεκμηρίωσης.</p>
<p>▲ ISPĖJIMAS Aukšta elektros įtampa! Pavojus gyvybei dėl elektros smūgio!</p> <p>Pavaros komponentus eksploatuokite tik su fiksuotai instaliuotu apsauginiu laidu.</p> <p>Prieš priedami prie pavaros komponentų išjunkite maitinimo įtampą.</p> <p>Atsižvelkite į kondensatorių išsikrovimo trukmę.</p>	<p>▲ HOIATUS Kõrge elektripingel! Eluootlik elektrilöögi tõttu!</p> <p>Käitage ajamikomponente üksnes püsivalt installeeritud maandusega.</p> <p>Lülitage enne ajamikomponentidega tööde alustamist toitepinge välja.</p> <p>Järgige kondensaatorite mahalaadumisaegu.</p>	<p>▲ ΠΡΟΕΙΔΟΠΟΙΗΣΗ Υψηλή ηλεκτρική τάση! Κίνδυνος θανάτου από ηλεκτροπληξία!</p> <p>Θέτετε σε λειτουργία τα στοιχεία μετάδοσης κίνησης μόνο εφόσον έχει τοποθετηθεί καλά προστατευτικός αγωγός γείωσης.</p> <p>Πριν από οποιαδήποτε παρέμβαση, αποσυνδέστε την τροφοδοσία των στοιχείων μετάδοσης κίνησης.</p> <p>Λάβετε υπόψη τους χρόνους αποφόρτισης των πυκνωτών.</p>
<p>▲ ISPĖJIMAS Pavojingi judesiai! Pavojus gyvybei!</p> <p>Nebūkite mašinų ar jų dalių judėjimo zonoje.</p> <p>Neleiskite netyčia patekti asmenims.</p> <p>Prieš patekdami į pavojaus zoną saugiai išjunkite pavaras.</p>	<p>▲ HOIATUS Ohtlikud liikumised! Eluootlik!</p> <p>Ärge viibige masina ja masinaosade liikumispiirkonnas.</p> <p>Tõkestage inimeste ettekavatsematu sisenemine masina ja masinaosade liikumispiirkonda.</p> <p>Tagage ajamite turvaline seiskamine enne ohupiirkonda juurdepääsu või sisenemist.</p>	<p>▲ ΠΡΟΕΙΔΟΠΟΙΗΣΗ Επικίνδυνες τάσεις! Κίνδυνος θανάτου!</p> <p>Μην στέκεστε στην περιοχή κίνησης μηχανημάτων και εξαρτημάτων.</p> <p>Αποτρέπετε την τυχαία είσοδο ατόμων.</p> <p>Πριν από την παρέμβαση ή πρόσβαση στην περιοχή κινδύνου, μεριμνήστε για την ασφαλή ακινητοποίηση των συστημάτων μετάδοσης κίνησης.</p>

LT Lietuviškai	EST Eesti	GR Ελληνικά
<p>⚠️ ĮSPĖJIMAS Elektromagnetiniai / magnetiniai laukai! Pavojus asmenų su širdies stimulatoriais, metaliniais implantais arba klausos aparatais sveikatai!</p> <p>Prieiga prie zonų, kuriose montuojami ir eksploatuojami pavaros komponentai, aukščiau nurodytiems asmenims yra draudžiama arba leistina tik pasitarus su gydytoju.</p>	<p>⚠️ HOIATUS Elektromagnetilised / magnetilised väljad! Terviseohtlik südamestimulaatorite, metallimplantatsioonide ja kuulmiseadmetega inimestele!</p> <p>Sisenemine piirkondadesse, kus toimub ajamikomponentide monteerimine ja käitamine, on ülalnimetatud isikutele keelatud või lubatud üksnes pärast arstiga konsulteerimist.</p>	<p>⚠️ ΠΡΟΕΙΔΟΠΟΙΗΣΗ Ηλεκτρομαγνητικά/μαγνητικά πεδία! Κίνδυνος για την υγεία ατόμων με καρδιακούς βηματοδότες, μεταλλικά εμφυτεύματα ή συσκευές ακοής!</p> <p>Η είσοδος σε περιοχές όπου πραγματοποιείται συναρμολόγηση και λειτουργία στοιχείων μετάδοσης κίνησης απαγορεύεται στα προαναφερθέντα άτομα, εκτός αν τους έχει δοθεί σχετική άδεια κατόπιν συνεννόησης με γιατρό.</p>
<p>⚠️ PERSPĖJIMAS Karšti paviršiai (> 60 °C)! Nudėgimo pavojus!</p> <p>Venkite liesti metalinius paviršius (pvz., radiatorių). Išlaikykite pavaros komponentų atvėsimo trukmę (bent 15 minučių).</p>	<p>⚠️ ETTEVAATUST Kuumad välispinnad (> 60 °C)! Põletusoht!</p> <p>Vältige metalsete välispindade (nt radiaatorid) puudutamist. Pidage kinni ajamikomponentide mahajahtumisajast (vähemalt 15 minutit).</p>	<p>⚠️ ΠΡΟΣΟΧΗ Καυτές επιφάνειες (> 60 °C)! Κίνδυνος εγκαύματος!</p> <p>Αποφεύγετε την επαφή με μεταλλικές επιφάνειες (π.χ. μονάδες ψύξης). Λάβετε υπόψη το χρόνο ψύξης των στοιχείων μετάδοσης κίνησης (τουλάχιστον 15 λεπτά).</p>
<p>⚠️ PERSPĖJIMAS Netinkamas darbas transportuojant ir montuojant! Susižalojimo pavojus!</p> <p>Naudokite tinkamus montavimo ir transportavimo įrenginius.</p> <p>Naudokite tinkamus įrankius ir asmenis saugos priemones.</p>	<p>⚠️ ETTEVAATUST Asjatundmatu käsitlemine transportimisel ja montaažil! Vigastusoht!</p> <p>Kasutage sobivaid montaaži- ja transportiseadiseid.</p> <p>Kasutage sobivaid tööriistu ja isikliku kaitsevarustust.</p>	<p>⚠️ ΠΡΟΣΟΧΗ Ακατάλληλος χειρισμός κατά τη μεταφορά και συναρμολόγηση! Κίνδυνος τραυματισμού!</p> <p>Χρησιμοποιείτε κατάλληλους μηχανισμούς συναρμολόγησης και μεταφοράς.</p> <p>Χρησιμοποιείτε κατάλληλα εργαλεία και ατομικό εξοπλισμό προστασίας.</p>

CN 中文

⚠ 警告 如果不按照下述指定的安全说明使用，将会导致人身伤害！

在没有阅读，理解随本产品附带的文件并熟知正当使用前，不要安装或使用本产品。

如果没有您所在国家官方语言文件说明，请与 Rexroth 销售伙伴联系。

只允许有资格人员对驱动器部件进行操作。

安全说明的详细解释在本文档的第一章。

⚠ 警告 高电压！电击导致生命危险！

只有在安装了永久良好的设备接地导线后才可以对驱动器的部件进行操作。

在接触驱动器部件前先将驱动器部件断电。

确保电容放电时间。

⚠ 警告 危险运动！生命危险！

保证设备的运动区域内和移动部件周围无障碍物。

防止人员意外进入设备运动区域内。

在接近或进入危险区域之前，确保传动设备安全停止。

⚠ 警告 电磁场/磁场！对佩戴心脏起搏器、金属植入物和助听器的人员会造成严重的人身伤害！

上述人员禁止进入安装及运行的驱动器区域，或者必须先咨询医生。

⚠ 小心 热表面（大于 60 度）！灼伤风险！

不要触摸金属表面（例如散热器）。驱动器部件断电后需要时间进行冷却（至少 15 分钟）。

⚠ 小心 安装和运输不当导致受伤危险！当心受伤！

使用适当的运输和安装设备。

使用适合的工具及用适当的防护设备。

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1 Important Notes

1.1 Safety Instructions

1.1.1 General Information

- Do not attempt to install and operate the components of the electric drive and control system without first reading all documentation provided with the product. Read and understand these safety instructions and all user documentation prior to working with these components. If you do not have the user documentation for the components, contact your responsible Rexroth sales partner and ask for these documents to be sent immediately to the person or persons responsible for the safe operation of the components.
- If the supplied documents contain some information you do not understand, it is absolutely necessary that you ask Rexroth for explanation before you start working at or with the components.
- If the component is resold, rented and/or passed on to others in any other form, these safety instructions must be delivered with the component in the official language of the user's country.
- Only qualified persons may work with components of the electric drive and control system or within its proximity.

In terms of this Instruction Manual, qualified persons are those persons who are familiar with the installation, mounting, commissioning and operation of the components of the electric drive and control system, as well as with the hazards this implies, and who possess the qualifications their work requires. To comply with these qualifications, it is necessary, among other things,

- to be trained, instructed or authorized to switch electric circuits and components safely on and off, to ground them and to mark them,
- to be trained or instructed to maintain and use adequate safety equipment,
- to attend a course of instruction in first aid.
- The technical data, connection and installation conditions of the components are specified in the respective application documentation and must be followed at all times.
- If the components take the form of hardware, then they must remain in their original state, in other words, no structural changes are permitted. It is not permitted to decompile software components or alter source codes.
- Do not mount damaged or faulty components or use them in operation.
- Only use accessories and spare parts approved by Rexroth.
- Follow the safety regulations and requirements of the country in which the electric components of the electric drive and control system are operated.
- Proper and correct transport, storage, mounting and installation, as well as care in operation and maintenance, are prerequisites for optimal and safe operation of the component.

- Requirements for United States / Canadian installations (UL / cUL)

For using the components in the scope of UL, take the UL ratings of the individual component into account.

An appropriate fuse must be used, which rating shall be equal to or greater than the SCCR (0K40...90K0: 42,000 Arms; 110K-160K: 85,000 Arms) of the power supply being used.

Power cable use 75 °C or above copper wire.

This equipment is capable of providing internal motor overload protection according to NEC (article 430.126) and UL 61800-5-1.

- For Canadian (cUL) installations the drive mains supply must be fitted with any external
 - Surge-protective devices; device shall be a Listed Surge-protective device (Category code VZCA and VZCA7)
 - Rated nominal voltage 480/277 VAC, 50/60 Hz, 3-phase
 - Clamping voltage VPR = 2000 V, IN = 3 kA min, MCOV = 508 VAC, SCCR = 42,000 Arms(0K40...90K0) , 85,000 Arms(110K...160K)
 - Suitable for Type 2 SPD application
 - Clamping shall be provided between phases and also between phase and ground

Improper use of these components, failure to follow the safety instructions in this document or tampering with the product, including disabling of safety devices, could result in property damage, injury, electric shock or even death.

1.1.2 Protection Against Contact With Electrical Parts and Housings



This section concerns components of the electric drive and control system with voltages of **higher than 50 V**.

Contact with parts conducting voltages above 50 V can cause personal danger and electric shock. When operating components of the electric drive and control system, it is unavoidable that some parts of these components conduct dangerous voltage.

High electrical voltage! Danger to life, risk of injury by electric shock or serious injury!

- Only qualified persons are allowed to operate, maintain and/or repair the components of the electric drive and control system.
- Follow the general installation and safety regulations when working on power installations.
- Before switching on, the equipment grounding conductor must have been permanently connected to all electric components in accordance with the connection diagram.
- Even for brief measurements or tests, operation is only allowed if the equipment grounding conductor has been permanently connected to the points of the components provided for this purpose.
- Before accessing electrical parts with voltage potentials higher than 50 V, you must disconnect electric components from the mains or from the power supply unit. Secure the electric component from reconnection.
- With electric components, observe the following aspects:

Always wait **10 minutes** after switching off power to allow live capacitors to discharge before accessing an electric component. Measure the electrical voltage of live parts before beginning to work to make sure that the equipment is safe to touch.

- Install the covers and guards provided for this purpose before switching on.
- Never touch electrical connection points of the components while power is turned on.
- Do not remove or plug in connectors when the component has been powered.
- Under specific conditions, electric drive systems can be operated at mains protected by residual-current-operated circuit-breakers sensitive to universal current (RCDs / RCMs).
- Secure built-in devices from penetrating foreign objects and water, as well as from direct contact, by providing an external housing, for example a control cabinet.

High housing voltage and high leakage current! Danger to life, risk of injury by electric shock!

- Before switching on and before commissioning, ground or connect the components of the electric drive and control system to the equipment grounding conductor at the grounding points.
- Connect the equipment grounding conductor of the components of the electric drive and control system permanently to the main power supply at all times. The leakage current is greater than 3.5 mA.
- Establish an equipment grounding connection with a minimum cross section according to the table below. With an outer conductor cross section smaller than 10 mm² (8 AWG), the alternative connection of two equipment grounding conductors is allowed, each having the same cross section as the outer conductors.

Cross section outer conductor	Minimum cross section equipment grounding conductor	
	Leakage current ≥ 3.5 mA	
	1 equipment grounding conductor	2 equipment grounding conductors
1.5 mm ² (AWG 16)	10 mm ² (AWG 8)	2 × 1.5 mm ² (AWG 16)
2.5 mm ² (AWG 14)		2 × 2.5 mm ² (AWG 14)
4 mm ² (AWG 12)		2 × 4 mm ² (AWG 12)
6 mm ² (AWG 10)		2 × 6 mm ² (AWG 10)
10 mm ² (AWG 8)		-
16 mm ² (AWG 6)	16 mm ² (AWG 6)	-
25 mm ² (AWG 4)		-
35 mm ² (AWG 2)		-
50 mm ² (AWG 1/0)	25 mm ² (AWG 4)	-
70 mm ² (AWG 2/0)	35 mm ² (AWG 2)	-
...

Tab. 1-1: Minimum Cross Section of the Equipment Grounding Connection

1.1.3 Protection Against Dangerous Movements

Dangerous movements can be caused by faulty control of connected motors. Some common examples are:

- Improper or wrong wiring or cable connection
- Operator errors
- Wrong input of parameters before commissioning
- Malfunction of sensors and encoders
- Defective components
- Software or firmware errors

These errors can occur immediately after equipment is switched on or even after an unspecified time of trouble-free operation.

The monitoring functions in the components of the electric drive and control system will normally be sufficient to avoid malfunction in the connected drives. Regarding personal safety, especially the danger of injury and/or property damage, this alone cannot be relied upon to ensure complete safety. Until the integrated monitoring functions become effective, it must be assumed in any case that faulty drive movements will occur. The extent of faulty drive movements depends upon the type of control and the state of operation.

Dangerous movements! Danger to life, risk of injury, serious injury or property damage!

A **risk assessment** must be prepared for the installation or machine, with its specific conditions, in which the components of the electric drive and control system are installed.

As a result of the risk assessment, the user must provide for monitoring functions and higher-level measures on the installation side for personal safety. The safety regulations applicable to the installation or machine must be taken into consideration. Unintended machine movements or other malfunctions are possible if safety devices are disabled, bypassed or not activated.

To avoid accidents, injury and/or property damage:

- Keep free and clear of the machine's range of motion and moving machine parts. Prevent personnel from accidentally entering the machine's range of motion by using, for example:
 - Safety fences
 - Safety guards
 - Protective coverings
 - Light barriers
- Make sure the safety fences and protective coverings are strong enough to resist maximum possible kinetic energy.

- Mount emergency stopping switches in the immediate reach of the operator. Before commissioning, verify that the emergency stopping equipment works. Do not operate the machine if the emergency stopping switch is not working.
- Prevent unintended start-up. Isolate the drive power connection by means of OFF switches / OFF buttons or use a safe starting lockout.
- Make sure that the drives are brought to safe standstill before accessing or entering the danger zone.
- Additionally secure vertical axes against falling or dropping after switching off the motor power by, for example,
 - mechanically securing the vertical axes,
 - adding an external braking/arrester/clamping mechanism or
 - ensuring sufficient counterbalancing of the vertical axes.
- The standard equipment **motor holding brake** or an external holding brake controlled by the drive controller is **insufficient to guarantee personal safety!**
- Disconnect electrical power to the components of the electric drive and control system using the master switch and secure them from reconnection ("lock out") for:
 - Maintenance and repair work
 - Cleaning of equipment
 - Long periods of discontinued equipment use
- Prevent the operation of high-frequency, remote control and radio equipment near components of the electric drive and control system and their supply leads. If the use of these devices cannot be avoided, check the machine or installation, at initial commissioning of the electric drive and control system, for possible malfunctions when operating such high-frequency, remote control and radio equipment in its possible positions of normal use. It might possibly be necessary to perform a special electromagnetic compatibility (EMC) test.

1.1.4 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting

Magnetic and electromagnetic fields generated by current-carrying conductors or permanent magnets of electric motors represent a serious danger to persons with heart pacemakers, metal implants and hearing aids.

Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electric components!

- Persons with heart pacemakers and metal implants are not allowed to enter the following areas:
 - Areas in which components of the electric drive and control systems are mounted, commissioned and operated.
 - Areas in which parts of motors with permanent magnets are stored, repaired or mounted.
- If it is necessary for somebody with a heart pacemaker to enter such an area, a doctor must be consulted prior to doing so. The noise immunity of implanted heart pacemakers differs so greatly that no general rules can be given.
- Those with metal implants or metal pieces, as well as with hearing aids, must consult a doctor before they enter the areas described above.

1.1.5 Protection Against Contact With Hot Parts

Hot surfaces of components of the electric drive and control system. Risk of burns!

- Do not touch hot surfaces of, for example, braking resistors, heat sinks, supply units and drive controllers, motors, windings and laminated cores!
- According to the operating conditions, temperatures of the surfaces can be **higher than 60 °C (140 °F)** during or after operation.
- Before touching motors after having switched them off, let them cool down for a sufficient period of time. Cooling down can require **up to 140 minutes!** The time required for cooling down is approximately five times the thermal time constant specified in the technical data.
- After switching chokes, supply units and drive controllers off, wait **15 minutes** to allow them to cool down before touching them.
- Wear safety gloves or do not work at hot surfaces.
- For certain applications, and in accordance with the respective safety regulations, the manufacturer of the machine or installation must take measures to avoid injuries caused by burns in the final application. These measures can be, for example: Warnings at the machine or installation, guards (shieldings or barriers) or safety instructions in the application documentation.

1.1.6 Protection During Handling and Mounting

Risk of injury by improper handling! Injury by crushing, shearing, cutting, hitting!

- Observe the relevant statutory regulations of accident prevention.
- Use suitable equipment for mounting and transport.
- Avoid jamming and crushing by appropriate measures.
- Always use suitable tools. Use special tools if specified.
- Use lifting equipment and tools in the correct manner.
- Use suitable protective equipment (hard hat, safety goggles, safety shoes, safety gloves, for example).
- Do not stand under hanging loads.
- Immediately clean up any spilled liquids from the floor due to the risk of falling!

1.2 Appropriate Use

This product may only be used for the applications mentioned in the reference documentation (see index entry "Reference documentation") and under the described application, ambient and operating conditions.

This product is exclusively intended for use in machines and systems in an industrial environment. This is to be understood as applications according to IEC 60204-1 "Safety of machinery, Electric equipment of machines" and NFPA 79 "Electrical Standard for Industrial Machinery".



According to EN 61800-3, EFC x610... are products of

- Category C3: with internal EMC filters
 - Category C1: with external EMC filters
-



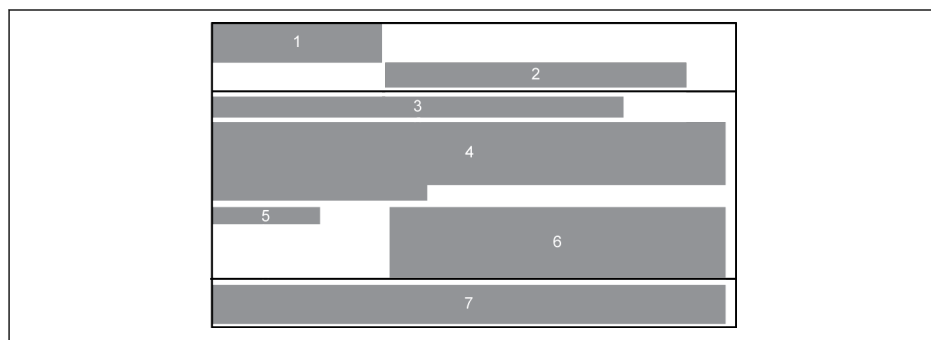
WARNING

In a residential environment (Category C1), EFC x610 frequency converters with internal EMC filters may cause radio interference.

Supplementary mitigation measures may be required.

2.2 Nameplate

Nameplate



- 1 Brand logo
- 2 Product series
- 3 Short text / Type code
- 4 Technical data

- 5 Production week: e.g., 14W20 means week 20 in 2014
- 6 Certification
- 7 Manufacturer

Fig. 2-2: Product nameplate

2.3 Standard Scope of Supply

- Frequency Converter
- Quick Start Guide
- Safety Instructions
- Instruction Manual (UL)

3 Ratings and Dimensions

3.1 EFC x610 UL Ratings and Dimensions in Common

Description	Symbol	Unit	Data
Listing according to UL standard (UL)	–	–	UL 61800-5-1
UL files (UL)	–	–	NMMS.E328841
Enclosure	–	–	Open type
Pollution degree (UL)	–	–	2
Ambient temperature with nominal data (UL)	T_{amax}	°C	45
Ambient temperature with reduced nominal data (UL)	$T_{\text{amax_red}}$	°C	55
Minimum distance on the top of the device ¹⁾	d_{top}	mm	125
Minimum distance on the bottom of the device ²⁾	d_{bot}	mm	125

Description	Symbol	Unit	Data
Horizontal spacing on the device ³⁾	d _{hor}	mm	0K40...22K0: 0 30K0...160K: 10
Short circuit current rating (UL)	SCCR	Arms	42,000 (0K40...90K0) 85,000 (110K-160K)
Rated input voltage, power (UL) ⁴⁾ (TN-Net)	U _{LN_nenn}	VAC	1P 200...240
			3P 200...240
			3P 380...480
Tolerance rated input voltage (UL)	–	–	1P: -10...+10 %
			3P: -15...+10 %
Input frequency (UL)	f _{LN}	Hz	50...60
Tolerance input frequency (UL)	–	Hz	± 5 %
Field wiring material (material; conductor temperature; class)	–	–	Copper; 75 °C
Output voltage (UL)	U _{out}	V	Corresponding to input voltage
Output frequency range (UL) ⁵⁾	f _{out}	Hz	0...400

Tab. 3-1: EFC x610 UL ratings and dimensions in common

3.2 EFC x610 UL Ratings and Dimensions 1P 200 VAC OK40...2K20

Description	Symbol	Unit	OK40	OK75	1K50	2K20
Net weight	m	kg	1.5	1.5	1.9	2.6
Device height (UL) ⁶⁾	H	mm	166	166	206	231
Device depth (UL) ⁷⁾	T	mm	167	167	170	175
Device width (UL) ⁸⁾	B	mm	95	95	95	120
Rated input current (UL)	I_{LN}	A	6.2	10.1	16.2	22.3
Branch circuit protection fuse (UL) ⁹⁾	I_{LN}	A	10	15	25	30
Required wire size according to EN 60204-1 ¹⁰⁾	A_{LN}	mm ²	2.5 ¹²⁾	2.5	4.0	6.0
			2.5 ¹³⁾	2.5	4.0	6.0
			2.5 ¹⁴⁾	2.5	2.5	4.0
Required wire size according to UL 61800-5-1 (internal wiring); (UL) ¹¹⁾	A_{LN}	AWG	14	14	10	10
Output current (UL) 200 V	I_{out}	A	2.4	4.1	7.3	10.1
Output current (UL) 240 V			2.0	3.4	6.1	8.4

Tab. 3-2: EFC x610 UL ratings and dimensions 1P OK40...2K20

3.3 EFC x610 UL Ratings and Dimensions 3P 200 VAC OK40...3K00

Description	Symbol	Unit	OK40	OK75	1K50	2K20	3K00
Net weight	m	kg	1.5	1.9	2.6	2.6	3.9
Device height (UL) ⁶⁾	H	mm	166	206	231	231	243
Device depth (UL) ⁷⁾	T	mm	167	170	175	175	233
Device width (UL) ⁸⁾	B	mm	95	95	120	120	130
Rated input current (UL)	I _{LN}	A	2.6	4.8	9.1	11.9	15.7/ 21.0
Branch circuit protection fuse (UL) ⁹⁾	I _{LN}	A	10	10	20	20	30
Required wire size according to EN 60204-1 ¹⁰⁾	A _{LN}	mm ²	2.5	2.5	4.0	4.0	6.0 ¹²⁾
			2.5	2.5	4.0	4.0	6.0 ¹³⁾
			2.5	2.5	2.5	2.5	4.0 ¹⁴⁾
Required wire size according to UL 61800-5-1 (internal wiring); (UL) ¹¹⁾	A _{LN}	AWG	14	14	12	12	8
Output current (UL) 200 V	I _{out}	A	2.4	4.1	7.3	10.1	13.4
Output current (UL) 240 V			2.0	3.4	6.1	8.4	11.2

Tab. 3-3: EFC x610 UL ratings and dimensions 3P 200 VAC OK40...3K00



3P 200 VAC: **ONLY** available with EFC 5610.

3.4 EFC x610 UL Ratings and Dimensions 3P 200 VAC 4K00...11K0

Description	Symbol	Unit	4K00	5K50	7K50	11K0
Net weight	m	kg	4.3	5.7	6.4	8.5
Device height (UL) ⁶⁾	H	mm	243	283	283	315
Device depth (UL) ⁷⁾	T	mm	233	233	233	241
Device width (UL) ⁸⁾	B	mm	130	150	150	165
Rated input current (UL) (HD/ND)	I_{LN}	A	21.0/ 28.0	28.0/ 37.8	37.8/ 45.8	52.7/ 71.2
Branch circuit protection fuse (UL) ⁹⁾	I_{LN}	A	40	50	60	100
Required wire size according to EN 60204-1 ¹⁰⁾	A_{LN}	mm ²	6.0	10.0	10.0	25.0 ¹²⁾
			10.0	10.0	10.0	35.0 ¹³⁾
			6.0	10.0	10.0	25.0 ¹⁴⁾
Required wire size according to UL 61800-5-1 (internal wiring); (UL) ¹¹⁾	A_{LN}	AWG	8	6	6	2
Output current (UL) 200 V	I_{out}	A	17.5	23.4	31.1	44.9
Output current (UL) 240 V			14.6	19.5	25.9	37.4

Tab. 3-4: EFC x610 UL ratings and dimensions 3P 200 VAC 4K00...11K0



3P 200 VAC: **ONLY available** with EFC 5610.

3.5 EFC x610 UL Ratings and Dimensions 3P 400 VAC OK40...4K00

Description	Symbol	Unit	OK40	OK75	1K50	2K20	3K00	4K00
Net weight	m	kg	1.5	1.5	1.9	1.9	2.6	2.6
Device height (UL) ⁶⁾	H	mm	166	166	206	206	231	231
Device depth (UL) ⁷⁾	T	mm	167	167	170	170	175	175
Device width (UL) ⁸⁾	B	mm	95	95	95	95	120	120
Rated input current (UL)	I_{LN}	A	1.5	2.6	4.8	6.8	9.1	11.9
Branch circuit protection fuse (UL) ⁹⁾	I_{LN}	A	6	10	10	15	20	20
Required wire size according to EN 60204-1 ¹⁰⁾	A_{LN}	mm ²	2.5 ¹²⁾	2.5	2.5	2.5	4.0	4.0
			2.5 ¹³⁾	2.5	2.5	2.5	4.0	4.0
			2.5 ¹⁴⁾	2.5	2.5	2.5	2.5	2.5
Required wire size according to UL 61800-5-1 (internal wiring); (UL) ¹¹⁾	A_{LN}	AWG	14	14	14	14	12	12
Output current (UL) 380 V	I_{out}	A	1.3	2.3	4.0	5.6	7.4	9.7
Output current (UL) 480 V			1.1	1.8	3.2	4.4	5.9	7.7

Tab. 3-5: EFC x610 UL ratings and dimensions 3P 400 VAC OK40...4K00

3.6 EFC x610 UL Ratings and Dimensions 3P 400 VAC 5K50...18K5

Description	Symbol	Unit	5K50	7K50	11K0	15K0	18K5
Net weight	m	kg	3.9	4.3	5.7	6.4	8.0
Device height (UL) ⁶⁾	H	mm	243	243	283	283	313
Device depth (UL) ⁷⁾	T	mm	233	233	233	233	241
Device width (UL) ⁸⁾	B	mm	130	130	150	150	165
Rated input current (UL) (HD/ND)	I_{LN}	A	15.7/ 21.0	21.0/ 28.0	28.0/ 37.8	37.8/ 45.8	45.8/ 52.7
Branch circuit protection fuse (UL) ⁹⁾	I_{LN}	A	30	40	50	60	80
Required wire size according to EN 60204-1 ¹⁰⁾	A_{LN}	mm ²	6.0 ¹²⁾	6.0	10.0	10.0	25.0
			6.0 ¹³⁾	10.0	10.0	10.0	25.0
			4.0 ¹⁴⁾	6.0	10.0	10.0	16.0
Required wire size according to UL 61800-5-1 (internal wiring); (UL) ¹¹⁾	A_{LN}	AWG	8	8	6	6	4
Output current (UL) 380 V (HD/ND) ¹⁵⁾	I_{out}	A	12.7/ 16.8	16.8/ 24.3	24.3/ 32.4	32.4/ 39.2	39.2/ 45.0
Output current (UL) 480 V (HD/ND) ¹⁵⁾			10.0/ 13.3	13.3/ 19.2	19.2/ 25.6	25.6/ 31.0	31.0/ 36.0

Tab. 3-6: EFC x610 UL ratings and dimensions 3P 400 VAC 5K50...18K5

3.7 EFC x610 UL Ratings and Dimensions 3P 400 VAC 22K0...90K0

Description	Symbol	Unit	22K0	30K0	37K0	45K0	55K0	75K0	90K0
Net weight	m	kg	8.5	27.5	29.5	39.0	42.0	54.0	61.0
Device height (UL) ⁶⁾	H	mm	315	510	510	585	585	760	760
Device depth (UL) ⁷⁾	T	mm	241	272	272	325	325	342	342
Device width (UL) ⁸⁾	B	mm	165	250	250	265	265	325	325
Rated input current (UL) (HD/ND)	I_{LN}	A	52.7/ 71.2	56.8/ 69.6	69.6/ 84.2	86.0/ 105.0	105.0/ 140.0	140.0/ 167.0	167.0/ 205.0
Branch circuit protection fuse (UL) ⁹⁾	I_{LN}	A	100	100	125	150	175	225	250
Required wire size according to EN 60204-1 ¹⁰⁾	A_{LN}	mm ²	25.0 ¹²⁾	35.0	35.0	50.0	70.0	120.0	120.0
			35.0 ¹³⁾	50.0	50.0	70.0	95.0	150.0	150.0
			25.0 ¹⁴⁾	35.0	35.0	50.0	70.0	95.0	95.0
Required wire size according to UL 61800-5-1 (internal wiring); (UL) ¹¹⁾	A_{LN}	AWG	2	2	1	1/0	2/0	4/0	250 kcmil
Output current (UL) 380 V (HD/ND) ¹⁵⁾	I_{out}	A	45.0/ 60.8	60.8/ 73.7	73.7/ 89.1	89.0/ 108.0	108.0/ 147.0	147.0/ 176.0	176.0/ 212.0
Output current (UL) 480 V (HD/ND) ¹⁵⁾			36.0/ 48.0	48.1/ 58.3	58.3/ 70.5	71.0/ 86.0	86.0/ 116.0	116.0/ 139.0	139.0/ 168.0

Tab. 3-7: EFC x610 UL ratings and dimensions 3P 400 VAC 22K0...90K0

3.8 EFC x610 UL Ratings and Dimensions 3P 400 VAC 110K...160K

Description	Symbol	Unit	110K	132K	160K
Net weight	m	kg	71.7	76.6	108
Device height (UL) ⁶⁾	H	mm	923	923	1030
Device depth (UL) ⁷⁾	T	mm	350	350	360
Device width (UL) ⁸⁾	B	mm	385	385	480
Rated input current (UL) (HD/ND)	I_{LN}	A	205.0/252.0	252.0/304.0	305.0/383.0
Branch circuit protection fuse (UL) ⁹⁾	I_{LN}	A	300	350	450
Required wire size according to EN 60204-1 ¹⁰⁾	A_{LN}	mm ²	Single cable: 120.0/150.0/120.0 ¹²⁾⁻¹⁴⁾ Double cable: 95.0*2/95.0*2/95.0*2 ¹²⁾⁻¹⁴⁾	Single cable: 185.0/240.0/185.0 5.0 Double cable: 95.0*2/95.0*2/95.0*2 5.0*2	Double cable: 120.0*2/150.0*2/120.0*2
Required wire size according to UL 61800-5-1 (internal wiring); (UL) ¹¹⁾	A_{LN}	AWG	Single cable: 400 kcmil Double cable: 3/0*2	Single cable: 500 kcmil Double cable: 250 kcmil*2	Double cable: 350 kcmil*2
Output current (UL) 380 V (HD/ND) ¹⁵⁾	I_{out}	A	212.0/253.0	253.0/303.0	303.0/380.0
Output current (UL) 480 V (HD/ND) ¹⁵⁾			168.0/200.0	200.0/240.0	240.0/300.0

Tab. 3-8: EFC x610 UL ratings and dimensions 3P 400 VAC 110K...160K

3.9 Remarks of the above Tables

1) 2) 3): See [chapter 3.10 "Distances" on page 20](#)

4): DC bus L+, L-; mains input L1, L2, (L3)

5): Depending on switching frequency

6) 7) 8): Housing dimension; see also related dimensional drawing

9): Use listed AC input line fuses (class J; 600 VAC) at the mains supply

10): Copper wire; XLPE or EPR-insulation (conductor temperature 90 °C)
installation mode B1

11): Copper wire; PVC-insulation (conductor temperature 75 °C)

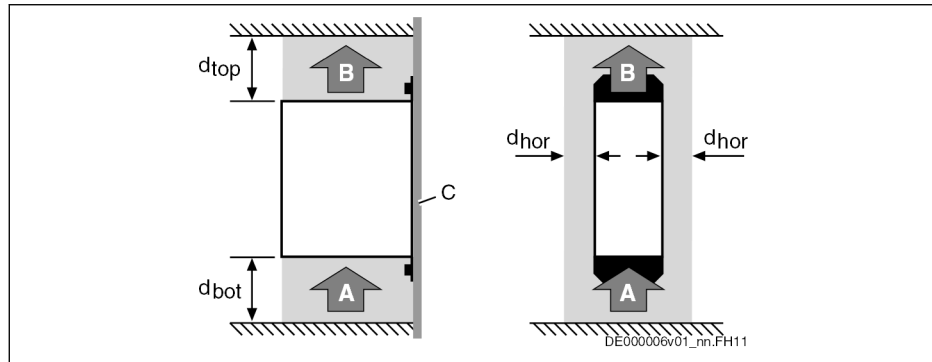
$T_a \leq 45\text{ °C}$

12)13)14): Cable installation modes B1, B2, E, see [chapter 3.11 "Cable Installation Modes" on page 21](#)

15):

- ND: Normal Duty, **ONLY available** with EFC 3610
- HD: Heavy Duty, available with both EFC 3610 and EFC 5610

3.10 Distances



A Air intake
B Air outlet
C Mounting surface in control cabinet
 d_{top} Distance top

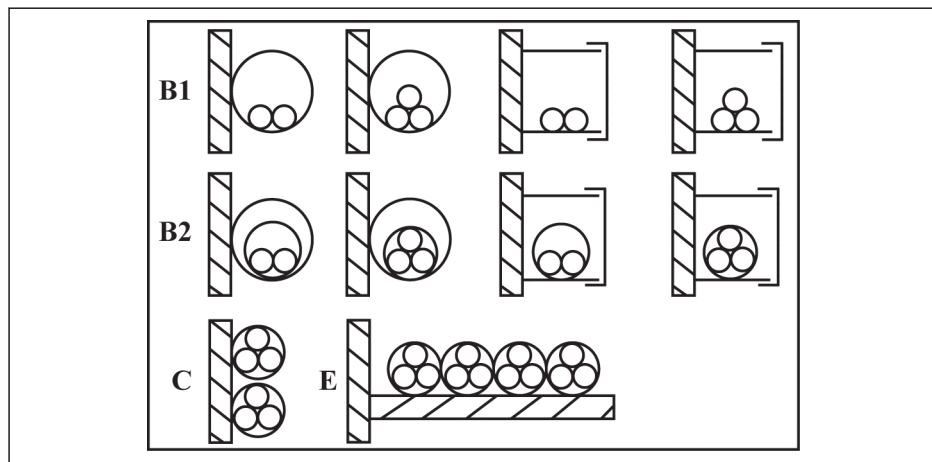
d_{bot} Distance bottom
 d_{hor} Distance horizontal

Fig. 3-1: Air intake and air outlet at device



For distance data, please see [chapter 3.1 "EFC x610 UL Ratings and Dimensions in Common" on page 11](#).

3.11 Cable Installation Modes



B1 Conductors in installation pipes and in installation channels that can be opened

B2 Cables or lines in installation pipes and in installation channels that can be opened

C Cables or lines on walls

E Cables or lines on open cable trays

Fig. 3-2: Cable installation types (cf. IEC 60364-5-52; DIN VDE 0298-4; EN 60204-1)

4 Reference Documentation

Frequency converter	Documentation type	Document typecode	Material number
EFC x610	Operating Instructions	DOK-RCON03-EFC-X610***-ITRS-EN-P	R912005854
	Quick Start Guide	DOK-RCON03-EFC-X610***-QURS-EN-P	R912005856

Tab. 4-1: Documentation overview

5 Instructions for Use

5.1 Overcurrent Protection

Protect the components against overcurrent:

- Branch circuit protection has to be provided externally
- Dimension the branch circuit protection according to the data "Branch circuit protection fuse (UL)" (see Ratings and Dimensions)

5.2 Mounting

5.2.1 General Information on Frequency Converter Mounting

WARNING

Lethal electric shock by live parts with higher than 50 V!

Before working on live parts: De-energize installation and secure power switch against unintentional or unauthorized re-energization.

Wait at least **10 minutes** after switching off the supply voltages to allow **discharging**.

Check whether voltage has fallen below 50 V before touching live parts!

Damage can be caused to the frequency converter or circuit boards if electrostatic charging present in people and/or tools is discharged across them. For this reason, please observe the following information:

NOTICE

Electrostatic charges can cause damage to electronic components and interfere with their operational safety!

Exposed conductive parts coming into contact with components and circuit boards must be discharged by means of grounding. Otherwise errors may occur when controlling motors and moving elements.

Such exposed conductive parts include:

- The copper bit when soldering
- The human body (ground connection by touching a conductive, grounded object)
- Parts and tools (place them on a conductive support)

Endangered components may only be stored or dispatched in conductive packaging.



Rexroth connection diagrams are only to be used for producing installation circuit diagrams! The machine manufacturer's installation circuit diagrams must be used for wiring the installation!

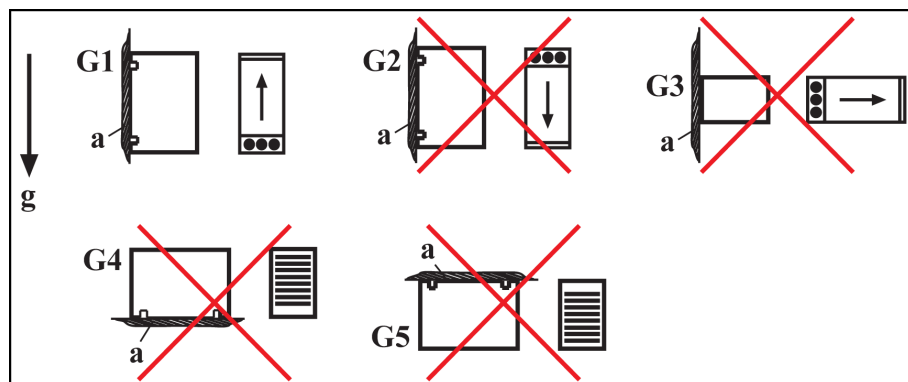
- Lay signal lines separately from the load resistance lines because of the occurrence of interference.
- Transmit analog signals (e.g. command values, actual values) via shielded lines.
- Do not connect mains, DC-bus or power cores to low voltages or allow them to come into contact with these.
- When carrying out a high voltage test or an applied-overvoltage withstand test on the machine's electrical equipment, disconnect all connections to the devices. This protects the electronic components (allowed in accordance with EN 60204-1). During their routine testing, Rexroth frequency converters are tested for high voltage (in accordance with EN 61800-5-1:2007, section 5.2.3.2) and insulation (in accordance with EN 60204-1:2006, section 18.3).

NOTICE

Risk of damage to the frequency converter by connecting and disconnecting live connections!

Do not connect and disconnect live connections.

5.2.2 Allowed Mounting Position



a Mounting surface

g Direction of gravitational force

G1 Normal mounting positions. The natural convection supports the forced cooling air current. This avoids the generation of pockets of heat in the component

G2 180° to normal mounting position

G3 Turned by 90° from vertical to horizontal mounting position

G4 Bottom mounting; mounting surface on bottom of control cabinet

G5 Top mounting; mounting surface at top of control cabinet

Fig. 5-1: Allowed mounting position

5.2.3 Sizing of Enclosure and Control Cabinet

Multiple-Line design of the control cabinet

Arrangement of the devices, air guides/drip protections, fans

Pay particular attention to the maximum allowed air intake temperature of devices when they are arranged in multiple lines in the control cabinet.

If possible, place devices with a high degree of power dissipation (e.g. supply units with braking resistors, DC-bus resistor units)

- in the top line and
- near the outlet air aperture to the cooling unit

Mount **air guides** between the lines to

- protect the devices in the upper lines against the warm outlet air of the devices beneath and
- protect the devices beneath against penetration of liquids (e.g. dripping condensation water or leaking cooling liquid)

Additional fans convey the outlet air to the cooling unit and cooling air to the upper lines.

At the installed control cabinet, check the air intake temperature of all devices.

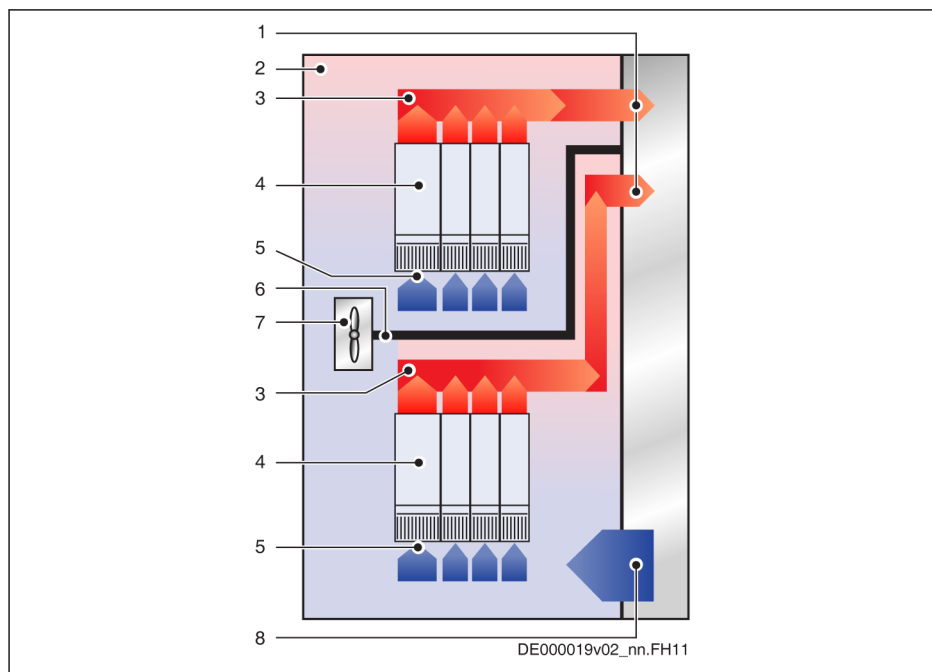


Fig. 5-2: Example of arrangement for double-line design

- 1: Discharge of heated air to cooling unit
- 2: Interior of control cabinet
- 3: Conveying direction of heated air in area where air flows off
- 4: Device in control cabinet
- 5: Air intake at device
- 6: Air guide in control cabinet (for liquid cooling, this is also the drip protection for the devices beneath)
- 7: Fan in control cabinet
- 8: Supply of cooled air from cooling unit

Arranging the cooling units

Unless the nominal data are reduced, the frequency converter may only be operated up to a specified maximum ambient temperature. A cooling unit might therefore be required.

NOTICE

**Possible damage to the frequency converter!
Operational safety of the machine endangered!**

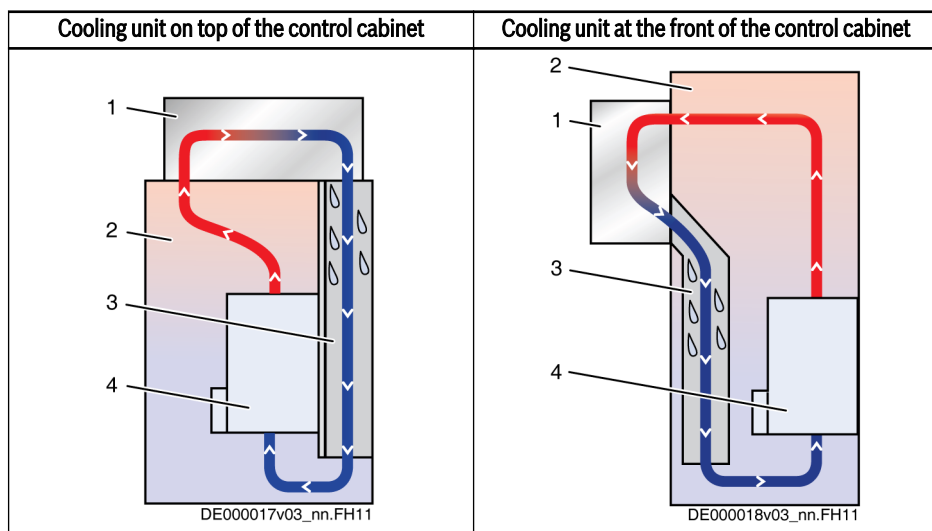
Observe the instructions below.

Avoiding dripping or spraying water

Due to their operating principle, condensation water is formed when cooling units are used.

For this reason, observe the following aspects:

- Always position cooling units in such a way that condensation water cannot drip onto the devices in the control cabinet.
- Position the cooling unit in such a way that the fan of the cooling unit does not spray accumulated condensation water onto the devices in the control cabinet. Mount the air duct in the control cabinet accordingly.



Tab. 5-1: Arranging the cooling units

1: Cooling unit

2: Interior of control cabinet

3: Air duct (protects devices against condensation water)

4: Device in control cabinet

Avoiding moisture condensation

Moisture condensation occurs when the temperature of the device is lower than the ambient temperature.

- Set cooling units with temperature adjustment to the maximum surrounding temperature and not lower!
- Set cooling units with follow-up temperature in such a way that the interior temperature of the control cabinet is not lower than the temperature of the surrounding air. Set the temperature limitation to the maximum surrounding temperature!
- Only use well-sealed control cabinets so that moisture condensation cannot arise as a result of warm and moist external air entering the cabinet.
- In the event that control cabinets are operated with the doors open (commissioning, servicing etc.), it is essential to ensure that after the doors are closed the drive controllers cannot at any time be cooler than the air in the control cabinet. For this reason, sufficient circulation must be provided inside the control cabinet.

5.3 Wiring

5.3.1 Block Diagram



Frequency converters EFC x610 up to 18K5 have internal brake choppers.

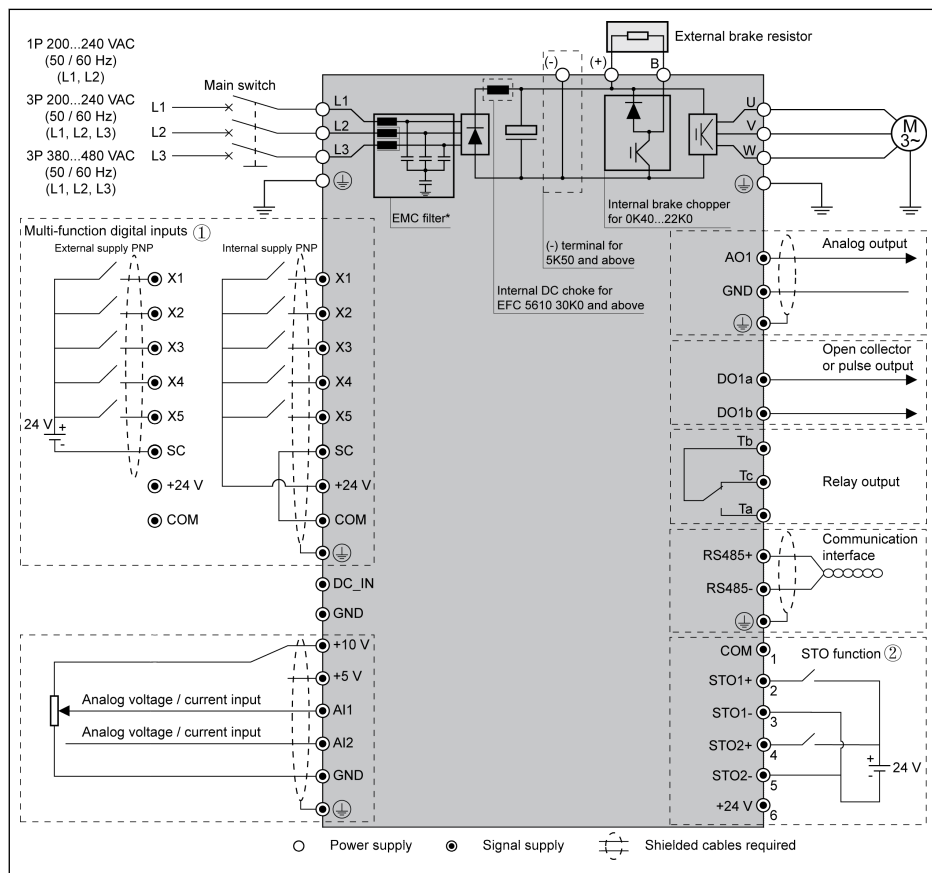


Fig. 5-3: EFC x610... Block diagram



①, ②: For PNP mode wiring and STO (Safe Torque Off), see EFC x610 **Operating Instructions**.

5.3.2 Main Circuit Wiring

Main circuit wiring diagram

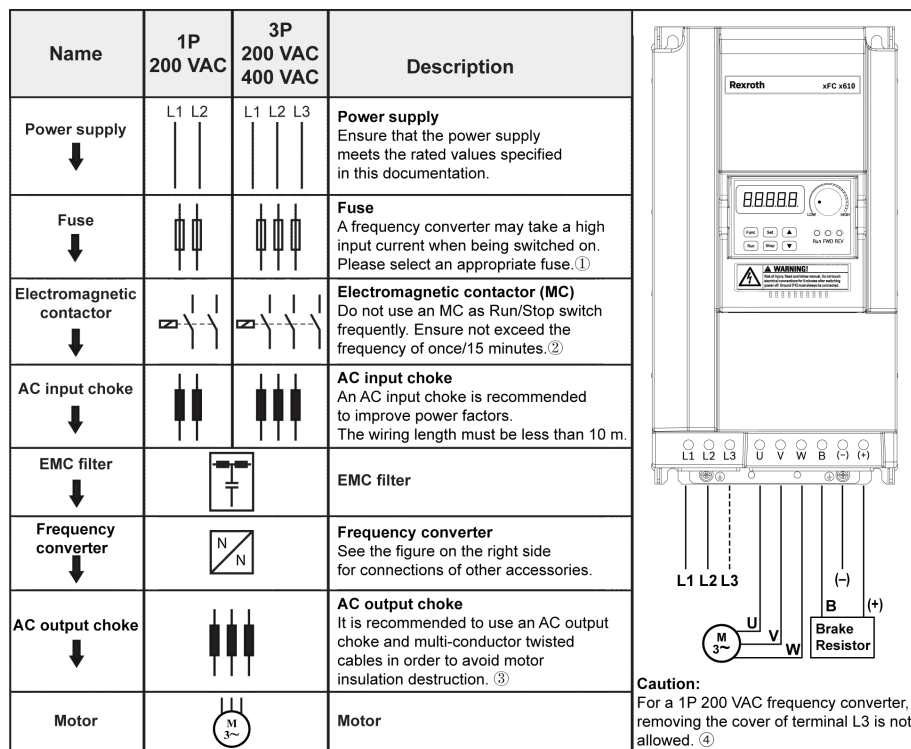


Fig. 5-4: EFC x610... Main circuit wiring diagram



①: To select an appropriate fuse, please refer to chapter "Power Cables" in the Operating Instructions.

②: Excessively frequent starting and stopping will shorten the life time of relay contacts and DC-bus capacitors, and may destroy the resistor for capacitor charging and current limitation.

③: Whether using an AC output choke or not depends on the factors of: the length, shielding and distribution capacitance of the motor cables, as well as the insulation of the motor.

④: The covers of terminal (+), (-) and B can be removed as needed.

Important notes

WARNING

Lethal electric shock by live parts with higher than 50 V!

Exclusively operate the device

- with plugged on connectors (even if there haven't been any lines connected to the connectors) and
- with connected equipment grounding conductor!

Notes on installation

Dimension the **required cross section** of the connection cables according to the determined phase current I_{LN} and the mains fuse.

5.3.3 Motor Connection

Important notes

WARNING

Lethal electric shock by live parts with higher than 50 V!

Exclusively operate the device

- with plugged on connectors (even if there haven't been any lines connected to the connectors) and
- with connected equipment grounding conductor!

Notes on installation

The indicated connection cross sections are the cross sections which can be connected. Dimension the **required cross section** of the connecting lines according to the occurring current load.

5.3.4 Terminal Block

EFC x610 main circuit terminals description

Terminal	Description
1P 200 VAC	
L1, L2	Mains power supply inputs
U, V, W	Frequency converter outputs (to be connected to the motor)
B	Reserved terminal for external brake resistor
(+)	DC positive bus output
3P 200 / 400 VAC	
L1, L2, L3	Mains power supply inputs
U, V, W	Frequency converter outputs (to be connected to the motor)
B	Reserved terminal for external brake resistor
(+)	DC positive bus output
(-)	DC negative bus terminal (only available with models of 5K50 and above)

Tab. 5-2: EFC x610 Main circuit terminals description

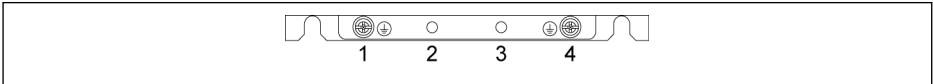


Fig. 5-5: Grounding and PE terminals

- 1: Grounding terminal for mains cables
- 2: Reserved for PE / shielding adapter (Order additionally)
- 3: Reserved for PE / shielding adapter (Order additionally)
- 4: Grounding terminal for motor cables

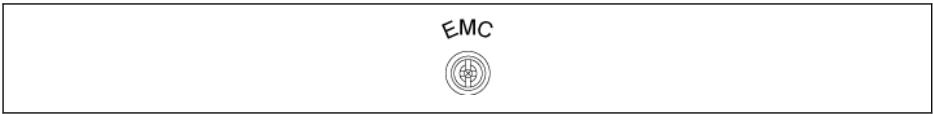


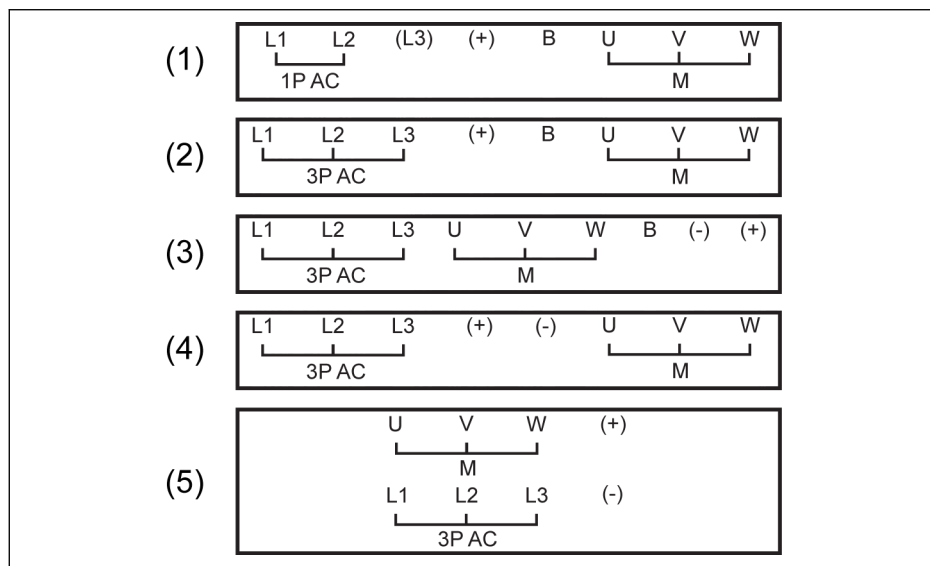
Fig. 5-6: Connection screw for internal EMC filter

Internal EMC filter must be disconnected in isolated neutral power system (e.g., IT-Net). Otherwise, the system will be grounded via the capacitor of the EMC filter, which may lead to danger or damage to the frequency converter. The connection screw for the internal EMC filter as shown in the figure above is located at the side of the frequency converter.



With the internal EMC filter disconnected, the specified EMC performance of the frequency converter cannot be reached.

EFC x610 main circuit terminals



(1) 1P 200 VAC 0K40...2K20

(2) 3P 200 VAC 0K40...2K20 / 3P 400 VAC 0K40...4K00

(3) 3P 200 VAC 3K00...11K0 / 3P 400 VAC 5K50...22K0

(4) 3P 400 VAC 30K0...90K0

(5) 3P 400 VAC 110K...160K

1P AC: Single phase AC power supply**3P AC:** Three phases AC power supply**M:** For three phases motor connection

Fig. 5-7: Power terminals

5.3.5 Ground Connection

The ground connection of the housing is used to provide functional safety of the drive controllers and protection against contact in conjunction with the equipment grounding conductor.

Ground the housings of the drive controllers:

1. Connect the grounding terminal of the frequency converter to the mounting surface in the control cabinet.
2. Connect the mounting surface of the control cabinet in conductive form to the equipment grounding system.

6 EMC Measures for Design and Installation

6.1 Rules for Design of Installations with Drive Controllers in Compliance with EMC

The following rules are the basis for designing and installing drives in compliance with EMC.

Mains Filter

Correctly use a mains filter recommended by Rexroth for radio interference suppression in the supply feeder of the drive system.

Control Cabinet Grounding

Connect all metal parts of the cabinet with one another over the largest possible surface area to establish a good electrical connection. This also applies to the mounting of the mains filter. If required, use serrated washers which cut through the paint surface. Connect the cabinet door to the control cabinet using the shortest possible grounding straps.

Line Routing

Avoid coupling routes between lines with high potential of noise and noise-free lines; therefore, signal, mains and motor lines and power cables have to be routed separately from another. Minimum distance: 100 mm. Provide separating sheets between power and signal lines. Ground separating sheets several times.

The lines with high potential of noise include:

- Lines at the mains connection (incl. synchronization connection)
- Lines at the motor connection

Lines at the DC bus connection

Generally, interference injections are reduced by routing cables close to grounded sheet steel plates. For this reason, cables and wires should not be routed freely in the cabinet, but close to the cabinet housing or mounting panels. Separate the incoming and outgoing cables of the radio interference suppression filter.

Interference Suppression Elements

Provide the following components in the control cabinet with interference suppression combinations:

- Contactors
- Input and output reactors
- Input filters
- Ferrite magnetic ring

Connect these combinations directly at each coil.

Twisted Wires

Twist unshielded wires belonging to the same circuit (feeder and return cable) or keep the surface between feeder and return cable as small as possible. Wires that are not used have to be grounded at both ends.

Lines of Measuring Systems

Lines of measuring systems must be shielded. Connect the shield to ground at both ends and over the largest possible surface area. The shield may not be interrupted, e.g. using intermediate terminals.

Digital Signal Lines

Ground the shields of digital signal lines at both ends (transmitter **and** receiver) over the largest possible surface area and with low impedance.

Analog Signal Lines

Ground the shields of analog signal lines at one end (transmitter **or** receiver) over the largest possible surface area and with low impedance. This avoids low-frequency interference current (in the mains frequency range) on the shield.

Connecting the Mains Choke

Keep connection lines of the mains choke at the drive controller as short as possible and twist them.

Installing the Motor Power Cable

- Use shielded motor power cables or run motor power cables in a shielded duct
- Use the shortest possible motor power cables
- Ground shield of motor power cable at both ends over the largest possible surface area to establish a good electrical connection
- Run motor lines in shielded form inside the control cabinet
- Do not use any steel-shielded lines
- The shield of the motor power cable mustn't be interrupted by mounted components, such as output chokes, sine filters or motor filters

6.2 Ground Connections

Housing and Mounting Plate

By means of appropriate ground connections, it is possible to avoid the emission of interference, because interference is discharged to ground on the shortest possible way.

Ground connections of the metal housings of EMC-critical components (such as filters, devices of the drive system, connection points of the cable shields, devices with microprocessor and switching power supply units) have to be well contacted over a large surface area. This also applies to all screw connections be-

tween mounting plate and control cabinet wall and to the mounting of a ground bus to the mounting plate.

The best solution is to use a zinc-coated mounting plate. Compared to a lacquered plate, the connections in this case have a good long-time stability.

Connection Elements

For lacquered mounting plates, always use screw connections with tooth lock washers and zinc-coated, tinned screws as connection elements. At the connection points, remove the lacquer so that there is safe electrical contact over a large surface area. You achieve contact over a large surface area by means of bare connection surfaces or several connection screws. For screw connections, you can establish the contact to lacquered surfaces by using tooth lock washers.

Metal Surfaces

Always use connection elements (screws, nuts, plain washers) with good electroconductive surface.

Bare zinc-coated or tinned metal surfaces have **good electroconductive properties**.

Anodized, yellow chromitized, black gunmetal finish or lacquered metal surfaces have **bad electroconductive properties**.

Ground Wires and Shield Connections

For connecting ground wires and shield connections, it is not the cross section but the size of contact surface that is important, as the high-frequency interference currents mainly flow on the surface of the conductor.

6.3 Installing Signal Lines and Signal Cables

Line Routing

For measures to prevent interference, see the Project Planning Manuals of the respective device. In addition, we recommend the following measures:

- Route signal and control lines separately from the power cables with a minimum distance of **100 mm** or with a grounded separating sheet. The optimum way is to route them in separate cable ducts. If possible, lead signal lines into the control cabinet at one point only.
- If signal lines are crossing power cables, route them in an angle of 90° in order to avoid interference injection.
- Ground spare cables, that are not used and have been connected, at least at both ends so that they do not have any antenna effect.
- Avoid unnecessary line lengths.
- Run cables as close as possible to grounded metal surfaces (reference potential). The ideal solution are closed, grounded cable ducts or metal pipes which, however, is only obligatory for high requirements (sensitive instrument leads).

Shielding

Connect the cable shield immediately at the devices in the shortest and most direct possible way and over the largest possible surface area.

Connect the shield of **analog signal lines** at one end over a large surface area, normally in the control cabinet at the analog device. Make sure the connection to ground/housing is short and over a large surface area.

Connect the shield of **digital signal lines** at both ends over a large surface area and in short form. In the case of potential differences between beginning and end of the line, run an additional bonding conductor in parallel. This prevents compensating current from flowing via the shield. The guide value for the cross section is 10 mm².

You absolutely have to equip separable connections with connectors with grounded metal housing.

In the case of non-shielded lines belonging to the same circuit, twist feeder and return cable.

6.4 General Measures of Radio Interference Suppression for Relays, Contactors, Switches, Chokes and Inductive Loads

If, in conjunction with electronic devices and components, inductive loads, such as chokes, contactors, relays are switched by contacts or semiconductors, appropriate interference suppression has to be provided for them:

- By arranging free-wheeling diodes in the case of d.c. operation
- In the case of a.c. operation, by arranging usual RC interference suppression elements depending on the contactor type, immediately at the inductance

Only the interference suppression element arranged immediately at the inductance does serve this purpose. Otherwise, the emitted noise level is too high which can affect the function of the electronic system and of the drive.

If possible, mechanical switches and contacts should only be realized as snap contacts. Contact pressure and contact material must be suited for the corresponding switching currents.

Slow-action contacts should be replaced by snap switches or by solid-state switches, because slow-action contacts strongly bounce and are in an undefined switching status for a long time which emits electromagnetic waves in the case of inductive loads. These waves are an especially critical aspect in the case of manometric or temperature switches.

7 Accessories

7.1 EMC Filter

7.1.1 The Function of EMC Filter

EMC filters are used to reduce radio interference and mains pollution.



EFC x610 has internal EMC filters, and the drive system can reach EMC class C3. To reach a higher EMC class of C1, external EMC filters are required.

7.2 Brake Components

7.2.1 Brake Chopper

A brake chopper is used to dissipate the energy produced by the motor during the braking process, resulting in an increased braking capability and faster deceleration of the load without over voltage trips.

EFC x610 series up to 22K0 have internal brake choppers. Only external braking resistors are needed to activate the braking function. The working principle of the internal brake chopper is shown as below:

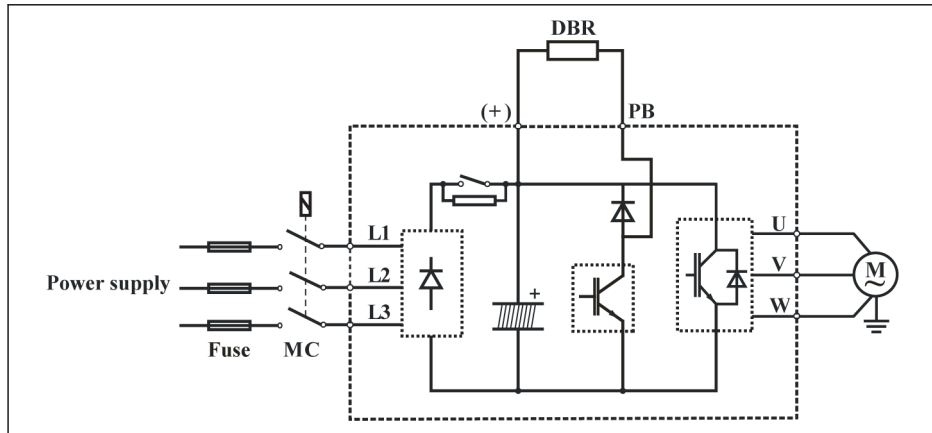


Fig. 7-1: Internal brake chopper

For detailed information about external brake chopper (30K0 and above models), please refer to "Brake Chopper Operating Instructions" (R912007235).

7.2.2 Brake Resistor

Energy regenerated when a 3-phase AC motor is decelerated (the frequency is reduced) is recovered and fed into the frequency converter. To prevent overvoltage of the frequency converter, an external braking resistor may be used. A power transistor discharges the DC bus voltage energy (braking voltage threshold at approx. 660 VDC) to the braking resistor, and the energy is lost as heat.



- If a resistance lower than the recommended value (and no less than the minimum resistance) is used, contact the agent or manufacturer for calculation of resistance power.
 - Safety and flammability of surrounding conditions shall be considered. Keep all items at least 100 mm away from the braking resistor.
 - A braking resistor can not work overload for a long time. 10 times of rated load should not exceed 5 seconds.
 - There could be smoking for the first use of the braking resistor since organic silicon is used on the surface which is normal and does not affect the performance of the braking resistor.
-

Braking resistors with different power ratings are available to dissipate braking energy when the frequency converter is in generator mode. For the selection of brake resistor, please refer to chapter 4.5 of "Brake Chopper Operating Instructions" (R912007235).

8 Service and Support

Our worldwide service network provides an optimized and efficient support. Our experts offer you advice and assistance should you have any queries. You can contact us **24/7**.

Service Germany

Our technology-oriented Competence Center in Lohr, Germany, is responsible for all your service-related queries for electric drive and controls.

Contact the **Service Helpdesk & Hotline** under:

Phone:	+49 9352 40 5060
Fax:	+49 9352 18 4941
E-mail:	service.svc@boschrexroth.de
Internet:	http://www.boschrexroth.com

Additional information on service, repair (e.g. delivery addresses) and training can be found on our internet sites.

Service worldwide

Outside Germany, please contact your local service office first. For hotline numbers, refer to the sales office addresses on the internet.

Preparing information

To be able to help you more quickly and efficiently, please have the following information ready:

- Detailed description of malfunction and circumstances resulting in the malfunction
- Type plate name of the affected products, in particular type codes and serial numbers
- Your contact data (phone and fax number as well as your email address)

9 Environmental protection and disposal

9.1 Environmental protection

Production processes

The products are made with energy- and resource-optimized production processes which allow re-using and recycling the resulting waste. We regularly try to replace pollutant-loaded raw materials and supplies by more environment-friendly alternatives.

No release of hazardous substances

Our products do not contain any hazardous substances which may be released in the case of appropriate use. Normally, our products will not have any negative influences on the environment.

Significant components

Basically, our products contain the following components:

Electronic devices

- steel
- aluminum
- copper
- synthetic materials
- electronic components and modules

Motors

- steel
- aluminum
- copper
- brass
- magnetic materials
- electronic components and modules

9.2 Disposal

Return of products

Our products can be returned to our premises free of charge for disposal. It is a precondition, however, that the products are free of oil, grease or other dirt.

Furthermore, the products returned for disposal must not contain any undue foreign material or foreign components.

Send the products "free domicile" to the following address:

Bosch Rexroth AG
Electric Drives and Controls
Buergermeister-Dr.-Nebel-Strasse 2
97816 Lohr am Main, Germany

Packaging

The packaging materials consist of cardboard, wood and polystyrene. These materials can be recycled anywhere without any problem.

For ecological reasons, please refrain from returning the empty packages to us.

Batteries and accumulators

Batteries and accumulators can be labeled with this symbol.



The symbol indicating "separate collection" for all batteries and accumulators is the crossed-out wheeled bin.

The end user within the EU is legally obligated to return used batteries. Outside the validity of the EU Directive 2006/66/EC keep the stipulated directives.

Used batteries can contain hazardous substances, which can harm the environment or the people's health when they are improperly stored or disposed of.

After use, the batteries or accumulators contained in Rexroth products have to be properly disposed of according to the country-specific collection.

Recycling

Most of the products can be recycled due to their high content of metal. In order to recycle the metal in the best possible way, the products must be disassembled into individual modules.

Metals contained in electric and electronic modules can also be recycled by means of special separation processes.

Products made of plastics can contain flame retardants. These plastic parts are labeled according to EN ISO 1043. They have to be recycled separately or disposed of according to the valid legal requirements.

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