

# MCL

Ironless Linear Motors

**Operating Instructions**  
**R911336970**

Edition 04

<b>Title</b>	MCL Ironless Linear Motors
<b>Type of Documentation</b>	Operating Instructions
<b>Document Typecode</b>	DOK-MOTOR*-MCL*****-IT04-EN-P
<b>Internal File Reference</b>	RS-c3de84b9f55a50990a6846a500e55417-4-en-US-3
<b>Purpose of Documentation</b>	This documentation ... <ul style="list-style-type: none"><li>• instructs assembly, operating and maintenance personnel</li><li>• contains basic notes about assembly, operation and maintenance of the motors of type</li></ul>
<b>Record of revisions</b>	Edition 04, 06/2020 See <a href="#">tab. 1-1 "Record of revisions" on page 1.</a>
<b>Copyright</b>	© Bosch Rexroth AG 2019 All rights reserved, also regarding any disposal, exploitation, reproduction, editing, distribution, as well as in the event of applications for industrial property rights.
<b>Liability</b>	The specified data is intended for product description purposes only and shall not be deemed to be a guaranteed characteristic unless expressly stipulated in the contract. All rights are reserved with respect to the content of this documentation and the availability of the product.
<b>Note</b>	This document has been printed on chlorine-free bleached paper.

<p style="text-align: center;"><b>D</b> Deutsch</p>	<p style="text-align: center;"><b>USA</b> English</p>	<p style="text-align: center;"><b>F</b> Français</p>
<p><b>▲WARNING</b> 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><b>▲WARNING</b> 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><b>▲AVERTISSEMENT</b> 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><b>▲WARNING</b> 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><b>▲WARNING</b> 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><b>▲AVERTISSEMENT</b> 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><b>▲WARNING</b> 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><b>▲WARNING</b> 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><b>▲AVERTISSEMENT</b> 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>
<p><b>▲WARNING</b> 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 oben genannten Personen untersagt bzw. nur nach Rücksprache mit einem Arzt erlaubt.</p>	<p><b>▲WARNING</b> 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><b>▲AVERTISSEMENT</b> 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><b>▲VORSICHT</b> Heiße Oberflächen (&gt; 60 °C)! Verbrennungsgefahr!</p> <p>Vermeiden Sie das Berühren von metallischen Oberflächen (z. B. Kühlkörpern). Abkühlzeit der Antriebskomponenten einhalten (mind. 15 Minuten).</p>	<p><b>▲CAUTION</b> Hot surfaces (&gt; 60 °C [140 °F])! 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><b>▲ATTENTION</b> Surfaces chaudes (&gt; 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>

D Deutsch	USA English	F Français
<p><b>⚠ VORSICHT</b> 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><b>⚠ CAUTION</b> 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><b>⚠ ATTENTION</b> 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>
<p><b>⚠ VORSICHT</b> Unsachgemäße Handhabung von Batterien! Verletzungsgefahr!</p> <p>Versuchen Sie nicht, leere Batterien zu reaktivieren oder aufzuladen (Explosions- und Verätzungsgefahr).</p> <p>Zerlegen oder beschädigen Sie keine Batterien. Werfen Sie Batterien nicht ins Feuer.</p>	<p><b>⚠ CAUTION</b> Improper handling of batteries! Risk of injury!</p> <p>Do not attempt to reactivate or recharge low batteries (risk of explosion and chemical burns).</p> <p>Do not dismantle or damage batteries. Do not throw batteries into open flames.</p>	<p><b>⚠ ATTENTION</b> Manipulation incorrecte de piles! Risque de blessure!</p> <p>N'essayez pas de réactiver des piles vides ou de les charger (risque d'explosion et de brûlure par acide).</p> <p>Ne désassemblez et n'endommagez pas les piles. Ne jetez pas des piles dans le feu.</p>




E Español	P Português	I Italiano
<p><b>⚠ ADVERTENCIA</b> ¡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><b>⚠ ATENÇÃO</b> 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><b>⚠ AVVERTENZA</b> 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><b>⚠ ADVERTENCIA</b> ¡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><b>⚠ ATENÇÃO</b> Alta tensão elétrica! Perigo de vida devido a choque elétrico!</p> <p>Opere componentes de acionamento apenas com condutores de proteção instalados.</p> <p>Desligue a alimentação de tensão antes de aceder aos componentes de acionamento.</p> <p>Respeite os períodos de descarga dos condensadores.</p>	<p><b>⚠ AVVERTENZA</b> 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><b>⚠ ADVERTENCIA</b> ¡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><b>⚠ ATENÇÃO</b> 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 acionamentos de forma segura.</p>	<p><b>⚠ AVVERTENZA</b> 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>




<b>E</b> Español	<b>P</b> Português	<b>I</b> Italiano
<p><b>⚠ ADVERTENCIA</b> ¡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><b>⚠ ATENÇÃO</b> 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><b>⚠ AVVERTENZA</b> 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><b>⚠ ATENCIÓN</b> ¡Superficies calientes (&gt; 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><b>⚠ CUIDADO</b> Superfícies quentes (&gt; 60 °C)! Perigo de queimaduras!</p> <p>Evite tocar superfícies metálicas (p. ex. radiadores). Respeite o tempo de arrefecimento dos componentes de acionamento (mín. 15 minutos).</p>	<p><b>⚠ ATTENZIONE</b> Superfici bollenti (&gt; 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><b>⚠ ATENCIÓN</b> ¡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><b>⚠ CUIDADO</b> 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><b>⚠ ATTENZIONE</b> 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>
<p><b>⚠ ATENCIÓN</b> ¡Manejo inadecuado de las pilas! ¡Peligro de lesiones!</p> <p>No trate de reactivar o cargar pilas descargadas (peligro de explosión y cauterización).</p> <p>No desarme ni dañe las pilas. No tire las pilas al fuego.</p>	<p><b>⚠ CUIDADO</b> Manejo incorreto de baterias! Perigo de ferimentos!</p> <p>Não tente reativar nem carregar baterias vazias (perigo de explosão e de queimaduras com ácido).</p> <p>Não desmonte nem danifique as baterias. Não deite as baterias no fogo.</p>	<p><b>⚠ ATTENZIONE</b> Utilizzo inappropriato delle batterie! Pericolo di lesioni!</p> <p>Non tentare di riattivare o ricaricare batterie scariche (pericolo di esplosione e corrosione).</p> <p>Non scomporre o danneggiare le batterie. Non gettare le batterie nel fuoco.</p>

<b>S</b> Svenska	<b>DK</b> Dansk	<b>NL</b> Nederlands
<p><b>⚠ VARNING</b> 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><b>⚠ ADVARSEL</b> 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><b>⚠ WAARSCHUWING</b> 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><b>⚠ VARNING</b> 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><b>⚠ ADVARSEL</b> 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><b>⚠ WAARSCHUWING</b> 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 ontlaadtijden van condensatoren in acht.</p>

S Svenska	DK Dansk	NL Nederlands
<p><b>⚠ VARNING</b> Farliga rörelser! Livsfaral</p> <p>Uppehåll dig inte inom maskiners och maskindelarers 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><b>⚠ ADVARSEL</b> Farlige bevægelser! 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>Stands drevene helt, inden du rører ved drevene eller træder ind i deres fareområde.</p>	<p><b>⚠ WAARSCHUWING</b> 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>
<p><b>⚠ VARNING</b> 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><b>⚠ ADVARSEL</b> 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><b>⚠ WAARSCHUWING</b> 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><b>⚠ OBSERVERA</b> Varma ytor (&gt; 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><b>⚠ FORSIGTIG</b> Varme overflader (&gt; 60 °C)! Risiko for forbrændinger!</p> <p>Undgå at berøre metaloverflader (f.eks. køleelementer). Overhold drive components nedkølingstid (min. 15 min.).</p>	<p><b>⚠ VOORZICHTIG</b> Hete oppervlakken (&gt; 60 °C)! Verbrandingsgevaar!</p> <p>Voorkom contact met metalen oppervlakken (bijv. Koellichamen). Afkoeltijd van de aandrijvingscomponenten in acht nemen (min. 15 minuten).</p>
<p><b>⚠ OBSERVERA</b> Felaktig hantering vid transport och montering! Skaderisk!</p> <p>Använd passande monterings- och transportanordningar.</p> <p>Använd lämpliga verktyg och personlig skyddsutrustning.</p>	<p><b>⚠ FORSIGTIG</b> Fejlhåndtering ved transport og montering! Risiko for kvæstelser!</p> <p>Benyt egnede monterings- og transportanordninger.</p> <p>Benyt egnet værktøj og personligt sikkerhedsudstyr.</p>	<p><b>⚠ VOORZICHTIG</b> Onjuist gebruik bij transport en montage! Letselgevaar!</p> <p>Gebruik geschikte montage- en transportinrichtingen.</p> <p>Gebruik geschikt gereedschap en een persoonlijke veiligheidsuitrusting.</p>
<p><b>⚠ OBSERVERA</b> Felaktig hantering av batterier! Skaderisk!</p> <p>Försök inte återaktivera eller ladda upp batterier (risk för explosioner och frätskador).</p> <p>Batterierna får inte tas isär eller skadas. Släng inte batterierna i elden.</p>	<p><b>⚠ FORSIGTIG</b> Fejlhåndtering af batterier! Risiko for kvæstelser!</p> <p>Forsøg ikke at genaktivere eller oplade tomme batterier (eksplosions- og ætsningsfare).</p> <p>Undlad at skille batterier ad eller at beskadige dem. Smid ikke batterier ind i åben ild.</p>	<p><b>⚠ VOORZICHTIG</b> Onjuist gebruik van batterijen! Letselgevaar!</p> <p>Probeer nooit lege batterijen te reactiveren of op te laden (explosiegevaar en gevaar voor beschadiging van weefsel door cauterisatie).</p> <p>Batterijen niet demonteren of beschadigen. Nooit batterijen in het vuur werpen.</p>

 Suomi	 Polski	 Český
<p><b>VAROITUS</b> Näiden turvaohjeiden noudattamatta jättämisestä on seurauksena hengenvaara!</p> <p>Ota tuote käyttöön vasta sen jälkeen, kun olet lukenut läpi tuotteen mukana toimitetut asiakirjat ja turvallisuusohjeet, 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><b>OSTRZEŻENIE</b> 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><b>VAROVÁNÍ</b> 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><b>VAROITUS</b> 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 purkausajat.</p>	<p><b>OSTRZEŻENIE</b> 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>Zwracać uwagę na czas rozładowania kondensatorów.</p>	<p><b>VAROVÁNÍ</b> 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><b>VAROITUS</b> 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><b>OSTRZEŻENIE</b> Niebezpieczne ruchy! Zagrożenie życia!</p> <p>Nie wolno przebywać w obszarze pracy maszyny i jej elementów.</p> <p>Nie dopuszczać 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><b>VAROVÁNÍ</b> Nebezpečné pohyby! Nebezpečí života!</p> <p>Nezdržujte 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 pohonu.</p>
<p><b>VAROITUS</b> Sähkömagneettisia/ magneettisia kenttiä! Terveystieteellisten haittojen vaara henkilöille, joilla on sydämentahdistin, metallinen implantti tai kuulolaite!</p> <p>Yllä mainituilta henkilöiltä on pääsy kielletty alueelle, joilla asennetaan tai käytetään käyttölaitteen komponentteja, tai heidän on ensin saatava tähän suostumus lääkäriltään.</p>	<p><b>OSTRZEŻENIE</b> 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><b>VAROVÁNÍ</b> 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><b>HUOMIO</b> Kuumia pintoja (&gt; 60 °C)! Palovammojen vaara!</p> <p>Vältä metallipintojen koskettamista (esim. jäähdytyslevyt). Noudata käyttölaitteen komponenttien jäähtymisaikoja (väh. 15 minuuttia).</p>	<p><b>PRZESTROGA</b> Gorące powierzchnie (&gt; 60 °C)! Niebezpieczeństwo poparzenia!</p> <p>Unikać kontaktu z powierzchniami metalowymi (np. radiatorami). Przestrzegać czasów schładzania podzespołów napędów (min. 15 minut).</p>	<p><b>UPOZORNĚNÍ</b> Horké povrchy (&gt; 60 °C)! Nebezpečí popálení!</p> <p>Nedotýkejte se kovových povrchů (např. chladičích těles). Dodržujte dobu ochlazení komponent pohonu (min. 15 minut).</p>

 Suomi	 Polski	 Český
<p><b>▲ HUOMIO</b> Epäasianmukainen käsittely kuljetuksen ja asennuksen yhteydessä! Loukkaantumisaara!</p> <p>Käytä soveltuvia asennus- ja kuljetuslaitteita.</p> <p>Käytä omia työkaluja ja henkilökohtaisia suojavarusteita.</p>	<p><b>▲ PRZESTROGA</b> 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><b>▲ UPOZORNĚNÍ</b> 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>
<p><b>▲ HUOMIO</b> Paristojen epäasianmukainen käsittely! Loukkaantumisaara!</p> <p>Älä yritä saada tyhjiä paristoja toimimaan tai ladata niitä uudelleen (räjähdys- ja syöpymisaara).</p> <p>Älä hajota paristoja osiin tai vaurioita niitä. Älä heitä paristoja tullen.</p>	<p><b>▲ PRZESTROGA</b> Niewłaściwe obchodzenie się z bateriami! Ryzyko urazu!</p> <p>Nie próbować reaktywować i nie ładować zużytych baterii (niebezpieczeństwo wybuchu oraz poparzenia żrącą substancją).</p> <p>Nie demontować i nie niszczyć baterii. Nie wrzucać baterii do ognia.</p>	<p><b>▲ UPOZORNĚNÍ</b> Nesprávné zacházení s bateriemi! Nebezpečí zranění!</p> <p>Nepokoušejte se znovu aktivovat nebo dobíjet prázdné baterie (nebezpečí výbuchu a poleptání).</p> <p>Nerozebírejte ani nepoškozujte baterie. Neházejte baterie do ohně.</p>

 Slovensko	 Slovenčina	 Română
<p><b>▲ OPOZORILO</b> 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><b>▲ VAROVANIE</b> Nebezpečnostv ohrozenia života pri nedodržiavaní 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><b>▲ AVERTIZARE</b> 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><b>▲ OPOZORILO</b> 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><b>▲ VAROVANIE</b> Vysoké elektrické napätie! Nebezpečnostv 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><b>▲ AVERTIZARE</b> 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><b>▲ OPOZORILO</b> 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><b>▲ VAROVANIE</b> Pohyby prinášajúce nebezpečnostv! Nebezpečnostv ohrozenia života!</p> <p>Nezdržiaavajte sa v oblasti pohybu strojov a častí strojov.</p> <p>Zabráňte nepovolanému prístupu osôb.</p> <p>Pred zásahom alebo prístupom do nebezpečnej oblasti uveďte pohony bezpečne do zastavenia.</p>	<p><b>▲ AVERTIZARE</b> 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><b>⚠ OPOZORILO</b> 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><b>⚠ VAROVANIE</b> Elektromagnetické/ magnetické polia! Nebezpečenstvo pre zdravie osôb s kardioštimulátormi, 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><b>⚠ AVERTIZARE</b> Câmpuri electromagnetice / magnetice! Pericol pentru sănătatea persoanelor cu stimuloare 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><b>⚠ POZOR</b> Vroče površine (&gt; 60 °C)! Nevarnost opeklin!</p> <p>Izogibajte se stiku s kovinskimi površinami (npr. hladilnimi telesii). Upoštevajte čas hlajenja pogonskih komponent (najm. 15 minut).</p>	<p><b>⚠ UPOZORNENIE</b> Horúce povrchy (&gt; 60 °C)! Nebezpečenstvo popálenia!</p> <p>Zabráňte kontaktu s kovovými povrchmi (napr. chladiacimi telesami). Dodržiavajte čas vychladenia komponentov pohonu (min. 15 minút).</p>	<p><b>⚠ ATENȚIE</b> Suprafețe fierbinți (&gt; 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><b>⚠ POZOR</b> Nestrokovno ravnanje med transportom in nameštivijo! Nevarnost poškodb!</p> <p>Uporablajte ustrezne pripomočke za nameščanje in transport.</p> <p>Uporabite ustrezno orodje in osebno zaščitno opremo.</p>	<p><b>⚠ UPOZORNENIE</b> 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><b>⚠ ATENȚIE</b> 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>
<p><b>⚠ POZOR</b> Nepravilno ravnanje z baterijami! Nevarnost poškodb!</p> <p>Ne poskušajte ponovno aktivirati ali napolniti praznih baterij (Nevarnost zaradi eksplozije ali jedkanja).</p> <p>Ne razstavljajte ali poškodujte nobenih baterij. Baterij ne mečite v ogenj.</p>	<p><b>⚠ UPOZORNENIE</b> Neodborná manipulácia s batériami! Nebezpečenstvo poranenia!</p> <p>Nepokúšajte sa reaktivovať alebo nabíjať prázdne batérie (nebezpečenstvo výbuchu a poleptania).</p> <p>Batérie nerozoberajte ani nepoškodzuje. Nehádzte batérie do ohňa.</p>	<p><b>⚠ ATENȚIE</b> Manipulare necorespunzătoare a bateriilor! Pericol de vătămare!</p> <p>Nu încercați să reactivați sau să încărcați bateriile goale (pericol de explozie și pericol de arsuri).</p> <p>Nu dezasamblați și nu deteriorați bateriile. Nu aruncați bateriile în foc.</p>

H Magyar	BG Български	LV Latviski
<p><b>⚠ FIGYELMEZTETÉS!</b> Az alábbi biztonsági útmutatások figyelmen kívül hagyása életveszélyes helyzethez 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><b>⚠ ПРЕДУПРЕЖДЕНИЕ</b> Опасност за живота при неспазване на посочените подолу 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><b>⚠ BRĪDINĀJUMS</b> Turpinājuma doto drošības norādījumu neievērošana var apdraudēt dzīvību!</p> <p>Sāciet lietot izstrādājumu tikai pēc tam, kad esat pilnībā izlasījuši, sapratuši un nēmuši 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 drīkst veikt tikai kvalificēts personāls.</p> <p>Detalizētus paskaidrojumus attiecībā uz drošības norādījumiem skatiet šī dokumenta 1. nodaļā.</p>
<p><b>⚠ FIGYELMEZTETÉS!</b> 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><b>⚠ ПРЕДУПРЕЖДЕНИЕ</b> 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><b>⚠ BRĪDINĀJUMS</b> 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>

H Magyar	BG Български	LV Latviski
<p><b>▲ FIGYELMEZTETÉS!</b> Veszélyes mozgás! Életveszély!</p> <p>Ne tartózkodjon a gépek és a gépkatrészek 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><b>▲ ПРЕДУПРЕЖДЕНИЕ</b> 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><b>▲ BRĪDINĀJUMS</b> 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>
<p><b>▲ FIGYELMEZTETÉS!</b> Elektromágneses / mágneses mező! Káros hatással lehet a szívritmus-szabályozó készülékkel, fémbelüktetéssel 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><b>▲ ПРЕДУПРЕЖДЕНИЕ</b> 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><b>▲ BRĪDINĀJUMS</b> 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><b>▲ VIGYÁZAT!</b> Forró felületek (&gt; 60 °C)! Égésveszély!</p> <p>Ne érjen hozzá fémfelületekhez (pl. hűtőtetekhez)! Vegye figyelembe a hajtás alkatrészeinek kihűlési idejét (min. 15 perc)!</p>	<p><b>▲ ВНИМАНИЕ</b> Горещи повърхности (&gt; 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><b>▲ UZMANĪBU</b> Karstas virsmas (&gt; 60 °C)! Apdedzināšanās risks!</p> <p>Neskarīties pie metāliskām virsmām (piemēram, dzesētāja). Ļaujiet piedziņas komponentiem atdzist (min. 15 minūtes).</p>
<p><b>▲ VIGYÁZAT!</b> 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><b>▲ ВНИМАНИЕ</b> 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><b>▲ UZMANĪBU</b> 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>
<p><b>▲ VIGYÁZAT!</b> Akkumulátorok szakszerűtlen kezelése! Sérülésveszély!</p> <p>Üres akkumulátorokat ne aktiváljon újra, illetve ne töltsön fel (robbanás- és marásveszély)!</p> <p>Az akkumulátorokat ne szedje szét, és ne rongálja meg! Az akkumulátort ne dobja tűzbe!</p>	<p><b>▲ ВНИМАНИЕ</b> Неправилно боравене с батерии! Опасност от нараняване!</p> <p>Не се опитвайте да активирате отново или да зареждате разредени батерии (Опасност от експлозия и напръскване с агресивен агент).</p> <p>Не разглобявайте и не повреждайте батерии. Не хвърляйте батерии в огън.</p>	<p><b>▲ UZMANĪBU</b> Nepareiza bateriju lietošana! Traumu gūšanas risks!</p> <p>Nemēģiniet no jauna aktivizēt vai uzlādēt tukšas baterijas (eksploziju un ķīmisko apdegumu draudi).</p> <p>Neizjauciet un nesabojājat baterijas. Nemetiet baterijas ugunī.</p>

<p style="text-align: center;"><b>LT</b> Lietuviškai</p>	<p style="text-align: center;"><b>EST</b> Eesti</p>	<p style="text-align: center;"><b>GR</b> Ελληνικά</p>
<p><b>⚠️ ISPĖJIMAS</b> 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 igaliotus 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><b>⚠️ HOIATUS</b> Alljärgnevatate ohutusjuhiste eiramine on eluohtlik!</p> <p>Võtke tooted käiku 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><b>⚠️ ΠΡΟΕΙΔΟΠΟΙΗΣΗ</b> 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><b>⚠️ ISPĖJIMAS</b> Aukšta elektros įtampa! Pavojus gyvybei dėl elektros smūgio!</p> <p>Pavaros komponentus eksploatuokite tik su fiksuotai instaliuotu apsauginiu laidu.</p> <p>Prieš prieidami prie pavaros komponentų išjunkite maitinimo įtampą.</p> <p>Atsižvelkite į kondensatorių išsikrovimo trukmę.</p>	<p><b>⚠️ HOIATUS</b> Kõrge elektripinge! Eluohtlik elektrilõõgi tõttu!</p> <p>Käitage ajamikomponente üksnes püsival installaeritud maandusega.</p> <p>Lülitage enne ajamikomponentidega tööde alustamist toitepinge välja.</p> <p>Järgige kondensaatorite mahalaadumisaegu.</p>	<p><b>⚠️ ΠΡΟΕΙΔΟΠΟΙΗΣΗ</b> 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><b>⚠️ ISPĖJIMAS</b> Pavojingi judesiai! Pavojus gyvybei!</p> <p>Nebūkite mašinų ar jų dalių judėjimo zonoje. Neleiskite netyčia patekti asmenims.</p> <p>Prieš patekdam į pavojaus zoną saugiai išjunkite pavaras.</p>	<p><b>⚠️ HOIATUS</b> Ohtlikud liikumised! Eluohtlik!</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><b>⚠️ ΠΡΟΕΙΔΟΠΟΙΗΣΗ</b> Επικίνδυνες τάσεις! Κίνδυνος θανάτου!</p> <p>Μην στέκεστε στην περιοχή κίνησης μηχανημάτων και εξαρτημάτων.</p> <p>Αποτρέψτε 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>
<p><b>⚠️ ISPĖJIMAS</b> 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><b>⚠️ HOIATUS</b> Elektromagnetilised / magnetilised väljad! Terviseohtlik südamestimulaatorite, metallimplantaatide ja kuulmisseadmetega inimestele!</p> <p>Sisenemine piirkondadesse, kus toimub ajamikomponentide monteerimine ja käitamine, on ülalnimetatud isikutele keelatud või lubatud üksnes pärast arstiga konsulteerimist.</p>	<p><b>⚠️ ΠΡΟΕΙΔΟΠΟΙΗΣΗ</b> 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 κατόπι συνεννόησης με γιατρό.</p>
<p><b>⚠️ PERSPĖJIMAS</b> Karšti paviršiai (&gt; 60 °C)! Nudėgimo pavojus!</p> <p>Venkite liesti metalinius paviršius (pvz., radiatorių). Išlaikykite pavaros komponentų atvėsimą trukmę (bent 15 minučių).</p>	<p><b>⚠️ ETTEVAATUST</b> Kuumad välispinnad (&gt; 60 °C)! Põletusoh!</p> <p>Vältige metalsete välispindade (nt radiaatorid) puudutamist. Pidage kinni ajamikomponentide mahajahtumisaegast (vähemalt 15 minutit).</p>	<p><b>⚠️ ΠΡΟΣΟΧΗ</b> Καυτές επιφάνειες (&gt; 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>

LT Lietuviškai	EST Eesti	GR Ελληνικά
<p><b>⚠ PERSPĖJIMAS</b> Netinkamas darbas transportuojant ir montuojant! Susižalojimo pavojus!</p> <p>Naudokite tinkamus montavimo ir transportavimo įrenginius.</p> <p>Naudokite tinkamus įrankius ir asmens saugos priemones.</p>	<p><b>⚠ ETTEVAATUSTI</b> Asjatundmatu käsitsemine transportimisel ja montaažil! Vigastusoht!</p> <p>Kasutage sobivaid montaaži- ja transportiseadiseid.</p> <p>Kasutage sobivaid tööriistu ja isiklikku kaitsevarustust.</p>	<p><b>⚠ ΠΡΟΣΟΧΗ</b> 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>
<p><b>⚠ PERSPĖJIMAS</b> Netinkamas darbas su baterijomis! Susižalojimo pavojus!</p> <p>Nebandykite tuščią bateriją reaktivuoti arba įkrauti (sprogimo ir išėsdinimo pavojus).</p> <p>Neardykite ir nepažeiskite baterijų.</p> <p>Nemeskite baterijų į ugnį.</p>	<p><b>⚠ ETTEVAATUSTI</b> Patareide asjatundmatu käsitsemine! Vigastusoht!</p> <p>Ärge üritage kunagi tühje patareisid reaktiveerida või täis laadida (plahvatus- ja söövitusoht).</p> <p>Ärge demonteerige ega kahjustage patareisid. Ärge visake patareisid tulle.</p>	<p><b>⚠ ΠΡΟΣΟΧΗ</b> Ακατάλληλος χειρισμός μπαταριών! Κίνδυνος τραυματισμού!</p> <p>Μην επιδιώκετε να ενεργοποιήσετε ξανά ή να φορτίσετε κενές μπαταρίες (κίνδυνος έκρηξης και διάβρωσης).</p> <p>Μην διαλύετε ή καταστρέφετε τις μπαταρίες. Μην απορρίπτετε τις μπαταρίες στη φωτιά.</p>

CN 中文
<p><b>⚠ 警告</b> 如果不按照下述指定的安全说明使用，将会导致人身伤害！</p> <p>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。</p> <p>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。</p> <p>只允许有资格人员对驱动器部件进行操作。</p> <p>安全说明的详细解释在本文档的第一章。</p>
<p><b>⚠ 警告</b> 高压！电击导致生命危险！</p> <p>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。</p> <p>在接触驱动器部件前先将驱动器部件断电。</p> <p>确保电容放电时间。</p>
<p><b>⚠ 警告</b> 危险运动！生命危险！</p> <p>保证设备的运动区域内和移动部件周围无障碍物。</p> <p>防止人员意外进入设备运动区域内。</p> <p>在接近或进入危险区域之前，确保传动设备安全停止。</p>
<p><b>⚠ 警告</b> 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！</p> <p>上述人员禁止进入安装及运行的驱动器区域，或者必须事先咨询医生。</p>
<p><b>⚠ 小心</b> 热表面（大于 60 度）！灼伤风险！</p> <p>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）。</p>
<p><b>⚠ 小心</b> 安装和运输不当导致受伤危险！当心受伤！</p> <p>使用适当的运输和安装设备。</p> <p>使用适合的工具及用适当的防护设备。</p>
<p><b>⚠ 小心</b> 电池操作不当！受伤风险！</p> <p>请勿对低电量电池重新激活或重新充电（爆炸和腐蚀的危险）。</p> <p>请勿拆解或损坏电池。请勿将电池投入明火中。</p>

# Table of Contents

	Page
<b>1</b>	<b>About this documentation..... 1</b>
1.1	Validity of the documentation ..... 1
1.2	Editions of this documentation..... 1
1.3	Additional documentation..... 1
1.4	Presentation of information..... 1
<b>2</b>	<b>Safety instructions..... 3</b>
2.1	About this product..... 3
2.2	Intended use..... 3
2.3	Unintended use..... 3
2.4	Qualification of personnel..... 4
2.5	General safety instructions..... 4
2.6	Product- and technology-dependent safety instructions ..... 4
2.6.1	Protection from electric voltage..... 4
2.6.2	Protection from mechanical danger..... 4
2.6.3	Protection against magnetic and electromagnetic fields..... 5
2.6.4	Protection during handling and assembly..... 6
2.6.5	Protection against burns..... 7
2.6.6	Electrostatic sensitive devices (EGB)..... 8
<b>3</b>	<b>Scope of delivery..... 9</b>
<b>4</b>	<b>About this product..... 11</b>
4.1	Product description..... 11
4.1.1	Technical features..... 11
4.2	Identification..... 11
4.2.1	Identification MCP primary part ..... 11
4.2.2	Identification MCS secondary part..... 13
4.3	Acceptances and approvals..... 14
4.3.1	CE..... 14
4.3.2	EAC..... 14
4.3.3	RoHS..... 14
4.3.4	China RoHS 2..... 14
<b>5</b>	<b>Transport and storage..... 15</b>
5.1	Notes about transport..... 15
5.2	Storage instructions..... 16
<b>6</b>	<b>Assembly..... 19</b>
6.1	Basic precondition..... 19
6.2	Installation of motor components..... 19
6.3	Air-gap, parallelism and symmetry of the motor components..... 19

## Table of Contents

	Page
6.4	Fastening secondary part..... 21
6.5	Fastening the primary part..... 23
6.6	Electrical connection..... 24
6.6.1	Power connection ..... 24
6.6.2	Connection Hall unit..... 30
6.6.3	Connection digital Hall sensor and length measuring system via Hall sensor adapter box SHL03.1..... 30
<b>7</b>	<b>Commissioning and operation..... 31</b>
7.1	Safety..... 31
7.2	Environmental conditions during operation..... 31
7.3	Commissioning..... 32
7.4	Operation..... 33
<b>8</b>	<b>Maintenance and repair..... 35</b>
8.1	Cleaning and servicing..... 35
8.2	Service repair, maintenance and spare parts..... 36
<b>9</b>	<b>Disassembly..... 37</b>
<b>10</b>	<b>Environmental protection and disposal ..... 39</b>
<b>11</b>	<b>Troubleshooting..... 41</b>
11.1	Procedure..... 41
<b>12</b>	<b>Technical data..... 43</b>
<b>13</b>	<b>Appendix..... 45</b>
13.1	Declaration of conformity..... 45
	<b>Index..... 47</b>

# 1 About this documentation

## 1.1 Validity of the documentation

This instruction has to be complied with by assemblers, operator, service engineers and facility operators. It contains notes about handling the motor components primary and secondary part of an ironless linear motor.

Before operating motors, read this operating instruction to ensure a safe and smooth functionality and a long motor lifetime.





## 1.2 Editions of this documentation

Edition	Release date	Notes
04	2020-06	EAC and RoHs2 labels amended, type plate adjusted
03	2019-12	Update of technical data, dimension sheets and assembly notes
02	2016-06	Revision and amendment
01	2012-02	First edition

Tab. 1-1: Record of revisions

## 1.3 Additional documentation

This operating instruction is only valid with the following Rexroth documentation:

	Title	Document type	Document number
	MCL Ironless Linear Motors	Project Planning Manual	DOK-MOTOR*-MCL*****-PR□□-□□-P
	IndraDrive Cs Drive Systems with HCS01	Project Planning	DOK-INDRV*-HCS01*****-PR□□-□□-P
	Connection cables	Selection Data	DOK-CONNEX-CABLE*INDRV-AU□□-□□-P
	Electromagnetic Compatibility (EMC) in Drive and Control Systems	Project Planning Manual	DOK-GENERL-EMC*****-PR□□-□□-P

Tab. 1-2: Additional documentation

## 1.4 Presentation of information

**Safety instructions** The safety notes in this documentation describe signal words (danger, warning, caution, note) and a signal symbol (acc. to ANSI Z535.6-2006).

The signal word is intended to draw your attention to the safety instructions and describes the seriousness of the danger. The warning triangle with exclamation mark indicates the danger for persons.

 **DANGER**

Non-compliance with this safety instructions **will** result in death or severe personal injury.

**⚠ WARNING**

Non-compliance with this safety instructions **can** result in death or severe personal injury.













**⚠ CAUTION**

Non-compliance with this safety instructions can result in moderate or minor personal injury.

**NOTICE**

Non-compliance with this safety instructions can result in material damage.

**Symbols**

Symbol	Meaning
	Reference to supplementary documentation
	This note gives important information, which must be observed.
	Single, independent handling step
1. 2. 3.	Numbered instruction: The numbers show that the action steps must be taken one after the other.
	Warning against dangerous electric voltage.
	Warning against hot surfaces.
	Warning against rotating machine parts.
	Warning against overhead load.
	Warning against crushing hazard.
	Electrostatic sensitive devices.
	Access for persons with cardiac pacemaker forbidden.
	Do not carry along metal parts or clocks.
	Hammer scales are forbidden.

Tab. 1-3: *Meaning of symbols*

## 2 Safety instructions

### 2.1 About this product

Observe the general safety notes in this chapter and the safety instructions in this documentation. Therewith, you avoid personal danger, damage and errors.



This operating instruction must be stored and transferred in case of sale during the complete product lifetime.

### 2.2 Intended use



Handle all motor components carefully, in all kinds of situations. Pay close attention to the safety notes and notes regarding the magnetic pull of the permanent magnets on the secondary part.

Prerequisites for proper and safe use of the motors are proper transport, appropriate storage, proper assembly and connection, careful maintenance, operation and overhaul.

The motors have been designed for installation in industrial machinery. The motors are according to the following standards and directives.

#### Standards

DIN EN 60034-1	Rating and performance behavior
DIN EN 60034-5	Degree of protection

#### Directives

2006/95/EG	Low voltage directive
------------	-----------------------

The machine manufacturer must evaluate the electric and mechanic safety as well as environmental influences in the assembled state of the machine according to the Machine Directive 2006/42/EC and DIN EN 60204-1 (safety of machines).

The electric installation must comply with the protection requirements of the EMC Directive 2004/108/EC. The plant manufacturer is responsible for appropriate installation (for example: physical separation of signal and power cables, using shielded cables, ...). The EMC instructions of the converter manufacturer must be observed.

Start-up is prohibited as long as the conformity with these directives is declared.

### 2.3 Unintended use

Any use of the motors outside of the specified fields of application or under operating conditions and technical data other than those specified in this documentation is considered to be "inappropriate use".

Unless explicitly provided for this purpose, the motors may not be used in explosion-hazardous areas (ATEX).

#### Trademark right third parties

Observe the trademark rights of third parties during assembly and use of single components delivered from Bosch Rexroth. For any infringement of the right, the customer is liable for the accruing damage.

## 2.4 Qualification of personnel

This operating instruction is intended for persons, who are familiar with transportation, installation, assembly, start-up and operation of components of electric drive and control systems and therewith associated danger and they must have appropriate qualifications.

All persons, working on, with or near an electric facility, must know the safety requirements, safety instructions and operating instructions (DIN EN 50110-1).

## 2.5 General safety instructions

Do not install or operate motors or components of an electric drive and control system, as long as you have not read and understood all relevant documents.

Please observe the respectively valid national, local and plant-specific regulations, the safety notes in the documentation and the warning signs on the components.

**Improper use of the components and non-observance of the described safety notes can lead to damage, bodily injury, electric shock or in extreme case lead to death.**

In the case of damage due to non-observance of the safety notes, Bosch Rexroth assumes no liability.

## 2.6 Product- and technology-dependent safety instructions

### 2.6.1 Protection from electric voltage

**Work required on the electric system may only be carried out by skilled electricians. Tools for electricians (VDE tools) are absolutely necessary.**

Before working:

1. Enable.
2. Secure against reactivation.
3. Ensure de-energization.
4. Ground and short-circuit.
5. Cover or shield any adjacent live parts.

After completing the job, cancel the measures in reverse order.

**Dangerous voltage occurs during operation! Danger to life, risk of injury by electric shock!**

- Before start-up, connect the protective conductors on all electric components according to the connection plan.
- Operation, even for short measuring purposes is only allowed with fixed connected protective conductor on the specified points of the components.

### 2.6.2 Protection from mechanical danger

**Dangerous movements! Danger to life, risk of injury, heavy injury or material damage.**

- Do not stay within the motion zone of the machine. Avoid unauthorized access into the danger zone.

- Additionally secure vertical axes to prevent them from sinking or descending after having shutdown the motor, for instance as follows:
  - Mechanically lock the vertical axis,
  - providing an external braking / catching / clamping device, or
  - ensuring sufficient equilibration of the vertical axis.

### 2.6.3 Protection against magnetic and electromagnetic fields

Magnetic and electromagnetic fields are created in the direct environment of live conductors or permanent magnets of electro motors and are a serious danger for persons. The machine operator must sufficiently protect personnel working in these areas from possibly occurring damage by suitable measures (e.g. warning notes, protective clothes, designation of the danger zone). Observe the safety instructions [chapter 2.6.4 "Protection during handling and assembly" on page 6](#).

Observe the country-specific regulations. For Germany, please observe the specifications of the occupational insurance association BGV B11 and BGR B11 regarding "electromagnetic fields".

#### **Electro magnetic and magnetic fields!**

#### **Danger for persons with active body aids or passive metallic implants and for pregnant women.**

- For persons with active body aids (like heart pacemakers), passive metallic implants (like hip prosthesis) and pregnant women possible hazards exist due to electro magnetic or magnetic fields in direct environment of electric drive and control components and the corresponding live conductors.

Access into these areas can be dangerous for these persons:

- Areas, in which components of electrical drive and control systems and corresponding live conductors are mounted, activated or operated.
- Areas in which motor parts with permanent magnets are stored, repaired or assembled.
- Above mentioned persons must contact their attending physician before entering these areas.
- Please observe the valid industrial safety regulations for plants which are fitted with components of electrical drive and control systems and corresponding live conductors.

#### **Risk of destruction of sensitive parts! Data loss!**

- Keep watches, credit cards, check cards and identity cards and all ferromagnetic metal parts, such as iron, nickel and cobalt away from permanent magnets.

#### **Crushing hazard of fingers and hand due to heavy attractive forces of the magnets!**

The attractive force of the permanent magnets have an effect on all magnetic materials. These attractive forces surge especially within a neighborhood < 100 mm. Loose or not fastened components made of magnetizable materials can abruptly and inadvertently attracted with the permanent magnets. Apart from crushing hazard, even the danger of chipping recalcitrant material, causing eye injury, exists.

- Extreme caution during handling of motor components with permanent magnets. Do never underestimate strong attractive forces.
- Never work alone.
- Use personal safety equipment (e.g. protective gloves, protective glasses).
- Unpack single motor components with permanent magnets immediately prior mounting.
- Do not unpack several motor components with permanent magnets or directly place them side by side at your working space.
- Do not bring magnetized or magnetizable materials in the area of permanent magnets. If using magnetizable tools cannot be avoided, hold on the tool very tight, move carefully and observe the attractive force effect of the permanent magnets.

#### **Behavior in the case of accidents with permanent magnets**

During work with permanent magnets, the following emergency tools must be ready to use in the case of an accident to release impacted body parts (like fingers, hands, arms a.s.o.):

- Hammer (3-5kg) made of non-magnetized material like brass
- Minimum 2 wedges with approx. 10 - 15 ° lip angles made of non-magnetized material like brass, wood or similar to impact driving into the cutting slit.
- A crowbar made of brass.

#### **In the case of an accident:**

- Keep calm!
- If the machine is live, immediately de-energize (emergency button).
- Give first aid or request appropriate help (e.g. emergency doctor).
- Disconnect magnetic adherent parts with the emergency tools. Therefore, beat the wedges with a hammer into the cutting slit to free the caught body parts.

## **2.6.4 Protection during handling and assembly**

Motor components with permanent magnets (e.g. secondary parts of a synchronous linear motor or rotor of a synchronous kit motor) create very strong attractive forces from ferromagnetic parts like further motor components with permanent magnets or parts of iron, nickel or cobalt.

Please observe the safety notes about strong attractive forces of permanent magnets under [chapter 2.6.3 "Protection against magnetic and electromagnetic fields"](#) on page 5.

The attractive forces of the permanent magnets influence all magnetizable materials. Especially in an area < 100 mm, the attractive forces rise. Surrounding components can abruptly and inadvertently be attracted by the permanent magnets. Apart from crushing hazard, even the danger of chipping recalcitrant material, causing eye injury, exists.

Use the origin package of the motor components for transport and storage only. The origin package of Rexroth is constructed in such a way that the motor components with the permanent magnets are positioned within the package with suitable distance, providing that the package is correctly used.

Observe the following instructions during unpacking and handling.

- Instruct the personal with regard to the danger.
- Use personal safety equipment (e.g. protective gloves, protective glasses).
- Store all components in its origin package until assembly and for transport.
- Do only work on clean working spaces in which no ferromagnetic parts exist.
- If possible, use non-magnetic tools, e.g. made from aluminum or brass.
- Remove only one motor component from the package and secure it on your working space against slipping, rolling away.

Instruct all participating persons about the dangers and if necessary, expand the preliminary instructions.

**Store the original package of the motor components with permanent magnets**  
Store the original package for later use.

In the case of reuse, ensure a good readability of the safety notes on the package. They must not be paste over!

**Risk of injuries due to improper handling! Bodily injury due to crushing, scissors, cutting, punching!**

- Observe the instructions on the package.
- Store the motor components with permanent magnets in the original package, only.
- Do not internally store or transport the motor components unpacked.
- Observe the accident prevention regulations.
- Use suitable assembly and transport equipment.
- Prevent clamping and squeezing by means of suitable measures.
- Use suitable tools, if necessary use special tools.
- Properly use lifting devices and tools.
- Use suitable safety equipment (like protective helmets, protective glasses, safety shoes, protective gloves).
- Never walk under hanging loads.
- Immediately remove spill on the ground, otherwise risk of falling!

## 2.6.5 Protection against burns

**Risk of burns due to hot motor surfaces!**

- Avoid contact with hot motor surfaces. **Temperatures may rise to over 60°C.**
- Allow the motor components to cool down long enough before touching them.
- Temperature-sensitive components may not come into contact with the motor surface. Ensure appropriate mounting distance of connection cables and other components.

## 2.6.6 Electrostatic sensitive devices (EGB)

Rexroth motors contain parts which underlie an electrostatic danger. These components, especially temperature sensors of the motor winding can be destroyed by improper use.

Avoid, e.g. direct contact of open wires of the connection cable of temperature sensors without being electrostatically discharged or grounded.



Do suitable ESD protective measures before you handle imperiled components (e.g. ESD protective clothes, wristlets, conductive floor, grounded cabinets and working surfaces).

---

### 3 Scope of delivery

The total scope of delivery is listed on the delivery note or waybill. However, its content can be partitioned in several packages. Each package can be identified by a forwarding label.

#### Scope of delivery of MCP primary part

The scope of delivery of a primary part contains:

- Primary part in origin package
- Type plate
- Safety notes and instructions on use

#### Scope of delivery of MCS secondary part

The scope of delivery of a secondary part contains:

- Secondary part in origin package
- Type plate
- Safety notes and instructions on use

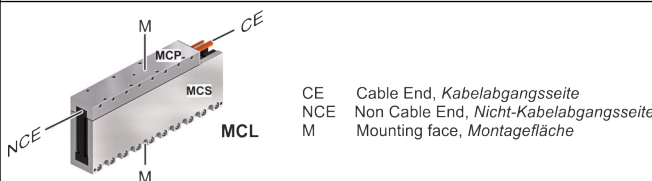
On delivery, immediately verify whether the delivered goods are those specified on the delivery note. The forwarder must be promptly informed of any damage on the packaging and goods, which is detected on delivery. Start-up of damaged goods is prohibited.



## 4 About this product

### 4.1 Product description

#### 4.1.1 Technical features

<b>Product</b>	3~ PM motor
<b>Type</b>	MCL consist of MCP and MCS
<b>Ambient temperature during operation</b>	0 ... 40 °C
<b>Degree of protection</b>	IP00 (IP20) (EN 60034-5)
<b>Cooling type</b>	IC410, Self-cooling (EN 60034-5)
<b>Installation altitude</b>	0 ... 1000 m above MSL (without derating)
<b>Thermal class</b>	130 (B) (EN 60034-1)
<b>Encoder system</b>	<b>Hall sensor digital</b> SUP-E01-D15-MCP020 SUP-E01-D30-MCP030/040/070 <b>Hall sensor analog</b> SUP-E01-A15-MCP020 SUP-E01-A30-MCP030/040/070
<b>Electrical connection</b>	Connection cable with open cable ends shielded cable (3x power + 1x PE, 2x KTY)
<b>Mechanical protection</b>	Primary part moulded with synthetic resin Magnets of the secondary part coated with synthetic resin
<b>Motor ends</b>	 <p>CE Cable End, Kabelabgangsseite                      NCE Non Cable End, Nicht-Kabelabgangsseite                      M Mounting face, Montagefläche</p>

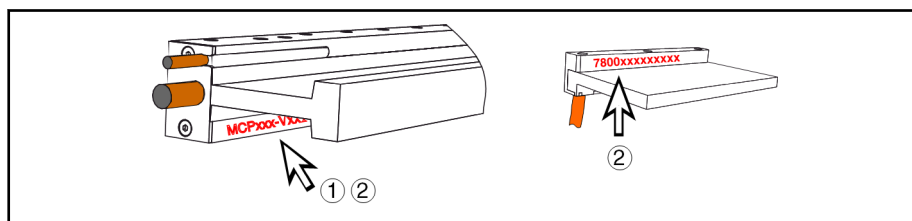


In the case of special design, details named in the operating instructions can deviate. In this case, order the supplementary documentation.

## 4.2 Identification

### 4.2.1 Identification MCP primary part

An engraved type designation is on the primary part.

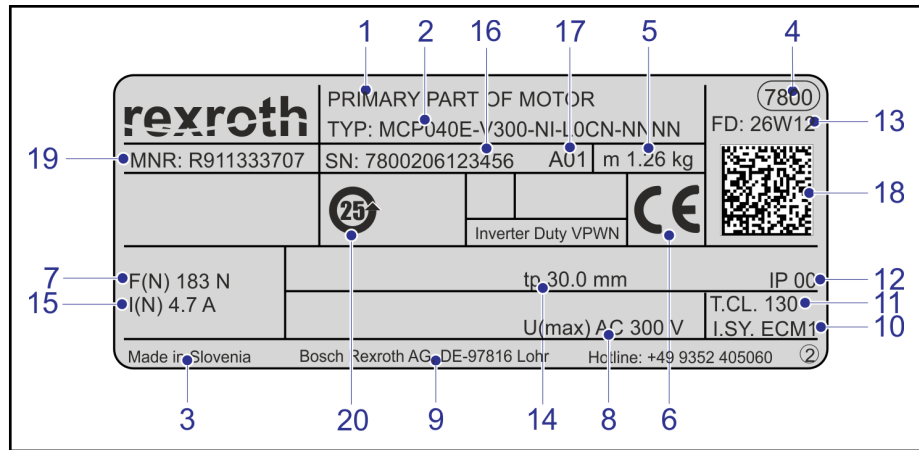


- ① Type designation (not for MCP015)
- ② Serial number

Fig. 4-1: Position of type designation and serial number of primary part

Additionally, the primary part has two identical type plates at delivery. The type plates allow an univocal identification of the primary part and can be fixed on the machine or used elsewhere by the user.

## About this product

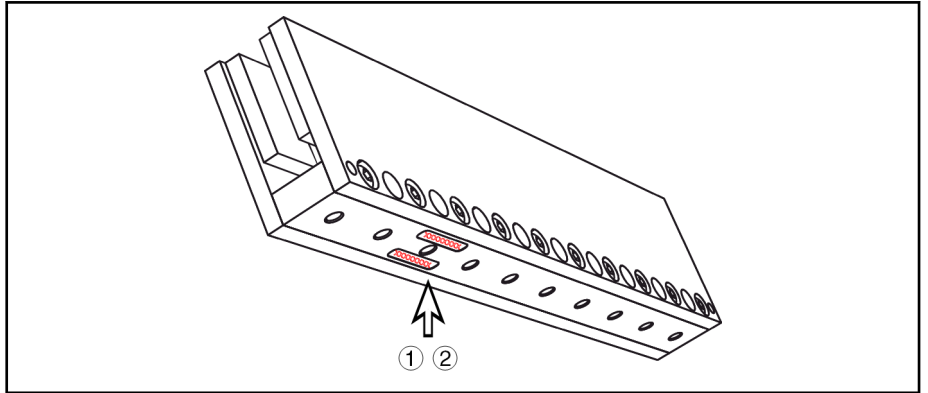


- 1 Motor type
- 2 Type designation
- 3 Designation of origin
- 4 Factory number
- 5 Mass of primary part
- 6 EC declaration of conformity
- 7 Rated power
- 8 Maximum input voltage
- 9 Company address
- 10 Insulation system
- 11 Thermal class
- 12 Degree of protection by housing
- 13 Manufacturing date
- 14 Pole pitch
- 15 Rated current
- 16 Serial number
- 17 Change status
- 18 Rexroth barcode
- 19 Material number
- 20 China RoHS conformity mark

Fig. 4-2: *Type plate example primary part*

### 4.2.2 Identification MCS secondary part

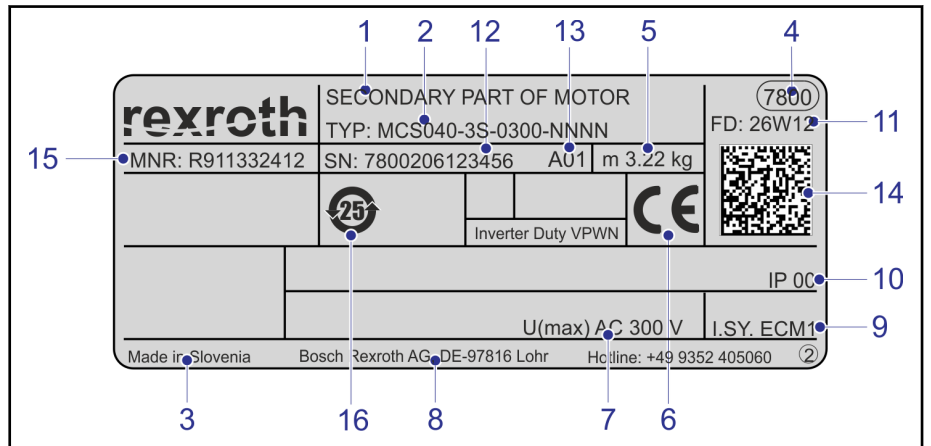
The type designation with serial number is at the bottom of the secondary part.



- ① Type designation
- ② Serial number

Fig. 4-3: Position of type designation and serial number of secondary part

Additionally, the secondary part has two identical type plates at delivery. The type plates allow an univocal identification of the secondary part and can be fixed on the machine or used elsewhere by the user.



- 1 Motor type
- 2 Type designation
- 3 Designation of origin
- 4 Factory number
- 5 Mass secondary part
- 6 EC declaration of conformity
- 7 Maximum input voltage
- 8 Company address
- 9 Thermal class
- 10 Degree of protection by housing
- 11 Manufacturing date
- 12 Serial number
- 13 Change status
- 14 Rexroth barcode
- 15 Material number
- 16 China RoHS conformity mark

Fig. 4-4: Type plate example secondary part

## 4.3 Acceptances and approvals

### 4.3.1 CE



Certificate of conformity certifying the structure of and the compliance with the valid EN standards and EC guidelines are available for all motors. If required, the declarations of conformity can be requested from the responsible sales office. The CE mark is attached to the motor type label of the motors.

### 4.3.2 EAC



EAC stands for Eurasian Conformity.

Motors of MCL series fulfill the specified technical requirements of the EAC member states in the tariff union. The member states are Russia, Belarus and Kazakhstan.

### 4.3.3 RoHS

We confirm in our manufacturer's declaration TC 30806-1 that our products confirm with the RoHS directive 2011/65/EG "Restriction of the use of certain hazardous substances in electrical and electronic equipment".

### 4.3.4 China RoHS 2



Motors of the MCL series are according to the specifications of standard SJ/T11364 and they have an EFUP (Environmentally friendly use period) of 25 years. A corresponding labeling is in preparation). For more information, refer to [https://www.boschrexroth.com.cn/zh/cn/home\\_2/china\\_rohs2](https://www.boschrexroth.com.cn/zh/cn/home_2/china_rohs2) [www.boschrexroth.com.cn/zh/cn/home\\_2/china\\_rohs2](http://www.boschrexroth.com.cn/zh/cn/home_2/china_rohs2) in section "Kit motors".

## 5 Transport and storage

### 5.1 Notes about transport

#### **⚠ WARNING**

**Strong attractive forces due to permanent magnets on the secondary part! Risk of injury and danger of crushing body parts by magnetic forces!**

Please note the safety instructions [Chapter 2.6.3](#) and [Chapter 2.6.4](#) .

Our products must be transported in their original package only. Also refer to the specific ambient factors to protect the products from transport damage.

Based on DIN EN 60721-3-2, the tables below specify classifications and limit values which are allowed for our products while they are transported by land, sea or air. Refer to the detailed description of the classifications to take all of the factors which are specified in the particular class into account.

#### **Allowed classes of environmental conditions during transport acc. to DIN EN 60721-3-2**

Classification type	Allowed class
Classification of climatic environmental conditions	2K11
Classification of biological environmental conditions	2B1
Classification of chemically active materials	2C1
Classification of mechanically active materials	2S5
Classification of mechanical environmental conditions	2M4

*Tab. 5-1: Allowed classes of environmental conditions during transport*

For a better overview, some essential environmental influencing variables of the previously mentioned classifications are listed. Unless otherwise specified, the specified values are the values of the particular class. However, Bosch Rexroth reserves the right to adjust these values at any time based on future experiences or changed environmental factors.

#### **Deviating from DIN EN 60721-3-2 permissible ambient conditions**

Environmental factor	Unit	Value
Temperature	°C	-25 ... +70 <sup>1)</sup>
Relative air humidity	%	5 ... 75 <sup>1)</sup>
Absolute air humidity	g/m <sup>3</sup>	1 ... 29 <sup>1)</sup>

1) Differs from DIN EN 60721-3-2

*Tab. 5-2: Deviating permissible storage conditions*

## Instructions on machine transport

**⚠ CAUTION**

**Risk of injuries and / or damage when handling secondary parts of synchronous linear motors!**

- Heed the safety notes and warnings (refer to [Chapter 5.1](#)) when using secondary parts and make sure that they are kept.
- Remove the transport or assembly protection which is stuck on the cover plate only when or after mounting into the machine.



Transport the secondary part in its original packing to the place of assembly and let it be packed until it must be mounted. Store the original packing after assembly of the secondary part for further use (e.g. re-storage or return). Observe a proper state and good visibility of the affixed warning notes.

The MCL motor components can be transported by hand. The mass of the single components is 0.04 kg up to 7.4 kg, depending from their frame size.

**NOTICE**

**Never touch the connection points of electrostatic sensitive devices!**



Mounted components (e.g. KTY84, encoder) can contain parts susceptible to electrical discharge (ESD).

- ▶ Observe the ESD safety measures.

**⚠ WARNING**

**Material damage due to improper handling during transport!**



- ▶ Do not lift or move the primary part on the cable strand.

## Transport by air freight

**⚠ CAUTION**

**Possible influence of plane electronic on board through magnet fields!**

Heed the packaging and transport instructions (IATA 953)

## 5.2 Storage instructions

**⚠ CAUTION**

**Inappropriate handling during storage or transport can damage or destroy the motor components!**

- Use the original packaging for permanent storage.
- Observe the ambient conditions for storage and transport.
- Do not throw parts
- Remove the transport or assembly protection only when or after mounting into the machine

Based on DIN EN 60721-3-1, the tables below specify classifications and limit values which are allowed for our products while they are stored. Refer to the detailed description of the classifications to take all of the factors which are specified in the particular classification into account.

### Allowed classes of ambient conditions during storage acc. to DIN EN 60721-3-1

Classification type	Class
Classification of climatic environmental conditions	1K21
Classification of biological environmental conditions	1B1
Classification of chemically active materials	1C1
Classification of mechanically active materials	1S10
Classification of mechanical environmental conditions	1M11

Tab. 5-3: Allowed classes of environmental conditions during storage

For a better overview, some essential environmental influencing variables of the previously mentioned classifications are listed. Unless otherwise specified, the specified values are the values of the particular class. However, Bosch Rexroth reserves the right to adjust these values at any time based on future experiences or changed environmental factors.

### Deviating from DIN EN 60721-3-1 permissible ambient conditions

Environmental factor	Unit	Value
Air temperature	°C	-25 ... +55 <sup>1)</sup>
Relative air humidity	%	5 ... 75 <sup>1)</sup>
Absolute air humidity	g/m <sup>3</sup>	1 ... 29 <sup>1)</sup>

1) Differs from DIN EN 60721-3-1

Tab. 5-4: Deviating permissible storage conditions

#### Motor storage times

Irrespective of the storage duration - which can exceed the warranty period of our products - the function is retained provided additional measures are taken into account and carried out during commissioning. However, this does not entail any additional warranty claims.

Storage time	Measures prior to commissioning
< 1 year	Visual inspection of all parts to be damage-free
1 ... > 5 years	Visual inspection of all parts to be damage-free Check the electric contacts to verify that they are free from corrosion Measure insulation resistance. Dry the winding at a value of < 1kOhm per volt rated voltage.


Tab. 5-5: Measures before commissioning motors that have been stored over a prolonged period of time



## 6 Assembly

### 6.1 Basic precondition

The following points must be considered or checked before starting the assembly work:

- Observation of the necessary installation sizes (see project planning manual  Ironless Linear Motors MCL)
- Machine construction fulfills the requests for mounting (stiffness, attractive force, feed and acceleration force, etc.) and is prepared for installation of the motor components.
- Clean screw-on surfaces between machine and motor components
- Installation of motor components by skilled personnel only
- Compliance of danger and safety notes is guaranteed.

### 6.2 Installation of motor components



The machine manufacturer has to consider the special character of his construction and must work out special mounting instructions for the motor components primary and secondary part. The machine manufacturer's mounting instructions are the only binding guidelines.

The range and order of installation of motor components is depending on the machine construction or the available space in the machine. Thereby, the arrangement of the motor components play a significant role.

The project planning manual "Ironless Linear Motors MCL" contains a suggestion to assemble motor components. This suggestion can be understood a guideline to estimate the necessary assembly effort and to prepare the necessary implements for assembly.

#### Screw lock


All screwed connections must be secured against potential impacts and vibrations during operation of the machine. A suitable and field-tested screw lock for all metal thread connections is, e.g., Loctite 243.

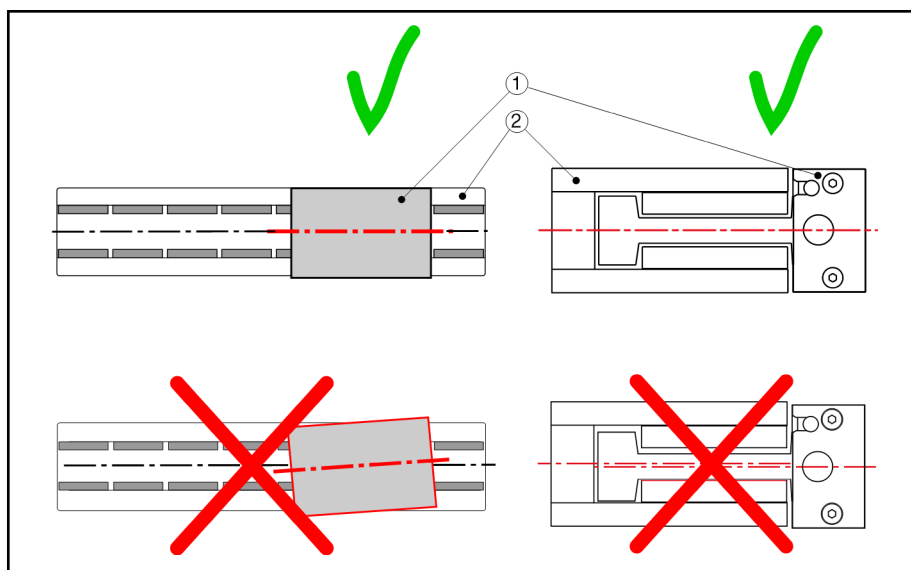
Loctite 243 is a liquid screw lock (medium-hard) and is applied to the parts to be mounted immediately prior to assembly. For detailed information on correct handling and processing, please refer to the manufacturer's data sheets under <http://www.loctite.de>. The manufacturer's homepage also provides information on hardening accelerators or other screw locks.

### 6.3 Air-gap, parallelism and symmetry of the motor components

#### Parallelism and symmetry

When mounting primary and secondary parts, their position is specified by the holes or threads within the machine slide and within the machine bed.

Due to the clearance, which exists within the holes of the screw connections, the motor components must be adjusted correctly acc. to [fig. 6-1 "Aligning the motor components" on page 20](#) before the screws are tightened. This can be done via pressing the motor components on the screw-on surfaces and stop faces. If all installation dimensions (see project planning manual  Ironless Linear Motors MCL) were kept, the correct arrangement of both motor components to each other results.



① Secondary part

② Primary part

Fig. 6-1: Aligning the motor components

Air gap

**NOTICE**

Motor damage due to insufficient air gap between primary and secondary part!

After assembly, check the free movement of the motor components to each other immediately. Therefore, move the versatile motor components by hand over the complete travel length. The versatile motor components must be freely movable at each position over the total travel length - without any contact to fixed motor components. This check can detect faulty assembly in time (e.g. dirt under the assembly surfaces, faulty installation dimensions, insufficient machine rigidity etc.).

## 6.4 Fastening secondary part

### ⚠ WARNING

Danger due to permanent magnets!



▶ Health hazard for persons with heart pacemakers, metallic implants and hearing aids in direct environment of permanent magnets.



▶ Crushing hazard of fingers and hand due to heavy attractive forces of the magnets.



▶ Risk of destruction of sensitive parts such as watches, credit cards, ...

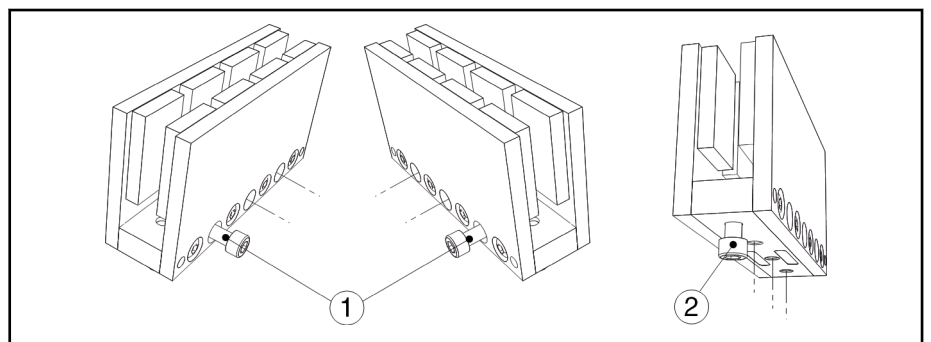
Please note the safety instructions [Chapter 2.6.3](#) and [Chapter 2.6.4](#).

Observe absolute cleanness during assembly. No dirt should exist on the screw-on surface and stop faces and no dirt or other parts (e.g. screws, washers, etc.) should reach the area of magnetic pull on the secondary part. Any kind of foreign bodies in this area could damage the primary or secondary part at the first traverse of the motor components.



- For safety reasons, the user or machine manufacturer is NOT allowed to dismount the secondary part in its separate parts!
- To fasten the secondary parts, it is only allowed to use new, unused screws.
- All screws have to be tightened with the specified tightening torque and provided with screw lock (e.g. Loctite 243).
- After assembly, check if any foreign bodies exist in the secondary part.

The secondary parts can be connected with the machine via two different ways.



① Fastening type variant 1

② Fastening type variant 2

Fig. 6-2: Secondary part fastening types

The screw-on surfaces and stop faces must be cleaned and be free of grease before the secondary parts can be screwed on the machine construction. For suitable screw selection and its tightening torques refer to the following table.

**NOTICE**

Observe during fastening of the secondary parts according to variant 2 that the maximum screw-in depth specified in the table, is kept. In the case of deflection, the primary part can be irreparably damaged due to collision with overhanging screws.

**Fastening type - variant 1**

Secondary part MCS ...	Drilling diameter within the secondary part	maximum screw-in depth	Screw size (DIN EN ISO 4762)	Fastening class	Tightening torque (+/-10%)
		Variant 1			
015	4.5 mm	depending from the customer's applica- tion	M4	8.8	3.1 Nm
020	4.3 mm		M4		3.1 Nm
030	4.3 mm		M4		3.1 Nm
040	6.4 mm		M6		10.4 Nm
070	8.5 mm		M8		25 Nm

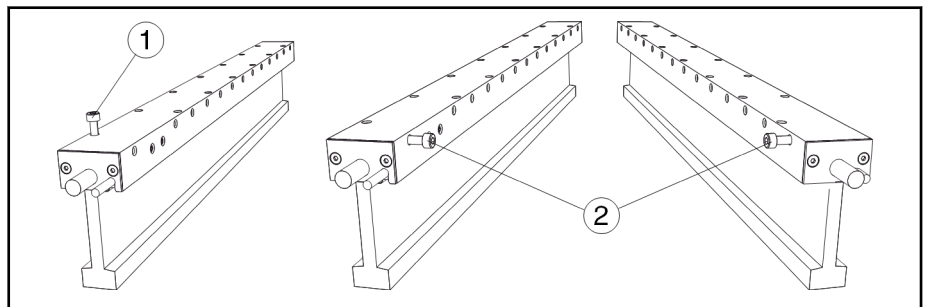
Tab. 6-1: Fastening mode (variant 1) with tightening torques for secondary parts MCS

**Fastening type - variant 2**

Secondary part MCS ...	Thread diameter within secondary part	maximum screw-in depth	Screw size (DIN EN ISO 4762)	Fastening class	Tightening torque (+/-10%)
		Variant 2			
015	M4	9 mm	M4	8.8	3.1 Nm
020	M5	9 mm	M5		6.1 Nm
030	M5	9 mm	M5		6.1 Nm
040	M6	11 mm	M6		10.4 Nm
070	M8	12 mm	M8		25 Nm

Tab. 6-2: Fastening mode (variant 2) with tightening torques for secondary parts MCS

## 6.5 Fastening the primary part



- ① Fastening type variant 1
- ② Fastening type variant 2

Fig. 6-3: Primary part fastening type

Primary part MCP ...	Screw size (DIN EN ISO 4762)	Screw-in depth		Fastening class	Tightening torque (+/-10%)
		Variant 1	Variant 2		
015	M3	see chapter 5 "Dimension sheets" in the project planning manual  Ironless Linear Motors MCL		8.8	1.3 Nm
020	M4				3.1 Nm
030					M6
040					
070					

Tab. 6-3: Tightening torque for the fastening screws of the primary parts

The screw-on surfaces and stop faces must be cleaned and be free of grease before the primary parts can be screwed on the machine construction.

Mounting instructions:

1. Fasten the primary part with screws 1, 2, 3...n until the primary part lies on the slide.
2. Fasten screws - from inside to outside - 1, 2, 3 ... x with nominal tightening torque:

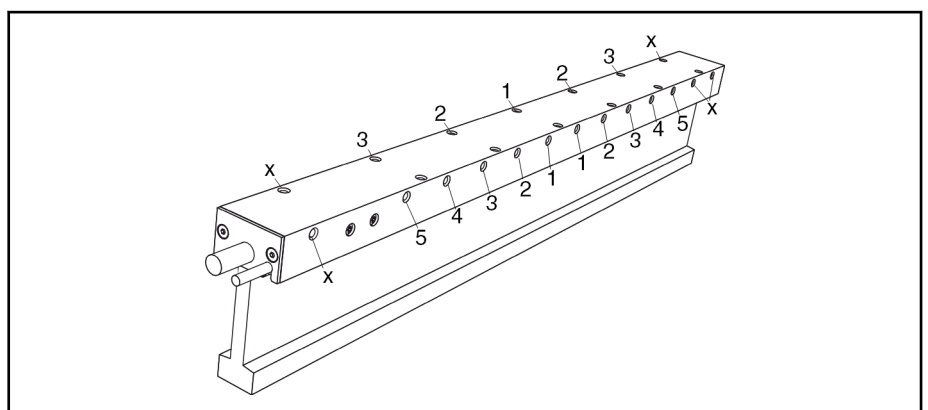


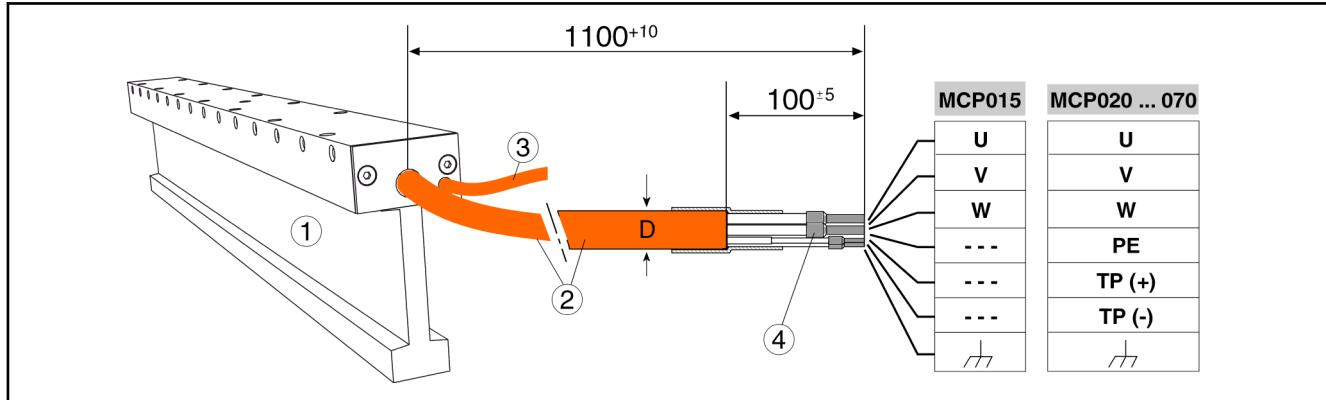
Fig. 6-4: Tightening row of screws

## 6.6 Electrical connection

### 6.6.1 Power connection

#### Connection cable on primary part

Primary parts of MCL motors are fitted with a flexible and totally shielded connection cable. This connection cable is connected with the primary part and is 1100 mm long.



- ① Primary part MCP
- ② Connection cable power
- ③ Connection cable Hall unit (optional for MCP020 ... 070; see chapter 6.6.2 "Connection Hall unit" on page 30)
- ④ Wires with wire end ferrules

Fig. 6-5: Design of connection cable (power) on the primary part MCP

The technical data of the connection cable for every single frame size are given in the following overview.

#### Connection cable power

Motor frame size	Connection cables	Diameter [D] [mm]	Cross section Power wires [mm <sup>2</sup> ]	Cross section Control wire [mm <sup>2</sup> ]	Allowed bending radius[R]*
MCP015	REL0010	4.2 ±0.1	3 x 0.14	- / -	- for fix installation 5 x D - for flexible installation 7.5 x D
MCP020	REL0011	7.8 ±0.2	4 x 0.5	2 x 0.14	
MCP030					
MCP040	REL0012	8.3 ±0.2	4 x 0.75		
MCP070					

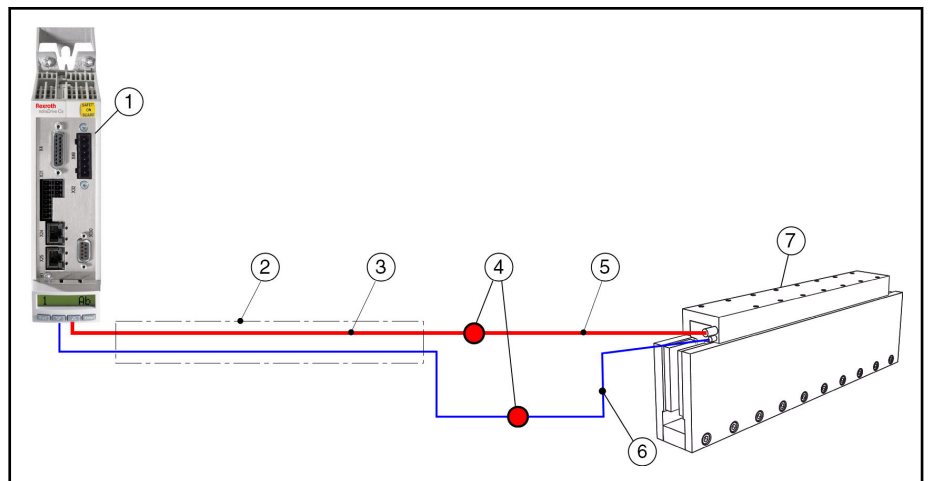
\*) See notes regarding bending radius under fig. 6-7 "Example for strain relief of connection cable" on page 26

Tab. 6-4: Connection cable power on MCP primary parts

#### Installation of connection cable

The connection cable is mulded fix with the primary part and ends with open cable ends with wire end ferrules . Basically, we recommend to lead the connection cable in fix installation to a junction, provided by the customer, like e.g. flange sockets or terminal boxes..

From this junction, a power cable can be laid to supply power through the energy chains or the machine construction. Appropriate power cables are in preparation at the moment, at Rexroth.



- ① Drive controller
- ② Energy chain
- ① Power cables
- ① Junction
- ① Connection cable (power)
- ⑥ Connection cable (Hall unit - optional)
- ⑦ Motor MCL

Fig. 6-6: Routing connection cable of primary part

### NOTICE

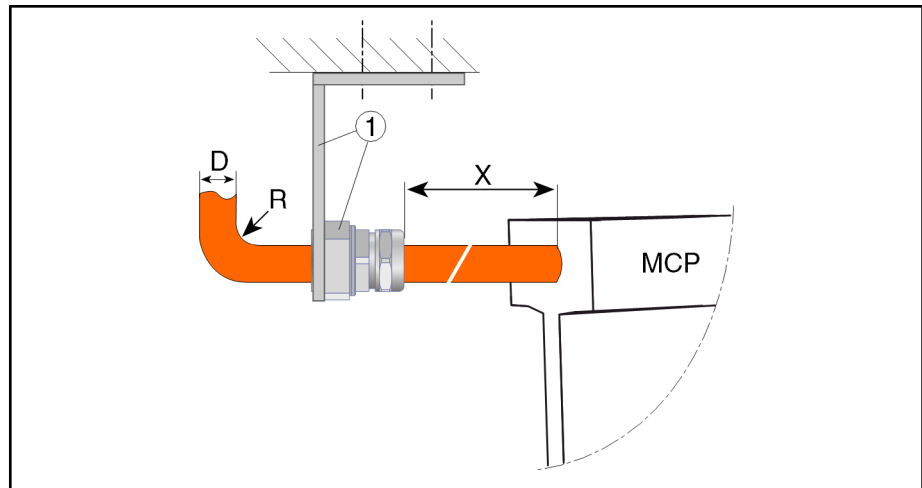
Avoid bending, pulling and pushing loads as well as continuous movements of the connection cable at the point where the cable exits from the primary part. Any load of this kind can lead to irreparable damage (e.g. cable break) on the primary part!

If a fixed installation is not possible, provide the connection cable with a strain relief (see [fig. 6-7 "Example for strain relief of connection cable" on page 26](#)) to protect the cable and the primary part from any damage (e.g. cable break).



If the grounding of the secondary parts cannot be ensured with mounting into the customer's machine construction, connect it according to DIN VDE 0100-410 with the potential of the protective conductor.

Assembly

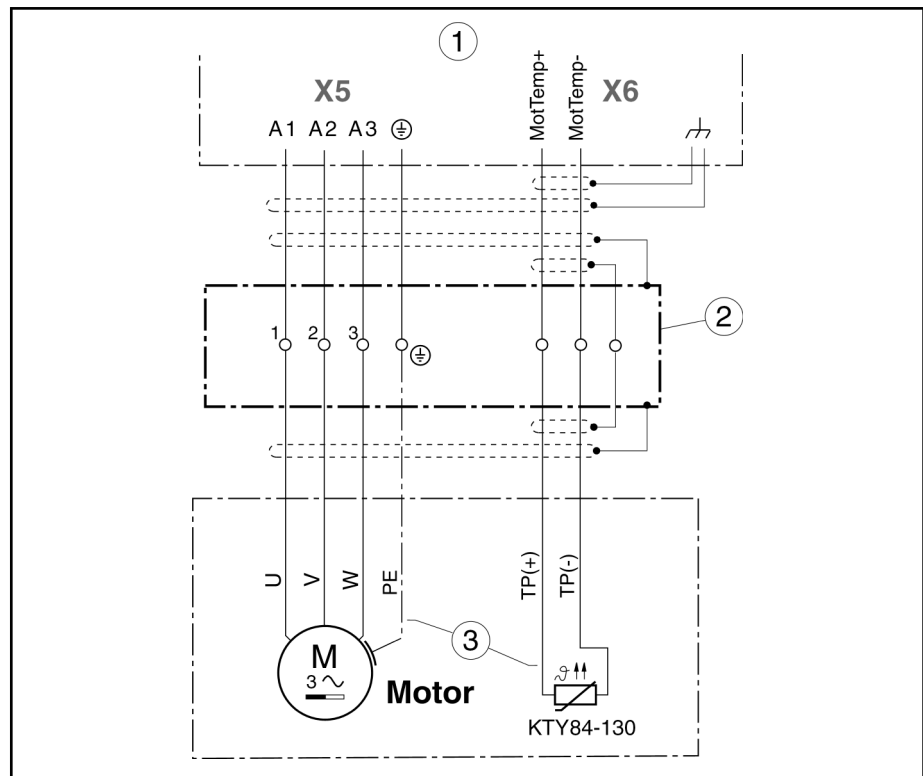


- Dimension "x" Minimum distance 5 mm
- ① Strain relief of the connection cable on MCP primary part
- D Diameter connection cable (see tab. 6-4 "Connection cable power on MCP primary parts" on page 24)
- R Allowed bending radius - see tab. 6-4 "Connection cable power on MCP primary parts" on page 24

Fig. 6-7: Example for strain relief of connection cable

Connection power

Motor single arrangement



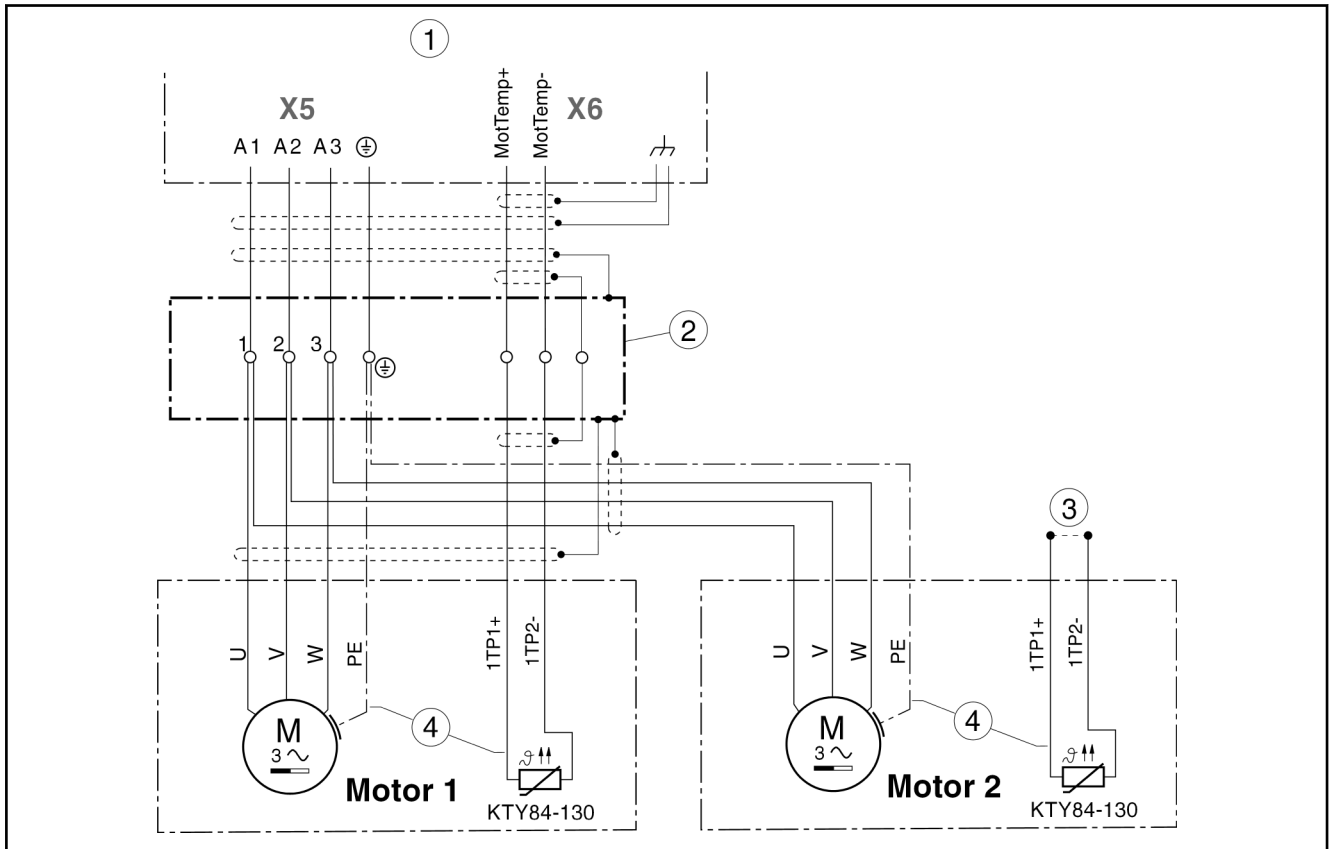
- ① Rexroth drive controller
- ② Junction (only if required, here a terminal box for example)
- ③ Temperature sensor and grounding wire only available for frame size MCP020 ... 070

Fig. 6-8: Power connection on drive controller - single arrangement

Motor parallel connection



For parallel connection, only identic primary parts may be used.



- ① Rexroth drive controller
- ② Junction (terminal box)
- ③ Shorting and isolating the wires of the temperature sensor KTY84 on the motor 2
- ④ Temperature sensor and grounding wire only available for frame size MCP020 ... 070

Fig. 6-9: Power connection on drive controller - parallel connection

Connection power cable in dependence from primary part at parallel arrangement

The connection of the power wires of the connection cable on the drive controller at parallel connection of the primary parts with outgoing cable outlet in the cross-direction depend on the direction of the outgoing cable.

Drive controller X5	Cable outlet in the same direction			Cable outlet in the opposite direction		
	A1	A2	A3	A1	A2	A3
Primary part 1	U	V	W	U	V	W
Primary part 2	U	V	W	U	W	V

Tab. 6-5: Connection of the power wires in case of parallel connection of primary parts on a drive controller

## Installation methods and cable cross sections

### Installation method for single arrangement

See [fig. 6-6 "Routing connection cable of primary part"](#) on page 25.

### Parallel motor connection

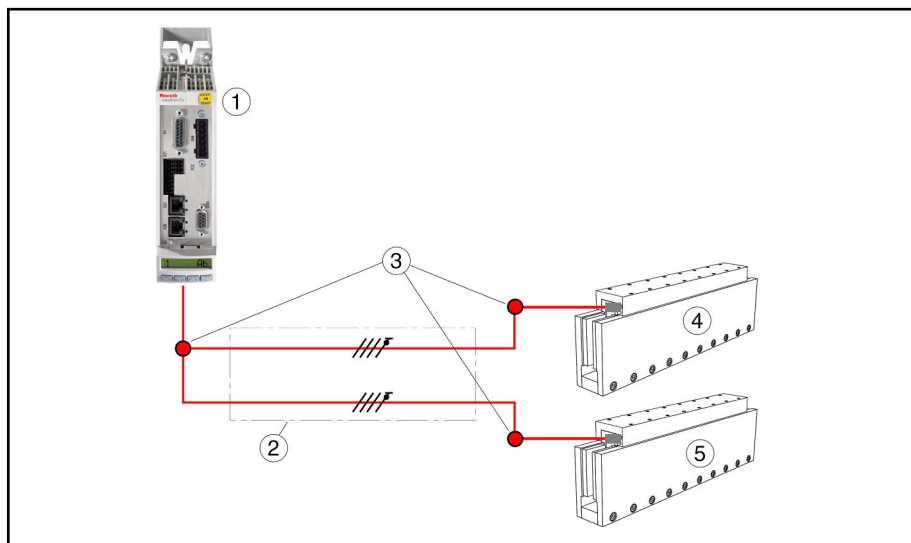
When connecting a motor parallel on a drive controller, the following possibilities exist to assemble the motor cable.

- Installation with two separate parallel power cables
- Installation with a collective power cable with bigger cross section



The description of the power cables is done in the documentation "Rexroth Connection Cables", MNR R911322948 (DE) or R911322949 (EN).

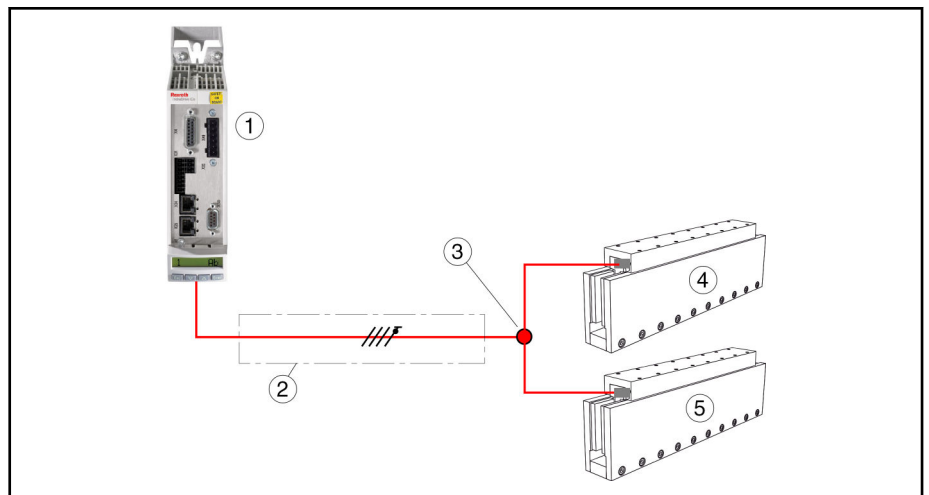
### Parallel connection, installation method separate power cables



- ① Drive controller
- ② Energy chain
- ① Junctions
- ① Motor 1
- ① Motor 2

Fig. 6-10: Parallel connection, separate power cables

### Parallel connection, installation method collective power cable with bigger cross section




- ① Drive controller
- ② Energy chain
- ③ Junctions
- ④ Motor 1
- ⑤ Motor 2

Fig. 6-11: Parallel connection, collective power cable

### Connection temperature sensor

All primary parts - except frame size MCP015 - are equipped with a PTC temperature sensor **KTY84-130**.

Heed the right polarity of the connection wires when connecting the KTY84-130. See also [fig. 6-8 "Power connection on drive controller - single arrangement"](#) on page 26.

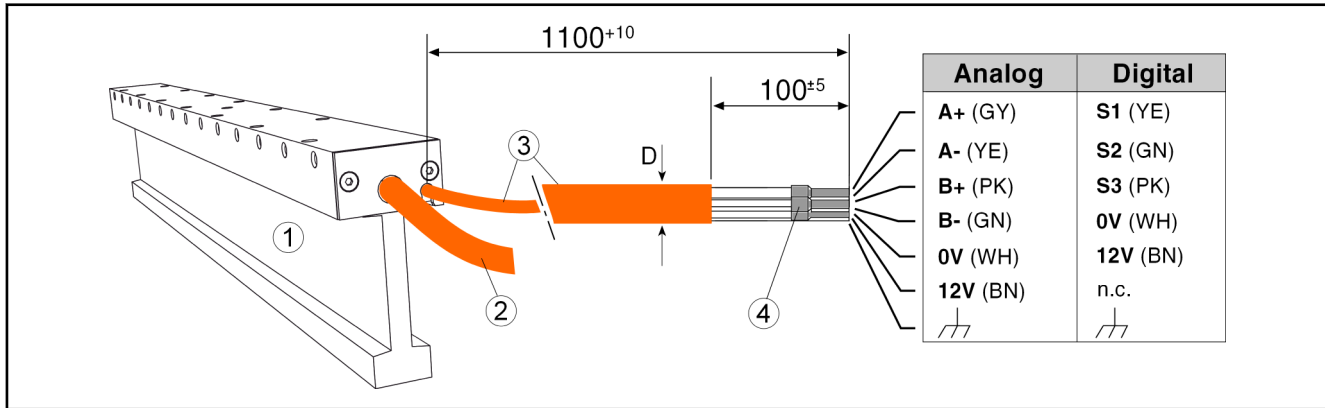
You will find additional information about temperature sensor in the project planning manual  Ironless Linear Motors MCL.



Temperature sensor KTY84-130 is a component that might be damaged by ESD! For this reason, the wires of the sensor are protected by a protective foil at the connection cable. Before connecting the sensor, take appropriate measures for ESD protection (ESD = electrostatic discharge).

### 6.6.2 Connection Hall unit

Motors with Hall unit have an additional cable to connect the sensor. This cable is beside the connection cable for the power. After motor assembly, the cable of the Hall unit can be shortened to the required length and lead to the junction of the controller.



- ① Primary part MCP
- ② Connection cable power (see chapter "Connection cable on primary part" on page 24)
- ① Connection cable Hall unit (optional for MCP020 ... 070)
- ① Wires with wire end ferrules

Fig. 6-12: Design of connection cable (Hall unit) in primary part MCP

#### Connection cable Hall unit

Motor frame size	Diameter [D]	Control wire cross section [mm <sup>2</sup> ]	Allowed bending radius [R]*
MCP020 ... 070	4.2 ±0.1	6 x 0.14	- for fix installation 5 x D - for flexible installation 7.5 x D

\*) See notes regarding bending radius under fig. 6-7 "Example for strain relief of connection cable" on page 26

Tab. 6-6: Connection cable Hall unit on primary parts MCP020 ... 070



The Hall unit is a component that might be damaged by ESD. For this reason, the wire ends on the connection cable are protected with a protective foil. Before connecting the Hall unit, take appropriate measures for ESD protection ( ESD = electrostatic discharge).

### 6.6.3 Connection digital Hall sensor and length measuring system via Hall sensor adapter box SHL03.1

Before startup, observe the notes in the project planning manual Rexroth IndraDrive Cs - Drive Systems with HCS01.

## 7 Commissioning and operation

### 7.1 Safety

#### WARNING

**High electric voltage! Danger to life, risk of injury by electric shock.**



Life parts are dangerous.

- ▶ Do not open any covers or flange sockets during operation.
- ▶ Do not connect or disconnect plug-connectors and connection clamps.

#### WARNING

**Risk of injuries due to moving machine parts!**



▶ Do not remove covers, machine parts or protective devices during operation.

▶ Do not enter the motion area of the machine. Prevent personnel from accidentally entering the machine's range of motion by using, for example:

- Safety fences, safety screens or protective covers.
- Optical sensors

#### CAUTION

**Thermal danger due to hot surfaces with temperatures over 60 °C during operation**



▶ Do not touch hot motor surfaces.

▶ Install protection against contact, if necessary.

▶ Make sure that no temperature-sensitive components (cables, electronic components, ...) touch hot surfaces.

### 7.2 Environmental conditions during operation

Environmental conditions are defined according to DIN EN 60721-3-3 in different classes. They are based on long-term experiences and take all influencing variables into account, e.g., air temperature and air humidity.

#### Overview of allowed classes of ambient conditions according to DIN EN 60721-3-3 during operation

Classification type	Allowed class
Classification of climatic environmental conditions	3K22
Classification of biological environmental conditions	3B1
Classification of mechanically active materials	3S6
Classification of mechanical environmental conditions	3M12

Tab. 7-1: Allowed classes of environmental conditions during operation

Based on DIN EN 60721-3-3, some limit values are partially defined in the following, which our products are allowed to be exposed to during operation. Observe the detailed description of the classifications to take all of the factors which are specified in the particular class into account.

**Allowed operation conditions**


Environmental factor	Unit	Value
Air temperature	°C	0 ... +40
Air humidity (relative)	%	5 ... 95
Air humidity (absolute)	g/m <sup>3</sup>	1 ... 29

Tab. 7-2: *Operating conditions*

Unless otherwise specified, the values given are the values of the particular class. However, Bosch Rexroth reserves the right to adjust these values at any time based on future experiences or changed environmental factors.

## 7.3 Commissioning




The motor can be operated only after installation into a machine. For start up, please observe the documentation of all system components. For detailed start up procedure of the motors refer to the project planning manual  Ironless Linear Motors MCL and the respective documentation about drive controller or firmware description.

Prior to commissioning, ensure that the following requirements are met.

- Make sure that the motor is mechanically and electrically connected correctly.
- Ensure that the motor and all participating components of the drive are undamaged (e.g. length measuring system).
- Make sure that the axis can freely move over the whole traverse path.
- Please observe the general safety instructions on the protection against hazardous movements [chapter 2.6.2 "Protection from mechanical danger" on page 4](#).

## 7.4 Operation

During operation, keep the technical data specified in the project planning manual  Ironless Linear Motors MCL.

### Checks during operation:

- ▶ Pay attention to exceptional noise.
- ▶ Pay attention to increased vibrations.
- ▶ Check the motor for cleanliness.
- ▶ Check the monitoring devices and diagnostic / error messages of the controllers.

**Decommission the drive when deviations from normal operation exist. For further procedure refer to [chapter 11 "Troubleshooting"](#) on page 41.**



## 8 Maintenance and repair

### 8.1 Cleaning and servicing

#### WARNING

**Danger! Electric voltage! Operations in the vicinity of live parts are extremely dangerous.**



Any work required on the electric system may be carried out only by skilled electricians. Tools for electricians (VDE tools) are absolutely necessary.

*Prior to commencing work:*

1. Isolate (even auxiliary circuits).
2. Secure against reactivation.
3. Ensure de-energization.
4. Ground and short-circuit.
5. Cover or shield any adjacent live parts.

#### WARNING

**Personal and material damage during maintenance work in operation!**



- ▶ Never do any maintenance work on life machines.
- ▶ While carrying out maintenance work, secure the machine such that it cannot restart or be used by unauthorized persons.

#### CAUTION

**Hot surfaces with temperatures over 60 °C may cause burns!**



- ▶ Before you work in the machine, let the motor cool down.
- ▶ Wear safety gloves.
- ▶ Do not work on hot surfaces.

#### Motors

Excessive dirt, dust or chips may adversely affect the functionality of the motors and, in extreme cases, even cause a failure of the motors. Clean the motors at regular intervals (after one year at the latest) to reach a sufficiently high heat emission surface. If the cooling fins are partially covered with dirt, sufficient heat dissipation via the ambient air is no longer ensured.

#### Connection cable

#### WARNING

**Death by electrocution possible due to live parts!**



- ▶ Immediately put the machine out of operation and replace defective connection cables.
- ▶ Never do any provisional repairs on the connection cables.

- Check in regular distances the connection cables on damage and replace them if necessary.
- Check optionally existing drag chains (Drag chains) on defects.
- Check the protective conductor connection for proper condition and firm seating at regular intervals. Replace it, if necessary.

## 8.2 Service repair, maintenance and spare parts

Increase availability with regular preventive maintenance measures. Observe the machine manufacturer's instructions in the machine maintenance plan and the maintenance measures described below.

The following points should be observed and if necessary restored during the preventive check of motor and auxiliary components:

- Noticeable sound during operation
- Scratches on primary and secondary part
- State of power and encoder cables in a drag chain.
- State of length measuring system (e.g. contamination)
- State of guides (e.g. deterioration of linear guides)

Measure	Interval
Check the mechanical and electrical connections.	According to the specifications in the machine maintenance plan, but at least every 1000 operating hours.
Check the machine for smooth running, vibrations and bearing noise.	According to the specifications in the machine maintenance plan, but at least every 1000 operating hours.

Tab. 8-1: Maintenance measures



Generally, keep the motor installation room clean to prevent that dirt (e.g. shavings, swarfs, grease by guides, etc.) reaches the air gap between primary and secondary part

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 drives and controls.

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

Phone: **+49 9352 40 5060**  
 Fax **+49 9352 18 4941**  
 Email: [service.svc@boschrexroth.de](mailto: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

For quick and efficient help, please have the following information ready:

- Detailed description of the fault and the circumstances
- Information on the rating plate of the products in question, particularly type codes and serial numbers
- Your contact data (phone number, fax number, e-mail address)

## 9 Disassembly

### DANGER

**Fatal injury due to errors during the activation of motors or work on moving elements!**

- ⇒ Work on machines is only allowed if they are secured and while they are not running.
- ⇒ Before starting disassembly, secure the machine against unforeseeable movements and against unauthorized operation.
- ⇒ Before dismantling the motor and the supply lines, secure them against dropping or moving and disconnect the mechanical connections only thereafter.

### WARNING

**High electric voltage! Danger to life, risk of injury by electric shock.**



Life parts are dangerous.

- ▶ Do not open any covers or flange sockets during operation.
- ▶ Do not connect or disconnect plug-connectors and connection clamps.

### WARNING

**Danger due to permanent magnets!**



▶ Health hazard for persons with heart pacemakers, metallic implants and hearing aids in direct environment of permanent magnets.



▶ Crushing hazard of fingers and hand due to heavy attractive forces of the magnets.



▶ Risk of destruction of sensitive parts such as watches, credit cards, ...

Please note the safety instructions [Chapter 2.6.3](#) and [Chapter 2.6.4](#) .



The machine manufacturer must observe the special features of the construction and create a special disassembly instruction for the motor components. Only this disassembly instruction of the machine manufacturer is binding.

1. Observe the disassembly instruction of the machine manufacturer.
2. Use the machine-side control command to decelerate the drive to a controlled standstill.
3. Switch off the power and control voltage of the controller.
4. Switch off the main switch of the machine and deactivate external systems according to the instructions of the manufacturer.
5. Secure the machine against accidental movements and against unauthorized operation.
6. Wait until the discharge time of the electrical systems has elapsed and then disconnect all electrical connections. Lock electric cables and contacts against contact with other electrical parts.

## Disassembly

7. Remove dirt, chips and other any kind of residues from the motor.
8. Before dismounting the motor and the supply lines, secure them against dropping or moving and disconnect the mechanical connections only thereafter.
9. Right after disassembly, store or transport the motor components, especially the secondary part in its origin package. Please observe the safety notes when handling the secondary part.
10. If necessary, record all measures in the commissioning log or machine maintenance plan.

## 10 Environmental protection and disposal

Disposal of the motor components can be done according to the applicable legal process in normal recycling process.

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

### Significant motor components

Basically, our motors consist of the following components:

- Steel, aluminum, copper, brass
- Plastic parts, insulation and composite material
- Electronic components
- Permanent magnets

Plastic parts of the products may 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 applicable legal provisions.

### WARNING

### Danger due to permanent magnets!



▶ Health hazard for persons with heart pacemakers, metallic implants and hearing aids in direct environment of permanent magnets.



▶ Crushing hazard of fingers and hand due to heavy attractive forces of the magnets.



▶ Risk of destruction of sensitive parts such as watches, credit cards, ...

Please note the safety instructions [Chapter 2.6.3](#) and [Chapter 2.6.4](#) .



The permanent magnets of the secondary part must be demagnetized before disposal to avoid injuries or damage.

### Demagnetize magnets

The demagnetization of the permanent magnets of the secondary part is reached via special thermal treatment. The handling duration is influenced by the frame of the motor component. The secondary part has to remain in the oven for a minimum of 30 minutes, starting at the time, the magnetic surface has reached 300 °C.



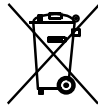
After cooling down of the secondary part and successful demagnetization, the magnets can be effortlessly disconnected from the mounting plate.

### Packaging

Our packaging materials do not contain any problematic materials and can therefore be easily disposed. Packaging materials are: Wood, carton and styrofoam

### 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.

End users in the EU are legally bound to return used batteries. Outside the scope of the EU Directive 2006/66/EC, the applicable regulations must be followed.

Used batteries may contain hazardous substances which can harm the environment or human health when improperly stored or disposed of.

After use, the batteries or accumulators contained in Rexroth products must be returned to the country-specific collection systems for proper disposal.

#### **Disposal by the manufacturer**

Our products can be returned to us for disposal. However, this requires that the products be free from oil, grease or other dirt.

The motor components must be returned in a suitable packaging (origin package if possible). In the case of a transport by air freight, please observe the dangerous goods regulations (IATA) for the secondary part.

Deliver 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

# 11 Troubleshooting

## 11.1 Procedure

Possible causes for failures of motors can be restricted to the following areas:

- Motor cooling and temperature behavior
- Internal temperature sensor
- Mechanical damage of the motor
- Mechanical connection to machine

The lengths measuring system and the temperature sensor are monitored by the controller or the control unit; corresponding diagnostic messages are displayed. Comply with the instructions in the corresponding documentation.

The sections below describe examples of some fault states along with possible causes. This list is not exhaustive.

Malfunction	Error cause	Measures
Motor does not run	Controller enable signal missing	Activate controller enable signal
	Controller fault	Troubleshoot acc. to documentation of controller
	Voltage supply missing	Control voltage supply
Vibrations	Mounting screws loose	Lock screw connections acc. to specifications
Running noise	Foreign bodies within the motor	Stop the motor --> repair by manufacturer
	Guides defective	Stop the motor --> repair by manufacturer
High motor temperatures Motor temperature monitoring is activated	Operation outside of rated data	Reduce load and check the dimensioning
Wrong or defective temperature display	Temperature sensor not connected	Connect temperature sensor
	Temperature sensor defective	Stop the motor --> repair by manufacturer


Tab. 11-1: Malfunctions on MCL motors



In the case of malfunctions, please additionally observe the notes described in the project planning manual. Contact the manufacturer, if necessary.



## 12 Technical data

Technical data and operating characteristic curves for all motor types are described in the project planning manual  Ironless Linear Motors MCL.



# 13 Appendix

## 13.1 Declaration of conformity



**EU-Konformitätserklärung - Original**

Dok.-Nr.: DCTC-30327-001  
Datum: 2016-04-20

---

nach Maschinenrichtlinie 2006/42/EG  
 nach Niederspannungsrichtlinie 2014/35/EU  
 nach EMV-Richtlinie 2014/30/EU  
 nach ATEX-Richtlinie 2014/34/EU

Hiermit erklärt der Hersteller,  
 Bosch Rexroth AG  
 Bürgermeister-Dr.-Nebel-Straße 2  
 97816 Lohr am Main / Germany,

dass die nachstehenden Produkte

Bezeichnung: 3-PHASE SYNCHRONOUS MOTOR

Baureihen:		(Primärteil)	(Sekundärteil)
	MCL015...	MCP015...	MCS015...
	MCL020...	MCP020...	MCS020...
	MCL025...	MCP025...	MCS025...
	MCL030...	MCP030...	MCS030...
	MCL040...	MCP040...	MCS040...
	MCL070...	MCP070...	MCS070...

Ab Herstellungsdatum: 2016-04-20

in Übereinstimmung mit den oben genannten EU-Richtlinien entwickelt, konstruiert und gefertigt wurden.

Angewandte harmonisierte Normen:

Norm	Titel	Ausgabe
EN 60034-1 <i>(IEC 60034-1)</i>	Drehende elektrische Maschinen – Teil 1: Bemessung und Betriebsverhalten	2010 + Cor.:2010 <i>(2010, modifiziert)</i>
EN 60034-5 <i>(IEC 60034-5)</i>	Drehende elektrische Maschinen – Teil 5: Schutzarten aufgrund der Gesamtkonstruktion von drehenden elektrischen Maschinen (IP-Code) –Einteilung	2001 + A1:2007 <i>(2000 + Corrigendum 2001 + A1:2006)</i>

\_\_\_\_\_  
Lohr a. Main , den 2016-04-20  
Ort Datum

i.V.   
Eberhard Schemm  
Entwicklungsbereichsleiter Antriebe

\_\_\_\_\_  
Škofja Loka , den 2016-04-20  
Ort Datum

i.V.   
Marcus Tenzer  
Werkleitung Skip/PM

Änderungen im Inhalt der EU-Konformitätserklärung sind vorbehalten. Derzeit gültige Ausgabe auf Anfrage.

Seite 1 / 1

R911336970\_Edition 04 Bosch Rexroth AG

© Bosch Rexroth AG 2016

DCTC-30327-001\_KOE\_N\_DE\_2016-04-20.docx

Fig. 13.1: CE declaration of conformity



**EU declaration of conformity - original**

Doc. No.: DCTC-30327-001

Date: 2016-04-20

- in accordance with Machinery Directive 2006/42/EC
- in accordance with Low Voltage Directive 2014/35/EU
- in accordance with EMC Directive 2014/30/EU
- in accordance with ATEX Directive 2014/34/EU

The manufacturer,  
 Bosch Rexroth AG  
 Bürgermeister-Dr.-Nebel-Straße 2  
 97816 Lohr am Main / Germany

hereby declares that the products below

Name: 3-PHASE SYNCHRONOUS MOTOR

Series:	(primary part)	(secondary part)
MCL015...	MCP015...	MCS015...
MCL020...	MCP020...	MCS020...
MCL025...	MCP025...	MCS025...
MCL030...	MCP030...	MCS030...
MCL040...	MCP040...	MCS040...
MCL070...	MCP070...	MCS070...

From the date of manufacture: 2016-04-20

were developed, designed and manufactured in compliance with the above-mentioned EU directives.

Harmonized Standards applied:

© Bosch Rexroth AG 2016



Standard	Title	Edition
EN 60034-1 (IEC 60034-1)	Rotating electrical machines – Part 1: Rating and performance	2010 + Cor.:2010 (2010, modified)
EN 60034-5 (IEC 60034-5)	Rotating electrical machines – Part 5: Degrees of protection provided by integral design of rotating electrical machines (IP code) - Classification	2001 + A1:2007 (2000 + Corrigendum 2001 + A1:2006)

DCTC-30327-001\_KOE\_N\_EN\_2016-04-20.docx

Lohr a. Main Place	2016-04-20 Date	 Eberhard Schemm Head of Development Drives Solutions
Škofja Loka Place	2016-04-20 Date	 Marcus Tenzer Plant Manager SKIP/PM

We reserve the right to make changes to the content of the EU Declaration of Conformity. Current issue on request.

Fig. 13-2: Translated CE declaration of conformity

# Index

## A

Accumulators.....	39
Air gap.....	20
Air humidity.....	31
Air temperature.....	31
Ambient temperature.....	11

## B

Batteries.....	39
----------------	----

## C

Cable outlet.....	27
CE-Declaration of conformity.....	45
Certificates	
CE.....	14
Certifications.....	14
China RoHS 2.....	14
EAC.....	14
RoHS.....	14
Commissioning.....	32
Connection cable.....	24
Allowed bending radius.....	24
Cable break.....	25
Cross section control wires.....	24
Cross section power wires.....	24
Diameter.....	24
fix installation.....	24
Fixed installation.....	25
flexible installation.....	24
Installation.....	24
Connection cable Hall unit.....	30
Allowed bending radius.....	30
Diameter.....	30
fix installation.....	30
flexible installation.....	30
Connection cables.....	35
Connection Hall unit.....	30
Contained substances	
see significant motor components.....	39
Cooling type.....	11

## D

Declaration of conformity.....	45
Degree of protection.....	11
Disassembly.....	37
Discharge time.....	37
Disposal.....	39
Drag chains.....	35

## E

Electric connection	
Hall sensor adapter box.....	30
Temperature sensor.....	29
Electrical connection.....	11
Motor parallel connection.....	27

Motor single arrangement.....	26
Power.....	26
Power connector.....	24
Environmental conditions.....	31
ESD.....	29, 30
ESD protection.....	29, 30

## F

Fastening type primary part.....	23
Fastening types secondary part .....	21
Fault states.....	41
Flange socket.....	24

## G

Grounding.....	25
----------------	----

## H

Hall unit.....	30
Hall unit connection cable	
Control wire cross section.....	30
Heat dissipation.....	35

## I

IATA 953.....	16
Identification.....	11
Improper use	
Improper use.....	4
Indented use	
Directives.....	3
Standards.....	3
Installation altitude .....	11
Intended use.....	3

## K

KTY84-130; see also temperature sensor.....	29
---	----

## P

Packaging.....	39
Parallel connection.....	27
Parallel connection, collective power cable.....	29
Parallel connection, separate power cables.....	28
Parallelism.....	19
Permanent magnets.....	6
Power cable	
Cable cross section.....	28
Collective power cable.....	28
Installation methods.....	28
Parallel power cable.....	28
Product identification.....	11
Protective conductor.....	25
Protective foil.....	29

## Q

Qualified personnel.....	4
--------------------------	---

**R**

Return of products..... 40

**S**

Safety notes..... 4

Scope of delivery..... 9

Screw-in depth..... 22, 23

Serial number MCP..... 11

Serial number MCS..... 13

Service Helpdesk & Hotline..... 36

Significant motor components..... 39

Skilled personnel..... 19

Strain relief..... 26

Symmetry..... 19

**T**

Technical data..... 43

Temperature sensor..... 29

    Polarity..... 29

Terminal box..... 24

Tightening torque..... 22, 23

Transport..... 15

Type designation MCP..... 11

Type designation MCS..... 13

Type plates..... 11, 13

**U**

Unintended use..... 3

**W**

Wire end ferrules..... 24

# Notes

**Bosch Rexroth AG**

P.O. Box 13 57

97803 Lohr a.Main, Germany

Bgm.-Dr.-Nebel-Str. 2

97816 Lohr a.Main, Germany

Phone +49 9352 18 0

Fax +49 9352 18 8400

[www.boschrexroth.com/electrics](http://www.boschrexroth.com/electrics)



R911336970