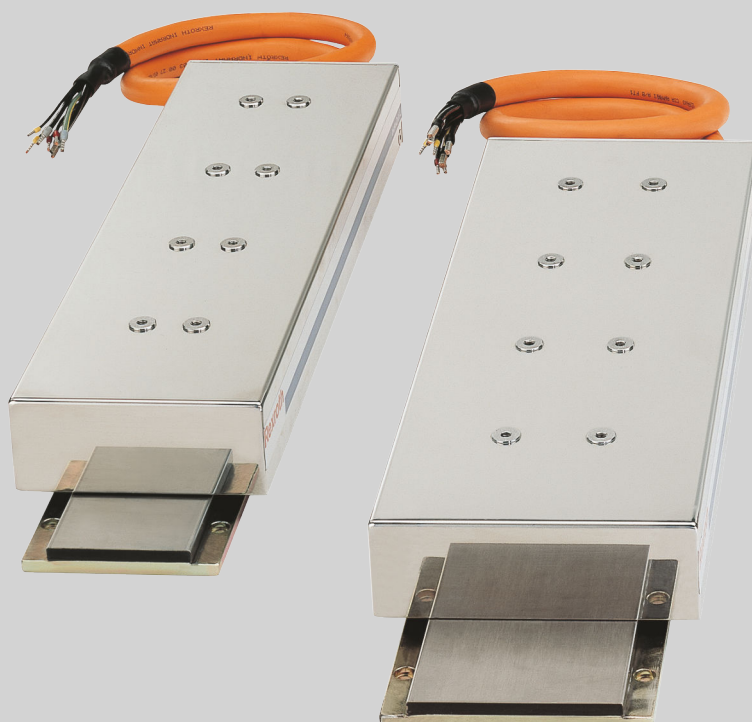


MLF

Water-Cooled Linear Motors

Operating Instructions
R911337311

Edition 03



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Type of Documentation	Operating Instructions
Document Typecode	DOK-MOTOR*-MLF*****-IT03-EN-P
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Purpose of Documentation	This documentation ... • instructs assembly, operating and maintenance personnel • contains basic notes about assembly, operation and maintenance of the motors of type
Record of revisions	Edition 03 See tab. 1-1 "Record of revisions" on page 1.
Copyright	© Bosch Rexroth AG 2021 All rights reserved, also regarding any disposal, exploitation, reproduction, editing, distribution, as well as in the event of applications for industrial property rights.
Liability	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.
Note	This document has been printed on chlorine-free bleached paper.

D Deutsch	USA English	F Français
⚠ WARNING Lebensgefahr bei Nichtbeachtung der nachstehenden Sicherheitshinweise! Nehmen Sie die Produkte erst dann in Betrieb, nachdem Sie die mit dem Produkt gelieferten Unterlagen und Sicherheitshinweise vollständig durchgelesen, verstanden und beachtet haben. Sollten Ihnen keine Unterlagen in Ihrer Landessprache vorliegen, wenden Sie sich an Ihren zuständigen Rexroth-Vertriebspartner. Nur qualifiziertes Personal darf an Antriebskomponenten arbeiten. Nähere Erläuterungen zu den Sicherheitshinweisen entnehmen Sie Kapitel 1 dieser Dokumentation.	⚠ WARNING Danger to life in case of non-compliance with the below-mentioned safety instructions! 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. If no documents in your language were supplied, please consult your Rexroth sales partner. Only qualified persons may work with drive components. For detailed explanations on the safety instructions, see chapter 1 of this documentation.	⚠ AVERTISSEMENT Danger de mort en cas de non-respect des consignes de sécurité figurant ci-après ! 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. Si vous ne disposez pas de la documentation dans votre langue, merci de consulter votre partenaire Rexroth. Seul un personnel qualifié est autorisé à travailler sur les composants d'entraînement. Vous trouverez des explications plus détaillées relatives aux consignes de sécurité au chapitre 1 de la présente documentation.
⚠ WARNING Hohe elektrische Spannung! Lebensgefahr durch elektrischen Schlag! Betreiben Sie Antriebskomponenten nur mit fest installiertem Schutzleiter. Schalten Sie vor Zugriff auf Antriebskomponenten die Spannungsversorgung aus. Beachten Sie die Entladezeiten von Kondensatoren.	⚠ WARNING High electrical voltage! Danger to life by electric shock! Only operate drive components with a permanently installed equipment grounding conductor. Disconnect the power supply before accessing drive components. Observe the discharge times of the capacitors.	⚠ AVERTISSEMENT Tensions électriques élevées ! Danger de mort par électrocution ! N'exploitez les composants d'entraînement que si un conducteur de protection est installé de manière permanente. Avant d'intervenir sur les composants d'entraînement, coupez toujours la tension d'alimentation. Tenez compte des délais de décharge de condensateurs.
⚠ WARNING Gefahrbringende Bewegungen! Lebensgefahr! Halten Sie sich nicht im Bewegungsbereich von Maschinen und Maschinenteilen auf. Verhindern Sie den unbeabsichtigten Zutritt für Personen. Bringen Sie vor dem Zugriff oder Zutritt in den Gefahrenbereich die Antriebe sicher zum Stillstand.	⚠ WARNING Dangerous movements! Danger to life! Keep free and clear of the ranges of motion of machines and moving machine parts. Prevent personnel from accidentally entering the range of motion of machines. Make sure that the drives are brought to safe standstill before accessing or entering the danger zone.	⚠ AVERTISSEMENT Mouvements entraînant une situation dangereuse ! Danger de mort ! Ne séjournez pas dans la zone de mouvement de machines et de composants de machines. Évitez tout accès accidentel de personnes. Avant toute intervention ou tout accès dans la zone de danger, assurez-vous de l'arrêt préalable de tous les entraînements.
⚠ WARNING Elektromagnetische / magnetische Felder! Gesundheitsgefahr für Personen mit Herzschrittmachern, metallischen Implantaten oder Hörgeräten! Zutritt zu Bereichen, in denen Antriebskomponenten montiert und betrieben werden, ist für oben genannten Personen untersagt bzw. nur nach Rücksprache mit einem Arzt erlaubt.	⚠ WARNING Electromagnetic / magnetic fields! Health hazard for persons with heart pacemakers, metal implants or hearing aids! 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.	⚠ AVERTISSEMENT Champs électromagnétiques / magnétiques ! Risque pour la santé des porteurs de stimulateurs cardiaques, d'implants métalliques et d'appareils auditifs ! 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.
⚠ VORSICHT Heiße Oberflächen (> 60 °C)! Verbrennungsgefahr! Vermeiden Sie das Berühren von metallischen Oberflächen (z. B. Kühlkörpern). Abkühlzeit der Antriebskomponenten einhalten (mind. 15 Minuten).	⚠ CAUTION Hot surfaces (> 60 °C [140 °F])! Risk of burns! 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).	⚠ ATTENTION Surfaces chaudes (> 60 °C)! Risque de brûlure ! Évitez de toucher des surfaces métalliques (p. ex. dissipateurs thermiques). Respectez le délai de refroidissement des composants d'entraînement (au moins 15 minutes).

D Deutsch	USA English	F Français
⚠ VORSICHT Unsachgemäße Handhabung bei Transport und Montage! Verletzungsgefahr! Verwenden Sie geeignete Montage- und Transporteinrichtungen. Benutzen Sie geeignetes Werkzeug und persönliche Schutzausrüstung.	⚠ CAUTION Improper handling during transport and mounting! Risk of injury! Use suitable equipment for mounting and transport. Use suitable tools and personal protective equipment.	⚠ ATTENTION Manipulation incorrecte lors du transport et du montage ! Risque de blessure ! Utilisez des dispositifs de montage et de transport adéquats. Utilisez des outils appropriés et votre équipement de protection personnel.
⚠ VORSICHT Unsachgemäße Handhabung von Batterien! Verletzungsgefahr! Versuchen Sie nicht, leere Batterien zu reaktivieren oder aufzuladen (Explosions- und Verätzungsgefahr). Zerlegen oder beschädigen Sie keine Batterien. Werfen Sie Batterien nicht ins Feuer.	⚠ CAUTION Improper handling of batteries! Risk of injury! Do not attempt to reactivate or recharge low batteries (risk of explosion and chemical burns). Do not dismantle or damage batteries. Do not throw batteries into open flames.	⚠ ATTENTION Manipulation incorrecte de piles! Risque de blessure! N'essayez pas de réactiver des piles vides ou de les charger (risque d'explosion et de brûlure par acide). Ne désassemblez et n'endommagez pas les piles. Ne jetez pas des piles dans le feu.

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

E Español	P Português	I Italiano
⚠ ADVERTENCIA ¡Campos electromagnéticos/magnéticos! ¡Peligro para la salud de las personas con marcapasos, implantes metálicos o audífonos! 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.	⚠ ATENÇÃO Campos eletromagnéticos / magnéticos! Perigo de saúde para pessoas com marcapassos, implantes metálicos ou aparelhos auditivos! 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.	⚠ AVVERTENZA Campi elettromagnetici / magnetici! Pericolo per la salute delle persone portatrici di pacemaker, protesi metalliche o apparecchi acustici! 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.
⚠ ATENCIÓN ¡Superficies calientes (> 60 °C)! ¡Peligro de quemaduras! 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).	⚠ CUIDADO Superfícies quentes (> 60 °C)! Perigo de queimaduras! Evite tocar superfícies metálicas (p. ex. radiadores). Respeite o tempo de arrefecimento dos componentes de acionamento (mín. 15 minutos).	⚠ ATTENZIONE Superfici bollenti (> 60 °C)! Pericolo di ustioni! Evitare il contatto con superfici metalliche (ad es. dissipatori di calore). Rispettare i tempi di raffreddamento dei componenti di comando (almeno 15 minuti).
⚠ ATENCIÓN ¡Manipulación inadecuada en el transporte y montaje! ¡Peligro de lesiones! Utilice dispositivos de montaje y de transporte adecuados. Utilice herramientas adecuadas y equipo de protección personal.	⚠ CUIDADO Manejo incorreto no transporte e montagem! Perigo de ferimentos! Utilize dispositivos de montagem e de transporte adequados. Utilize ferramentas e equipamento de proteção individual adequados.	⚠ ATTENZIONE Manipolazione inappropriata durante il trasporto e il montaggio! Pericolo di lesioni! Utilizzare dispositivi di montaggio e trasporto adatti. Utilizzare attrezzi adatti ed equipaggiamento di protezione personale.
⚠ ATENCIÓN ¡Manejo inadecuado de las pilas! ¡Peligro de lesiones! No trate de reactivar o cargar pilas descargadas (peligro de explosión y cauterización). No desarme ni dañe las pilas. No tire las pilas al fuego.	⚠ CUIDADO Manejo incorreto de baterias! Perigo de ferimentos! Não tente reativar nem carregar baterias vazias (perigo de explosão e de queimaduras com ácido). Não desmonte nem danifique as baterias. Não deite as baterias no fogo.	⚠ ATTENZIONE Utilizzo inappropriato delle batterie! Pericolo di lesioni! Non tentare di riattivare o ricaricare batterie scariche (pericolo di esplosione e corrosione). Non scomporre o danneggiare le batterie. Non gettare le batterie nel fuoco.

S Svenska	DK Dansk	NL Nederlands
⚠ VARNING Livsfara om följande säkerhetsanvisningar inte följs! Använd inte produkterna innan du har läst och förstått den dokumentation och de säkerhetsanvisningar som medföljer produkten, och följ alla anvisningar. Kontakta din Rexroth-återförsäljare om dokumentationen inte medföljer på ditt språk. Endast kvalificerad personal får arbeta med drivkomponenterna. Se kapitel 1 i denna dokumentation för närmare beskrivningar av säkerhetsanvisningarna.	⚠ ADVARSEL Livsfare ved manglende overholdelse af nedenstående sikkerhedsanvisninger! 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. Kontakt din Rexroth-forhandler, hvis dokumentationen ikke medfølger på dit sprog. Det er kun kvalificeret personale, der må arbejde på drive components. Nærmere forklaringer til sikkerhedsanvisningerne fremgår af kapitel 1 i denne dokumentation.	⚠ WAARSCHUWING Levensgevaar bij niet-naleving van onderstaande veiligheidsinstructies! 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. Mocht u niet beschikken over documenten in uw landstaal, kunt u contact opnemen met uw plaatselijke Rexroth distributiepartner. Uitsluitend gekwalificeerd personeel mag aan de aandrijvingscomponenten werken. Meer informatie over de veiligheidsinstructies vindt u in hoofdstuk 1 van deze documentatie.
⚠ VARNING Hög elektrisk spänning! Livsfara genom elchock! Använd endast drivkomponenterna med fastmonterad skyddsledare. Koppla bort spänningsförsörjningen före arbete på drivkomponenter. Var medveten om kondensatorernas urladdningstid.	⚠ ADVARSEL Elektrisk højspænding! Livsfare på grund af elektrisk stød! Drive components må kun benyttes med et fast installeret jordstik. Sørg for at koble spændingsforsyningen fra, inden du rører ved drive components. Overhold kondensatorernes afladningstider.	⚠ WAARSCHUWING Hoge elektrische spanning! Levensgevaar door elektrische schok! Bedien de aandrijvingscomponenten uitsluitend met vast geïnstalleerde aardleiding. Schakel voor toegang tot aandrijvingscomponenten de spanningsvoorziening uit. Neem de ontladtijden van condensatoren in acht.

S Svenska	DK Dansk	NL Nederlands
⚠️ VARNING Farliga rörelser! Livsfara! Uppehåll dig inte inom maskiners och maskindelarars rörelseområde. Förhindra att obehöriga personer får tillträde. Innan du börjar arbeta eller vistas inom drivsystemets riskområde måste maskinen vara stillastående.	⚠️ ADVARSEL Farlige bevægelser! Livsfare! Du må ikke opholde dig inden for maskiners og maskindeles bevægelsesradius. Sørg for, at ingen personer kan få utilsigtet adgang. Standt drevene helt, inden du rører ved drevene eller træder ind i deres fareområde.	⚠️ WAARSCHUWING Risicovolle bewegingen! Levensgevaar! Houdt u niet op in het bewegingsbereik van machines en machineonderdelen. Voorkom dat personen onbedoeld toegang verkrijgen. Voor toegang tot de gevaarlijke zone moeten de aandrijvingen veilig tot stilstand gebracht zijn.
⚠️ VARNING Elektromagnetiska/magnetiska fält! Hälsofara för personer med pacemaker, implantat av metall eller hörapparat! Det är förbjudet för ovan nämnda personer (eller kräver överläggning med läkare) att beträda områden där drivkomponenter är monterade och i drift.	⚠️ ADVARSEL Elektromagnetiske/magnetiske felter! Sundhedsfare for personer med pacemakere, metalliske implantater eller høreapparater! For disse personer er der adgang forbudt eller kun adgang med tilladelse fra læge til de områder, hvor drive components monteres og drives.	⚠️ WAARSCHUWING Elektromagnetische / magnetische velden! Gevaar voor de gezondheid van personen met pacemakers, metalen implantaten of hoorapparaten! Toegang tot gebieden, waarin aandrijvingscomponenten worden gemonteerd en bediend, is verboden voor voornoemde personen of uitsluitend toegestaan na overleg met een arts.
⚠️ OBSERVERA Varma ytor (> 60 °C)! Risk för brännskador! Undvik att vidröra metallytor (t.ex. kylelement). Var medveten om att det tar tid för drivkomponenterna att svalna (minst 15 minuter).	⚠️ FORSIGTIG Varme overflader (> 60 °C)! Risiko for forbrændinger! Undgå at berøre metaloverflader (f.eks. kølelementer). Overhold drive components nedkølingstid (min. 15 min.).	⚠️ VOORZICHTIG Hete oppervlakken (> 60 °C)! Verbrandingsgevaar! Voorkom contact met metalen oppervlakken (bijv. Koellichamen). Afkoeltijd van de aandrijvingscomponenten in acht nemen (min. 15 minuten).
⚠️ OBSERVERA Felaktig hantering vid transport och montering! Skaderisk! Använd passande monterings- och transportanordningar. Använd lämpliga verktyg och personlig skyddsutrustning.	⚠️ FORSIGTIG Fejlhåndtering ved transport og montering! Risiko for kvæstelser! Benyt egnede monterings- og transportanordninger. Benyt egnet værktøj og personligt sikkerhedsudstyr.	⚠️ VOORZICHTIG Onjuist gebruik bij transport en montage! Letselgevaar! Gebruik geschikte montage- en transportinrichtingen. Gebruik geschikt gereedschap en een persoonlijke veiligheidsuitrusting.
⚠️ OBSERVERA Felaktig hantering av batterier! Skaderisk! Försök inte återaktivera eller ladda upp batterier (risk för explosioner och frätskador). Batterierna får inte tas isär eller skadas. Släng inte batterierna i elden.	⚠️ FORSIGTIG Fejlhåndtering af batterier! Risiko for kvæstelser! Forsøg ikke at genaktivere eller oplade tomme batterier (eksplosions- og ætsningsfare). Undlad at skille batterier ad eller at beskadige dem. Smid ikke batterier ind i åben ild.	⚠️ VOORZICHTIG Onjuist gebruik van batterijen! Letselgevaar! Probeer nooit lege batterijen te reactiveren of op te laden (explosiegevaar en gevaar voor beschadiging van weefsel door cauterisatie). Batterijen niet demonteren of beschadigen. Nooit batterijen in het vuur werpen.

FIN Suomi	PL Polski	CZ Český
VAROITUS Näiden turvaohjeiden noudattamatta jättämisestä on seurauksena hengenvaara! Ota tuote käyttöön vasta sen jälkeen, kun olet lukenut läpi tuotteen mukana toimitetut asiakirjat ja turvallisuusohjeet, ymmärtänyt ne ja ottanut ne huomioon. Jos asiakirjoja ei ole saatavana omalla äidinkielelläsi, ota yhteys asianomaiseen Rexrothin myyntiedustajaan. Käyttölaitteiden komponenttien parissa saa työskennellä ainoastaan valtuutettu henkilöstö. Lisätietoa turvaohjeista löydät tämän dokumentaation luvusta 1.	OSTRZEŻENIE Zagrożenie życia w razie nieprzestrzegania poniższych wskazówek bezpieczeństwa! Nie uruchamiać produktów przed uprzednim przeczytaniem i pełnym zrozumieniem wszystkich dokumentów dostarczonych wraz z produktem oraz wskazówek bezpieczeństwa. Należy przestrzegać wszystkich zawartych tam zaleceń. W przypadku braku dokumentów w Państwa języku, prosimy o skontaktowanie się z lokalnym partnerem handlowym Rexroth. Przy zespołach napędowych może pracować wyłącznie wykwalifikowany personel. Blizsze objaśnienia wskazówek bezpieczeństwa znajdują się w Rozdziale 1 niniejszej dokumentacji.	VAROVÁNÍ Nebezpečí života v případě nedodržení níže uvedených bezpečnostních pokynů! Před uvedením výrobků do provozu si přečtěte kompletní dokumentaci a bezpečnostní pokyny dodávané s výrobkem, pochopte je a dodržujte. Nemáte-li k dispozici podklady ve svém jazyce, obraťte se na příslušného obchodního partnera Rexroth. Na komponentách pohonu smí pracovat pouze kvalifikovaný personál. Podrobnější vysvětlení k bezpečnostním pokynům naleznete v kapitole 1 této dokumentace.
VAROITUS Voimakas sähköjännite! Sähköiskun aiheuttama hengenvaara! Käytä käyttölaitteen komponentteja ainoastaan maadoitusjohtimen ollessa kiinteästi asennettuna. Katkaise jännitteensyöttö ennen käyttölaitteen komponenteille suoritettavien töiden aloittamista. Huomioi kondensaattoreiden purkausajat.	OSTRZEŻENIE Wysokie napięcie elektryczne! Zagrożenie życia w wyniku porażenia prądem! Zespoły napędu mogą być eksploatowane wyłącznie z zainstalowanym na stałe przewodem ochronnym. Przed uzyskaniem dostępu do podzespołów napędu należy odłączyć zasilanie elektryczne. Zwracać uwagę na czas rozładowania kondensatorów.	VAROVÁNÍ Vysoké elektrické napětí! Nebezpečí života při zasažení elektrickým proudem! Komponenty pohonu smí být v provozu pouze s pevně nainstalovaným ochranným vodičem. Než začnete zasahovat do komponent pohonu, odpojte je od elektrického napájení. Dodržujte vybíjecí časy kondenzátorů.
VAROITUS Vaarallisia liikkeitä! Hengenvaara! Älä oleskele koneiden tai koneenosien liikealueella. Pidä huolta siitä, ettei muita henkilöitä pääse alueelle vahingossa. Pysäytä käyttölaitteet varmasti ennen vaara-alueelle koskemista tai menemistä.	OSTRZEŻENIE Niebezpieczne ruchy! Zagrożenie życia! Nie wolno przebywać w obszarze pracy maszyny i jej elementów. Nie dopuszczać osób niepowołanych do obszaru pracy maszyny. Przed dotknięciem urządzenia/maszyny lub zbliżeniem się do obszaru zagrożenia należy zgodnie z zasadami bezpieczeństwa wyłączyć napędy.	VAROVÁNÍ Nebezpečné pohyby! Nebezpečí života! Nezdržujte se v dosahu pohybu strojů a jejich součástí. Zabraňte náhodnému přístupu osob. Před zásahem nebo vstupem do nebezpečného prostoru bezpečně zastavte pohony.
VAROITUS Sähkömagneettisia/ magneettisia kenttiä! Terveystieteiden haavojen vaara henkilölle, joilla on sydämentahdistin, metallinen implantti tai kuulolaite! Yllä mainituilta henkilöiltä on pääsy kielletty alueelle, joilla asennetaan tai käytetään käyttölaitteen komponentteja, tai heidän on ensin saatava tähän suostumus lääkäriltään.	OSTRZEŻENIE Pola elektromagnetyczne / magnetyczne! Zagrożenie zdrowia dla osób z rozrusznikiem serca, metalowymi implantami lub aparatami słuchowymi! Wstęp na teren, gdzie odbywa się montaż i eksploatacja napędów jest dla ww. osób zabroniony względnie dozwolony po konsultacji z lekarzem.	VAROVÁNÍ Elektromagnetická/ magnetická pole! Nebezpečí pro zdraví osob s kardiostimulátory, kovovými implantáty nebo naslouchadly! Výše uvedené osoby mají zakázán přístup do prostorů, kde jsou montovány a používány komponenty pohonu, resp. ho mají povolen pouze po poradě s lékařem.
HUOMIO Kuumia pintoja (> 60 °C)! Palovammojen vaara! Vältä metallipintojen koskettamista (esim. jäähdytyslevyt). Noudata käyttölaitteen komponenttien jäähdytysaikoja (väh. 15 minuuttia).	PRZESTROGA Gorące powierzchnie (> 60 °C)! Niebezpieczeństwo poparzenia! Unikać kontaktu z powierzchniami metalowymi (np. radiatorami). Przestrzegać czasów schładzania podzespołów napędów (min. 15 minut).	UPOZORNĚNÍ Horké povrchy (> 60 °C)! Nebezpečí popálení! Nedotýkejte se kovových povrchů (např. chladičů těles). Dodržujte dobu ochlazení komponent pohonu (min. 15 minut).

FIN Suomi	PL Polski	CZ Český
▲HUOMIO Epäasianmukainen käsittely kuljetuksen ja asennuksen yhteydessä! Loukkaantumisvaara! Käytä soveltuvia asennus- ja kuljetuslaitteita. Käytä omia työkaluja ja henkilökohtaisia suojavarusteita.	▲PRZESTROGA Niewłaściwe obchodzenie się podczas transportu i montażu! Ryzyko urazu! Stosować odpowiednie urządzenia montażowe i transportowe. Stosować odpowiednie narzędzia i środki ochrony osobistej.	▲UPOZORNĚNÍ Nesprávné zacházení při přepravě a montáži! Nebezpečí zranění! Používejte vhodná montážní a dopravní zařízení. Používejte vhodné nářadí a osobní ochranné vybavení.
▲HUOMIO Pariston epäasianmukainen käsittely! Loukkaantumisvaara! Älä yritä saada tyhjiä paristoja toimimaan tai ladata niitä uudelleen (räjähdys- ja syöpymisvaara). Älä hajota paristoja osiin tai vaurioita niitä. Älä heitä paristoja tulleen.	▲PRZESTROGA Niewłaściwe obchodzenie się z bateriami! Ryzyko urazu! Nie próbować reaktywować i nie ładować zużytych baterii (niebezpieczeństwo wybuchu oraz poparzenia żrącą substancją). Nie demontować i nie niszczyć baterii. Nie wrzucać baterii do ognia.	▲UPOZORNĚNÍ Nesprávné zacházení s bateriemi! Nebezpečí zranění! Nepokoušejte se znovu aktivovat nebo dobíjet prázdné baterie (nebezpečí výbuchu a poleptání). Nerozebírejte ani nepoškozujte baterie. Neházejte baterie do ohně.

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

SLO Slovensko	SK Slovenčina	RO Română
⚠ OPOZORILO Elektromagnetna / magnetna polja! Nevarnost za zdravje za osebe s spodbujevalniki srca, kovinskimi vsadki ali slušnimi aparati! Dostop do območij, v katerih so nameščene delujoče pogonske komponente, je za zgoraj navedene osebe prepovedan oz. dovoljen samo po posvetu z zdravnikom.	⚠ VAROVANIE Elektromagnetické/ magnetické polia! Nebezpečenstvo pre zdravie osôb s kardioštimulátormi, kovovými implantátmi alebo načúvacími prístrojmi! 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.	⚠ AVERTIZARE Câmpuri electromagnetice / magnetice! Pericol pentru sănătatea persoanelor cu stimulatore cardiace, implanturi metalice sau aparate auditive! 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.
⚠ POZOR Vroče površine (> 60 °C)! Nevarnost opeklin! Izogibajte se stiku s kovinskimi površinami (npr. hladilnimi telesii). Upoštevajte čas hlajenja pogonskih komponent (najm. 15 minut).	⚠ UPOZORNENIE Horúce povrchy (> 60 °C)! Nebezpečenstvo popálenia! Zabráňte kontaktu s kovovými povrchmi (napr. chladiacimi telesami). Dodržiavajte čas vychladenia komponentov pohonu (min. 15 minút).	⚠ ATENȚIE Suprafețe fierbinți (> 60 °C)! Pericol de arsuri! Nu atingeți suprafețele metalice (de ex. radiatoare de răcire). Respectați timpii de răcire ai componentelor de acționare (min. 15 minute).
⚠ POZOR Nestrokovno ravnanje med transportom in nameštivjo! Nevarnost poškodb! Uporablajte ustrezne pripomočke za nameščanje in transport. Uporabite ustrezno orodje in osebno zaščitno opremo.	⚠ UPOZORNENIE Neodborná manipulácia pri transporte a montáži! Nebezpečenstvo poranenia! Používajte vhodné montážne a transportné zariadenia. Používajte vhodné náradie a osobné ochranné prostriedky.	⚠ ATENȚIE Manipulare necorespunzătoare la transport și montaj! Pericol de vătămare! Utilizați dispozitive adecvate de montaj și transport. Folosiți instrumente corespunzătoare și echipament personal de protecție.
⚠ POZOR Nepravilno ravnanje z baterijami! Nevarnost poškodb! Ne poskušajte ponovno aktivirati ali napolniti praznih baterij (Nevarnost zaradi eksplozije ali jedkanja). Ne razstavljajte ali poškodujte nobenih baterij. Baterij ne mečite v ogenj.	⚠ UPOZORNENIE Neodborná manipulácia s batériami! Nebezpečenstvo poranenia! Nepokúšajte sa reaktivovať alebo nabíjať prázdne batérie (nebezpečenstvo výbuchu a poleptania). Batérie nerozoberajte ani nepoškodzuje. Nehádzte batérie do ohňa.	⚠ ATENȚIE Manipulare necorespunzătoare a bateriilor! Pericol de vătămare! Nu încercați să reactivați sau să încărcăți bateriile goale (pericol de explozie și pericol de arsuri). Nu dezasmblați și nu deteriorați bateriile. Nu aruncați bateriile în foc.

H Magyar	BG Български	LV Latviski
⚠ FIGYELMEZTETÉS! Az alábbi biztonsági útmutatások figyelmen kívül hagyása életveszélyes helyzethez vezethet! Üzembe helyezés előtt olvassa el, értelmezze, és vegye figyelembe a csomagban található dokumentumban foglaltakat és a biztonsági útmutatásokat. Amennyiben a csomagban nem talál az Ön nyelvén írt dokumentumokat, vegye fel a kapcsolatot az illetékes Rexroth-képviselővel. A hajtás alkatrészein kizárólag képzett személy dolgozhat. A biztonsági útmutatókkal kapcsolatban további magyarázatot ennek a dokumentumnak az első fejezetében találhat.	⚠ ПРЕДУПРЕЖДЕНИЕ Опасност за живота при неспазване на посочените подолу инструкции за безопасност! 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. Ако текстът не е написан на Вашия език, моля обърнете се към Вашия компетентен търговски представител на Rexroth. Със задвижващите компоненти трябва да работи само квалифициран персонал. Подробни пояснения към инструкциите за безопасност можете да видите в Глава 1 на тази документация.	⚠ BRĪDINĀJUMS Turpinājumā doto drošības norādījumu neievērošana var apdraudēt dzīvību! Sāciet lietot izstrādājumu tikai pēc tam, kad esat pilnībā izlasījuši, sapratuši un iemēuši vērā ņemamā ar izstrādājumu piegādātos dokumentus. Ja dokumenti nav pieejami Jūsu valsts valodā, vērsieties pie pilnvarotā Rexroth izplatītāja. Darbus pie piedziņas komponentiem drīkst veikt tikai kvalificēts personāls. Detalizētus paskaidrojumus attiecībā uz drošības norādījumiem skatiet šī dokumenta 1. nodaļā.
⚠ FIGYELMEZTETÉS! Magas elektromos feszültség! Életveszély áramütés miatt! A hajtás alkatrészeit csak véglegesen telepített védővezetővel üzemeltesse! Mielőtt hozzányúl a hajtás alkatrészeihez, kapcsolja ki az áramellátást. Ügyeljen a kondenzátorok kisülési idejére!	⚠ ПРЕДУПРЕЖДЕНИЕ Високо електрическо напрежение! Опасност за живота от удар от електрически ток! Работете със задвижващите компоненти само при здраво закрепен заземяващ проводник. Преди работа по задвижващите компоненти, изключете захранващото напрежение. Обърнете внимание на времето за разреждане на кондензаторите.	⚠ BRĪDINĀJUMS Augsts elektriskais spriegums! Dzīvības apdraudējums elektriskā trieciena dēļ! Piedziņas komponentus darbiniet tikai ar fiksēti uzstādītu zemējumvadu. Pirms darba pie piedziņas komponentiem atslēdziet elektroapgādi. Nemiet vērā kondensatoru izlādes laikus.

H Magyar	BG Български	LV Latviski
▲ FIGYELMEZTETÉS! Veszélyes mozgás! Életveszély! Ne tartózkodjon a gépek és a gépalkatrészek mozgási területén belül! Illetéktelen személyeket ne engedjen a gép közelébe! Mielőtt beavatkozik, vagy a veszélyes zónába belép a hajtásokat biztonságosan állítsa le.	▲ ПРЕДУПРЕЖДЕНИЕ Опасни движения! Опасност за живота! Не стойте в обсега на движение на машините и частите на машините. Не допускайте непреднамерен достъп на хора. Преди работа или влизане в опасната зона, спрете надеждно приводния механизъм.	▲ BRĪDINĀJUMS Bīstamas kustības! Dzīvības apdraudējums! Neuzturieties mašīnu un mašīnas detaļu kustību zonā. Novērsiet nepiederošu personu piekļūšanu. Pirms darba bīstamajās zonās pilnībā apstādiniet piedziņu.
▲ FIGYELMEZTETÉS! Elektromágneses / mágneses mező! Káros hatással lehet a szívritmus-szabályozó készülékkel, fémbesüléssel vagy hallókészülékkel rendelkezők egészségére! 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.	▲ ПРЕДУПРЕЖДЕНИЕ Електромагнитни / магнитни полета! Опасност за здравето на хора със сърдечни стимулатори, метални импланти или слухови апарати! 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.	▲ BRĪDINĀJUMS Elektromagnētiskais / magnētiskais lauks! Veselības apdraudējums personām ar sirds stimulatoriem, metāliskiem implantiem vai dzirdes aparātiem! Tuvošanās zonām, kurās tiek montēti un darbināti piedziņas komponenti, iepriekš minētajām personām ir aizliegta, respektīvi, atļauta tikai pēc konsultēšanās ar ārstu.
▲ VIGYÁZAT! Forró felületek (> 60 °C)! Égésveszély! Ne érjen hozzá fémfelületekhez (pl. hűtőtestekhez)! Vegye figyelembe a hajtás alkatrészeinek kihűlési idejét (min. 15 perc)!	▲ ВНИМАНИЕ Горещи повърхности (> 60 °C)! Опасност от изгаряне! Не докосвайте метални повърхности (например радиатори). Съблюдавайте времето на охлаждане на задвижващите компоненти (мин. 15 минути).	▲ UZMANĪBU Karstas virsmas (> 60 °C)! Apdedzināšanās risks! Neskarīties pie metāliskām virsmām (piemēram, dzesētāja). Ļaujiet piedziņas komponentiem atdzist (min. 15 minūtes).
▲ VIGYÁZAT! Szakszerűtlen kezelés szállításkor és szereléskor! Sérülésveszély! A megfelelő beszerelési és szállítási eljárásokat alkalmazza! Használjon megfelelő szerszámokat és személyes védőfelszerelést!	▲ ВНИМАНИЕ Неправилно боравене по време на транспорт и монтаж! Опасност от нараняване! Използвайте подходящо монтажно и транспортно оборудване. Използвайте подходящи инструменти и лични предпазни средства.	▲ UZMANĪBU Nepareizi veikta transportēšana un montāža! Traumu gūšanas risks! Izmantojiet piemērotas montāžas un transportēšanas ierīces. Izmantojiet piemērotus instrumentus un individuālos aizsardzības līdzekļus.
▲ VIGYÁZAT! Akkumulátorok szakszerűtlen kezelése! Sérülésveszély! Üres akkumulátorokat ne aktiváljon újra, illetve ne töltsön fel (robbanás- és marásveszély)! Az akkumulátorokat ne szedje szét, és ne rongálja meg! Az akkumulátort ne dobja tűzbe!	▲ ВНИМАНИЕ Неправилно боравене с батерии! Опасност от нараняване! Не се опитвайте да активирате отново или да зареждате разредени батерии (Опасност от експлозия и напръскване с агресивен агент). Не разглобявайте и не повреждайте батерии. Не хвърляйте батерии в огън.	▲ UZMANĪBU Nepareiza bateriju lietošana! Traumu gūšanas risks! Nemēģiniet no jauna aktivizēt vai uzlādēt tukšas baterijas (eksploziju un ķīmisko apdegumu draudi). Neizjauciet un nesabojājiēt baterijas. Nemetiet baterijas ugunī.

LT Lietuviškai	EST Eesti	GR Ελληνικά
⚠️ ĮSPĖJIMAS Pavojus gyvybei nesilaikant toliau pateikiamų saugumo nurodymų! Naudokite gaminį tik kruopščiai perskaitę prie jo pridėtus aprašus, saugumo nurodymus. Susipažinkite su jais ir vadovaukitės naudodami gaminį. Jei Jūs negavote aprašo gimtąja kalba, kreipkitės į įgaliotus Rexroth atstovus. Prie pavaros komponentų leidžiama dirbti tik kvalifikuotam personalui. Išsamesnius saugumo nurodymų paaiškinimus rasite šios dokumentacijos 1 skyriuje.	⚠️ HOIATUS Alljärgnevatte ohutusjuhiste eiramine on eluohtlik! Võtke tooted käiku alles siis, kui olete toodetega kaasasolevad materjalid ning ohutusjuhised täielikult läbi lugenud, neist aru saanud ja neid järginud. Kui Teil puuduvad emakeelsed materjalid, siis pöörduge Rexrothi kohaliku müügiesinduse poole. Ajamikomponentidega tohib töötada üksnes kvalifitseeritud personal. Täpsemad selgitusi ohutusjuhiste kohta leiate käesoleva dokumentatsiooni peatükist 1.	⚠️ ΠΡΟΕΙΔΟΠΟΙΗΣΗ Κίνδυνος θανάτου σε περίπτωση μη συμμόρφωσης με τις παρακάτω οδηγίες ασφαλείας! Θέστε το προϊόν σε λειτουργία αφού διαβάσετε, κατανοήσετε και λάβετε υπόψη το σύνολο των οδηγιών ασφαλείας που το συνοδεύουν. Εάν δεν υπάρχει τεκμηρίωση στη γλώσσα σας, απευθυνθείτε σε εξουσιοδοτημένο αντιπρόσωπο της Rexroth. Μόνο εξειδικευμένο προσωπικό επιτρέπεται να χειρίζεται στοιχεία μετάδοσης κίνησης. Περαιτέρω επεξηγήσεις των οδηγιών ασφαλείας διατίθενται στο κεφάλαιο 1 της παρούσας τεκμηρίωσης.
⚠️ ĮSPĖJIMAS Aukšta elektros įtampa! Pavojus gyvybei dėl elektros smūgio! Pavaros komponentus eksploatuokite tik su fiksuotai instaliuotu apsauginiu laidu. Prieš priedami prie pavaros komponentų išjunkite maitinimo įtampą. Atsižvelkite į kondensatorių išsikrovimo trukmę.	⚠️ HOIATUS Kõrge elektripinge! Eluohtlik elektrilöögi tõttu! Käitage ajamikomponente üksnes püsivalt installeeritud maandusega. Lülitage enne ajamikomponentidega tööde alustamist toitepinge välja. Järgige kondensaatorite mahalaadumisaegu.	⚠️ ΠΡΟΕΙΔΟΠΟΙΗΣΗ Υψηλή ηλεκτρική τάση! Κίνδυνος θανάτου από ηλεκτροπληξία! Θέτετε σε λειτουργία τα στοιχεία μετάδοσης κίνησης μόνο εφόσον έχει τοποθετηθεί καλά προστατευτικός αγωγός γείωσης. Πριν από οποιαδήποτε παρέμβαση, αποσυνδέστε την τροφοδοσία των στοιχείων μετάδοσης κίνησης. Λάβετε υπόψη τους χρόνους αποφόρτισης των πυκνωτών.
⚠️ ĮSPĖJIMAS Pavojingi judesiai! Pavojus gyvybei! Nebūkite mašinų ar jų dalių judėjimo zonoje. Neleiskite netyčia patekti asmenims. Prieš patekdam į pavojaus zoną saugiai išjunkite pavaras.	⚠️ HOIATUS Ohtlikud liikumised! Eluohtlik! Ärge viibige masina ja masinaosade liikumispirkonnas. Tõkestage inimeste ettekavatsematu sisenemine masina ja masinaosade liikumispirkonda. Tagage ajamite turvaline seiskamine enne ohupirkonda juurdepääsu või sisenemist.	⚠️ ΠΡΟΕΙΔΟΠΟΙΗΣΗ Επικίνδυνες τάσεις! Κίνδυνος θανάτου! Μην στέκεστε στην περιοχή κίνησης μηχανημάτων και εξαρτημάτων. Αποτρέπετε την τυχαία είσοδο ατόμων. Πριν από την παρέμβαση ή πρόσβαση στην περιοχή κινδύνου, μεριμνήστε για την ασφαλή ακινητοποίηση των συστημάτων μετάδοσης κίνησης.
⚠️ ĮSPĖJIMAS Elektromagnetiniai / magnetiniai laukai! Pavojus asmenų su širdies stimulatoriais, metaliniais implantais arba klausos aparatais sveikatai! Prieiga prie zonų, kuriose montuojami ir eksploatuojami pavaros komponentai, aukščiau nurodytiems asmenims yra draudžiama arba leistina tik pasitarus su gydytoju.	⚠️ HOIATUS Elektromagnetilised / magnetilised väljad! Terviseohtlik südamestimulaatorite, metallimplantaatide ja kuulmisseedmetega inimestele! Sisenemine piirkondadesse, kus toimub ajamikomponentide monteerimine ja käitamine, on ülalnimetatud isikutele keelatud või lubatud üksnes pärast arstiga konsulteerimist.	⚠️ ΠΡΟΕΙΔΟΠΟΙΗΣΗ Ηλεκτρομαγνητικά/ μαγνητικά πεδία! Κίνδυνος για την υγεία ατόμων με καρδιακούς βηματοδότες, μεταλλικά εμφυτεύματα ή συσκευές ακοής! Η είσοδος σε περιοχές όπου πραγματοποιείται συναρμολόγηση και λειτουργία στοιχείων μετάδοσης κίνησης απαγορεύεται στα προαναφερθέντα άτομα, εκτός αν τους έχει δοθεί σχετική άδεια κατόπιν συνεννόησης με γιατρό.
⚠️ PERSPĖJIMAS Karšti paviršiai (> 60 °C)! Nudegimo pavojus! Venkite liesti metalinius paviršius (pvz., radiatorių). Išlaikykite pavaros komponentų atvėsimo trukmę (bent 15 minučių).	⚠️ ETTEVAATUST Kuumad välispinnad (> 60 °C)! Põletusohut! Vältige metalsete välispindade (nt radiaatorid) puudutamist. Pidage kinni ajamikomponentide mahajahtumisajast (vähemalt 15 minutit).	⚠️ ΠΡΟΣΟΧΗ Καυτές επιφάνειες (> 60 °C)! Κίνδυνος εγκαύματος! Αποφεύγετε την επαφή με μεταλλικές επιφάνειες (π.χ. μονάδες ψύξης). Λάβετε υπόψη το χρόνο ψύξης των στοιχείων μετάδοσης κίνησης (τουλάχιστον 15 λεπτά).

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⚠ PERSPĖJIMAS Netinkamas darbas transportuojant ir montuojant! Susižalojimo pavojus! Naudokite tinkamus montavimo ir transportavimo įrenginius. Naudokite tinkamus įrankius ir asmens saugos priemonės.	⚠ ETTEVAATUST Asjatundmatu käsitsemine transportimisel ja montaažil! Vigastusoht! Kasutage sobivaid montaaži- ja transpordiseadiseid. Kasutage sobivaid tööriistu ja isiklikku kaitsevarustust.	⚠ ΠΡΟΣΟΧΗ Ακατάλληλος χειρισμός κατά τη μεταφορά και συναρμολόγηση! Κίνδυνος τραυματισμού! Χρησιμοποιείτε κατάλληλους μηχανισμούς συναρμολόγησης και μεταφοράς. Χρησιμοποιείτε κατάλληλα εργαλεία και ατομικό εξοπλισμό προστασίας.
⚠ PERSPĖJIMAS Netinkamas darbas su baterijomis! Susižalojimo pavojus! Nebandykite tuščių baterijų reaktyvuoti arba įkrauti (sprogimo ir išėsdinimo pavojus). Neardykite ir nepažeiskite baterijų. Nemeskite baterijų į ugnį.	⚠ ETTEVAATUST Patareide asjatundmatu käsitsemine! Vigastusoht! Ärge üritage kunagi tühje patareisid reaktiveerida või täis laadida (plahvatus- ja söövitusoht). Ärge demonteerige ega kahjustage patareisid. Ärge visake patareisid tulle.	⚠ ΠΡΟΣΟΧΗ Ακατάλληλος χειρισμός μπαταριών! Κίνδυνος τραυματισμού! Μην επιδιώκετε να ενεργοποιήσετε ξανά ή να φορτίσετε κενές μπαταρίες (κίνδυνος έκρηξης και διάβρωσης). Μην διαλύετε ή καταστρέφετε τις μπαταρίες. Μην απορρίπτετε τις μπαταρίες στη φωτιά.

CN 中文
⚠ 警告 如果不按照下述指定的安全说明使用，将会导致人身伤害！ 在没有阅读，理解随本产品附带的文件并熟知正当使用前，不要安装或使用本产品。 如果没有您所在国家官方语言文件说明，请与 Rexroth 销售伙伴联系。 只允许有资格人员对驱动器部件进行操作。 安全说明的详细解释在本文档的第一章。
⚠ 警告 高电压！电击导致生命危险！ 只有在安装了永久良好的设备接地导线后才可以对驱动器的部件进行操作。 在接触驱动器部件前先将驱动器部件断电。 确保电容放电时间。
⚠ 警告 危险运动！生命危险！ 保证设备的运动区域内和移动部件周围无障碍物。 防止人员意外进入设备运动区域内。 在接近或进入危险区域之前，确保传动设备安全停止。
⚠ 警告 电磁场/磁场！对佩戴心脏起搏器、金属植入物和助听器的人员会造成严重的人身伤害！ 上述人员禁止进入安装及运行的驱动器区域，或者必须事先咨询医生。
⚠ 小心 热表面（大于 60 度）！灼伤风险！ 不要触摸金属表面（例如散热器）。驱动器部件断电后需要时间进行冷却（至少 15 分钟）。
⚠ 小心 安装和运输不当导致受伤危险！当心受伤！ 使用适当的运输和安装设备。 使用适合的工具及用适当的防护设备。
⚠ 小心 电池操作不当！受伤风险！ 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）。 请勿拆解或损坏电池。请勿将电池投入明火中。

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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 a MLF kit 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	Remark
03	2021-09	Revision and amendment of frame size xx2
02	2016-06	Amended safety notes, MLS300 with threads for eyebolts
01	2012-08	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
	MLF Water-Cooled Linear Motors	Project Planning Manual	DOK-MOTOR*-MLF*****-PR□□-□□-P
	Connection cables IndraDrive and IndraDyn	Selection data	DOK-CONNEC-CABLE*INDRV-AU□□-□□-P
	Electromagnetic Compatibility (EMC) in Drive and Control Systems	Project Planning Manual	DOK-GENERL-EMV*****-PR□□-□□-P
	Documentation about special products are available on demand.		

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. Sur-

rounding 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 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 (ESD)

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 stranded 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 primary part MLP

The scope of delivery of a primary part contains:

- Primary part in origin package
- Type plate
- Safety instructions

Scope of delivery of secondary part MLS

The scope of delivery of a secondary part contains:

- Secondary part in origin package
- Type plate
- Safety instructions

At delivery, immediately check if the supplied components match with the delivery note. The carrier must be informed immediately, in the case of any damaged package and goods. Start-up of damaged goods is prohibited.

4 About this product

4.1 Product description

4.1.1 Technical features

Product	Three phase synchronous motor
Manufacturer	Bosch Rexroth Electric Drives and Controls GmbH Buergermeister-Dr.-Nebel-Straße 2 97816 Lohr am Main, Germany
Type	MLP 040, -052, -070, -100, -102, -140, -152, -200, -202, -300 MLS 040, -052, -070, -100, -102, -140, -152, -200, -202, -300
Listed acc. to UL standard	UL 1004, Fifth Edition
Listed acc. to CSA standard	Canadian National Standard(s) C22.2 No. 100-04
UL-Files	E341734
Ambient temperature during operation	0 ... 40 °C
Motor design	Open (kit motor)
Degree of protection (DIN EN 60034-5)	IP65
Installation altitude	0 ... 1000 m
Sound pressure level	< 75 dB(A)
Insulation class (DIN EN 60034-1)	155 (F)
Electrical connection	Connection cable

4.2 Identification of motor components

4.2.1 Type code MLP

Product
 MLP _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _
 MLP = Primary part of an IndraDyn L synchronous k

Frame size
 MLP _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _
 _ = See project planning manual IndraDyn L

Frame length
 MLP _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _
 _ = See project planning manual IndraDyn L

Winding
 MLP _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _
 _ = See project planning manual IndraDyn L

Coolant
 MLP _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _
 F = Liquid cooling

Encapsulation
 MLP _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _
 S = Standard encapsulation
 T = Thermal encapsulation

Encoder
 MLP _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _
 N0 = Without motor encoder

Electric connection
 MLP _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _
 CN = Cable lead out on front of primary part

Other design
 MLP _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _
 N N N N = None

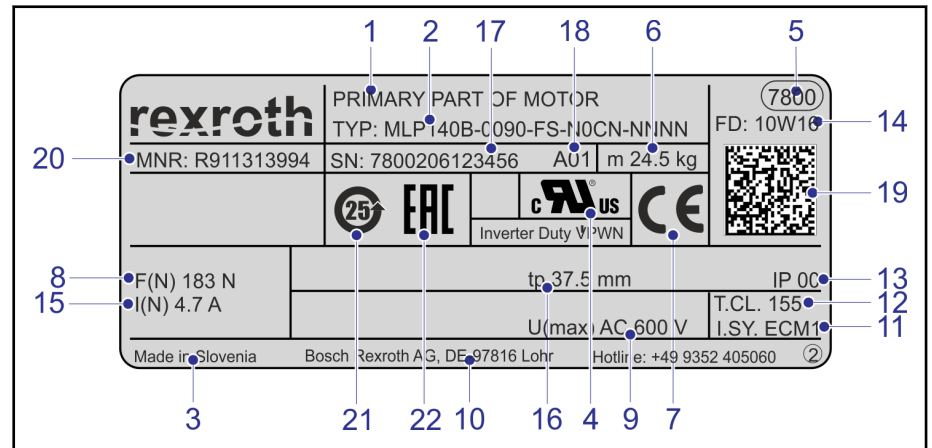
Fig. 4-1: Type code MLP



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

4.2.2 Labeling MLP

On the front of the primary part, a type plate is fixed. The type plate is for a precise identification of the primary part. A second type plate is enclosed. This can be adjusted on the machine or used ulterior by the user. The type plate of the primary part contains the following data



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

Fig. 4-2: Type plate primary part



Observe the information on the certification mark under [Chapter 4.2.5](#).

4.2.3 Type code MLS

Product

MLS - - - - - - - - - - - - - - - -

MLS = Secondary part of an MLF synchronous kit motor

Frame size

MLS - - - - - - - - - - - - - - - -

= See project planning manual MLF

Type

MLS - - - - - - - - - - - - - - - -

S = Secondary part

Mechanical design

MLS - - - - - - - - - - - - - - - -

3 = Fastening by screws

Mechanical protection

MLS - - - - - - - - - - - - - - - -

A = With cover plate

Segment length

MLS - - - - - - - - - - - - - - - -

= See project planning manual MLF

Other design

MLS - - - - - - - - - - - - - - - -

NNNN = None

HNNN = Basic body reinforced (only for MLS300)

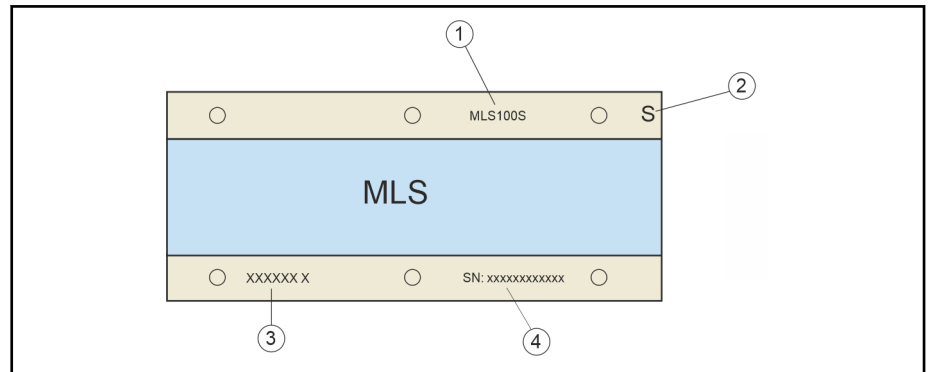
Fig. 4-3: Type code MLS



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

4.2.4 Labeling MLS

Due to lack of space, a type plate cannot be fixed on the secondary part. Two identical type plates are enclosed to the secondary part, whereby the UL-label is specified on the first plate only. To ensure a safe and continuous identification of the type, the type designation and the serial number are additionally on the secondary part (Fig. 4-4).



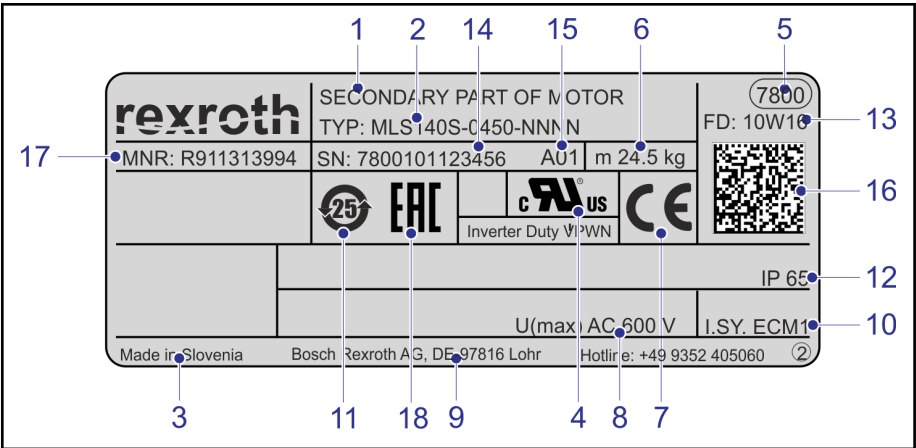
- ① Type designation
- ② Pole designation "S" (for South Pole)
- ③ Internal labeling
- ④ Serial number

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



Each secondary part has a magnetic north pole on one front face and a magnetic south pole on the opposite front face, regardless of length. The secondary parts are signed with "S" (south pole) on one front

The type plate of the secondary part contains the following data



- 1 Motor type
- 2 Type designation
- 3 Designation of origin
- 4 UL sign
- 5 Factory number
- 6 Secondary part mass
- 7 EC declaration of conformity
- 8 Maximum input voltage
- 9 Company address
- 10 Insulation system
- 11 China RoHS conformity mark
- 12 Degree of protection by housing
- 13 Manufacturing date
- 14 Serial number
- 15 Revision state
- 16 Rexroth barcode
- 17 Material number
- 18 EAC conformity mark

Fig. 4-5: Type plate secondary part



Please observe the information on the certification mark under [Chapter 4.2.5](#).

4.2.5 Certification mark

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.

UR/cUR



MLF motors were presented to “Underwriters Laboratories Inc.®” and have been approved by this UL authority. The E-file number issued is **E341734**. The appropriate identification of the motors is specified on the motor type plate.



The following designs are not UR/cUR listed:

- R911308208 MLP140C-0350-FS-N0CN-NNNN
- R911332685 MLP200D-0100-FS-N0CN-NNNN
- R911315704 MLP200D-0100-FT-N0CN-NNNN
- R911325249 MLP200D-0120-FS-N0CN-NNNN
- R911322955 MLP200D-0120-FT-N0CN-NNNN
- R911338371 MLP300C-0120-FS-N0CN-NNNN
- R911338370 MLP300C-0120-FT-N0CN-NNNN

A non-UL-compliant cable thread is used for this products.

EAC



EAC stands for Eurasian Conformity.

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

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".

China RoHS 2



Motors of the MLF 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 www.boschrexroth.com.cn/zh/cn/home_2/china_rohs2 in section "Kit motors".

5 Transport and storage

5.1 Notes about transport

⚠ WARNING

Heavy attractive forces on the 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](#).

A self-adhesive label with the following warning label is on the package of the secondary part::

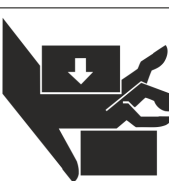
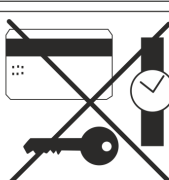
	⚠ WARNING Health hazard to people with heart pacemakers, metal implants and hearing aids when in proximity to these parts! Strong magnetic fields due to permanent motor magnets! • Anyone with pacemakers, metal implants or hearing aids are not permitted to approach or to handle these motor parts. • If you have such conditions, consult with a physician prior to handling these parts.	⚠ WARNING Gesundheitsgefahr für Personen mit Herzschrittmachern, metallischen Implantaten oder Splintern und Hörgeräten in unmittelbarer Umgebung dieser Teile! Starkes Magnetfeld durch Permanentmagnete der Motorteile! • Personen mit Herzschrittmachern, metallischen Implantaten oder Hörgeräten dürfen sich nicht diesen Motorteilen nähern oder damit umgehen. • Besteht die Notwendigkeit für solche Personen sich diesen Teilen zu nähern, so ist das zuvor von einem Arzt zu entscheiden.
	⚠ CAUTION Hazardous to fingers and hands due to high attractive forces of permanent motor magnets! Strong magnetic fields due to permanent motor magnets! • Handle only with protective gloves! Handle with extreme care.	⚠ VORSICHT Quetschgefahr von Finger und Hand durch starke Anziehungskräfte der Magnete! Starkes Magnetfeld durch Permanentmagnete der Motorteile! • Nur mit Schutzhandschuhen anfassen. Vorsichtig handhaben.
	⚠ CAUTION Hazardous to sensitive parts! • Keep watches, credit cards, identification cards with magnetic strips, magnetic tape and ferromagnetic material (such as iron, nickel, and cobalt) away from magnetic parts.	⚠ VORSICHT Zerstörungsgefahr empfindlicher Teile! • Uhren, Kreditkarten, Scheckkarten und Ausweise mit Magnetstreifen sowie alle ferromagnetischen Metallteile wie Eisen, Nickel und Cobalt von den Permanentmagneten der Motorteile fernhalten.

Fig. 5-1: Warning label on the package of MLS secondary parts

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 type	Allowed class
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 ¹⁾
Relative air humidity	%	5 ... 75 ¹⁾
Absolute air humidity	g/m ³	1 ... 29 ¹⁾

1) Differs from DIN EN 60721-3-2

Tab. 5-2: Deviating permissible storage conditions

To lift the motor out of the transport crate or to install the motor into the machine, use the transport or lifting eyebolts at the motor.

The lifting eyebolts at least must meet the requirements of DIN 580. Before each transport, ensure that the lifting eyebolts have been screwed down fully to the contact surface and that your selected lifting equipment and lifting method does not overstress the lifting eyebolts.



Please comply with DIN 580 on the transport of motors. Non-observance of the information in this standard can cause overstress to the lifting eyebolts and result in personal injury and/or product damage.



Before transport, empty the liquid coolant from the liquid-cooled motors to avoid damage.

5.2 Instructions on machine transport

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 primary part

Depending from size and weight of the particular motor components, they cannot be transported by hand. In this case, use suitable lifting tools.

Depending from size and weight of the primary part it is no longer possible to transport it by hand. In this case, use suitable lifting tools.

To move the primary part in horizontal position, transport it by ring screws, for example. Therefore, please observe the thread dimensions in the dimension sheet of the primary part.

⚠ CAUTION

Risk of injuries and / or damage when using primary parts!

- For example, use the two or four of the outermost diagonally opposite threaded holes on the mounting side of the MLP (see [Fig. 5-2](#)).
- Manually screw the ring screws into the fastening thread as far as possible or the base of head of the ring screw lies on the primary part. Do not exceed the permitted thread depths.
- Use 4 lifting belts of equal lengths to reach a uniform load of the threaded holes and to prevent tilting of the primary parts during transport.

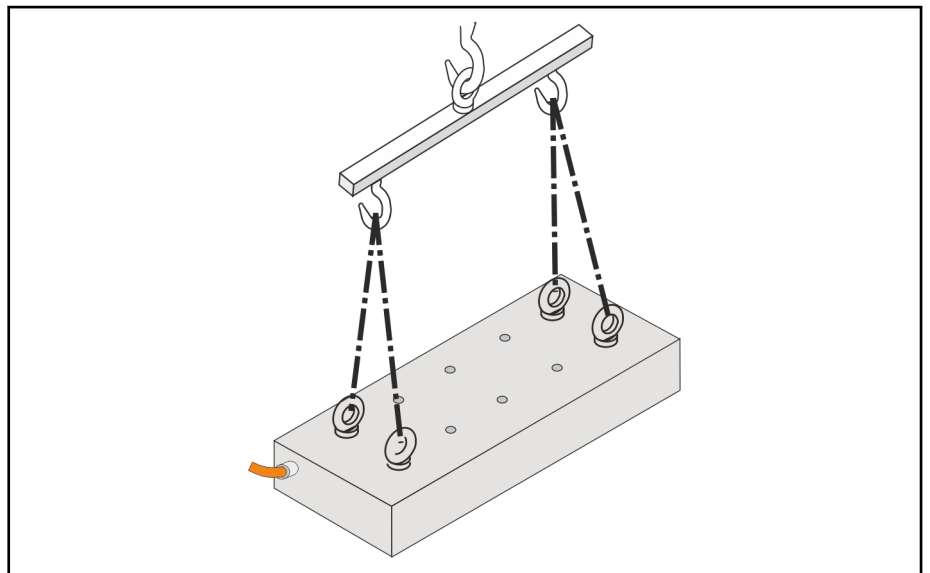


Fig. 5-2: Transport primary part (example)

Transport secondary part**⚠ 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 (see [Fig. 5-3](#))



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.

Depending from size and weight of the secondary part it is no longer possible to transport it by hand. Due to heavy magnetic fields around the secondary part, use antimagnetic lifting devices.

We recommend to transport the secondary part with lifting belts.

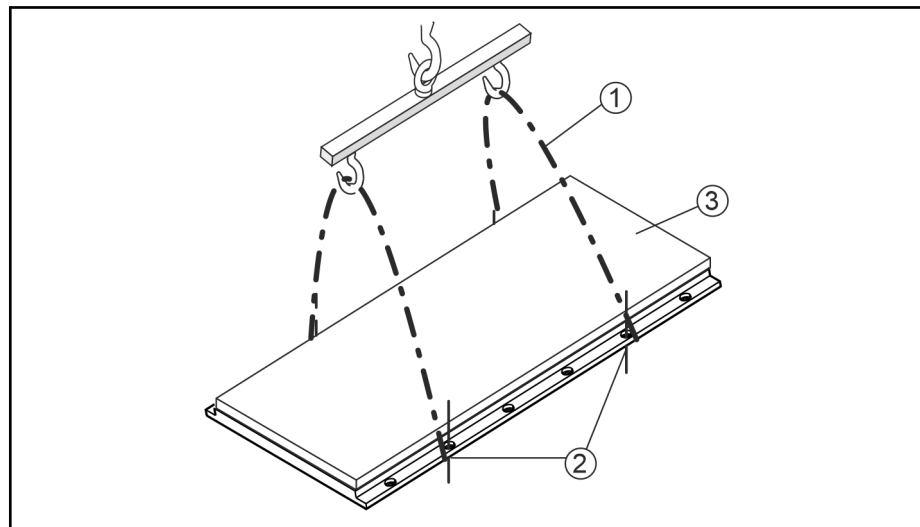
Safety during transport on lifting belt.

To prevent slipping lifting belts during transport, secure it. Therefore, two fastening screws for the secondary part can be connected into the appropriate holes on the secondary part (see Fig. 5-3). Ensure sufficient protrusion of the securing underneath the secondary part.

⚠ CAUTION

Risk of injuries and / or damage when handling secondary parts!

The permanent magnets of the secondary parts of synchronous linear motors are magnetically not shielded. Use an antimagnetic securing during transport of secondary parts. The securing prevents from sliding of lifting belts during transport.



①

Lifting devices

②

Safety against sliding lifting belts. To transport MLS300 use the two ring screws.

③

Affixed transport and assembly protection

Fig. 5-3:

Transport secondary part (example)



Due to their size and weight, secondary parts of size 300 have two additional threaded holes (M10) to fix the ring screws for transport. For exact position of the threaded holes, refer to the dimension sheet of MLS300 in the MLF project planning manual.

Instructions on transport by air

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

If motor components are not forwarded in the unopened Rexroth original packaging, applicable packaging and transport regulations must be observed (IATA 953).

This involves, for example:

- Secondary parts of synchronous linear motors
- Rotors of synchronous kit motors
- Rotors of synchronous housing motors (if these are dispatched as motor component, i.e. separate from the stator or motor housing, in service cases)

For details on the maximum allowed magnetic field strengths as well as information on measurement methods for these magnetic field strengths, please refer to the current IATA DGR.

5.3 Storage instructions

Storage of primary and secondary parts

Preferably use the original package to store the parts. If this is not possible, the components, i.e. primary and secondary parts, of synchronous linear motors must be supported over their entire surface when stored on a flat base. This must also be ensured in the case of brief discarding.

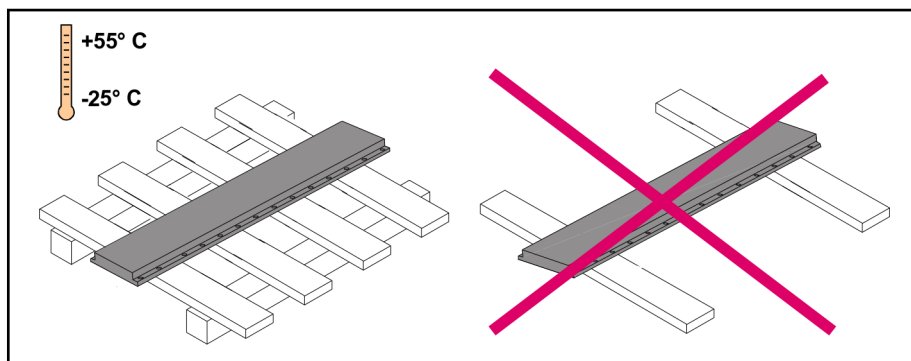


Fig. 5-4: Storage of linear motor components

⚠ CAUTION

Damage or destruction of motor components due to improperly handling during storage and transport!

- Use the original packaging for permanent storage.
- Observe the ambient conditions for storage and transport.
- Short-term storage during installation acc. to [Fig. 5-4](#)
- Do not throw parts
- Remove the transport or assembly protection only when or after mounting into the machine

On delivery, protective sleeves and covers may be attached to our motors. They have to remain on the motor for transport and storage. Do not remove these parts until shortly before assembly.

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 ¹⁾
Air temperature	°C	-25 ... +55
Relative air humidity	%	5 ... 75
Absolute air humidity	g/m ³	1 ... 29
Insolation	-/-	Not permitted

1) Differs from DIN EN 60721-3-1

Tab. 5-4: *Deviating permissible storage conditions*



Before re-storage, empty the liquid coolant from the liquid-cooled motors to avoid damage.

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. Visually inspect the cable jacket. Do not use the cable if you detect any abnormalities (squeezed or kinked spots, color deviations, ...).

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

6 Assembly

6.1 General notes



The machine manufacturer has to consider the special character of their 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. Also, the arrangement of the motor components plays a significant role.

The MLF project planning manual contains a suggestion about motor component assembly. This suggestion can be understood as a guideline to estimate the necessary assembly effort and to prepare the necessary implements for assembly.

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

- Observance of the necessary installation size (see project planning manual MLF)
- 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.

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.

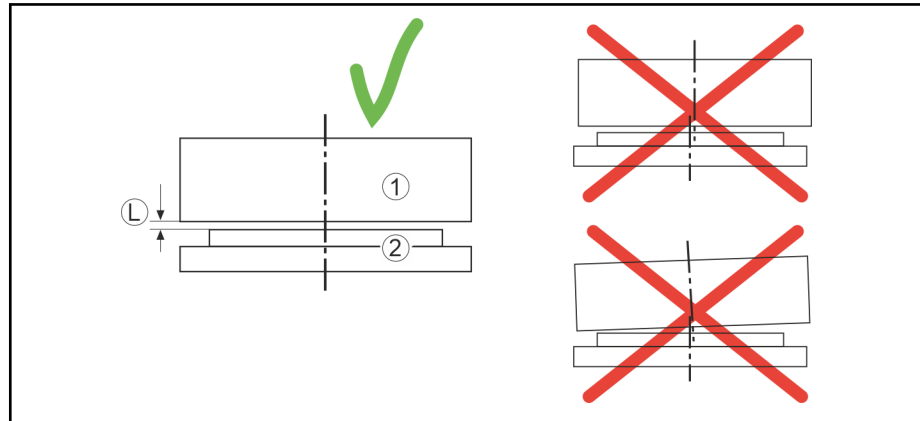
Loctite 243 is a liquid screw lock (medium-hard) and is applied to the parts to be mounted immediately prior to assembly. For detailed information on correct handling and processing, please refer to the manufacturer's data sheets under <http://www.loctite.de>. The manufacturer's homepage also provides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

6.2 Mechanical assembly

6.2.1 Air-gap, parallelism and symmetry among 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 before the screws are tightened according to the following figure.



- ① Primary part
- ② Secondary part
- (L) Air gap

Fig. 6-1: Aligning the motor components

Air gap After assembly of the motor components, we recommend to check the minimum air gap between primary and secondary part.

Therefore, insert a test strip made of antimagnetic material (aluminum, plastics) with a thickness of

- 0.5 ... 0.55 mm (at frame size 040 ... 200)
- 0.7 ... 0.75 mm (at frame size 300)

into the air gap between primary and secondary part. The test strip must be versatile in the air gap on every position of the total length via the complete surface of the primary part.

This measure ensures the minimum necessary air gap between the motor components.

Furthermore, with this test you will detect a faulty assembly (e.g. due to dirt under the mounting surface, faulty installation dimension, insufficient machine rigidity etc.) in time.

⚠ CAUTION

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

With aforementioned measures check the necessary minimum air gap between primary and secondary part immediately after assembly of both motor components.

6.2.2 Assembly of secondary part segments

⚠ 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](#).



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. Additionally secure all screw connection with Loctite 243. Observe the instructions of the adhesive manufacturer about correct screw lock.

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. It must be expected that certain influences continuously occur during motor operation, contact of secondary part with coolant lubricants, grinding emulsion, and others, for example. This can reduce the kinetic friction among the screwed parts during the machine lifetime. In this case, we recommend to use screws with a higher fastening class, like 10.9, to realize a higher tightening torque.

The tightening torques of the fastening screws is specified in the following table:

Frame size secondary part	Screw size	Fastening class	Tightening torque (+/-10%)
040 ... 200	M6 (DIN 7984, flat head)	8.8	10 Nm
		10.9	15 Nm
300	M8 (DIN EN ISO 4762)	10.9	37 Nm

Tab. 6-1: Fastening screws with tightening torques for MLS secondary parts

The calculation of screw connection for fastening the secondary part are based on assumption that the screwing surface of the secondary part and the screwing surface of the machine is clean and the secondary part is screwed directly with the machine.



- In certain cases it is not possible to screw the secondary part with the machine directly, as additional materials like distance plates, thermal grease and so on, are among secondary part and machine. Then a sufficient fastening of the screw connection must be ensured by the machine manufacturer.
- The effect of liquid screw lock is damaged by loosening or re-tightening of screws (e.g. due to torque tests) and must be renewed. Observe the instructions of the adhesive manufacturer about correct screw lock.

6.2.3 Installation at a path with several secondary parts

WARNING

Malfunction and / or uncontrolled movement of the motor and therewith danger of material damage or risk of injuries!



- Correct concatenation of secondary part segments

If several secondary part segments are used over the whole traverse path, keep the poles and the flush direction at concatenation according to the following figure.

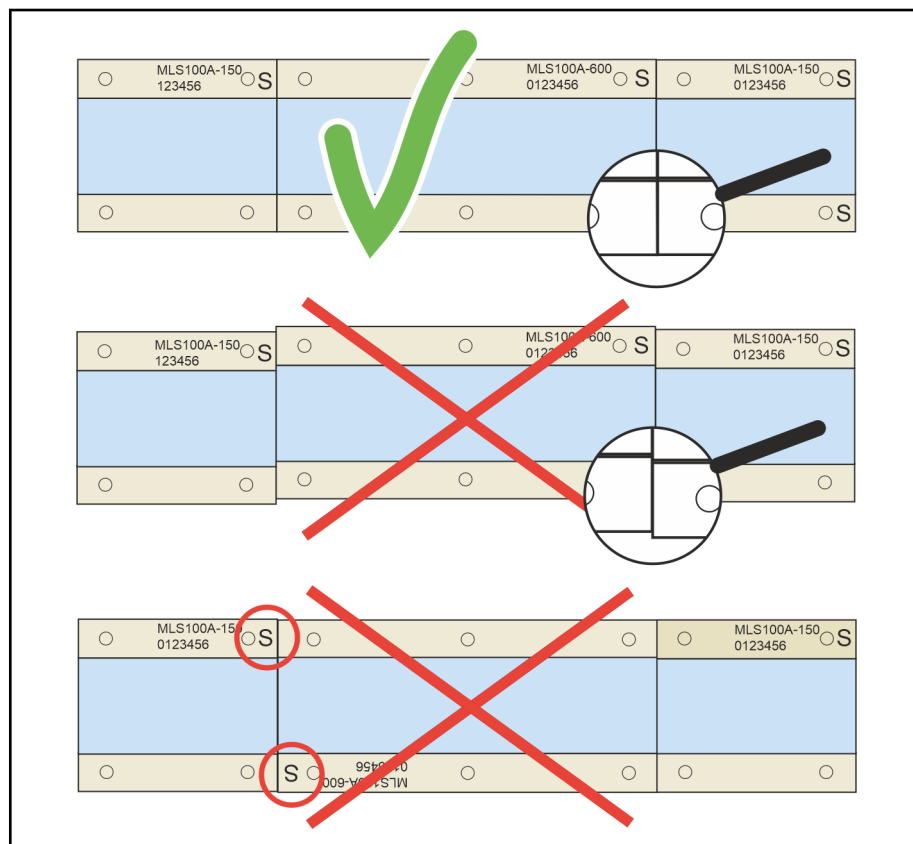


Fig. 6-2: Concatenation of several secondary part segments

⚠ WARNING

Risk of injuries or material damage due to attractive or repulsive force at concatenation of secondary part segments!



- Secure against uncontrolled movement
- Remove the transport or assembly protection only when or after mounting into the machine

The attractive or repulsive force when arranging the secondary part segments can be up to 300 N depending from their frame size.

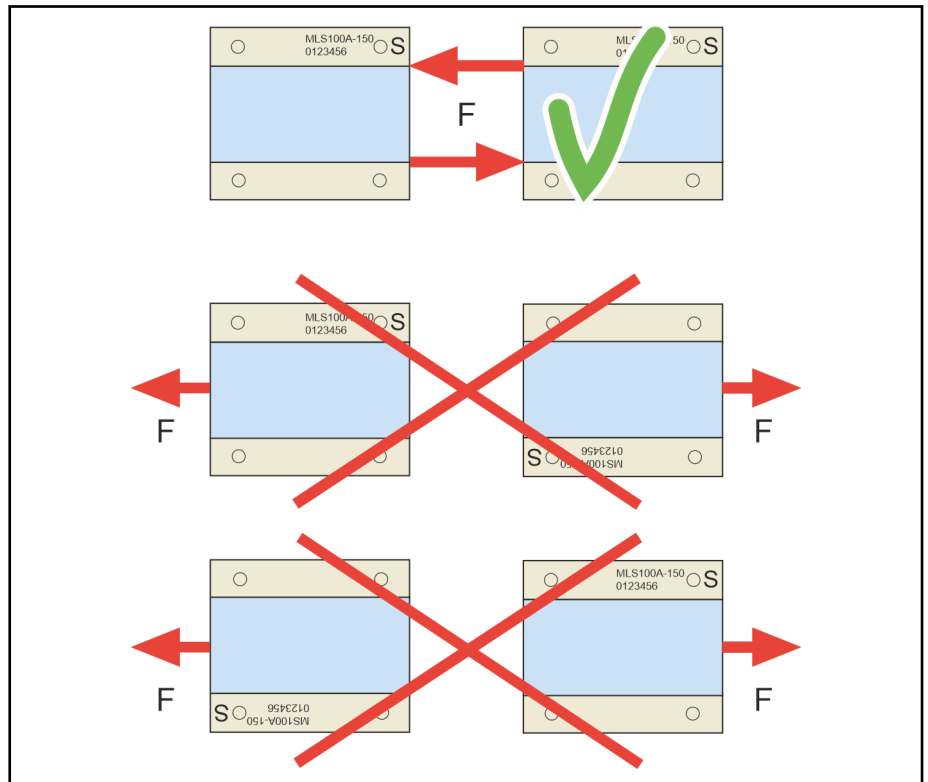


Fig. 6-3: Attractive or repulsive force when arranging the secondary part segments

In the case of a path consisting of several secondary parts, the assembly can be made as follows [Fig. 6-4](#). Here, only one part of the secondary parts is initially installed so that the primary part can be placed on the machine bed during its assembly.

⚠ WARNING

Do not deposit the primary part directly onto the secondary part!

Lifting the primary part from the secondary part is very difficult due to the high attraction forces (fixture required). In addition, there is a risk of mechanical damage to the secondary and/or primary part during placement.

After that, the primary part can be assembled in the already installed slide. The slide with the primary part installed can then be slid over the previously installed secondary parts. Then, assemble the remaining secondary parts.

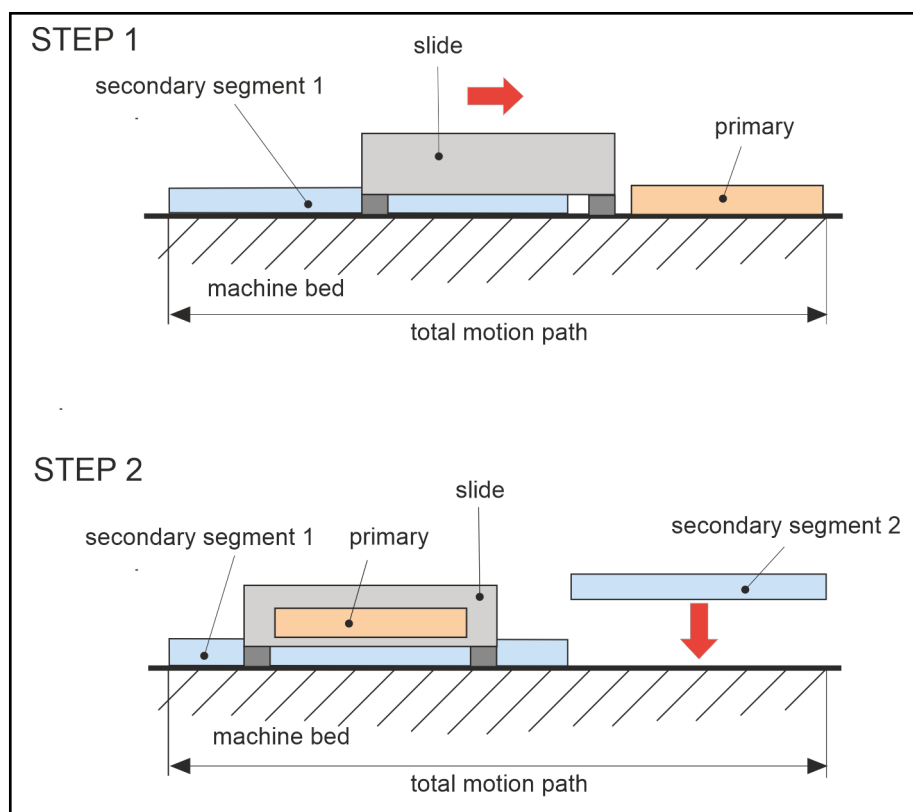


Fig. 6-4: Installation of linear motor components at a path with several secondary parts

⚠ CAUTION

Uncontrolled movement of the slide! Crushing hazard or risk of injury!

Secure the slide against uncontrolled movement due to partial overlapped primary and secondary parts (force in traverse direction).

6.2.4 Installation at a path with one secondary part

In the case of a path consisting of one secondary part only, the primary part can be preassembled on the slide that has not yet been installed. After the secondary part has been installed, the slide with preassembled primary part can be lowered onto the machine bed by means of a suitable device.

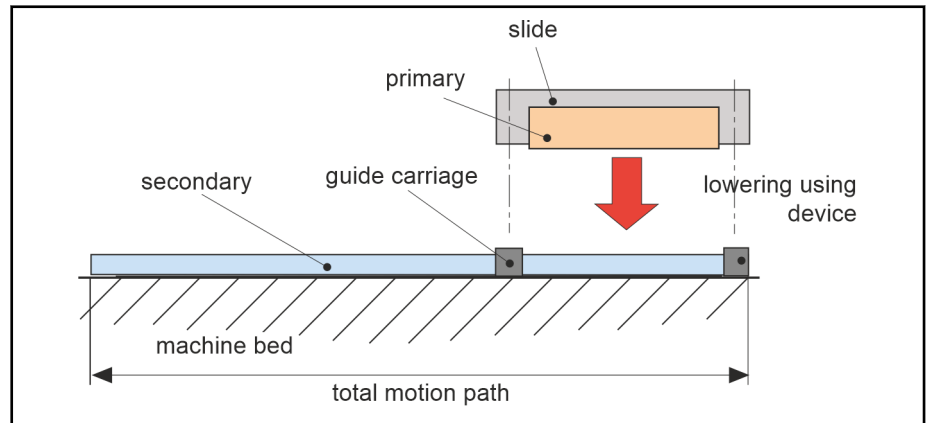


Fig. 6-5: Installation of linear motor components at a path consisting of one single secondary part.



A fixture to lower the primary part or the slide is not in the scope of delivery of Bosch Rexroth.

⚠ CAUTION

As soon as the primary part is lowered onto the secondary part, the attractive forces will increase as a result of the reduced air gap.

- Note the information on the attractive forces as a function of the air gap in the MLF project planning manual (see [Chapter 1.3](#)).
- Do not put down the primary part onto the secondary part by a crane (elasticity / attractive force).

Another option is to place the primary part on the installed secondary part - also using a suitable device - and then screw it into the slide using the fastening screws. In this case, a non-ferromagnetic distance plate (plastic, wood, etc.) must be inserted between the primary and secondary parts so that the primary part does not directly contact the secondary part. The thickness of the distance plate must be dimensioned in such a way that it is possible to move the slide after the primary part has been screwed to it. The thickness of the distance plate must be dimensioned in such a way that the primary part with the fastening screws must not be lifted or only slightly.

Example: Measurable air gap: 1.0 mm

Thickness of distance plate: 0.95 mm

The tightening of the fastening screws for the primary part has to be made as described in [chapter Chapter 6.2.5 on page](#).

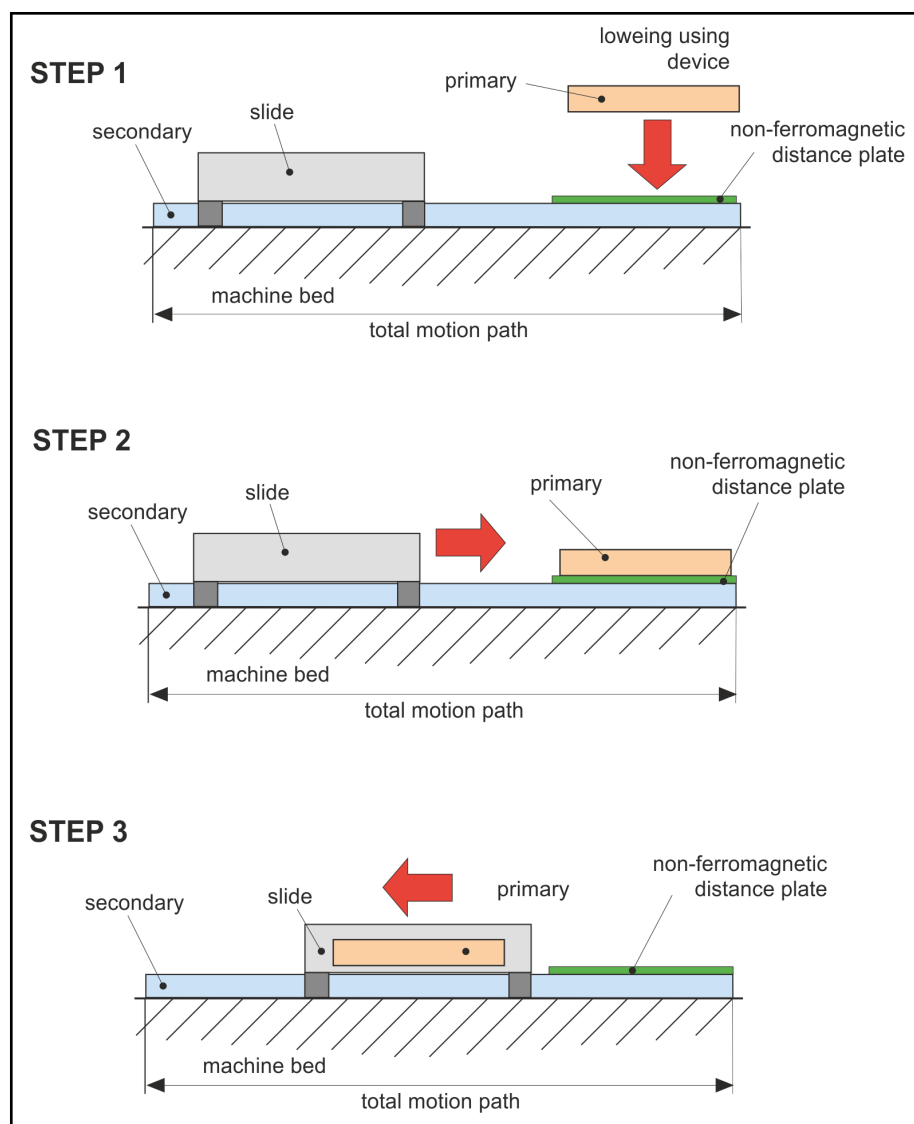


Fig. 6-6: Installation of linear motor components at a complete secondary part via the total path.

6.2.5 Assembly of primary parts



To fasten the primary part, only new, unused screws must be used.

All screws have to be tightened with the specified tightening torque. Additionally secure all screw connection with Loctite 243. Observe the instructions of the adhesive manufacturer about correct screw lock.

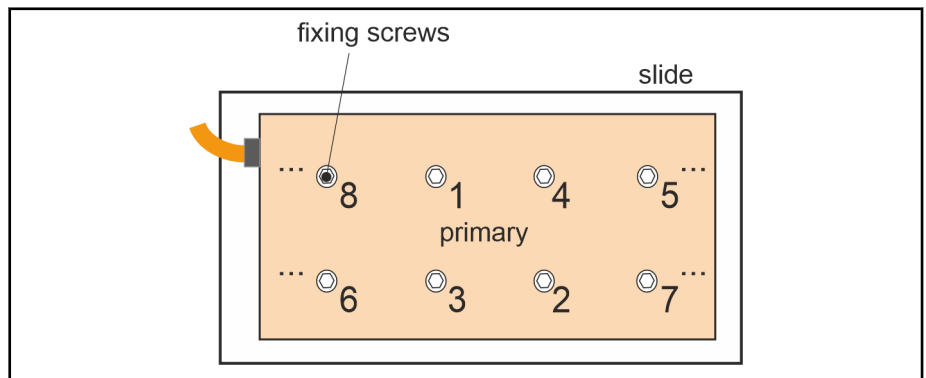


Fig. 6-7: Tightening order of fastening screws of primary part

The screw-on surfaces must be cleaned and be free of grease before the primary parts can be screwed on the machine construction. If it can be expected, that certain influences are continuously occurring during motor operation, like contact of the primary part with coolant lubricant, grinding emulsion a.s.o., the kinetic friction among the screwed parts can be reduced during the machine lifetime. In this case, we recommend to use screws with a higher fastening class, like 10.9, to realize a higher tightening torque.

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:

Frame size Primary part	Screw size	Fastening class	Tightening torque (+/- 10%)
040 ... 300	M6 (DIN EN ISO 4762)	8.8	10 Nm
		10.9	15 Nm

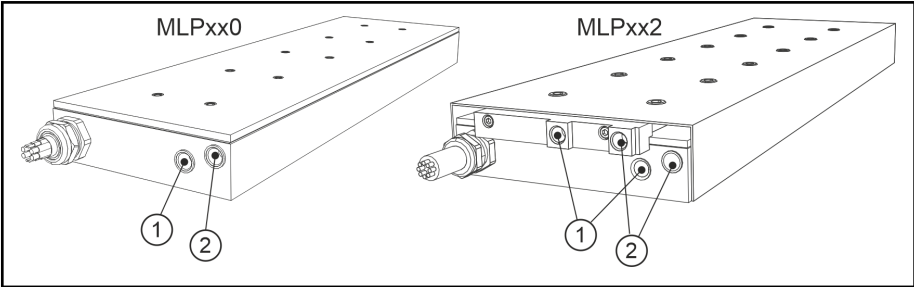
Tab. 6-2: Tightening torque for the fastening screws of the primary parts



The effect of liquid screw lock is damaged by loosening or re-tightening of screws (e.g. due to torque tests) and must be renewed. Observe the instructions of the adhesive manufacturer about correct screw lock.

6.2.6 Connection liquid cooling

The coolant connections on the motor side are provided for coolant connection threads with axial sealing.



- ① Cooling connection (IN)
- ② Cooling connection (OUT)

Fig. 6-8: Cooling connection on primary part MLPxx0 and MLPxx2

Bosch Rexroth recommends to use threaded connections which contain an O-ring for axial sealing of the screw connections.

For example, seals consisting of hemp, teflon tape or cone-shaped screw connections are not considered to be suitable, since this type of seal may stress the connection thread at the motor to an unreasonably high extent and/or damage it permanently.

 The machine manufacturer is responsible for ensuring that the coolant connection is tight and for verifying and accepting the tightness after the motor has been installed.

Additionally, record regular monitoring of the proper state of the cooling connection in the maintenance plan of the machine.

Tightening torque The tightening torque of the screws of the motor may not be exceeded. Please note, depending from the selected connection thread, the specified value cannot be exhausted, but must be reduced to do not damage the connection thread.

 Therefore observe the information of the manufacturer of the selected connection thread, especially the details about permissible tightening torque.

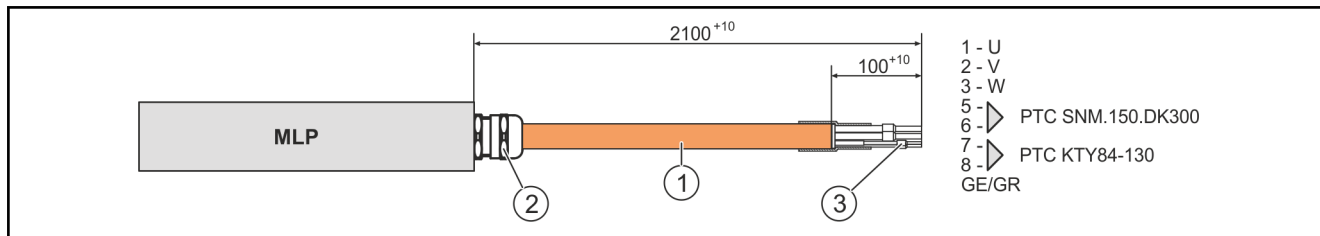
Primary part with ...	Screw on the motor side		
	Thread	Tightening torque	Screw-in depths
Standard encapsulation	G1/4	max. 30 Nm	max. 12 mm
Thermal encapsulation			

Tab. 6-3: Connection liquid cooling

6.3 Electrical connection

6.3.1 Power connection

Power cables on primary part



- ① Connection cables
- ② PG thread
- ③ Wire end ferrules

Fig. 6-9: Design of the power cable on primary part MLP

This connection cable is connected with the primary part. The technical data of the connection cable for every single frame size in standard design (= Other designs NNNN) are given in the following overview. The condition of the connection cable on primary parts in special design can deviate from the following details. Please also observe the information provided in the supplementary documentation (data sheet) for the special design.

Assembly

Frame size	Connection cables	Cross section [mm²]		Ø D [mm]	Bending radius static [mm]
		Power wired (4x)	Sensors (2x2)		
MLP040x-xxxx	REL0105	1.0	0.75	12 ±0.5	
MLP052x-xxxx	(INK0653)				
MLP070x-xxxx	REL0108 (INK0603)	4.0	1.0	17 ±0.5	
MLP100K-0040	REL0105 (INK0653)	1.0	0.75	12 ±0.5	
MLP100A-xxxx MLP100B-xxxx MLP100C-xxxx	REL0109 (INK0604)	6.0	1.0 + 1.5	18.2 ±0.6	5 x D
MLP102x-xxxx					
MLP140Z-0060 MLP140A-xxxx MLP140B-xxxx MLP140C-0050 MLP140C-0120 MLP140C-0170					
MLP152x-xxxx					
MLP200A-xxxx MLP200B-xxxx MLP200C-0090 MLP200D-0035 MLP200D-0060					
MLP202x-xxxx					
MLP140C-0350					
MLP200C-0120 MLP200C-0170 MLP200D-0100 MLP200D-0120					
MLP300x-xxxx	REL0110 (INK0605)	10.0		22.2 ±1	

Tab. 6-4: Connection cables on MLP primary part

Routing of power cables

The power cables must not be exposed to dynamic bending load. Do not install the primary part cable in a moving energy chain.

We recommend to lead this cable in a fixed installation to

- a device connector,
- a coupling or
- a terminal box (not in the scope of delivery of Bosch Rexroth)

. From this junction, the power cable can be laid through the energy chains or the machine construction. Ready-made connection cables are available from Rexroth.

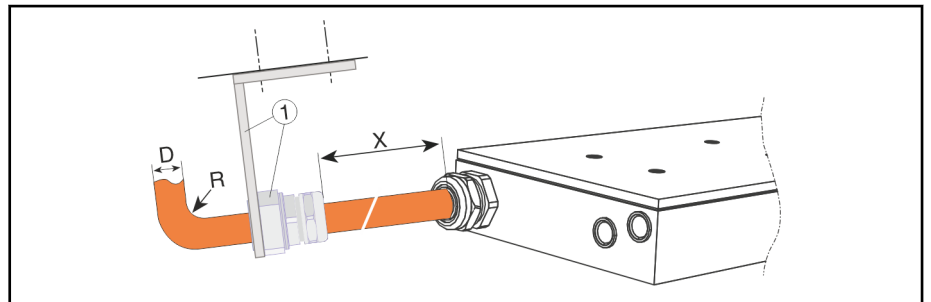
NOTICE

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. 6-10) 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.



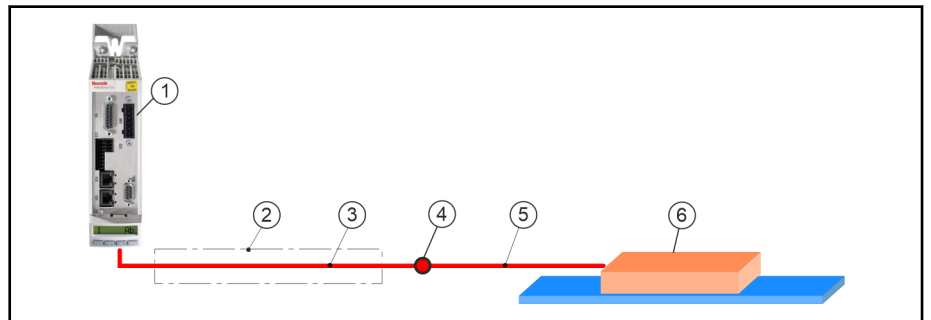
Dimension "X" Minimum distance 5 mm

① Strain relief of the connection cable on primary part

D Diameter of connection cable

R Allowed bending radius

Fig. 6-10: Example for strain relief of connection cable



① Drive controller

② Energy chain

③ Power cables

④ Junction (e.g. connector, terminal boxes)

⑤ Connection cables

⑥ Motor MLF

Fig. 6-11: Routing connection cable of primary part

⚠ WARNING

Due to dynamic bending loads, the connection cable and the motor are damaged!

- Do not install the primary part cable in a moving energy chain
- Installation of a continuative power cable lead after a junction into an energy chain.



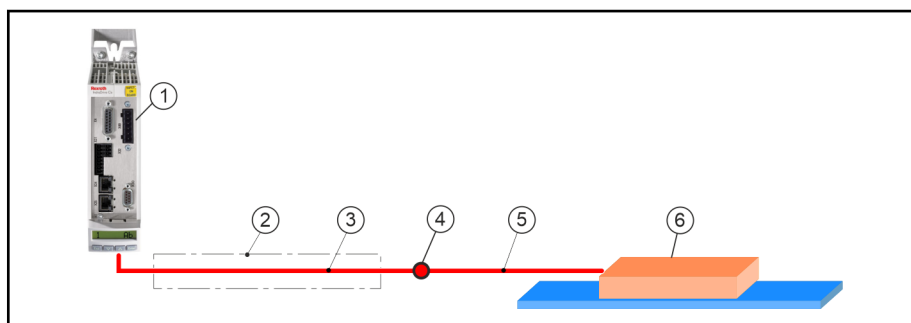
The power cable of the primary part is designed for the highest type current of a frame size. The cross section of a continuative power or connection cable can be designed smaller, if necessary.

Parallel motor connection

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

- Installation of two separate parallel cables (see Fig. 6-13)
- Installation of a collective cable with higher cross section (see Fig. 6-14)

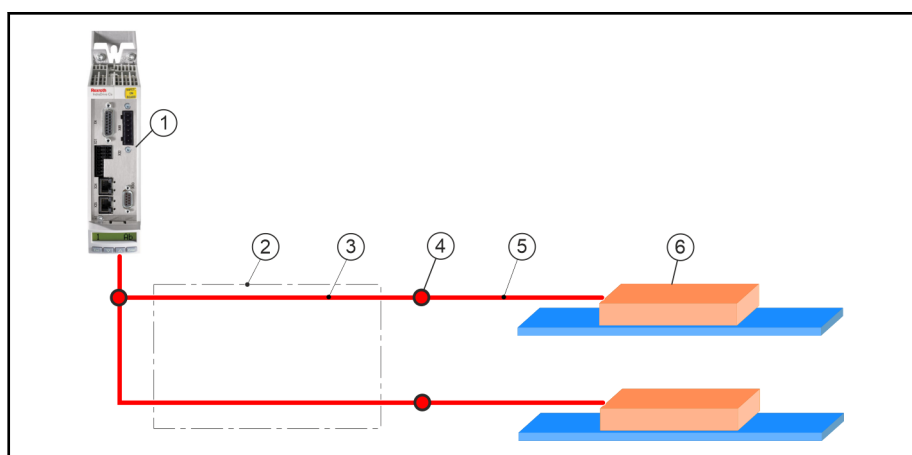
The first possibility offers the benefit of smaller bending radii. The whole cross section of parallel installed cables must be according to the increased cross section for parallel motor connections.

Power connection for single arrangement

- ① Drive controller
- ② Energy chain
- ③ Power cables
- ④ Junction (e.g. connector, terminal boxes)
- ⑤ Connection cables
- ⑥ Motor MLF

Fig. 6-12: Power connection for single arrangement

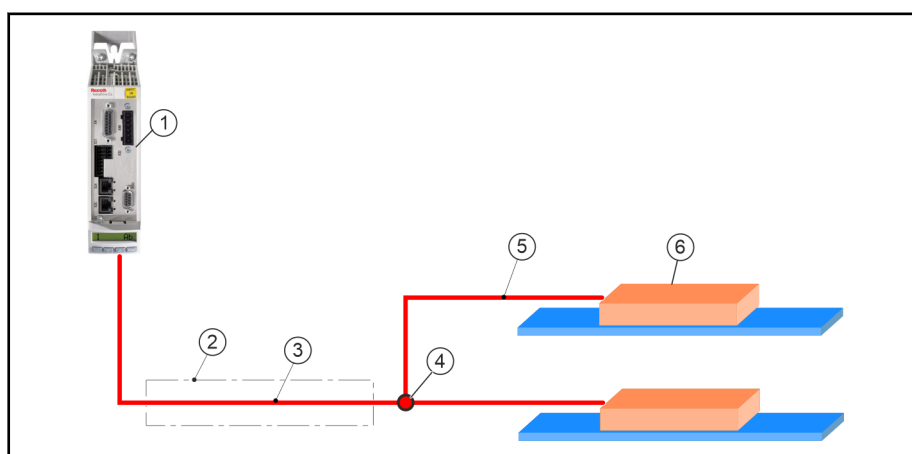
Power connection for parallel arrangement, separate connection cable



- ① Drive controller
- ② Energy chain
- ③ Power cables
- ④ Junction (e.g. connector, terminal boxes)
- ⑤ Connection cables
- ⑥ Motor MLF

Fig. 6-13: Parallel arrangement, separate power cables

Power connection at parallel arrangement, collective power cable with higher cross section

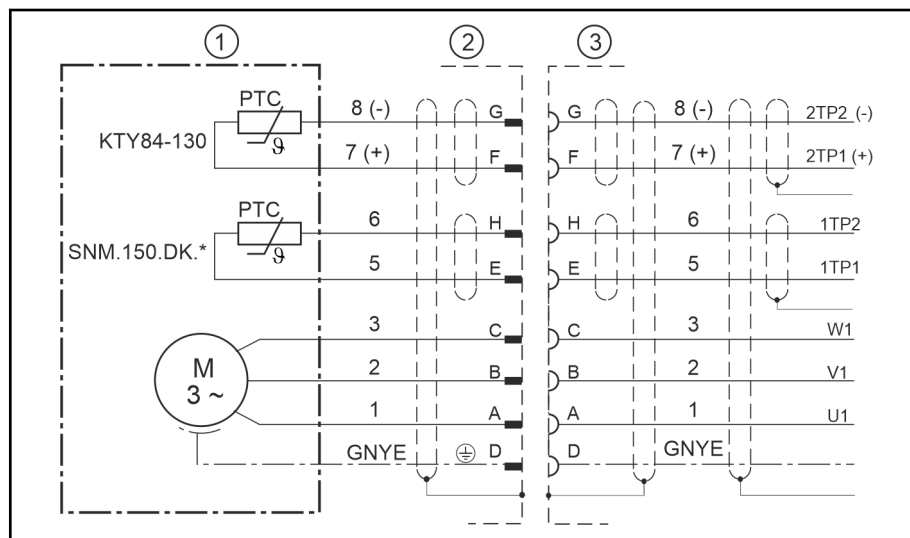


- ① Drive controller
- ② Energy chain
- ③ Power cables
- ④ Junction (e.g. connector, terminal boxes)
- ⑤ Connection cables
- ⑥ Motor MLF

Fig. 6-14: Parallel arrangement, collective power cable

Connection power

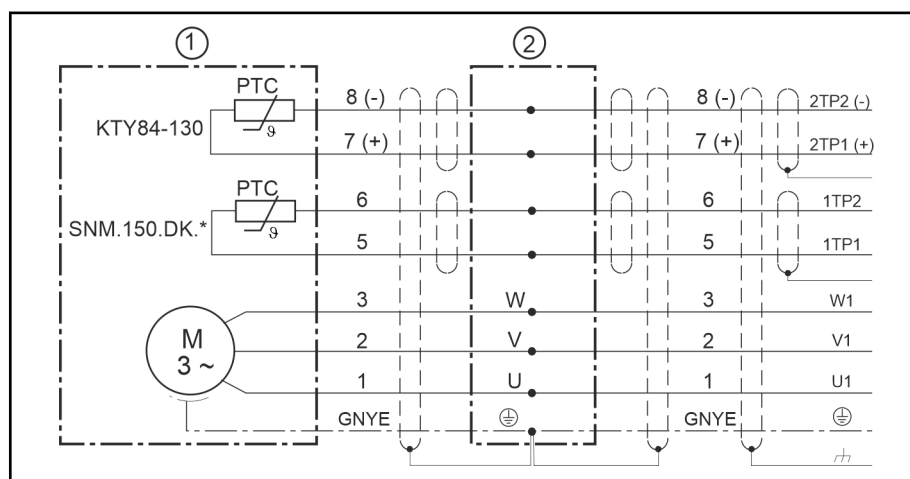
Connection via device connector and coupling



- ① Primary part MLP
- ② Device connector INS0486
- ③ Coupling INS0481

Fig. 6-15: Connection example with device connector and coupling

Connection via terminal boxes

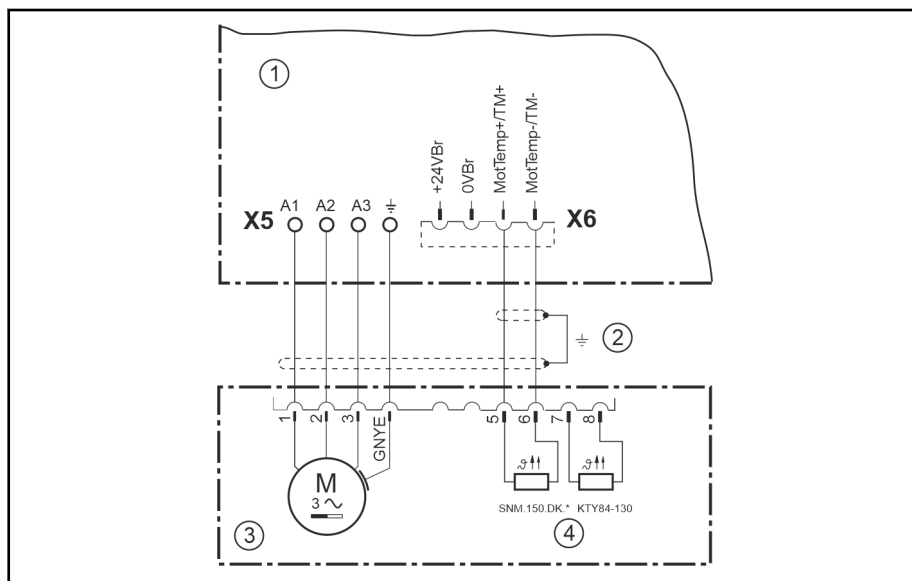


- ① Primary part MLP
- ② Terminal boxes

Fig. 6-16: Connection example with terminal boxes

Connection on a Rexroth drive controller

Single arrangement

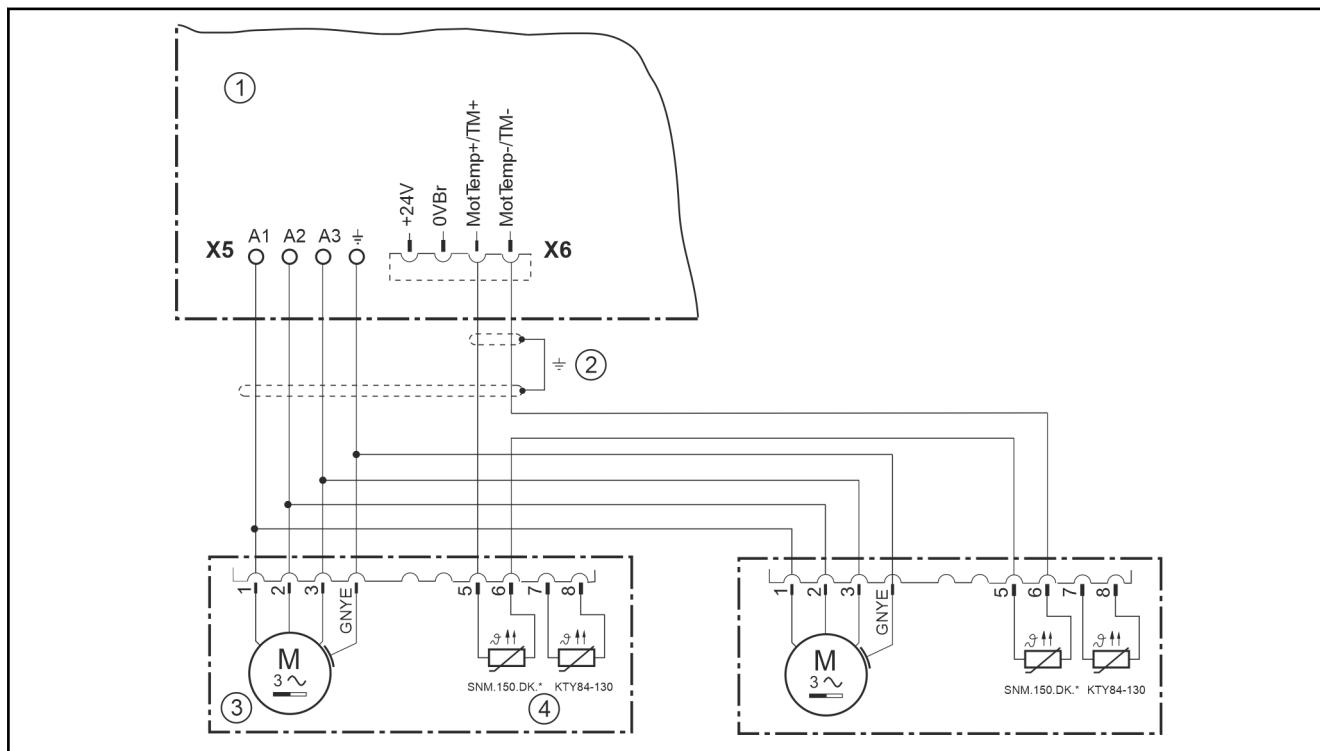


- ① Drive controller
- ② Shielding plate motor cable
- ③ Primary part MLP
- ④ Temperature sensors

Fig. 6-17:

Connection on drive controller - single arrangement primary part

Parallel connection



- ① Drive controller
- ② Shielding plate motor cable
- ③ Primary part MLP
- ④ Temperature sensors

Fig. 6-18:

Connection on drive controller - parallel connection primary part

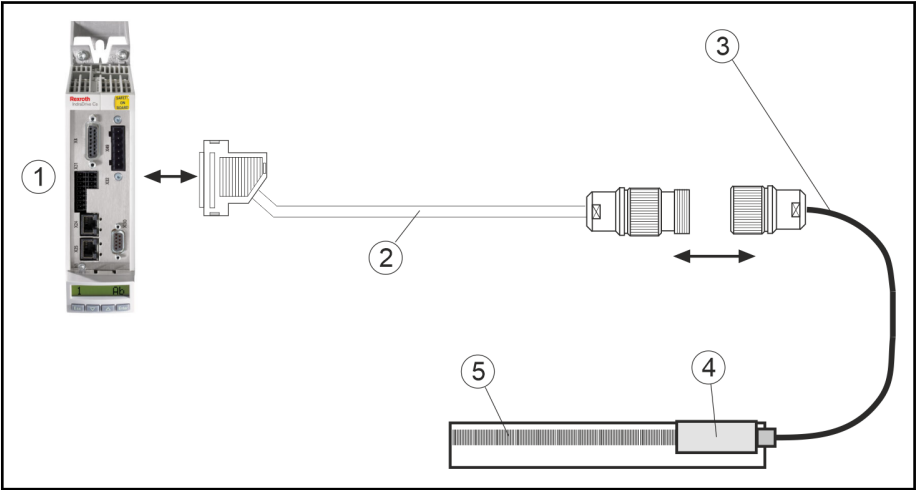
Connection of power cables depending from the primary part arrangement at parallel arrangement

The connection of the power wires of the connection cable on the drive controller at parallel arrangement of primary parts with cable output in the opposite direction is dependent from the direction of the outgoing cable.

Connection for primary part cable output into the same direction			
Drive controller X5	A1	A2	A3
Primary part 1	A1	A2	A3
Primary part 2	A1	A2	A3
Connection for primary part cable outlet in opposite direction			
Drive controller X5	A1	A2	A3
Primary part 1	A1	A2	A3
Primary part 2	A1	A3	A2

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

6.3.2 Connection linear scale



- ① Drive controller
- ② Ready-made cable with connector or coupling (available from Rexroth).
- ③ Connection cables for sensor head (part of lengths measuring system)
- ④ Sensor head
- ⑤ Measuring standard

Fig. 6-19: Connection example linear scale

Depending from the connection mode (connector or coupling), Rexroth offers different ready-made connection cables for connecting controller and measuring systems:

Connection cable	Type of measurement system	
	Absolute, ENDAT	Incremental
DIAX04 <--> Connector	IKS 4142	IKS 4384
DKCxx.3 <--> Connector	IKS 4001	IKS 4002
IndraDrive <--> Connector	IKS 4038	IKS 4041
DIAX04 <--> Coupling	---	IKS 4383
DKCxx.3 <--> Coupling	---	IKS 4389
IndraDrive <--> Coupling	---	IKS 4040

Tab. 6-6: Connection cable linear scale

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.
 - Light barrier

CAUTION

Thermal hazard due to hot surfaces during operation with temperatures over 70 °C.



- ▶ 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 ³	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 MLF project planning manual  and the respective documentation about drive controller or firmware description.

Please observe the general safety instructions on the protection against hazardous movements. 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.

7.4 Operation

During operation, keep the ambient and operation conditions and technical data specified in the MLF project planning manual .

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 for troubleshooting refer to [Chapter 11](#).

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, chips or dust can negatively influence the motor functions. In extreme cases lead to motor loss. Clean the motor in regular distances - after one year at the latest.

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
 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.

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

10.1 Environmental protection

Production processes The products are manufactured in energy- and resource-optimized production processes which allow the resulting waste to be re-used and recycled. We regularly try to replace pollutant-loaded raw materials and supplies by more environment-friendly alternatives.

No release of hazardous substances Our products do not contain any hazardous substances which may be released in case of appropriate use. Normally, our products will not have any negative influences on the environment.

Basic components Basically, our products contain the following components:

Electronic devices

- Steel
- Aluminum
- Copper
- Plastics
- Electronic components

Motors

- Steel / Stainless steel
- Aluminum
- Copper
- Brass
- Magnetic materials
- Electronic components

WARNING

Danger due to permanent magnets!

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

10.2 Disposal

Demagnetize magnets

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 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.

Return of products

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

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

Environmental protection and disposal

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

Packaging Packaging materials consist of cardboard, wood and polystyrene. They can be recycled anywhere without any problem.

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

Batteries and accumulators Batteries and accumulators can be labeled with this symbol.



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

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

Batteries and accumulators can contain hazardous substances which can harm the environment or people's 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.

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.

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.

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 MLF motors



In the case of malfunctions or troubleshooting, please observe the notes in the project planning manual, too. Contact the manufacturer, if necessary.

12 Appendix

12.1 Technical data

Technical data and operating characteristic curves are described for all motor types in  MLF project planning manual.

12.2 Declaration of conformity



EU-Konformitätserklärung - Original

Dok.-Nr.: DCTC-30328-001
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: MLF...0... (Primärteil MLP...0..., Sekundärteil MLS...0...)
MLF...1... (Primärteil MLP...1..., Sekundärteil MLS...1...)
MLF...2... (Primärteil MLP...2..., Sekundärteil MLS...2...)

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

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.

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Fig. 12-1: EC declaration of conformity - origin, German



EU declaration of conformity

(Translation of the original Declaration of Conformity)

Doc. No.: DCTC-30328-001

Date: 2016-04-20

☐
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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: MLF...0... (primary part MLP...0..., secondary part MLS...0...)
 MLF...1... (primary part MLP...1..., secondary part MLS...1...)
 MLF...2... (primary part MLP...2..., secondary part MLS...2...)

From the date of manufacture: 2016-04-20

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

Harmonized Standards applied:

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)

Place/date/signature as indicated in the original declaration.

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

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 DCTC-30328-001 KOE N EN 2016-04-20.docx

Fig. 12-2: EC declaration of conformity - translation

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