

MSK

Synchronous Servomotors

Operating Instructions
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Edition 03



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Purpose of Documentation	This documentation ... <ul style="list-style-type: none"> • instructs assembly, operating and maintenance personnel • contains basic notes about assembly, operation and maintenance of the motors
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D Deutsch	USA English	F Français
<p>⚠ WARNING Lebensgefahr bei Nichtbeachtung der nachstehenden Sicherheitshinweise!</p> <p>Nehmen Sie die Produkte erst dann in Betrieb, nachdem Sie die mit dem Produkt gelieferten Unterlagen und Sicherheitshinweise vollständig durchgelesen, verstanden und beachtet haben.</p> <p>Sollten Ihnen keine Unterlagen in Ihrer Landessprache vorliegen, wenden Sie sich an Ihren zuständigen Rexroth-Vertriebspartner.</p> <p>Nur qualifiziertes Personal darf an Antriebskomponenten arbeiten.</p> <p>Nähere Erläuterungen zu den Sicherheitshinweisen entnehmen Sie Kapitel 1 dieser Dokumentation.</p>	<p>⚠ WARNING Danger to life in case of non-compliance with the below-mentioned safety instructions!</p> <p>Do not attempt to install or put these products into operation until you have completely read, understood and observed the documents supplied with the product.</p> <p>If no documents in your language were supplied, please consult your Rexroth sales partner.</p> <p>Only qualified persons may work with drive components.</p> <p>For detailed explanations on the safety instructions, see chapter 1 of this documentation.</p>	<p>⚠ AVERTISSEMENT Danger de mort en cas de non-respect des consignes de sécurité figurant ci-après !</p> <p>Ne mettez les produits en service qu'après avoir lu complètement et après avoir compris et respecté les documents et les consignes de sécurité fournis avec le produit.</p> <p>Si vous ne disposez pas de la documentation dans votre langue, merci de consulter votre partenaire Rexroth.</p> <p>Seul un personnel qualifié est autorisé à travailler sur les composants d'entraînement.</p> <p>Vous trouverez des explications plus détaillées relatives aux consignes de sécurité au chapitre 1 de la présente documentation.</p>
<p>⚠ WARNING Hohe elektrische Spannung! Lebensgefahr durch elektrischen Schlag!</p> <p>Betreiben Sie Antriebskomponenten nur mit fest installiertem Schutzleiter.</p> <p>Schalten Sie vor Zugriff auf Antriebskomponenten die Spannungsversorgung aus.</p> <p>Beachten Sie die Entladezeiten von Kondensatoren.</p>	<p>⚠ WARNING High electrical voltage! Danger to life by electric shock!</p> <p>Only operate drive components with a permanently installed equipment grounding conductor.</p> <p>Disconnect the power supply before accessing drive components.</p> <p>Observe the discharge times of the capacitors.</p>	<p>⚠ AVERTISSEMENT Tensions électriques élevées ! Danger de mort par électrocution !</p> <p>N'exploitez les composants d'entraînement que si un conducteur de protection est installé de manière permanente.</p> <p>Avant d'intervenir sur les composants d'entraînement, coupez toujours la tension d'alimentation.</p> <p>Tenez compte des délais de décharge de condensateurs.</p>
<p>⚠ WARNING Gefahrbringende Bewegungen! Lebensgefahr!</p> <p>Halten Sie sich nicht im Bewegungsbereich von Maschinen und Maschinenteilen auf.</p> <p>Verhindern Sie den unbeabsichtigten Zutritt für Personen.</p> <p>Bringen Sie vor dem Zugriff oder Zutritt in den Gefahrenbereich die Antriebe sicher zum Stillstand.</p>	<p>⚠ WARNING Dangerous movements! Danger to life!</p> <p>Keep free and clear of the ranges of motion of machines and moving machine parts.</p> <p>Prevent personnel from accidentally entering the range of motion of machines.</p> <p>Make sure that the drives are brought to safe standstill before accessing or entering the danger zone.</p>	<p>⚠ AVERTISSEMENT Mouvements entraînant une situation dangereuse ! Danger de mort !</p> <p>Ne séjournez pas dans la zone de mouvement de machines et de composants de machines.</p> <p>Évitez tout accès accidentel de personnes.</p> <p>Avant toute intervention ou tout accès dans la zone de danger, assurez-vous de l'arrêt préalable de tous les entraînements.</p>
<p>⚠ WARNING Elektromagnetische / magnetische Felder! Gesundheitsgefahr für Personen mit Herzschrittmachern, metallischen Implantaten oder Hörgeräten!</p> <p>Zutritt zu Bereichen, in denen Antriebskomponenten montiert und betrieben werden, ist für oben genannten Personen untersagt bzw. nur nach Rücksprache mit einem Arzt erlaubt.</p>	<p>⚠ WARNING Electromagnetic / magnetic fields! Health hazard for persons with heart pacemakers, metal implants or hearing aids!</p> <p>The above-mentioned persons are not allowed to enter areas in which drive components are mounted and operated, or rather are only allowed to do this after they consulted a doctor.</p>	<p>⚠ AVERTISSEMENT Champs électromagnétiques / magnétiques ! Risque pour la santé des porteurs de stimulateurs cardiaques, d'implants métalliques et d'appareils auditifs !</p> <p>L'accès aux zones où sont montés et exploités les composants d'entraînement est interdit aux personnes susmentionnées ou bien ne leur est autorisé qu'après consultation d'un médecin.</p>
<p>⚠ VORSICHT Heiße Oberflächen (> 60 °C)! Verbrennungsgefahr!</p> <p>Vermeiden Sie das Berühren von metallischen Oberflächen (z. B. Kühlkörpern). Abkühlzeit der Antriebskomponenten einhalten (mind. 15 Minuten).</p>	<p>⚠ CAUTION Hot surfaces (> 60 °C [140 °F])! Risk of burns!</p> <p>Do not touch metallic surfaces (e.g. heat sinks). Comply with the time required for the drive components to cool down (at least 15 minutes).</p>	<p>⚠ ATTENTION Surfaces chaudes (> 60 °C)! Risque de brûlure !</p> <p>Évitez de toucher des surfaces métalliques (p. ex. dissipateurs thermiques). Respectez le délai de refroidissement des composants d'entraînement (au moins 15 minutes).</p>

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

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

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<p>⚠ ADVERTENCIA ¡Campos electromagnéticos/magnéticos! ¡Peligro para la salud de las personas con marcapasos, implantes metálicos o audífonos!</p> <p>El acceso de las personas arriba mencionadas a las zonas de montaje o funcionamiento de los componentes de accionamiento está prohibido, salvo que lo autorice previamente un médico.</p>	<p>⚠ ATENÇÃO Campos eletromagnéticos / magnéticos! Perigo de saúde para pessoas com marcapassos, implantes metálicos ou aparelhos auditivos!</p> <p>Acesso às áreas, nas quais os componentes de acionamento são montados e operados, é proibido para as pessoas em cima mencionadas ou apenas após permissão de um médico.</p>	<p>⚠ AVVERTENZA Campi elettromagnetici / magnetici! Pericolo per la salute delle persone portatrici di pacemaker, protesi metalliche o apparecchi acustici!</p> <p>L'accesso alle zone in cui sono installati o in funzione componenti di comando è vietato per le persone sopra citate o consentito solo dopo un colloquio con il medico.</p>
<p>⚠ ATENCIÓN ¡Superficies calientes (> 60 °C)! ¡Peligro de quemaduras!</p> <p>Evite el contacto con las superficies calientes (p. ej., disipadores de calor). Observe el tiempo de enfriamiento de los componentes de accionamiento (mín. 15 minutos).</p>	<p>⚠ CUIDADO Superfícies quentes (> 60 °C)! Perigo de queimaduras!</p> <p>Evite tocar superfícies metálicas (p. ex. radiadores). Respeite o tempo de arrefecimento dos componentes de acionamento (mín. 15 minutos).</p>	<p>⚠ ATTENZIONE Superfici bollenti (> 60 °C)! Pericolo di ustioni!</p> <p>Evitare il contatto con superfici metalliche (ad es. dissipatori di calore). Rispettare i tempi di raffreddamento dei componenti di comando (almeno 15 minuti).</p>
<p>⚠ ATENCIÓN ¡Manipulación inadecuada en el transporte y montaje! ¡Peligro de lesiones!</p> <p>Utilice dispositivos de montaje y de transporte adecuados.</p> <p>Utilice herramientas adecuadas y equipo de protección personal.</p>	<p>⚠ CUIDADO Manejo incorreto no transporte e montagem! Perigo de ferimentos!</p> <p>Utilize dispositivos de montagem e de transporte adequados.</p> <p>Utilize ferramentas e equipamento de proteção individual adequados.</p>	<p>⚠ ATTENZIONE Manipolazione inappropriata durante il trasporto e il montaggio! Pericolo di lesioni!</p> <p>Utilizzare dispositivi di montaggio e trasporto adatti.</p> <p>Utilizzare attrezzi adatti ed equipaggiamento di protezione personale.</p>
<p>⚠ ATENCIÓN ¡Manejo inadecuado de las pilas! ¡Peligro de lesiones!</p> <p>No trate de reactivar o cargar pilas descargadas (peligro de explosión y cauterización).</p> <p>No desarme ni dañe las pilas. No tire las pilas al fuego.</p>	<p>⚠ CUIDADO Manejo incorreto de baterias! Perigo de ferimentos!</p> <p>Não tente reativar nem carregar baterias vazias (perigo de explosão e de queimaduras com ácido).</p> <p>Não desmonte nem danifique as baterias. Não deite as baterias no fogo.</p>	<p>⚠ ATTENZIONE Utilizzo inappropriato delle batterie! Pericolo di lesioni!</p> <p>Non tentare di riattivare o ricaricare batterie scariche (pericolo di esplosione e corrosione).</p> <p>Non scomporre o danneggiare le batterie. Non gettare le batterie nel fuoco.</p>

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

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

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

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

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

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

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

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

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

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

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

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1 About this documentation

Editions of this documentation

Edition	Release date	Notes
DOK-MOTOR*-MSK*****-IT01-xx-P	06-2011	First edition
DOK-MOTOR*-MSK*****-IT02-xx-P	12-2012	Revision
DOK-MOTOR*-MSK*****-IT03-xx-P	12-2020	Compliant according to low voltage directive 2014/35/EU




Tab. 1-1: Record of revisions

1.1 Validity of the documentation

This documentation is valid for Rexroth housing motors of the MSK series and must be observed by assemblers, operators, service engineers and facility operators.

1.2 Additional documentation

Operate this product only, if you have the following documentation available. You must understand and observe this documentation.

	Title	Document type	Document number
	MSK Synchronous servomotors	Project Planning Manual	DOK-MOTOR*-MSK*****-PR-...-P
	MSK Synchronous servomotors for hazardous areas	Project Planning Manual	DOK-MOTOR*-MSK*EXGIK3-PR-...-P
	IndraDrive and IndraDyn	Selection Data	DOK-CONNEC-CABLE*INDRV-AU-...-P

Tab. 1-2: Additional documentation

1.3 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
	Electrostatic sensitive devices
	Prohibition for persons with cardiac pacemaker
	Do not carry along metal parts or clocks
	Hammer scales are forbidden
	ATEX-Logo; Explosion protection identification
	The UL Recognized Component Mark identifies recognized component parts which are components of a bigger product or system
	The letters "C" and "E" stand for "Communautés Européennes". The CE-marking expresses the conformity of a product with relevant EC-regulations. For MSK motors, conformity according to low-voltage directive 2014/35/EU, EN 60034-1, EN 60034-5.
	Components for the use in systems for "integrated safety technique" prepared.

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 Indented use

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

EN 60034-1	Rating and performance behavior
EN 60034-5	Type of protection

Directives

2006/95/EG	Low Voltage Directive (valid until April 19, 2016)
2014/35/EU	Low Voltage Directive 2014/35/EU (valid from April 20, 2016)

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 electrical installation must comply with the protection requirements of EMC Directive 2014/30/EU. 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.

The machine may not be commissioned before conformity with these directives has been confirmed.

2.3 Unintended use

Any use of the MSK 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 (compare housing design **-NSNN**).

Direct operation on the three-phase network is forbidden.

2.4 Qualification of personnel

For the purpose of this manual, qualified personnel means persons who are familiar with transporting, installing, mounting, commissioning and operating the components of the electrical drive and control system and the associated hazards and have an appropriate qualification for their job.

All persons working on, with or in the vicinity of an electrical system must be informed of the relevant safety requirements, safety guidelines and internal instructions (EN 50110-1).

2.5 General safety instructions

Do not install or operate motors or components of the electric drive and control system before you have not carefully read all delivered documents.

Please observe the particular applicable national, local and system-specific regulations, the safety instructions in the documentation and the warning and informative labels on the motors.

Improper use of the motors and failure to follow the safety instructions in this document may result in material damage, personal injury, electric shock or, in extreme cases, to death!

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

Applications for functional safety are only allowed if the motors have the SI-sign on the rating plate.

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
 - Ensure sufficient weight compensation of the axes.

Only using the serially delivered **motor holding brake** or an external holding brake activated by the drive controller **is not suitable for personal protection!**

Rotating parts! Danger to life, risk of injury, heavy injury or material damage.

- Secure key and/or transmission elements against ejection.
- Install covers on dangerous rotating machine parts before start-up.

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.

Strong magnetic and electromagnetic fields pose a health hazard for persons with heart pacemakers, metallic implants and hearing aids in the direct environment of motor components!

- Persons with heart pacemakers and metallic implants are not allowed to approach or handle these motor components.

Crushing hazard of fingers and hands due to strong attractive forces of the magnets!

- Handle only with protective gloves.

Risk of destruction of sensitive parts!

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

2.6.4 Protection against burns

Risk of burns due to hot motor surfaces!

- Avoid contact with hot motor surfaces. **Temperatures may rise to over 70°C.**
- Allow the motors 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.

3 Scope of delivery

The scope of delivery of an IndraDyn housing motor contains:

- Motor in original package
- Additional type plate
- Operating instructions with safety instructions
- Optional connecting accessories for motors with terminal box
- Protective covers for output shaft, plug connections and coolant connections of water-cooled motors.
- Accompanying papers

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

4 About this product

4.1 Product description

4.1.1 Technical features

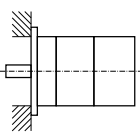
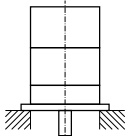
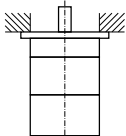
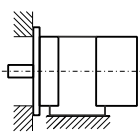
The motors of the MSK series are three-phase synchronous motors which are energized by a permanent magnet and are suitable for operation on converters or inverters of Bosch Rexroth.

Product	Three phase synchronous motor
Manufacturer	Bosch Rexroth Electric Drives and Controls GmbH Buergermeister-Dr.-Nebel-Straße 2 97816 Lohr am Main, Germany
Type	MSK030, -040, -043, -050, -060, -061, -070, -071, -075, -076, -100, -101, -103, -131, -133
Listed acc. to UL standard (UL)	UL 1004, Fifth Edition
Listed acc. to CSA standard (UL)	Canadian National Standard(s) C22.2 No. 100-04
UL-files (UL)	E 335445
Ambient temperature during operation	0 ... 40 °C
Motor design	B5 (EN 60034-7) B35 (EN 60034-7)
Degree of protection	IP65 (EN 60034-5)
Vibration severity grade	Level A (EN 60034-14)
Concentricity, run-out and alignment	Standard tolerance N (IEC 60072-1) for encoders S1, M1, S3, M3 Optional tolerance R (IEC 60072-1) for encoders S2, M2
Flange	acc. to DIN 42948
Shaft end	Cylindric (DIN 748 part 3), keyway optional, centering hole (DIN 332 part 2)
Installation altitude	0 ... 1000 m
Sound pressure level	< 75 dB(A)
Insulation class	155 (EN 60034-1)
Balancing	Full key balancing
Electrical connection	Flange socket for power and encoder Terminal boxes
Encoder system	S1 (optically, Singleturn Hiperface, 128 signal periods) S2 (optically, Singleturn EnDat 2.1, 2,048 signal periods) S3 (capacitive, Singleturn Hiperface, 16 signal periods) M1 (optically, Multiturn Hiperface, 128 signal periods) M2 (optically, Multiturn EnDat 2.1, 2,048 signal periods) M3 (capacitive, Multiturn Hiperface, 16 signal periods)
Motor holding brake (optional)	Principle: electrically released U_N 24V DC ($\pm 10\%$)



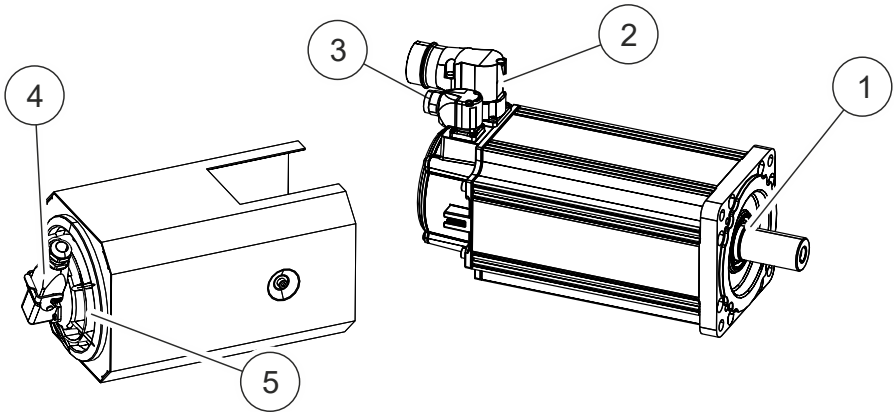
In the case of special design, details named in the operating instructions can deviate. In this case, order the supplementary documentation.

4.1.2 Frame size

Motor design B05			B35
IM B5	IM V1	IM V3	IM B3
			
Flange attachment on the drive side of the flange	Flange attachment on the drive side of the flange, drive side facing down	Flange attachment on the drive side of the flange, drive side facing up	Foot assembly, feet at the bottom

Tab. 4-1: Allowed installation types acc. to EN 60034-7

4.1.3 Type of protection

Motor area	Degree of protection	Notes
		
Motor housing, output shaft, motor connector when properly assembled in mated condition	IP65	Standard version
Motor housing, output shaft, motor connector when properly assembled in mated condition and use of sealing air	IP67	Sealing air accessories
Blower motor and connector in mated condition	IP65	Blower unit accessories
Fan grille	IP24	Blower unit accessories

- ①
- ② ③
- ④
- ⑤
- Output shaft with shaft sealing ring
- Connector for performance and encoder connection (optionally retrofittable for sealing air connection)
- Blower motor with connector
- Fan grille

Tab. 4-2: IP protection type ranges for MSK motors

4.1.4 Output shaft

Centering hole , acc. to DIN 332 Part 2, edition 05.83	MSK														
	030	040	043	050	060	061	070	071	075	076	100	101	103	131	133
DS M3	■														
DS M5		■	■												
DS M6				■		■									
DS M8					■					■					
DS M10							■	■	■		■				
DS M12												■	■		
DS M16														■	■

Tab. 4-3: Centering hole

corresponding key, acc. to DIN 6885-A (not included in the scope of delivery)	MSK														
	030	040	043	050	060	061	070	071	075	076	100	101	103	131	133
3×3×16	■														
5×5×20		■	■												
6×6×32				■		■									
8×7×40					■					■					
10×8×45							■	■	■		■				
10×8×70												■			
14×9×80														■	

Tab. 4-4: Keys

4.1.5 Bearings

The motors are equipped with permanently greased deep-groove ball bearings. The fixed bearing is on the B-side. The nominal bearing lifetime L_{10h} is 30,000 h under consideration of the shaft and bearing load specified in the project planning description.


4.1.6 Cooling

Natural convection

The nominal data are achieved at ambient temperatures of up to 40 °C. Sufficient heat radiation must be ensured by the installation situation. Unhindered vertical convection has to be ensured by a sufficient distance of 100 mm to adjacent components on the side surfaces. Pollution of the surface of the motor reduces heat dissipation and can result in thermal overload, see [chapter 12 "Troubleshooting "](#) on page 48.

Surface ventilation

Cooling is realized by external radial (LEM-RB) or axial (LEM-AB) fan units. Please also observe the additional information on holding brakes in and .

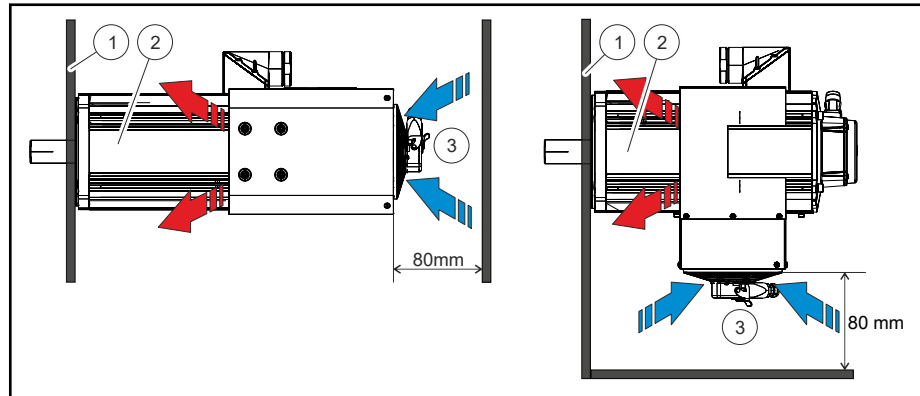
 DOK-MOTOR*-MSK*****-PR...-P, "Synchronous Servomotors MSK".

Contamination can reduce the flow rate of the fans and lead to thermal overload of the motors. For cooling use clean ambient air only. Heated air may not be sucked in again.

The use of the fan under the following conditions is expressly not suitable:

- Delivery of air which contains abrasive particles
- Delivery of air which has a strongly corroding effect, e.g., salt mist

- Delivery of air which contains a high dust load, e.g., extraction of saw dust
- Conveying of flammable gases/particles
- Use of the fan units as safety-related components or for the assumption of safety-relevant functions



- ① Machine
- ② Air outlet space
- ③ Air suction area

Fig. 4-1: Fan units installation area, minimum distance

Consider the minimum distance of the air supply ③ when designing the machine.

Liquid cooling

Liquid-cooled energy storage devices may only be operated on a closed coolant circuit with heat exchanger. The coolant flow direction can be arbitrarily selected.

Expand the cooling circuit with anticorrosive. Please observe the information in the project planning manual.

DOK-MOTOR*-MSK*****-PR...-P, "Synchronous Servomotors MSK".

4.2 Product identification

4.2.1 Type code

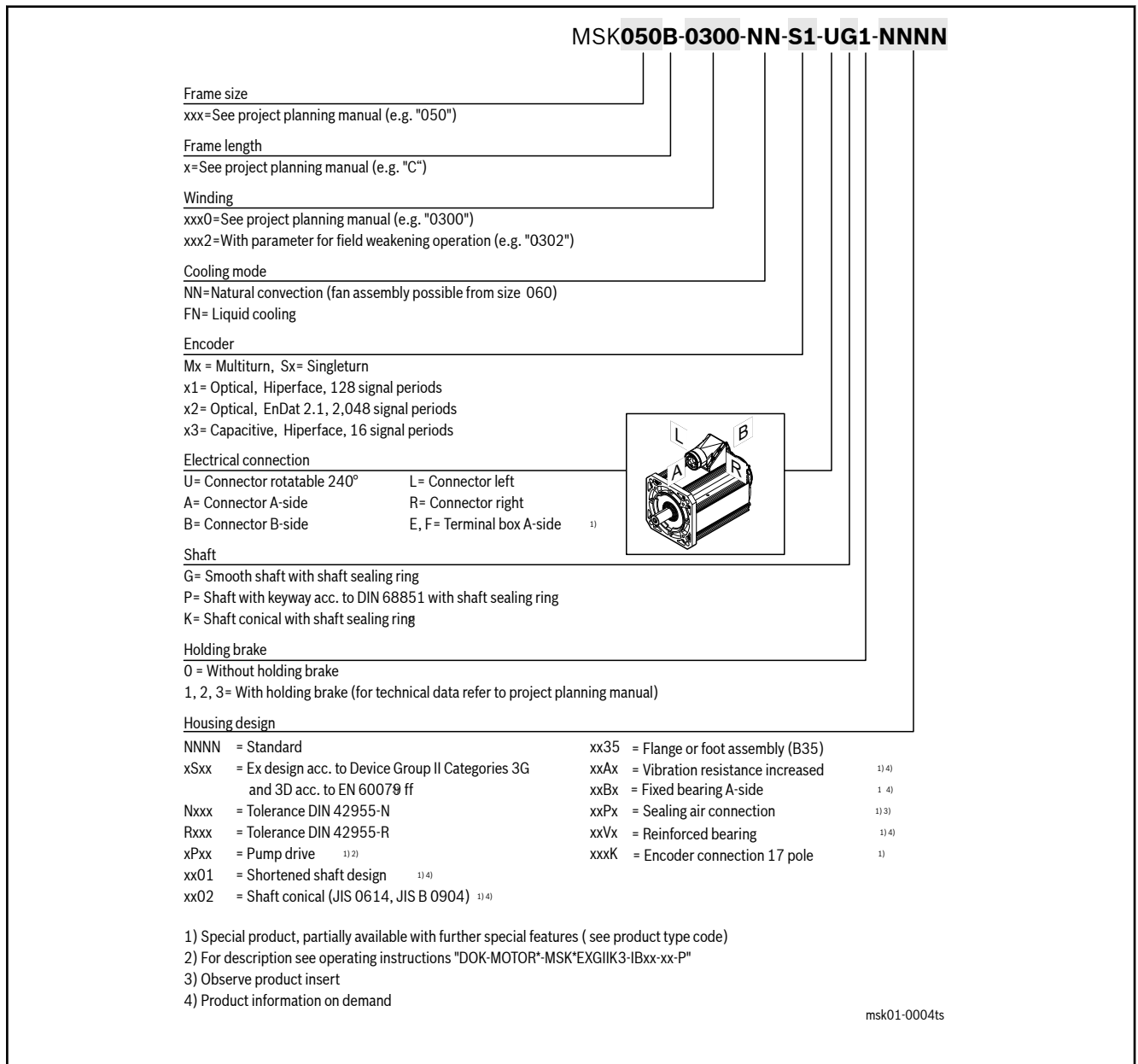
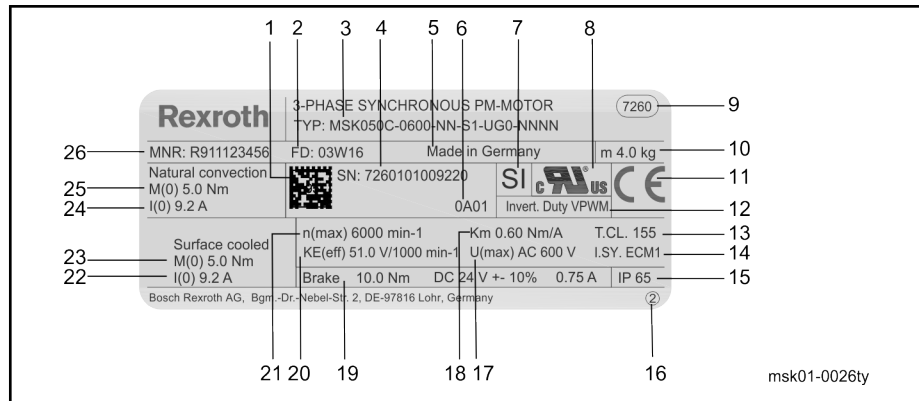


Fig. 4-2: Overview type designation

4.2.2 Type plate



- 1 Barcode
- 2 Date of production
- 3 Motor type (ordering designation according to the type code)
- 4 Serial number
- 5 Country of origin
- 6 Revision state
- 7 Designation motor prepared for safety technique
- 8 Designation cURus (UL)
- 9 Factory number
- 10 Netto weight
- 11 CE conformity
- 12 Inverter Duty VPWM (UL)
- 13 Thermal temperature class
- 14 Designation isolation system (UL)
- 15 Degree of protection housing
- 16 Type plate designation
- 17 Voltage class (UL)
- 18 Torque constant at 20°C
- 19 Data about holding brake, optional (holding brake, rated voltage, rated current)
- 20 Voltage constant
- 21 Maximum velocity
- 22 Standstill current (surface or liquid)
- 23 Standstill torque (surface or liquid)
- 24 Continuous current at standstill 60K
- 25 Continuous torque at standstill 60K
- 26 Part number

Fig. 4-3: Type plate MSK

5 Transport and storage

5.1 Transport (shipping) instructions

The motors have to be transported in their original packaging, complying with 2K2, 2B1, 2C2, 2S2, 2M1 acc. to DIN EN 60721-3-2.

Please observe the following classification limitations:

- Transport temperature range -20 ... +80 °C
- Relative air humidity max. 75% (at +30 °C)
- No occurrence of salt mist



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

5.2 Instructions on machine transport

NOTICE

Never touch the connection points of electrostatic sensitive devices!



Installed components (e.g., KTY84, encoder) may contain electrostatic sensitive devices (ESD).

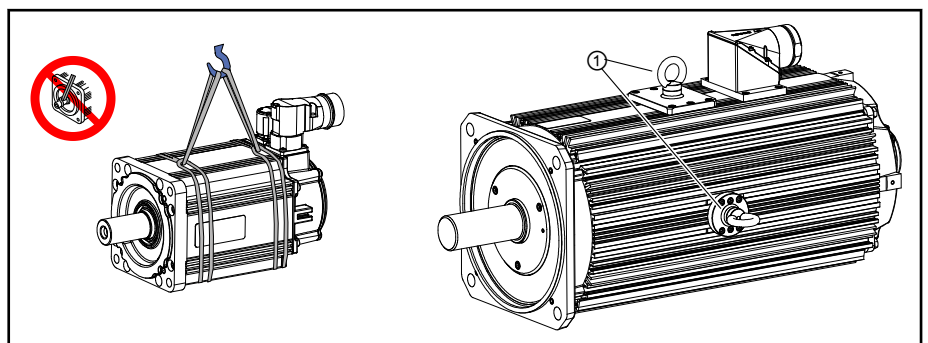
- Observe the ESD safety measures.

⚠ WARNING

Risk of injury and material damage due to improper handling during transport!



- Only use hoisting gear suited for the weight of the motors. Use lifting sling belts or lifting eye bolts. Secure the lifting eye bolts before use.
- Never walk under hanging loads.
- Do not lift the motor at the shaft or on the optional fan housing.
- Use suitable protective equipment and protective clothing during transport, and wear safety shoes.



① Eye bolts (check firm seating before use)

Fig. 5-1: Lifting and transporting motors

- Before transporting the motor, determine the weight of the motor. For more details about motor weight, please refer to the type plate or the project planning manual (Technical data).

- ▶ Adjust the carrying capacity of the lifting device to the motor weight.
- ▶ If provided by the manufacturer, all lifting eye bolts must be used and tightened before use.
- ▶ Avoid increased transport vibrations.
- ▶ Remove any existing transport locks prior to commissioning and keep them.

5.3 Product storage

Store the motors in their original packaging in a dry, dust-free, vibration-free and light-protected place without direct solar radiation. Comply with the classes 1K2, 1B1, 1C1, 1S1, 1M2 specified for storage acc. to DIN EN 60721-3-2.

Please observe the following classification limitations:

- Storage temperature range -20 ... +60 °C
- Relative air humidity 5 ... 95 %
- Absolute air humidity 1 ... 29 g/m³
- No condensation
- No ice formation/freezing
- No occurrence of salt mist

NOTICE

Damage due to moisture and humidity!

- ▶ Use coverings to protect the products from moisture.
- ▶ Store them only in rainproof and dry rooms.



Before storage, discharge the liquid coolant from liquid-cooled motors to avoid frost damage.

5.4 Storage times

Additional measures must be taken on commissioning to preserve proper functioning - irrespective of the storage time which may be longer than the warranty period of our products. However, this does not involve any additional warranty claims.

Motors

Bearing time / months			Measures for commissioning
> 1	> 12	> 60	
■	■	■	Visual inspection of all parts to be damage-free
■	■	■	Resurface the holding brake
	■	■	Check the electric contacts to verify that they are free from corrosion
	■	■	Let the motor run in without load for one hour at 800 ... 1000 rpm
	■	■	Measure insulation resistance. Dry the winding at a value of < 1kOhm per volt rated voltage.

Bearing time / months			Measures for commissioning
> 1	> 12	> 60	
		■	Exchange bearings
		■	Exchange encoders

Tab. 5-1: Measures before commissioning motors that have been stored over a prolonged period of time

Cables and Connectors

Bearing time / months			Measures for commissioning
> 1	> 12	> 60	
■	■	■	Visual inspection of all parts to be damage-free
	■	■	Check the electric contacts to verify that they are free from corrosion
		■	Visually inspect the cable jacket. Do not use the cable if you detect any abnormalities (squeezed or kinked spots, color deviations, ...).

Tab. 5-2: Measure before commissioning cables and connectors that have been stored over a prolonged period of time

6 Assembly

6.1 Motor assembly

6.1.1 Flange assembly


NOTICE

Motor damage due to ingress of liquids!

Liquid which exists over a longer period on the shaft sealing ring of the output shaft can ingress into the motor and cause damage.

- ▶ Ensure that liquid cannot be present at the output shaft.
- ▶ Do not mount any open gearboxes (gearboxes that are not hermetically sealed).

For details on mounting holes, please refer to the project planning manual.

 DOK-MOTOR*-MSK*****-PR-----P, "Synchronous servomotors MSK". Use all motor mounting holes to mount the motor safely to the machine.

- ▶ If coupling is direct, ensure that the support is plane and the orientation is precise.
- ▶ Avoid pinching or jamming the centering collar on the motor side.
- ▶ Avoid damaging the receptacle fit on the plant side.
- ▶ Use the following screws and washers for flange assembly.

Mounting screws for IndraDyn motors

Hole ø [mm]	Screw 8.8 DIN EN ISO 4762 DIN EN ISO 4014	Tightening torque M _A [Nm] at μ _K = 0.12	Washer DIN EN ISO 28738
4.5	M4 × 20	3	-
6.6	M6 × 20	10.1	-
9	M8 × 20	24.6	yes
11	M10 × 30	48	yes
14	M12 × 40	84	yes
18	M16 × 35	206	yes

Tab. 6-1: Mounting screws tightening torque

6.1.2 Foot mounting

Before attaching the motors according to the foot assembly method, observe the clearance from the center of the motor shaft to the bottom edge of the foot specified in the particular motor dimension drawing. Compare this dimension with the connection dimension on the machine side.



The mounting holes and clearances correspond to the general tolerance according to DIN ISO 2768-1 (tolerance class m).

Before attaching the motor to the machine, it must be aligned so that the center line of the motor shaft is aligned with the center line of the connecting shaft.

The following procedure is recommended for foot mounting of the motors:

1. Dismount the lower lateral air baffles to have free access to the mounting holes.
2. Align the motor such that the center line of the motor shaft is flush with the center line of the connection shaft of the machine. To align the motor, use sheet steel strips as a base.
3. Connect the motor firmly to the machine.

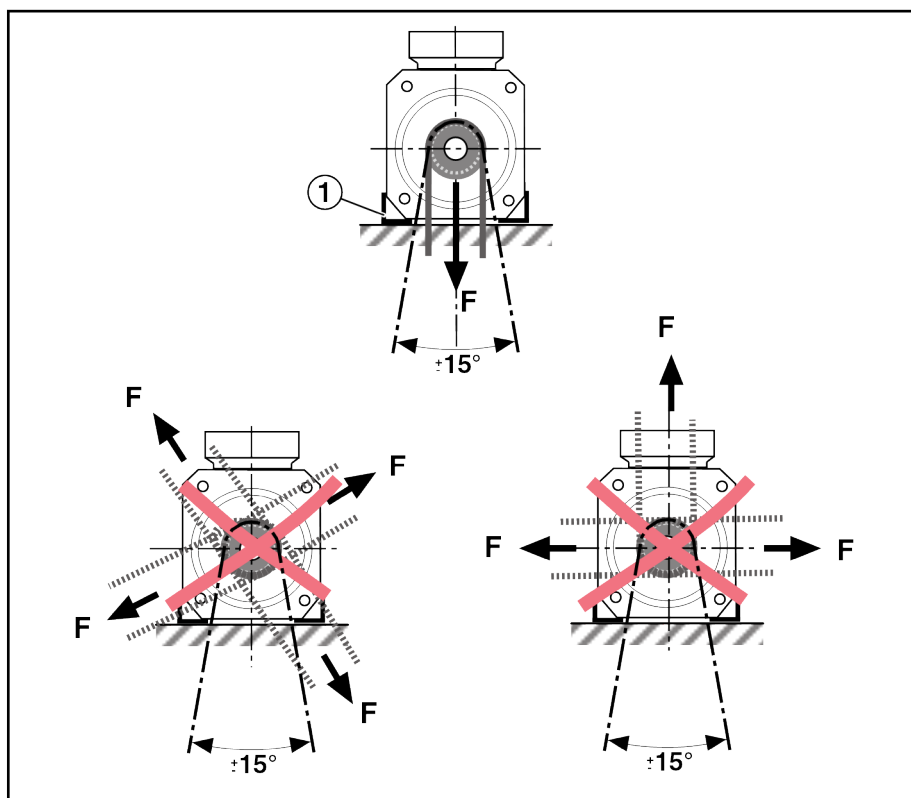
Fastening screws for foot mounting of IndraDyn motors

Motor frame size	Hole \varnothing [mm]	Screw 8.8 DIN EN ISO 4762 DIN EN ISO 4014	Tightening torque M_A [Nm] at $\mu_K = 0.12$	Washer DIN EN ISO ...
133	11	M10 x ...	48	28738

Tab. 6-2: Mounting screws tightening torque (foot mounting)

4. Reattach the air baffles to the motor.

In contrast to flange assembly, radial forces may only be effective in a direction perpendicular to the mounting surface ($\pm 15^\circ$) if foot assembly is selected. The transmission of forces in other effective directions is not allowed.



①

Mounting feet

Fig. 6-1: Force direction at foot mounting



Please note the following in case of foot assembly ...

- Forces which are transmitted by a gear and have an effect on the motor feet are not allowed.
Forces taking effect via the gear shaft must be supported against the gear.
- Incorrect installation situations give rise to forces which may cause short-term damage to the motors.
- If necessary, consider "flange assembly" as an alternative.

6.1.3 Attaching transmission elements

Fit and pull off the transmission elements such as pulleys and couplings only with suitable equipment; heat them, if necessary.

- Avoid inadmissible beltbalance tensions. Please consider the allowed radial and axial forces in the project planning manuals.
- The balancing state of transmission elements must comply with the full-key balancing of the motors.

NOTICE

Motor damage due to strikes onto the motor shaft



- Do not strike the shaft end and do not exceed the allowed axial and radial forces of the motor.

Fitting

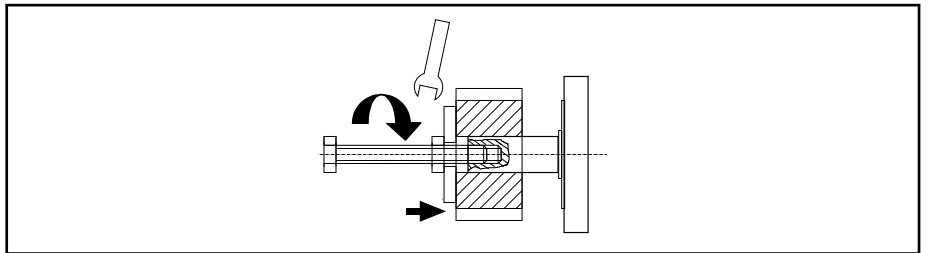


Fig. 6-2: Fitting the transmission element

- Use the centering hole for fitting transmission elements. For details on centering holes, please refer to the project planning manual.

DOK-MOTOR*-MSK*****-PR...-P, "Synchronous servomotors MSK". Heat the transmission element, if necessary.

6.2 Connecting the electric supply

6.2.1 Safety

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

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



While the rotor is rotating, motors with permanent magnet excitation create a voltage > 60 V at the motor connections.

- ▶ Any work may only be carried out while the motor is at standstill.
- ▶ Never connect or disconnect plug connectors under load!

NOTICE

Never touch the connection points of electrostatic sensitive devices!





Installed components (e.g., KTY84, encoder) may contain electrostatic sensitive devices (ESD).

- ▶ Observe the ESD safety measures.

6.2.2 Connectors

Observe for Device connector:

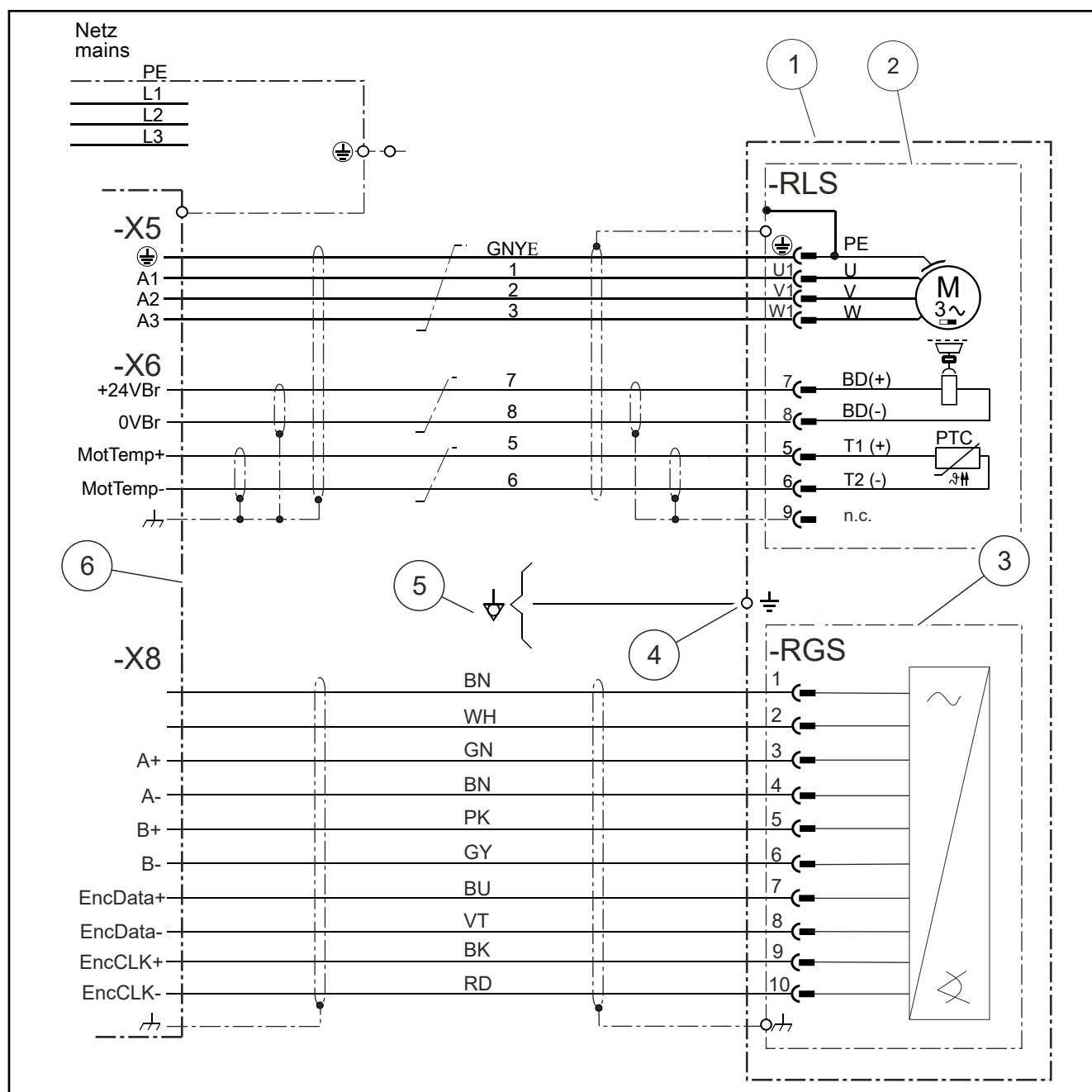
- Use ready-made cables of Rexroth, see documentation  DOK-CONNEC-CABLE*INDRV-AU...-P, "Rexroth Connection Cables IndraDrive and IndraDyn".
- Observe the circuit diagrams specified in the Project Planning Manual, see  DOK-MOTOR*-MSK*****-PR...-P, "Synchronous Servomotors MSK".
- The connections must be established such that a permanent safe electrical connection is ensured.
- Establish a safe protective conductor connection.
- Do only use plug connectors free from dirt, foreign bodies and humidity.

- Completely tighten the screw-type device connector. The vibrating O-ring must no longer be visible.
- Connect or disconnect plug connections only in de-energized, dry and clean state.
- Protect the device connectors from external force effect.

Connection diagram

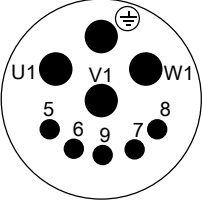
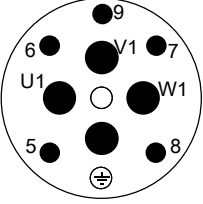
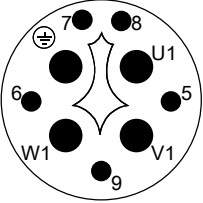
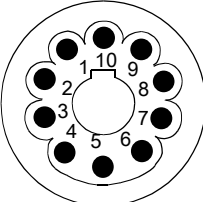
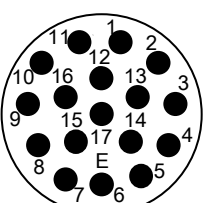
The following connection diagram shows a possible connection. Observe the valid installation regulations at the installation site of the machine.

Assembly



- ① Motor housing
- ② Device connector power
- ③ Device connector encoder
- ④ Equipotential bonding connection at the motor (only available on ATEX motors)
- ⑤ Equipotential bonding connection at the machine (required for ATEX motors)
- ⑥ Rexroth drive controller

Fig. 6-3: Connection diagram of device connector

Connector size	Pole pattern	Device connector	Notes
M23	 <ul style="list-style-type: none"> U1 A1 V1 A2 W1 A3 PE 5 MotTemp+ 6 MotTemp- 7 +24VBr 8 0VBr 9 n.c. 	RLS1100 ¹⁾ RLS1103	Power
M40	 <ul style="list-style-type: none"> U1 A1 V1 A2 W1 A3 PE 5 MotTemp+ 6 MotTemp- 7 +24VBr 8 0VBr 9 n.c. 	RLS1200 ¹⁾ RLS1203	Power
M58	 <ul style="list-style-type: none"> U1 A1 V1 A2 W1 A3 PE 5 MotTemp+ 6 MotTemp- 7 +24VBr 8 0VBr 9 n.c. 	RLS1300	Power
M23	 <ul style="list-style-type: none"> 1 VCC_Encoder 2 GND_Encoder 3 A+ 4 A- 5 B+ 6 B- 7 Enc_Data+ 8 Enc_Data- 9 Enc_CLK+ 10 Enc_CLK- 	RGS1000 ¹⁾ RGS1003	Encoder
M23	 <ul style="list-style-type: none"> 1 A+ 2 A- 3 n.c. 4 n.c. 5 VCC_Encoder 6 n.c. 7 GND_Encoder 8 Enc_CLK+ 9 Enc_CLK- 10 VCC_Encoder 11 B+ 12 B- 13 n.c. 14 ENrncData+ 15 n.c. 16 n.c. 17 EncData- 	RGS1010	Encoder

1) Device connector rotatable

Tab. 6-3: Pin assignment device connector

The orientation of the device connector is adjustable. To change the orientation, screw a coupling completely onto the device connector. Then move the device connector with the coupling to the desired position. The adjustment possibilities are shown in the following figure.

Assembly

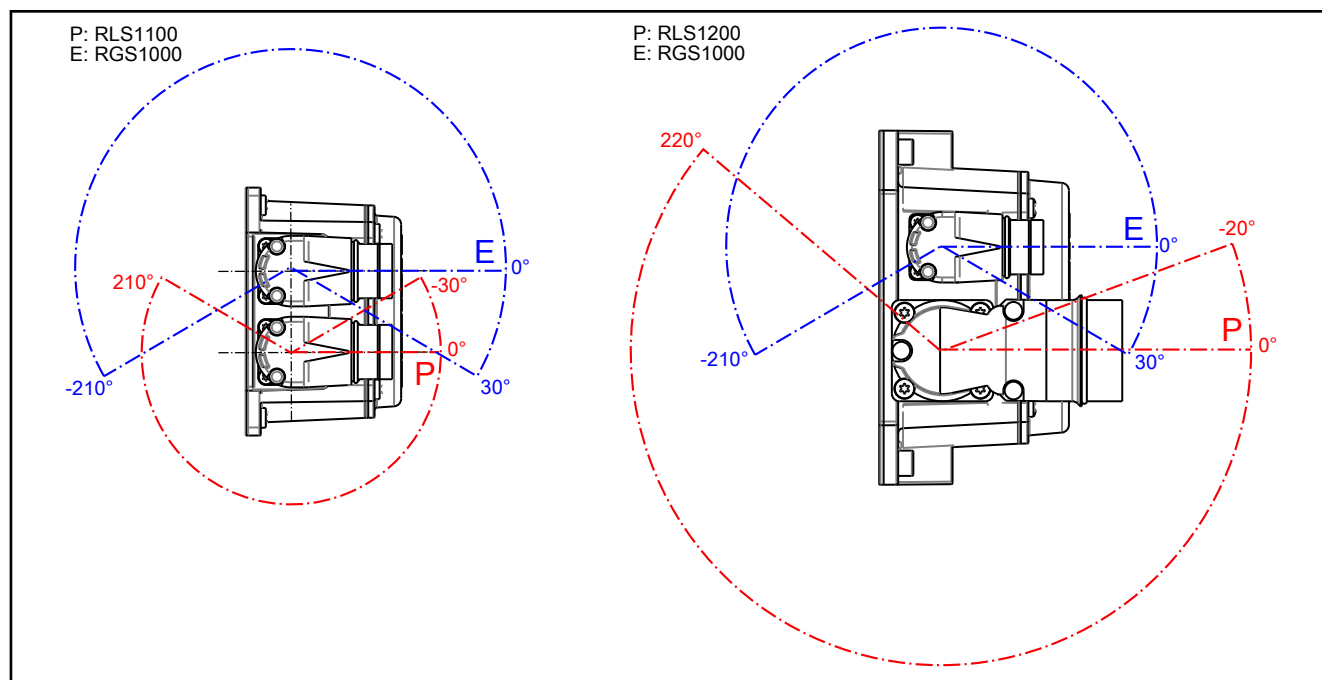


Fig. 6-4: Adjustment range of device connector, rotatable

Device connector	Twisting moment ¹⁾ maximum [Nm]
RGS1000	12
RGS1010	
RLS1100	
RLS1200	18

1) Maximum torque to change the orientation of the device connectors

Tab. 6-4: Twisting moments of device connectors



- ▶ Never exceed the specified torsional torques .
- ▶ Do not change the connector output direction more than 10 times.

6.2.3 Terminal boxes

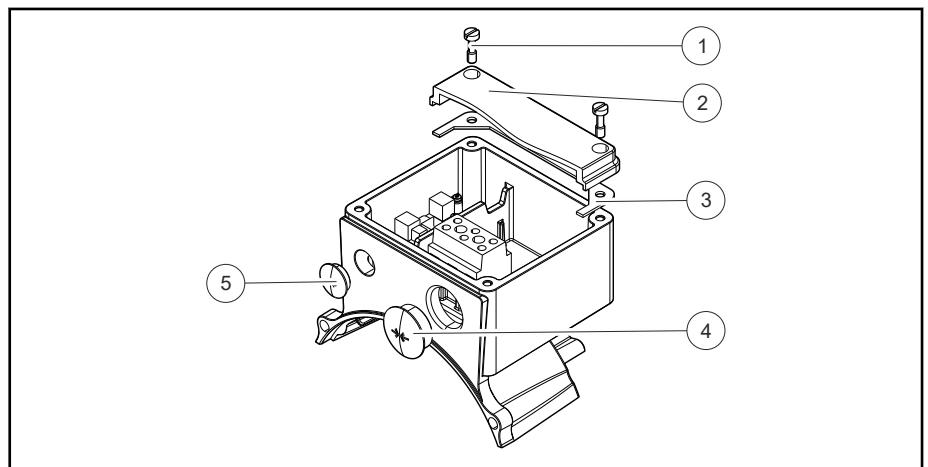
General

Motor	Terminal box
MSK101X-----F--NPNN; (X=C,D,E,F)	RZK3100
MSK131X-----E--NPNN; (X=F)	RKL1300
MSK133X-----E--NP35; (X=B)	RKL1200
MSK133X-----E--NP35; (X=C,D,E)	RKL1300

When using terminal boxes, observe the following:

- Use ready-made cables of Rexroth, see documentation  DOK-CONNEC-CABLE*INDRV-AU-----P, "Rexroth Connection Cables IndraDrive and IndraDyn".
- Observe the circuit diagrams specified in the Project Planning Manual, see  DOK-MOTOR*-MSK*****-PR-----P, "Synchronous Servomotors MSK".
- The connections must be established such that a permanent safe electrical connection is ensured.
- Establish a safe protective conductor connection.
- Use the related cable ends for terminal boxes (no protruding wire ends).
- Do only use terminal boxes free from dirt, foreign bodies and humidity.
- Seal unused cable entry openings and the box itself so that they are dustproof and waterproof.

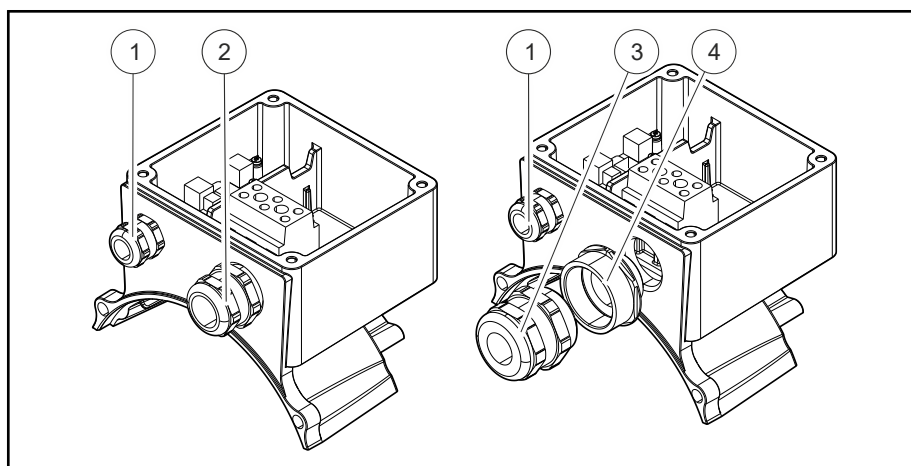
RZK3100 Terminal box



- ① 4 screws; M_A 5.9...7.1 Nm
- ② Cover
- ③ Seal
- ④ Lock M32 (power)
- ⑤ Lock M20 (encoder)

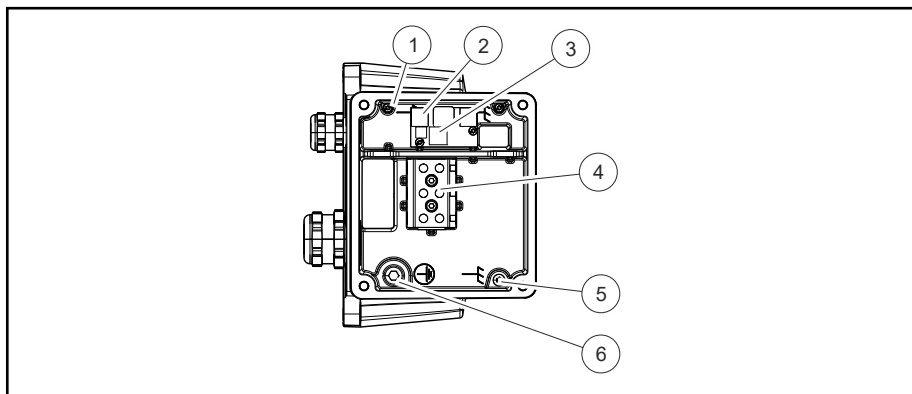
Fig. 6-5: RZK3100 Terminal box

Assembly



- ① Screw connection M20 x 1.5 plastics (encoder)
- ② Screw connection M32 x 1.5 plastics (power cable 2.5 ... 10.0 mm²)
- ③ Screw connection M40 x 1.5 plastics (power cable 16.0 mm²)
- ④ Extension M32 / M40 plastics (power cable 16.0 mm²)

Fig. 6-6: *Select screw connections*



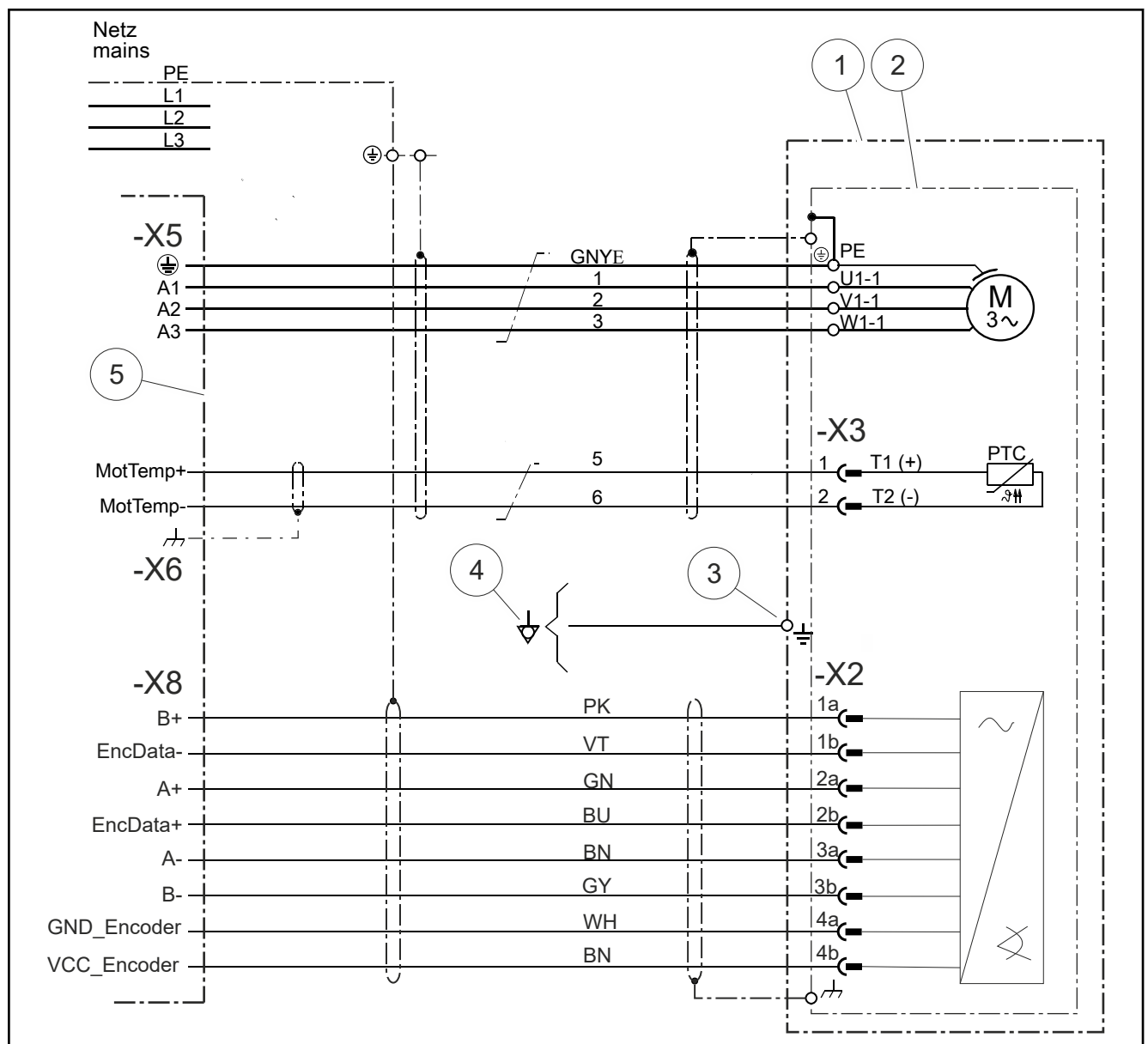
- ① Shield connection encoder cable
- ② Clamp terminal encoder 8 pole
- ③ Clamp terminal brake/temperature 2 pole
- ④ Power connection U, V, W (max. 16.00 mm²)
- ⑤ Shield connection power cable M4 x 10
- ⑥ Protective conductor power cable M8 x 12

Fig. 6-7: *Connection points power and encoder cables*

Connection diagram



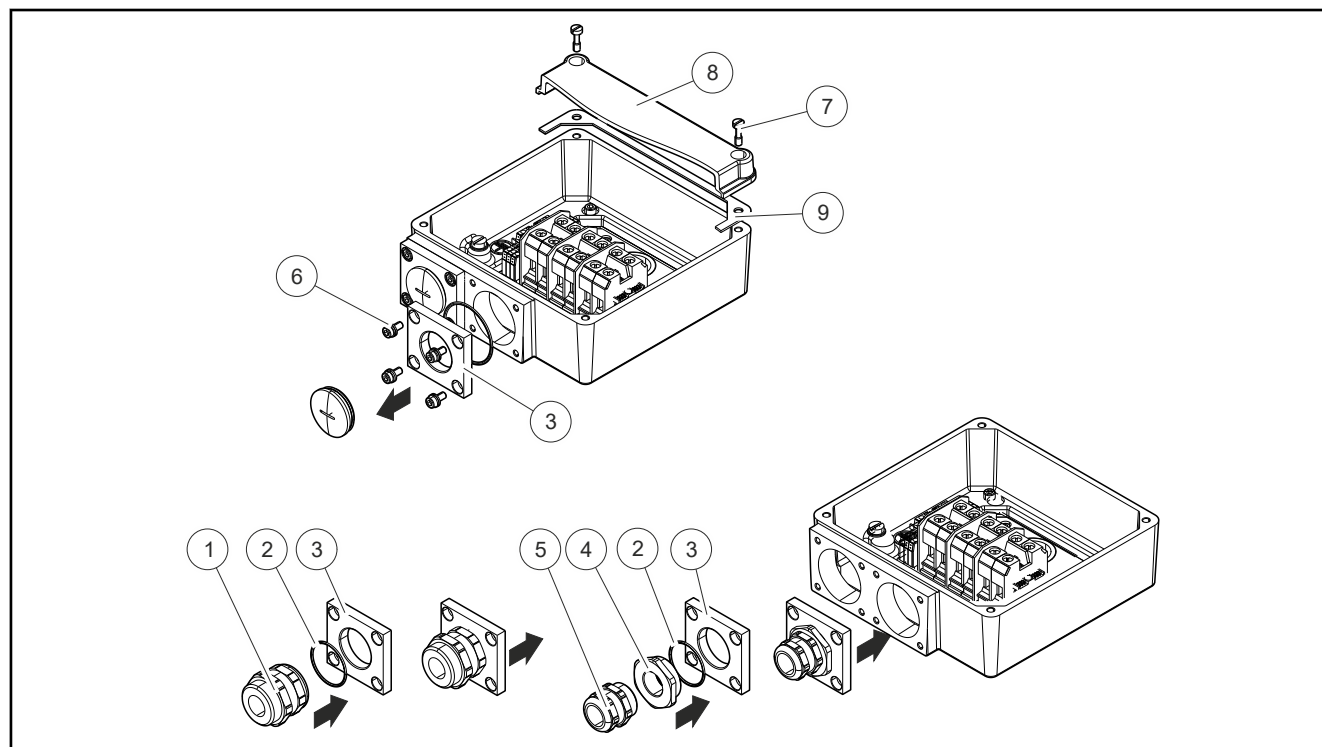
The connection diagram represents a possible connection. Observe the valid installation regulations at the installation site of the machine.



- ① Motor housing
- ② Terminal box
- ③ Equipotential bonding connection at the motor (only available on ATEX motors)
- ④ Equipotential bonding connection at the machine (required for ATEX motors)
- ⑤ Rexroth drive controller

Fig. 6-8: Connection diagram terminal box individual wiring RZK3100

Terminal box type RKL1200, RKL1300



- ① ⑤ Screw connection
- ② O-ring
- ③ Adapter plate to accommodate the screw connection
- ④ Reduction (optional for cable cross-sections 1.5, 2.5 mm²)
- ⑥ Adapter plate mounting screws
- ⑦ Cover screws
- ⑧ Cover
- ⑨ Seal of terminal box cover

Fig. 6-9: Assembly RKL 1200, RKL 1300

The power connection is made in single or double wiring. The assembled power cables are inserted into the terminal box via the adapter plates (2 × M40×1.5) and cable glands.

Power cable connection at the terminal box

Connecting the power cable to the terminal box requires the following steps:

1. Open the terminal box cover.
Loosen and remove the mounting screws (4 pieces).
2. Remove the protective cover of the cable gland.
3. Detach the adapter plate ③ from the terminal box.
4. Screw the adapter plate firmly to the metric cable gland on the power cable. Use reduction for power core cross-sections of 1.5 mm² and 2.5 mm².
Before attaching the power cable to the adapter plate, check the correct condition and position of the O-ring.
5. Feed the power cable up to the adapter plate through the opening in the terminal box and fasten the adapter plate to the terminal box.
Tightening torque of the screws ⑥: 9 Nm (±10%)

Before attaching the adapter plate ⑥ to the terminal box, check the O-ring ⑤ inserted in the adapter plate for proper condition and correct position.

- 6. Connect the cores according to the connection diagram for standard or double cabling.

Observe the following tightening torques:

Designation	Type	Connection mm²	Size / type	Tightening torque M _A Nm
U-V-W	WEF	1.5 ... 35	M6	2.5
1 ... 6 (Temp / brake)	WEF	0.2 ... 2.5	Spring-cage terminal	-
PE	RTE		M8	3.8

WEF = wire end ferrules
RTE = ring terminal end

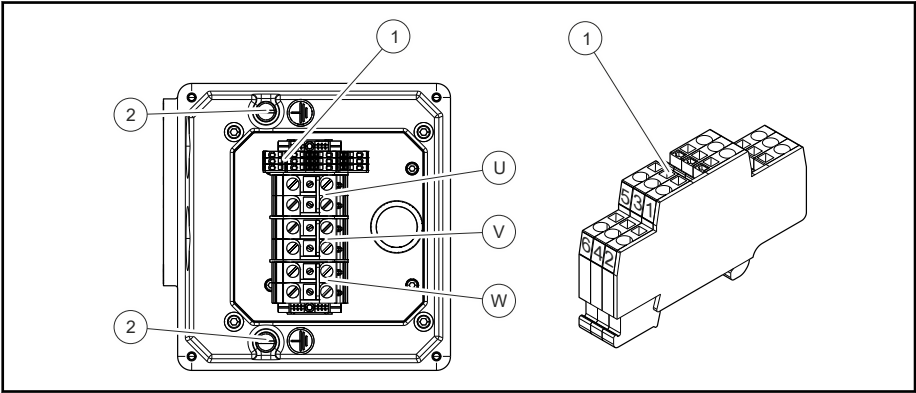
Tab. 6-5: Screw tightening torques in Nm in terminal box

- 7. Close and fasten the terminal box cover.

Apply Loctite 243 (liquid screwlock) to the thread of the mounting screws for the lid ① and then attach the lid with all of the mounting screws.

Tightening torque of the screws: 6.5 Nm (±10%)

⇒ Before attaching the terminal box cover to the terminal box, check for proper condition and the correct position of the glued seal ② on the terminal box cover.



- ① Terminal strip (brake, temperature sensor)
- ② Protective conductor terminal
- U V W Power connection

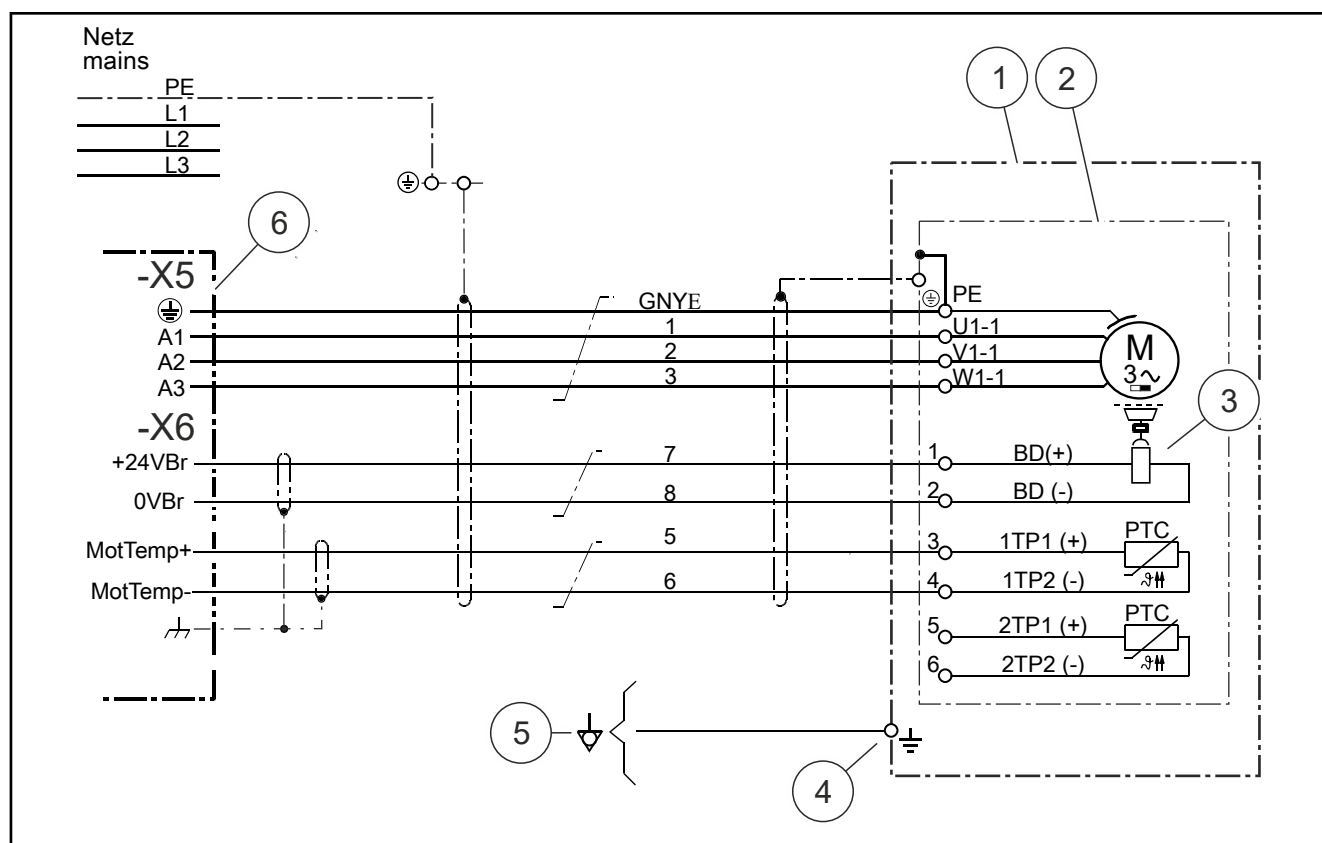
Fig. 6-10: Connection points

Wiring diagram single wiring



The connection diagram represents a possible connection. Observe the valid installation regulations at the installation site of the machine.

Assembly



- ① Motor housing
- ② Terminal box
- ③ Holding brake (option)
- ④ Equipotential bonding connection at the motor (only available on ATEX motors)
- ⑤ Equipotential bonding connection at the machine (required for ATEX motors)
- ⑥ Rexroth drive controller

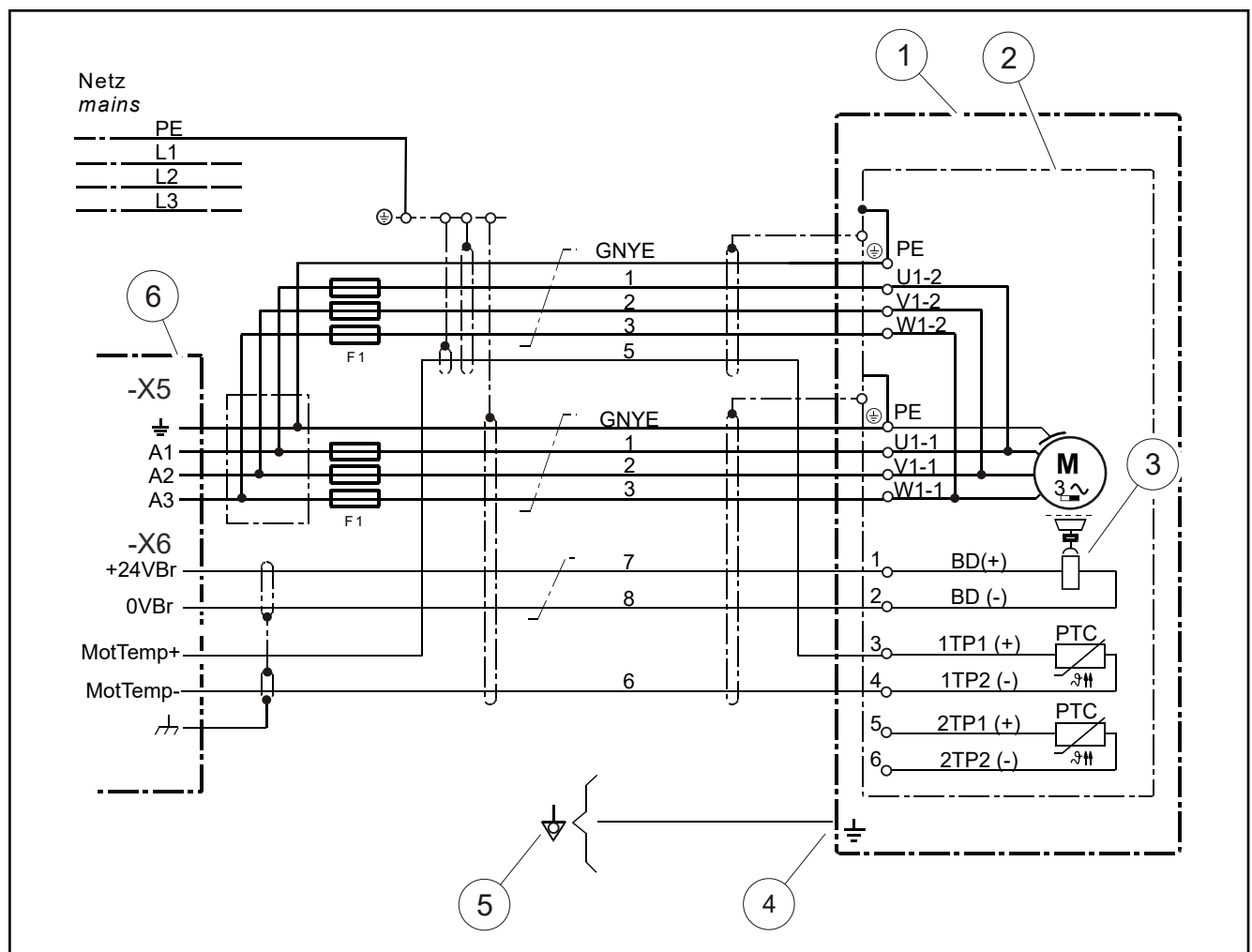
Fig. 6-11: Connection diagram terminal box individual wiring RLK1200, RLK1300

Double cabling connection diagram

The motor connection with two power cables is required if a corresponding single cable cannot be used due to the bending radius or its dimensions.



The connection diagram represents a possible connection. Observe the valid installation regulations at the installation site of the machine.



- ① Motor housing
- ② Terminal box
- ③ Holding brake (option)
- ④ Equipotential bonding connection at the motor (only available on ATEX motors)
- ⑤ Equipotential bonding connection at the machine (required for ATEX motors)
- ⑥ Rexroth drive controller

Fig. 6-12: Connection diagram terminal box double wiring RLK1300




- Fuses F1 (NH...) protecting the wires against overload in case of a cable break must be dimensioned according to the current carrying capacity of the particular line cross-section.
- The fuses should be installed in the control cabinet such that they are as close as possible to the power output of the controller.
- The shield of the motor power cable must be connected to the control cabinet on the motor side of the fuses such that it is conducting over a large area.
- Power cables are not available to establish the double cabling. To install the fuses, standard Rexroth power cables have to be opened and cut to the appropriate length on site.

6.2.4 Fan units

General

MSK motors can optionally be operated with fan units. Observe the safety instructions:

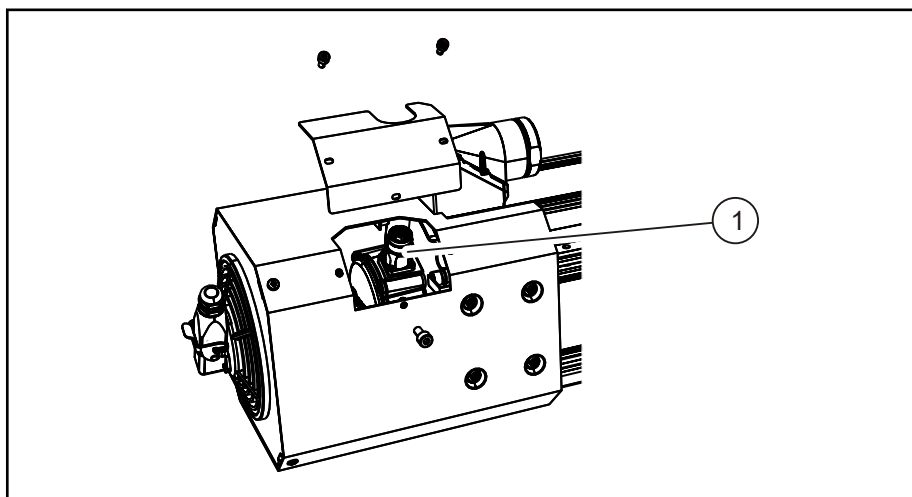
- Connect the fan unit according to the connection voltage on the rating plate.
- Establish a safe protective conductor connection.
- Do only use suitable installation material.

 DOK-MOTOR*-MSK*****-PR...-P, "Synchronous Servomotors MSK".

For motors with axial fan unit

For motors with axial fan unit, the device plug for the encoder connection is covered by the fan guard.

- Unscrew the cover plate from the fan housing to connect the encoder connector.
- Mount the cover plate again after connection (contact protection).



1 Connection for device connector encoder

Fig. 6-13: Cover plate encoder connection

Fan connection 1 phase plug connector RLS0780

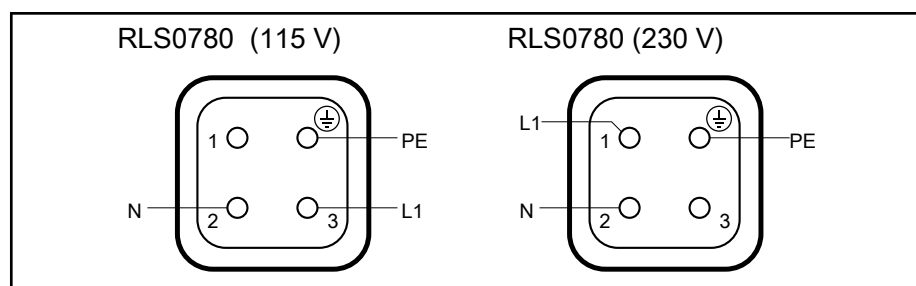


Fig. 6-14: Pin assignment cable connector LEM

LEM fan units in design "T" with integrated thermal protection. Fan units "T" do **not** need a circuit with external motor protection.

- The supplied cable gland is used for cable diameter 7 ... 10 mm.

Fan connection 3-phase connector RLS0782

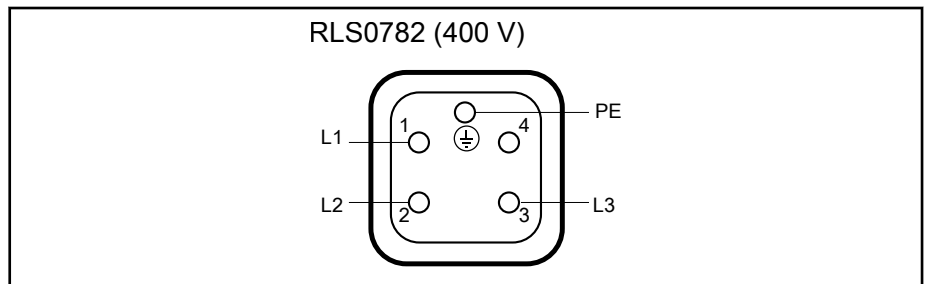


Fig. 6-15: Pin assignment cable connector LEM

LEM fan units in "N" version wired with external motor protection (not included in scope of delivery).

- The supplied cable gland can be used for cable diameters 7 ... 10 mm.

Fan connection 1-phase terminal box LEM-AB-XXXT-21-NPNN; XXX=140,192

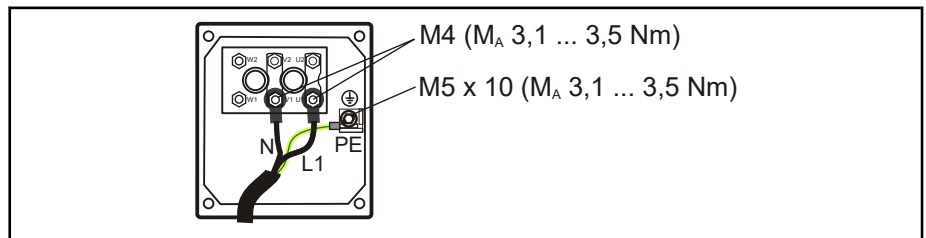


Fig. 6-16: Connection fan cable

LEM fan units in design "T" with integrated thermal protection. Fan units "T" do **not** need a circuit with external motor protection.

- Use a cable gland M16 x 1.5 according to the cable diameter. Installation material is not included in the scope of delivery.

6.3 Connect liquid cooling supply

Connection of cooling water is required for MSK-...-FN motors.

⚠ WARNING

Risk of injury by improper handling of pressurized lines!

- Observe the operating instructions and the manufacturer's information on the cooling system.
- Use suitable protective equipment (safety goggles, safety shoes, safety gloves, for example).
- Immediately remove spill on the ground, otherwise risk of falling!
- Before dismounting lines, relieve pressure and empty medium.
- Do not attempt to disconnect, open or cut pressurized lines (risk of explosion).



The inlet (IN) and outlet (OUT) can be arbitrarily assigned. The assignment does not have any effect on the performance data of the motor.

The connecting threads on the motor are covered with factory-attached protective caps. These protective caps must only be removed immediately be-

fore screwing in the coolant lines or the quick coupling in order to prevent dirt from entering the cooling system.

Notes for assembly for coolant ducts

Frame size	Connection	Screw-in depth [mm]	Tightening torque [Nm]
MSK071	Pipe thread ISO 228 G 1/8	8	14 ... 15
MSK075	Pipe thread ISO 228 G 1/8	8	14 ... 15
MSK101	Pipe thread ISO 228 G 1/8	9	14 ... 15
MSK133	Pipe thread ISO 228 G 1/4	14	18 ... 20

Tab. 6-6: Cooling connection, permissible screw-in depths and tightening torques

NOTICE


The coolant port threads on the motor may be destroyed by incorrect tightening torques!

The allowed motor connection tightening torque may not be exceeded! If the tightening torque or screw-in depth is exceeded, the motor may be damaged irreversibly.

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

Bosch Rexroth recommends the use of connection fittings which contain an O-ring for axial sealing of the screw connection.


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 tightness of the coolant connection is the responsibility of the machine manufacturer and must be checked and approved by him after the motor has been installed.

Additional, regular inspections to ensure proper condition of the coolant connection should be logged in the maintenance schedule of the machine.

The maximum inlet pressure of the motors is **6 bar** (3 bar for motors manufactured up to 2010-01-01 FD 10W01).

- Make sure that the cooling water complies with the requirements see project planning description  DOK-MOTOR*-MSK*****-PR-----P, "Synchronous Servomotors MSK".

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.
- ▶ Never connect or disconnect plug connectors under load!

WARNING

Risk of injury due to rotating motor shaft!



- ▶ Do not remove covers, machine parts or protective devices during operation.
- ▶ Do not enter the motion area of the machine. Avoid unintended access for persons, due to
 - 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 Commissioning

MSK Motors can only be commissioned with other components (drive controller, control unit).

Prior to commissioning

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

- Storage time of the motor. Depending on the storage time, take measures to ensure safe operation. Run in bearings, resurface the holding brake, ... See [tab. 5-1 "Measures before commissioning motors that have been stored over a prolonged period of time" on page 16](#).
- Ensure that all device connector are correctly connected and protected against coming loose.
- Ensure that a holding brake voltage of 24 V ±10% is applied to the motor. If necessary, adjust the voltage.
- Check the proper function of the holding brake.
- Ensure that the motor and all participating components of the drive are undamaged.
- Ensure that keys are protected against ejection.

Commissioning

For start up procedure refer to the 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 [chapter 2.6.2 "Protection from mechanical danger" on page 4](#).

7.3 Operation

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

Checks during operation:

- ▶ Pay attention to exceptional noise.
- ▶ Pay attention to increased vibrations.
- ▶ Check the motors and fan units for cleanliness.
- ▶ Check the tightness of the coolant connections.
- ▶ Check the monitoring devices and diagnostic / error messages of the controllers.

Decommission the drive when deviations from normal operation exist. For further procedure refer to [chapter 12 "Troubleshooting " on page 48](#).

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 live 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 70 °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 cooling fins of the motors at regular intervals (after one year at the latest) to reach a sufficiently high heat emission surface. If the cooling fins are partially covered with dirt, sufficient heat dissipation via the ambient air is no longer ensured.

Connection cables

WARNING

Death by electrocution possible due to live parts!



- ▶ Change damaged connection cables and decommission the plant immediately.
- ▶ Do not repair any connection lines provisionally.

- 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

Wearing parts are reliably and professionally repaired and replaced by the Bosch Rexroth Service in shopfloor-oriented quality.

The service lives of motor components, such as seals and bearings, may vary depending on the operating conditions, such as operation mode, speed, vibration and shock load, and frequent reverse mode.

We recommend to change the bearing after 30,000 operating hours. Shorter replacement intervals may be necessary; cf. checks during operation [chapter 7.3 "Operation" on page 38](#).

We recommend regular visual inspections on shaft sealing rings. Depending on operating conditions, signs of wear may appear after 5,000 operating hours. If necessary, replace the shaft sealing rings.



We recommend to have these repairs made by Bosch Rexroth Service.

The Bosch Rexroth service helpdesk at our headquarters in Lohr, Germany and our worldwide service provide You can contact us **24/7**.

Phone: **-49 (0) 9352 40 50 60**
Fax **-49 (0) 9352 18 49 41**
Email: service.svc@boschrexroth.de
Internet: <http://www.boschrexroth.com>

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 and exchange

9.1 Tools required

NOTICE

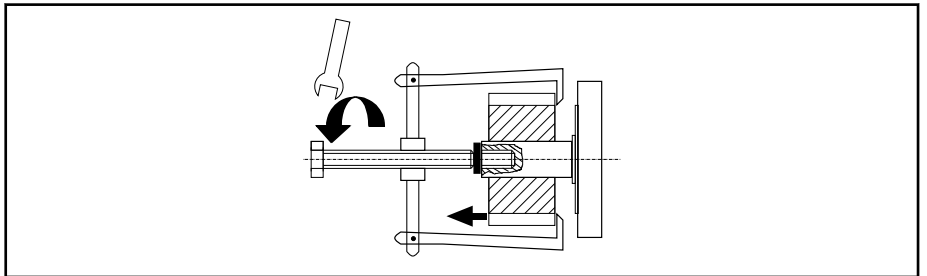
Motor damage due to strikes onto the motor shaft



- Do not strike the shaft end and do not exceed the allowed axial and radial forces of the motor.

Use suitable tools when disassembling transmission elements.

Pulling off



① Shim

Fig. 9-1: Pulling off the transmission element

Use tools suitable for pulling off. Use a shim to protect the shaft end when using pulling-off tools. Heat the output element, if necessary.

9.2 Replace the motor

⚠ WARNING

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

The supply unit may only be replaced by qualified personnel which have been trained to perform the work on or with electrical devices.



The motor should be replaced by a motor of identical type. This is the only way to ensure that all parameterizations can remain unchanged. Moreover, repeated acceptance within the scope of the "Integrated switching technology" function is not required.

1. If necessary, note down the previous absolute value
2. Open the main switch
3. Make sure the main switch cannot be switched back on
4. Disconnection plug connections



When exchanging the motor, close open plug sides of power connections with protection caps if moistening with coolant/lubricant or soiling must be expected (allowed soiling degree according to EN 50178: 2).

5. Replace the motor



Observe the machine manufacturer's instructions when exchanging the motor mechanically.

6. Re-establish the plug connections
7. Re-establish the dimensional reference

⚠ WARNING

Risk of accidents due to unintentional axis movements!

If servo axes are provided with an indirect position measuring system via the motor encoder, the dimensional reference is lost after motor replacement!

For this reason, the reference to the machine coordinate system must be re-established.

9.3 Preparing storage

Before motors are stored, the protection covers on device connector, shaft and input openings for cooling water in case of liquid-cooled motors which were attached on delivery must be re-attached.

When motors are liquid-cooled, completely discharge the coolant from the cooling tubes (e.g., via purging the coolant holes with pressure air). This will prevent frost damage at storage temperatures lower than 0 °C.

10 Environmental protection and disposal

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 motors consist of the following components: Steel, aluminum, copper, brass, permanent magnets (rare earth metal), electronic components.

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.

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

Permanent magnets Permanent magnets present a serious danger during disposal.

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.



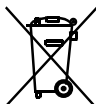
► Risk of destruction of sensitive parts such as watches, credit cards, ...

Before disposal, permanent magnets must be demagnetized. This can be reached by thermal conditioning. The transport of magnetized rotors is forbidden.

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. Outside the scope of the EU Directive 2006/66/EC, the applicable regulations must be followed.


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

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






11.1 Optional accessories

11.1.1 Ready-made connection cables

	Title	Document type	Document number
	IndraDrive and IndraDyn	Selection Data	DOK-CONNEC-CABLE*INDRV-AU...-P

Tab. 11-1: Additional documentation

11.1.2 Fan units

	Title	Document type	Document number
	MSK Synchronous servomotors	Project Planning Manual	DOK-MOTOR*-MSK*****-PR...-P
	Rexroth LEM-AB-116T, LEM-AB-140T	Package Insert	DOK-MOTORx-LEMAB1XXTxx-IS01-D0-P
	Rexroth LEM-AB-192T	Package Insert	DOK-MOTORx-LEMAB192Txx-IS01-D0-P
	Rexroth LEM-RB-116T, LEM-AB-140T	Package Insert	DOK-MOTORx-LEMRB1XXTxx-IS01-D0-P
	Rexroth LEM-RB-192T	Package Insert	DOK-MOTORx-LEMRB192Txx-IS01-D0-P

Tab. 11-2: Additional documentation

11.1.3 Air-pressure connector kit

To use sealing air on MSK motors, a compressed air connection must be available on the system. The required compressed air preparation and compressed air hoses must be provided by the plant.

Designation	Symbol	Unit	Value
Operating pressure	p	bar	0.1 ±0.05
Max. relative humidity	φ	%	20...30 %
Air			dust-free
			oil-free
Necessary compressed air hose			4 × 0.75 (not included in the scope of delivery)

Tab. 11-3: Technical data of the sealing air connection

Use the SUP-M01-MSK accessory kit for motors with RGS1000 encoder connection and the SUP-M02-MSK accessory kit for the motors with RLS1300 power connection.



The proper sealing function of the rotary shaft seal is important for the safe function of the sealing air application. Observe the information on the mark of conformity under (Fig.: 8.2).

Assembly

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

WARNING

Fatal electric shock from live parts with more than 50V!



- Only open the connector sockets of the motor when the system is de-energized!

- Mount SUP-M01-MSK on the encoder flange socket RGS1000 (Fig.: 11-1, SUP-M02-MSK on the power flange socket RLS1300 (Fig.: 11-2).
- Loosen the encoder connector cover screws and remove the cover.
- Mount the sealing air connection
- Screw the encoder connector cover with sealing air connection onto the motor. Tightening torque of the screws RGS1000 1.3 Nm, RLS1300 3.1 Nm. Use screw lock adhesive, e.g. LOCTITE 243®.

- Connect the compressed air -quick coupling from the accessory kit to the regulated compressed air source.

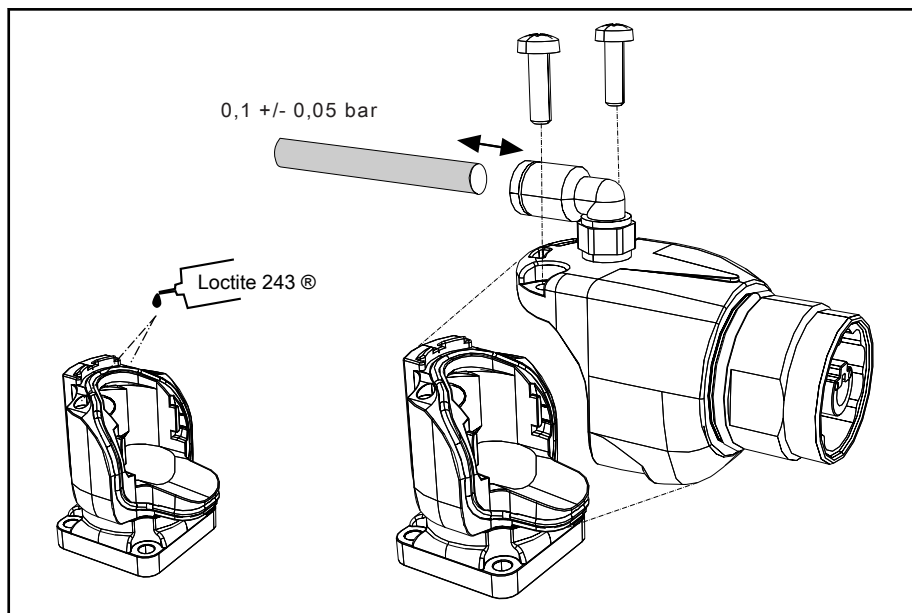


Fig. 11-1: Assembly SUP-M01-MSK on RGS1000

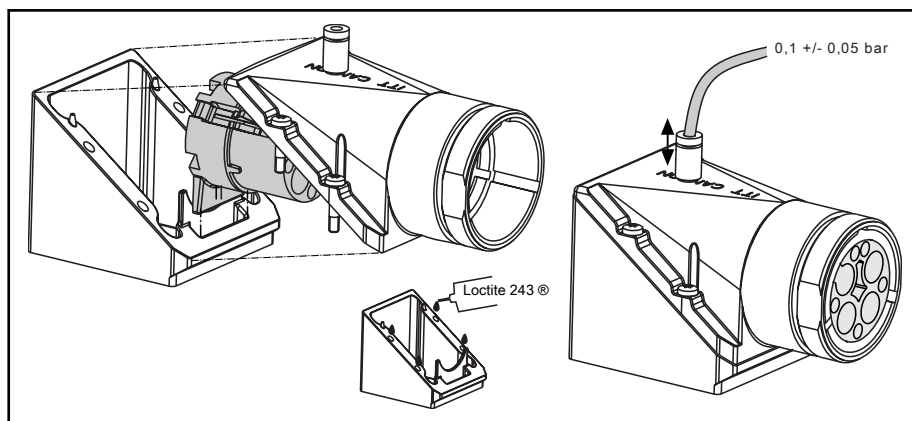


Fig. 11-2: Assembly SUP-M02-MSK on RLS1300

12 Troubleshooting

12.1 Troubleshooting procedure



As a matter of principle, the instructions in the project planning and commissioning manuals must be followed in case of failures and errors. Contact the manufacturer, if necessary.

Malfunctions	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
	Brake is not released	Check the brake activation
Vibrations	Coupling elements or attachments are poorly balanced	Re-balance
	Adjustment of shaft end attachments (coupling, gearbox, ...) is insufficient	Re-align the attachments
	Mounting screws loose	Lock screw connections acc. to specifications
Running noise	Foreign bodies within the motor	Stop the motor --> repair by manufacturer
	Bearing is damaged	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
	Heat dissipation is impaired	Clean the motor For fan units, clean fan grille and check the fan function For liquid cooling, check cooling circuit.
Wrong or defective temperature display	Temperature sensor not connected	Connect temperature sensor
	Temperature sensor defective	Stop the motor --> repair by manufacturer Connect the backup temperature sensor, if any is available.

Tab. 12-1: Measure at malfunction on MSK motors

13 Technical data

Technical data with operating characteristic curves are described in the project planning manual for all motor types. Please, refer to the following documentation for relevant information.

	Title	Document type	Document number
	MSK Synchronous servomotors	Project Planning Manual	DOK-MOTOR*-MSK******-PR·-·-P
	MSK Synchronous servomotors for hazardous areas	Project Planning Manual	DOK-MOTOR*-MSK*EXGIK3-PR·-·-P

Tab. 13-1: Additional documentation

14 Appendix

14.1 EU Declaration of conformity

In accordance with
Low Voltage Directive 2006/95/EC (valid until April 19, 2016)
Low Voltage Directive 2014/35/EU (valid from April 20, 2016)
the manufacturer,
Bosch Rexroth AG
Bürgermeister-Dr.-Nebel-Straße 2
97816 Lohr am Main, Germany
declares that the following products

3-PHASE SYNCHRONOUS PM-MOTOR				
MSK030...	MSK040...	MSK043...	MSK050...	MSK060...
MSK061...	MSK070...	MSK071...	MSK075...	MSK076...
MSK100...	MSK101...	MSK103...	MSK131...	MSK133...

from the date of manufacture 2009-01-08 were developed, designed and manufactured in compliance with the above-mentioned EU directives.
The sole responsibility for drawing up this declaration of conformity lies with the manufacturer.

Applied harmonized standards:

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 in- tegral design of rotating electrical ma- chines (IP-Code) - Classification	2001 + A1:2007 (2000 + Corrigen- dum 2001 + A1:2006)



EU-Konformitätserklärung - Original

Dok.-Nr.: DCTC-30318-001

Datum: 2018-02-02

- ☐ nach Maschinenrichtlinie 2006/42/EG
☒ nach Niederspannungsrichtlinie 2006/95/EG (gültig bis 19. April 2016)
☒ nach Niederspannungsrichtlinie 2014/35/EU (gültig ab 20. April 2016)
☐ 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 PM-MOTOR

Baureihen: MSK030... MSK040... MSK043... MSK050... MSK060...
 MSK061... MSK070... MSK071... MSK075... MSK076...
 MSK100... MSK101... MSK103... MSK131... MSK133...

Ab Herstelldatum: 2009-01-08

in Übereinstimmung mit den oben genannten EU-Richtlinien entwickelt, konstruiert und gefertigt wurden.
 Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.

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 am Main , den
Ort

2018-02-02
Datum

ppa.

Joachim Hennig
 Werkleitung LoP2

i.V.

Eberhard Schemm
 Entwicklungsbereichsleiter Antriebe

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



Seite 1 / 1

Fig. 14-1: EU Declaration of conformity - original, German

Appendix

**EU declaration of conformity - original**

Doc. No.: DCTC-30318-001

Date: 2018-02-02

- ☐ in accordance with Machinery Directive 2006/42/EC
☒ in accordance with Low Voltage Directive 2006/95/EC (valid until 19th April, 2016)
☒ in accordance with Low Voltage Directive 2014/35/EU (valid from 20th April, 2016)
☐ 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 PM-MOTOR

Series: MSK030... MSK040... MSK043... MSK050... MSK060...
 MSK061... MSK070... MSK071... MSK075... MSK076...
 MSK100... MSK101... MSK103... MSK131... MSK133...

From the date of manufacture: 2009-01-08

were developed, designed and manufactured in compliance with the above-mentioned EU directives.
 This declaration of conformity is issued under the sole responsibility of the manufacturer.

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)

Lohr am Main , dated 2018-02-02
 Place Date

ppa

Joachim Hennig
 Plant Manager LoP2

i.V.

Eberhard Schemm
 Head of Development Drives Solutions

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



Fig. 14-2: EU Declaration of conformity - original, English

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