

MBT

Synchronous Torque Motors

Operating Instructions
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Edition 03



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Note	This document has been printed on chlorine-free bleached paper.

D Deutsch	USA English	F Français
⚠ WARNING Lebensgefahr bei Nichtbeachtung der nachstehenden Sicherheitshinweise! Nehmen Sie die Produkte erst dann in Betrieb, nachdem Sie die mit dem Produkt gelieferten Unterlagen und Sicherheitshinweise vollständig durchgelesen, verstanden und beachtet haben. Sollten Ihnen keine Unterlagen in Ihrer Landessprache vorliegen, wenden Sie sich an Ihren zuständigen Rexroth-Vertriebspartner. Nur qualifiziertes Personal darf an Antriebskomponenten arbeiten. Nähere Erläuterungen zu den Sicherheitshinweisen entnehmen Sie Kapitel 1 dieser Dokumentation.	⚠ WARNING Danger to life in case of non-compliance with the below-mentioned safety instructions! Do not attempt to install or put these products into operation until you have completely read, understood and observed the documents supplied with the product. If no documents in your language were supplied, please consult your Rexroth sales partner. Only qualified persons may work with drive components. For detailed explanations on the safety instructions, see chapter 1 of this documentation.	⚠ AVERTISSEMENT Danger de mort en cas de non-respect des consignes de sécurité figurant ci-après ! Ne mettez les produits en service qu'après avoir lu complètement et après avoir compris et respecté les documents et les consignes de sécurité fournis avec le produit. Si vous ne disposez pas de la documentation dans votre langue, merci de consulter votre partenaire Rexroth. Seul un personnel qualifié est autorisé à travailler sur les composants d'entraînement. Vous trouverez des explications plus détaillées relatives aux consignes de sécurité au chapitre 1 de la présente documentation.
⚠ WARNING Hohe elektrische Spannung! Lebensgefahr durch elektrischen Schlag! Betreiben Sie Antriebskomponenten nur mit fest installiertem Schutzleiter. Schalten Sie vor Zugriff auf Antriebskomponenten die Spannungsversorgung aus. Beachten Sie die Entladezeiten von Kondensatoren.	⚠ WARNING High electrical voltage! Danger to life by electric shock! Only operate drive components with a permanently installed equipment grounding conductor. Disconnect the power supply before accessing drive components. Observe the discharge times of the capacitors.	⚠ AVERTISSEMENT Tensions électriques élevées ! Danger de mort par électrocution ! N'exploitez les composants d'entraînement que si un conducteur de protection est installé de manière permanente. Avant d'intervenir sur les composants d'entraînement, coupez toujours la tension d'alimentation. Tenez compte des délais de décharge de condensateurs.
⚠ WARNING Gefahrbringende Bewegungen! Lebensgefahr! Halten Sie sich nicht im Bewegungsbereich von Maschinen und Maschinenteilen auf. Verhindern Sie den unbeabsichtigten Zutritt für Personen. Bringen Sie vor dem Zugriff oder Zutritt in den Gefahrenbereich die Antriebe sicher zum Stillstand.	⚠ WARNING Dangerous movements! Danger to life! Keep free and clear of the ranges of motion of machines and moving machine parts. Prevent personnel from accidentally entering the range of motion of machines. Make sure that the drives are brought to safe standstill before accessing or entering the danger zone.	⚠ AVERTISSEMENT Mouvements entraînant une situation dangereuse ! Danger de mort ! Ne séjournez pas dans la zone de mouvement de machines et de composants de machines. Évitez tout accès accidentel de personnes. Avant toute intervention ou tout accès dans la zone de danger, assurez-vous de l'arrêt préalable de tous les entraînements.
⚠ WARNING Elektromagnetische / magnetische Felder! Gesundheitsgefahr für Personen mit Herzschrittmachern, metallischen Implantaten oder Hörgeräten! Zutritt zu Bereichen, in denen Antriebskomponenten montiert und betrieben werden, ist für oben genannten Personen untersagt bzw. nur nach Rücksprache mit einem Arzt erlaubt.	⚠ WARNING Electromagnetic / magnetic fields! Health hazard for persons with heart pacemakers, metal implants or hearing aids! The above-mentioned persons are not allowed to enter areas in which drive components are mounted and operated, or rather are only allowed to do this after they consulted a doctor.	⚠ AVERTISSEMENT Champs électromagnétiques / magnétiques ! Risque pour la santé des porteurs de stimulateurs cardiaques, d'implants métalliques et d'appareils auditifs ! L'accès aux zones où sont montés et exploités les composants d'entraînement est interdit aux personnes susmentionnées ou bien ne leur est autorisé qu'après consultation d'un médecin.
⚠ VORSICHT Heiße Oberflächen (> 60 °C)! Verbrennungsgefahr! Vermeiden Sie das Berühren von metallischen Oberflächen (z. B. Kühlkörpern). Abkühlzeit der Antriebskomponenten einhalten (mind. 15 Minuten).	⚠ CAUTION Hot surfaces (> 60 °C [140 °F])! Risk of burns! Do not touch metallic surfaces (e.g. heat sinks). Comply with the time required for the drive components to cool down (at least 15 minutes).	⚠ ATTENTION Surfaces chaudes (> 60 °C)! Risque de brûlure ! Évitez de toucher des surfaces métalliques (p. ex. dissipateurs thermiques). Respectez le délai de refroidissement des composants d'entraînement (au moins 15 minutes).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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1 About this documentation

1.1 Validity of the documentation

This instruction has to be complied with by assemblers, operator, service engineers and facility operators. It contains notes about handling the motor components of a MBT motor.

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

1.2 Editions of this documentation

Edition	Release date	Remark
03	2021-07	Revision and amendment of new frame sizes and windings Amendment of MBTxx1 series
02	2012-06	Multi lingual safety notes and information about motor connection cables amended
01	2012-02	First edition

Tab. 1-1: Record of revisions

1.3 Additional documentation

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

	Title	Document type	Document number
	MBT Synchronous Torque Motors	Project Planning Manual	DOK-MOTOR*-MBT*****-PR□□-□□-P
	Rexroth Connection Cable	Selection Data	DOK-CONNEC-CABLE*INDRV-CA□□-□□-P
	Rexroth Connection System, Assembly and Tools	Assembly Instructions	DOK-CONNEC-CAB*INSTR02-MA□□-□□-P
	Electromagnetic Compatibility (EMC) in Drive and Control Systems	Project Planning Manual	DOK-GENERL-EMV*****-PR□□-□□-P

Tab. 1-2: Additional documentation

1.4 Presentation of information

Safety instructions

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

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

 **DANGER**

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

Symbols

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

Tab. 1-3: *Meaning of symbols*

2 Safety instructions

2.1 About this product

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



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

2.2 Appropriate use



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

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

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

Standards

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

Directives

2014/35/EU	Low voltage directive
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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.

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

2.3 Inappropriate use

Any use of the motors outside of the specified fields of application or under operating conditions and technical data other than those specified in this documentation (DOK-MOTOR*-MBT*****-PRxx) is considered to be "inappropriate use".

Direct operation on the three-phase network and in explosion-hazardous areas (ATEX) is forbidden.

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

2.4 Qualification of personnel

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

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

2.5 General safety instructions

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

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

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

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

2.6 Product- and technology-dependent safety instructions

2.6.1 Protection from electric voltage

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

Before working:

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

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

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

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

2.6.2 Protection from mechanical danger

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

- Do not stay within the motion zone of the machine. Avoid unauthorized access into the danger zone.
- Additionally secure vertical axes to prevent them from sinking or descending after having shutdown the motor, for instance as follows:
 - Mechanically lock the vertical axis,
 - providing an external braking / catching / clamping device, or
 - ensuring sufficient equilibration of the vertical axis.

2.6.3 Protection against magnetic and electromagnetic fields

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

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

Electro magnetic and magnetic fields!

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

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

Access into these areas can be dangerous for these persons:

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

Risk of destruction of sensitive parts! Data loss!

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

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

The attractive force of the permanent magnets have an effect on all magnetic materials. These attractive forces surge especially within a neighborhood < 100 mm. Loose or not fastened components made of magnetizable materials can abruptly and inadvertently attracted with the permanent magnets. Apart

from crushing hazard, even the danger of chipping recalcitrant material, causing eye injury, exists.

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

Behavior in the case of accidents with permanent magnets

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

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

In the case of an accident:

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

2.6.4 Protection during handling and assembly

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

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

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

Use the origin package of the motor components for transport and storage only. The origin package of Rexroth is constructed in such a way that the mo-

tor components with the permanent magnets are positioned within the package with suitable distance, providing that the package is correctly used.

Observe the following instructions during unpacking and handling.

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

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

Store the original package of the motor components with permanent magnets

Store the original package for later use.

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

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

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

2.6.5 Protection against burns

Risk of burns due to hot motor surfaces!

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

2.6.6 Electrostatic sensitive devices (ESD)

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

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



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

3 Scope of delivery

The motor components are individually packaged in a box. For identification, the package is marked with a label similar to the type plate with the type designation of the components.

Scope of delivery of MST stator

The scope of delivery of a stator contains:

- Stator in its origin package
- Type plate
- Operating instructions with safety instructions
- Optional connection accessories (only for connection option "terminal box")
- O-rings (2 pc.) for coolant sealing (only for cooling mode "liquid cooling")



If the O-rings included in the scope of delivery of a liquid-cooled stator are damaged, e.g. during assembly, they can be reordered if necessary by observing the following material number.

O-rings (only for cooling mode "liquid cooling")

O-ring for stator	Material number R911...	(Amount)
MST130	R911306474	2
MST160	R911306476	
MST161		
MST201	R911245301	
MST210A/ -C/ -D/ -E	R911306477	
MST210R	R911306478	
MST251	R996556274	
MST290	R911306479	
MST291		
MST360	R911306480	
MST450	R911306482	
MST530	R911306481	
MST531		

Tab. 3-1: Material number O-ring

Scope of delivery MRT rotor

The scope of delivery of a rotor contains:

- Rotor in its origin package
- Type plate
- Operating instructions with safety instructions

At delivery, immediately check if the supplied components match with 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

Product	Three phase synchronous motor
Manufacturer	Bosch Rexroth Electric Drives and Controls GmbH Buergermeister-Dr.-Nebel-Straße 2 97816 Lohr am Main, Germany
Type	MST 110, -130, -160, -161, -201, -210, -251, -290, -291, -360, -450, -530, -531 MRT 110, -130, -160, -161, -201, -210, -251, -290, -291, -360, -450, -530, -531
Listed acc. to UL standard	UL 1004, Fifth Edition
Listed acc. to CSA standard	Canadian National Standard(s) C22.2 No. 100-04
UL-Files	E 341734
Ambient temperature during operation	0 ... 40 °C
Motor design	Open (kit motor)
Degree of protection	IP00 (DIN EN 60034-5)
Installation altitude	0 ... 1000 m
Sound pressure level	< 75 dB(A)
Insulation class	155 (DIN EN 60034-1)
Electrical connection	Connection cables or device connectors or terminal boxes



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

4.1.2 Cooling

Natural convection

Frame size 130 motors with cooling type "N" and frame size 530C motors with cooling type "S" are suitable for operation without liquid cooling. 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 minimum 100 mm to adjacent components on the side surfaces. Pollution of the surface of the motor reduces heat dissipation. Clean the motor in regularly intervals.

Liquid cooling

Liquid-cooled energy storage devices may only operated on a closed coolant circuit with heat exchanger. The coolant flow direction must be determined depending on the installation position of the motor. Basically, the coolant inlet must be connected at the bottom and the coolant outlet at the top. Please observe the details in the project planning manual  of MBT motors about position and dimension of the coolant connection thread.

Corrosion inhibitors must be added to the engine cooling water circuit. Please also refer to the detailed information of the project engineering.

4.2 Identification of motor components

4.2.1 Type code stator

Product

M S T _ _ _ _ - _ _ _ _ - _ _ - _ _ - _ _ _ _

M S T = stator of an IndraDyn T kit motor

Frame size

M S T _ _ _ - _ _ _ _ - _ _ - _ _ - _ _ _ _

_ = see project planning manual

Frame length

M S T _ _ _ _ - _ _ _ _ - _ _ - _ _ - _ _ _ _

_ = see project planning manual

Winding

M S T _ _ _ _ - _ _ _ _ - _ _ - _ _ - _ _ _ _

_ = see project planning manual

Cooling mode

M S T _ _ _ _ - _ _ _ _ - _ _ - _ _ - _ _ _ _

F = liquid cooling (standard cooling mode)

N = natural convection (only available for MST130)

S = surface ventilation (only available for MST530)

Encapsulation

M S T _ _ _ _ - _ _ _ _ - _ _ - _ _ - _ _ _ _

S = standard encapsulation; stator package without cooling jacket (only available for MST130)

T = thermal encapsulation; stator package with aluminum cooling jacket (without housing)

H = housing; stator package with aluminum cooling jacket and housing

Encoder

M S T _ _ _ _ - _ _ _ _ - _ _ - _ _ - _ _ _ _

N 0 = without motor encoder

Electric connection

M S T _ _ _ _ - _ _ _ _ - _ _ - _ _ - _ _ _ _

C N = connection cable on stator side with bigger outer diameter

S N = connection cable on stator side with smaller outer diameter

R N = connection cable radial on stator side with bigger outer diameter

K R = terminal box (only available for stators with encapsulation "H")

P U = flange socket (only available for stators MST210 and MST290 with encapsulation "H")

Other design

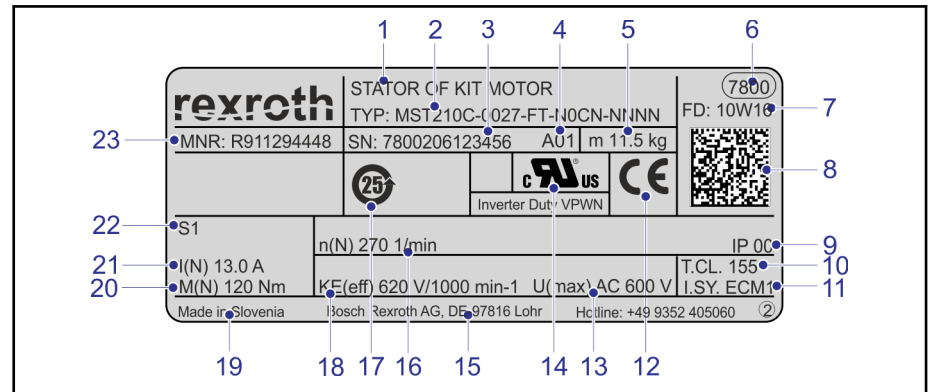
M S T _ _ _ _ - _ _ _ _ - _ _ - _ _ - _ _ _ _

_ _ _ _ = see project planning manual

Fig. 4-1: Type code MST

4.2.2 Type plate stator

An individual type plate with the exact type designation and technical data are enclosed for each stator. Attach the type plate to an easily visible position at the machine. This way, you can read the motor data at any time without having to work in areas that are difficult to access and where the motor may be attached.



- 1 Type of machine
- 2 Type designation
- 3 Serial number
- 4 Change status
- 5 Stator mass
- 6 Manufacturing plant
- 7 Date of manufacture
- 8 Rexroth barcode
- 9 Degree of protection by housing
- 10 Thermal class
- 11 Insulation system
- 12 CE mark of conformity
- 13 Maximum input voltage
- 14 UL label
- 15 Company address
- 16 Rated velocity in mode S1
- 17 China RoHS 2 label
- 18 R.m.s. voltage constant
- 19 Designation of origin
- 20 Rated torque in mode S1
- 21 Rated current in mode S1
- 22 Operation mode S1
- 23 Material number

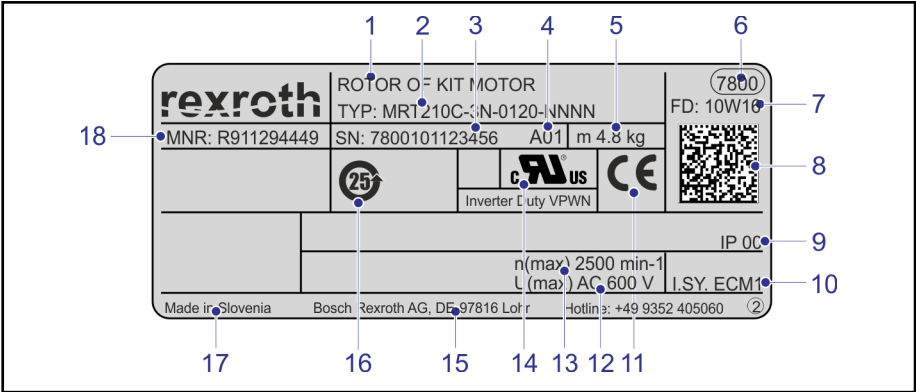
Fig. 4-2: Example type plate MST

4.2.3 Type code rotor

Product	MRT _ _ _ _ - _ _ - _ _ _ _ - _ _ _ _
	MRT = rotor of an IndraDyn T kit motor
Frame size	MRT _ _ _ - _ _ - _ _ _ _ - _ _ _ _
	_ = see project planning manual
Frame length	MRT _ _ _ _ - _ - _ _ _ _ - _ _ _ _
	_ = see project planning manual
Frame size / mechanical design	MRT _ _ _ _ - _ _ - _ _ _ _ - _ _ _ _
	3N = fastening by screws
Inner diameter of rotor	MRT _ _ _ _ - _ _ - _ _ _ _ - _ _ _ _
	_ = see project planning manual
Other design	MRT _ _ _ _ - _ _ - _ _ _ _ - _ _ _ _
	_ _ _ _ = see project planning manual

Fig. 4-3: Type code MRT

4.2.4 Type plate rotor



- 1 Type of machine
- 2 Type designation
- 3 Serial number
- 4 Change status
- 5 Rotor mass
- 6 Manufacturing plant
- 7 Date of manufacture
- 8 Rexroth barcode
- 9 Degree of protection by housing
- 10 Thermal class
- 11 CE mark of conformity
- 12 Maximum input voltage
- 13 Highest allowed velocity (mechanical)
- 14 UL label
- 15 Company address
- 16 China RoHS 2 label
- 17 Designation of origin
- 18 Material number

Fig. 4-4: Example of type plate MRT

4.2.5 Certification mark

Certification mark	Significance
	Conformity with applicable EC Directives
	Approval according to UR, cUL listing
	RoHS 2 conformity

Tab. 4-1: Certification mark at type plate

5 Transport and storage

5.1 Notes about transport (shipping) instructions

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

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

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

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

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

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

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

Environmental factor	Unit	Value ¹⁾
Temperature	°C	-25 ... +70
Relative air humidity	%	5 ... 75
Absolute air humidity	g/m ³	1 ... 29
Occurrence of salt mist	-	Not permitted

1) Differs from DIN EN 60721-3-2

Tab. 5-2: Deviating permissible storage conditions



Before transport, discharge the liquid coolant from liquid-cooled stators with housing (encapsulation "H") to avoid frost damage.

Transport by air freight

CAUTION

Possible influence of plane electronic on board through magnet fields!

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

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!



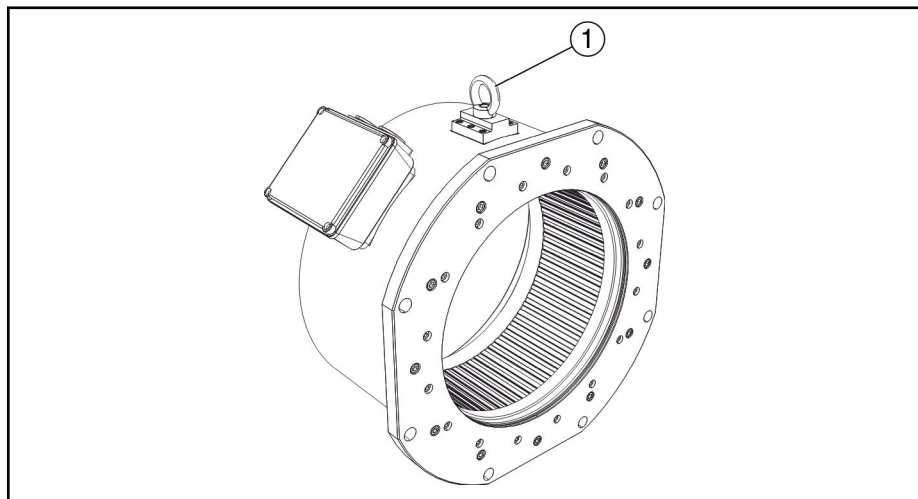
- Only use hoisting gear suited for the weight of the motors. Use the eyebolts provided on the housing to lift the stator with housing. Check the tight fit of the eyebolts before each use.
- Never walk under hanging loads.
- Use suitable protective equipment and protective clothing during transport, and wear safety shoes.
- Do not lift or move the motor at the cable strand.
- Remove any existing transport locks prior to commissioning and keep them.



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

Transporting stators in the housing

Stators with housing have one or two eyebolts on the top of the housing for transport, depending on the stator size or length. Use these eyebolts to lift and position the stators.



①

Lifting eyebolt for transport

Fig. 5-1:

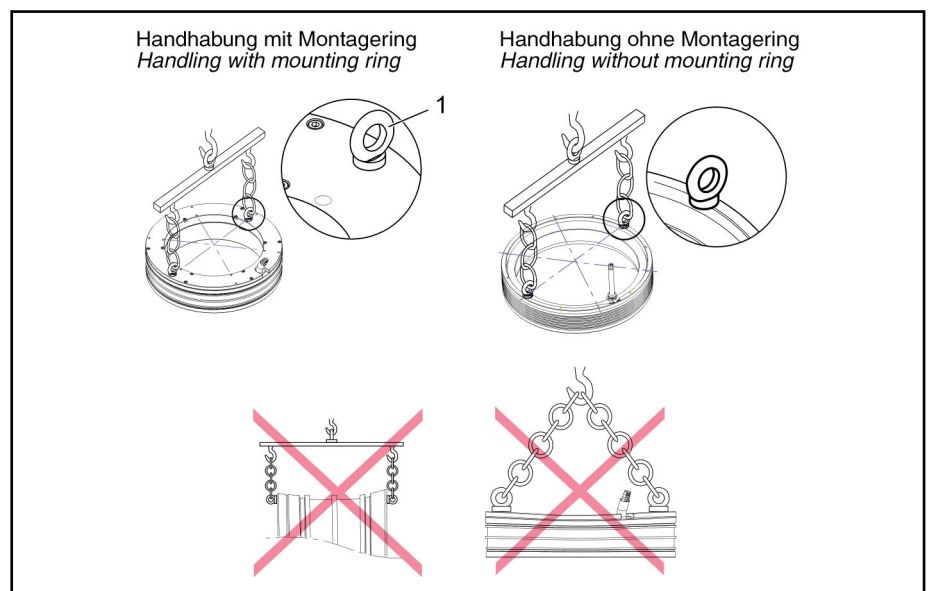
Lifting eyebolt on MST450E with housing

NOTICE

Possible penetration of liquids or dirt into the motor!

On stators of the MST210 / 290 / 360 design, the eyebolts are glued into the stator housing to form a seal. Especially with these stator designs, make sure that the eyebolt always remains on the stator housing. This prevents liquids or dirt from entering the inside of the motor through the threaded hole.

Transporting stators with and without mounting ring



① Lifting eyebolt for transport

Fig. 5-2: Transport

- ▶ Use only suitable lifting gear (observe the motor weight).
- ▶ Use lifting eyebolts during transport in opposite holes only.
- ▶ The stator will be unusable if the fits on the cooling jacket are damaged.
- ▶ Put down the motor components only on a clean, straight base in lying position.

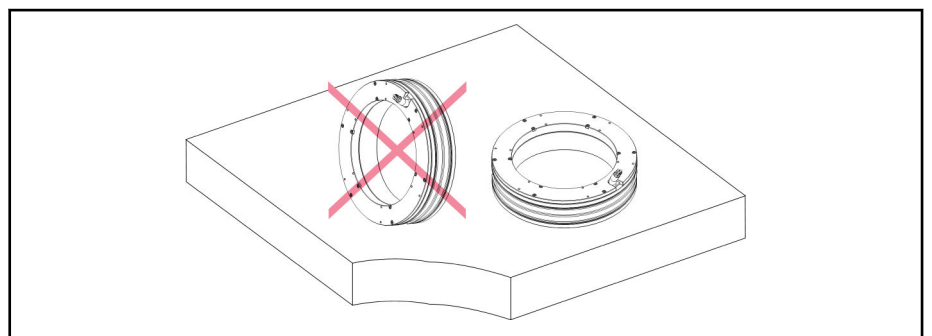


Fig. 5-3: Put the motor components down

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

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

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

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

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

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

Environmental factor	Unit	Value ¹⁾
Air temperature	°C	-25 ... +55
Relative air humidity	%	5 ... 75
Absolute air humidity	g/m³	1 ... 29
Insolation	-	Not permitted

1) Differs from DIN EN 60721-3-1

Tab. 5-4: Deviating permissible storage conditions

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.

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

5.4 Storage times

Independend from the storage time of the motors (observe the warranty claim), the function is preserved under observance and execution of additional measures at start-up.

Storage times motors

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

Storage time	Measures for commissioning
< 1 year	No measures required
1 ... 5 years	Check the electric contacts to verify that they are free from corrosion
> 5 years	Check the electric contacts to verify that they are free from corrosion

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

Storage time for cables and connectors

Storage time	Measures prior to commissioning
< 1 year	None
1 ... 5 years	⇒ Check the electric contacts to verify that they are free from corrosion
> 5 years	⇒ If the cable or the cable jacket has porous parts, replace it; otherwise check the electric contacts to verify that they are free from corrosion

Tab. 5-6: Measures before commissioning of cables and connectors that have been stored over longer periods of time

6 Assembly

6.1 General notes



The machine manufacturer must observe the special features of the construction and create a special assembly instruction for the motor components rotor and stator. The machine manufacturer's mounting instructions are the only binding guidelines.

The project planning manual  Rexroth MBT motors contains a suggestion to assemble rotor and stator. This suggestion can be understood as a guideline to estimate the necessary assembly efforts and to provide the mounting tools required, such as spacer sleeve, clamping ring, insertion and centering tool.

The volume and order of the working steps described can be affected by special features of the machine construction and deviate from the schematic procedure.

Screw lock

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

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

6.2 Mechanical assembly

6.2.1 Assembly of stators without housing



The machine manufacturer must observe the special features of the construction and create a special assembly instruction for the motor components rotor and stator. The machine manufacturer's mounting instructions are the only binding guidelines.

WARNING

Strong magnetic forces may cause injury/damage!

⇒ The permanent magnets at the rotor and the resulting magnetic forces can cause the rotor to be abruptly pulled into the stator. Therefore, fasten the machine housing to the work table and only use lifting gear (e.g. crane with hoisting chains) which avoids uncontrolled movements of the rotor package while it is lowered into the stator.



Avoid

- jamming or clamping the housing while mounting it to the machine.
- damaging the centering collar on the housing and the machine.



- In general, the stator has to be connected to the machine via all mounting holes.
- All screwed connections are equipped with a liquid screw lock. See also "[Screw lock](#)" on page 23.
- The necessary screw length for fastening the stator depends on the machine construction.
- The screwed connections has to be able to take up both the force due to the weight of the motor and the forces acting during operation.
- Use screws of the fastening class specified in the dimension sheet. The property class of the screws and the hardness category of the washers has to be equivalent in order to transmit the required tightening torques (see [tab. 6-2 "Mounting screws with tightening torque"](#) on page 27)

Assemble the stator according to the specifications of the machine manufacturer. The machine manufacturer has to consider the special character of his construction and has to prepare special mounting instructions.

For general orientation, the MBT project planning manual contains an assembly instruction. The example of a MST530 describes a schematic construction without considering the special structural features of the machine and serve only for general orientation. The dimension sheets also show parts that are required but are maybe not included in the Bosch Rexroth delivery and have to be appropriately dimensioned and provided by the user.

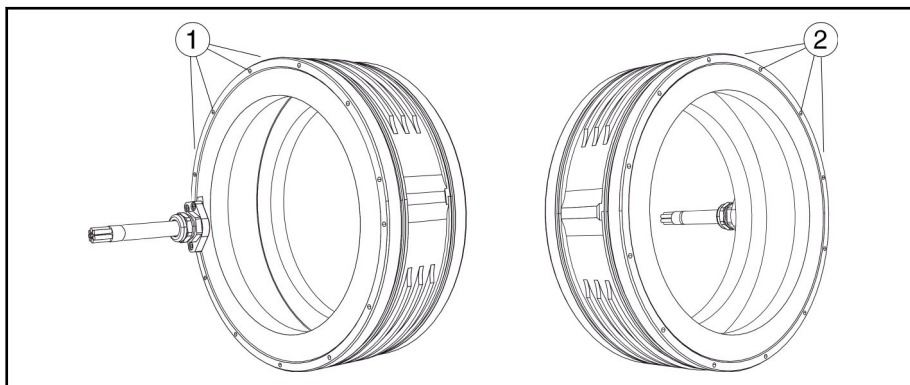
General procedure during disassembly: The motor components lie on a clean and a flat surface.

1. Check whether the components are damaged. Damaged components must not be mounted.

2. Provide tools, auxiliary material, measuring and test equipment and make sure that the rotor can be mounted in a clean, dry and dust-free environment.
3. Check all components and mounting surfaces, holes and threads, as well as the O-ring grooves on the stator to verify that they are clean and free from burrs. Everything must be **clean, stainless and completely free from burrs**. Clean and deburr such areas if necessary.
4. Prior to assembly, clean the contact surfaces of the stators design "...-ST-.." with a suitable cleaning agent (e.g., RIVOLTA A.C.S.3).
5. Grease the O-rings with an ordinary lubricant grease and mount the O-rings in the stator grooves provided. Avoid twisting and soiling of the O-rings.
6. Screw the lifting eyebolts which are required for transport of stators without housing in mutually opposite threads (see [fig. 5-2 "Transport "](#) on [page 19](#)).

Ensure cleanliness during all working steps!

Fastening thread at the stator



- ① Fastening thread circumferentially on the cable output side
 ② Fastening thread circumferentially toward the cable output side

Fig. 6-1: Fastening thread at the stator

Stator	Fastening thread at the stator	
	Dimension	(Amount)
MST130...- FT-...	M6 / 14 mm deep	4 (cable output side)
	M4 / 9 mm deep	8 (towards cable output)
MST130...- NS-...	M5 / 11 mm deep	8 (cable output side)
MST160	M5 / 11 mm deep	8 (on both sides)
MST161	M5 / 11 mm deep	8 (on both sides)
MST201	M5 / 11 mm deep	8 (on both sides)
MST210A MST210C MST210D MST210E	M5 / 11 mm deep	12 (on both sides)
MST210U		24 (on both sides)
MST251	M5 / 11 mm deep	30 (on both sides)

Stator	Fastening thread at the stator	
	Dimension	(Amount)
MST290B MST290D	M5 / 11 mm deep	12 (on both sides)
MST290E		20 (on both sides)
MST290F MST290G		30 (towards cable output) 28 (cable output side)
MST291C MST291D	M5 / 11 mm deep	12 (on both sides)
MST291E		20 (on both sides)
MST360B MST360D	M6 / 14 mm deep	12 (on both sides)
MST360E		20 (on both sides)
MST450B MST450D	M8 / 18 mm deep	8 (on both sides)
MST450E		16 (on both sides)
MST530B MST530C	M8 / 20 mm deep	12 (on both sides)
MST530D MST530E		20 (on both sides)
MST530F	M10 / 23 mm deep	30 (on both sides)
MST530G MST530L		
MST530P		20 (on both sides)
MST530R		
MST531E	M8 / 20 mm deep	20 (on both sides)
MST531L	M10 / 23 mm deep	30 (on both sides)

Tab. 6-1: Fastening thread at the stator



For exact position of the threaded holes, refer to the dimension sheet of the stator in MBT project planning manual (see [tab. 1-2 "Additional documentation" on page 1](#)).

6.2.2 Mounting stators with cooling jacket and housing



The machine manufacturer must observe the special features of the construction and create a special assembly instruction for the motor components rotor and stator. The machine manufacturer's mounting instructions are the only binding guidelines.



- In general, the stator has to be connected to the machine via all mounting holes.
- All screwed connections are equipped with a liquid screw lock. See also ["Screw lock" on page 23](#).
- The necessary screw length for fastening the stator depends on the machine construction.
- The screwed connections has to be able to take up both the force due to the weight of the motor and the forces acting during operation.

1. Lift and position the stator on the machine via suitable lifting tools and the lifting eyebolts.



Avoid...

- jamming or clamping the housing while mounting it to the machine.
- damaging the centering collar on the housing and the machine.

2. Center the stator housing on the machine using the centering collar provided on the housing. Because of the enormous torque development of the motors, all of the mounting holes on the motor flange must always be used to fasten the motor. An exception are frame sizes 530B, 530C and 530E where at least the two outer mounting holes must be used per quarter hole circle diameter on the motor flange. Use screws with property class 8.8 or higher.



The property class of the screws and the hardness category of the washers has to be equivalent in order to transmit the required tightening torques (see [tab. 6-2 "Mounting screws with tightening torque" on page 27](#)).

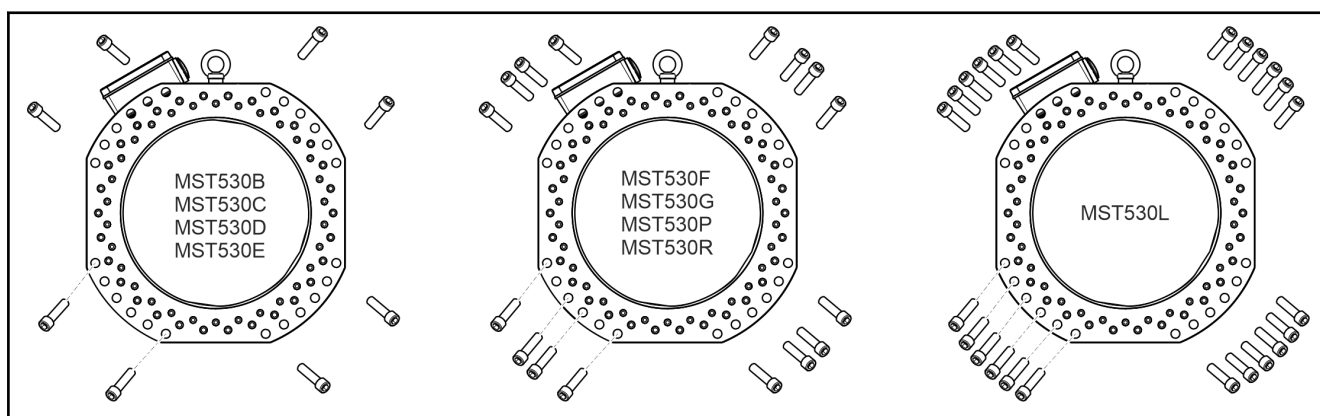


Fig. 6-2: Mounting holes on motor flange MST530x

3. Check the correct position of the stator and tighten all mounting screws crosswise to the required tightening torque.

Frame size	Screws (property class 8.8)	M _{GA} [Nm] at μ_G 0.12
MST210	M16 x ...	206
MST290	M16 x ...	206

Frame size	Screws (property class 8.8)	M_{GA} [Nm] at μ_G 0.12
MST360	M16 x ...	206
MST450 ... 530	M20 x ...	415

M_{GA} Tightening torque in Newton meters

μ_G Coefficient of friction

Tab. 6-2: Mounting screws with tightening torque

6.2.3 Mounting the rotor



The machine manufacturer must observe the special features of the construction and create a special assembly instruction for the motor components rotor and stator. The machine manufacturer's mounting instructions are the only binding guidelines.

⚠ WARNING

The rotor is magnetic! Risk of injury and danger of crushing body parts by magnetic forces!

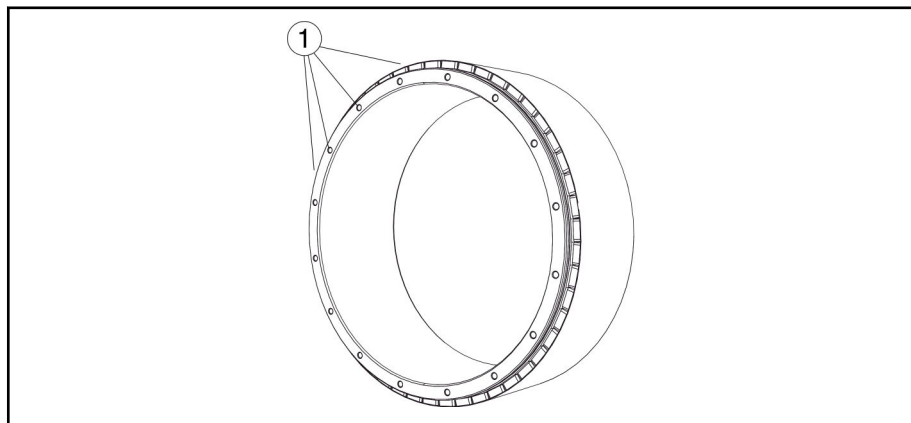
⇒ Remove or secure any movable metal objects.



⇒ 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!

⇒ Observe the notes under [Protection against magnetic and electromagnetic fields](#).

Fastening thread at the rotor



① Rotary fastening thread at the rotor (on both sides)

Fig. 6-3: Fastening thread at the rotor

Rotor	Fastening thread at the rotor	
	Dimension	(Amount)
MRT130	M5 / 10 mm deep	8 (only onesided)
MRT160	M6 / 12 mm deep	12
MRT161	M5 / 12 mm deep	12
MRT201	M5 / 14 mm deep	12
MRT210	M6 / 14 mm deep	12

Rotor	Fastening thread at the rotor	
	Dimension	(Amount)
MRT251	M6 / 14 mm deep	30
MRT290B MRT290D	M6 / 14 mm deep	12
MRT290E		20
MRT290F		30
MRT290G		
MRT291C MRT291D	M6 / 14 mm deep	12
MRT291E	M6 / 14 mm deep	20
MRT360B MRT360D	M6 / 14 mm deep	16
MRT360E	M8 / 18 mm deep	16
MRT450B MRT450D	M8 / 18 mm deep	12
MRT450E	M8 / 18 mm deep	20
MRT530B MRT530C MRT530D	M8 / 18 mm deep	12
MRT530E MRT530F	M8 / 18 mm deep	20
MRT530G MRT530L	M10 / 20 mm deep	40
MRT530P		20
MRT530R		30
MRT531E	M8 / 18 mm deep	20
MRT531L	M10 / 20 mm deep	40

Tab. 6-3: Fastening thread at the rotor



- The rotor assembly must be done at room temperature. The rotor must not be heated.
- The necessary screw length to fasten the rotor, depends on the machine construction.
- All screwed connections are equipped with a liquid screw lock. See also "[Screw lock](#)" on page 23.
- The screwed connections have to be able to take up both the force due to the weight of the motor and the forces acting during operation.
- Use screws of the fastening class specified in the dimension sheet.

When inserting the rotor into the stator, take the radial and axial forces caused by magnetic force into account. Use an appropriate mounting tool to ensure that the rotor is prevented from coming into contact with the stator hole when it is inserted into the stator.

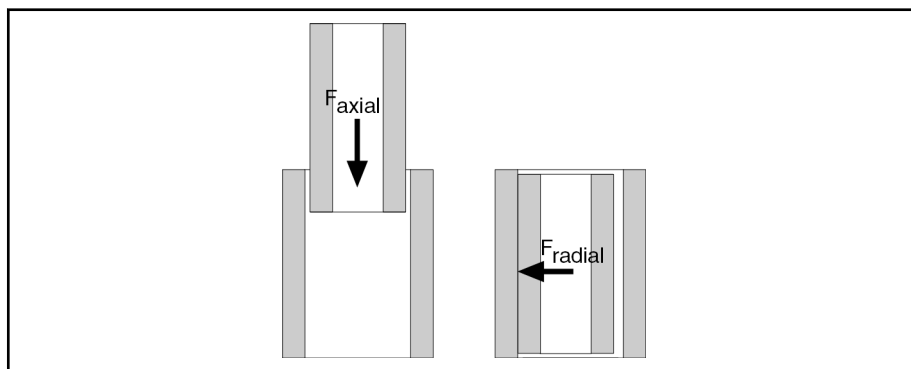


Fig. 6-4: Attractive forces during mounting

Frame size		F_{axial} [N]	F_{radial} [N]
110	A	90	100
130	A	105	120
	C		370
	E		610
	G		850
160	A	145	410
	C		820
	E		1230
161	C	145	535
	E		1070
	G		1105
201	C	185	690
	D		1040
	F		1740
210	A	195	330
	C		830
	D		1160
	E		1650
	U		3630
251	F	250	2460

Frame size		F_{axial} [N]	F_{radial} [N]
290	B	290	1000
	D		1500
	E		2490
	F		3000
	G		3500
291	C	290	1250
	D		1870
	E		2490
360	B	370	1280
	D		1910
	E		3190
450	B	480	1,660
	D		2480
	E		4130
530	B	565	1940
	C		2920
	D		3890
	E		4860
	F		5830
	G		9710
	L		14560
	P		6,800
	R		8750
531	E	565	4590
	L		13770

Tab. 6-4: Magnetic attractive forces during mounting

6.3 Electrical connection

6.3.1 Notes

NOTICE

Motor destruction by direct connection to the 50/60 Hz mains power supply (three phase or single phase net)!

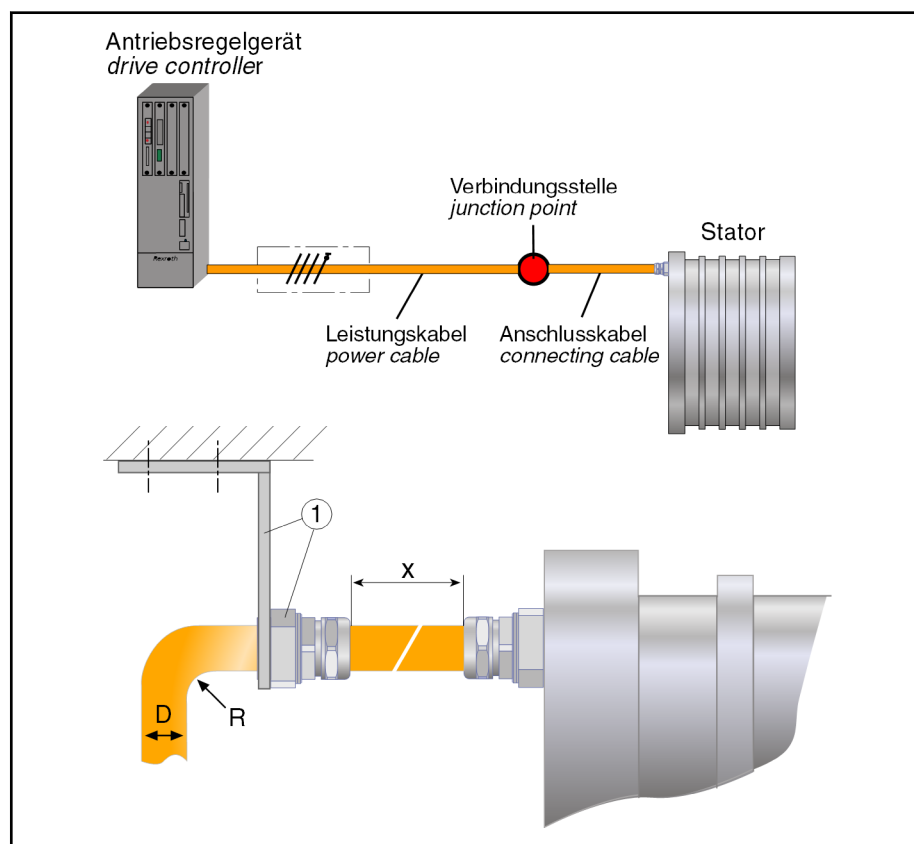
The motors described here can only be operated with suitable drive controllers with variable output voltage and frequency (converter mode) as specified by Rexroth.

6.3.2 Power connection of stators with connection cable

NOTICE

Avoid bending, pulling and pushing loads as well as continuous movements of the connection cable at the point at the cable outlet at the stator. Loads of this type may lead to irreversible damage (e.g. by cable break or ingressing fluids) at the stator.

For example, a suitable protection of the connection cable is a strain relief in the form of a metal angle in connection with a second cable gland (see the following figure). However, the customer may also take other protective measures, depending on the installation situation.



- x Minimum distance 10 mm
- D Diameter of connection cable
- R Bending radius
- ① Strain relief of cable gland at stator

Fig. 6-5: Cable gland with strain relief

Bending radius R

Cable type	Smallest permissible bending radius R* [mm]
REL (INK...)	5 x D
Stranded wires	3 x D

* permanent installation

Tab. 6-5: Smallest permissible bending radius

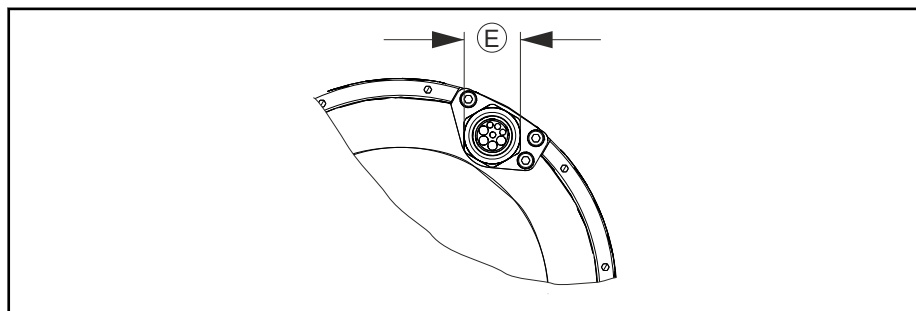
Cross section sensor wires at stator design "D30_"

For stators with stranded wires, the cross-sections of the wires for the sensors differ depending on the selected temperature sensor. The assignment of the cross sections can be taken by [Tab. 6-6](#)

Temperature sensor	Cross section power wires
SNM.150.DK	0.5 mm ²
KTY84-130	AWG24

Tab. 6-6: Cross section of sensor connection wires

The following table provides data on the connection cables and connection wires for the individual stator frame sizes. In addition, the table provides information on the power cable and the power wire cross section required for connecting the stator to the controller.

Cable glands at stators with connection cables

⑤ Dimension "E", screw connection size see [Tab. 6-7](#)

Fig. 6-6: Cable gland at the stator

Stator	Connection mode ¹⁾	Cross section [mm²]		Ø D [mm] ²⁾	Dimension “E” [mm] ³⁾	Minimum cross section	
		Power	Sensors			Continuative power cable [mm²]	
MST130A-0200-F... -D303	Stranded wires	AWG ⁴⁾ 16	see Tab. 6-6	2.85 ±0.2	/	1.0	
MST130A-0250-N... -D303							
MST130C-0050-F... -D303							
MST130C-0075-N... -D303						1.5	
MST130C-0200-F... -D303							
MST130C-0300-N... -D303							
MST130E-0020-F... -D303						1.0	
MST130E-0035-N... -D303							
MST130G-0035-N... -D303							
MST130A-0200-F... -NNNN	INK0678 + 5xTTZ18- 1930Z11Y	1.5	- / -	9.8 ±0.3	23	1.0	
MST130C-0050-F... -NNNN						1.5	
MST130C-0200-F... -NNNN		- / -	1.0	6.0 ±0.2		1.0	
MST130E-0020-F... -NNNN							

Assembly

Stator	Connection mode ¹⁾	Cross section [mm²]		Ø D [mm] ²⁾	Dimension “E” [mm] ³⁾	Minimum cross section		
		Power	Sensors			Continuative power cable [mm²]		
MST160A-0050-F... -NNNN	REL0107 (INK0602)	2.5	1.0	14.8 ±1	32	1.0		
MST160C-0050-F... -NNNN						2.5		
MST160E-0027-F... -NNNN								
MST160E-0050-F... -NNNN								
MST160A-0050-F... -D303	Stranded wires	AWG 14	see Tab. 6-6	3.5 ±0.2	/	1.0		
MST160C-0050-F... -D303						2.5		
MST160E-0027-F... -D303								
MST160E-0050-F... -D303								
MST161C-0140-F...-NNNN	REL0107 (INK0602)	2.5	1.0	14.8 ±1	32	2.5		
MST161E-0050-F...-NNNN								
MST161C-0140-F...-D303	Stranded wires	AWG 14	see Tab. 6-6	3.5 ±0.2	/	2.5		
MST161E-0050-F...-D303		AWG 12		4.0 ±0.2				
MST161E-0140-F...-D303		AWG 10		4.7 ±0.2		6.0		
MST161G-0100-F...-D303								
MST201C-0010-F...-D303	Stranded wires	AWG 16	see Tab. 6-6	2.85 ±0.2	/	1.0		
MST201C-0027-F...-D303						1.5		
MST201D-0010-F...-D303						1.0		
MST201D-0027-F...-D303								
MST201F-0075-F...-NNNN	REL0109 (INK0604)	6.0	2 x 1.0 2 x 1.5	18.5 ±1	33	6.0		
MST210A-0027-F... -D30x	Stranded wires	AWG 14	see Tab. 6-6	3.5 ±0.2	/	1.0		
MST210D-0070-F... -D301		AWG 10		4.68 ±0.2		6.0		
MST210U-0030-F...-D303		AWG 8		6.4 ±0.2		10.0		
MST210A-0027-F... -NNNN	REL0107 (INK0602)	2.5	1.0	14.8 ±1	34	1.0		
MST210C-0027-F... -NNNN								
MST210C-0050-F... -NNNN	REL0108 (INK0603)	4.0	2 x 1.0 2 x 1.5	17 ±0.5	33	4.0		
MST210E-0027-F... -NNNN				18.5 ±1		6.0		
MST210D-0070-F... -NNNN	REL0109 (INK0604)	6.0						
MST251F-0040-F...-D303	Stranded wires	16.0	see Tab. 6-6	9 ±0.3	/	16.0		

Stator	Connection mode ¹⁾	Cross section [mm²]		Ø D [mm] ²⁾	Dimension “E” [mm] ³⁾	Minimum cross section
		Power	Sensors			Continuative power cable [mm²]
MST290B-0018-F... -NNNN	REL0107 (INK0602)	2.5	1.0	14.8 ±1	34	1.5
MST290D-0002-F... -NNNN						1.0
MST290D-0004-F... -NNNN						
MST290D-0018-F... -NNNN	REL0108 (INK0603)	4.0	2 x 1.0	17.0 ±0.5	33	4.0
MST290E-0004-F... -NNNN			2 x 1.5			1.0
MST290E-0018-F... -NNNN	REL0109 (INK0604)	6.0	2 x 1.0 2 x 1.5	18.5 ±1		
MST290F-0020-F...-D303	Stranded wires	AWG 8	see Tab. 6-6	6.4 ±0.2	/	10.0
MST290G-0020-F...-D303						
MST291C-0018-F...-D303	Stranded wires	AWG 12	see Tab. 6-6	4.0 ±0.2	/	2.5
MST291D-0010-F...-D303						
MST291E-0010-F...-D303						
MST360B-0006-F... -NNNN	REL0107 (INK0602)	2.5	1.0	14.8 ±1	34	1.0
MST360B-0018-F... -NNNN	REL0108 (INK0603)	4.0	2 x 1.0 2 x 1.5	17.0 ±0.5	33	2.5
MST360D-0009-F... -NNNN	REL0107 (INK0602)	2.5	1.0	14.8 ±1	34	1.0
MST360D-0012-F... -NNNN	REL0108 (INK0603)	4.0	2 x 1.0	17.0 ±0.5	33	2.5
MST360D-0018-F... -NNNN			2 x 1.5			4.0
MST360E-0008-F... -NNNN	REL0107 (INK0602)	2.5	1.0	14.8 ±1	39	2.5
MST360E-0018-F... -NNNN	REL0110 (INK0605)	10.0	1.0	22.2 ±1	40	10.0
MST360B-0006-F... -D303	Stranded wires	AWG 14	see Tab. 6-6	4.0 ±0.2	/	1.0
MST360B-0018-F... -D303		AWG 12				2.5
MST360D-0009-F... -D303		AWG 14				1.0
MST360D-0012-F... -D303		AWG 12		2.5		
MST360D-0018-F... -D303		AWG 10		4.0 ±0.2		4.0
MST360E-0008-F... -D303		AWG 14		4.0 ±0.2		2.5
MST360E-0018-F... -D303		AWG 8		6.4 ±0.2		10.0

Assembly

Stator	Connection mode ¹⁾	Cross section [mm²]		Ø D [mm] ²⁾	Dimension “E” [mm] ³⁾	Minimum cross section
		Power	Sensors			Continuative power cable [mm²]
MST450B-0012-F... -NNNN	REL0109 (INK0604)	6.0	2 x 1.0 2 x 1.5	18.5 ±1	33	2.5
MST450D-0006-F... -NNNN	REL0108 (INK0603)	4.0		17.0 ±0.5		
MST450D-0012-F... -NNNN	REL0109 (INK604)	6.0		18.5 ±1		6.0
MST450E-0006-F... -NNNN						
MST450E-0011-N... -NNNN	(REL0107 (INK0602)	2.5	1.0	14.8 ±1	34	1.0
MST450E-0012-F... -NNNN	REL0110 (INK0605)	10.0	1.0	22.2 ±1	40	10.0
MST450E-0018-N... -NNNN	REL0108 (INK0603)	4.0	2 x 1.0 2 x 1.5	17.0 ±0.5	33	2.5
MST450B-0012-F... -D303	Stranded wires	AWG 12	see Tab. 6-6	4.0 ±0.2	/	2.5
MST450D-0006-F... -D303		AWG 14		3.5 ±0.2		
MST450D-0012-F... -D303		AWG 10		4.7 ±0.2		6.0
MST450E-0006-F... -D303				AWG 8		6.4 ±0.2
MST450E-0012-F... -D303						
MST530B-0010-F... -NNNN	REL0109 (INK0604)	6.0	2 x 1.0 2 x 1.5	18.5 ±1	33	4.0
MST530C-0010-F... -NNNN						6.0
MST530C-0010-N... -NNNN						
MST530C-0014-F... -NNNN						
MST530D-0012-F... -NNNN	REL0110 (INK0605)	10.0	1.0	22.2 ±1	40	10.0
MST530E-0010-F... -NNNN	REL0111 (INK0606)	16.0	1.5	25.5 ±1	44	16.0
MST530F-0012-F... -NNNN						
MST530G-0006-F... -D303	Stranded wires	2 x 16.0	see Tab. 6-6	2 x 9 ±0.3	/	2 x 10.0
MST530G-0007-F... -D303						2 x 16.0
MST530G-0010-F... -D303						2 x 25.0
MST530L-0003-F... -D303		16.0		9 ±0.3		10.0
MST530L-0006-F... -D303		2 x 16.0		2 x 9 ±0.3		2 x 25.0
MST530L-0007-F... -D303						
MST530P-0012-F... -D303		25.0		9 ±0.3		25.0
MST530R-0011-F... -D303						35.0

Stator	Connection mode ¹⁾	Cross section [mm ²]		Ø D [mm] ²⁾	Dimension "E" [mm] ³⁾	Minimum cross section Continuative power cable [mm ²]
		Power	Sensors			
MST531E-0006-F...-D303	Stranded wires	AWG 8	see Tab. 6-6	6.4 ±0.2	/	6.0
MST531E-0018-F...-D303		16.0		9 ±0.3		2 x 10.0
MST531L-0009-F...-D303		2 x 16.0		2 x 9 ±0.3		35.0

- 1) For the amount of stranded wires refer to [Fig. 6-4](#)
- 2) Layout according to DIN VDE 0298-4. The required power wire cross sections apply to laying type B2 (single laying). Laying type E (multiple installation) and a reduction factor of 0.8 was taken into account for double cabling.
- 3) When using motors with connection mode "stranded wires", the biggest diameter of the cables (normally of a power wire) is specified. This allows the minimum bending radius to be determined. The diameter of a bundle of the eight stranded wires (4x power + 4x temperature sensor) can be assumed to be 3 times the specified diameter.
- 4) AWG = American Wire Gauge: codes for wire diameters of electrical lines which are predominately used in North America.

Tab. 6-7: Connection cables at the stator

The wire designation at the motors with connection cable depends on the selected stator design and has to be done as follows:

Assembly

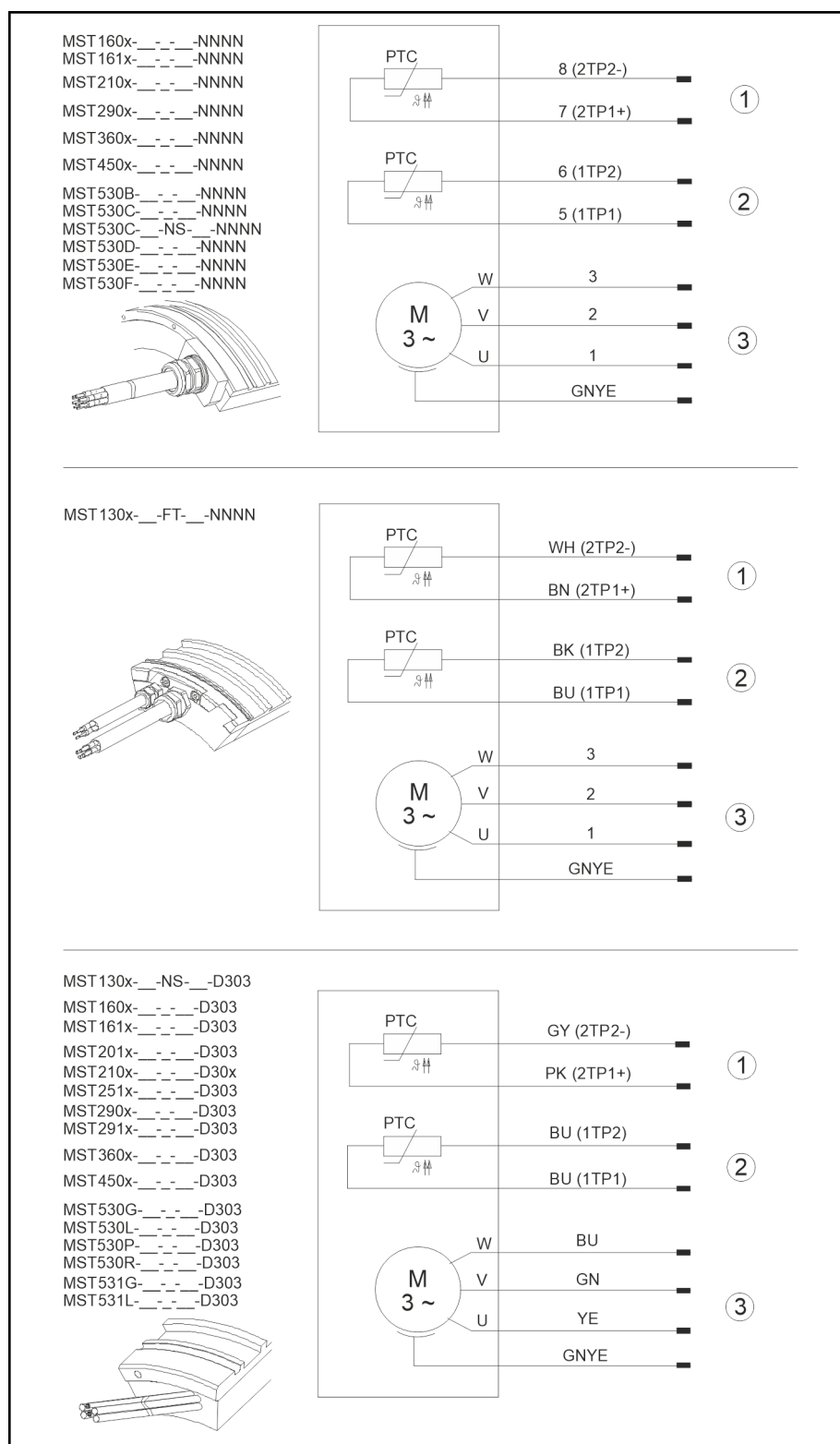


Fig. 6-7: Wire identification at stators with connection cable

Before connecting the motor, the following steps have to be taken by the machine manufacturer:

1. Shortening the power cable to the desired length (only if required).
2. Assembly of the motor-sided connection according to the specifications of the machine manufacturer.

3. Fastening the coupling and the cable harness to the machine.

Pay particular attention to the following issues when cutting the cables to length and installing the connections:

- Careful execution of the ground connection and the shield connection to meet EMC directives ..
- Careful execution of the tightening and plug-in connections to comply with the safety class.
- Power cables for connection to the controller or drive are not included in the scope of delivery of the motor and must be ordered separately.
- Do not open or disconnect any factory-made PG glands on the stator. Internal shield connection could be damaged or become ineffective.
- The coolants, lubricants and fuels used at the machine should not damage the lines and connection cables used nor modify them chemically or with regard to the structure.

6.3.3 Power connection of stators with housing

General information

Depending on the stator design, the power connection of the stators with a housing for flange mounting is realized via

- a **terminal box** or
- a **device connector**.

From this junction, the power supply can be realized using a power cable to the controller. Prepared power cables are available from Rexroth.

Stators with housing and device connector

Frame size	Device connector	Required power wire cross section [mm ²]
MST210A-0027-FH-xx PU -...	RLS1200	1.0
MST210C-0027-FH-xx PU -...		1.0
MST210C-0050-FH-xx PU -...		4.0
MST210D-0070-FH-xx PU -...		6.0
MST210E-0027-FH-xx PU -...		4.0
MST290B-0018-FH-xx PU -...		1.5
MST290D-0002-FH-xx PU -...		1.0
MST290D-0004-FH-xx PU -...		1.0
MST290D-0018-FH-xx PU -...		4.0
MST290E-0004-FH-xx PU -...		1.0
MST290E-0018-FH-xx PU -...		6.0

Tab. 6-8: Overview of stators with housing and device connector

Pin assignment device connector

U1	Power
V1	Power
W1	Power
PE	Grounding
5	Temperature sensor SNM150 (1TP1+)
6	Temperature sensor SNM150 (1TP2-)
7	Temperature sensor KTY84 (2TP1+)

8	Temperature sensor KTY84 (2TP2-)
9	n.c.

Tab. 6-9: Pin assignment device connector

Stators with housing and terminal box

Frame size	Terminal box					Minimum cross section
	Designation	U-V-W	Connection cross section [mm²]	ØPE	Connection thread	Continuative power cable [mm²]
MST360B-0006-FH-xxKR-...	RLK0003	WEF ¹⁾	2.5 ... 10	RTE ²⁾ for thread M6	See motor dimension sheet	see Tab. 6-7
MST360B-0018-FH-xxKR-...						
MST360D-0009-FH-xxKR-...						
MST360D-0012-FH-xxKR-...						
MST360D-0018-FH-xxKR-...						
MST360E-0008-FH-xxKR-...						
MST360E-0018-FH-xxKR-...						
MST450B-0012-FH-xxKR-...	RLK0004		2.5 ... 16	RTE for thread M8		
MST450D-0006-FH-xxKR-...						
MST450D-0012-FH-xxKR-...						
MST450E-0006-FH-xxKR-...						
MST450E-0012-FH-xxKR-...	RLK0004		2.5 ... 16	RTE for thread M8		
MST530B-0010-FH-xxKR-...						
MST530C-0010-FH-xxKR-...						
MST530C-0014-FH-xxKR-...						
MST530D-0012-FH-xxKR-...						
MST530E-0010-FH-xxKR-...						
MST530F-0012-FH-xxKR-...			2.5 ... 35			
MST530G-0006-FH-xxKR-...	RLK1300		2.5 ... 35	RTE for thread M8		
MST530G-0007-FH-xxKR-...						
MST530G-0010-FH-xxKR-...						
MST530L-0003-FH-xxKR-...						
MST530L-0006-FH-xxKR-...						
MST530L-0007-FH-xxKR-...						
MST530P-0012-FH-xxKR-...	RLK0004		2.5 ... 35			
MST530R-0011-FH-xxKR-...						

1)

WEF = wire end ferrule

2)

RTE = ring terminal end

Tab. 6-10: Stators with housing and terminal box



- Do not remove or damage the seal glued in the cover of the terminal box.
- Note the size of the cable gland and connection thread for the cable inlet into the terminal box.
- In particular, make sure that the connection cables are correctly installed in the terminal box, without tension to avoid abrasion or pressure marks on the cables.
- The connections of the internal motor windings in the terminal box must not be loosened.

Terminal box connection for frame size 360 / 450 / 530

Terminal box example

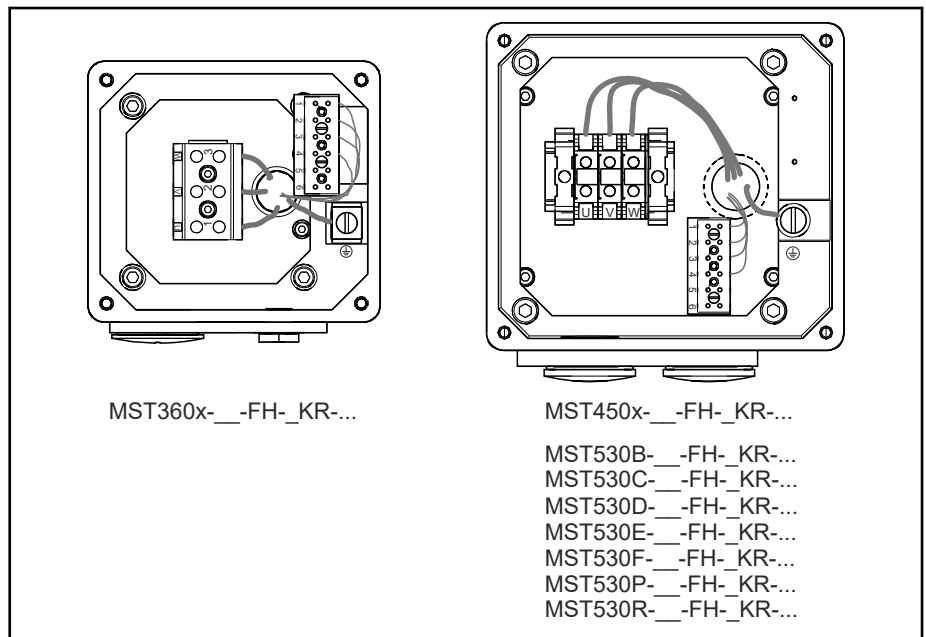
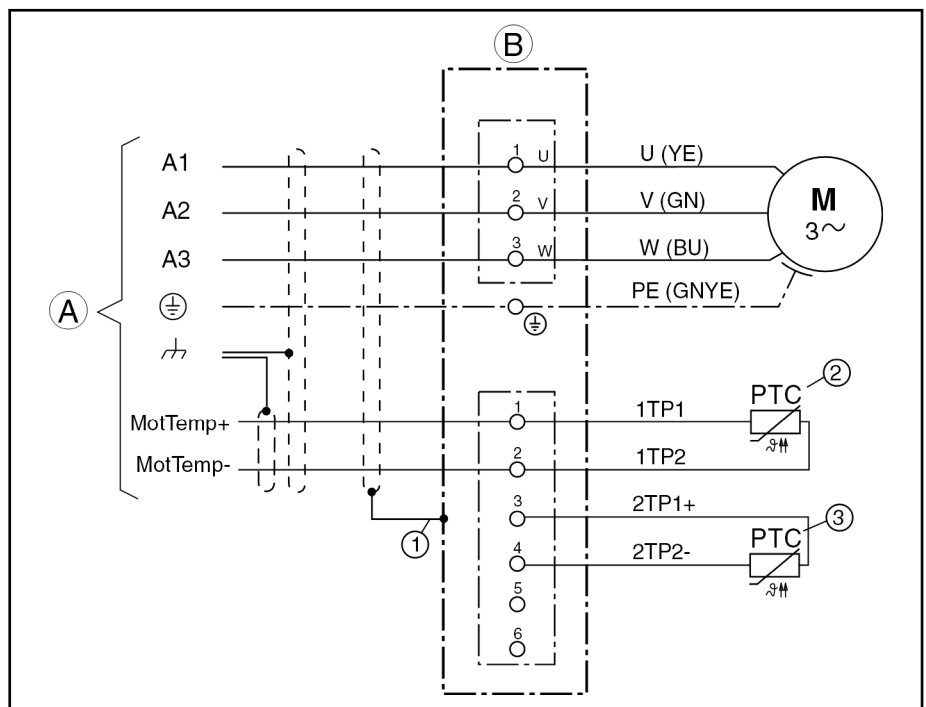


Fig. 6-8: Terminal boxes MST360 / -450 / -530B, -C, -D, -E, -F, -P, -R

Connection overview terminal boxes



- ① Total shield connection via cable clamp of strain relief in the cable gland
- ② Connect temperature sensor SNM.150.DK to the drive controller for motor protection
- ③ Temperature sensor KTY84-130 can be used for external temperature measurement

Fig. 6-9: Overview of connections to the terminal box

Terminal box for double cabling - frame size 530G / 530L

Stators of frame sizes 530G and 530L are connected to the motor via two power cables.

Terminal box at MST530G /
MST530L

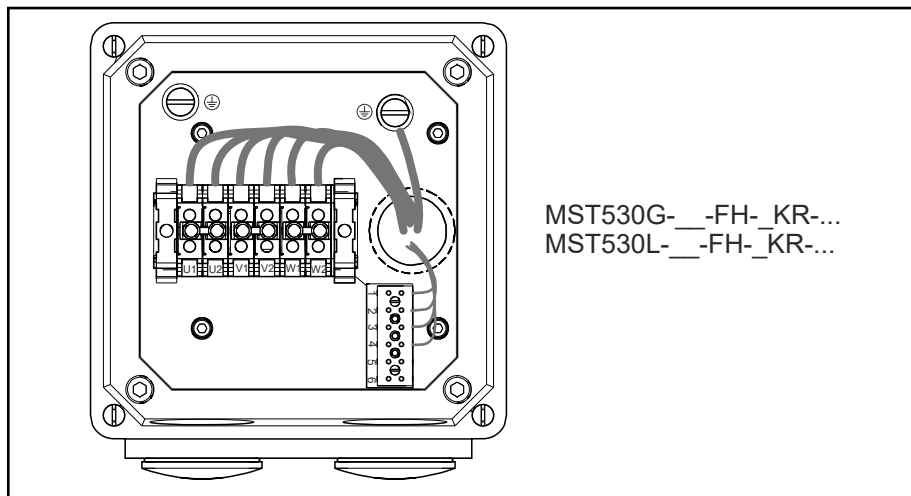
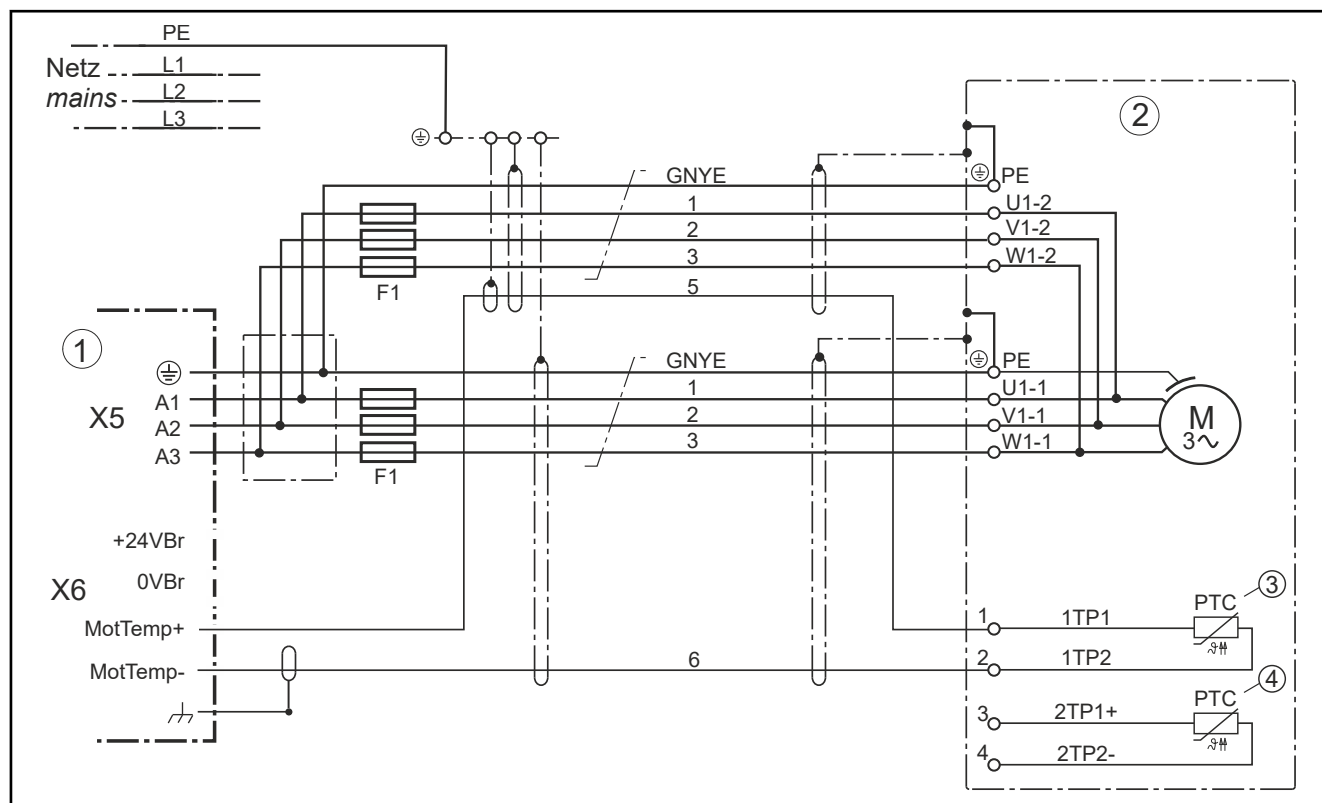


Fig. 6-10: Terminal box RLK1300 (double cabling)

Overview of double cabling



- ① Bosch Rexroth controller
- ② Motor terminal box
- ③ Temperature sensor SNM.150.DK (for thermal motor protection)
- ④ Temperature sensor KTY84-130 (for external temperature monitoring)

Fig. 6-11: Double cabling connection diagram

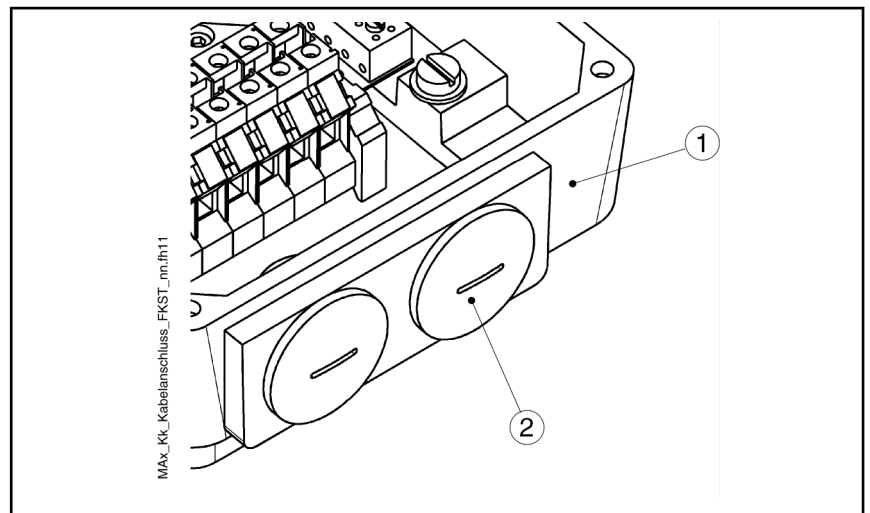


- The terminal box can only be used for double cabling for power connection.
- The double cabling connection diagram shows a possible circuit. When planning the double cabling, please note the applicable installation regulations at the installation site of the machine.
- Temperature sensor 1TPx (SNM.150.DK*) has to be connected to the controller for thermal protection of the motor.
Different temperature sensors may be used for special products. Observe the documentation about the special product.
Temperature sensor 2TPx (KTY84*) is only available for external motor temperature monitoring.
- Fuses F1 (NH...) protecting the wires from overload in case of cable break are dimensioned according to the current carrying capacity of the respective line cross section.
- The fuses should be installed in the control cabinet as close as possible to the power output of the controller.
- The shield of the power cables should be connected to the switch cabinet on a large scale!
- Cable pairs have to be connected correctly to series terminal strips or to the terminal studs of the controllers and have to comply with the relevant safety requirements.
- Finished power cables are not available for double cabling. To install the fuses, standard Rexroth power cables have to be opened and cut to the appropriate length on site.

Power cable connection at the terminal box

The output direction of the power cable is specified and must not be changed afterwards. Connecting the power cable to the terminal box requires the following steps:

1. Open the terminal box cover.



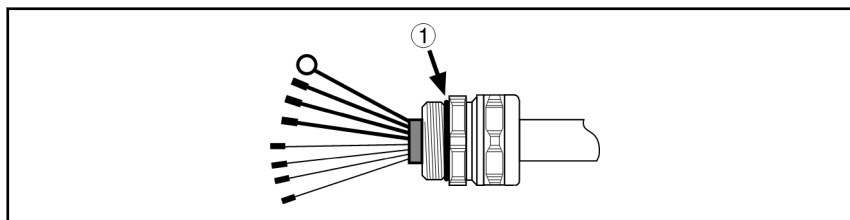
- ① Terminal box
② Safety cover of cable gland

Fig. 6-12: Cable gland at terminal box

2. Unscrew the safety cover of the cable gland ②.

3. Run the power cable through the opening into the terminal box up to the cable gland and attach the cable including cable gland to the terminal box.

The cable gland of the power cable features an O-ring. Ensure that the O-ring is positioned correctly in the gland of the power cable during mounting.



① O-ring position

Fig. 6-13: O-ring at cable gland

NOTICE

If seals are inserted incorrectly or not at all, the degree of protection of the motor will be lost!

Before attaching the power cable to the terminal box, visually inspect the O-ring to verify that it is in a proper state and correctly positioned at the power cable gland.

If the O-ring is missing, do not use the power cable. In this case, contact your Rexroth sales or service partner.

4. Connect the wires according to the connection diagram for standard or double cabling.

Comply with the following tightening torques:

Screw tightening torques in Nm ($\pm 10\%$) for power connection

Stator	Terminal box	U-V-W	PE	
		M4	M6	M8
MST360x-xxxx-FH-xxKR-...	RLK0003	1.5	2.5	-/-
MST450x-xxxx-FH-xxKR-...	RLK0004	1.5	-/-	3.5
MST530B-xxxx-FH-xxKR-...	RLK0004	1.5	-/-	3.5
MST530C-xxxx-FH-xxKR-...				
MST530D-xxxx-FH-xxKR-...				
MST530E-xxxx-FH-xxKR-...				
MST530F-xxxx-FH-xxKR-...				
MST530G-xxxx-FH-xxKR-...	RLK1300	1.5	-/-	3.5
MST530L-xxxx-FH-xxKR-...				
MST530P-xxxx-FH-xxKR-...	RLK0004	1.5	-/-	3.5
MST530R-xxxx-FH-xxKR-...				

Tab. 6-11: Screw tightening torque in Nm within the terminal box

5. Close the cover of the terminal box.

Wet the thread of the fastening screws for the lid with liquid threadlocker and then fasten the lid with all fastening screws.

Tightening torque of the screws: 6.5 Nm ($\pm 10\%$)

Before tightening the screws, make sure that the seal between the cover and the terminal box housing is positioned correctly.

NOTICE

If seals are inserted incorrectly or not at all, the degree of protection of the motor will be lost!

Before attaching the terminal box cover to the terminal box, check the glued-in seal at the terminal box cover to verify that it is in a proper state and at the correct position.

6.3.4 Ground connection

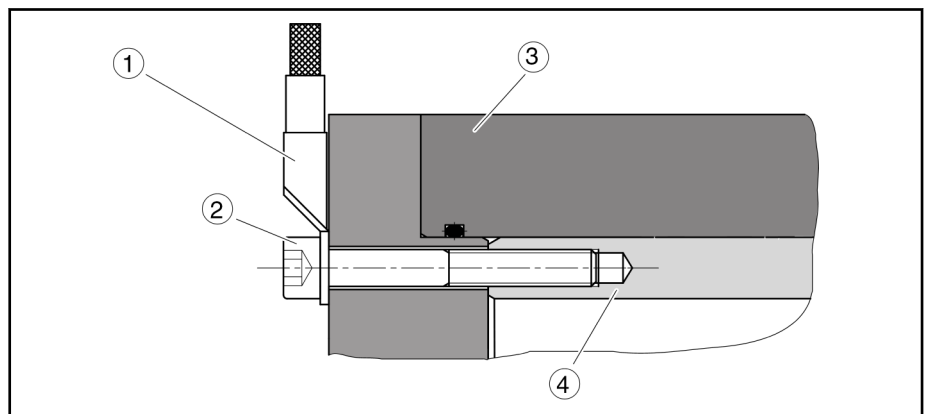
The grounding cable is not included in the scope of delivery for MSTxx1 stators in version D303 (= stranded wires led out axially on the stator side). A threaded hole is provided on the stator front face for the ground connection.

Fasten the ground cable with a ring terminal at the threaded hole. For details on the exact position and the connection thread of the threaded hole, refer to the dimensional drawing of the respective motor. The necessary minimum cross-section of the grounding cable depends on the motor type and can be seen in the data sheet.



The power wire cross-section specified in the data sheet of the motor also applies for the grounding cable and must be complied with.

Observe the supplementary notes about motor connection in chapter "Connection technology" in the MBT project planning manual.



- ① Ground connection
- ② Brass screw M5 or M6
- ③ Spindle housing
- ④ Stator

Fig. 6-14: Design ground connection - example

Procedure:

1. Clean the contact surface for the screw head. The surface must be bare metal so that both the spindle housing and the stator are grounded.
2. Screw the grounding cable with cable lug to the end shield using a brass screw.
3. Grease the connection with petroleum jelly to protect it from corrosion.

6.3.5 Sensors

Encoder

Encoder and encoder connection components are not included in the scope of delivery of the motor. Select the components according to the machine requirements.

Temperature sensors

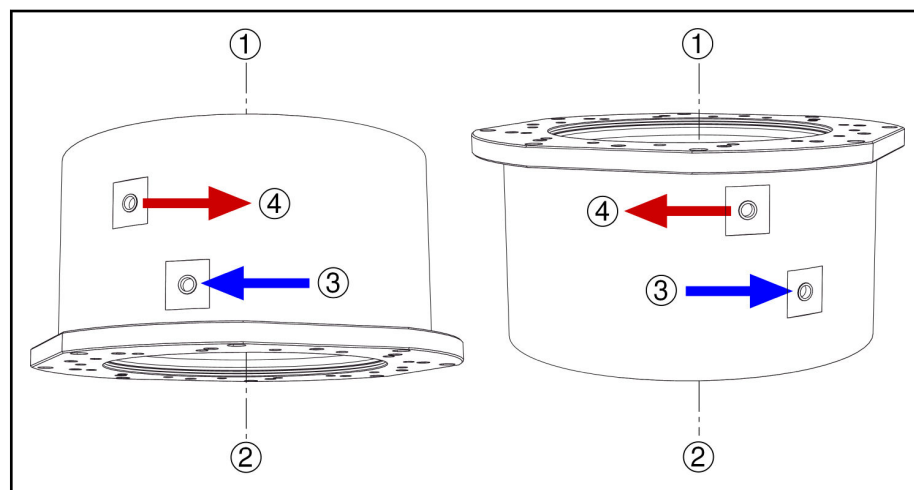
To ensure safe motor protection against thermal overload, the temperature sensor SNM.150.DK has to be connected to the drive controller. Comply with the respective connection diagram for the selected connection type (device connector or terminal box) when connecting the temperature sensors. You will find additional information about temperature sensor in the MBT project planning manual .



- Different temperature sensors may be used for special products. Observe the documentation about the special product.
- Temperature sensor KTY84-130 is a component that might be damaged by ESD! For this reason, the stranded wires of the sensor are protected by a protective foil at the connection cable. Before connecting the sensor, take appropriate measures for ESD protection (ESD = electrostatic discharge).

6.4 Coolant connection

The liquid cooling system on the stator must be connected in such a way that the coolant inflow is at the bottom and the coolant outflow is always at the top when the stator is installed vertically.



- ① Mounting side - TOP
- ② Mounting side - BELOW
- ③ Inlet (IN)
- ④ Outlet (OUT)

Fig. 6-15: In- and outlet direction of coolant



- The supply lines are not allowed to exert any force on the motor-sided screwed connections.
- The connection diagrams of the product documentation serve to create system circuit diagrams. Only the machine manufacturer's system wiring diagrams are relevant for the connection of the drive components in the machine. This also applies to the incorporation of systems for pressure reduction, flow and temperature monitoring.
- Prior to machine commissioning, the whole cooling system must be subjected to a leakage test and be ventilated. Start-up of the coolant system is not a part of motor commissioning. Refer to the instructions of the manufacturers of the machine and the cooling system.

Stators with cooling jacket without housing

If MBT torque motors are delivered as kit motors without stator housing for installation in machines, the connection technology has to be selected and dimensioned by the machine manufacturer.

For more information about motor cooling, please refer to MBT project planning manual.

Stators with cooling jacket and housing

Stators with housing have two connection threads at the stator housing for connecting the liquid coolant. Note the particular dimension sheet of the stator in the MBT project planning manual with regard to dimension and position of the bores.



- Install systems in the cooling circuit for monitoring flow, pressure and temperature.

Operating pressure

The maximum coolant supply pressure of **6 bar** applies to all MBT motors based on the effective current pressure directly at the coolant connection of the motor.

Please observe that additional screw connections or junctions in the cooling circuit can reduce the flow and supply pressure of the cooling medium. Select well-spaced dimensioned connection screws and tube diameters.

7 Commissioning and operation

7.1 Safety

WARNING

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



Life parts are dangerous.

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

WARNING

Risk of 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. Prevent personnel from accidentally entering the machine's range of motion by using, for example:
 - Safety fences, safety screens or protective covers.
 - Light barrier

CAUTION

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



- ▶ Do not touch hot motor surfaces.
- ▶ Install protection against contact, if necessary.
- ▶ Make sure that no temperature-sensitive components (cables, electronic components, ...) touch hot surfaces.

7.2 Commissioning



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

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

- Make sure that the motor cooling as well as the motor are mechanically and electrically connected correctly.
- Ensure that the motor and all participating components of the drive are undamaged and functional (e.g. encoder, cooling, brake, ...).
- Make sure that the axis can rotate freely over the complete rotation range.
- Please observe the general safety instructions on the protection against hazardous movements [chapter 2.6 "Product- and technology-dependent safety instructions "](#) on page 4.

7.3 Operation

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

Checks during operation:

- ▶ Pay attention to exceptional noise.
- ▶ Pay attention to increased vibrations.
- ▶ Check the motor 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 9 "Disassembly" on page 55](#).

8 Maintenance and repair

8.1 Cleaning and servicing

WARNING

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



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

Prior to commencing work:

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

WARNING

Personal and material damage during maintenance work in operation!



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

CAUTION

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

Connection cable

WARNING

Death by electrocution possible due to live parts!



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

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

8.2 Service repair, maintenance and spare parts

Synchronous motors of the MBT series are low-maintenance as long as they are operated under the specified operating conditions and during their service life. Operation under unfavorable conditions can, however, lead to restrictions in availability.

- Increase availability with regular preventive maintenance measures. Comply with the machine manufacturer's instructions in the machine maintenance plan and the maintenance measures described below.
- Record all maintenance measures in the machine maintenance plan.

Bosch Rexroth recommends the following maintenance measures based on the machine manufacturer's maintenance plan:

Measure	Interval
Check the cooling system for proper functioning.	According to the specifications in the machine maintenance plan, but at least every 1000 operating hours.
Check the mechanical and electrical connections.	According to the specifications in the machine maintenance plan, but at least every 1000 operating hours.
Check the machine for smooth running, vibrations and bearing noise.	According to the specifications in the machine maintenance plan, but at least every 1000 operating hours.
Remove dust, chips and other dirt in the motor, from the motor housing, cooling fins and the connections.	Depending on the degree of soiling, but after one operating year at the latest.

Tab. 8-1: MBT Maintenance measures

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

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

8.3 Service and support

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

Service Germany

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

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

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

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

Service worldwide

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

- Preparing information** To be able to help you more quickly and efficiently, please have the following information ready:
- Detailed description of malfunction and circumstances
 - Type plate specifications of the affected products, in particular type codes and serial numbers
 - Your contact data (phone and fax number as well as your e-mail address)

9 Disassembly

DANGER

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

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

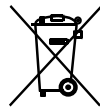


The machine manufacturer must observe the special features of the construction and create a special disassembly instruction for the motor components rotor and stator. Only this disassembly instruction of the machine manufacturer is binding.

1. Observe the disassembly instruction of the machine manufacturer.
2. Use the machine-side control command to decelerate the drive to a controlled standstill.
3. Switch off the power and control voltage of the controller.
4. Switch off the main switch of the machine and deactivate external systems according to the instructions of the manufacturer.
5. Secure the machine against accidental movements and against unauthorized operation.
6. Wait until the discharge time of the electrical systems has elapsed and then disconnect all electrical connections. Lock electric cables and contacts against contact with other electrical parts.
7. Remove dirt, chips and other any kind of residues from the motor.
8. Before disassembling the motor and the supply lines, secure them against dropping or movements. Subsequently, disconnect the mechanical connections.
9. Empty the coolant ducts of the motor and dismount the motor from the machine. Store the motor appropriately.
10. If necessary, record all measures in the commissioning log or machine maintenance plan.

10 Environmental protection and disposal

Production method	The products are manufactured in energy- and resource-optimized production processes which allow re-using and recycling the resulting waste. We regularly try to replace pollutant-loaded raw materials and supplies by more environment-friendly alternatives.
No release of hazardous substances	Our products do not contain any hazardous substances which may be released in 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), electrotechnical 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	 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, ...
	Permanent magnets present a serious danger during disposal. Prior to disposal, permanent magnets attached to the motor components (e.g. synchronous motor rotors, secondary parts of linear motors) have to be demagnetized using thermal treatment. The disposal of demagnetized permanent magnets is prohibited. Demagnetize magnets The demagnetization of the permanent magnets is reached via special thermal treatment. The handling duration is influenced by the frame of the motor component. The motor component has to remain in the oven for a minimum of 30 minutes, starting at the time, the magnetic surface has reached 300 °C. Please also refer to the safety instructions regarding protection from magnetic fields, handling and assembly in the chapter "Safety Notes for Electric Drives and Controls" when using permanent magnets.
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 validity of the EU Directive 2006/66/EC, the particularly applicable regulations must be followed.

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

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

Recycling

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

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

Plastic parts of the products may contain flame retardants. These plastic parts are labeled according to EN ISO 1043. They have to be recycled separately or disposed of according to the applicable legal provisions.

11 Troubleshooting

11.1 Procedure

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

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

Encoder and temperature sensor are controlled by the controller or the control unit; corresponding diagnostic messages are displayed. Comply with the instructions in the corresponding documentation.

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

Malfunction	Error cause	Measures
Motor does not run	Controller enable signal missing	Activate controller enable signal
	Controller fault	Troubleshoot acc. to documentation of controller
	Voltage supply missing	Control voltage supply
	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 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

Tab. 11-1: Malfunctions on MBT motors



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

12 Appendix

12.1 Technical data

Technical data and operating characteristic curves are described for all motor types in  [MBT project planning manual](#).

12.2 Declaration of conformity



EU-Konformitätserklärung - Original

Dok.-Nr.: DCTC-30316-003

Datum: 2016-04-20

☐
☒
☐
☐

nach Maschinenrichtlinie 2006/42/EG

nach Niederspannungsrichtlinie 2014/35/EU

nach EMV-Richtlinie 2014/30/EU

nach ATEX-Richtlinie 2014/34/EU

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

dass die nachstehenden Produkte

Bezeichnung: 3-PHASE SYNCHRONOUS MOTOR

Baureihen: MBT...0... (Rotor MRT...0..., Stator MST...0...)
 MBT...1... (Rotor MRT...1..., Stator MST...1...)

Ab Herstellungsdatum: 2016-04-20

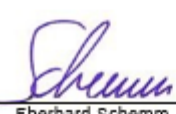
in Übereinstimmung mit den oben genannten EU-Richtlinien entwickelt, konstruiert und gefertigt wurden.

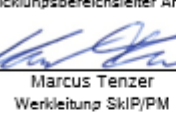
Angewandte harmonisierte Normen:

Norm	Titel	Ausgabe
EN 60034-1 (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)

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

_____, den 2016-04-20
Škofja Loka Ort Datum

i.V. 
 Eberhard Schemm
 Entwicklungsbereichsleiter Antriebe

i.V. 
 Marcus Tenzer
 Werkleitung SkIP/PM

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

Seite 1 / 1

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



EU declaration of conformity

(Translation of the original Declaration of Conformity)

Doc. No.: DCTC-30316-003

Date: 2016-04-20

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

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

hereby declares that the products below

Name: 3-PHASE SYNCHRONOUS MOTOR

Series: MBT...0... (Rotor MRT...0..., Stator MST...0...)
MBT...1... (Rotor MRT...1..., Stator MST...1...)

From the date of manufacture: 2016-04-20

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

Harmonized Standards applied:

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

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

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

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

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Notes

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